TÜRKİYE PETROLLERİ ANONİM ORTAKLIĞI

OTC OFFSHORE TECHNOLOGY CENTER

SAKARYA GAS FIELD DEVELOPMENT PROJECT - ESIA

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

Chapter 7.1 Social Components Impact Assessment

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Information Classification

Code	Description of Information Classification
PUBLIC	Information and data that may be shared without restrictions because it is unlikely to result in any harm if disclosed to outside parties. Permission to actually release information to the public must be obtained separately through External Affairs
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7.0 IMPACT ASSESSMENT AND MITIGATION

7.1 Social Components

Changes on the socio-economic environment and communities may originate from various positive and adverse environmental and social impacts that may result by the Project impact factors. Therefore, it is important to determine effective mitigation measures to minimize the negative impacts and enhance positive impacts of the Project. The aim of the social impact assessment study is to evaluate temporary and permanent social impacts that will resulted from Project activities. Social Impact Assessment (SIA) is critical to comprehending and promoting a project's impact on, and contribution to, sustainability.

This chapter of the ESIA report assesses the impacts from the construction, operation and decommissioning phases of the proposed Sakarya Gas Field Development Project based on stakeholder concerns and expectations, outputs of the environmental impacts, expert opinion and review of similar projects. Impacts are measured against specific baseline conditions and the receptors in the Project social study area on;

Onshore social impact assessment

- Population change,
- Economy and employment,
- Land use patterns,
- Infrastructure and Services,
- Health issues and facilities,
- Cultural heritage and archaeology,
- Ecosystem Services

Offshore social impact assessment

- Impact on fisheries
- Impacts on tourism and recreation
- Marine archaeology
- Other sea users

Social impact assessment identifies the impacts that will result in different stages of the Project including construction and operation phases. Construction phase includes site preparation and construction activities; operation phase includes the impacts related to the gas production.

It should be noted that the impacts were discussed with stakeholders for each phase of the Project separately. However, it has been observed that the answers provided by the participants were mainly concerned with the construction and operation phases. As a result, the data generated from the household surveys (HHSs) are presented in the analysis of the construction phase impacts and not repeated in other sections.

7.1.1 Population and demography

Based on the information collected for the definition of the baseline (see Chapter 6.1), the social component *Population and demography* was assigned a **High** value of sensitivity for the following reasons:

- General decline of the population.
- Insufficient infrastructure and services of the local study area.

Impacts potentially affecting this component are assessed here below for the construction phase and operation phase.

7.1.1.1.1 Construction phase

Impact factors

The impact factors from the Project activities potentially affecting population in construction phase are listed in the following table.

Table 7-1: Project actions and related impact factors potentially affecting population and demography during construction phase.

Project actions	Brief description	Impact factors
General onshore engineering/construction works	It is planned to employ 1,900 people as a maximum for each phase (Phase 1 and Phase 2) of the construction of the offshore section of the Project. A maximum of 6,500 people will work during the construction of the Project's onshore section (Phase 1).	Immigration of workers and other people

All the impact factors identified above are described below and assessed in the matrix that follows.

- **Immigration of workers and other people**

Construction activities will generate an influx of population in the Area of Influence. This will be mainly due to the workers that will move to the AoI, which will consist in approx. 1,900 workers for the offshore section of the Project and 6,500 for the onshore section of the Project employed by the Project, and additional workers employed indirectly through the supply chain.

A large proportion of the workforce will be accommodated in the construction camps that will be established in autonomy by the contractors. There will be contractor camp sites of Subsea 7, Güngör Elektrik, Schlumberger and their subcontractors, TP-OTC and other authority contractor camp site (existing Kolin camp site). The rest will be accommodated in rental houses and hotels in the vicinity of the Project area.

Capacity of each camp is given below.

- Schlumberger and its subcontractors: 2,554 (There may be an additional capacity increase of approximately 2,000 people)
- Kolin: 850
- Subsea7 and its subcontractors: 80
- Güngör Elektrik: 40

In addition, lodgings are planned on an area of 2 hectares, approximately 1.8 km west of the OPF, to be used in the construction and subsequent phases of the Project.

Most of the installed housing units will be containerized on pre-installed concrete sleepers and connected to the pre-installed water and sewage lines and electric cabling. All construction camps will be fenced, lighted and guarded. The construction camps will be removed after the construction period. Construction camps position is shown in Figure below.

Figure 7-1: Construction Camps Positions

In addition, informal immigration towards the AoI may occur due to people looking for employment opportunities in the Project and connected activities. This kind of influx, which is more difficult to control, can increase pressure on the local housing situation, on access to infrastructures and can in general create tensions with the local population. Collaboration with local authorities will represent a key action to ensure that appropriate mitigation measures to manage these impacts are implemented.

Considering the proximity of the accommodation to the village of Sazköy, this is determined to be a sensitive receptor for population influx since the population of the settlement is only 127 people and residential areas and the accommodation is located approximately 0.3 km from the village. In addition, it has been determined during the social baseline study in February 2022 that road, transportation and electricity infrastructure in the village is not sufficient for the existing residents.

Taking into consideration that with insufficient infrastructure, general population increase, and the close proximity of the workers accommodation to the residential areas, the impact is assessed as high negative in Sazköy village and will need to be carefully managed.

The proportion of people expecting an impact on the population by settlement is presented in the table below. Participants in the AoI expect population growth over 65%.

Table 7-2: Expectation on population change

Expectation on population change	Number	%
Yes	60	65,9
No	23	25,3
No idea	8	8,8
Total	91	100

Source: Household Survey, February 2022

Mitigation measures

The following mitigation measures shall be implemented to mitigate the effects of the impact factors.

- **Immigration of workers and other people**

The most important aspect to mitigating the negative impacts of influx is related to the management of Project workers (including workers of Project contractors) i.e., how and where workers are housed, how they behave and how they treat current residents will all influence how influx may affect community cohesion. In order to prevent indirect impacts from influx, the Project will:

- Hire as many unskilled and semiskilled workers as possible, locally. This will reduce the influx of Project workers not native to the Project area, and it will maximize local employment.
- In case non-local Turkish workers are hired, they will be incentivized to live in Çaycuma or Zonguldak rather than in the villages surrounding the Project.
- Provide accommodation to all non-local Project workers in strategic locations, preferably within the Project fence line.
- Accommodation will meet IFC/ EBRD worker accommodation guidelines Workers' Accommodation: Processes and Standards, 2009
- Accommodation should be fully contained with meals, entertainment, medical clinic. Workers will not need to go into communities and if they pass through communities to get to the site at the beginning and end of their shift, they should be discouraged from interacting negatively with community residents
- Code of Conduct will be applied and all Project workers are required to abide by, to include expected behaviour in local communities;
- Provide cultural awareness training as an on-boarding requirement to all non-local workers, and in particularly foreign workers, in order to prevent cultural clashes with regards to dress codes, food consumption, etc.
- Implement and disseminate a community level grievance mechanism, through which local community members can submit concerns and complaints about influx and related negative impacts.
- Engage regularly with mukhtars.

Residual impacts

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix K.

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **low negative impact** is expected on population and demography during the construction phase.

Table 7-3: Residual impact assessment matrix for population and demography during construction phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Immigration of workers and other people	Duration:	Medium	High	Mid-term	**High**	High	**Low**
	Frequency:	Highly Frequent					
	Geo. Extent:	Regional					
	Intensity:	High					
Overall assessment:		**Low**	Rationale:	Construction of the Project is expected to be completed approximately in 12 months and the duration of the impact is assesses as medium and during the construction phase population increase related with the Project will be highly frequent. Since the population influx will not be limited with the workers accommodations and rental houses and existing hotels and hostels will be used, the geographical extend of the population impact is expected to be regional. Considering the closest village Sazköy (127 people) and the insufficient infrastructure, the sensitivity of the component is assessed as high. According to the outputs of the social surveys and the observations it has been observed that some influx impact especially the local inflation determined in the social AoI and the reversibility of this impact assessed as high. With the implementation of the proposed mitigation measures residual impact value will be low.				

Monitoring measures

The following monitoring measure shall be implemented to assess the true effects of the project on population and demography during the construction and verify the effectiveness of the mitigation measures.

- Community grievances register and performance indicator records in accordance with grievance mechanism to be produced for the Project,
- Stakeholder Engagement and consultation register and records in accordance with the Stakeholder Engagement Plan to be produced for the Project,
- Percentages of the local employees reported annually (which will be a KPI for ESMS to be prepared for the Project),

- Population figures of the settlements according to TURKSTAT data.

7.1.1.1.2 Operation phase

Impact factors

The impact factors from the Project activities potentially affecting population and demography during operation phase are listed in the following table.

Table 7-4: Project actions and related impact factors potentially affecting population and demography during operation phase.

Project actions	Brief description	Impact factors
Plant/infrastructure operation onshore	It is planned to employ 120 people for Phase 1 operation and 270 people for Phase 2 operation. No personnel will work in the offshore section during the operation phase.	■ Immigration of workers and other people

The impact factor identified above is described below and assessed in the matrix that follows.

- **Immigration of workers and other people**

The operational activities may result in long term population increase at local level. The intensity of the impact will be low in Sazköy village. The reversibility of the impact will be long term and the impact will occur during the operation period for 25-40 years.

On the other hand, the operational activities may attract people from other regions to migrate to the Project Area in parallel with economic development and urbanization at District level.

Mitigation measures

The following mitigation measure shall be implemented to mitigate the effects of the impact factor.

- **Immigration of workers and other people**
- Increasing business entity competition through creating the local institutions necessary for faster development and structural adjustment.
- Give emphasis to local processing of agricultural products, agroindustry, and other "clean" sections of the economy that will benefit from location benefits obtained from proximity to the market.
- Identifying communities that can perform as the region's most efficient service, manufacturing, and commercial products

Residual impacts

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **negligible negative impact** is expected on population and demography during the operation phase.

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix K.

Table 7-5: Residual impact assessment matrix for population and demography during operation phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Immigration of workers and other people	Duration:	Long	Low	Short-term	**Negligible**	Low	**Negligible**
	Frequency:	Continuous					
	Geo. Extent:	Project footprint					
	Intensity:	Low					
Overall assessment:		**Negligible**	Rationale:	The operational activities may result in long term population increase at local level. The intensity of the impact will be low in Sazköy village. The reversibility of the impact will be long term and the impact will occur during the operation period for 25-40 years.			

Monitoring measures

The following monitoring measure shall be implemented to assess the true effects of the Project on population and demography during the operation and verify the effectiveness of the mitigation measures.

- Community grievances register and performance indicator records in accordance with grievance mechanism to be produced for the Project,
- Stakeholder Engagement and consultation register and records in accordance with the Stakeholder Engagement Plan to be produced for the Project,
- Percentages of the local employees reported,
- Population figures of the settlements according to TURKSTAT data and the consultations with the Mukhtars

7.1.2 Economy and employment

Based on the information collected for the definition of the baseline (see Chapter 6.1), the social component *Economy and employment* was assigned a **High** value of sensitivity for the following reasons:

- Contribution on the national economy
- Demand for workforce
- Demand for goods materials and services
- Local inflation

7.1.2.1.1 Construction phase

The impact factors from the Project activities potentially affecting economy and employment in construction phase are listed in the following table.

Table 7-6: Project actions and related impact factors potentially affecting economy and employment during construction phase.

Project actions	Brief description	Impact factors
General onshore engineering/construction works	Project construction activities will change direct and in indirect employment, i.e., employment arising from increased disposable income and demand for additional goods and services will create both positive and negative impacts on the local economy.	■ Demand for workforce ■ Demand for goods, materials and services ■ Local inflation

All the impact factors identified above are described below and assessed in the matrix that follows.

Impact factors

- **Demand for workforce**

It is expected that the Project will contribute directly local and regional economy by employing 1,900 people for the offshore section and 6,500 people for the onshore section during the construction phase of the Project.

As of September 2022, there are 6,361 people working for the Project, of which 339 are direct employees of TP-OTC. Approximate percentage of the total women employees are consisting 5% of the total workforce. According to the data provided by TP-OTC, the percentage of the local employees is 35%.

Detailed numbers of the workforce according to the companies, gender and skill levels are provided in below table.

Table 7-7: Employed Number of SGFDP Companies (Sep 2022)

Company	Skilled			UnSkilled			Total Number of Employees (employed as of Sep, 2022)	Total # of Locals	Total Number of Women Workers
	Total	#Locals*	%Locals*	Total	#Locals	%Locals*			
TP-OTC	339	158	47%	212	205	97%	551	363	66
Kolin	404	133	33%	148	95	64%	552	228	11
Güngör Elektrik	109	109	100%	18	18	100%	127	127	1
Schlumberger	4062	1035	25%	651	350	54%	4713	1385	208
Subsea 7	349	111	32%	69	40	58%	418	151	33
TOTAL	**5263**	**1546**		**1098**	**708**		**6361**	**2254**	**319**

Construction activities will generate both a direct and an indirect demand of workforce. Direct workforce includes workers that are directly hired by the Project contractors and subcontractors. Workers will be required to carry out the construction activities planned; in addition, a number of workers will be necessary for associated activities, such as the catering of workers, cleaning services in the construction camp and security services.

In addition, indirect workforce demand will be generated the supply chain for the provision of materials, goods and services. In this case it is not possible to estimate the number of employment opportunities that will be generated.

Both direct and indirect working opportunities will generate positive effects on the income of the workers and on the overall livelihood conditions of the household. It should be noted that most of these work opportunities will be of temporary nature, therefore specific mitigation measures will have to be taken by the Proponent to avoid negative consequences on the livelihood of workers once the construction activities are over. In addition to positive benefits from an economic standpoint, the Project will also generate an improvement of the skills of workers, which can then be useful to find future employment opportunities. Finally, the demand of workers and hence the presence of workforce in the area will likely generate informal economic opportunities linked to selling products to workers such as food and small everyday items.

Large infrastructure projects often generate expectations of employment opportunities in local communities that not always can be met, due to specific skills needed that may not be found among local workers, creating situations of tensions and resentment between the Proponent and local communities and local authorities. For this reason, it is important to clearly engage local authorities and local communities on these issues, ensuring a transparent and clear communication on the actual Project needs, to avoid unrealistic expectations on employment opportunities.

Employment opportunities generated by the Project will be more significant in the rural villages along the road, indicated as having a medium-high sensitivity, due to the general lack of other employment opportunities other than agriculture and informal commerce.

- **Demand for goods materials and services**

During the construction phase of the Project, both direct and indirect economic opportunities at regional level is expected to occur. In addition, the increased income of the direct and indirect employees will lead to an increase in general spending on goods and services as well as potentially related job creations.

Construction activities will generate both a direct and an indirect demand of goods, materials and services. Direct demand consists of goods, materials and services directly procured by the contractor and the subcontractor. It is expected that some may be sourced locally, and other nationally or even internationally. The procurement of goods, materials and services provides an economic benefit to the companies involved and employment opportunities. If sourced locally, this increases the overall economic benefits generated by the Project within the local community.

Indirect demand consists in goods, materials and services sourced along the supply chain. Because of the potential extension of the supply chain, it is not known exactly where these goods, materials and services will be sourced from.

Considering the nature of the Project, the procurement of goods, materials and services will be done according to high standards in terms of working conditions, quality and management of environmental and social aspects. This will encourage the adoption of these standards by companies (if not already adopted), improving their overall positioning and allowing them to participate in similar procurement opportunities also in the future.

Procurement and Subcontracting for the Project will be sourced within the global supply market. Where possible and practical, Contractor will rely on the use of Frame Agreements. Contractor has already ensured, during the FEED phase, the procurement of long lead items such that the Project schedule is maintained

The items below form the main Procurement items:

- Permanent Works; Pipe procurement (Production and MEG line) , Flexible Jumpers procurement, Buckle arrestor system ,Coating procurement , Pipeline anodes , Main and Infield Umbilical procurement, Well Umbilical procurement , Fabrication of rigid pipelines PLETs c/w mudmats, Fabrication of Manifolds, Subsea Connectors , Structural steel, Anodes for structures, Pipework, forgings/fittings, Valves, Bends, Fabrication of gooseneck connectors, Components for lateral buckling and pipe walking if required
- Temporary Works, Lift Rigging, Seafastening, Pig Cages, launchers and receivers

- **Local inflation**

Local price inflation is a complex adverse indirect impact from the Project and can be the negative result of some of the positive economic impacts like employment and procurement. Inflation can be linked to increased demand for local products or housing as a result of influx. There can also be inflation of wages, a dynamic that benefits those receiving employment, but creating a negative impact for farms or other economic livelihoods that may compete for lower skilled workers. Attribution of inflation to one source is difficult as other dynamics can also affect the cost of goods, services and labour.

Interviews and surveys conducted for this ESIA indicate that the Project is likely to have caused an increase in local land prices as a result of the influx impact of the Project. The Project provides worker accommodation to nonlocal workers on the Project site and additionally rental houses, hotel and hostel are being used that will leads pressure on rental prices in the Project area. In summary, based on the analysis, this impact is considered as indirect and negative. Inflationary effects disproportionately affect the cost of living for non-Project employees and residents in the Project Area, which are the impact receptors.

Mitigation measures

The following mitigation measures shall be implemented to mitigate the effects of the impact factors.

- **Demand for workforce**

- The Project will implement human resource policies and procedures in compliance with the IFC PS-2: Labour and Working Conditions. Such policies are expected to provide more predictable employment opportunities for direct and indirect employees as well as outline benefits, contract conditions and workplace conditions
- The Project will enhance local employment through a preferential employment policy which prioritizes jobs for qualified local people. Hiring preference criteria will prioritise settlements directly affected by the current activities of the Project.
- Formal, and transparent recruitment process will be implemented to provide equal opportunity to the applicants.
- The Worker Grievance mechanism will be established and implemented.
- Labour management plan will be implemented to cover the following topics.

Human Resource Policies and Procedures

- TP-OTC will implement Human Resources Policies and Procedures appropriate to its size and workforce that set out its approach to managing workers consistent with the requirements of this Performance Standard and national law.
- TP-OTC will require its contractors and subcontractors to adopt and implement human resources policies and procedure aligned with TP-OTC's policies and procedure and with this plan. TP-OTC will perform periodic audits of its contractors and subcontractors to ensure that the policies and procedures are adopted and implemented.

Non-Discrimination and Equal Opportunity

- TP-OTC will strictly prohibit discrimination against any worker or applicant for employment on the basis of race, religion, gender, sexual orientation, gender identity or expression, national origin, age, disability, veteran's status or any other characteristic protected by law.
- Turkish Labour Law forbids discrimination due to race, language, gender, political views and opinion and religion. In accordance with the equal treatment principle covered in Article 5 of the Turkish Labour Law, employers should treat part time workers with the same rights as full time workers and indefinite period workers to definite period workers unless there are genuine reasons for not doing so. As TP-OTC will comply with the Turkish Labour Law and will base the employment relationships on the principle of equal opportunity and fair treatment, the Turkish standards will fulfil the requirements of PS2 with regard to ensuring non-discrimination.

Child and Forced Labor

- The employment of children (i.e., persons below the age of 18) for the Project will not be permitted. The same requirement will be applicable to Project contractors and subcontractors.
- Periodic audits of contractors and subcontractors will be performed by TP-OTC to ensure that no employment of children occurs.
- The employment of forced labor (i.e., any work not voluntarily performed and that is exacted from an individual under threat of force or penalty) for the Project will not be permitted. The same requirement will be applicable to Project contractors and subcontractors.
- Periodic audits of contractors and subcontractors will be performed by TP-OTC to ensure that no forms of forced labor occur.

Workers Grievance Redress Mechanism

- Besides the grievance mechanism for the overall TPAO and TP-OTC, a separate Workers Grievance Redress Mechanism (WGRM) will be established, developed and implemented for the Project workers including contractors' and subcontractors' workforce at sites. WGRM will be designed specifically to record and track of the process of "grievances," "complaints," "feedback," or another functionally equivalent term expressing the workers' concerns or complaints. Workers will be able to raise their complaints relating to their work environment or work conditions. The persons responsible for the WGRM will be the HR Specialist from HR Department.

- **Demand for goods, materials and services**
- A simplified tender process should be applied for the local suppliers,
- If required, training shall be given to local suppliers on how to submit a bit after the supplier assessment process,
- Equal tender process will be applied
- Equal procurement opportunities will be provided lo local small businesses through the Local Procurement Plan,
- Before the procurement, local suppliers will be identified and if required,
- Capacity development will be applied including training on OHS and HR.
- **Local Inflation**
- The Project will assess inflationary impacts through is regular stakeholder engagement and consultation. If feedback includes comments about a rise in prices, a more formal monitoring system will be set up to monitor prices for staple goods on a regular basis. If inflation can be linked to the Project, the Project will consider targeted support programs.
- The Project will purchase at market rate the goods and services, land, and labor it procures.

Residual impacts

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix K.

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **high positive** is expected on economy and employment during the construction phase.

Table 7-8: Residual impact assessment matrix for economy and employment during construction phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Demand for workforce	Duration:	Medium	High	Mid-term	**Very high**	High	**Very high**
	Frequency:	Highly frequent					
	Geo. Extent:	Beyond regional					
	Intensity:	Very high					
Demand for goods, materials and services	Duration:	Medium	High	Mid-term	**High**	High	**Very high**
	Frequency:	Highly frequent					
	Geo. Extent:	Beyond regional					
	Intensity:	Low					
	Duration:	Medium	High	Short-mid term	**High**	Low	**Medium**

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Local inflation	Frequency:	Highly frequent					
	Geo. Extent:	Regional					
	Intensity:	Very high					
Overall assessment:		**Low**	Rationale:	Due to the short-term reversibility, even using a precautionary approach, the residual impact values are not expected to cumulate to a higher impact value. Therefore, the average residual impact value may be considered as a reference for the overall impact.			

Monitoring measures

The following monitoring measure shall be implemented to assess the true effects of the project on economy and employment during the construction and verify the effectiveness of the mitigation measures.

- **Demand for workforce**
  - Employment agreements made with contractors and subcontractors
  - Training Records (training materials, participant list, training planning, photos),
  - records (contracts, employee register,
  - Incident records;
  - Grievance Records;
  - Collective Agreements (if any)
- **Demand for goods, materials and services**
  - Employment agreements made with contractors and subcontractors
  - Employment records (contracts, employee register,
- **Local inflation**
  - Grievance Records
  - Annual reports of the government
  - Market prices

7.1.2.1.2 Operation phase

Impact factors

The impact factors from the Project activities potentially affecting economy and employment during operation phase are listed in the following table.

Table 7-9: Project actions and related impact factors potentially affecting economy and employment during operation phase.

Project actions	Brief description	Impact factors
Plant/infrastructure operation onshore	The Project will continue demand for workforce and demand for goods and services during the operation phase of the Project and contribute the national economy with less dependency to other countries.	■ Benefit to national Economy ■ Demand for workforce ■ Demand for goods, materials and services

The impact factor identified above is described below and assessed in the matrix that follows.

- **National Economy**

As of 2022, Turkey has both oil and natural gas is dependent on foreign countries. Extraction of the natural gas will provide an important economic contribution to national economy. During the operation phase of the Project, approximately 30% of the country's natural gas consumption will be met, and this will create contribution to the country's economy financially.

- **Demand for workforce**

The demand of workforce during the operation phase will be limited and will consist essentially in workforce needed for the operation facilities and the maintenance when required. It is planned to employ 120 people for Phase 1 operation and 270 people for Phase 2 operation. No personnel will work in the offshore section during the operation phase. These employment positions will be permanent and will likely involve skilled positions.

- **Demand for goods, materials and services**

In parallel with the long-term procurement opportunities, the Project is expected to attract more investors in the Project region. The increased investment create diversification of economic activities and capacity development of the local suppliers and new economic fields are expected to be active especially in Filyos and Çaycuma.

Mitigation measures

The following mitigation measure shall be implemented to mitigate the effects of the impact factor.

- **National Economy**
- To ensure the diversification of routes and resources in the supply of oil and natural gas, taking into account the increasing demand and import dependency,
- To contribute to regional and global energy security,
- To be a regional trade center in energy,
- To consider social and environmental impacts in the context of sustainable development in every phase of the energy chain

- **Demand for workforce**
- Labor management plan will be implemented (please refer to mitigation measures of Chapter 7.1.2.1.1.)
- In accordance with IFC Performance Standard 2 on Labour and Working Conditions, the Project shall establish human resource policies and procedures. Such regulations are anticipated to offer direct employees more stable employment opportunities. more specifically
- The Project's hiring procedure will follow an equal opportunity process and be structured, official, and transparent in order to find new hires that possess the required levels of training, expertise, and knowledge. The paper outlines the procedures for new hires, job openings, interviews, and reference checks.
- Plans for labor management and contractor management will be crucial in attempting to maximize local employment prospects and guarantee a fair distribution of work to all adjacent towns. Locals who meet the qualifications will be given preference for employment.
- Settlements that are directly impacted by the Project's ongoing activities will be given priority in hiring. Turkish citizens will always take precedence over foreigners, who will only be utilised in situations where Turkish citizens are unable to provide the necessary expertise and experience. A variety of regional skill-development initiatives will be supported by the Project.
- The Worker Grievance Procedure, which intends to give every employee a uniform mechanism for resolving employment complaints not covered by other current human resources policies and programs, will be put into use.
- **Demand for goods, materials and services**
- The Project is committed to prioritize procurement of goods and services from businesses in the Project Area where these they can ensure that prices are competitive, quality can be maintained, and periodicity of supply can be maintained

Residual impacts

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **low negative impact** is expected on economy and employment during the operation phase.

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix K.

Table 7-10: Residual impact assessment matrix for economy and employment during operation phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Benefit to national economy	Duration:	Long	High	Long-term	**Very high**	Medium-high	**Very high**
	Frequency:	Highly frequent					
	Geo. Extent:	Beyond regional					

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
	Intensity:	Very high					
Demand for workforce	Duration:	Long	Medium	Long term	Medium	High	High
	Frequency:	Sporadic					
	Geo. Extent:	Regional					
	Intensity:	Negligible					
Demand for goods, materials and services	Duration:	Long	Medium	Long term		High	High
	Frequency:	Sporadic					
	Geo. Extent:	Regional					
	Intensity:	Negligible					
Overall assessment:		**High**	Rationale:	The economy and employment impacts during the operation phase is considered a positive impact with medium to high sensitivity, underlined by the frequency of economy and employment being raised during consultation. The impact is, long term and will extend beyond the local area.			

Monitoring measures

The following monitoring measure shall be implemented to assess the true effects of the project on economy and employment during the operation and verify the effectiveness of the mitigation measures.

- **Benefit to national economy**
  - Information disclosure materials;
  - Web site
  - Annual reports of the governmental bodies
- **Demand for workforce**
  - Employment agreements made with contractors and subcontractors
  - Training Records (training materials, participant list, training planning, photos),
  - Employment records (contracts, employee register,
  - Incident records;
  - Grievance Records;
- **Demand for goods, materials and services**

- Procurement records
- Number of local employees
- Number of local services acquired
- Grievance records

7.1.3 Land use patterns

The onshore facilities of the Project will be located in Zonguldak City, Çaycuma District, 25 km from Zonguldak city centre and 15 km from Çaycuma district centre beeline. The nearest settlement to the OPF site is Sazköy Village, which is located at approximately 300 meters east.

OPF is bounded by:

- North: Black Sea
- Northeast: Coastal Logistics Centre
- East: Sözköy Village
- West: Filyos River and Filyos Industrial Zone (under construction)
- South: Derecikören Village
- Southeast: Aşağıihsaniye Village

Based on the information collected for the definition of the baseline (see Chapter 6.1), the social component *Land use patterns* was assigned a **Low.**

7.1.3.1.1 Construction phase

Impact factors

The impact factors from the Project activities potentially affecting land use patterns during construction phase are listed in the following table.

Table 7-11: Project actions and related impact factors potentially affecting land use patterns during construction phase.

Project actions	Brief description	Impact factors
General onshore engineering/construction works	As summarised above, the acquisition of privately owned land is required for the construction of the ETL.	■ Change in land use

All the impact factors identified above are described below and assessed in the matrix that follows.

- **Changes in land use**

The ownership status of the onshore areas of the Project is summarized below:

- The Industrial Zone Area, where the OPF (including transformer station) will be constructed, is owned by the treasury and assigned to Turkish Ministry of Industry and Technology. Upon assent of Turkish Ministry

of Industry and Technology, the pre-easement of this land was granted to TPAO. After EIA Positive Decision was obtained, right of easement was granted by General Directorate of National Real Estate to TPAO for 49 years for the Project, with the consent of Ministry of Industry and Technology. With the Presidential Decree No. 5071 published in the Official Gazette dated 6 January 2022, this area was removed from the Filyos Industrial Zone area and allocated to TPAO as a special economic zone. Previous and current status of the land is illustrated in Figure 7-2.

- The area between the shoreline and OPF, where the SURF passes through, is partly in the industrial zone and partly in the area where the right of easement was given in favour of the Ministry of Transport and Infrastructure and the use of land in the zoning plans was determined as a coastal logistics center. With the Presidential Decree No. 5071 published in the Official Gazette dated 6 January 2022, the part of the area (industrial zone) was allocated to TPAO as an individual investment site and consent/easement was made with the Ministry of Transport and Infrastructure for the other part.
- Energy transmission line passes through forest land which belongs to treasury except 1 private agricultural land. Agricultural land will be expropriated, and non-agricultural land use permit will be obtained from the Provincial Directorate of Agriculture and Forestry if required. Forest land will be allocated after the permission to be obtained from the Provincial Directorate of Agriculture and Forestry.
- Temporary camp site of Kolin is located in the land allocated to Ministry of Transport and Infrastructure for the Port construction and camp site of Subsea7 is located within the land of which preliminary consent/easement was made with the Ministry of Transport and Infrastructure while Schlumberger camp site is located inside OPF boundaries that is allocated to TPAO as a special economic zone.
- In addition, lodgings are planned on an area of 2 hectares, approximately 1.8 km west of the Project area, to be used in the construction and subsequent phases of the Project. TPAO purchased the title deed from the Ministry of National Defense.

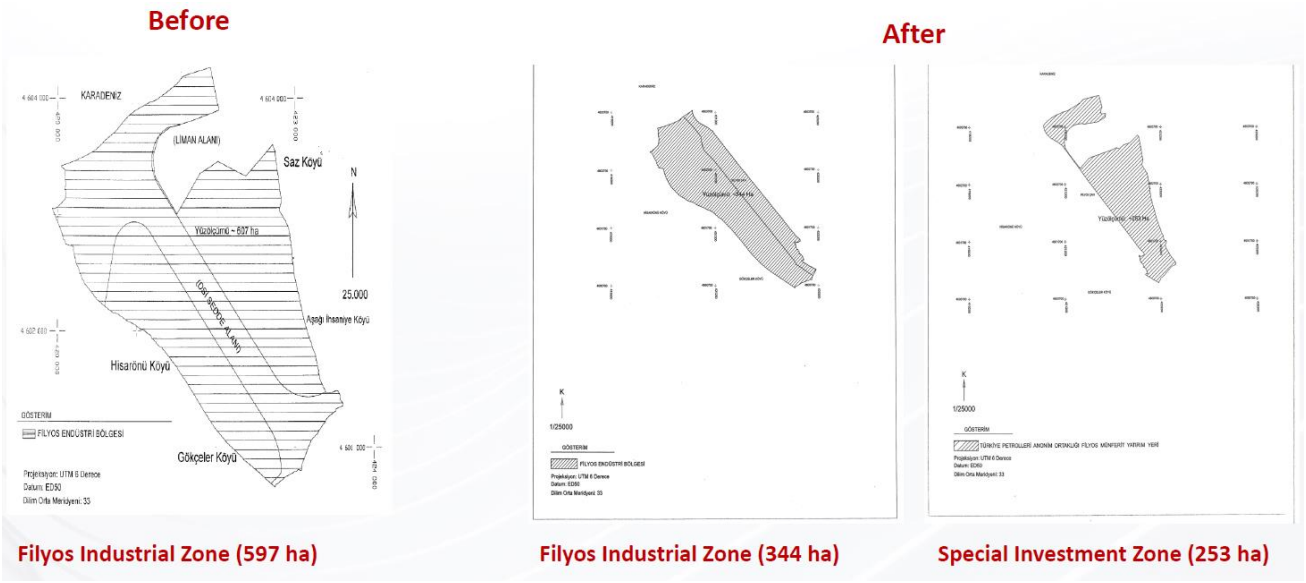


Figure 7-2: Previous and Current Land Status of the Filyos Industrial Zone and TPAO Special Investment Zone

The part of the Project located on the seaside of shore edge line (onshore stretch of the Phase 1 SURF: MEG pipeline + gas pipeline) is situated within the state-owned lands, and the utilization permit for the area up to the boundary of territorial waters have been obtained from the Directorate General of National Property.

In the Project's offshore section, one part of the subsea umbilical and pipelines are located in Turkey's territorial waters with a width of 12 nautical miles, while the other part is located in Turkey's exclusive economic zone. The entire subsea production system is located over 155 km offshore, at a depth of approximately 2,200 m, within the Turkey exclusive economic zone. Turkey's right of usage for the territorial waters located on the seaside of the Project is set out in the Territorial Waters Law. TPAO is not required to acquire any lands in this area.

The onshore part of the Project site was used as a stockpile area during the construction of Filyos Port before it was declared an industrial zone. With the declaration of the site as an industrial zone, the Ministry of Industry and Trade gave the operator company (Tosyalı) "Preliminary Use Permit" and soil improvement works were started. After the area was declared as special investment zone and EIA Positive Decision was obtained, pre-easement of this land was granted to TPAO and soil improvement works were taken over.

Excess excavation material from the construction of Filyos Port and Industrial Zone is currently stored as stocks at the site. Some of this material is currently being transported to be used in the soil improvement works of the industrial zone located on the opposite side of Filyos River and in the ongoing construction works of Filyos Port. Some part of it will be used in the soil improvement works of the Project area.

The existing roads will be used in the Projects' construction phase and no link road is planned. For the construction of the ETL, existing forest roads will be used and no access road will be opened.

According to the information obtained from the project authorities, the expropriation activities in the region started in 1998. Expropriation works were completed in 2013, and until 2016, those whose lands were affected continued to use their expropriated lands. Due to the expropriations that have taken place and the inadequacy of employment opportunities in the region, the social structure in the region has changed over time, and the industrial facilities in the region have replaced the livelihoods based on the land. Although the impact of the expropriation carried out in 1998 is large-scale, analysing the retrospective effects of this impact creates difficulties as the affected people do not live in the region as of 2022.

Mitigation measures

The following mitigation measures shall be implemented to mitigate the effects of the impact factors.

- **Change in land use**
  - The expropriation process and compensation process will be conducted in accordance with Turkish law, managed by relevant governmental bodies
  - The Project will ensure that engagement and consultation will be conducted and that compensation will be provided in accordance with IFC PS 5.
  - The Project will conduct a census of all people affected by the expropriation process, in order to confirm the number of affected households and persons. An asset survey will be conducted to confirm the number, type, and qualities of the properties affected.
  - The Project external/community grievance mechanism will be available to submit grievances related to the expropriation process and economic displacement caused.

- The Project will continue to prioritise those affected by Project land acquisition and expropriation for the recruitment of Project jobs.

Residual impacts

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix K.

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **low negative impact** is expected on land use patterns during the construction phase.

Table 7-12: Residual impact assessment matrix for land use patterns during construction phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Changes in land use	Duration:	Medium	Medium-high	Short-term	**Low**	Low	**Low**
	Frequency:	Continuous					
	Geo. Extent:	Project footprint					
	Intensity:	Medium					
Overall assessment:		**Low**	Rationale:	Due to the low dependency on the land based livelihoods in the region, the overall impact is evaluated as low.			

Monitoring measures

The following monitoring measure shall be implemented to assess the true effects of the Project on land use patterns during the construction and verify the effectiveness of the mitigation measures.

- Completion audit
- Grievance Records
- Compensation records

7.1.3.1.2 Operation phase

Considering the nature of the Project, no impacts are expected during the operation phase. Impacts due to land acquisition will be addressed during the construction phase and will generally be solved by the beginning of operation. Some monitoring and livelihood restoration activities may continue during the operation phase, as a prosecution of activities started during construction.

7.1.4 Infrastructure and services

Based on the information collected for the definition of the baseline (see Chapter 6.1), the social component *Infrastructure and services* was assigned a **High** value of sensitivity for the following reasons:

- Pressure on the current infrastructure system.

Impacts potentially affecting this component are assessed here below for the construction phase and operation phase.

7.1.4.1.1 Construction phase

Impact factors

The impact factors from the Project activities potentially affecting infrastructures and services during construction phase are listed in the following table.

Table 7-13: Project actions and related impact factors potentially affecting infrastructures and services during construction phase.

Project actions	Brief description	Impact factors
Material transportation	The materials are anticipated to be transported from the Filyos Port to the construction site of the coastal crossing section by barges or by trucks.	■ Increase and modification of traffic onshore and offshore
General onshore engineering/construction works	Water will be withdrawn form groundwater wells within the Project's footprint, used for construction-related activities, and wastewater will be discharged back into the river. Construction and domestic wastes, excavation debris will be generated.	■ Demand for freshwater ■ Demand for waste disposal services

All the impact factors identified above are described below and assessed in the matrix that follows.

- **Increase and modification of traffic onshore**

Construction activities will generate an increased traffic compared to the current situation for the transport of workers, goods and materials. The existing roads will be used during the land preparation and construction phase of the Project and no road widening is planned. In addition, no link road is planned for the construction phase. The roads that will be used by Project vehicles during the construction phase are shown in the figure below.

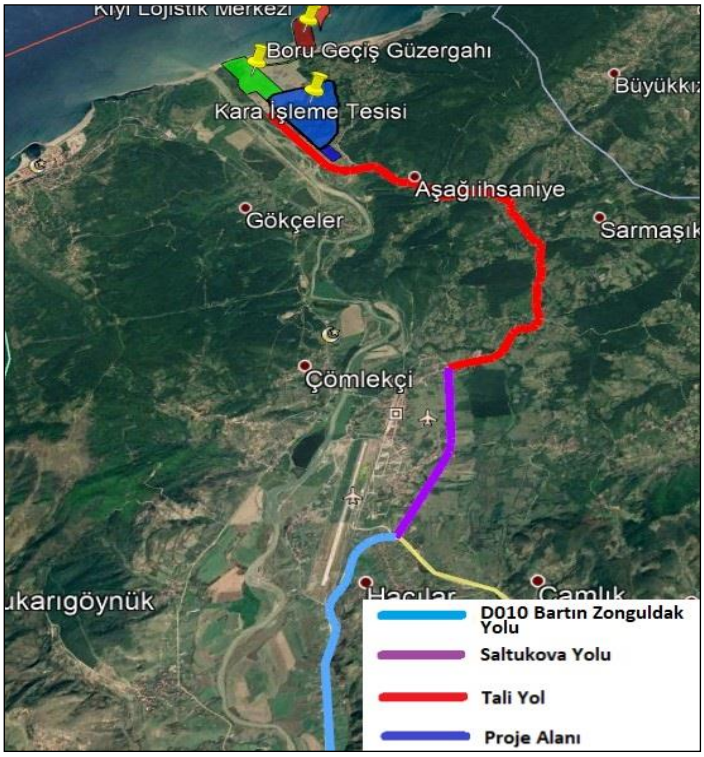


Figure 7-3: The Roads to be used in the Land Preparation and Construction Phase of the Project

Three main gates will be used by vehicles to enter the construction site:

- Cargo gate: all cargo carrying vehicles will enter the construction site through the Cargo Gate in order to be checked and approved.
- Filyos Gate: this gate is only to be used for light duty vehicles. Cargo carrying or any other kind of heavy-duty vehicles cannot enter the FPA from this gate.
- Port Gate: Port gate is only to be used for entering to Filyos Turkish Petroleum Port. Access to this facility is subjected to Port Administration's permission.

During the construction phase, at the peak of activities, a maximum of 284 heavy vehicles are expected to enter and exit the site per day for the transportation of excavation material for the land preparation and other excavation materials for filling purposes. In addition, 50 cars and 25 buses will enter and exit the site daily, for a total of 150 trips per day. Thus, during the construction phase, the Project will generate a maximum of 434 trips, including heavy vehicles, buses and cars.

Data on daily traffic volume along the roads in proximity to the Site is available from 2021[1] and is presented in the figure below. The data from the station closest to the Site is highlighted in red.

[1] https://www.kgm.gov.tr/SiteCollectionDocuments/KGMdocuments/Trafik/trafikhacimharitasi/2021HacimHaritalari/Bolge15.pdf

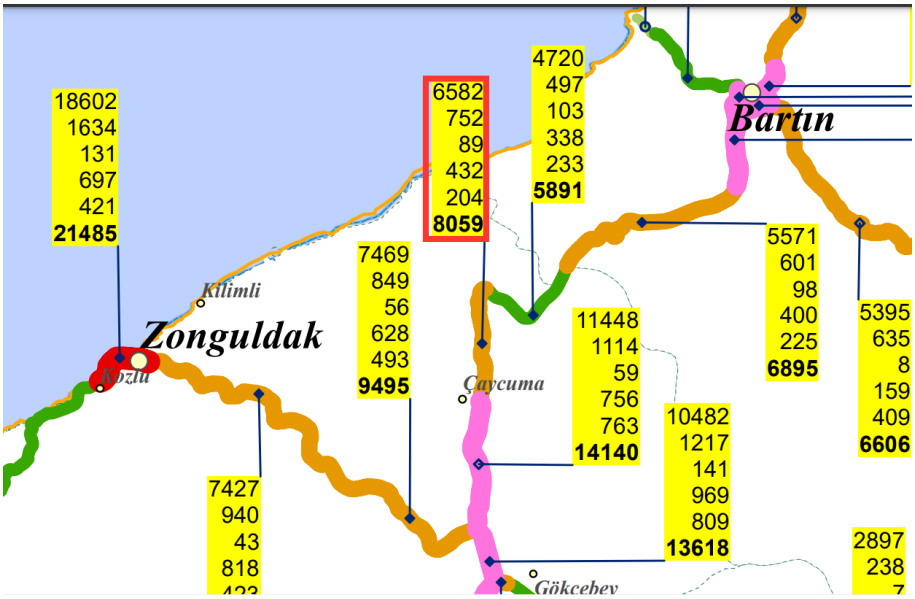


Figure 7-4: Traffic load registered during a survey performed in 2018. The survey station closest to the Project Site is highlighted in red.

In 2018 the traffic load at the closest station on the road that will be used for the Project was found to be equal to 5177 vehicles daily. The table below shows the traffic load registered in 2018 and the expected traffic generated by the Project at the peak of activities.

Table 7-14: Traffic Volume Data and The Effect of the Project on the Traffic Load (Construction Phase)

Type of vehicle	Number of trips registered daily in 2021	Additional trips generated by the Project
Car	6582	100
Medium Goods Vehicle	752	-
Bus	89	50
Truck	432	284
Articulated Truck	2014	-
Total	8059	434

The traffic load will increase by 434 vehicles per day during construction, resulting in an increased volume of traffic equal to 5.3%, compared to the 2021 data. It should be noted that most of the traffic registered on the road is relative to cars, and the Project will not increase substantially car traffic. However, when looking at the truck traffic, the Project will double the amount of trucks travelling on the road. Most of the impacts generated by the Project on traffic will therefore be due to trucks. It should be noted that majority of the trucks will be operated inside the Project boundaries.

The increase of traffic can potentially create interferences with current traffic conditions, including congestions and increased time necessary to travel along the road. This can be particularly relevant in villages or in crossroads where traffic is already significant. The additional traffic can also worsen the conditions of the roads, especially if they are already not in a very good state. Traffic Management Plan will be implemented, to ensure

the application of measures that can reduce impacts generated by the additional traffic due to the Project. Measures will include liaising with local authorities to identify and agree on specific solutions, that can include avoiding traffic at certain hours or using alternative routes for specific vehicles.

- **Demand for freshwater**

Freshwater will be required by the Project during the construction phase mainly for personnel needs, dust suppression and for concrete production purposes. Water needed at the construction site phase will be supplied mainly from groundwater wells and also from Filyos and Saltukova Municipalities with water tankers. Potable water needed for the personnel residing in off-site accommodation will be supplied through municipality potable network.

A maximum of 6,500 people will be employed during Phase 1 in the onshore section during the Project construction phase including offsite accommodation and construction camps. Water demand per capita is estimated as 228 L/person day based on 2020 data of TUIK (Turkish Statistical Institute) Municipal Water Statistics. As such, the water consumption per day is calculated as follows:

Water demand of personnel = 6,500 individuals x 228 L/person day = 1,482,000 L/day ≈ 1,482 m^3/day.

With regards to offshore activities, some vessels will be equipped with desalination equipment to obtain utility water. Support vessels will supply water to the vessels that are not equipped with desalination equipment. A maximum of 1,900 people will be employed during Phase 1 in the offshore section during the Project construction phase. Water demand per capita is estimated as 228 L/person day and as such, the water consumption per day is calculated as follows:

Water demand of the personnel = 1,900 individuals x 228 L/person day = 433,200 L/day = 433.2 m^3/day

As mentioned above, most of the water needed during construction will be obtained through the groundwater wells, which is expected to be able to provide the amounts required for the Project as mentioned in Chapter 7.2.1.5 Hydrogeology and Groundwater quality. It should be noted however that the need of water for Project activities can create competition on water with other activities and can generate increased pressure on the overall water sourcing and distribution system, particularly in summer periods, when the population in the surrounding villages tends to increase and in dry periods. According to the baseline information collected, access to drinking and irrigation water does not seem to be an issue in most of the villages within the AoI, however in a couple of villages problems with the availability and quality of water were raised. In addition, the household interviews revealed that around 40% of households obtain water for civil uses and for irrigation from the municipal network. According to the hydrogeological model conduction in the scope of the ESIA, SK-3 well, which is the water source of Sazköy Village, is being in the area of cone of depression, and it is expected to be impacted by groundwater abstractions during the construction phase. Beside this well, no other groundwater sources in and near the Project site is expected to be impacted by the cone of depression. Since SK-3 is in a location affected by Project activities, SK-4 well was constructed by TP-OTC instead of SK-3 well as Sazköy Village's water resource, and Sazköy's water resource will be SK-4 in the next period. The Project water needs will therefore have to be kept under control to avoid interferences with the normal distribution of water and to access for the local communities.

- **Demand for waste disposal services**

Construction activities will entail the production of waste of various nature, both hazardous and non-hazardous, which will have to be disposed of. Waste will be managed in line with Turkish legislation through authorized

contractors, which are expected to be able to manage the amounts of waste generated by the Project. The production of waste can add increased pressure on waste disposal systems and infrastructures. According to the baseline information collected, the management of waste collection and disposal does not seem to be an issue in the villages within the AoI.

Mitigation measures

The following mitigation measures shall be implemented to mitigate the effects of the impact factors.

- **Increase and modification of traffic onshore**
  - Define the transport needs of the Project and identify the routes that will be used, keeping in mind social and environmental constraints, so to use the less impacting routes available. Organize vehicle journeys so to optimize the transport of materials and reduce unnecessary trips.
  - Identify speed limits in construction areas and in public roads and ensure that they are respected by drivers.
  - Identify sensitive receptors (e.g. schools) within the AoI and identify additional road safety measures in proximity to these receptors.
  - Perform traffic safety awareness campaigns targeted at local communities and vulnerable groups, such as children and elderly, that may be increasingly involved in road accidents.
  - Ensure that vehicles are equipped with all safety devices such as seat belts, mirrors, safety signals etc.
  - Periodically check all vehicles to ensure that they are properly maintained and that all the safety devices are working properly.
  - Verify and register of all traffic related incidents and periodically revise road safety measures based on lessons learned.
  - Implement targeted measures to reduce traffic related incidents that may be caused by the Project.
  - Implement Traffic Management Plan, with indication of the measures that shall be enforced to reduce impacts generated by traffic and to increase safety for workers and local communities. The Plan will include the measures indicated above and additional measures that may emerge from engagement with stakeholders.
  - Define alternative routes, construction area crossings and road closures for each construction spread in collaboration with local authorities and local communities, to identify solutions that are less impacting as possible on local communities.
  - Discuss with local authorities and local communities specific measures to ensure that disruption to mobility and transport is reduced to the extent possible.
  - Within the context of the SEP inform local authorities, local communities on the progress of activities and in particular on the schedule of activities that will entail closures/limitations of roads and interruption of infrastructure networks; possible changes to limit impacts on local communities will be agreed and implemented.

- Implement the Stakeholder Engagement Plan and ensure that appropriate resources and budget are dedicated to engagement. Periodically revise the stakeholder mapping and the plan based on progress of activities

- **Demand for freshwater**
  - Monitor water requirements during the construction phase and periodically liaise with the water supplier to ensure that water needs for the Project does not create shortages for other activities and local communities, particularly in summer and during dry periods.
  - Implement water saving strategies, particularly to reduce consumption of water for civil uses among workers. Provide indications on water saving initiatives to workers during induction and periodic training.
- **Demand for waste disposal services**
  - Implement Waste Management Plan that includes an identification of the waste disposal facilities for the Project and selects those that are less impacting from an environmental and social standpoint and closest to the Project location.
  - Identify strategies to ensure that waste is recovered and recycled to the extent possible, so to reduce the need of sending it to landfills. Provide indications on waste reduction and waste recycling initiatives to workers during induction and periodic training.

Residual impacts

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix K.

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **low negative impact** is expected on infrastructures and services during the construction phase.

Table 7-15: Residual impact assessment matrix for the infrastructures and services during construction phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Increase and modification of traffic onshore	Duration:	Medium	High	Short-term	Low	Medium	Low
	Frequency:	Highly frequent					
	Geo. Extent:	Local					
	Intensity:	High					
Demand for freshwater	Duration:	Medium	High	Short-term	Low	Low	Low
	Frequency:	Continuous					
	Geo. Extent:	Local					
	Intensity:	Medium					
	Duration:	Medium	High	Short-term	Low	Medium	Low

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Demand for waste disposal services	Frequency:	Frequent					
	Geo. Extent:	Regional					
	Intensity:	Medium					
Overall assessment:		Low	Rationale:	Due to the short-term reversibility, even using a precautionary approach, the residual impact values are not expected to cumulate to a higher impact value. Therefore, the average residual impact value may be considered as a reference for the overall impact.			

Monitoring measures

The following monitoring measure shall be implemented to assess the true effects of the project on infrastructure and services during the construction and verify the effectiveness of the mitigation measures.

- Verification that the transport needs of the Project are defined, and that routes and vehicle journeys are organised so to minimize impacts;
- Verification that the Traffic Management Plan is developed and implemented;
- Verification that alternative routes, construction area crossings and road closures for each construction spread have been defined in collaboration with local authorities and local communities;
- Verification of the number, type and outcomes of meetings performed with local authorities and local communities; verification of the number, type and outcomes of additional mitigation measures identified;
- Verification of number, type, attendance and outcomes of stakeholder engagement activities.
- Verification of the number of disruptions to local infrastructures caused by Project activities.
- Verification of the number of grievances received and percentage of grievances resolved positively.
- Verify the amount of water consumed for the different uses;
- Monitor waste disposal practices and management as per Water and Waste Management Plan provisions.

7.1.4.1.2 Operation phase

Impact factors

The impact factors from the Project activities potentially affecting infrastructure and services during operation phase are listed in the following table.

Table 7-16: Project actions and related impact factors potentially affecting infrastructures and services during operation phase.

Project actions	Brief description	Impact factors
Plant/infrastructure operation onshore	Technical and administrative activities, including operation of the plant/infrastructure, surveillance, monitoring,	■ Demand for freshwater

Project actions	Brief description	Impact factors
	maintenance, performed according to standard operating procedures to maintain the Project offshore parts in operation.	■ Demand for waste disposal services ■ Increase and modification of traffic onshore

The impact factor identified above is described below and assessed in the matrix that follows.

- **Demand for freshwater**

The units/processes that will need water during the operation phase are listed below.

- Potable water for the personnel;

  120 people will be employed during Phase 1. Water demand per capita is estimated as 228 L/person day based on 2020 data of TUIK Municipal Water Statistics. As such, the water consumption per day is calculated as follows:

  Maximum water demand of personnel = 120 individuals x 228 L/person day = 27,360 L/day = 27 m^3/day

- Process water for the Natural Gas Steam Boiler

  Natural gas steam boiler will generate dry saturated steam to use as heating medium for process systems. Make-up water required to compensate losses in the boiler is estimated as 15.6 m^3/day.

- Fire-fighting water

  The Firefighting System will consist of two fire water storage tanks, each will be sized to provide a minimum of 6 hours supply based on fire system design case of 4,000 gpm. Each tank has a capacity of 5,572 m^3. Tanks will be filled with water at the start of the operation phase.

- Process water for the Demineralized and Potable Water Generation Package

  The amount of water required for the backwash of filters in the package is 175 m3/day.

The potable water, utility water, process water, and fire-fighting water will be supplied by the groundwater wells, after obtaining necessary permissions from the relevant institutions. The raw water will be treated at Demineralized and Potable Water Generation Package and distributed to the network.

Unlike the construction phase, during the operation phase the Project will not use water from the Municipality network, but instead will be self-sufficient through the water from a well. Water requirement is also substantially lower than construction phase. According to the hydrogeological model conduction in the scope of the ESIA, SK-3 well, which is the water source of Sazköy Village, is being in the area of cone of depression, and it is expected to be impacted by groundwater abstractions during the operation phase. Beside this well, no other groundwater sources in and near the Project site is expected to be impacted by the cone of depression. Since SK-3 is in a location affected by Project activities, SK-4 well was constructed by TP-OTC instead of SK-3 well as Sazköy Village's water resource, and Sazköy's water resource will be SK-4 in the next period. In this phase

the project will therefore it will not cause increased pressure on the existing water network and impacts on access to water resources for local communities.

- **Demand for waste disposal services**

Operation activities will entail the production of waste of various nature, both hazardous and non-hazardous, which will have to be disposed of. Significant additional waste stream specific to onshore oil and gas development activities is given below:

- Monovalent salts (sodium, chloride, plus lesser quantities of potassium) and divalent salts (calcium, magnesium, iron, strontium and barium) recovered in the MEG system;
- Slurry removed at Liquid Flash Drums by sand jetting/fluidization;
- Oily water recovered at Liquid Flash Drums;

Waste will be managed in line with Turkish legislation through authorized contractors, which are expected to be able to manage the amounts of waste generated by the Project. Considering the type and amount of waste produced during operation, the Project is not expected to add increased pressure on existing waste disposal systems and infrastructures.

- **Increase and modification of traffic onshore**

During the operation phase the natural gas will be transported from the subsea production facility located in Turkey's exclusive economy region to the onshore processing facility through the pipelines. Limited traffic will be generated by the Project during this phase and will be relative to staff entering and exiting the Site daily. During operation approx. 120 workers will be employed for Phase 1 and 270 workers for Phase 2. Workers will reach the Site in cars or busses, however the number of vehicles entering and exiting the Site will be limited; heavy vehicles will be used to transport waste and for periodic maintenance activities. Based on the traffic load generated by the Project during the operation phase, no significant impacts on traffic are therefore expected.

Mitigation measures

The following mitigation measure shall be implemented to mitigate the effects of the impact factor.

- **Demand for freshwater**
  - Implement water saving strategies, to reduce water consumption to the extent possible. Provide indications on water saving initiatives to workers during induction and periodic training.
- **Demand for waste disposal services**
  - Implement Waste Management Plan that includes an identification of the waste disposal facilities for the Project and selects those that are less impacting from an environmental and social standpoint and closest to the Project location.
  - Identify strategies to ensure that waste is recovered and recycled to the extent possible, so to reduce the need of sending it to landfills.
- **Increase and modification of traffic onshore**
  - Define the transport needs of the project and identify the routes that will be used, keeping in mind social and environmental constraints, so to use the less impacting routes available.

- Organize vehicle journeys so to encourage collective transport systems among workers and to reduce unnecessary trips.
- Implement Traffic Management Plan, with indication of the measures that shall be enforced to reduce impacts generated by traffic and to increase safety for workers and local communities. The Plan will include the measures indicated above and additional measures that may emerge from engagement with stakeholders.
- Implement the Stakeholder Engagement Plan and ensure that appropriate resources and budget are dedicated to engagement. Periodically revise the stakeholder mapping and the plan based on progress of activities

Residual impacts

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **low negative impact** is expected on infrastructure and services during the operation phase.

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix K.

Table 7-17: Residual impact assessment matrix for the infrastructures and services during operation phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Demand for freshwater	Duration:	Long	High	Short-term	Low	Low	Low
	Frequency:	Highly frequent					
	Geo. Extent:	Local					
	Intensity:	Low					
Demand for waste disposal services	Duration:	Long	High	Short-mid-term	Medium	Medium	Low
	Frequency:	Infrequent					
	Geo. Extent:	Regional					
	Intensity:	Low					
Increase and modification of traffic onshore	Duration:	Long	High	Short-term	Low	Medium	Negligible
	Frequency:	Frequent					
	Geo. Extent:	Local					
	Intensity:	Negligible					
Overall assessment:		Low	Rationale:	During the operation phase, considering the long term duration of Project activities, Project needs in terms of infrastructures and services can be planned with due advance, so to reduce impacts and interferences with the needs of local communities. Overall impacts are			

Impact Factor	Impact Factor Features	Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
			therefore, expected to be low.			

Monitoring measures

The following monitoring measure shall be implemented to assess the true effects of the project on infrastructures and services during the operation and verify the effectiveness of the mitigation measures.

- Verification that the transport needs of the Project are defined, and that routes and vehicle journeys are organised so to minimize impacts;
- Verification that the Traffic Management Plan is developed and implemented;
- Verification that alternative routes, construction area crossings and road closures for each construction spread have been defined in collaboration with local authorities and local communities;
- Verification of the number, type and outcomes of meetings performed with local authorities and local communities; verification of the number, type and outcomes of additional mitigation measures identified;
- Verification of number, type, attendance and outcomes of stakeholder engagement activities.
- Verification of the number of disruptions to local infrastructures caused by Project activities.
- Verification of the number of grievances received and percentage of grievances resolved positively.
- Verify the amount of water consumed for the different uses;
- Monitor waste disposal practices and management as per Pollution Prevention Plan and Waste Management Plan provisions.

7.1.5 Health issues and facilities

Based on the information collected for the definition of the baseline (see Chapter 6.1), the social component *Health issues and facilities* was assigned a **Medium** value of sensitivity for the following reasons:

- Level of healthcare services provided by local facilities is insufficient, as expressed by the stakeholders during socioeconomic field survey

Impacts potentially affecting this component are assessed here below for the construction phase and operation phase.

7.1.5.1.1 Construction phase

Impact factors

The impact factors from the Project activities potentially affecting health issues and facilities during construction phase are listed in the following table.

Table 7-18: Project actions and related impact factors potentially affecting health issues and facilities during construction phase.

Project actions	Brief description	Impact factors
Onshore construction activities (vegetation clearing, site levelling and grading, material transportation, stockpiles, batching plant etc.)	During land preparation dust will occur due to earthworks including excavation, backfilling, grading, equipment movement, material piling, loading and unloading. Dust emissions will occur due to wind erosion from stockpiles. Fugitive dust emissions will be released from batching plant. Exhaust emissions will be released from the construction machinery and trucks during land preparation activities and material transportation.	Dust emissions Exhaust emissions from vehicles and construction machinery Emission of aerial noise Emission of vibrations Increase and modification of traffic onshore Immigration of workers and other people
Offshore excavation (trenching) and sediment storage, offshore pipeline laying	During offshore activities exhaust emissions will be released from the vessels.	Exhaust emissions from vessels

All the impact factors identified above are described below and assessed in the matrix that follows.

- **Onshore construction activities – Dust Emissions**

During land preparation dust will occur due to earthworks including excavation, backfilling, grading, equipment movement, material piling, loading and unloading. Dust emissions will occur due to wind erosion from stockpiles. Fugitive dust emissions will be released from batching plant. Dust emissions is evaluated in detail in Chapter 7.2.1.2 Air Quality Impact Assessment.

- **Onshore construction activities – Exhaust Emissions**

During site preparation activities, heavy duty vehicles (i.e., trucks) will be used to transfer excavated earth to the dump site located on the north. It is assumed that the excavated earth will be transferred to the soil dump site by trucks. Pollutants such as Nitrogen Oxides (NO_x), Carbon Monoxide (CO), Hydrocarbon (HC), Particulate Matter (PM) and Sulphur dioxide (SO_2) will be produced particularly by the engine of the vehicles and machinery used for construction activities. Pollutants will also be generated by Project vehicles along the roads used to enter and exit the Site. Finally, pollutants will be produced by the diesel engines that will be used for electricity generation. These emissions can have direct effect on the health conditions of people in proximity to the construction site and along the roads used by Project vehicles, as it is well established that pollutants can lead to episodic and chronic diseases. The closest settlement to the Site is Sazköy, which is approximately 300 meters away. The village of Sazköy comprises around 40 households and a population of approx. 120 persons. In addition, there are two residences approximately 180 meters and 120 meters away from the Site. Considering these distances and the limited number of human receptors living in proximity to the Site, the overall exposure of the local population to pollutants generated by construction activities will be reduced. Pollutants generated by increased traffic can have effects on the health of people living along the roads that will be used by Project vehicles. Specific measures will be adopted in the Traffic Management Plan and in the Pollution Prevention Plan to reduce these impacts to the extent possible. Emission of gaseous pollutants is evaluated in detail in Chapter 7.2.1.2 Air Quality Impact Assessment.

- **Emission of aerial noise and vibrations**

Construction activities will generally entail the emission noise and vibrations, due to the use of heavy vehicles and machinery, to the engines of the diesel generator and to the heavy vehicles that will be used for the transport of goods, materials and workers. The emission of noise and vibrations can have direct effects on the health of people and affect sleep. As mentioned, one village is at a distance of 300 m from the perimeter of the construction site, while the others are located at a further distance, which reduces the overall exposure of people to noise and vibrations. Emission of aerial noise and vibrations is evaluated in detail in Chapter 7.2.1.3 Noise and Vibration Impact Assessment.

- **Increase and modification of traffic onshore**

Construction activities will generate an increased traffic compared to the current situation for the transport of workers, goods and materials. As previously mentioned, the traffic load will increase by 434 vehicles as a maximum per day during construction; the additional traffic will include heavy vehicles, cars and busses. The increase of traffic can increase the risk of accidents with other vehicles and with people, with potentially significant effects on the health and safety of people, including fatal incidents. Accidents can occur particularly along roads in villages and in residential areas, where there are more pedestrians and vehicles using these roads. Traffic Management Plan and Road Safety Procedures will be developed and implemented, to ensure the application of measures that can reduce impacts generated by the additional traffic due to the Project.

- **Immigration of workers and other people**

The demand of workforce will generate an influx of workers in the Area of Influence, with a series of potential impacts on health and safety conditions for the local communities. The arrival of workers from other parts of the country and from abroad may increase the possibility of spread of communicable diseases both among workers and within the local community, due to increased interactions between workers and local population. Workers will be accommodated in construction camps that will be in general terms self-sufficient, hence interactions between local population and workers will be limited, reducing the risk spreading communicable diseases between workers and local community. Health procedures will be followed within the camps to reduce the risk of spreading communicable diseases among workers.

The issue of communicable diseases is particularly relevant considering the current situation of the COVID-19 pandemic. Communicable diseases also include sexually transmitted diseases, which can be an issue in such large scale projects, considering that most of the workers will be males and will not be accompanied by their families.

The camps will include medical facilities to manage internally basic health needs that workers may have and to avoid using local facilities to the extent possible. The capacity of external health centres to be used for Project needs will have to be assessed by the Project, to avoid adding increased pressure on these facilities. According to the baseline information collected, existing health facilities are generally sufficient for the needs of the local communities, however access to health facilities was raised as an issue in some of the villages.

In terms of safety and security, the presence of workers can generate tensions and disturbance with local communities, due to the interactions between workforce and people. These disturbances may affect women and vulnerable groups more than others. As mentioned interactions between workers and local population will be reduced to the extent possible.

During the construction phase armed and non-armed security will be needed on the site. A Security Manager will be assigned to establish contracts with private security that align with Good international Industry Practice (GIIP) and will be responsible for training and implementing a security management plan. According to the

national legal requirements, the parties involved in the Project will follow the Law on Private to ensure security within the Project site.

Mitigation measures

The following mitigation measures shall be implemented to mitigate the effects of the impact factors.

- **Onshore construction activities – Dust and Exhaust Emissions**

In order to reduce the exhaust emissions from the construction machinery and equipment, the mitigation measures identified are presented in Chapter 7.2.1.2 Air Quality Impact Assessment.

- **Offshore construction activities – Exhaust Emissions from Vessels**

The air emissions management strategies recommended to for vessel operations are presented in Chapter 7.2.1.2 Air Quality Impact Assessment.

- **Emission of aerial noise and vibrations**

Mitigation measures for noise and vibration are detailed in Chapter 7.2.1.3 Noise and Vibration Impact Assessment.

- **Increase and modification of traffic onshore**

Mitigation measures for traffic onshore are detailed in Chapter 7.1.4 Infrastructure and Services.

- **Immigration of workers and other people**
  - Perform a health screening of all workers prior to beginning of work and on a periodic basis.
  - Provide all necessary PPEs to workers, based on their position.
  - Provide induction training and periodic training to all workers on Health & Safety aspects and on communicable diseases, particularly sexually transmittable diseases, to all workers.
  - Implement the Occupational Health and Safety (OHS) Management Plan compliant with national regulations, IFC standards and OHSAS18001 standard. The Plan will include the measures indicated above and additional measures that may emerge from engagement with stakeholders.
  - Implement the COVID-19 Management Plan that will identify additional measures necessary to manage the ongoing COVID-19 Pandemic among workers and local communities.
  - Implement the Community Health, Safety and Security Management Plan. The Plan will include the measures indicated above and additional measures that may emerge from engagement with stakeholders.
  - Implement Emergency Preparedness and Response Management Plan.
  - Within the context of the SEP inform local authorities, local communities and health facilities on the progress of activities and in particular on the schedule of activities that will entail closures/limitations of roads and interruption of infrastructure networks; possible changes to limit impacts on local communities will be agreed and implemented.

- Implement the Stakeholder Engagement Plan and ensure that appropriate resources and budget are dedicated to engagement. Periodically revise the stakeholder mapping and the plan based on progress of activities.

Residual impacts

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix K.

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **low negative impact** is expected on health issues and facilities during the construction phase.

Table 7-19: Residual impact assessment matrix for the health issues and facilities during construction phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Dust emissions	Duration:	Medium	Medium-high	Short-term	**Low**	Low	**Low**
	Frequency:	Continuous					
	Geo. Extent:	Local					
	Intensity:	High					
Exhaust Emissions from vehicles and construction machinery	Duration:	Medium	Medium-high	Short-term	**Low**	Low	**Low**
	Frequency:	Continuous					
	Geo. Extent:	Local					
	Intensity:	High					
Vessel exhaust emissions	Duration:	Medium-short	Medium-high	Short/Mid-term	**Medium**	Low	**Medium**
	Frequency:	Continuous					
	Geo. Extent:	Local					
	Intensity:	High					
Emission of aerial noise	Duration:	Medium	Medium-high	Short-term	**Medium**	Medium	**Low**
	Frequency:	Highly Frequent					
	Geo. Extent:	Local					
	Intensity:	High					
Emission of vibrations	Duration:	Medium	Medium-high	Short/Mid-term	**Low**	Medium	**Low**
	Frequency:	Frequent					
	Geo. Extent:	Local					

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
	Intensity:	Low					
Increase and modification of traffic onshore	Duration:	Medium	Medium	Short-term	**Low**	Medium	**Negligible**
	Frequency:	Highly frequent					
	Geo. Extent:	Local					
	Intensity:	High					
Immigration of workers and other people	Duration:	Medium	Medium	Short-term	**Low**	Medium-high	**Negligible**
	Frequency:	Continuous					
	Geo. Extent:	Local					
	Intensity:	High					
Overall assessment:		**Low**	Rationale:	Even though the individual impact factors are assessed to be generally negligible, the overall impact has been assessed as low, considering that the health of local communities is potentially affected by the combination of different impact factors.			

Monitoring measures

In addition to the monitoring measures listed in Chapters Chapter 7.2.1.2 Air Quality Impact Assessment., Chapter 7.2.1.3 Noise and Vibration Impact Assessment and Chapter 7.1.4 Infrastructure and Services, 7.1.1.1.2, the following monitoring measure shall be implemented to assess the true effects of the project on health issues and facilities during the construction and verify the effectiveness of the mitigation measures.

- Verification of the percentage of drivers that have been provided with induction training on traffic safety;
- Verification of number of speed limit infractions identified among drivers;
- Verification of number and location of sensitive receptors identified and of number and type of additional road safety measures enforced;
- Verification of number, location, attendance and outcomes of traffic safety campaigns performed;
- Verification of percentage of vehicles equipped with all safety devices;
- Verification of number and outcome of periodic checks performed to vehicles to ensure that they are properly maintained and that all the safety devices are working properly.
- Verification of the number, location and attendance of training activities to inform students on Project related risks to health and safety and measures to be implemented, particularly on the issue of road safety.
- Verification that the traffic incidents register is compiled correctly and that lessons learned measures are implemented;
- Verification that the Traffic Management Plan is developed and implemented;

- Verification of the percentage of workers that are subject to health screening;
- Verification of the percentage of workers that are provided with appropriate PPEs, based on their position;
- Verification of the percentage of workers that are provided with induction training and periodic training on Health & Safety aspects;
- Verification that the Occupational Health and Safety (OHS) Management Plan is developed and implemented, in compliance with national regulations, IFC standards and OHSAS18001 standard;
- Verification that the COVID-19 Management Plan is developed and implemented;
- Verify number, type and outcomes of training and awareness raising campaigns among local communities on health and safety risks that may be caused by the Project;
- Verify the number, type and outcomes of targeted measures to reduce traffic related incidents that may be caused by the Project;
- Verification of the number, type and outcomes of targeted measures implemented to ensure the protection of vulnerable groups like elders, people with disabilities and children from risks that may be caused by the Project;
- Verification that the Community Health and Safety Management Plan is developed and implemented;
- Verification that the Emergency Preparedness and Response Management Plan is developed and implemented;
- Verification of the cooperation and coordination activities performed with local health facilities to minimize impacts on health centres;
- Verification of the number, type and outcomes of support activities implemented for vulnerable groups;
- Verification of number, type, attendance and outcomes of stakeholder engagement activities.

7.1.5.1.2 Operation phase

Impact factors

The impact factors from the Project activities potentially affecting health issues and facilities during operation phase are listed in the following table.

Table 7-20: Project actions and related impact factors potentially affecting health issues and facilities during operation phase.

Project actions	Brief description	Impact factors
Plant/infrastructure onshore operation	Technical and administrative activities, including operation of the plant/infrastructure, surveillance, monitoring, maintenance, performed according to standard operating procedures to maintain the Project offshore parts in operation..	■ Emission of gaseous pollutants and/or greenhouse gases ■ Emission of aerial noise ■ Emission of vibrations

Project actions	Brief description	Impact factors
		■ Increase and modification of traffic onshore ■ Immigration of workers and other people
Plant/infrastructure operation offshore	Technical and administrative activities, including operation of the plant/infrastructure, surveillance, monitoring, maintenance, performed according to standard operating procedures to maintain the Project offshore parts in operation.	■ Immigration of workers and other people

The impact factor identified above is described below and assessed in the matrix that follows.

- **Emission of gaseous pollutants and/or greenhouse gases**

Detailed information about the Emission of gaseous pollutants is described in chapter 7.2.1.2, Air Quality Impact Assessment. The main sources of air emissions resulting from operations include: combustion emissions from power and heat generation (gas engines and boilers), ground flaring and fugitive emissions (gas/fuel oil leaks). Principal pollutants from these sources include nitrogen oxides, sulfur oxides, carbon monoxide, and particulates. Additional pollutants include: hydrogen sulphide (H_2S); volatile organic compounds (VOC) methane and ethane. Best available techniques will be used to ensure that emissions are compliant with Turkish and IFC standards, and possibly be well below them. These emissions can have direct effect on the health conditions of people in proximity to the site, as it is well established that pollutants can lead to episodic and chronic diseases. However it should be noted that the village closest to the perimeter of the construction camp is Sazköy, located at a distance of approx. 300 m, while other villages are located further away, which reduces the overall exposure of the local population to pollutants generated during the operation phase. These are detailed in Chapter 7.2.1.2 Air Quality Impact Assessment.

- **Emission of aerial noise and vibrations**

During operations, the main sources of noise pollution will be produced by flaring, gas engines and rotating equipment. Noise sources include flares, pumps, compressors, generators, and heaters. The emission of noise can have direct effects on the health of people and affect sleep. As mentioned, one village is at a distance of 300 m from the perimeter of the construction site, while the others are located at a further distance, which reduces the overall exposure of people to noise. It is expected that there will not be a vibration impact that can occur at the receiving locations for the equipment that will work in the operation phase. Emission of aerial noise and vibrations is evaluated in detail in Chapter 7.2.1.3 Noise and Vibration Impact Assessment.

- **Increase and modification of traffic onshore**

During the operation phase, limited traffic will be generated by the Project due to the staff entering and exiting the Site daily. During operation approx. 120 workers will be employed for Phase 1 and 270 workers for Phase 2. Workers will reach the Site in cars or busses, however the number of vehicles entering and exiting the Site will be limited and no significant impacts on traffic are therefore expected during this phase.

- **Immigration of workers and other people**

Considering the number of workers involved in this phase, it is unlikely that there will be an increase in the spread of communicable diseases. Likewise, considering the numbers involved, it is not expected that in this phase the presence of workers will add pressure to the existing health system in the AoI or generate particular tensions and disturbance with local communities.

Mitigation measures

The following mitigation measure shall be implemented to mitigate the effects of the impact factor.

- **Emission of gaseous pollutants and/or greenhouse gases**

For the operation phase, the mitigation measures identified for the emission of gaseous pollutants and/or greenhouse gasses are presented in Chapter 7.2.1.2 Air Quality Impact Assessment.

- **Emission of aerial noise and vibrations**

For the operation phase, mitigation measures for noise and vibration are detailed in Chapter 7.2.1.3 Noise and Vibration Impact Assessment.

Since there is no vibration impact observed at the receiving locations for the operation phase, mitigation is not required.

- **Increase and modification of traffic onshore**

Mitigation measures for traffic onshore are detailed in Chapter 7.1.4 Infrastructure and Services.

- **Immigration of workers and other people**

Mitigation measures for the immigration of workers and other people, during operation phase are same as the construction phase and are detailed above in Chapter 7.1.5.1.1.

Residual impacts

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **low negative impact** is expected on health issues and facilities during the operation phase.

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix K.

Table 7-21: Residual impact assessment matrix for health issues and facilities during operation phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Emission of gaseous pollutants during normal operation	Duration:	Long	Medium-high	Short-term	**Low**	Low	**Low**
	Frequency:	Continuous					
	Geo. Extent:	Local					
	Intensity:	Low					

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Emission of gaseous pollutants during abnormal operation	Duration:	Long	Medium-high	Short-term	**Low**	Low	**Low**
	Frequency:	Infrequent					
	Geo. Extent:	Local					
	Intensity:	Medium					
Emission of gaseous pollutants during emergency operations	Duration:	Long	Medium-high	Short-mid-term	**Medium**	None	**Medium**
	Frequency:	Infrequent					
	Geo. Extent:	Regional					
	Intensity:	Very high					
Noise	Duration:	Long	Medium-high	Short-mid-term	**Medium**	Medium	**Low**
	Frequency:	Highly frequent					
	Geo. Extent:	Local					
	Intensity:	Medium					
Increase and modification of traffic onshore	Duration:	Long	High	Short-term	**Low**	Medium	**Low**
	Frequency:	Frequent					
	Geo. Extent:	Local					
	Intensity:	High					
Immigration of workers and other people	Duration:	Long	Low	Short-term	**Negligible**	Low	**Negligible**
	Frequency:	Continuous					
	Geo. Extent:	Project footprint					
	Intensity:	Low					
Overall assessment:		Low	Rationale:	Even though the individual impact factors are assessed to be generally negligible, the overall impact has been assessed as low, considering that the health of local communities is potentially affected by the combination of different impact factors.			

Monitoring measures

In addition to the monitoring measures listed in Chapters Chapter 7.2.1.2 Air Quality Impact Assessment., Chapter 7.2.1.3 Noise and Vibration Impact Assessment and Chapter 7.1.4 Infrastructure and Services, 7.1.1.1.2, the following monitoring measure shall be implemented to assess the true effects of the project on health issues and facilities during the operation and verify the effectiveness of the mitigation measures.

- Verification of the percentage of drivers that have been provided with induction training on traffic safety;

- Verification of number of speed limit infractions identified among drivers;
- Verification of number and location of sensitive receptors identified and of number and type of additional road safety measures enforced;
- Verification of number, location, attendance and outcomes of traffic safety campaigns performed;
- Verification of percentage of vehicles equipped with all safety devices;
- Verification of number and outcome of periodic checks performed to vehicles to ensure that they are properly maintained and that all the safety devices are working properly.
- Verification of the number, location and attendance of training activities to inform students on Project related risks to health and safety and measures to be implemented, particularly on the issue of road safety.
- Verification that the traffic incidents register is compiled correctly and that lessons learned measures are implemented;
- Verification that the Traffic Management Plan is developed and implemented;
- Verification of the percentage of workers that are subject to health screening;
- Verification of the percentage of workers that are provided with appropriate PPEs, based on their position;
- Verification of the percentage of workers that are provided with induction training and periodic training on Health & Safety aspects;
- Verification that the Occupational Health and Safety (OHS) Management Plan is developed and implemented, in compliance with national regulations, IFC standards and OHSAS18001 standard;
- Verification that the COVID-19 Management Plan is developed and implemented;
- Verify number, type and outcomes of training and awareness raising campaigns among local communities on health and safety risks that may be caused by the Project;
- Verify the number, type and outcomes of targeted measures to reduce traffic related incidents that may be caused by the Project;
- Verification of the number, type and outcomes of targeted measures implemented to ensure the protection of vulnerable groups like elders, people with disabilities and children from risks that may be caused by the Project;
- Verification that the Community Health and Safety Management Plan is developed and implemented;
- Verification that the Emergency Preparedness and Response Management Plan is developed and implemented;
- Verification of the cooperation and coordination activities performed with local health facilities to minimize impacts on health centres;
- Verification of the number, type and outcomes of support activities implemented for vulnerable groups;
- Verification of number, type, attendance and outcomes of stakeholder engagement activities.

7.1.6 Cultural heritage and archaeology

7.1.6.1 Onshore cultural heritage

During the baseline studies, both desk-based studies and field studies were performed by HERMES Arkeoloji Çevre ve Sosyal Danışmanlık company (Hermes) for investigation of tangible and intangible cultural heritages.

As a result of the studies, tangible archaeological assets discovered within the Project AoI (defined in Chapter 6.1.1.7) are given in Table 7-22 and Figure 7-5.

Table 7-22: Information on the Archaeological Assets Identified Around the Project Area

No	Site name	Archaeological Area Registration Status[2]			Province	District/Village	Distance to Project Component (m)		
		Registered	Unregistered	Unknown			Lodgings	Kolin Camp	OPF
1	Filyos 1st Degree Archaeological Site	X			Zonguldak	Filyos	3 m	NA	1500
2	Sazköy 3rd Degree Archaeological Site	X			Zonguldak	Filyos / Sazköy	N/A	5	30
3	3rd Degree Archaeological Site	X			Zonguldak	Filyos / Sazköy	N/A	750	480
4	Sazköy Modern Cemetery		X		Zonguldak	Filyos / Sazköy	N/A	NA	15
5	Derecikören Ancient Bridge	X			Zonguldak	Filyos / Derecik ruin site	N/A	NA	1300

[2] Project EIA Report and Archaeology Baseline Report

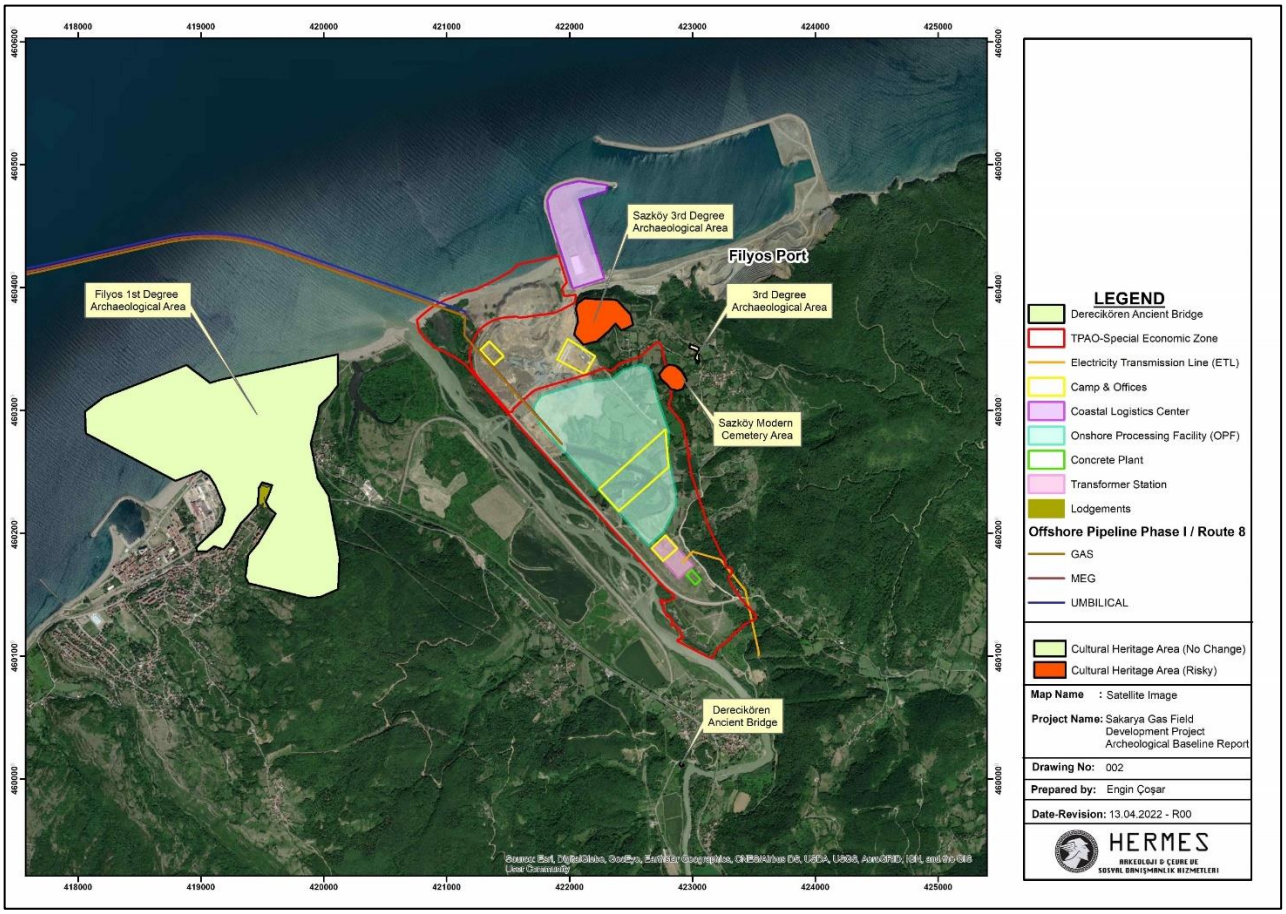


Figure 7-5: Satellite Image Showing Project Site and General Archaeological Status

(Note: The boundaries of the protected areas given on the map are approximately determined)

Interviews were held with Derecikören Village and Sazköy Mukhtars in the vicinity of the Project site and also with some people living in the region regarding presence of intangible in the region. According to the interviews, no intangible cultural heritage was identified within the Project AoI.

Impact Assessment Methodology

Impacts on the identified cultural heritages within the Project AoI were evaluated according to "Guidance on Heritage Impact Assessments for Cultural World Heritage ("WH") Properties" document[3] published by International Council on Monuments and Sites (ICOMOS) (see Figure 7-6).

The interrelations between the discovered archaeological sites and the Project site have been evaluated. The interrelations identified are presented in this chapter with their degree of importance, impact, and sensitivity. The mitigation measures to be followed for minimizing the effects of activities on the cultural heritages are also presented.

[3] https://www.iccrom.org/sites/default/files/2018-07/icomos_guidance_on_heritage_impact_assessments_for_cultural_world_heritage_properties.pdf

VALUE OF HERITAGE ASSET	SCALE & SEVERITY OF CHANGE/IMPACT				
	No Change	**Negligible change**	**Minor change**	**Moderate change**	**Major change**
For WH properties Very High – attributes which convey OUV	**SIGNIFICANCE OF EFFECT OR OVERALL IMPACT (EITHER ADVERSE OR BENEFICIAL)**				
	Neutral	Slight	Moderate/ Large	Large/very Large	Very Large
For other heritage assets or attributes	**SIGNIFICANCE OF IMPACT (EITHER ADVERSE OR BENEFICIAL)**				
Very High	Neutral	Slight	Moderate/ Large	Large/very Large	Very Large
High	Neutral	Slight	Moderate/ Slight	Moderate/ Large	Large/Very Large
Medium	Neutral	Neutral/Slight	Slight	Moderate	Moderate/ Large
Low	Neutral	Neutral/Slight	Neutral/Slight	Slight	Slight/ Moderate
Negligible	Neutral	Neutral	Neutral/Slight	Neutral/Slight	Slight

Figure 7-6: Impact Matrix Defined by ICOMOS

According to the matrix defined by the Guidance, professional expert judgement is used to determine the importance of the resource. The value of the asset is defined using the following grading scale:

- Very High
- High
- Medium
- Low
- Negligible
- Unknown potential.

Scale or severity of impacts or changes is judged by taking into account their direct and indirect effects and whether they are temporary or permanent, reversible or irreversible. The cumulative effect of separate impacts is considered. The scale or severity of impact can be ranked without regard to the value of the asset as:

- No change
- Negligible change
- Minor change
- Moderate change
- Major change

Since the discovered cultural heritages within the Project AoI are not in the status of “world heritage”, during identification of significance of possible impacts on the cultural heritages, value of heritage assets is categorised according to “value of heritage asset for other heritage assets or attributes” given in Figure 7-6.

Detailed investigations and assessments were carried out for the environmental impact, mitigation measures, management, and monitoring of impacts for the phase where the impact on cultural heritages are at maximum.

Considering the risks of potential discoveries during the construction period, movable and immovable archaeological heritage constitutes the main focus of the field works.

Based on the information collected for the definition of the baseline, the social component *Onshore cultural heritage* was assigned as **Medium** value of sensitivity in general according to ESIA Methodology for the following reasons:

- Presence of archaeological sites close to the Project site boundaries;
- Uncertainty of the boundaries of archaeological sites;
- Presence of unregistered archaeological sites;
- Other ongoing construction projects around archaeological sites.

Sensitivity analysis according to ICOMOS and impacts potentially affecting each identified archaeological asset are assessed here below for the construction phase. Considering the nature of the Project no impacts are expected on the onshore cultural heritage component during the operation phase.

7.1.6.1.1 Construction phase

Impact factors

The impact factors from the Project activities potentially affecting onshore cultural heritage during construction phase are listed in the following table.

Table 7-23: Project actions and related impact factors potentially affecting onshore cultural heritage during construction phase.

Project actions	Brief description	Impact factors
Site levelling and grading	Soil removal except for small amounts is not planned as part of the construction phase. However, in unexpected situations during the construction phase, soil removal operations can be performed.	■ Removal of soil

Definition of the potential impacts and impact analysis based on the Guidance of ICOMOS for each cultural asset is presented in Table 7-24.

Mitigation measures

The following mitigation measures shall be implemented to mitigate the impacts on the cultural heritage assets identified.

Filyos 1st Degree Archaeological Site

- No mitigations measures are required.

Sazköy 3rd Degree Archaeological Site

- Necessary information and training should be provided to the personnel to raise awareness about the archaeological site;
- In particular, truck/truck drivers should be informed that the materials that are considered as waste should not be dumped into the area, that these areas are protected areas by the relevant law. If it is determined that the excavation material near the site overflows to the site after the site is determined as boundaries, this material will need to be removed;
- Measures should be taken to prevent access to such areas (i.e., by marking the archaeological site with signs similar to "no entry, sensitive zone");
- Boundaries of the site should be confirmed and measures should be taken to prevent possible physical interventions in the site;
- Human and vehicle traffic along the boundaries of the area should be minimized;

3rd Degree Archaeological Site

- No mitigations measures are required.

Sazköy Cemetery

- Cemetery boundaries should be determined together with Museum Directorate and take precautions against possible expansions within the scope of the Project since it is very close to the welcome center area;
- Since the pathway leading to the welcome center and the cemetery is shared, it is necessary to limit the use of the aforementioned pathway, and at this point, certain rules should be introduced for vehicle drivers;

Derecikören Ancient Bridge

- In case the usage of the bridge is planned in order to access Project site, speed-reducing applications can be made, and speed can be reduced at this point with the signs to be placed on the road with the approval of relevant authority of the highways.

Intangible Cultural Heritage

- Mobility of public and vehicles in the region during the planned activities should not be prevented;

- It should be ensured that transit routes are left for uninterrupted access to areas regularly visited by the public;
- Contractors and subcontractors should be trained on the code of conduct, including their approach to relations with local communities, during the employment phase and at regular intervals throughout the Project;
- Information should be provided to contractors and subcontractors on any site-specific sensitivity/issue (e.g., festival locations, dates, events, etc.) regarding intangible cultural heritage.

General

- The Cultural Heritage Management Plan and Chance Finds Procedure prepared within the scope of the Project should be implemented throughout the Project. In case of chance find, all work must cease at the location where discovery is made and a temporary buffer zone around the chance find will be put in place. Cultural Heritage/Archaeological Monitoring Specialist will informed site management and museum archaeologist immediately. Chance find site will be properly secured with flagging, no-entry signs etc.
- Protection of site: chance find should not be moved, removed or further disturbed
- In particular, all operators and Project workers assigned to land preparation works should receive training on project requirements, protection of cultural and archaeological heritage, laws and regulations regarding archaeological and cultural heritage, Cultural Heritage Management Plan and Chance Find Procedure;

Residual impacts

The table below summarizes the impacts caused by Project activities on the identified archaeological assets and residual impacts after mitigation measures are applied.

Table 7-24: Impact Analysis Table

No	Name	Distance to Project Site (m)	Definition of Possible Impacts	Impact Analysis as per ICOMOS Guidance			
				Value of Heritage Asset	Scale of Impact	Significance of Impact	Residual Impact
1	Filyos 1st Degree Archaeological Site	3 m to Lodgings 1,500 m to OPF	Lodgings will be constructed in Filyos Neighbourhood, outside the borders of the ancient city which was determined according to natural elevation. There are already buildings.	Very High	No Change	Neutral	Neutral
2	Sazköy 3rd Degree Archaeological Site	5 m to Kolin Camp Site 30 m to OPF	Vibration and construction activity effects could be expected. Artificial filling materials and solidified concrete leachate were observed at the boundaries of the site, which are presumed to be related to previous construction activities in the area. Since the area boundaries are not marked, there may be a risk of overflow to this area.	High	Minor Change	Moderate/ Slight	Slight
3	3rd Degree Archaeological Site	480 m to OPF	It is not expected to be affected by construction activities.	High	No Change	Neutral	Neutral
4	Sazköy Cemetery	15 m to OPF Adjacent to welcome center (*karşılama merkezi)*	Possible expansions within the scope of the project as the cemetery area is not marked and there are also tombs that do not have tombstones and/or whose area is determined simply by stones	Medium	Minor Change	Slight	Neutral
5	Derecikören Ancient Bridge	1,300 m to OPF	It is not expected to be affected by construction activities as the bridge is not defined on the Project access roads.	High	No Change	Neutral	Neutral

Monitoring measures

The following monitoring measure shall be implemented to assess the true effects of the project on onshore cultural heritage during construction and verify the effectiveness of the mitigation measures.

- Archaeological monitoring by an archaeologist is required for construction activities to be carried out near the identified cultural heritage finds.

7.1.6.1.2 Operation phase

Considering the nature of the Project no impacts are expected on the onshore cultural heritage component during the operation phase.

7.1.6.2 Marine archaeology

Based on the information collected for the definition of the baseline (see 6.1.6.2), the social component *Marine archaeology* was assigned a **Low** value of sensitivity for the following reasons:

- Absence of evident marine archaeological heritage in the AoI

Impacts potentially affecting this component are assessed here below for the construction phase and operation phase.

7.1.6.2.1 Construction phase

Impact factors

The impact factors from the Project activities potentially affecting marine archaeology during construction phase are listed in the following table.

Table 7-25: Project actions and related impact factors potentially affecting marine archaeology during construction phase.

Project actions	Brief description	Impact factors
Offshore excavation (trenching) and sediment storage	Excavation of a trench in shallow water in correspondence of the land approach (1.4 km). The sediments removed will be temporarily stored west of Filyos Port, east of the pipeline, and will be moved back to cover the pipeline.	■ Handling and resuspension of sediments ■ Presence of the cofferdams
Offshore pipeline laying	Offshore laying of the pipelines, umbilical line, and lines within the SPS and their connection.	■ Handling and resuspension of sediments ■ Introduction of new offshore infrastructures

Mitigation measures

The following mitigation measures shall be implemented to mitigate the effects of the impact factors.

- **Handling and resuspension of sediments**

In the eventuality that the removed sediment presents some foreign object this should be immediately inspected and its photographic records should be taken, if the object/s are not immediately identifiable as modern age

debris the coordinates of the finding should be recorded and the photos should be immediately provided to an archaeologist for a preliminary assessment of the material. The initial assessment will be then discussed with the responsible of offshore construction operations for an eventual temporary alt of the activities.

- **Presence of the cofferdams**

No specific mitigation is required for this impact factor.

- **Introduction of new offshore infrastructures**

No specific mitigation is required for this impact factor.

Residual impacts

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix K.

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **low negative impact** is expected on marine archaeology during the construction phase.

Table 7-26: Residual impact assessment matrix for marine archaeology during construction phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Handling and resuspension of sediments	Duration:	Medium	Low	Short-term	**Negligible**	Low	**Negligible**
	Frequency:	Continuous					
	Geo. Extent:	Project footprint					
	Intensity:	Medium					
Presence of the cofferdams	Duration:	Medium-short	Low	Short-term	**Negligible**	None	**Negligible**
	Frequency:	Continuous					
	Geo. Extent:	Project footprint					
	Intensity:	High					
Introduction of new offshore infrastructures	Duration:	Medium	Low	Short-term	**Negligible**	None	**Negligible**
	Frequency:	Continuous					
	Geo. Extent:	Project footprint					
	Intensity:	Low					
Overall assessment:		**Negligible**	Rationale:	Due to the short-term reversibility, even using a precautionary approach, the residual impact values are not expected to cumulate to a higher impact value. Therefore, the average residual impact value may be considered as a reference for the overall impact.			

Monitoring measures

No mitigation measures were considered necessary.

7.1.6.2.2 Operation phase

Considering the nature of the Project, no impacts on the marine archaeology component are expected during the operation phase.

7.1.7 Ecosystem services

7.1.7.1 Fishery

Based on the information collected for the definition of the baseline (see Chapter 6.1), the social component *Fishery* was assigned a **High** value of sensitivity for the following reasons:

- The fishing sector has gained importance in the AoI in the last decades and there is a high number of fisheries located in the AoI.

Impacts potentially affecting this component are assessed here below for the construction phase and operation phase.

7.1.7.1.1 Construction phase

Impact factors

The impact factors from the Project activities potentially affecting fishery during construction phase are listed in the following table.

Table 7-27: Project actions and related impact factors potentially affecting fishery during construction phase.

Project actions	Brief description	Impact factors
Offshore excavation (trenching) and sediment storage	Excavation of a trench in shallow water in correspondence of the land approach (1.4 km). The sediments removed will be temporarily stored west of Filyos Port, east of the pipeline, and will be moved back to cover the pipeline.	■ Minor leakage of contaminants into water ■ Emission of underwater noise ■ Presence of working and moving vessels
Offshore pipeline laying	Offshore laying of the pipelines, umbilical line, and lines within the SPS and their connection.	■ Emission of light ■ Minor leakage of contaminants into water ■ Presence of working and moving vessels
Pipeline hydrotesting	During the pre-commissioning phase, the pipelines will by hydrotested by pumping a chemical mixture.	■ Emission of chemicals in water

All the impact factors identified above are described below and assessed in the matrix that follows.

- **Minor leakage of contaminants into water**

Vessels will be used for all the activities concerning the offshore section of the project: 7 vessels for the land approach (i.e., first 1.4 km from the shoreline) and 19 for the pipelay operations in deeper waters.

When dealing with a vessel, the leakage of small amounts (i.e., negligible, but still present) of contaminants (mostly oily and greasy) from the engines is considered “physiological” and inevitable. Contaminants of such typology are mostly insoluble in water and tend to remain on the surface, potentially affect the fishing activities.

It must be noted, however, that all the vessels must be compliant with MARPOL, to which Turkey is signatory, highly reducing the possibility of large leakages. In addition, the construction works should not last more than a year and the two groups of vessels mentioned above will be rarely operational in the same timeframe, having sequential functions.

- **Emission of Underwater Noise**

A total of 26 vessels will be used for the pipelay activities offshore, namely 7 for the land approach (corresponding to the first 1.4 km to be dredged from the shoreline) and 19 for the pipelaying in the deeper waters. Such vessels are expected to be the main responsible for the emission of underwater noise,

- **Emission of light**

During the construction phase, pipelay activities are operations that are performed continuously. Therefore, night working, and the use of artificial light, will be required for the construction and port area.

According to the results of the interviews with the fisheries, it was underlined that the artificial lights of the port is affecting fishing activities adversely.

- **Presence of working and moving vessels**

As part of offshore construction activities of Sakarya Gas Field Development Project, safety measures and restrictions are introduced in the Gas Field Research Areas (the restricted area is below). The restricted area will be in force for the pipeline and three kilometres to the left and right of the pipeline. The corridor is approximately 177 km from the shore. The restrictions and conditions for the safety corridor is as follows:

- Anchoring is restricted
- Marine activities including fishing (using trap nets and rods) and diving are restricted
- Cruising 2 km distance from the Project vessels

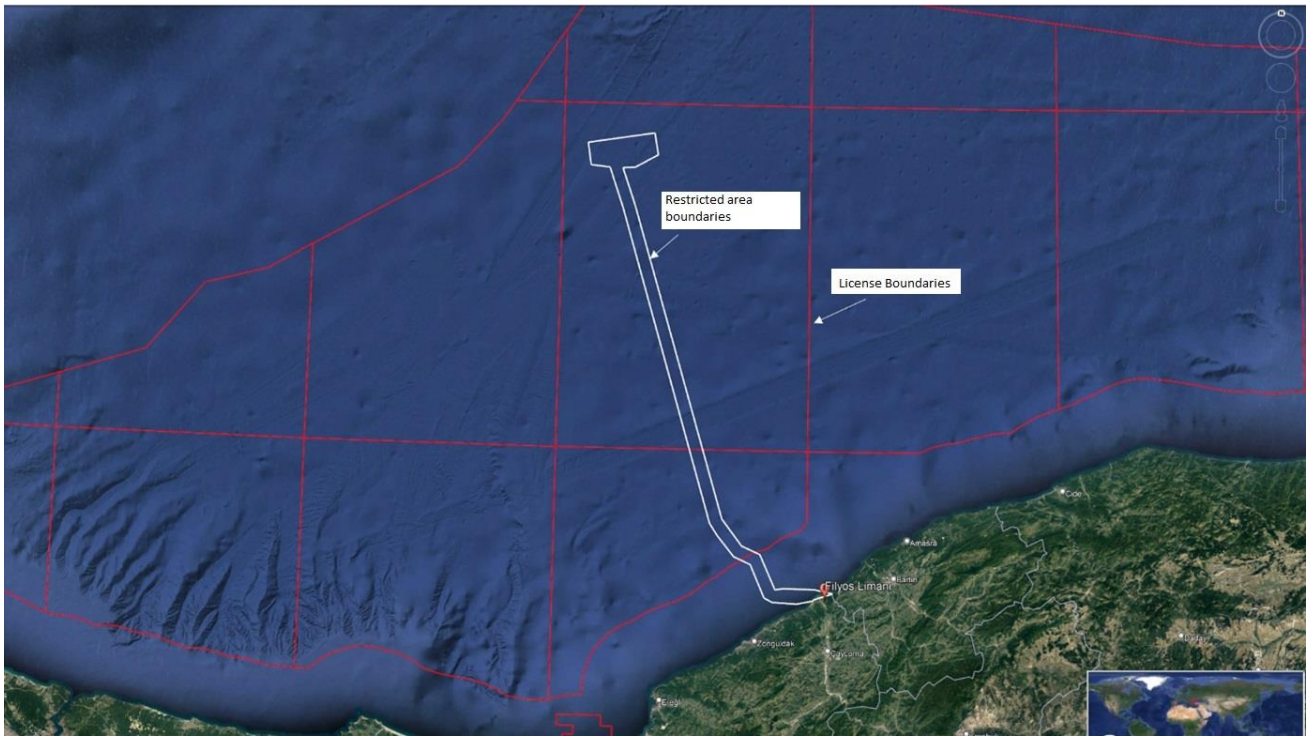


Figure 7-7 Restricted Area

- **Emission of light**

During the construction phase, pipelay activities are operations that are performed continuously. Therefore, night working, and the use of artificial light, will be required for the construction and port area.

According to the results of the interviews with the fisheries, it was underlined that the artificial lights of the port is affecting fishing activities adversely

- **Emission of chemicals in water during Hydrotest**

Following the completion of the construction phase and before the operation of the pipelines, all the pipes will be hydrotested by pumping liquids at 550 ppm into them to detect possible faults in the junctions and prevent leakage. The testing process typically made by filtered seawater, or filtered seawater with chemical additive, such as RX-5255, containing a mixture of corrosion inhibitor, oxygen scavenger, biocide, and dye to prevent internal corrosion or to identify leaks, MEG or umbilical transportation liquid.

The hydrotest fluids are planned to be discharged deep sea, in correspondence to the SPS site (i.e., at a depth of 2,200 m), where they may cause alteration of the seawater quality. Nevertheless, as previously discussed, this alteration is not expected to affect marine life, since the discharge point is located in the anoxic water layer, where no life exists.

Mitigation measures

The following mitigation measures shall be implemented to mitigate the effects of the impact factors.

- **Minor leakage of contaminants into water**
  - All vessels will be compliant with MARPOL.

- Outdated engines to be avoided in favour of recent and well-maintained ones.
- In case of any leakage fishers will be informed.

- **Emission of Underwater noise**
  - All vessels used to be compliant with MARPOL.
  - Outdated propellers to be avoided in favour of recent and well-maintained ones, possibly anti-cavitation.
- **Presence of working and moving vessels**
  - Regular and timely engagement with local fishermen and other users of local harbours and ports in order to discuss and agree on Navtex area.
  - Timely communication of the security zone to local fishermen and other users of local harbours and coordinating the practical consequences of such security zone.
  - Regular and timely communication to local fishers and other users of local ports and harbours about construction activities and the routes and frequency of Project vessels.
  - Impact on fishers' livelihoods will be continuously monitored and if negative impacts are found as a consequence of the Project, then fishermen will be compensated in accordance with the Livelihood Restoration Plan.
- **Emission of Light**
  - Light emissions will be focused within the Project Area boundaries.
  - As far as practicable, no intense light has to be aimed directly towards the freshwater habitats within and in proximity of the Project Area.
  - Lights will be mounted as low as practicable.
  - Downward-facing lights will be used to manage horizon glow. Louvered bollards, low height flat beam technology luminaires, poles and structure mounted fittings are acceptable.
  - Shielded light fittings and directional lights will be used to manage light spill.
  - Use of artificial light will be limited to what required to maintain a safe working environment during construction activities past sunset and before sunrise.
  - Unnecessary lighting will not be used, including lights in unused areas, decorative lighting, or lighting that is brighter than needed for the task being carried out.
  - Where practicable, timers and motion sensors will be used to turn off lights when not in use (e.g., sunset switch on, timer off for lighting used for walkways, car parks, and roads).
- **Emission of particulates and chemicals in water**
  - Hydrotest fluids discharged deep sea to be compliant with the relevant standards for deep sea discharges,

- Minimize the volume of hydrotest water offshore by testing equipment at an onshore site prior to loading the equipment onto the offshore facilities.
- Use the same water for multiple tests.
- Reduce the need for chemicals by minimizing the time that test water remains in the equipment or pipeline.
- Carefully select chemical additives in terms of dose concentration, toxicity, biodegradability, bioavailability, and bioaccumulation potential.

Residual impacts

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix K.

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **low negative impact** is expected on plankton during the construction phase.

Table 7-28: Residual impact assessment matrix for Fisheries during construction phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Minor leakage of contaminants into water	Duration:	Medium	High	Short-mid-term	**Medium**	Medium-high	**Low**
	Frequency:	Continuous					
	Geo. Extent:	Local					
	Intensity:	Low					
Emission of Underwater Noise	Duration:	Medium	Medium-high	Short-term	**Low**	Low	**Low**
	Frequency:	Continuous					
	Geo. Extent:	Local					
	Intensity:	Medium					
Emission of light	Duration:	Medium	High	Short-term	**Low**	None	**Low**
	Frequency:	Continuous					
	Geo. Extent:	Project footprint					
	Intensity:	Medium					
Presence of working and moving vessels	Duration:	Medium	High	Mid term	**Medium**	Medium	**Low**
	Frequency:	Continuous					
	Geo. Extent:	Local					
	Intensity:	Medium					
	Duration:	Short	High	Short-mid-term	**Medium**	Medium	**Low**

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Emission of particulates and chemicals in water	Frequency:	Infrequent					
	Geo. Extent:	Local					
	Intensity:	Medium					
Overall assessment:		**Low**	Rationale:	Due to the compliance with relevant standards of the impact factors, even using a precautionary approach, the residual impact values are not expected to cumulate to a higher impact value. Therefore, the average residual impact value may be considered as a reference for the overall impact.			

Monitoring measures

The following monitoring measures shall be implemented to assess the true effects of the project on plankton during the construction and verify the effectiveness of the mitigation measures.

- Marine Traffic Management in cooperation with Port Authority
- Grievance Records
- The number of affected fishers
- Nature of compensation for all the affected fisheries by the Project.
- Measures for improving livelihood standards of fisheries
- The number of conflicts between fisheries
- The number of conflicts between fishers and workers before and during the restriction process
- The number of vulnerable fishers faced with decreasing living standards.
- The number of grievances registered through the grievance mechanism.
- The number of grievance cases addressed.
- Percentage of closed grievances where PAPs indicate their satisfaction with the grievance process.
- The number of persons engaged during the implementation of the Project focused on women fishers (if any).
- Number of Fishing Cooperatives involved during the implementation process.
- The number of beneficiaries from the livelihood improvement programmes
- The number of contracts signed.
- The number of fishers received cash compensation for fuel in the period.
- Regular continuous monitoring at the wastewater treatment plant

- Results of water samplings

7.1.7.1.2 Operation phase

Impact factors

The impact factors from the Project activities potentially affecting plankton during operation phase are listed in the following table.

Table 7-29: Project actions and related impact factors potentially affecting plankton during operation phase.

Project actions	Brief description	Impact factors
Plant/infrastructure onshore operation	Technical and administrative activities, including operation of the plant/infrastructure, surveillance, monitoring, maintenance, performed according to standard operating procedures to maintain the Project offshore parts in operation.	■ Discharge of wastewater ■ Minor leakage of contaminants into water

The impact factors identified above are described below and assessed in the matrix that follows.

- **Discharge of wastewater**

Such as already stated in Chapter 7.2.1.4, wastewaters produced by the OPF are expected to be discharged in the Filyos river, after being properly treated. Such discharges concern the industrial wastewater, civil sewage and rain drainages.

Considering that the Wastewater Treatment Plants will collect hazardous and non-hazardous compounds.

In fact, even if diluted by the flow rate of the river, once reached the sea, the discharged wastewater may alter the seawater quality throughout the years (i.e., 20 to 45 year) which may affect the fishing activities on the region during the operation phase.

- **Minor leakage of contaminants into water**

Maintenance/repair operations of the SPS and pipelines are planned for the operation phase of the project. Such operations are always conducted using vessels that, such as previously stated, may lose small amounts of contaminants (mostly oily and greasy) from the engines, potentially altering the seawater quality (see Chapter 7.3.1.3.2) and, by consequence, the plankton communities of the AoI.

However, it must be noted that these maintenance/repair operations are not performed continuously and do not require a large number of vessels. In addition, all vessels must be compliant with MARPOL, to which Turkey is signatory; therefore, it is unlikely that this impact factor could severely affect the seawater to cause a community significant alteration or switch. In case of a leakage or contamination, there could be a loss of market confidence as people may be unwilling to buy fish caught in a contaminated area.

Fishing vessels may be excluded from the affected area of oil spill unplanned event, although for short periods

Mitigation measures

The following mitigation measures shall be implemented to mitigate the effects of the impact factors.

- **Discharge of wastewater**
  - Wastewater effluents to be compliant to national and international standards.
- **Minor leakage of contaminants into water**
  - All vessels used to be compliant with MARPOL.
  - Outdated engines to be avoided in favour of recent and well-maintained ones.

Residual impacts

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix x.

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **medium negative impact** is expected on plankton during the operation phase.

Table 7-30: Residual impact assessment matrix for fisheries during operation phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Discharge of wastewater	Duration:	Long	High	Mid term	**High**	Medium-high	**Medium**
	Frequency:	Continuous					
	Geo. Extent:	Local					
	Intensity:	Medium					
Minor leakage of contaminants into water	Duration:	Long	High	Short-mid-term	**Medium**	Medium-high	**Low**
	Frequency:	Infrequent					
	Geo. Extent:	Local					
	Intensity:	Low					
Overall assessment:		**Medium**	Rationale:	The impact generated by the discharge of wastewater may be considered as a reference for the overall impact, being the most important in terms of intensity and frequency.			

Monitoring measures

The following monitoring measures shall be implemented to assess the true effects of the project on plankton during the operation and verify the effectiveness of the mitigation measures.

- Regular continuous monitoring at the discharge points in the Filyos river as illustrated in hydrology and surface water impact assessment will be useful also for plankton as a consequence.
- Water samplings (i.e., by Niskin bottle at the chlorophyll-a peak, quantified by probe) and zooplankton samplings (i.e., WP2 net), with subsequent plankton community identification, to be performed along a transect starting from the Filyos river mouth and directed offshore following the predominant current

direction before the first wastewater discharge into the river (in two opposite seasons, if practicable with the project timings). Results to be used in case of exceeding the thresholds (see the next bullet point).

- In case of exceeding the thresholds defined in Annex C at the discharge points, water samplings (i.e., by Niskin bottle at the chlorophyll-a peak, quantified by probe) and zooplankton samplings (i.e., WP2 net), with subsequent plankton community identification, to be performed along a transect starting from the Filyos river mouth and directed offshore following the predominant current direction immediately after the detection of the exceeding and in the opposite season (e.g., summer and winter) in the same sampling stations as per seawater. Results to be compared with the previous bullet point and among them.
- Seasonal water samplings (i.e., by Niskin bottle at the chlorophyll-a peak, quantified by probe) and zooplankton samplings (i.e., WP2 net), with subsequent plankton community identification, to be performed along a transect starting from the Filyos river mouth and directed offshore following the predominant current direction in the same sampling stations as per seawater. Results to be compared among them.

7.1.7.2 Marine traffic

Based on the information collected for the definition of the baseline (see 6.1.13), the social component *Marine traffic* was assigned a **High** value of sensitivity for the following reasons:

- There is a high number of main commercial routes crossing the AoI.

Impacts potentially affecting this component are assessed here below for the construction phase and operation phase.

7.1.7.2.1 Construction phase

Impact factors

The impact factors from the Project activities potentially affecting marine traffic during construction phase are listed in the following table.

Table 7-31: Project actions and related impact factors potentially affecting marine traffic during construction phase.

Project actions	Brief description	Impact factors
Offshore excavation (trenching) and sediment storage	There is a high number of main commercial routes crossing the AoI. Vessels crossing from and to the Bosphorus strait, from and to Zonguldak on the main route to Odessa in the north-west, and local traffic to and from nearby marinas.	■ Presence of working and moving vessels
Offshore pipeline laying		■ Presence of working and moving vessels

All the impact factors identified above are described below and assessed in the matrix that follows.

- **Presence of working and moving vessels**

With the implementation of the Project, there will be an increase in maritime traffic density, which may pose risks to the community as a result of vessel collisions, fires and other accidents. Such incidents may result in spills and discharges that might spread, affecting marine life. In addition, the increase in marine traffic will cause an increasing of underwater noise and a risk to fish species.

Mitigation measures

The following mitigation measures shall be implemented to mitigate the effects of the impact factors.

- **Presence of working and moving vessels**
- Regular and timely engagement with local fishermen and other users of local harbours and ports in order to discuss and agree on manoeuvring routes and areas.
- Timely communication on Navtex restrictions and other users of local harbours and coordinating the practical consequences of such security zone.
- Regular and timely communication to local fishers and other users of local ports and harbours about pipeline construction activities and the routes and frequency of Project vessels.

Residual impacts

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix x.

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **low negative impact** is expected on marine traffic during the construction phase.

Table 7-32: Residual impact assessment matrix for marine traffic during construction phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Presence of working and moving vessels	Duration:	Medium	Medium-high	Short-term	**Low**	Low	**Low**
	Frequency:	Continuous					
	Geo. Extent:	Project footprint					
	Intensity:	Medium					
Overall assessment:		**Low**	Rationale:	Due to the short-term reversibility, even using a precautionary approach, the residual impact values are not expected to cumulate to a higher impact value. Therefore, the average residual impact value may be considered as a reference for the overall impact.			

Monitoring measures

The following monitoring measure shall be implemented to assess the true effects of the project on marine traffic during the construction and verify the effectiveness of the mitigation measures.

- Marine Traffic Management in cooperation with Port Authority
- Grievance Records

7.1.7.2.2 Operation phase

Limited vessel movements will occur during operation. These movements will not significantly change the number or composition of marine traffic in the region.

7.1.7.3 Tourism

Based on the information collected for the definition of the baseline (see 6.1.7.2), the social component *Tourism* was assigned a **Medium** value of sensitivity for the following reasons:

- Tourism is an important economic sector for the AoI and includes both recreational and business tourism. Even though some Projects that have impacted the tourism sector, like the construction of harbours, tourism representatives stated that the sector is in an overall good condition.

Impacts potentially affecting this component are assessed here below for the construction phase and operation phase.

7.1.7.3.1 Construction phase

Impact factors

The impact factors from the Project activities potentially affecting tourism during construction phase are listed in the following table.

Table 7-33: Project actions and related impact factors potentially affecting tourism during construction phase.

Project actions	Brief description	Impact factors
Offshore excavation (trenching) and sediment storage	Excavation of a trench in shallow water in correspondence of the land approach (1.4 km). The sediments removed will be temporarily stored west of Filyos Port, east of the pipeline, and will be moved back to cover the pipeline.	■ Presence of the cofferdams ■ Presence of working and moving vessels
Offshore pipeline laying	Offshore laying of the pipelines, umbilical line, and lines within the SPS and their connection.	■ Presence of working and moving vessels

All the impact factors identified above are described below and assessed in the matrix that follows.

- **Presence of the cofferdams**

The presence of the two rows of cofferdams will be limited to the dredging period in the 268 m of the pipeline corridor and the pipeline laying in the trench (around 105 days). In addition, the alteration to the seafloor morphology by the presence of such cofferdams is expected to be completely reversible, since the seascape will be restored by the backfilling.

- **Presence of working and moving vessels**

During the construction phase of the Project, Limit or prohibit public access to the Filyos beach to prevent the community health and safety impacts. This short-term impact would have an influence on any visitors or residents of Filyos.

Mitigation measures

The following mitigation measures shall be implemented to mitigate the effects of the impact factors.

- **Presence of working and moving vessels**
- Develop a schedule that avoids high traffic on the road accessing the beach. If not possible, design the schedule for moving the machineries earlier in the morning so that main traffic would be avoided.

Residual impacts

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix x.

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **low negative impact** is expected on tourism during the construction phase.

Table 7-34: Residual impact assessment matrix for tourism during construction phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Presence of working and moving vessels	Duration:	Medium	Medium-high	Short-term	**Low**	Low	**Low**
	Frequency:	Continuous					
	Geo. Extent:	Project footprint					
	Intensity:	Medium					
Presence of the cofferdams	Duration:	Medium-short	Medium-high	Short-term	**Low**	None	**Low**
	Frequency:	Continuous					
	Geo. Extent:	Project footprint					
	Intensity:	High					
Overall assessment:		**Low**	Rationale:	Due to the short-term reversibility, even using a precautionary approach, the residual impact values are not expected to cumulate to a higher impact value. Therefore, the average residual impact value may be considered as a reference for the overall impact.			

Monitoring measures

The following monitoring measure shall be implemented to assess the true effects of the project on tourism during the construction and verify the effectiveness of the mitigation measures.

- Grievance Records
- Tourism statistics
- Stakeholder engagement records (mainly the owners/operators of touristic facilities)

7.1.7.3.2 Operation phase

Considering the nature of the Project no impacts are expected on the tourism component during the operation phase.

7.1.8 Visual aesthetics

Based on the information collected for the definition of the baseline (see 6.1.15), the physical component *Visual aesthetics* was assigned a **Medium-low** value of sensitivity for the following reasons:

- Presence of one settlement (approx. 120 inhabitants people) within the visual zone of visual influence.
- Absence of areas of touristic interest within the visual zone of visual influence.
- Presence of roads and volume of traffic within the visual zone of visual influence.
- There are no natural parks protected and classified areas within the visual zone of visual influence.

Impacts potentially affecting this component are assessed here below for the construction phase and operation phase.

7.1.8.1.1 Construction phase

Impact factors

The impact factors from the Project activities potentially affecting infrastructures and services during construction phase are listed in the following table.

Table 7-35: Project actions and related impact factors potentially affecting visual aesthetics during construction phase.

Project actions	Brief description	Impact factors
Vegetation clearing	Removal of natural and farmed vegetation from the area where ETL poles coincide, and from coastal dune area within the Project's footprint.	■ Removal of natural vegetation
Site levelling and grading	Removal of the first 300 mm of soil from ETL pole areas and dune habitat in the landfall area	■ Removal of soil
General onshore engineering/construction works	Heavy machinery will be operating on the Project area and the ETL RoWs construction and poles installation	■ Emission of light ■ Change in land use

All the impact factors identified above are described below and assessed in the matrix that follows.

- **<u>Removal of natural vegetation</u>**

Vegetation is an element that plays an important role in defining the visual character of an area. The natural vegetation within the Project' footprint is present only in the following two areas:

- The landfall area located in the dune habitat on the coast section where the offshore pipeline will be connected to the OPF.
- The ETL area where poles will be installed.

The removal of vegetation that will occur due to construction activities will therefore alter the current visual character of the area and change the perception of the landscape. It should be noted however that the area where the Project will be built, and surrounding areas have already been significant altered by previous construction activities for the industrial zone and other infrastructures, altering the overall natural appearance that the area had previously. In addition, as indicated in the baseline, there are limited persons living within the Project's visual zone of visual influence and no touristic activities. At the end of the construction phase, open areas with no buildings will be revegetated to the extent possible with native species, so to ensure that the Site blends in the surrounding landscape context as much as possible.

- **Removal of soil**

Topsoil removal will be carried out as a consequent step of the natural vegetation clearance discussed above and therefore, it will affect the same areas (i.e., Landfall and ETL pole area). As per the removal of natural vegetation, also the removal of soil will alter the current aspect of the area and change the perception of the landscape. Earthworks and alterations to the soil morphology have already occurred in the Project site area and in the surroundings, therefore the overall landscape conditions have already changed compared to previous conditions. At the end of the construction activities, all open areas with no buildings will have to be revegetated to the extent possible using native species.

- **Emission of light**

Construction activities are planned to be performed during daytime, therefore it is expected that artificial lighting will generally not be necessary during construction. However, on some occasions it may be necessary to work at night time and hence artificial lighting will have to be used. In addition, some construction Site areas may have to be illuminated for security reasons. Also, accommodation camps will be illuminated for security reasons. Currently the AoI has limited human infrastructures and hence little artificial lighting is present in the area. The introduction of new artificial lighting will therefore alter the appearance of the AoI during the night. Measures will be implemented to reduce light spill and to illuminate only areas where it is strictly necessary. LED lighting and modern lighting systems allow to better direct the light, to avoid glare effects and light pollution. If necessary, solutions will be discussed and agreed with local authorities and local communities to reduce the impact of lighting to the extent possible.

- **Change in land use**

The construction of the Project will change the current land use, leading to alterations to the current visual aspect of the AoI. The construction Site is located in an industrial area that has already introduced changes to the overall landscape character of the AoI. The Project will therefore be developed in an area that has already been subject to significant transformations over time. The construction of the OPF will be in line with the land use that the area has been planned for. As previously mentioned, visual impacts introduced by the Project will be reduced by the fact that limited persons live within the Project's visual zone of visual influence and there are no touristic activities.

Mitigation measures

The following mitigation measures shall be implemented to mitigate the effects of the impact factors.

- **Removal of natural vegetation**
  - Limits of clearing and construction areas will be clearly marked or fenced in order to avoid impacts outside this area;

- All vehicles will drive on designated routes unless otherwise authorized, and off-road driving will be strictly prohibited;
- To allow for vegetation recovery those structures and service roads built for construction purposes only in previously vegetated areas should be removed after construction activities are terminated;

- **Removal of soil**
  - Reinstatement of topsoil in the landfall construction area and ETL pole areas to enhance natural habitat restoration.

Emission of light

- Artificial lighting will be used only where necessary for safety and security reasons and for construction purposes. Light will be directed only where necessary, to reduce light spillage in other areas.
- Lighting systems that reduce light pollution and glare effects will be used.
- If necessary, agreements will be taken with surrounding receptors and local communities to identify and implement measures to reduce unwanted lighting.

Change in land use

- Visual impacts will be discussed with surrounding receptors and local communities to identify and implement measures to reduce visual impacts during the construction phase.
- The use of artificial and vegetations screens will be considered to reduce visibility of the Project from external viewpoints.
- The colour of buildings and structures will be selected so to ensure that they blend as much as possible in the landscape context.

Residual impacts

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix K.

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **low negative impact** is expected on visual aesthetics during the construction phase.

Table 7-36: Residual impact assessment matrix for the visual aesthetics during construction phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Removal of natural vegetation	Duration:	Medium	Medium-low	Long term	**Medium**	Medium	**Low**
	Frequency:	Continuous					
	Geo. Extent:	Local					
	Intensity:	Medium					
Removal of soil	Duration:	Medium	Medium-low	Long term	**Medium**	Medium-high	**Low**
	Frequency:	Continuous					
	Geo. Extent:	Local					

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
	Intensity:	Medium					
Emission of light	Duration:	Medium	Medium-low	Short-term	**Negligible**	Medium	**Negligible**
	Frequency:	Frequent					
	Geo. Extent:	Local					
	Intensity:	Low					
Change in land use	Duration:	Medium	Medium-low	Irreversible	**High**	Low	**Medium**
	Frequency:	Continuous					
	Geo. Extent:	Local					
	Intensity:	High					
Overall assessment: Low			Rationale: The overall impact on the component has been assessed to be low, as an average of the value assessed for the different impact factors.				

Monitoring measures

The following monitoring measure shall be implemented to assess the true effects of the project on visual aesthetics during the construction and verify the effectiveness of the mitigation measures.

- Monitoring for vegetation cover and recovery of construction areas and the 100 m AoI around the general Project area to be carried out at completion of works and in the following two years, annually.
- Monitoring of landfall area should follow the indications provided in the relative BAP (Golder, 2022a).
- Verification of number, type, attendance and outcomes of stakeholder engagement activities.
- Verification of the number of grievances received and percentage of grievances resolved positively.
- Verification of the effectiveness of revegetation activities at the end of the construction phase.

7.1.8.1.2 Operation phase

Impact factors

The impact factors from the Project activities potentially affecting visual aesthetics during operation phase are listed in the following table.

Table 7-37: Project actions and related impact factors potentially affecting visual aesthetics during operation phase.

Project actions	Brief description	Impact factors
Plant/infrastructure operation	During the operation phase, new onshore infrastructures will be represented by the OPF, the transformer facility and the ETL. These infrastructures will entail lighting during the night, for safety and security issues.	■ Presence of new onshore infrastructures ■ Emission of light

All the impact factors identified above are described below and assessed in the matrix that follows.

- **Presence of new onshore infrastructures**

During the operation phase, impacts on visual aesthetics will be generated by the new onshore infrastructures, namely the OPF, the transformer facility and the ETL.

The OPF will consist of a series of structures and facilities divided in three blocks mainly located in the northern section of the Site. Structures will consist mainly of piping systems and racks, storage tanks and sheds. The OPF will cover an area of 966,000 m^2. The tallest elements, which are the storage tanks and boiler and boilers and gas engine stacks, which will have an elevation of approx. 40 m. Other elements such as the pipe racks and the sheds will have a lower height. An idea of the visual aspect of the Site during operation is provided in the 3D renderings shown below.

Figure 7-8: 3D rendering of the site - bird-eye's view from east

Figure 7-9: 3D rendering of the site - bird-eye's view from south

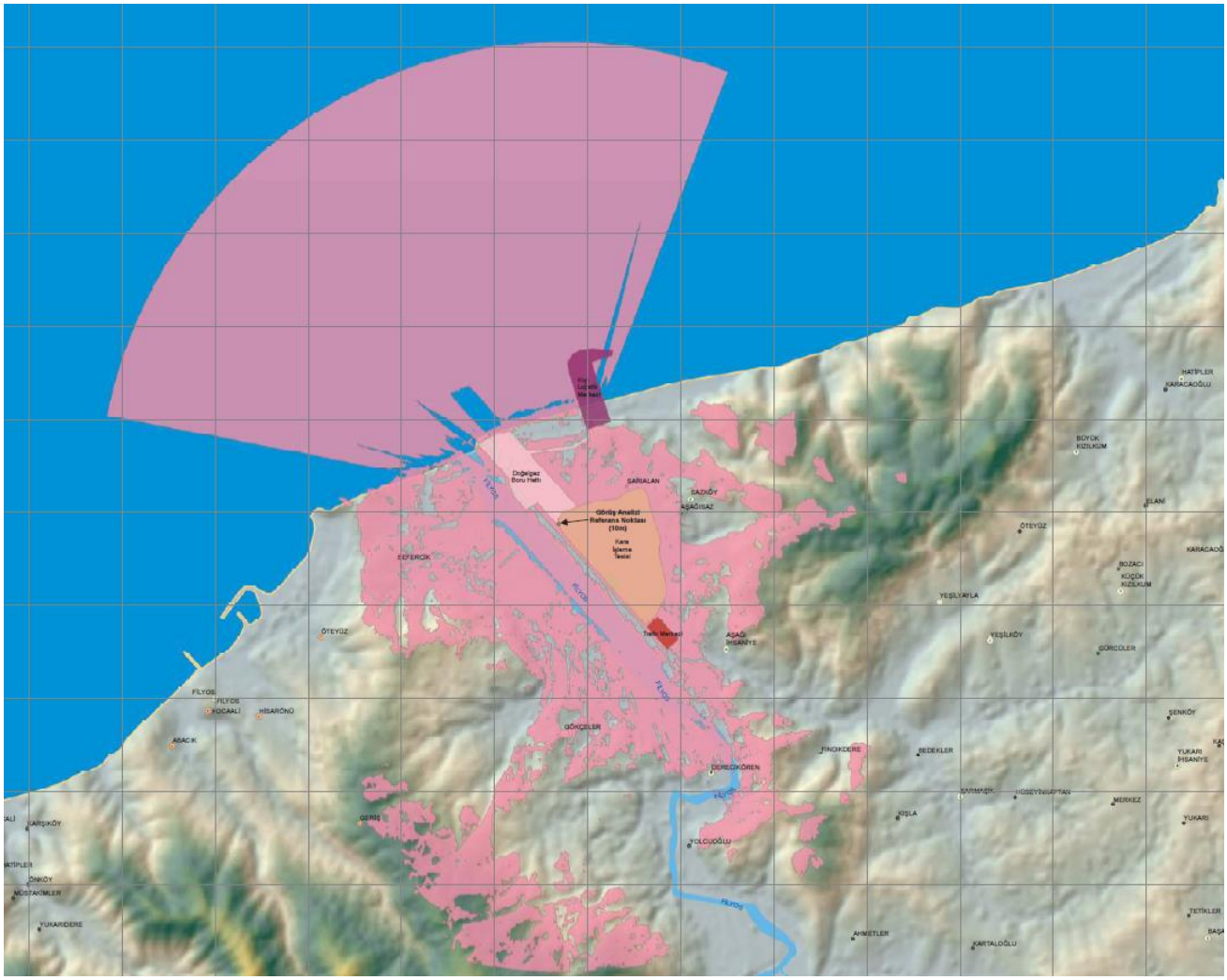
Figure 7-10: 3D rendering of the site – close up view from east

Figure 7-11: 3D rendering of the site – close up view from south-east

The transformer facility will be located towards the south of the Site and will cover an area of approx. 52,900 m^2. Also the ETL will represent a new infrastructure that will impact the current visual aspect of the area, mainly due to the presence of the poles. The ETL will have a length of approx. 1.3 km. In order to have an idea of the overall visual impact of the Project during operation, it is useful to understand what will be the visibility of the Site from surrounding receptors, i.e. from houses and villages in the surroundings of the Site. As indicated in the baseline, the receptors in the Project's visual zone of influence are limited, as the area is scarcely populated. In addition, no touristic activities are present. The Site is potentially visible from the cultural heritage site of Tios, which is located approx. 2 km northwest of the Site.,

Within the context of the national EIA report, a sight analysis was performed, to calculate all visible points in a circle with a given radius from a selected elevation point (at a height of h from the ground) on any terrain at an angle of 360 degrees. Sight analysis, which is the most important and widely used type of analysis in geographic analysis systems, provides information about from which points around the facility can be seen.

In the sight analysis of the National EIA, a digital elevation model of open source ALOS DEM data (~30m) enhanced to 5m horizontal resolution by interpolation was used. This elevation model data was levelled to obtain a facility area ground level of 7m. Consequently, the elevation data model was applied by using the Viewshed algorithm of the Global Mapper software. Sight was calculated including all the points within a circle with a radius of 5 km, assuming that there was a lighting post at a height of 10m at a point closest to the sea, which was selected in the facility region. The results of this analysis are shown in the figure below; the areas coloured in pink are those from which the Site is theoretically visible.



In addition, pictures from visual points surrounding the Project site have been taken to provide an actual idea of the visibility of the Site. The location of the viewpoints is presented in the figure below.

Figure 7-12: Location of viewpoints from where pictures have been taken

Figure 7-13: Picture taken from viewpoint 1

Figure 7-14: Picture taken from viewpoint 2

Figure 7-15: Picture taken from viewpoint 3

Figure 7-16: Picture taken from viewpoint 4

Figure 7-17: Picture taken from viewpoint 5

Figure 7-18: Picture taken from viewpoint 6 – Cultural heritage site of Tios

As shown in the pictures, the Project Site is located in a flat area, while surrounding viewpoints are usually in a more elevated position, which makes the Site more visible from around. It has to be highlighted however that the presence of vegetation in many cases acts as a barrier that hides the site from the view of the observer. In general, the full extent of the Project Site is usually not visible from most of the viewpoints around the Site, hence the overall visual impact of the Project is reduced.

The Project will introduce manmade elements that will alter the character of the area and hence the overall landscape appearance. It should be noted however that the area has already been subject to significant transformations over time, due to the strategic decision to make of the area an industrial and infrastructural hub. The Project will therefore be in line with the overall industrial and infrastructural function that has been planned for the area.

As mentioned, the area is scarcely populated and there are not tourism activities, hence the visual impacts will affect a limited number of receptors and will not directly affect economic activities that are linked to landscape features such as tourism and recreational activities.

Mitigations to reduce the overall visual impact of the Project include using specific colours for the facilities and buildings, creating visual barriers through vegetation or screening systems and vegetating open and unbuilt areas to the extent possible. Measures will also be discussed with local communities and local authorities to identify specific actions that can be introduced to reduce the overall visual impact of the Project during operation.

- **Emission of light**

Project facilities of the OPF will have to be artificially illuminated during operation for safety and security reasons. Currently the AoI has limited human infrastructures and hence little artificial lighting is present in the area. The introduction of new artificial lighting will therefore alter the appearance of the AoI during the night. Measures will

be implemented to reduce light spill and to illuminate only where it is strictly necessary. LED lighting and modern lighting systems allow to better direct the light, to avoid glare effects and light pollution. If necessary, solutions will be discussed and agreed with local authorities and local communities to reduce the impact of lighting to the extent possible.

Mitigation measures

The following mitigation measures shall be implemented to mitigate the effects of the impact factors.

Emission of light

- Artificial lighting will be used only where necessary for safety and security reasons. Light will be directed only where necessary, to reduce light spillage in other areas.
- Lighting systems that reduce light pollution and glare effects will be used.
- If necessary, agreements will be taken with surrounding receptors and local communities to identify and implement measures to reduce unwanted lighting.

Change in land use

- Visual impacts will be discussed with surrounding receptors and local communities to identify and implement measures to reduce visual impacts during the construction phase.
- The use of artificial and vegetations screens will be considered to reduce visibility of construction activities from external viewpoints.

Residual impacts

The table below summarizes the impacts caused by the identified impact factors on the component assessed. The whole matrix used for the assessment, including all scores, is available in Appendix K.

Based on the baseline conditions of the assessed component, the project characteristics and actions, as well as the proper implementation of the mitigation measures proposed above, a potential **low negative impact** is expected on visual aesthetics during the operation phase.

Table 7-38: Residual impact assessment matrix for the visual aesthetics during the operation phase.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Presence of new onshore infrastructures	Duration:	Long	Medium-low	Mid term	Medium	Low	Medium
	Frequency:	Continuous					
	Geo. Extent:	Local					
	Intensity:	High					
Emission of light	Duration:	Long	Medium-low	Short-term	Negligible	Medium	Negligible
	Frequency:	Highly frequent					
	Geo. Extent:	Local					
	Intensity:	High					

Impact Factor	Impact Factor Features	Component Sensitivity	Impact Reversibility	Impact Value	Mitigation effectiveness	Residual impact value
Overall assessment:	Medium	Rationale:	The overall impact on the component has been Assessed to be medium, considering the value assessed for the “presence of new onshore infrastructure”, which is the most relevant impact factor on the visual aesthetic component during operation.			

Monitoring measures

The following monitoring measure shall be implemented to assess the true effects of the project on visual aesthetics during the construction and verify the effectiveness of the mitigation measures.

- Verification of number, type, attendance and outcomes of stakeholder engagement activities.
- Verification of the number of grievances received and percentage of grievances resolved positively.

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