ANNEX 16.2: CO2 Monitoring Plan and Corrective Measures Plan

Environmental Impact Assessment (EIA) of the Project: CO2 Storage Unit in Prinos

Έργο	Μονάδα Αποθήκευσης CO_2 στον Πρίνο		
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ENV. CONSULTANT	LDK CONSULTANTS A.E. – WSP SA		
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1.1 CO_2 MONITORING PLAN

Energean will implement a Monitoring Plan of Paragraph 2 of Article 14 of Joint Ministerial Decision 48416/2037/E.103/2011), which is prepared in accordance with the requirements of Annex II of the above Joint Ministerial Decision. Monitoring of the injection wells of the storage complex (including, whenever possible, the CO2 plume), and, where applicable, the surrounding environment, will be carried out, with the aim of:

- comparing the actual and modelled behaviour of CO2 and formation water at the storage site,
- detecting significant anomalies,
- detecting CO2 migration,
- detecting CO2 leakage,
- detecting significant negative impacts on the surrounding environment, including in particular on drinking water, human populations or users of the surrounding biosphere,
- assessing the effectiveness of any corrective measures taken pursuant to Article 17 of Joint Ministerial Decision 48416/2037/E.103/2011.

The Monitoring Plan will assess the short-term and long-term safety and integrity of the storage complex (including whether the stored CO2 will remain fully and permanently isolated).

The Monitoring Plan covers the main stages of the Project, including basic monitoring during operation and after closure. For each phase, the following is specified:

- the parameters monitored,
- the monitoring technology used based on best available practices, and the justification for the choice of technology,
- the monitoring locations and spatial sampling logic,
- the frequency of application and the temporal sampling logic.

1.1.1 Monitoring Parameters

The monitoring plan will include continuous or periodic monitoring of the following parameters:

1. Fugitive CO2 emissions at the injection equipment,
2. Volumetric CO2 flow at the injection wellheads,
3. Pressure and temperature of CO2 at the injection wellheads (to determine mass flow),
4. Chemical analysis of the injected material,
5. Reservoir temperature and pressure (to determine the phase behavior and state of CO2).

1.1.2 Basic plan for monitoring potential CO2 leakage routes in Prinos

The Core Monitoring Plan is proposed to focus on identified leakage pathways, particularly those classified as the most hazardous. Therefore, the monitoring plan should focus on identifying any potential migration outside the injection targets along the identified leakage pathways.

1.1.2.1 Monitoring technologies

To address the potential CO2 leakage pathways identified following a structured Subsurface Risk Mitigation Assessment, as well as to address the overall risks of loss of CO2 containment through existing and future drilling, various alternative technologies are being considered.

The following options are being considered and used for monitoring technologies:

- technologies that can detect the presence, location and migration pathways of CO2 below and at the surface.
- technologies that provide information on the volume-pressure behavior and surface/vertical saturation distribution of the CO2 plume to more accurately fit the digital 3D simulation to the 3D geological models of the storage formation.
- technologies that can provide a broad surface spectrum to obtain information on any previously undetected potential leakage pathways across the surface dimensions of the complete storage complex and beyond, in the event of significant anomalies or migration of CO2 outside the storage complex.
- These technologies include instruments located near or on the seabed, such as inclinometers and active seismic instruments, as well as instruments included in the well monitoring plan for ongoing monitoring and evaluation.

It is also important to emphasize that the proposed monitoring strategy has the capacity not only to address the risks of loss of CO2 containment, but also other types of Project risks related to storage capacity, injection potential, potential induced seismicity and management design.

Table 17-1 presents the proposed Monitoring, Measurement, and Verification (MMV) plan for potential CO2 leakage pathways at Prinos. It includes several technologies recommended for both the Baseline and Contingency plans (Section 17.2.2). In addition, the plan describes a response strategy and potential corrective actions.

Table 17-2 highlights which potential CO2 leakage pathways are covered by specific techniques. Potential leakage pathways associated with the subsurface are labeled #V1 to #V5 for potential vertical Leakage Pathways, and #L1 to #L3 for potential horizontal Leakage Pathways outside the designated Prinos storage complex.

The technologies indicated in red in Table 17.2 are applied to the subsurface leakage paths that require greater attention, namely #L1, but also #L2 and #V1, #V2 and #V3, as the possibility of leakage in these paths is enhanced due to the age of the old boreholes in Prinos and North Prinos.

1.1.2.2 Baseline data acquisition (before CO2 injection)

The following monitoring methods are proposed:

- Baseline logging using 3D cable-borne seismic or seabed loggers (OBN): Coverage will be defined once the final design is complete.
- Micro-seismicity database logging & 3D vertical seismic profile (3D DAS-VSP):
- The fiber optic (FO) cable that will be installed in the injection wells and possible monitoring wells can also be used as a seismic (acoustic) signal sensor, allowing the "listening" of the surrounding micro-seismicity, as well as obtaining a seismic image of the subsurface, i.e. the 3D-DAS-VSP (3D Vertical Seismic Profile).
- It should be assessed whether the use of FO cables in the wells is sufficient and whether receivers or stations on nearby platforms are sufficient to monitor any induced seismicity that could be associated with the injection operations. A feasibility study is also required to determine the extent of seismic recording.
- Inclinometers: Micro-deformation is one of the most important technologies for monitoring injection and its effect on the uplift of overlying strata. A series of inclinometers should be installed prior to injection to ensure the detection of any deformation associated with the injection operations.
- Baseline logging using electrical mapping: This should include a baseline of pulsed neutron measurements, sigma/neutron pulse measurements, cement and casing evaluation, and reservoir fluid sampling.
- Environmental and subsea surveys: It is recommended that an environmental data base be obtained. These surveys include sampling of bottom sediments, flora and fauna, and multibeam echo sounding (MEBS) and/or side scan sonar (SSS) for bottom imaging. In addition, baselines of bottom, flora and fauna sampling should be established for geochemical characterization and monitoring.
- Fluid and physical tracer sampling: To address any potential follow-up issues during or after injection operations, it is recommended to take at least a baseline sample of the reservoir fluids and CO2 to be injected.

1.1.2.3 Data acquisition during CO2 injection

The following monitoring methods are proposed:

- Through-bore monitoring methods: pressure and temperature gauges in the deepest permeable formation outside the storage complex (above the brown marker zone, in the post-Messian sequence), as well as a Fiber Optic (FO) cable.
- The Pressure and Temperature Gauges and the Fiber Optic (FO) cable are recommended to be installed in the deepest permeable unit within the secondary CO2 containment system (Messian evaporative sequence). This can be achieved by drilling new monitoring wells, the location of which has not yet been determined, or by installing suitable gauges behind the protective casing of the injection wells (LinX system), or by reusing any old wells.

- Pressure/Temperature meters at the depth of the CO2 injection, as well as the use of a Fiber Optic cable, are also proposed to be installed in the injection wells.
- The presence of a Fiber Optic cable can be applied for the purposes of monitoring the reservoir and the distribution of the injection wells, by measuring the acoustic signal (Distributed Acoustic Detection - DAS) and/or the Temperature signal (Distributed Temperature Detection - DTS) associated with the flow of the reservoir CO2. Also, any possible leakage in the A-annulus of the well or in the overlying rock can be detected.
- 3D DAS-VSP: Assuming 20 years of intrusion operations, it is proposed to acquire 3D DAS-VSP surveys at years 2, 5, 8, 10, 15 and 20. The last survey will be taken immediately after the completion of intrusion operations to support platform decommissioning and possible early handover of the site. A different frequency may be set depending on the actual intrusion operations and the results of the initial monitoring, as well as the availability of any other less intrusive and/or effective technology.
- Inclinometers: Inclinometers can monitor ground deformation during intrusion. During the period of intrusion the ground level can be pushed upwards and inclinometers attached to the seabed can monitor these anomalies. To collect data from inclinometers attached to the seabed, it is necessary to provide a vessel that acquires the data once every desired period of time. It is also possible to acquire the data with unmanned underwater drones. Underwater inclinometers are battery operated and require replacement every 2-3 years. Having an array of inclinometers allows for simultaneous, low-cost monitoring of other tasks, such as recording hydraulic fracturing repairs.

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1.1.2.4 Environmental and Underwater Research

Assuming injection operations for 20 years, it is proposed to repeat the environmental surveys in years 2, 5, 8, 10, 15 and 20. The last record will be acquired immediately after the completion of injection operations.

As part of the seabed monitoring strategy, ROVs and other environmental photographic techniques can be focused on the platform and drillings. These less intrusive techniques can minimize the need for regular sampling of seabed flora / fauna / sediments.

In addition, a different frequency can be set depending on the actual injection operations and the results of monitoring in the early stages of the Project.

In any case, the CO2 monitoring program will be carried out in accordance with the general monitoring program in Section 13.2 of this EIA.

1.1.3 Proposed CO2 Monitoring Plan

Table 17-1 presents the proposed Monitoring, Measurement, and Verification (MMV) plan for potential CO2 leakage pathways at Prinos. It includes several technologies recommended for both the Baseline and Contingency plans (Section 17.2.2). In addition, the Monitoring plan describes a response strategy and potential corrective actions.

Table 17-2 highlights which potential CO2 leakage pathways are covered by specific techniques. Potential leakage pathways associated with the subsurface are labeled #V1 to #V5 for potential vertical Leakage Pathways, and #L1 to #L3 for potential horizontal Leakage Pathways outside the designated Prinos storage complex.

Figure 17-1 gives an indication of the monitoring techniques that are planned to be implemented at each stage during the evolution of the CO2 Storage Project.

Table 1-1: Overview of the proposed monitoring plan

Monitoring options			Pre-injection Characterisation / Base line	Conformance	Containment	
					Well related	Geological
Characterization / Base Monitoring Plan	Surface	2D / 2DHR seismic lines (to fill any gaps from DAS-VSP)	Yes/No			
		Surface Passive seismic – Microseismicity	Yes			
		Environmental/seabed surveys/sampling	Yes			
		Tiltmeters	Yes			
	Injection/Monitor Wells	3D DAS-VSP	Yes			
		Annuli & downhole P&T gauges	No			
		Fibre Optics (DTS/DAS)	No			
		Behind casing P&T gauges (LinX)	No			
		P&T gauges in Monitor wells (Storage units only)	No			
		Fibre Optics (DTS/DAS) in Monitor wells	No			
		Overburden (Out-of-Zone) P&T gauges exclusively in Monitor wells	No			
		Sigma/Neutron logging	Yes			
		Pulsed Neutron logging (IntelliSat™)	Yes			
Triggered or Contingency Plan	Surface	OBN 3D survey	Yes			
		Streamer 3D survey	Yes			
		Seawater / Bubble stream chemistry + AUV (Sniffer)	Yes			
		Multi Beam Echo Sounder	Yes			
		Side Scan Sonar	Yes			
		Gas-flux spectroscopy	Yes			
	Injection/Monitor Wells	Cement Evaluation Casing Integrity (CBL/CAST logging)	Yes			
		Passive seismic – Microseismicity	Yes			
		Fluid sampling / Natural tracers in Monitor wells	Yes			
Response Plan (After Triggered Plan)		Manage injection	NA			
		Stop injection some/all wells	NA			
		Drill Pressure relief well	NA			
		Drill CO2 drainage well	NA			
Other options	Surface	Traditional 3D/3C VSP	Yes			
		2D/3D PRM systems				
		Gravity surveys	Yes			
		CSEM	Yes			
		Pingers / Chirps	Yes			
	Injection/Monitor	Dipole EM / X-well				
		Artificial tracers	Yes			

Table 1-2: Proposed Monitoring Plan and leakage paths[1]

Monitoring options			CONTAINMENT Geological Leak-paths		
			Across Caprock (V5)	Along faults (V1, V2, V3, V4)	Laterally outside Storage complex (L1, L2, L3)
Characterization / Base Monitoring Plan	Surface	2D / 2DHR seismic lines (to fill any gaps from DAS-VSP)			
		Surface Passive seismic – Microseismicity			
		Environmental/seabed surveys/sampling			
		Tiltmeters			
	Injection/Monitor Wells	3D DAS-VSP			
		Annuli & downhole P&T gauges			
		Fibre Optics (DTS/DAS)			
		Behind casing P&T gauges (LinX)			
		P&T gauges in Monitor wells (Storage units only)			
		Fibre Optics (DTS/DAS) in Monitor wells			
		Overburden (Out-of-Zone) P&T gauges exclusively in Monitor wells			
		Sigma/Neutron logging			
		Pulsed Neutron logging (IntelliSat™)			
Triggered or Contingency Plan	Surface	OBN 3D survey			
		Streamer 3D survey			
		Seawater / Bubble stream chemistry + AUV (Sniffer)			
		Multi Beam Echo Sounder			
		Side Scan Sonar			
		Gas-flux spectroscopy			
	Injection/Monitor Wells	Cement Evaluation Casing Integrity (CBL/CAST logging)			
		Wells Passive seismic – Microseismicity			
		Fluid sampling / Natural tracers in Monitor wells			
Response Plan (After Triggered Plan)		Manage injection			
		Stop injection some/all wells			
		Drill Pressure relief well			
		Drill CO2 drainage well			
Other options	Surface	Traditional 3D/3C VSP			
		2D/3D PRM systems			
		Gravity surveys			
		CSEM			
		Pingers / Chirps			
	Injection/Monitor Wells	Dipole EM / X-well			
		Artificial tracers			

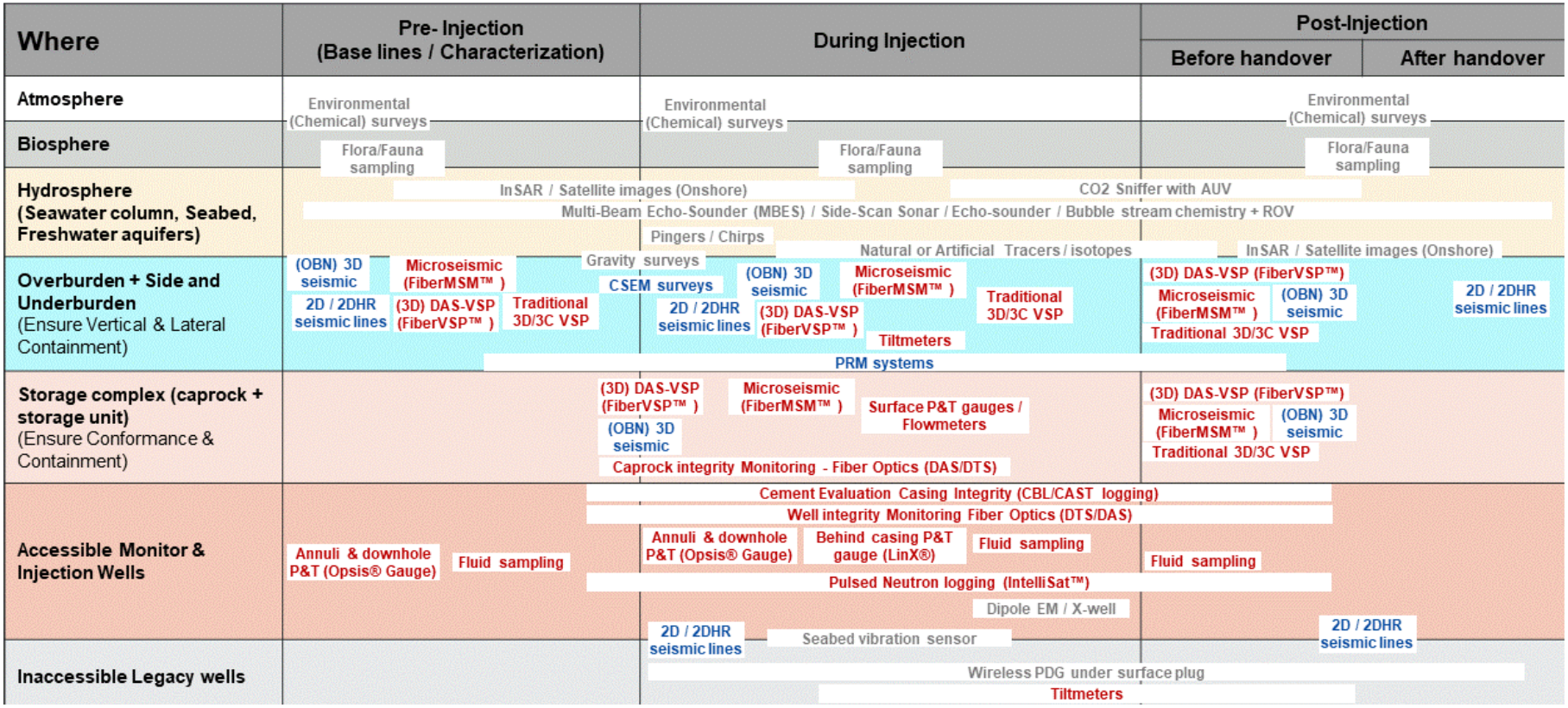


Figure 1-1: Monitoring techniques throughout the duration of the CO2 Storage Project

1.1.4 Detection and Monitoring of Leaks in CO2 Pipelines

A comprehensive approach to detecting and monitoring leaks in CO2 pipelines is achieved through a combination of methods. Monitoring for leak prevention is vital to both ensuring safe operating conditions for personnel and equipment, and to avoid operational delays and increased costs due to product loss.

The most common way to detect leaks is to monitor flow rates, pressures and temperatures at various points in the pipeline. In the event of a compressed gas leak, the sensor will register a sudden drop in pressure at the point, which will be accompanied by a possible drop in temperature. To prevent and monitor this during normal operation, pressure sensors should be installed at the inlet and outlet of the pipeline. Thermometers can also be used to continuously monitor the temperature at the inlet and outlet of the pipeline.

Chemical sensors (CO2 sensors) can be installed on land and offshore facilities to detect elevated CO2 concentrations in the air, indicating a leak somewhere along the pipeline. At the current stage of development of the CO2 capture and storage sector worldwide, the industrial application of CO2 sensors is not widespread. However, the limited number of industrial applications for CO2 detection use the Non-Dispersive InfraRed (NDIR) sensor technique, which is currently the most common and effective method for measuring carbon dioxide levels. Part of the monitoring of CO2 pipelines will be to monitor the composition of the CO2 that will end up in the injection wells. Sampling can be carried out prior to injection to ensure that the CO2 flow is within specifications from the entry point to the injection point.

1.1.5 Updating the Plan

The Plan will be updated in accordance with the requirements of Annex II of JMD 48416/2037/E.103/2011, and in any case every five years to take into account changes in the estimated risk of leakage, changes in the estimated risks to the environment and health, new scientific knowledge and improvements in the best available technology. The updated plans will be submitted to the competent authority for approval.

The data collected from the monitoring will be synthesized and interpreted. The observed results will be compared with the predicted behavior in the dynamic simulation of the three-dimensional pressure and volume and the saturation behavior.

In cases where a significant deviation is observed between the observed and predicted behavior, the three-dimensional model is recalibrated to reflect the observed behavior. The recalibration will be based on the data observations from the monitoring plan and, whenever necessary, additional data will be added to provide confidence in the recalibration assumptions.

Phases 2 (development of the 3D static geological model) and 3 (Characterization of the storage dynamic behavior, sensitivity characterization, risk assessment) of Annex I to JMD 48416/2037/E.103/2011 are repeated using the recalibrated 3D model(s) in order to generate new potential risk scenarios and flow rates and to update the risk assessment.

In cases where new CO2 sources, pathways and flow rates are identified, or significant deviations from previous estimates are observed after historical comparison and model recalibration, the monitoring plan will be updated accordingly.

1.1.6 Post-closure monitoring

Post-closure monitoring will be based on the information collected and modelled during the implementation of the monitoring plan and its updating. It will serve in particular to provide the information required to ensure the safety requirements of the closed storage site, in accordance with paragraph 1 of article 19 of Joint Ministerial Decision 48416/2037/E.103/2011.

Since no anomalies have been identified from the basic monitoring plan during the 20 years of injection operations, indicating any sign of loss of containment, it is proposed to include repeated environmental and subsea monitoring in the 5th year after the end of injection operations.

Additional passive seismic recordings in conjunction with active (2D) seismic lines could be included to demonstrate that CO2 has not migrated through local tight, extended covers, and along any old wells.

To provide further assurance of permanent containment of CO2 and to optimize the delivery period, an additional 3D repeat seismic recording could be included to provide full image coverage of the entire storage complex and all abandoned wells.

The operator will prepare a report documenting, based on all available evidence, that the stored CO2 will be kept fully and permanently contained. This report shall document at least the following:

- the correspondence of the actual behaviour of the injected CO2 to the modelled behaviour,
- the absence of detectable leakage,
- the evolution of the storage site towards a state of long-term stability.

The post-closure monitoring plan should be reviewed and finalised once discussions with the competent authorities have taken place.

1.2 CORRECTIVE MEASURES PLAN

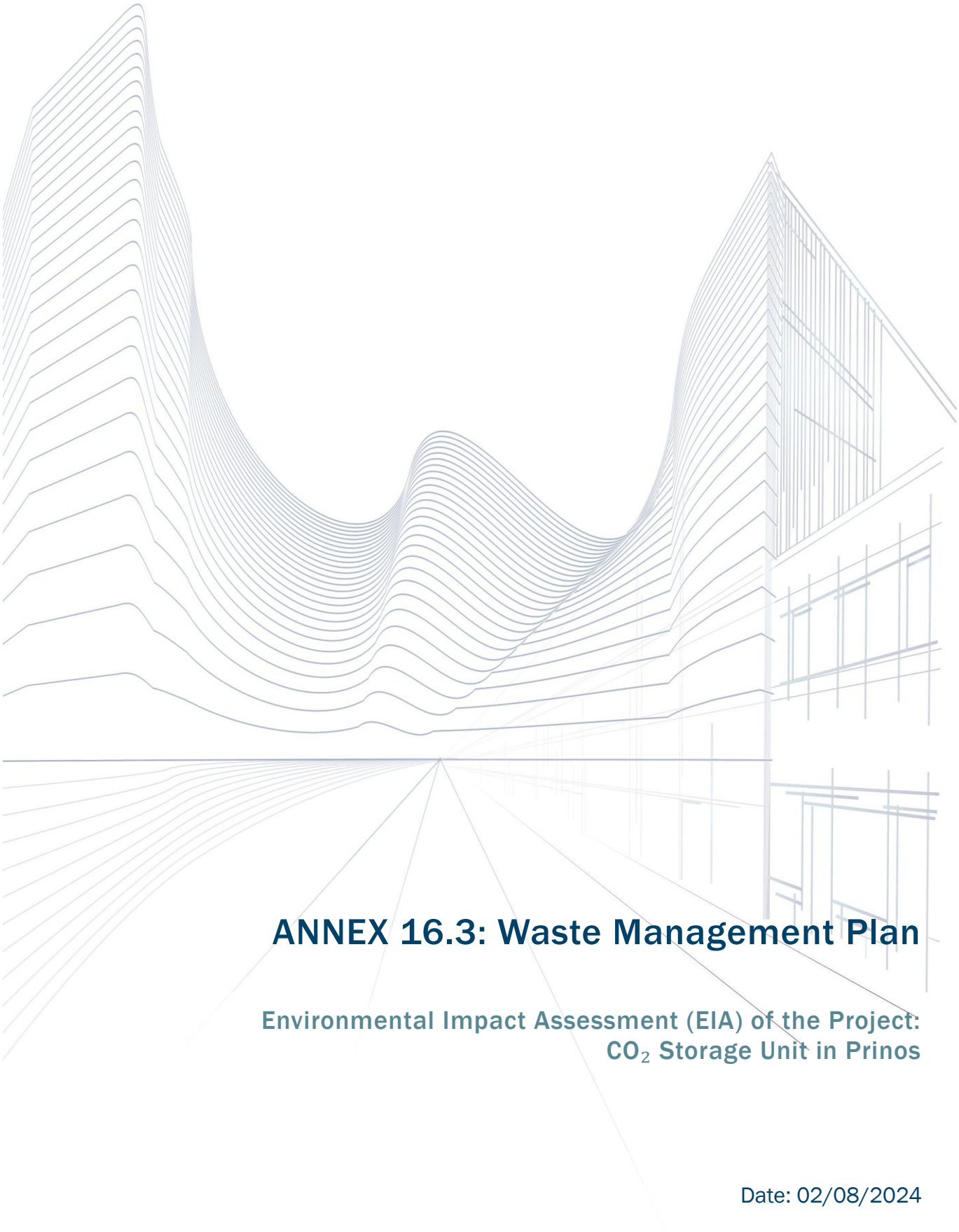
According to paragraph 2 of article 17 of Joint Ministerial Decision 48416/2037/E.103/2011, in the event of leaks or significant anomalies, the operator is obliged to immediately notify the competent authority and take the necessary corrective measures, including measures related to health protection.

In the event of leaks and significant anomalies that pose a risk of leakage, the operator shall also notify the Climate Change and Air Quality Directorate of the General Directorate of Environmental Policy of the Ministry of Economic Development, which is the competent authority according to Joint Ministerial Decision 181478/965 (Government Gazette 3763/B/26.10.2017).

In the unlikely event that the baseline monitoring plan detects any anomaly that may indicate CO2 leakage outside the storage complex (loss of containment), injection will be immediately stopped to assess the situation before further corrective action is taken.

Additional testing will then be conducted to help determine the most appropriate corrective action. The proposed Contingency Monitoring Plan includes the following:

- Repeat 3D wireline seismic logging: It is proposed to evaluate scheduling at least one repeat 3D seismic logging as part of the handover criteria to demonstrate that CO2 has not moved outside the storage complex laterally or vertically.
- Repeat 2D/2DHR seismic logging: It is proposed as a targeted alternative to full 3D wireline seismic logging. The choice to acquire 2D seismic lines instead of a full 3D record should be supported by an appropriate feasibility study if very specific and local anomalies are identified from the initial monitoring.
- Micro-seismicity (Passive Seismic Monitoring): Passive monitoring has been included as part of the contingency and not the core monitoring plan under the assumption that fiber optic (FO) cables are only installed in the injection wells and there are no monitoring wells. Therefore, passive seismic recordings would be more likely to operate reliably during periods of injection outage. The possibility of including micro-seismicity detection in the core monitoring plan will be examined with an appropriate feasibility study. It will be assessed whether the use of fiber optic cables in the injection wells and possible monitoring wells is sufficient or whether other alternatives with receivers or stations on nearby platforms are required to monitor any induced seismicity that could be related to the injection operations.
- Repeat logging using electrical logs: pulsed neutron, sigma/neutron, cement casing assessment (CBL/CAST logging). In particular, if there is evidence of loss of containment in any injection or monitoring well, these techniques are useful for further investigation.
- Multi-logger and/or side-scan sonar mapping: If there is evidence of a leak in the seabed, a seabed image, including the use of multi-logger echo sounders (MBES), would show areas where any fluid may be escaping.
- Based on the results of the above checks, the corrective measures mainly concern the following:
- Management of the injection process and possible modification of operating parameters.
- Stopping injection in some or all wells.
- Drilling an auxiliary well to reduce pressure (water well).



ANNEX 16.3: Waste Management Plan

Environmental Impact Assessment (EIA) of the Project: CO_2 Storage Unit in Prinos

Date: 02/08/2024

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Copyright Statement

Project:	CO_2 Storage Unit in Prinos		
STUDY STAGE	Waste Management Plan within the Environmental and Social Impact Assessment (ESIA)		
STUDY CODE	CCP - 2902		
DATE	25.11.2024		
VERSION	v.01		
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ENVIRONMENTAL CONSULTANT	LDK CONSULTANTS A.E. – WSP SA		
PROJECT DEVELOPER	ENEARTH GREECE		
PREPARED BY	LDK – WSP Study Team		
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CONTENTS

TABLES

1 INTRODUCTION

1.1 SCOPE AND OBJECTIVES OF THE WASTE MANAGEMENT PLAN

The scope of the Waste Management Plan (WMP) includes the initial assessment of the types and quantities of waste expected to be generated during the implementation of the Project "CO_2 Storage Unit in Prinos,"[1] the specification of objectives and requirements, and the development of proposals and actions for the management and disposal of the respective waste in accordance with applicable legislation, prioritizing prevention, reuse, recycling, and source separation.

The WMP aims to satisfy the requirements and objectives set by national and European legislation, the National Waste Management Plan (NWMP), the National Hazardous Waste Management Plan (NHWMP), the National Waste Prevention Programme 2021–2030 (NWPP), the Revised Regional Solid Waste Management Plan (RSWMP) of the Region of Eastern Macedonia and Thrace (2016), and the Local Waste Management Plan (LWMP) of the Municipality of Kavala (2021).

It is noted that the WMP serves as a guiding document. Its purpose is to be used as a dynamic reference framework, outlining directions for the integrated management of waste, the specific actions to be implemented, and highlighting the constraints and objectives to be met.

The WMP includes the following:

- the formulation of the fundamental principles and assumptions of the design – incorporation of obligations and requirements of applicable legislation on Waste Management (WM),
- the estimation of the type (according to the European Waste Catalogue – EWC) and quantity of waste generated during the implementation phase of the Project, and the proposed integrated waste management system,
- the monitoring of the plan's implementation.

1.2 PROJECT SUMMARY DESCRIPTION

The project under study consists of a full-scale CO_2 storage installation in Prinos (the "Project") [1]. The planned CO_2 storage site is located within the Prinos Basin, in the Gulf of Kavala, in the Northern Aegean. The area of interest for CO_2 storage lies within the Prinos Concession, where Energean Oil & Gas SA ("Energean"), an affiliated company of EnEarth, has held 100% of the interests and operatorship for oil and gas exploration and production activities since 2007. The potential CO_2 storage location is situated within the Prinos structure and the underlying aquifer.

The operation of the facility is planned to be developed in two distinct phases (Phase 1 and Phase 2), to allow for scalability and adaptation to market conditions.

The project under study concerns the installation of a full-scale carbon dioxide (CO_2) storage unit in Prinos (the "Project"). The planned CO_2 storage site is located within the Prinos Basin, in the Gulf of Kavala, in the Northern

[1] Hereinafter referred to as the "Project"

Aegean. The area of interest for CO_2 storage lies within the Prinos Concession, where Energean Oil & Gas SA ("Energean"), an affiliated company of EnEarth, has held 100% of the interests and operatorship for oil and gas exploration and production activities since 2007. The potential CO_2 storage location is situated within the Prinos structure and the underlying aquifer.

The operation of the facility is planned to be developed in two distinct phases based on capacity (Phase 1 and Phase 2), to allow for scalability and adaptation to market conditions.

This study concerns **Phase 1 of the Project**.

Phase 1 has an initial nominal capacity of up to 1 MTPA for 20 years (commencement around late 2025 to early 2026). The CO_2 will be mainly supplied in bulk via a third-party pipeline that will reach a designated area within the existing Sigma onshore industrial facility under appropriate conditions for injection. The CO_2 stream from the onshore station within the Sigma facility will be transported through a new subsea pipeline, approximately 20 km in length, to the existing Beta platform of the offshore facilities, where the injection of CO_2 into the reservoir will take place through dedicated injection wells.

In addition, small quantities of CO_2 will be received at the Sigma onshore facilities in ISO containers, transported by trucks, within the framework of pilot CO_2 capture projects. The containers will either be loaded onto ships by cranes and transferred to the existing Beta platform of the Prinos offshore facilities via a flexible hose system, where appropriate conditions for injection will be achieved, or be directly injected into the manifold together with the bulk CO_2 stream.

The new facilities and wells foreseen for the operation of Phase 1 of the Project and forming the subject of this study include:

- Onshore facilities: modification of a designated area within the existing Sigma plant site for the construction of the CO_2 reception manifold and an unloading and compression area.
- Offshore pipeline: subsea pipeline connecting the Sigma plant area with the offshore Beta platform, approximately 20 km in length.
- Offshore platforms: modification and/or use of the existing Prinos offshore facilities (Beta and Delta platforms) for receiving CO_2 from the new subsea pipeline and ISO container shipments, injecting it into the new wells, and treating the produced water (Delta platform).
- Wells: 2 CO_2 injection wells and 2 water production wells on the existing Beta platform of the Prinos offshore complex.

Modifications will be made to the existing Beta platform to include the necessary CO_2 injection facilities. The platform has 12 well slots and is connected to the Delta processing platform. As part of the Project, 4 of the 12 slots will be used for the two new CO_2 injection wells and the two new water production wells (Table 1-1). Electric Submersible Pumps (ESP) will operate in the two water wells to extract water from the reservoir, providing a means of active pressure management. Water will be managed at the existing processing facility on the Delta platform.

Πίνακας 1-1: Κριτήρια Τελικού Βάθους Γεώτρησης (UTM zone 35N)

Drilling Type	Name	Kick-off Well	Kick-off Depth of New Well (m)	Target	Surface Location
CO_2 Injection	PBC-1	PB-17A	1.000	X:287725.69 y:4518803.72 Z:-2779.95	X:288963.21 y:4519413.86
CO_2 Injection	PBC-2	PB-24	1.000	X:287778.73 y:4519015.54 Z:-2718.38	X:288963.21 y:4519411.57
Water Production	PBW-1	PB-22	1.000	X:290192.01 y:4517931.73 Z:-2741.54	X:288967.79 y:4519416.15
Water Production	PBW-2	PB-23A	1.000	X:290060 y:4518995 Z:-2840	X:288965.50 y:4519413.86

The modification of the Delta platform will involve an overall upgrade of the auxiliary facilities, the produced water treatment and disposal unit, as well as the control and safety systems. The aim is for the water produced from the two new wells—used for managing the reservoir pressure—to be treated using the existing facilities. This integrated approach optimizes resource utilization while enhancing the platform's operational performance and environmental management.

During the construction phase of the Project, the following activities will be carried out:

- Structural works and modifications, installation of CO_2 reception and handling equipment at the Sigma onshore facilities.
- Installation of buried CO_2 transfer pipelines (onshore pipeline and offshore pipeline).
- Construction of CO_2 injection wells and water production wells:
  - Delivery & installation of drilling rig.
  - Preparation of existing starter well (installation of permanent mechanical barrier and preparation for sidetrack drilling).
  - Drilling of 16" diameter well to a depth of up to ~2,200 m.
  - Drilling of 12-1/4" x 13½" diameter well to a depth of up to approximately 3,150 m.
  - Drilling of 8-1/2" diameter well to a depth of up to approximately 3,700 m.

The drilling muds to be used are provided in the following table:

Πίνακας 1-2: Πολφοί γεώτρησης

Section	Diameter (inches)	Estimated drilling mud volume per well (m^3)	Drilling mud system – Main additives	Mud type
I	16"	+/- 700	Gel / Polymer / Lime Additives: Bentonite, Potassium Chloride, Polypac, CMC, Lime, Calcium Carbonate, Sodium Chloride, Flo-Vis.	Water-based / Lime
II	12 1/4"	+/- 490	Versavert LTOBM Additives: EDC 95/11, Safe-Scav, Safe Carb, Bentonite, Calcium Chloride, Barite, Versatrol	Oil-based
III	8 1/2"	+/- 350	FLO-PRO WBM or Versavert LTOBM Additives: Flo-Trol, Soda Ash, Safe-Scav, Sodium Chloride, Zinc Oxide, Conqor	Oil-based / Water-based

The decommissioning of the Project, with priority given to the plugging of wells and the safety of the reservoir, will be carried out in accordance with best practices and guidelines (Offshore Energies United Kingdom (OEUK), 2022).

2 WASTE MANAGEMENT STRATEGY

2.1 BASIC PRINCIPLES OF WASTE MANAGEMENT

The basic principles on which the Project's Waste Management Plan is based are the following:

Waste hierarchy[2]:

Prevention and reuse of waste are the most preferred options, followed by recycling (including composting) and then energy recovery. The disposal of waste in sanitary landfills is considered the last resort.

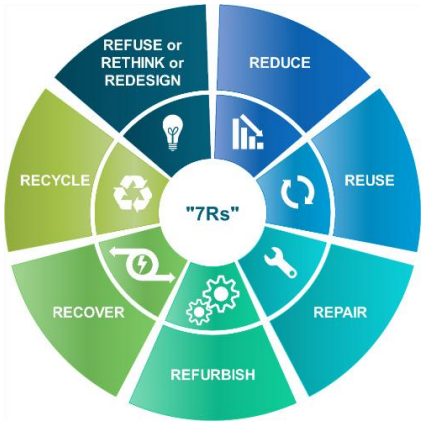
Circular economy:

This model involves the efficient use of resources and favors the input of renewable energy sources, the maximization of the use and lifespan of a product in order to extract the maximum value, as well as the recovery and reuse of by-products and waste to manufacture new materials or products. It promotes the practices of maintenance, reuse/redistribution, refurbishment/remanufacturing, and recycling to create a closed-loop system, minimizing resource inputs and the generation of waste, pollution, and carbon emissions.

Green development and circular economy:

The management of the life cycle of natural resources—from extraction to the design and manufacture of products, and finally to what is considered as waste—is essential for green development and is part of building a resource-efficient circular economy where nothing goes to waste. Smarter design allows products to be repaired, reused, remanufactured, and eventually recycled again.

[2] Directive 2008/98/EC on waste, as amended and in force. When applying the waste hierarchy, measures must be taken to promote alternative options that deliver the best overall environmental outcome. This may require deviating from the hierarchy for certain specific waste streams, provided this is justified on the basis of life-cycle thinking, taking into account the overall impacts of the generation and management of such waste.



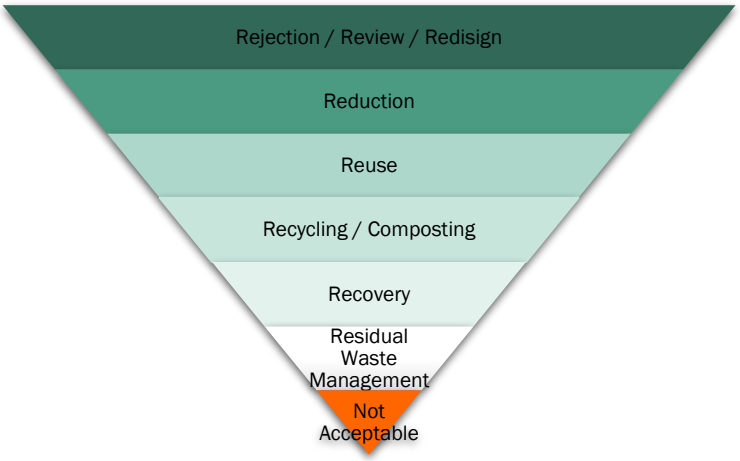
In this context, as outlined above, the traditional 3Rs (Reduce, Reuse, Recycle – Waste Hierarchy) approach is redefined, with an increase in the number of actions to achieve more effective Waste Management.

The circular economy is structured around the philosophy based on the "**7Rs**":

Refuse or Rethink or Redesign – Reduce – Reuse – Repair – Refurbish – Recover – Recycle.

In the same spirit, the philosophy of **"Zero Waste"** pertains to waste management and the design of approaches that emphasize preventing waste generation rather than managing it after it has been produced. It is a systemic approach aimed at radically transforming the flow of materials throughout society, with the ultimate goal of achieving zero waste.

The philosophy of "Zero Waste" includes not only eliminating waste through recycling and reuse and ending the incineration or landfilling of waste (unacceptable practices), but also focusing on the restructuring of production and distribution systems to reduce waste.



"Polluter pays" principle:

The cost of waste management, including the cost of the necessary infrastructure and its operation, is borne by the original producer of the waste or the current or previous holders of the waste.

Proximity principle:

Possibility for the disposal or recovery of waste at one of the closest suitable facilities, using the most appropriate methods and technologies, in order to ensure a high level of protection for the environment and public health.

Sustainable systems:

Development of systems that are adaptable, flexible, scalable, resilient, and appropriate within the limits of the local ecosystem.

The Waste Management Plan (WMP) takes into account the general principles of environmental protection, precaution and sustainability, technical feasibility and economic viability, resource protection, as well as the overall impact on the environment, human health, the economy, and society.

2.2 INSTITUTIONAL FRAMEWORK FOR WASTE MANAGEMENT

The main institutional framework governing waste management in Greece is defined by:

- **Law 4819/2021** (Government Gazette 129/A/23.07.2021): *"Integrated framework for waste management – Transposition of Directives 2018/851 and 2018/852 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste and Directive 94/62/EC on packaging and packaging waste, framework for the organization of the Hellenic Recycling Organization, provisions for plastic products and the protection of the natural environment, spatial planning - urban planning, energy and related urgent regulations,"* as amended and in force.
- **Law 4685/2020** (Government Gazette 92/A/7.5.2020): *"Modernization of environmental legislation, transposition into Greek law of Directives 2018/844 and 2019/692 of the European Parliament and of the Council, and other provisions,"* as amended and in force.
- **Law 4042/2012** (Government Gazette 24/A/13.2.2012): *"Criminal protection of the environment – Harmonization with Directive 2008/99/EC – Framework for the production and management of waste – Harmonization with Directive 2008/98/EC – Regulation of issues of the Ministry of Environment, Energy and Climate Change,"* which incorporates into national law the Waste Framework Directive 2008/98/EC, as amended and in force.
- **Law 1650/1986** (Government Gazette 160/A/16.10.1986): *"On environmental protection,"* as amended and in force.

In addition, a series of ministerial decisions and presidential decrees have been issued to regulate specific matters, as recorded below:

Table 1-3: Legislative Framework Regulating Specific Waste Management Issues

Legislation	Description
JMD 114218/1997 (GG 1016/B/17.11.1997)	Establishment of a framework of Specifications and general solid waste management programs
JMD 7589/731/2000 (GG B 514/11.4.2000)	Definition of measures and terms for the management of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT)
MD 18083/1098/E.103/2003 (GG B 606/15.5.2003)	Disposal/disinfection plans for devices containing PCBs – General guidelines for the collection and subsequent disposal of devices and PCB-containing waste, in accordance with Article 7 of Joint Ministerial Decision 7589/731/2000 (B' 514)
PD 82/2004 (GG A 64/2.3.2004)	Replacement of JMD 98012/2001 "Determination of measures and conditions for the management of used mineral oils" (B' 40). Measures, conditions and program for the alternative management of Waste Lubricating Oils. Note: Abolished after the issuance of the Joint Decisions of the Minister for the Environment and Energy and the respective competent ministers on End-of-Life Vehicles (ELVs), waste oils and used vehicle tires, pursuant to Article 101§4: Article 73§b, Law 4819/2021

Legislation	Description
PD 109/2004 (GG 75/A/5.3.2004)	Measures and conditions for the alternative management of used vehicle tires. Program for their alternative management. Note: Abolished after the issuance of the Joint Decisions of the Minister for the Environment and Energy and the respective competent ministers, pursuant to Article 101§4: Article 73§c, Law 4819/2021
PD 117/2004 (GG A 82/5.3.2004)	Measures, conditions and program for the alternative management of waste from electrical and electronic equipment, in accordance with Directives 2002/95 “on the restriction of the use of certain hazardous substances in electrical and electronic equipment” and 2002/96 “on waste electrical and electronic equipment” of the Council of 27 January 2003, as amended and in force
PD 116/2004 (GG 81/A/5.3.2004)	Measures, conditions and program for the alternative management of end-of-life vehicles, their used spare parts and deactivated catalytic converters, in accordance with Directive 2000/53/EC “on end-of-life vehicles” of the Council of 18 September 2000, as amended by MD 42666/1345/E103/2013 (GG 1879/B'/01.08.13) *Note: Abolished after the issuance of the Joint Decisions of the Minister for the Environment and Energy and the respective competent ministers, pursuant to Article 101§4: Article 73§a, Law 4819/2021*
PD 15/2006 (GG A 12/3.2.2006)	Amendment of Presidential Decree 117/2004 (A’ 82), in accordance with Directive 2003/108 “amending Directive 2002/96 on waste electrical and electronic equipment (WEEE)” of the Council of 8 December 2003
JMD 13588/725/2006 (GG 383/B/28.3.2006)	Measures, conditions and restrictions for the management of hazardous waste in accordance with Directive 91/689/EEC “on hazardous waste” of the Council of 12 December 1991, as amended and in force
MD 39624/2209/E103/2009 (GG 2076/B/25.9.2009)	Measures, terms, and restrictions for the management of extractive waste, in accordance with Directive 2006/21/EC of 15 March 2006 "on the management of waste from extractive industries and amending Directive 2004/35/EC"
Law 3854/2010 (GG 94/A/23.06.2010)	Amendment of the legislation on the alternative management of packaging and other products and the National Organization for the Alternative Management of Packaging and Other Products (EOEDSAP), as amended and in force
JMD 36259/1757/E103/2010 (GG 1312/B/24.08.2010)	Measures, terms, and program for the alternative management of excavation, construction, and demolition waste (CDW), as amended and in force
JMD 41624/2057/E103 (GG B 1625/11.10.2010)	Measures, conditions and programme for the alternative management of waste batteries and accumulators, in compliance with the provisions of Directives 2006/66/EC "on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC" and 2008/103/EC "amending Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators as regards the placing on the market of batteries and accumulators", of the European Parliament and of the Council, as amended and in force
JMD oik. 146163/2012 (GG B 1537/08.05.2012)	Measures and conditions for the management of Healthcare Waste
JMD 36060/1155/E.103/2013 (GG B 1450/14.06.2013)	Establishment of a framework of rules, measures and procedures for the integrated prevention and control of environmental pollution from industrial activities, in compliance with Directive 2010/75/EU “on industrial emissions (integrated pollution prevention and control)” of the European Parliament and of the Council of 24 November 2010, as amended and in force
MD 54461/1779/E.103/2013 (GG B 2500/04.10.2013)	Replacement of Annex I of Article 4 of JMD 9268/469/2007 (GG B 286), in compliance with Directive 2013/2/EU “amending Annex I to Directive 94/62/EC of the European Parliament and of the Council on packaging and packaging waste” of the European Commission of 7 February 2013
MD H.P. 23615/651/E.103/2014 (GG B 1184/09.05.2014)	Establishment of rules, conditions and requirements for the alternative management of Waste Electrical and Electronic Equipment (WEEE), in compliance with the provisions of Directive 2012/19/EU “on waste electrical and electronic equipment (WEEE)”, of the European Parliament and of the Council of 4 July 2012, and other provisions, as amended and in force

Legislation	Description
JMD oik. 56366/4351/2014 (GG B 3339/12.12.2014)	Specification of requirements (standards) for treatment operations within the framework of mechanical-biological treatment of mixed municipal waste and definition of the characteristics of the materials produced depending on their uses, pursuant to point (b) of paragraph 1 of Article 38 of Law 4042/2012 (GG A 24)
MD Oik. 41848/1848/2017 (GG B 3649/16.10.2017)	Amendment of JMD oik. 146163/2012 – Measures and Conditions for the Management of Healthcare Waste, as in force
Law 4496/2017 (GG A 170/08.11.2017)	Amendment of Law 2939/2001 on the alternative management of packaging and other products, adaptation to Directive 2015/720/EU, regulation of issues of the Hellenic Recycling Organization and other provisions
Law 4736/2020 (GG A 200/20.10.2020)	Transposition of Directive (EU) 2019/904 on the reduction of the impact of certain plastic products on the environment and other provisions, as amended and in force
Circular YPEN/DDA/8437/176/28.1.2021	Collection and transport of non-hazardous waste in application of paragraph 4 of Article 36 of Law 4042/2012, as replaced by paragraph 1 of Article 85 of Law 4685/2020 (CORRECTED REPUBLICATION 09.02.2021)
MD YPEN/DDA/81490/1650/2021 (GG B 4382/22.09.2021)	Transposition of Directive (EU) 2018/849 of the European Parliament and of the Council of 30 May 2018 amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment (WEEE), to the extent that it concerns the amendment of Directive 2012/19/EU on WEEE – Amendment of Joint Ministerial Decision H.P. 23615/651/E.103/2014 (GG B 1184) of the Ministers of Development and Competitiveness and of Environment, Energy and Climate Change "Establishment of rules, terms and conditions for the alternative management of waste electrical and electronic equipment (WEEE), in compliance with the provisions of Directive 2012/19/EU of the European Parliament and the Council of 4 July 2012 and other provisions." (GG B 1184)
MD YPEN/DDA/81492/1651/2021 (GG B 4382/22.09.2021)	Transposition of Directive (EU) 2018/849 of the European Parliament and of the Council of 30 May 2018 amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment (WEEE), to the extent that it concerns the amendment of Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators – Amendment of JMD 41624/2057/2010 of the Ministers of Economy, Competitiveness and Shipping, and of Environment, Energy and Climate Change "Measures, conditions and programme for the alternative management of waste batteries and accumulators in compliance with the provisions of Directives 2006/66/EC 'on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC' and 2008/103/EC 'amending Directive 2006/66/EC as regards the placing on the market of batteries and accumulators' of the European Parliament and of the Council" (GG B 1625)
MD YPEN/DDA/90439/1846/2021 (GG B 4514/30.09.2021)	Measures and conditions for the landfilling of waste in alignment with the provisions of Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste, as amended by Directive (EU) 2018/850 of the European Parliament and of the Council of 30 May 2018
MD YPEN/DDA/41531/626/2023 (GG B 2654/21.04.2023)	Replacement of Annex II of Article 18 of Presidential Decree 116/2004 "Measures, conditions and programme for the alternative management of end-of-life vehicles, their used parts and deactivated catalytic converters in compliance with the provisions of Directive 2000/53/EC on end-of-life vehicles of the Council of 18 September 2000" (GG A 81), in compliance with the provisions of Commission Delegated Directive (EU) 2023/544 of 16 December 2022 amending Directive 2000/53/EC of the European Parliament and of the Council as regards exemptions for the use of lead in aluminium alloys for machining purposes, in copper alloys and in certain batteries

Other key European Union directives on waste have also been transposed into national law, while the **European Waste Catalogue (EWC)** has direct applicability, in accordance with the Annex to Decision 2000/532/EC (L 226), as amended and in force.

In addition, the **National Waste Prevention Program 2021–2030 (NWPP)** has been adopted, which defines the strategy, policies and objectives for waste prevention at the national level, and its drafting constitutes an obligation of Greece arising from **Directive 2008/98/EC**, as amended by **Directive (EU) 2018/851**.

The **National Waste Management Plan 2020–2030** (NWMP) is in force, as adopted by Ministerial Act No. 39 of 31.8.2020 (Government Gazette 185/A/29.9.2020), and amended by Cabinet Act No. 5 of 18.4.2023 (Government Gazette 94/A/18.4.2023). The **National Hazardous Waste Management Plan** (NHWMP) is also in force, as adopted by Ministerial Decision No. oik. 62952/5384/2016 (Government Gazette 4326/B/30.12.2016). In addition, the Updated **Regional Waste Management Plan (RWMP) of the Region of Eastern Macedonia and Thrace**, adopted by Joint Ministerial Decision No. 61076/5267 (Government Gazette B'/4123/21-12-2016), and the **Local Waste Management Plan (LWMP) of the Municipality of Kavala (2021)** are also in force.

The NWMP defines the policy, strategies, pillars, and both qualitative and quantitative objectives for waste management and its individual streams, excluding the wastes referred to in Article 2 of Law 4819/2021, which include wastes from the exploration and extraction of mineral resources (paragraph 2d). It also sets out the action pillars and measures for achieving the targets defined by both national and EU legislation on waste management. The NWMP has set ambitious targets aligned with EU directives regarding source separation, which are also targets of the Circular Economy package. These include achieving at least 55% by weight of preparation for reuse and recycling of Municipal Solid Waste (MSW) by 2025 and 60% by 2030. It also sets a target to minimize landfilling to 10% of generated MSW by 2030.
In order to achieve the above objectives, the NWMP provides for the implementation of specific measures as well as the competent authorities for their implementation, aiming in particular at the development of separate collection, which among others includes:

- the separate collection of new waste streams.
- source separation.
- the "Pay-As-You-Throw" principle.
- the strengthening and upgrading of Sorting Centers for Recyclable Materials (SCRMs).

*The **NWMP** aims, through the integrated and rational management of hazardous waste, to promote the waste hierarchy as provided for in Directive 2008/98/EC, in order to reduce the impacts on the environment and public health, while at the same time ensuring that waste management contributes positively to economic and social development. Within the framework of the NWMP, hazardous waste is grouped into the following streams:*

- Industrial hazardous waste (IHW).
- Hazardous waste from healthcare units (HWHU).
- Hazardous waste from public utility facilities, public service units, etc. (PUF).
- Hazardous waste falling under alternative management:
  - Waste oils (WO).
  - Waste batteries and accumulators from vehicles and industry (WBAVI).
  - Waste portable batteries and accumulators (WPBA).
  - Waste falling under alternative management and classified as hazardous or generating hazardous waste during decontamination: Hazardous end-of-life vehicle decontamination waste (ELV), Waste lamps containing hazardous substances, Hazardous waste from decontamination of waste electrical and electronic equipment (WEEE).
- Waste containing asbestos (hazardous C&DW).
- Small quantities of hazardous waste in Municipal Solid Waste (SQHW).
- Packaging waste containing hazardous substances.
- Waste containing polychlorinated biphenyls/triphenyls (PCB/PCT).

*The general objectives of the **RSWMP** of the Region of Eastern Macedonia and Thrace are:*

- Sustainable waste management throughout the Region.
- Prevention – reduction of the generation of municipal waste, prioritizing the prevention and continuous reduction of packaging waste, food (bio-waste), paper and WEEE, with particular emphasis on public awareness and guidance of target groups and the implementation of specialized actions.
- Expansion and modernization of the municipal waste collection and transportation network.
- Enhancement of actions promoting the reuse of unwanted products that do not need to be discarded as waste.
- Strengthening recycling by encouraging alternative management systems for packaging and other products.
- Utilization of various materials contained in municipal waste (recycling) and energy recovery from them, in order to conserve resources and energy and reduce the final disposal rate.
- Safe final disposal: environmentally acceptable final disposal in sanitary landfills (SLs) of the portion of municipal waste that cannot undergo further treatment.

- Restoration of environmental damage: cessation of operation, gradual restoration and environmental upgrading of sites that have been polluted by uncontrolled municipal waste disposal.
- Implementation of the proximity principle.
- Public information and awareness so that there is active participation and responsibility of citizens in solid waste management.
- Full harmonization with Joint Ministerial Decision 29407/3508/2002, which requires significant upgrading and transformation of management bodies, changes in the project planning and permitting process, immediate introduction of waste treatment technologies, changes in the pricing of provided services, and sets stricter operating rules for SLs with the ultimate aim of constructing as few SLs as possible, operating them to higher standards, and gradually converting them into sanitary landfills for residual waste (SLRWs).

The main national targets for Municipal Solid Waste (MSW) management set out in the Local Waste Management Plan (LWMP) of the Municipality of Kavala (2021) are summarized below:

- Practical implementation of the waste management hierarchy, whereby landfilling – always and only after appropriate pre-treatment of waste – is the last resort. The maximum percentage of municipal waste that will be landfilled by 2030 must not exceed 10%.
- Mandatory universal separate collection of bio-waste by 31 December 2022.
- Packaging waste recycling must reach 65% by weight by 2025 and 70% by weight by 2030, with specific targets set for individual packaging waste streams.
- Increase in the preparation for reuse and recycling of MSW to at least 55% by weight by 2025 and 60% by weight by 2030.
- Energy recovery of residual MSW and secondary (refuse-derived) fuels.
- Safe final disposal in Sanitary Landfills for Waste/Residuals (SL/SLRWs) for the entire country.
- Final closure and remediation of all existing uncontrolled waste disposal sites (UWDSs) by 2022.

2.3 LEGISLATIVE PROVISIONS AND RESTRICTIONS

The Project's WMP aligns with the requirements of the current legislation and concerns the optimal management of expected waste with specific goals and actions. More specifically, in this section, the main obligations/requirements are analyzed, the integration of which determines the fundamental design principles of the Project's Waste Management System.

2.3.1 Urban Wastewater Flows

Municipal Waste *(MW) is defined as::*

1. *Mixed waste and separately collected waste from households, including, among others, paper and cardboard, glass, metals, plastics, bio-waste, wood, textiles, packaging waste, waste electrical and electronic equipment, waste batteries and accumulators, and bulky waste, including mattresses and furniture.*
2. *Mixed waste and separately collected waste from other sources, when similar in nature and composition to household waste.*

Municipal waste does not include waste from production, agriculture, forestry, fishing, septic tanks, and waste from sewer networks and waste treatment, including sewage sludge, end-of-life vehicles or construction and demolition waste.
Ο ορισμός αυτός ισχύει με την επιφύλαξη του καταμερισμού των ευθυνών για τη διαχείριση των αποβλήτων μεταξύ δημόσιων και ιδιωτικών φορέων. (Ν.4819/2021)
Municipal Waste (MW) includes the following:

- Bio-waste (BW)
- Recyclable Materials (RM) (paper, plastic, metal, glass – including packaging made of the respective materials)
- Packaging Waste (PW)
- Wood and Other Waste (WPBA, WEEE, bulky, inert, textiles, SQHW, etc.)

According to Article 25 of Law 4819/2021, **separate collection is applied at least for paper, metal, plastic, and glass,** and by January 1, 2024, **separate collection of textile products** will be established. Additionally, the following targets are set:

- Preparation for the reuse and recycling of waste materials, such as at least paper, metal, plastic, and glass from households and possibly from other sources, to the extent that these wastes are similar to household wastes, at least 50% by weight,
- The preparation for reuse, recycling, and recovery of other materials, including backfilling operations where waste is used to replace other materials, non-hazardous construction and demolition waste, excluding materials found in nature and classified under category 17 05 04 of the waste list, at least 70% by weight.
- By the end of 2025, the preparation for reuse and recycling of municipal waste will increase to at least 55% by weight,
- By the end of 2030, the preparation for reuse and recycling of municipal waste will increase to at least 60% by weight,
- By the end of 2035, the preparation for reuse and recycling of municipal waste will increase by at least 65% by weight.

For the separate collection of materials, bins or collection means of different colors are mandatorily used, in accordance with Article 26 of Law 4819/2021.

Additionally, regarding **packaging waste**, Article 84 of Law 4819/2021 provides for Extended Producer Responsibility (EPR) schemes for the promotion of high-quality recycling of packaging waste through separate collection into distinct streams for paper, metals, plastics, and glass in accordance with paragraph 1 of Article 25. The organization of the separate collection of individual packaging materials, such as glass, plastic, metals, and paper, is mandatory according to the provisions of the relevant Local Waste Management Plan and the approved Regional Waste Management Plan (RWMP).

According to Article 50 of Law 4819/2021, regarding **organic waste (biowaste)** (BW)[3], it is stipulated that by December 31, 2022, organic waste **must either be separated and recycled at the source or collected separately** and not mixed with other types of waste in order to be recycled, including composting and digestion, in a manner that ensures a high level of environmental protection and that the resulting product meets the relevant high-quality standards. For this purpose, the first-level local authorities are responsible for organizing and operating the separate collection and transportation of these waste.

Regarding **single-use plastics**, Law 4736/2020 established measures to restrict and reduce their consumption, as well as Extended Producer Responsibility for specific plastic products.

From January 1, 2024 (Article 46 of Law 4819/2021), subject to the responsibility of the respective Alternative Management Systems (AMS), **hazardous waste produced by households**, such as hazardous waste from paints, varnishes, solvents, or cleaning products, must be collected separately under the care of the respective first-level Local Government Organization (LGO) at Green Points, and, in the event that the first-level LGO does not have a Green Point, at a suitably licensed location indicated by the respective Waste Management Organization (WMO). Organized management through the Alternative Management Systems for **Small Quantities of Hazardous Waste** at Households (**AMSHW**)[4] is currently carried out only for certain waste streams included in the AMSHW, specifically for lamps, small WEEE, and batteries/accumulators. Individual management is carried out through private initiatives for toners. The goal of the P.E.S.D.A. of Eastern Macedonia & Thrace Macedonia & Thrace is the organization of a separate collection system for small hazardous waste and diversion from landfilling.

According to the Waste Management Law, **bulky waste** included in the stream of household waste encompasses a wide range of items, such as—indicatively—furniture, mattresses, large packaging materials, bicycles, packaging pallets, and WEEE, large toys, suitcases, bicycles, carpets, strollers, etc. Bulky waste, according to the provisions of Law 4819/2021, is accepted at Green Points and Recycling Centers, Source Separation Education Centers (KEDISP). The goals of the Regional Waste Management Plan of Eastern Macedonia and Thrace include the creation of separate collection and management infrastructures for bulky waste, 100% diversion of bulky waste from landfilling, and the promotion of reuse and recycling. Macedonia & Thrace include the creation of separate collection and management infrastructure for bulky items, 100% diversion of bulky items from landfilling, and the promotion of reuse and recycling.

The separate collection of certain additional MW streams and similar waste is carried out through approved Alternative Management Systems (AMS). The following streams are covered:

- Waste Batteries and Accumulators (WB&A)
- Waste Electrical and Electronic Equipment (WEEE) – includes waste lighting equipment and lamps.
- Waste Lubricating Oils (WLO).
- Used Vehicle Tires (UVT).

Finally, according to the NWMP, the development of a separate collection network includes edible fats and oils, which must be collected separately and directed to biofuel production for energy recovery. The environmentally

[3] Biological waste (biowaste): biodegradable waste from gardens and parks, food and kitchen waste from homes, restaurants, catering facilities, and retail spaces, and related waste from food processing facilities.

[4] According to the Waste Framework Directive (WFD), the following are defined as hazardous waste: cleaning agents, disinfectants, batteries (WEEE), lamps, insect repellents, inks.

sound management of cooking oils requires their separate collection and delivery to licensed collection companies for their subsequent utilization. The RSWMP of Eastern Macedonia & Thrace provides for the separate collection of edible oil and fat waste to be implemented through special bins placed in appropriate locations within the municipalities (e.g. near large producers), as well as within green points.

In parallel with all the above, the "Pay-As-You-Throw" system (Art. 5, Law 4819/2021) is established, according to which waste producers are charged based on the actual quantity of waste they generate. In application of this system, the calculation of the unified municipal cleaning and lighting fee may also be based on waste generation per household or building complex, professional activity, urban or municipal unit, provided that the relevant first-level Local Government Authority has a system for measuring the generated waste or for one of the waste streams produced.

In addition to the above legal provisions, **the limitations of the municipal waste management system of the Municipality of Kavala** must be taken into account, which includes:

- Collection and management of mixed municipal waste: Collected in green bins and transported to the Kavala SL, where MW is subjected to mechanical sorting in a suitably dimensioned and licensed mobile unit.
- Collection and management of recyclable packaging (paper, plastic, metal): Collected in blue bins and transported to the Sorting Center for Recyclable Materials (SCRM) of Xanthi.
- Collection and management of glass packaging: Collected in bell-type containers serving mainly businesses, and further managed under the responsibility and supervision of the Hellenic Recovery Recycling Corporation SA (HRRC SA).
- Collection and management of clothing and textile waste: Collected through a network of metal collection bins and further managed under the responsibility and supervision of a suitably licensed private company.
- Collection and management of printed paper waste and paper/cardboard packaging: Collected in blue bins with yellow lids serving mainly the needs of commercial enterprises and school units, collected by the Cleaning Department of the Municipality of Kavala and forwarded to the SCRM of Xanthi.
- Collection and management of WEEE: Collected in bins for small electrical – electronic devices, installed in municipal buildings, and further managed under the responsibility and supervision of “Appliances Recycling SA”.
- Collection and further management of Waste Lubricating Oils (WLO) generated from the activities of the Municipality of Kavala, used vehicle tires, bulky waste, green waste from gardening activities, and small quantities of C&DW, which derive from the MW stream during the collection process, by appropriately licensed entities.

Finally, according to the **National Waste Prevention Program** (NWPP), food waste, Packaging Materials/Waste (PW), special categories of plastic products/waste (Plastic Carrier Bags (PCB) and Single-Use Plastic Products (SUPP)) are **priority waste streams** and may be relevant to the uses of the Project.

The adoption of NWPP measures and actions within the boundaries of the Project may contribute to achieving the targets set for the priority streams, such as:

- Reduction of (excessive) packaging and packaging waste.
- Promotion of bulk product purchasing over packaged products, particularly in relation to packaging waste generated during product distribution.

- Selection of reusable packaging.
- Selection of environmentally friendly packaging.
- Promotion of the substitution of single-use plastics with reusable or biodegradable materials.
- Promotion of the use of recycled plastic.
- Promotion of the creation of drinking water points to discourage the use of plastic bottles.
- Selection of materials and products made from recycled materials.
- Investigation of banning the use/consumption of plastic carrier bags.
- Substitution of plastic carrier bags with other materials that are biodegradable or environmentally friendly.
- Promotion of the use of reusable carrier bags.

The Project's WMP, in implementation of the above regarding the collection of MW streams, will include the following:

- The collection of MW within the Project will be carried out in two (2) separate streams: Recyclable Materials (paper/cardboard, plastic, metals, glass) and mixed waste.
- Separate collection will be carried out for the following additional MW streams, where they arise during the implementation of the Project:
  - Waste Streams subject to Alternative Management (Waste Portable Batteries[5], Waste Electrical and Electronic Equipment – includes waste lighting equipment and lamps[6], Waste Lubricating Oils, Used Vehicle Tires), Small Quantities of Hazardous Waste (SQHW).

2.3.2 Excavation, Construction and Demolition Waste (ECDW)

Regarding Excavation, Construction and Demolition Waste (ECDW), Article 30 of Law 4819/2021 provides that the management of ECDW from public or private projects or activities of category A' of Law 4014/2011 (A' 209) aims at their maximum possible utilization for the needs of the project. It provides for **separate sorting of at least the following: wood, inorganic fractions such as concrete, bricks, tiles and ceramics, stone, metals, glass, plastics, and gypsum, and is carried out preferably within the project site**, where technically feasible, in accordance with the provisions of the relevant Environmental and Social Impact Assessment (ESIA).).

In addition, the management of surplus excavation materials with EWC code 17 05 04 (excavation materials managed outside the construction site) is carried out in accordance with the provisions of the Environmental Terms Approval Decision (ETAD) of the respective project. For the above excavation materials, as well as for ECDW managed within the construction site, no contract is required with Collective Alternative Management Systems (CAMS) or the establishment of an Individual Alternative Management System (IAMS), unless this is provided for in the relevant ETAD. For ECDW excluding EWC code 17 05 04, which is managed outside the construction site, the project or activity operator is required to enter into a cooperation agreement with an approved CAMS as an ECDW operator. The project operator is required to register in the Electronic Waste Register (EWR) the relevant data,

[5] SQHW

[6] SQHW

including data relating to construction and demolition waste (ECDW excluding EWC code 17 05 04) that is utilized within the construction site.

If the project or activity does not fall under category A' of Law 4014/2011, the project or activity operator is required to enter into a cooperation agreement with an approved CAMS as an ECDW operator for all ECDW it generates, including that with EWC code 17 05 04.

The Project's Waste Management Plan, in implementation of the above regarding the management of ECDW, is based on the following principles / assumptions:

- ECDW collection within the Project will be carried out separately by type of ECDW.
- ECDW will be utilized/reused for the needs of the project to the greatest possible extent.
- ECDW will in any case not be mixed with the MW streams.

2.3.3 Extractive Waste

Extractive waste[7] generated from offshore exploration, extraction, and processing of mineral resources is excluded from the scope of Law 4819/2021 and Joint Ministerial Decision 39624/2209/E103 (Government Gazette B/2076/25.9.2009) [Measures, conditions, and restrictions for the management of waste from the extractive industries, in compliance with the provisions of Directive 2006/21/EC of 15 March 2006 "on the management of waste from extractive industries and amending Directive 2004/35/EC" of the Council of 15 March 2006].

The management of extractive waste to be generated during the implementation of the Project will comply with the general specifications for the protection of the marine environment and will follow the guidelines of international and regional protocols, such as:

- The London Convention and the London Protocol on the prevention of marine pollution by dumping of wastes and other matter[8].
- The Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean[9], and more specifically the "Protocol for the Protection of the Mediterranean Sea against Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil" (Offshore Protocol)[10].

2.3.4 Hazardous Waste

The management of hazardous waste that may be generated during the implementation of the Project, which is not included in the waste categories analyzed above (MW, ECDW, Extractive Waste), will be carried out in accordance with applicable legislation, taking into account the objectives and provisions of the NWMP.

[7] Waste resulting from the prospecting, extraction, treatment, and storage of mineral resources and from the operation of quarries *(Article 3, paragraph 2 of Joint Ministerial Decision 39624/2209/E103/2009 (Government Gazette 2076/B/25.09.2009))*

[8] https://www.imo.org/en/about/Conventions/pages/convention-on-the-prevention-of-marine-pollution-by-dumping-of-wastes-and-other-matter.aspx

[9] https://ypen.gov.gr/symvasi-tis-varkelonis-gia-tin-prostasia-tou-thalassiou-perivallontos-kai-ton-paraktion-periochon-tis-mesogeiou/

[10] https://wedocs.unep.org/bitstream/handle/20.500.11822/2961/94ig4_4_protocol_eng.pdf

3 INTEGRATED WASTE MANAGEMENT

3.1 MUNICIPAL WASTE

3.1.1 Type of Waste – Classification according to EWC

It is estimated that the Project will generate both non-hazardous and hazardous Municipal Waste (MW), as well as certain other waste streams falling under alternative management (management through AMS).

The categories of waste estimated to be generated during the implementation (construction and operation) of the Project, based on the European Waste Catalogue (EWC) (Decision 2001/118/EC, as amended and in force), are presented in the following table. It is noted that codes accompanied by an asterisk (*) in addition to the number represent waste considered hazardous.

Table 1-4: Classification of urban-type waste according to the EWC

EWC Code	EWC Description
15	**WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED**
15 01	Packaging (including separately collected municipal packaging waste)
15 01 01	Paper and cardboard packaging
15 01 02	Plastic packaging
15 01 04	Metallic packaging
15 01 05	Composite packaging[11]
15 01 06	Mixed packaging
15 01 07	Glass packaging
15 01 10*	Packaging containing residues of or contaminated by hazardous substances
19	**19 WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTEWATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND INDUSTRIAL USE**
19 08	Wastes from wastewater treatment plants not otherwise specified
19 08 05	Sludges from treatment of urban wastewater
20	**MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS**
20 01	Separately collected fractions (except 15 01)
20 01 01	Paper and cardboard
20 01 02	Glass
20 01 13*	Solvents
20 01 14*	Acids
20 01 15*	Alkaline wastes
20 01 19*	Pesticides
20 01 21*	Fluorescent tubes and other mercury-containing waste
20 01 23*	Discarded equipment containing chlorofluorocarbons
20 01 25	Edible oils and fats
20 01 27*	Paints, inks, adhesives and resins containing hazardous substances

[11] Beverage packaging (e.g. Tetra Pak), snack packaging (e.g. chips, cheese puffs), blister packs.

EWC Code	EWC Description
20 01 29*	Detergents containing hazardous substances
20 01 33	Batteries and accumulators referred to in 16 06 01, 16 06 02 or 16 06 03 and mixed batteries and accumulators containing such batteries
20 01 34	Batteries and accumulators other than those mentioned in 20 01 33
20 01 35*	Discarded electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components
20 01 36	Discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35
20 01 37*	Wood containing hazardous substances
20 01 39	Plastics
20 01 40	Metals
20 03	Other municipal wastes
20 03 01	Mixed municipal waste
20 03 04	Septic tank sludge

It is noted that the classification of waste, i.e. the identification of hazardous properties through the assessment of waste hazardousness and, ultimately, their classification as hazardous or non-hazardous, shall be carried out in accordance with the provisions of the "Commission Notice on technical guidance on the classification of waste" (2018/C 124/01) (see §1.4.1), based on the Waste Framework Directive 2008/98/EC, which has been transposed into Greek legislation through Law 4819/2021 (Government Gazette 129/A/23.07.2021), and Regulation (EC)[12] No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (CLP Regulation).

3.1.2 Estimated Quantities

This section presents the estimates made for the generation of municipal waste from the Project, which are based on a series of assumptions.

<u>Construction Phase</u>

- Duration of construction works
  - Onshore facilities: 3 months (60 working days).
  - CO_2 pipeline: 9 months (180 working days).
  - Modification of existing offshore Prinos facilities to receive CO_2 from the new subsea CO_2 pipeline and for injection into new wells: 4 months (80 working days).
  - Well drilling: 8 months (160 working days).
  - Total construction duration: 14 months (worst-case scenario for MW estimation).
- Average number of workers per day:
  - Onshore facilities: 10.
  - CO_2 pipeline: 200.
  - Modification of existing offshore facilities: 20.

[12] Current consolidated version: 01/12/2023: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008R1272-20231201

  - Well drilling: 90.
- Daily MW generation rate: 0.4 kg/person.
- Qualitative composition of MW based on NWMP[13] estimates.
- Separate collection of recyclable materials (paper and cardboard, metals, plastics, glass).
- Specific weight per type of MW:
  - Paper/cardboard: 0.20 tn/m³
  - Plastics: 0.22 tn/m³
  - Metals: 0.23 tn/m³
  - Glass: 0.33 tn/m³
  - Other – mixed: 0.26 tn/m³
- Recyclable waste recovery rate per MW stream:
  - Paper/cardboard: 85%
  - Plastics: 50%
  - Metals: 70%
  - Glass: 60%

Based on the above, Table 15 presents the estimated total quantity of MW during the construction phase of the Project, as well as the average daily quantities of MW generated. Additionally, the maximum expected MW generation is presented, which corresponds to a simultaneous daily presence of 188 workers.

Table 1-5: Estimation of Produced Quantities MW - Construction Phase

NW Generation		Mixed	Recyclables	Total	Unit
Total Generation (14 months)	MW Generation (tn)	14,19	6,85	**21,04**	**tn**
	MW Generation (m³)	54,57	32,22	**86,79**	**m³**
Average Daily Generation	Average Daily MW Generation (tn/d)	0,05	0,02	**0,08**	**tn/d**
	Average Daily MW Generation (m³/d)	0,19	0,12	**0,31**	**m³/d**
Maximum Daily Generation	Maximum Daily MW Generation (tn/d)	0,08	0,04	**0,12**	**tn/d**
	Maximum Daily MW Generation (m³/d)	0,30	0,18	**0,48**	**m³/d**

As regards other urban-type waste streams (waste streams subject to Alternative Management, Small Quantities of Hazardous Waste (SQHW), etc.), the permanent generation of which is not expected during the operation of the Project based on the data available at this stage, the estimation of the quantities to be generated is not feasible.

Finally, as regards domestic wastewater from workers' accommodation, it is estimated that:

- during the construction phase at the onshore facilities site, approximately **12 m³** of domestic wastewater will be generated,

[13] NSWMAP MD Act 39 of 31.8.2020 (OG A' 185/29.9.2020), as amended by the Cabinet Act No. 5 of 18.4.2023 (OG A' 94/18.4.2023).

- during the well drilling construction phase, approximately **200 m³** of domestic wastewater will be generated, and
- during the CO_2 pipeline construction phase, approximately **30 m³** of domestic wastewater will be generated.

The domestic wastewater will be discharged to the existing Wastewater Treatment Plant (WWTP) of the Sigma installation. Other liquid wastes expected to be generated by the specialised pipelay and trenching vessel, along with the two supply/tug support vessels during the construction of the CO_2 pipeline, include bilge water and ballast water. Water from the engine room may contain grease and/or oils (bilge water). The management of bilge water will be carried out in accordance with Annex I of MARPOL 73/78 (Regulations for the Prevention of Pollution by Oil) and its relevant amendments. The treatment equipment (bilge water separator) will comply with the IMO Guidelines and Specifications for Pollution Prevention Equipment for Machinery Space Bilges of Ships (IMO Resolution MEPC.107(49)). The discharge of ballast water used for vessel stability at sea is subject to the requirements of Annex I of MARPOL 73/78 and the International Convention for the Control and Management of Ships' Ballast Water and Sediments (Ballast Water Management – BWM). The treatment equipment (ballast water treatment system) will comply with Standard D-2, which concerns the treatment of marine ballast water.

<u>Operation Phase</u>

- Average number of workers per day: 46
- Daily MW generation rate: 0.4 kg/person
- Qualitative composition of MW based on NWMP[14] estimates
- Separate collection of recyclable materials (paper and cardboard, metals, plastics, glass)
- Specific weight per type of MW:
  - Paper/cardboard: 0.20 tn/m³
  - Plastics: 0.22 tn/m³
  - Metals: 0.23 tn/m³
  - Glass: 0.33 tn/m³
  - Other – mixed: 0.26 tn/m³
- Recyclable waste recovery rate per MW stream:
  - Paper/cardboard: 85%
  - Plastics: 50%
  - Metals: 70%
  - Glass: 60%

Based on the above, **Table 16** presents the estimated annual quantity of MW during the operation phase of the Project as well as the average daily quantities of MW generated.

Πίνακας 3-1: Εκτίμηση παραγόμενων ποσοτήτων ΑΑ - Φάση Λειτουργίας

NW Generation		Mixed	Recyclables	Total	Unit
Annual Generation	MW Generation (tn)	14,19	6,85	**21,04**	**tn**

[14] NSWM Ministerial Act No. 39 of 31.8.2020 (Government Gazette 185/A/29.9.2020), as amended by the Cabinet Act No. 5 of 18.4.2023 (Government Gazette 94/A/18.4.2023).

NW Generation		Mixed	Recyclables	Total	Unit
	MW Generation (m^3)	54,57	32,22	**86,79**	**m^3**
Average Daily Generation	Average Daily MW Generation (tn/d)	0,012	0,006	**0,02**	**tn/d**
	Average Daily MW Generation (m^3/d)	0,048	0,028	**0,08**	**m^3/d**

As regards other urban-type waste streams (waste streams subject to Alternative Management, Small Quantities of Hazardous Waste (SQHW), etc.), the permanent generation of which is not expected during the operation of the Project based on the data available at this stage, the estimation of the quantities to be generated is not feasible.

3.1.3 Waste Management Plan

The plan for managing the waste generated by the Project (urban-type waste and other waste streams of similar nature arising during construction and operation) was developed based on the requirements of §1.2.3. It is noted that the management (separate collection, temporary storage) of waste within the boundaries of the Project was selected, with the aim of promoting the basic principles of waste management (§1.2.1).

The waste stream management approach is presented in the following table.

Table 1-7: Mapping of an Integrated Waste Management System - Municipal Waste

EWC Code	EWC Description	Description of the type of waste	Waste Stream Management		
			Collection/Temporary Storage within the Project	Temporary Storage Equipment within the Project	Collection (Transportation) / Treatment[15]
20 03 01	mixed municipal waste	Mixed municipal waste	Separate collection of mixed municipal waste / Temporary storage within the Project	Mixed Waste Bin (plastic bin EN 840-2/5/6, capacity 80 to 1100 liters)	Responsible LGO or collection and transportation agency – *in case it is not feasible, the disposal of waste by the Project Agency should be provided for in the existing collection system of the LGO* / Kavala Landfill.
19 08 05	sludge from the treatment of urban wastewater	Sludge from the Sigma WWTP from the treatment of urban wastewater of the Project	-	-	Licensed entity for collection, transportation, and management
15 01 01	packaging made of paper and cardboard	Mixed recyclable materials from paper/cardboard, plastic, metal, and glass[16]	Separate collection of recyclable materials / Temporary storage within the Project	Recyclable Materials Bin (plastic bin EN 840-2/5/6, capacity 80 to 1100lt)	Competent LGO or collection and transportation agency – *in case it is not feasible, the disposal of waste by the Project Agency should be provided for in the existing collection system of the LGO*
15 01 02	plastic packaging				
15 01 04	metal packaging				

[15] "Treatment": operations of recovery or disposal, including preparation prior to recovery or disposal (Law 4819/2021)

[16] https://www.eoan.gr/%ce%b5%ce%bd%ce%b7%ce%bc%ce%ad%cf%81%cf%89%cf%83%ce%b7/%cf%84%ce%b9-%cf%85%ce%bb%ce%b9%ce%ba%ce%ac-%ce%b1%ce%bd%ce%b1%ce%ba%cf%85%ce%ba%ce%bb%cf%8e%ce%bd%ce%bf%cf%85%ce%bc%ce%b5/

EWC Code	EWC Description	Description of the type of waste	Waste Stream Management		
			Collection/Temporary Storage within the Project	Temporary Storage Equipment within the Project	Collection (Transportation) / Treatment[15]
15 01 05	synthetic packaging[17]				/ Recycling Material Sorting Center (RMSC) of Xanthi.
15 01 06	mixed packaging[18]				
15 01 07	glass containers				
20 01 01	paper and cardboard				
20 01 02	glass				
20 01 39	plastics				
20 01 40	metals				
20 01 25	edible oils and fats	Edible oils and fats. *Permanent production during the implementation of the Project is not foreseen. In any case, and if the need arises, the produced quantities should be temporarily stored in the project's temporary waste storage area.*	Separate collection of edible oils and fats / Temporary storage within the Project *if the need arises	Container for Collecting Edible Oils and Fats (Intermediate Bulk Container (IBC) or UN HDPE barrel, capacity from 30 to 220 liters) *if necessary	Licensed entity for collection, transportation, and management *if necessary
20 01 23*	discarded equipment containing chlorofluorocarbons	Waste Electrical and Electronic Equipment (WEEE).	Separate collection of WEEE / Temporary storage within the Project	WEEE Bin (plastic bin EN 840-2/5/6, capacity 80 to 1100 liters or WEEE Bin	Collection and transportation entity / WEEE compliance scheme

[17] Beverage packaging (Tetra Pak type), snack packaging (e.g., potato chips, cheese puffs), tablet packaging.

[18] Mixed packaging: packaging consisting of two or more layers of different materials that cannot be separated by hand and constitute a single integrated unit consisting of an inner receptacle and an outer casing, which is filled, stored, transported, and emptied as a single unit, DIRECTIVE (EU) 2018/852.

EWC Code	EWC Description	Description of the type of waste	Waste Stream Management		
			Collection/Temporary Storage within the Project	Temporary Storage Equipment within the Project	Collection (Transportation) / Treatment[15]
20 01 35*	discarded electrical and electronic equipment, except for those mentioned in 20 01 21 and 20 01 23 that contain hazardous components	*Permanent production of WEEE during the implementation of the Project is not anticipated. In any case, and if the need arises, the produced quantities should be temporarily stored in the project's temporary waste storage area.*	*if necessary	from an approved EPR scheme) *if the need arises	*- in case it is not feasible, the disposal of waste by the Project entity should be provided for at appropriate WEEE recycling points of the compliance schemes.* **if necessary*
20 01 36	discarded electrical and electronic equipment, except for that referred to in 20 01 21, 20 01 23, and 20 01 35				
20 01 33	batteries and accumulators referred to in 16 06 01, 16 06 02, or 16 06 03 and mixed batteries and accumulators containing the aforementioned batteries	Waste from Electric Batteries (batteries) & Accumulators (WEEE)	Separate collection of WEBA / Temporary storage within the Project	LSSA Bin (LSSA bin from an authorized Collective Compliance Scheme)	Collection and transport entity / LSSA Collective Compliance Scheme
20 01 34	batteries and accumulators other than those mentioned in 200133				
20 01 21*	fluorescent tubes and other mercury-containing waste	Waste from Lighting Fixtures, Bulbs, and Small Appliances WEEE. *Permanent production of WEEE during the implementation of the Project is not foreseen. In any case, and if the need arises, the produced quantities should be temporarily stored in the project's temporary waste storage area.*	Separate collection of lighting fixtures, bulbs, and small appliances / Temporary storage within the Project *if necessary	Luminaires and Lamps Collection Bin (WEEE bin from an authorized Collective Compliance Scheme) *if necessary	Collection and transport entity / WEEE Collective Compliance Scheme – in case this is not feasible, provision shall be made for the disposal of the waste by the Project Entity at appropriate WEEE recycling points of the Collective Compliance Schemes. *if necessary
20 01 13*	solvents	SQHW (Small Quantities of Hazardous Waste in the MW). *Permanent production during the implementation of the Project is not anticipated. In any case, and if the need arises, the produced quantities should be temporarily stored separately for each type in*	Separate collection / Temporary storage within the Project *if necessary	Suitable separate container for each type (plastic container EN 840-2/5/6, capacity 80 to 1100lt or UN HDPE barrel, UN metal barrel, etc.) *if necessary	Licensed entity for the collection, transportation, and management of Hazardous Waste *if necessary
20 01 14*	acids				
20 01 15*	alkaline waste				
20 01 19*	pesticides				

EWC Code	EWC Description	Description of the type of waste	Waste Stream Management		
			Collection/Temporary Storage within the Project	Temporary Storage Equipment within the Project	Collection (Transportation) / Treatment[15]
20 01 27*	paints, inks, glues, and resins that contain hazardous substances	*the temporary waste storage area of the Project.*			
20 01 29*	detergents that contain hazardous substances				
20 01 37*	wood that contains hazardous substances				
15 01 10*	packaging that contains residues of hazardous substances or has been contaminated by them	Empty paint cans, solvents, etc. *Permanent production during the implementation of the Project is not foreseen. In any case, and if the need arises, the produced quantities should be temporarily stored separately for each type in the project's temporary waste storage area and managed as hazardous waste.*	Separate collection / Temporary storage within the project *if necessary	UN HDPE barrel, UN metal barrel *if necessary	Licensed entity for the collection, transportation, and management of Hazardous Waste *if necessary
20 03 04	septic tank sludge	Wastewater from construction site chemical toilets	-	-	Collection and transportation agency

It is noted that, through the electronic services of the Electronic Waste Registry (HMA), it is possible to search, based on the EWC code(s), for the corresponding licensed waste collection and transport operators per regional unit.

3.2 CONSTRUCTION WASTE

3.2.1 Type of Waste – Classification according to EWC

The integrated management of C&DW related to the construction works and excavation activities of the Project is carried out in accordance with Joint Ministerial Decision 36259/1757/E103/2010 (Government Gazette 1312/B/24.08.2010) "Measures, conditions and programme for the alternative management of construction and demolition waste (C&DW)" and the relevant provisions of Law 4819/2021, as amended and in force.

It is estimated that the Project will generate C&DW subject to alternative management (via Collective Alternative Management Systems - CAMS) as well as other waste, hazardous and non-hazardous, such as construction residues (e.g., concrete, metals, packaging materials, etc.) and surplus materials from site preparation and construction activities.

The types of waste arising from the construction works and estimated to be generated during the construction phase of the Project are presented in the following table, based on the European Waste Catalogue (Decision 2001/118/EC, as amended and in force). It is noted that codes accompanied by an asterisk (*) denote waste classified as hazardous.

Table 1-8: Classification of construction waste according to the EWC

EWC CODE	Description
08	**WASTES FROM THE MANUFACTURE, FORMULATION, SUPPLY AND USE (MFSU) OF COATINGS (PAINTS, VARNISHES AND VITREOUS ENAMELS), ADHESIVES, SEALANTS AND PRINTING INKS**
08 01	Wastes from MFSU and removal of paint and varnish
08 01 11*	Waste paint and varnish containing organic solvents or other hazardous substances
08 04	Waste paint and varnish containing organic solvents or other hazardous substances
08 04 09*	Waste adhesives and sealants containing organic solvents or other hazardous substances
10	**WASTES FROM THERMAL PROCESSES**
10 13	Wastes from cement, lime and plaster production and products made from them
10 13 14	Waste concrete and concrete sludge
13	**OIL WASTES AND WASTES OF LIQUID FUELS (EXCEPT EDIBLE OILS, AND THOSE IN CHAPTERS 05, 12 AND 19)**
13 01	Waste hydraulic oils
13 01 11*	Synthetic hydraulic oils
13 02	Waste engine, gear and lubricating oils
13 02 06*	Synthetic engine, gear and lubricating oils
13 05	Oil/water separator contents
13 05 07*	Oily water from oil/water separators
15	**WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED**
15 02	Absorbents, filter materials, wiping cloths and protective clothing

EWC CODE	Description
15 02 02*	Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths and protective clothing contaminated by hazardous substances
17	**CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)**
17 01	Concrete, bricks, tiles and ceramics
17 01 01	Concrete
17 02	Wood, glass and plastic
17 02 01	Wood
17 02 04*	Glass, plastic and wood containing or contaminated with hazardous substances
17 04	Metals (including their alloys)
17 04 05	Iron and steel
17 04 09*	Metal waste contaminated with hazardous substances
17 05	Soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 04	Soil and stones other than those mentioned in 17 05 03
17 05 06	Dredging spoil other than those mentioned in 17 05 05

It is emphasized that the classification of waste, i.e., the identification of hazardous properties through the assessment of the waste's hazard and, ultimately, their classification as hazardous or non-hazardous, shall be carried out in accordance with the provisions of the "Commission Notice on technical guidance on the classification of waste" (2018/C 124/01) (see §1.4.1), based on the Waste Framework Directive 2008/98/EC (WFD), which has been transposed into Greek legislation by Law 4819/2021 (Government Gazette 129/A/23.07.2021) and the CLP Regulation "Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006."

3.2.2 Εκτιμώμενες Ποσότητες

4 Estimated Quantities

According to initial estimates, the surplus excavation materials from the earthworks of the Project site amount to approximately 200 m³. Excavations will be limited to the absolute necessary, while surplus material will be reused as a priority for embankment needs within the framework of the Project construction.

Beyond the excavation surplus, other generated C&DW from construction activities are difficult to estimate at this stage, given that there is no corresponding calculation model.

It is noted that construction waste may contain small quantities of hazardous or toxic materials. Hazardous materials that may be found on construction sites include:

- Solvent-based concrete additives
- Chemicals for moisture protection
- Adhesives
- Bitumen-based emulsions
- Asbestos-based materials

- Mineral fibers (insulation)
- Paints and coating layers
- Treated wood
- Resins
- Plasterboards

Table 19 records the possible hazardous constituents in the construction waste stream and their potential hazardous properties.

Table 1-9: Hazardous Components in C&D Waste (CDW)

Product / Material	Possible Hazardous Components	Potential Hazardous Properties
Concrete additives	Hydrocarbon solvents	Flammable
Moisture-resistant materials	Solvents, bitumen	Flammable, Toxic
Adhesives	Solvents, isocyanate compounds	Flammable, Toxic, Irritant
Protective coatings, sealants	Solvents, bitumen	Flammable, Toxic
Road coating materials	Tar-based emulsions	Toxic
Asbestos	Fibres that can penetrate the respiratory system	Toxic, Carcinogenic
Mineral fibres	Fibres that can penetrate the respiratory system	Skin and respiratory irritation
Treated wood	Copper, arsenic, chromium, tar, biocides, fungicides	Toxic, Ecotoxic, Flammable
Paints and coating layers	Lead, chromium, vanadium-based solvents	Toxic, Flammable
Power transmission equipment	PCBs	Ecotoxic
Light source	PCBs, mercury, sodium	Toxic, Ecotoxic
Ventilation systems	CFCs	Ozone-depleting
Fire protection systems	CFCs	Ozone-depleting
Contaminated woven fibres used in construction	Radionuclides	Toxic
	Heavy metals including cadmium, mercury	Toxic
	Carbon	Toxic
Animal by-products	Carbon	Toxic
Gas cylinders	Propane, butane, acetylene	Flammable
Insulation fibres	Isocyanate compounds, phthalic anhydride	Toxic, Irritant
Oils and fuels	Hydrocarbons	Flammable, Ecotoxic

Product / Material	Possible Hazardous Components	Potential Hazardous Properties
Plasterboards	Possible source of H_2S in the disposal area	Flammable, Toxic
Glass	-	-
Roads	Tar, solvents	Flammable, Toxic
Ash/clinker substrate	Heavy metals including mercury and copper	Toxic

It is noted that the types and quantities of hazardous materials in the C&DW (Construction and Demolition Waste), which may be generated during the construction phase of the Project, cannot be estimated at present due to the early stage of the Project's study.

Other hazardous wastes expected to be produced in small quantities during the construction phase mainly include wastes containing oil, sewage sludge, oily waters from oil separators, water, absorbent materials, filter materials, packaging, etc. The sacks and pallets from the chemicals to be used for the preparation of the drilling mud during the drilling of wells are estimated at 1 ton.

4.1.1 Management Plan

The primary objective of the integrated management of the Project's C&DW is to promote the on-site utilization of the maximum possible quantity of construction materials and the recycling of the remainder, as well as the reuse of excavation materials. In any case, through appropriate mechanisms, the reuse, recycling, and recovery of construction wastes will be promoted, reducing the percentage that ends up in landfills and contributing to the achievement of the national target for the reuse, recycling, recovery, and utilization of at least 70% of C&DW by total weight of those produced in the country[19].

The plan for managing the generated C&DW of the Project and other wastes arising from the construction works was formulated based on the requirements of §1.2.3. It is noted that the management (separate collection, temporary storage) of wastes within the boundaries of the Project was selected, aiming at the promotion of the basic principles of waste management (§1.2.1).

The presentation of the management method for the waste streams is given in the following table.

Πίνακας 3-2: Αποτύπωση ολοκληρωμένου συστήματος διαχείρισης αποβλήτων από κατασκευαστικές εργασίες

EWC Code	EWC Description	Waste Type Description	Waste Stream Management		
			Collection/Temporary On-Site Storage	Temporary On-Site Storage Equipment	Removal (Transport) / Treatment[20]
17 01 01	concrete	Concrete from demolitions. *No production is foreseen during Project implementation. In any case, if required, the quantities generated must be temporarily stored in the Project's waste temporary storage area.*	Separate collection of concrete from demolitions / Temporary on-site storage *if required	Concrete container (Skip Lift Container) *if required	Reuse – recycling on-site or authorized collection & transport operator / CWCS *if required

[19] Naturally occurring inert materials (soils and stones, EWC 17 05 04) resulting from excavation works are excluded from the target calculation.

[20] "Treatment": Recovery or disposal operations, including preparation prior to recovery or disposal (Law 4819/2021).

EWC Code	EWC Description	Waste Type Description	Waste Stream Management		
			Collection/Temporary On-Site Storage	Temporary On-Site Storage Equipment	Removal (Transport) / Treatment[20]
17 02 01	wood	Wood. *No production is foreseen during Project implementation. In any case, if required, the quantities generated must be temporarily stored in the Project's waste temporary storage area.*	Separate collection of wood / Temporary on-site storage *if required	Wood container (Skip Lift Container) *if required	Reuse on-site or authorized collection & transport operator / CWCS * if required
17 02 04*	glass, plastic and wood containing or contaminated with hazardous substances	Wood containing or contaminated with hazardous substances. *No production is foreseen during Project implementation. In any case, if required, the quantities generated must be temporarily stored in the Project's waste temporary storage area and managed as hazardous waste.*	Separate collection of hazardous wood / Temporary on-site storage *if required	Hazardous wood container (Skip Lift Container) *if required	Authorized hazardous waste collection, transport, and management contractor *if required
17 04 05	iron and steel	Iron and steel (metal waste)	Separate collection of iron/steel / Temporary on-site storage	Iron/steel container (Skip Lift Container or metal container EN 840-2/5/6)	Reuse on-site or authorized collection & transport operator / CWCS
17 04 09*	metal waste contaminated with hazardous substances	Metals contaminated with hazardous substances. *No production is foreseen during Project implementation. In any case, if required, the quantities generated must be temporarily stored in the Project's waste temporary storage area and managed as hazardous waste.*	Separate collection of hazardous metals / Temporary on-site storage *if required	Hazardous metals container (Skip Lift Container or metal container EN 840-2/5/6) *if required	Authorized hazardous waste collection, transport, and management contractor *if required
17 05 04	soil and stones other than those mentioned in 17 05 03	Excavation soil waste	Separate collection of excavated material / Temporary on-site storage	Bulk – Temporary stockpile near the Project site area	Reuse on-site or authorized collection and transport operator / Disposal at approved suitable sites (e.g. quarries, landfills) in accordance with the Project's EIA Approval Decision or CWCS

EWC Code	EWC Description	Waste Type Description	Waste Stream Management		
			Collection/Temporary On-Site Storage	Temporary On-Site Storage Equipment	Removal (Transport) / Treatment[20]
08 01 11*	waste from paints and varnishes containing organic solvents or other hazardous substances	*Permanent production during Project implementation is not foreseen. In any case, if required, the quantities generated*	Separate collection /	Appropriate separate container for each type (plastic bin EN 840-2/5/6, capacity 80 to 1100 L, or UN HDPE or UN metal drum, etc.) uired	Authorized hazardous waste collection, transport, and management contractor *if required
08 04 09*	waste adhesives and sealants containing organic solvents or other hazardous substances				
10 13 14	waste concrete and concrete slurry	Waste from concrete production *No production is foreseen during Project implementation. In any case, if required, the quantities generated must be temporarily stored in the Project's waste temporary storage area and managed as hazardous waste.*	Separate waste collection / no temporary storage *if required	-	Collection and Management by the supplier/contractor or Authorized collection & transport operator / CWCS
13 01 11*	synthetic hydraulic oils	Waste Lubricating Oils (WLO)	Separate collection of Lubricating Oils / Temporary on-site storage	Lubricating Oil Container (UN metal drum)	Collection and transport contractor / Lubricating Oils Collective Compliance Scheme (LOCCS)
13 02 06*	synthetic engine, gear, and lubricating oils				
13 05 07*	oily water from oil/water separators				

EWC Code	EWC Description	Waste Type Description	Waste Stream Management		
			Collection/Temporary On-Site Storage	Temporary On-Site Storage Equipment	Removal (Transport) / Treatment[20]
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by hazardous substances	Oily rags, oil filters. *Permanent production during Project implementation is not foreseen. In any case, if required, the quantities generated must be stored temporarily and separately per type in the Project's waste temporary storage area and managed as hazardous waste.*	Separate collection / Temporary on-site storage *if required	UN HDPE drum, UN metal drum, portable pollution response unit containing big bags for waste placement *if required	Authorized hazardous waste collection, transport, and management contractor *if required
-	-	Other construction waste not included in this plan that may contain small quantities of hazardous or toxic substances (e.g., concrete additives with solvents, adhesives, bitumen emulsions, paints and coatings, packaging, etc. (see §1.3.2.1)). *If such waste is generated during Project implementation, it must be classified based on the EWC, temporarily stored in the Project's waste temporary storage area, and managed as hazardous waste.*	Separate collection per type / Temporary on-site storage *if required	Suitable hazardous waste temporary storage equipment (Intermediate Bulk Container (IBC) or UN HDPE drum, etc.) *if required	Authorized hazardous waste collection, transport, and management contractor *if required

It is noted that through the electronic services of the Electronic Waste Registry (HMA), it is possible to search by the European Waste Catalogue (EWC) code or codes for the corresponding licensed waste collection and transport entities per regional unit.

The management of Construction and Demolition Waste (C&DW) in the Region of Eastern Macedonia and Thrace is carried out according to the provisions of Joint Ministerial Decision (JMD) 36259/1757/E103/2010 through the following Alternative Management Systems (based on data from the Hellenic Recycling Agency – EOAN[21]):

- Collective Alternative Management System (CAMS) “Northern Greece Aggregate Recycling S.A.”, trade name “AN.A.V.E. S.A.”.
- CAMS “Central Macedonia C&DW Recycling S.A.”, trade name “ANA.KE.M.”.
- CAMS “Central Greece Recycling System Ltd.”, trade name “S.AN.K.E. Ltd.”.

[21] https://www.eoan.gr

- CAMS “PEDMEDE ECO Limited Liability Company”, trade name “PEDMEDE ECO M.E.P.E.”.

4.2 DRILLING WASTE

4.2.1 Waste Type – Classification by EWC

Drilling activities generate mining waste, both hazardous and non-hazardous, primarily consisting of drilling cuttings and drilling muds.

Drilling muds are categorized based on their main component, which can be oil-based, water-based, or synthetic substances. To produce drilling muds, a combination of materials and chemicals is used to achieve desired properties (such as specific gravity, viscosity, etc.). For the implementation of the Project, water-based/lime mud, oil-based mud, and oil-based/water-based mud will be used. Cuttings consist of fragments of geological formations penetrated by the drill string, separated during the removal of solids from the recirculating drilling fluid flow through a series of physical processes, and are temporarily stored in special closed containers. Subsequently, the drilling muds are temporarily stored in special mud tanks and reused in further drilling operations until no longer needed or depleted.

It is noted that the primary drilling section will be 16 inches, drilled from approximately 350 m to a depth of 2,200 m. In this section, a water-based mud with seawater and lime will be used, which is biodegradable and environmentally non-harmful. The geological formation in this section is uniform and consists of sandstone and clay layers; from all wells drilled in the area, no traces of hydrocarbons have ever been observed at these depths. The cuttings from this section will be deposited on the seabed, while below approximately 2,200 m depth, drilling fluids will return to the surface where cuttings will be removed and mud will be processed. It will be ensured that the constituents of the water-based muds are not harmful to the environment, and a record of these constituents with their safety data sheets (MSDS) will be maintained. Provided the above conditions are met, cuttings resulting from the use of these water-based muds may be disposed of on the seabed.

Regarding cuttings containing hydrocarbons due to oil-based muds, they will be separated at the drilling unit and transferred to a management system located at the drilling facility. The cuttings undergo centrifugation to remove most of the mud and then are dried. The dry cuttings are placed in containers and transported onshore for further management by a certified waste management contractor. Drilling muds are temporarily stored in special mud tanks and reused until depleted. The exhausted mud is transferred to onshore facilities, and final management is carried out by a licensed waste collection, transport, and management entity.

During the cementing stage of the drilling, since drilling mud and cement slurry are displaced sequentially, an intermediate spacer fluid ($CaCl_2$ brine), known as a spacer, is interposed to ensure effective displacement and prevent contamination between the two fluids (drilling fluids and slurry). The spacer fluid displaces the drilling fluid, which is then displaced by cement injection without leaving a passage between them.

The categories of mining wastes expected to be generated during the Project construction phase based on the European Waste Catalogue (EWC) are presented in the following table. Codes with an asterisk (*) indicate wastes classified as hazardous.

Table 3-3: Classification of Drilling Waste According to the European Waste Catalogue (EWC)

EWC Code	EWC Description
01	**WASTES FROM PROSPECTION, MINING, QUARRYING AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS**
01 05	drilling muds and other drilling wastes
01 05 04	muds and wastes from water drilling (fresh water drilling muds and wastes applies to water-based mud/fluids)
01 05 05*	oil-containing drilling muds and waste
01 05 06*	drilling muds and other drilling wastes containing hazardous substances
01 05 07	barite-containing drilling muds and wastes other than those mentioned in 01 05 05 and 01 05 06
01 05 08	chloride-containing drilling muds and wastes other than those mentioned in 01 05 05 and 01 05 06
17	**CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)**
17 01	concrete, bricks, tiles and ceramics
17 01 01	concrete

It is noted that the classification of waste, i.e., the determination of hazardous properties through the hazard assessment of the waste and ultimately their classification as hazardous or non-hazardous, will be carried out in accordance with the provisions of the "Commission Notice on technical guidance for the classification of waste" (2018/C 124/01) (see §1.4.1), based on the Waste Framework Directive 2008/98/EC (WFD), which has been incorporated into Greek legislation by Law 4819/2021 (Government Gazette 129/A/23.07.2021) and the CLP Regulation

"Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labeling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.".

4.2.2 Estimated Quantities

It is estimated that the drilling muds produced during the construction of the Project will amount to 1,540 m³ per well.

In a typical well for the CO2 storage project, approximately 650 m³ of cuttings are generated; therefore, for the planned four (4) wells, approximately 2,700 m³ of solid waste will be produced. The drilling operations in the Project generate small volumes of residues, as all planned wells are of small diameter and side drilling type.

Table 1-12: Estimated Quantities of Drill Cuttings per Drilling Section

Borehole Section (in)	MD (m)	Mud Type	Specific Gravity (SG)	Mud Volume per Well (m³)	Cuttings Volume per Well (m³)	Total Cuttings Volume (4 Wells) (m³)
16	1850	Water-based / Lime	1.05-1.15	+/- 700	360	1.140
12 1/4	950	Oil-based	1.45-1.70	+/- 490	210	844

Borehole Section (in)	MD (m)	Mud Type	Specific Gravity (SG)	Mud Volume per Well (m³)	Cuttings Volume per Well (m³)	Total Cuttings Volume (4 Wells) (m³)
8 1/2	1033	Oil-based / Water-based	Oil-based / Water-based	Oil-based / Water-based	Oil-based / Water-based	406
			Total:	1.540	Oil-based / Water-based	Oil-based / Water-based

The spacer fluid ($CaCl_2$ brine) that may be used during the cementing phase is estimated at approximately 20–30 m³ per well, while the excess cement is estimated at approximately 20 m³ per well.

4.2.3 Management Plan

The management plan for the waste generated from the drilling activities of the Project was developed based on the requirements of §1.2.3. It is noted that management (separate collection, temporary storage) of waste within the boundaries of the Project was selected, aiming to promote the fundamental principles of waste management (§1.2.1).

The method of managing the waste streams that may be generated is presented in the following table.

Table 3-4: Mapping of the Integrated Waste Management System from Drilling Operations

EWC Code	Description of EWC	Description of Type of Waste	Waste Stream Management		
			Collection/Temporary Storage within the Project Site	Temporary Storage Equipment within the Project Site	Collection (Transport) / Treatment[22]
01 05 04	Sludges and wastes from water drilling	Sludges (water-based drilling muds)	Separate collection of sludge / Temporary storage within the Project	Mud tanks	Licensed entity for collection, transportation and management
		Drilling cuttings from water-based drilling muds	Separate sludge collection / Temporary storage within the Project	-	Disposal at the seabed
		Separator fluid - spacer	Separate collection of liquid / Temporary storage within the Project *if needed	Metal storage tanks 5-25 m^3	Licensed entity for collection, transportation, and management
01 05 05*	Sludges and wastes from oil drilling	Sludges (oil-based drilling muds)	Separate collection of sludge / Temporary storage within the Project	Mud tanks	Licensed entity for collection, transportation, and management
		Drilling cuttings from oil-based drilling muds	Separate collection of cuttings / Temporary storage within the Project	Cutting tanks	Licensed entity for collection, transportation, and management

[22] "Treatment": Recovery or disposal operations, including preparation prior to recovery or disposal (Law 4819/2021).

EWC Code	Description of EWC	Description of Type of Waste	Waste Stream Management		
			Collection/Temporary Storage within the Project Site	Temporary Storage Equipment within the Project Site	Collection (Transport) / Treatment[22]
		Spacer fluid	Separate collection of liquid / Temporary storage within the Project, *if needed	Metal storage tanks 5-25 m^3	Licensed entity for collection, transportation, and management
01 05 06*	Drilling muds and other drilling wastes containing hazardous substances	Sludges (drilling muds containing hazardous substances)	Separate collection of liquid / Temporary storage within the Project, *if needed	Mud tanks	Licensed entity for collection, transportation, and management
		Cuttings from drilling operations containing hazardous substances	Separate collection of liquid / Temporary storage within the Project, *if needed	Cutting tanks	Licensed entity for collection, transportation, and management
		Spacer fluid	Separate collection of liquid / Temporary storage within the Project, *if needed	Metal storage tanks 5-25 m^3	Licensed entity for collection, transportation, and management
01 05 07	Drilling muds and wastes containing baryte other than those mentioned in entries 01 05 05 and 01 05 06	Water-based drilling muds containing baryte	Separate collection of liquid / Temporary storage within the Project	Mud tanks	Licensed entity for collection, transportation, and management
		Drill cuttings containing baryte from water-based drilling muds	Separate collection of liquid / Temporary storage within the Project	Cutting tanks	Entity responsible for collection and transport or disposal to approved suitable recipients in accordance with the Environmental Terms Approval (AEPO) of the Project.
01 05 08	Muds and drilling wastes containing chlorides other	Muds containing chlorides (water-based drilling fluids)	Separate collection of sludge / Temporary storage within the Project site.	Mud tanks	Licensed entity for collection, transportation, and management

EWC Code	Description of EWC	Description of Type of Waste	Waste Stream Management		
			Collection/Temporary Storage within the Project Site	Temporary Storage Equipment within the Project Site	Collection (Transport) / Treatment[22]
	than those mentioned in 01 05 05 and 01 05 06	Drilling cuttings containing chlorides from water-based drilling fluids	Separate collection of cuttings/ Temporary storage within the Project site.	Cutting tanks	Entity responsible for collection and transport or disposal to approved suitable recipients in accordance with the Environmental Terms Approval (AEPO) of the Project.
		Spacer Fluid	Separate Collection of Liquid / Temporary Storage within the Project Site *if necessary	Metal storage tanks 5-25 m^3	Licensed entity for collection, transportation, and management
17 01 01	Concrete	Excess Cement Slurry	Separate Collection of Solidified Cement / Temporary Storage within the Project Site *if necessary*	Metal Storage Container	Reuse on-site or collection and transport entity / Collective Alternative Management System (SEΔ).

It is noted that through the electronic services of the Electronic Waste Registry (HMA), it is possible to search, based on the EWC code(s), for the respective licensed entities for waste collection and transport by regional unit.

4.3 WASTE FROM OPERATION / MAINTENANCE OF THE FACILITY

It is estimated that during the operation and maintenance of the underground CO_2 storage facility, both non-hazardous and hazardous waste will be generated.

Given the early stage of the Project study, it is not possible to accurately estimate the types and quantities of hazardous and non-hazardous waste that may be produced. However, it can be mentioned that hazardous waste from existing facilities is generated on the Delta platform. This waste is produced during general maintenance of the facilities, which lasts 15 days every 30 months. The hazardous waste generated from cleaning tanks V-101 A/B, V-107, and V-102 from the water treatment on the Delta platform consists of oily sludge (mixtures of heavy hydrocarbons mainly containing asphaltenes), rags, absorbent materials, etc. Hazardous and non-hazardous waste may arise from the processing of CO_2.

Indicatively, the categories of waste estimated to be generated from the operation and maintenance of the underground CO_2 storage facility, according to the European Waste Catalogue (EWC), are presented in the following table. It is noted that codes with an asterisk (*) denote wastes considered hazardous.

Table 1-14: Indicative types of waste from the operation and maintenance of the underground facility according to the EWC

EWC Code	Description
13	**WASTE OILS AND WASTE FUELS (excluding edible oils and those included in chapters 05, 12, and 19)**
13 02	engine, gearbox, and lubrication oils
13 02 05*	non-chlorinated engine, gearbox, and lubrication oils based on minerals
14	**WASTES FROM ORGANIC SUBSTANCES USED AS SOLVENTS, REFRIGERANTS, AND PROPELLANTS (excluding chapters 07 and 08)**
14 06	wastes from organic substances used as solvents, refrigerants, and foaming/aerosol propellants
14 06 01*	chlorofluorocarbons, HCFC, HFC
14 06 03*	other solvents and mixtures of solvents
15	**WASTE FROM PACKAGING; ABSORBENT MATERIALS, WIPING CLOTHS, FILTER MATERIALS, AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED**
15 02	absorbent materials, filter materials, wiping fabrics, and protective clothing
15 02 02*	absorbent materials, filter materials (including oil filters not otherwise specified), wiping fabrics, protective clothing that have been contaminated with hazardous substances
16	**OTHER WASTES NOT SPECIFIED ELSEWHERE IN THE LIST**
16 05	gases in pressure containers and discarded chemical substances
16 05 06*	laboratory chemicals consisting of hazardous substances or containing hazardous substances, including mixtures of laboratory chemicals
16 10	aqueous liquid waste intended for off-site treatment
16 10 01*	aqueous liquid waste containing hazardous substances

EWC Code	Description
16 10 02	aqueous liquid waste other than those included in 16 10 01
17	**WASTE FROM CONSTRUCTION AND DEMOLITION**
17 04	metals (including their alloys)
17 04 05	iron and steel
17 04 09*	metal waste contaminated with hazardous substances

The management of the above-mentioned hazardous and non-hazardous wastes, as well as any other potentially generated wastes during the operation and maintenance phase of the facility, will be carried out in accordance with the applicable legislation. The generated wastes will be collected separately by type in containers suitable for their safe temporary storage within the Project boundaries, in compliance with safety and environmental protection regulations, and their management will be performed by licensed entities for waste collection, transport, and management.

Hazardous wastes such as rags, absorbent materials, etc., related to this Project and originating from the shared use of the water separation system of the Delta platform, e.g., water separator V-102, are already included in the existing operation of the Delta platform.

4.4 WASTE FROM DECOMMISSIONING – RESTORATION

The management of wastes during the decommissioning and dismantling phase will be conducted according to the applicable legislation. The generated wastes will be collected separately by type in containers suitable for their safe temporary storage within the Project boundaries, in compliance with safety and environmental protection regulations, and their management will be carried out by licensed entities for waste collection, transport, and management.

At the current stage of the Project, it is not possible to estimate the type and quantities of wastes to be generated. Indicatively, the most significant source of waste is the removable equipment, whose management will be carried out appropriately depending on the applied decommissioning method, with the primary priority being reuse, followed by recycling, and finally the safe disposal of materials that cannot be reused or recycled, according to the applicable legislation. Additionally, a waste stream during the shutdown phase derives from the growth of marine organic matter in the support pipelines, the quantities of which will be possible to estimate once the exact time of the Project's shutdown is known. Apart from the above, it is expected that urban waste, packaging waste, Construction and Demolition Waste (C&DW), Waste Electrical and Electronic Equipment (WEEE), oil wastes, etc., will be produced.

5 WASTE MANAGEMENT PROCEDURES AND EQUIPMENT

5.1 WASTE CLASSIFICATION

The evaluation and classification of wastes are applied to each separate waste stream produced, after obtaining a representative sample. In the case where more than one type of waste exists, each type must be assessed separately. This ensures that any hazardous waste batches or elements:

- are not misclassified as non-hazardous due to mixing (dilution) with other wastes.
- are identified timely to prevent mixing with other wastes, e.g., in containers, bags, piles, or bins.

Only mixed municipal waste originating from households is exempt from these obligations.

Waste classification must be performed according to the instructions contained in the "Commission Notice on technical guidance for the classification of waste C/2018/1447."[23].

Briefly, the general waste classification stages are as follows:

Stage 1: Is the Waste Framework Directive 2008/98/EC (WFD), which has been incorporated into Greek legislation by Law 4819/2021 (Government Gazette 129/A/23.07.2021), applicable?

- First, it must be confirmed that the substance or object under consideration constitutes waste (as defined by the WFD). Determining whether the substance or object is waste under the WFD is a prerequisite for further hazard assessment. The guidance regarding the WFD provides clarifications on the basic definition of "disposal" within the WFD framework, as well as related concepts of "by-product" and "waste recovery" within the WFD.
- Second, it must be checked whether certain specified waste streams are excluded from the WFD scope. Even if the substance or object is considered waste, it must be evaluated whether any of the exemptions in Article 2 of the WFD apply. The WFD guidance provides detailed clarifications on selected exemptions. If an exemption applies, neither the WFD nor the waste list applies (an exceptional case is the mining waste directive, which is outside the WFD scope but requires classification according to the waste list if conditions apply).

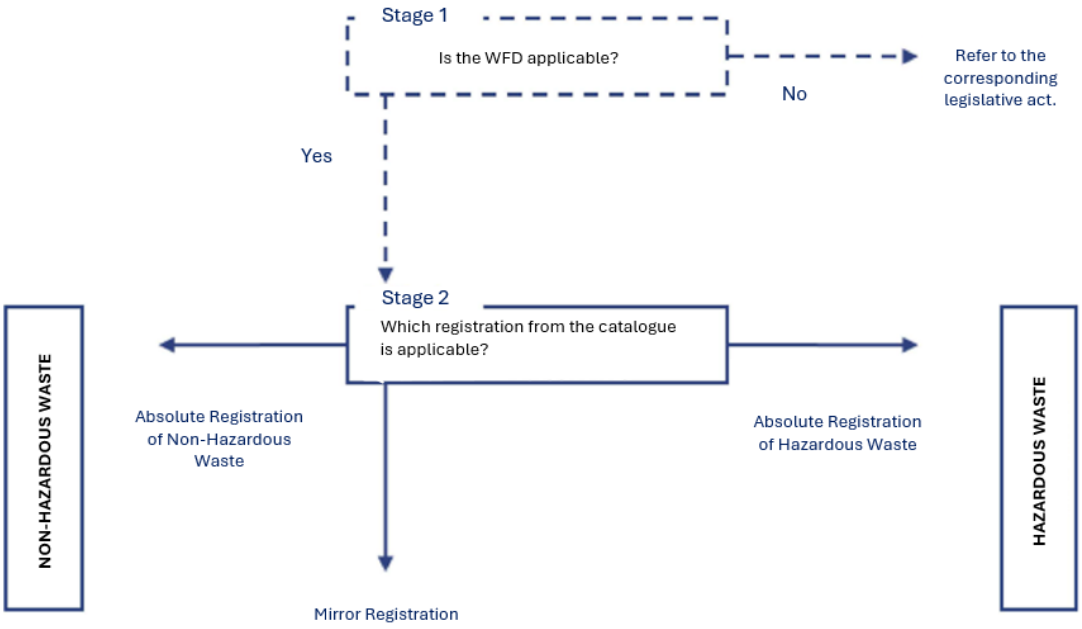
All waste streams not explicitly excluded from the WFD scope must be classified according to the WFD and the waste list, following the approach outlined in the technical guidance note. This obligation also applies when additional legislation exists for a given waste stream, as referenced in Article 2(4) of the WFD.

Stage 2: Which entry in the waste list (2000/532/EC (L 226), as amended) is applicable?
Upon completing the first two stages, the following should be known:

- whether the substance or object falls under the WFD and the waste list, and

[23] https://eur-lex.europa.eu/legal-content/EL/ALL/?uri=CELEX%3A52018XC0409%2801%29

- whether an "absolute" classification (Absolute Hazardous - AH or Absolute Non-Hazardous - ANH) or a "mirror" classification (Mirror Hazardous - MH or Mirror Non-Hazardous - MNH) applies, and consequently, whether further assessment (Stages 3 to 5) is required.



Stage 3: Are sufficient data available regarding the composition of the waste to determine whether it exhibits hazardous properties, either through calculation or testing as described in Stage 4.

Collecting adequate information on the presence and content of hazardous substances in the waste in order to determine whether the waste may exhibit one or more of the hazardous properties HP1 to HP15 is an essential stage of waste classification. Certain information on the composition of the waste is required regardless of the method used to assess the hazardous properties (calculation or testing), as described in Stage 4. There are several ways to obtain information on the relevant composition of the waste, the hazardous substances potentially present, and the hazardous properties that may arise:

- Information on the production process/physical or chemical process generating the waste and on related input substances and intermediates, including expert judgement (useful sources may include BREFs, industry handbooks, process descriptions, and lists of input materials issued by the producer, etc.),
- Information from the original producer of the substance or object before it became waste, e.g. safety data sheets (SDS), labels, or product sheets (Annex 2 of the Guidance),
- Waste analysis databases at Member State level,
- Sampling and chemical analysis of the waste (see Annex 4 of the C/2018/1447 guidance).

Once information on the composition of the waste is collected, it becomes possible to assess whether the identified substances are classified as hazardous, i.e., whether they must be assigned hazard statements according to the criteria set out in the CLP Regulation.

> *CLP[24] Regulation on Classification, Labelling and Packaging*
>
> *The CLP Regulation sets out the criteria for the classification of substances and mixtures for hazardous properties. According to the CLP Regulation, waste is not considered a substance, mixture, or article. Nevertheless, the hazardous properties applied to waste are linked to the criteria in the CLP Regulation. Moreover, the classification of substances under CLP may be useful for the classification of waste.*
>
> *Although Annex III of the WFD is based on the CLP Regulation, the criteria set out in the CLP Regulation have not been fully incorporated on a one-to-one basis. Instead, for waste classification purposes, it should be noted that some HP criteria in Annex III of the WFD refer directly to the hazard classes and categories under CLP, as well as to hazard statements and their associated classification criteria. Many mirror entries refer specifically to "hazardous substances." Substance classification is carried out in accordance with CLP, while the presence of hazardous substances in the waste must be assessed based on Annex III of the WFD (for further information, see Annex 3 of the Guidance). Furthermore, Table 3.1 of Part 3 of Annex VI of the CLP Regulation provides a set of official harmonised classifications of substances. Where such harmonised classification is available, it must be used in the classification of waste (for information on this, see Annex 2 of C/2018/1447).*

Stage 4: Does the waste exhibit any of the hazardous properties HP1 to HP15[25]?

Annex 3 of C/2018/1447 and Annex III of the WFD describe the 15 properties (HP1 to HP15) that render waste hazardous.

By the end of Stage 3, sufficient information should exist regarding the relevant composition of the waste under consideration. This means that the hazardous substances present in the waste and their classification (e.g. whether they correspond to relevant hazard statement codes under the CLP Regulation) should be known to a sufficient degree to allow application of at least one of the following methods to determine whether the waste exhibits hazardous properties:

- **Calculation**: if the amount of hazardous substances in the waste equals or exceeds the threshold values based on hazard statement codes (individually, depending on properties HP4 to HP14 – see Annex 3 of C/2018/1447),
- **Testing**: to determine whether the waste exhibits hazardous properties or not.

Annex 3 of C/2018/1447 provides detailed descriptions and guidance on how to assess each of the hazardous properties HP1 to HP15 via calculation or testing.

[24] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

[25] The 15 properties (HP1 to HP15) of waste that render it hazardous, as set out in Annex III of the Waste Framework Directive (WFD) and Annex III of Law 4819/2021.

With regard to the calculation method, it should be noted that the content values of hazardous substances in the waste, as determined, e.g. by sampling and chemical analysis, must be compared to the concentration limits listed in Annex III of the WFD. Furthermore, it must be explicitly stated that according to Article 7(4) of the WFD, dilution or mixing of the waste in order to reduce the initial concentration of hazardous substances is not permitted. It is also noted that the concentration limits in Annex III of the WFD do not apply to pure metal alloys in solid form, provided they are not contaminated with hazardous substances. Further information on metal alloy classification is available in Annex 1, section 1.4.6 of C/2018/1447.

Further guidance on waste sampling and chemical analyses for the purpose of applying the calculation method is provided in Annex 4 of C/2018/1447.

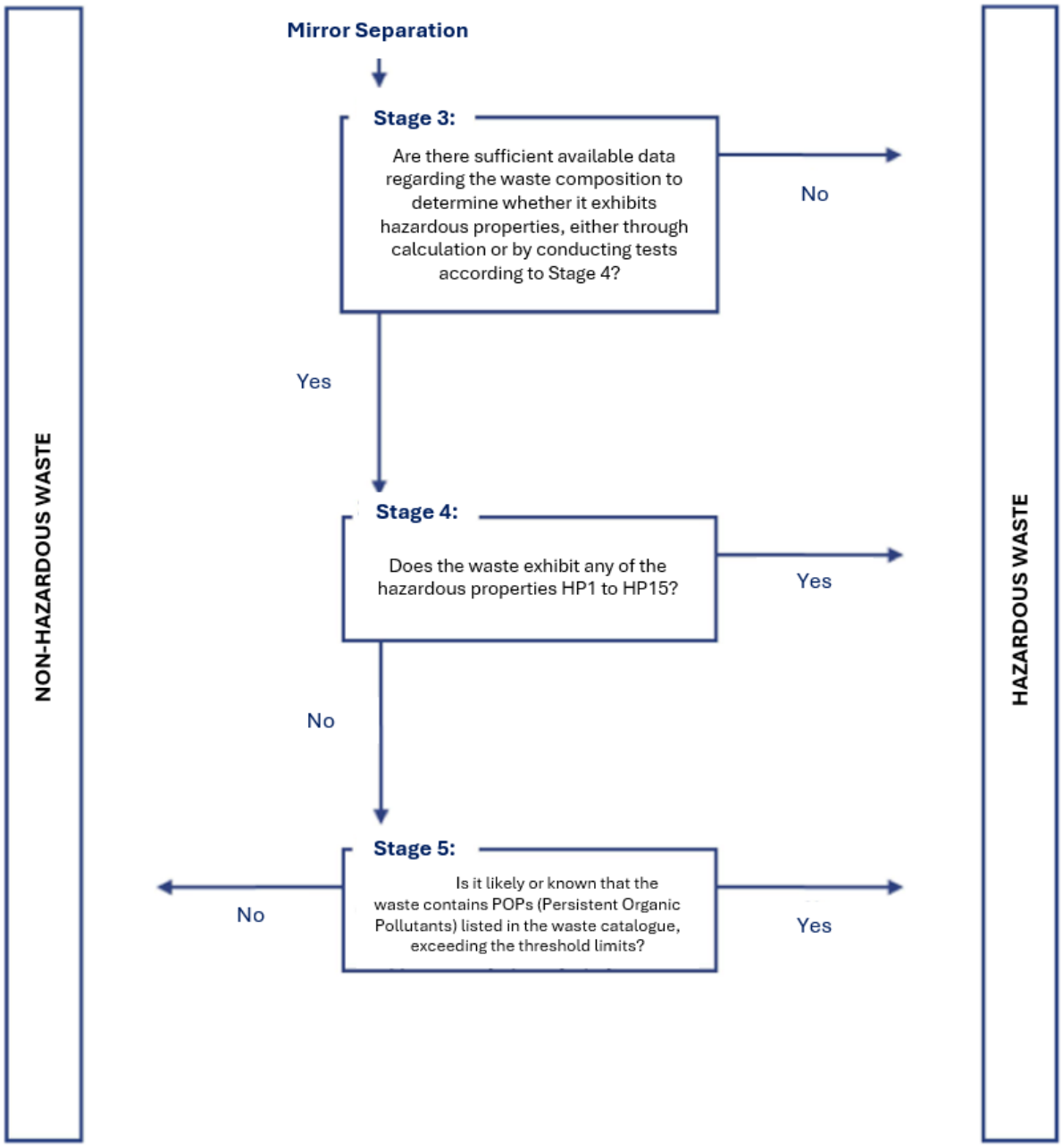
***Direct testing**: In certain cases, it may be useful to determine whether the waste exhibits a specific hazardous property (e.g., physical properties such as HP1 "Explosive," HP2 "Oxidising," or HP3 "Flammable").*

According to the Waste List Annex, "Where a hazardous property of the waste has been assessed both by testing and by using the concentrations of hazardous substances set out in Annex III of Directive 2008/98/EC, the test results shall prevail.".

Finally, if the waste exhibits one or more of the 15 hazardous properties, it must be assigned the relevant MH (Mirror Hazardous) entry. If, on the other hand, it does not exhibit any hazardous properties, then Stage 5 must be carried out to assess whether the waste contains certain specific POPs in quantities above the relevant thresholds. This is the final stage before a decision can be made to assign the MH or MNH (Mirror Non-Hazardous) entry to the waste under consideration.

Stage 5: Is it likely or known that the waste contains POPs listed in the Waste List Annex?

> *Stages 3, 4, and 5 must be used when selecting the appropriate mirror entry. Moreover, these sections may also be used to identify hazardous properties of waste related to AH (Absolute Hazardous) entries, as such information may be required to ensure compliance with the provisions set out in Article 19 of the WFD (Article 45 of Law 4819/2021) regarding proper labelling of hazardous waste (e.g., for completing waste transfer tracking forms).*
>
> *Upon completion of Stages 3 to 5, it should be finally determined whether the waste under consideration contains hazardous components and whether it exhibits one or more hazardous properties (HP1 to HP15), and/or whether it contains relevant POPs. Subsequently, a decision can be made on whether the waste is hazardous or non-hazardous.*



5.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

During waste handling, appropriate safety measures shall be taken. Personnel involved in waste management shall be fully equipped with appropriate Personal Protective Equipment (PPE). The aforementioned equipment includes:

- Work overalls.
- Protective goggles.
- Gloves:
  - Rubber gloves shall be worn when handling hazardous waste.

- Safety gloves shall be worn when handling non-hazardous waste.

- Mask:
  - A biological mask shall be used when dealing with hazardous waste (solid and liquid).
  - A dust mask shall be used when dealing with non-hazardous waste.
- Safety boots (steel-toed).
- Safety helmet.

5.3 TEMPORARY WASTE STORAGE

Temporary waste storage areas shall cover sufficient surface area, taking into account the requirements of the Project, as well as the number and size of the containers.

The temporary waste storage areas shall be located within the Project site, and access shall be provided for waste removal.

Space must be provided for filling and emptying containers, as well as for equipment washing and the collection of contaminated water. Sufficient spacing shall be maintained between containers to allow for proper visual inspection and to facilitate emergency access.

Areas where waste from drilling activities is collected must have an impermeable floor (concrete base, compacted subsoil, or embankment above a concrete base to allow for the removal of potentially contaminated soil) and a washing and drainage system suitable for handling contaminated effluents.

All waste management areas must be appropriately marked and signposted.

The accumulation period for hazardous and non-hazardous waste shall be kept to a minimum, thereby reducing the risks associated with the storage of large quantities of waste, particularly hazardous waste.

Containers used for waste storage must be in good condition, free of visible defects that could lead to leaks or spills, clearly labelled with their contents and any associated hazards, and made of materials compatible with the type of waste they contain. For the temporary storage of extractive waste pending collection, only covered metal skips and closed tanks shall be used.

All waste shall be removed from the site during the Preliminary Decommissioning Phase of the Project.

5.4 WASTE TRANSPORTATION

Waste transportation shall be carried out by waste collection and transport entities registered in the National Waste Registry (HMA). Specifically for hazardous waste, collection, transportation, storage, and treatment shall be conducted by licensed operators.

All waste transfers shall be accompanied by the relevant transport documents, which shall be completed by the waste collection and transport operator, with a copy retained by the Project Operator.

5.5 INSPECTION AND CONTROL

The Project Operator shall carry out checks and inspections as part of daily operations to ensure that all collection and temporary storage equipment and facilities remain in good condition, and that the procedures of the present Waste Management Plan (WMP) are followed.

The Project Operator shall carry out inspections to ensure compliance with the WMP, including but not limited to the following:

- Practical implementation of the WMP.
- Implementation of the procedures outlined in the WMP.
- Annual recording of hazardous and non-hazardous waste.
- Annual reporting of hazardous and non-hazardous waste in the HMA.
- Waste transport documentation.

In the event of findings or instances of non-compliance, the necessary corrective measures shall be taken.

5.6 ANNUAL WASTE GENERATION REPORT

Each year, an annual review and update of the WMP shall be carried out as needed by the Project Operator, who shall submit to the Electronic Waste Registry (HMA) of the Ministry of Environment and Energy (YPEN) annual data and information on the generation and management of all types of waste covered by the EWC (in particular, and as applicable, the producer, the type of waste (EWC code), the quantity, the waste management facility, and the disposal or recovery operations), in accordance with Article 53 of Law 4819/2021.

6 MONITORING OF PLAN IMPLEMENTATION

The present Waste Management Plan (WMP) constitutes the guiding plan for the implementation and execution of the Project's integrated waste management system. It serves as a reference document, as it sets out the directions for integrated waste management, the actions to be implemented, and the objectives to be met.

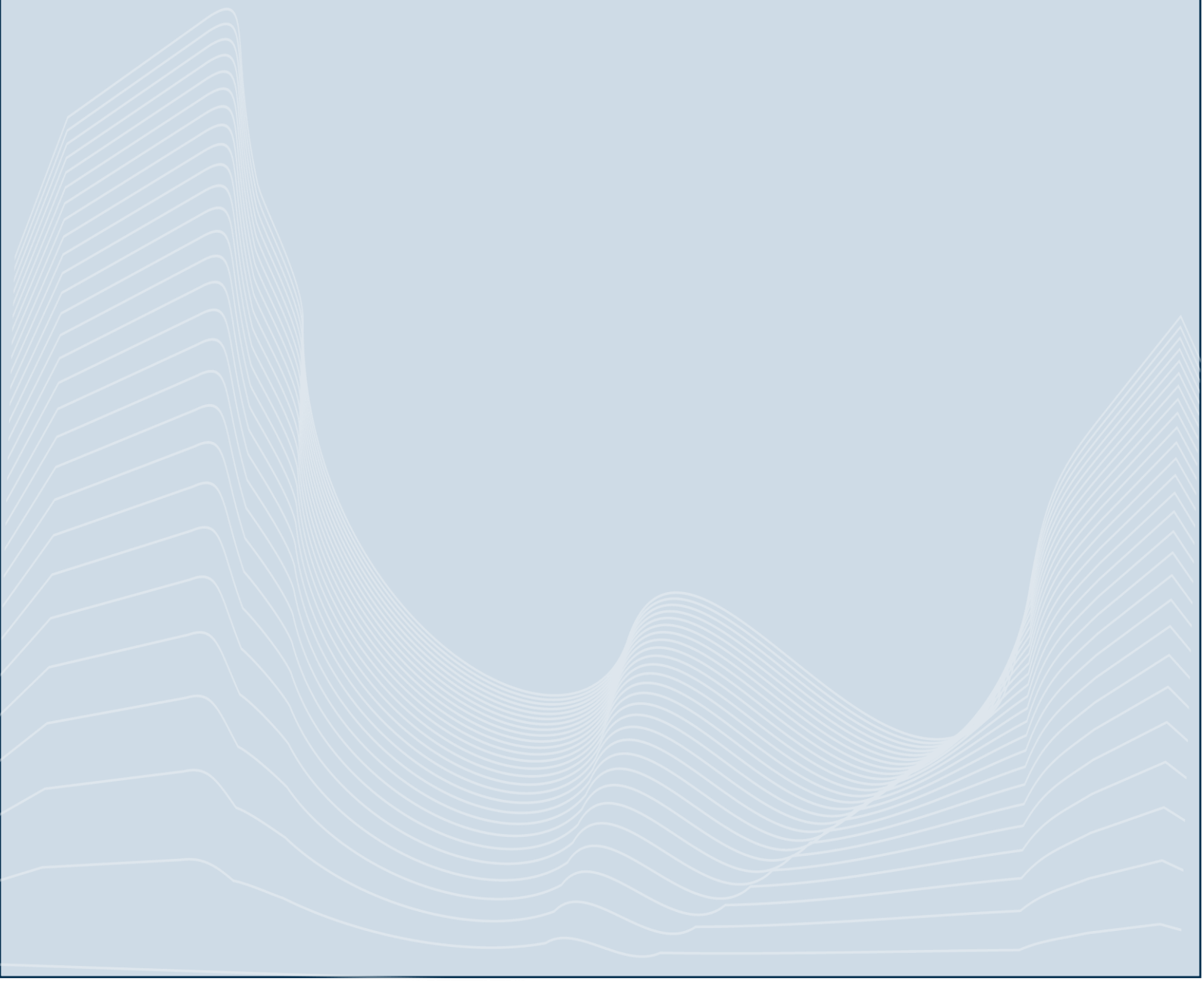
Within the framework of monitoring and evaluating the WMP, continuous improvement and adaptation of the plan to new data is recommended, by implementing the necessary modifications or updates as needed. The form and frequency of monitoring shall be determined as the project progresses.

Monitoring the achievement of the WMP objectives shall be carried out through the collection of data from the waste management system. The data shall include both quantitative and qualitative characteristics in order to enable a detailed monitoring of results. The data collected by the respective waste collection, transport, and management operators shall consist, indicatively and not exhaustively, of:

- the quantities of collected waste,
- the qualitative analysis of generated and collected waste,
- financial data and related analyses (e.g. cost per person, cost per tonne),
- the number and type of awareness-raising actions.

The evaluation of the achievement of the WMP objectives is proposed to be carried out, indicatively, through the monitoring of the following indicators:

- reduction of total waste generation,
- diversion rate from landfill (reduction of waste quantities sent to landfill),
- increase in the amount of waste collected by alternative waste management systems,
- reduction in the quantity of waste collected that does not fall under alternative waste management systems,
- reduction of contamination in recyclable materials.



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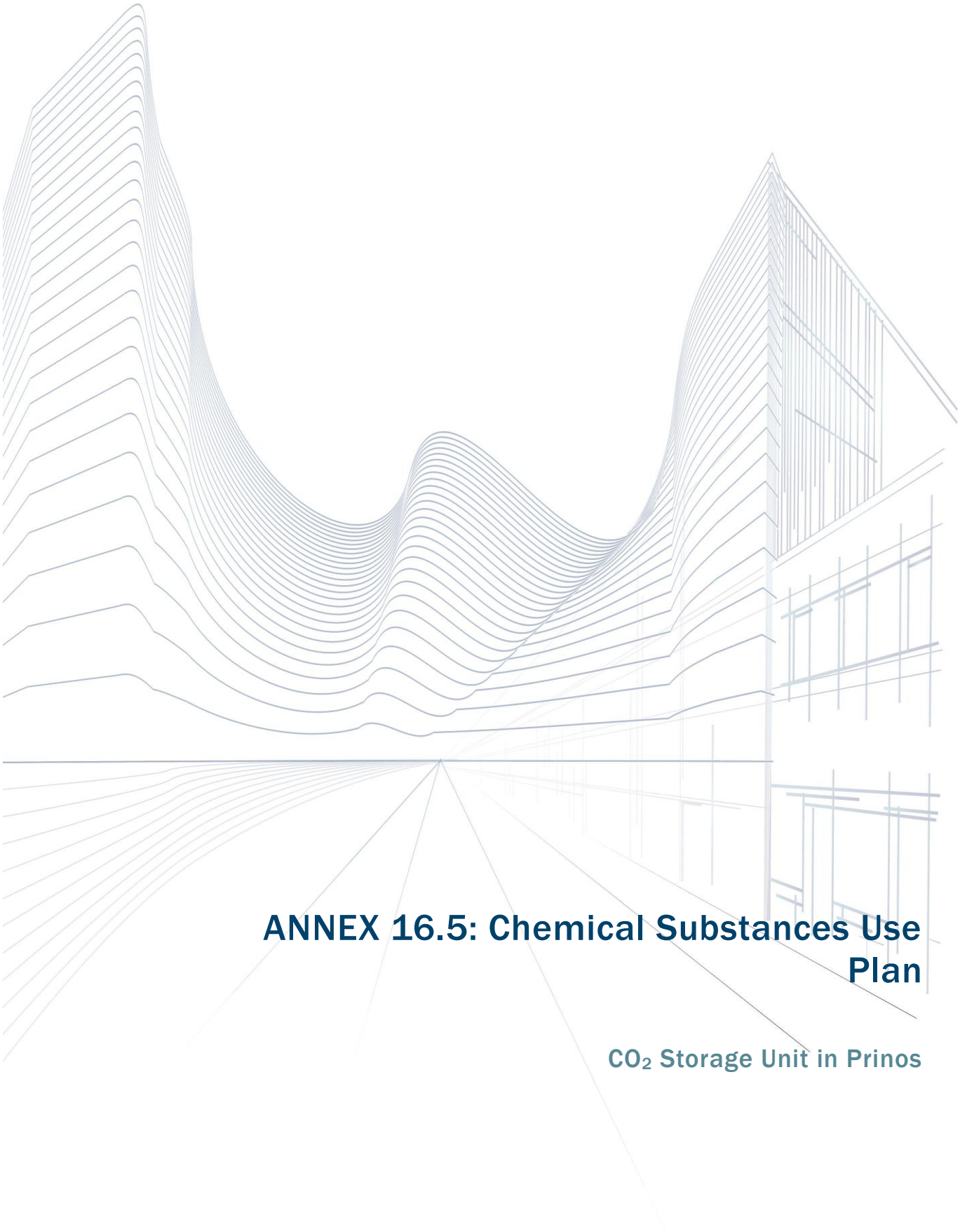

ANNEX 16.5: Chemical Substances Use Plan

CO_2 Storage Unit in Prinos

LDK CONSULTANTS

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Project	CO_2 Storage Unit in Prinos		
STUDY PHASE	Chemical Substances Use Plan within the framework of the Environmental Impact Assessment (EIA)		
STUDY CODE	CCP - 2902		
DATE	25.11.2024		
VERSION	v.01		
REVISION	v.01		
ENVIRONMENTAL CONSULTANT	LDK CONSULTANTS A.E. – WSP SA		
PROJECT OWNER	ENEARTH GREECE		
PREPARATION	Study Team LDK – WSP		
REVIEW	Kostis Nikolopoulos, LDK Project Manager Anna Borroni, WSP Project Director		
APPROVAL	Kostis Nikolopoulos Project Manager	LDK CONSULTANTS A.E. ΠΑΡΟΔΟΣ ΘΗΒΑΪΔΟΣ 21 - ΚΗΦΙΣΙΑ - Τ.Κ. 145 64 ΤΗΛ. 210 8196700 Α.Φ.Μ. 094061957 - ΔΟΥ: Φ.Α.Ε. ΑΘΗΝΩΝ ΑΡ. ΓΕΜΗ : 324501000	
APPROVAL	Vasilis Tsetoglou Health, Safety and Environmental Manager		
PROJECT OWNER REPRESENTATIVE	Katerina Sardi, Chief Executive Officer – Country Manager	ENEARTH GREECE ΜΟΝΟΠΡΟΣΩΠΗ Α.Ε ΛΕΩΦ.ΚΗΦΙΣΙΑΣ 32 - ΜΑΡΟΥΣΙ Τ.Κ. 151 25 ΤΗΛ. 210 81 74 200 – FAX. 210 81 74299 ΑΦΜ: 802522310 – ΔΟΥ ΚΕΦΟΔΕ ΑΤΤΙΚΗΣ	

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CONTENTS

TABLES

1 INTRODUCTION

This Chemical Substances Use Plan complies with Article 9(1) and Article 1(ia) of the Protocol "for the Protection of the Mediterranean Sea against Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil" of the Barcelona Convention (Decision 2013/5/EU).

This Plan applies to the Project: **CO_2 Storage Unit in Prinos**. The Project falls within the scope of the Protocol, as the storage activity constitutes the exploitation of resources in the Protocol's area, in accordance with point (d)(iii) of Article 1.

1.1 PROJECT SUMMARY

The project under study concerns the installation of a full-scale carbon dioxide (CO_2) storage unit in Prinos (the "Project"). The proposed CO_2 storage site is located within the Prinos Basin, in the Gulf of Kavala, in the Northern Aegean. The area of interest for CO_2 storage lies within the Prinos Concession, where Energean Oil & Gas SA ("Energean"), an affiliate of EnEarth, holds 100% of the interests and management rights for oil and natural gas exploration and production activities since 2007. The potential CO_2 storage location is situated within the Prinos structure and the underlying aquifer.

The operation of the facility is planned to be developed in two distinct phases based on capacity (Phase 1 and Phase 2), for reasons of scalability and adaptation to market conditions.

- **Phase 1** with an initial nominal capacity of up to **1 MTPA** for 20 years (starting around the end of 2025 to early 2026). The CO_2 will be supplied mainly in bulk, via third-party pipelines reaching the facility's boundaries under suitable conditions for injection. Additionally, small quantities of CO_2 shipments will be received at the Sigma onshore facilities in containers, transported by trucks, as part of pilot CO_2 capture projects.
- During **Phase 2**, an expansion is planned to reach a final nominal capacity of up to **3 MTPA**. The facility will be modified to also receive liquefied CO_2, which will be delivered via sea transport to a newly constructed jetty. For this purpose, marine facilities for mooring, unloading, storage and processing (pumping, heating) of the liquefied CO_2 will be built within the onshore area of the Sigma plant operations. The CO_2 will be transported to the offshore facilities through the subsea pipeline constructed during Phase 1.

This study focuses on **Phase 1 of the Project**.

The new facilities and wells planned for the operation of Phase 1 of the CO_2 storage Project, which are the subject of this study, include:

- Onshore facilities: modification of a designated area within the existing Sigma plant site for the construction of the CO_2 reception manifold and an unloading and compression area.
- Offshore pipeline: subsea pipeline connecting the Sigma plant area with the offshore Beta platform, approximately 20 km in length.

- Offshore platforms: modification and/or use of the existing offshore facilities at Prinos (Beta and Delta platforms) for the reception of CO_2 from the new subsea pipeline and CO_2 shipments in containers, injection into the new wells, and treatment of produced water (Delta platform).
- Wells: 2 CO_2 injection wells and 2 water production wells at the existing Beta platform of the Prinos offshore complex.

The CO_2 sources and the main reception processes during Phase 1 of the CO_2 storage Project will be as follows:

- Supply of bulk CO_2 under suitable conditions for injection via a third-party pipeline to an onshore reception station within the Sigma facilities operational area.
- Reception of CO_2 shipments from trucks carrying ISO containers at the Sigma onshore facilities. The containers will be loaded onto supply vessels/barges with a crane, transported, and unloaded at the existing Beta platform of the Prinos offshore facilities. It is noted that provision is also made for the direct injection of CO_2 shipments into the onshore reception manifold via a compression station during unloading from the trucks.

The CO_2 stream from the onshore station within the Sigma facilities will be transported via a new dedicated subsea pipeline, approximately 20 km in length, to the existing Beta platform of the offshore facilities, where the CO_2 injection into the reservoir will be carried out through specialized injection wells.

Modifications will be made to the existing Beta platform to include the necessary CO_2 injection facilities. The platform has slots for 12 wells and is connected to the Delta processing platform. As part of the Project, 4 of the 12 slots will be used for the two new CO_2 injection wells and the two new water production wells (Table 1-1). Electric Submersible Pumps (ESPs) will operate in the two water wells to extract water from the reservoir, providing a means of active pressure management. Water management will take place at the existing processing facility on the Delta platform.

Table 1-1: Final Drilling Depth Criteria (UTM Zone 35N)

Well Type	Name	Spudding Well	Spud Depth of New Well (m)	Target	Surface Location
CO_2 Injection	PBC-1	PB-17A	1.000	X:287725.69 y:4518803.72 Z:-2779.95	X:288963.21 y:4519413.86
CO_2 Injection	PBC-2	PB-24	1.000	X:287778.73 y:4519015.54 Z:-2718.38	X:288963.21 y:4519411.57
Water production	PBW-1	PB-22	1.000	X:290192.01 y:4517931.73 Z:-2741.54	X:288967.79 y:4519416.15
Water production	PBW-2	PB-23A	1.000	X:290060 y:4518995 Z:-2840	X:288965.50 y:4519413.86

The modification of the Delta platform will involve a comprehensive upgrade of the auxiliary facilities, the produced water treatment and disposal unit and the control and safety systems. This will ensure that the water produced for reservoir pressure management purposes will be treated using the existing facilities. This integrated approach optimizes resource utilization while enhancing the operational performance of the platform, environmental management, and the protection of the marine environment.

During the construction phase of the Project, the following activities will be carried out:

- Structural works and modifications, installation of CO_2 reception and handling equipment at the Sigma onshore facilities
- Installation of buried CO_2 transport pipelines (onshore pipeline section and offshore pipeline).
- Construction of CO_2 injection wells and water production wells:
    - Delivery & installation of the drilling rig
    - Preparation of the existing spudding well (placement of permanent mechanical barrier and preparation for sidetracking)
    - Drilling of a 16" diameter well to a depth of approximately 2,200 m
    - Drilling of a 12-1/4" x 13-1/2" diameter well to a depth of approximately 3,150 m
    - Drilling of an 8-1/2" diameter well to a depth of approximately 3,700 m

The drilling muds to be used are provided in the following table:

Table 1-2: Drilling Mud Program by Section and Used Additives

Section	Diameter (inches)	Estimated volume of drilling mud per well (m^3)	Drilling mud system – Main additives	Mud type
I	16"	+/- 700	Gel / Polymer / Lime Additives: Bentonite, Potassium Chloride, Polypac, CMC, Lime, Calcium Carbonate, Sodium Chloride, Flo-Vis.	Water-based / Lime
II	12 1/4"	+/- 490	Versavert LTOBM Additives: EDC 95/11, Safe-Scav, Safe Carb, Bentonite, Calcium Chloride, Barite, Versatrol	Oil-based
III	8 1/2"	+/- 350	FLO-PRO WBM or Versavert LTOBM Additives: Flo-Trol, Soda Ash, Safe-Scav, Sodium Chloride, Zinc Oxide, Conqor	Oil-based/water-based

The project shutdown, prioritizing the well closure and reservoir safety, will be carried out in accordance with best practices and guidelines (Offshore Energies United Kingdom (OEUK), 2022).

1.2 LEGISLATION – BARCELONA PROTOCOL

On December 17, 2012, the Council approved the accession of the EU to the Offshore Activities Protocol, highlighting the EU's commitment to reducing the environmental impacts of offshore activities in the

Mediterranean through effective regional cooperation (Decision 2013/5/EU). The legal consequence of this is that the Offshore Activities Protocol has now become part of EU legislation.

The Protocol "for the Protection of the Mediterranean Sea against Pollution resulting from the Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil" under the Barcelona Convention refers to the protection of the Mediterranean Sea from pollution arising from the exploration and exploitation of the continental shelf, seabed and its subsoil.

Article 9(1) of the Protocol requires operators to obtain approval from the competent authority for the use and storage of chemical substances related to their activities (based on the Chemical Use Plan), which is not subject to regulatory provisions within the Regulation Plan.

According to Article 1(ia) of the Offshore Activities Protocol for the Protection of the Mediterranean Sea against Pollution caused by the Exploration and Exploitation of the Continental Shelf, the Seabed, and its Subsoil, this Protocol mandates the preparation of a Chemical Use Plan.

The Chemical Use Plan includes the following requirements:

- The chemical substances that the operating entity intends to use during the operations
- The purposes for which the operating entity intends to use the chemical substances
- The maximum concentrations of chemical substances, as well as the maximum quantities expected to be used during all periods
- The area within which the chemical substance may potentially be released into the marine environment

2 DESCRIPTION OF CHEMICAL SUBSTANCES

The chemical substances that the operator intends to use in the new CO_2 storage facilities are described below.

No modifications to the existing Sigma facilities are planned for the implementation of the Project. The onshore CO_2 management facilities (reception, processing and pumping to the storage field) are located within the Sigma facility

The existing Beta platform has slots for 12 wells and is connected to the Delta processing platform.

Modifications will be made on the Beta platform to include the necessary CO_2 injection facilities. The platform will be equipped with a hoist, a gathering pipeline, equipment for processing CO_2 shipments, and the auxiliary facilities may be upgraded to accommodate the new activities. Two CO_2 injection wells and two water production wells will be drilled. The new wells will be sidetracked using the existing slots on the Beta platform

The modification of the Delta platform will involve a comprehensive upgrade of the auxiliary facilities, the processing and disposal unit for produced water, and the control and safety systems, so that the water produced for reservoir pressure management can be treated using the existing facilities.

The following tables summarize the required materials for the aforementioned modifications as well as the total basic materials used for the preparation of drilling fluids.

For the onshore facilities of the CO_2 storage project, the following will be required during the construction phase:

Table 2-1: Required Materials for Onshore Facilities

Material	Quantity
Carbon steel pipes and protective steel casings	50 tn
Concrete for pipeline coatings, foundations, pipeline supports, temporary access	350 tn
Copper cables for electrical installations and instruments of various sizes	2 tn

The following materials are expected to be required for the construction of the new subsea CO2 transport pipeline:

Table 2-2: Required Materials for the Construction of the New Subsea CO_2 Transport Pipeline

Material	Quantity
Carbon steel pipes for the offshore pipeline	2.480 tn
Concrete for pipeline coating	3.800 tn
Anti-corrosion coating with epoxy polyethylene/polypropylene (3LPE/PP)	102 tn
Anodes for cathodic protection of pipelines: Mix of Magnesium, Zinc, Aluminium	2 tn

For the new CO2 injection and produced water wells on the Beta platform, the following will be required:

Table 2-3: Required Materials for the Construction of the New Wells

Material	Quantity
Carbon steel pipes and protective steel casings	30 tn
Valves, pipe fittings, flanges	25 tn
Copper cables for electrical installations and instruments, of various sizes	3 tn

The basic materials to be used for the preparation of drilling fluids are summarized in the following Table, based on the Safety Data Sheets (SDS) and the European Regulation (EU) 2015/830.

The Safety Data Sheets (SDS) for each substance describe the properties, hazards, hazard symbols, as well as the safety measures.

The concentrations of substances in the drilling mud for each well on the Beta platform, as well as the estimated quantities of materials for the preparation of the drilling mud by wellbore section, are presented in Tables 4.1 and 4.2, respectively

Table 2-4: Properties of Key Chemical Substances for the Preparation of Drilling Fluids According to the SDS

Chemical Substance	CAS[1] - Number	Properties	Hazards	Safety Measures	Hazard Symbol
Bentonite	14808-60-7	Clay mineral used to increase the specific gravity of the drilling mud and to compensate for hydrostatic pressure.	Bentonite at the proposed concentrations is a mineral and is not considered hazardous to the environment. In other cases, it is considered possibly carcinogenic if inhaled (H351) or may cause organ damage through prolonged or repeated exposure by inhalation (H373).	Avoid inhalation. In case of inhalation, move to an area with fresh air. Seek medical attention if respiratory irritation develops or if breathing becomes difficult. Avoid contact with eyes. In case of contact, immediately rinse eyes with plenty of water for at least 15 minutes and seek medical attention if irritation persists. In case of skin contact, wash the area with water and soap and seek medical attention if irritation persists. Avoid ingestion. In case of ingestion,	

[1] Chemical Abstracts Service

Chemical Substance	CAS[1] - Number	Properties	Hazards	Safety Measures	Hazard Symbol
				rinse the mouth with water several times.	
POLYPAC	-	It consists of polyanionic cellulose and is a high-quality water-soluble polymer designed to control fluid loss. It is an ultra-low dosage additive, therefore causing zero to minimal reduction in fluidity. The typical concentration is 5 - 15 kg/m^3.	POLYPAC at the proposed concentration is not considered hazardous to the environment.	For prolonged or repeated skin contact, use appropriate protective gloves. There is no specific recommendation, but respiratory protection may be required in exceptional circumstances when there is excessive air contamination. Dust filter P2 (for fine dust).	-
Lime	-	Used as a source of calcium (Ca^{2+}) and alkalinity (OH^-) in water-based drilling fluids.	Lime at the proposed concentration (**Table 4.1**) is not considered hazardous to the environment. Causes skin irritation (H315), serious eye damage (H318) and may cause respiratory irritation (H335).	Wear protective gloves/protective clothing/eye protection/face protection. Avoid contact with eyes. In case of accidental contact, rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. In case of skin contact, immediately remove contaminated clothing and wash the skin with soap and water. Seek immediate medical attention if symptoms appear after washing. To avoid environmental hazards, do not allow it to enter drains, sewers or watercourses.	
CMC HV	-	It is high-viscosity sodium carboxymethyl cellulose, designed to control drilling fluid loss to the borehole walls and to manage the rheology of water-	No physical, environmental, or human health hazards are classified.	Inhalation: In case of inhalation, move away from the area to fresh air. Seek medical attention if respiratory irritation develops or if breathing becomes difficult.	-

Chemical Substance	CAS[1] - Number	Properties	Hazards	Safety Measures	Hazard Symbol
		based mud. It is resistant to bacterial degradation and has high tolerance to the chemical reactions of the mud. CMC HV is biodegradable.		Ingestion: Avoid swallowing. In case of ingestion, rinse the mouth. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Seek medical attention if symptoms occur. Skin contact: Avoid skin contact. In case of contact, wash immediately with soap and plenty of water, removing all contaminated clothing and shoes. Seek medical attention immediately if symptoms appear. Eye contact: Avoid eye contact by using special safety goggles. In case of contact, immediately rinse the eyes with plenty of water while lifting the eyelids. Continue rinsing for at least 15 minutes. Seek medical attention if any irritation persists.	
POLYDRILL	-	It is a polymer for water-based mud that controls fluid loss and the rheology of the mud and is particularly effective at high temperatures as well as in fluids with high electrolyte content. Usually dark brown to black powder, non-flammable.	It can form a concentration of flammable dust in the air.	Avoid inhalation. If respirable aerosols/dust are generated, wear respiratory protection if ventilation is inadequate. Use a NIOSH-certified (or equivalent) organic vapor/particulate respirator. Safety goggles with side shields are recommended. Wear protective clothing as required to minimize contact. Handle according to	-

Chemical Substance	CAS[1] - Number	Properties	Hazards	Safety Measures	Hazard Symbol
				good industrial hygiene and safety practices.	
Barite	7727-43-7	Usually in the form of a gray or brown powder, odorless or with no distinct smell. It is used to increase the specific gravity of drilling mud and to counterbalance hydrostatic pressure.	Barite is a mineral and is not considered hazardous to the environment. In case of accidental contact with eyes or skin, it may cause irritation to the eyes, skin and respiratory tract. Prolonged inhalation of particles may cause lung damage.	Eye contact: Immediately rinse eyes with plenty of water, lifting the eyelids. Continue rinsing for at least 15 minutes. Seek medical attention if any irritation persists. Skin contact: Wash skin thoroughly with soap and water. Remove contaminated clothing and wash it before reuse. Seek medical attention if any discomfort persists. Inhalation: Move the person to fresh air. If they are not breathing, administer artificial respiration. If breathing is difficult, provide oxygen. Ingestion: Dilute with 2–3 glasses of water or milk, if conscious. Never give anything by mouth to an unconscious person. If signs of irritation or toxicity appear, seek medical attention.	-
FLO-VIS	-	It is a high-quality biopolymer (clarified xanthan gum biopolymer), which can enhance the rheological properties of the drilling mud.	It is not considered hazardous to the environment. No physical hazards or public health risks are classified.	There is no specific recommendation, but respiratory protection may be required under exceptional circumstances when there is excessive air contamination. For prolonged or repeated skin contact, use appropriate protective gloves	-

Chemical Substance	CAS[1] - Number	Properties	Hazards	Safety Measures	Hazard Symbol
				(made of rubber, neoprene, or PVC). Wear approved chemical safety goggles where eye exposure is reasonably likely.	
FLO-TROL	-	It is a highly modified starch derivative used for controlling fluid loss and viscosity. This product has been classified as not containing hazardous ingredients in accordance with EC directives.	It is not considered hazardous to the environment. It is not considered hazardous to health according to applicable legislation.	For prolonged or repeated skin contact, use appropriate protective gloves (rubber or plastic). Wear dust-resistant safety goggles where there is a risk of eye contact. Wear suitable clothing to avoid repeated or prolonged skin contact. An eye wash station should be available.	-
SAFE-SCAN HS	-	It reacts with hydrogen sulfide and remains soluble even after the chemical reaction with it. It is based on an organic chemical substance, as an alternative to the use of zinc or iron mixtures.	Harmful if inhaled, in contact with skin, and if swallowed. Irritates the eyes and skin.	Avoid contact with skin. Use protective gloves made of neoprene, nitrile, polyethylene, or PVC. Wear protective goggles to prevent any possible eye contact.	 -
SAFE-CARB	471-34-1	SAFE-CARB is a high-purity, acid-soluble calcium carbonate used as a bonding agent in drilling, treatment, and completion fluids. Compared to limestone, it has higher hardness and purity, providing better acid solubility.	No environmental, physical, or other hazards are recorded.	Avoid skin contact. In case of contact, immediately remove contaminated clothing and wash the skin with soap and water. Avoid contact with the eyes. In case of contact, ensure that any contact lenses are removed before rinsing. Rinse the eyes immediately with plenty of water, lifting the eyelids.	-
Calcium Carbonate	14808-60-7	It is produced in different grain sizes that can be used as a weighting agent to increase the specific gravity of drilling mud and to reduce	This product has not been classified as hazardous. Therefore, no hazard statements	Inhalation: In case of inhalation, move to an area with fresh air. Seek medical attention if respiratory irritation develops or if	-

Chemical Substance	CAS[1] - Number	Properties	Hazards	Safety Measures	Hazard Symbol
		formation fluid influx into the drilling fluids. It is a mineral and is not considered hazardous to the environment.	(H) have been assigned.	breathing becomes difficult. Ingestion: Rinse the mouth. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Seek medical attention if symptoms appear. Skin contact: Wash the skin thoroughly with soap and water. Seek medical attention if irritation persists. Eye contact: Immediately rinse the eyes with plenty of water, lifting the eyelids. Remove contact lenses. Continue rinsing for at least 15 minutes. Seek medical attention if discomfort persists.	
Calcium Chloride	10043-52-4	Usually in the form of an off-white powder, odorless, soluble in water.	No environmental hazards have been identified. May cause eye irritation or serious eye damage (H319).	Inhalation: Avoid inhalation. In case of inhalation, move to an area with fresh air. Seek medical attention if respiratory irritation develops or if breathing becomes difficult. Ingestion: Rinse the mouth. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Seek medical attention if irritation occurs. Skin contact: Avoid skin contact by wearing appropriate protective clothing. In case of contact, immediately wash with soap and plenty of water, removing	

Chemical Substance	CAS[1] - Number	Properties	Hazards	Safety Measures	Hazard Symbol
				all contaminated clothing and shoes. Seek medical attention immediately if symptoms develop. Eye contact: Use special safety goggles. In case of eye contact, remove contact lenses. Immediately rinse the eyes with plenty of water, lifting the eyelids. Continue rinsing for at least 15 minutes. Seek medical attention if any irritation persists.	
VESATROL (Natural Resin)	12002-43-6	It is used for high-pressure, high-temperature (HPHT) filtration control in all VERSA oil-based systems. It is often used for sealing low-pressure and depleted formations. High-temperature conditions and special applications require higher concentrations, up to 29 kg/m³. It is usually a solid, black and odorless material.	No environmental or physical hazards have been identified. Neither are there any risks to public health.	For prolonged or repeated skin contact, use appropriate protective gloves. Neoprene or nitrile gloves are recommended. Wear approved chemical safety goggles where eye exposure is reasonably likely.	-
Potassium Chloride	-	Liquid, odorless, colorless, soluble in water.	It does not contain hazardous substances in concentrations above the threshold limits according to the competent authority.	Wear safety goggles or protective glasses to guard against exposure. Regular work overalls are recommended. Avoid inhalation. In case of inhalation, move to an area with fresh air. Seek medical attention if respiratory irritation develops or if breathing becomes difficult.	-

Chemical Substance	CAS[1] - Number	Properties	Hazards	Safety Measures	Hazard Symbol
EDC 95-11	-	It is the main component of LTOBM and is also referred to as base oil. It has a high level of purity and a very low content of aromatic hydrocarbons. Liquid, colorless, and odorless, soluble in common solvents.	This product is classified as harmful according to EU regulations. It may cause lung damage if swallowed.	Inhalation: If inhaled, immediately move the exposed person to fresh air. Seek medical attention if any irritation persists. Ingestion: DO NOT INDUCE VOMITING! If vomiting occurs, keep the head low to prevent stomach contents from entering the lungs. Rinse the mouth thoroughly with water and give large amounts of milk or water to conscious persons. Seek medical attention. Skin contact: Use chemically resistant gloves required for prolonged or repeated contact, made of polyvinyl chloride (PVC), nitrile, or polyvinyl alcohol (PVA). In case of contact, wash the skin thoroughly with soap and water. Remove contaminated clothing. Seek medical attention if discomfort persists. Eyes: Wear splash-proof protective goggles to prevent any possible eye contact. In case of contact, immediately rinse the eyes with plenty of water, lifting the eyelids. Continue rinsing for at least 15 minutes. Seek medical attention if any irritation persists.	

Chemical Substance	CAS[1] - Number	Properties	Hazards	Safety Measures	Hazard Symbol
SODA ASH (Sodium Carbonate)	497-19-8	Usually in the form of a white powder, odorless, soluble in water. Sodium carbonate, as an alkalinity agent in granular form, is primarily used to increase the pH of the drilling fluid. It can also maximize the performance of bentonite and other polymers. The typical concentration is 1.2 – 2.4 kg/m³.	It may cause irritation of the skin, eyes, and respiratory tract. It may cause stomach discomfort, nausea, and vomiting if swallowed.	Avoid contact with eyes, skin, and clothing. Avoid inhaling airborne product. Keep the container tightly closed. Use with adequate ventilation. Wash thoroughly after handling.	-
CONQOR	-	It is a phosphate-based corrosion inhibitor used for water-based drilling fluids, saline water systems, and fluids in gas, aerosol, and foam forms. It is suitable for managing calcium salt deposits and is particularly effective in highly aerated fluids, such as during drilling operations. If the corrosion rate is high, its concentration should be increased to at least 1.7 L/m³. It is odorless, water-soluble, liquid in form and yellow in color.	No environmental or physical hazards have been identified, nor are there any risks to human health.	Inhalation**:** Avoid inhalation. In case of inhalation, immediately move the exposed person to fresh air. If respiratory problems occur, provide artificial respiration or oxygen. Seek medical attention if symptoms persist. Ingestion: Avoid swallowing. In case of ingestion, do not induce vomiting. Seek medical attention if any discomfort persists. Skin contact: Wear appropriate clothing to avoid any possible skin contact. In case of contact, immediately remove contaminated clothing and wash the skin with soap and water. Seek medical attention immediately if symptoms appear after washing. Eye contact: Use approved safety goggles. In case of eye contact, ensure that any contact lenses are removed before rinsing. Immediately rinse	-

Chemical Substance	CAS[1] - Number	Properties	Hazards	Safety Measures	Hazard Symbol
				the eyes with plenty of water, lifting the eyelids. Continue rinsing for at least 15 minutes. Seek medical attention if any irritation persists.	
Sodium Chloride	7647-14-5	Usually in solid form, white, odorless and soluble in water.	No environmental or physical hazards, nor risks to human health, have been identified.	Avoid skin contact. In case of skin contact, immediately remove contaminated clothing and wash the skin with soap and water. Avoid contact with eyes. In case of eye contact, immediately rinse the eyes with plenty of water while holding the eyelids open. Continue rinsing for at least 15 minutes.	-
Zinc oxide	1314-13-2	White or yellowish powder. Practically insoluble in water. Odorless. Soluble in acids, alkalis, and ammonium carbonate.	Avoid release into the environment. Very toxic to aquatic life with long-lasting effects.	Avoid skin contact. Use gloves tested according to relevant standards (e.g., Europe EN 374, USA F739, AS/NZS 2161.1, or equivalent national standard). Avoid eye contact. Wear safety goggles with side shields. Do NOT eat, drink, or smoke while handling. Avoid spills. In case of a spill, rinse the area with large amounts of water and prevent it from entering the drainage system. If drains or waterways become contaminated, notify emergency services.	

3 USE OF CHEMICAL SUBSTANCES

As mentioned above, two CO_2 injection wells will be drilled at the Beta Platform, which will start using the existing wells. The main materials used for the preparation of the drilling fluids are:

- Bentonite is a clay mineral used to increase the specific gravity of the drilling mud and to counterbalance hydrostatic pressure. It is used with pre-hydration at initial concentrations of 40 - 70 kg/m³. Bentonite at the recommended concentrations is a mineral and is not considered hazardous to the environment.
- POLYPAC consists of polyanionic cellulose and is a high-quality water-soluble polymer designed to control fluid loss. It is an additive used in very small quantities ("Ultra Low" additive), thus causing zero to minimal reduction in fluidity. The usual concentration is 5 - 15 kg/m³. POLYPAC at the recommended concentration is not considered hazardous to the environment.
- Lime is used as a source of calcium (Ca^{2+}) and alkalinity (OH^-) in water-based drilling fluids. Lime at the recommended concentration is not considered hazardous to the environment.
- CMC HV is high-viscosity sodium carboxymethyl cellulose, designed to control drilling mud losses along the borehole walls and to manage the fluidity of water-based mud. It is resistant to bacterial degradation and has high tolerance to the chemical reactions of the mud. CMC HV is biodegradable.
- POLYDRILL is a polymer used in water-based mud systems that controls fluid loss and mud rheology. It is particularly effective at high temperatures and in fluids with high electrolyte content. Polydrill reduces fluid loss by decreasing or plugging pore diameter. This polymer has significant water-binding capacity, minimizing fluid loss.
- KLA-CURE is a hydration suppression agent composed of a water-soluble, environmentally acceptable organic blend, designed to reduce the swelling and dispersion of reactive clay formations. KLA-CURE can be used in fresh or saltwater systems with low or high solids content. Typical concentrations range from 11.4 to 22.8 kg/m³, depending on hole diameter and drilling length.
- Barite is used to increase the specific gravity of the drilling mud and to counterbalance hydrostatic pressure. Barite is a mineral and is not considered hazardous to the environment.
- FLO-VIS is a high-quality biopolymer (clarified xanthan gum biopolymer) that can improve the rheological properties of drilling mud. It is not considered hazardous to the environment.
- FLO-TROL is a highly modified starch derivative used to control fluid loss and viscosity. It is not considered hazardous to the environment.
- SAFE-SCAN HS reacts with hydrogen sulfide and remains soluble even after the chemical reaction. It is based on an organic chemical substance, serving as an alternative to the use of zinc or iron mixtures
- SAFE-CARB is a high-purity, acid-soluble calcium carbonate used as a bridging agent in drilling, treatment, and well completion fluids. Compared to limestone, it has greater hardness and purity, providing better solubility in acids.
- Calcium carbonate is produced in various grain sizes and can be used to increase the specific gravity of drilling mud and to reduce the influx of formation fluids into drilling fluids. It is a mineral and is not considered hazardous to the environment.

- The natural resin VESATROL is used to control high-pressure, high-temperature (HPHT) filtration in all VERSA oil-based systems. It is often used to seal low-pressure and depleted formations. High-temperature conditions and special applications may require higher concentrations, up to 29 kg/m³.
- EDC 95-11 is the main component in low-toxicity oil-based mud and is also referred to as base oil. It has a high level of purity and a very low content of aromatic hydrocarbons
- CONQOR is a phosphate-based corrosion inhibitor used in water-based drilling fluids, brine systems, and fluids in gas, aerosol, and foam form. It is suitable for managing calcium salt deposits and is particularly effective in highly aerated fluids, such as those used in drilling operations. If the corrosion rate is high, its concentration should be increased to at least 1.7 L/m³.
- Sodium carbonate, in granular form as an alkalinity agent, is primarily used to increase the pH of the drilling fluid. It can also enhance the performance of bentonite and other polymers. The typical concentration is 1.2 – 2.4 kg/m³.

The concentrations of substances in the drilling mud of each well on Platform Beta, as well as the estimated quantities of materials for the preparation of the drilling mud per wellbore section, are presented in **Tables 4.1 and 4.2**, respectively.

4 MAXIMUM CONCENTRATIONS AND MAXIMUM QUANTITIES OF CHEMICAL SUBSTANCES

Below are the maximum concentrations of chemical substances and the maximum quantities expected to be used in the CO_2 storage project. The concentrations of substances in the drilling mud for each well on the Beta platform, as well as the estimated quantities of materials required for the preparation of drilling mud per well section, are presented in the following **Tables**.

Table 4-1: Concentration of Substances in the Drilling Mud by Well Section

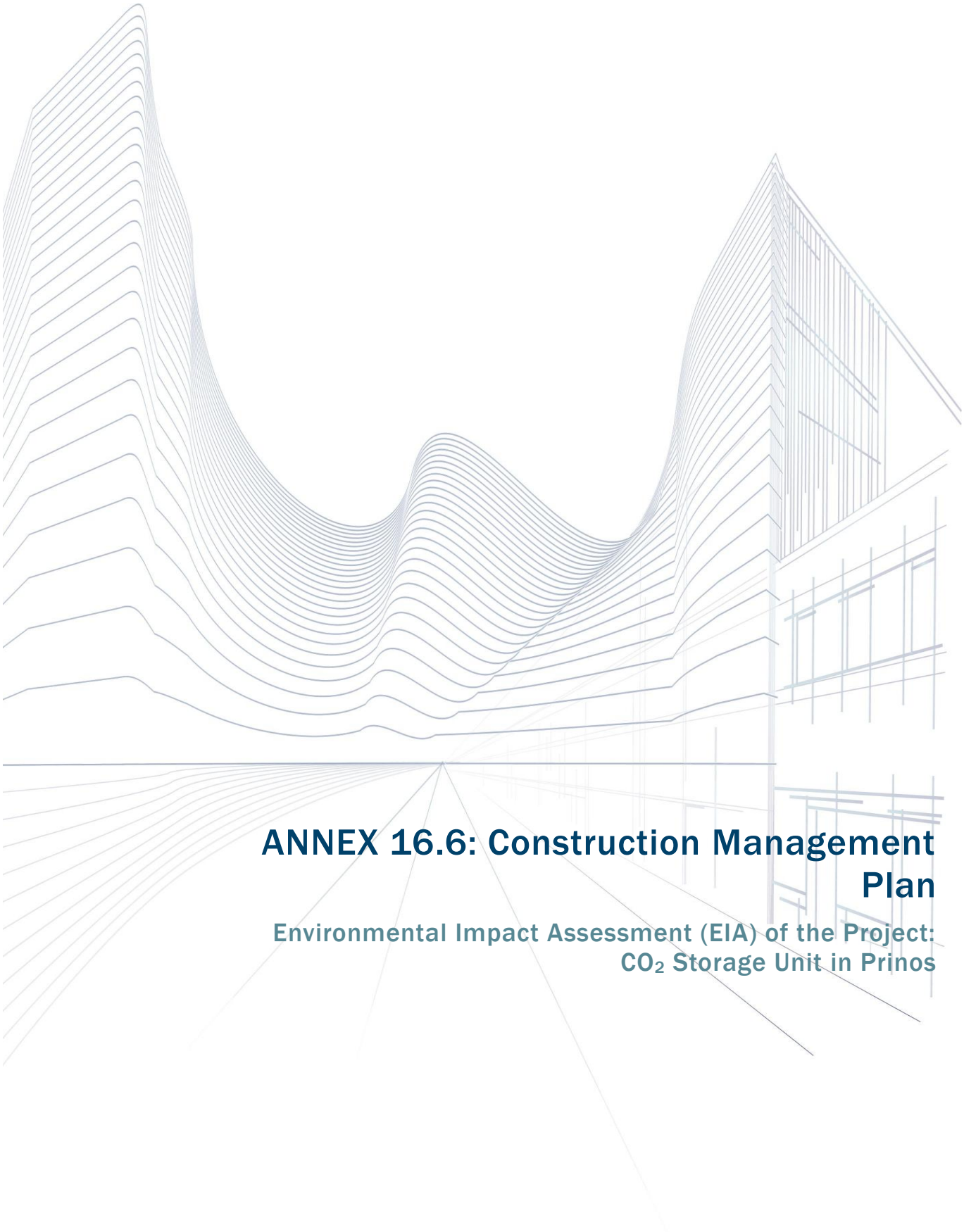
Substances / Additives		Concentration per section (cross-section)		
		I	II	III
Bentonite	kg/m³	86		
Potassium chloride	kg/m³	100		100
Polypac	kg/m³	6		6
CMC	kg/m³	6		
Lime	kg/m³	11	7	
Calcium carbonate	kg/m³	100		
Sodium chloride	kg/m³	40		314
Flo-Vis	kg/m³	4		4
EDC 95-11	kg/m³		428	
Safe Scav NA	kg/m³	1		1
Safe Carb	kg/m³	100	42	100
Spercene	kg/m³	9		
Calcium chloride	kg/m³		60	
Barite	kg/m³	30	565	
Versatrol	kg/m³		14	
Flo-trol	kg/m³	9		9
Sodium carbonate	kg/m³	1		1
Safe Scav	kg/m³	1		1
Zinc oxide	kg/m³	1		1
Conqor	kg/m³	1		1

Table 4-2: Estimated Quantities of Materials for Drilling Mud Preparation by Well Section

Substances / Additives		Concentration per section (cross-section)		
		I	II	III
Bentonite	kg	45.000		
Potassium chloride	kg	53.000		23.000
Polypac	kg	3.000		1.400

Substances / Additives		Concentration per section (cross-section)		
		I	II	III
CMC	kg	3.000		
Lime	kg	6.000	3.000	
Calcium carbonate	kg	53.000		
Sodium chloride	kg	21.000		72.000
Flo-Vis	kg	2.500		1.000
EDC 95-11	kg		165.000	
Safe Scav	kg	15		7
Safe Carb	kg	53.000	27.000	23.000
Spercene CF	kg	4.500		
Calcium chloride	kg		23.000	
Barite	kg	16.000	225.000	
Versatrol	kg		5.400	
Flo-trol	kg	4.500		2.000
Sodium carbonate	kg	745		350
Safe Scav	kg	300		150
Zinc oxide	kg	375		180
Conqor	kg			100

“LDK Consultants” refers to



ANNEX 16.6: Construction Management Plan

Environmental Impact Assessment (EIA) of the Project: CO_2 Storage Unit in Prinos

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Project	CO_2 Storage Unit at Prinos		
STUDY PHASE	Waste Management Plan within the framework of the Environmental Impact Assessment (EIA)		
STUDY CODE	CCP - 2902		
DATE	25.11.2024		
VERSION	v.01		
REVISION	v.01		
ENVIRONMENTAL CONSULTANT	LDK CONSULTANTS A.E. – WSP SA		
PROJECT ENTITY	ENEARTH GREECE		
DERIVATION	Study Team LDK – WSP		
REVIEW	Kostis Nikolopoulos, Project Manager LDK Anna Borroni, Project Director WSP		
APPROVAL	Kostis Nikolopoulos Project Manager	LDK CONSULTANTS A.E. ΠΑΡΟΔΟΣ ΘΗΒΑΪΔΟΣ 21 - ΚΗΦΙΣΙΑ - Τ.Κ. 145 64 ΤΗΛ. 210 8196700 Α.Φ.Μ. 094061957 - ΔΟΥ: Φ.Α.Ε. ΑΘΗΝΩΝ ΑΡ. ΓΕΜΗ : 324501000	
APPROVAL	Vasilis Tsetoglou Health, Safety and Environment (HSE) Manager		
PROJECT ENTITY REPRESENTATIVE	Katerina Sardi, Chief Executive Officer – Country Manager	ENEARTH GREECE ΜΟΝΟΠΡΟΣΩΠΗ Α.Ε ΛΕΩΦ.ΚΗΦΙΣΙΑΣ 32 - ΜΑΡΟΥΣΙ Τ.Κ. 151 25 ΤΗΛ. 210 81 74 200 – FAX. 210 81 74299 ΑΦΜ: 802522310 – ΔΟΥ ΚΕΦΟΔΕ ΑΤΤΙΚΗΣ	

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1 INTRODUCTION

The Construction Management Plan describes the risk mitigation measures and commitments, defines responsibilities, and sets the schedule for monitoring, inspection and implementation concerning the construction activities of the CO_2 storage Project in Prinos.

The Project under study is a full-scale CO_2 storage facility in Prinos (the "Project"). The planned CO_2 storage site is located within the Prinos basin, in the Gulf of Kavala, in the Northeastern Aegean Sea. The area of interest for CO_2 storage lies within the Prinos Concession, where Energean Oil & Gas SA ("Energean"), an affiliated company of EnEarth, holds 100% of the interests and management rights for oil and gas exploration and production activities since 2007. The examined CO_2 storage location is situated within the Prinos structure and the underlying aquifer.

The operation of the facility is planned to be developed in two distinct phases (Phase 1 and Phase 2), for reasons of scalability and adaptation to market conditions.

During the construction phase of the Project, the following activities will be carried out:

- Structural works and site preparation, installation of CO2 reception and handling equipment at the onshore Sigma facilities.
- Installation of buried CO2 transport pipelines (one onshore pipeline section and one offshore pipeline).
- Construction of CO2 injection wells and water production wells.
    - Delivery and installation of drilling rig
    - Preparation of existing starter well (installation of permanent mechanical barrier and preparation for sidetracking)
    - Drilling of 16" diameter well to a depth of approximately 2,200 m
    - Drilling of 12-1/4" x 13½" diameter well to a depth of approximately ±3,150 m
    - Drilling of 8-1/2" diameter well to a depth of approximately ±3,700 m

The pipeline construction works will be carried out in five phases:

- **Phase 1:** Geophysical and geotechnical surveys along the pipeline route (1 month)
- **Phase 2:** Shore approach works for the pipeline, including dredging of a 500 m section from the shoreline at the pipeline head area near the Sigma plant. The trench will be approximately 3 m deep along its entire length and will taper off to seabed level at the end of the 500 m zone (6 months).
- **Phase 3:** Installation of the subsea pipeline and hydrotesting using a specialized pipe-laying vessel (2–3 weeks).
- **Phase 4:** Installation of the riser on the existing Beta platform and diver-assisted operations to connect the riser to the end of the subsea pipeline (1 week).
- **Phase 5:** Final commissioning and testing (1 month).

The planned equipment will be prefabricated off-site and delivered to the construction site by trucks, where it will be offloaded using a crane.

Before the start of construction works and for the determination of the final pipeline route, a series of geophysical and geotechnical surveys will be carried out, in accordance with standard industry practices.

Regarding the construction phase, the Contractor is required to develop their own Environmental and Social Management and Monitoring Plan (ESMMP), which will define how they intend to comply with specific obligations and mitigation measures for the Project's impacts, in accordance with the Health, Safety and Environment (HSE) policy and standards of EnEarth.

2 SCOPE OF THE PLAN

The Construction Management Plan is prepared to describe the necessary risk mitigation measures to ensure the prevention of any adverse impacts on the environment and health and safety, focusing on the general issues related to the construction of the Project or, if this is not possible, to ensure their reduction in terms of scale and significance.

The objectives of the Management Plan are to ensure that any construction activities carried out as part of the Project comply with EnEarth's Health, Safety and Environment (HSE) Policy, national legislation and best international practices, in order to prevent potential environmental damage and to ensure the highest possible level of health and safety protection.

More specifically, the Construction Management Plan aims to:

- Describe how EnEarth will monitor and review the Contractor's performance throughout the construction phase.
- Define the roles and responsibilities of the Contractor.
- Ensure environmental protection at the highest possible level.
- Ensure high standards of working conditions and assist the Contractor in identifying potential risks associated with the work processes and in taking appropriate measures to mitigate those risks.
- To anticipate and prevent potential environmental damage or damage to third-party property resulting from construction activities.

3 ROLES AND RESPONSIBILITIES

3.1 PROJECT MANAGEMENT

The Project Management Team of EnEarth will collaborate with the Contractor and coordinate the Contractor's activities to meet the Project's schedule requirements and corporate policies.

The Contractor shall prepare and coordinate the delivery of reports/plans and information requested by the Project Management Team in order to support the overall planning and risk management for the construction of the Project. The Project Management Team will coordinate the Contractor's activities on site.

The Contractor will be required to provide regular updates regarding its activities, in coordination with the EnEarth Project Management Team, in accordance with the responsibility matrix outlined in the following paragraph (Table 3-1). A detailed organizational chart for the Project will be developed during the construction phase.

The Contractor will be responsible for providing all calculations, reports, diagrams, and procedures for the scheduled construction activities of the Project. Additionally, detailed lists of materials and specifications will be required. The construction work specifications will cover at least the following:

- Layout and preparation of storage areas for raw materials and construction materials, including requirements for facilities, equipment, space and storage.
- Equipment specifications.
- Welding method specifications
- Specifications for the construction and installation of the subsea pipeline ("S-lay," trenching).
- Worksite methods and HSE (Health, Safety, and Environment) plans, in compliance with EnEarth's safety and health policies, including waste management.
- Engineering analyses to support all construction activities
- Preparation of offshore procedures and methods
- Hydrostatic test specifications
- Implementation of safe work/lifting procedures, safety-related matters
- Participation in risk assessments.

The following Table defines the proposed responsibilities of the Construction Contractor and the EnEarth Construction Management Team:

Table 3-1: Responsibilities

Activity	Contractor	Team Management of EnEarth
Overall project management and implementation of company/project standards and procedures	Inflow	Responsible
Location of temporary storage areas	Inflow	Responsible
Preparation of storage procedures	Responsible	Inspection / Inflow

Activity	Contractor	Team Management of EnEarth
Risk assessments / hazard identification meetings, risk mitigation measures and control procedures	Inflow	Responsible
Welding procedures, Inspection and Testing Plans (ITPs)	Responsible	Inspection
Construction and installation procedures for the subsea pipeline ("S-lay", trenching)	Responsible	Inspection
Quality Assurance and Quality Control (QA/QC)	Inflow	Responsible
Procedures for offshore operations	Responsible	Inspection / Inflow
Procurement of pipelines/flanges	Inspection	Responsible
Procurement of installation equipment/temporary equipment and personnel for pipeline welding	Responsible	Inspection
Procurement of hydrostatic testing equipment	Responsible	Inflow
Procurement of equipment for vessels, tugboats, and support boats	Inflow	Responsible
Procurement and management of equipment/services for installation monitoring	Inflow	Responsible
Restoration of temporary storage areas to their original condition	Responsible	Inflow
Construction drawings	Responsible	Inspection

3.2 ROLES AND RESPONSIBILITIES OF ENEARTH

The roles and responsibilities of EnEarth personnel in relation to the Construction Management Plan are as follows:

- Project Execution Manager – responsible for the execution of the Project.
- Drilling Manager – responsible for the construction of new wells..
- Offshore Installation Manager – responsible for new constructions and modifications of the facilities on the Beta and Delta platforms.
- Project Management / Pipeline Engineer – responsible for the installation of the pipelines.
- Storage Yard Quality Assurance / Control Manager – responsible for ensuring and controlling the quality of welding methods and procedures applied by the contractors
- Project Health, Safety, and Environment (HSE) Coordinator – responsible for conducting inspections of the Contractor's safe practice methods in accordance with EnEarth's HSE Management Systems and monitoring discussions on health, safety, and environmental management issues at the facilities.
- Project Supply Chain Coordinator – organizes procurement for the Project construction
- Project Marine Coordinator – organizes maritime support services.

The evaluation of the Contractor's General Construction Management Plan for the Project will be carried out by the Construction Supervisor with the assistance of EnEarth's HSE Manager.

Before the start of construction, EnEarth's Project Management Officer will forward the Construction Management Plan to the Contractor.

EnEarth will provide any required permits and approvals for the construction works to the Contractor in order to finalize the Project's General Construction Management Plan

3.3 ROLES AND RESPONSIBILITIES OF THE CONTRACTOR

The Contractor must comply with all National, European, and International regulations regarding environmental standards and health and safety requirements at the workplace.

The Contractor will be responsible for the proper setup of the onshore construction site and the organization and execution of the offshore operations, ensuring the implementation of all necessary measures for the protection of the environment, as well as the health and safety of personnel and the general public. In general terms, the Contractor will be entrusted with the following duties:

- The development and implementation of a General Construction Management Plan for the Project,
- The appointment of responsible personnel,
- The communication of the Management Plan to workers and subcontractors,
- Ensuring compliance,
- Establishing a communication line with the competent authorities, if necessary,
- Implementing effective supervision, including subcontractors,
- Submitting reports.

For this reason, the following specific tasks must be assigned:

- The Site Manager assumes the following duties:
    - Understanding EnEarth's HSE policy and HSE Management Plan.
    - Implementing the Management Plan.
    - Ensuring subcontractors' compliance with the Construction Management Plan.
    - Allocating responsibilities according to the site hierarchy.
    - In cooperation with the HSE Coordinator, confirming effective management and control of the site.
    - Ensuring that workers are trained in HSE matters and regarding the Construction Management Plan
    - Ensuring that all workers know how to implement risk mitigation measures.
- The Project Engineer is responsible for the following:
    - Understanding EnEarth's HSE policy and HSE Management Plan
    - Preparing HSE reports for their area of the project/ongoing activities.
    - Implementing the Construction Management Plan
    - Informing and training personnel on the provisions of the Construction Management Plan, first aid training, organizing emergency response teams, providing first aid, etc., for their area of the project/ongoing activities..
    - Ensuring suitable working conditions in compliance with health, safety and environmental legislation and the Construction Management Plan.
    - Supervising subcontractors' compliance with the Construction Management Plan and health, safety, and environmental regulations..

- The HSE Coordinator is responsible for the following:
    - Monitoring subcontractors' compliance with the Construction Management Plan and health, safety and environmental regulations..
    - Providing detailed instructions for the safe and proper implementation of the Construction Management Plan.
    - Being informed of every accident and participating in its investigation, proposing measures to prevent recurrence.
    - Updating the Project's HSE Logbook.
    - Conducting inspections to ensure procedures are followed and to assess their effectiveness.
    - Collecting information on all incidents and near-misses and participating in their investigation, reporting to the Project Manager.
    - In the event of an incident or near-miss, completing all documentation required by the procedures.

3.4 ROLES AND RESPONSIBILITIES OF SUBCONTRACTORS

Subcontractors must be aware of and comply with the duties or responsibilities defined by National, European and International regulations regarding health, safety and the environment

Before the start of construction, the Contractor, through the HSE Coordinator, must inform the Subcontractor of the specific requirements of the HSE Plan. The Subcontractor must appoint a representative with whom the Contractor can communicate regarding health, safety and environmental issues. The Subcontractor must ensure that all requirements stated in the Construction Management Plan are known and adhered to by their personnel.

4 PROJECT STANDARDS

The management of construction activities will be carried out in accordance with national and European legislation, as well as EnEarth's standards. More specifically:

- National legislation:
  - ✓ Law 3850/2010 (Government Gazette 84/A/2.6.2010): *"Ratification of the Code of Laws for the Health and Safety of Workers."*
  - ✓ Presidential Decree 305/1996: Establishing minimum safety and health requirements to be applied at temporary or mobile construction sites, in compliance with Directive 1992/57/EEC
  - ✓ Law 4042/2012: *On the criminal protection of the environment – Harmonization with Directive 2008/99/EC – Framework for waste generation and management – Harmonization with Directive 2008/98/EC.*
  - ✓ Law 4014/2011: Concerning environmental permitting for projects and activities.
  - ✓ Law 3028/2002: On the protection of antiquities.
- European legislation:
  - ✓ Directive 92/57/EEC on the minimum safety and health requirements to be applied at temporary or mobile construction sites..
  - ✓ Directive 89/391/EEC (Framework Directive) and Directive 91/383/EEC supplementing the measures aimed at improving the safety and health of workers at work.
- Law 2779/1999: *Ratification of the Agreement on the exploitation of hydrocarbons in the marine area of the Thracian Sea between the Hellenic Republic and the company KAVALA OIL S.A.* (Government Gazette A 296/30.12.1999), as amended and currently in force.
- EnEarth Standards:
  - ✓ HSE Policy,
  - ✓ HSE Management Plan.
  - ✓ Drilling Programs, which include drilling execution instructions along with safety guidelines and recommendations.

5 IMPLEMENTATION SCHEDULE

The work schedule for the new onshore and offshore facilities of the CO_2 storage Project is as follows:

Table 5-1: Work schedule

Works	Time
Onshore facilities: modification of a designated area within the existing premises at the Sigma plant for the construction of the manifold and an unloading and compression area.	3 months
Offshore pipeline: subsea pipeline connecting the Sigma plant area with the offshore Beta platform, approximately 20 km in length. The pipeline works will be carried out in several phases:	9 months
• Phase 1: Geophysical and geotechnical surveys along the pipeline route	1 month
• Phase 2: Works for the approach of the pipeline to the shore, including dredging of a 500 m long section from the shoreline, in the area of the pipeline head at the Sigma plant. The trench will have a depth of approximately 3 m along its entire length and will end at the seabed level at the end of the 500 m zone	6 months
• Phase 3: Installation of the subsea pipeline and hydrostatic testing using a specialized pipe-laying vessel	2 – 3 weeks
• Phase 4: Installation of the riser pipe on the existing Beta platform and diver operations to connect the riser to the end of the subsea pipeline	1 week
• Phase 5: Final commissioning and testing	1 month
Offshore platform: Modification of the existing offshore installations at Prinos for the reception of CO2 from the new subsea CO2 pipeline and injection into the new wells.	4 months
Wells: 2 CO_2 injection wells and 2 water production wells on the existing Beta platform of the offshore Prinos complex.	8 months

5.1 BEFORE THE START OF CONSTRUCTION

The implementation schedule of the Construction Management Plan before the start of construction is as follows:

Table 5-2: Construction Management Plan Implementation Schedule Before the Start of Construction

Activity	Schedule / Milestone
Appointment of the Contractor's and EnEarth's Responsible Officers	Before contract signing

Activity	Schedule / Milestone
Provision of environmental documents (EIA, approved environmental terms, Management Plans) to the Contractor	Immediately after the contract signing
Provision at the construction site of EnEarth's HSE Policy and HSE Management Plan	Immediately after the contract signing
Definition of the onshore construction site	Immediately after the contract signing
Designation of waste and chemical storage areas	Two months before the construction works
Estimation of quantities and sources of water (industrial and potable)	Two months before the construction works
Obtaining permits and approvals for construction works	Before the construction works
Establishment of a communication line between the Contractor and EnEarth	Before the construction works
Notification of the Construction Management Plan to the workers	Before the construction works

5.2 DURING THE CONSTRUCTION WORKS

The implementation schedule of the Construction Management Plan during the construction phase is as follows:

Table 5-3: Implementation Schedule of the Construction Management Plan During the Construction Phase

Activity	Schedule / Milestone
Fencing and signage of the onshore construction site	At the start of the construction works
Detailed schedule of drilling operations at the Beta platform	At the start of the construction works
Detailed schedule of construction works / equipment modifications at the Delta platform	At the start of the construction works
Detailed schedule of subsea pipeline construction works (Phases 1-5)	At the start of the construction works
All materials, equipment, machinery, and vehicles across the entire construction site are stored/parked in designated locations	Continuously
All areas must be kept clean from trash, waste materials and spilled substances (lubricants, fuels, etc.)	Continuously
Pressure gas tanks (used for welding and cutting work) must be stored together in one area, kept upright and fenced off	Continuously
The pipes must be properly placed and fenced off to prevent them from rolling or falling	Continuously
Vehicle and machinery maintenance	Continuously
Pollution prevention	Continuously
Proper handling and use of hazardous substances	Continuously
Proper management of waste and wastewater	Continuously

6 RISK MANAGEMENT AND MITIGATION CONTROLS

EnEarth and the Contractor have the following general obligations:

Table 6-1: General obligations of the Contractor and EnEarth

Obligation	Responsible	Means of verification
Obtaining all permits and approvals for the commencement of construction works	EnEarth (HSE Officer) Contractor (Site Manager)	Issuance of permits and approvals prior to the commencement of construction work
Communication of the Management Plan to the Contractor	EnEarth (Construction Supervisor)	Training records
The environmental documents (EIA, approved environmental terms, Management Plan) must be available at the construction site	EnEarth (HSE Manager) Contractor (HSE Coordinator)	Document availability
Provision at the construction site of the HSE policy and the HSE Management Plan of EnEarth.	EnEarth (HSE Officer) Contractor (HSE Coordinator)	Document availability

The following risk reduction and management measures are implemented:

Table 6-2: Risk reduction and management measures

Measure / obligation	Responsible	Means of verification
Fencing of the onshore construction site		
Specifications for the fencing: • Materials • Dimensions • Distance from the premises • Color • Signage	Contractor (Project Engineer)	List of specifications
Fencing of the site boundaries	Contractor (Site Manager)	Construction of fencing before the start of the works
Appropriate fencing for areas within the construction site: • Where personnel are exposed to hazards • Waste storage • Storage of hazardous substances	Contractor (Site Manager)	Construction of fencing before the commencement of the works
Signage of the construction site boundaries		
Specifications for signage	Contractor (Project Engineer)	List of specifications
Site Signage	Contractor (Site Manager)	Installation of signage before the commencement of the works
Signage near vehicle/machinery exit points on the construction site	Contractor (Site Manager)	Installation of signage before the commencement of the works

Measure / obligation	Responsible	Means of verification
Signage within the construction site indicating: • Prohibition (red) • Warning (yellow) • Mandatory actions (blue) • Emergency and medical information (green) • Fire-fighting measures (red)	Contractor (Site Manager)	Installation of signage before the commencement of the works
Utility networks		
Mapping of the utility networks affected by the onshore construction site	Contractor (Project Engineer)	Plans showing the utility networks
Application of the instructions for utility networks	Contractor (Project Engineer)	Supervision of the related works
Creation and implementation of a safety exclusion zone for offshore operations		
Specifications for signage (small markers): • Materilas • Dimensions • Position • Color	Contractor (Project Engineer)	List of specifications
Sanitary facilities		
The construction site will have sufficient and appropriate sanitary facilities (toilets, a space for the safe storage of personnel's clothes and personal belongings).	Contractor (Site Manager)	Installation prior to the commencement of construction works
Cleanliness and order		
All materials, equipment, machinery, and vehicles throughout the construction site are stored/parked in designated locations.	Contractor (Project Engineer)	Designated locations before the start of construction works
All areas are kept clean from trash, waste materials, and spilled substances (lubricants, fuels, etc.).	Contractor (Project Engineer)	Daily inspection
The tanks with compressed gases (for welding and cutting operations) are concentrated in one area, positioned upright, and fenced off.	Contractor (Project Engineer)	Daily inspection
The pipes are properly placed and fenced to prevent them from rolling or falling.	Contractor (Project Engineer)	Daily inspection
Vehicle inspection at the onshore construction site		
Development of a vehicle management plan for the construction site	Contractor (Site Manager)	Vehicle Management Plan
Pollution Prevention and Resource Availability		
Regular maintenance of vehicles and machinery	Contractor (HSE Coordinator)	Maintenance log
Estimation of the quantities and sources of water (industrial and potable)	Contractor (Project Manager)	Development of a water usage study
Proper management of wastewater	According to the waste management plan	Waste Management Plan
Proper management of wastewater	According to the waste management plan	Waste Management Plan
Cultural Heritage		

Measure / obligation	Responsible	Means of verification
Chance finds of cultural heritage	According to the Chance Finds Procedure	Chance Finds Procedure

7 MONITORING APPROACH AND LIST OF MONITORING PROCEDURES

The following monitoring procedures should be implemented:

Table 7-1: Monitoring Procedures

Measure /Obligation	Responsible	Frequency
The fencing (both the site boundaries and internal areas within the site) must be in good condition without any damage.	Contractor (HSE Coordinator)	Weekly
The signage of the offshore work safety exclusion zone must be in good condition without any damage	Contractor (HSE Coordinator)	Weekly
The signage of the offshore work safety exclusion zone must be in good condition without any damage	Contractor (HSE Coordinator)	Weekly
The sanitary facilities must be in good condition.	Contractor (HSE Coordinator)	Weekly
Storage of materials in designated locations	Contractor (HSE Coordinator)	Daily
Cleaning and tidying of the areas	Contractor (HSE Coordinator)	Daily
All pressurized gas tanks must be kept in an upright position	Contractor (HSE Coordinator)	Daily
Pipeline placement	Contractor (HSE Coordinator)	Daily
Vehicle and machinery maintenance record	Contractor (Project Engineer)	Monthly

The monitoring parameters for the management of emergency situations, waste, wastewater and chance finds of cultural heritage must comply with the provisions of the relevant Construction Management Plan.

8 TRAINING REQUIREMENTS

Before the commencement of construction works, the Project Management Officer of EnEarth will forward the Construction Management Plan to the Contractor.

An effective training program can reduce the number of injuries, material damages, legal liabilities, illnesses, workers' compensation claims and lost work time.

Safety training programs contribute to the creation of a safety culture, in which employees themselves play an active role in promoting appropriate workplace safety procedures. The safety training program covers topics such as:

- Accident prevention and promotion of safety,
- Compliance with safety procedures
- Accident and emergency response measures,
- Personal protective equipment (PPE),
- Safe work practices,
- Principles of fire safety and firefighting,
- Equipment and machinery safety
- Chemical and hazardous materials safety
- Occupational hazards
- First aid and automated external defibrillator (AED) use

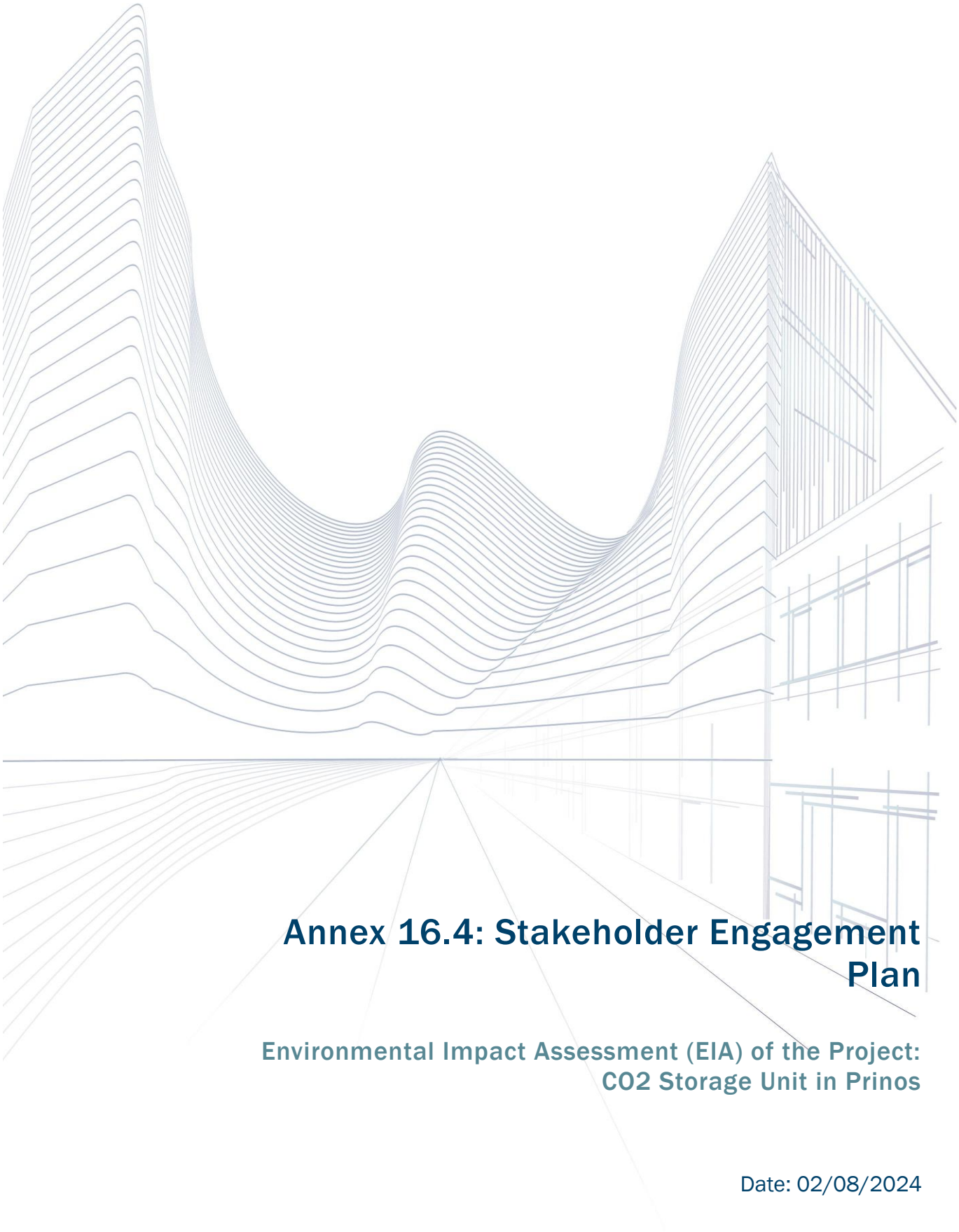
9 INSPECTION AND REPORT SUBMISSION

The following will be carried out with regard to inspection and reporting:

Table 9-1: Inspection and Reporting

Inspection / Reporting	Parameter / Indicator	Frequency
Implementation of risk mitigation measures during construction	100% implementation	Monthly
Non-compliance report	Non-compliance	When it occurs
Submission of reports for accidents/near-misses	According to the HSE Management Plan	According to the HSE Management Plan

EnEarth



Annex 16.4: Stakeholder Engagement Plan

Environmental Impact Assessment (EIA) of the Project: CO2 Storage Unit in Prinos

Date: 02/08/2024

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Copyright Statement

Project	CO2 Storage Unit in Prinos		
STUDY STAGE	Stakeholder Participation in the context of the Environmental Impact Assessment (EIA)		
CODE STUDY	CCP - 2902		
DATE	25.11.2024		
VERSION	v.01		
REVISION	v.01		
ENV. CONSULTANT	LDK CONSULTANTS A.E. – WSP SA		
PROJECT ORGANISER	ENEARTH GREECE		
ELABORATION	LDK – WSP study group		
CONTROL	Costis Nikolopoulos, LDK Project Manager Anna Borroni, WSP Project Manager		
APPROVAL	Costis Nikolopoulos Project Manager	LDK CONSULTANTS A.E. ΠΑΡΟΔΟΣ ΘΗΒΑΪΔΟΣ 21 - ΚΗΦΙΣΙΑ - Τ.Κ. 145 64 ΤΗΛ. 210 8196700 Α.Φ.Μ. 094061957 - ΔΟΥ: Φ.Α.Ε. ΑΘΗΝΩΝ ΑΡ. ΓΕΜΗ : 324501000	
APPROVAL	Vasilis Tsetoglou Director of Health, Safety and Environment		
PROJECT ORGANIZATION REPRESENTATIVE	Katerina Sardi, Managing Director – Country Manager	ENEARTH GREECE ΜΟΝΟΠΡΟΣΩΠΗ Α.Ε ΛΕΩΦ.ΚΗΦΙΣΙΑΣ 32 - ΜΑΡΟΥΣΙ Τ.Κ. 151 25 ΤΗΛ. 210 81 74 200 – FAX. 210 81 74299 ΑΦΜ: 802522310 – ΔΟΥ ΚΕΦΟΔΕ ΑΤΤΙΚΗΣ	

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FIGURES

1 INTRODUCTION

This document presents the Stakeholder Engagement Plan (SEP) for EnEarth's project to develop a CO2 storage facility in Prinos. The SEP has been developed in accordance with national legislation and regulations as well as the requirements of International Financial Institutions such as Performance Requirement (PR) 10 of the Environmental and Social Policy of the European Bank for Reconstruction and Development (EBRD).

The document is intended to serve as guidance for the development and implementation of the full Stakeholder Engagement Plan (SEP) and the main sub-objectives of the SEP are as follows:

• Contribute to the understanding of stakeholder engagement requirements.

• Preliminary identification, mapping and prioritization of key stakeholders for the Project, including any vulnerable groups (if any).

• Define a technically and culturally appropriate approach to stakeholder engagement, which is essential for the successful management of a Project's environmental and social risks and impacts.

• Ensure that the EIS is supported by adequate resources, supportive institutional structures and adequate procedures.

The EIS is a key supporting document for the Project's Environmental Impact Assessment (EIA), which is being prepared by LDK Consultants in collaboration with WSP and is scheduled to be submitted to the relevant Greek authorities (Ministry of Environment and Energy - MEEE) within 2024.

1.1 BRIEF DESCRIPTION OF THE PROJECT

1.1.1 Project location

The proposed CO2 storage site is located within the Prinos Basin, in the Gulf of Kavala, in the North Aegean. The existing offshore facilities and the total area of the planned and potential future development of Prinos are located in the Gulf of Kavala, 8 km west of Thassos and 18 km south of the Kavala coastline.

The deposits in this area have been explored since the 1970s, followed by oil production from 3 deposits within the Prinos Concession, as well as natural gas production from the South Kavala Concession, since the 1980s.

The onshore facilities of the proposed CO2 Storage Project are located within the Energean Sigma facilities, within the boundaries of the Municipality of Kavala, approximately 2.4 km east of the settlement of Nea Karvali.

The Figure below presents the satellite image of the project area.

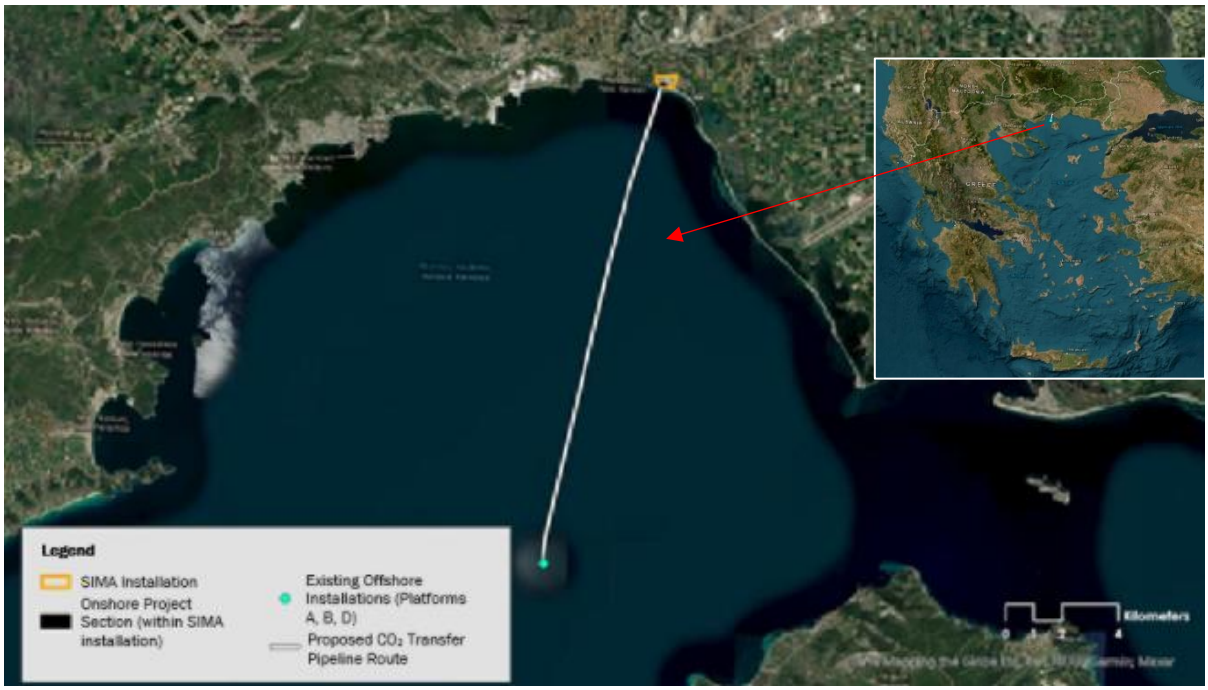
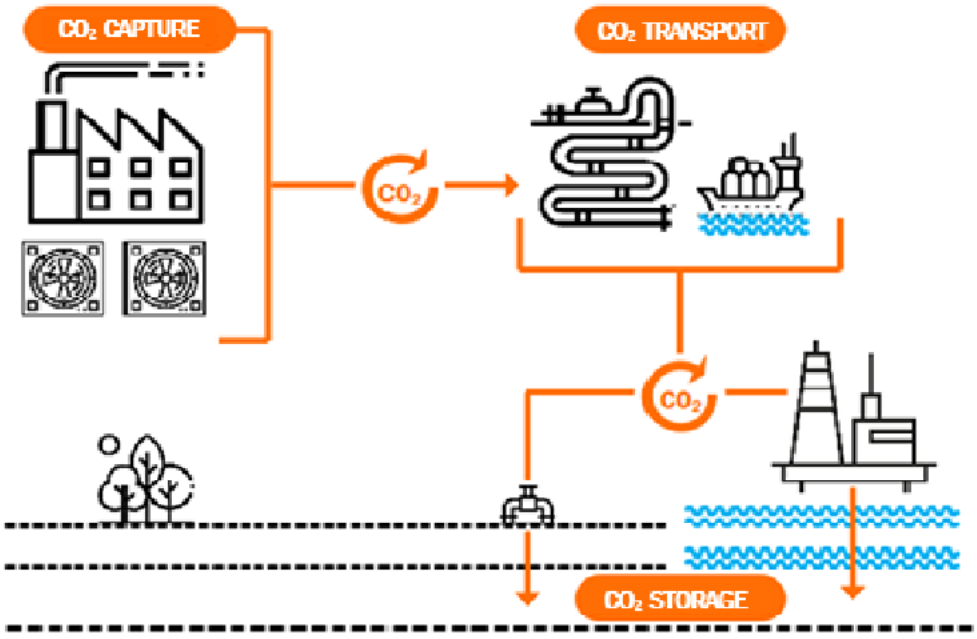


Figure 1–1: Satellite image of the Project

1.1.2 General information for the project

Carbon capture and storage (CCS) refers to the process by which carbon dioxide (CO_2) emitted from large point sources (such as power plants) is captured, processed and transported to storage sites. Carbon capture and storage technology is a key technology for the transition to a competitive low-carbon economy by 2050 and for mitigating climate change. The main stages of carbon capture, transport and storage are briefly described below:

- CO_2 capture from industrial facilities aims to capture CO_2 from the industrial process and there are several capture technologies.
- Transport: Once captured, the CO_2 is transported to storage sites, located at sea or on land, via pipelines (mainly through the reuse of natural gas pipelines) or, in the case of smaller quantities, via ships, trucks, etc. The supply chain of CO_2 transport from production sources to storage sites requires the development of highly capital-intensive transport infrastructure (pipelines, liquefaction terminals, etc.).
- CO_2 storage: The injection of CO_2 into geological formations or depleted natural gas and oil fields enables the safe and permanent storage of CO_2 underground, thus contributing, to a large extent, to the minimization of the quantities of CO_2 emissions released into the atmosphere by industrial processes.



(Source: Edited from https://climate.ec.europa.eu/eu-action/carbon-capture-use-and-storage/overview_en)

Figure 1–2: Main stages of CO_2 capture and storage

CCS projects are regulated by Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide, as amended by Council Directive 85/337/EEC, Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC of the European Parliament and of the Council and Regulation (EC) No 1013/2006. The above were incorporated into Greek legislation through Joint Ministerial Decision 48416/2037/2011. In September 2022, Energean obtained an exploration permit for CO_2 storage in Prinos, Kavala, in accordance with European and Greek legislation. The Project is a key part of the Mediterranean CCS Strategic Plan developed by France, Italy and Greece, with the aim of creating the first industrial/commercial CO_2 storage hub in the SE Mediterranean.

The Project is a full-scale CO2 storage facility at Prinos (the "Project"). The planned CO2 storage site is located within the Prinos Basin, in the Gulf of Kavala, in the North Aegean. The area of interest for the CO2 storage is located within the Prinos Concession, where Energean Oil & Gas SA ("Energean"), an affiliate of EnEarth, has held 100% of the interests and management for oil and gas exploration and production activities since 2007. The planned CO2 storage site is located within the Prinos structure and the underlying aquifer.

The operation of the facility is planned to be developed in two distinct phases based on capacity (Phase 1 and Phase 2), for reasons of scalability and adaptation to market conditions.

- **Phase 1** with an initial nominal capacity of up to **1 MTPA** for 20 years (starting around late 2025 to early 2026). The CO2 will be supplied primarily in bulk, via a third-party pipeline that will reach the facility boundaries in suitable conditions for injection. In addition, CO2 parcels will be received in

small quantities at the Sigma onshore facilities, transported by trucks, in the context of pilot CO2 capture projects.

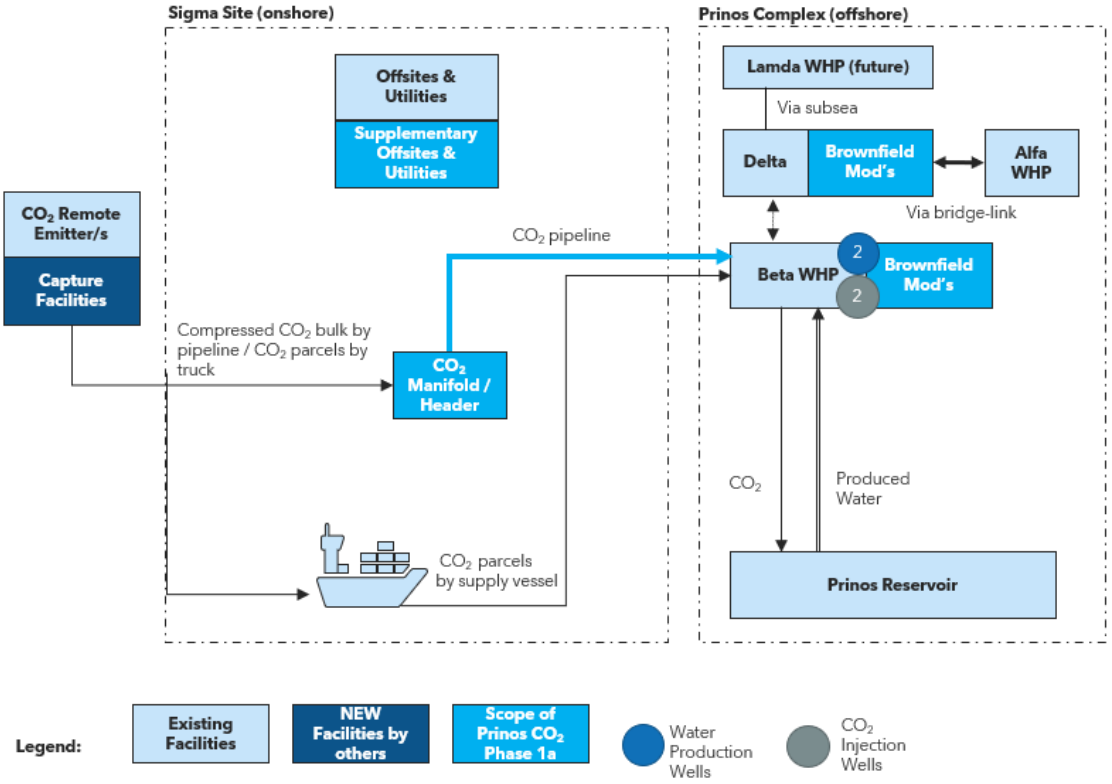


Figure 1–3: Schematic representation of Phase 1 of the Project

- **During Phase 2**, an expansion to the final nominal capacity of up to **3 MTPA** is planned. The facility will be modified to accept additional liquefied CO2, which will be received via sea transport to a newly built pier. For this purpose, marine facilities will be constructed for docking, unloading, storage and processing (pumping, heating) of the liquefied CO2, within the onshore area of the Sigma plant activities. The CO2 will be transported to the offshore facilities via the submarine pipeline that will have been constructed within the framework of Phase 1. In order to serve Phase 2, an upgrade of the facilities will be required, as follows:
- Upgrade/expansion of onshore liquefied CO2 storage and management facilities, liquefied CO2 docking and offloading facilities and ancillary facilities.
- Possible installation of a new platform to cover the maximum capacity of Phase 2.
- At least four new CO2 injection wells and four new water production wells.
- Possible expansion of the water treatment facility.

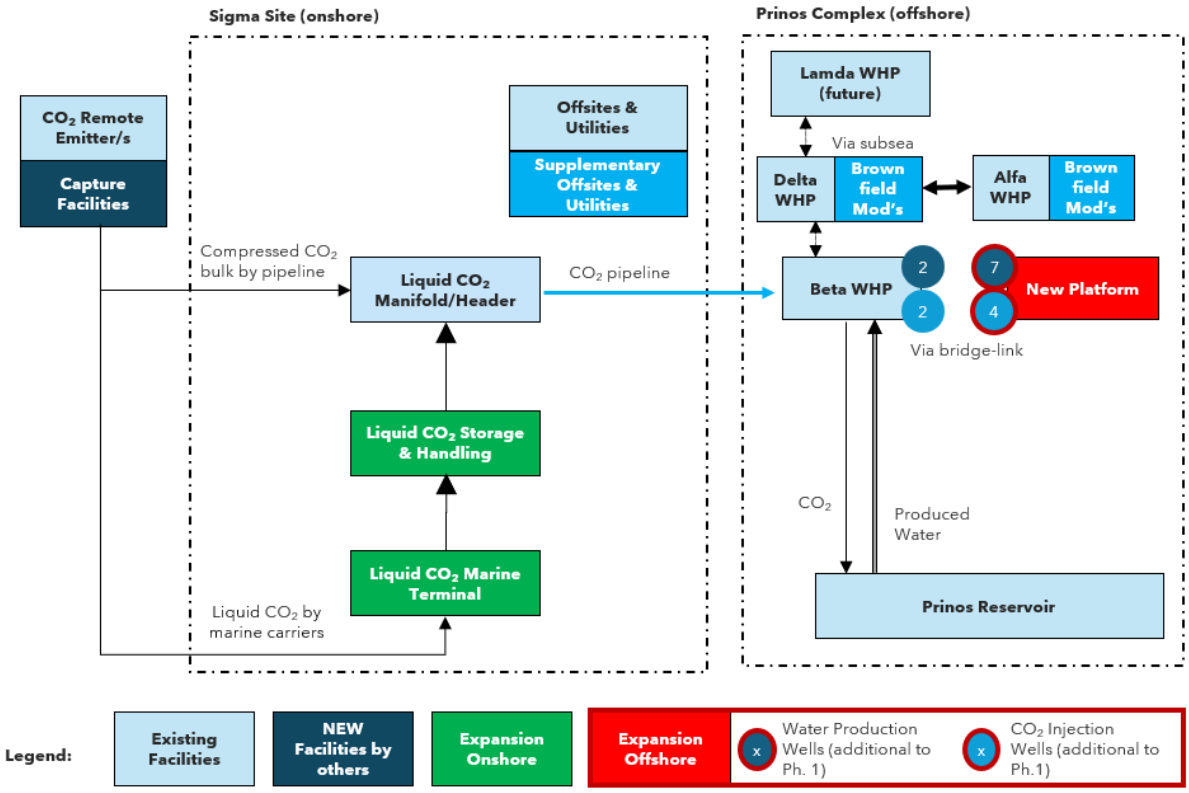


Figure 1–4: Schematic representation of Phase 2 of the Project

This SEP forms an annex to the study focusing on Phase 1 of the Project.

The new facilities and drilling envisaged for the operation of Phase 1 of the CO2 Storage Project and which are the subject of this study include:

- Onshore facilities: modification of a certain area within the existing area at the Sigma plant for the construction of the CO2 reception collector and an unloading and compression area.
- Offshore pipeline: a subsea pipeline connecting the Sigma plant area to the Beta offshore platform, approximately 20 km long.
- Offshore platforms: modification and/or use of the existing offshore facilities of Prinos (Beta and Delta platforms) for the reception of CO2 from the new subsea pipeline and CO2 cargoes in containers, injection into the new wells, and treatment of the produced water (Delta platform).
- Drilling: 2 CO2 injection wells and 2 water production wells on the existing Beta platform of the Prinos offshore complex.

The CO2 sources and the main reception processes during Phase 1 of the CO2 Storage Project will be as follows:

- Supply of bulk CO2 in suitable conditions for injection via a third-party pipeline to an onshore reception station within the Sigma facility area.
- Reception of CO2 parcels from ISO container trucks at the Sigma onshore facilities. The containers will be loaded onto supply vessels/transport barges by crane, transported and unloaded at the existing Beta

platform of the Prinos offshore facilities. It is noted that there is also provision for direct injection of the CO2 cargoes into the onshore receiving manifold, via a compression station, upon unloading from the trucks.

1.1.3 Project Proponent

The Project Proponent (Operator) is EnEarth Greece Single Member S.A. (Address: 32 Kifissias Ave., P.C. 151 25, Maroussi, Telephone: 2108174200). EnEarth is a Greek public limited company established with the primary purpose of developing CO2 storage activities in Greece, and in particular, the development of the Project. EnEarth belongs to the Energean group of companies and is an affiliated company of Energean Oil & Gas S.A., which operates the Prinos, North Prinos and Epsilon fields, in the Gulf of Kavala, which are the only hydrocarbon production sites in the country.

The persons responsible for the EIA, on behalf of the Project Proponent, are:

Vasilis Tsetoglou	HSE Director of ENERGEAN Group
Vasilis Zenios	Head of Facilities Projects - Egypt, Italy, Greece, Croatia, UK
Eleni Chalasti	Junior Process Engineer
Paschalia Kiomourtzi	Subsurface Lead, Greece
Efstathios Skarvelas	Well Delivery Manager
Costas Angelides	Head of Technical Inspection & Energy Projects
Costas Dimotzis	Technical Services Superintendent
Giannis Karagiannis	Environmental Engineer
Katerina Athitsou	Legal Counsel
Theodora Charalambidi	Legal Counsel

Energean, headquartered in London, is a hydrocarbon exploration and production group focused on the sustainable development of the Mediterranean's natural resources, with a focus on natural gas. It is committed to net-zero emissions by 2050 and aims to deliver on the 17 UN Sustainable Development Goals through its daily operations and a wide range of corporate social responsibility initiatives.

The group operates in seven countries in the Mediterranean and the North Sea and has an excellent track record of Health, Safety and Environment in hydrocarbon exploration, development and production, with over 1 billion barrels of oil equivalent in proven and probable reserves, of which approximately 80% is in gas.

Energean Group's production comes from Egypt, Italy, Greece, Croatia and the United Kingdom, exceeding 40,000 barrels of oil equivalent in daily production in 2021 and targeting 200,000 in the medium term.

Energean Group's largest ongoing investment project is the development of the Karish, North Karish and Tanin fields in Israel. The three fields have approximately 100 billion cubic meters of natural gas. At the same time, three other major hydrocarbon development programs are underway in Egypt, Italy and Greece. Its total ongoing investments are in the order of $3 billion.

In Greece, Energean operates the Prinos, North Prinos and Epsilon fields in the Gulf of Kavala, which provide the country's only hydrocarbon production. Given market conditions, Energean has implemented a

restructuring and modernization program for Prinos, with the aim of gradually reducing its dependence on oil price fluctuations and further reducing its environmental footprint through carbon dioxide (CO2) storage.

In the context of the execution of petroleum operations (exploration and exploitation) within the Prinos Exploitation Area (as defined in the Agreement of 23.11.1999 of Law 2779/1999 as amended and in force) for several years, Energean has collected geological, geophysical and drilling data for the Prinos geological basin and in particular for the Prinos and Epsilon structures, from which it is documented that the specific structures are in principle eligible as CO2 storage sites. Consequently, within the context of its activities in the area, Energean proceeded with the design and licensing maturation of a CO2 Storage Unit in Prinos, making use of no. 173 of Law 4964/2022. More specifically, according to Law 4964/2022 (Government Gazette A 150/30.07.2022) entitled "Provisions for the simplification of environmental licensing, establishment of a framework for the development of Offshore Wind Farms, addressing the energy crisis, environmental protection and other provisions", and more specifically based on art. 173 thereof, the entities to which the Greek State has granted (according to Law 2289/1995 (A' 27)) the right or permit to explore and exploit hydrocarbons in a specific area, and which have sufficient data (in particular geological, geophysical and drilling) to document the eligibility in principle as a carbon dioxide (CO2) storage site, of a geological formation or formations located in the subsoil of the granted area (onshore or offshore), acquire (under the conditions of the said article) the right to continue and complete the exploration process of the specific area in order to determine its suitability for CO2 storage.

Based on the above, Energean requested from HEREMA on 31.08.2022 the activation of the right to continue and complete the investigation of the structures of the Prinos, Epsilon fields and the underlying aquifer (the "Area") in order to determine their suitability as CO2 storage sites. The said application was accepted with the Decision to Activate the Right to Explore for CO2 Storage (as approved by the decision of the Hellenic Energy and Natural Resources Development Authority (EGD) No. 14577/29.09.2022 (Government Gazette 5247/B/11.10.2022)), which approved the in-principle eligibility of the storage site, which is located within the boundaries of the Prinos concession and includes the structures of the Prinos, Epsilon fields and the underlying aquifer, as well as approved the continuation and completion of the exploration of the Area as a storage site for a period of twenty-two (22) months starting from October 1, 2022 by Energean.

According to par. 5 of art. 173 of L. 4964/2022, after the completion of the suitability investigation and before the expiration of the right to complete the investigation, the interested entity submits an application to EDEYEP, in order to determine the suitability of the geological formation as a CO2 storage site and to activate the storage right of the entity. An interested entity is understood to be either the entity with the right to continue and complete the investigation (in this case Energean), or an affiliated company, which has as its exclusive purpose the activity of CO2 storage (in this case EnEarth).

With the progress and completion of the exploration procedures of the Area as a CO2 storage site, EnEarth, as an affiliated company of Energean, submitted on 30.06.2024 an application in order to determine the suitability of the geological formation as a CO2 storage site and to activate the storage right of the entity in accordance with par. 5 of article 173 of Law 4964/2022. Energean, as the entity with the right to continue and complete the exploration, has co-signed the above application.

Furthermore, in accordance with par. 5, letter e of article 173 of Law 4964/2022, facilities used by the operator to serve the activity of hydrocarbon exploration and exploitation may be used in the context of the CO2 storage activity. EnEarth and Energean have included in the above application a detailed description of the facilities (existing and new) that are to be used for the needs of the CO2 storage activity.

Following the issuance of the decision establishing the suitability of the geological formation as a CO2 storage site and the activation of EnEarth's storage right in accordance with par. 5 of article 173 of Law 4964/2022, Energean will grant to EnEarth those facilities (onshore and offshore) from the existing facilities that are necessary for the development of the CO2 storage activity. At the same time, Energean will provide technical support to EnEarth through its human resources.

1.2 ENVIRONMENTAL CATEGORY OF THE PROJECT

According to Ministerial Decision DIPA/37674/10-8-2016, as amended by MD 2307/2018 and MD YPEN/DIPA/ 17185/1069/2022 (Government Gazette 841/B` 24.2.2022), currently in force, the Project falls under Category 11 "Transport of energy, fuels and chemicals", no. 6 "Infrastructure for the transport and storage of carbon dioxide streams in geological formations, in application of Directive 2009/31/EC:

- Transport pipelines, including associated compressor stations,
- Storage sites
- Capture facilities for the purpose of storage in geological formations

and is classified under Subcategory A1.

Subcategory A1 includes projects that may have significant impacts on the environment, and therefore:

- A detailed Environmental Impact Assessment (EIA) is required in accordance with the specifications set out in Annex 2 of Joint Ministerial Decision 170225/2014.
- The competent authority for issuing the permit is the Ministry of Environment and Energy (MEE) and specifically the Directorate of Environmental Licensing (DIPA) in accordance with Law 4014/2011.
- The licensing procedure for a subcategory A1 project is defined in Article 3 of Law 4014/2011.
- The consultation principles during the EIA process are defined in Joint Ministerial Decision 1649/45/2014 “Specification of the procedures for opinions and the manner of informing the public and participating in the public consultation during the environmental licensing of projects and activities of Category A of the decision of the Ministry of Environment, Forestry and Climate Change No. 1958/2012 (Government Gazette 21/A), in accordance with the provisions of article 19 paragraph 9 of Law 4014/2011 (Government Gazette 209/A), as well as any other relevant details”.
- The EIA will include forms T and Y, which define the identity of the activity subject to environmental licensing, as well as information regarding the environmental licensing activity in accordance with Decree-Law 167563 (Government Gazette 964/B/19-04-2013) “Specification of the procedures and special criteria for the environmental licensing of projects and activities of articles 3, 4, 5, 6

and 7 of Law 4014/2011, as defined in article 2, paragraph 13, the special forms of the above-mentioned procedures, as well as any other matter related to these procedures".

The environmental licensing procedure of the Project is determined by Law 4014/2011, as amended by Law 4685/2020 "Modernization of environmental legislation, incorporation into Greek legislation of Directives 2018/844 and 2019/692 of the European Parliament and of the Council and other provisions" (Government Gazette 92/A/7.5.2020). The content and level of detail of the Environmental Impact Assessment are specified in Joint Ministerial Decision (JMD) 170225/2014.

1.3 PURPOSE AND OBJECTIVES OF STAKEHOLDER PARTICIPATION

Stakeholder engagement plays a key role in building strong, constructive and flexible relationships with stakeholders. In this context, the primary objective of stakeholder engagement is to communicate the Project and its impact and to gather stakeholder views with a view to improving Project decision-making and building understanding through the active participation of individuals, groups and organisations in the Project.

The objective of the stakeholder participation plan is to identify and map all potentially affected groups and individuals and to outline the strategy for informing, consulting, engaging and engaging with the identified stakeholders. The stakeholder participation plan aims to contribute to:

- facilitating access to information and achieving appropriate disclosure of information
- ensuring the accuracy of information about the Project
- early identification of issues that may endanger the Project or its stakeholders and the successful management of the Project's environmental and social risks and impacts
- establishing a substantial system of long-term communication and feedback exchange between the Project and its stakeholders
- designing a mechanism for addressing and resolving complaints or concerns related to the Project

The figure below illustrates the processes involved in the development and implementation of the stakeholder participation plan:

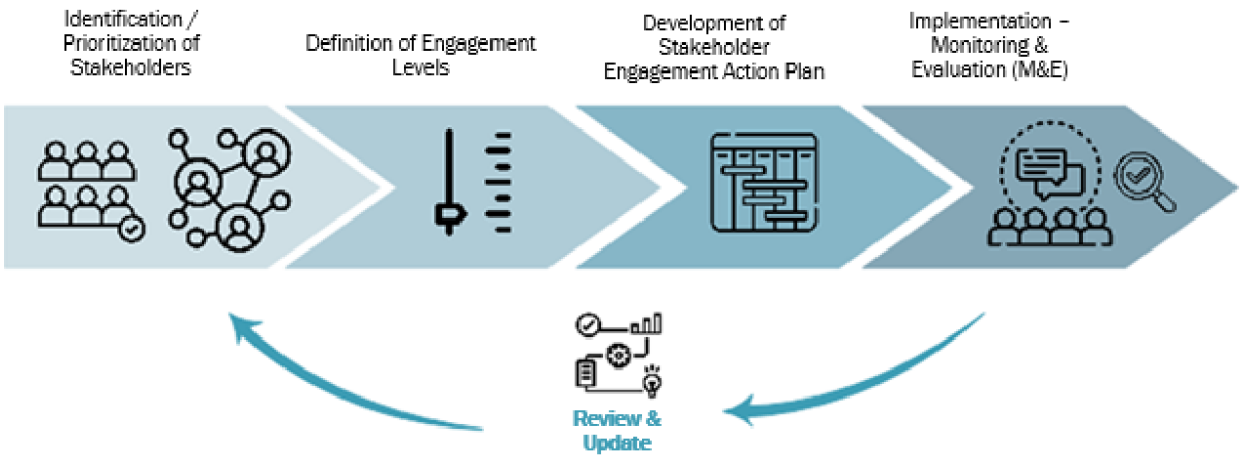


Figure 1–5: Process for Developing and Implementing a SEP

The proposed SEP is a preliminary framework, which outlines the basic principles of engagement, the identification, description and prioritization of stakeholders, a preliminary set of tools and communication channels to achieve the planned level of engagement and an initial Stakeholder Engagement Action Plan. A Comprehensive SEP will be developed for the Project in accordance with applicable legislation, and EBRD Performance Requirement 10 and will be included in the EIA, so that it can be further developed and maintained in subsequent phases of the Project. The comprehensive SEP should include:

- The principles and objectives for stakeholder engagement.
- The key regulatory requirements for stakeholder engagement.
- The existing engagement and available engagement mechanisms that already exist and can be used.
- An updated stakeholder list and thorough analysis. The analysis should allow for the identification of how and to what extent stakeholders (1) are affected, or are likely to be affected, (directly or indirectly) by the Project, or (2) may have an interest in and/or influence the Project; the analysis should also allow for a clear understanding of the characteristics and needs of stakeholders, as well as the structure of their relationships.
- A stakeholder hierarchy to help determine the most appropriate engagement approach, identify the resources that will be needed and target them effectively.
- Preliminary Stakeholder Engagement Plan, both in the construction and operational phases - which will describe at least the form of engagement, the timing and frequency of activities, the information to be communicated/content of engagement, the resources to be allocated for the implementation of the stakeholder engagement plan, the manner in which engagement activities will be communicated, the manner in which comments/feedback will be taken into account.
- Description of a functioning Grievance Mechanism.
- Monitoring and reporting arrangements to assess the effectiveness of stakeholder engagement and guide the adaptation and revisions of the SEP.
- Relevant institutional arrangements, indicative resources and responsibilities for the implementation of the SEP, as well as oversight arrangements.

It is important to note that the SEP is a dynamic document and should be reviewed regularly throughout the life of the Project. Reviews will examine the situation as it evolves, as well as the results of stakeholder activities already undertaken in order to make necessary updates to the Plan.

2 REGULATORY FRAMEWORK FOR STAKEHOLDER PARTICIPATION

2.1 NATIONAL AND EU REGULATORY FRAMEWORK

Stakeholder Participation for the Project will be carried out in accordance with the requirements of applicable national and EU legislation which is summarized as follows:

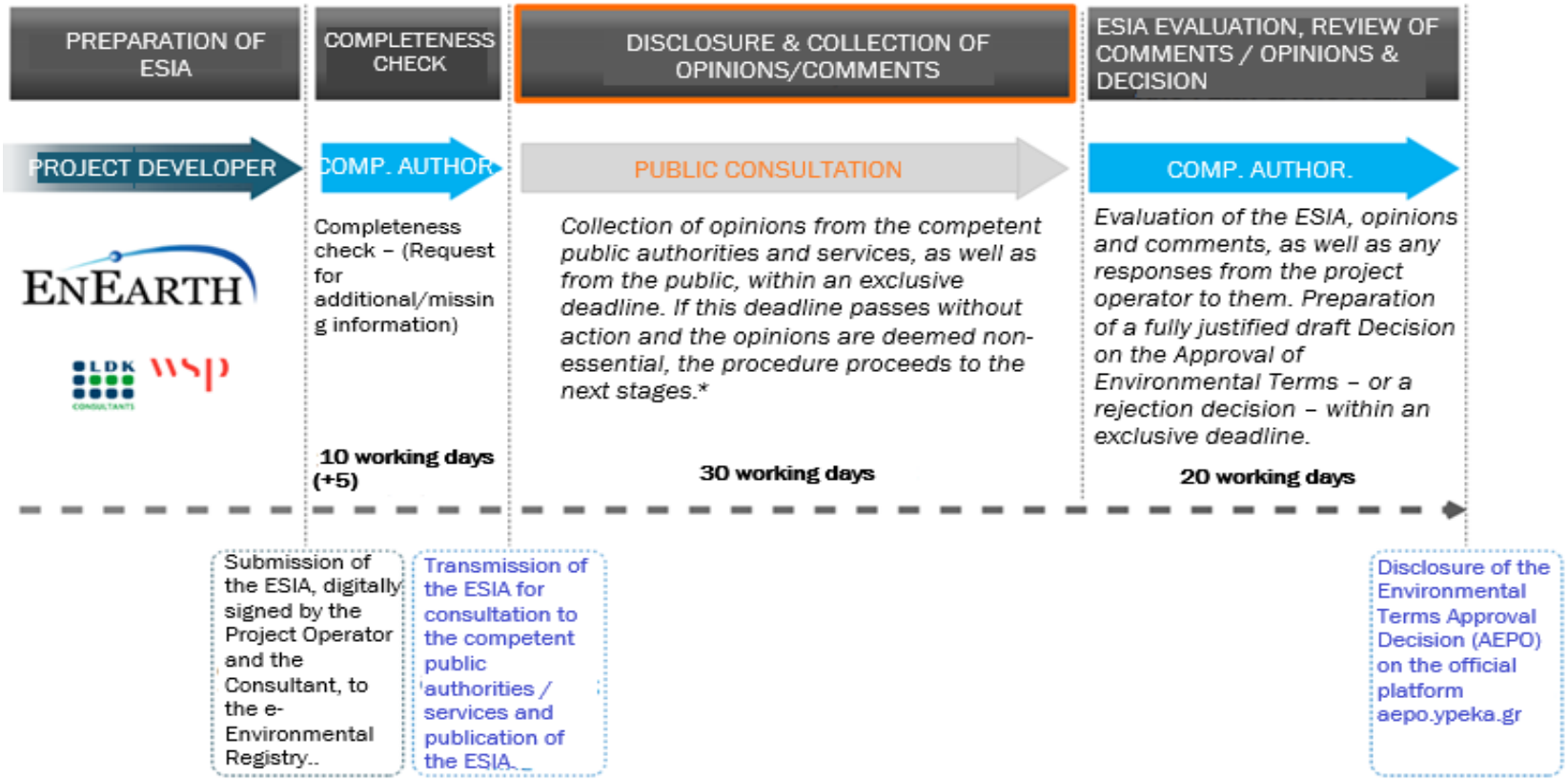
Table 2-1: Relevant National and Union Legislation

Serial Number of Legislation & Official Gazette	Legislation
Regulation (EC) No 1367/2006	Regulation (EC) No 1367/2006 of the European Parliament and of the Council of 6 September 2006 on the application of the provisions of the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters to Community institutions and bodies of 6 September 2006.
Directive 2003/35/EC Directive 2014/52/EU	• Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 on public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending, as regards public participation and access to justice, Council Directives 85/337/EEC and 96/61/EC. • Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 (EIA Directive) amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.
Law 3422/2005 (Government Gazette 303/A 13.12.2005)	Law 3422/2005 on the ratification of the Aarhus Convention on access to information, public participation in decision-making and access to justice in environmental matters.
Y.A.I.P. 11764/653/2006 (Government Gazette 327/B 17.3.2006)	11764/653/2006 on public access to environmental information held by public authorities, in compliance with the provisions of Council Directive 2003/4/EC "on public access to environmental information and repealing Directive 90/313/EEC". Replacement of Joint Ministerial Decision No. 77921/1440/95 (795/B).

Law 4014/2011 (Government Gazette 209/A 21.9.2011) Ministry of Housing and Urban Development No. 48963/2012 (Government Gazette 2703/B` 5.10.2012) Ministry of Housing and Urban Development No. 167563/EYPE/2013 (Government Gazette 964/B 19.4.2013) Ministry of Housing and Urban Development No. 1649/45/2014 (Government Gazette 45/B 14.1.2014) Ministry of Housing and Urban Development No. 170225/2014 (Government Gazette 135/B 27.1.2014) Ministry of Housing and Urban Development No. 1915/2018 (Government Gazette 304/B 2.2.2018) , Law. 4685/2020 (Government Gazette 92/A 07.05.2020)	• Law 4014/2011, as amended and in force, on the environmental licensing of projects and activities, regulation of arbitrary measures in connection with the creation of an environmental balance and other provisions of the Ministry of Environment's competence. • Ministerial Decree no. 48963/2012 Specifications for the content of Environmental Terms Approval Decisions (AEPO) for category A projects and activities of the decision no. 1598/13.1.12 of the Minister of Environment, Energy and Climate Change (21/B), as in force in accordance with article 2 §7 of Law 4014/11 (209/A). • Ministerial Decree no. Εικ.: 167563/ΕΥΠΕ/2013, as amended and in force, for the specification of the procedures and the more specific criteria for environmental licensing of projects and activities of articles 3, 4, 5, 6 and 7 of Law 4014/2011, in accordance with the provisions of article 2 paragraph 13 thereof, the special forms of the above procedures, as well as any other matter related to these procedures. • M.A. Εικ. 1649/45/2014 for the specification of the procedures for opinions and the manner of informing the public and participating in the public consultation during the environmental licensing of projects and activities of Category A of the decision of the Minister of Environment, Energy and Climate Change no. 1958/2012 (Government Gazette 21/A), in accordance with the provisions of article 19 paragraph 9 of law 4014/2011 (Government Gazette 209/A), as well as any other relevant details. • Ministerial Decree no. 170225/2014, as amended and in force, for the specification of the contents of the environmental licensing files for Category A projects and activities of the decision of the Minister of Environment, Energy and Climate Change with no. 1958/2012 (21/B) as in force, in accordance with article 11 of law 4014/2011 (209/A), as well as any other relevant details. • Ministerial Decree no. 1915/2018 for the amendment of no. 48963/2012 (B' 2703) of joint ministerial decision, no. 167563/2013 (B' 964) of joint ministerial decision and no. 170225/2014 (B' 135) of ministerial decision, which have been issued under the authorization of Law 4014/2011 (A' 209), in compliance with Directive 2014/52/EU "amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment" of the European Parliament and of the Council of 16 April 2014. • Law 4685/2020, as amended and in force, for the modernization of environmental legislation, incorporation into Greek legislation of

Serial Number of Legislation & Official Gazette	Legislation
	Directives 2018/844 and 2019/692 of the European Parliament and of the Council and other provisions.

Below are presented the basic steps of the procedure for issuing a Decision for the Approval of Environmental Terms (AEPO), including the Public Consultation requirement, in accordance with Law 4014/2011, as amended and applicable to projects and activities of subcategory A1, without submitting a Preliminary Determination of Environmental Requirements (PDER) file.



*Essential (substantive, material), in the context of assessing the environmental impacts of a project or activity, are considered the opinions of public authorities whose area of competence is directly related to the characteristics of the proposed project and its potential environmental impacts.

Figure 2–1: Procedure for issuing Env. Terms (Subcategory A1 projects, without submission of a PDER file)

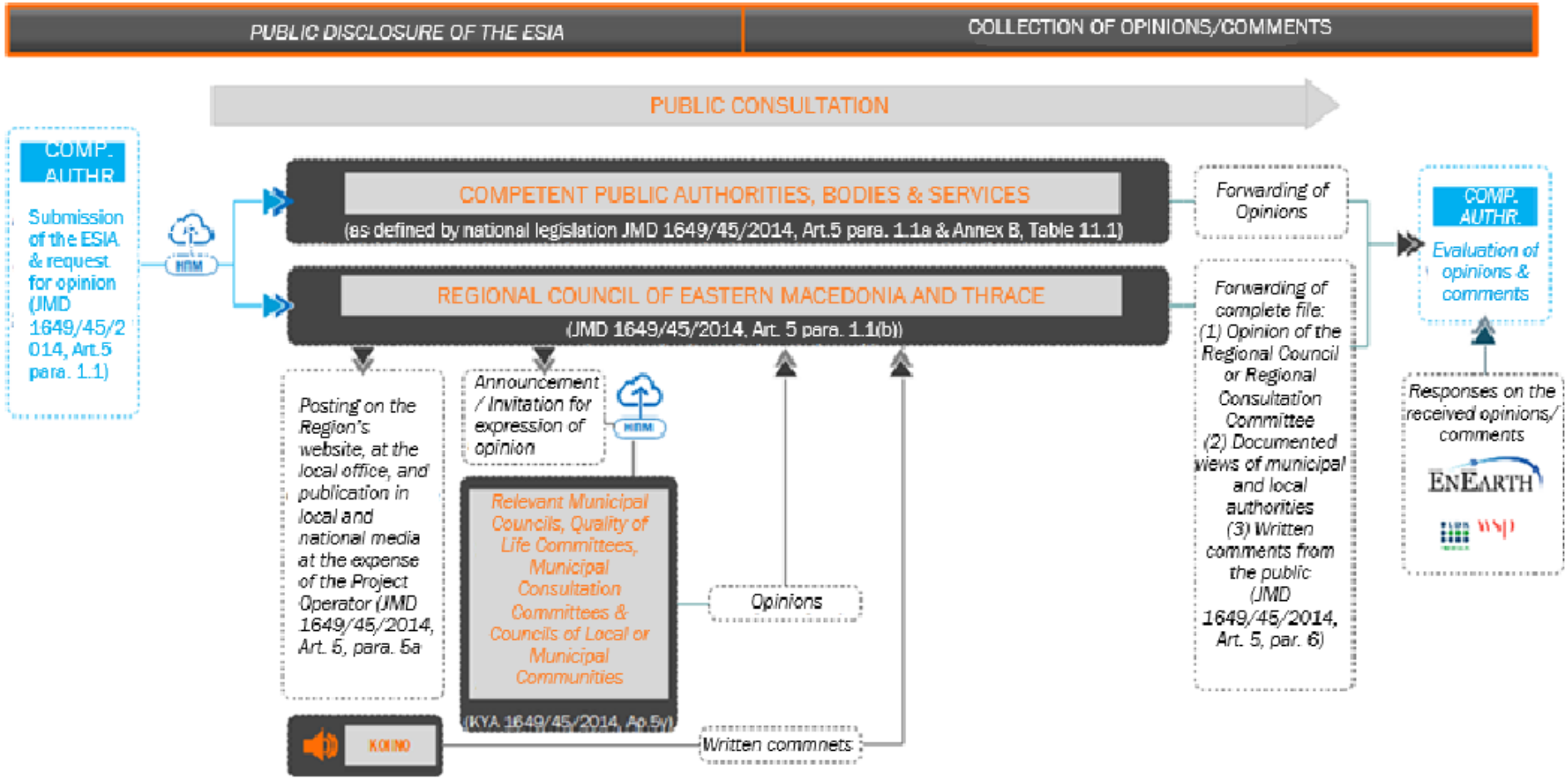


Figure 2–2: Disclosure and Consultation Procedure (Subcategory A1 Projects, without submission of a PDER file)

2.2 REQUIREMENTS OF INTERNATIONAL FINANCIAL INSTITUTIONS

2.2.1 European Bank for Reconstruction and Development (EBRD)

The Project may seek international financing and the EBRD is considered as a potential financier. As a result, the CIP will follow the EBRD's standards. The EBRD is committed to promoting "environmentally responsible and sustainable development". To this end, the EBRD has established a comprehensive set of Performance Requirements for key areas of environmental and social sustainability that projects are required to meet (EBRD Environmental and Social Policy 2019) including Performance Requirement 1: Assessment and management of environmental and social risks and impacts and Performance Requirement 10: Disclosure of information and stakeholder engagement.

The key elements of these Performance Requirements are summarised below:

Table 2–2: Key Performance Requirements 1 & 10

Performance Requirement 1	Performance Requirement 10
Identification and assessment of adverse and beneficial environmental and social impacts and issues related to the Project.	Identification of Project stakeholders who are affected or likely to be affected by the Project, including disadvantaged or vulnerable groups who may be differently or disproportionately affected by the Project.
Adoption of measures to avoid or, where avoidance is not possible, minimize, mitigate or compensate for adverse impacts on employees, affected communities and the environment.	Ensure information disclosure and meaningful consultation throughout the life of the Project so that stakeholders are appropriately involved in consultation on environmental and social issues that could potentially affect them. Provide relevant information, guidance and training to workers and communities affected by the Project on health and safety risks, protective and preventive measures.
Identifying and, whenever possible, exploiting opportunities to improve environmental and social performance.	Establish a Grievance Mechanism to receive and facilitate the resolution of stakeholder concerns and complaints regarding the Project
Promoting improved environmental and social performance through a dynamic performance monitoring and evaluation process.	Providing stakeholders, on an ongoing basis, with appropriate information regarding the Project's environmental and social performance, risks, impacts and complaints arising in relation to the Project. Monitoring any changes to the Project and updating the SEP accordingly.

2.2.2 Other financial institutions

In addition to the EBRD, other international financial institutions now recognize stakeholder engagement as an essential element of good business practice and corporate responsibility, as well as a means of improving project quality. In particular, meaningful public engagement is recognized as a key factor in successfully managing risks and impacts for project-affected communities and achieving improved benefits for society

as a whole. The approaches adopted by major organizations that constitute good practices, which the Project's SEP incorporates to varying degrees, are summarized below.

The World Bank Environmental and Social Framework is the World Bank's commitment to sustainable development, through a specific Policy and a set of Environmental and Social Standards (ESS). Projects supported by the Bank are required to meet these Environmental and Social Standards, including Environmental and Social Standards 10: Stakeholder Participation and Disclosure of Information.

In summary, ESP 10 requires:

- Establishing a systematic approach to stakeholder engagement that allows for the identification of stakeholders, the establishment and maintenance of a constructive relationship with them, in particular with those affected by the project.
- Assessing the level of stakeholder interest and support for the project and providing opportunities for their views to be taken into account in the project design and its environmental and social performance.
- Supporting effective and inclusive participation of stakeholders affected by the project throughout the project life cycle.
- Ensuring the dissemination of information on the project's environmental and social risks and impacts in a timely, clear, easily understandable and accessible manner.
- The development of an accessible and inclusive mechanism that allows project-affected parties to raise issues and complaints and for funders to address and manage these issues and complaints.

The United Nations Development Programme Social and Environmental Standards (UNDP Social and Environmental Standards) ensure, among other things, the meaningful, effective and informed participation of stakeholders in the design and implementation of programmes and projects. Stakeholder engagement is required to be a continuous process that may include, to varying degrees, the following elements: stakeholder analysis, disclosure and dissemination of information, consultation and meaningful participation, dispute resolution and redress procedures, and ongoing reporting to affected communities and other stakeholders. The stakeholder engagement process is required to take due account of the gender dimension and be conducted in a culturally sensitive, non-discriminatory and inclusive manner, ensuring that potentially affected vulnerable and marginalised groups are identified and provided with opportunities to participate.

2.3 STANDARDS AND POLICIES

EnEarth is part of the Energean group of companies, which seeks to implement the 17 United Nations (UN) Sustainable Development Goals through its daily operations and a wide range of corporate social responsibility actions. The participation of local communities is an integral part of Energean's corporate and social responsibility policy and cooperation with the communities in which it operates is at the forefront of Energean's corporate values. In this context, it has a "Health, Safety, Environmental & Social Responsibility Policy" which, among other things, aims to ensure cooperation with local communities and other stakeholders in a responsible and transparent manner and a "Code of Ethics" which is guided by Energean's core values, which include interacting with local communities to meet their expectations and needs.

3 STAKEHOLDER IDENTIFICATION AND ANALYSIS

3.1 APPROACH TO IDENTIFYING AND PRIORITIZING STAKEHOLDERS

The objective of the stakeholder identification and prioritization process is to establish an initial list of organizations and individuals who may be directly or indirectly affected (positively or negatively/permanently or temporarily), have an interest in and/or influence the Project, including groups that may be differently affected or disproportionately affected due to their disadvantaged or vulnerable status.

The selection of stakeholders and their analysis will contribute to their prioritization, ensuring that the appropriate level of involvement is determined for each stakeholder; it will also contribute to defining the key parameters for engagement, including time, place and method of engagement.

Stakeholder prioritization involves the analysis of stakeholders based on selected parameters and characteristics to develop appropriate stakeholder management plans and effectively support stakeholder management and engagement objectives.

While there are many models reflecting different approaches, for this Project the characteristics of impact on interests and influence on Project results were chosen to enable a better understanding of the following:

- How and to what extent the interests of stakeholders are expected to be affected by the Project.
- How different stakeholders can influence the Project and the risks or opportunities associated with it.
- The most appropriate degree and manner of involvement.
- The stakeholders identified are classified into three main categories based on their expected involvement in Project activities as follows:
- Key stakeholders: Stakeholders whose interests are likely to be directly affected by the Project and who can exert significant influence to influence it.
- Potentially active (secondary) stakeholders: Stakeholders who are likely to be affected by the Project and/or who may experience indirect impacts.
- Other stakeholders: Stakeholders who are likely to express their views and/or concerns, but are not likely to experience any impact from the Project or influence the Project.

The level of participation takes into account the above hierarchy and the purpose of the participation (type of relationship/intended outcome). Four levels of participation are identified: information, advice, active participation and cooperation. Each level of participation is linked to a broadly defined purpose, as presented below.

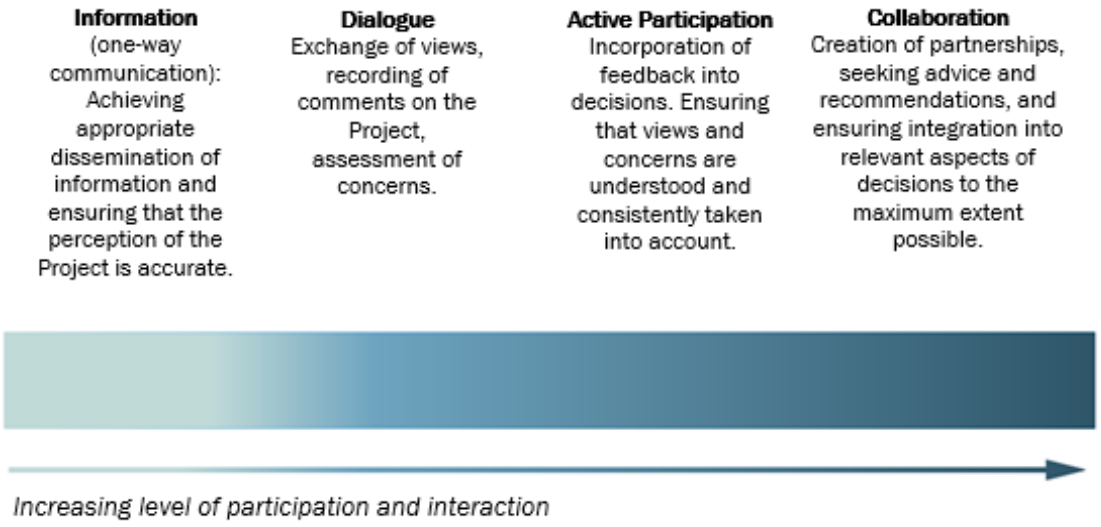


Figure 3–1: Purpose of participation

The following Table is used to guide the prioritization and corresponding determination of participation levels:

Table 3–1: Stakeholder Hierarchy Table

Impact on Stakeholders	Influence on the Project: Low	Medium	High
High	• Information • Dialogue	• Information • Dialogue • Active participation	• Information • Dialogue • Active participation • Collaboration
Medium	• Information • Dialogue as needed	• Information • Dialogue • Active participation as needed	• Information • Dialogue • Active participation • Collaboration as needed
Low	• Information	• Information • Dialogue as needed • Active participation as needed	• Information • Dialogue • Active participation as needed • Collaboration as needed

As the Project progresses through its various phases, the process of identifying stakeholders and prioritizing them will become more of a review process and the initial list drawn up will be updated.

3.2 PRELIMINARY IDENTIFICATION AND PRIORITIZATION OF STAKEHOLDERS

The identification and analysis of stakeholder groups is crucial for the project objectives and for the selection of appropriate participation mechanisms. The main stakeholder groups are presented in the table below. During the implementation of the project, this list may be further clarified and modified.

To prioritize stakeholders, stakeholder influence relationships are illustrated. Stakeholder influence relationships allow for a better understanding of the following issues:

- who is affected by the project and how
- how different stakeholders can influence the project and what risks or opportunities for the project this influence is associated with

Table 3–2: Project stakeholders

Group	Stakeholder	Description of potential impact on interests/influence	Impacts	Influence
National Authorities and Bodies	• Ministry of Environment and Energy • Ministry of Labor and Social Security • Ministry of Culture (includes Archaeology and Cultural Heritage) • Ministry of Rural Development and Food (General Directorate of Fisheries) • Ministry of Tourism • Natural Environment and Climate Change Organization (OFYPEKA) - Management Unit of Nestos, Vistonida and Rodopi National Parks • Other competent national bodies and services as defined by national legislation for environmental licensing.	• Prominent role in the project with direct influence/impact through project decision-making, regulatory and permitting controls, etc. • If their views/concerns are not taken into account, they may take actions that may jeopardize the Project		

Group	Stakeholder	Description of potential impact on interests/influence	Impacts	Influence
Regional and Local Authorities	• Decentralized Administration of Macedonia-Thrace (Directorate of Civil Protection, Department of Civil Defense (PAM) – Civil Emergency Planning (PSEA), Directorate of Environment and Spatial Planning of Eastern Macedonia – Thrace, Directorate of Waters of Eastern Macedonia – Thrace, Directorate of Rural Affairs of Eastern Macedonia-Thrace • Region of Eastern Macedonia and Thrace • Regional unit of Kavala • Municipal Councils of the municipalities of Kavala, Nestos, Pangaio and Thassos and relevant municipal departments (e.g. Directorate of Technical Services) • Coast Guard - Hellenic Coast Guard (2nd Regional Administration) • Fire Department (Regional Fire Department of Eastern Macedonia and Thrace, Kavala Fire Service) • Ephorate of Underwater Antiquities, Ephorate of Antiquities of Kavala, Service of Modern Monuments and TW of EM&T	• Direct influence/impact on the Project through regulatory enforcement. • Interest in the Project's impact on local safety, emergency planning, accident prevention, etc. • If their views/concerns are not taken into account, they may take actions that could jeopardize the Project	■	■

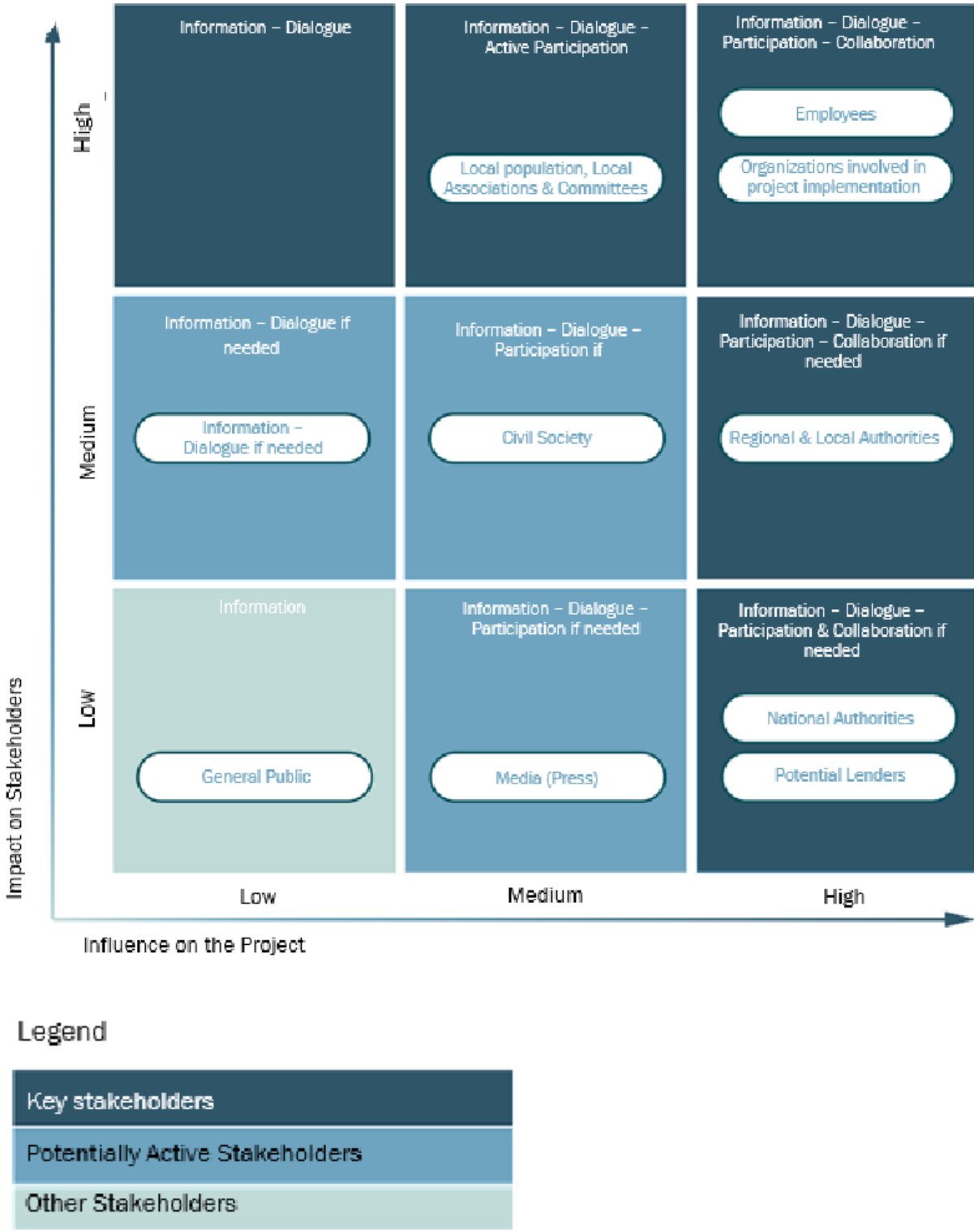
Local Population, Local Businesses and Professionals	• Residents of the municipalities of Kavala, Nestos, Pangaio and Thassos • Residents of the Region of Eastern Macedonia and Thrace • Hospitality and retail businesses in the area • Local fishermen • Local businesses active in the construction sector • Professional associations (fishing, aquaculture, tourism, etc.)	• Population living near the Project sites and related infrastructure, including local entrepreneurs • Residents of communities located near the roads used for the transport of materials during construction • Residents of the municipalities with wider economic interests linked to the project activities (e.g. employment, suppliers, etc.) • This group has a high interest in the Project, as the majority of the population of the Kavala Bay area resides in the city of Kavala and the neighboring coastal suburbs and villages as well as on the island of Thassos and is likely to be affected by the Project. • Fishermen are the main users of the sea. Their interest in the Project is high as their only source of income comes from the use of the sea.	■	■

Group	Stakeholder	Description of potential impact on interests/influence	Impacts	Influence
Vulnerable groups	• Vulnerable groups refer to individuals who, due to gender identity, ethnicity, age, disability, economic disadvantage or social status, may be more adversely affected by the impacts of the project than others and who may be limited in their ability to claim or benefit from the project's benefits. • Such individuals within the context of the Project are categorized as: • Those living below the poverty line • Single-parent households • Households with members with disabilities • Elderly • Children	• At this stage, no vulnerable group has been identified as potentially affected by the Project.	-	-
Employees	• Employees employed by EnEarth	• The involvement and participation of employees in the implementation of the Project is important for the implementation of the Project Interest in employment • Employee rights and working conditions • Possible collective mobilizations may negatively affect the implementation schedule of the Project	■	■

Group	Stakeholder	Description of potential impact on interests/influence	Impacts	Influence
Private sector organizations involved in the Project Implementation	• Contractors, subcontractors, suppliers and their personnel	• Contractors and subcontractors will be involved in the activities to implement the project, as well as ensuring compliance with labor rights and working conditions standards. • They are directly involved in the development of each location and have a direct interest in its success • They are interested in labor rights, working conditions, health and safety.	■	■
Media	• International, national and local media including Print, Radio, Television, Online media (social media, websites, blogs, etc.)	• Cover news related to the project on an ongoing basis • Inform the public and individual groups about key aspects of the Project • Have the ability to exert influence by acting as information transmitters, allowing for the outreach of wider audiences.	■	■

Group	Stakeholder	Description of potential impact on interests/influence	Impacts	Influence
Civil Society	• Non-Governmental Organizations (NGOs) e.g. Society for the Protection of Nature and Eco-Development, Ecological Movement of Kavala, Greenpeace Greece, WWF Greece, Hellenic Ornithological Society and other possible national and international NGOs that may be interested in the Project • Think Tanks e.g. Institute of Energy of South-East Europe (IENE), The Hellenic Association for Energy Economics (HAEE) • Professional organizations. Indicatively, these may include the Technical Chamber of Greece/Regional Department of Eastern Macedonia, Chamber of Commerce and Industry of Kavala, Labor Center of Kavala Prefecture, etc.) • Other organizations of the Civil Service (e.g. Nautical Club of Kavala, the Kavala Water Sports Club)	• Interest in environmental and social issues • They can act as information relay agents to disseminate information about the Project • Professional organizations may have a financial or other interest in the Project, either as suppliers or as organizations primarily associated (directly or indirectly) with construction materials and other supplies. They also provide expert opinions and advice on specific aspects of the Project that are relevant to their area of expertise.	■	■
Educational and Scientific Institutions	• Universities and Educational Organizations (e.g. Democritus University of Thrace (DUTH), Fisheries Research Institute)	• Possibly have a scientific interest in the project (research, education and training related to the Project)	■	■

Group	Stakeholder	Description of potential impact on interests/influence	Impacts	Influence
General public	• General population outside the wider Project area	• The general public may be interested in the Project because it can contribute positively to innovation and provide opportunities for building knowledge and expertise.		
Potential lenders	• EBRD	• They set standards (environmental, social, procurement, etc.) • Potential lenders will have a direct impact/influence on the Project through decision-making at every stage of the Project		



Legend

Key stakeholders

Potentially Active Stakeholders

Other Stakeholders

Figure 3–2: Stakeholder map

4 PREPARATION OF THE STAKEHOLDER ENGAGEMENT PLAN (SEP)

4.1 APPROACH FOR DETERMINING THE METHOD, FREQUENCY, AND ALLOCATION OF RESOURCES FOR STAKEHOLDER ENGAGEMENT

To achieve the desired level of engagement and the defined objectives, the appropriate combination of tools and channels must be selected and applied at the appropriate phase of the Project.

The table below summarizes the approach regarding the methods that contribute to ensuring information disclosure and meaningful consultation throughout the Project's lifecycle, so that stakeholders are appropriately engaged. This list is not exhaustive.

Table 4–1: Purpose and Method of Participation

Purpose of Participation	Information	Dialogue	Active Participation	Collaboration
Method (Channels & Tools)	• Online and offline dissemination (physical/virtual events, dedicated website/section for the Project – other stakeholder websites – media) • Press releases, newsletters, project presentations, speeches (basic information about the Project, benefits/opportunities, progress, etc.)	• Consultation meetings • Questionnaires • Distribution of printed materials • Online/offline monitoring/feedback reports on participation outcomes	• Meetings with stakeholders • Facilitated roundtables • Ad-hoc direct contacts and calls • Key informant interviews / focus groups • Monitoring/feedback reports demonstrating understanding and consideration of the issues raised	• Regular and ad-hoc direct contacts, discussions, meetings and phone calls • Monitoring and feedback reports (online or offline) regarding all comments/input received
	GRIEVANCE MECHANISM			

The frequency of interaction is determined based on the stakeholder hierarchy, where the higher the levels of impact and influence, the more frequent and personalized the interaction, as illustrated in the figure below.

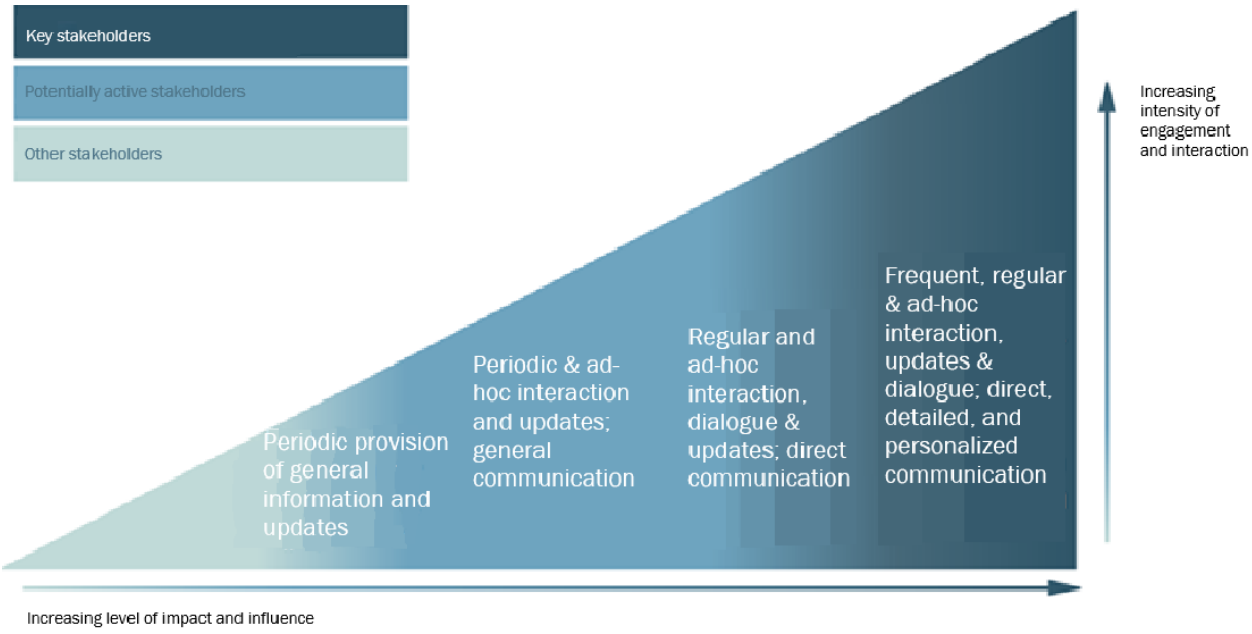


Figure 4–1: Frequency of Interaction

In a similar manner, the resources allocated for the management and implementation of the SEP should be proportionate to the depth and frequency of interactions. These will be defined as the project progresses and will include:

- Adequately trained personnel responsible for managing and overseeing the implementation of the SEP
- A sufficient budget allocated for the implementation of stakeholder engagement activities.

The capacity of designated personnel will also be regularly evaluated to ensure that they possess the appropriate qualifications. Where necessary, staff will be trained to acquire the knowledge and skills required to perform their duties effectively.

4.2 APPROACH TO INFORMATION DISCLOSURE AND EXCHANGE

The selection of the method and medium for disclosing and exchanging information should take into account how stakeholders typically access information and communicate. Accordingly, all disclosures and communications will be conducted in the local language (Greek), in an accessible, open, and appropriate manner—both offline (e.g. newspapers) and online (e.g. websites)—while also considering the rules and requirements of specific administrative bodies and authorities. In all cases, a variety of communication methods will be used to ensure outreach to the full spectrum of stakeholders. When reaching specific stakeholder groups presents challenges—due either to their nature or scale (e.g. the general public)—it is necessary to identify suitable intermediaries who can act as vehicles to facilitate the meaningful participation of the targeted stakeholders. For certain types of communication and reporting, the English language may also be used to meet the requirements of the project proponent (e.g. EBRD) and/or other institutional bodies. Finally, depending on each stakeholder group's level of technical knowledge, it may be necessary to adapt

the presentation of technical information into plain language to ensure information is more accessible to the audience.

4.3 APPROACH TO THE MANAGEMENT, MONITORING, AND EVALUATION OF THE SEP

The implementation of the SEP will be monitored at regular intervals. EnEath will be responsible for managing the SEP and, as noted above, will allocate appropriately trained personnel for this purpose.

The effectiveness of engagement activities will be evaluated by documenting and tracking performance indicators, which should be specific, measurable, and achievable. It is important to note that the monitoring and evaluation approach should be designed prior to actual engagement, to ensure that the necessary information will be collected.

The implementation of activities should be documented in a format that feeds back into the SEP, allowing the integration of stakeholder engagement outcomes into the decision-making process. Documentation may include, among others:

- A list of publications or reposts related to the Project, along with the source of publication.
- A stakeholder engagement activity log including details of meetings held, invited participants and attendance, information presented, comments and feedback received, and responses provided—including any commitments made to stakeholders.
- Meeting minutes and monitoring/feedback reports, or other simplified reports.

In addition, the Grievance Mechanism process—presented in a separate chapter—includes specific measures that contribute to the documentation, monitoring, and management of certain aspects of stakeholder engagement.

In all cases, stakeholder consent will be ensured for any form of personal data handling, and the management of such information will be carried out in accordance with the General Data Protection Regulation (EU) 2016/679 (GDPR) and applicable national legislation.

The results of monitoring and evaluation will be presented in reports and/or statements, which will be prepared at regular intervals or on an ad-hoc basis, depending on the needs of the Project and/or the requirements of relevant institutional bodies.

4.4 STAKEHOLDER ENGAGEMENT ACTION PLAN (SEAP)

The final SEP will cover the following phases of Project implementation:

- Phase 1: Preliminary actions
- Phase 2: Preparation and disclosure of the Project's Environmental and Social Impact Assessment (ESIA)
- Phase 3: Construction
- Phase 4: Operation
- Phase 5: Decommissioning

This preliminary SEAP covers Phases 1 and 2. At this stage, using the information presented in the previous sections, the following key parameters for stakeholder engagement have been defined:

- Documents for disclosure/information sharing
- Method of engagement (tool/channel)
- Indicative timing and frequency
- Indicators for monitoring and evaluation

Based on the initial activities to be carried out, the SEAP covering Phases 1 and 2 will be updated to include additional elements, such as the resources to be allocated and the structure of the EnEath team that will hold overall responsibility for implementing the SEP.

Planned actions for the subsequent phases of the Project will be added in future versions of the SEP.

Table 4–2: Stakeholder Engagement Action Plan (SEAP)

Stakeholders	Level of Engagement	Actions	Description	Indicative Timing	Proposed Performance Indicators
All stakeholders	Information	Information activities (distribution / disclosure of Project-related information)	• Project information for posting on official websites and use in meetings/presentations. This information will indicatively include: • Project scope • Brief overview of key project characteristics • Planned activities and estimated duration of each project phase • Project implementation progress • Brief description of anticipated positive impacts/opportunities from the Project • Employment opportunities • Information about the SEP • Project information will be updated accordingly throughout the Project's lifecycle. • Project-related information will also be disseminated through press releases and/or interviews in local and national media.	Implementation will begin in Phase 1 (Preliminary actions) and continue throughout the duration of the Project.	• Number of press releases, publications, and other outreach materials developed by the Project • Number of press releases, publications, and other outreach materials published/presented by the Project • Number of re-posts of Project material • Number and type (positive/negative) of third-party publications
Regional and Local Authorities / Representatives of Local Institutions (e.g.	Information / Dialogue / Active Participation	Information and dialogue activities for scoping the content of the ESIA	• Presentation of the existing and planned project to stakeholders • Presentation of the procedure to be followed during the environmental permitting process for projects and activities	Implementation will begin in Phase 1 (Preliminary actions) and will be completed	• Number of information/dialogue activities completed

Stakeholders	Level of Engagement	Actions	Description	Indicative Timing	Proposed Performance Indicators
businesses, professionals, NGOs, scientific bodies)			• Discussion on the scope of the ESIA, e.g. identification of key environmental parameters potentially affected by the planned facilities, and incorporation/resolution of any relevant comments • Presentation of the impact assessment/mitigation methodology, for both expected and unexpected events • Understanding stakeholder issues that may need to be considered or integrated into the Project design and/or ESIA • Consultation activities will take the form of meetings to be held either at the stakeholder premises or at EnEath offices • Stakeholder views and suggestions regarding additional measures to further mitigate potential adverse impacts and enhance positive impacts will be recorded and considered.	during Phase 2 (Preparation and disclosure of the ESIA)	• Number of information materials developed • Attendance rate relative to invitations • Number of meeting minutes prepared (including the presentation of comments and observations expressed, as well as the responses provided, including any commitments made to stakeholders) • Number of reports prepared and disseminated
Key stakeholders	Information / Dialogue / Active Participation / Collaboration	Information, dialogue and consultation activities with key stakeholders	• In the event that, during the preparation of the ESIA, environmental and social issues are identified that may significantly affect specific groups or individuals, it may be necessary to hold meetings to ensure that effective consultation with those stakeholders takes place, and that their potential concerns and views are duly considered and integrated into the decision-making process. • These actions will take the form of meetings.	Implementation will begin in Phase 1 (Preliminary Actions) and continue throughout the duration of the Project.	• Number of engagement activities completed • Number of information materials developed • Number of meeting minutes prepared (including the presentation of comments and observations expressed, as well as the responses

Stakeholders	Level of Engagement	Actions	Description	Indicative Timing	Proposed Performance Indicators
					provided, including any commitments made to stakeholders) • Number of stakeholder views incorporated
National Authorities and Institutions	Information / Dialogue / Active Participation / Collaboration	Collaboration with the competent authorities for environmental permitting	• The ESIA, along with the required documentation for the environmental permitting procedure, will be submitted to the competent authority (DIPA) in accordance with national legislation by EnEath. • EnEath (in collaboration with the consultants preparing the ESIA) will provide any required supplementary/additional documentation or information, as requested, either electronically or in person.	Phase 2 (Preparation and disclosure of the Project ESIA)	• Number of submissions completed, compared to the scheduled ones • Number of requests for additional information successfully addressed within the defined target timeframe
National, Regional, and Local Authorities and Institutions, and the General Public	Information / Dialogue (as needed) Active Participation / Collaboration (as needed)	Information activities and consultation for environmental permitting in accordance with legislation	• According to the relevant legal framework as presented in the above chapters, the ESIA, following completeness check, is forwarded by DIPA to the competent public authorities, bodies, and services, as well as to the Regional Council of Eastern Macedonia and Thrace, with a request for opinion. • The ESIA is published on the Region's website, and the invitation to submit comments is announced in local and national media (at EnEath's expense) for the general public. At the same time, the ESIA is circulated by the Regional	Phase 2 (Preparation and disclosure of the Project ESIA)	• Number of information/dialogue activities completed • Number of media publications completed, compared to those required • Number of requests for additional information

Stakeholders	Level of Engagement	Actions	Description	Indicative Timing	Proposed Performance Indicators
			Council to the relevant Municipal Councils / Committees for their opinion. • At the end of the public consultation process, the opinions and comments of the public and other stakeholders are discussed during the relevant session of the Regional Council (public hearing). This session is open to the public, and EnEath (together with the ESIA consultants) is invited to participate in order to respond to any questions that may arise. • The opinions collected are submitted to DIPA for evaluation.		successfully addressed within the defined target timeframe
All Stakeholders	Information / Dialogue / Active Participation (as needed)	Additional information activities for the disclosure of the ESIA	• Disclosure of the ESIA on EnEath's website • Announcement of the document's availability through press releases and notices in local and national media • Activation of the grievance mechanism • In cooperation with the Ministry, to ensure full compliance with the official consultation process: • Direct notification of key stakeholders regarding the official consultation process, the access points to ESIA documentation, and the dates of public hearings • Provision of support/guidance to any interested party (individual or group) who faces difficulties accessing the ESIA documents		• Number of press releases, media publications, and other outreach materials developed by the Project • Number of information/dialogue activities completed • Number of requests for additional information successfully addressed

Stakeholders	Level of Engagement	Actions	Description	Indicative Timing	Proposed Performance Indicators
All Stakeholders	Dialogue / Active Participation / Collaboration	Development and implementation of the Grievance Mechanism	• A Grievance Form (sample form included in the relevant section) will be posted on official websites, along with contact details (email, phone, fax) for the submission of complaints/grievances. • Responsibility for the management and resolution of grievances lies with EnEath. This also applies in cases where third parties (e.g. contractors) are involved. • EnEath is expected to ensure timely handling and resolution of complaints and concerns submitted via the website (forms, email, phone, fax) in cooperation with other relevant parties, as required. When a complaint is referred to a third party for resolution, it is important that the ultimate responsibility for resolution remains with EnEath, including in cases where the third party fails to reach an acceptable outcome. • All grievances/opinions/objections and the responses to them will be logged and recorded in a digital database. Anonymous submissions will also be allowed. A non-retaliation policy will be applied and clearly communicated.	Phase 2 (Preparation and disclosure of the Project ESIA) and at least 2 weeks prior to the start of Phase 3 (Construction)	• Number of grievances received and categorized by stakeholder group and by 3-month period • Number of grievances submitted and acknowledged within the target timeframe of the Grievance Mechanism • Number of grievances submitted and resolved within the target timeframe of the Grievance Mechanism • Indicator on recurrence trends, e.g. number of complaints received more than twice within a 3–6 month period • Number of reports produced

5 Grievance Mechanism

The objective of the Grievance Mechanism procedure is to address and ensure an appropriate response to potential complaints and appeals raised by stakeholders, including the local population affected by the Project.

EnEarth is expected to hold responsibility for the management and processing of complaints and grievances. The designated officer (or team) will be tasked with receiving, recording, liaising with the relevant authorities, and overseeing responses to stakeholder complaints and requests.

5.1 MANAGEMENT AND TIMELINE FOR ACKNOWLEDGING RECEIPT AND RESOLVING COMPLAINTS

All complaints, concerns, and appeals—without exception—will be logged and recorded in the Project's grievance database and assigned a unique tracking number. An acknowledgment of receipt and registration of the complaint/appeal will be sent to the submitter within one week. The acknowledgment will include information on the tracking process and indicate the expected resolution date of the complaint or appeal. Responses will be provided in written form for all stakeholder complaints and appeals within 20 days. If the complainant is not satisfied with the response and the proposed resolution, state supervisory authorities or the court system may be involved to resolve the issue. Ο Μηχανισμός Παραπόνων θα είναι άμεσα προσβάσιμος από τον επίσημο ιστότοπο. The Grievance Mechanism will be directly accessible through the official website. Anonymous submissions will be allowed, along with a guaranteed non-retaliation policy. As the Project progresses, any additional access channels to the Grievance Mechanism will be identified and utilized.

5.2 STAGES OF THE GRIEVANCE MANAGEMENT PROCESS

Effective management and handling of complaints and appeals will be ensured through the following steps::

1. Issue identification
2. Logging/registration
3. Response to the stakeholder
4. Communication and request for feedback
5. Closure
6. Complaint registration form content

The Grievance Database will include the following information:

- Issue
- Contact details of the complainant
- Person/department responsible for addressing the issue
- Actions to be taken

- Deadline
- Proposed resolution
- Feedback from the complainant
- Outcomes
- Date of issue closure

Appropriate measures will be taken to ensure that procedures for the collection and processing of personal data are in compliance with the General Data Protection Regulation (EU) 2016/679.

5.3 GRIEVANCE FORM

Complaints and appeals may be submitted either in free written form or by using the dedicated Grievance Form presented below, which will be available in designated public locations as well as in digital format on the official Project website. In this way, all stakeholders will be able to submit complaints and appeals in person, by mail, email, telephone, fax, or through the website. Contact details will be provided on the website.

A proposed Grievance Form is presented below:

Ref. No.	
Name (Please indicate if you wish to remain anonymous or if you request that your identity not be disclosed to third parties without your consent)	
Relationship to the Project:	
Tel.:	
E-mail:	
Fax:	
Address:	
Preferred Language:	
Description of the issue raised (complaint/appeal):	
Source, date, frequency, and duration of the issue:	
Your suggestions for resolving the issue:	

Date of submission:	
Please return this form to the following address:	

The option to include attachments (e.g. photographs, documents, etc.) that may assist in understanding and addressing the grievance will also be considered at later stages.

In the event of EBRD financing, and in cases where the above mechanism proves unsuccessful, individuals and organizations may seek to address their concerns through the EBRD's Independent Project Accountability Mechanism (IPAM).

5.4 MONITORING OF THE GRIEVANCE MECHANISM OPERATION

A database of complaints and responses will be developed by the Project proponent. In addition, a grievance handling report will be prepared on a regular basis (at least semi-annually). The report will summarize the substance of each complaint/appeal received, assess its validity, and describe the actions taken.

6 MONITORING AND REPORTING

EnEarth will be responsible for monitoring all stakeholder engagement activities related to the Project and for ensuring the implementation and regular updating of the full Stakeholder Engagement Plan (SEP).

Monitoring reports should include the following information:

- Location and timing of the activities and type of engagement, including information on participants (with gender-disaggregated data and specific information on the participation of vulnerable groups, where applicable).
- Issues and concerns raised during the meetings, and information on how these were taken into account.
- Monitoring and evaluation outcomes based on the selected performance indicators

The report will include a dedicated section on the Grievance Mechanism, which will contain a database outlining, at a minimum, the number and types of complaints submitted during the reporting period, indicating those that were filed, resolved, and closed, as well as a description of the corrective measures implemented to address them.