

# Environmental and Social Impact Assessment Diamniadio, Sénégal September, 2022



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## 1 Introduction

### 1.1 Project presentation

#### 1.1.1 Overview



Ifria is an integrated cold chain development company (DevCo) focused on the development and operation, under franchise, license or directly, of cold chain logistics assets ranging from storage/logistics centers added value to the first mile cold chain.

The Ifria team is developing commercially viable investment opportunities for a total amount of \$117 million in these target markets, to develop basic cold chain infrastructure and cold logistics centers, with a additional impact investment potential support.

Ifria received funding from USDFC for the implementation of cold chain infrastructure in Senegal.

In this report, we will deal in detail with the main impacts generated by the activities of the planned unit on the Diamniadio site and the measures taken by the operator to mitigate these impacts, as well as the environmental monitoring and surveillance program.

#### 1.1.2 Scope of the environmental and social impact study



The environmental and social impact statement will describe the environmental and social conditions of the project area of influence, identify the environmental, social and economic impacts and benefits of the project, and recommend mitigation measures. The study is organized into six chapters. The environmental and social impact study will address the following factors:

- Review relevant documentation and literature related to the program (including feasibility studies and master plans) so that appropriate plans and social and environmental management instruments can be developed and developed, ensuring that particular attention is given to achieving the objectives of the project concepts;
- Develop a procedure to identify potential environmental and social impacts of specific activities, and measures to address and manage those impacts; or whether there are potentially significant effects on natural habitats, physical or cultural resources at particular project work sites that would require further and separate analysis due to these complexities; Create appropriate mitigation measures to be incorporated into project contract documents;
- The ESIA should also include legal and institutional arrangements and information on the agency or agencies responsible for overseeing project impacts;

#### 1.1.3 Project location and access



The project site is located in the Diamniadio industrial zone, Dakar Region. The project is directly connected with the A1 motorway allowing it to be connected mainly with the city of Dakar.





#### 1.1.4 Report structure




The study report is prepared according to the table shown below:

Table 1: Structure of the report

Chapter	Contents
Chapter 1 – Introduction	Provides a brief history of the project, as well as the purpose, methodology and structure of the report.
Chapter 2 – Legal framework	Describes relevant GoL policies and African Development Bank environmental and social guidelines and policies triggered by the project.
Chapter 3 – Environmental Reference State	Provides a detailed baseline condition of the existing physical, biological and socio-economic environment in the project area.

Chapter 4 – Potential environmental impacts	Presents the foreseeable impacts on the physical, biological and socio-economic and cultural environment due to the proposed project.
Chapter 5 – Social Reference State	Provides a detailed baseline condition of the existing physical, biological and socio-economic environment in the project area.
Chapter 6 – Potential social impacts	Presents the foreseeable impacts on the physical, biological and socio-economic and cultural environment due to the proposed project.
Chapter 7 – Mitigation Measures	Provides mitigation measures to reduce, mitigate, offset and prevent various impacts resulting from the proposed project during construction and operation.

## 1.2 Summary of impacts and mitigation measures

 Possible effects related to the project	 Effect characteristics				 Reduction measures
	Intensity	Extent	Duration	Significance	
Climate	Weak	Punctual	Short	Minor	<ul style="list-style-type: none"> <li>• Use machinery and vehicles in good working order</li> <li>• Ensure regular maintenance and technical inspections of construction machinery and vehicles</li> <li>• Landscape excavated areas to allow native vegetation to grow back naturally.</li> <li>• Suspend activities during extreme precipitation events</li> <li>• Be sure to provide drainage channels and silt traps for all parts of the topsoil storage areas.</li> <li>• Be sure to reclaim areas with topsoil and revegetate them after activities are completed.</li> <li>• Use non-toxic and readily biodegradable chemicals on site when possible.</li> <li>• Install natural or synthetic liners under chemical storage tanks.</li> <li>• Level unpaved roads</li> <li>• Ensure that sediment and erosion control measures are installed.</li> <li>• Follow guidelines and procedures for immediate cleanup of spills (oil, fuel, chemicals).</li> </ul>
Floor	Mean	Punctual	Short	Minor	
Surface water	Mean	Local	Short	Mean	
Underground waters	Mean	Local	Short	Mean	

					<ul style="list-style-type: none"> <li>• Cover open stockpiles of building materials on site with tarps during storms to prevent building materials from being washed away.</li> <li>• Install natural or synthetic liners under chemical storage tanks.</li> <li>• Compact earthworks as soon as the final surfaces are formed to prevent erosion, especially during the rainy season.</li> <li>• Be sure to grade gravel roads to maintain existing drainage patterns.</li> <li>• Ensure the protection of riparian areas</li> <li>• Take care to avoid the dumping of construction waste into waterways.</li> <li>• Ensure that chemicals and materials used on the job site are properly stored.</li> </ul>
Vibration	Mean	Punctual	Mean	Mean	<ul style="list-style-type: none"> <li>• Choose intrinsically silent equipment</li> <li>• Keep equipment speed as low as possible</li> <li>• Minimize idling time for pickup trucks and other equipment.</li> <li>• Limit working hours on site when possible</li> <li>• Ensure that all workers exposed to environmental noise are equipped with appropriate hearing protection and PPE.</li> <li>• Schedule noisy activities during the morning hours</li> <li>• Set up noise monitoring</li> <li>• Inform the local population when loud activities are planned.</li> <li>• Properly use and maintain mufflers that reduce vibration from construction machinery.</li> </ul>

					<ul style="list-style-type: none"> <li>• Use only well-maintained mechanical equipment on the job site.</li> </ul>
air quality	Mean	Local	Short	Mean	<ul style="list-style-type: none"> <li>• Ensure proper maintenance and repair of equipment and machinery.</li> <li>• Adopt a traffic management plan avoiding congested roads.</li> <li>• Ensure vehicles and machinery are turned off when not in use.</li> <li>• Hose down surfaces to control dust emissions</li> <li>• Avoid burning materials resulting from site clearance.</li> <li>• Make sure people working in dusty areas have PPE.</li> <li>• Ensure the use of high quality diesel for generators and vehicles.</li> <li>• Maintain a minimum traffic speed on the site and on access roads.</li> <li>• Make sure building materials and hazardous substances are handled properly.</li> <li>• Cover all vehicles transporting materials likely to generate excessive dust emissions.</li> <li>• Water surfaces regularly to control dust emissions.</li> </ul>
Noise	Mean	Local	Short	Mean	<ul style="list-style-type: none"> <li>• Use equipment with low noise emissions, as indicated by the manufacturers.</li> <li>• Properly adjust and maintain all vehicles and machinery.</li> <li>• Where possible, conduct construction activities during daylight hours to minimize disturbance to humans and wildlife.</li> <li>• Limit working hours to 7 a.m. - 7 p.m. when activities are very noisy.</li> </ul>

Wildlife	Weak	Punctual	Short	Minor	<ul style="list-style-type: none"> <li>• Avoid killing any wild animal during the work;</li> <li>• Avoid killing any wild animal caught during the work and keep it away from the site;</li> <li>• Do not expose food or attract prey to avoid attracting predators (snakes among others) to the site;</li> <li>• Physically protect construction sites against snakes;</li> <li>• Avoid the elimination of wild animals during the work;</li> <li>• Prevent any hunting activity</li> <li>• Be sure to report wildlife species of high conservation value.</li> <li>• Avoid any direct or indirect impact on areas of high ecological value.</li> <li>• Ensure sustainable management of solid and liquid waste from construction and operating activities.</li> <li>• Ensure that exterior lighting on construction sites is discreet and switched off when not needed.</li> <li>• If these measures described above are taken into account, they will partially reduce the impacts during the operation phase.</li> </ul>
Flora	Weak	Punctual	Short	Minor	<ul style="list-style-type: none"> <li>• Reduce the direct destruction of vegetation as much as possible by delimiting the surfaces of construction sites, barracks, access tracks and sites for the storage and extraction of construction materials to the strict minimum and by concentrating all activities within these sites.</li> <li>• Identify and clearly delineate the sites (marking them with ribbons, informing the workers) and the areas not to be damaged, considering their ecological value (denser vegetation, etc.).</li> </ul>

					<ul style="list-style-type: none"> <li>• Take all preventive measures to avoid damaging the surrounding environment, in particular agricultural land;</li> <li>• Protect the species present;</li> <li>• Carry out the adjustment and restoration of the premises after the work.</li> </ul>
Odors	Weak	Punctual	Short	Minor	
Waste management	Mean	Local	Short	Mean	<p>Identify all waste streams for effective management</p> <ul style="list-style-type: none"> <li>• Manage waste based on the three Rs (reduce, reuse, recycle)</li> <li>• Train all staff.</li> <li>• Minimize the production of waste that must be treated or disposed of.</li> <li>• Control placement of all construction waste (including spoil) in approved disposal sites (&gt;300m from rivers, streams, lakes or wetlands). Deposit in authorized areas all waste, metals, used oils and surplus materials produced during construction, integrating systems for recycling and separation of materials.</li> <li>• Identify and delineate equipment maintenance areas (&gt;15m from rivers, streams, lakes or wetlands).</li> <li>• Sign a contract for the recovery and treatment of hydrocarbon waste, filters, irons, batteries and other non-biodegradable waste with a company that has an environmental permit</li> <li>• Set up a concrete washing area for vehicles and machinery with an oil separator</li> </ul>

Cultural properties	Weak	Punctual	Short	Minor	<ul style="list-style-type: none"> <li>• Reinforce the presence of visual plant screens vis-à-vis the landscape of the area and the axes of communication of rural localities.</li> <li>• Reinforce the plantations at the level of the fence taking into account the orientations of the prevailing winds and constitute a diversified and coherent screen fitting into the landscape.</li> </ul>
Cultural landscapes	Weak	Punctual	Short	Minor	
Human environment	Mean	Local	Short	Mean	<ul style="list-style-type: none"> <li>• provide staff with adequate Personal Protective Equipment (PPE) (helmets, safety shoes, boots, etc.)</li> <li>• provide the site with an infirmary and first aid equipment; –register employees with the National Social Insurance Fund (CNPS);</li> <li>• educate employees and local populations on hygiene, health and safety at work;</li> <li>• develop and apply a Health, Safety and Environment Plan (PHSE);</li> <li>• train employees in safety and risks and ensure compliance with the wearing of personal protective equipment (PPE) on construction sites;</li> <li>• sign an agreement with the CHD Borgou-Alibori to manage serious cases of accidents;</li> <li>• put up signs near the work areas (approximately 100m).</li> </ul>
Road traffic	Mean	Local	Short	Mean	<ul style="list-style-type: none"> <li>• Sensitize the local populations as well as the project drivers on road safety</li> <li>• Put up signs to indicate the presence of the works.</li> </ul>
Quality of life of the population	Mean	Local	Short	Mean	<ul style="list-style-type: none"> <li>• Ensure sorting, collection and transport to the waste management center</li> <li>• Inform and raise awareness among the personnel and users of the industrial zone</li> </ul>



					<ul style="list-style-type: none"><li>• Ensure the cleaning and removal of the site after the work.</li></ul>
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## 2 Legal framework

### 2.1 International conventions relevant to the project

The international legal framework is composed of non-legally binding instruments and legally binding instruments. The legally non-binding instruments appear as documents announcing legal commitments of a conventional nature, while the legally binding instruments consist of the various international conventions.

Moreover, the place of international texts in the national legal system is specified by Title IX of the Constitution of 22 January 2001 devoted to international treaties. Article 98 specifies that “treaties or agreements duly ratified or approved have, as soon as they are published, an authority superior to that of laws, subject, for each agreement or treaty, to its application by the other party”. Alongside international conventions, Senegal has participated in numerous international conferences relating to the environment during which non-binding acts have been adopted.

Senegal has signed and ratified most of the international conventions relating to the protection of the environment, the most relevant of which for this project are listed in the following table.

Text	Area of intervention	Relevance to the project
African Convention on the Protection of Nature and Natural Resources (Algiers Convention 1968, revised in Maputo in 2003)	This Convention aims at the conservation and rational use of soil, water, flora and fauna resources.	Project activities must not be a source of degradation of natural resources. If the impacts are unavoidable, they must be minimized as much as possible and compensated where necessary.
United Nations Convention on Desertification (1994)	It relates to the fight against desertification in countries seriously affected by drought and/or desertification, particularly in Africa.	The project activities could integrate reforestation actions and constitute a form of fight against desertification, in particular by defending and restoring the soil.
United Nations Framework Convention on Climate Change (UNFCCC1992) Kyoto Protocol to the UNFCCC (1997) Paris Agreement of December 12, 2015	They relate to the mitigation of greenhouse gas emissions and adaptation to the effects of climate change.	The project is concerned with the climate regime insofar as it can promote technologies aimed at reducing the emission of greenhouse gases in the perspective of carbon credits
Convention on Biological Diversity (1992)	Its objectives are the conservation of biological diversity, the sustainable use of its components and the fair and	The project is concerned by this convention because the negative impacts of the project on biological

Text	Area of intervention	Relevance to the project
	equitable sharing of the benefits arising from the use of genetic resources.	diversity must be minimized.
Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1972)	Conservation and wise use of wetlands	Project activities must not compromise the ecological balance of wetlands located in its area of influence.
Convention Concerning the Protection of the World Cultural and Natural Heritage 1972	Obligation to ensure the identification, protection, conservation, enhancement and transmission to future generations of the cultural and natural heritage located on its territory	The project activities must participate in the protection, conservation and enhancement of the natural and cultural heritage.
Bonn Convention on the Conservation of Migratory Species of Wild Animals (CMS, 1979)	Conservation of migratory species and their habitat	Project activities must not harm the conservation of migratory species and their habitats
Stockholm Convention on Persistent Organic Pollutants (2001)	It relates to the protection of human health and the environment against persistent organic pollutants.	Project activities must not promote the emission or discharge of persistent organic pollutants (dioxins, furans etc.).
ILO Convention No. 117 concerning the Basic Objectives and Standards of Social Policy ratified by Senegal on November 13, 1967	Improved living standards Employment of migrant workers Workers' compensation and related issues Non-discrimination with respect to race, colour, sex, creed, traditional group membership or trade union membership Education and vocational training	The project is concerned by this text because the social policy implemented as part of its execution must comply with the guidelines of convention 117
Convention No. 182 on the worst forms of child labor of June 17, 1999	Article 1. Each Member which ratifies this Convention shall take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labor as a matter of urgency. The	The project must not employ children for work which, by its nature or the conditions in which it is carried out, is likely to harm their health or safety.

Text	Area of intervention	Relevance to the project
	term child applies to all persons under the age of 18.	

## 2.2 National legal framework

The national legal framework is marked by the existence of several texts which deal with environmental and social aspects.

### 2.2.1 Constitutional Law No. 2016-10 of April 5, 2016 amending the Constitution

Constitutional Law No. 2016-10 of April 5, 2016 amending the Constitution. The constitution of the republic promulgated on June 11, 1991 affirms the right of every individual to a healthy environment is guaranteed by article 25-2. This constitutionalization of the right to a healthy environment is likely to serve as a basis for any development policy in Senegal. This study is part of this logic of regulatory compliance to avoid any harm in the implementation of the cold chain infrastructure project on the human and biophysical environment.

### 2.2.2 Law No. 2001-01 of April 12, 2001 on the Environmental Code and its implementing decree

It is the main environmental management instrument in Senegal. It provides a framework for all sectors of the environment and provides the guiding principles for good management, compliance with which is necessary regardless of the area concerned. Decree no. 2001-282 of April 12, 2001 was issued pursuant to the legislative part of the Environmental Code.

Articles L48, L49, L50, L51, L52, L53 and L54 of the Act relate to environmental assessments.

The provisions relating to environmental assessment contained in the Environmental Code are presented below.

References	Regulated domain	Relevance to the project
Chapter V Article L 48	Any development project or activity likely to harm the environment, as well as policies, plans, programs, regional and sectoral studies must be subject to an environmental assessment. The environmental impact study is the procedure which makes it possible to examine the consequences, both beneficial and harmful, that a proposed development project or program will have on the environment and to ensure that these consequences are duly taken into account in the design of the project or programme.	The project, by carrying out an in-depth environmental impact study prior to its implementation, complies with the provisions of the Code in terms of environmental and social assessment.
Article L 49	The impact study is part of an already existing authorization, approval or concession granting procedure. The impact study is prepared at the promoter's expense and submitted by him to the ministry responsible for the environment, which issues	

References	Regulated domain	Relevance to the project
	a certificate of authorization after technical advice from the Department of the Environment and Classified Establishments.	
Section L94	Any person who has: <ul style="list-style-type: none"> <li>• Carried out a project referred to in article L 50 without an impact study;</li> <li>• Carried out a project that does not comply with the criteria, standards and measures set out in the impact study;</li> <li>• Opposes the performance of the checks and analyzes provided for in this law.</li> </ul>	
Article R38	Impact studies are carried out prior to any administrative authorization required to carry out the planned activity.	

To ensure effective protection and management of the environment, the first paragraph of Article L.48 provides "Any development project or activity likely to harm the environment, as well as policies, plans, programmes, regional and sectoral studies shall be subject to an environmental assessment (EA)". The elements of environmental assessment are: Environmental Impact Assessment (EIA), Strategic Environmental Assessment and Environmental Audit.

The project will trigger all SO.1, SO.4 and SO.5 Operational Safeguards and is classified under Category 1 of the Bank's Environmental and Social Assessment Procedures (ESAP). It is in this context that the promoter of the Agropole Center project must produce an Environmental and Social Management Framework (ESMF) in accordance with the Integrated Safeguard System (ISS)

### 2.2.3 Other laws framing national environmental and social legislation

THEME	LEGAL TEXTS	REFERENCES	OBLIGATIONS	APPLICATION TO STUDY
<b>ENVIRONMENT</b>				
Study framework	Law No. 2001-01 of January 15, 2001 on the Environmental Code	CHAPTER V Impact study ARTICLE L 48: Paragraph 1	Any development project or activity likely to harm the environment, as well as policies, plans, programs, regional and sectoral studies must be subject to an environmental assessment.	This environmental study complies with this regulatory provision
ICPE	Decree no. 2001-282 of April 12, 2001 implementing the environment code	ARTICLE R3:	“Installations classified for the protection of the environment must, as the case may be, be the subject of a request for authorization addressed to the Minister in charge of the environment, or be the subject of a declaration. »	Any classified installation must first be the subject of a request for authorization from the relevant competent authority.
Waste	Law No. 2001-01 of January 15, 2001 on the Environmental Code	Article L 30	“Waste must be disposed of or recycled in an environmentally sound manner in order to eliminate or reduce its harmful effects on human health, on natural resources, fauna and flora or the quality of the environment. The provisions of this chapter apply to all categories of waste, including biomedical waste. »	The study should identify the company's waste management system and make recommendations, if necessary, for greater efficiency.
		Article L 31	“Any person who produces or holds waste must ensure its own disposal or recycling or have it	

			disposed of or recycled by companies approved by the Ministry responsible for the environment. Failing this, it must hand over this waste to the local community or to any company approved by the State for waste management. This company, or the local community itself, can sign contracts with the producers or holders of waste for their disposal or recycling. Recycling must always be done according to the standards in force in Senegal. »	
		<b>Article L 33</b>	“Waste disposal includes the collection, transport, storage and treatment operations necessary for the recovery of useful materials or energy, or any deposit or discharge in the appropriate places, any other deposit in conditions to avoid the nuisances mentioned in this law. »	
	<b>Law law n° 2020-04 of January 08, 2020 relating to the prevention and reduction of the environmental impact of plastic products</b>	<b>Section 4</b>	The production, import, holding for sale, offering for sale, sale, making available to the user, use, in any form whatsoever, of single-use plastic products or disposable plastic products the products made or manufactured from the following plastic materials: - cups, glasses or glass lids; - cutlery and plates; - straws and stir sticks for drinks; - sachets intended and used to package water or any other beverage, alcoholic or not, for marketing purposes.	The company must avoid all use of disposable plastic products in accordance with the regulations.
		<b>Section 5</b>	Checkout plastic bags, with or without handles, with or without straps, are prohibited, regardless of their thickness. The ban does not apply to plastic bags intended for use at points of sale to package foodstuffs in order to	

			protect them, to allow them to be handled or transported from the producer or seller to the consumer and to ensure their presentation.	
	<b>Order No. 009311 of 05/10/2007 on the management of used oils</b>	<b>Article 3 Paragraph 1</b>	"It is prohibited to deposit or let waste oils flow, in any place whatsoever where they may pollute the environment, in particular in or on the ground, in surface water or underground water, in sewers, pipelines or collectors; »	The promoter must ensure the management of used oils to avoid any form of pollution
		<b>Section 6</b>	"Holders must: - either give their used oils to approved collectors; - either carry out the transport of used oils themselves with a view to handing them over to approved eliminators in accordance with Article 8; after having obtained approval as provided for in Article 9."	
<b>Rubble: Landscape/Overgrown public road</b>	<b>DECREE n° 2009-1450 of December 30, 2009 on the regulatory part of the Town Planning Code.</b>	<b>Article R 379.</b>	The agents in charge of the fight against congestion are authorized to remove or remove, without delay or at the expiry of the time granted, the obstructions and nuisances of any kind which are on the paths, sidewalks, passages waterways, bridges and watercourses, by the persons who caused them, or on their refusal or negligence, by any other person they authorize for this purpose, at the expense of the person in default. It is forbidden to deposit on the public highway or in unenclosed places, scrap metal, rubble and wrecks of all kinds.	The developer must ensure that the rubble is managed in such a way as to avoid any encroachment or nuisance on private or public areas.
		<b>Article R 380.</b>	In the event of encroachment on the right-of-way of a road, the State or the local authority concerned may	



			<p>proceed with the removal and deposit of the materials in a site specially laid out for this purpose or in any other site where the conditions of preservation of these materials are met.</p> <p>In the case of discarded goods that have been placed on the public highway, if it becomes necessary to rent a building or a warehouse in order to preserve the objects, the cost of the operation includes the actual costs rental and the labor required to remove objects that encroach on the public road.</p>	
<b>Atmospheric discharges</b>	<b>Law No. 2001-01 of January 15, 2001 on the Environmental Code</b>	<b>Article L 78</b>	"In order to avoid atmospheric pollution, buildings, agricultural, industrial, commercial or craft establishments, vehicles or other movable objects owned, operated or held by any natural or legal person, are built, operated or used in such a way as to meet the standards techniques in force or taken pursuant to this law. They are all subject to a general obligation to prevent and reduce harmful impacts on the atmosphere"	The study should verify the sources of atmospheric pollution, verify their level of compliance with the standards in force, the measures taken to reduce nuisances.
	<b>Decree n° 2001 – 282 of April 12, 2001 implementing the environment code</b>	<b>Article R 72</b>	"When the polluting emissions from the facilities can cause, due to meteorological conditions observed or foreseeable in the short term, an increase in the level of atmospheric pollution constituting a threat to people or property, the operators of these facilities must implement all useful measures to eliminate or reduce their polluting emissions. »	The study should identify the facilities that are sources of atmospheric pollution, the discharge conditions and possibly carry out a dispersion model based on

				meteorological parameters.
	<b>Standards N05-062</b>	<b>Chapter II 1.1 Capture and disposal of emissions</b>	<p>“Emissions are captured as completely and as close to their source as possible, and vented in such a way that no excessive emissions result.</p> <p>-The operator must take all the necessary measures in the design and operation of the installations to reduce air pollution at the source. exhaust duct-Devices indicating the direction and speed, if necessary, of the wind must be installed near installations liable to emit dangerous substances into the atmosphere in the event of a malfunction. »</p>	The study should verify compliance with the standard for a reduction in atmospheric emissions at source.
		<b>L-spot</b>	<p>Construction site "Emissions from construction sites must be limited, in particular by limiting emissions from the machines and devices used and by using appropriate operating procedures, insofar as technology and operation permit, and where this is economically bearable, the nature, size and location of the site as well as the duration of the works having to be taken into account. The competent authority shall issue directives on this subject. »</p>	
<b>Floor</b>	<b>Law No. 2013-10 of December 28, 2013 on the General Code of Local Authorities Title IV: local</b>	<b>“Article 195. Paragraph 1</b>	<p>"- The operating revenue of the municipality is as follows:</p> <p>6. tax revenue which includes: a) The products of the direct taxes below, collected on the territory of the municipality: tax representative of the tax on the minimum tax;- The business license contribution and the related additional tax;- The land tax on built properties;- The land tax on unbuilt properties;- The</p>	The promoter is required to approach the municipality in order to see the terms of payment of taxes.

	<b>administration and local services</b> <b>Chapter 1:</b> <b>Budget of local authorities</b> <b>Sub-section 2:</b> <b>operating revenue of the municipality</b>		land surcharge on insufficiently built properties ; License contribution. »	
	<b>Law No. 2013-10 of December 28 , 2013 on the General Code of Local Authorities</b> <b>First Title:</b> <b>fundamental principles and procedures for the transfer of powers</b>	<b>Section 278.</b>	“- The local communities regulate, by deliberations, the affairs of their competence. They contribute with the State, to the administration and regional planning, to economic, educational, social, health, cultural and scientific development as well as to the protection and enhancement of the environment and to improving the living environment. The State exercises the missions of sovereignty, the control of the legality of the acts of the local communities under the conditions fixed by the law, ensures the coordination of the actions of development and guarantees the cohesion and the national solidarity as well as the integrity of the territory "	
<b>Waste</b>	<b>Law No. 2001-01 of January 15, 2001 on the Environmental Code</b>	<b>Article L 63</b>	“Any direct or indirect discharges, flows, rejections, deposits of any kind likely to cause or increase the pollution of continental waters and/or sea waters within the territorial limits are prohibited. »	-The study should verify the sources of discharges that may affect surface or groundwater in any

	<p><b>Water Code Law No. 81-13 of March 4, 1981 on the Water Code</b></p>	<p><b>Section 49</b></p>	<p>"No spillage, flow, rejection, direct or indirect deposit into an underground water table or a watercourse likely to modify its physical characteristics, including thermal and radio-atomic, chemical, biological or bacteriological characteristics, may be made without authorization granted, after investigation, by the Ministers in charge of Hydraulics and Sanitation. »</p>	<p>way, and verify the characteristics of these discharges. -The study must identify the different types of waste water, the treatment and evacuation devices and finally assess their compliance with the provisions of this code.</p>
<p><b>Law No. 2009-24 of July 8, 2009 on the Sanitation Code</b></p>		<p><b>Article L 3</b></p>	<p>"Any direct or indirect spill, flow, deposit, jet, burial and immersion of liquid waste, of domestic and industrial origins in the natural environment must be subject to prior depollution under the conditions set by the texts in force. . »</p>	
		<p><b>Article L 4</b></p>	<p>“The sources of pollution are regulated by the legal provisions in force, in particular, this code, the environment code, the water code and the hygiene code. Sources of pollution are required to submit to checks by sworn agents under these various codes or their delegates. »</p>	
		<p><b>Article L 13</b></p>	<p>"The discharge of untreated effluents of domestic origin, excreta and faecal sludge into gutters, open rainwater channels or closed rainwater drains as well as on the surface of the soil natural or developed, is prohibited throughout the national territory. Likewise, the discharge of untreated domestic effluents into streams, lakes, ponds and the sea is prohibited.</p>	

		<p><b>Article L 15</b></p>	<p>“Any place that can produce domestic wastewater must be equipped with a drainage system for this water established in accordance with the provisions of this Code, its implementing texts and other texts in force. »</p>	
		<p><b>Section L29</b></p>	<p>"It is strictly forbidden to discharge into public sewage collectors:</p> <ul style="list-style-type: none"> <li>- Spring water, drainage and ditches,</li> <li>- The contents of watertight or accumulation pits,</li> <li>- The contents of septic tanks and all-water pits ,</li> <li>- Household waste, plastic waste,</li> <li>- Hydrocarbons,</li> <li>- Radioactive substances,</li> <li>- Paint residues,</li> <li>- Used oils.</li> <li>- Products resulting from the cleaning of sanitation works of the collective or individual type,</li> <li>- Bodies and solid materials, harmful or flammable liquids or gaseous products,</li> <li>- Substances such as sludge, sand, rubble, glues, tars, oils, etc., which, by their nature, can compromise the proper functioning of the sewers, damage the pipes, endanger the personnel in charge of their maintenance or disrupt the normal operation of the treatment plants,</li> </ul> <p>the water temperature above 30°C. »</p>	
		<p><b>Article L 52</b></p>	<p>“When a public sewer is accessible less than sixty meters from a place producing effluents of industrial origin, the evacuation device of this place must be</p>	

			connected to the public sewer under the conditions set by the Code of the Environment and by this code and its application texts. »	
		<b>Section L56</b>	The contents of polluting substances in the effluent discharged into the public sewer network are set on the basis of the values retained by the texts in force, in particular the environment code and the Senegalese standard NS 05-061. However, different values may be retained by the service responsible for sanitation depending on the type of industry and the sensitivity of the receiving environment to pollution.	
	<b>Senegalese Standards NS 05-061 Relating to discharge standards in relation to wastewater</b>	<b>Chapter 1-Point. 5.1</b>	“Any discharge of liquid effluents causing stagnation, inconvenience for the neighborhood, or pollution of surface, underground or marine waters is prohibited throughout the national territory. »	
	<b>Construction Code Chapter 1: General Rules Section 2: General Hygiene Provisions Applicable</b>	<b>Item L3</b>	“Any domestic wastewater and runoff water evacuation system must be equipped with a device established in accordance with the provisions of the Town Planning Code and the Hygiene Code. The maintenance of the works, in particular up to the upstream of the connection box, if there is one, is the responsibility of the building owners. The installation of a device preventing the rise of odors is compulsory. »	The company will have during the construction to set up a good management of waste water

<b>Noise</b>	<b>Law No. 2001-01 of January 15, 2001 on the Environmental Code</b>	<b>Article L 84</b>	<p>“Noise emissions likely to harm human health, constitute an excessive nuisance for the neighborhood or harm the environment are prohibited. The natural or legal persons at the origin of these broadcasts must implement all the necessary measures to suppress them. When the emergency justifies it, the Minister in charge of the environment, in conjunction with the Minister of the Interior and the Ministry of the Armed Forces, must take all executory measures intended ex officio to put an end to the disturbance. »</p>	<p>The study should identify all sources of noise pollution, assess the level of pollution at the property boundary and their compliance with regulations. In addition, it must recommend that the company favor less noisy machines and ensure compliance with the wearing of PPE.</p>
	<b>Law No. 2001 - 282 Decree implementing the environmental code</b>	<b>Article R 84</b>	<p>“The maximum noise thresholds not to be exceeded without exposing the human body to dangerous consequences are fifty to sixty decibels during the day and forty decibels at night. However, the diversity of sources of noise pollution (classified installation, building site, passage of a jet plane, siren, automobile traffic, the neighbour's radio or television, etc.) makes the regulations specific. »</p>	
	<b>Decree No. 2006-1252 of November 15, 2006 setting the minimum requirements for the prevention of certain physical</b>	<b>Section 13</b>	<p>“The level of exposure to noise must be as low as possible and remain within an intensity limit that does not risk damaging the health of workers, in particular their hearing. To achieve this result, the employer must, in particular:</p> <ul style="list-style-type: none"> <li>- favor the least noisy manufacturing processes; -</li> <li>reduce at source the noise emitted by professional equipment and, in particular, machines; -</li> <li>insulate, in specific premises, noisy equipment whose operation requires only a limited number of workers; -</li> <li>avoid the transmission of noise from one workshop to another; -</li> </ul>	

	<b>environmental factors</b>		arrange the work premises in such a way as to reduce the reverberation of noise on the walls in glass or ceilings;- organize work so that employees are away from noise. »	
		<b>Section 14</b>	“The daily noise exposure level, that is to say the value of the average noise level received by a worker throughout the duration of his working day, must not exceed 85 A-weighted decibels. technically possible to reduce the level of daily noise exposure below 85 db (A), the employer must provide employees with suitable personal protective equipment. He must ensure that they are actually used. This limit of 85 db (A), required for the use of personal protective equipment, can be lowered depending on the nature of the work, intellectual or otherwise, requiring concentration. »	

<b>THEME</b>	<b>LEGAL TEXTS</b>	<b>REFERENCES</b>	<b>OBLIGATIONS</b>	<b>APPLICATION TO STUDY</b>
<b>HEALTH AND SAFETY AT WORK</b>				
<b>General measures</b>	<b>Law No. 97-17 of December 1, 1997 on the Labor Code</b>	<b>Article L 170</b>	“The Labor and Social Security Inspector monitors the employer's compliance with health and safety provisions. When it finds a breach of the standards or prescriptions thus enacted, it gives formal notice to the employer to comply with them. In addition, when there are working conditions hazardous to the safety	The study should suggest that the employer adopt compliant facilities and take measures that



			<p>or the health of the workers, not covered by the decrees issued pursuant to Article L. 168, the employer is given formal notice by the Labor and Social Security Inspector to remedy them. The formal notice must be made in writing on the employer's register or by registered letter with acknowledgment of receipt. It is dated and signed. It specifies the nature of the shortcomings or dangers noted and sets the deadline within which they must have disappeared. This period may not be less than 4 clear days except in an emergency indicated by the Labor and Social Security Inspector. Under the conditions and according to the procedures set by the Social Security Code, the employer is required to notify the Labor and Social Security Inspector of any workplace accident or any occupational disease observed in the company. This notice is given without delay by any emergency means in the event of a fatal accident.</p> <p>»</p>	<p>ensure the safety of personnel. Provide personnel with personal protective equipment</p>
	<b>Article L 171</b>	<p>“The employer must ensure that the workplaces, machines, materials, substances and work processes placed under his control do not pose a risk to the health and safety of workers. In this respect, prevention is ensured:</p> <ul style="list-style-type: none"> <li>• 1° by technical measures applied to new installations or new processes during their design or implementation, or by technical additions made to existing installations or processes;</li> <li>• 2° by taking measures to organize occupational medicine;</li> <li>• 3° by taking measures to organize work. »</li> </ul>		
	<b>Article L 172</b>	<p>“When the measures taken under Article 171 are not sufficient to guarantee the safety or health of workers, individual protection measures against occupational risks must be implemented. When these individual protection measures require the worker to use appropriate equipment, the latter is provided and maintained by the employer. In this case, no</p>		

			worker must be admitted to his workstation without his personal protective equipment. »	
		<b>Article L 174</b>	"The use of processes, substances, machines or materials specified by the regulations resulting in the exposure of workers to occupational risks in the workplace, must be brought to the attention of the Labor and Safety Inspector in writing. social. »	
		<b>Section 175</b>	"Workplaces must be subject to regular surveillance under the conditions and in accordance with the procedures laid down by the administrative authority, with a view in particular to verifying the safety of equipment and installations as well as monitoring the health risks on work places. »	
		<b>Article L 177</b>	“All workers: . 1° must be fully informed of the occupational risks existing in the workplace; 2° must receive adequate instructions as to the means available and the conduct to adopt to prevent these risks and protect themselves against them. This information and instructions must be brought to the attention of the workers under conditions and in a form that allows each of them to have a good minimum general training in health and safety. »	
		<b>Article L.185</b>	Employers are required to organize a work safety service and a health and safety committee. The safety service assists and advises the employer and, where appropriate, the workers or their representatives, in the development and implementation of a health and safety program at work. This service can be for a single company or common to several or even be provided by an external organization. Worker safety representatives and a joint health and safety committee cooperate in the development of this programme. The	The creation of a health and safety committee at work is to be considered on the basis of the conditions set by this code.

			organization, missions, operation and means of action of the occupational safety services, as well as the methods of appointment and intervention of safety delegates and joint health and safety committees are set by decree.	
	<p style="text-align: center;"><b>Law No. 83-71 of July 05 , 1983 on the hygiene code</b></p>	<b>Article L.35</b>	“The personnel of factories and other industrial enterprises must be subject to periodic medical examinations in accordance with the regulations in force. »	Staff must undergo a medical examination before hiring
		<b>Article L.49</b>	“Without prejudice to the application of the rules specific to each profession, persons called upon by reason of their employment to handle foodstuffs, both during their collection, preparation, treatment, transformation, packaging, packaging, transport, storage, and during their exhibition, sale and distribution are bound to the greatest cleanliness of body and clothing under the responsibility of the employer. They are subject to periodic medical examinations in accordance with the regulations in force. In the food preparation workshops, it is forbidden to smoke. The handling of foodstuffs is forbidden to people likely to contaminate them, in particular those who are suffering from cutaneous-mucous, respiratory or intestinal infections. Any subject suffering from such a condition noted by a clinical or bacteriological examination must be excluded until complete recovery, confirmed by medical certificate. The staff must use the sanitary facilities made available to them: sufficient number of changing rooms, lavatories without direct communication with the premises and annexes. Washbasins, soap and hand towels are placed next to the lavatories and close to the workplaces. »	The sponsor must ensure the hygiene and cleanliness of products intended for human or animal consumption

	<b>Law No. 94-63 of August 22, 1994 on prices, competition and economic litigation</b>	<b>Section 23</b>	<p>“ All economic operators are required to respect the rules of free competition so that competition is healthy and fair. All practices tending to obstruct in various forms the positive evolution of the laws of the market are therefore considered as offences. So-called anti-competitive practices may be individual or collective in nature as defined in the provisions below. »</p>	<p>The company is required to respect the rules of free competition as required by the regulations</p>
		<b>Section 24</b>	<p>“ Are prohibited, subject to specific legislative and regulatory provisions, any action, agreement, combination, express or tacit agreement in any form and for any reason whatsoever, having as their object or which may have the effect of preventing, restricting or to distort the free play of competition, in particular those:</p> <ul style="list-style-type: none"> <li>- hindering the lowering of cost, sale or resale prices;</li> <li>- favoring the artificial increase or decrease in prices;</li> <li>- hindering technical progress;</li> <li>- limiting the exercise of free competition.</li> </ul>	
	<b>Decree No. 68-507 of May 7, 1968, regulating the control of products intended for human or animal consumption</b>	<b>Section 6</b>	<p>Containers or packaging containing products intended for human or animal consumption held for sale, offered for sale or sold, must permanently bear, either by labeling or by direct printing, the following particulars which must be written French language.</p> <p>a) The name and address of the manufacturer (or company name); b) The name of the product; c) The brand of the product (if any); d) The net weight (or gross, with indication of the tare) or the capacity of the container; e) The manufacturing and sale authorization number, the name and address of the manufacturer may be replaced by those of the retailer or a registered trademark, subject to the affixing of a conventional indication decreed by the Fraud Prevention Service; f) With regard only to animal feed, the indication of the products entering into their composition, and the guaranteed levels of</p>	<p>In order to preserve the quality of the product, the company must take the necessary measures to meet the conditions laid down by the regulations.</p>

			protein, fat, cellulose, vitamins and minerals, as well as the user manual.	
	<b>Decree n°2006 – 1251 of 15/11/2006 relating to work equipment</b>	<b>Art. 25.</b>	Each machine must be equipped with as many emergency stop devices as necessary. At a minimum, an emergency stop is required. These devices must make it possible to eliminate the dangerous situations which risk or are in the process of occurring, by stopping the machine by optimal deceleration of its moving parts. The emergency stop order must take priority over all other orders. .	All equipment must meet the required standards in terms of safety
	<b>Decree n°2006 – 1251 of 15/11/2006 relating to work equipment</b>	<b>Art. 26.</b>	Emergency stop devices must be clearly identifiable and easily accessible. They should be an eye-catching red or yellow color. Machines for which an emergency stop device could not reduce the time required to obtain a normal stop, portable machines and hand-guided machines are not subject to the provisions of the preceding paragraph.	
	<b>Decree n°2006 – 1251 of 15/11/2006 relating to work equipment</b>	<b>Art. 41</b>	Work equipment must be properly maintained, with the aim, in particular, of guaranteeing its safe operation. Each piece of work equipment must be provided with a maintenance log on which are mentioned the details and dates of the maintenance operations to which it has been subject, as well as the names and qualifications of the persons who carried them out. These notebooks are kept at the disposal of the labor inspector.	
	<b>Decree n°2006 – 1251 of 15/11/2006 relating to work equipment</b>	<b>Section 43</b>	“Visits are carried out by qualified personnel appointed by the employer. The results and dates of these inspections, as well as the names and qualifications of the people who carried them out, are mentioned in the safety register with which each of this work equipment is equipped. »« The safety registers are made	The company must have a security register.

			available to the Labor Inspector. The Labor Inspector may require the employer to submit to the aforementioned visits any other work equipment for which he deems these quarterly checks necessary. »	
<p><b>Decree No. 2006 – 1252 of 15/11/2006 setting the minimum requirements for the prevention of certain physical environmental factors</b></p>	<p><b>Section 4</b></p>	<p>“The lighting of work areas must be designed and produced in such a way that the level of lighting is adapted to the nature and precision of the work to be carried out and that it does not cause any visual fatigue and resulting ailments. In particular:  - the lighting values of the work areas which are contiguous to them must be close. In the same room, the value of the illumination must be equal, at least, to the fifth of the value of the illumination of the work area; - the quality of the lighting must allow a correct perception of the colors and the forms , in relation to the activity carried out;- workers must be protected against phenomena of glare due, for example, to the sun, to sources of artificial light, to surfaces with high luminance or to excessive ratios of luminance between neighboring surfaces . - light fluctuation phenomena: stroboscopic effects, which are due in particular to the poor condition or poor maintenance of certain lamps, must be eliminated;- workstations must be protected from direct sunlight.”</p>		<p>The company will have to take all its measures to put its employees in very good working conditions</p>
		<p><b>Section 10</b></p>	<p>“The ambient temperature must be at an acceptable level; it must be compatible with the health of the employees and not cause them discomfort, taking into account, in particular, the physical constraints that their work requires. It is monitored by thermometers installed in the workplace. »</p>	
		<p><b>Art. 12.</b></p>	<p>“Employees who work in cold environments must be equipped with the means to resist the cold; the employer provides them with suitable protective equipment, in particular warm clothing, hats, earmuffs, gloves and shoes. »</p>	

				require them to wear
	<b>Decree n°2006 – 1254 of 15/11/2006 relating to the manual handling of loads</b>	<b>First article</b>	“This decree applies to employers, workers and establishments falling within the scope of the Labor Code. »	It shall be recommended to the factory to avoid carrying excessive load in accordance with this provision.
		<b>Section 8</b>	Article 8 sets the maximum authorized weights according to gender (male/female, age) and for pregnant women. Within the meaning of this article, it is forbidden for a single worker (over 18 years old) to carry, push, drag a load greater than 50 kg. For women this load is 15 kg, and for pregnant women 5 kg exceptionally »	
	<b>Decree No. 2006-1261 of November 15, 2006 laying down general health and safety measures in establishments of all kinds</b>	<b>Section 12</b>	“The employer must provide, free of charge, to each beneficiary, two complete work clothes per year, adapted to the size of the latter. The first outfit is provided within fifteen days of hiring. »	The employer must provide its employees with the necessary amenities (changing rooms, toilets) to enable them to carry out their work in compliance with health and safety measures.
		<b>Section 13</b>	“The employer must provide each worker with the appropriate means, in particular soap and detergents, to keep his work clothes clean. Workers assigned to or near work equipment must wear appropriate clothing. »	
		<b>Section 15</b>	“The employer must make changing rooms available to his staff, when all or part of them are normally required to change their clothing for the performance of their work. Changing rooms must be sufficiently spacious and properly ventilated. The clothes placed there must be able to dry there. Their floors and walls should be easy to clean. They must be kept in a constant state of cleanliness and cleaned at least once a day. Separate changing rooms must be provided for male and female workers. Changing rooms will be provided with a	Men's locker rooms and toilets must be separate from women's.

			sufficient number of seats, such as benches, chairs, stools and individual lockers.”	
		<b>Section 19</b>	<p>“It is forbidden to let workers take their meals at their workstation.</p> <p>In establishments where at least fifteen workers wish to bring their meals and eat them on site, the employer must provide them with a canteen presenting all the guarantees of hygiene. This room must not communicate directly with the work premises. It must be spacious enough and properly ventilated. It must be effectively insulated from excessive heat due to solar radiation. The temperature must be suitable. Its floors and walls must be easy to clean. »</p>	
		<b>Section 29 :</b>	<p>Any employer who accommodates, inside or outside the limits of the establishment, one or more workers who do not live with their family, must declare this to the Labor Inspectorate within the month following the opening of accommodation.</p> <p>This declaration must specify: the number and sex of the employees accommodated; the plan of the accommodation and sanitary facilities: toilets, sinks, showers, canteens, kitchens, with indications of their surface area and volume.</p>	
<b>Organization / Planning of OHS measures</b>	<b>Law No. 2001-01 of January 15, 2001 on the Environmental Code</b>	<b>Article L 56</b>	"The operator of any classified installation subject to authorization is required to draw up its own internal operation plan (POI) to ensure that the competent authorities and neighboring populations are alerted in the event of a disaster or the threat of a disaster, the evacuation of personnel and the means of circumscribing the causes of the disaster. »	The study must identify all the sources of danger, assess the level of risk and their compliance with the regulations.
	<b>Interministerial Order No. 04862/MEPN/MEMI /M. Int of 14 July</b>	<b>Section 5</b>	“The POI is established on the basis of a study of the dangers of the establishment, the analysis of the various possible accident scenarios and their most penalizing consequences. »	



	<b>1999 on POIs in classified establishments</b>	<b>Section 9</b>	“POI application exercises must be carried out at least twice a year to check its reliability, in order to fill, if necessary, any shortcomings and also to train the personnel of the establishment and allow it to be updated in a continuous and regular. »	
	<b>Interministerial Order No. 5945 M.INT-PC of 14 May 1969 establishing safety rules against the risk of fire and panic in establishments open to the public</b>	<b>Section 1</b>	"The safety rules against the risk of fire and panic in establishments open to the public, provided for in article 189 of the Town Planning Code (regulatory part) are established by the safety regulations annexed to this order. . »	
		<b>Section 11</b>	“The employer takes the appropriate measures so that the workers of the external establishments working in his establishment receive adequate information concerning the prevention of occupational risks. »	
<b>Occupational Medicine</b>	<b>Decree No. 2006-1258 of November 15, 2006 setting the missions and rules for the organization and operation of occupational medicine services</b>	<b>Section 29</b>	“In each workshop, site or service where dangerous work is carried out, a member of staff must have received the necessary instruction to give first aid in the event of an emergency. When the activity of an establishment includes day and night work and in the absence of a nurse, or when their number, calculated in accordance with the provisions of Article 27 above, does not allow To ensure the permanent presence of this staff, the employer, after obtaining the opinion of the occupational physician, takes the necessary measures to provide first aid in the event of an accident. These provisions are recorded in a document made available to the competent Labor and Social Security Inspector. »	The employer must carry out medical visits according to the defined frequencies, he is also required to ensure the health of his workers at all times.
		<b>Rule 38</b>	“All employees undergo a medical examination before hiring or, at the latest, before the end of the trial period following their hiring. The worker subject to special medical supervision defined in	

			<p>article 41 of this decree must benefit from this examination before being hired. The purpose of the medical examination is to: . to ensure that the worker is medically fit for the post to which the head of the establishment plans to perform;. to find out if the employee is not suffering from a dangerous condition for other workers;. possibly proposing adaptations to the position or assignment to other positions. »</p>	
		<b>Section 40</b>	<p>“All employees must have a medical examination at least once a year, in order to ensure that they are still fit for the job they occupy. This examination includes at least: . a clinical examination; a chest X-ray examination, by a radiologist, and a urine test for albumin and sugar. »</p>	

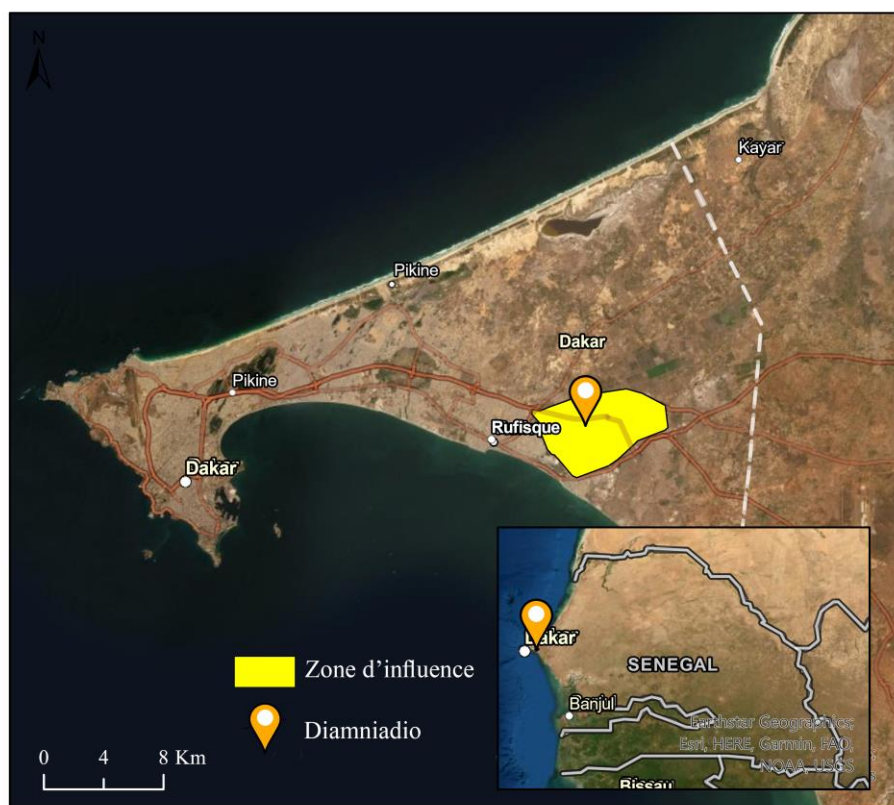
### 3 Current environmental baseline

#### 3.1 Introduction

To be relevant, the examination of the project study area requires the consideration of several areas/spaces of influence taking into account the direct and induced effects.

The analysis of the initial state of the environment will be done taking into account one space or another depending on the relevance of the angle of analysis.

Figure 1: Delimitation of the project's area of influence



#### 3.2 Climate

The project site belongs to the Sahelian but coastal climatic domain, determined by its own and specific parameters of wind, precipitation, temperature, relative humidity and insolation. Compared to the rest of the country, this area enjoys a fairly mild climate due to its privileged geographical position on the western side of the Atlantic Ocean. Thus, it is subject to the oceanic influences of the Azores anticyclone which subjects the Senegalese coast to cool currents over a good part of the year from November to May (7 months). The relatively hot rainy season extends from June to October with temperatures around 27° C and a variable peak in rainfall between August and September.

<b>Parameters climatic</b>	<b>Chronologic series</b>	<b>Average of the series</b>
<b>Annual rain (mm)</b>	1960 - 2016	411.6
<b>Temperature made (°C)</b>	1960 - 2016	24.6
<b>Relative Humidity (%)</b>	1960 - 2016	75.6
<b>Insolation (Hr)</b>	1960 - 2016	8.1
<b>Speed (m/s)</b>	1960 - 2016	4.77
<b>Dominant management wind</b>	1960 - 2016	N to NE

### 3.2.1 Directions and speeds of the wind and importance of the intertropical front on the climate

The wind regime is characterized by a seasonal variation of the dominant directions with north winds or maritime trade winds (November to May) and northeast winds or harmattan. From the April-May period, the monsoon wind sets in. The average monthly speeds vary between 2.9m/s during the month of September and 5.3m/s during the month of March.

The monsoon winds that blow during the rainy season are trade winds that come from the Saint Helena anticyclone and enter the moisture-laden country. They are characterized by a low thermal amplitude but with temperatures generally higher than those of the maritime trade winds. Monsoon winds blow in a westerly or southwesterly direction due to seasonal variation in speed and prevailing directions. These winds bring rain.

The maritime trade winds coming from the Azores anticyclone strongly influences the region of

Dakar where it remains for almost the whole year. From north to northeast, the maritime trade wind is a constantly humid wind and is marked by a low thermal amplitude. Its humidity can be deposited in the form of dew, especially during the night.

The region is also influenced by the Libyan anticyclone which directs the harmattan, a hot, dry wind blowing northeast to southwest from March to April. This hot, dry wind that crosses the Sahara brings large amounts of dust. Exposure to these particles could contribute to the rise in the prevalence of subjects suffering from broncho-pulmonary diseases (asthma, chronic bronchitis).

Based on the aeraulic study carried out as part of the construction of the United Nations City located in the urban center of Diamniadio (SETEC, February 2018) the wind direction is generally North-East, however, we will be able to observe northwesterly winds in summer.

The median air speed is 4.8 m/s (~17 km/h).

Figure 2: Distribution diagram of wind speeds in frequency

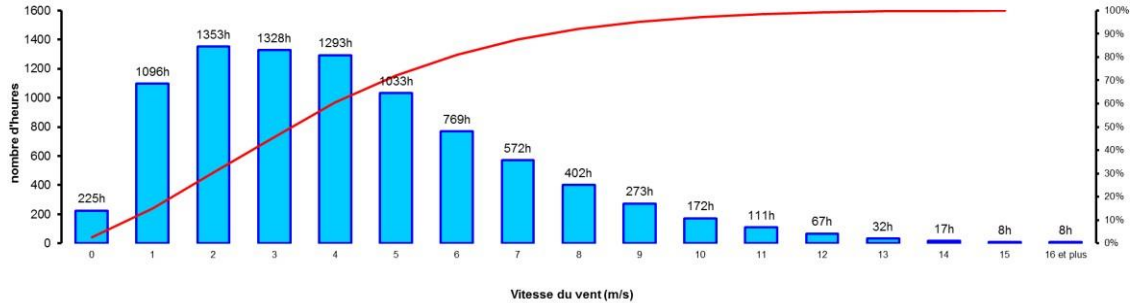
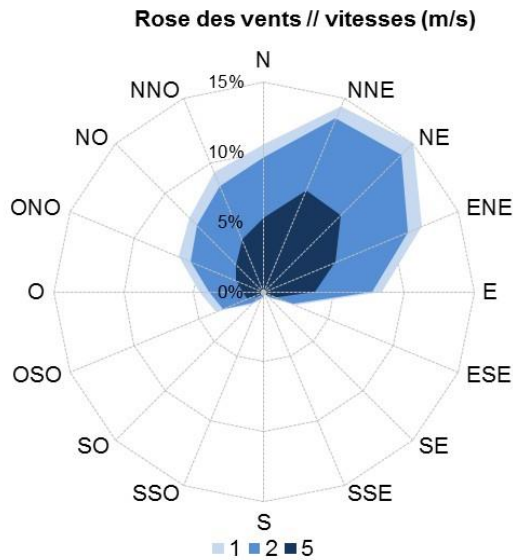


Figure 3: Wind rose



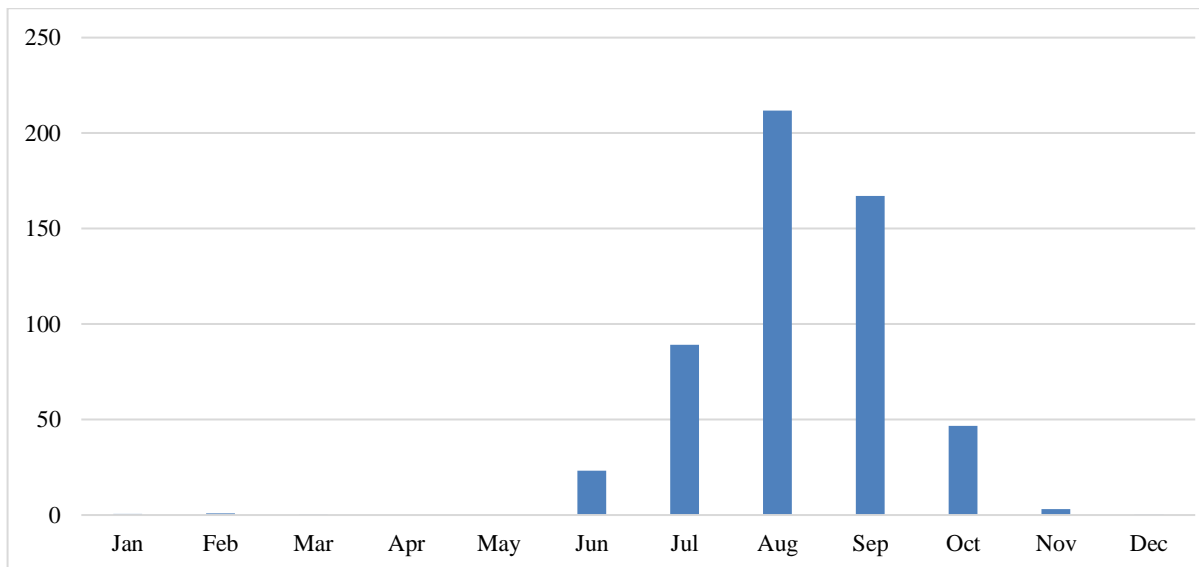
Winds can transport dust, smoke, gases and odors emitted by road traffic and the various classified installations erected on the PUD upstream. Certain substances contained in these emissions (SO<sub>2</sub>, CO, NO<sub>x</sub>, NH<sub>3</sub>, etc.) will affect the air quality of the surrounding environment (housing and service areas). This degradation of air quality may affect the health and well-being of populations residing in the PUD.

### 3.2.2 Rainfall

The average annual rainfall in the area recorded by ANACIM at the Dakar Yoff station between 1960 and 2016 shows interannual fluctuations with the benchmark years 1967 -1969 and 2012 - 2015 where more than 600 mm of rainfall is recorded. The minimum having been recorded in 1972 and 2014 with nearly 160 mm. The drought of the 70s pushed migrants to occupy the lowlands which once served as a place to receive runoff water. In addition, the evacuation of wastewater is becoming a major problem for the populations of the Dakar region with the recharge of the groundwater table. The latter is very exposed to pollution. Consequently, rainfall has direct impacts on the sanitation systems in place.

The monthly distribution of precipitation at the synoptic station of Dakar Yoff shows two main seasons: a short rainy season which lasts 3 to 4 months (July-October) and a long dry season of 9 months (Ref. Figure). Rainfall is linked to monsoon flows which generally blow from May to October. However, rains can be recorded during the winter period. They are due to invasions of polar air.

Figure 4: Evolution of monthly precipitation



Source: World Bank

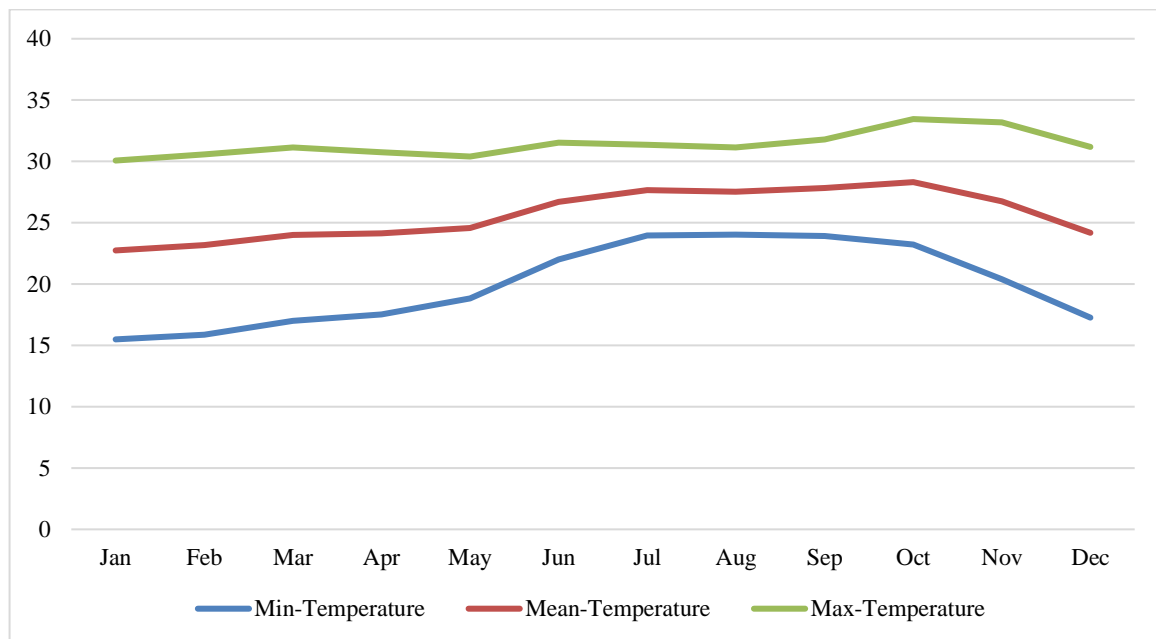
This figure above shows the existence of 11 rainy months and one month (April) during which there is no precipitation. This allows us to distinguish: winter precipitation occurring between November and March due to invasions of polar air called "Heug" rains or mango rains for a total of 2.6 mm or 0.63% of the annual total . Rainfall in winter, that is to say during the rainy season between May and October for a total of 409 mm or 99.3% of the annual total. August is the rainiest month with 171.2 mm and represents 44.44 mm of winter rainfall. It is in August and September that we receive the largest quantities of precipitated water. These two months total 309.9 mm or 75.2% of the total wintering. The average annual precipitation is 411.6 mm.

### 3.2.3 Temperature

The influence of the maritime trade wind, a constantly humid wind, is felt during the months of December to May. During this period, temperatures are relatively low and oscillate between 22° C and 24° C. On the other hand, the period from June to November remains the hottest with average temperatures varying between 26 and 28° C.

The graph below, produced with data obtained from the World Bank, shows the evolution of the monthly average temperature over the period 1990-2020.

Figure 5: Evolution of the monthly average temperature in the Dakar region (1991-2020)



Source: World Bank

### 3.3 Hydrology

The hydrographic network of the area is essentially composed of rainwater flow channels or talwegs because the project area does not have any perennial watercourses. The area of the site, located in the watershed of Sébi-Ponty, is characterized by a relatively dense hydrographic network which flows towards the depression of Lake Sébi-Ponty, located in the extension of the fossil valley of Ndoyène. The clayey typology of the soils as well as a shallow aquifer, 7 meters in general, make the watershed belong to the class of impermeable watersheds.

The lake is the only perennial body of water in the vicinity of the site, to the south. However, in years with high rainfall, the water body can expand considerably. It is a wetland that is home to fish, birds and reptiles. These edges are rich in silt and very popular for market gardening, as was observed during field investigations.

#### 3.3.1 Surface water

The Mbao and Bargny plateaus are drained by seasonal backwaters. They flow only during the rainy season. The backwaters of Mbao, Diokoul and Bargny are the most important. They generally open out into lagoons located at the back of the coastal strip (which can be broken in places by rainwater). They are more or less submerged.

According to Niang Diop (2004) there are two main backwaters in Rufisque, one to the west of Cap des Biches (called the Rio Fresco) and to the east bordering the town. There are four slopes in the department. Their flow directions are oriented from North to South to meet towards the Center through the undulating depressions. The three watersheds are connected to drainage channels, which allows them to evacuate most of the rainwater (Laroubi, 1997).

In the study area, the nearest watershed is that of Diokoul, which occupies an area of 1.173 km<sup>2</sup>. It is a low-altitude watershed and the soils are marly-clayey.

It should be noted the presence of the Atlantic Ocean located to the west of the Department.

### 3.3.2 Underground waters

Groundwater is contained in two aquifers, the deep aquifer which corresponds to that of Maestrichtian sands and sandstones and the semi-deep aquifers represented by Paleocene limestones to the east of the Diass massif to the west of Lake Tanma .

The deep aquifer covers 4/5 of the territory with a potential of 500,000 m<sup>3</sup>/d. It can be exploited with boreholes sometimes reaching more than 500 meters deep with flow rates varying between 100 and 205 m<sup>3</sup>/h. Located in the Horst de Diass area, to the west of the Thiès cliff, on a narrow strip at the outcrop of the Maestrichtian up to the beginning of the Cape Verde peninsula, the Maestrichtian aquifer system is characterized by bicarbonates, generally of low mineralization.

The Palaeocene aquifer is best known and exploited in the western sector of the country around Horst de Diass in the Pout and Sébikotane compartment and in the Mbour area. In the Diass horst sector, a decrease in the piezometric level testifies to the overexploitation of the aquifer in the Diass horst and the rainfall deficit since the 1970s. These constraints have led to a general drop in the piezometry.

A shallow water table is exploited by the market gardeners of the commune of Diamniadio established in the villages established along the hydrographic network of the area.

The drinking water supply in the project area is made by drinking water pipes in connection with the SDE. The values communicated by the DGPU are respectively 100 l/hbt/d for those living in high standing and 80 l/hbt/d for those living in medium standing and in budget housing.

The project area thus remains an area receiving transferred water. Consequently, the project will not have any negative impact on groundwater. Their water needs at all phases of the project will be fully covered. On the other hand, the wastewater treated and discharged by the WWTP as well as the runoff water towards the lake located at the lowest point of the watershed will recharge the surface water tables collected by wells by the small market gardeners of the surrounding villages. The recovery of treated wastewater for market gardening should be studied to strengthen the livelihoods of local populations.

### 3.4 *Air quality*

According to the Dakar Air Quality Management Center, certain areas of the Dakar region, particularly high traffic areas, are faced with pollution levels beyond the limits defined by the NS-05-062 standard. . The pollutants concerned are particularly sulfur dioxide (SO<sub>2</sub>), the mixture of benzene, toluene and xylene (BTX), ozone and PM<sub>10</sub> particles (indicator of concentration of particles which can penetrate the respiratory system) and PM<sub>2.5</sub> (indicator of total gravimetric concentration of different classes of particles that are directly emitted or formed secondarily).

In the project area of influence, air pollution is expected to increase with the intensification of road traffic (mobile sources) on the Dakar-Diamniadio highway and industrial facilities (stationary sources) that are in operation (SOCOCIM, industrial estate of APROSI) or planned



for the Diamniadio Industrial Park. Hence the need to establish the baseline situation before the advent of all the infrastructure planned in the area for quality monitoring.

The main pollutants from mobile sources (transport among others) will mainly come from engine exhaust effluents, but also from gasoline evaporation. The main pollutants are CO and CO<sub>2</sub>, NO, monocyclic aromatic hydrocarbons (HAM), fine particles in suspension (PS), polycyclic aromatic hydrocarbons (PAH) and SO<sub>2</sub> for the diesel engine, hydrocarbons etc.

The concentration of vehicles and regular travel will undoubtedly contribute to the increase in carbon dioxide emissions from cars.

Air quality can deteriorate considerably due to weather conditions, as was the case on Tuesday, February 13, 2018, during which "the air quality index went to red alert (very bad) due to an increase in suspended particulate concentrations whose hourly averages exceeded 800 micrograms per cubic meter" (Dakar Air Quality Management Center, February 2018).

The exposure of populations to this intermittent fine particle pollution presents a real risk to their health. It will therefore be necessary to take this aspect into account to prevent the personnel who will have to work on the site from being exposed to the ambient air for a long time during this period.

### **3.5 Noise**

According to article R 84 of the Environmental Code, the maximum noise thresholds not to be exceeded without exposing the human body to dangerous consequences are fifty-five (55) to sixty (60) decibels during the day and forty (40 ) decibels at night. According to the World Health Organization (WHO, 1980), the dose deemed safe for hearing is 75 audible decibels (dBA) for exposure for 8 hours.

The main sources of noise in the area will be due to road traffic, particularly on the toll motorway, industries, road works, building and civil engineering, construction and the neighbourhood. All these sources will coexist in the vicinity of the project.

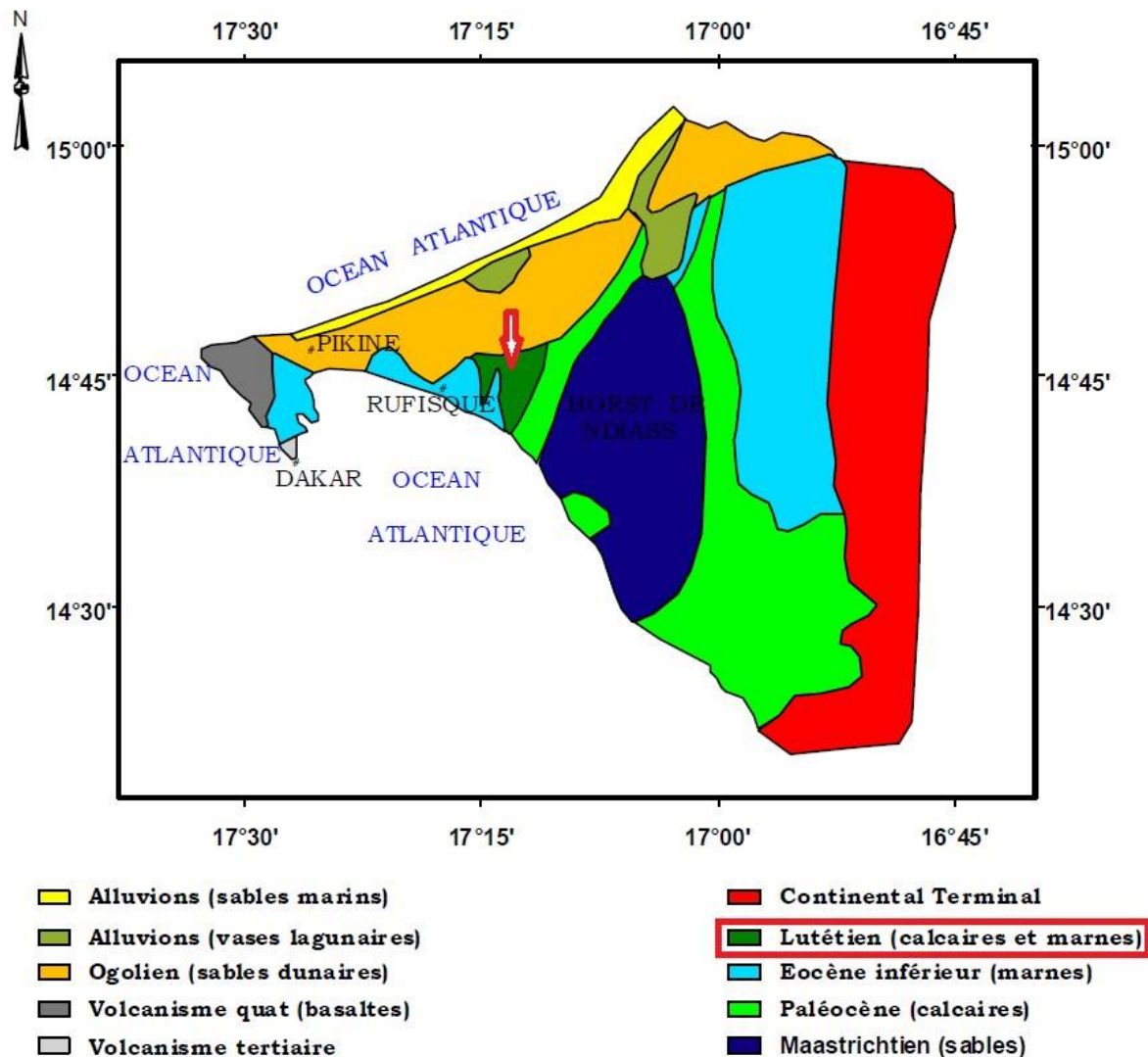
What is not yet known is the risk of hearing damage due to the lack of sound pressure level and exposure data that determine the prevalence of noise-induced hearing damage. Despite this incompleteness, i.e. a situation where information for decision-making does not exist, it would be advisable, as a precautionary principle, to establish the reference situation for sound pressure levels in the entire area. of the project to properly measure the impacts of future human activities.

### **3.6 Geology and soil**

According to the conclusions of the report on the study of the dangers of the Abdou Diouf Conference Center in Diamniadio, the project area is not subject to a significant level of seismic or climatological disaster risk (absence of cyclones and tidal waves). . The flat topography also eliminates a priori the risk of landslides.

The site is in the Lutetian zone according to the geological map below and we should therefore mainly encounter marls and limestones in the depth of the survey.

Figure 6: Geological context of the site



Source: LixCap

The results of the geotechnical surveys carried out as part of the preliminary geotechnical study<sup>6</sup> at the location of the construction project for a sports complex in Diarniadio have made it possible to highlight the formations present on the site.

The ground section obtained is as follows from top to bottom:

- A layer of black sandy clay
- A marly clay formation
- A marly formation containing calcareous concretions
- A layer of yellow marl containing blocks of limestone

The hydrostatic level of the water table was not encountered during the investigations.

The sections of the drillings obtained and the laboratory tests carried out on the samples taken revealed very plastic clay and marly soils, and presenting potential for shrinkage - swelling.

According to the soil report, the site therefore has soils with poor identification characteristics. These soils cannot validly be used as foundations for future works.

As part of the realization of the sports complex project, the loads of the structures can therefore be taken up by means of foundations laid either on a substitute embankment after purging the marly soils, or on deep rock layers if the latter are highlighted. during a G2 geotechnical campaign.

Case of substitution: taking into account the surveys carried out, the company must carry out the excavations on the right-of-way of the works. An extension of the substitution beyond the outer limits of the constructions is necessary to preserve the structures from shrinkage and swelling of the marls. A lateritic material will then be placed by successive compaction of layers 20 centimeters thick. This laterite must be of good quality and have a plasticity index of less than 20%. It must be adequately compacted to 95% of the Modified Optimum Procter. Also another type of material can be used as a substitute. It will be a well-consolidated granular backfill placed in 20 cm layers compacted with 4 to 6 passages of a vibrating roller compactor.

### 3.7 *Wildlife*

Plant and animal species are present on the site, it should be noted that the site is home to low biodiversity. Indeed, the area where the project is located is a modified habitat, an agricultural area. A modified habitat is an area which may support a large proportion of exotic animal and/or plant species and/or whose human activity has considerably modified the primary ecological functions and species composition. Although it does not include a great biological richness, it does not prevent the proponent from implementing appropriate mitigation measures through reforestation and the development of green spaces for regulating services, which are the advantages enjoyed by the people through ecosystem processes

Like vegetation, fauna has also been impoverished in recent decades due to the modification and destruction of its habitat by urbanization and productive activities. It is represented by water and savannah avifauna, small mammals, reptiles, insects. We still note in the area the presence of monkeys, hares, squirrels, genets, palm rats, mongooses, wild cats, jackals, porcupines, monitor lizards, and a wide variety of birds ( hornbill, cattle egret (*Bubulcus ibis*), green parrot, francolins (*Pternistis* sp), doves (*Streptopelia* sp) etc.).

### 3.8 *The flora*

The project site was occupied by fields. Thus, the project led to the loss of agricultural land which was dedicated to arboriculture, mainly to the planting of lemon trees.

The vegetation that has developed on the hydromorphic soils covering the limestone rocks of the Bargny plateau is essentially made up of thorny shrubs (*Ziziphus mauritiana*, *Faidherbia albida* (Kaad) and *Adansonia digitata* (Baobab). herbaceous cover consists of species such as *Andropogon gayanus*, *Aristida stipoides*, *Schoenefeldia gracilis*, *Tephrosia linearis*, *Indigofera astragalin* which settle during the rainy season.

Among the plant species inventoried on the site *Faidherbia albida*, and *ziziphus mauritiana* are partially protected by the forest code of Senegal.

The identified baobabs are off site.

The tree species found are the tamarind tree (*Tamarindus indica*), the lemon tree and the mandarin tree.

If deforestation is unavoidable, the promoter must compensate for this loss by implementing a reforestation program. The promoter must first obtain a felling authorization from the water and forest service.

## 4 Potential environmental impacts

The project to build a storage infrastructure for perishable products generally generates environmental consequences such as the loss of agricultural land, soil erosion, degradation of plant cover, socio-cultural effects, disruption of local activities, etc. . During the works, the negative impacts are generally limited in time. Those of the exploitation phase can appear continuously during the life of the project.

The project area does not include natural habitats or areas with legal protection and classified physical cultural resources.

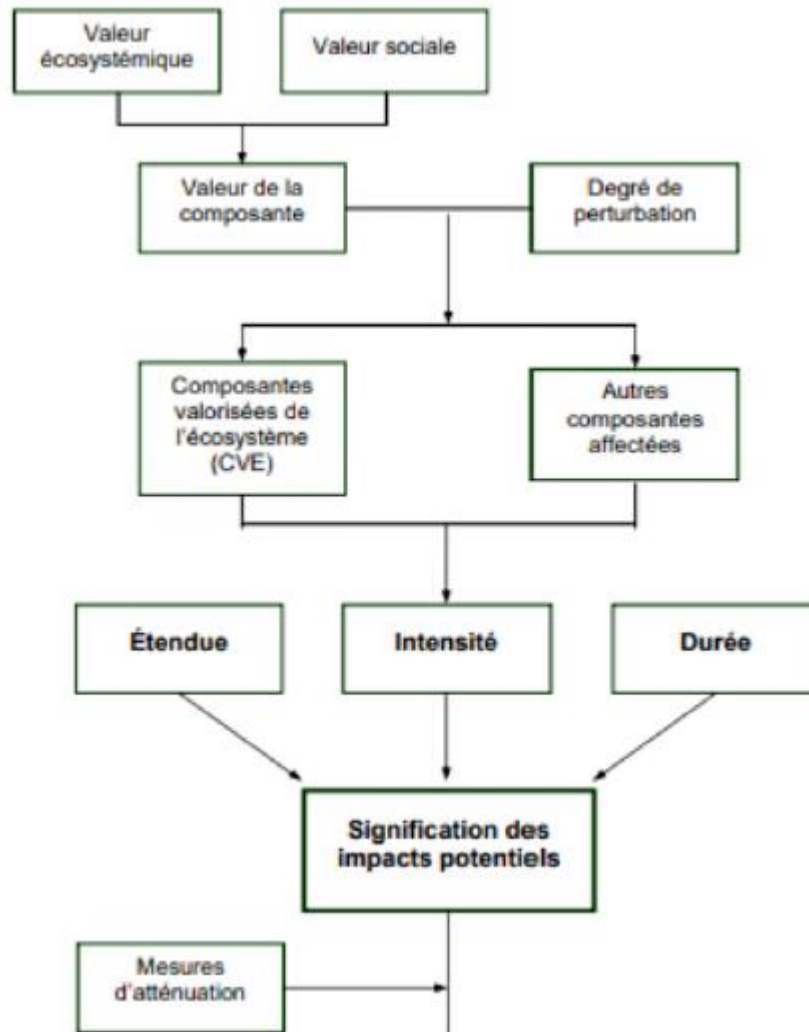
### 4.1 *Impact evaluation methodology*

The impact assessment methodology used in this project is based on the methodological approach developed by the Ministère des Transports du Québec and on the federal approach recommended by the Canadian Environmental Assessment Agency for carrying out environmental reviews. prerequisites.

This assessment of the impacts is based first on the assessment of three indicators, i.e. the intensity (determined according to the value of the component and the degree of disturbance), the extent and the duration of the the apprehended impact. These four indicators are aggregated into a summary indicator, ie the significance of the anticipated potential impact. In a second stage of analysis, the importance of the residual impact is estimated so as to make an overall judgment on the impact associated with the interaction of an activity on an environmental component, by considering the mitigation measures. put forward to reduce the anticipated adverse effects. The figure below shows the process leading to the evaluation of the significance of the potential environmental impacts, then to that of the significance of the residual environmental impacts, including those that could affect the valued ecosystem components (VECs). Details relating to each step of the evaluation process are presented below.

For the purposes of this project, the terms “environmental impact” and “environmental effect” are equivalent.

Figure 7: Stages of the environmental impact process



The first step in evaluating the significance of the impact consists in evaluating the potential impact of the project by taking into account its intensity, according to the value of the component affected and the degree of disturbance apprehended, its extent and its duration.

#### 4.1.1 Description of indicators

Each of the indicators for determining the significance of the potential impact includes a scale of three distinct levels. The description of each of these indicators and the levels used to characterize them are presented below.

##### 4.1.1.1 *Impact intensity*

The intensity of the impact expresses the relative importance of the consequences attributable to the alteration of a component of the environment. It concerns the extent of the modifications that affect the productivity of a habitat, a species or a community or the use of a component affected by the source of impact. It integrates the value of the component both in terms of its ecosystem value and its social value.

The intensity of the impact can be low, medium or high. This evaluation is expressed by the degree of disturbance.

**a. Determination of component value**

The ecosystem value expresses the relative importance of a component according to its interest for the ecosystem where it is located. It calls on the judgment of specialists following a systematic analysis of the components of the environment. There are three ecosystem values:

- Strong: the component is of major interest in terms of its ecosystem role or biodiversity and exceptional qualities whose conservation or protection are the subject of consensus in the scientific community;
- Average: the component presents a strong interest and recognized qualities whose conservation or protection represents a subject of concern without however being the subject of a consensus;
- Low: the component has an interest and qualities whose conservation and protection are the subject of little concern.

**b. Determination of the degree of disturbance**

The degree of disturbance assesses the extent of the changes made to the structural and functional characteristics of the component likely to be affected by the project. These modifications may result in the total or partial destruction of the component or the loss of one or more characteristics specific to it. This degree of disturbance takes into account the reversibility or irreversibility of the environmental effect on a component. There are three degrees of disturbance:

- Strong: the project calls into question the integrity of the affected component, strongly and irreversibly modifies this component or the use made of it;
- Average: the project leads to a reduction in the quality or use of the affected component without compromising its integrity;
- Low: the project only slightly changes the quality, use or integrity of the environmental component affected.

**c. Impact intensity determination**

The grid for determining the intensity of the impact based on the value of the environmental component and the degree of disturbance is presented in the following table:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

It is thus possible to identify three classes of intensity:

- High: the project completely or largely destroys or alters a component of the environment and calls into question its integrity. For the components of the biological environment, the intensity is high if an entire population or a high proportion of the population or habitat of a species is threatened. For the components of the human environment, the intensity is high if it significantly or irreversibly affects or limits the use of the component by a local community or population.
- Medium: the project modifies the affected component without jeopardizing its integrity and its use or leads to a limited modification of its general distribution in the environment. For the components of the biological environment, the intensity is medium if the effect affects an average proportion of the population, of the size of the population or of the habitat of the species, without calling into question the integrity of this species, but may lead to a decrease in average abundance or a change in distribution. For the human environment, the intensity is medium if the effect affects part of a community or a population or if it significantly reduces the use, quality and integrity of the use of the component without irreversibly and completely reducing its use.
- Low: the project slightly alters the component, but does not really modify its quality, its general distribution or its use. For the components of the natural environment, the intensity is low if only a small proportion of the population or the habitat of a population is affected by the project. In this case, the effect does not jeopardize the integrity of the species and does not lead to a reduction or a change in the distribution that exceeds the fluctuations in natural conditions. For the human environment, the intensity is low if a small part of a community or population is affected and if the reduction in the use or the quality of the component does not call into question its vocation or its use.

#### *4.1.1.2 Extent*

The extent expresses the spatial scope of the effects generated by an intervention in the environment and refers to the distance or the surface on which the disturbance will be felt. Thus, the extent can represent the relative distance over which the repercussions of an intervention on an element of the environment will have an effect. It can also represent the relative area that will be affected, either directly or indirectly (nature), by the effects of the project. In the context of this project, three levels of scope are distinguished:

- Regional: the intervention on an element of the environment is felt over a vast territory or at a significant distance from the project site, or is felt by the entire population of the study area or by a significant proportion of the population .
- Local: the intervention affects a relatively small space or a number of elements of the same nature located near the project or at a certain distance from the project, or it is felt by a limited proportion of the population of the study area .
- Punctual: the intervention affects only a very limited space, few components inside or near the project site, or it is felt by only a small number of individuals in the study area .

#### *4.1.1.3 Duration*

Impact duration refers to the time dimension of the impact. It assesses the period during which the effects will be felt in the environment. This period may be the recovery or adaptation time of the affected element. The duration of an impact can be:



- Long: the impact is felt continuously or discontinuously throughout the life of the project.
- Medium: the effects of the impact are felt continuously or discontinuously over a relatively prolonged period of time but generally less than the life of the project.
- Short: the effects are felt continuously or discontinuously over a limited period of time, generally corresponding to the construction period or when the recovery or adaptation time of the affected component is less than one year.

The indicator that constitutes the duration also takes into account the schedule, that is, all the stages of the life of the project, for example at the time of construction or operation, as well as the frequency of the environmental impacts on the components of the environment. Frequency is the measure of repetitions of an environmental effect over a period of time.

#### 4.1.2 Assessment of the significance of the potential impact

The assessment of the significance of the potential impact is based on the integration of the three indicators described above, i.e. intensity, extent and duration of the impact, and is obtained using the grid presented in the table below. It is thus possible to identify three levels of significance:

- Major: the impact causes strong repercussions on the component affected by the project, corresponding to a profound alteration of its nature and its use, and which may even jeopardize its sustainability;
- Moderate: the impact causes appreciable repercussions on the affected component, resulting in a partial alteration of its nature and its use, without however calling into question its durability in the study area;
- Minor: the impact causes reduced repercussions on the affected component, resulting in a minor alteration of its quality and use.

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
Strong	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Major
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor
Mean	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Mean
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor
Weak	Regional	Long	Mean
		Mean	Mean
		Short	Minor
	Local	Long	Mean
		Mean	Mean
		Short	Minor

	Punctual	Long	Minor
		Mean	Minor
		Short	Minor

## 4.2 Climate and meteorology

### 4.2.1 During the construction phase



The construction site has no impact on the climate, namely: Temperature and rainfall.

The impact of the construction phase on climate and temperature is of minor or even negligible importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	<b>Weak</b>	Weak

The impact of the construction works on the climate will be of low intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Weak</b>	Regional	Long	Mean
		Mean	Mean
		Short	Minor
	Local	Long	Mean
		Mean	Mean
		Short	Minor
	<b>Punctual</b>	Long	Minor

		Mean	Minor
		<b>Short</b>	Minor

The effect of the construction works on the climate will be of minor significance.

#### 4.2.2 During the operation phase

Estimating the exact impact of cold chains on the environment is a difficult exercise because the type of cold chain logistics varies from region to region and data on energy consumption or emissions from different sections of the cold chain are inconsistent. The limited data available suggests that food cold chains account for 1% of global CO<sub>2</sub> emissions <sup>1</sup>. Sources likely to cause climate change are: Emissions of greenhouse gases during cooling, which come from refrigerated vehicles.

Food cold chain process	Overview of emission sources	Quantity of emissions
Post-harvest cooling (including cleaning, packaging, etc.)	<p>Refrigeration is an energy-intensive technology. Depending on the type of food and the efficiency of operations, refrigeration can account for 60-70% of the electricity used in the establishment.</p> <p>The energy load also depends on the product and the cooling system cooling system (eg freezing, refrigeration for fresh meat and milk products).</p>	<p>There are no precise estimates of GHG emissions from electricity consumption for post-harvest cooling on a global scale due to the discrepancy in energy consumption between different countries.</p> <p>- The pre-chill range, especially for fruits and vegetables, is also defined by the regional sales cycle of these types of food.</p>
Transportation	<p>Depending on the type of refrigerated truck and the temperature maintained, it can consume around 20 liters of diesel per hour of travel.</p> <p>The refrigeration unit uses approximately 8% of the truck's total fuel consumption when in use.</p>	<p>The CO<sub>2</sub> emissions of medium, large and 32-38 ton refrigerated vehicles vary between 51g CO<sub>2</sub>/pallet/kilometre (km) and 115g CO<sub>2</sub>/pallet/km depending on temperature conditions.</p> <p>Refrigerants could increase CO<sub>2</sub> emissions from food vehicle transport systems by up to 40%. It is estimated that a high class vehicle with a refrigerant charge of 6 kilograms (kg) and an annual</p>

<sup>1</sup>James, SJ & James, C. The food cold-chain and climate change. Food Res. Int. 43, 1944–1956 (2010).

Food cold chain process	Overview of emission sources	Quantity of emissions
		leakage rate of 20% produces 5.3 g CO <sub>2</sub> /pallet/km.

The impact of the operating phase on the climate and temperature and of average importance to the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	<b>Weak</b>	Weak

The impact of the operation phase on the climate will be of low intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Weak</b>	Regional	Long	Mean
		Mean	Mean
		Short	Minor
	Local	<b>Long</b>	<b>Mean</b>
		Mean	Mean
		Short	Minor
	Punctual	Long	Minor
		Mean	Minor
		<b>Short</b>	Minor

The effect of the operation phase on climate will be of medium significance.

### 4.3 Soil and physical change

Soil can be affected and degrades over time. Soil degradation refers to undesirable changes in the physical, chemical and biological properties of soils.

#### 4.3.1 During the construction phase



The cold chain infrastructure construction works will generate various wastes that will pollute the ground. It's about :

- Ordinary Industrial Waste (DIB) which is non-inert and non-hazardous waste generated by activities. We can cite for example: timber (frames, framework, floor, etc.), metals, plastics, unsoiled packaging waste, paper, cardboard, etc.
- Inert Waste (DI) which is waste which does not undergo, in the event of storage, any significant physical, chemical or biological modification and does not present a danger to humans or the environment. Examples: remains of concrete and mortar, broken concrete blocks, sand and gravel, shavings, sawdust, pieces of formwork wood, mixed construction and demolition waste, not containing any hazardous substance, etc...

The impact of the construction phase on the ground is low following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of the construction works on the ground will be of medium intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
Mean	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Mean

		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The significance of the potential impact is minor. It requires special mitigation measures. This impact is reversible.

#### 4.3.2 During the operational phase

The most important sources of soil pollution are linked to cleaning water from the premises. With the promoter's requirement for the installation of separate pits (collection of washing water) this impact will be reduced. The ground of the buildings will be staked what will prevent having infiltrations. In addition, domestic solid waste generated by project staff may degrade the quality of surrounding agricultural land. Collecting its waste and transporting it to the nearest public landfill site.

The impact of the operation phase on the ground is average following the assessments carried out in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of the operation phase of the project on the ground will be of medium intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
Mean	Regional	Long	Major
		Mean	Major

	Local	Short	Mean
		Long	Major
		Mean	Mean
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The significance of the potential impact is medium. It requires special mitigation measures. This impact is reversible.

#### 4.4 Capacity Building



The project will increase capacity building and training during the construction and operation phases, ensuring that local people, project-affected people and their communities are prioritized. During the construction and implementation of the project, local people and project affected people will receive training, their skills will be enhanced and they will be used even after the life cycle of the project.

#### 4.5 Sources of energy

##### 4.5.1 During the operation phase



The average electricity consumption of current cold stores is around 30 to 50 kWh/m<sup>3</sup>/year, depending on the characteristics of the building, the activity, the temperature of the products, the outside temperature, the speed of rotation, the the size of the rooms. The following measures reduce consumption:

- Control the insulation system
- Provide maintenance
- Sustained management.



#### 4.6 Hydrology

##### 4.6.1 Surface water

###### 4.6.1.1 During the construction phase



Surface water quality could be affected by a number of factors during the construction of the cold chain infrastructure. Construction activities can lead to increased soil erosion and sediment loading of nearby waterways, while leaks or accidental spills of hydrocarbons (oil, fuel or other substances) can also pollute waters. surface and have an impact on groundwater.

The impact of the construction phase on surface water is average following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of construction works on surface water will be of medium intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Mean</b>	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Mean
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The significance of the potential impact is medium. It requires special mitigation measures. This impact is reversible.

#### 4.6.1.2 During the operational phase

The project activities are not likely to generate substances or objects that can pollute surface waters. It is noted that at the level of the project site, the absence of any watercourse, the rainwater runoff could be loaded by the washing waters of the infrastructure which could have an impact on the surface waters nearby. infrastructure.

The impact of the operation phase on surface water is moderate following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of the operation phase on surface water will be of medium intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
Mean	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Mean
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean

		Short	Minor
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The significance of the potential impact is medium. It requires special mitigation measures. This impact is reversible.

#### 4.6.2 Underground waters

##### 4.6.2.1 *During the construction phase*

Construction work in cold chain infrastructure can have significant impacts on hydrology and groundwater quality. Potential chemicals and improper handling of lubricating sludge, fertilizers and other toxic substances during construction can lead to groundwater pollution through gradual seepage.

The impact of the construction phase on the ground is average following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of construction works on surface water will be of medium intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Mean</b>	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Mean

		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The significance of the potential impact is medium. It requires special mitigation measures. This impact is reversible.

#### 4.6.2.2 During the operational phase

Project activities are not likely to generate substances or objects that could pollute groundwater. So there will be no direct or indirect impact of the project during the operation phase on groundwater.

## 4.7 Vibration

### 4.7.1 During the construction phase



The workers on the various infrastructural modernization work sites of the port, in particular the workers, will be exposed to the vibrations generated by the vehicles and machines operating on the site, during the dredging, excavation and vibro-compacting works.

The oscillations are exerted on the workers by means of means of transport, machines and vibrating tools. The importance of mechanical oscillations, characterized by their frequency, amplitude and duration, determines whether or not their action is detrimental to health, well-being and safety.

The effects of oscillations and vibrations on human beings can be detrimental to their well-being or even damaging to their organism. The oscillations can act both locally and on the whole body. The effects of vibrations are still poorly understood, above all in the neurovegetative field. Local vibrations can cause health problems, such as vasomotor disorders (Raynaud's syndrome or dead fingers), damage to the nervous system, damage to the bones and joints of the upper limbs and degeneration of the spine.

Regular exposure to vibrations, daily or several times a week, represents a health risk if the following acceleration values, weighted over a working day, are exceeded:

Guide values for vibrations

$$- \text{Ensemble main - bras: } \overline{a_{hw}} \leq 5m/s^2$$

$$- \text{Corps entier: } \overline{a_2} = 0,8m/s^2$$

The impact of the construction phase on vibrations is moderate following the evaluations carried out in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The intensity of this impact is classified as medium, the value of the component is social since it concerns human beings.

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Mean</b>	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Mean
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The significance of the potential impact of the project during the construction phase is medium. It requires special mitigation measures. This impact is reversible.

#### 4.7.2 During the operation phase

During the operational phase, the frequency of truck movements will increase, which may induce an increase in vibrations. The impact of the operation phase of the project on vibrations in the area is of low significance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of the operation phase of the project on vibrations around the area will be of low intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Weak</b>	Regional	Long	Mean
		Mean	Mean
		Short	Minor
	Local	Long	Mean
		Mean	Mean
		Short	Minor
	Punctual	Long	Minor
		Mean	Minor
		Short	Minor

The effect of the operation phase on noise will be of minor significance, this impact is reversible.

## 4.8 Air quality

### 4.8.1 During the construction phase



The Air component testifies to an accumulation of fine particles due to the movement of earth, digging and traffic in the site. Air quality may deteriorate within the work area. Maximum daily emissions can be estimated as a function of time with the maximum expected operations of construction equipment, fugitive dust, heavy truck operations, and commuting of the

workforce, divided by the number of working days. operation during this period (6 working days per week).

The impact of the construction phase on air quality is moderate following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of construction work on air quality will be of medium intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Mean</b>	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Mean
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The significance of the potential impact of the project during the construction phase is medium. It requires special mitigation measures. This impact is reversible.

#### 4.8.2 During the operational phase

It is important to note that the project is taking place in rural areas where the air quality is generally good. The current and existing source of air pollution along the project area is

vehicular traffic (particulates and combustion emissions). Potential air emissions from the Project in the form of fugitive dust and emissions releases will occur as a result of transportation activities of various products to and from Project sites, particularly when trucks travel over unpaved portions of tracks and roads. The local ambient air quality around the project area will be affected during the operation phase due to air emissions generated by transportation activities.

The impact of the operation phase of the project on noise in the area is of medium importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of the operation phase of the project on the noise around the area will be of low intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
Weak	Regional	Long	Mean
		Mean	Mean
		Short	Minor
	Local	Long	Mean
		Mean	Mean
		Short	Minor
	Punctual	Long	Minor
		Mean	Minor
		Short	Minor



The effect of the operational phase on noise will be of medium significance.

#### 4.9 Noise

##### 4.9.1 During the construction phase



During the construction phase, the noise level due to the mobilization of heavy machinery (side-boom, trax, mechanical shovels, bulldozer, trucks, etc.) is below the admissible limit threshold (60 dB) for short-term exposure. The non-repetitive nature of the construction work on the same perimeter and the scarcity of nearby environments potentially impacted, makes it possible to assess that the effects of noise and vibrations are minor, except for the site personnel, to whom by default, measures mitigation are required.

Sound levels from these sources can be estimated at 70 dB(A). The work will respect the usual working hours (7:00 a.m. to 6:00 p.m.).

In addition, Law 65-99 sets out the noise limits and individual protection standards.

During the work, these unusual noises in the environment and the rise in the noise level in the environment will cause noise pollution that can cause hearing problems on the site and disturb the tranquility of the surrounding populations.

The impact of the construction phase on noise is of medium importance following the assessments carried out in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of construction works on noise will be of medium intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
Mean	Regional	Long	Major
		Mean	Major

	Local	Short	Mean
		Long	Major
		Mean	Mean
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The significance of the potential impact of the project during the construction phase is medium. It requires special mitigation measures. This impact is reversible.

#### 4.9.2 During the operation phase

The noise emitted by the unit will be produced by trucks as well as transport vehicles, the movement of the vehicles themselves and the operation of mechanical equipment. During the operation phase, noise from trucks is not likely to be heard above the background noise of the surrounding road system.

The promoter will pay attention to the noise produced by the installations of his unit in order to minimize the impact on the areas bordering the site, it will however be very low and will remain within the standards taking into account:

- Both the machines and the installations carried out will comply with the safety standards in force;
- The sound levels which are very low compared to the standards in force (70db);
- Compliance with transport schedules (avoid night schedules).

The impact of the operation phase of the project on noise in the area is of medium importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak

Weak	Mean	Weak	Weak
------	------	------	------

The impact of the operation phase of the project on the noise around the area will be of low intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Weak</b>	Regional	Long	Mean
		Mean	Mean
		Short	Minor
	Local	Long	Mean
		Mean	Mean
		Short	Minor
	Punctual	Long	Minor
		Mean	Minor
		Short	Minor

The effect of the operational phase on noise will be of medium significance.

#### 4.10 Wildlife

##### 4.10.1 During the construction phase



The construction phase does not represent any significant impact that could affect terrestrial fauna. As the species existing on the two facades are mainly birds, a temporary migration from the site perimeter is expected. However, no rare or vulnerable species is likely to be directly impacted, except in relation to their deterioration or the destruction of their natural habitat (forests, Marjas, etc.).

The impact of the construction phase on wildlife is of minor or even negligible importance following the assessments made in the following tables:

Degree of disturbance	Component value
-----------------------	-----------------

	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	<b>Weak</b>

The impact of construction works on wildlife will be of low intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Weak</b>	Regional	Long	Mean
		Mean	Mean
		Short	Minor
	Local	Long	Mean
		Mean	Mean
		Short	Minor
	<b>Punctual</b>	Long	Minor
		Mean	Minor
		<b>Short</b>	<b>Minor</b>

The effect of construction works on wildlife will be of minor significance.

#### 4.10.2 During the operation phase

During the operation of the project and to meet the sanitary requirements of the storage and distribution of the cold chain, it is important to install and have the necessary devices to hunt insects and other species outside the infrastructure, which will impact wildlife around the project but not to a significant extent.

The impact of the operation phase on wildlife is of minor or even negligible importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	<b>Weak</b>

The impact of the operation phase on wildlife will be of low intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Weak</b>	Regional	Long	Mean
		Mean	Mean
		Short	Minor
	Local	Long	Mean
		Mean	Mean
		Short	Minor
	Punctual	<b>Long</b>	<b>Minor</b>
		Mean	Minor
		Short	Minor

The effect of the operation phase on wildlife will be of minor significance.

#### 4.11 *The flora*



##### 4.11.1 During the construction phase

Vegetation at the project site consists of grass and seasonal crops. Land preparation and earthworks operations will only require some deforestation.

Hence, the impact of the development, construction and transport work phase on the vegetation of the environment studied will be of low intensity.

The project is located in an area with no space recognized as a protected area. However ; it is located in the middle of agricultural land and land with dayas and crops will not be impacted during the project's operating phase.

The impact of the construction phase on the flora is of minor or even negligible importance following the assessments carried out in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	<b>Weak</b>

The impact of the construction works on the flora will be of low intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Weak</b>	Regional	Long	Mean
		Mean	Mean
		Short	Minor
	Local	Long	Mean
		Mean	Mean
		Short	Minor
	<b>Punctual</b>	Long	Minor
		Mean	Minor
		<b>Short</b>	<b>Minor</b>

The effect of the construction works on the flora will be of minor significance.

#### 4.11.2 During the operation phase

The installation of the project will have an indirect impact through the clearing of vegetation on microfauna and the protection of the soil against the various forms of soil erosion. This impact remains slight taking into account the nature of the project. Also, the petitioner will reinforce the installation of a plant screen at the level of the fence.

The impact of the operation phase on the flora is of minor or even negligible importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	<b>Weak</b>

The impact of the operation of the infrastructure on the flora will be of low intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Weak</b>	Regional	Long	Mean
		Mean	Mean
		Short	Minor
	Local	Long	Mean
		Mean	Mean
		Short	Minor
	<b>Punctual</b>	Long	<b>Minor</b>
		Mean	Minor
		Short	Minor

The effect of the construction works on the flora will be of minor significance.

#### 4.12 Odors

##### 4.12.1 During the construction phase



Due to its nature, the cold chain infrastructure construction project has minor negative impacts, indeed the waste emitted during the construction phase will be the only source of unpleasant odors.

The impact of the construction phase on odor is of minor or even negligible importance following the assessments carried out in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of the construction works on the odor will be of low intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Weak</b>	Regional	Long	Mean
		Mean	Mean
		Short	Minor
	Local	Long	Mean
		Mean	Mean
		Short	Minor
	<b>Punctual</b>	Long	Minor
		Mean	Minor
		<b>Short</b>	<b>Minor</b>

The effect of construction works on odor will be of minor significance. This impact is reversible



#### 4.12.2 During the operation phase

During the operation of the infrastructure, there will be no release of odors, even the waste that will be rejected will not have an impact on the odor of the area surrounding the site.

### 4.13 *Waste management*

#### 4.13.1 During the construction phase



Several activities and factors related to the sub-project will produce waste likely to pollute the ground or clutter it.

This concerns the use/storage of lubricants and fuels and other site materials, the maintenance of vehicles and machinery, the catering of personnel, the withdrawal from the construction site, etc.

The waste generated may be solid or liquid and thrown on the ground. This may result in congestion or soil pollution. This waste will be, among other things, packaging for various consumer products, tin cans which are generally non-biodegradable. During the storage and use of lubricants and fuels as well as the maintenance of vehicles and machines, more or less significant quantities of these products can accidentally spill onto the ground and pollute it.

Moreover, at the end of the construction works, carcasses of machines and other remains of materials may be left on the sites or in the periphery. These machine carcasses will gradually leak out the remains of engine oil and fuel. Such flows will pollute the ground, even beyond the obstruction that will be caused by their presence. Pollution and land clutter is a direct negative impact.

The impact of the construction phase on waste management is of medium importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of construction work on waste management is medium.

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Mean</b>	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Mean
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The effect of construction works on waste management will be of medium significance, this impact may be reversible.

#### 4.13.2 During the operational phase

The operational phase of the project will generate moderate amounts of solid waste. The types of waste likely to be generated include packaging, green waste, cans, bottles, hazardous waste (waste fuel, etc.).

Solid waste management is likely to have a moderate indirect impact on the environment, with appropriate mitigation measures. The primary concern of the project is related to potential food waste resulting from spoilage or emergency issues such as a cold storage system or power outage. In such a scenario, there may be large amounts of waste to be disposed of, and if left in open areas, it may pose a health concern.

The impact of the project's operations phase on waste management is of medium importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak

Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of cold chain infrastructure operations on waste management is medium.

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Mean</b>	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Mean
		Short	Mean
	<b>Punctual</b>	Long	Mean
		Mean	Mean
		Short	Minor

The effect of infrastructure operations on waste management will be of medium significance, this impact may be reversible.

#### 4.14 Cultural properties

##### 4.14.1 During the construction phase



Diamniadio does not have cultural properties. No paleontological evidence has been recorded in the area. However, an archaeologist may be hired during the construction phase to monitor excavated areas and any unearthed items or artifacts. If elements are discovered, it will be necessary to modify the route of the pipeline to avoid damaging them.

##### 4.14.2 During the operational phase

Based on public consultation, site assessment and available documentation, there is no area of interest in terms of archaeological, historical and cultural sites near the cold chain infrastructure.

#### 4.15 Natural landscapes

##### 4.15.1 During the construction phase



During the construction phase, there will be a modification of the existing landscape through deforestation with the possible felling of partially protected species. Clearing will reduce vegetation and disturb wildlife found in the area, particularly monkeys and birds.

The construction works of the installations can contribute to a degradation of the landscape

(Visual nuisance) by the generation of waste of any kind. This impact will be all the greater if precautions are not taken by the contractor in charge of the works.

The opening and anarchic exploitation of unauthorized quarries for the extraction of construction materials (sand, gravel, etc.) can also contribute to deforestation and the disfiguration of the landscape.

##### 4.15.2 During the operational phase

The construction of the cold chain infrastructure in Diamniadio will no longer change the landscape of the area.

The impact of the operation phase on the cultural landscapes is of minor or even negligible importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	<b>Weak</b>	Weak

The impact of the operation phase of the project on cultural landscapes will be of low intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Weak</b>	Regional	Long	Mean
		Mean	Mean
		Short	Minor
	Local	Long	Mean

		Mean	Mean
		Short	Minor
	<b>Punctual</b>	Long	Minor
		Mean	Minor
		Short	Minor

The effect of the operation of cold chain infrastructure on cultural landscapes will be of minor significance.

#### *4.16 Geological features*

The project will have no direct or indirect influence on the geological characteristics of the area in the two phases: construction phase and operation phase.

#### *4.17 Hydrological characteristics*

The project will have no direct or indirect influence on the hydrological characteristics of the area in the two phases: construction phase and operation phase.

#### *4.18 Cultural landscape*

The project will have no direct or indirect influence on the cultural landscape of the area in the two phases: construction phase and operation phase.

#### *4.19 Entertainment*

The project will have no direct or indirect influence on the entertainment areas of Diamniadio in the two phases: construction phase and operation phase.

#### *4.20 Ground subsidence*

Activities that may cause ground subsidence are not anticipated during the construction or operation phase. There will be no direct or indirect influence of the project on ground subsidence.

## **5 Current social reference state**

### **5.1 Population**

The general population census of 2013 estimated the population of the municipality of Diamniadio at 23,547 inhabitants and that of the municipality of Bambilor at 44,962 inhabitants (ANSD 2015). With a workforce of 10,898 inhabitants in 2002 (ANSD 2004), the population of Diamniadio has doubled in a decade. Among the growth factors noted, the share of immigration is not negligible. Indeed, the department of Rufisque is the area of expansion of residential spaces par excellence in the Dakar region. It has become the preferred destination for people looking for new housing. Land saturation in the departments of Dakar, Pikine and Guédiawaye explains the rush to the department of Rufisque for housing needs. Thus, with an area of 371.7 km<sup>2</sup>, the department of Rufisque occupies more than 67% of the Dakar region and has the last land reserves in the region.

It thus hosts the major urban development projects of the State: infrastructure projects, industrial activities, housing projects. More than 25,000 plots are being allocated and built (Diamniadio commune 2017). The advent of the urban center of Diamniadio with a projection of 350,000 inhabitants by 2025 suggests a demographic boom in the municipal perimeter and its surroundings in the coming years. Historically, the land of Diamniadio was populated by Lebous and of Serer but the various highly economic migrations (installation of industries, agricultural activities, etc.). Today, these neighborhoods are characterized by an ethnic diversity which has increased due to the various migrations linked above all to the availability of housing plots or to economic reasons.

The establishment of the Diamniadio center in this territory is a new factor of local migration, particularly with the influx of laborers and various service providers. Indeed, the objective of functional and social diversity set at the pole, suggests the presence of a wave of populations with a more modern form of housing and a densification of economic, administrative, social infrastructures and associated services.

### **5.2 Public facilities**

The neighboring districts around the urban center of the extension zones (such as Keur Ndiaye Lô in Bambilor and Bargny green city in Bargny) or are former villages attached to the municipalities (this is the case of Déni Malik Gueye in Diamniadio). Access to basic social services is moderately satisfactory.

#### **5.2.1 Health**

In the commune of Bambilor, there is only one health post in Keur Ndiaye Lô, one health center and three health posts in Diamniadio. The construction of the Diamniadio pediatric hospital reinforces the existing potential by offering a technical platform that polarizes beyond the municipality, the department of Rufisque but also localities in the interior of the country and the sub-region. The health infrastructures of these local authorities are characterized by under-equipment and a shortage of personnel, like many of the country's health structures.

The urban center of Diamniadio comes to enhance the medical platform by developing an ambitious health program with the realization by the Pasteur Institute Foundation of Dakar of the Africamaril project which consists of the construction of the largest production unit of

vaccines against yellow fever in Africa. The unit aims for an annual production of 10 to 15 million vaccines with a maximum capacity of 30 million.

A Dakar Medical City university hospital center is also planned in the urban center of Diamniadio.

### 5.2.2 Education

There are many primary schools in the neighboring districts (Keur Ndiaye Lô, Déni Malick Gueye and Bargny ville verte). The urban center reinforces the sector, particularly for higher education with the second University of the Dakar region (Amadou Makhtar Mbow University), oriented towards science, technology, trades, economics and management and social sciences.

It should also be noted the presence of private teaching structures in the PUD such as the Health Research Institute for Epidemiological Surveillance and Training (IRESSEF).

### 5.2.3 Access to energy and the telecommunications network

The Diamniadio urban center must be served by the Senelec network. The various infrastructures also have their own production units made up of emergency generators or photovoltaic solar systems.

Telephone network coverage is with the three main mobile operators in Senegal: Orange, Tigo and Expresso. The first two have set up data centers in the area.

## 5.3 *Road traffic*

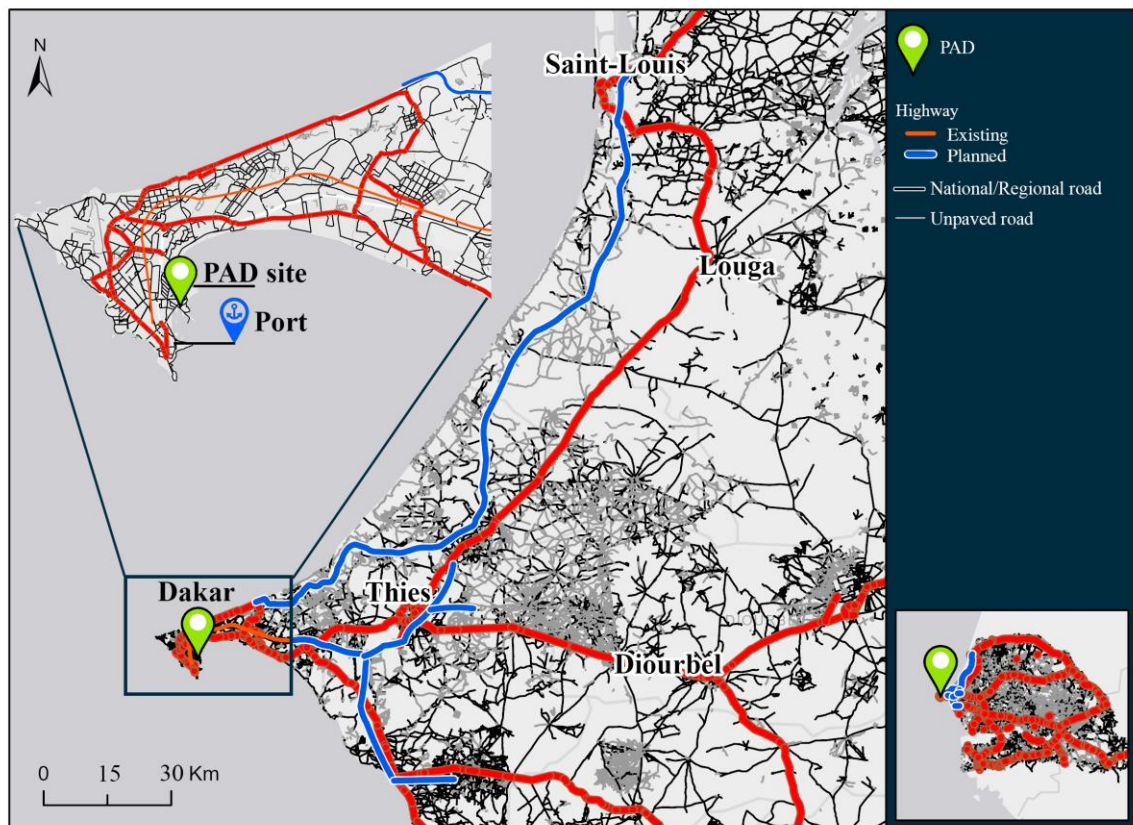
Since the end of 2012, access to the municipality of Bambilor as well as to localities in the area has been facilitated by the toll motorway (Dakar – Diamniadio). The other means of communication are made up of the national road, tracks making it possible to join isolated areas, in particular fields, orchards, henhouses and villages. The extension of the toll motorway with the Diamniadio – Diass motorway under construction will help facilitate direct access to the new Blaise Diagne International Airport (AIBD).

In the outlook, note should be taken of the regional express train (TER) project which will connect the Dakar region to the AIBD via Diamniadio which will be served at the emblematic Diamniadio station.

The urban pole is accessible by the toll motorway which horizontally separates the pole from North to South. Inside the axis of 70 m which separates Arrondissements 2 and 3 from Arrondissements 1 and 4 vertically, a road is being built by the company CSE. The Germe de Ville loop that surrounds the heart of the center is under construction with the company SOTRACOM. All other road works and miscellaneous networks are entrusted to the company ECOTRA.

Among the networks operated by dealers, we can cite:

- The Lac de Guiers supply pipe (ALG 1) DN 1100 and another pipe connecting to the ALG 1 (DN 800) operated by SDE;
- A medium voltage electricity network (30kVA) operated by SENELEC;
- A gas line located north of the site at the limit of the pole;
- The toll highway.



#### 5.4 Jobs

In the Dakar region, the population of working age is estimated at 2,291,411 in 2019 compared to 2,243,217 in 2018. As in the general population, women appear to be more numerous than men and it is noted that the working population is growing. from year to year, which implies that the level of absorption of the labor market is still low.

Due to the absence of labor market characteristics in Dakar, we will characterize the labor market in Senegal. The unemployment rate is estimated at 24.1% in the fourth quarter of 2021, an increase of 7.8 percentage points compared to the last quarter of 2020. Unemployment is higher in rural areas where the rate is estimated at 29 .8% against 19.1% in urban areas. By gender, unemployment affects women more (35.8%) than men (13.0%). More than half (55.8%) of the working-age population (15 years or older) participated in the labor market in the fourth quarter of 2021. The activity rate fell by 2.1 points percentage compared to the same period in 2020 and varies according to the place of residence, with a level of 57.2% in urban areas, against 54.3% in rural areas. According to gender, it is higher among men (64.5% against 48.8% for women).



### ***5.5 Quality of products available in local markets***

Like in developing countries, the local market in Senegal is mainly characterized by the predominance of the informal sector in several regions, presenting products with mediocre or inferior quality.

The formal market in Senegal is concentrated in the Dakar region, which is characterized by the presence of modern processing units, as well as supermarkets and hypermarkets selling products imported from Europe and products that meet health standards and requirements. .

On the other hand, the consumption of agricultural products is oriented towards urban (informal) markets mainly because of the relatively low prices compared to prices in formal markets.

At the level of the processing plants, the heterogeneity of peasant production was managed with mixed success by carrying out sorting at the entrance, cleaning at different stages of the process and verification at the exit. However, these actions could not solve the lack of homogeneity of the raw material or the contaminations.

This situation limited the performance and competitiveness of Senegalese agricultural products. It resulted in low prices for producers, low productivity of processing units and marketing made difficult by the variable quality of the product and strong competition from imports of more homogeneous quality.

The meat and dairy sectors focus on short-cycle farming in semi-intensive and intensive systems capable of producing sufficient quantities of quality products around major consumption centres. They are based on an improvement in the production and sales cycles.

A diversity of processing companies promote a diversified supply of processed products of increasing quality. These companies represent an essential element of the agro-industrial sector, valuing primary productions, creating agricultural and non-agricultural jobs, in particular for rural women and young people.

### ***5.6 Accessibility of farmers to cold chain infrastructure***

Rapid access to the cold chain is an essential requirement for agribusinesses and farmers to take advantage of the growing demand for fresh produce in national and international markets that demand consistent quality, large volumes and high levels of Food Safety. Access to first-mile cold chain and certification-ready facilities offers agribusinesses the ability to reduce post-harvest losses and store, consolidate and process produce from multiple farmers.

Despite this, the cold chain system is still weak or even non-existent in some countries. A small percentage of all perishable product volumes in Senegal are refrigerated. As in most emerging markets, cold chain growth is fragmented, usually concentrated in urban centers, and cold storage capacity for fresh produce consists mainly of large packing warehouses with cold rooms. The storage capacity of cold rooms in Senegal is allocated mainly to seafood products, favoring the country's exports.

In rural areas, most farmers located in the first mile of distribution do not have the infrastructure necessary for the development of the cold chain. Additionally, most farmers do not have access

to the cold chain due to their inability to invest capital in infrastructure or due to the lack of nearby cooling facilities, which means they are relatively disadvantaged in the supply chain.

## 6 Potential social impacts

### 6.1 Human environment

#### 6.1.1 During the construction phase

The risks of work accidents and damage to the health and safety of employees and populations will be linked to the construction of foundations, the construction of buildings, related infrastructure and fencing (elevation of walls, framework, coating) , related facilities, movement of vehicles and machinery, presence of site personnel, onlookers and job seekers as well as during maintenance of vehicles and machinery.

Accidents at work can be related to a shock, a fall, a slip, an injury, etc. or be the result of poor control of the operation of equipment and poor posture during manual and mechanical handling. For the risks of disease, factors such as dust, gases and odors can be identified, with risks of contamination by respiratory and eye diseases.

The impact of the construction phase on the population is of medium importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of the construction works on the population is of medium intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
Mean	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Mean
		Short	Mean
	Punctual	Long	Mean

		Mean	Mean
		<b>Short</b>	Minor

The effect of construction works on road traffic will be of medium significance, this impact may be reversible.

## **6.2 Habitat**

### **6.2.1 During the construction phase**

According to the site observations, the area development plan and the GIS analysis, there will be no potential impact of the project on the habitat since the area is already designed as an industrial area.

### **6.2.2 During the operation phase**

According to the site observations, the area development plan and the GIS analysis, there will be no potential impact of the project on the habitat since the area is already designed as an industrial area.

## **6.3 Public facilities**

### **6.3.1 During the construction phase**

According to the observations of the site, the development plan of the area and the GIS analysis, there will be no potential impact of the project on public facilities (Schools, Hospitals or others) since the area is already designed as an industrial zone where there are no public facilities, namely "electricity station or other public infrastructure" which may be directly or indirectly impacted by the project during the construction phase.

### **6.3.2 During the operational phase**

According to the observations of the site, the development plan of the area and the GIS analysis, there will be no potential impact of the project on public facilities (Schools, Hospitals or others) since the area is already designed as an industrial zone where there are no public facilities, namely "electricity station or other public infrastructure" which may be directly or indirectly impacted by the project during the operation phase.

## **6.4 Road traffic**

### **6.4.1 During the construction phase**

The circulation of construction trucks and transport of materials for the construction of the cold chain infrastructure will disturb the movement of the inhabitants a little. The increase in traffic could also locally increase emissions of dust and other solid particles and exhaust gases.

The impact of the construction phase on road traffic is of medium importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of construction works on road traffic is medium

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Mean</b>	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Mean
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The effect of construction works on road traffic will be of medium significance, this impact may be reversible.

#### 6.4.2 During the operation phase

Daily traffic related to the operation of the cold room will concern staff vehicles and refrigerated distribution and transport trucks. However, this impact will be moderate to minor as additional parking will also be provided for parking.

In addition to the fact that transport activities generate environmental impacts linked to greenhouse gas (GHG) emissions, transport can generate other impacts, known as societal, such as noise, deterioration of pavements, accidents in urban areas. Often presented in the background, these side effects represent a real financial but also human cost. Better control of travel is therefore an environmental and societal issue.

The impact of the operation phase on road traffic is of medium importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of mining works on road traffic is moderate

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
<b>Mean</b>	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Mean
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The effect of the project operation phase on road traffic will be of medium significance, this impact may be reversible.

## 6.5 Jobs

### 6.5.1 During the construction phase

The construction of the cold chain infrastructure, sanitation works and roads will require the recruitment of skilled and unskilled labour. It is a job opportunity for young people looking for labourers. Thus, the works will generate direct and indirect jobs. It is a chance for local labor (from different localities due to the Commune of Parakou or surrounding Communes) because for these types of work, it is more prioritized. This labor will be more in demand for the actual construction work, painting, cleaning, glazing, security, etc. In total, from the preparation phase to construction, 100 jobs will be created.

The impact of the construction phase on employment is of medium importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of the construction works on employment will be of high intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
Strong	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Major
		Short	Mean

	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The significance of the potential impact of the project during the construction phase is medium. It requires special mitigation measures. This impact is reversible.

#### 6.5.2 During the operation phase

The project will generate multiple direct and indirect jobs. For direct jobs, there will be the recruitment of personnel who will have a direct link with the infrastructure, namely the shelving workers, the inventory manager and the manager. Indirect jobs will be created in the field of miscellaneous trade, miscellaneous consumer goods, provision of small services, catering, etc. which will be able to develop around the infrastructure in order to satisfy the needs of the workers. With this project, the promotion of this sector will encourage the creation of around 200 jobs, especially for young people trained in the logistics and cold chain sector. The activities, surveillance and guarding of the site will generate specific jobs on the site. Job creation is a direct and indirect positive impact. It is high intensity, given the high potential number of people to be employed. This staff will come from localities neighboring the site as well as from other localities in the country or even from outside, depending on the technical skills and expertise required. Therefore, the extent of the impact is considered regional. The jobs will last for the duration of the project.

The impact of the operation phase on employment is of major importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of mining works on employment will be very intense

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
Strong	Regional	Long	Major



		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Major
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The significance of the potential impact of the project during the operation phase is major.

## **6.6 Accessibility of farmers to cold chain infrastructure**

### **6.6.1 During the construction phase**

During the construction phase, the project will have no direct or indirect impact on the accessibility of farmers.

### **6.6.2 During the operation phase**

The commissioning of the cold chain infrastructure will increase the vision of the actors of the different sectors (Agricultural, Dairy products, meat and others) due to the modernity of the storage equipment for these products. So they will find pleasure and satisfaction.

The work planned as part of the modernization of the cold chain infrastructure will allow rational and optimal management of space. This would give a better organization and occupation of the space inside this infrastructure. Indeed, the markets may be equipped with an operational back-up plan in the event of an emergency. From a security point of view, farmers can access the storage premises by respecting the security codes which will be drawn up by the Ifria team. Thus, the lighting will have a deterrent effect in the fight against insecurity, banditry in the environment of the infrastructure. The technology to be deployed will considerably reduce the constraints formerly linked to the activity.

The operation of the infrastructure will generate gains which will be reinvested in the infrastructure with a view to improving its technological performance and renewing obsolete equipment.

The impact of the exploitation phase on the accessibility of farmers is of major importance following the evaluations carried out in the following tables:

Degree of disturbance	Component value
-----------------------	-----------------

	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of the operation of the infrastructure on the accessibility of farmers will be of high intensity

Impact intensity	Scope of impact	Duration of impact	Meaning of potential impact
Strong	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Major
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The significance of the potential impact of the project during the operation phase is major.

## 6.7 *Quality of products available in local markets*

### 6.7.1 During the construction phase

During the construction phase, the project will have no direct or indirect impact on the quality of products available on local markets.

### 6.7.2 During the operation phase

The agricultural products cold chain is a special supply chain system. The agricultural products cold chain is composed of agricultural producers (farmers/production base), agricultural product supply and processing companies, distributors, retailers and logistics companies, a service network farm-to-table logistics.

Specifically, the cold chain of agricultural products includes agricultural production, acquisition, sale of the pre-cooling process, transportation, storage, handling, transport, packaging, distribution, processing of circulation, information activities and other sectors, and aims to achieve organizational objectives and produce added value in the process.

The project will provide most of the added value of the cold chain process, namely: pre-cooling, storage, packaging and distribution using modern equipment and ensuring product quality (by reducing the percentage of post-harvest loss) passing through Ifria's cold chain infrastructure intended for the local market or the external market.

The impact of the exploitation phase on the quality of the products available on the local market is of major importance following the evaluations carried out in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of the operation of the infrastructure on the quality of the products available on the local market will be of high intensity

Impact intensity	Scope of impact	Duration of impact	Meaning of potential impact
Strong	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Major
		Short	Mean
	Punctual	Long	Mean
		Mean	Mean
		Short	Minor

The significance of the potential impact of the project during the operation phase is major.

## 6.8 *Quality of life of the population*

### 6.8.1 During the construction phase

The project site is far from the homes of Diamniadio, it is located in the industrial zone of the new city. However, for users of the industrial zone, the work could cause some inconvenience (noise, dust, construction waste, etc.). In terms of environmental hygiene, the anarchic discharge of waste from the works (especially residues from the demolition of existing buildings) and from the site base could degrade the site or its environment.

The impact of the construction phase on the quality of life of the population is of medium importance following the assessments made in the following tables:

Degree of disturbance	Component value		
	Strong	Mean	Weak
Strong	Strong	Strong	Mean
Medium	Strong	Mean	Weak
Weak	Mean	Weak	Weak

The impact of the construction works on the quality of life of the population will be of medium intensity

Impact intensity	Extent of impact	Duration of impact	Meaning of potential impact
Mean	Regional	Long	Major
		Mean	Major
		Short	Mean
	Local	Long	Major
		Mean	Mean
		Short	Mean

	<b>Punctual</b>	Long	Mean
		Mean	Mean
		<b>Short</b>	Minor

The significance of the potential impact of the project during the construction phase is medium. It requires special mitigation measures. This impact is reversible.

## 7 Reduction measures

### 7.1 Summary of impacts

Phase, project activities	Possible effects related to the project	Effect characteristics			
		Intensity	Extent	Duration	Significance
Construction phase	Climate	Weak	Punctual	Short	Minor
	Floor	Mean	Punctual	Short	Minor
	Surface water	Mean	Local	Short	Mean
	Underground waters	Mean	Local	Short	Mean
	Vibration	Mean	Punctual	Mean	Mean
	air quality	Mean	Local	Short	Mean
	Noise	Mean	Local	Short	Mean
	Wildlife	Weak	Punctual	Short	Minor
	Flora	Weak	Punctual	Short	Minor
	Odors	Weak	Punctual	Short	Minor
	Waste management	Mean	Local	Short	Mean
	Cultural properties	Weak	Punctual	Short	Minor
	Cultural landscapes	Weak	Punctual	Short	Minor
	Human environment	Mean	Local	Short	Mean
	Road traffic	Mean	Local	Short	Mean
	Quality of life of the population	Mean	Local	Short	Mean
Jobs	Strong	Local	Short	Mean	
Operation phase	Climate	Weak	Local	Long	Mean
	Floor	Mean	Punctual	Long	Mean

	Surface water	Mean	Punctual	Long	Mean
	Vibration	Weak	Local	Short	Minor
	air quality	Weak	Local	Long	Mean
	Noise	Mean	Local	Long	Mean
	Wildlife	Weak	Punctual	Long	Minor
	Flora	Weak	Punctual	Long	Minor
	Waste management	Mean	Punctual	Mean	Mean
	Cultural properties	Weak	Punctual	Long	Minor
	Cultural landscapes	Weak	Punctual	Long	Minor
	Road traffic	Mean	Local	Short	Mean
	Jobs	Strong	Regional	Long	Major
	Accessibility of farmers to cold chain infrastructure	Strong	Regional	Long	Major
	Quality of products available on the market	Strong	Regional	Long	Major
	Quality of life of the population	Strong	Regional	Long	Major

## 7.2 *Reduction measures*

### 7.2.1 Air pollution

- Ensure proper maintenance and repair of equipment and machinery.
- Adopt a traffic management plan avoiding congested roads.
- Ensure vehicles and machinery are turned off when not in use.
- Hose down surfaces to control dust emissions
- Avoid burning materials resulting from site clearance.
- Make sure people working in dusty areas have PPE.
- Ensure the use of high quality diesel for generators and vehicles.

- Maintain a minimum traffic speed on the site and on access roads.
- Make sure building materials and hazardous substances are handled properly.
- Cover all vehicles transporting materials likely to generate excessive dust emissions.
- Water surfaces regularly to control dust emissions.

#### 7.2.2 The water pollution

- Ensure that sediment and erosion control measures are installed.
- Follow guidelines and procedures for immediate cleanup of spills (oil, fuel, chemicals).
- Cover open stockpiles of building materials on site with tarps during storms to prevent building materials from being washed away.
- Install natural or synthetic liners under chemical storage tanks.
- Compact earthworks as soon as the final surfaces are formed to prevent erosion, especially during the rainy season.
- Be sure to grade gravel roads to maintain existing drainage patterns.
- Ensure the protection of riparian areas
- Take care to avoid the dumping of construction waste into waterways.
- Ensure that chemicals and materials used on the job site are properly stored.

#### 7.2.3 Soil pollution

- Landscape excavated areas to allow native vegetation to grow back naturally.
- Suspend activities during extreme precipitation events
- Be sure to provide drainage channels and silt traps for all parts of the topsoil storage areas.
- Be sure to reclaim areas with topsoil and revegetate them after activities are completed.
- Use non-toxic and readily biodegradable chemicals on site when possible.
- Install natural or synthetic liners under chemical storage tanks.
- Level unpaved roads

#### 7.2.4 Vibes

- Choose intrinsically silent equipment
- Keep equipment speed as low as possible
- Minimize idling time for pickup trucks and other equipment.
- Limit working hours on site when possible
- Ensure that all workers exposed to environmental noise are equipped with appropriate hearing protection and PPE.
- Schedule noisy activities during the morning hours
- Set up noise monitoring
- Inform the local population when loud activities are planned.
- Properly use and maintain mufflers that reduce vibration from construction machinery.
- Use only well-maintained mechanical equipment on the job site.

#### 7.2.5 Climate change

- Use machinery and vehicles in good working order
- Ensure regular maintenance and technical inspections of construction machinery and vehicles

#### 7.2.6 Hydrological characteristics

- Use vehicles in good working order to carry out the work
- Provide the site with garbage bins for the pre-collection of household waste
- Have on each site a sealed space for handling used oils



- Take preventive measures to avoid accidental spills of effluents when emptying septic tanks
- Provide oil absorption devices in case of accidental spillage
- To avoid disruption of the surface water flow system, the substation's concrete areas will be limited to runways and handling areas.

#### 7.2.7 Wildlife

- Avoid killing any wild animal during the work;
- Avoid killing any wild animal caught during the work and keep it away from the site;
- Do not expose food or attract prey to avoid attracting predators (snakes among others) to the site;
- Physically protect construction sites against snakes;
- Avoid the elimination of wild animals during the work;
- Prevent any hunting activity
- Be sure to report wildlife species of high conservation value.
- Avoid any direct or indirect impact on areas of high ecological value.
- Ensure sustainable management of solid and liquid waste from construction and operating activities.
- Ensure that exterior lighting on construction sites is discreet and switched off when not needed.
- If these measures described above are taken into account, they will partially reduce the impacts during the operation phase.

#### 7.2.8 Flora

- Reduce the direct destruction of vegetation as much as possible by delimiting the surfaces of construction sites, barracks, access tracks and sites for the storage and extraction of construction materials to the strict minimum and by concentrating all activities within these sites.
- Identify and clearly delineate the sites (marking them with ribbons, informing the workers) and the areas not to be damaged, considering their ecological value (denser vegetation, etc.).
- Take all preventive measures to avoid damaging the surrounding environment, in particular agricultural land;
- Protect the species present;
- Carry out the adjustment and restoration of the premises after the work.

#### 7.2.9 Natural landscape

- Reinforce the presence of visual plant screens vis-à-vis the landscape of the area and the axes of communication of rural localities.
- Reinforce the plantations at the level of the fence taking into account the orientations of the prevailing winds and constitute a diversified and coherent screen fitting into the landscape.

#### 7.2.10 Noise

- Use equipment with low noise emissions, as indicated by the manufacturers.
- Properly adjust and maintain all vehicles and machinery.
- Where possible, conduct construction activities during daylight hours to minimize disturbance to humans and wildlife.
- Limit working hours to 7 a.m. - 7 p.m. when activities are very noisy.

All costs included in the contract value as general maintenance of the site.

#### 7.2.11 Population

- Provide staff with adequate Personal Protective Equipment (PPE) (helmets, safety shoes, boots, etc.)
- Provide the site with an infirmary and first aid equipment; –register employees with the National Social Insurance Fund (CNPS);
- Raise awareness among employees and local populations on hygiene, health and safety at work;
- Develop and apply a Health, Safety and Environment Plan (PHSE);
- Train employees in safety and risks and ensure compliance with the wearing of personal protective equipment (PPE) on construction sites;
- Sign an agreement with the CHD Borgou-Alibori to manage serious cases of accidents;
- Put up signs near the work areas (approximately 100m).

#### 7.2.12 Road traffic

- Sensitize the local populations as well as the project drivers on road safety
- Put up signs to indicate the presence of the works.

#### 7.2.13 Waste management

Identify all waste streams for effective management

- Manage waste based on the three Rs (reduce, reuse, recycle)
- Train all staff.
- Minimize the production of waste that must be treated or disposed of.
- Control placement of all construction waste (including spoil) in approved disposal sites (>300m from rivers, streams, lakes or wetlands). Deposit in authorized areas all waste, metals, used oils and surplus materials produced during construction, integrating systems for recycling and separation of materials. Identify and delineate equipment maintenance areas (>15m from rivers, streams, lakes or wetlands).
- Sign a contract for the recovery and treatment of hydrocarbon waste, filters, irons, batteries and other non-biodegradable waste with a company that has an environmental permit
- Set up a concrete washing area for vehicles and machinery with an oil separator

#### 7.2.14 Quality of life of the population

- Ensure sorting, collection and transport to the waste management center
- Inform and raise awareness among the personnel and users of the industrial zone
- Ensure the cleaning and removal of the site after the work.

### **7.3 *Environmental and social programs, monitoring and follow-up***

#### **7.3.1 Construction stage**

##### *7.3.1.1 Environmental and social monitoring*

Environmental and social monitoring

The purpose of environmental monitoring is to ensure compliance with:

- The measures proposed in the impact study, in particular the mitigation measures;
- Conditions set by regulations and the various standards;
- Commitments of the promoter in relation to the institutional actors concerned;

- Requirements relating to other laws and regulations in terms of hygiene and public health, management of the living environment of populations, protection of the environment and natural resources. Environmental monitoring will concern both the construction phase of the infrastructure and the operation phase.

During the construction phase, environmental and social monitoring must be carried out by a Control Office or Control Mission (MdC) whose main missions will be to:

- Ensure compliance with all current and specific mitigation measures for the project;
- Remind contractors of their environmental obligations and ensure that these are respected during the construction period;
- Write environmental monitoring reports throughout the work;
- Inspect the work and request the appropriate corrective measures if necessary;
- Write the final report of the environmental monitoring program during the period.

#### *7.3.1.2 Environmental and social monitoring*

Environmental monitoring will make it possible to verify, in the field, the accuracy of the assessment of certain impacts and the effectiveness of certain mitigation or compensation measures provided for in the ESIA, and for which uncertainty remains. The knowledge acquired with the environmental monitoring will make it possible to correct the mitigation measures and possibly to revise certain measures taken by the proponent in terms of environmental management. It will be ensured by the Environment Expert that Ifria will recruit to lead the Environment Unit.

#### 7.3.2 Areas of environmental and social inspection

During the works, monitoring will include the effectiveness of the implementation of the mitigation measures retained in the environmental and social surveillance and monitoring programme. Aspects that should be monitored include:

##### **In the construction phase:**

- Gear movement
- Origin of building materials
- Protection of personnel against the raising of dust
- Soil erosion during excavations
- Waste management
- Hygiene and safety on the construction site

##### **In operation phase**

- Air quality
- Quality of stored products
- Operating personnel and accidents
- Fire fighting device
- Energy consumption
- Control of the cold chain

#### 7.3.3 Environmental and social monitoring indicators

Indicators are parameters whose use provides quantitative or qualitative information on the environmental and social impacts and benefits of project activities. Monitoring of all

biophysical and socioeconomic parameters is essential. It is suggested to follow the main elements indicated in the following tables:

### 7.3.3.1 During the construction phase

Table 2: Monitoring indicators during the construction phase

Item to check	Indicators	Monitoring manager	Implementation deadline
Gear movement	<ul style="list-style-type: none"> <li>• Speed limit</li> <li>• Machine parking</li> </ul>	Ifria environmental expert	During the works
Origin of building materials	<ul style="list-style-type: none"> <li>• Number of sites authorized to operate</li> <li>• Number of suppliers</li> </ul>	Ifria environmental expert	Before the works
Protection of personnel against the raising of dust	<ul style="list-style-type: none"> <li>• Number of masks</li> <li>• Number of agents sensitized</li> </ul>	Ifria environmental expert	During the works
Soil erosion during excavations	<ul style="list-style-type: none"> <li>• Foundation design</li> </ul>	Ifria environmental expert	Before the works
Waste management	<ul style="list-style-type: none"> <li>• Quantity of waste evacuated to the CET</li> </ul>	Ifria environmental expert	During the works
Hygiene and safety on the construction site	<ul style="list-style-type: none"> <li>• Number of PPE provided</li> <li>• Safety instructions</li> <li>• Number of accidents</li> </ul>	Ifria environmental expert	During the works

### 7.3.3.2 During the operation phase

Table 3: Monitoring indicators during the operation phase

Item to check	Indicators	Tracking frequency
Air quality	<ul style="list-style-type: none"> <li>• Compliance of the refrigerants used</li> </ul>	Annually
Operating personnel and accidents	<ul style="list-style-type: none"> <li>• Number of officers with appropriate PPE</li> <li>• Safety instructions</li> <li>• Number of accidents</li> </ul>	Daily

Item to check	Indicators	Tracking frequency
Energy consumption	<ul style="list-style-type: none"> <li>• Insulation system performance</li> </ul>	Monthly
Control of the cold chain	<ul style="list-style-type: none"> <li>• Compliance of the links in the cold chain monitored</li> </ul>	Daily
Quality of stored products	<ul style="list-style-type: none"> <li>• Storage temperature compliance</li> <li>• Room sanitation</li> </ul>	Daily

#### ***7.4 Institutional capacity building and communication plan***

The effectiveness of the consideration of environmental and social issues in the implementation of project activities requires training and capacity building of the actors involved. These are the actors in charge of the execution of the project, the follow-up and the monitoring of the mitigation measures identified. It is also about the users of the platform and the local populations of the site.

For the proper execution of the measures contained in the program and environmental and social monitoring and the monitoring of their application, it appears necessary to take into account the fact that the technical capacities for implementing the various measures to mitigate negative impacts and monitoring are not the same for all categories of actors. To this end, it is important to develop a program to strengthen the institutional capacities of the external structures (DPM, National Hygiene Service) called upon to monitor the implementation of the programme. This capacity building program should be based on information and awareness campaigns on environmental management; good environmental practices; health and safety measures, etc.

During the works phase, the Promoter will be supported in environmental monitoring by a control office with an HSE expert specializing in the implementation of environmental and social management plans. In addition, the staff that will be hired as part of the works must be trained and made aware of good practices and health, safety and environmental measures.

In the operational phase, Ifria will have to recruit an HSE specialist to monitor the implementation of the program and environmental and social monitoring.

Ifria will also have to train staff in health/safety/environment and energy management. He must see to the establishment of a hygiene, health and safety committee for working conditions.

Ifria will have to coordinate the implementation of communication, information and awareness campaigns for local populations, particularly on the nature of the work and the environmental and social issues during the implementation of project activities.