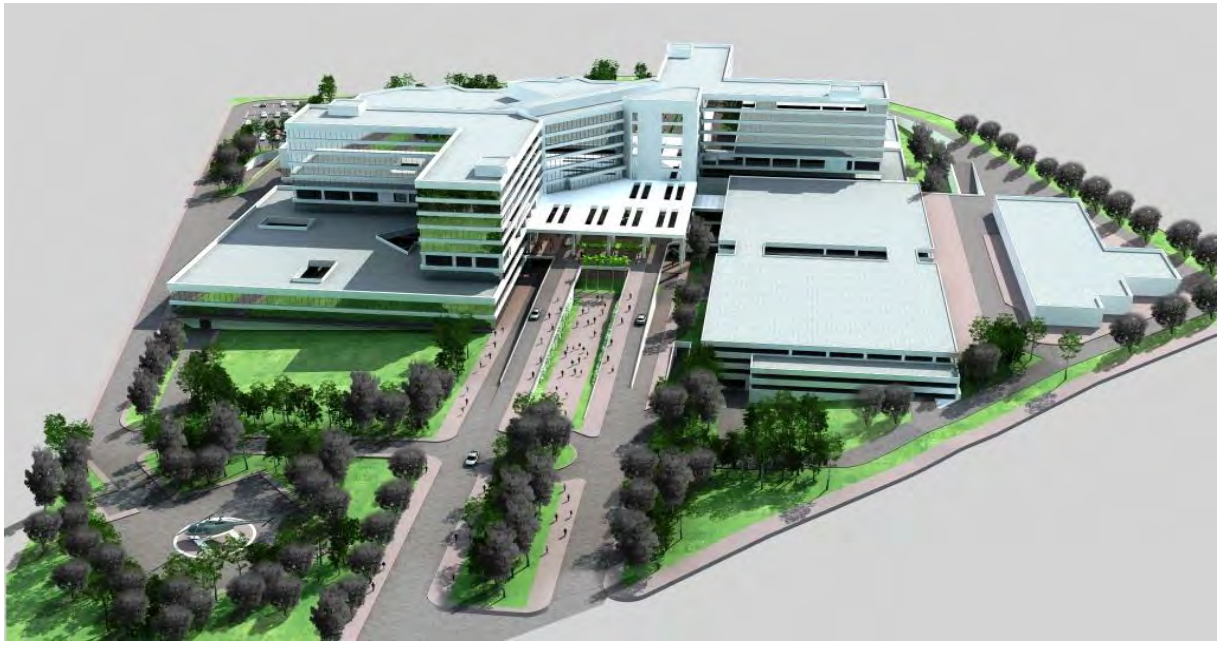
ATM SAĞLIK MANİSA YATIRIM VE İŞLETME A.Ş.



MANİSA TRAINING AND RESEARCH HOSPITAL PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

(FINAL DRAFT)

MANİSA PROVINCE, ŞEHZADELER DISTRICT, YUKARI ÇOBANISA QUARTER

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ABBREVIATIONS

%	Percentage
^{0}C	Centigrade Degree
A.Ş.	Corporation
ADNKS	Address-based Population Registration System
Ag	Silver
As	Arsenic
B	Boron
BHM	Bitumen Hot Mix
BOD	Biochemical Oxygen Demand
Cd	Cadmium
Cl	Chloride
Cn	Cyanide
CO	Carbon monoxide
COD	Chemical Oxygen Demand
Cr	Chrome
Cu	Copper
dBA	Decibel-A
DSİ	State Hydraulic Works
EBRD	European Bank For Reconstruction And Development (*"Avrupa İmar ve Kalkınma Bankası"*)
EHS	Environmental, Health and Safety Guidelines (*"Çevre, Sağlık ve Güvenlik"*)
e.g.	For example
EIA	Environmental Impact Assessment
EP	Equator Principles ("*Ekvator Prensipleri*")
EPA	Environmental Protection Agency *("ABD Çevre Koruma Kurumu")*
EPFI	Equator Principles Financial Institution *("Ekvator Prensipleri Finans Kuruluşu")*
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Monitoring Plan
EU	European Union
GIIP	Good International Industry Practice *("İyi Sanayi Uygulamaları")*
ha	Hectar
HBYS	Hospital Information Management System
Hg	Mercury
HKİ	Air Quality Index
HKKD	Contribution Value for Air Pollution
hm^3/year	Hectometercube/year
Hz	Hertz
IAPCR	The Regulation on Industrial Air Pollution Control
IFC	International Finance Corporation
KGM	General Directorate of Highways
km	Kilometer
km^2	Kilometer square
KÖİ	Public-Private Sector Cooperation
LEC	Local Environmental Council
Ltd.Şti.	Limited Company

LTL	Long Term Limit Value
m^2	Meter square
m^3	Metrecube
m^3/day	Metrecube /day
m^3/h	Metrecube /hour
MEB	Ministry of National Education
mg/kg	Milligram/kilogram
mg/L	Milligram/liter
mg/m^2-day	Milligram/meter square -day
MWt	Megawatt (thermal)
µg/m^3	Microgram/metercube
NGO	Non-governmental organizations
Ni	Nickel
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Dioxides
O_3	Ozone
Project	Manisa Training and Research Hospital
Pb	Lead
pH	H^+ İon Concentration
PM	Particle Matter
PR	Performance Requirement
PS	Performance Standards
RAMEN	The Regulation on Asssessment and Management of Environmental Noise
RWPC	The Regulation on Water Pollution Control
Sb	Antimony
SGK	Social Security Institution
Sn	Tin
SO_2	Sulphur dioxide
SO_4	Sulphate
STL	Short Term Limit Value
T.C.	Republic of Turkey
TEİAŞ	Turkish Electricity Administration Corporation
TL	Turkish Lira
TURKAK	Turkish Accreditation Institution
TÜİK	Turkish Statistics Institution
TSS	Total Suspended Solid
USA	United States of America
Zn	Zinc

1. INTRODUCTION

"Manisa Training and Research Hospital Project" (Project) is planned to be constructed in the boundaries of Eagean Region, Manisa Province, Şehzadeler District.

"Manisa Training and Research Hospital Project "is one of the city hospitals in the scope of "Health Transformation" program run by Ministry of Health. The Project is based on a Public Private Partnership (PPP) investment – finance model which has become widespread in recent years. The reason is that resources are limited due to public debt burden and it is desired to increase the private sector's participation in infrastructure investment.

The project has a capacity of 558* beds and it will be installed over an area of 97,515 m^2. The project will be held with PPP investment and finance model. The investment period of the project is 2 years and the period of the operation is 25 years.

Visual plan of the Project is given in **Figure 1** and location map of the Project is given in **Figure 2.**

Figure 1.Visual Plan of the Project

The main reasons of the use of PPP model in health sector are as follow; the usage of private sector finance funding in public investments, the ability of private sector of rapid decision-making and implementation of these decisions, creativity of private sector to integrate into project process, the sharing of risk, not bearing the cost in the name of public until health facility is active, extending over years of investment burden on limited investment funding at the level of hire payment, support of the operation of working areas and other services except medical service by private sector.

ATM Sağlık Manisa Yatırım ve İşletme A.Ş. which will conduct the construction, operation and maintenance phases of the project has been founded for this project

* *Manisa Training and Research Hospital project was tendered with 560 beds, during planning phase it was considered that appropriate design will be 558-bed capacity according to site studies.*

within the body of YDA Group organization in 2013. YDA Group is one of Turkey's leading companies which conglomerate generating business volume at the international level with companies operating in different sectors innational and over seas subsidiaries. YDA Group, opening international markets from the beginning of the 2000s, has undertaken projects in many countries such as Kazakhstan, Ukraine, United Arab Emirates, Russia, Saudi Arabia, Afghanistan and Moldova. In addition to investing in real estate projects, national and international infrastructure implementation projects using Built-Operate-Transfer and PPP models and especially it maintains its position as one of the leading and experienced company in the city hospitals.

The purpose of Environmental and Social Impact Assessment (ESIA) Report which is prepared for Manisa Training and Research Hospital is; to identify the various environmental and social impacts that may be caused by this project and to eliminate or identify mitigation measures of adverse effects.

This report has been prepared in an appropriate manner with the requirements set by financial institutions.

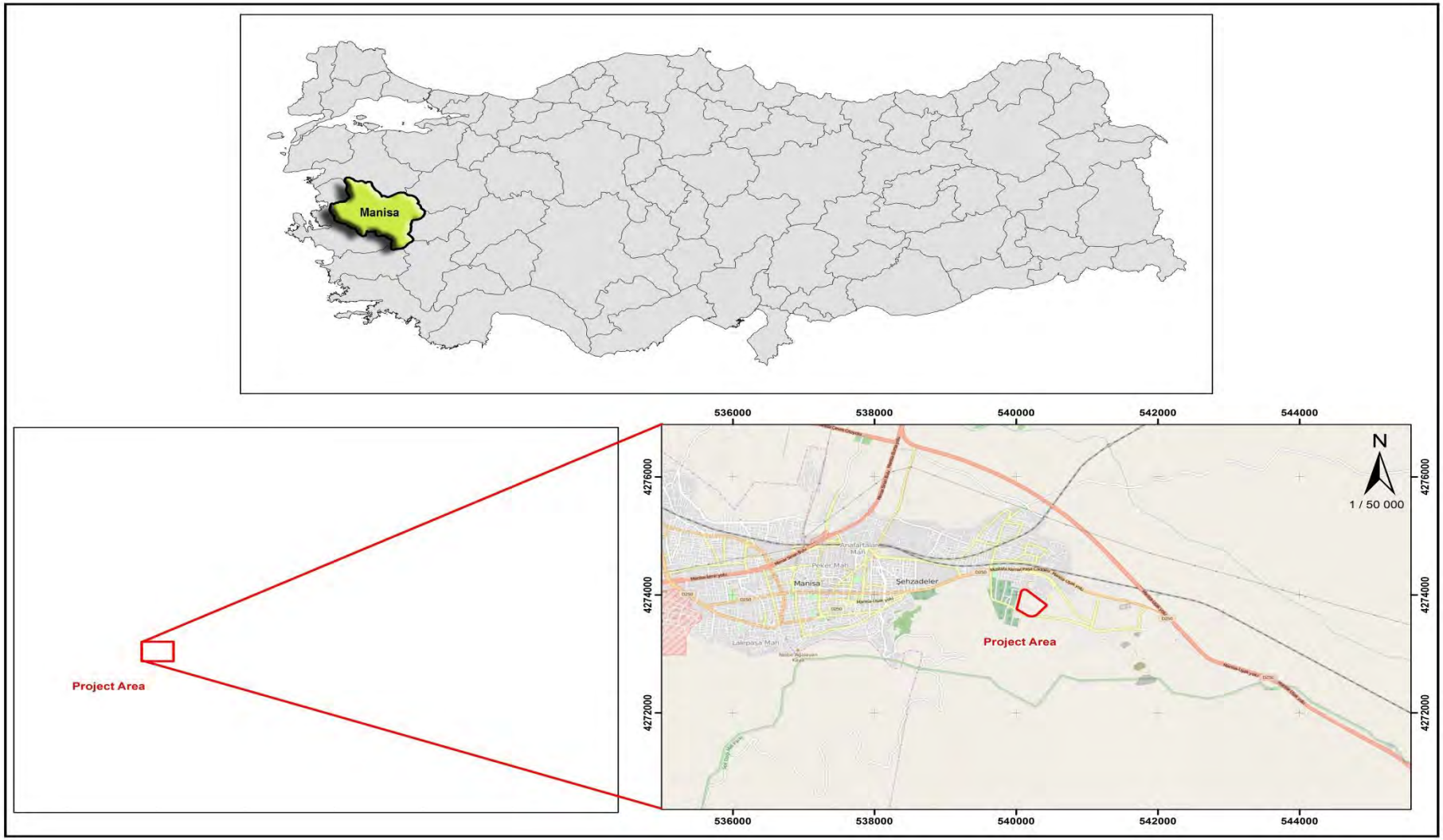


Figure 2.The map of the Project's Location

2. OBJECTIVES AND SCOPE OF ESIA

2.1. Objectives

ESIA is a research study of physical, natural, cultural, social and socio-economically impacts of the project's design, construction, operation and decommissioning phases.

ESIA Report defines the Project and impacts of Project on the environmental and social conditions and informs about how the Project is designed, mitigation measures to decrease negative impacts and procedures to maximize positive impacts.

The main objectives of the ESIA are to:

- Determine the baseline conditions of the Study area,
- Identify and assess the anticipated environmental and social impacts of the proposed projects, both positive and negative,
- Identify and analyse alternatives to the proposed projects,
- Propose mitigation measures for negative impacts and enhancement measures for positive impacts to be undertaken before, during and after the implementation of the proposed projects,
- Verify compliance with international and national environmental regulations and policies,
- Generate baseline data for monitoring and evaluation of the mitigation measures implementation during the project life cycle,
- Recommend cost effective mitigation measures against the anticipated negative impacts;

It is required the Project to be in conformance with Turkish Environmental and Social Regulations. Ready-mixed concrete plant which will be used for the construction of the recommended hospital is exempt from the state National Environmental Impact Assessment (EIA) legislation (Temporary Article 2 "Offsite projects). In this regard received text from Manisa Provincial Directorate of Environment and Urbanisation is presented in **Annex A**.

On the other hand, after finalizing power and thermal specifications of the tri-generation system[1] which will be implemented under the project, it will be evaluated in accordance with national legislation and all required permits including taking EIA permit. However, request would be made to the relevant authorities at the national level in terms of environmental management and monitoring of the project.

Although this project is legally exempted from EIA process that is being implemented by Ministry of Environment and Urbanisation, this ESIA Report has been requested by ATM Sağlık Manisa Yatırım ve İşletme A.Ş. and it has been prepared in accordance with the requirements of the IFC and EBRD and implemented by MGS Project Consulting Engineering and Trade Ltd. Sti.

[1] *Trigeneration system is a system providing production of three energy types (electricity + heating + cooling) together at the same energy source.*

In order to ensure environmental and social sustainability, International financial institutions demand compliance with the standards listed below:

- EBRD (European Bank For Reconstruction And Development *"Avrupa İmar ve Kalkınma Bankası"*) Performance Requirements (2014),
- EBRD Environmental and Social Policy (2014),
- EBRD Sub-Sectoral Environmental and Social Guidelines for Health Services and Clinical Waste Disposal (October 2009),
- Equator Principles (July 2013),
- World Bank/IFC (International Finance Corporation *"Uluslararası Finans Kurumu"*)Performance Standards (1 January 2012),
- IFC EHS Guidelines (Environmental, Health and Safety Guidelines *"Çevre, Sağlık ve Güvenlik"*) (30 April 2007),
- IFC General Guidelines for Environment, Health and Safety for Health Centers (April 30, 2007) and
- International Environmental Conventions Applicable for Turkey

2.2. EISA Scope

Environmental and Social Impact Assessment studies for the Project consist of:

- Construction of the hospital,
- Operation of the hospital.
- Closure of the health campus

Studies for the Project are implemented for three phases;

- Design (Project Preparation)
- Construction
- Operation

This ESIA report has been based on public notification meetings which have been held in between August 2015 and November 2015, local community questionnaires, socio-economic and ecologic based studies, laboratory analysis, management meetings, literature reviews, contributor participations, various field visits.

- To meet with the desired environmental compliance standards under the EBRD, IFC/World Bank Guidelines and national/ international regulatory framework (discussed in detail in Section 4) as applicable to the Project,
- Determine the baseline conditions of the Project area,
- Activities to mitigate any potential adverse impacts.

Baseline Conditions

Environmental and social impact assessment is based on baseline situation. For this reason, environmental measurements and social studies have been performed in order to make evaluation of the requirement and effects of the Project.

Socio-Economic Conditions

As mentioned above, current socio-economic conditions have been tried to be determined by field studies and literature reviews. Literature review includes demography, employment and economic activities (agriculture, stockbreeding, industry, etc.), health, education and substructure properties. In addition to that, information has been acquired from field studies, meetings with contributors, local community questionnaire and socio-economic information received from the vicinity.

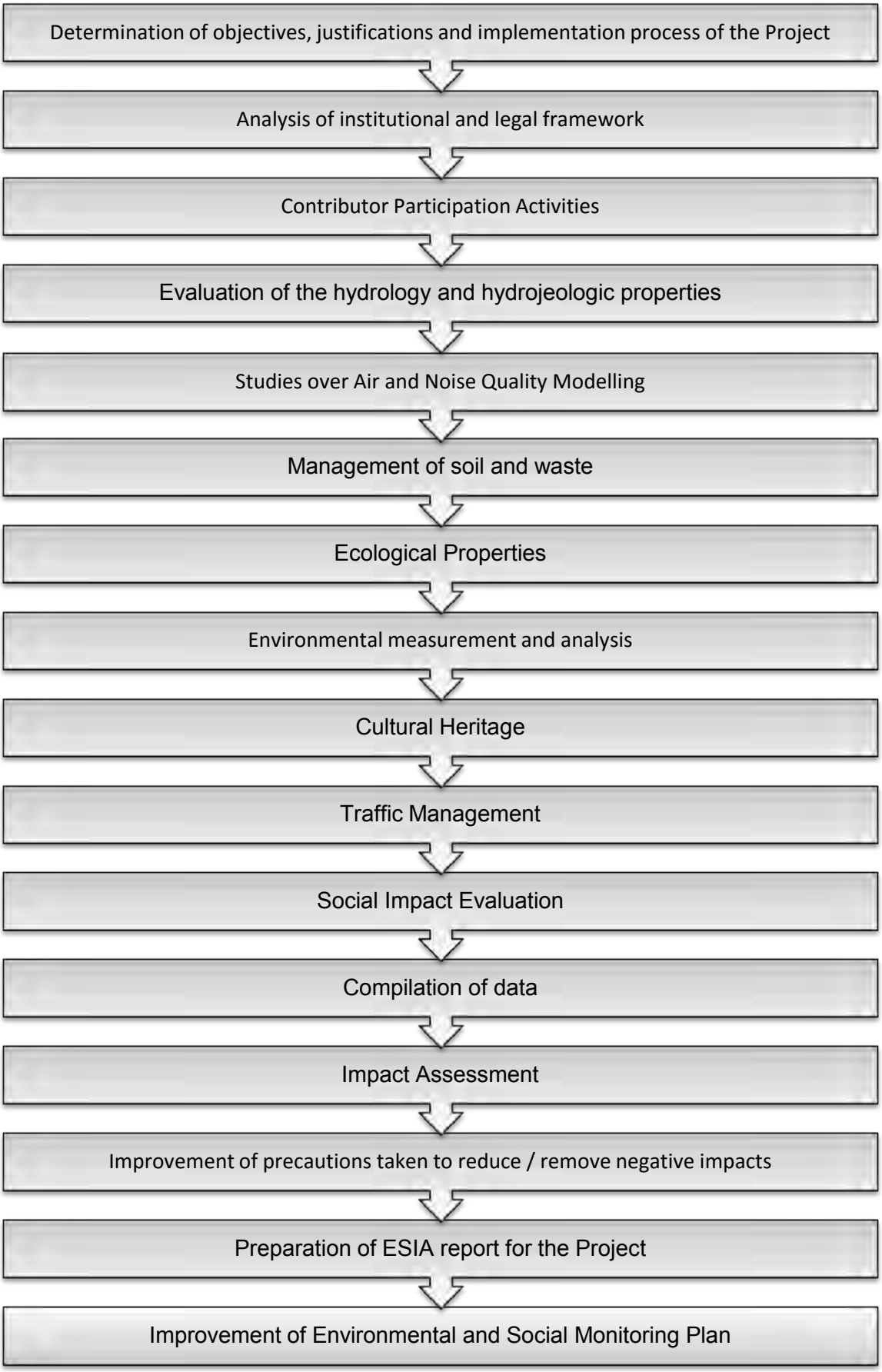
Environmental Conditions

Environmental sampling and analysis on; air (PM, NO_2, SO_2), surface water, groundwater, noise and soil were carried out at the site and it's surrounding in order to determine the ambient conditions.

Sampling and analysis activities are conducted by SEGAL Environmental Measurement and Analysis Laboratory Company authorized by Environment and Urbanization Ministry as well as Turkish Accreditation Agency (TURKAK) in compliance with EBRD, IFC/World Bank Guidelines and national/international regulatory framework.

Development of ESIA Report

The ESIA report is prepared by taking the following aspects into consideration.


Determination of objectives, justifications and implementation process of the Project
Analysis of institutional and legal framework
Contributor Participation Activities
Evaluation of the hydrology and hydrojeologic properties
Studies over Air and Noise Quality Modelling
Management of soil and waste
Ecological Properties
Environmental measurement and analysis
Cultural Heritage
Traffic Management
Social Impact Evaluation
Compilation of data
Impact Assessment
Improvement of precautions taken to reduce / remove negative impacts
Preparation of ESIA report for the Project
Improvement of Environmental and Social Monitoring Plan

The ESIA report for the Project is organized in the following way:

Section 1	Introduction
Section 2	Determination and explanation of objectives and goals of the Project, explanation of scope of ESIA and methodology used during ESIA process
Section 3	Explanation of necessity of the proposed Project, project activities, program, field and alternatives
Section 4	Explanation of legal and institutional frame which is in conformance with the project,
Section 5	Determination of negative and positive impacts of the Project life cycle and precautions to remove / reduce these negative impacts, explanation of operation procedure of ATM Sağlık Manisa Yatırım ve İşletme A. Ş.
Section 6	Information about participation of contributors and adopted consultation methods as a part of ESIA process
Section 7	Explanation of monitoring and reporting program
Section 8	List of references used in preparation of this report

Applicable Financial Institutions Standards

Basic credit guidelines to be followed throughout the project have been determined as May 2014 dated "*EBRD Environmental and Social Policy*" and July 2013 dated "*Equator Standards*" and 2012 January dated "*IFC Performance Standards*". These documents include respectively "*EBRD Performance Requirements*", "*Equator Principles*" and "*IFC Performance Standards*". EBRD, Equator Principles and IFC standards are given in **Section 4**.

Projects are evaluated in three categories in the initial stages at ESIA process that is being implemented by the World Bank[2] **(Please refer to Table 1).**

Table 1. World Bank Scanning System

Turkey Environmental Assessment Screening Decision	World Bank Environmental Assessment Screening Decision		
	Category A		**Category A**
Annex I - EIA	X	X	
Annex II Required EIA Decision	X	X	
Annex II EIA Not Required Decision	X	X	X
Out of scope		X	X

Category A: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EIA Report for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the 'without project' situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance

Category B: A proposed project is classified as Category B if it's potential adverse environmental impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EIA Report

[2] *Operational Manual Environmental Safeguards Framework Document; November 2011,http://wwwwds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2011/10/25/000333038_20111025010337/Rendered/INDEX/ E26820v20TURKI0for0PSREEE0Env0FW0TR.txt.*

for a Category B project may vary from project to project, but it is narrower than that of Category A EIA Report

Category C: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. There is no EIA Report requirement for Category C projects.

The Project of Manisa Training and Research Hospital is classified as “Category B”. This means that the Project has minimum, site specific and irreversible social and environmental impacts.

The planned project has some impacts on both construction and operation phases. These effects should be managed according to EBDR and IFC principles.

Environmental and Social Performance Requirements (PR) of EBDR are given below:

- **PR1:** Assessment and Management of Environmental and Social Impacts and Issues
- **PR2:** Labour and Working Conditions
- **PR3:** Pollution Prevention and Abatement
- **PR4:**Health and Safety
- **PR5:**Land Acquisition, Involuntary Resettlement and Economic Displacement
- **PR6:**Biodiversity Conservation and Sustainable Management of Living Natural Resources
- **PR7:**Indigenous Peoples
- **PR8:**Cultural Heritage
- **PR9:**Financial Intermediaries
- **PR10:**Information Disclosure and Stakeholder Engagement

IFC Performance Standards (PS)

- **PS 1:** Assessment and Management of Environmental and Social Risks and Impacts
- **PS 2:** Labor and Working Conditions
- **PS 3:** Resource Efficiency and Pollution Prevention
- **PS 4:** Community Health, Safety, and Security
- **PS 5:**Land Acquisition and Involuntary Resettlement
- **PS 6:**Biodiversity Conservation and Sustainable Management of Living Natural Resources
- **PS 7:** Indigenous Peoples
- **PS 8:** Cultural Heritage

The project area of the property is owned by the Treasury, and has been allocated to the Ministry of Health by Manisa Governor Revenue National Real Estate Directorate. The Ministry of Health has transferred the land construction right of the said land to ATM Sağlık Manisa ve Yatırım A.Ş. **(Please refer to Annex A).** In this respect, in project scope there is no need to implement specified performance criteria mentioned below:

- **PR5:** Land Acquisition, Involuntary Resettlement and Economic Displacement
- **PS 5:** Land Acquisition, Involuntary Resettlement

Since the field has no ecological and bio-diversity importance (See Annex A), it is not required to follow the following performance criteria:

- **PR6:**Biodiversity Conservation and Sustainable Management of Living Natural Resources
- **PS 6:**Biodiversity Conservation and Sustainable Management of Living Natural Resources

No local public is living in the field so it is not required to follow the following performance criteria:

- **PR 7:**Indigenous Peoples
- **PS 7:**Indigenous Peoples

As is mentioned by Directorate of Manisa Museum and Directorate of Provincial Urban Planning and institutional writings shown in Annex A, there are no cultural assets in the scope of 2863 numbered “Cultural and Natural Assets Protection Code”. Since there is no impact over cultural heritage, it is not required to follow the following performance criteria:

- **PR 8:**Cultural Heritage
- **PS 8:**Cultural Heritage

On the other hand, if ever any movable / immovable cultural assets are found during project activities, then due to the requirement of 2863 numbered Code "Archaeological Findings Procedure" will be followed **(please refer to Section 5.8.2)**.

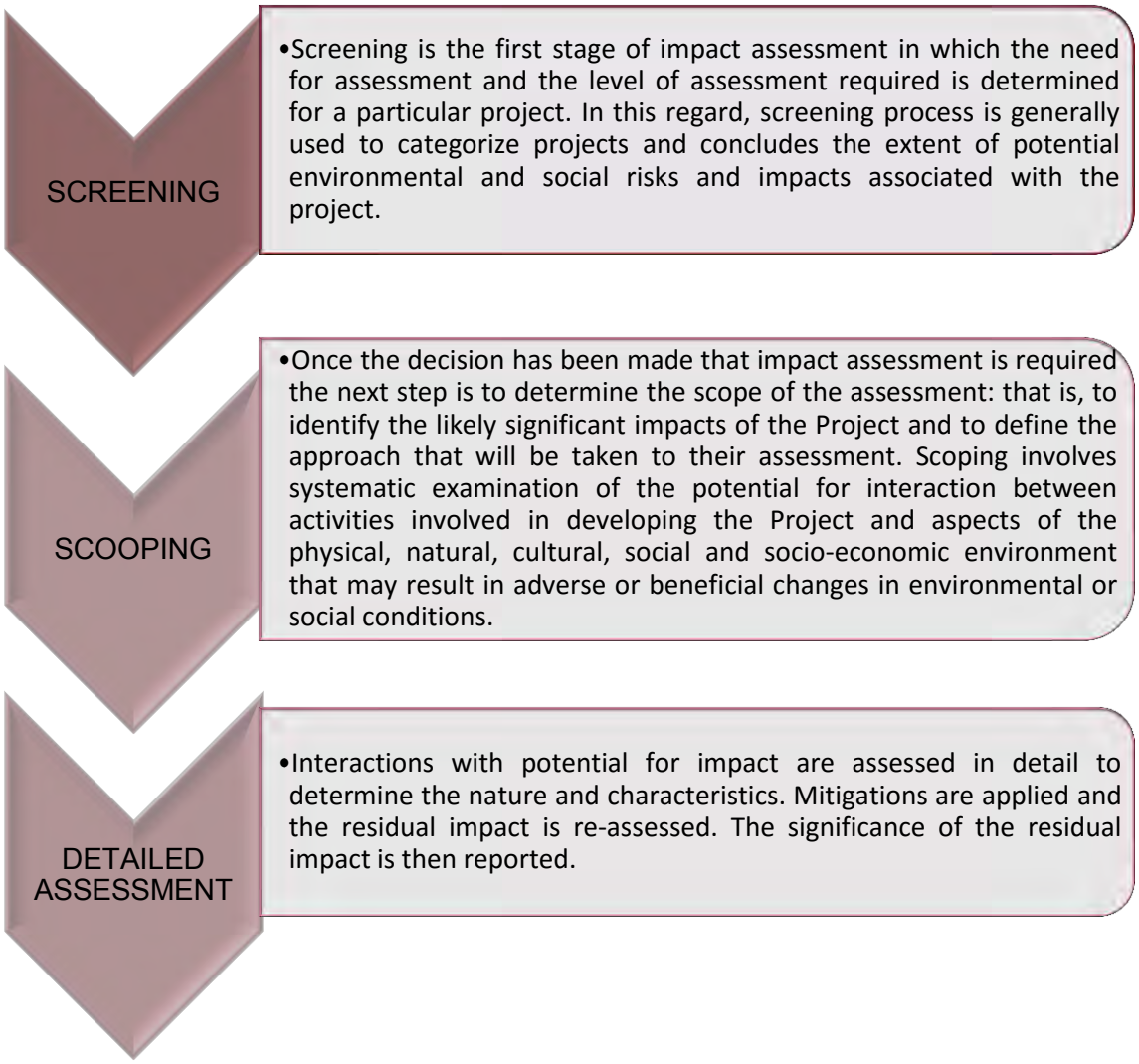
The Project is not classified in financial intermediaries (FI) category. Therefore, the following performance criteria will not be applicable.

- **PR 9:Financial Intermediaries**

2.3. Methodology

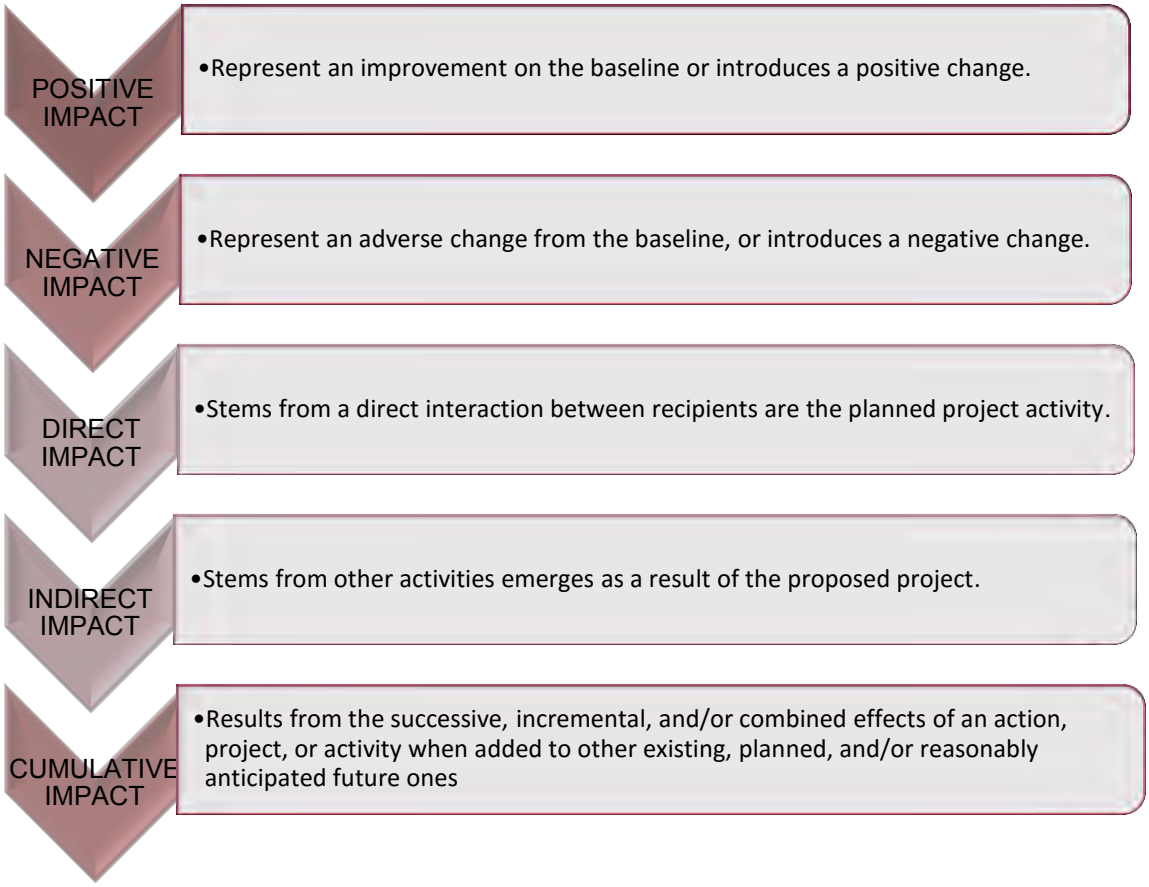
Methodology, which has been mentioned in this section, explains the general approach adopted for ESIA studies and reveals the key steps followed during ESIA studies.

The steps of impact identification and assessment process through screening, scoping and detailed impact assessment are shown below.

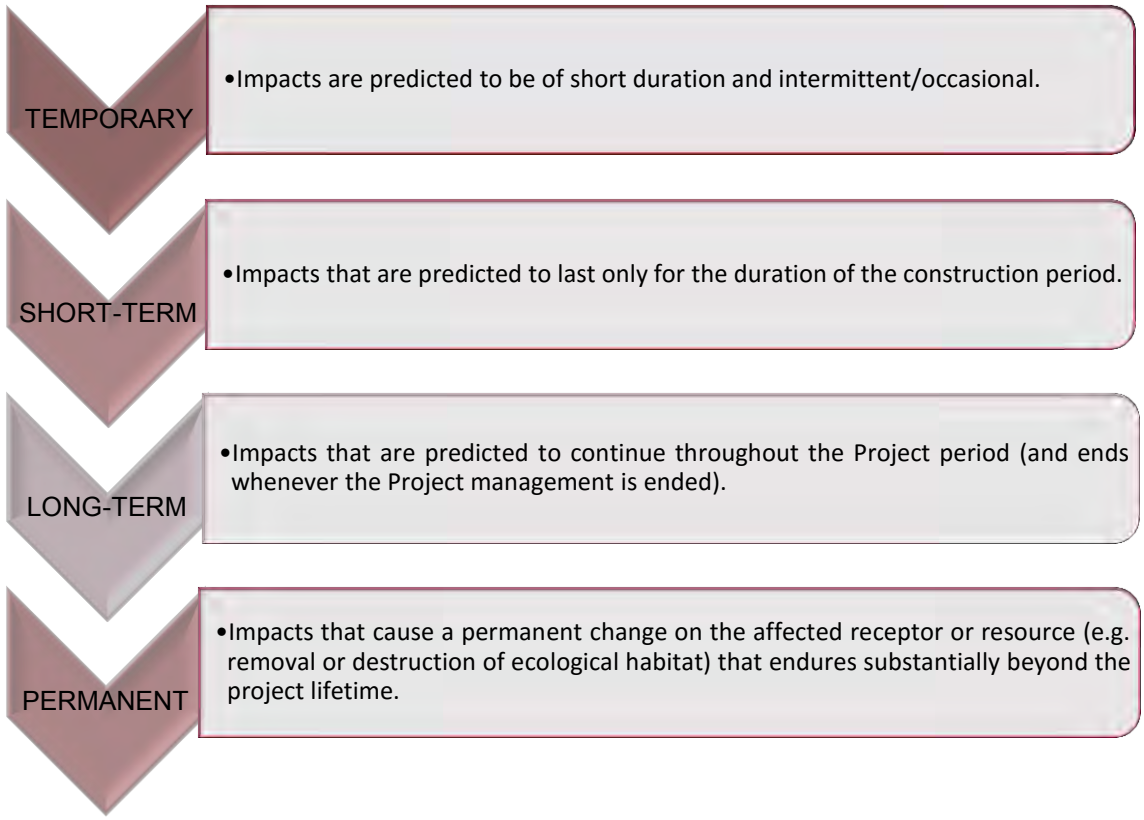


The purpose of impact assessment and mitigation is to identify and evaluate the significance of potential impacts on identified receptors and resources according to defined assessment criteria; to develop and describe measures that will be taken to avoid or minimize any potential adverse effects and enhance potential benefits; and to report the significance of the residual impacts that remain following mitigation.

There may be impact over any resource or receiver caused by Project components or as a result of execution of Project activities. The evaluation of baseline data provides crucial information for the process of evaluating and describing how the Project could affect the physical and socio-economic environment. Impacts are classified as:



Duration of impacts is classified as:



The criteria for determining significance are specific for each environmental and social aspect but generally for each impact the magnitude and the sensitivity of the receiving environment are defined with reference to that environmental or social aspect under consideration.

Generic criteria for defining magnitude, sensitivity and significance are summarized below.

Sensitivity: The sensitivity of baseline conditions or receptors has been determined according to the relative importance of existing environmental features or by the sensitivity of receptors which would potentially be affected by the development such as human, flora or fauna. The ability of the baseline conditions or receptors to adapt to change and has also been considered.

Magnitude: The magnitude of potential impacts on environmental baseline conditions has been defined by considering the scale or degree of change the proposed development. While assessing the magnitude of the impact, two steps are followed. First, the key issues associated with the Project are categorized as beneficial and adverse. Then, impacts are categorized as major, moderate, minor or negligible considering duration of the impact, spatial extent of the impact, reversibility likelihood and compliance with legal standards.

Significance: Interaction between the sensitivity of the receiving environment and the magnitude of the change has been considered while determining the significance of the impacts.

The significance of impacts will be evaluated with reference to the interaction between magnitude and sensitivity as presented in **Table 2** below.

Table 2. Impact Significance Matrix

	Sensitivity			
Severity	*Negligible*	*Low*	*Medium*	*High*
Negligible	Negligible	Negligible	Negligible	Negligible
Low	Negligible	Low	Low	Low
Medium	Negligible	Low	Medium	Medium
High	Negligible	Low	Medium	High

SENSITIVITY

High: Receptor has no or low capacity to absorb the Project based changes without having significant changes over its structure having high environmental value or international importance.

Medium: Receptor medium level capacity to absorb the Project based changes without having significant changes over its structure having high environmental value or international importance

Low: Receptor may compensate the project based changes without causing any harm over its structure having low environmental value or local importance.

Negligible: The receptor is resistant to change and is of little environmental value.

MAGNITUDE

Major: Total loss or fundamental change to the specific conditions, typically wide spread in nature, and requiring significant intervention to return to baseline conditions, exceeds national/international limits.

Moderate: Perceptible change to the specific conditions resulting in non-fundamental temporary and permanent change.

Minor: Perceptible but minor change to specific conditions.

Negligible: Imperceptible change to specific conditions.

SIGNIFICANCE

Not Significant: The receptor will not be affected in any way by a particular activity, or the predicted effect is deemed to be imperceptible or is indistinguishable from natural background levels.

Minor: The receptor may experience an effect, but the magnitude of the impact is sufficiently small and within accepted standards.

Moderate: The impact is within the accepted limit and standards.

Major: The effect is experienced such that accepted limit and standards may be exceeded once or more than once, or large magnitude impacts occur to highly valued/sensitive resource/receptors.

The Project would be required to identify suitable and practicable mitigation measures and fully implement them. The implementation of the mitigations will be ensured through the Environmental and Social Management Plan (ESMP). Once the mitigation is applied, each impact is re-evaluated, assuming that the mitigation measure is effectively applied, and any remaining impact is rated once again using the process outlined above. The result is important for impact.

3. DESCRIPTION OF PROJECT

3.1. Project Overview

As a result of increasing in private sector with the competition of standards in housing industry and health sector, it is aimed to create a unit which has enough comfort requirements, provide all kinds of standards and become self-sufficient.

Compared to other facilities, the project comes to the prominence thanks to providing health service in an effective and quick way, reaching the specialized knowledge easily, saving space and time, reduction in cost, activity on staff organization, high level of infrastructure in social and hotel management quality, enough bed capacity, the opportunity of caring lots of patients with short-term patient process, making saving with projects in technology and other logistic units (electricity, water, heating up, cooling), vehicle and parking level. Due to the increasing population of the Province, the requirements for higher quality of services and developing technologies, new health care facilities are needed in Manisa.

“**Manisa Training and Research Hospital**” is one of the investments planned by Ministry of Health as a result of health needs assessment.

The rooms to take place in “**the Project**” will be with 1 or 2 beds in accordance with Health Facility Program and objectives of Ministry of Health.

The project will be done in the framework of "The Regulation on Building Health Facilities in return for lease and Renewal in return for the Operation of Areas Standing out of Health Care Services" which is in 3359 numbered "Health Services Fundamental Law" (article 7). This model can be thought as "Public-Private Partnership" but it is "build-lease-transfer" method in terms of implementation model.

In this model based on working in collaboration and partnership in order to provide the public and private sector health infrastructure and services; health facilities will be made with rental money over a specified time and price on immovable property belonging to Treasury or individuals within the framework of the basic standards and preliminary design will be determined by the Ministry and not to exceed 30 years to be determined by the tender bidders. Thus, financial needs will be met by private sector and the burden on government budget will be shared, new and efficient facilities will be built, investments in health sector will be supported, no payment will be made to private sector until the facility will be ready to use, standards determined before for services will be stay the same during the cooperation process.

Public-Private Partnership gets close to private sector with non-governmental organizations, develops a new understanding for public management. Moreover, it is a method in which cost of goods, risk and benefits are shared by everyone.

PPP has been used these days commonly, because funds are limited and there is a demand for increasing the private sector's participation in infrastructure investment.

The Necessity of Project

The need for health services has been increased with the Manisa province's intensive and increasing population. Founding year of the current hospitals is very old. In addition, the hospital does not have enough space for parking area and green area.

According to Manisa Provincial Directorate of Health and Turkey Statistical Institute (TÜİK) data, hospitals at Manisa; are gathered under three main headings such as Ministry of Health, university and private hospitals.

The number of state hospitals in the province according to TÜİK is 29 in 2012 and 29 in 2013 while this number is set at 27 in 2014[3].

When looked at the hospital in terms of bed capacity in Manisa, during transition to 2013 there was a decline from 2012, but this decline has been disappeared in 2014, and an increase has begun in the number of beds **(Please refer to Table 3**).

Table 3. Number of Beds According to Years

Years	2012	2013	2014
Number of Beds	3,859	3,851	4,059

Source: Manisa with Numbers (2014) and Turkish Statistical *Institute*

Data about health units located in Manisa Province in 2014 are given in **Table 4**.

Table 4. Manisa Province Health Units (Year 2014)

Unit	Ministry of Health	Private	University	Total
Number of Hospitals	18	8	1	27
Number of Dispensary	3	-	-	3
Number of Family Health Center	162	-	-	162
Family Practice Unit	403	-	-	403
Number of Sanitarium	124	-	-	124
Number of Actual Bed	2,960	540	559	4,059

Source: Manisa Provincial Directorate of Health, 2014.
NOTE: From The Special Universal Hospital in November of 2013, the Private Soma Vefa Hospital was not included in the number of hospitals because it is not operational since May 2014.

The distribution over districts of the health institutions and the number of beds in these institutions are presented in **Table 5.**

Table 5. The number of Hospitals at Manisa Province on a District Base (at 2014)

District	Number of Health Institutions	Total Number of Bed in Health Institutions
Ahmetli	2	305**
Akhisar	2	107
Alaşehir	1	150
Demirci	1	60
Gölmarmara	1	-**
Gördes	1	35
Kırkağaç	1	43
Kula	2	289
Köprübaşı	1	-**
Salihli	3	239
Sarıgöl	1	50
Saruhanlı	1	40
Şehzadeler	***4***	***1,516***
Selendi	1	25
Soma	1*	225

[3]*Manisa Province Health Directorate data.*

District	Number of Health Institutions	Total Number of Bed in Health Institutions
Turgutlu	2	338
Yunusemre	2*	637
Total	***27***	***4,059***

Source: Manisa with Numbers, 2014.
*** Special Vefa Hospital in Soma district and the Universal Hospital in Yunusemre District is not included in the list because is not in operation since 2014 and 2013.*
***Number of beds at the E-2 type District State Hospitals at Ahmetli, Gölmarmara and Köprübaşı Districts is not included in the list.*

The majority of health care stuff consists of nurses (%24.64). While there were 10,090 health care staff working provincial-wide in 2013, this number increased to 18,722 in 2014 **(See Table 6).**

Table 6. Manisa Province Health Care Staff Information

Staff Information	Health Ministry	University+ Private	Total	%
Number of Specialist	670	1,189	1859	9.93
Number of Practitioner	691	758	1449	7.74
Total Number of Dental Specialist	156	304	460	2.46
Total Number of Pharmacist	39	504	543	2.90
Total Number of Midwife	1,105	1,162	2267	12.11
Total Number of Nurse	1,963	2,650	4613	24.64
Health Staff	1,158	1,710	2868	15.32
Health Technician	214	339	553	2.95
Laborant	247	53	300	1.60
Social Worker	21	21	42	0.22
Nutritionist	19	35	54	0.29
Chemist	3	5	8	0.04
Biologist	22	55	77	0.41
Statistician	1	1	2	0.01
Physiotherapy+Psychologist+Health Physician	58	99	157	0.84
Other Staff	1,207	2,263	3470	18.53

Considering the state of the health staff, it arises rather a meagre table for a big city like Manisa. When examining **Table 6** in health care facilities across the province, it is seen that mostly nurses (24.64 %) are working. The remaining health service providers are health officers with 15.32 %, midwives with 12.11 % and specialists with 9.93 %.

Population per specialist physicians is 3,192; the population per general practitioners is 3,785. Although these figures are above the average of Turkey due to attending (or specialist) and general practitioners for the European Union (EU) it is well below the average. The EU average shows that 300 people fell a physician.

In Manisa, due to Address Based Population Registration System conducted by TUIK in 2014 (ADNKS) the population has been found 1,367,905. This population is experiencing difficulties in benefiting from the services of the hospital in Manisa province. The bed capacity of hospitals of the Ministry of Health is not enough. At the same time compared to the EU member and candidate countries together although there is a rise in the number of beds per 10,000 people in Turkey has the least number of beds.

When examined individually The Ministry of Health hospitals and clinics bed occupancy rates (when emergency observation beds and dialysis removed), many clinics are seen as more than 100% of beds occupied. At the hospitals that clinical bed occupancy rates is up to 100%, delay of hospitalization may adversely affect the treatment process. At the end of 2014 in hospitals in Manisa 2,856,432 people was treated standing and 53,457 people are hospitalized. In 2014 4,753 births occurred in these institutions. In hospitals, dialysis and intensive care services are also provided. When these conditions are considered with the increase in population, the desired quality and service competencies to the citizen in Manisa Province and surrounding settlements cannot be given.

Even though total budget for health investment are on the rise of this budget not allow to produce physical capacity parallel to increasing population and it is not enough to renovate and develop current health facilities. Budget can only be made to develop ongoing constructions. New investment decisions taken get into a financial need cycle and these decisions are doomed to the financial facilities of general budget in the future. Therefore, each investment decision taken postpones the end date of current and new projects. While unfinished constructions wait to be financed, finished parts of the construction start to run out of construction time in the framework of project life cycle. For this reason, PPP model is seen as a problem-solving model.

Construction years of hospitals in the province Manisa are often very old. Only Celal Bayar University Faculty of Medicine is relatively new and it is on the west of the city. Other hospitals do not have the opportunity for the expansion because they are stuck and located in occupied area of the city center. There are not enough parking space and green area in the hospitals, as previously stated.

Determination of Area of Influence for the Project

Under the scope of EBRD Performance Requirement 1, arising environmental and social impacts and constraints will be assessed under the scope of area of influence of the Project. One or more of the followings can be included in this area of influence:

i. Assets and facilities (such as production facility, energy transmission lines, pipe lines, canals, harbours, access roads and construction camps) which are owned or managed by the customer related with the project activities to be financed.

ii. Assets and facilities which support / allow the activities owned or controlled by the contract parties by the purpose of completion of the project or which are required for customer's business activities (such as contractors).

iii. Facilities or works which are not financed by EBRD as a part of the project and which are separate legal administrations but of which existences are dependent exclusively on the project.

iv. Activities and services which are owned or conducted by the customer and which are a part of the guaranty package committed to EBRD as collateral.

v. Fields and communities which are possibly affected from the fact of project being developed more than the planned one or from the cumulative impacts arisen due to any other existing project or condition or other sources of similar effects at the geographical area and other developments which are realistically expected during the assumed case assessment.

vi. Fields and communities which are possibly affected from impacts which are caused by the project, which occur later or at another place and which are unplanned but expected. Impact area does not include possible impacts which arise without the project of which arise independent of the project.

Buildings which are under the body of the health facility due to scope of the Project and surroundings of the hospital are within the impact area. Areas which are expected to be impacted from the project are mentioned below:

Social Impact Area	➡ Gediz Elementary School just 70 m from the northern part of the project site, ➡ TOKI buildings about 80 km from the north-eastern part of the project site ➡ Manisa Asri Cemetery just south-south-west direction of the project site, ➡ Adnan Menderes district at about 160 m northwest of the project site ➡ Small Industrial Estate approximately 450 m east of the project site, ➡ Approximately 570 m northeast of the project area, Marble Industrial Estate, ➡ Tube depot area about 50 km east of the project site, ➡ Construction area of the municipality in the southeast direction of the project site ➡ The police martyrdom, İn the northwest of the project site area of approximately 550 m ➡ Waste disposal facilities to be used during the project, ➡ Traffic arising out of the project, cumulative impacts on air quality and noise levels, ➡ The closure of any hospital or health care provider after the project implementation is the responsibility of the Ministry of Health and is not an issue at this stage. ➡ Social Impact Area map is given in **Figure 55**.
Impact Area In terms of air quality	➡ Air Quality Impact Area map is given in **Figure 22**.
Impact Area In terms of noise	➡ Noise Impact Area map is given in **Figure 45**.

Under the scope of ESIA study, impacts over the fields have been classified as positive or negative in order to assess the effected fields, size of the impact and impact periods have been determined.

Technical Properties of the Project

"The Project" was designed as a hospital consisting of 4 blocks. The hospital will have 320 rooms with 1 and 2 beds and totally 558 beds. The hospital will have 224 one bed room and 96 rooms with two beds. Number of beds in dialysis unit is 15. At the Hospital there will be 20 operating rooms, the total number of tables in the operating rooms has been identified as 20. Project includes construction of 3 intensive care units. At those units there will be 73 beds in the general intensive care unit, 10 beds in coronary and 37 beds in neonatal intensive care. In addition to the 7 emergency room 10 LDR[4] rooms are also available.

Besides, other locations for helipad area[5], parking lot, cafeteria, technical services, etc. would also be constructed.

Facility layout of hospital units are given in **Figure 3.**

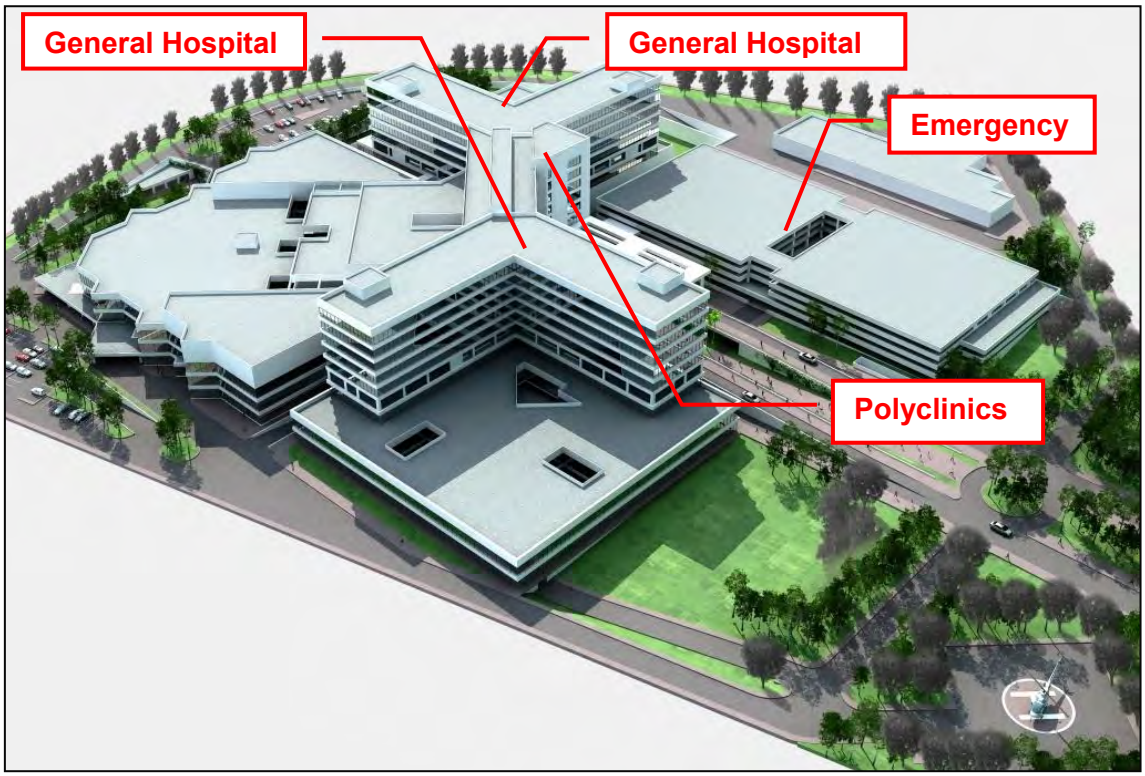


Figure 3. Facility Layout of Manisa Training and Research Hospital

Energy requirements during the construction phase of the project will be met by transformer(s) via electric distribution network of the city. Power generators which will be kept ready at the construction site which will only be used for required case to maintain the sustainability of electrical tools and machines against any power failure at the region.

Energy used during the operation phase is electrical energy and natural gas. In the operational phase of the Project (for the first one year), burning systems (1 trigeneration system and 1 boiler system) will be used for heating and steam production. It is planned to install a boiler system with 15.67 MW_t total thermal capacity.

[4] *LDR, (Labour, Delivery, Recovery "Gripes-Birth-Lohusa") is the process of birth and place in the same venue, which allows the system short name after birth.*
[5] *Helicopter landing, take-off and are suitable areas where they can fully or partially movements.*

Whenever the health facility is at operation phase, its energy requirement will be monitored for 1 year and if required, a trigeneration facility will be constructed. Heat power of this trigeneration facility will be determined due to the requirement; nonetheless, it has been determined at the preliminary study that the heat power requirement of the facility will be around 3 MW_t. Whenever the heat power of the trigeneration facility is determined exactly, it will be assessed per national regulations and required approvals will be taken.

Fields of units covered by the Manisa Training and Research Hospital Project and their bed capacities are given at **Table 7 and Table 8.**

Table7.Properties of the Project Units

Number of Beds	558
Land Area	97,515 m^2
Closed Construction Area (Excluding Parking Areas)	173,500 m^2
Outpatient Rooms	156 room
Helipad	1
Number of Blocks	4
1 Bed with WC and Shower Room Number	224
2 Bed with WC and Shower Room Number	96
Total Number of Patient Rooms	320
Dialysis Beds	15
Number of operating rooms	20
Total Operating Table	20
General Intensive Care Number of Beds	73
Coronary Intensive Care Number of Beds	10
Number of beds in the Neonatal Intensive Care	37
Emergency Rooms	7
LDRP Number of Rooms	10

Table 8. The Area that Project Units Occupy

Hospital Units	**Area (m^2)**
Acute Intensive Care Unit	31,262
Coronary Intensive Care Unit	1,066
26-bed Intensive Care Unit	4,767
21 bed Intensive Care Unit	1,370
Cardiovascular Surgery Intensive Care Unit	489
LDR	2,532
Family Hotel	534
Day Hospital	775
Patient admission	869
Clinics	258
Endoscopy Unit	1,269
Department of Radiology	3,852
Operating rooms	3,925
Emergency	5,320
Hemodialysis Center	1,167
Physiotherapy Centre	1,020
Sterile Processing Department	1,184
Advanced Pathology Department	649

Hospital Units	Area (m^2)
Department of Laboratory	1,154
Radiation Oncology	1,687
Transfusion center	186
Chemotherapy Clinic	1,876
Management Administrative Unit	432
Data Processing & Computing	437
Medical Records & Documentation Department	681
Training Area & Conference Hall	1,954
Staff Dining Hall	1550
General Warehouses & Logistics	1,359
Kitchen	1,281
Laundry	1,047
Morgue & Autopsy	781
Pharmacy	656
Cafeteria	451
Parking Garage	56,257
Shelter	1,869

3.2. Assessment of Alternatives

During the feasibility study of the project, site (location) selection, project design alternatives and no project option alternatives have been taken into consideration.

Location Selection

Right of construction of the Project site has been transferred to ATM Sağlık Manisa Yatırım ve İşletme A.Ş. for investment and operation.

Considering the land's topographic conditions, entrance to the project site is planned from the 15 m road at the west direction which is connected to the Turgutlu Street and the emergency services approach is designed to 20 meters on the road to the east direction. Therefore, transportation facilities, is appropriate because it is the edge of the ring road. The project area was marked in the Municipality development plan as "*Health Care Facilities*".

On the other hand designated location has been recognized as the most suitable site because of the topography of the area is not too rough. There is no risk of sludging tendency liquefaction and transport in terms of living soil properties and soil bearing capacity is adequate.

In addition to the matters described above, from the interviews and surveys with local people in the county within the scope of the ESIA study it was evident the need for the project. Alternative sites in the region have been investigated in the study conducted by the Ministry of Health; considering hospital capacity and infrastructure a suitable area for the project has been identified.

Design Selection

In the design of the Project, the typical project design specified by Ministry of Health is used. This typical design is developed according to the location and capacity of the project.

No Project Option

No project option indicates the status of not realization of the project will result in a lack of health facilities in the district. People in the region are experiencing difficulties because of lack of a comprehensive hospital. Therefore, the implementation of the project is important.

3.3. Location and Properties of the Project

The project area which belongs to the treasury was empty land until 1991. Then Manisa Municipality has used the project area belonging to the treasury between 1991 and 2011 as the worksite of Technical Works. With the transfer of treasury land to the Ministry of Health in 2014, the project area has been allocated for the hospital project. The units in the worksite of Technical Works are municipal vehicle repair and maintenance workshop, welding workshop, business machines parking, asphalt plants, fuel depots, closed storages for materials, aggregate stock areas, carpenter, and administrative units of municipality Technical Works.

3.3.1. Properties of the Location

Manisa Training and Research Hospital Project is located in Manisa Province, Şehzadeler District, Yukarı Çobanisa quarter.

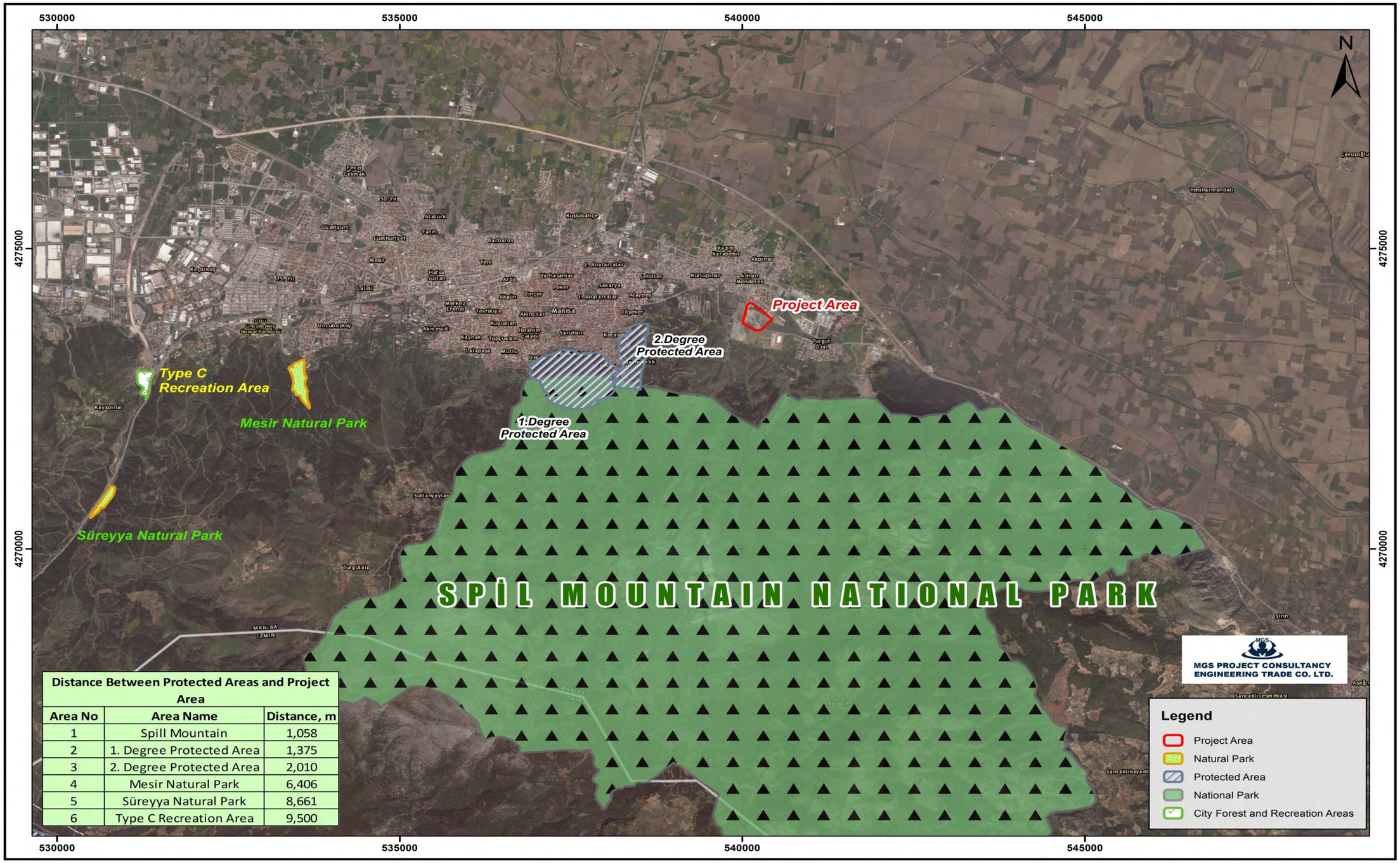
Total properties of the immediate surroundings of the project that will be installed on 97,515 m^2 are summarized below:

Project site is surrounded by the followings (**please refer to Picture 1, Figure 4, Figure 5, Figure 6 and Annex B)**;

- Gediz Elementary School in the northern part.
- TOKI houses in the north-eastern sector,
- Manisa Municipality Asri Cemetery at south-southwest direction,
- Settlements in the northwest-northeast direction,
- Turgutlu Street at north,
- About 1 km south Spil Mountain National Park,

The coordinates of the area where the project plan is located are presented in **Table 9**.

Picture 1. Photo Showing the Project Area and Vicinity



Distance Between Protected Areas and Project Area

Area No	Area Name	Distance, m
1	Spill Mountain	1,058
2	1. Degree Protected Area	1,375
3	2. Degree Protected Area	2,010
4	Mesir Natural Park	6,406
5	Süreyya Natural Park	8,661
6	Type C Recreation Area	9,500

Figure 4.Protected Areas

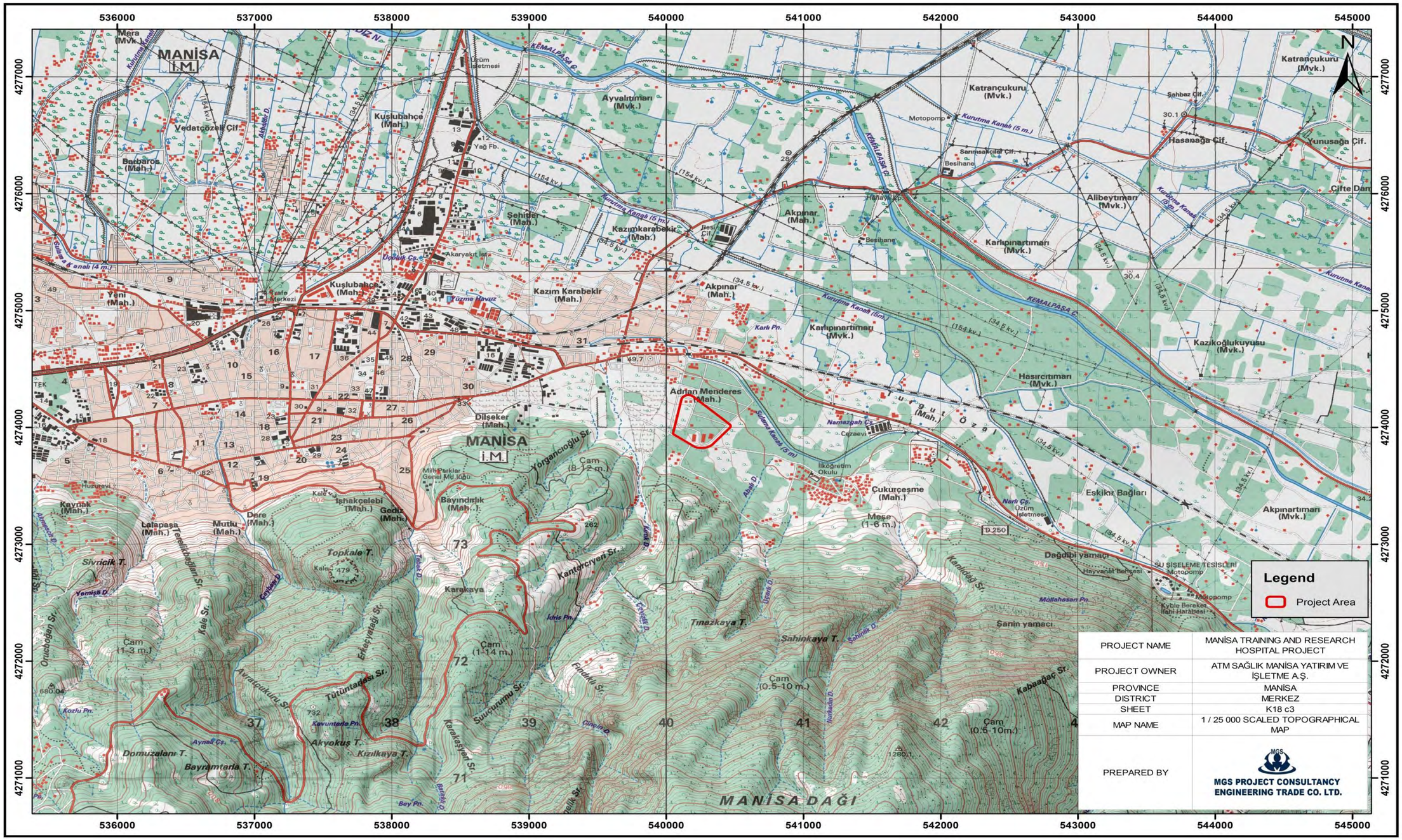


Figure 5.Topographical Map

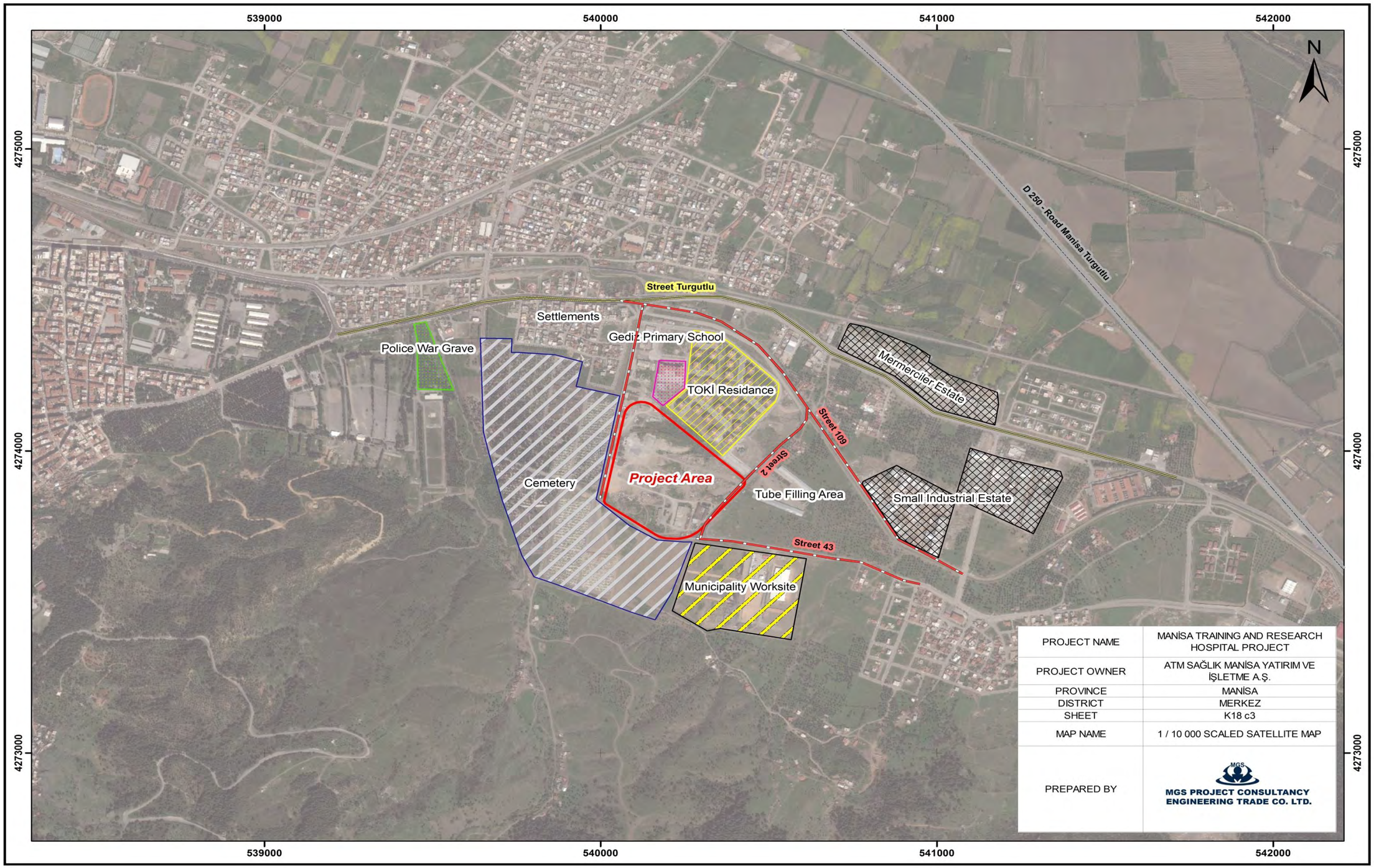


Figure 6.Satallite Image

Table 9. List of Coordinates of the Project Field

Coordinate Sequence		:	Right, Up	Coordinate Sequence		:	Latitude, Longitude
Datum		:	ED-50	Datum		:	WGS-84
Type		:	UTM	Type		:	GEOGRAPHICAL
D.O.M.		:	27	D.O.M.		:	--
Zone		:	35	Zone		:	--
Scale Fac.		:	6 degree	Scale Fac.		:	--
1	540405.4751	:	4275552.3914	1	38.62590747	:	27.46370507
2	540412.3682	:	4275538.1330	2	38.62577867	:	27.46378343
3	540407.1601	:	4275523.1767	3	38.62564412	:	27.46372274
4	540290.2820	:	4275391.9905	4	38.62446724	:	27.46237248
5	540259.1460	:	4275368.7915	5	38.62425959	:	27.46201347
6	540221.3849	:	4275359.7497	6	38.62417983	:	27.46157916
7	540198.2167	:	4275360.2574	7	38.62418545	:	27.46131305
8	540158.3836	:	4275373.2983	8	38.62430477	:	27.46085622
9	540018.0381	:	4275469.8876	9	38.62518153	:	27.45924955
10	540014.5950	:	4275478.4930	10	38.62525924	:	27.45921049
11	540071.6687	:	4275750.4853	11	38.62770775	:	27.45988179
12	540089.5239	:	4275779.2377	12	38.62796604	:	27.46008857
13	540121.6375	:	4275789.7704	13	38.62805951	:	27.46045810
14	540153.0532	:	4275777.2824	14	38.62794555	:	27.46081828

Ownership and Zoning Status

Manisa Training and Research Hospital Project, which is 97,515 m^2, belong to under secretariat of Treasury. Project field is registered as in 3582 plot, 4 parcel in land registration and has been transferred to ATM Sağlık Manisa Yatırım İşletme A.Ş for 27 years (See Annex A).

Project Field is specified as “Health Facility” in 1/1,000 scaled zoning plan and 1/5,000 scaled Nazım Zoning Plan **(See Figure 7, Figure 8, Annex A** and **Annex B).**

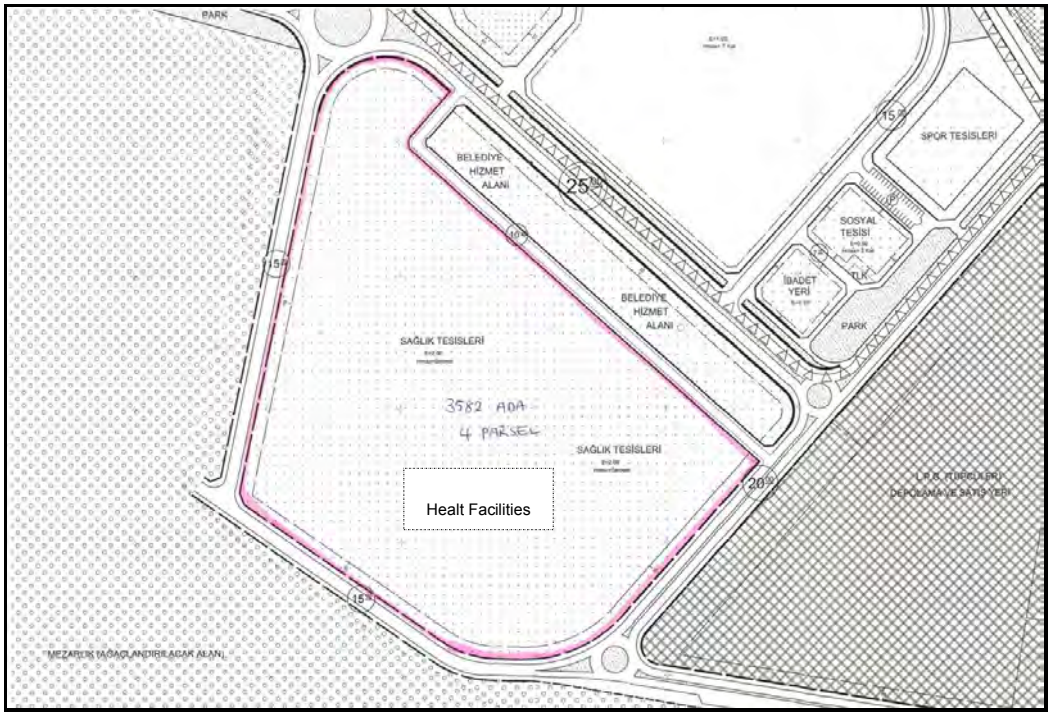


Figure 7. 1/1,000 Scaled Zoning Plan

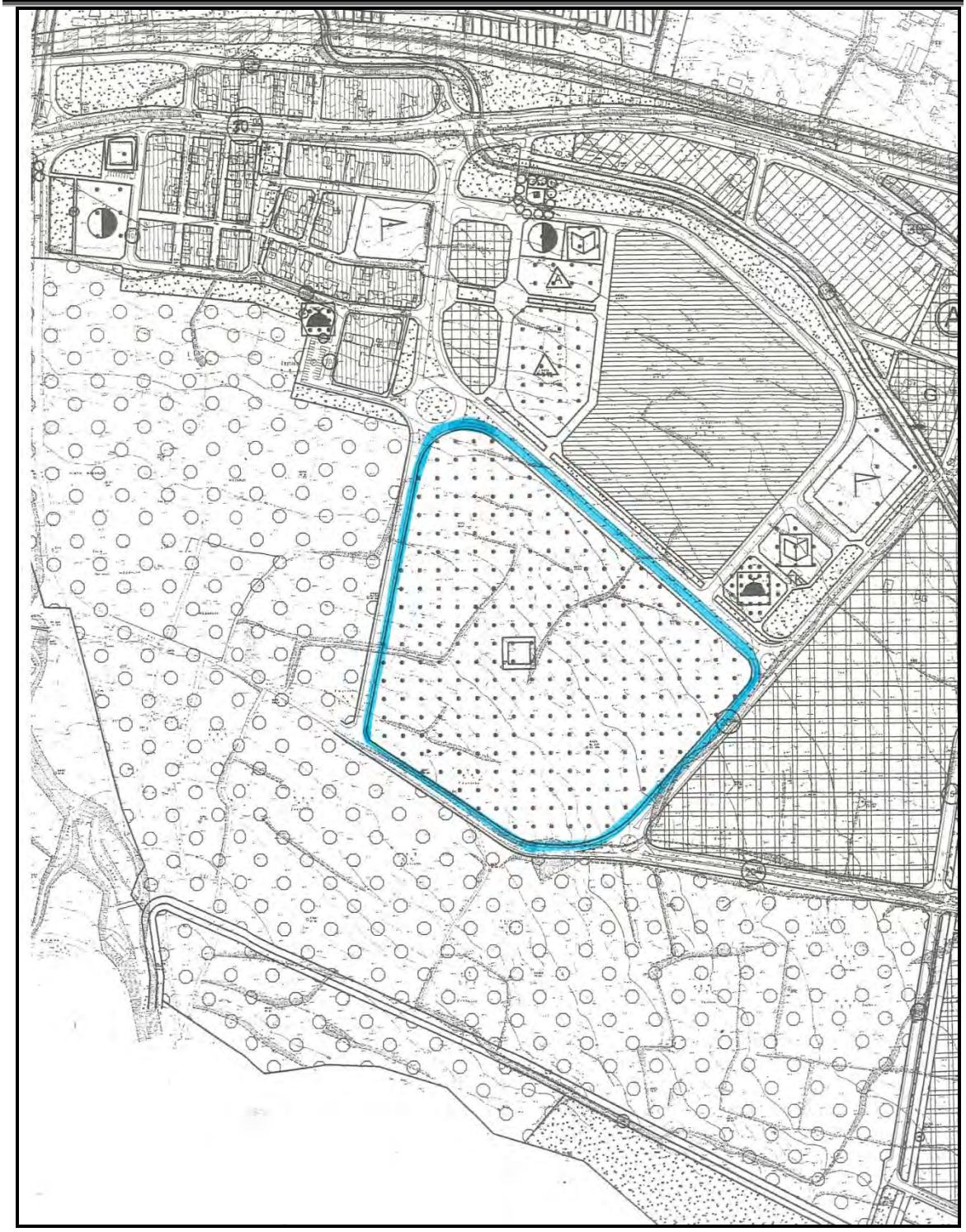


Figure 8. 1/5.000 Scaled Nazım Zoning Plan

Climatic Characteristics

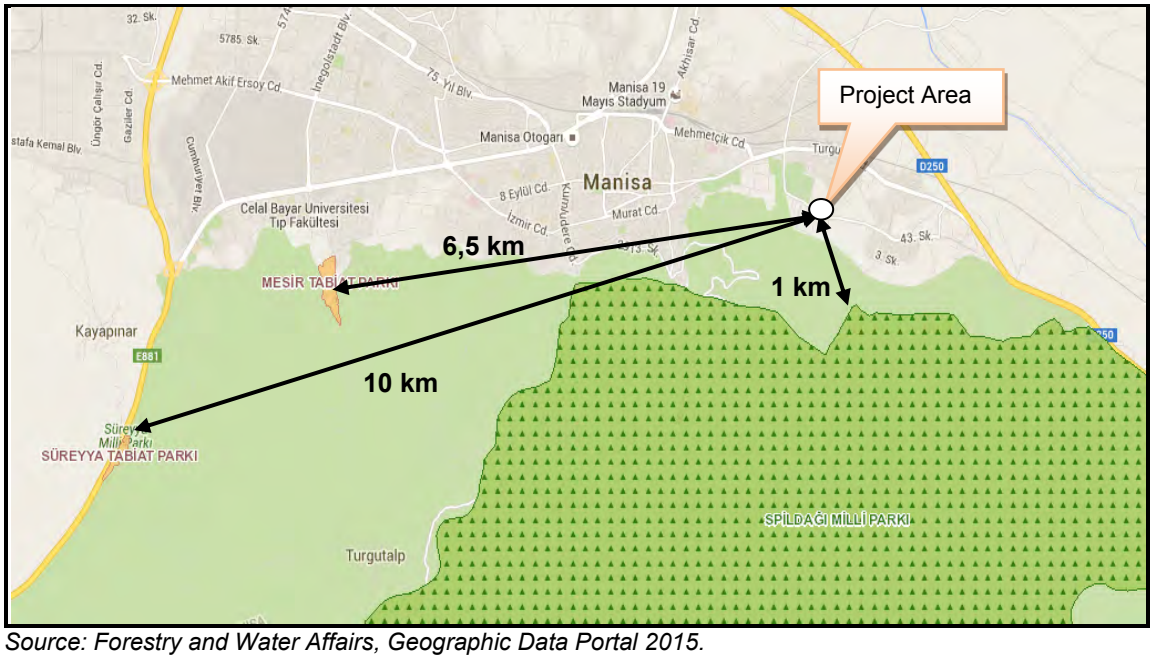
Continental climate prevails in the region of Central Anatolia with the Mediterranean climate. At the plains surrounding valleys are seen in terrestrial qualified Mediterranean climate and at high mountains, highlands and plateaus in the north and northeast plateau seen the effects of the terrestrial climate of Central Anatolia.

Climate prevailing in the plains is also known as Mediterranean continental climate type. Temperature rises in the summer and rainfall is concentrated in winter. Because the plains of the surrounding mountains are not high enough to stop the effects of the sea and they are perpendicular to the sea the sea effect decreasingly felt at west to the east direction. The climate of the lowland sector is softening due to its proximity to the sea.

Protected Areas

In Manisa, there is 1 National Park (Spil Mountain National Park), 1 Natural Monument (Kula chimneys Natural Monument) and 2 Nature Park (Mesa Nature Park and Suresh Nature Park) which are declared by T. C. Ministry of Forestry and Water Affairs, Directorate of Nature Conservation and National Parks. There is no Wildlife Development Area that has been declared in accordance with the 4915 Law.

Of the above mentioned area; Spil Mountain National Park is approximately 1 km from the project site, Kula chimneys Natural Monument area is about 117 km from the project site, Mesir Nature Park is located approximately 10 km from the project site and Suresh Nature Park is about 6.5 km away from the project area **(please refer to Figure 9** and **Figure 10**).



Source: Forestry and Water Affairs, Geographic Data Portal 2015.

Figure 9. Satellite Image that shows Distances to the Protected Areas Satellite Image-1

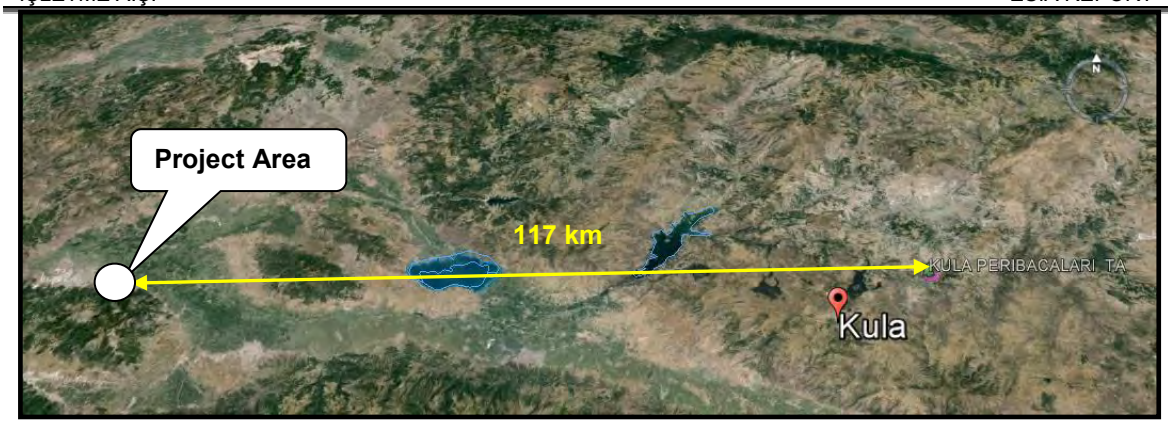


Figure 10. Satellite Image that shows Distances to the Protected Areas Satellite Image-2

Within the boundaries of the project area, there are no areas that are covered by the law numbered 2863 (the presence of natural / nature conservation / special environmental protection area / cultural assets) **(please refer to Annex A).**

Detailed information about cultural features is described in Section 5.9 (Cultural Heritage).

Geology and Seismicity

General Geology

Paleozoic metamorphic rock is the foundation at Manisa and near surrounding. The underlying rocks called the Menderes Massif are considered as two units formed by a core and 48 cover. The core is composed of gneiss. These are the gneisses and blue eyes lies a thick blanket over the gneiss composed of schist. Metamorphic grade decreases outwardly from the core. There are Mesozoic limestones on the metamorphic rocks. On the Mesozoic limestone there are uncomfortably Neogene terrestrial sediments and basalts from Kula volcanic rocks. At the top there are Quaternary alluvium brought by Gediz River and side streams.

Geology of the Project Site

Project site consists of Quaternary aged alluvial unit **(please refer to Figure 11 and Annex B)**. Fine clay and silt levels have been found in the mainly alluvial gravel. As going deeper, a structure with alluvial block and coarse debris is observed. There are levels that are changing from silt level to block size in the alluvial that mainly consisting of uncompressed-loose gravel. Alluviums are usually formed from blocks of surrounding rocks.

There are silty sand, silt and gravel with silt, consisting of multi-block clean gravel up to 6-8 m depth and after this depth there are multiblock small gravel and clay blocks.

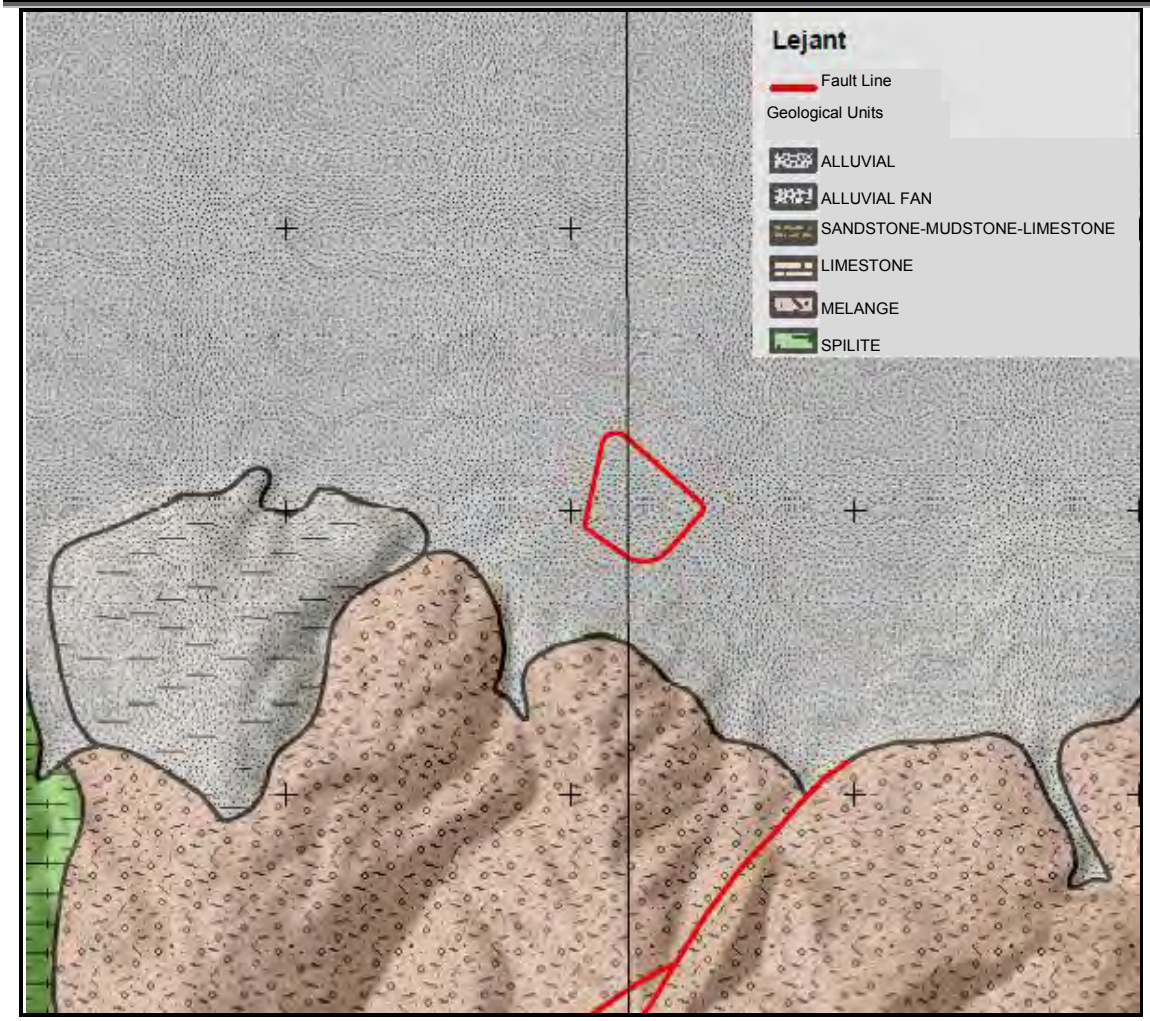


Figure 11.1 / 25,000 Scale Geological Map of the Project Site

Structural Geology

Manisa Province is located between Spil Mountain that gives a steep topography in the south and Manisa Plains that is forming flat areas at north. Largest known fault in Manisa is the fault limiting Spil Mountain and Manisa Plain (Manisa Fault).This fault in the west with the east-west direction between the Gürle village and Manisa; lies in the NW-SE direction along the Manisa-Turgulu highway. This fault is a continuation of forming the Gediz graben fault system carries a possible active feature. At the southern part of the fault due to the high slope, landslides are observed in many different sizes.

Active Fault Map of the project area is given at **Annex B.**

Natural Disaster Situation

Manisa Training and Research Hospital area is located on a topographically smooth so there is no risk of rock falling. The heighest point is 76.60 m in height and the lowest point is 56.4 m in height at project site.

Against flood risk in the region, rain water directing culverts will be built around the facility and rain water will be directed to suitable channel designated by the municipality at outside of the facility area.

Besides, there will be a rain water substructure inside the facility area and rain water accumulation shall be prevented. Rain water will be diverted to the location that municipality allows.

There is no regional expose to disaster decree available for the field over which the Project will be constructed **(please refer to Annex A**).

Earthquake Situation

The project area remains within 1st degree Seismic Zone according to the "*Turkey Earthquake Regions Map*" which has entered into force as of 18.04.1996 by 96/8109 numbered decree of Council of Ministers. During constructions, the provisions of "*Disaster Zone Regulations about the structures to be built on* " and provisions of 7269 numbered "*Code of Aids via mitigation measures taken about Disasters that have Effects over Public Life*" will be complied.

Seismic Map of Turkey which is also showing the project area is given in **Annex-B**.

3.4. Project Activities

3.4.1. Construction Phase

Tasks and Responsibilities

Construction activities of Manisa Training and Research Hospital Project will be performed by Contractor named ATM Sağlık Manisa Yatırım ve İşletme A.Ş. Due to the requirements of 63rd Article of 4857 numbered *"Labour Law"* the provision of *"in general, weekly working period is at most 45 hours"* will be followed.

Rest areas, dormitories, canteen and infirmary meet the requirements of personnel as well as administrative buildings, offices and material storage areas will be available within the construction site. All designs and arrangements at the construction site will be built-in accordance with technical specification, Turkish legal regulations and standards of financial bodies. Contractor will meet the requirements of personnel in accordance with the "*Workers' accommodation: Processes and Standards Public guidance*" which are mentioned in guidelines prepared by IFC, EBRD and *International* Labour Organization (ILO).

ILO core Labour standards:

- Forced labour (C105)
- Child Labour (C182)
- Discrimination (C111)
- Freedom of Association and the Right to Organize (C87)
- Equal Remuneration (C100)
- Minimum Age (C138)

Entries and exits to and from the construction site will be continuously monitored by a guard. Security warnings will be placed in the construction site and surroundings to prevent unauthorized entries. Trainings will be given to the employees about the security precautions and speed limits to be followed. Following management plans in the construction site will be put into practice:

- Contractor Management Plan
- Construction Camp Management Plan
- Worker code of conduct
- Security Plan
- Traffic Management Plan
- Waste Management Plan
- Air Quality, Noise and Vibration Management Plan
- Archaeological Chance Find Procedure
- Emergency preparedness and response plan
- Spill Response Plan

Personnel will be employed and assigned in conformance with organization chart and job descriptions. For jobs and responsibilities related with environmental and social management mentioned in organization chart, the following Corporate Governance Plan is used.

- Human Resources Management Plan and Procedures
- Health, Safety and Environment Plan and Procedures

Work Force

Organization Plan is presentd at Annex B. It is forecasted to employ at least 1,250 employees for the construction phase of the project. Employees will be recruited among the local public as much as possible according to their education and talents.

Equipment

Machinery and equipment to be used during the construction phase are listed in **Table 10.**

Table 10. List of Machinery – Equipment to be used for Construction Phase

Machinery/Equipment	Quantity
Truck	20
Excavator	6
Dozer	2
Grader	2
Loader	4
JCB	5
Sprinkler	1
Mobile Crane	5
Tower Crane	11
Concrete Power Plant	1
Trans mixer	20
Mobile Concrete Pump	4
Compressor	2
Generator	1
Sprinkler	1

3.4.2. Operation Phase

Tasks and Responsibilities

Project will be realized under the scope of PPP model which has been administered for 25 years by dual management. Management and administrative staff will be provided by Ministry of Health during the operation phase of the project and mandatory and optional services except doctors and health personnel will be provided by ATM Sağlık Manisa Yatırım ve İşletme A.Ş.

According to dual management model, duties and responsibilities of Ministry of Health are explained in general in the following section:

- Ministry of Health acts in conformance with related regulations and codes and gives permissions to which it is authorized to give.
- Ministry of Health is responsible from land ownership and subjects related with this ownership.
- Ministry of Health performs or makes another independent institution perform audit over the construction of health facility.
- Ministry of Health supplies related health personnel for the facility.
- Ministry of Health is responsible from diagnosis and treatment of patients.
- Ministry of Health controls and audits all works executed by the project company.
- Ministry of Health is responsible to supply consumable materials.
- Ministry of Health is responsible from energy consumption and expenses.

Outlines of mandatory and optional services to be provided by ATM Sağlık Manisa Yatırım ve İşletme A.Ş. are given below as items:

- Cleaning, disinfestation and laundry services,
- General services required inside the building and around the hospital,
- Parking lot services,
- Security services,
- Landscaping of surroundings of the hospital and maintenance services,

- Food and waste management services,
- Material and goods provision,
- Medical support services,
- Services provided to patients and patient relatives except medical services.

Hospital Information Management System (HIMS): Operator of this service will be conscious of his/her legal obligations. Managing company is obliged to have required experience in this field. Current data management can be handled by ATM Sağlık Manisa Yatırım ve İşletme A.Ş. and service subcontractor. Under the scope of HBYS, data related with the patient will be entered by *"data entry operator"* who is employee of service provider. Entries and exits to and from the system will be made via personal passwords and user accounts. System will perform its own backup. Advanced coding mechanisms will be used and all precautions required to protect data of patients receiving medical treatment will be taken.

Work Force

It is forecasted to employ total of 1,500 employee including personnel of Ministry of Health and personnel of ATM Sağlık Manisa Yatırım ve İşletme A.Ş. for the operation phase.

Project Calendar

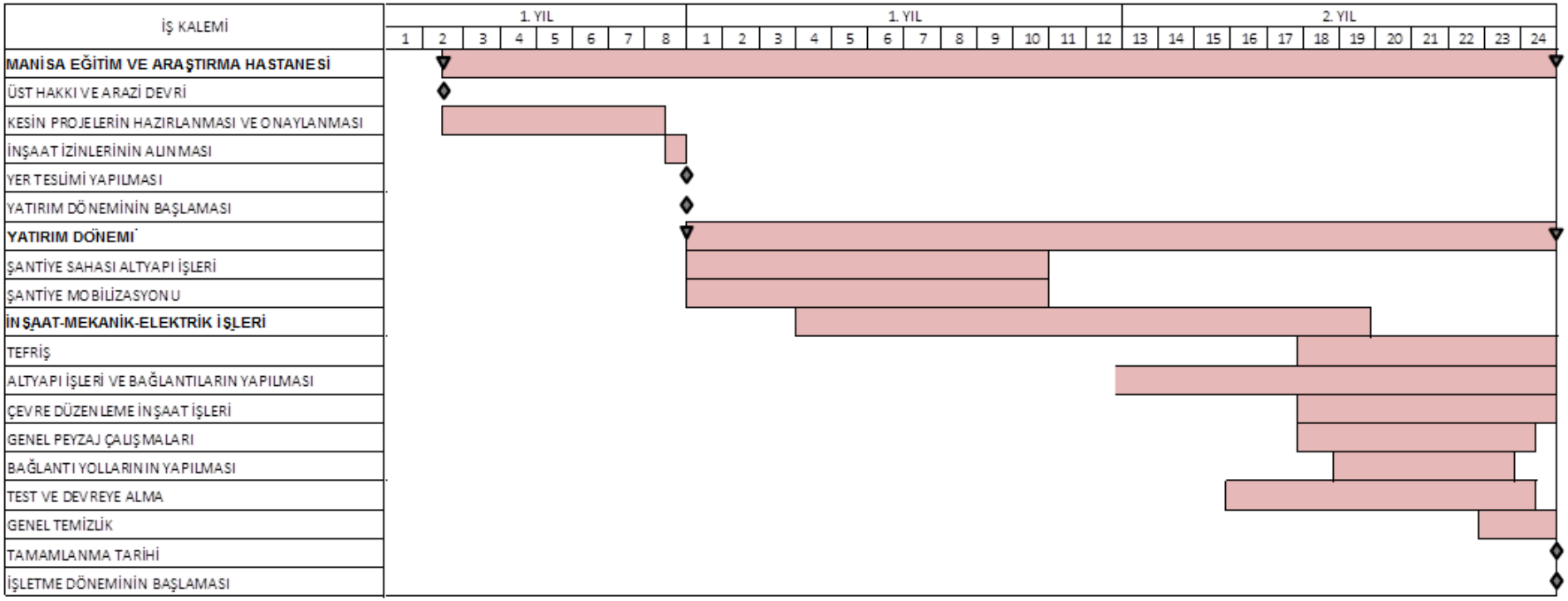
Organization Plan is presentd at Annex B. Investment period of the planned project has been determined for 2 years and management period has been determined for 25 years. Before the investment period of the project is, land transfer operations will be completed. Transfer of project land to Ministry of Health has already been completed. Right of construction has been transferred to ATM Sağlık Manisa Yatırım ve İşletme A.Ş.

First of all 2 years of construction period will be completed, and then 25 years of management period will start. Time schedule related with the project is given in **Table 11**.

3.4.3. Decommissioning

Responsibility period of the project owner will be 27 years in total of which 2 years are for construction and 25 years are for management. At the end of this 27 years, project will be fully transferred to Ministry of Health. Decree responsibility of management period of the project belongs to Ministry of Health. For this reason, there is no information available in this phase related with closure of the project.

Table 11.Time Schedule



4. LEGAL AND INSTITUTIONAL FRAMEWORK

4.1. Institutional Framework

Main institutional documents to be followed for environmental and social management during construction and operation phases of the project by the project owner are listed below.

Construction Phase

- Waste management plan (including all solid, medical and hazardous wastes)
- Emergency situation preparation and intervention management plan
- Soil management plan
- Construction traffic management plan
- Noise and vibration control and monitoring plan
- Air quality management plan
- Security plan
- Hazardous material management plan
- Occupational health and safety plan for construction
- Labour management plan and construction camp management plan
- Personnel procedure
- Human resources plans and procedures to be prepared in conformance with YDA institutional human resources policies and procedures
- Employment and procurement management plan (including local employment and procurement)
- Subcontractor management and monitoring plan
- Archaeological chance find procedure
- Community health and safety management plan
- Employee ethics
- Traffic management plan

Operation Phase

- Waste management plan (including all solid, medical and hazardous wastes)
- Emergency preparedness and response plan
- Traffic management plan for training and research hospital
- Air quality control and management plan
- Security plan
- Hazardous material management plan
- Occupational health and safety plan
- Human Resources management plan/procedure/personnel procedure
- Employment and procurement plan
- Subcontractor management and monitoring plan
- Public health and safety management plan
- Infectious disease control plan
- Radiation exposure management plan
- Radioactive materials management plan

Aforementioned plans and procedures will be prepared in accordance with EBRD and IFC guidelines and standards specified for the project. Besides, required resources will be allocated in order to provide high performance in environmental and social management applications of the project.

Responsibilities of official institutions which are related with the project are explained below.

Ministry of Health

- Protection and development of public health, reduction and prevention of illness risks,
- Performance of health services for diagnosis, treatment and rehabilitation,
- Prevention of international health risks to enter into Turkey,
- Development of health training and research activities,
- To provide safe availability of high quality medicines, special products, substances which are subjected to national and international control, active and inactive ingredients which are used in medicine production, cosmetics and medical devices for public and to determine their prices,
- To provide savings and to increase efficiency in workforce and financial sources, to provide a balance distribution of health personnel throughout the whole country and to provide equal, high quality and efficient service throughout the whole country via realization of cooperation among all shareholders,
- To determine policies to plan and generalize health institutions to be established by public institutions and real person and legal entities and to manage the health system.

Manisa Provincial Directorate of Health

- Provincial Health Directors act as Ministry Representatives at the Province. They monitor and audit whether services performed by district organizations of affiliated institutions are performed in conformance with policies determined by the Ministry or not. They provide coordination in between Ministry and district organizations of affiliated institutions in order to protect service integrity.
- Directorate audits conformance of activities of health institutions with Ministry policies and regulations. It imposes sanctions over all public and private health institutions whenever required. It directly executes preliminary hospital emergency health services during disasters and emergency situations. It assumes management of all health institutions available within the province on behalf of Governor. It has an important role in performance of health services more effectively, efficiently.
- It collects data related with health statistics.
- It executes programs and activities related with health development (management of patient rights units, patient pleasance surveys, arbitration, health services at home, etc).
- It observes and audits all health services primarily family practice

Ministry of Environment and Urbanization

Manisa Provincial Directorate of Environment and Urbanization

- Main duties of Ministry and Provincial Organizations are to protect environment and public safety, to prevent pollution and to provide sustainable development.
- They evaluate environmental impacts of all activities which are performed for public to live in a more health environment and give permissions and licenses for this purpose; they perform environmental audits and measurements for this purpose, they aim to prevent and control environmental pollution and to increase environmental standards. Other goals are to increase quality of environmental bodies / institutions, to present correct, updated and reliable environmental information to public, decision makers, researchers.

Ministry of Labor and Social Security

- Duties of Ministry of Labor and Social Security are to arrange and perform audits over working life, to provide working peace, to take precautions to increase employment and social security, to contribute increase in public welfare and to protect rights and benefits of Turkish citizens who work in foreign countries.

Manisa Metropolitan Municipality

Şehzadeler Municipality

- Municipalities performs or make others to perform the following services and include the following departments: provincial substructure works such as zoning, water and sewage affairs, transportation; environment related works and environmental health, cleaning and collection of solid wastes; municipal police, fire department, emergency aid, research and ambulance services; local traffic; funeral operations and graveyards; foresting, parks and green fields; residences; cultural and art services, tourism and introduction, youth and sport; social services and aids, marriage ceremonies, occupational trainings; development of economy and trade.

4.2. National Legal Framework

Environment

Manisa Training and Research Hospital Project is under the scope of "*activities which are out of scope*" in accordance with Temporary Article 2 of "EIA Regulations" which is in force after being published in 25.11.2014 dated and 29186 numbered Official Gazette (**Please refer to Annex A**).

According to The Regulation on Environmental Permit and License, hospital which has capacity of more than 20 beds is in the scope of the regulation. Moreover, concrete plant which will be used during construction phase and burning systems which will be used during operation phase will be evaluated under the Regulation on Environmental Permit and License according to their capacity and working life time.

During construction and operation phases of the project, primarily provisions of *"Environmental Law"* and all other regulations, directions, provisions and legislations which are in force due to this Code will be followed.

Codes and regulations which will be followed under the scope of the project are given below:

- 2872 numbered *"Environmental Law",*
- 167 numbered *"Groundwater Law",*
- 5403 numbered *"Soil Protection and Land Usage Law",*
- 25.10.2014 dated and 29186 numbered *"The Regulation on Environmental Impact Assessment",*
- 11.09.2014 dated and 29115 numbered *"The Regulation on Environmental Permit and License",*
- 24.08.2011 dated and 28035 numbered *"The Regulation on Packaging Waste Control",*
- 02.04.2015 dated and 29314 numbered *"The Regulation on Waste Management",*
- 22.07.2005 dated and 25883 numbered *"The Regulation on Medical Wastes Control",*
- 31.08.2004 dated and 25569 numbered *"The Regulation on Waste Batteries and Accumulators Control",*
- 30.07.2008 dated and 26952 numbered *"The Regulation on Waste Oils Control",*
- 25.11.2006 dated and 26357 numbered *"The Regulation on End of Life Tires Control",*
- 31.12.2004 dated and 25687 numbered *"The Regulation on Water Pollution Control",*
- 30.12.2012 dated and 28483 numbered *" The Regulation on Surface Water Quality ",*
- 07.04.2012 dated and 28257 numbered *" The Regulation on Protection of Groundwater Against Pollution",*
- 11.02.2014 dated and 28910 numbered *"The Regulation on Protection of Groundwater Against Pollution",*
- 31.03.2007 dated and 26479 numbered *"The Regulation on Transportation of Hazardous Materials*
- 18.03.2004 dated and 25406 numbered *"The Regulation on Control of Excavation Soil, Construction Wastes",*

- 04.06.2010 dated and 27601 numbered *"The Regulation on Assessment and Management of Environmental Noise",*
- 30.11.2013 dated and 28837 numbered *"The Regulation on Fuel Oil and Diesel Assessment via Exhaust Gas Emission Control",*
- 06.06.2008 dated and 26898 numbered *"The Regulation on Air Quality Assessment and Management",*
- 03.07.2009 dated and 27277 numbered *"The Regulation on Industrial Air Pollution Control*
- 13.01.2005 dated and 25699 numbered *"The Regulation on Air Pollution Control Due to Heating"*
- 17.05.2014 dated and 29003 numbered *"The Regulation on Greenhouse Gas Emissions Follow Up",*
- 17.02.2005 dated and 25730 numbered *"The Regulation on Water Consumed by People",*
- 08.06.2010 dated and 27605 numbered *"The Regulation on Soil Pollution Control and Point-Source Contaminated Sites".*

Social Environment and Vocational Health / Security

Codes and regulations about Social Environment and Vocational Health / Safety to be followed under the scope of the project are given below:

- 4857 numbered *"Labour Law"*
- 6331 numbered *"Occupational Health and Safety Law"*
- 5510 numbered *"Social Insurances and General Health Insurance Law"*
- 1593 numbered *"Public Health Law"*
- 3359 numbered *"Health Services Basic Law",*
- 6428 numbered *"Law on Facility Construction, Renewal and Obtaining Service By the Ministry of Health with the Public Private Sector Corporation Model and Amendments of Certain Laws and Decrees",*
- 13.01.1983 dated and 17927 numbered *"The Regulation on the Operation of Inpatient Treatment Institutions",*
- 06.04.2011 dated and 27897 numbered *"The Regulation on Providing Patient and Personnel Safety",*
- 01.08.1998 dated and 23420 numbered "*The Regulation on Patient Rights",*
- 29.12.2012 dated and 28512 numbered *"The Regulation on Occupational Health and Safety Services ",*
- 11.09.2013 dated and 28762 numbered *"The Regulation on Occupational Health and Safety Signs"*,
- 11.02.2004 dated and 25370 numbered *"The Regulation on Health and Safety Provisions in Usage of Work Equipment",*
- 13.07.2013 dated and 28706 numbered *"The Regulation on Occupational Trainings of People Who Will be Employed For Jobs Which are Classified as Hazardous and Very Hazardous",*
- 28.07.2013 dated and 28721 numbered *"The Regulation on Protection of Employee from Noise related Risks",*
- 16.08.2013 dated and 28737 numbered *"The Regulation on Working Conditions of Pregnant and Nurturing Women and Nurturing Rooms and Child Care Centers",*
- 03.03.2004 dated and 25391 numbered *"The Regulation on Annual Paid Off",*
- 01.08.2004 dated and 25540 numbered *"The Regulation on Minimum Wage",*

4.3. International Framework

EBRD Standards

EBRD brought forward its first Environmental Policy in 1991 at the initial meeting of the Board of Directors. The scope of the Policy has evolved over time and it is now an "*Environmental and Social Policy*". In recent years the EBRD has developed related Performance Requirements that were first introduced in 2014 (For details see EBRD Environmental and Social Policy Report, 2014[6]).

Bank-financed projects are expected to meet good international practice related to sustainable development. To help clients and/or their projects achieve this, the Bank has defined specific Performance Requirements (PR) for key areas of environmental and social issues and impacts as listed below:

PR1 – Assessment and Management of Environmental and Social Impacts and Issues
PR2 – Labour and Working Conditions
PR3 – Resource Efficiency and Pollution Prevention and Control
PR4 –Health and Safety
PR5 – Land Acquisition, Involuntary Resettlement and Economic Displacement
PR6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources
PR7 – Indigenous Peoples
PR8 – Cultural Heritage
PR9 – Financial Intermediaries
PR10 – Information Disclosure and Stakeholder Engagement

EBRD Guideline:

- Sub Sectorial Environmental and Social Guidelines Principles Related with EBRD Health Services and Clinical Waste Disposal (October, 2009).
- EBRD Sub-sectoral Environmental and Social Guidelines for Health Services and Clinical Waste Disposal (October, 2009).

Equator Principles

Another applied standard for preparation of Environmental and Social Impact Assessment Report is Equator Principles. Standards which are composed of ten main principles are the benchmark for the evaluation of social and environmental impacts of the projects over the value of $ 10 million. Since total project capital cost exceeds the threshold value, compliance with EP Principles will be ensured.

Principle 1: Review and Categorization

Principle 2: Environmental and Social Assessment

Principle 3: Applicable Environmental and Social Standards

Principle 4: Environmental and Social Management System and Equator Principles Action Plan

Principle 5: Stakeholder Engagement

Principle 6: Grievance Mechanism

[6]http://www.ebrd.com/downloads/research/policies/esp-final.pdf

Principle 7: Independent Review

Principle 8: Covenants

Principle 9: Independent Monitoring and Reporting

Principle 10: Reporting and Transparency

The EPs are based on the International Finance Corporation Performance Standards on social and environmental sustainability and on the World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines). Project that prepared in accordance with the EP should include;

- A description of the project and its social and environmental aspects
- Maps and drawings of the project and a delineation or description of its area of influence
- Discussion of the Project's compliance with the legal and regulatory framework
- IFC Performance Standards and the environmental and health and safety performance levels established for the project
- Key potential impacts and risks, including the identification of the affected communities
- Planned mitigation and any areas of concern that need to be further addressed
- The process of community engagement

IFC Standards

Environmental and Social Impact Assessment studies will contain IFC Performance Standards that listed below:

PS 1: Assessment and Management of Environmental and Social Risks and Impacts
PS 2: Labor and Working Conditions
PS 3: Resource Efficiency and Pollution Prevention
PS 4: Community Health, Safety, and Security
PS 5: Land Acquisition and Involuntary Resettlement
PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
PS 7: Indigenous Peoples
PS 8: Cultural Heritage

IFC EHS Guidelines:

The specific EHS guidelines which are technical reference documents of IFC utilized in the scope of the project are given below:

- IFC Environmental, Health and Safety (EHS) General Guidelines (April 30, 2007)
- IFC Environmental, Health and Safety Guidelines for Healthcare Facilities (April 30, 2007)

EU Legislation

- Since EBRD is included to the Project and Turkey is a candidate country to enter the EU, project must comply with EU Directives about environmental and social protection.
- The below EU Directives on environmental and social protections are considered during the preparation of this report
- World Bank Environmental Management Plan (OP 4.01 Environmental Assessment Annex-C),
- "World Bank Pollution Prevention and Abatement Handbook", "1998"
- EIA Directive, 85/337 EEC and 97/11/EC Directive revision,
- "Air Quality Framework Directive", 96/62/EC,
- "Water Framework Directive", 2000/60/EC,
- Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)", EC 1907/2006
- "Directive on Environmental Noise", 2002/49/EC,
- "Council Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora", 92/43/EEC,
- "Directive on the Conservation of Wild Birds", 79/409/EEC,
- "Commission Decision Concerning a Site Information Format for Proposed Natura 2000 Sites", 97/266/EC,
- Hazardous Waste Directive, 1991/689/EEC,
- Packaging Waste Directive (94/62/EC),
- Waste Framework Directive (75/442/EEC (revised: 2006/12/EC)),
- CITES Convention (EEC/362/82, EEC/3418/83 and EC/338/97),
- The Bern Convention on the Conservation of European Wildlife and Natural Habitats
- Council Directive 2008/50/EC of 21 May 2008 on Ambient Air Quality and Cleaner Air for Europe
- Council Directive 98/83/EC of 3 November 1998 on the Quality of Water Intended for Human Consumption
- Groundwater Directive 80/68/EEC
- Integrated Pollution Prevention and Control (IPPC) Directive 2008/1/EC
- Dangerous Substances Directive (76/464/EEC)
- Directive 89/391 - OSH "Framework Directive"
- Directive 2003/88/EC - Working Time
- Directive 2009/104/EC – Use Of Work Equipment
- Directive 89/656/EEC - Use of Personal Protective Equipment
- Directive 2003/10/EC – Noise

International Treaties

Turkey is a signatory to several regional and international conventions. Those related to the proposed Project are listed as follows:

- Kyoto Protocol United Nations Climate Change Frame Contract (1997)
- Wien Convention Related with Protection of Ozone Layer (1985) and Montreal Protocol Related with Ozone Depleting Substances (1987)
- Basel Convention Related with Cross-Border Transportation of Hazardous Wastes and Control of Disposal of Hazardous Wastes (1989)

- "Convention on Biological Diversity", approved by 4177 numbered Law dated August 29, 1996 and published in the Official gazette No. 22860 and dated December 27, 1996, Ratified 1997;
- "Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES)", published in the Official Gazette No.22672 and dated June 20, 1996, Ratified 1996;

- "Convention on the Conservation of European Wildlife And Natural Habitats (Bern)", published in the Official Gazette No. 18318 and dated February 20, 1984, Ratified 1984;
- "International Convention for the Protection of Birds", published in the Official Gazette No. 12480 and dated December 17, 1966, Ratified 1967;
- "Convention Concerning the Protection of the World Cultural and Natural Heritage", published in the Official Gazette No. 17959 and dated February 14, 1983.
- European Landscape Treaty put into force by being published in the Official Gazette dated 27/7/2003 and numbered 25181

4.4. Comparison of National and International Environmental Limit Values

Comparison of National and International Environmental Limit Values used under the scope of ESIA is given in following tables.

Table 12.National and International Environmental Limit Values (Wastewater Discharge Standards)

Parameter	NATIONAL			INTERNATIONAL	
	Discharge to Sewage System		Discharge to Receiving System	Discharge to Receiving Medium	
	RWPC - Table 25: Wastewater Standards of Wastewaters foreseen in Wastewater Discharge to Infrastructure	Sewerage Wastewater Discharge Regulations of Manisa General Directorate of Manisa Water and Sewerage Administration	SKKY - Table 21.2: Sector: Domestic Waste Waters(Class 2: Raw Pollutant Load as BOD 120-600 Kg/Day, Population = 2000-10000)	IFC	EU
	At Wastewater Infrastructure Facilities of which sewer systems are resulted with Full Treatment	The maximum value allowed in wastewater example	Composite Sample For 2 Hours	EHS General Guidelines Limit Values for Sanitary Sewage Discharge	91/271/EEC Directive
Temperature (° C)	40	40°C	-	-	-
pH	6.5-10.0	6-10	6-9	6-9	-
Suspended solids (TSS) (mg / L)	500	400	60	50	35 (more than 10000 equivalent population) 60 (2000-10000 equivalent population)
Oil and grease (mg / L)	250	100	-	10	-
Tar and petroleum-based oils (mg / L)	50	-	-	-	-
Chemical oxygen demand (COD) (mg / L)	4000	1000	160	125	125
Biochemical Oxygen Demand (BOD5) (mg / L)	-	-	50	30	25
Sulphate (SO4 =) (mg / L)	1700	1700	-	-	-

Parameter	NATIONAL			INTERNATIONAL	
	Discharge to Sewage System		Discharge to Receiving System	Discharge to Receiving Medium	
	RWPC - Table 25: Wastewater Standards of Wastewaters foreseen in Wastewater Discharge to Infrastructure	Sewerage Wastewater Discharge Regulations of Manisa General Directorate of Manisa Water and Sewerage Administration	SKKY - Table 21.2: Sector: Domestic Waste Waters(Class 2: Raw Pollutant Load as BOD 120-600 Kg/Day, Population = 2000-10000)	IFC	EU
	At Wastewater Infrastructure Facilities of which sewer systems are resulted with Full Treatment	The maximum value allowed in wastewater example	Composite Sample For 2 Hours	EHS General Guidelines Limit Values for Sanitary Sewage Discharge	91/271/EEC Directive
Total sulphur (S) (mg / L)	2	2	-	-	-
Phenol (mg / L)	20	20	-	-	-
Free chlorine (mg / L)	5	5	-	-	-
Total nitrogen (N) (mg / L)	- [(a)]	100	-	10	-
Total phosphorus (P) (mg / L)	- [(a)]	10	-	2	-
Arsenic (As) (mg / L)	3	3	-	-	-
Total cyanide (Total CN) (mg / L)	10	10	-	-	-
The total lead (Pb) (mg / L)	3	3	-	-	-
Total cadmium (Cd) (mg / L)	2	2	-	-	-
Total chrome (Cr) (mg / L)	5	5	-	-	-
Total mercury (Hg) (mg / L)	0.2	0.2	-	-	-
Total copper (Cu) (mg / L)	2	2	-	-	-

Parameter	NATIONAL			INTERNATIONAL	
	Discharge to Sewage System		Discharge to Receiving System	Discharge to Receiving Medium	
	RWPC - Table 25: Wastewater Standards of Wastewaters foreseen in Wastewater Discharge to Infrastructure	Sewerage Wastewater Discharge Regulations of Manisa General Directorate of Manisa Water and Sewerage Administration	SKKY - Table 21.2: Sector: Domestic Waste Waters(Class 2: Raw Pollutant Load as BOD 120-600 Kg/Day, Population = 2000-10000)	IFC	EU
	At Wastewater Infrastructure Facilities of which sewer systems are resulted with Full Treatment	The maximum value allowed in wastewater example	Composite Sample For 2 Hours	EHS General Guidelines Limit Values for Sanitary Sewage Discharge	91/271/EEC Directive
Total nickel (Ni) (mg / L)	5	5	-	-	-
Total zinc (Zn) (mg / L)	10	5	-	-	-
Total tin (Sn) (mg / L)	5	5	-	-	-
Total silver (Ag) (mg / L)	5	5	-	-	-
Cl (chloride) (mg / L)	10000	-	-	-	-
Surfactants (MBAS) (mg / L) reacting by Methylene blue	Discharge of substances of which biological degradation are not in conformance with Turkish Standards Institute standards is not permitted in principle.	-	-	-	-
Total Coli form Bacteria (MPN / 100)	-	-	-	400	-
Biodene of fish (ZSF)	-	-	-	-	-
Amtimo (SB)	-	3	-	-	-

Parameter	NATIONAL			INTERNATIONAL	
	Discharge to Sewage System		Discharge to Receiving System	Discharge to Receiving Medium	
	RWPC - Table 25: Wastewater Standards of Wastewaters foreseen in Wastewater Discharge to Infrastructure	Sewerage Wastewater Discharge Regulations of Manisa General Directorate of Manisa Water and Sewerage Administration	SKKY - Table 21.2: Sector: Domestic Waste Waters(Class 2: Raw Pollutant Load as BOD 120-600 Kg/Day, Population = 2000-10000)	IFC	EU
	At Wastewater Infrastructure Facilities of which sewer systems are resulted with Full Treatment	The maximum value allowed in wastewater example	Composite Sample For 2 Hours	EHS General Guidelines Limit Values for Sanitary Sewage Discharge	91/271/EEC Directive
Boron (B)	-	3	-	-	-
MPN: Most Probable Number					

Table 13.National and International Environmental and H&S Limit Values (Noise Standards)

Receiver		NATIONAL	INTERNATIONAL	
		RAMEN Regulation Annex VII Table 4 Environmental Noise Limit Values for Industrial Plants (Day: 07:00-19:00, Evening:19:00-23, Night:23:00-07:00)	**IFC**	**EU**
			EHS General Guidelines Limit Values for Noise Level (Day: 07:00-22:00, Night:22:00-07:00)	**2002/49/EC Directive**
Educational, cultural and health facilities which are sensitive against noise and areas where cottage and camp sites are mostly located		Ldaytime: 60 dBA Leveningtime: 55 dBA Lnighttime: 50 dBA	-	-
Commercial buildings and those areas of the densely-populated residential areas which are sensitive against noise.		Ldaytime: 65 dBA Leveningtime: 60 dBA Lnighttime: 55 dBA	-	-
Commercial buildings and those areas of the densely-populated office areas which are sensitive against noise.		Ldaytime: 68 dBA Leveningtime: 63 dBA Lnighttime:: 58 dBA	-	-
Industrial areas		Ldaytime: 70 dBA Leveningtime: 65 dBA Lnighttime: 60 dBA	Ldaytime: 70 dBA and Lnighttime: 60 dBA (or background noise up to 3 dB transition to outside the nearest receiver)	-
Housing, institutions and training places		-	Ldaytime: 55 dBA and Lnighttime: 45 dBA (or background noise up to 3 dB transition to outside the nearest receiver)	-
Kind of activity (construction, demolition and repair)		**RAMEN Regulations, Annex VII, Table 5, Environmental Noise Limit Values for construction site**	**IFC**	**EU**
			EHS General Guidelines Values	**2002/49/EC Directive**
Building		Ldaytime: 70 dBA	-	-
Road		Ldaytime: 75 dBA		
Other Sources		Ldaytime: 70 dBA		
Area of usage		**RAMEN Regulation Annex VII Table 9: Indoor Noise limit values (values in the absence of any activity in space)**	**IFC**	**EU**
			EHS General Guidelines Values	**2002/49/EC Directive**
Health Facility Areas	Inpatient institutions, dispensaries, clinics, nursing and retirement homes and the like.	Closed Window Leqi: 35 dBA Open Window Leqi: 45 dBA	-	-
	Rest and treatment rooms	Closed Window Leqi: 25 dBA Open Window Leqi: 35 dBA	-	-
Hospitals		-	equivalent level LA_{eq} 8h: 30-35 dBA Maximum LAmax fast: 40 dB	-

Table 14.National and International Environmental Limit Values (Ambient Air Quality)

Pollutant	Limit Values						
	National Legislation			IFC		EU	
Air Quality	Air Quality Assessment and Management (Annex 1 / Annex 1A) Industrial Air Pollution Control Regulation (Annex 2)			EHS General Guidelines Limit Values for Air Quality		2008/50/EC Directive 2004/107/EC Directive	
	Average Time	Limit Value	Tolerance	Average Time	Limit Value	Average Time	Limit Value
SO_2	hourly for Protection of human health	350 mg / m3 (not to be exceeded 24 times in 1 year)	As of 01/01/2014, it is 500 mg / m^3 (43 % of the limit value) and annually is decreased in equivalent amounts for once in every 12 months until the tolerance rate becomes zero up to the date of 01.01.2019	10 Minute	500 µg/m^3	1 Hour (for Protection of human health)	350 µg/m^3
	24 hour For Protection of human health	125 mg / m3 (not to be exceeded 3 times in 1 year)	As of 01/01/2014, it is 250 mg / m^3 (100 % of the limit value) and is decreased in equivalent amounts for once in every 12 months until the tolerance rate becomes zero up to the date of 01.01.2019.	24 Hour	20 µg/m^3	24 Hour (for Protection of human health)	125 µg/m^3
	Annual and Winter Term (October 1 to March 31) - Ecosystem protection-	20 µg/m^3	-	-	-	1 Year (For protection of vegetation)	20 µg/m^3
NO_2	hourly for Protection of human health	200 mg / m3 (not to be exceeded 18 times in 1 year)	As of 01/01/2014, it is 300 mg / m^3 (50 % of the limit value) and is decreased in equivalent amounts for once in every 12 months until the tolerance rate becomes zero up to the date of 01.01.2019	1 Hour	200 µg/m^3	1 Hour (for protection of human health n)	200 µg/m^3
	Annually For Protection of human health	40µg/m^3	As of 01/01/2014, it is 60 mg / m^3 (50 % of the limit value) and is decreased in equivalent amounts for once in every 12 months until the tolerance rate becomes zero up to the date of 01.01.2019	1 Year	40 µg/m^3	1 Year (for protection of human health)	40 µg/m^3

Pollutant	Limit Values						
	National Legislation			IFC		EU	
Air Quality	Air Quality Assessment and Management (Annex 1 / Annex 1A) Industrial Air Pollution Control Regulation (Annex 2)			EHS General Guidelines Limit Values for Air Quality		2008/50/EC Directive 2004/107/EC Directive	
	Average Time	Limit Value	Tolerance	Average Time	Limit Value	Average Time	Limit Value
NO_X	Annually For protection of vegetation	30 µg/m^3	-	-	-	Calendar Year and Winter (1 October – 31 March) (For protection of vegetation)	30 µg/m^3
PM10	24 hour Protection of human health	50 mg / m3 (not to be exceeded 35 times in 1 year)	As of 01/01/2014, it is 100 mg / m^3 (100 % of the limit value) and is decreased annually in equivalent amounts for once in every 12 months until the tolerance rate becomes zero up to the date of 01.01.2019.	24 Hour	50 µg/m^3	24 Hour (for protection of human health)	50 µg/m^3
	Annually Protection of human health	40 µg/m^3	As of 01/01/2014, it is 60 mg / m^3 (50 % of the limit value) and is decreased annually in equivalent amounts for once in every 12 months until the tolerance rate becomes zero up to the date of 01.01.2019.	1 Year	20 µg/m^3	1 Year (for protection of human health)	40 µg/m^3
CO	Maximum daily 8-hour average- Protection of human health	10 mg/m^3	As of 01/01/2014, it is 16 mg / m^3 (60 % of the limit value) and is decreased annually in equivalent amounts for once in every 12 months until the tolerance rate becomes zero up to the date of 01.01.2017.	-	-	8 Hour (for protection of human health)	10 mg/m^3

Table 15. National and International Environmental Limit Values (Flue Gas Emissions)

POLLUTANT	Limit Values				
	National Legislation			IFC	EU
Flue Gas Emissions	Industrial Air Pollution Control Regulation (Annex 5)			General EHS Guideline Value	2008/50/EC Directive 2004/107/EC Directive
	Emission Limit Values for Gas Fuels (mg / Nm^3) (≤ 50 MW Thermal Fuel power <500 MW)	Emission Limit Values for Gas Fuels (mg / Nm^3) (Thermal Fuel Power (≤ 50 MW)	Explanation	Turbine: 15 MWth <x <50 MWth plant used natural gas	-
Dust	5	10	The amount of oxygen in the flue gas volume will be based on 3 %.	-	-
SO_2	35	100		-	-
NO_2	200	800		-	-
NO_X	-	-		25 ppm	-
CO	100	100		-	-

Limit values for soil pollution mentioned within “The Regulations on Soil Pollution Control and Point Source Contaminated Sites” are mentioned in **Table 16**.

Table 16. National Environmental Limit Values (Soil Pollution)

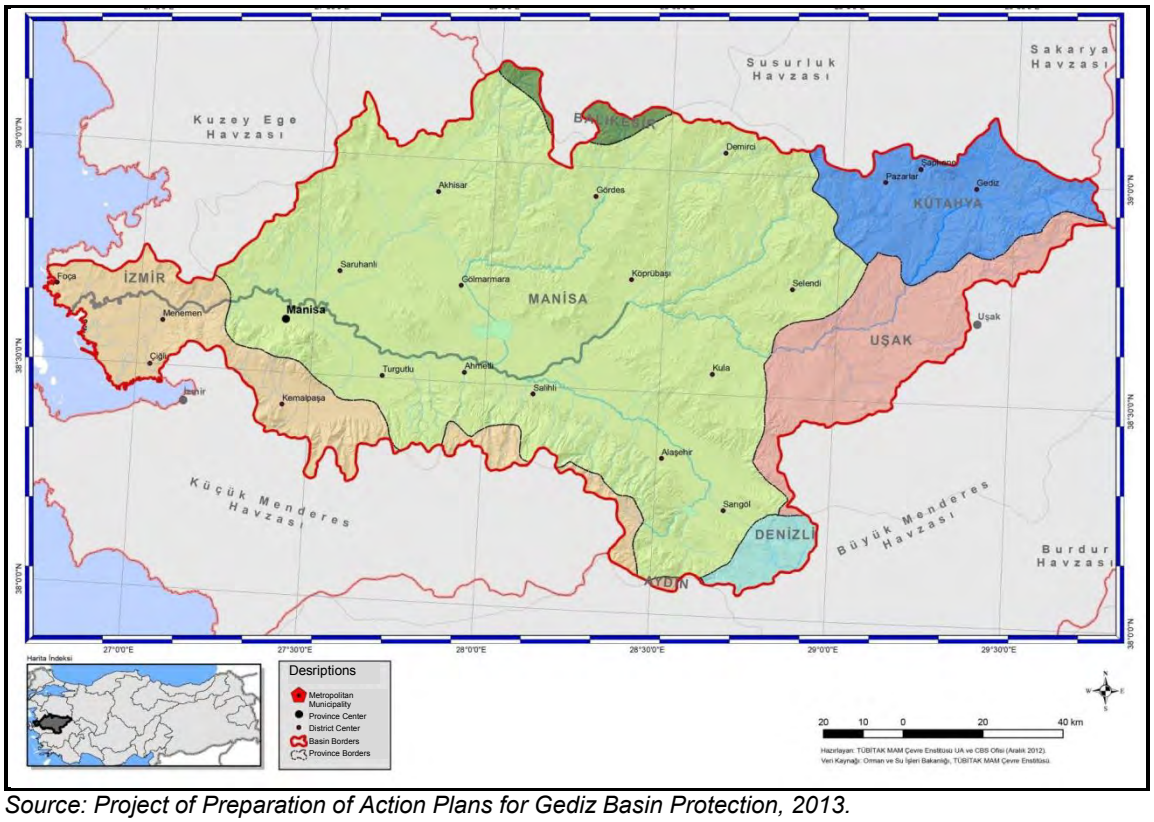
Parameter (mg/kg)	Swallowing of soil and absorption through skin contact (mg/kg oven dry soil)	Breathing of volatile substances at external medium (mg/kg oven dry soil)
Arsenic	0.4	471
Cupper	3,129	-
Mercury	23	-
Zinc	23,464	-
Cadmium	70	1,124
Chromium	235	24
Lead	400	-
Nickel	1,564	-
Total Petroleum Hydrocarbons	No limit value	No limit value

5. ENVIRONMENTAL AND SOCIAL BASELINE, ASSESSMENT OF EFFECTS AND MITIGATION MEASURES

5.1. Hydrology and Hydrogeological Characteristics

5.1.1. Baseline

Manisa Training and Research Hospital Project are located within the borders of Gediz Basin. Gediz Basin which is one of 25 Basins of Turkey (**Please Refer to Figure 12**) is located at the Western Part of Turkey in the Aegean Region and waters of Gediz flow into Aegean Sea through branches of Gediz and it encloses the field in between Northern Aegean, Susurluk and Küçük Menderes Basins. Total area of Gediz Basin is approximately 1,703,394 hectares and forms 2.2 % of total area of Turkey. Length of Gediz River of which Gediz Basin is named after is 275 km. Since Gediz Basin has arable lands and good climate for agricultural activities, it takes place near the top compare to other basins in Turkey. On the other hand, there is an intense industrialization at Kemalpaşa and Menemen Districts of İzmir and Manisa Province which are located within the basin.



Source: Project of Preparation of Action Plans for Gediz Basin Protection, 2013.

Figure 12.Gediz Basin

General characteristics of the basin are as follows:

- 50 % (8,559,829 ha) of the area inside the drainage area of Gediz Basin is agricultural field,
- 47 % (7,980,508 ha) of the basin is forest land and semi-natural fields, 2 % of it (316,015 ha) is artificial lands which have been modified by humans such as province, etc.
- Surface water cover include 1 % (129,140 ha) of the total basin area and wetlands cover only 50,384 ha.

- Since the basin has enormously productive plain soils formed by Gediz River and has a climate which is very suitable for agricultural activities, it forms quite important agricultural fields which for Turkey.
- The characteristics which Gediz Basin have like: raw material sources skilled workforce, transportation possibilities and being close to many internal and external markets have been driving force of the development of the industry.

Whenever the status of environmental substructures is evaluated for the basin, it has been seen that wastewater and solid waste problems throughout the basin have not been analysed yet. It is known that water pollution problem increases with the population growth and industrialization and therefore, surface water quality is adversely affected due to domestic and industrial wastewaters and agricultural activities. Besides, it is observed that there is a decrease in groundwater levels which are used by industry and for irrigation purposes and it also affects the water quality. When the amounts of expected water usage during construction and operation phases of the project are considered (**Please refer to Section 5.1.2**), it is foreseen that the levels will be quite low compared to water consumption amount throughout the basin. Regarding water limits at Gediz Basin, most convenient present applications will be used for efficient water consumption under the scope of the project.

Surface Water Resources

The most important river of Manisa Province is Gediz. Total length of Gediz is 379 km and portion of it remained within borders of Manisa Province is approximately 200 km. Its flow rate is 52.51 m^3/s and it is used for irrigation purposes. Other important rivers of the province are Bakırçay and Kumçayı. Length of Bakırçay within the borders of the province is 16 km and its flow rate is 12.14 m^3/s. Length of Kumçayı within the borders of the province is 135 km and its flow rate is 4.31 m^3/s. Bakırçay and Kumçayı are used for watering purposes (Environmental status Report for Manisa Province, 2013).

Lakes and ponds which are located within borders of Manisa Province are presented in **Table 17**.

Table 17. Ponds and Lakes located within borders of Manisa Province

Name	Volume (m^3)	ırrigation Area (ha)	Amount of pumped water (m^3)	Purpose of Usage
Kula Pond	2.05	179	0.94	Irrigation
Yuntdağı Köseler Pond	1.47	128	0.6	Irrigation
Kırkağaç Pond	0.83	142	-	Irrigation
Marmara Lake Dam	321.36	76,423	64.2	Irrigation+prevention of flood
Demirköprü Dam	1,022.2	95,894	699.1	Irrigation+energy +prevention of flood
Buldan Dam	44.8	5,549	5.5	Irrigation+ prevention of flood
Afşar Dam	84	13,500	54.1	Irrigation+ prevention of flood + potable water
Sevişler Dam	121	6,759	37.2	Industrial water + Irrigation
Gördes Dam	453.38	12,591	-	Irrigation+ prevention of flood + potable water

Source: Environmental Status Report for Manisa Province, 2013

There is no other project which is ongoing and / or planned by General Directorate of State Hydraulic Works (DSİ) 2nd Regional Directorate within the borders of the field

over which the project will be constructed (**Please refer to Annex A**). In addition to this, there is no other surface water source available within the borders of the field over which the project will be constructed (**Please refer to Figure 13** and **Annex B**).

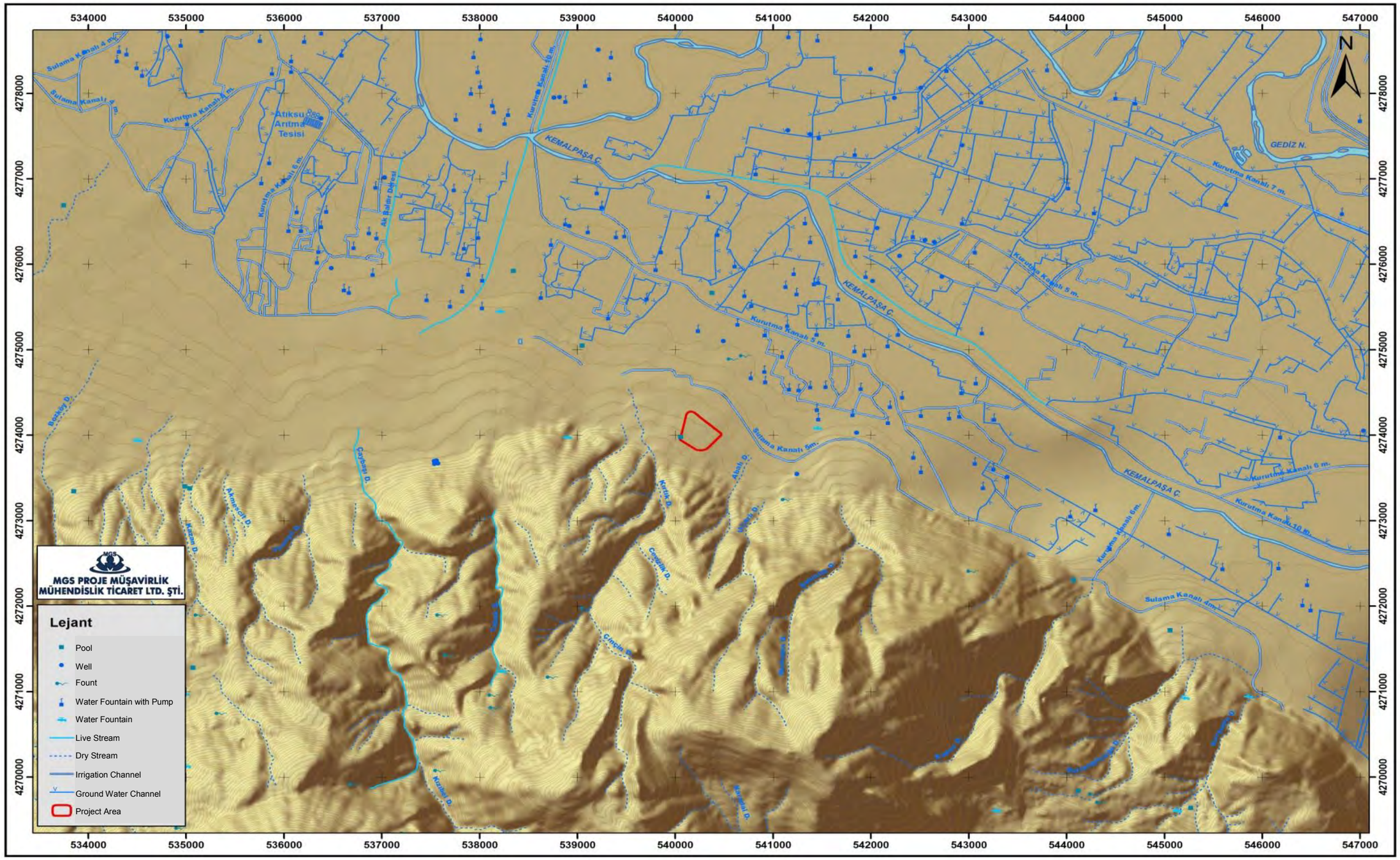


Figure 13.The Map of Surface Water Sources and Project Area

Groundwater Resources

Manisa Province is located within Gediz Basin. Aquifer alluvial deposit is used within Gediz Basin. At some places, groundwater is obtained from limestone and Neogene units. Some parts of Gediz and Bakırçay supply 474 hm^3/year Groundwater potential in total to the province (DSİ 2nd Regional Directorate, 2013).

In addition to this, the groundwater levels of the other water resources are presented in **Table 18**.

Table 18.Groundwater Levels of Water Sources

Name of Source	Groundwater Level (hm^3/year)
Kırkağaç Bekraz River	9.3
Muradiye Göksu	7.55
Saruhanlı Sarıkız	6.85
Saruhanlı Hacırahmanlı	7.15
Salihli Kabazlı	10
Alaşehir Center	12.5

Source: Environmental Status Report for Manisa Province, 2013

Schematic presentation of Groundwater wells available within project field and its near environment is shown at **Figure 14**.

Source: Ministry of Forest and Water Affairs, Geographical Data Portal, 2015

Figure 14.Groundwater Wells Located within Project Field and Near Environment

5.1.2. Impact Assessment

Construction Phase

Water Use

In the construction phase; water needs of staff for drinking and using, for preventing dust formation, for using in concrete construction will be needed.

While water need of staff will be met by buying from the market, tap water need will be met through current ground water wells or city water supply. Drinking and tap water in the phase of construction will be provided according to the provisions of "The Regulation Concerning Water Intended for Human Consumption" which entered into force upon its publication in 17.02.2005 dated and 25730 numbered Official Gazette and "Amendment Regulation on the Regulation Concerning Water Intended for Human Consumption" entering into force upon its publication 07.03.2013 dated and 28580 numbered Official Gazette.

It is planned that water need for preventing dust formation and for concrete manufacture will be provided from current city water.

- Drinking and Tap Water Need for Employees:

1.250 employees will work in the phase of construction. When water need per day is accepted as 150 liter per person[7], water requirement will be 187.5 m^3 per day.

- Water Use to Prevent Dust Formation:

In the phase of construction, water will be used to prevent dust formation. This amount is calculated as approximately 30 m^3/day except rainy days. (3 times irrigation with 10 ton sprinkler).

- Water Amount for Concrete Manufacture:

Concrete consists of 75% of aggregate, 10% of cement and 15% water. For this reason, there will be need for process water during the production of ready mixed concrete. Ready-mixed concrete plant to use in the construction phase will have 90 m^3/h capacity. In this case, maximum 1,080 m^3 concrete will be produced per day. This means that 162 m^3 water per day will be used as concrete mixing water.

- Wash Water of Concrete Plant Equipment

It is required to wash the truck mixers for installing concrete again when they returned to plant area after transporting of concrete with truck mixers. Process water will be needed for this process.

The maximum capacity of each concrete plant which will be operated under the project will be 90 m^3/h. When daily production amount is taken into consideration and average capacity of a truck mixer is considered as 15 m^3, there will be concrete transportation 72 times (1,080 m^3 ÷ 15 m^3 = 72). So, it is required to wash truck mixers 72 times in a day.

[7] *http://tuikapp.tuik.gov.tr*

Approximately 0.5 m^3 water per vehicle will be used for washing a truck mixer and cleaning concrete ruins in it. When it is accepted that there will be 72 cruises in a day 36 m^3/day wastewater occur in total during the phase of washing.

Wastewater Sources

During construction phase; domestic waste water will occur due to personnel working at the Project site and waste water including lots of suspended solid materials due to washing of ready concrete plant equipment.

Since water which will be used in irrigation works to prevent dust formation will evaporate and since concrete mixing water which will provide hydration with cement will be in concrete construction it is not possible to return as wastewater.

- Domestic Wastewater Caused by Employees

Assuming all of water which is used in the construction phase of the project will return as wastewater, the amount of domestic wastewater was calculated as 187.5 m^3 / day.

- Wastewater Because of Washing of Concrete Plant Equipment

Mixers transporting in concrete plant should be washed after pouring of concrete. As a result of washing mixers, wastewater will occur in concrete plant. TSS concentration and turbidity are very high as a result of this wastewater. These waters will be given to sedimentation basin which will be built in construction sites.

For washing and cleaning a truck mixer, approximately 0.5 m^3 water will be used for each vehicle. All of the water to use will turn into wastewater. In this case, when it is accepted that there will be 72 cruises in a day 36 m^3/day wastewater occur in total during the phase of washing.

Water use and wastewater sources in the construction phase of the project are shown in **Table 19**.

Table 19.Wastewater Sources

Point of Water Use	**Amount of Water Use**	**Supply Point**	**Amount of Wastewater**
Drinking and Tap Water for Employees	187.5 m^3/day	Buying from the Market and Mains	187.5 m^3/day
Water Use to Prevent Dust	30 m^3/day	City Water	- (evaporation)
Water use in concrete production	162 m^3/day	City Water	- (Remain in concrete structure)
Water Use During Washing of Concrete Plant Equipment	36 m^3/day	City Water	36 m^3/day
Total	***415.5 m^3/day***	**-**	***223.5 m^3/day***

Other Impacts Caused by Project Construction Activities

In general, construction activities can create negative impacts on surface and groundwater resources. To give an example: possible leaks during moving materials like fuel and oil which are needed for earth movement, construction machines and equipment, adverse situations like percolation while moving and using the concrete. In addition, flooding can occur during the storm drainage. Water released or leaked as a result of these negative impacts can mix in surface and groundwater resources.

Operation Phase

This phase of project include water need of patients, patient relatives, visitors and staff; water use for hygiene, water use for equipment used in the hospital (autoclave, sterilizer, Rontgen etc.), water need which will be used in landscape areas. Also, surface water run-off, water pollution and radioactive and medical waste leakeges to water are other potential impact of the project on water streams during operation phase,

Water consumption per bed and per patient has been determined as 1.60 m^3/day by United States of America (USA) Energetics Administration (2007) under the scope of *"Data Which Belongs to Large Size Hospitals"*. Whenever mentioned Daily water consumption is regarded, it is expected to have **892.8 m^3/day** water requirement for Manisa Training and Research Hospital Project having 558 bed capacity.

Cumulative Impacts

Wastewater to occur during the phases of construction and operation of Manisa Training and Research Hospital Project will be disposed by using sewer system. Considering the amount of urban wastewater, the wastewater will not cause a significant increase in the amount of wastewater. Therefore, there is not any cumulative impact and any negative impact on water quality.

5.1.3. Mitigation Measures

General

Ministry of Health request mitigation of impact in technical specification prepared in the scope of Manisa Training and Research Hospital Project. Some measures determined in the scope of design criteria and infrastructure needs are given below.

In addition to this, disposal methods of wastewater to occur in the phases of construction and operation are described in sub-titles:

Drainage systems in buildings will be designed taking into account the hospital's capacity.

Piping will be created for storm drainage and connected to sewer system. Rainwater will be directed through oil slinger and if necessary pump system will be set up.

During the phase of construction, storage and disposal of waste will be regularly provided in order to prevent water pollution. In addition to this, employees will be trained during storage and transportation of excavation materials. These materials will be stored in a place away from hazardous materials. Storage and transportation will be implemented under supervision.

Oil change of machinery, fuel delivery etc. will not be performed in excavation area. Needs will be met on systems of impermeable floor.

Any damage will be reported and required measures will be taken and disposed in a proper way.

Domestic waste water during construction and operation phases of the Project will be forwarded to Manisa Metropolitan Municipality Waste Water Substructure facility. Discharge of any wastewater which can cause deterioration of current quality of project area and near water resources will be prevented and necessary measures will be taken by receptor.

The project will be implemented according to provisions of The Regulation for Surface Water Quality Control and Protection of Watersheds, The Regulation on the Preparation of Management Plans and The Regulation for Protection of Groundwater against Pollution and Degradation.

Construction Phase

Wastewater depending on water use can occur in the construction phase. In the construction phase, it is expected that there will be wastewater because of employees and washing of concrete plant equipment. Wastewater and disposal method given in **Table 20**.

Table 20.Wastewater and Disposal Method in the Construction Phase

Wastewater Resource	Wastewater Amount	Disposal Method
Drinking and Tap Water for Employees	187.5 m^3/day	City Sewer System
Water Use During Washing of Concrete Plant Equipment	36 m^3/day	Sediment Pool
Total	***223.5 m^3/day***	**-**

- Disposal of Domestic Wastewater

Assuming all of the water which will be used by employees during construction phase will turn into wastewater, the amount of domestic wastewater is calculated as 187.5 m^3/day.

Domestic wastewater contains suspended solid content, colloid, dissolved organic and inorganic matters. Needs of staff to work during construction phase will be met in the construction site. It is planned that wastewater of construction plant will be sent to Manisa Wastewater Treatment Facility and there will be disposal of wastewater by connecting to city sewer system.

Waste water treatment capacity of Manisa Waste Water Treatment Facility is 31,000 m^3/day and coarse grid, fine grid (mechanical grid), sand catcher, preliminary settling pools and final settling pools, biological treatment (trickling filter), aerobic mud stabilization pools and mud drying beds are included within the waste water treatment facility.

- Disposal of Process Wastewater

Since concrete plant will be operated to meet concrete need there can be wastewater caused by washing concrete plant equipment. It is expected that 36 m^3 water/day will be used because of washing process.

Mixers transporting in concrete plant should be washed during the transportation and after pouring of concrete. As a result of washing mixers, wastewater will occur in concrete plant. Suspended solid concentration and turbidity are very high as a result of this wastewater. There will be concrete admixture (clay, sand, pebble etc.) in these wastewaters. Therefore, "Sediment Pool" will be set up in construction sites for recycling of wastewaters and concrete aggregate. Thus, the water of truck mixers will be given to sediment pool and solids will be separated from water. Concrete admixtures sink to the bottom in time with the rest water taken into sediment pool. The water in the pool will be used again by performing loopback for washing interior and exterior of mixer.

Exit waters of sediment pool will not be discharged to any receiving environment. Concrete aggregate accumulated in the bottom of the pool will be processed again in concrete plant.

- Management of Other Wastewater

Runoff water will be collected separately from domestic and process wastewater and will be connected to the channel which will be designated by municipality.

Operation Phase

This phase of project include water need of patients, patient relatives, visitors and staff; water use for hygiene, water use for equipment used in the hospital (autoclave, sterilizer, Rontgen etc.). There will be wastewater as a result of this water use. If all of the daily water turn into wastewater for Manisa Training and Research Hospital Project (558 beds), 892.8 m^3/day of wastewater will occur.

It is planned that wastewater of hospital will be sent to Manisa Wastewater Treatment Facility and there will be disposal of wastewater by connecting to city sewer system. During the operation phase, wastewater will be managed according to related regulations.

5.1.4. Residual Impacts

Residual impacts on water quality in the scope of project can be negligible when Water Management is implemented properly and updated during the activity.

5.2. Soil Quality

5.2.1. Baseline

Most of lands of Manisa Province are convenient for agricultural activities. Total area of agricultural fields of Manisa is 5,032,560 decare and 116,753 decare of these agricultural fields are fallowed and 4,915,807 decare of these agricultural fields are arable lands. Among arable lands; cereals and other herbal products are planted over 2,651,416 decare lands, there are available vegetable gardens over 337,755 decare, there are fruits and medicinal plants over 1,925,796 decare and ornament plants are available over the remaining 840 decare (TÜİK, Herbal Production Statistics, 2014).

Major soil groups observed throughout the province are listed below:

- Alluvial Soils
- Colluvial Soils
- Red Chestnut Soils
- Red Mediterranean Soils
- Chestnut Colored Soils
- Regosol Soils
- Red Brown Mediterranean Soils
- Brown Forest Soils
- Non-calcareous Forest Soils
- Non-calcareous Brown Soils
- Vertisol Soils
- Rendzina Soils
- Basaltic Soils
- Bare Rocks and Debris
- Sandy, Pebbled, Rubble, River Overflood Beds
- Salty, Alkali and Salty Alkali Mixed (Arid) Soils

The agricultural fields are 5,139,374 decare (38.9 %) while grasslands are 325,290 decare (2.5 %), forest and heaths are 3,398,319 decare (25.7 %), unused agricultural lands are 34,583 decare (0.3 %) and percentage of non-arable lands is 33 % (4,3036,434 decare) of whole lands of Manisa Province.

Ratio of 1st class lands among total soil lands of Manisa Province is 8.12 %. The biggest ratio belongs to 4th class soils with 42.79 % (**Please refer to Table 21** and **Figure 15**).

Table 21. Land Classes of Manisa Province

Land Class	Total Area (ha)	Ratio Among Total Soil Area (%)
Class I.	107,201	8.12
Class II.	103,364	7.83
Class III.	101,252	7.67
Class IV.	88,579	6.71
Class V.	309,563	23.45
Class VI.	564,871	42.79
Class VII.	45,147	3.42
Class VIII.	-	-
Total	***1,320,100***	***100***

Source: Environmental Status Report for Manisa Province, 2013.

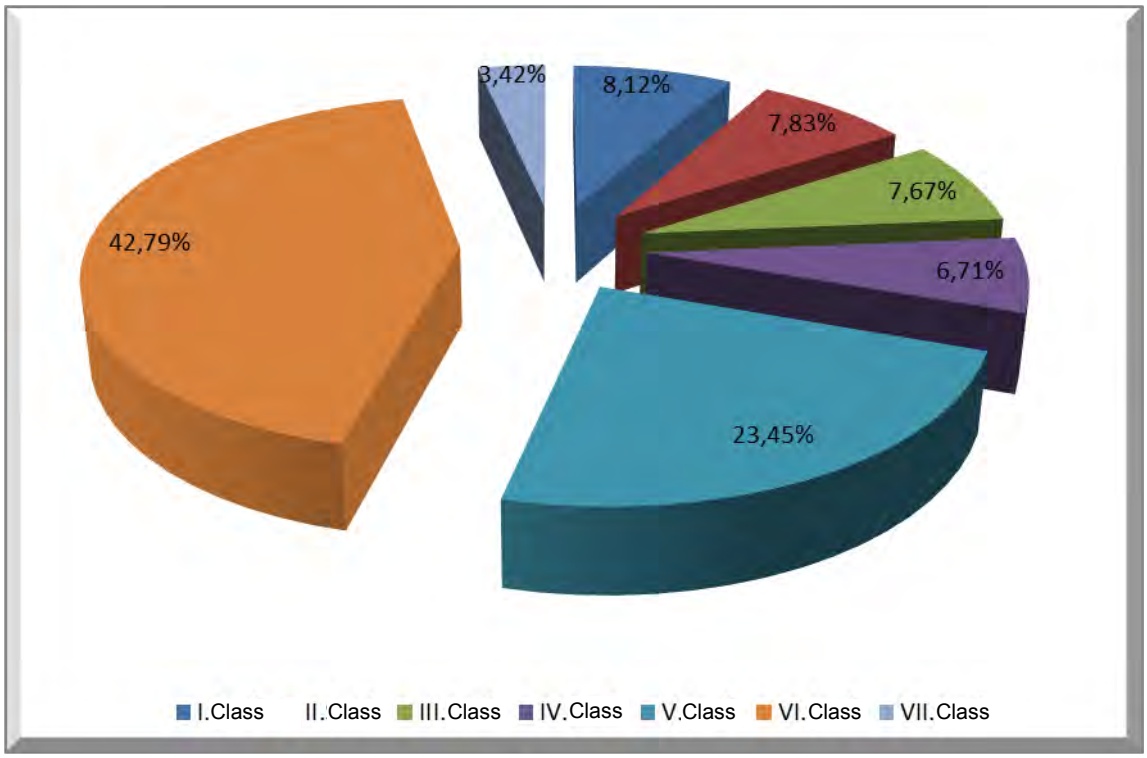


Figure 15. Distribution of Field Class of Manisa Province

No agricultural activities are performed over the Project field. Land size map which show the soil properties of the field is given in **Figure 16** and **Annex B**. Accordingly, field over which Manisa Training and Research Hospital will be built is composed from 2nd class soil (lands over which cereals and some industrial crops are grown and which are proper for these cereals and crops to be grown) and land cover is described as "*construction fields*" (**please refer to Figure 17**).

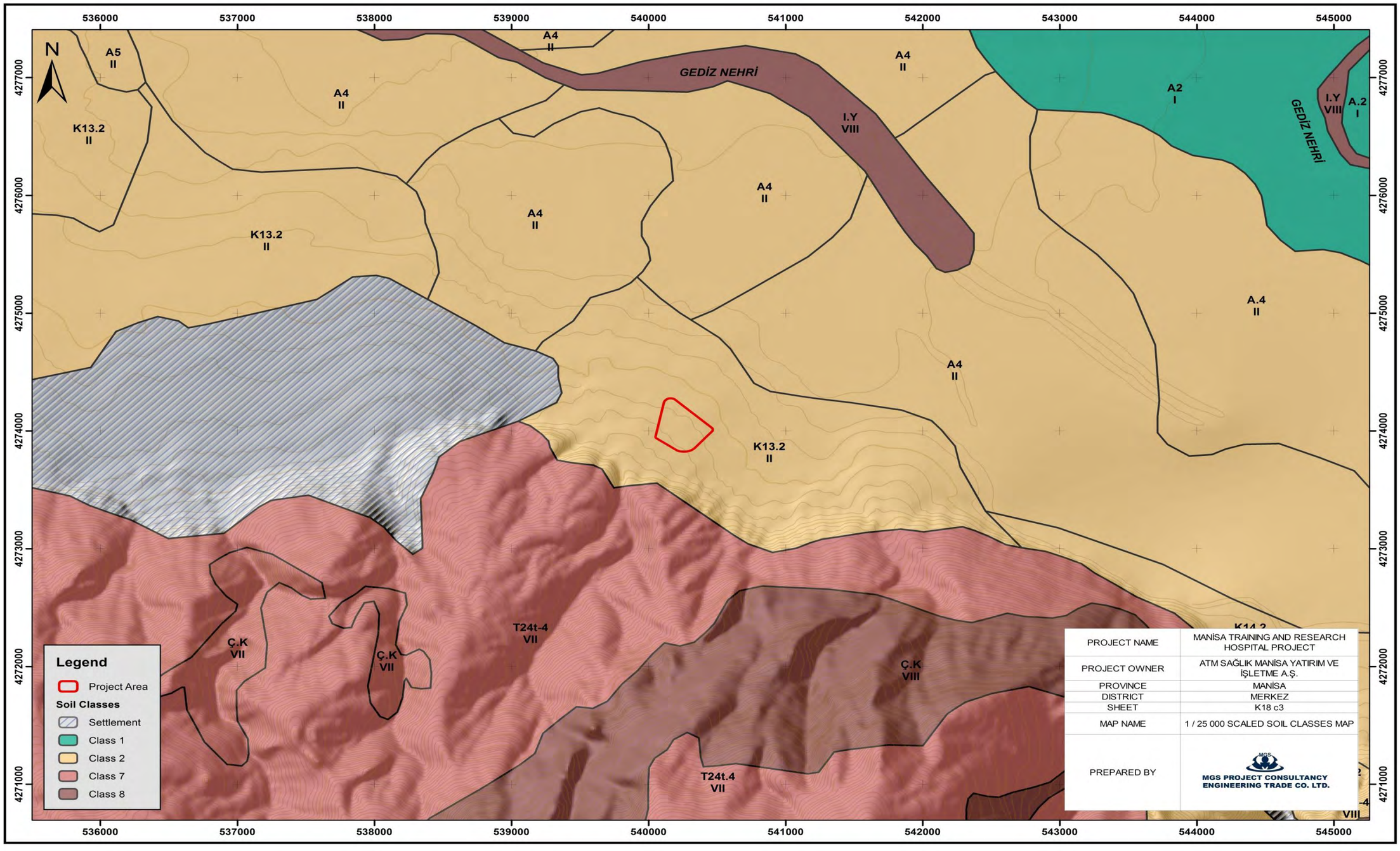


Figure 16.Land Size Map of the Project Field

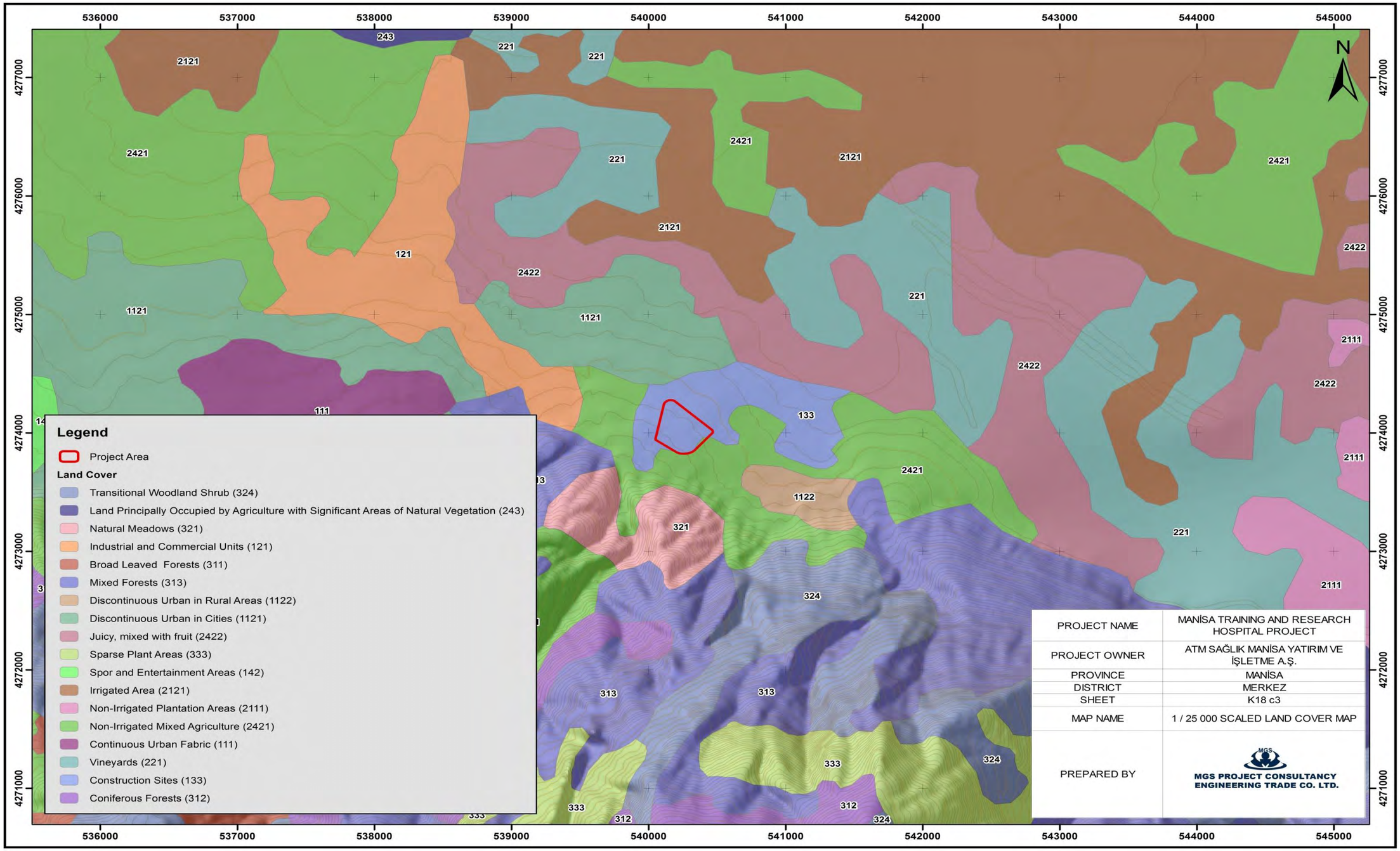


Figure 17. Map of Land Cover of the Project Field

Soil Analysis

In order to determine soil quality of the project field and surroundings and to examine the soil pollution, soil samples have been taken by SEGAL Environmental Measurement and Analysis Laboratory from the points which are shown within satellite vie wat **Figure 18**.

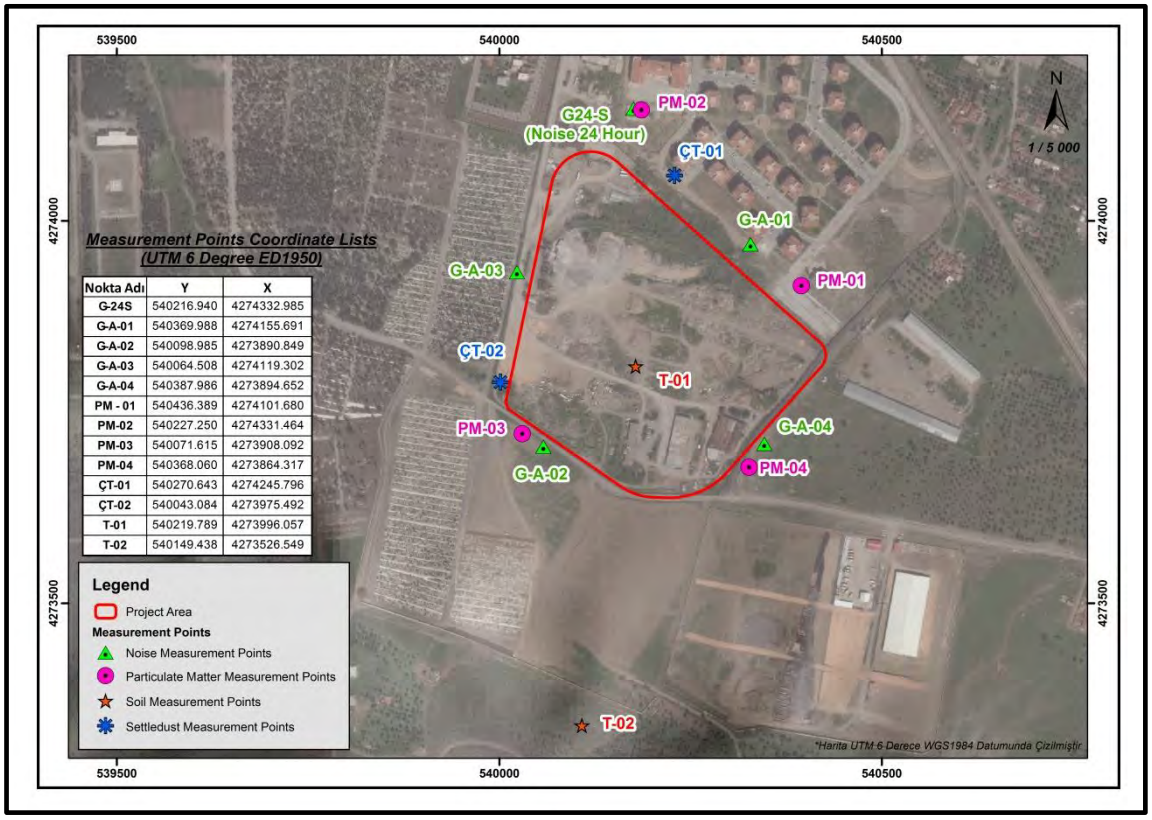


Figure 18. Satellite Photo showing points of environmental sampling

Heavy metal analysis has been performed for the soil samples taken from 2 locations where in the Project field and its surroundings. Heavy metal analyses have been evaluated in conformance with *"The Regulations on Soil Pollution Control and Point Sources Contaminated Sites*" Table 2 (List of Industrial activity and activity specific contamination indicator parameters) (Please refer to **Table 22** and **Table 23**). Parameters which are included in the mentioned table and which are analysed are; arsenic (As), cupper (Cu), mercury (Hg), zinc (Zn), cadmium (Cd), chromium (Cr), lead (Pb), nickel (Ni), total petroleum hydrocarbons and Total Organic Halogens.

Table 22.List of Industrial Activity and Activity specific contamination indicator parameters (Table 2)

NACE Code	Industrial Activity	Activity specific contamination indicator
4120	Construction of buildings for residence purpose and not for residence purpose	TOX, TPH, As, Cd, Cr, Cu, Hg, Ni, Pb, Zn
8610	Hospital Services	TOX, TPH, Ag, As, Ba, Bi, Cd, Cr, Cu, Hg, Mo, Pb, Pt, Sb, Se, Sn, Zn

Table 23.Results of Soil Analysis

Parameter-Unit	Soil-1	Soil-2	Ingestion of soil or dermal contact (mg/kg oven dry soil)	Outdoor inhalation of fugitive dust (mg/kg oven dry soil)
Arsenic(mg/ kg)	**33**	**9.25**	0.4	471
Cupper (mg/ kg)	**34.25**	**22.5**	3,129	-
Mercury (mg/ kg)	<0.25	<0.25	23	-
Zinc (mg/ kg)	134.5	85	23,464	-
Cadmium (mg/ kg)	<0.25	<0.25	70	1,124
Chromium (mg/ kg)	**92.25**	**57.25**	235	24
Lead (mg/ kg)	20.75	17	400	-
Nickel (mg/ kg)	80.75	55.25	1,564	-
Total Petroleum Hydrocarbons (mg/ kg)	132.5	11.1	No limit value	
*Total Organic Halogens (TOX) (mg/ kg)	256.29	181.82	No limit value	

Assessment made based on the analysis results are given below:

- For both of the soil samples, arsenic concentration is over the generic pollutant limit values for absorbance of soil by skin contact and swallowing of soil. However, breathing of volatile substances including arsenic concentrations are lower than the generic pollutant limit values. The reason of high arsenic concentration may be due to nature of the soil and/or previous artificial activities.
- Cupper, zinc, cadmium, lead and nickel parameters determined in both soil samples are under the generic pollutant limit values for absorbance of soil by skin contact and swallowing of soil and for these parameters, there are no generic pollutant limit value for breathing of volatile substances at external medium.
- For both of the soil samples, chromium concentration is under the generic pollutant limit values for absorbance of soil by skin contact and swallowing of soil and breathing of volatile substances including chromium concentrations are over the generic pollutant limit values. The reason of high chromium concentration may be due to nature of the soil and/or previous artificial activities.
- No generic pollutant limit value has been specified for Total Petroleum Hydrocarbons and Total Organic Halogens. These parameters will be monitored during construction phase and comparison will be made with the period before the construction phase.
- For parameters mentioned for Hospital Services with 8610 NACE code, soil analysis will be performed at unexcavated field during construction phase in order to compare with the current situation of the soil with the completion of the construction activities(initial phase of commissioning).

5.2.2. Impact Assessment

Construction Phase

Construction phase of the Project includes all of activities (excavation, foundation, concrete pouring, elaborate, etc.) required for construction of the hospital. Possible impacts over soil during construction phase of the hospital have been analysed in this section.

If hazardous materials, hazardous wastes or waste oil mix into the soil during construction works, soil pollution will occur. Contaminated soil will be transported to licensed companies with licensed vehicles.

Leakages and spill occur during working of machines and equipment for excavation, during storage of fuel oil, etc. materials and these leakages and spill cause pollution at the soil and groundwater.

Occupation of land is one of the potential impacts of the project to be consider. However, there will be no negative impact as ccoupation of land since the projet area is empty area belongs to government.

During activities performed for concrete plant which is planned to be established at construction phase, spills occur during manufacturing or uncontrolled handling. This results in pollution at soil and safety problems.

Considering going deep in soil during excavations, if ever spill and leakages occur these have adverse effects over soil and groundwater.

If ever no precautions such as providing impermeability of soil in order to protect soil and groundwater are taken, then these mentioned potential impacts will be long termed and cause massive pollution.

Operation Phase

Operation phase of the project is described as the period when the facility is put into operation. Possible impacts over soil after the health facility is put into operation are examined in this section.

Spills of hazardous materials required in operation phase of the Manisa Training and Research Hospital, leakages at storage areas, uncontrolled management of generated hazardous wastes, leakages from waste water network pipes may cause pollution at the soil. Degree of the pollution depends on the dimension of spill outs and leakages and depending on the area.

Matters to be regarded during the operation phase have been specified in technical specification of the project contracted by Ministry of Health. Septic waste water drainage systems of buildings to be operated under the body of the health facility will be designed in such a way to be able to carry the load of the envisaged facility. Ventilation and waste facilities will be available at all buildings for wastes to be collected.

Underground fuel oil tanks or protected over ground tanks will be used in the region where energy will be supplied to health facility. Emergency Case Generators will be kept ready. Besides, control systems will be made available to determine possible leakages and fuel level. So, pipe line fuel tanks will be controlled.

Cumulative Impacts

Whenever health institutions located at Manisa Şehzadeler County are examined, it is understood that there are no other facility having the same capacity and properties as the planned facility. Therefore, there will be no cumulative impact sourced from project.

5.2.3. Mitigation Measures

The following protection measures will be taken in order to protect soil and groundwater quality during construction and operation phase:

- Training will be given by Contractor to personnel about the matters causing soil pollution.

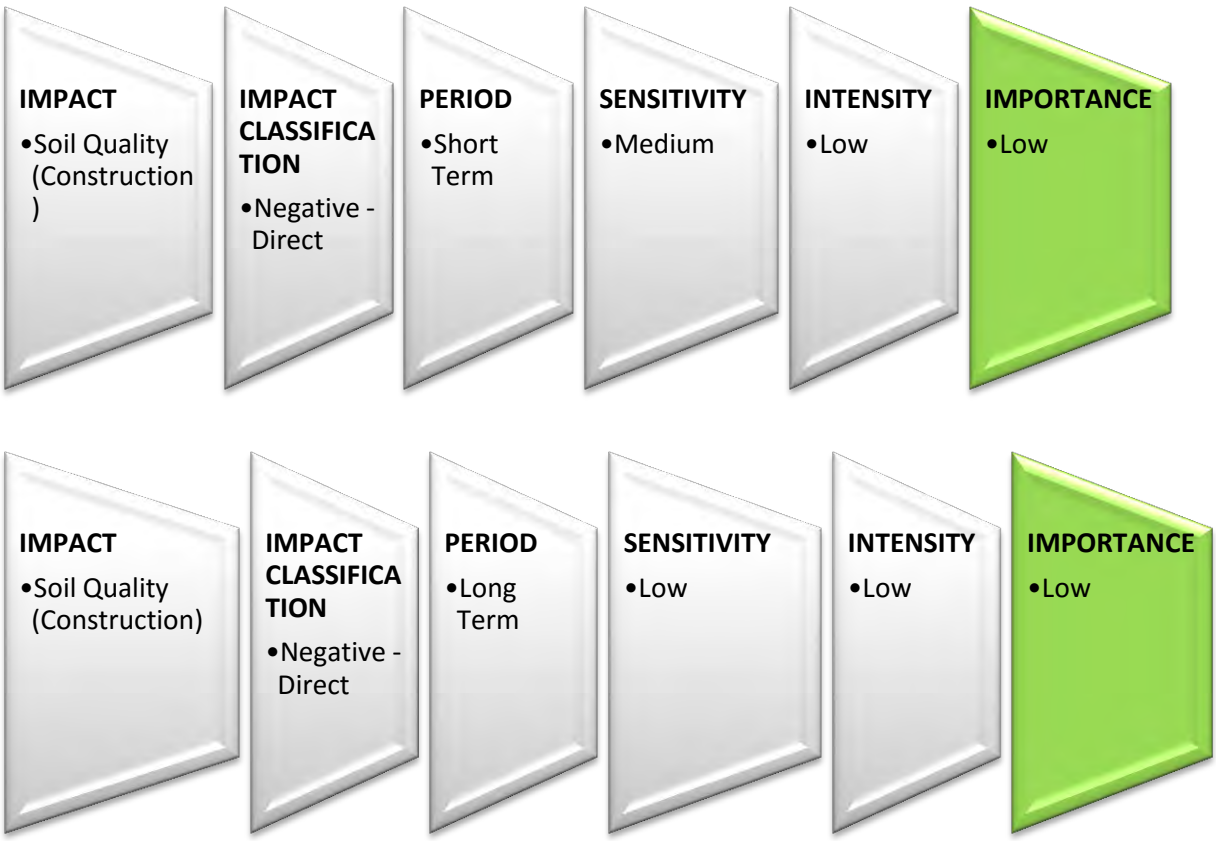
- Excavated soil will be stored in such a manner protected from rain and wind erosions.
- Dumpers of trucks will be covered during transportation of excavation material to prevent soil to be scattered.
- Top soil obtained after stripping operations will be re-used so it is important to provide this soil to keep its own characteristics. Therefore, top soil will be kept in a separate place and will be kept humidified.
- If excavation soil is found proper then it will be used in backfill. Waste soil which is not used in backfill will be transported to areas mentioned by the municipality.
- Waste Management Plan and Hazardous Material Management Plan will be prepared.
- Cement and concrete production during concrete power plant operations will be kept under control. Spill outs and leakages during transportation and usage of concrete will be controlled.
- Transportation and disposal of excavation material and hazardous materials will be made in conformance with national regulations.
- Under the scope of prevention and control of soil pollution, hazardous materials, hazardous wastes and waste oil will be prevented to mix with environment.
- No discharge will be made to the receiving medium.
- Waste oil and hazardous wastes will be collected in impermeable tanks and these tanks will be kept at a concrete floor having barriers against leakages. There will be no connection of storage area of these tanks with rain water drainage canals.
- Maintenance and repair of construction equipment and machinery will be performed over concrete floor having barriers against leakages.
- Rain water and surface water drainage canals will be built in conformance with topography of the region. Drainage canals will be inspected in regular intervals during operation phase.
- All required precautions against floods within project field will be taken by the Contractor.
- Domestic waste water sourced from water usage in construction site during construction phase of the project and water usage inside the facility within the operation phase will be discharged to sewage system. Proper connections to sewage system will be made and these connections will be inspected in regular intervals.
- Fuel oil storage, fuel supply to vehicles and maintenance of vehicles will be made on an impermeable area and barriers will be used against leakages.

If there is area contamination doubt during construction and operation phases of the project or if contamination is detected then necessary measures will be taken to recover the negative impact, to prevent leakage. Contaminated fields will be regularly cleaned not to impose risk over human health or ecosystem. Besides, Emergency Action Plan will be followed in case of leakage, spill out, fire, etc. Negative impacts over soil will be prevented/mitigated by taken required measures.

After the construction phase of the project is completed, recreation studies will be commenced regarding natural vegetation. During the project activities, provisions of 167 numbered Groundwater Law, The Regulation about Protection of Groundwater against Pollution and Degradation and The Regulation of Groundwater Measurement Systems of General Directorate of state Hydraulic Works will be followed.

5.2.4. Residual Impacts

If ever aforementioned measures are taken in project field for protection of soil and groundwater against pollution then residual impacts are expected to be insignificant.



5.3. Air Quality

5.3.1. Baseline

Air pollution effects human health directly or indirectly and impairs the life quality. In present, regional and global problems have been widespread due to air pollution. Intense urbanization, wrong settlements in provinces, increase in motor vehicles, irregular industrialization and usage of low quality fuel, topographic and meteorological conditions cause air pollution especially during the winter season.

In this respect, the most important sources of air pollution in the province of Manisa are emissions of industry, emissions from domestic heating and traffic emissions.

Air pollution from traffic is an important part in the increase of pollution in city center. Therefore exhaust gas taking measurements of the vehicles that are on the traffic should be done and surrounding roads should be planned and constructed in order to carry a portion of the inner-city traffic to outside of the city.

In the air quality assessment of Manisa, meteorological data and dispersion model has been used by Provincial Directorate of Environment and Urbanisation and current status of the province's air quality has been revealed and has been published at the Provincial Environmental Status Report (2013) (**See Table 24**). Manisa Center Station at which measurements have been made are in approximately 5 km distance to the Project Area (**Please refer to Figure 19**).

Table 24.Air Quality Values Measured in Manisa Province (Manisa Center Station)

Year	Parameter	Months												Annual Average
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
2006	PM_{10}	143	158	83	88	71	68	69	93	80	90	159	225	111
	SO_2	55	58	22	12	10	8	8	12	11	9	44	81	27
2007	PM_{10}	189	125	94	95	78	94	89	103	120	111	132	146	113
	SO_2	80	52	30	-	6	4	7	6	8	6	7	21	97
2008	PM_{10}	168	142	66	80	55	56	74	80	-	-	93	101	90
	SO_2	27	40	10	5	5	-	5	6	-	-	5	10	12
2009	PM_{10}	125	66	90	60	45	67	53	52	52	53	148	112	78
	SO_2	14	9	11	10	8	7	7	8	4	4	12	16	9
2010	PM_{10}	82	82	78	67	62	58	55	80	-	78	118	97	78
	SO_2	13	7	9	7	6	5	4	3	-	3	5	142	7
2011	PM_{10}	161	100	63	54	54	61	63	56	-	8	27	31	17
	SO_2	30	27	22	7	5	5	10	11	-	8	27	31	17
2012	PM_{10}	91	91	77	53	54	60	61	59	78	70	77	92	75
	SO_2	20	22	22	7	5	6	7	12	14	7	13	16	13
2013	PM_{10}	83	67	68	50	72	40	44	82	82	95	115	187	83
	SO_2	27	20	16	9	17	11	-	-	4	-	8	38	18

Figure 19. Satellite View Showing the Position of Manisa Center Station and the Project Area

National Air Quality Index which is determined by the Ministry of Environment and Urbanisation was created by adapting EPA Air Quality Index to the national laws and limits. The air quality index is calculated for 5 main pollutants. These are: particulate substances (PM_{10}), carbon monoxide (CO), sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and ozone (O_3).

Table 25.The National Air Quality Index Breakpoint

Index	HKI	SO_2	NO_2	CO	O_3	PM_{10}
		Average per hour	Average per hour	Average per 8 hours	Average per 8 hours	Average per 24 hours
Good	0 - 50	0-100	0-100	0-5500	0-120L	0-50
Middle	51 - 100	101-250	101-200	5501-10000	121-160	51-100L
Sensitive	101 - 150	251-500L	201-500	10001-1600L	161-150B	101-260U
Unhealthy	151 -200	501-850U	501-1000	16001-24000	181-240U	261-400U
Bad	201 - 300	851-1100U	1001-2000	24001-32000	241-700	401-520U

Index	HKI	SO_2	NO_2	CO	O_3	PM_{10}
		Average per hour	Average per hour	Average per 8 hours	Average per 8 hours	Average per 24 hours
Hazardous	301 - 500	>1101	>2001	>32001	>701	>521

L: Limit Value, B: Information Threshold: U: Warning Threshold

In order to determine air quality of Project Area, near environment and sensitive buildings' background, settled dust measurements have been realized in 2 points during 1 month period (in between 21.05.2015 and 20.06.2015) and PM_{10}measurements have been realized in 4 points during 2 days (23.06.2015 and 24.06.2015) for continuous during 24 hours have been realized by SEGAL Environmental Measurement and Analysis Laboratory. Map showing measurement points are given at **Annex B**.

Results of these measurements are given in **Table 26** and **Table 27**.

Table 26.Measurement Results of Settled Dust (SD-01 and SD-02)

Measurement Points	Concentration of Settled Dust (mg/m^2-day)						
	21.05.2015 – 20.06.2015				Average	Limit Value	
	1	2	3	4		LTL	STL
SD-01	77	103	111	101	98.0	210	390
SD-02	77	106	43	82	77.0		

Table 27.Measurement Results of PM10 (PM-01, PM-02, PM-03 and PM-04)

Measurement Points	Measurement Result ($\mu g/m^3$)	Limit Values		
		2015	2016	2017
PM-01	29	STL: 56 LTL: 90	STL: 52 LTL: 80	STL: 48 LTL: 70
PM-02	25			
PM-03	26			
PM-04	28			

Measurement and analysis results related with settled dust and PM_{10} which have been realized under the scope of the Project has been evaluated under the frame of "*The Regulation on Industrial Air Pollution Control*, *IAPCR*" which has been in force by 03.07.2009 dated and 27277 numbered Official Gazette (amended by 20.12.2014 dated and 29211 numbered Official Gazette). According to this evaluation, analysis results of both settled dust and PM_{10} are quite under the limit values mentioned in "*IAPCR*".

5.3.2. Impact Assessment

Mass flow values sourced from pollutants during construction and operation phases of Manisa Training and Research Hospital Project have been calculated. For calculation results, air quality dispersion modelling has been made and Ground Level Concentration of Pollutants has been calculated.

Method Used in Modelling Study

In order to calculate the contribution of the Project on air quality, distribution model study was performed. During the modelling study, AERDMO distribution model which is internationally accepted was used and calculated contribution values have been evaluated according to "*IAPCR*" which has been in force by 03.07.2009 dated and

27277 numbered Official Gazette(amended by 20.12.2014 dated and 29211 numbered Official Gazette).

AERMOD is based on real time data which are variable in time and is one of the most improved computer models which are capable of forecasting hourly, daily and annual ground level concentration values. Model is capable of performing calculations of many different pollutants such as flue leakage from insulated stacks (point, volume, area) and also considers aerodynamic waves, turbulence and similar events to which pollutants emerged from the industrial zones.

AERMOD model is operated at a network system which is defined by the user and calculations are made for corner points of each one of receiver body. Network system used by the model can be described as polar or Cartesian and by specifying separate receiving points outside the network system; it is also possible to make more detailed calculations.

At distribution calculations, “Atmospheric Limit Layer” is issued as stability model. In this model, rough terrains are also taken into consideration. AERMOD model uses the following four different data types:

- Meteorological data set including potential vertical temperature difference, wind profile, direction of wind, speed of wind, temperature, density and height of clouds,
- Coordinates and heights of each of elements in network system which is described as receiving body,
- Coordinates of sources, heights of sources, diameter of sources, pollutant speed, and pollutant temperature and flow rate determined by the user according to a specified initial point.

There are also many control parameters inside the model under control of the user. Model outputs allow preparation of distribution maps for the entire field. So, it is possible to evaluate air quality of the region under different scenarios (for example different treatment conditions, different pollutants and changing seasonal conditions).

Modelling study allowing the forecast of concentrations of gas and dust pollutants in ambient air via mathematical calculations has the following steps:

- “*Distribution Region*” is determined for sources.
- This distribution region is split into a grid system which is formed from tetragons (in this study the resolutions are 200 m x 200 m); latitude, longitude and height information are supplied. Edges of these tetragons are peak points.
- Information related with pollutants is determined.

After the mentioned transactions are entered into the program, modelling program is run and then hourly, daily and annual ground level concentration values of pollutants over ambient air can be estimated. Model inputs used in this study have been presented in the following sections of the report.

Meteorological Data Set Used in Modelling

Meteorological data required for modelling studies are provided by present meteorological stations located nearby. For AERMOD model, hourly surface station data measured at climate, synoptic or automatic type stations and meteorological testing data measured in radiosonde type stations. Upon interviews made with General

Directorate of Meteorology, it has been found proper to take hourly meteorological data sets from Manisa Meteorology Station which is the nearest station to the project field and the upper air data is received from İzmir Meteorology Station.

AERMOD model uses meteorological data of 1 year. For this reason, it is required to make year selection for the meteorological data to be used in the model. To use meteorological data representing wind profile of the region increases the accuracy of the study. At modelling studies, wind profile of the region has been drawn out by using meteorology bulletin including data obtained in between 1960 and 2014 years by Manisa Meteorology Station. Annual wind profiles of the last 5 years (in between 1998 and 2012) have been analysed and matching year for long years have been searched. According to this analysis, it has been found out that wind blowing data of 2011 have been matched better considering the wind blows for long years. Therefore, meteorological data of 2011 have been used.

According to this information, the following data of 2011 for the Manisa Meteorology station has been used for air quality dispersion modelling study:

- Hourly pressure
- Hourly wind speed and direction
- Hourly temperature data
- Hourly cloud sealing height
- Hourly closure of cloud

Upper air data (in between 0-6,000 m. by 10 m. intervals) of İzmir Meteorology Station for 2011 was used.

At the following figures, data of wind blows for long years for Manisa Meteorology Station and wind blow numbers of the year 2011 are seen and wind diagram of meteorological file to be used as input in model have been composed by using these data.

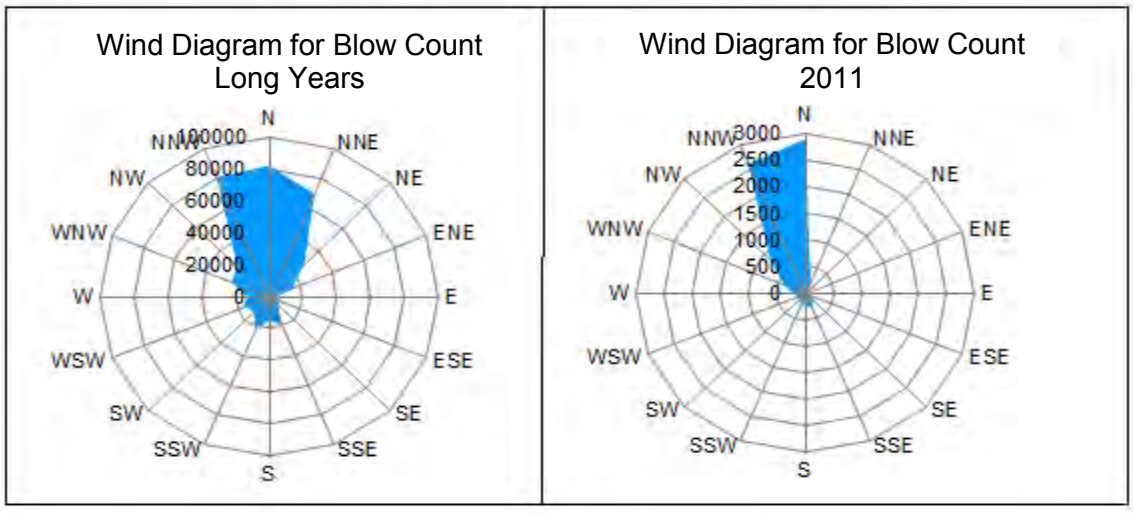


Figure 20. Wind Schema of Manisa Meteorology Station for Long Years and 2011

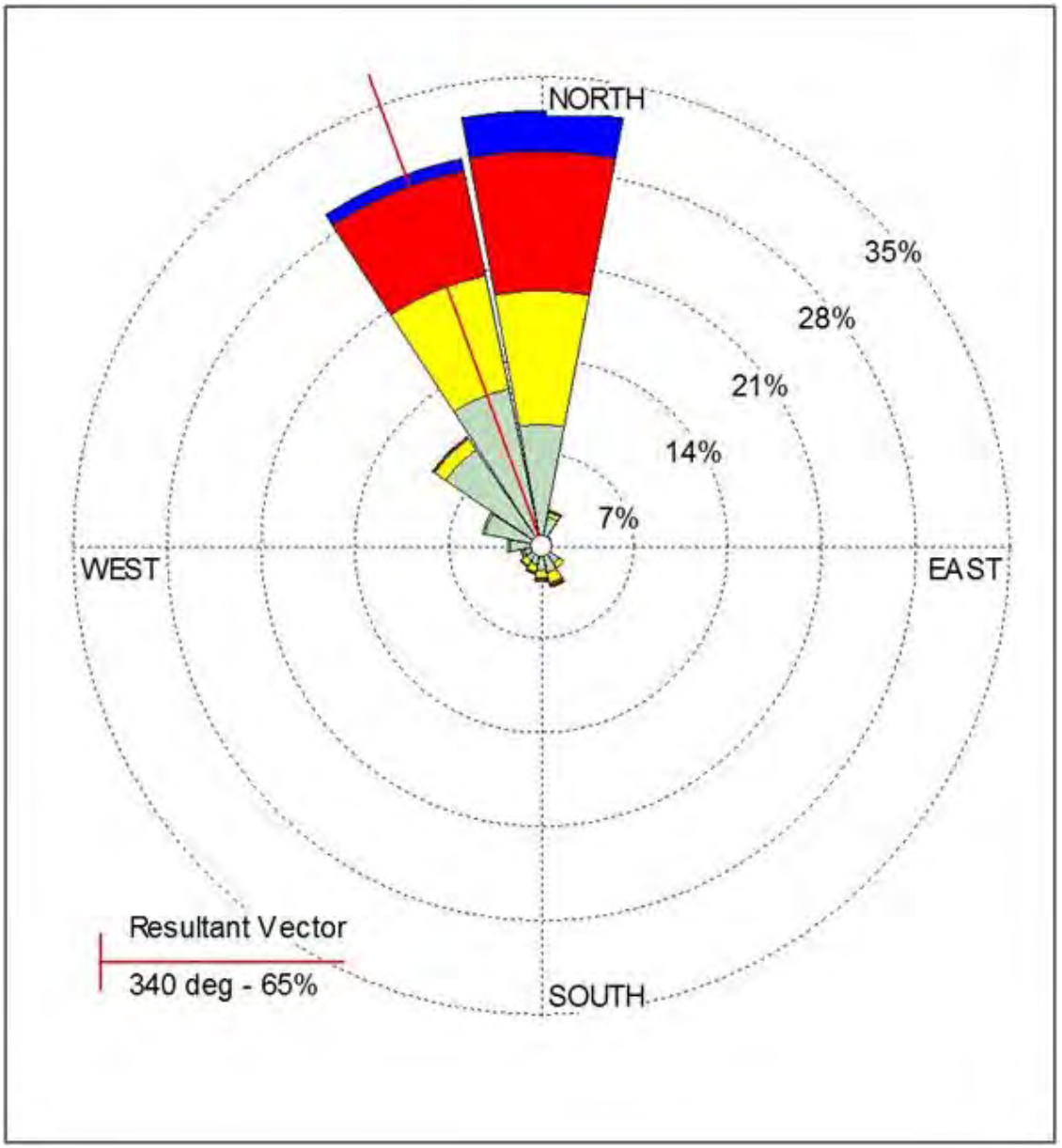


Figure 21.Wind Diagram of Meteorological File to be used in Model Input

Receptor System Used for Air Quality Dispersion Modelling Study

At IAPCR ANNEX-4, it is said that "if ever surface dispersion of out of flue emission sources (area source) is more than 0.04 km^2 then facility impact area is square area of which one side is 2 km and the area is located at the center of the square. In determination of surficial dispersion of emission sources, facility impact area is taken as basis".

Regarding IAPCR ANNEX-4, project field has been kept in safe side and a 4.5 km x 4.5 km square has been selected. Square area which is defined as impact area for this study has been selected by leaving emission sources at the center. Since the project field is located at the city center, initial 1,250 meter are from the center of the emission source has been divided into 100 m x 100 m areas and the rest 1,000 meter has been divided into 250 m x 250 m area and a total of 879 receiving medium has been formed. Besides, 11 sensitive points which are at the nearest locations to the project field are descripted as receptors.

Facility impact area and hill points are shown over the following map.

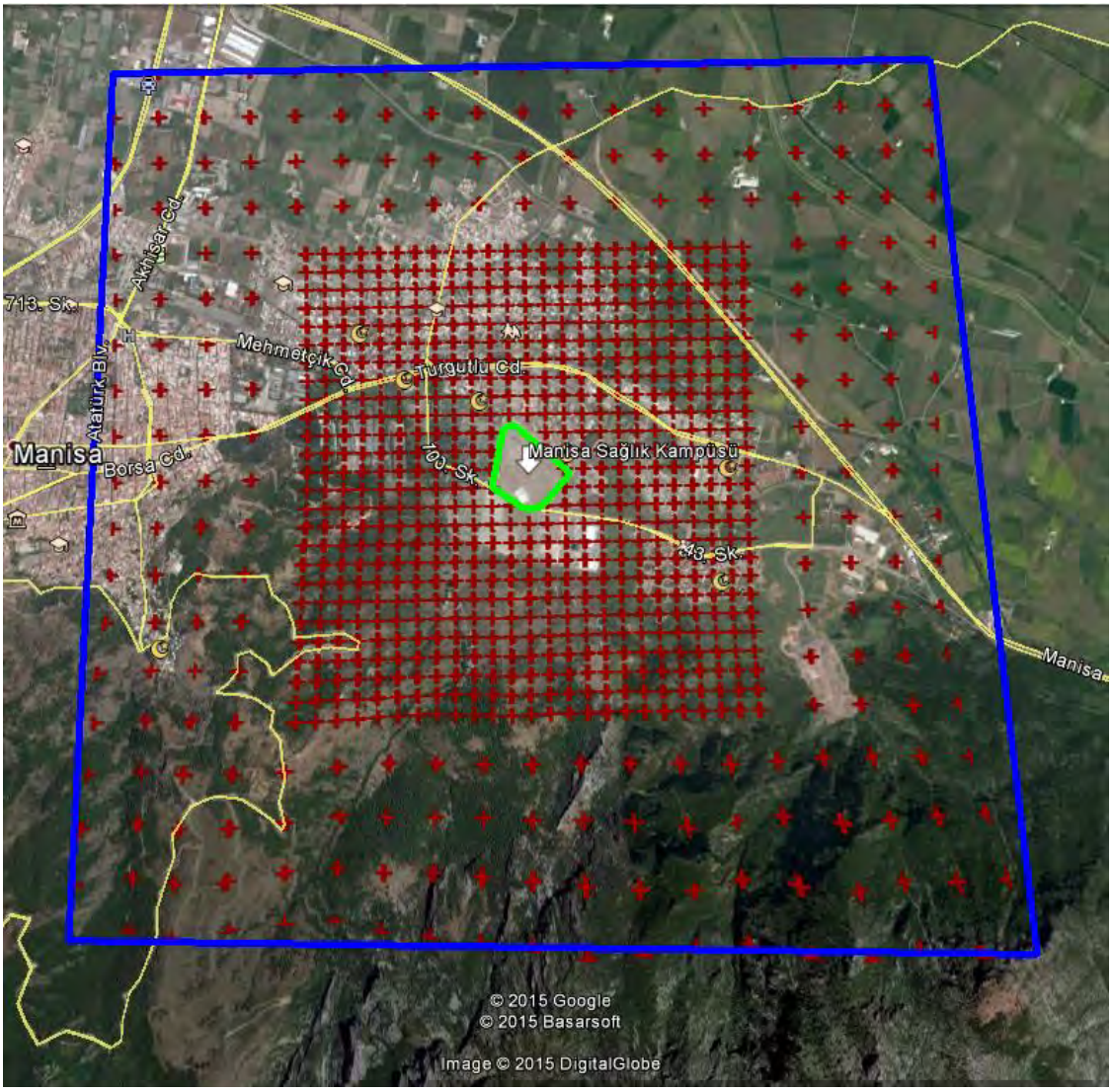


Figure 22. Model Impact Area Map

Calculation of Mass Flows of Emissions

Air Quality Distribution Modelling studies have been formed for following scenarios and mass flows of emissions for these scenarios have been separately calculated.

Scenario 1: Construction Phase of Training and Research Hospital (Excavation + Construction Activities)

Scenario 2: Operation Phase of Training and Research Hospital

Scenario 1: Calculations of Construction Phase of the Project

At the Training and Research Hospital construction phase;

a) Dust emissions sourced from excavations (excavation, filling, transportation etc.),
b) Dust emissions sourced from operation of concrete power plant,

c) Exhaust gas emissions from heavy machines to be operated in excavations and construction activities.

a) Mass Flows of Emissions Sourced from Excavations

Dust emission will occur during excavation, loading, unloading, etc. activities at construction phase of the project.

In order to calculate dust emission occurred during construction phase, it is mentioned in 2nd provision of "Quarrying, Rock Crushing and Classification Facilities" headed "d" paragraph of Annex-12 of 03.07.2009 dated and 27277 numbered "The Regulation on Industrial Air Pollution Control" that In case that measures (Watering, using of closed transportation systems, keeping material humid, unloading without tossing, etc.) mentioned in Annex-1 are taken during Dismounting, Loading, Transportation, Unloading, Storage Activities then mass flow of dust emission sourced from these activities should be calculated by using emission factors mentioned in Table 12.6 and separate calculations have been made for controlled and uncontrolled emission factors under the scope of the project.

Table 28. Dust Emission Factors to be used in calculations of dust emissions

Activity	Unit of measure	Emission Factor (uncontrolled)	Emission Factor (controlled)
Dismounting	kg/ton	0.025	0.0125
Loading	kg/ton	0.01	0.005
Transportation	kg/km-vehicle	0.7	0.35
Unloading	kg/ton	0.01	0.005
Storage	kg/ha-day	5.8	2.9

At the area where the health facility will be constructed, approximately 400,000 m^3 excavation will be made including topsoil and 61,000 m^3 of it will be topsoil (topsoil thickness in the field is taken as 15 cm in average). All of topsoil will be lay down for landscaping studies after the construction phase is over. Approximately 40 % of excavation except the topsoil will be used in filling.

In this context, approximately 136,000 m^3 of excavated soil will be re-used. Remaining 203,000 m^3 excavated soil will be transported to an area directed by Manisa Metropolitan Municipality.

Excavation works including topsoil will be completed within 12 months and topsoil stripping activities will be conducted in parallel with excavation works.

Total Working Period : 12 months
Days of work per month : 30 days/month
Days of work per year : 180 days/year
Hours of work per day : 10 hours/day
Amount of Excavation : 400,000 m^3

Amount of excavation surplus = 61,000 m^3 x 1.5 ton/m^3 + 339,000 m^3 x 1.7 ton/m^3= 667.800 ton (topsoil density has been taken as 1.5 ton/m^3, excavation material density has been taken as 1.7 ton/m^3)

Monthly Excavation Amount = 55,650 ton/month
Daily Excavation Amount = 1,855 ton/day
Hourly Excavation Amount = 185.5 ton/hour

If a truck carries 25 ton-times material, number of hourly trucks;
(2318.3 ton/day / 25 ton-times ≅75 times/day)

Mass flow dust emission has been calculated according to uncontrolled conditions.

Excavation

Dust emission during Excavation (Uncontrolled) = 185.5 ton/hour x 0.025 kg/ton
Dust emission during Excavation (Uncontrolled) = 4.64 kg/hour

Loading

Dust emission during Loading (Uncontrolled) =185.5 ton/hour x 0.01 kg/ton
Dust emission during Loading (Uncontrolled) = 1.85 kg/hour

Transportation

Transportation distance within Training and Research Hospital construction area has been taken as 200 m on average.

Dust emission during transportation (Uncontrolled) = 0.7 kg/km.times x 75 times/day x 1day/10 hour x 0.4 km (round-trip) = 2.1 kg/hour

136,000 m^3 of transported excavation materials will be used in filling, 61,000 m^3 of transported excavation materials will be temporarily stored within the field to be used in landscaping studies later. Remaining 203,000 m^3 excavation material will be transported to a proper storage area directed by Manisa Metropolitan Municipality.

Unloading TopSoil

61,000 m^3 (25.41 ton/hour) topsoil will be unloaded to storage area.

Dust emission during unloading (Uncontrolled) =25.41 ton/hour x 0.01 kg/ton
Dust emission during unloading (Uncontrolled) = 0.25 kg/hour

Storing Topsoil

61,000 m^3 topsoil will be temporarily stored in 20,000 m^2 area.

Dust emission during storing (Uncontrolled) =5.8 kg/ha.day x 2 ha x day/24 hour=0.48 kg/hour

Loading

136,000 m^3 (64.22 ton/hour) material will be used again in loading.

Dust emission during unloading (Uncontrolled) =64.22 ton/hour x 0.01 kg/ton
Dust emission during unloading (Uncontrolled) = 0.64 kg/hour

2nd Loading of Topsoil

61,000 m^3 (25.41 ton/hour; 254.10 ton/day) soil will be temporarily stored in 20,000 m^2 area. Then soil will be loaded to trucks and will be brought to the area at which landscaping studies will be made.

Dust emission during Loading (Uncontrolled) =25.41 ton/hour x 0.01 kg/ton
Dust emission during Loading (Uncontrolled) = 0.25 kg/hour

2nd Transportation of Topsoil

61,000 m^3 (25.41 ton/hour; 254.10 ton/day) soil will be temporarily stored in 20,000 m^2 area. Then soil will be used as filling material in landscaping studies.

Transportation distance within Training and Research Hospital area has been taken as 200 m on average.

Dust emission during Transportation (Uncontrolled) = 0.7 kg/km.times x 11 times/day x 1day/10 hour x 0.4 km (round trip) = 0.308 kg/hour

Unloading Topsoil

61,000 m^3 (25.41 ton/hour) topsoil will be laid again over the surface.

Dust emission during unloading (Uncontrolled) =25.41 ton/hour x 0.01 kg/ton
Dust emission during unloading (Uncontrolled) = 0.25 kg/hour

Dust Emission Amounts (Q) Occur During Excavation / Filling Activities of Training and Research Hospital:

Q= Excavation + Loading + Transportation + Unloading Topsoil + Storing topsoil + Filling + Loading topsoil + Unloading Topsoil

Q(Uncontrolled)=4.64 kg/hour + 1.85 kg/hour + 2.1 kg/hour + 0.25 kg/hour +0.48 kg/hour + 0.64 kg/hour + 0.25 kg/hour + 0.30 kg/hour + 0.25 kg/hour =10.76 kg/hour ≈ 11 kg/hour

b) Dust Emission Sourced by Concrete Power Plant

Calculations have been made as follows assuming that capacities of concrete power plant will be 90 m^3/hour and will be operated for 8 hours under maximum conditions and 75 % of concrete is aggregate. Density of concrete is taken as 2.2 ton/m^3.

Transportation -1 (Transportation of Aggregate Material to Concrete Power Plant)

Dust emission during Transportation (Uncontrolled) = 0.7 kg/ton x 27 times/day x 1day/8 hour x 0.4 km/times round trip)
Dust emission during Transportation (Uncontrolled) = 0.945 kg/hour

Material Unloading to Concrete Power Plant Bunkers

Dust emission during unloading (Uncontrolled) = 148.5 ton/hour x 0.01 kg/ton
Dust emission during unloading (Uncontrolled) = 1.48 kg/hour

Transportation -2 (Concrete)

Transportation volume of transmixer has been taken as 15 m^3 and average transportation to the power plant is taken as 200 m.

Dust emission during Transportation (Uncontrolled) = 0.7 kg/ton x 48 times/day x 1day/8 hour x 0.4 km/times
Dust emission during Transportation (Uncontrolled) = 1.68 kg/hour

Q=Amount of Total dust emission:

Dust emission (Uncontrolled)= 0.945 kg/hour + 1.48 kg/hour + 1.68 kg/hour = 4.1 kg/hour

b) Training and Research Hospital Building Construction Activities

Dust emission will occur during construction activities of health facility. Dust emission to occur during construction activities has been calculated by using emission factor given by EPA.

Constructions of health facility will be made over approximately 116,180 m^2area. Construction of the buildings under the scope of the project are planned to be completed within 12 months by working 10 hours per day.

1.2 tons/acre/month x 116.18 acres x 12 month = 1,672.99 tons of TSP (0.46 kg/hour TSP)

c) Calculation of Exhaust Gas Emissions Sourced from Heavy Machinery (Non Road)

Emission factors given by EPA (Environmental Protection Agency) for heavy machinery are shown in **Table 29.**

Table 29.Emission Factors which are used in calculations (Tier 4 Emission Standards – EPA for Motors up to 560 kW)

Motor Power	Year	CO (g/Kwh)	HC (g/Kwh)	NO_x (g/Kwh)	PM (g/Kwh)
75 ≤ kW < 130	2011 and later	5.0	0.19	0.40	0.02
130 ≤ kW ≤ 560	2011 and later	3.5	0.19	0.40	0.02
560 ≤ kW ≤ 900	2011 and later	3.5	0.19	3.5	0.04

Equipment List to be used in Training and Research Hospital works are given in **Table 30.**

Table 30.Equipment to be used during Excavation and Construction Phases

Type of Vehicle	Quantity	Motor Power - kW
Dump Truck	20	210
Grader	2	161
Dozer	2	170
Sprinkler	2	64
Excavator	6	213
Loader	4	88
Concrete Pump	4	209
Concrete Mixer	20	209
Mobile Crane	5	208
Tower Crane	11	134
Roller	1	180

Emission factors given in **Table 29** have been used and emission calculations to be occurred according to machinery-equipment given in **Table 30** have been made and results are given in **Table 31**.

Table 31.Mass Flow of Exhaust Gas Originated from Heavy Equipment to be used in Construction Phase (kg/hour)

Equipment	CO	HC	NOx	PM
Dump Truck	14.700	0.798	1.680	0.084
Digger	1.127	0.061	0.129	0.006
Dozer	1.190	0.065	0.136	0.007
Pumper	0.640	0.024	0.051	0.003
Excavator	4.473	0.243	0.511	0.026
Loader	1.760	0.067	0.141	0.007
Concrete Pump	2.926	0.159	0.334	0.017
Concrete Mixer	14.630	0.794	1.672	0.084
Mobile Crane	3.640	0.198	0.416	0.021
Tower Crane	5.159	0.280	0.590	0.029
Cylinder	0.630	0.034	0.072	0.004

Table 32. Total Mass Flow of Exhaust Gas Originated From Heavy Equipment

Pollutant	Mass Flow (kg / h)	Limit Values Regulations
CO	50.875	50 kg/h
HC	2.723	3 kg/h
NOx	5.732	4 kg/h
PM	0.287	1 kg/h

Scenario 2: Calculations for Operation Phase

At the operation phase of the Training and Research Hospital;

a) Flue gas emissions will be generated by boiler flues within energy automation (3 MWt trigeneration) system to be available in health facility,

b) Flue gas emissions from 15.67 MW boiler flue,

c) Exhaust gas emissions will be generated by vehicles using open and closed parking lot.

a) Flue gas emissions generated by boiler flues in 3 MWt (Trigeneration) System

Natural gas will be used in trigeneration unit that is planned under the scope of the project and it is envisaged that 334 m^3 per hour natural gas will be consumed. At EMEP/EEA Air Pollution Emission Inventory Guide Book, emission factors for small scaled burning facilities have been used.

Table 33.Emission Factors for Gas Motor

Pollutant	Emission Factor	Unit	Mass Flow
NOx	135	g/GJ (Nielsen et al. (2010))	1.56 kg/hour NOx 1.17 kg/hour NO2
CO	56	g/GJ(Nielsen et al. (2010))	0.26 kg/hour
SOx	0.5	g/GJ (Bowel (2001))	0.002 kg/hour
PM10	2	g/GJ Buwal (2001))	0.009 kg/hour

Calculation example (for NO_X): 334 m^3/hour x 135 g/GJ * 8,250 kcal/m^3 * 1 GJ/238845.89kcal * 1 kg/1,000g = 1.46

Information relating with trigeneration unit planned in Training and Research Hospital are given in **Table 34.**

Table 34.Flue Information for Trigeneration Unit

Diameter of Flue	0,7 m
Temperature of Flue Gas	170 ^{0}C
Speed of Flue Gas	12 m/sec
Flow of Flue Gas	16.617 m^3/hour
	10.240 Nm3/hour (dry)
Height of Flue	15 m

Determination of Height of Flue by Abac Calculation

For NO_2

Q NO_2 = 1.17 kg/hour (%75 of NO_X' is accepted as NO_2)

Q/S = 1.17 / 0.10 10 (S value has been taken from regulations as 0.10) = 11.7 kg/hour

R: 10.240 Nm^3/Hour
Temperature of Flue Gas: 170 ^{o}C
Diameter of Flue: 0.7 m

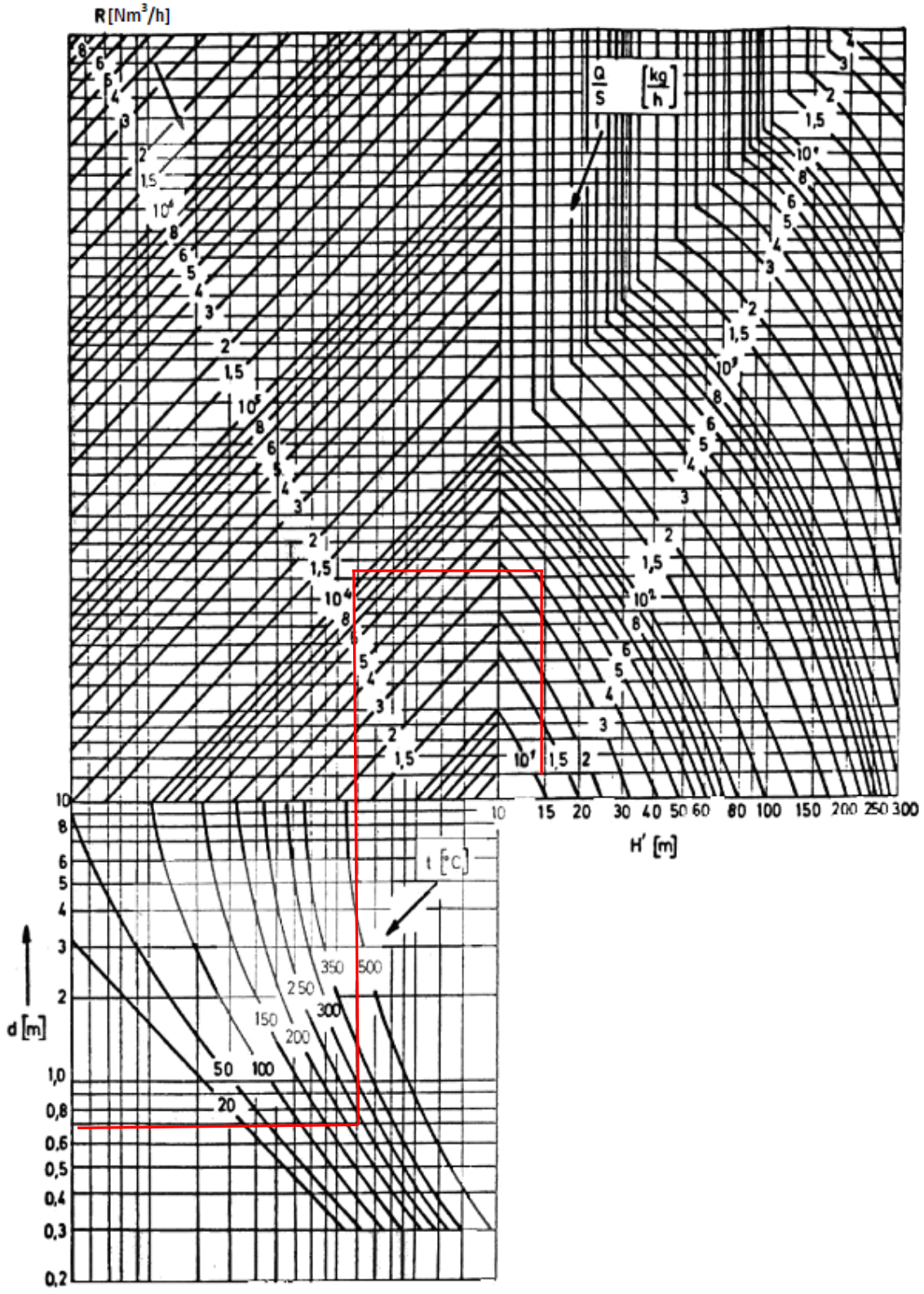


Figure 23. ABAC Calculation for Trigeneration Unit

Flue height which is specified by using chart is (H') 10 m. Average height from bottom of the rippled facility with 10H' (100 m) radius or height average of maximum building heights determined in accordance with development plan in 10 H' radius has been taken as 10 (J') m. J'/H' (10/100) has been calculated as 0.1 and J/J' value has been found as 0.35 by using the following figure.

J/J^{I} = 0.35
J = 0.35 x J'
J = 10 * 0.35 =3.5 m

Corrected flue height is found as;

H = H^{I} + J
= 10 m + 3.5 m
= 13.5 m

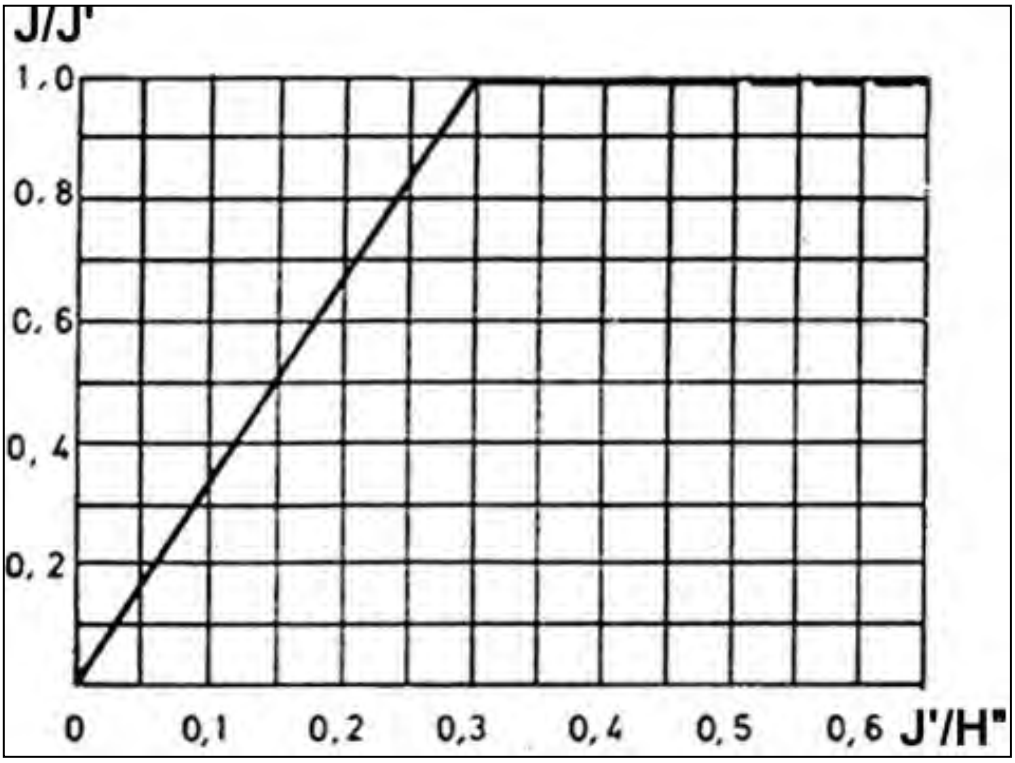


Figure 24. Abac which is used for J/JI Value Calculation

b) Flue gas emissions from boiler flue at 15.67 MWt Boiler system

Natural gas will be used as fuel in boiler planned under the scope of the Project and it is forecasted that 1.635 m^3/ hour natural gas will be consumed. Emission factors given for small sized boilers in EMEP/EEA Air Pollution Emission Inventory Guide have been used.

Table 35. Emission Factors for Boiler

Pollutant	Emission Factor	Unit	Mass Flow
NO_x	40	g/GJ	2.26 kg/hour NO_x 1.7 kg/hour NO_2
CO	30	g/GJ	1.7 kg/hour
SO_x	0.3	g/GJ	0.017 kg/hour
PM_{10}	0.45	g/GJ	0.02 kg/hour

Sample calculation (for NOx): 1635 m^3/day x 40 g/GJ * 8,250 kcal/m^3 * 1 GJ/238,845.89kcal * 1 kg/1,000 g= 2.26 kg/hour

Information related with boiler planned for Training and Research Hospital are given in

Table 36. Boiler Flue Information

Diameter of Flue	0.8 m
Temperature of Flue Gas	175 ^{0}C
Speed of Flue Gas	10 m/sec
Flow of Flue Gas	18.086 m^3/hour
	11.021 Nm^3/hour (dry)
Height of Flue	16 m

Determination of Height of Flue by Abac Calculation

For NO_2

Q NO_2 = 1.7 kg/hour (75% of NO_X' is accepted as NO_2)

Q/S = 1.7 / 0.10 (S value has been taken from regulations as 0.10) = 17 kg/hour

R: 11.021 Nm^3/Hour
Temperature of Flue Gas: 175 ^{o}C
Diameter of Flue: 0.8 m

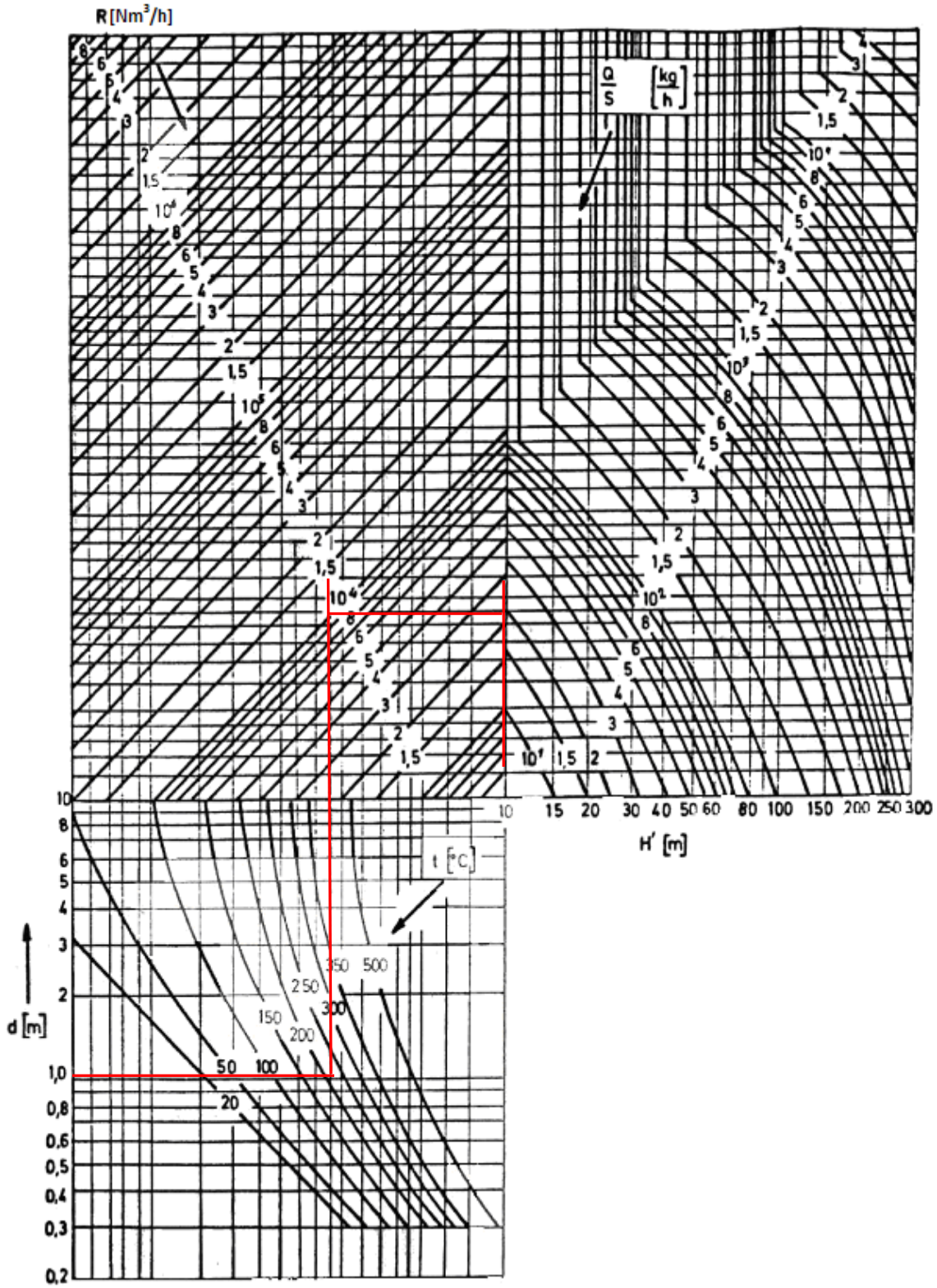


Figure 25. Abac Calculation for Heat Boiler

Flue height which is specified by using chart is (H') 10 m. Average height from bottom of the rippled facility with 10H' (100 m) radius or height average of maximum building heights determined in accordance with development plan in 10 H' radius has been taken as 10 (J') m. J'/H' (10/100) has been calculated as 0.1 and J/J' value has been found as 0.2 by using the following figure.

J/J^{I} = 0.35
J = 0.35 x J'
J = 10 * 0.35 =3.5 m

Corrected flue height is found as;

H = H^{I} + J
= 10 m + 3.5 m
= 13.5 m

c) Exhaust Gas Emissions from Vehicles using Open and Closed Parking Lots

In order to calculate massive flows of emissions of vehicles at parking lot, emission factors mentioned in *Updated Emission Factors of Air Pollutants from Vehicle Operations in GREET Using (September 2013)* which has been issued by US Environment Protection Agency (EPA) have been used.

According to unit mass flows calculated, total mass flows of vehicles which use parking lots are given in **Table 37.**

Table 37.Calculated Emission Factors for Vehicles in Parking Lot (g/mil)

Number of Vehicles	Average Speed (km/hour)	Pollutants Amount (g/mil/vehicle)			
		CO	NO_X	SO_2	PM_{10}
1.429	20	2.8652	0.1202	0.0044	0.0076

Values of Contribution to air Pollution

The results obtained from modelling work are evaluated according to IAPCR.

Table 38.Limit Values for Air Quality in Impact Area of the Facility

Parameter	Duration	Unit	Year						
			2014	2015	2016	2017	2018	2019-2023	2024 and after
SO_2	Hourly (not to exceed more than 24 in one year)	µg/m3	500	470	440	410	380	350	350
	24 hourly		250	225	200	175	150	125	125
	LTL		60	60	60	60	60	60	60
	**Annual and winter season (1 Oct-31 March)		20	20	20	20	20	20	20
NO_2	Hourly (not to exceed	µg/m^3	300	290	280	270	260	250	200*

Parameter	Duration	Unit	Year						
			2014	2015	2016	2017	2018	2019-2023	2024 and after
	more than 18 in one year)								
	Annual		60	56	52	48	44	40*	40
Particulate Substance Suspended in Air (PM_{10})	For 24 hrs (not to exceed more than 35 in one year)	$\mu g/m^3$	100	90	80	70	60	50	50
	Annual		60	56	52	48	44	40	40
CO	maximum daily 8 hours average	mg/m^3	16	14	12	10	10	10	10
Settled dust	STL	mg/m^2gün	390	390	390	390	390	390	390
	LTL		210	210	210	210	210	210	210

YSK values found for pollutants caused by the Project as a result of model run for Scenario-1 and Scenario 2 and distributions related with these results are given below.

Table 39.Ground Level Concentrations Calculated for Scenario-1

Parameter	Period	Scenario-1
NO_2	Hourly $\mu g/m^3$ (99.79%)	161.08 (540447.262; 4274040)
	Annual $\mu g/m^3$	1.59 (540347.262; 4274140)
PM	24 Hour $\mu g/m^3$ (90.41%)	38.00 (540447.262; 4274040)
	Annual $\mu g/m^3$	16.42 (540368; 4273864)
Settleddust	Monthly (mg/m^2/day)	60.61 (540447.262; 4273840)
	Annual (mg/m^2/day)	33.42 (540447.262; 4273940)
CO	8 Hour (max) $\mu g/m^3$	747.69 (540547.262; 4273940)
HC	Hourly $\mu g/m^3$	190.22 (540447.262; 4274140)
	24 Hourly $\mu g/m^3$	11.87 (540047.262; 4274440)
	Annual $\mu g/m^3$	0.58 (540347.262; 4274140)

Table 40.Ground Level Concentrations Calculated for Scenario-2

Parameter	Period	Scenario-2
SO_2	Hourly $\mu g/m^3$ (99.72%)	0.77 (539847.262; 4273440)
	Daily $\mu g/m^3$ (99.17%)	0.18(540247.262; 4273240)
	Annual$\mu g/m^3$	0.05(540147.262; 4273340)
NO_2	Hourly $\mu g/m^3$(99.79%)	118.20 (539847.262; 4273440)
	Annual $\mu g/m^3$	7.02 (540147.262; 4273340)
PM	24 Hour $\mu g/m^3$ (90.41%)	0.15 (540147.262; 4273340)
	Annual $\mu g/m^3$	0.07(540147.262; 4273340)
Settleddust	Monthly (mg/m^2/day)	0.13 (540147.262; 4273840)
	Annual (mg/m^2/day)	0.06 (540147.262; 4273840)
CO	8 Hour (max) $\mu g/m^3$	50.86(540147.262; 4273340)

Table 41.Contribution Values for Air Pollution in the Nearest Residential Areas for Scenario 1

Settlement	Coordinate	8CO	1HC	24HC	YHC	$1NO_2$
Toki Residences	540375.00; 4274185.00	617.32	167.49	7.26	49.95	106.83
Tube Storage	540592.40; 4274001.80	322.86	76.91	4.85	46.69	93.11
Asri Cemetery	540049.50; 4274104.20	266.83	65.94	3.81	60.05	21.24
Toki Residences	540918.00; 4273681.00	109.07	22.75	1.84	42.31	44.96
Tube Storage	540546.00; 4274974.00	46.13	12.52	0.87	28.10	17.84
Settlement	**Coordinate**	**YNO_2**	**24PM**	**YPM**	**ACOKEN**	**YCOKEN**
Toki Residences	540375.00; 4274185.00	1.30	20.24	6.35	9.68	4.93
Tube Storage	540592.40; 4274001.80	0.83	10.50	3.42	6.74	2.66
Asri Cemetery	540049.50; 4274104.20	0.40	8.31	2.53	4.40	1.77
Çukurceşme	540918.00; 4273681.00	0.34	1.52	0.62	1.14	0.51
Akpınar	540546.00; 4274974.00	0.13	1.04	0.27	0.39	0.18

Table 42.Contribution Values for Air Pollution in the Nearest Residential AreasFor Scenario 2

Settlement	Coordinate	8CO	$1SO_2$	$24SO_2$	YSO_2	$1NO_2$
Toki Residences	540375.00; 4274185.00	2.8623	0.0416	0.0127	0.0024	5.9603
Tube Storage	540592.40; 4274001.80	1.9535	0.0244	0.0108	0.0014	3.1521
Asri Cemetery	540049.50; 4274104.20	3.8096	0.0640	0.0113	0.0021	9.2255
Çukurceşme	540918.00; 4273681.00	1.8241	0.0141	0.0123	0.0007	1.7202
Akpınar	540546.00; 4274974.00	0.9294	0.0113	0.0029	0.0004	1.8790
Settlement	**Coordinate**	**YNO_2**	**24PM**	**YPM**	**ACOKEN**	**YCOKEN**
Toki Residences	540375.00; 4274185.00	0.2722	0.0086	0.0028	0.0110	0.0030
Tube Storage	540592.40; 4274001.80	0.1504	0.0039	0.0016	0.0060	0.0020
Asri Cemetery	540049.50; 4274104.20	0.1772	0.0062	0.0020	0.0070	0.0020
Çukurceşme	540918.00; 4273681.00	0.0659	0.0017	0.0007	0.0020	0.0010
Akpınar	540546.00; 4274974.00	0.0444	0.0016	0.0005	0.0010	0.0000

Total Pollution Value (TKD)

In *"IAPCR"* Annex-2, it is stated that Total Pollution Value (TPV); *"is formed for newly established facilities by total of Long Term Value (LTV) measured or calculated by Contribution Value for Air Pollution (CVAP) which is calculated in facility impact area ".* Total pollution values has been calculated by adding contribution value for air pollution to air pollutionobtained by modelling study performed in measurement points mentioned in **Table 43**.

Table 43.Total Pollution Values for Measurement Points - construction

Parameter	Measurement Point	Coordinate	Modelling results (CVAP) (µg/m^3)	Back ground (µg/m^3) (LTV)	Total pollution values (TPV)	Limit values- (for 2015)	Limit values- (after 2019)
Annual PM	PM1	E:0540387 N:4273912	9.60	29	38.6	56 µg/m^3	40 µg/m^3
	PM2	E:0540190 N:4274124	3.51	25	28.51		
	PM3	E:0540057 N:4274124	4.80	26	30.8		
	PM4	E:0540345 N:4273717	16.42	28	44.42		
Settled dust	Settled1	E:0540210 N:4274071	4.26	98.0	102.26	210 (mg/m^2/day)	210 (mg/m^2/day)
	Settled1	E:0539987 N:4273807	2.79	77.0	79.79		

Table 44. Pollution Values for Measurement Points – Operation

Parameter	Measurement Point	Coordinate	Modelling results (CVAP) (µg/m^3)	Back ground (µg/m^3) (LTV)	Total pollution values (TPV)	Limit values- (for 2015)	Limit values- (after 2019)
Annual PM	PM1	E:0540387 N:4273912	0.00258	29	29.0025	56 µg/m^3	40 µg/m^3
	PM2	E:0540190 N:4274124	0.00363	25	25.003		
	PM3	E:0540057 N:4274124	0.02154	26	26.021		
	PM4	E:0540345 N:4273717	0.00661	28	28.006		
Settled dust	Settled1	E:0540210 N:4274071	0.004	98,0	98.004	210 (mg/m^2/day)	210 (mg/m^2/day)
	Settled1	E:0539987 N:4273807	0.035	77,0	77.035		

As can be seen from **Table 43** and **Table 44** total amount of pollution remains under the limit values specified for 2015 by *"IAPCR*".

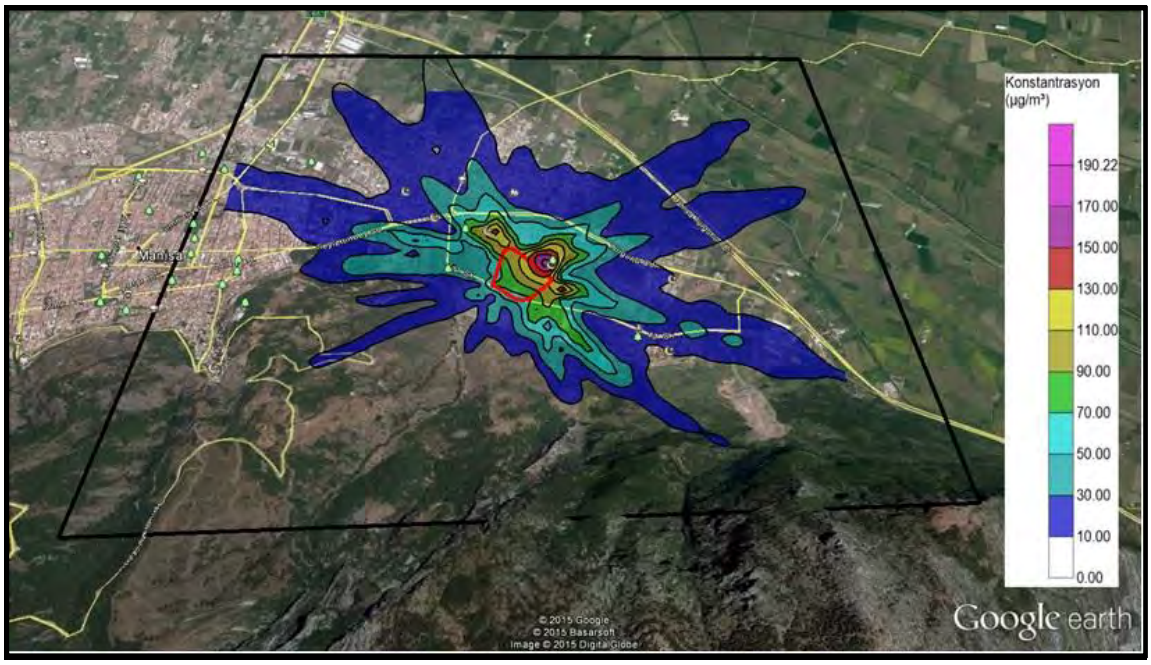


Figure 26.Scenario 1: Distribution of Hourly (HC) Emission

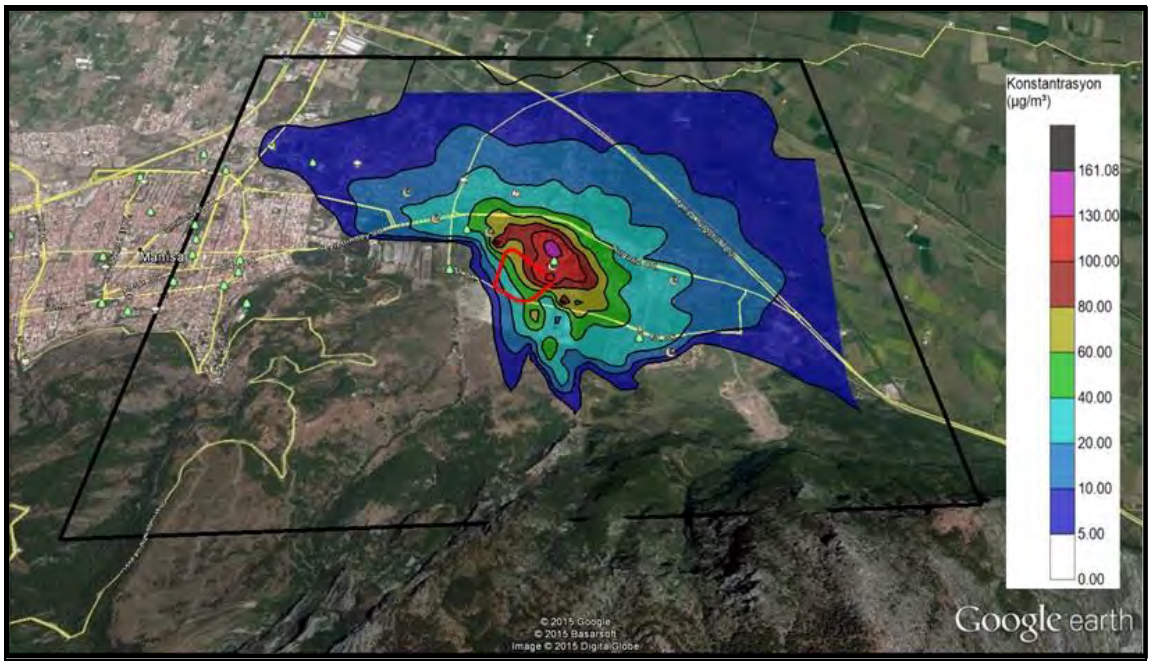


Figure 27.Scenario 1: Distribution of Hourly (NO_2) Emission

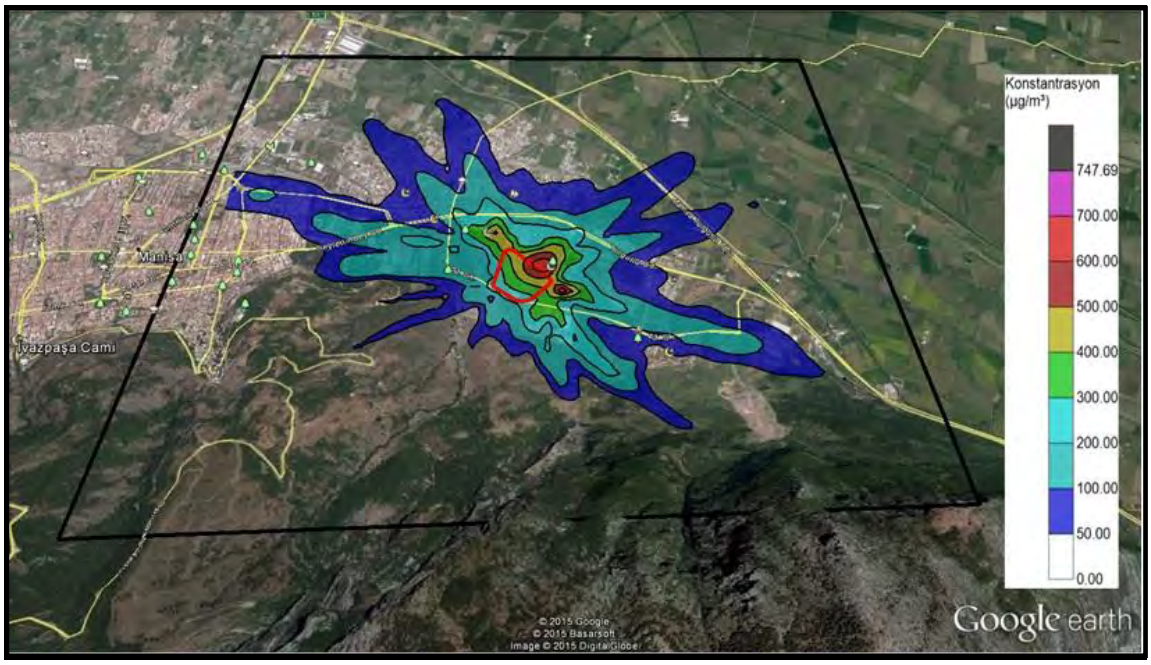


Figure 28.Scenario 1: Distribution of 8 Hour (CO) Emission

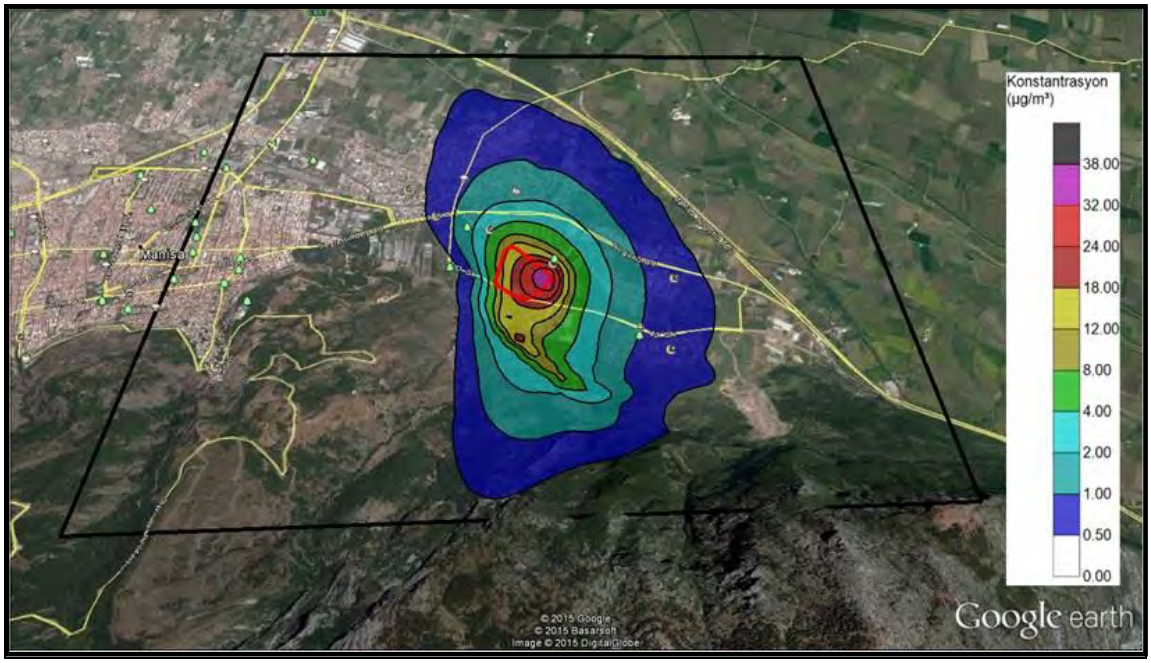


Figure 29.Scenario 1: Distribution of 24 Hour (PM) Emission

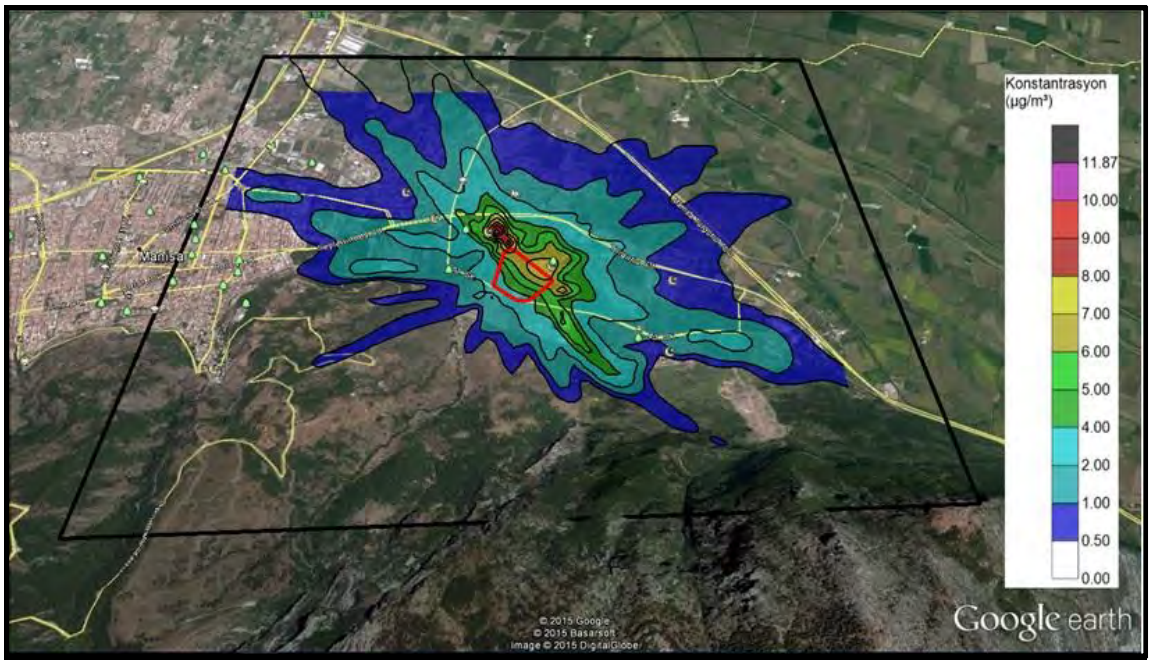


Figure 30.Scenario 1: Distribution of 24 Hour HC Emission

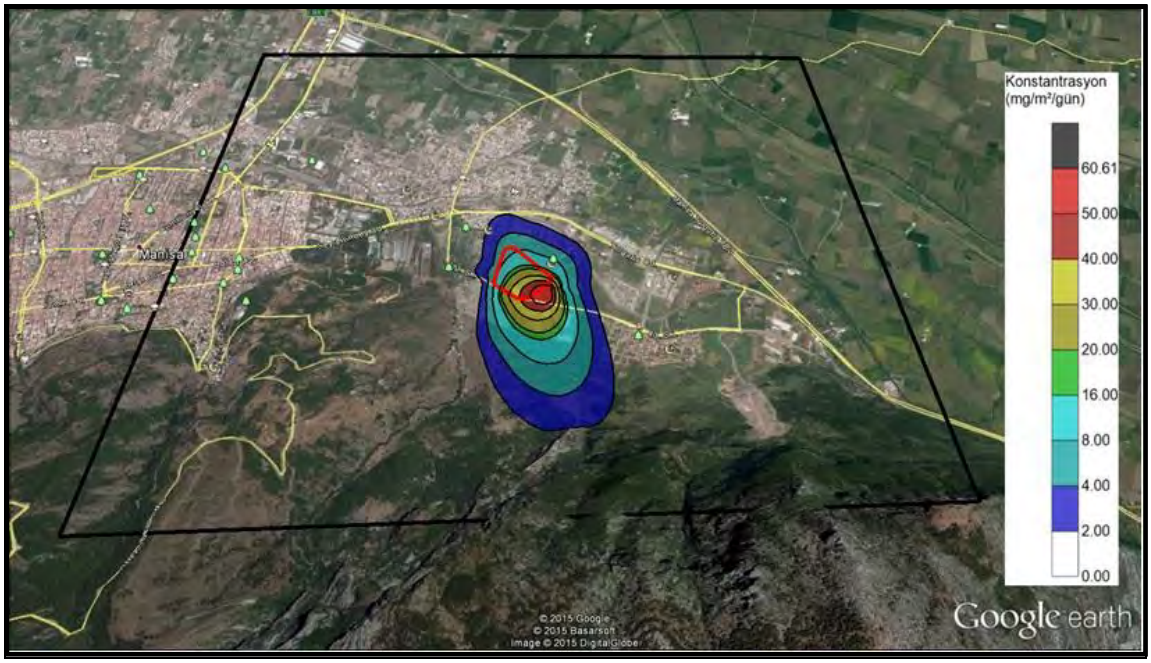


Figure 31.Scenario 1: Distribution of Monthly Settled Dust Emission

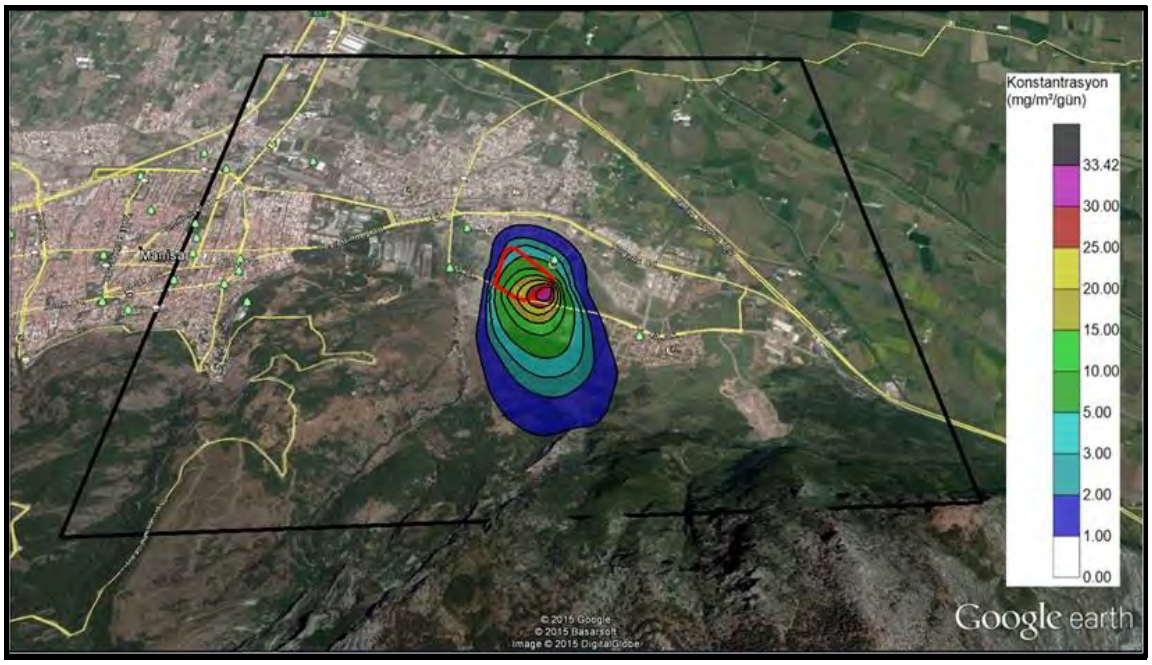


Figure 32.Scenario 1: Distribution of Annual Settled Dust Emission

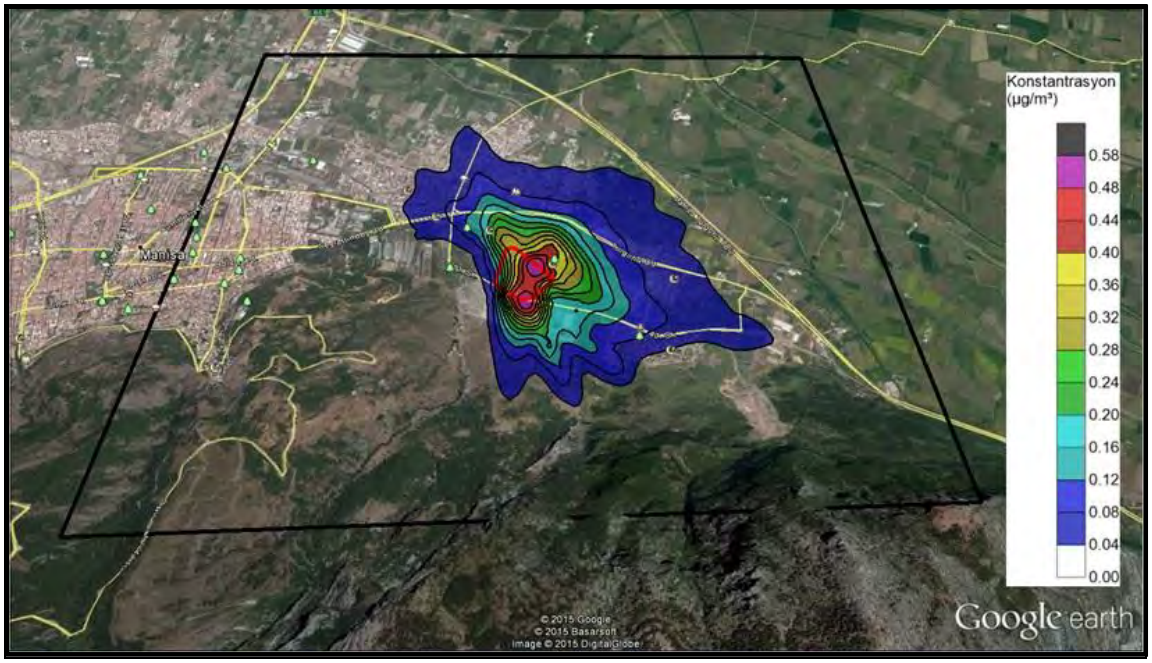


Figure 33.Scenario 1: Distribution of Annual HC Emission

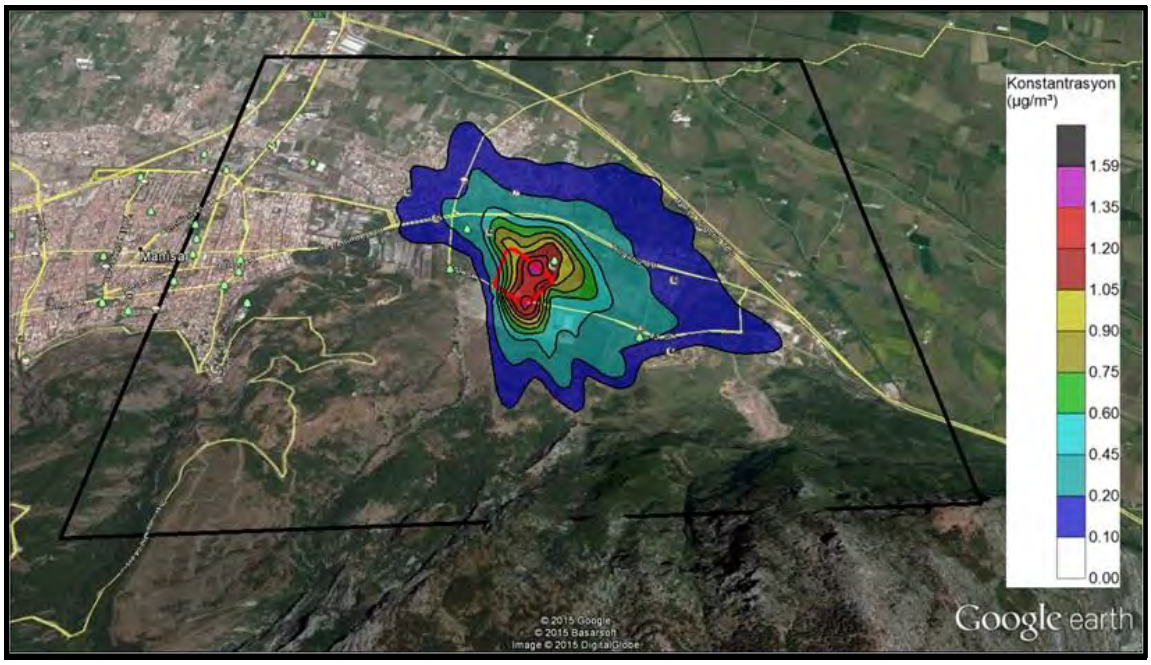


Figure 34.Scenario 1: Distribution of Annual (NO_2) Emission

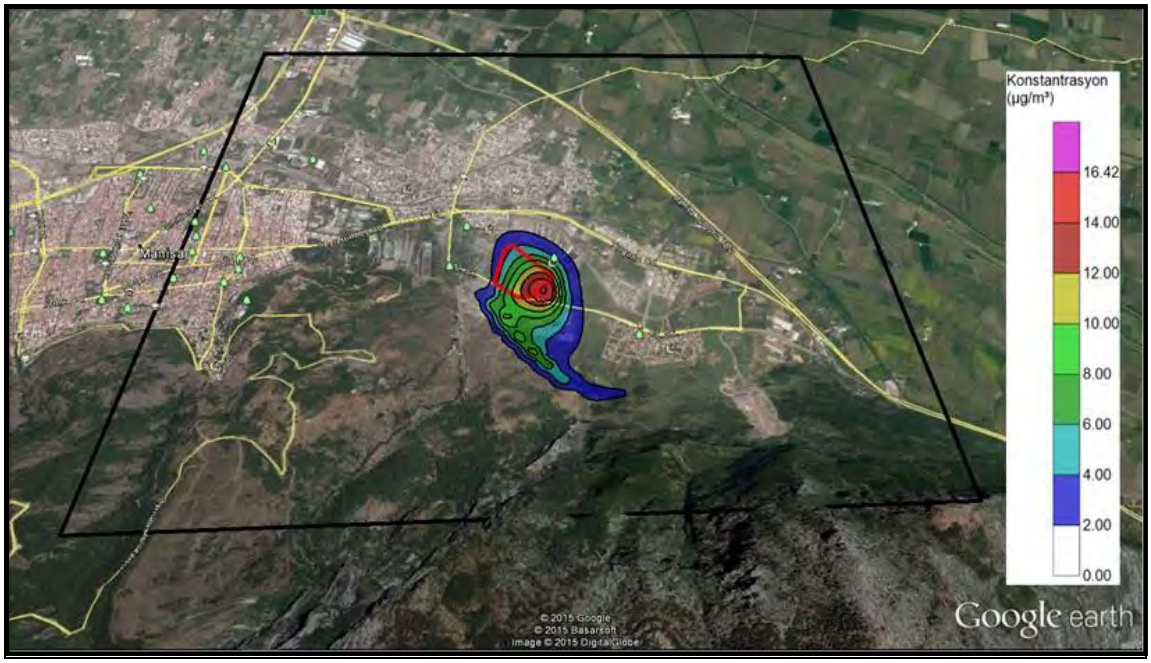


Figure 35.Scenario 1: Distribution of Annual (PM) Emission

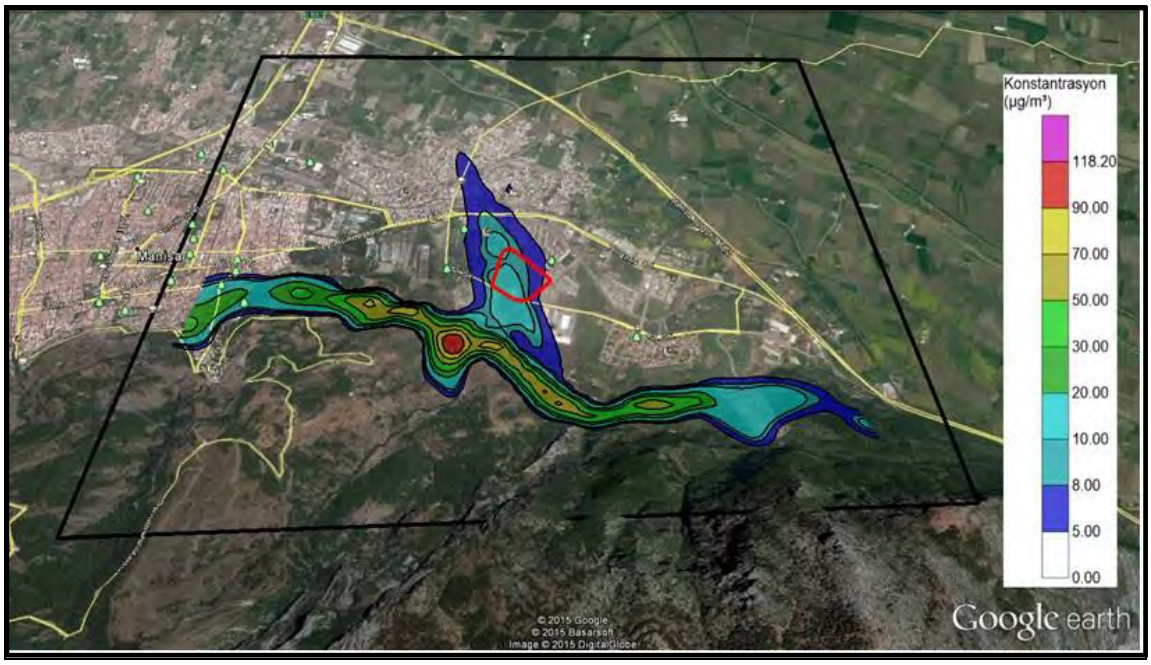


Figure 36.Scenario 1: Distribution of Hourly (NO_2) Emission

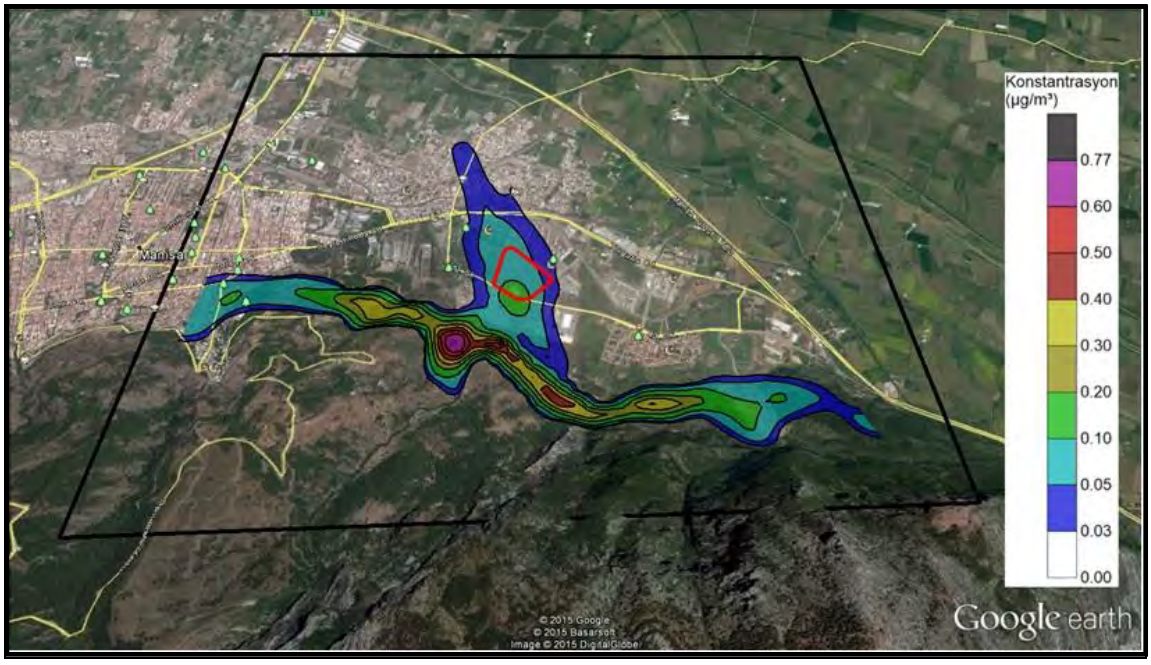


Figure 37.Scenario 2: Distribution of Hourly (SO_2) Emission

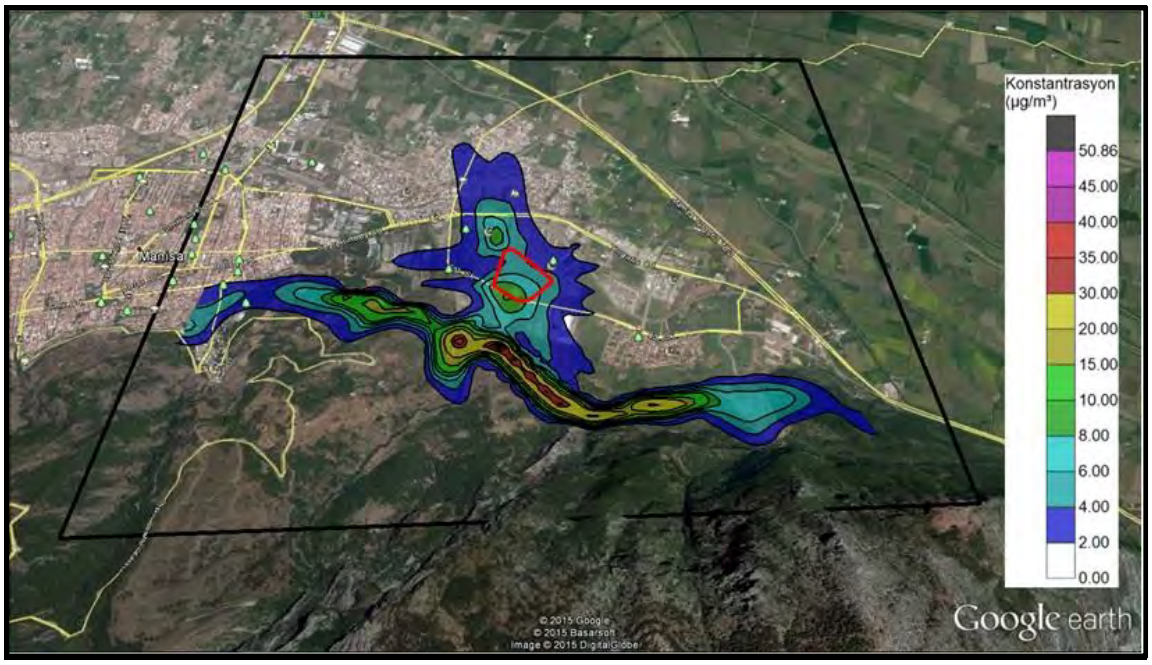


Figure 38.Scenario 2: Distribution of 8 Hour (CO) Emission

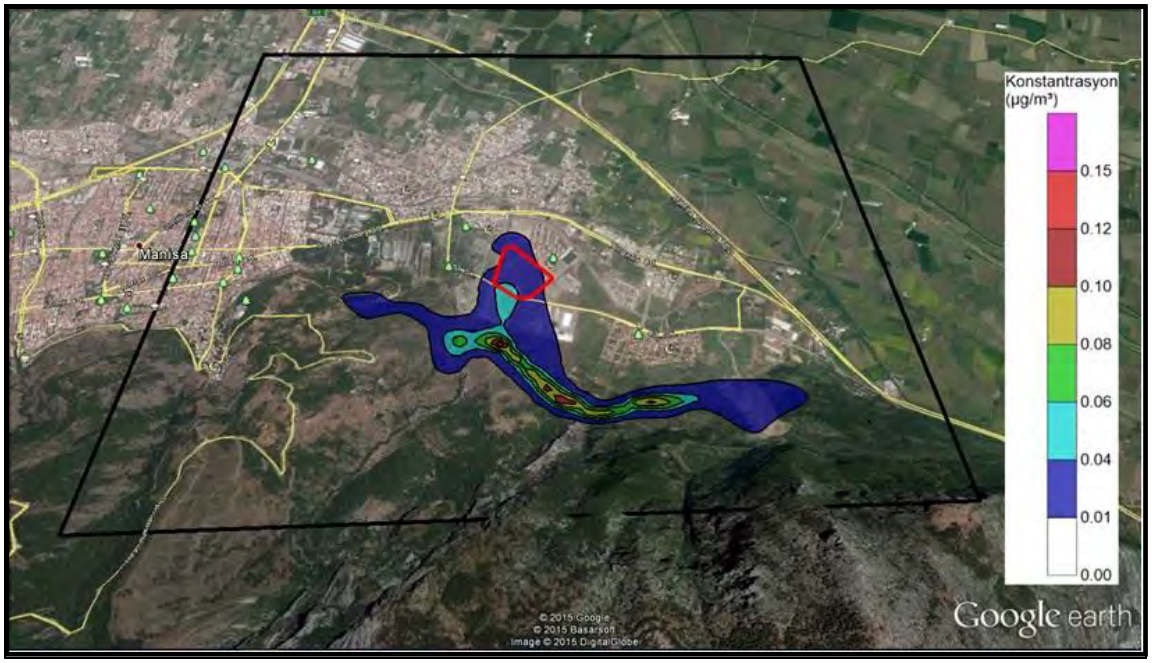


Figure 39.Scenario 2: Distribution of 24 Hour (PM) Emission

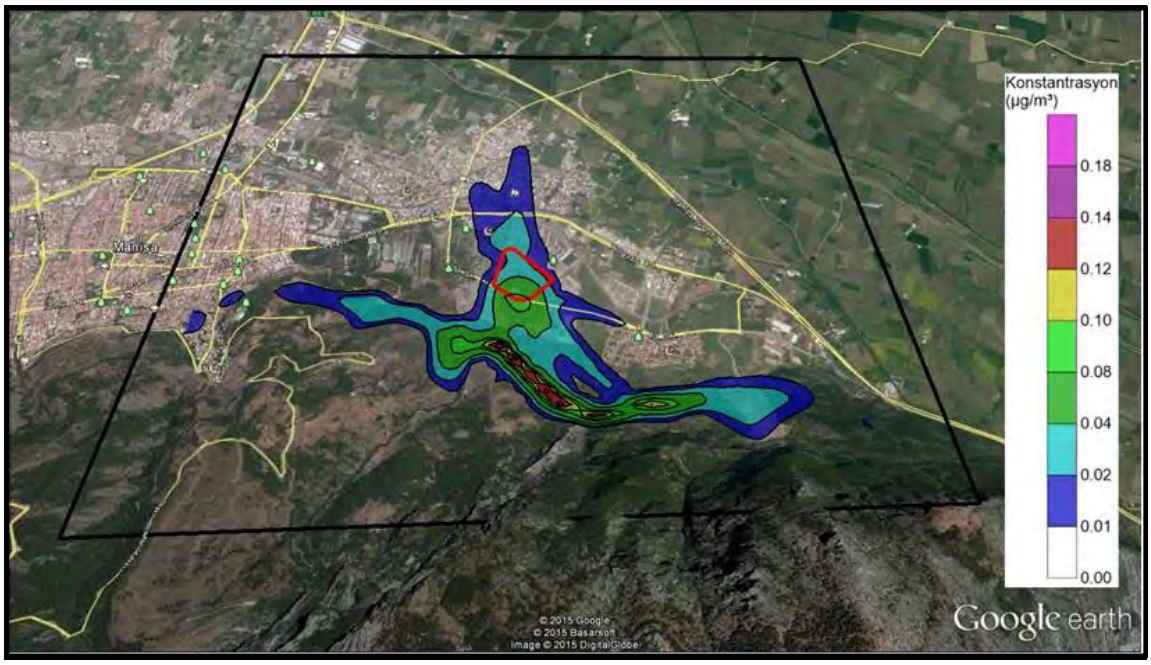


Figure 40.Scenario 2: Distribution of 24 Hour (SO_2) Emission

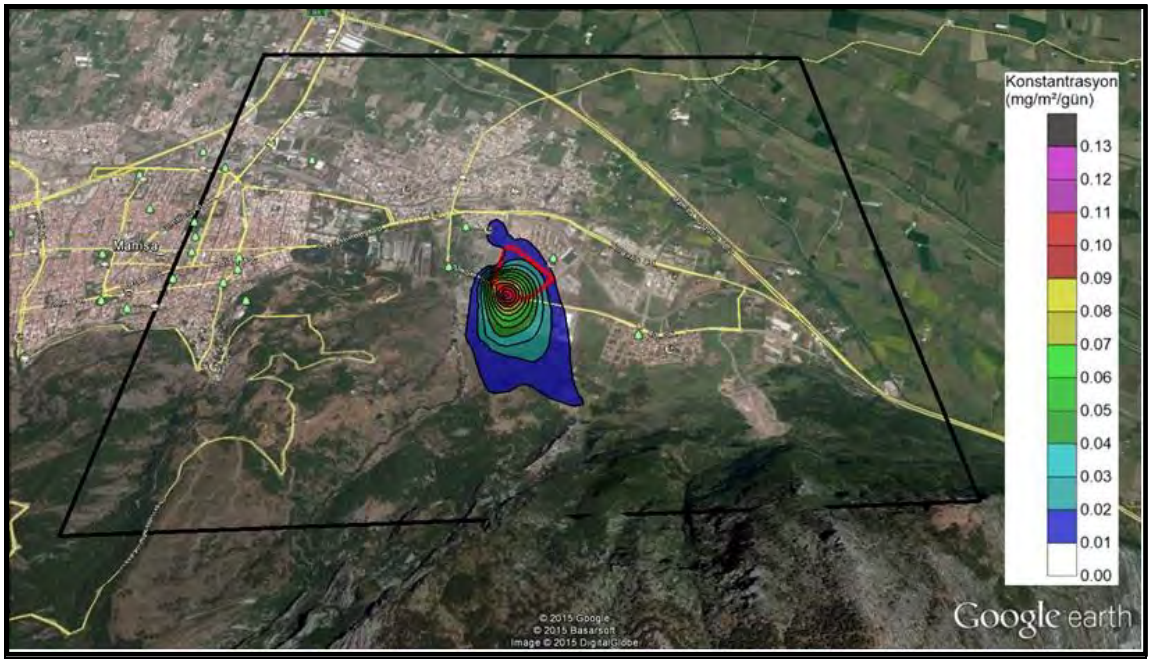


Figure 41.Scenario 2: Distribution of Monthly Settled Dust Emissions

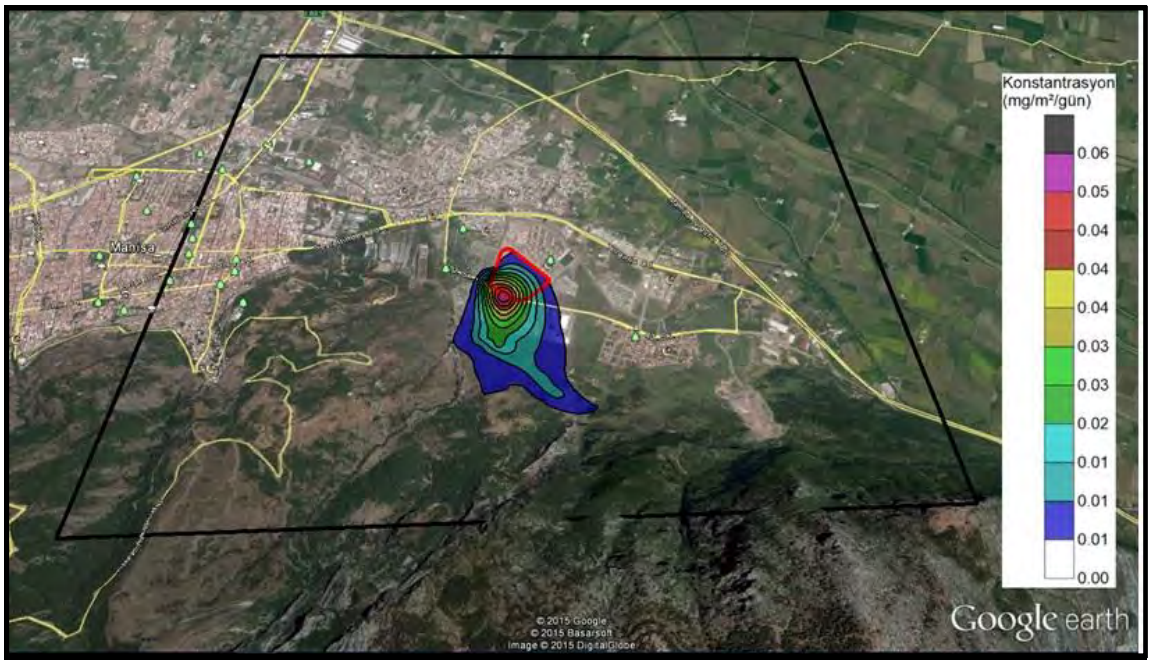


Figure 42.Scenario 2: Distribution of Annual Settled Dust Emissions

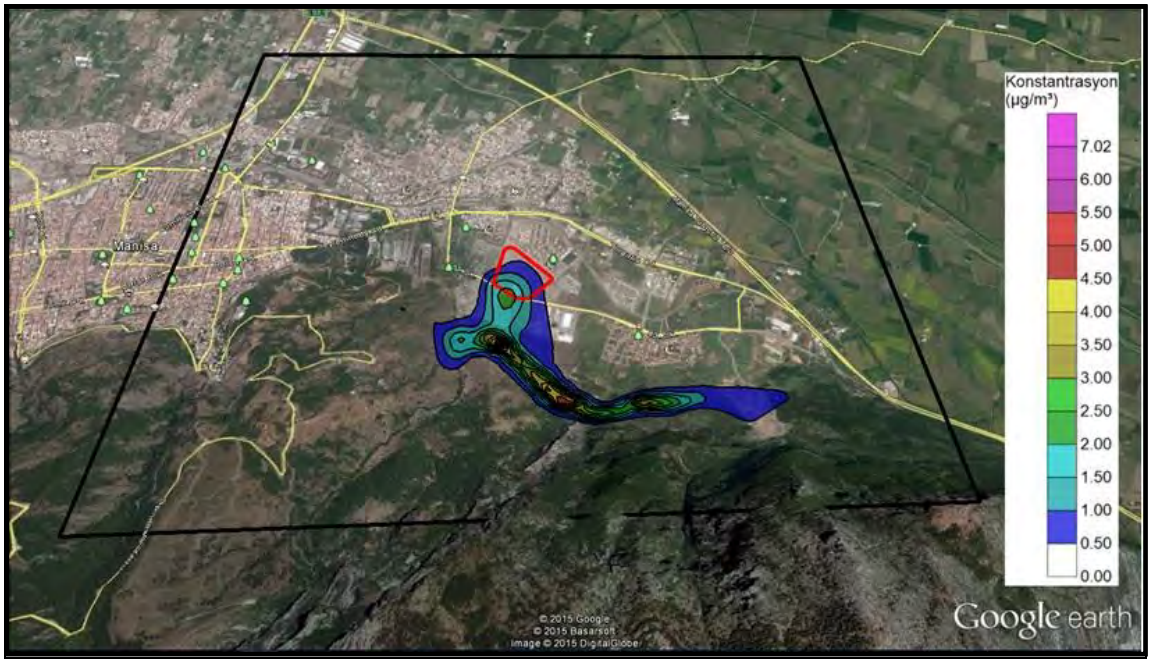


Figure 43.Scenario 2: Distribution of Annual (NO_2) Emission

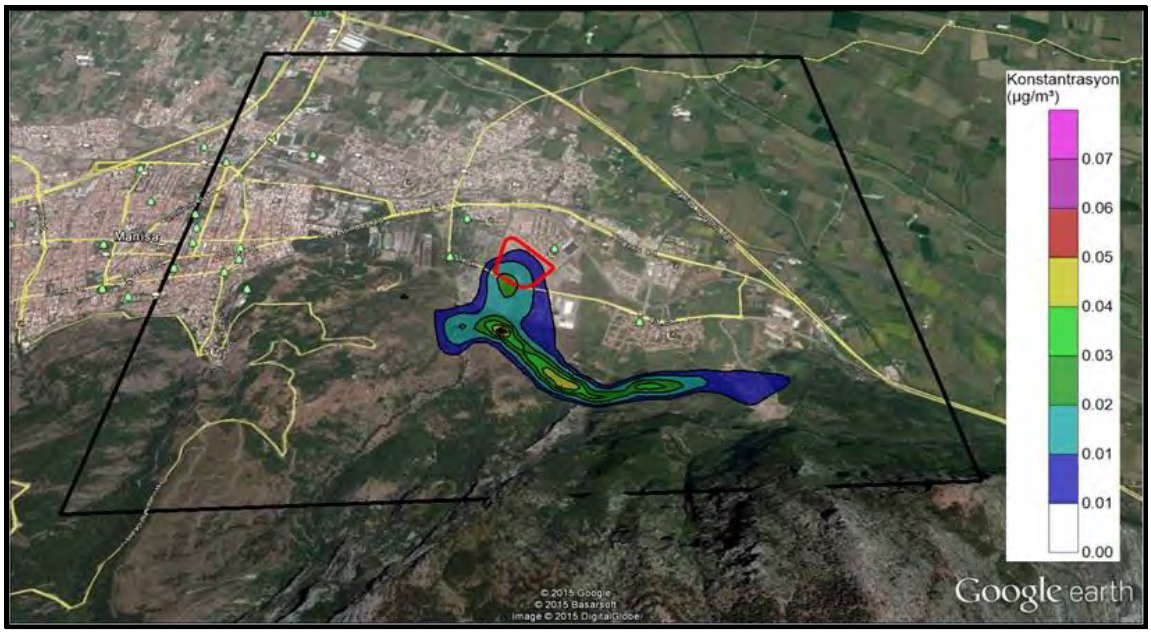


Figure 44.Scenario 2: Distribution of Annual (PM) Emission

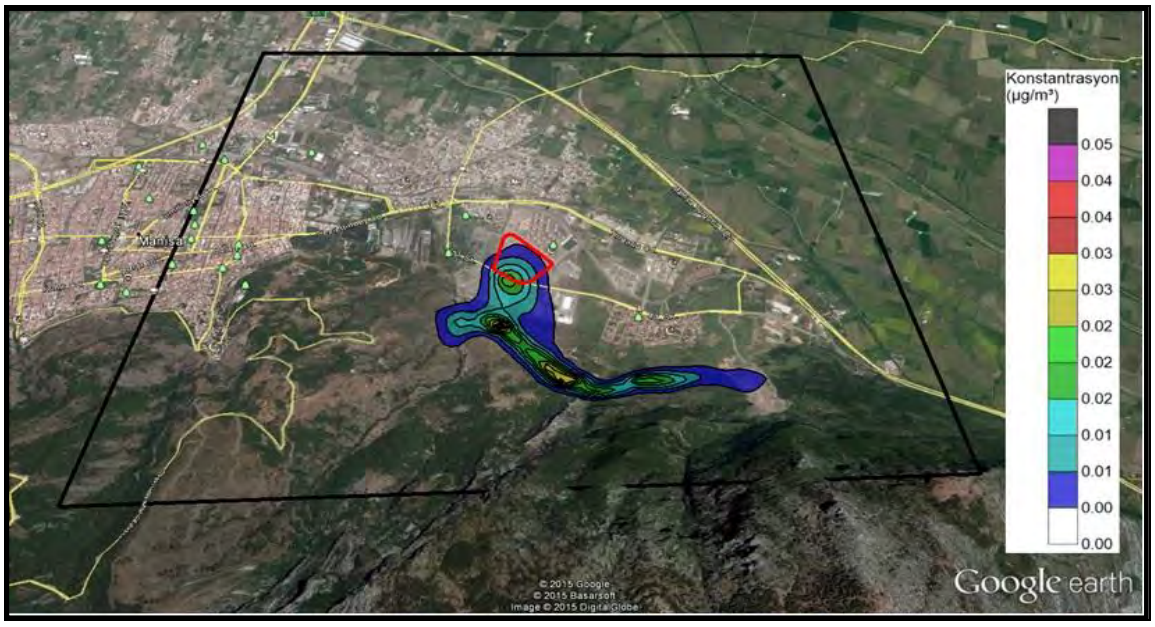


Figure 45.Scenario Distribution of Annual (SO_2) Emission

Greenhouse Gas Emissions

Greenhouse gases are the compounds that are found in the atmosphere supporting the greenhouse effect and have the most heat retention capacity. Contribution to global warming of greenhouse gases from human activities is 49% in energy use, 24% in industrialization, 14 % by deforestation and 13% in agriculture.

The Regulation on Greenhouse Gas Emissions Monitoring has been published in 17.05.2014 dated and 29003 numbered Official Gazette. Fossil fuel combustion activities are available within the scope of the regulations but activities originated from vehicle exhaust emission are not considered under the regulations. For the Operational phase of the Project, trigeneration plant greenhouse gas emissions calculation is shown below;

CO2 Emission Factor * : 2.693 CO_2 ton/fuel tonnes (Only for CO_2)
(*IFC Carbon Emission Estimator Tool*, 12.02.2014)*
Natural Gas Consumption : 1,969ton/year
CO_2- equivalent emissions amount : 5,302.52 ton/year (CO_2 + CH_4 + N_2O)

Cumulative Effects

The cumulative impact on baseline PM10 measurement locations are given in **Table 43** and **Table 44**.

5.3.3. Mitigation Measures

In order to ensure quality control of air emissions in the construction phase of the project, the following measures will be taken:

- Construction site and routes will be watered with sprinklers in certain periods. In studies, it is observed that the dust formation is reduced 80% by watering.
- Truck tire washing unit will be installed close to the asphalt road.
- During the transportation of excavated material, skidding of soil will be blocked by covering the truck.
- Trucks will not be allowed to leave the construction area without washing the tires and the upper part being covered with a tarpaulin.
- Loading and unloading operations will be ensured to be performed without tossing.
- Construction machinery will comply with the specified speed limit value in the Highways Traffic Act and Regulations.
- Dust emissions will be controlled by monitoring studies, in case of any complaints the frequency of monitoring will be increased and comprehensive measures will be taken.
- In order to control exhaust emissions during the construction phase, new vehicles and / or new-maintained vehicle will be used and "The Regulation on Exhaust Gas Emissions Control with Gasoline and Diesel Quality "will be complied.
- Except for maintenance and repair operations construction equipment will be stopped during park position.

Following measures will be taken in order to control dust emissions during the operational phase of the project:

- Regular maintenance of vehicles for emission sources will be made.
- Chimney height of emission sources will have the specified dimensions at National and International regulations /standards.
- Emission sources will be closed during the time that there is no need to use.
- All necessary application will be made in order to ensure compliance with national and international emission standards.
- In accordance with the IFC General EHS Guidelines, to flue gas central heating height will be designed according to Good International Industry Practice (GIIP).
- Boiler systems will be designed in accordance with relevant national legislation and the IFC standards.

Greenhouse Gas Emission Reduction Studies

In Turkey, the resulting total CO_2 emission is designated as 459,100,000 tonnes/ year (TÜİK, Greenhouse Gas Emissions Inventory, 2013). Manisa Training and Research Hospital Project will only contribute at the rate of 0.001% to CO_2 emissions in Turkey.

The following measures will be taken to keep greenhouse gas emissions at the lowest possible level:

- Studies performed for the reduction of heating fuel;
  - Taking the necessary measures for building insulation
  - Outside the entrance of the building, a revolving door, double doors or air curtains will be used.
  - The maintenance and control of the heating system will cover the burner settings based on flue gas measurements.
  - To inform the relevant employees and users about this matter.

- Studies performed for the reduction of fuel used in generators;
  - Timely maintenance of generators

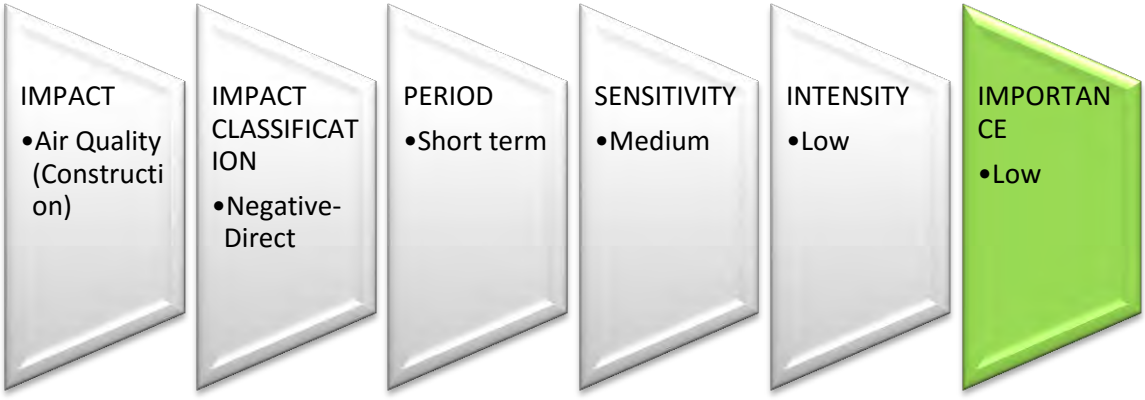
- Studies about air-conditioning gases;
  - Preferring A Class ventilation systems
  - The use of automatic air-conditioning system

- Studies on electricity consumption;
  - Using high efficiency fixtures and lamps, electronic ballasts, lighting control systems for lighting and benefiting from daylight as much as possible.
  - Using compact fluorescent lamps and electronic ballasted highly efficient fluorescent or LED lamps.
  - Using motion, heat or light sensitive sensor control system
  - Using highly reflective luminaries instead of the luminaries preventing light transmission
  - For interior lighting, arrangements should be made for the sections that have more than one armature
  - Reduction in lighting during daylight hours

5.3.4. Residual Impacts

Lasting impact on the air quality is not expected to occur because the impact on the air quality is very short at the construction phase.

During the operational phase, the effects on the air quality are for lifetime so it is considered to be a long term effect; but these effects will disappear when the operation of the project is ended. Due to the measures taken considering duration and impact, it is estimated that permanent effect is not significant.



5.4. Noise

5.4.1. Baseline

Background noise measurements have been made at June 2015 in order to determine background noise level of the Project area. Measurements have been made at 4 points for 5 minutes for day, evening and night and at 1 point for 24 hours (**Figure 18**). Measurement results are given in the following Tables.

Measurement results have been compared with limit values mentioned in *"The Regulation of Assessment and Management of Environmental Noise (RAMEN)"* which has been issued in 04.06.2010 dated and 27601 numbered Official Gazette and have been in force (amended by 27.04.2011 dated and 27917 numbered Official Gazette) and have been compared with IFC limit values.

Table 45. Noise Measurement Results during Daytime in the Project Area

Measurement Point	Distance to Project Area (m)	Measurement Time (Daytime)	Measured Noise Level (dB)	RAMEN Limit Value (dBA)	IFC Limit Value (dBA)
GA-1	15	15:05	48.6	60	55
GA-2	15	15:37	60.9	60	55
GA-3	10	15:49	47.2	60	55
GA-4	15	15:26	60.2	60	55

Measurement results have been compared with limit values mentioned in "RAMEN" which has been issued in 04.06.2010 dated and 27601 numbered Official Gazette and have been in force (amended by 27.04.2011 dated and 27917 numbered Official Gazette). In present situation, analysis results at both of the sampling points (GA-1 and GA-3) are under the limit value mentioned by *"RAMEN"* ($L_{day=}$60 dBA) and are also under IFC limit value.

Level of noise measured at two other points (GA-2 and GA-4) are both over the limit values mentioned in "RAMEN" ($L_{day=}$60 dBA) and IFC limit value. Since these points are adjacent to construction site of Municipality having ongoing construction activities. Due to ongoing construction activities at the mentioned construction site, day time noise levels at points named as GA-2 and GA-4 exceed limit values mentioned in *"RAMEN"* and IFC limit values.

Table 46. Noise Measurement Results in the Evening in the Project Area

Measurement Point	Distance to Project Area (m)	Measurement Time (Evening)	Measured Noise Level (dB)	RAMEN Limit Value (dBA)	IFC Limit Value (dBA)
GA-1	15	21:40	48.2	55	55
GA-2	15	21:53	54.0	55	55
GA-3	10	22:06	44.0	55	55
GA-4	15	22:20	45.1	55	55

Measurement results have been compared with limit values mentioned in "RAMEN" which has been issued in 04.06.2010 dated and 27601 numbered Official Gazette and has been in force (amended by 27.04.2011 dated and 27917 numbered Official Gazette) and it has been seen that obtained results are under the limit value (L_{day}=55 dBA) mentioned in "RAMEN" and ve IFC limit value.

Table 47. Noise Measurement Results in the Evening in the Project Area

Measurement Point	Distance to Project Area (m)	Measurement Time (Evening)	Measured Noise Level (dB)	RAMEN Limit Value (dBA)	IFC Limit Value (dBA)
GA-1	15	23:16	41.20	50	45
GA-2	15	23:35	41.34	50	45
GA-3	10	23:54	41.10	50	45
GA-4	15	00:17	41.70	50	45

Measurement results have been compared with limit values mentioned in "RAMEN" which has been issued in 04.06.2010 dated and 27601 numbered Official Gazette and has been in force (amended by 27.04.2011 dated and 27917 numbered Official Gazette) and it has been seen that obtained results are under the limit value (L_{day}=50 dBA) mentioned in "RAMEN" and IFC limit value.

Table 48. 24 Hours Noise Measurement Results

24 Hours Measurement Point	Distance to Project Area (m)	Measurement Time (24 Hours)	Measured Noise Level (dB)	RAMEN Limit Value (dBA)	IFC Limit Value (dBA)
Daytime	30	07:00-19:00	52.7	60	55
Evening		19:00-23:00	50.5	55	55
Night		23:00-07:00	47.4	50	45

Measurement point at which values have been measured for 24 hours is Gediz Primary School which is located at approximately 70 meter distance to the Project area. According to the evaluation of the measurement, it has been found out that results are under the limit values for day, evening and night mentioned in "RAMEN" which has been issued in 04.06.2010 dated and 27601 numbered Official Gazette and has been in force (amended by 27.04.2011 dated and 27917 numbered Official Gazette) but night value measured in receiving point is over IFC limit value. Main reason of this is that measurement point is located to approximately 35 meter distance to the road.

5.4.2. Impact Assessment

Construction Phase

Due to the machinery and equipment that will be used at the projects site preparation and construction phase, noise will occur. List of construction equipment that will be used during construction activities for land preparation are given in **Section 3.4.1.**

The project site is specified in *"The areas at which residences are more at areas over which Commercial buildings and noise sensitive constructions are located together*" class at " RAMEN " Annex VII in Table 4.

Table 49. Environmental Noise Limit Values (RAMEN Annex VII Table 4)

Areas	**$L_{daytime}$ (dBA)**	**$L_{evening}$ (dBA)**	**L_{night} (dBA)**
Sensitive to noise areas such as educational, cultural and health areas and areas where the density of the cottage and camp sites	60	55	50
The densely-populated residential areas that are in the areas where commercial buildings and noise sensitive areas together.	65	60	55
Commercial areas that are in the areas where commercial buildings and noise sensitive areas together.	68	63	58
Industrial areas	70	65	60

Table 50. Environmental Noise Limit Values (IFC)

Areas	**IFC EHS General Guideline Values**
Housing, institutions and training places	Ldaytime: 55 dBA and Lnight: 45 dBA (or background noise, except the closest receiver to switch to a maximum of 3 dB)

At this stage, it is not possible to give exact information about the location of equipment to be employed during the construction phase. However, worst-case calculations (maximum amount of machines and equipment which will operate at the same place and at the same time) were made. In fact, it is not the case at application. Therefore, it is expected that noise level at application will be much lower than the calculated values.

Evaluation of the Noise from construction activities and the preparation of land

The noise sources that will occur during the land preparation and construction phases will be at 2 different points. The first area is the location where the concrete plant and equipment placed and the other is defined as the area where excavation and construction activities will be carried out. Area where concrete plant is located will be located approximately 350 meters from the area of construction activities. For this reason, for the noise sources that will work at the same time; two separate calculations were made for concrete plant and construction area. Then the cumulative effects on the receiving points are determined. Receiving points are as follows:

- **Receiving Point 1.** TOKİ residences which are located at North-east of the Project area,
- **Receiving Point 2.**100.Sokak which is located at South of the Project area (near Municipality site area),
- **Receiving Point 3.**Contemporary cemetery of Metropolitan Municipality which is located at South - west of the Project area,
- **Receiving Point 4.**Cylinder depot area which is located at East of the Project area,

➧ **Receiving Point5.**Gediz Primary School which is located at 70 meter North of the Project Area,

The distance of the receiving points mentioned above to the construction site is given at **Table 51** and the positions of the Receiving Points are given at the map on the **Figure 46**.

Table 51. Distance of the Receiving Points to the construction site

Receiving Point		Distance (m) to Concrete plant Area	Distance (m) to Other Construction Activities Area *	
1	TOKİ Residences	310	360	340
2	Municipality Site Area	140	110	50
3	Manisa Asri Cemetery	340	180	220
4	Cylinder Depot area;	180	360	300
5	Gediz Primary School	450	380	395

**It has been envisaged that construction activities will be executed in two different locations within the borders of Project area.*

Figure 46. Map of Noise Impact Area

Formulas set forth in **Table 52** are used for sound power level of the machinery and equipment that will be used during construction.

Table 52. Type of Equipment and Noise Power Levels of Them Described in Conformance with Net Power Levels of Them

Equipment Type	**Net installed capacity P (kW) Electric power Per (1) (kW) Application mass, m (kg) Cutting width L (cm)**	**Permissible sound power level in dB / 1 pW**	
		From January 3 2004	**From January 3 2006**
Compaction machines (vibrating rollers, vibrating plates, vibrating hammers)	P ≤ 8	108	105
	8 < P ≤ 70	109	106
	P > 70	89 + 11 log P	86 + 11 log P
Crawler tractors, crawler loaders, crawler backhoe loaders	P ≤ 55	106	103
	P > 55	87 + 11 log P	84 + 11 log P
Wheeled dozers, wheeled loaders, wheeled excavator-loaders, dumpers, graders, loader-type soil-loading compressors, internal combustion engine driven counterweight hydraulic lift trucks, mobile cranes, compaction machines (flicker cylinders), paving leveler, hydraulic power to create machines	P ≤ 55	104	101
	P > 55	85 + 11 log P	82 + 11 log P
Diggers, hoists to move goods, building (construction) cranes, powered farm machines	P ≤ 15	96	93
	P > 15	83 + 11 log P	80 + 11 log P
Hand-held concrete breakers and drills	m ≤ 55	107	105
	15< m < 30	94 + 11 log m	92 + 11 log m
	m ≥ 30	96 + 11 log m	94 + 11 log m
Tower cranes		98 + log P	96 + log P
Welding and power generators	P_{el} ≤ 2	97 + log P_{el}	95 + log P_{el}
	2< P_{el}≤ 10	98 + log P_{el}	96 + log P_{el}
	P_{el} > 10	97 + log P_{el}	95 + log P_{el}
Compressors	P ≤ 15	99	97
	P > 15	97 + 2 log P	95 + 2 log P

1. Sound Power Level

500-4000 Hz octave band between 4 distributions of the total sound power level of noise sources in the calculation are given in the table below. Sound power level has been calculated by reversing the collection of decibels per octave band.

$$L_w = 10x\log(\sum_{i=1}^{n} 10^{\frac{L_w(i)}{10}})$$

$$L_w(i) = 10\log(\frac{10^{\frac{L_w}{10}}}{4})$$

2. Sound Pressure Levels

In the 4 octave band, sound pressure level of each noise source is calculated according to the formula and results are shown in the following table.

Lp : Noise in the x Distance
Q : Volume constant (2 was taken.)
r : radius in the x distance

3. Atmospheric Absorbance

For each frequency atmospheric absorbance value is calculated according to the formula below where relative humidity (Q) is taken 63.3%.

4. Final Sound Pressure Levels

After deduction of the atmospheric absorbance value, the final sound pressure level of each noise source in 4 octave bands is calculated again by the formula given below and results are given in the table below.

Lp = Lp – Aatm

5. Sound Levels

For calculating the weighted noise levels the correction factors at the table given below is used and the calculations for each noise source at 4 octave band is made and noise levels are found.

Table 53. Correction Factors

Pike Frequency (Hz)	Correction Factor
500	-3.2
1000	0.0
2000	+1.2
4000	+1.0

6. $L_{daytime}$ Values

The equivalent noise level is calculated and given at the table below for the worst case scenario in which all the noise sources works at the same time.

$$L_{eq} = 10x\log(\sum_{i=1}^{n} 10^{\frac{L_w(i)}{10}})$$

$$L_{gündüz} = L_{eq}$$

The equipment and their sound power levels that will be used in the construction of Manisa Training and Research Hospital Project are given at **Table 54.**

Table 54. Machinery / Equipment that are Planned to be Used During Construction Phase and Their Noise Levels

Equipment	Machinery / Equipment Number	Machinery / Equipment Number That will Work Simultaneously			Sound Power Level (dB)
		Concrete Plant Area	Construction Activities Area-1	Construction Activities Area-2	
Truck	20	1	2	1	108
Excavator	6	-	1	1	105
Dozer	2	-	1	-	106
Digger	2	-	-	1	106
Loader	4	-	-	1	104
Beko Loader	5	-	1	-	104
Cylinder	1	-	-	1	108
Mobile Cranes	11	-	-	1	98
The tower crane	5	-	1	1	106
Pumper	2	1	1	1	106
Concrete Plant	1	1	-	-	106
Trans mixer	20	1	-	-	102
Mobile Concrete Pump	4	1	-		107
Compressor	1	-	-		98
Generator	1	-	-		97

The distribution of the octave band sound power level calculated according to the level of work-induced noise machine to be used, atmospheric absorption coefficients and the final sound pressure levels are given in the table below.

Table 55. Distribution of Sound Power Level to Octave Band

Noise Sources	Total	Sound Power Level (dB)			
		500 Hz	1000 Hz	2000 Hz	4000 Hz
Truck	108	102.0	102.0	102.0	102.0
Excavator	105	99.0	99.0	99.0	99.0
Dozer	106	100.0	100.0	100.0	100.0
Digger	106	100.0	100.0	100.0	100.0
Loader	104	98.0	98.0	98.0	98.0
Beko Loader	104	98.0	98.0	98.0	98.0
Cylinder	108	102.0	102.0	102.0	102.0
Mobile Cranes	106	100.0	100.0	100.0	100.0
The tower crane	98	92.0	92.0	92.0	92.0
Pumper	106	100.0	100.0	100.0	100.0
Concrete Plant	106	100.0	100.0	100.0	100.0
Trans mixer	102	96.0	96.0	96.0	96.0
Mobile Concrete Pump	107	101.0	101.0	101.0	101.0
Compressor	98	92.0	92.0	92.0	92.0
Truck	97	91.0	91.0	91.0	91.0

Table 56. Atmospheric Absorption Coefficients Calculated Depending on Distance

Frequency (Hz)	Distance (m)	Atmospheric Absorbance
500	100	0.03
500	120	0.04
500	150	0.04
500	160	0.05
500	170	0.05
500	200	0.06
500	310	0.09

Frequency (Hz)	Distance (m)	Atmospheric Absorbance
500	345	0.10
500	350	0.10
500	450	0.13
500	500	0.15
1000	100	0.12
1000	120	0.14
1000	150	0.18
1000	160	0.19
1000	170	0.20
1000	200	0.23
1000	310	0.36
1000	345	0.40
1000	350	0.41
1000	450	0.53
1000	500	0.58
2000	100	0.47
2000	120	0.56
2000	150	0.70
2000	160	0.75
2000	170	0.79
2000	200	0.94
2000	310	1.45
2000	345	1.61
2000	350	1.64
2000	450	2.10
2000	500	2.34
4000	100	1.87
4000	120	2.24
4000	150	2.81
4000	160	2.99
4000	170	3.18
4000	200	3.74
4000	310	5.80
4000	345	6.45
4000	350	6.55
4000	450	8.42
4000	500	9.35

Table 57. Final Sound Pressure Levels of Noise Sources that will be used during activities

Noise Source	Distance (m)	Sound Pressure Level (dB)				
		500 Hz	1000 Hz	2000 Hz	4000 Hz	Total
Truck	100	50.8	53.9	54.7	53.1	59.4
	120	49.2	52.3	53.1	51.2	57.7
	150	47.2	50.3	51.0	48.7	55.6
	160	46.7	49.7	50.4	47.9	54.9
	170	46.1	49.2	49.8	47.2	54.3
	200	44.7	47.7	48.2	45.2	52.8
	310	40.9	43.8	43.9	39.4	48.4
	345	39.9	42.8	42.8	37.8	47.3
	350	39.8	42.7	42.7	37.6	47.2
	450	37.6	40.4	40.0	33.5	44.6
	500	36.7	39.4	38.9	31.7	43.5
Excavator	100	47.8	50.9	51.7	50.1	56.4
	120	46.2	49.3	50.1	48.2	54.7
	150	44.2	47.3	48.0	45.7	52.6
	160	43.7	46.7	47.4	44.9	51.9
	170	43.1	46.2	46.8	44.2	51.3

Noise Source	Distance (m)	Sound Pressure Level (dB)				
		500 Hz	1000 Hz	2000 Hz	4000 Hz	Total
	200	41.7	44.7	45.2	42.2	49.8
	310	37.9	40.8	40.9	36.4	45.4
	345	36.9	39.8	39.8	34.8	44.3
	350	36.8	39.7	39.7	34.6	44.2
	450	34.6	37.4	37.0	30.5	41.6
	500	33.7	36.4	35.9	28.7	40.5
Dozer	100	48.8	51.9	52.7	51.1	57.4
	120	47.2	50.3	51.1	49.2	55.7
	150	45.2	48.3	49.0	46.7	53.6
	160	44.7	47.7	48.4	45.9	52.9
	170	44.1	47.2	47.8	45.2	52.3
	200	42.7	45.7	46.2	43.2	50.8
	310	38.9	41.8	41.9	37.4	46.4
	345	37.9	40.8	40.8	35.8	45.3
	350	37.8	40.7	40.7	35.6	45.2
	450	35.6	38.4	38.0	31.5	42.6
	500	34.7	37.4	36.9	29.7	41.5
Digger	100	48.8	51.9	52.7	51.1	57.4
	120	47.2	50.3	51.1	49.2	55.7
	150	45.2	48.3	49.0	46.7	53.6
	160	44.7	47.7	48.4	45.9	52.9
	170	44.1	47.2	47.8	45.2	52.3
	200	42.7	45.7	46.2	43.2	50.8
	310	38.9	41.8	41.9	37.4	46.4
	345	37.9	40.8	40.8	35.8	45.3
	350	37.8	40.7	40.7	35.6	45.2
	450	35.6	38.4	38.0	31.5	42.6
	500	34.7	37.4	36.9	29.7	41.5
Loader	100	46.8	49.9	50.7	49.1	55.4
	120	45.2	48.3	49.1	47.2	53.7
	150	43.2	46.3	47.0	44.7	51.6
	160	42.7	45.7	46.4	43.9	50.9
	170	42.1	45.2	45.8	43.2	50.3
	200	40.7	43.7	44.2	41.2	48.8
	310	36.9	39.8	39.9	35.4	44.4
	345	35.9	38.8	38.8	33.8	43.3
	350	35.8	38.7	38.7	33.6	43.2
	450	33.6	36.4	36.0	29.5	40.6
	500	32.7	35.4	34.9	27.7	39.5
JCB	100	46.8	49.9	50.7	49.1	55.4
	120	45.2	48.3	49.1	47.2	53.7
	150	43.2	46.3	47.0	44.7	51.6
	160	42.7	45.7	46.4	43.9	50.9
	170	42.1	45.2	45.8	43.2	50.3
	200	40.7	43.7	44.2	41.2	48.8
	310	36.9	39.8	39.9	35.4	44.4
	345	35.9	38.8	38.8	33.8	43.3
	350	35.8	38.7	38.7	33.6	43.2
	450	33.6	36.4	36.0	29.5	40.6
	500	32.7	35.4	34.9	27.7	39.5
Cylinder	100	50.8	53.9	53.3	53.1	58.9
	120	49.2	52.3	53.1	51.2	57.7
	150	47.2	50.3	51.0	48.7	55.6
	160	46.7	49.7	50.4	47.9	54.9
	170	46.1	49.2	49.8	47.2	54.3
	200	44.7	47.7	48.2	45.2	52.8

Noise Source	Distance (m)	Sound Pressure Level (dB)				
		500 Hz	1000 Hz	2000 Hz	4000 Hz	Total
	310	40.9	43.8	43.9	39.4	48.4
	345	39.9	42.8	42.8	37.8	47.3
	350	39.8	42.7	42.7	37.6	47.2
	450	37.6	40.4	40.0	33.5	44.6
	500	36.7	39.4	38.9	31.7	43.5
Mobile Crane	100	48.8	51.9	52.7	51.1	57.4
	120	47.2	50.3	51.1	49.2	55.7
	150	45.2	48.3	49.0	46.7	53.6
	160	44.7	47.7	48.4	45.9	52.9
	170	44.1	47.2	47.8	45.2	52.3
	200	42.7	45.7	46.2	43.2	50.8
	310	38.9	41.8	41.9	37.4	46.4
	345	37.9	40.8	40.8	35.8	45.3
	350	37.8	40.7	40.7	35.6	45.2
	450	35.6	38.4	38.0	31.5	42.6
	500	34.7	37.4	36.9	29.7	41.5
Tower crane	100	40.8	43.9	44.7	43.1	49.4
	120	39.2	42.3	43.1	41.2	47.7
	150	37.2	40.3	41.0	38.7	45.6
	160	36.7	39.7	40.4	37.9	44.9
	170	36.1	39.2	39.8	37.2	44.3
	200	34.7	37.7	38.2	35.2	42.8
	310	30.9	33.8	33.9	29.4	38.4
	345	29.9	32.8	32.8	27.8	37.3
	350	29.8	32.7	32.7	27.6	37.2
	450	27.6	30.4	30.0	23.5	34.6
	500	26.7	29.4	28.9	21.7	33.5
Water Pumper	100	48.8	51.9	52.7	51.1	57.4
	120	47.2	50.3	51.1	49.2	55.7
	150	45.2	48.3	49.0	46.7	53.6
	160	44.7	47.7	48.4	45.9	52.9
	170	44.1	47.2	47.8	45.2	52.3
	200	42.7	45.7	46.2	43.2	50.8
	310	38.9	41.8	41.9	37.4	46.4
	345	37.9	40.8	40.8	35.8	45.3
	350	37.8	40.7	40.7	35.6	45.2
	450	35.6	38.4	38.0	31.5	42.6
	500	34.7	37.4	36.9	29.7	41.5
Concrete Plant	100	48.8	51.9	51.1	51.1	56.9
	120	47.2	50.3	49.3	49.2	55.1
	150	45.2	48.3	47.8	46.7	53.2
	160	44.7	47.7	46.9	45.9	52.5
	170	44.1	47.2	45.8	45.2	51.7
	200	42.7	45.7	44.2	43.2	50.2
	310	38.9	41.8	40.2	37.4	45.9
	345	37.9	40.8	38.7	35.8	44.7
	350	37.8	40.7	36.5	35.6	44.1
	450	35.6	38.4	33.7	31.5	41.6
	500	34.7	37.4	32.7	29.7	40.5
Trans mixer	100	44.8	47.9	48.7	47.1	53.4
	120	43.2	46.3	47.1	45.2	51.7
	150	41.2	44.3	45.0	42.7	49.6
	160	40.7	43.7	44.4	41.9	48.9
	170	40.1	43.2	43.8	41.2	48.3
	200	38.7	41.7	42.2	39.2	46.8
	310	34.9	37.8	37.9	33.4	42.4

Noise Source	Distance (m)	Sound Pressure Level (dB)				
		500 Hz	1000 Hz	2000 Hz	4000 Hz	Total
	345	33.9	36.8	36.8	31.8	41.3
	350	33.8	36.7	36.7	31.6	41.2
	450	31.6	34.4	34.0	27.5	38.6
	500	30.7	33.4	32.9	25.7	37.5
Mobile Concrete Pump	100	49.8	52.9	53.7	52.1	58.4
	120	48.2	51.3	52.1	50.2	56.7
	150	46.2	49.3	50.0	47.7	54.6
	160	45.7	48.7	49.4	46.9	53.9
	170	45.1	48.2	48.8	46.2	53.3
	200	43.7	46.7	47.2	44.2	51.8
	310	39.9	42.8	42.9	38.4	47.4
	345	38.9	41.8	41.8	36.8	46.3
	350	38.8	41.7	41.7	36.6	46.2
	450	36.6	39.4	39.0	32.5	43.6
	500	35.7	38.4	37.9	30.7	42.5
Compressor	100	40.8	43.9	44.7	43.1	49.4
	120	39.2	42.3	43.1	41.2	47.7
	150	37.2	40.3	41.0	38.7	45.6
	160	36.7	39.7	40.4	37.9	44.9
	170	36.1	39.2	39.8	37.2	44.3
	200	34.7	37.7	38.2	35.2	42.8
	310	30.9	33.8	33.9	29.4	38.4
	345	29.9	32.8	32.8	27.8	37.3
	350	29.8	32.7	32.7	27.6	37.2
	450	27.6	30.4	30.0	23.5	34.6
	500	26.7	29.4	28.9	21.7	33.5
Generator	100	39.8	42.9	43.7	42.1	48.4
	120	38.2	41.3	42.1	40.2	46.7
	150	36.2	39.3	40.0	37.7	44.6
	160	35.7	38.7	39.4	36.9	43.9
	170	35.1	38.2	38.8	36.2	43.3
	200	33.7	36.7	37.2	34.2	41.8
	310	29.9	32.8	32.9	28.4	37.4
	345	28.9	31.8	31.8	26.8	36.3
	350	28.8	31.7	31.7	26.6	36.2
	450	26.6	29.4	29.0	22.5	33.6
	500	25.7	28.4	27.9	20.7	32.5

1. Noise level to occur in areas where the Concrete Plant and Equipment are available

Day value and chart of noise emissions originating from the activities to take place in the area of the Concrete Plant are given below.

Table 58. Net Noise Sound Levels Depending on Distance from Resources at Concrete Plant Area

Distance (m)	L daytime (dBA)	Limit Value
110	63.57	60.00
140	61.29	60.00
180	58.92	60.00
310	53.55	60.00
340	52.59	60.00
360	51.93	60.00
380	51.37	60.00
450	49.64	60.00
500	48.55	60.00
550	47.54	60.00

Distance (m)	L daytime (dBA)	Limit Value
600	46.63	60.00

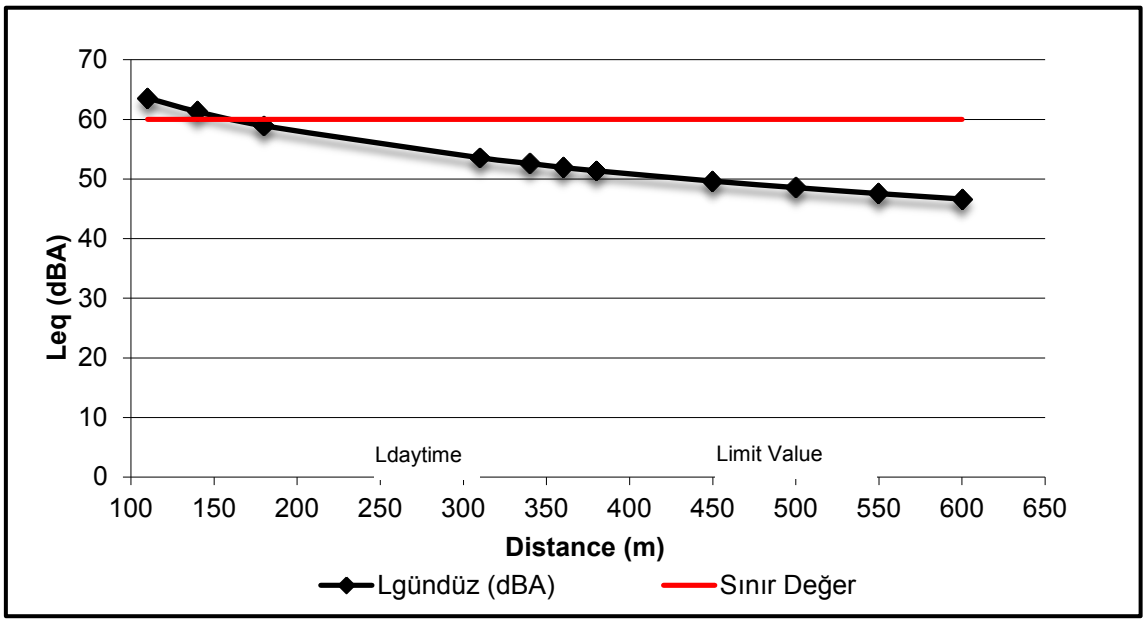


Figure 47. Graphic of Volume of Noise Levels by Distance to the Concrete Plant

2. Noise Level to occur in the Field that Other Construction Facilities will be Performed

Construction activities under the scope of the Project will be performed in two different locations. Day value of noise due to machinery and equipment Works at the construction area and noise distribution graphic are given in below.

Table 59. Net Noise Sound Levels Depending on Distance from Resources at Construction Activity Areas-1

Distance (m)	L Daytime (dBA)	Limit Value
110	65.29	60.00
140	63.01	60.00
180	60.60	60.00
310	55.23	60.00
340	54.30	60.00
360	53.72	60.00
380	53.17	60.00
600	48.46	60.00
700	46.84	60.00
800	45.43	60.00
900	44.18	60.00

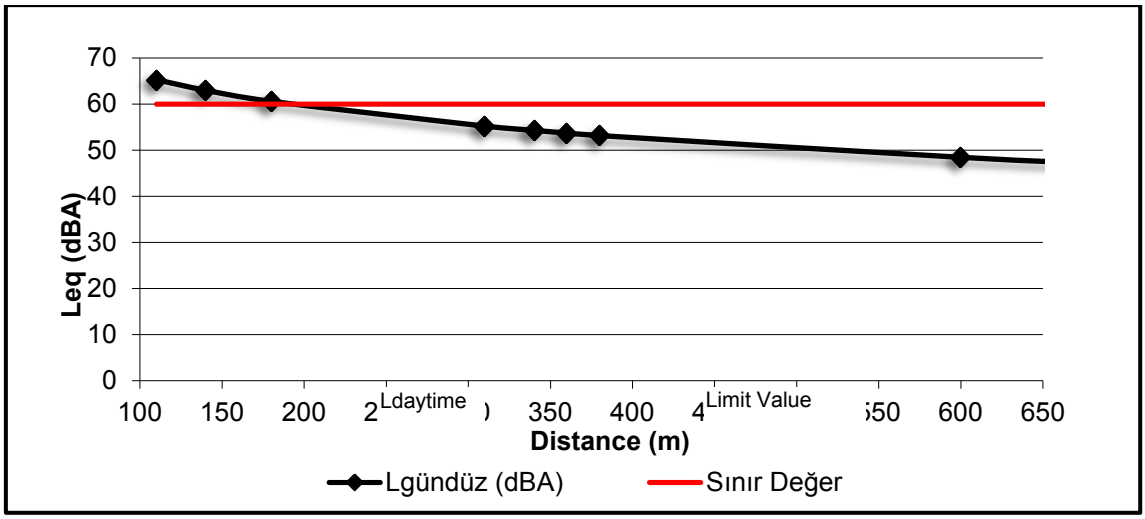


Figure 48.Graphic of Volume of Noise Levels by Distance from Resources at Construction Activity Areas-1

Table 60.Net Noise Sound Levels Depending on Distance from Resources at Construction Activity Areas-2

Distance (m)	L Daytime (dBA)	Limit Value
50	71.98	60.00
200	59.07	60.00
220	58.13	60.00
300	55.05	60.00
340	53.79	60.00
394	52.29	60.00
400	52.14	60.00
600	47.95	60.00
700	46.33	60.00
800	44.92	60.00
900	43.67	60.00

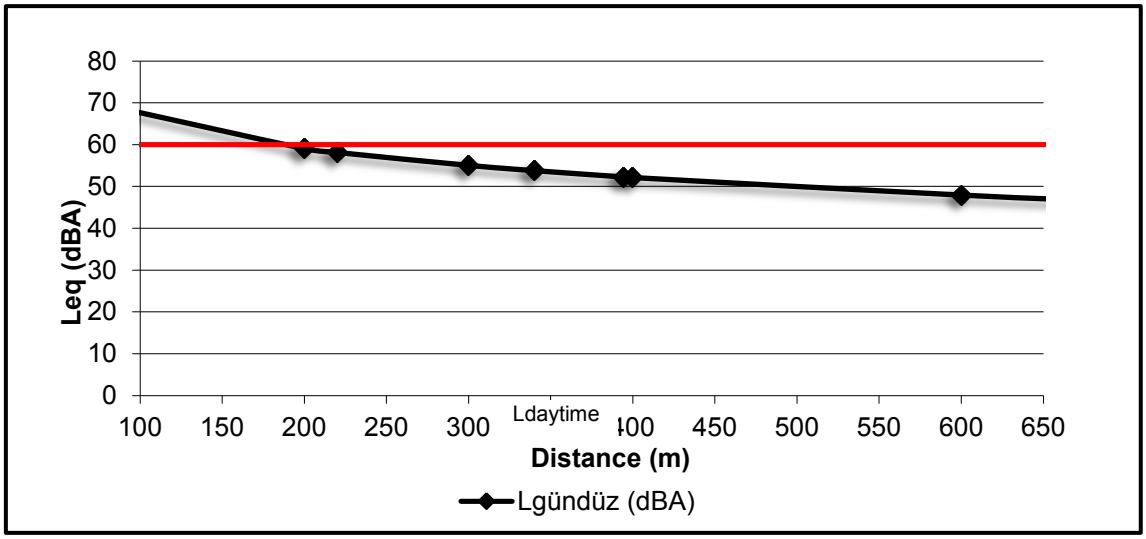


Figure 49.Net Noise Sound Levels Depending on Distance from Resources at Construction Activity Areas-2

Background noise measurements, calculated noise levels and the cumulative values are given in **Table 61**.

Table 61.Construction Phase Noise Impact Assessment Results

Point	Background Noise Measurement			Construction Noise level[1] (dBA)				Cumulative Noise Level[8] (dBA)	Change at the Background Noise Level[9]
	Time[2]	Result (dBA)	Area-1[3]	Area-2[4]	Area -2[5]	Total[6]	Limit Value[7]		
Receiver (1)	15:05	48.6	53.55	53.72	53.79	58.5	60	58.9	10.3
Receiver (2)	15:37	60.9	61.29	65.29	71.98	73.1	60	73.4	12.5
Receiver (3)	15:49	47.2	52.59	60.60	58.13	63.0	60	63.1	15.9
Receiver (4)	15:26	60.2	58.92	53.72	55.05	61.3	60	63.8	3.6
Receiver (5)	07:00-19:00	52.7	49.64	53.17	52.29	56.7	60	58.2	5.5

1-Noise level at receiver point is taken according to distances.
2- Background noise measurements were carried out in between 23/06/2015 and 24/06/2015.
3- Noise level originated from the work performed at Concrete Plant area.
4- Noise levels originated from machinery that will be used at other construction areas.
5- Noise levels originated from machinery that will be used at other construction areas.
6- Noise level originated from all construction activities on the receiver spots.
7- According to RAMEN Annex VII Table 4, limit values were determined as 60 dB.
8-The overall noise level originated from background and construction activities
9- According to FC EHS General Guidelines, the value of background noise is foreseen to be at most 3 dB except the nearest receiver.

Operation Level

The main noise sources in the operational phase are trigeneration unit and hospital traffic noise that will occur at entry and exit. Since the hospital is near to the highway, noise emerged from hospital vehicles will be at negligible level. The trigeneration unit will be selected according to advanced technological design and they will be set up in private buildings designed according to high sound insulation measures. Noise limit values given in Turkish regulations for hospitals are 25 dBA (night). According to IFC standards, noise limit value for residential areas is 40 dBA (night). Noise sourced by Trigeneration unit will be guaranteed to meet the noise limit values specified as proper for the hospital. The impact of the noise resulting from the operational phase of the project on the existing background noise level will be negligible. It is estimated that helicopter usage will be limited. Therefore, noise exposure is expected to be short-term and temporary considering helicopter usage.

Cumulative Impacts

The most important noise sources in the region are heavy traffic loaded highways. At short-term in the construction phase, there may be a noise effect. For this reason, during the construction and operation phases, there will not be a significant cumulative effect.

5.4.3. Mitigation Measures

The following mitigation measures will be taken during the construction phase of the project:

- All of the business machinery and equipment will not be operated simultaneously.
- Periodic maintenance of all working machines and equipment will be done on time.
- High-tech equipment with the lowest possible noise level will be used.
- Construction machinery will be turned off whenever not used.
- Construction activities will be conducted during daylight hours whenever possible.
- Activities that will cause noise will be carried out in as far locations from residential areas as possible.
- Noise monitoring will be conducted in order to ensure the noise standards.
- Excavation will be done during normal working hours using shipping routes. If it must be done at night, all the permissions will be taken.
- Staff will be made aware on reducing the impact of the noise level.
- Local people will be informed about the progress of activities which will cause noise. Complaints on noise will be considered under the Grievance Mechanism.
- Working hours will be set by the provisions of the relevant legislation.

In the operational phase of the project, noise sources will be in closed environments and contractor will perform the necessary insulation inside the building. Therefore, the operational phase of the project would have a negligible effect on the current noise level.

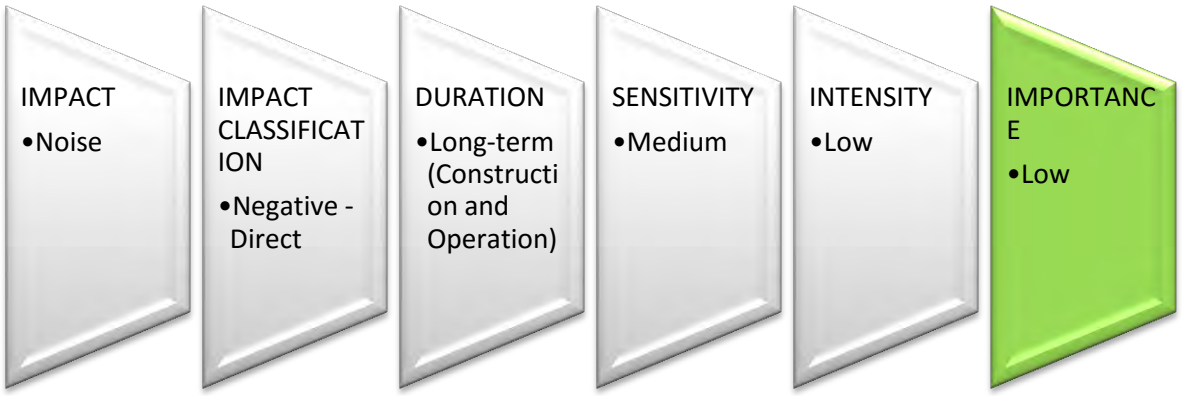
Machinery and equipment working in the field will be checked regularly and necessary maintenance will be made at regular intervals to determine the noise levels at all construction phase of the project including land preparation .In addition at periodic intervals noise measurements will be made at the project site and at the nearest residential unit .

At construction and operation phases of the project, noise limit values specified in national and international legislation will be strictly adhered.

5.4.4. Residual Impacts

As can be seen from calculations of noise during construction phase, IFC limit values are not exceeded by sensitive receivers for evening and night times but IFC limit values are exceed for day times. The reason is construction activities continued at the adjacent construction site.

During the operational phase of the project, since the new noise sources will take place indoors, it will have a negligible effect on the current noise levels. Since the intensity of the noise that will occur during the construction and operation phases of the project will be low and the sensitivity will be deemed as at middle level, the effect of the impact will be low.



5.5. Waste Management

5.5.1. Baseline

Manisa Provincial Environment Status Report (2013), Turkish statistical Institution official data base and Manisa Metropolitan Municipality data has been examined to determine the current waste management substructure of Manisa.

Waste Generation and Disposal

Domestic Solid Wastes: Domestic solid wastes from companies operating in the Organized Industrial Zone are collected with the coordination of the region and are disposed of at municipal sanitary landfill.

Disposal of solid waste is carried out at irregular storage in Şahindere Kırtık Locality. In addition a Solid Waste Disposal Facility construction is planned at Yunus Emre Quarter district Uzunburun in Sarıçam Locality. Upon completion of the project, Turgutlu, Saruhanlı, Ahmetli, Yunus Emre and Şehzadeler waste will be transported to this area.

The province continues to work with solid waste landfill. Processes related to the study are as follows:

- Special Provincial Administration, Manisa-Centrum, Saruhanlı County and District Municipalities Union (Union Chairman: Manisa Municipality)
  - ✓ The case at 6. Office of the State Council related to site selection of solid waste disposal facilities in Develi village is not finished.
  - ✓ MAÇEV Environmental Services Union Ministers gained legal personality affirmed by the 1064 numbered and 24.11.2010 dated Council of Ministers decision.
  - ✓ Project has EIA positive decision; the revision of the project about composting plants, mechanical biological separation plant and packaging waste sorting plant and changing the lot levels and numbers has been completed.

Due to the extension of the judicial process related to the field in the Develi village by the Manisa Municipality; Local Environmental Council (LEC) gave a decision about the site selection of alternative Solid Waste Landfill at 29.06.2012 and No. 04, this decision states that this site will be in the vicinity of Central District Uzunburun and Akgedik villages of 60 hectares area. Pre-Feasibility Report is approved by the T. C. Ministry of Environment and Urbanization on 15/12/2012.EIA process is completed on 01.04.2013. After LEC, Pre-Feasibility and EIA process is completed the last step needed to complete the project according to the legislation is Implementation Project.

- Special Provincial Administration, Turgutlu, Ahmetli County and District Municipal Association (Association President: Turgutlu Municipality)
  - ✓ Council of the Union has been established with 02.03.2010 date and 27509 numbered Official Gazette of Ministers decision.
  - ✓ With regard to the choice of location dated 30.03.2010 and No. 2 LEC decision was taken.
  - ✓ Lawsuits related to expropriation are continuing.

- Special Provincial Administration, Salihli, Alaşehir, Sarıgöl County and District Municipal Association (Association President: Salihli Municipality)
  - ✓ Technical Support has been taken from Dokuz Eylul University's Environmental Engineering Department for alternative sites in the site selection by Salihli Municipality and work continues.
  - ✓ Demirci Municipality, has completed participation in the Union's accession to the Union Köprübaşı Municipality studies are conducted.
  - ✓ Upon the decree taken by the Association at 19.12.2012, legal entity of our Solid Waste Disposal Association has been ended based on 26th paragraph of 1st Article of the 6330 numbered Code related with Forming Metropolitan Municipalities in 13 provinces which has been in force after been issued in 06.12.2012 dated and 24489 numbered Official Gazette.

- Special Provincial Administration, Kula District and District Municipalities Union (Union Chairman: Kula Municipality)
  - ✓ The EIA process has been completed, the solid waste landfill project application is approved by T. C Ministry of Environment and Urbanization at 05.04.2012.
  - ✓ Union accession efforts of Selendi County Council were made.
  - ✓ Due to the financial difficulties expropriation works could not be done and there has been no progress in construction.

- Special Provincial Administration, Akhisar, Gordes, Gölmarmara, Soma Kırkağaç County and District Municipal Association (Association President: Akhisar Municipality)
  - ✓ The site selection has been done related with Solid Waste Disposal Facility at 28.05.2012 and No. 03 LEC decision at Akhisar District, Kayalıoğlu town of Karayunt Location of 2989 parcel.
  - ✓ Kayalıoğlu Municipal Assembly decision could not be taken about selling the field which is the property of Kayalıoğlu Town to Solid Waste Association. Therefore, the ownership issue is being experienced.
  - ✓ EIA, Feasibility and Storage area design work has started.

- Special Provincial Administration, the Demirci, Selendi, Bridgehead County and District Municipal Association (Association President: Blacksmith Municipality)
  - ✓ Works in accordance with the Ministry of opinion on the involvement of Selendi Municipality to Kula Union and Demirci and Köprübaşı Municipalities to Salihli Union continues.

Excavation Wastes: Excavation wastes occurring across the province are disposed in the area which is indicated by Manisa Metropolitan Municipality.

Packaging Wastes: There are 17 packaging waste collection and sorting companies with license and permits registered in the database of Manisa, Ministry of Environment and Urban Planning Environmental Management General Directorate at Manisa.

Hazardous wastes: Some of the hazardous wastes generated in Manisa are sent to SÜREKO industrial waste disposal and recycling facility which is located in Sandal Municipality. There are also domestic waste landfills at the facility which are founded on 143 decare area with a capacity of 110,000 tons of waste.

And also there are 10 companies with a license to transport hazardous wastes across the province.

Waste Oils: There is 1 recycling company under the Regulation on Control of Waste Oil in Manisa.

Waste Batteries and Accumulators: There are 4 in the city center in Manisa, 1 in Akhisar, 7 in Alaşehir, 7 in Demirci ,1 in Gördes , 4 in Kırkağaç, 4 in Kula, 4 in Salihli and Sarıguhanlı, and 2 in Soma and Turgutlu waste battery collection machine and collected waste batteries are disposed by Portable battery Manufacturers and Exporters Association (TAP) .

Medical Wastes: All medical wastes in Manisa from all health institutions and organizations, doctors' offices including medical waste from home in the Manisa Municipality borders are collected separately without harming public health and the environment, are moved and sterilized under the scope of "The Regulation on Control of Medical Wastes". Medical wastes are collected and processed at Medical Waste Sterilization Plant which is built by Manisa Metropolitan Municipality at 2012 and then sterilized, This facility also serves to Izmir and at 2012 from Manisa 509,249 kg and from İzmir 3,518,592 kg medical waste was removed by sterilizing, Till at the end of July 2013 from Manisa 683,717 kg and from İzmir 3,859,445 kg medical waste was collected and removed by sterilizing,

Generated medical waste taken to the vehicles with dedicated staff and equipment and brought to a sterilization plant. Medical waste transported in red plastic bags that are resistant to puncture, explosion and transportation, sealed, double base produced and welded without bellows, at least 10 kg lifting capacity and with the labels on both sides written “International Biohazard" and "Attention Medical Waste". The wastes that has penetrating feature are collected in laminated plastic or cardboard box with the same characteristics that are resistant to puncture, tear, rupture and explosion, waterproof and sealed, opening and mixing is not possible and with the labels "International Biohazard" and "Attention! Cutting and Drilling Medical Waste “and then brought to the sterilization facility.

Medical wastes from health care institutions taken after they are weighed and "National Waste Transportation Form" or "Medical Waste Receipt" for medical waste is issued. For the collection and transportation of Medical waste, vehicles that are properly licensed according to "The Regulation on Medical Waste Control" should be used and there are two cars of Manisa Metropolitan Municipality that serves the collection of medical waste.

In case of insufficient capacity of medical devices for bulk waste in order not to create hazardous situation waste materials should be into cold storage and should be waited here to prevent the growth of microorganisms. Until it is to sterilize all medical waste should be kept under in cold storage.

In 2012, a total of 509,249 tons of medical waste has occurred; this number reached 950,375 tonnes in 2013 in Manisa.

5.5.2. Impact Assessment

Construction Phase

Liquid waste during the construction phase of the project are examined in detail at **5.1** section of the report, in this section only solid waste that will occur in the construction phase of the facility are evaluated.

- Domestic Solid Waste
- Excavation Waste
- Packaging Waste
- Waste Oils
- Hazardous Waste
- Medical
- Waste Batteries and Accumulators
- Worn out Tires

In the most intense construction work, it is calculated that at most 1.250 person will work at the same time. Assuming that daily domestic solid waste amount will be 1.27 kg / person-days[8], it is estimated to occur 1587.5 kg/day domestic solid waste during the most intense construction process of the project's work when 1.250 person at the same time.

Solid wastes include food waste, packaging waste (glass bottles, metal, paper, etc.). 30% of daily amount of domestic solid waste is constituted by packaging waste (Ministry of Environment and Urbanisation, Waste Management Action Plan, 2008-2012). Regarding this fact, in the construction phase of the project, the amount of packaging waste will be daily 476.25 kg. Properties and disposition of the specified waste are given in **Table 62**.

[8] *TUİK, Regional Statistics, Average amount of Municipal wastes ber person, 1,27 kg/day*

Table 62.Characteristics and Disposal Methods of wastes to be Generated During Construction Phase

Waste Type	Waste Code	Waste Source	Waste Management	Related Legislation	Disposal Method
Domestic Solid Waste	**20 03 01**	Non-hazardous solid waste that will be produced at the construction site	Domestic solid waste will be collected in sealed containers or in watertight containers and sent to the municipal landfill site.	-Regulation on Waste Management (04/02/2015 dated and 29 314 numbered Official Gazette)	Will be sent to Metropolitan Municipality Regular Landfill Storage and Disposal Facility.
Excavation Waste	**17 09 04**	Uncontaminated material to occur during excavation work (estimated as 400,000 m^3)	Stripped topsoil will be stored at the open storage area and will be reused for landscaping. Approximately 40 % of the excavated soil will be used as backfill	- Regulation on Waste Management (04.02.2015 dated and 29 314 numbered Official Gazette) - Regulation on Excavation, Construction and Demolition Waste Control (03.18.2014 dated and 25406 numbered Official Gazette)	Temporarily will be stored at the construction site. 25% of the excavated material will be used as backfill. The rest will be transferred to excavation warehouses/fields that are approved by the municipality.
Packaging Waste	**15 01 06**	Non-hazardous waste such as Plastic packaging, metal waste, glass, etc. at the construction site.	Recyclable waste (paper, plastic, glass and iron scrap, etc.) packaging waste will be collected in impermeable containers or in closed containers, separately from the municipal solid waste.	- Regulation on Waste Management 04.02.2015 dated and 29 314 numbered Official Gazette) - Regulation on Packaging Waste Control (24.08.2011 dated and 29 314 numbered Official Gazette)	They will be given to licensed recovery/collection separation-transport firms

Waste Type	Waste Code	Waste Source	Waste Management	Related Legislation	Disposal Method
Waste Oils	**13 01 10**	Waste oils caused from the repair and maintenance of construction equipment and construction machinery	Waste oil that is originated from machinery and equipment will be stored in sealed containers and mixing with soil will be prevented. Pursuant to the relevant regulations, analysis will be done according to provided parameters and they will be collected separately in sealed tanks. Waste oil storage tanks will be colored red and "waste oil" stickers will be found on tanks.	- Regulation on Waste Management (04.02.2015 dated and 28035 numbered Official Gazette) - Regulation on Control of Waste Oils (26 952 numbered and 30.07.2008 dated Official Gazette)	These wastes will be taken from the facility by special vehicles of carriers having license to transport hazardous waste license and will be sent to disposal / recycling facilities having environmental license.
Waste Vegetable Oils	**20 01 25**	Construction site vegetable oil wastes sourced from the food requirements of the employees	Waste Vegetable Oil will be stored separately from other waste in barrels that are sealed inside and outside and resistant to corrosion.	Regulation on Waste Management (04.02.2015 dated and 29 314 numbered Official Gazette)	Waste vegetable oils will be sent to a licensed waste vegetable oil recycling plant for recycling.
Hazardous Waste	**15 01 10**	Fuel, machinery equipment filters and wastes, chemical wastes, chemical waste or oil-contaminated wastes, pharmaceutical wastes, wasted machine parts, etc., contaminated excavation material.	It will be collected in the area reserved for temporary storage of hazardous waste.	Regulation on Waste Management (04.02.2015 dated and 29 314 numbered Official Gazette)	These wastes will be taken from the facility by special vehicles of carriers having license to transport hazardous waste license and will be sent to disposal / recycling facilities having environmental license
Medical Waste	**18 01 01** **18 01 03** **18 01 04**	Medical waste to be originated by the infirmary unit to be built at the construction site	Medical waste will be collected in a special sealed bag separately from other wastes.	- Regulation on Waste Management (04.02.2015 dated and 29 314 numbered Official Gazette) - Regulation on Control of Medical Waste (22.07.2005 dated and 25883 numbered Official Gazette)	It will be given to licensed medical waste disposal facility.

Waste Type	Waste Code	Waste Source	Waste Management	Related Legislation	Disposal Method
Waste Batteries and Accumulators	**16 06 01**	Waste batteries and accumulators on the equipment to be used during the construction phase	It will be collected in containers with the characteristics determined by the relevant regulatory provisions in the space reserved for temporary waste storage of waste batteries	- Regulation on Waste Management (04.02.2015 dated and 29 314 numbered Official Gazette) - Regulation on Control of Waste Batteries and Accumulators (31.08.2004 dated and 25569 numbered Official Gazette)	The waste batteries originated from the battery exchange process will be given to the companies that replace the batteries with charged ones. Waste batteries will be collected on the project site in the appropriate fields at waste battery boxes and battery waste will be sent to the recycling facilities having environmental license.
Worn-out Tires	**16 01 03**	It may result from work machines and tools used in construction.	They will be stored separately from other wastes.	- Regulation on Waste Management (02.04.2015 dated and 29 314 numbered Official Gazette) - Regulation on Control of End of Life Tires (25.11.2006 dated and 26357 numbered Official Gazette)	They will be submitted to the licensed recycling facility that has environmental permits with licensed vehicles.

Operation Phase

Medical waste generation during the operational phase of the project has come into prominence. Amount of medical waste that will be generated and amount of chemical that will be used will be explained in detail in this section.

- General Waste
- Packaging Waste
- Medical Waste
  - Infectious Waste
  - Pathological waste,
  - Stab Waste
- Hazardous Waste
  - Hazardous Chemicals
  - Cytotoxic and cytostatic medicines
  - Amalgam Waste
  - Genotoxic and cytotoxic waste
  - Pharmaceutical Waste
  - Heavy Metal Containing Waste
  - Pressure Vessels
- Radioactive Waste

Within the framework of Waste Management Action Plan (2008-2012) prepared by Ministry of Environment and Forests, physical composition distribution of the total amount of solid waste generated by public and private hospitals was studied. At public hospitals, it has been determined that 1.92 kg of it is daily medical waste, 0.38 kg of it domestic waste and 0.09 kg of it recyclable wastes. In private hospitals, it has been determined that 4.34 kg waste is generated daily; 2.01 kg of it is daily medical waste, 1.35 kg of it domestic waste and 0.98 kg of it recyclable wastes. Distributions of medical wastes per health departments in Turkey are given in **Table 63**.

Table 63.Medical Waste Amount generated in Turkey (kg / bed / day)

Health Unit	Solid Waste for bedside (kg / bed-days)		
	Medical	Domestic	Recyclable
Public Hospitals	1.92	0.38	0.09
Private Hospitals	2.01	1.35	0.98

Other statistical indicators compiled by the Ministry of Health relating to medical wastes are given in **Table 64** and **Table 65.**

Table 64.Medical Waste Generation by Source Size

Source	Daily Waste Production (kg / bed) *
University Hospital	4.10-8.7
General Hospital	2.10-4.2
Regional Hospital	0.50-1.8
Primary Health Center	0.05-0.2

** Data for high-income countries*
Source: Economopoulos (1993)

Table 65.Medical Waste Production by Number of Beds

Number of beds	Daily Waste Production (kg / bed)
<100	2.59
100-299	4.7
300-499	5.67
>500	5.83
Average	4.18

Source: W.A.Rutala. 1989. Infectious Waste Management:

While estimated medical waste amount is calculated for operation phase under the scope of the project. Key for years in between 2008 and 2012 have been regarded. Therefore medical waste has been calculated as 1.97 kg/bed-day by taking the average of amount of medical wastes given for public and private hospitals.

According to this assumption, it is foreseen that:

1.97 kg / bed-days x 558 bed = 1099.26 kg / day = 1.1 tonnes of medical waste will be originated at the operation phase of the project.

If is envisaged that the most important type of waste which will emerge during operation phase of the Project will be medical wastes. Medical wastes will be sent to Medical Waste Sterilization Facility. Facility owns the certificate in accordance with *"The Regulation of Control of Medical Wastes"* and its capacity is good enough. There is no specific EU Regulations as *"The Regulation of Control of Medical Wastes"* which is available in Turkey. So there are no special EU Guides related with permissions of sterilization of medical wastes.

Properties and disposal methods of wastes that will be originated during the operational phase of the Project are presented in **Table 66.**

Table 66.Characteristics and Disposal Methods of Wastes to be Generated During Operation Phase

Waste Type		Waste Code	Waste Source	Waste Management	Related Legislation	Disposal Method
General Waste		**20 03 01**	Places that healthy persons live. Sections for non-patient examination. First aid areas. Administrative offices.housekeeping.kitchen. warehouses and waste from workshops	Collected in closed and impermeable containers or vessels and will be sent to regular municipal waste landfill site.	- Regulation on Waste Management	Will be sent to landfill disposal property by Manisa Metropolitan Municipality.
Packaging Waste		**15 01 01** **15 01 02** **15 01 04** **15 01 05** **15 01 06** **15 01 07**	Reused.recycled waste (such as paper. cardboard. paperboard. plastic. glass. metal. etc.) originated from all administrative offices.kitchen.warehouse. workshop	recyclable packaging waste will be separated from other wastes and will be collected in separate closed containers or impermeable container.	- Regulation on Waste Management - Regulation on Packaging Waste Control	They will be given to licensed recovery / collection separation-transportation firms
Medical Waste	**Infectious Waste**	**18 01 03** **18 02 02**	Wastes that require special handling and disposal practices to prevent the transmission of infectious agents: Major sources; Microbiological laboratory waste (Culture and inventories. infectious body fluids. serological waste and other contaminated laboratory waste. etc.). Blood-blood products and contaminated with these objects.used surgical clothes (fabric. gown and gloves etc.). Dialysis waste (waste water and equipment).quarantine waste.air filters.including bacteria and viruses.infected laboratory animal carcasses.body parts.blood and all objects that come into contact with them.	Before being sent to the sterilization facilities.they will be stored safely and temporarily without harming the environment and human health in a refrigerated storage at +4 ° C. They will be stored in yellow or red bags and containers marked with the international infection symbol.	- Regulation on Waste Management - Regulation on Control of Medical Waste	It will be sent to the licensed sterilization property by licensed transport for sterilization process in order to make them harmless.

Waste Type		Waste Code	Waste Source	Waste Management	Related Legislation	Disposal Method
	Pathological Waste	**18 01 02**	Anatomical waste tissues.organs and body parts and body fluids generated during surgery.autopsy. and medical interventions: - body parts..organic parts.placenta.cut limbs and so on originating from places such as forensics. Operating rooms.mortuary.autopsy. (human pathological wastes) - Guinea pig carcasses used in biological experiments	Pathological wastes will be sent to a licensed facility for disposal by incineration.	-Regulation on Waste Management - Regulation on Control of Medical Waste	It will be sent to a licensed disposal companies with licensed vehicles.
	Stab Waste	**18 01 01** **18 02 01**	Wastes that may cause abrasions and puncture wounds: - Injector needle. - Other cutter with needle - Scalpel - Lam-lamellae - Glass Pasteur pipette - Broken glass.etc. other.	Separately from other medical wastes.they must be collected in tear.rupture and explosion-proof.waterproof and leak proof containers of which opening and mixing is not possible and which is made of plastic or laminated cardboard box that have "International Biohazard" and "CAUTION! Cutting and drilling MEDICAL WASTE “sticker.These storage containers must be filled at most ¾.their mouth must be closed and must be put in red plastic bag. After penetrating waste containers are full.they must not be pinched.opened.recycled and will not be discharged. Medical waste bags and penetrating waste containers will be replaced by new ones immediately when ¾ full.New bags and containers must be ready for use at the source or nearest waste.	-Regulation on Waste Management - Regulation on Control of Medical Waste	After being subjected to sterilization process they will be sent to the sterilization facility with a licensed transport vehicle license in order to make them harmless.

Waste Type	Waste Code	Waste Source	Waste Management	Related Legislation	Disposal Method
Hazardous Wastes	**18 01 06** **18 01 08** **18 01 10** **18 02 05** **18 02 07**	Wastes to be subjected to special treatment due to theirs physical or chemical properties or due to specific legal reasons for the waste processing - Hazardous chemicals - Cytotoxic and cytostatic drugs - Amalgam waste - Genotoxic and cytotoxic waste - Pharmaceutical waste - Waste containing heavy metals - Pressure vessels	Genotoxic waste.pharmaceutical waste.waste containing heavy metals.chemical waste and pressure vessels are collected separately from other waste.	-Regulation on Waste Management	They will be taken by carriers that have license to transport hazardous wastes and will be sent to environmental licensed disposal / recycling facilities.
Radioactive Waste	**-**	Radioactive waste is removed according to national legislation and the international Atomic Energy Agency Manual regulations.	Will be stored in the lead box that has symbol of radioactive waste mark on it.	- IAEA (2003) - IAEA Draft Safety Guide - Management of Radioactive Waste	It will be sent to a licensed disposal company with licensed vehicles by taking necessary precautions. The necessary precautions are described at below.

It is necessary to comply with the provisions of *the "The Regulation on the Waste Produced from Use of Radioactive Materials"* about radioactive wastes and other wastes which are contaminated by radioactive waste during the operation phase. Fulfilment of these provisions will be provided in the operational phase.

Following points must be fulfilled before radioactive solid waste being sent to disposal facilities;

- Waste collection container is marked with radiation warning signs and if necessary. Depending on the type and energy of the radiation emitted by the radioactive substance used is shielded with a suitable material.
- Non-radioactive wastes are not put into the radioactive waste containers.
- When plastic bag that is inserted in the storage container is filled. Its mouth is firmly fixed and a label is fixed. These bags in holding tanks are transported to Long-term radioactive waste storage that has been approved by the Authority.
- Hazardous chemicals or other toxic substances cannot be mixed in to radioactive waste. However for inevitable mixing of these substances. Information about these mixtures is mentioned over the labels.
- Solid radioactive waste is suspended in radioactive waste holding tank until activity values fall into limit values specified in the regulations.
- Solid waste bags which are waited will be placed in 150 microns thick and red plastic bags which are resistant to break and puncture. On these bags. "International Clinical Waste" note which can be seen on both sides must be found. These wastes are not installed on the same vehicle with domestic wastes.
- Accumulated waited bagged solid wastes of which necessary radiation measurements have been done are considered as medical wastes and are disposed in accordance The Regulation on Medical Waste Control.

In order radioactive liquid wastes to be fed into the sewage system. The following matters must be fulfilled:

- Liquid wastes are diluted with water according to the limits specified in the Regulations and they are released from a sink with no (T) elbow to the sewage system. A standard radioactive sign mentioned in Regulation on Radiation Safety is fitted over this sink. Non-radioactive work is not carried out in this basin.
- Liquid waste which contain radioactivity exceeding the limits specified in the Regulations are waited in waste holding systems of which the location and capacity projects are approved by Turkey Atomic Energy Agency then they are released into the sewage system within the limits laid down in these regulations.
- All radioisotopes in the liquid to be discharged to the sewer system must be soluble in water and dispersible. If there are insoluble solid particles in the liquid. They must be filtered before being released to the sewer. Materials used in filtration are treated as solid waste.
- Acidic solution containing radioisotopes are neutralized before being released into the sewage system.
- If the liquid containing radioactivity to be released into the sewer system contains toxic substances or other chemicals then permission is taken by the certificate owner from authorities according to "*Environmental Law*" and relevant legislation before being released into the sewage system.

The type, activity, dose rate, amounts and release dates of solid wastes and liquid wastes to be released to the sewage system after being held should be recorded and kept according to Regulation on Radiation Safety. For wastes containing a higher proportion of radioactivity from the limit values specified in the Regulation. Application will be made to TAEK.

Cumulative Effects

How the domestic wastes emerged from schools and residences located in the near environment of the Project area are currently disposed. Domestic wastes which will emerge during construction and operation phase of the planned hospital will be disposed in the same manner. In addition to this, medical wastes emerged from current health institutions in the county are sent to medical waste sterilization facility. So medical wastes to be emerged from planned hospital will also be sent to the same sterilization facility and will be disposed here.

Capacity of the medical waste sterilization facility is 32 ton/day and its capacity is sufficient to meet disposal of medical wastes emerged from planned hospital.

5.5.3. Mitigation Measures

Waste management specified in the guidelines IFC Health Care Facilities for wastes to be generated during construction and operation phases will be followed. Wastes that will be generated during the construction and operation phase of hospital will be collected, stored and disposed in accordance with national and international standards. "*Waste Management Plan"* will be prepared in this regard. For the prevention of soil contamination originating from the project. Measures mentioned in **Section 5.2** will be followed.

Management of Hazardous Chemicals

For fuels and chemical containing materials that will be used in the project construction and operation phases. Hazardous Materials Management Plan will be prepared and will be developed under the scope of transportation and storage in conformance with international standards and national regulations for transport and storage of the scope. Including the safety precautions.

During the construction and operation phases of the project:

- Refuelling operations will be performed over the concrete floor in sealed impermeable area. Storage of needed fuel oil etc. hazardous substances will be made in proper sized watertight tanks allowing leak detection.
- Storage of fuel and chemicals will be made over the concrete floor that is protected against the adverse weather conditions and floods.
- In case of spills and leaks, emergency action will be taken and absorbing kit and sawdust will be available in order to collect the spills and leakage.
- Transportation storage and disposal of dangerous substances will be managed in accordance with the manufacturer's instructions.

Construction Phase

Excavation waste that will be generated during construction activities will be disposed properly in accordance with the Excavation. Construction and Demolition Waste Control Regulation. In case of contamination of soil the proper management and disposal will be provided in accordance with Soil Pollution Control and Point Source Contaminated Sites Regulation.

Domestic liquid wastes which are generated during the project phase will be disposed directly to the provincial sewer system. Required protocol will be made with the Municipality for this activity.

Mitigation measures during the construction phase of the project are given below:

- During the storage, transport and disposal of the wastes all kinds of measures will be taken against leaks and spills and storage will be made in an area where there are barriers against leakage.
- All of recyclable wastes will also be stored and will be sent to landfills.
- Construction machinery and equipment sourced waste oils will be stored in impermeable and sealed containers and will be sent to a licensed disposal facility to be disposed.
- During temporary storage of waste temporary storage times of wastes of which maximum storage period have been specified will be monitored by the Environmental Officer Registration Statement and wastes will be shipped before the end of this specified period.
- Hazardous waste will be stored temporarily in a safe manner sealed containers and over concrete floors in accordance with the standards specified in the relevant regulations. Dates, name, code, quantity, storage date of hazardous wastes will be recorded at the Delivery date Registration Table by the administration.
- The doors of hazardous waste landfills will be kept constantly locked and only authorized people will be allowed to enter. At the warehouse space entry. "Warning! Hazardous Waste Temporary Storage Area" and "Dangerous" signs will be placed.
- National Waste Transportation Form will be held during the transportation of hazardous waste.
- Waste notification will be made Manisa Provincial Directorate of Environment and Urban Planning at regular intervals.
- Documents relating to the waste will be kept for five years and will be declared to the relevant authorities during inspections.
- Storage transport and disposal of the waste will be made in accordance with the provisions laid down in the national and international legislation and will be conducted in accordance with best practices.
- Emergency equipment will be ready for use in the field.

Operation Phase

Wastes arising from operating activities are classified separately in **Table 66** and disposal methods of them are indicated.

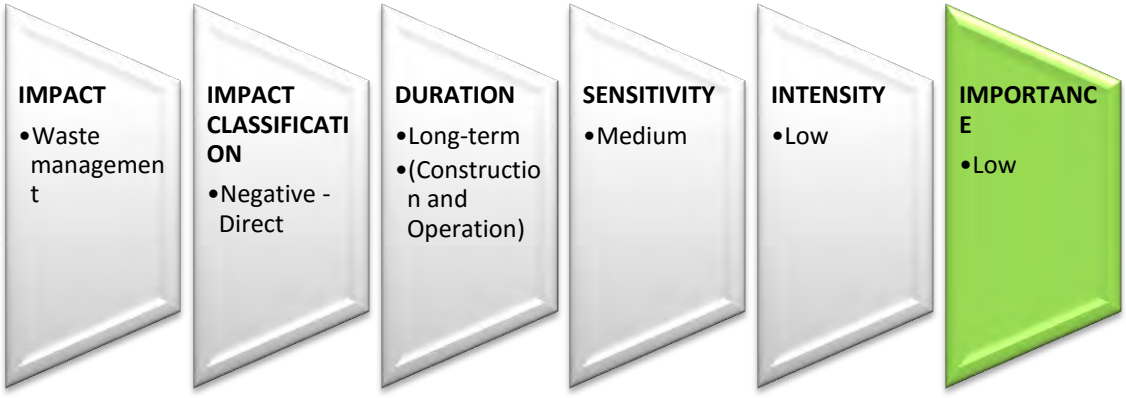
Waste that will arise during the operational phase will be moved to the temporary storage area regarding their types. In health care facilities waste to be stored in temporary storage sites will not be in the parts of hospital which are intensely used by patients and people .In order to avoid accidents that may occur in the waste handling process. Waste management provisions will be followed and additional required measures will be taken.

There will be neutralisation tank for laboratory waste water and bloody waste waters and a decay tank system for radioactivity recovery.

Waste that will occur during the operational phase will be stored in separate areas according to their class in accordance with national and international regulations.

5.5.4. Residual Impacts

In case the above-mentioned measures about wastes are taken in the project area and Waste Management is effectively conducted. The effects stemming from the project are expected to be insignificant.



5.6. Ecology

In this section, information about existing ecosystem characteristics of the project area. Studies to identify flora and fauna species and habitat are given. Spring and summer field studies were carried out by biologist Hazal TONGUÇ for determination of the existing ecosystem structure and biodiversity in the project area. During the field study habitat type has been observed species sampling / recording has been performed and interviews with employees have been conducted.

The project area is located in the city center. The project area and the surrounding natural ecosystem structure has already been exposed to human influence.

Since the terrain has no significance due to ecological point of view and biological diversity. There is no need to follow the following performance criteria:

- **PR6:**Biodiversity Conservation and Sustainable Management of Living Natural Resources
- **PS 6:**Biodiversity Conservation and Sustainable Management of Living Natural Resources

5.7. Social and Economic Characteristics

In this section, social and economic characteristics of the project area, the effects of the project on these characteristics and employment are presented. Considering titles given as IFC "Addressing the Social Dimensions of Private Sector Projects -Table 1"Good Practice Note: Social and economic characteristics of the project have been detailed under this title.

Data Collection and Assessment

Social and economic assessments made in the scope of Manisa Training and Research Hospital Project is classified in 3 steps.

- The provision and interpretation of statistical data of Official Institutions.
- Survey which is made to local community and its assessment.
- Social Impact Assessment

It was benefited from publications and statistical data of several official institutions in order to determine social and economic characteristics of project area province, district, locals. Data which will represent locals was used and assessments were made during this process. Some institutions and organizations from which data was provided are as follows:

- Manisa Governorship
- Provincial Directorate of Health
- Provincial Directorate of Environment and Urbanisation
- Directorate of Public Health
- Şehzadeler Sub-governorship
- Manisa Metropolitan Municipality
- Şehzadeler Municipality
- Manisa Provincial Secretariat of General Public Hospitals Union
- Provincial Directorate of Social Security Institution
- Turkey Statistical Institute

Assessments are given in **Section 5.7.1** under titles.

In order to inform and enlighten the regional public under the scope of Manisa Training and Research Hospital Project Public Participation Meeting has been held in MEB Manisa Teachers' House and ASO Conference Hall at 31.08.2015In this meeting. Project has been introduced and information has been given about ÇSED Report and the process. Besides, an optional questionnaire has been filled out by participants and results have been evaluated.

8 women and 3 men, total 11 people have participated in questionnaire. Age intervals of participants are 53 and 23 and one person has not answered to the question about his/her age. Age groups of participants are given in **Figure 50**.

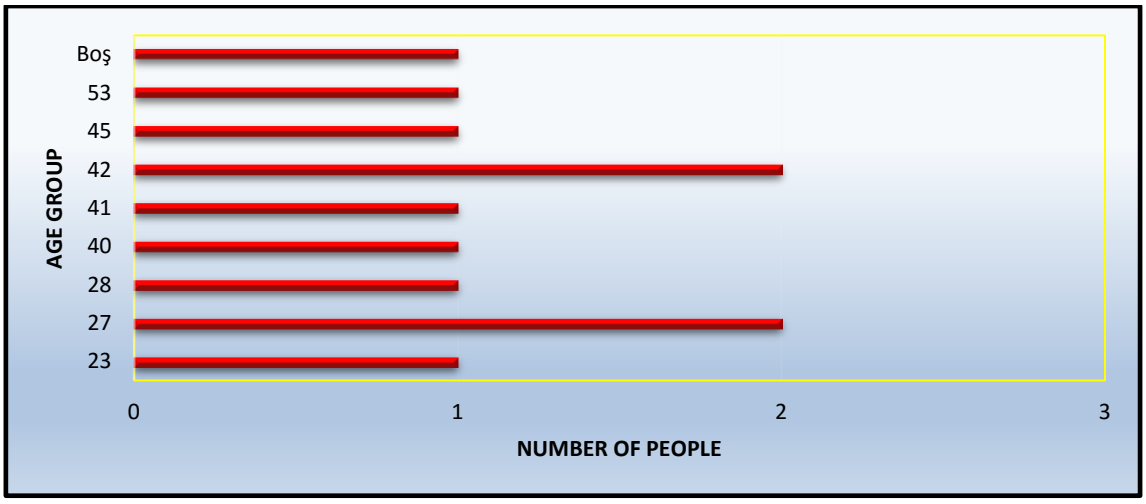


Figure 50. Age Range of Participants

According to the results of the survey, educational levels, occupations, employment situations of participants are shown in following graphics (**See Figure 51**).

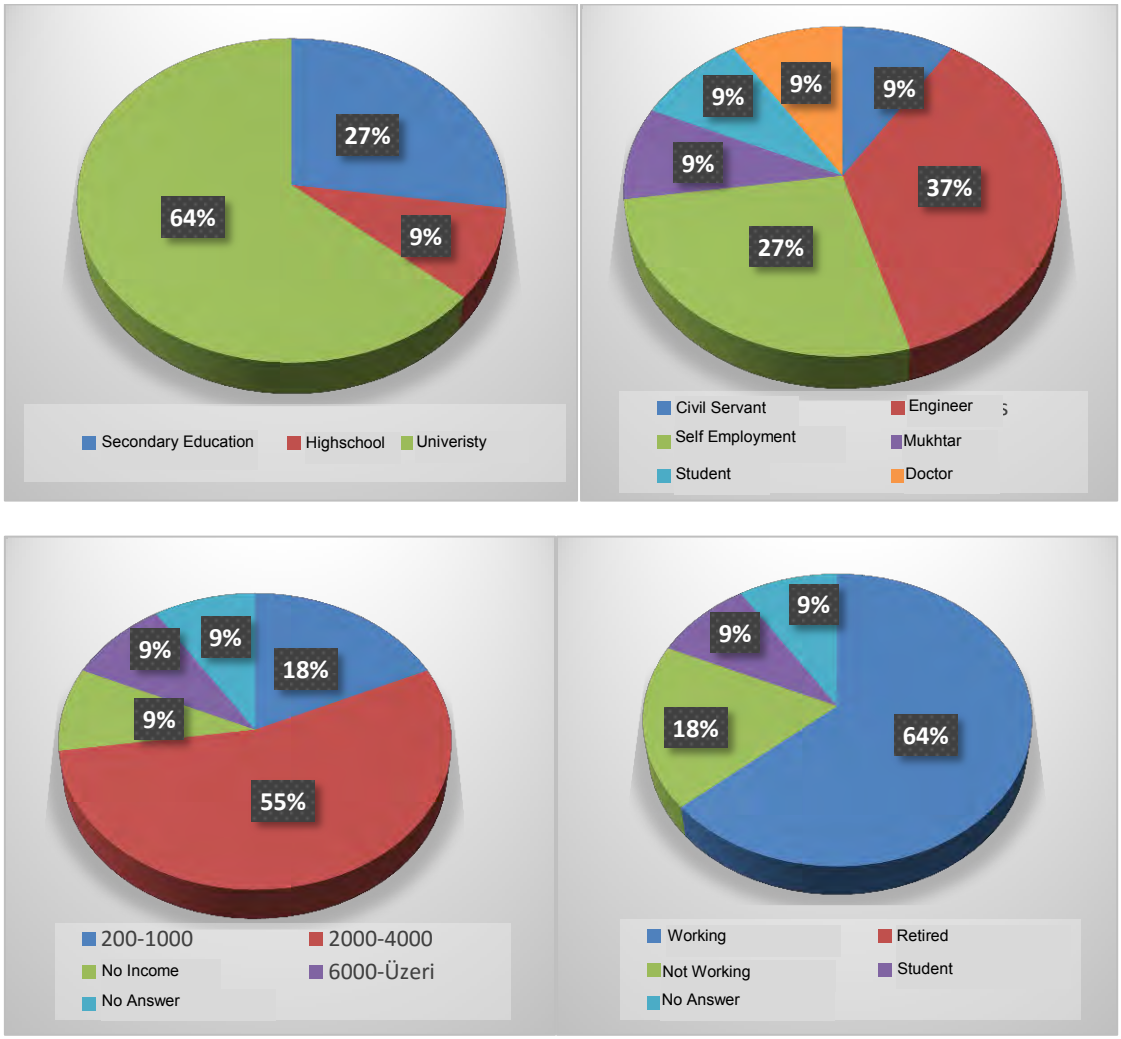


Figure 51. Education, Employment and Income Situations of Participants

Most of the participants of the questionnaire lives in Şehzadeler (6 person).Yunusemre (4 person) and Akhisar (1 person) counties.

Participants have been asked whether they or any of their family members suffer from chronic health problem (s) or not. Whenever the questionnaire results have been examined.it has been seen that 91 % of the participants and their families do not suffer from such a health problem.

According to the results of the questionnaire, social security of most of the participants is Social Security Institution (SGK). There is one person insured from foreign country and 1 person has not answered to this question.

Households with %72.7 have not faced with a health problem within the last 1 year but 18.2 % of them have suffered herniated disc problems and spinal cord problems. Besides it has been understood that 82 % of the participants have not suffered from epidemy within the last 1 year.

36 % of the participants have regular health controls. In case of health problems it has been understood that they apply generally at Public Hospitals and they also apply at family practice, private and university hospitals.

The nearest health institutions for the participants are generally family practices. Except family practices public hospitals health centers university hospitals and private hospitals are also close to these participants. Whenever hospitals which are preferred in health problems are compared it has been seen that distance is not the major preference reason. Reason of this is that patients and their relatives prefer reliable and big hospitals.

Satisfaction of participants for the health facilities located in the region has been analyzed and results are given in detail in the following graphics (**Please refer to Figure 52** and **Figure 53).**

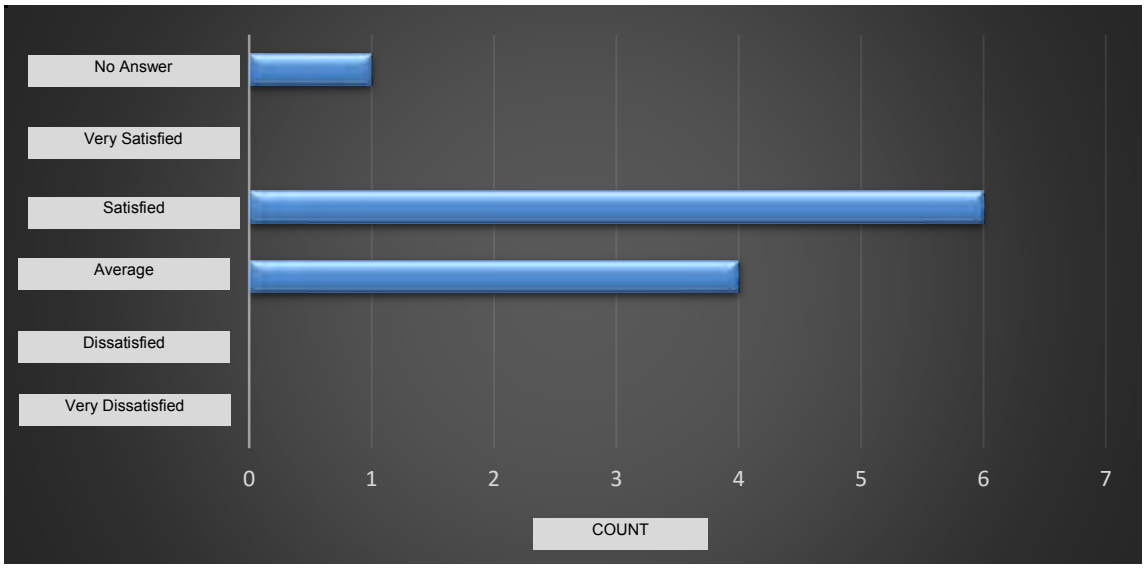


Figure 52.Satisfaction Status

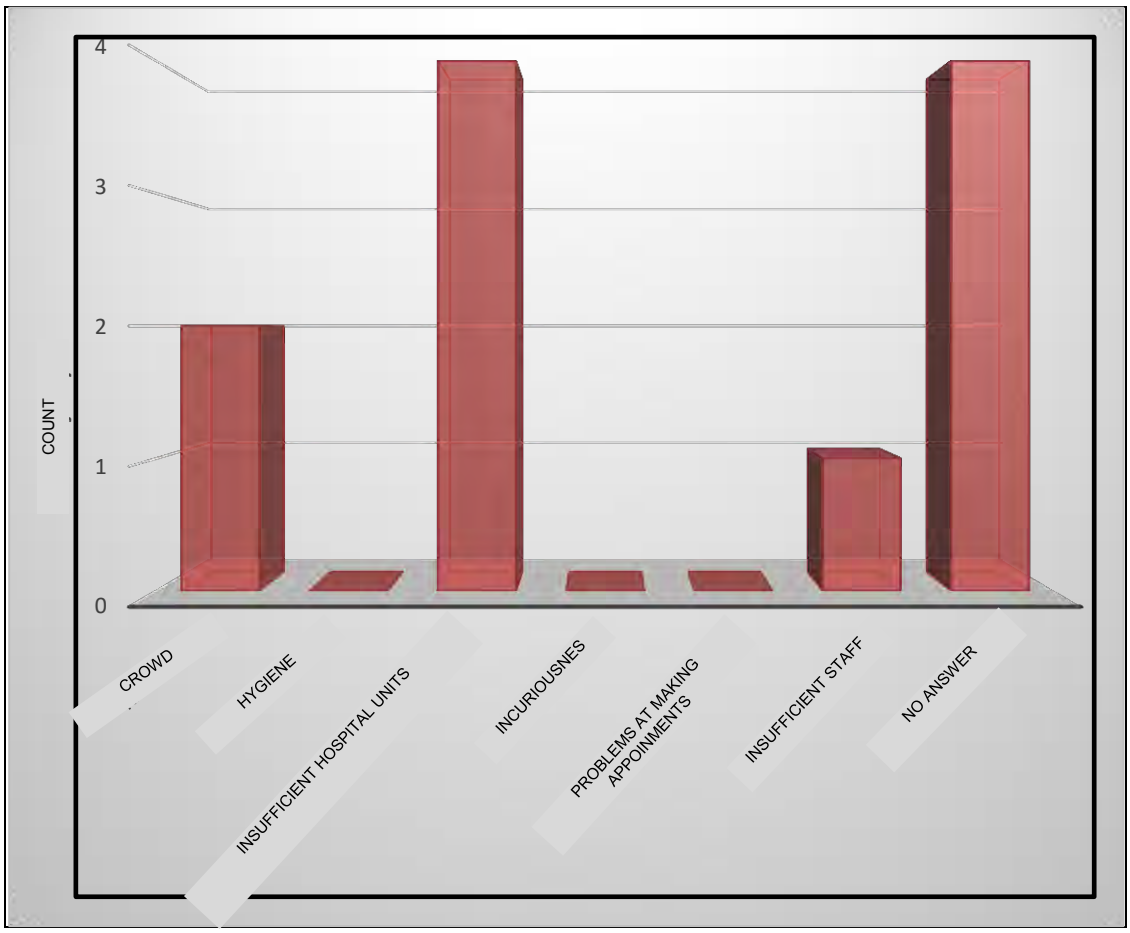


Figure 53. Satisfaction Performance Graphics

Even though 36% of those who benefit from health services are satisfied from the health units the main reason for dissatisfaction is the inadequacy of hospital units. Among other reasons problems such as the inadequacy of staff and crowdness of hospital units are the reasons for dissatisfaction.

When the choice of private and public hospital is examined it showed that 82 % of respondents prefer public health units because there is no extra fee. 9% of the participants prefer private health units due to faster treatment process.

As the survey results are analyzed. Participants of 55% found the health units in the region as insufficient. Participants stated that they need more comprehensive hospitals. There is no fully equipped health unit and the existing ones are not adequate.

The opinions of participants about health centres are specified below:

- Service quality will increase together with increase in numbers of hospitals.
- Health units are essential for our life.
- Renovations are essential for the province.
- There is a lack of fully equipped hospitals in the region.
- Numbers of high quality doctors should increase in hospitals.
- More clean and hygienic health units are required.
- Hospitals should be located at places having easy access.

Participants' opinions about Manisa Training and Research Hospital were asked. 10 out of 11 people participated in the survey indicated that they want this facility. 1 people did not answer the question.

Most common answer taken among participants requesting Manisa Training and Research Hospital to be established is that; this project will provide contribution to the region. Service quality will increase and the region requires a fully equipped hospital.

It has been understood that half of the participant are aware of the planned hospital. They have stated that they have learned about this project from press, Mukhtars, bodies at which they work and from their social environment.

Opinions of participants about benefits provided by Manisa Training and Research Hospital for whole Manisa Province have been asked and the following answers have been given:

- Service will come near to the citizens by this planned hospital.
- Load over other hospitals will decrease.
- It is a required project to continue development in health area.
- It will answer to the requirements of increasing population.
- High quality services will be provided.
- Demand for hospitals located out of the province will decrease.
- A significant contribution will be provided for economy of the province.
- Services will be received from hospital building having much better physical conditions.
- Transportation chances will increase.

In addition to mentioned works, social impact evaluation studies have been performed by Prof. Dr. Suavi Aydın from Hacettepe University Communication Faculty under the scope of ÇSED studies. Under this scope, social researches have been executed by neighbourhood mukhtars of Şehzadeler District. Photos shoot during these interviews are given in **Picture 2**.

Picture 2. Photos Shoot During Interviews Made under the scope of Social Influence Evaluation Studies

Social Domain

While determining the social domain of project sensitive structures living quarters, facilities etc. were taken into account. Besides traffic load caused by Project was also taken into consideration. The districts bordering the project site are Adnan Menderes. Ahmet Bedevi Akpınar, Kazım Karabekir, Nurlupınar ve Turgut Özal. Mentioned social facilities sensitive structures residential area and public institutions are located within the borders of these neighbourhoods. Schools and public facilities which are located around the project area are as follows:

- Contemporary cemetery of Metropolitan Municipality which is located at West and north-west of the Project area
- Municipality site are which is located at West and South-east of the Project area
- Cylinder depot area which is located at East of the Project area
- TOKİ residences which are located approximately at 80 meter North-east of the Project area
- Gediz Primary School. Gediz Secondary School and Manisa Research and Guidance Center which are located at North of the Project area

Satellite image of structures mentioned above is given **Figure 54**. In addition to this while specifying social domain; about 15 neighbourhoods which are approx. 6 km diameters of Şehzadeler District and neighbourhoods which are 3 km diameter of the social domain impact area are shown in **Figure 55**. Neighbourhoods which are 3

diameters of project area are given in Figure 57 Having looked at distribution of neighbourhoods it is seen that settlements in the north and west of planned project shift to the center of Manisa metropolitan area and Şehzadeler metropolitan District.

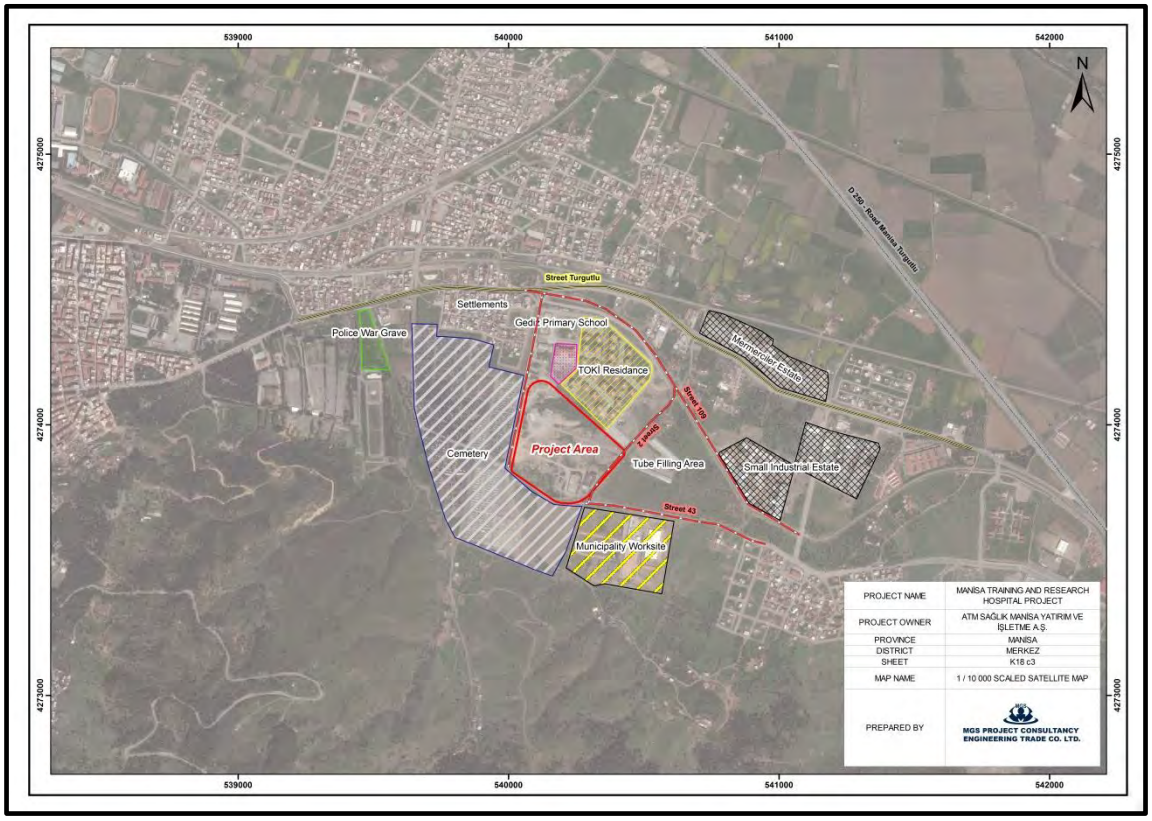


Figure 54. Satellite Image of Project Area and Nearby Structures

Figure 55. Neighbourhoods in the Project Area

Information about Institutions Located in Social Domain and Facilities

It is located in the boundary of Asri Cemetery, Adnan Menderes District of Manisa Metropolitan Municipality. Cemetery has been located over approximately 300,000 m^2 surface area.

Municipal site is located at south-eastern of Project area. Site which is located over approximately 90,000 m^2surface area will be removed whenever the Project is commissioned. Depot Area which is located at eastern of the Project area has a 19,000 m^2surface area.

TOKİ residences region is inside Adnan Menderes Neighbourhood borders. In this region there are 724 residences. Inside TOKİ residential area, Adnan Menderes Sports Facility construction is continued. Distance of TOKİ residences to the Project area is 70 meter. Distances of other residences located at northwest of the area are in between 250 meter and 380 meter.

There is a primary school, a pre-school and a Research and Guidance Center located at the North of Project are. Gediz Primary School and Gediz Secondary School are located within the same campus and Research and Guidance Center is located to the adjacent of the primary school and at northern side of the school. There are 20 classrooms.441 students and 21 teachers available in Gediz Primary School. There are 20 classrooms. 591 students and 30 teachers are available at Gediz Secondary School.

Residential units located at North of Project area have urban qualification and they have complete substructure facilities such as potable water, transportation and sewage system. However this newly developed residential area is out of traditional downtown of Manisa Province and out of natural development area extending through West and represents expansion of the province through east. Development through east is new for Manisa and TOKİ residences are the densest residences located over this new residential development. Starting from the end of these residences, there are few residential areas and there are forests.

Residential Areas (Neighbourhoods)

There are 65 neighbourhoods in total in Şehzadeler metropolitan area. 31 of these neighbourhoods are former village residences which have kept their rural qualification and they have become neighbourhoods after 2012 dated and 6360 numbered Code. There are 6 neighbourhoods located inside the related diameter forming the impact area of Manisa Training and Research Hospital project. These neighbourhoods are in alphabetical order; Adnan Menderes, Ahmet Bedevi Akpınar, Kazım Karabekir, Nurlupınar and Turgut Özal neighbourhoods.

Soci-economic and demographic status of urban areas are similar to parameters of metropolitan area of Şehzadeler County. While two of these neighbourhoods are extension of former downtown others are relatively new neighbourhoods which have been developed around Manisa-Turgutlu Highway and Manisa-Turgutlu railway. For this reason they have been developed mostly by immigrants from other locations. Population of these neighbourhoods is high. Population increase rate of these neighbourhoods is over Manisa average and under Turkey's average (**Please refer to Table 67**). If ever this demographic development tendency continues the same, since spatial potential of Şehzade County and related neighbourhoods are more proper compared to other counties and neighborhoods. They will have 1/3 of metropolitan population of Manisa.

Table 67.Annual Change of Population

Neighbourhood	Years		Change in population (%)		
	2014	2013	Neighbourhoods	Manisa(Province)	Turkey
Adnan Menderes	4,710	4,628	+1.77		
Ahmet Bedevi	4,452	4,369	+1.90		
Akpınar	6,417	6,300	+1.85		
Kazım Karabekir	6,058	5,941	+1.96		
Nurlupınar	2,376	2,333	+1.84		
Turgut Özal	3,948	3,912	+0.92		
Total	***27,961***	***27,483***	***+1.74***	***+0.62***	***+2.73***

Manisa is an important industrial province and industrial regions are located at the west and north of the province. Under these circumstances most proper residential areas are located at east of the province. As a result it is forecasted that mentioned neighbourhoods will be significantly developed.

Regarding that these neighbourhoods which continue to have immigrants are integrated with the province and regarding that current development status will change in favour of construction servitude (increasing floor permissions at zoning plans).this foresight is getting stronger. The most significant problem of residents of these neighbourhoods is this development plan (in present case. 2 and 2.5 floor is allowed. Expectation is that this will be increased up to 4 and even up to 6 floors. This expectation is getting stronger since TOKİ residences have 6+7 construction servitude).

In these neighbourhoods which are located within the social impact area mostly people who have comes from eastern provinces live. The oldest neighbourhood which has been integrated with the province is Nurlupınar Neighbourhood. Initial residents of this neighbourhood have come from Kütahya Province. So the neighbourhood is also named as *"Kütahya Residents Neighbourhood".* Late people from Kars, Balıkesir and Afyonkarahisar have come to this neighbourhood.

Origins of residents of Adnan Menderes Neighbourhood are east and South-eastern provinces.

There is a more complex population structure at Akpınar and Ahmet Bedevi neighbourhoods and there are people who have come from west of Turkey (mostly from Balıkesir and Kütahya) and from east of Turkey (mostly from Bitlis, Muş, Erzurum and Kars).

Residents of Kazım Karabekir Neighbourhood have mostly come from Erzurum, Diyarbakır, Mardin and Bitlis provinces.

5.7.1. Baseline

i. Population

According to the results of "Address Based Population Registration System in 2014" performed by TSI the total population in Turkey is 77,695,904. Total population consists of 50.2 % male and 49.8% female.

The population of Şehzadeler where the project planned is 156,445. (**See Table 68)**

Table 68. Population Information about Manisa Districts (2009-2014)

Districts	Year					
	2015	2014	2013	2012	2011	2010
Şehzadeler*	***156.445***	***166,443***	***164,649***	**-**	**-**	**-**

**Şehzadeler and district has gained district status when Central County is split into two upon 6360 numbered code which has been accepted by Grand National Assembly of Turkey as of November 12. 2012. So there are no population data of the mentioned districts before 2012.*
Source: http://tuikapp.tuik.gov.tr/adnksdagitapp/adnks.zul

The population change chart of Şehzadeler District in between 2010 and 2015 is given in **Figure 56**.

Figure 56. Population Distribution Graph of Şehzadeler District

As can be seen from graphic shown in **Figure 56,** population of Şehzadeler District has decreased in 2013-2014 period and increased in 2014-2015

2014 population of Şehzadeler County over which the Project has been planned is 166,443 and 50.6 % of the population is men (84,274 person) and 49.4 % of the population is women (82.169 person). Population data of neighbourhoods of Şehzadeler County for 2014 is given in **Table 69**.

Table 69. Population Information about the Neighbourhoods of Şehzadeler (2014)

Neighbourhood Name	Population	Neighbourhood Name	Population
Adakale	3767	Kırançiftliği	77
Adnan Menderes	4,710	Kocatepe	1,868
Ahmet Bedevi	4,452	Kuşlubahçe	3,495
Akıncılar	3,264	Mimarsinan	4,022
Akpınar	6,417	Nişancıpaşa	3,485
Alaybey	9,323	Nurlupınar	2,376
Arda	4,943	Peker	7,483
Aşağıçobanisa	2,825	Sakarya	5,219
Ayvacık	105	Sancaklıbozköy	2,056
Bayındırlık	3,144	Sancaklıçeşmebaşı	229
Belenyenice	206	Sancaklıiğdecik	1,023
Çamköy	153	Sancaklıkayadibi	118
Çarşı	1,628	Sancaklıuzunçınar	136
Çavuşoğlu	455	Sarıalan	222
Çınarlıkuyu	1,354	Saruhan	2,762
Dere	1,590	Selimşahlar	1,922
Dilşikar	5,353	Şehitler	10,329
Dinçer	3,058	Tekeliler	122
Ege	4,945	Tepecik	305
Gediz	1,419	Tilkisüleymaniye	499
Göktaşlı	3,909	Tunca	3,329
Güzelköy	200	Turgut Özal	3,948
Hacıhaliller	1,156	Utku	2,946
Halıtlı	527	Veziroğlu	320

Neighbourhood Name	Population	Neighbourhood Name	Population
Hamzabeyli	730	Yarhasanlar	10,303
İbrahimçelebi	3,396	Yeniharmandalı	329
İshakçelebı	2,301	Yeniköy	1,168
Kağan	283	Yenimahmudiye	86
Kalemli	361	Yeşilköy	734
Karaağaçlı	2,232	***Yukarıçobanisa***	***433***
Karaoğlanlı	1,910	1,Anafartalar	3,112
Karayenice	450	2,Anafartalar	5,363
Kazım Karabekir	6,058		

The majority of the population of Şehzadeler district is in between 30-34 years old (14,665 people). The number of the people between 15-19 years old is 14,358, between 35-39 years old is 13,689 and between 20-2 years old is 13,501 (**See Table 70** and **Figure 57**).

Table 70.The Distribution of Şehzadeler District Population According to Age Groups (2014)

Age Group	Total Population	Male	Female
0-4	12,539	6,382	6,157
10-14	11,723	6,117	5,606
15-19	12,768	6,611	6,157
20-24	13,501	7,097	6,404
25-29	***14,358***	***7,601***	***6,757***
30-34	***14,665***	***7,670***	***6,995***
35-39	***13,689***	***7,153***	***6,536***
40-44	12,033	6,060	5,973
45-49	10,641	5,466	5,175
50-54	10,545	5,318	5,227
55-59	8,491	4,291	4,200
60-64	7,053	3,390	3,663
65-69	5,255	2,388	2,867
70-74	3,616	1,600	2,016
75-79	2,628	1,102	1,526
80-84	1,772	644	1,128
85-89	832	280	552
90+	336	93	243
Total	***156,445***	***79,263***	***77,182***

Source:http://rapory.tuik.gov.tr

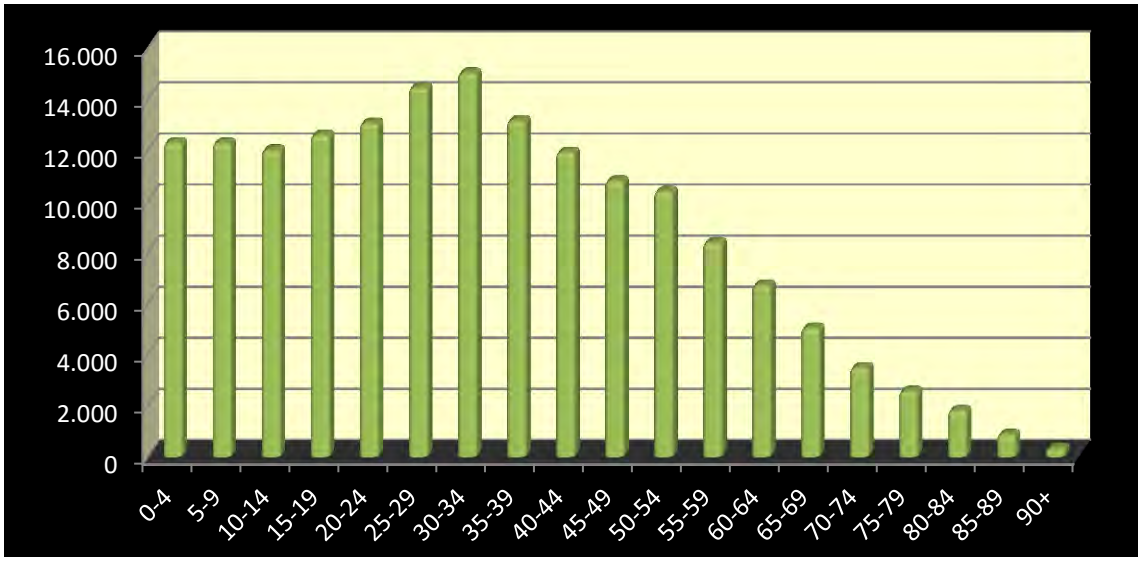


Figure 57. The Graph of Şehzadeler District Population According to Age Groups

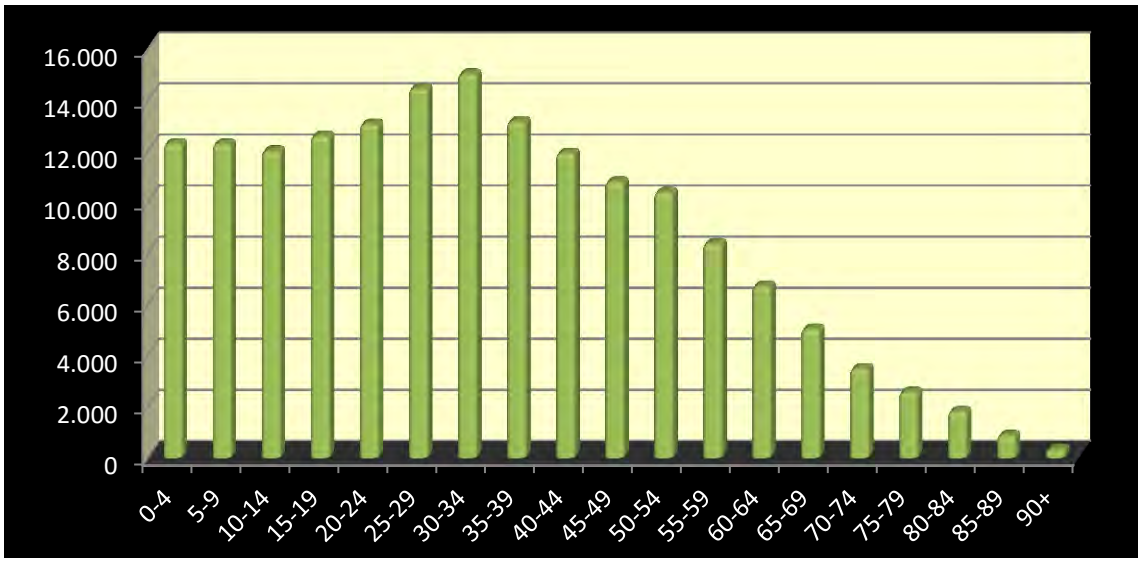


Figure 58. The Graph of Şehzadeler District Population According to Age Groups

According to data of ADNKS 2014; migration to Manisa Province has been 35,570 during the year and migration out of Manisa Province has been identified as 38,432. Provincial Order immigration is more than immigration out and net migration rate has been calculated as %-2.09. Similarly, 141 people immigrate to Şehzadeler district in 2013 (http://tuikapp.tuik.gov.tr).

ii. Economy

Manisa province's economy is based on agriculture and industry. 1.9 % of agricultural and forestry products produced in Turkey are exported from Manisa province. Similarly. 0.16 % of the products obtained from mining and quarrying products are exported from Manisa.

Agriculture

Due to the geographical structure and suitable features for agriculture. Manisa is one of Turkey's major agricultural production centers. Despite the growing industry movement accelerated in the 1970s.Agriculture constitutes the basis of the economy of the province in present times. Upon transition to market economy production has been oriented from traditional grain production to production of industrial crops and the production of industrial crops such as cotton, tobacco, olives has become widespread. Related with the production of seedless grapes which is a specific product and export of Manisa. There has been substantial production increase with the expansion of the use of modern techniques. Vegetable production mainly keeps the major percentage in agriculture of Manisa. The alluvial soils which are along the Gediz River that irrigates the lands of the province are among the most fertile soils in Turkey.

Manisa is one of the leading cities of our country with its agricultural potential and agricultural production. Approximately 6 % of Turkey's total agricultural production value is obtained from Manisa. The most fertile lands of the province are concentrated in the Gediz Plain.

Manisa is among the top three cities in Turkey with the value of agricultural production. Manisa's most important products are seedless raisins and tobacco. 73-85% of exported from Turkey seedless raisins are from Manisa. Manisa has a similar importance especially in Turkish type (Oriental type-Oriyantal) tobacco production. 93 % of exported tobacco from Turkey is produced at Aegean region and nearly 50 % of it is produced in Manisa province. Another product which will be a symbol of Manisa in the near future together with tobacco and grapes is olives. Olive planting areas are increasing rapidly in recent years. In cotton production Manisa is above the world average in terms of both quality and fertility. Whenever agricultural values of Manisa are evaluated within Turkey. Cultivation of seedless grapes, tobacco, cotton, olive and cherry seems to hold a significant ratio. These products provide great added value regarding export.

Almost all of the working population in Şehzadeler District is active at services, industry and agriculture sectors. Agricultural areas that they work in are outside the metropolitan area and these farms are engaged in the production of capitalist market-oriented organizations. The majority of employees are working in industrial sector. There is no industrial zone in the metropolitan area of Şehzadeler District. Spatial weight of Manisa industry is largely within the boundaries of the Yunusemre district. In this respect Şehzadeler Town is mostly regarded as a residence area.

Mining

Manisa is quite rich in minerals. The lignite extracted from the Soma District of Çamlıca Mountain slopes is used at the Soma Thermal Power Plant and electricity is obtained. İn 1975 near Rahmanlar Village a mineral deposit containing lead, gold and antimony mixture had been found out. In Manisa province other than lignite lead mercury sand marble and perlite mines are in operation.

Stockbreeding

Stockbreeding is a source of revenue in the third degree in Manisa Province since pastures and rangelands are gradually reduced. While the number of horses, oxen, mules and camel is decreasing the amount of other animals are increasing.

Industry[9]

Wine and olive industry based on agricultural products olive and grape can be considered as the pioneers of the manufacturing industry of Manisa. Leather and leather products, earthenware equipment, weaving and carpet weaving and food products have been the initial sectors of the manufacturing industry in the province of Manisa.

Manisa Organized Industrial Zone has brought diversity and sectorial richness by allowing condensation in manufacturing. In Manisa Organized Industrial Zone; there are many companies operating in iron and steel, textiles and clothing, electronics, electrical appliances, food, chemical, forestry, construction, automotive industry and they perish to the production of industrial and commercial life. Manisa Organized Industrial Zone has 3 sections; first section is 174 ha second section is 150 ha and third section is 185 ha. Fourth section is thought to be “Techno Park” to create investment opportunities in technology-intensive areas.to create job opportunities for qualified persons and researchers.to assist the transfer of technology and to provide the technological infrastructure for entrance of high / advanced technology to Turkey.

Manisa is a rich province in Turkey in the field of mineral resources and reserves. The most important underground resources are lignite. Except this bitumen schist uranium, asbestos, dits, feldspat, kaolin, marble, perlite, titanium, zeolite, sand, gold, antimony, copper-lead-zinc, mercury, iron, manganese and nickel mine reserves have also been designated and business is done at some sections of these mine reserves.

Trade[10]

Manisa Province has dominated over a wide area as a trade and industry center due to its agricultural product richness and due to be located over rail and highways but due to development of highway transportation.it has lost this domination and has entered into domination field of İzmir Province. Since 1997, major industrial establishments have transported their centres to Manisa Province so revival of commercial life has been observed.

According to the data of the year of 2005. 649 joint-stock companies, 4,458 limited companies 147 collective companies. 32 limited liability companies. 985 cooperatives and 88 banks are active. Manisa Chamber of Commerce which has been founded as of 1908 has become a significant Trade and Industry Center directing the regional economy by its Organized Industrial Zone located over a land more than 5,000,000 m^2 which has been built by its own means and by its members more than 4,500 in 20 different occupational groups.

There are 15 accommodation facilities that have tourism operation certificate across the province and these facilities have 852 rooms and 1,754 beds.

Similarly there are 7 accommodation facilities that have tourism investment certificates and these facilities have 418 rooms and 844.

[9] *http://www.mesob.org.tr*
[10] *http://www.mesob.org.tr*

Tourism[11]

While total amount of tourists visiting the province are 319,709 as of 2014.This amount had been 406.492 as of 203 and had been 345,492 as of 2012.

iii. Income State

In Manisa Province there are 86,159 taxpayers in total and 78,543 of them are income taxpayers and 7,616 corporate taxpayers. 1,750,681,554 TL has been collected by tax offices as of 2013 and this amount has been 1,952,801,980 TL by a 12.1 % increase as of 2014 and this increase for whole Turkey has been 10.1 % for the same period.

Tax accrual and tax collection numbers for 5 years period in between 2009 and 2014 are compared.it is observed that accrual of income taxes have increased by 103.5 % and collection of taxes have increased by 99.5 %. Regarding tax collection increase rates over the main tax types for the last 5 years it is seen that an increase of 85 % in income tax increase of 138 % in corporate tax and an increase of 92 % in value added tax.

At Şehzadeler County which is the Project field there are 19,242 income taxpayers and 2,764 corporate taxpayers. Tax collection ratio realized in county is 79 %[12].

iv. Employment

According to TÜİK 2013 data labour force participation rate is changing in between 54.9 % and 55.5 % and employment rate is changing in between 53.3 % and 52.1 % in Manisa Province.

As of 2015 the unemployment rate is in between 9.3 % 11.3 % in Manisa Province.

Table 71. Labour force, number of unemployed people and the unemployment rate Indicators in Manisa Province.

	2012			2013			2014			2015		
	Total Workforce (Thousands)	Number of unemployed (Thousands)	Unemployment Rate (%	Total Workforce (Thousands)	Number of unemployed (Thousands)	Unemployment Rate (%)	Total Workforce (Thousands)	Number of unemployed (Thousands)	Unemployment Rate (%)	Total Workforce (Thousands)	Number of unemployed (Thousands)	Unemployment Rate (%)
JANUARY	25,122	2,348	9.3	26,256	2,552	9.7	27,261	2,805	10.3	28,713	3,259	11.3
FEBRUARY	24,950	2,402	9.6	26,241	2,539	9.7	27,824	2,825	10.2	28,803	3,226	11.2
MARCH	25,267	2,305	9.1	26,597	2,496	9.4	28,330	2,747	9.7	29,022	3,069	10.6
APRIL	25,848	2,123	8.2	27,140	2,366	8.7	28,773	2,579	9.0	29,459	2,821	9.6
MAY	26,319	1,988	7.6	27,450	2,263	8.2	29,089	2,551	8.8	29,861	2,789	9.3
JUNE	26,551	1,935	7.3	27,606	2,240	8.1	29,240	2,654	9.1	30,141	2,880	9.6
JULY	26,560	2,020	7.6	27,518	2,370	8.6	29,276	2,867	9.8	30,311	2,970	9.8
AUGUST	26,580	2,123	8.0	27,537	2,482	9.0	29,257	2,944	10.1			

[11] *Manisa Environmental Status Report, 2013*
[12] *Supplied data means total of Şehzadeler and Yunusemre Counties.*

	2012			2013			2014			2015		
	Total Workforce (Thousands)	Number of unemployed (Thousands)	Unemployment Rate (%	Total Workforce (Thousands)	Number of unemployed (Thousands)	Unemployment Rate (%)	Total Workforce (Thousands)	Number of unemployed (Thousands)	Unemployment Rate (%)	Total Workforce (Thousands)	Number of unemployed (Thousands)	Unemployment Rate (%)
SEPTEMBER	26,756	2,213	8.3	27,426	2,527	9.2	29,233	3,064	10.5			
OCTOBER	26,819	2,221	8.3	27,252	2,470	9.1	29,181	3,043	10.4			
NOVEMBER	26,715	2,304	8.6	26,958	2,497	9.3	28,970	3,096	10.7			
DECEMBER	26,443	2,458	9.3	26,902	2,582	9.6	28,787	3,145	10.9			

Source:http://www.bumko.gov.tr/TR.156/istihdam.html

v. Education

The number of students and teachers in Manisa Province are presented in **Table 72**.

Table 72. School, Branch, Teacher, Student and Classroom Numbers Per Educational Level (for 2012 and after 2012)

Parameter	Number of Person
Pre-school / School	492
Pre-School /Branch	1,102
Pre-School / Male student	9,537
Pre-School / Female student	8,623
Pre-School / Male Teacher	43
Pre-School / Female Teacher	1,020
Pre-School / Classroom	896
Primary school / School	545
Primary school / Branch	4,487
Primary school / Male student	41,956
Primary school / Female student	39,514
Primary school / Male Teacher	2,287
Primary school / Female Teacher	2,846
Primary school / Classroom	4,754
Middle School/ School	332
Middle School/ Branch	3,526
Middle School/ Male student	40,681
Middle School/ Female student	39,230
Middle School/ Male Teacher	2,503
Middle School/ Female Teacher	2,579
Middle School/ Classroom	2,864
Secondary sum/ School	161
Secondary sum/ Branch	3,355
Secondary sum/ Male student	45,059
Secondary sum/ Female student	42,309
Secondary sum/ Male Teacher	3,111
Secondary sum/ Female Teacher	2,276
Secondary sum/ Classroom	2,737
General Secondary Education / School	75

Parameter	Number of Person
General Secondary Education/ Branch	1,320
General Secondary Education/ Male student	20,553
General Secondary Education/ Female student	22,680
General Secondary Education/ Male Teacher	1,278
General Secondary Education/ Female Teacher	971
General Secondary Education/ Classroom	1,292
Vocational and technical education/ School	86
Vocational and technical education/ Branch	2,035
Vocational and technical education/ Male student	24,506
Vocational and technical education/ Female student	19,629
Vocational and technical education/ Male Teacher	1,833
Vocational and technical education/ Female Teacher	1,305
Vocational and technical education/ Classroom	1,445

Source: http://tuikapp.tuik.gov.tr/Bolgesel/TableOlustur.do#

There are 1 University (Karatay University), 4 preschools, 27 Primary schools, 25 secondary schools, 6 public high schools, 3 private high schools of which two are vocational and technical training schools, 1 Evening Art School, 1 Adult Education Centre, 1 Guidance and Research Center in Şehzadeler metropolitan. Two of the state high schools are vocational and technical high school. In addition, there are 10 classrooms for preparation to the university exam and 2 Female student dormitory. According to 2013 data whenever educational status of population living in Şehzadeler County is compared with provincial and regional[13] data.it is seen that educational level of people living here are better than the other regions (**Please refer to Table 73**).

Table 73. Educational Status

	Şehzadeler District	%	Manisa Province	%	District	%
Illiteracy	4,185	3.27	38,377	3.58	84,913	3.62
Literates without diploma	6,218	4.86	73,195	6.83	159,015	6.78
Primary school graduates	36,702	28.73	403,414	37.64	835,046	35.58
Primary school graduates	28,814	22.54	219,116	20.44	490,269	20.89
Middle School graduates	5,925	4.64	44,934	4.19	105,404	4.49
High school graduates	28,743	22.49	183,932	17.17	429,743	18.30
University graduates	15,530	12.15	97,199	9.07	213,481	9.09
Post graduates	829	0.65	4,612	0.43	12,317	0.53
PhD holder	245	0.19	1,178	0.11	3,395	0.14
Unknown	611	0.48	5,778	0.54	13,819	0.59
Total	***127,802***	***100***	***1,071,735***	***100***	***2,347,402***	***100***

vi. Recreation and Tourism

There are 15 accommodation facilities which have tourism operation certificate across the province and these facilities have 852 rooms and 1,754 beds. Similarly there are 7 accommodation facilities which have tourism investment certificates and these facilities have 418 rooms and 844. At 78 accommodation facilities which have municipality certificate there are 2,056 rooms and 4,901 beds available (*www.manisakulturturizm.gov.tr).*

[13]*Manisa is located in TR33 statistics zone. Manisa, Afyon, Kutahya and Usak provinces are located in this zone. Herein "Zone" concept, will be used for statistical area covering these provinces.*

vii. Health

The need for health care at Manisa province is increasing in parallel to the intensive and increasing population. Construction years of the current hospitals are often very old. In addition the hospitals do not have enough parking space and green areas.

The number of public hospitals in the province according to TÜİK was 29 in 2012 and 2013 while this number has been determined as 27 in 2014[14].

Regarding the hospital in terms of bed capacity in Manisa, there has been a decrease in 2013 compared to 2012.But this decline has been disappeared in 2014 and there is an increase in the number of beds **(Please refer to Table 74).**

Table 74. Number of Beds by Years

Years	2012	2013	2014
Number of Beds	3,859	3,851	4,059

Source: Facts and Figures Manisa (2014) and TÜİK

The data of health units located in Manisa Province belonging to 2014 are presented in Table 76.

Table 75. Manisa Health Units (Year 2014)

Unit	Ministry of Health	Private	University	Total
Number of Hospitals	18	8	1	27
Number Dispensary	3	-	-	3
Family Health Center Number	162	-	-	162
Family Medicine Unit	403	-	-	403
Health House Number	124	-	-	124
Actual Number of Beds	2,960	540	559	4,059

Source: Manisa Provincial Health Directorate. 2014.

NOTE: Private Universal Hospital and Private Soma Wafa Hospital was not included in the number of hospital because they are not operational since 2014 and 2013 respectively.

The distributions of district hospitals in Manisa are presented in **Table 76**.

Table 76. Districts Hospitals in Manisa Province Breakdown (Year 2014)

District	Branch Hospital	State Hospital	E2 District Hospital	Private Hospital	University	Oral and Dental Health Center
Center	1*	2	-	2	1	1
Ahmetli	-	-	1	-	-	-
Akhisar	-	1	-	2	-	1
Alaşehir	-	1	-	-	-	-
Demirci	-	1	-	-	-	-
Gölmarmara	-	-	1	-	-	-
Gördes	-	1	-	-	-	-
Kırkağaç	-	1	-	-	-	-

[14] *Manisa Provincial Directorate of Health data.*

District	Branch Hospital	State Hospital	E2 District Hospital	Private Hospital	University	Oral and Dental Health Center
Kula	-	1	-	-	-	-
Köprübaşı	-	-	1	-	-	-
Salihli	-	1	-	3	-	1
Sarıgöl	-	1	-	-	-	-
Saruhanlı	-	1	-	-	-	-
Selendi	-	1	-	-	-	-
Soma	-	1	-	-	-	-
Turgutlu	-	1	-	1	-	1
Total	***1***	***14***	***3***	***8***	***1***	***4***

Source: Manisa Provincial Health Directorate. 2014.
**Mental Health and Diseases Hospital*

The distribution of other health institutions in Manisa are presented in **Table 77**.

Table 77. Breakdown of Other Health Care Units over Districts in Manisa (Year 2014)

Districts	Community Health Care Center	Family Health Care Center	Family Practice Unit	Sanatorium	Child Monitoring Center	Community Mental Health Center	Tuberculosis Dispensary	Public Health Laboratory	Açsap Center
Center	2	33	103	18	1	1	1	1	1
Ahmetli	1	2	7	3	-	-	-	-	-
Akhisar	1	23	49	16	-	-	1	-	-
Alaşehir	1	12	29	3	-	-	-	-	-
Demirci	1	8	13	7	-	-	-	-	-
Gölmarmara	1	1	7	2	-	-	-	-	-
Gördes	1	5	10	7	-	-	-	-	-
Kırkağaç	1	5	11	8	-	-	-	-	-
Kula	1	2	6	3	-	-	-	-	-
Köprübaşı	1	6	14	8	-	-	-	-	-
Salihli	1	18	46	14	-	-	1	-	-
Sarıgöl	1	7	11	9	-	-	-	-	-
Saruhanlı	1	11	17	9	-	-	-	-	-
Selendi	1	4	7	7	-	-	-	-	-
Soma	1	10	30	3	-	-	-	-	-
Turgutlu	1	18	43	7	-	-	-	-	-
Total	***17***	***165***	***403***	***124***	***1***	***1***	***3***	***1***	***1***

Source: Manisa Provincial Health Directorate. 2014.

The majority of the employees in the health institutions in Manisa are nurses (24.64 %). As of 2013 while the number of health staff employees working in the province was 10,090 this number has reached up to 1,722 as of 2014 **(Please refer to Table 78).**

Table 78. Manisa Health Professionals Information

Employee Information	Ministry of Health	University+ Private	Total	%
Number of Specialist Physician	670	1,189	1859	9.93
Number of GPs Doctors	691	758	1449	7.74
Total Number of Dentists	156	304	460	2.46
Total Pharmacy	39	504	543	2.90

Employee Information	Ministry of Health	University+ Private	Total	%
Total Number of Midwives	1,105	1,162	2267	12.11
Total Number of Nurses	1,963	2,650	4613	24.64
Health officer	1,158	1,710	2868	15.32
Health Technician	214	339	553	2.95
Laboratory Assistant	247	53	300	1.60
Social Worker	21	21	42	0.22
Dietician	19	35	54	0.29
Chemist	3	5	8	0.04
Biologist	22	55	77	0.41
Statistician	1	1	2	0.01
Psychologist + Physiotherapist + Health Physicist	58	99	157	0.84
Other Staff	1,207	2,263	3470	18.53

Considering the state of the health staff for a metropolitan like Manisa emerging numerical table is quite inadequate. When **Table 78** is examined it is observed that at the health institutions in the province in general mostly nurses (24.64%) are working. Then 15.32 % is health officials, 12.11% are midwives 9.93 % are specialists.

viii. Transportation

Intercity Transportation

Manisa is the most important hinterland of İzmir and it provides transportation by road and rail links. There are a total of 1,091 km of provincial and state roads. Izmir-Istanbul highway passes along the edge of the city through KumÇayı Valley at southwest-northeast direction across the Kenan Evren Industrial Estate. Izmir-Ankara highway E23. Passes through the provincial borders of the east-west direction Turgutlu, Ahmetli, Salihli and Kula district. Also there is a connection to Denizli through Alaşehir-Sarigol Districts to Kütahya through Salihli-Demirci highway and to Çanakkale through. Akhisar Bergama and Menemen highway

In rail transportation, Manisa is an important crossroad. Bandırma-Balıkesir Railway and Uşak-Manisa Railway converges in the city center. İstanbul Metropolitan is accessible by ferry connections via Bandirma, Kütahya, Eskişehir and Ankara rail link is provided via Bandırma. There is Blue Train and Izmir Express connecting Manisa to Ankara. There is Aegean Express connecting Manisa to Eskişehir. There is Marmara Express connecting Manisa to Bandırma and there is Uşak Express connecting Manisa to Uşak. Besides there is a mail train going to Diyarbakır also passes through Manisa.

Local Transportation

Manisa city center is experiencing a concentration in transportation in the same ratio as rapidly increasing population. Vehicles within Manisa city are limited with vans public buses shuttle bus services village vehicles and private vehicles. Those places where there are traffic congestion in the city are; Ulupark vicinity Garage and around Karaköy.

Manisa Metropolitan Municipality is concentrated on projects that will relieve the transport network in the whole province. In this context, it is planned to implement the trolleybus project.

According to data of 2014, there are 177,038 cars, 6,588 minibuses, 6,350 buses, 57,213 small trucks, 13,924 trucks, 162,086 motorcycles, 628 special purpose vehicles and 78,150 tractors are available in Manisa. In Manisa, the number of cars per person has been determined as 129.

There have been 4,173 traffic accidents in Manisa as of 2014 and 112 people have lost their lives in these accidents and 6,963 people have been wounded.

5.7.2. Impact Assessment

For development of such a project the area chosen for the project is seen as one of the most suitable places in Manisa metropolitan area. On the other hand regarding the social validity of the project, there is a consensus in between especially local governments (municipalities concerned). Provider institutions (Ministry of Health) and certain service stakeholders. Related metropolitan municipalities have already made changes to the zoning to allow the construction and operation of this facility. There is a high expectation of this project at Şehzadeler municipality and neighbourhoods that make up the project's domain. There are two basic objectives of this support and expectations:

1) Health facilities and institutions in the domain of Şehzadeler metropolitan are far away to meet the health requirements of the region. In the interviews it has been revealed that people only get benefit from the Manisa State Hospital and two health centres.

2) Şehzadeler metropolitan area within the metropolitan area of Manisa is less developed compared to Yunusemre County in terms of social and spatial reinforcement.

Whenever all of the data are analysed it is observed that in Şehzadeler municipality except the existing health centres, there is only Manisa State Hospital as a state-owned integrated or multi-part bed health institution. This hospital gives service to all Manisa Province together with this county and for this reason. Its capacity is not enough. To get the health service the district residents have to travel in between 0.1 and 15 km distances.

Although the neighbourhood is located in the social domain has relatively easy access to centres providing primary health care the total number of health care centres available in the district is 14 and number of users is sometimes 166,000 people. On the other hand considering that all the Manisa Province citizens are using several health organizations that have enough quality and considering that these health organizations have difficulties due to spatial and financial resources to increase their capacity. Introduction of a hospital in favourable position in terms of spatial and financial resources in Şehzadeler District is expected to create social benefits.

It can be seen that these social benefits are not limited only to the Şehzadeler district. This hospital also offers health services to the crowd towns around Manisa Center. Especially Turgutlu and Salihli towns that are located at the south and east of Manisa are very big towns like a city and their connection to Manisa is via Şehzadeler District[15].

[15] *According to 2014 ADNS data, the population of Turgutlu County is 150,460, Salihli County is 156,861. Also total population of Ahmetli, ,Alaşehir, Selendi, Kula, Köprübaşı Sarigol and Demirci Counties which*

People of these towns use İzmir Hospitals to get high level health services. To relieve the health service load on Izmir Province establishment of a hospital with high standards and capacity in Şehzadeler District which is the closest district in Manisa City to these towns serves the general public interest. Therefore the location of Manisa makes it necessary to increase the capacities and efficiencies provided by public and private health institutions. This facility which will serve as an advance health center and which will be operated within the framework of a new investment model may lead to a regional capacity relief and efficiency increase.

Condition of The Facility in Terms of Related Investment Model

Manisa Training and Research Hospital is envisaged to be constructed and operated within the framework of KÖİ model. By KÖİ model, it is possible to finish health facilities in a shorter period of time due to state commitment system so the system will gain new facilities in the shortest possible period; in this manner facilities will be able to provide their own finances and to make a planning for investments will be possible under the frame of general budget and circulating capital possibilities by paying debts from incomes instead of waiting for finance. This will provide to spread long-term opportunities of short-term dilemma of the budget allocated to the health sector opportunities.

Besides, with this investment and operating system reducing construction and operating costs considering the population growth rate in the country with the understanding of faster and more effective investment in the health sector and use of modern management techniques the use of private sector ability efficient in management of public services and to adapt to new conditions easily to share risks. Management and responsibilities with private sector are aimed at ensuring common-profit public benefit. In this health investment which will be implemented according to the KOİ model specific to Manisa province parallel to the benefits of the above general interest.it is expected to provide high quality and fast service delivery renovation and financial benefits.

Within this budget technique, source can only be allocated for progress of ongoing constructions via annual general budget financing profits. New investment decisions are similarly shifted to enter into a financing need of this investment cycle and these investments remain dependent on the general budget financing facilities that will be allocated in the following years. Therefore, any new investment decisions taken are shifting the chances of completion of ongoing and unfinished projects to future. On one hand, while ongoing and unfinished constructions are waiting for financing allocations. On the other hand the finished portions of said constructions begin to consume the project life cycle. In the KÖİ model, since construction of health facilities can be finished in a very short period of time (maximum in 3 years).System is able to attract new plants within a short time as well as the facilities in question may start to create their own sources of funding. So for investments which are made under the frame of general budget and circulating capital in this model it becomes possible to make a finance planning based on debt payment instead of finance waiting and budget flexibility and sustainability can be obtained. This system spreads short-term dilemma of the budget allocated to the health sector opportunities to long term (20-25 years in average).

are also located within the hinterland areas of the county reaches at 276,514. Thus, including Şehzadeler County the potential population that this health institution will serve will be 750,000 people as of 2014 data.

Construction Phase

The site selected for the project is located relatively isolated from residential areas. North and northwest of the project area is urban areas. The South is mountainous and forested. City cemetery is located at west and at the east there are municipal construction sites and storage areas. In this manner the project area is relatively isolated from urban life so there are no any social and economic activities in the field of construction and because of these reasons. There are no human and vehicle movements. In this context the working machine traffic performed with heavy and light vehicles for construction site will not affect traffic regime in this region. In addition, potential risks associated with the flow of construction traffic and meeting with provincial traffic are minimal.

During the construction phase accommodation requirements of workers. Project management office and machine-vehicle parking needs will be met by using the empty land near the construction area therefore social and economic life in this part of the city is not expected to be affected negatively. However, at entrances and exits of employees and vehicles control problems may occur in driveways.

The project will create employment opportunities during the construction phase. The use of local human resources in favour of this opportunity will have a positive social impact.

In the construction phase of the project it is not expected to create a population movement causing adverse impact over social and economic life regarding urban area of Manisa which is in metropolitan category in Turkey scale and also it has been observed that the project will not be a demographic pressure element.

The project site is not an area used for social, cultural or economic activities. If measures are taken to keep entrances and exits to the site at “authorized” level during the construction phase, it is unlikely to produce adverse effects in terms of social and economic environment. In particular if measures are taken to prevent the entrance to the construction site, north of the project site in terms of settlements and schools are not expected to be under a risk because of human and vehicle traffic which is caused by the residential settlements and schools nearby the site is not in the direction through the site but is oriented to the east and south and west.

During the construction phase, solid, liquid and chemical wastes that can have adverse effects over the environmental health and urban life and disposal of these wastes cause a problem that has to be solved.

The personnel health and job safety and discipline are one of the most important problems of the construction phase. In this respect the national public health and safety standards should be implemented and procedures which will provide personnel discipline should be prepared.

Operation Phase

During the operation phase due to determined local requirements and expectations it has been observed that health project will have positive impacts. Public and administrative approvals of the project are available. During the meetings held in the neighbourhoods that make up the social environment of the project.it has been observed that this health investment in Şehzadeler region “*has been expected to be realized for a long time*” and there is a concern about the delay and because the

realization of this project has been very prolonged. There has been a despair as the project will not be realized. This public support and administrative approval overlaps with each other both Manisa Municipality as well as Şehzadeler Municipality has defined project site in the framework of health functions as defined by the project and have allocated this area for this project by making changes in the development plan. In addition Provincial Directorate of Health which is acting as the agency that is implementing health policies of the government in this area has registered the project's necessity for this area and has given approval for the project.

Under the scope of the project, the resulting human and vehicle traffic should be designed in a way that will not lead to the risk of accidents by taking necessary measures to ensure a healthy access to the hospital. Otherwise project can lead to condensation and risks regarding human mobility within the traffic. In this context, necessary arrangements for the people with disabilities should also be made for easy access to the hospital and related units.

Currently defined routes and allocated vehicles for public-transport system from the city center and other neighbourhoods to the hospital are available but since the requirements will increase after the operational phase. Current capacities should be revised and should be increased by calculating the number of passengers. On the other hand parking needs will arise for private cars and for the moment there is no such a parking area so appropriate allocation and planning of parking places in the area owned by the municipality should be provided.

While the employment and procurement policy at the operation stage are determined it is an obligation to give priority to local resources. Except the cases that require expertise and except some special working conditions caused from specific properties.to address local sources in the employment for general services level is a need in the macro scale for the development of social peace and job and income opportunities in the region and this implementation in micro must comply with the macro level requirements.

During the construction phase, solid, liquid and chemical wastes that can have adverse effects over the environmental health and urban life and disposal of these wastes cause a problem that has to be solved.

5.7.3. Mitigation Measures

Construction Phase

In order to eliminate the risks arising from conflicts between traffic regime of the region and the construction machinery and light and heavy duty vehicles traffic of the construction field, vehicle and heavy duty vehicle clutter on adjacent local roads which could lead to stagnation and slowdown should be avoided. To do this, approach side roads and side pockets with interior parking spaces should be created to remove the vehicles from the roads and to direct them to the construction area; at the places and times where the entrance and exit traffic is increased. Flowing traffic should be warned; within work hours. Construction machines should be prevented to access the municipal roads. When urban travel of light and heavy vehicles and construction machinery are required. There should be specified speed limits and timing limits for joining to traffic for these vehicles.

Entry and exit of vehicles and people to the construction area must be kept under full control. For this purpose, the number of entry-exit guardhouses which regulates the entrance and exit should be limited as much as possible. These entry-exit guardhouses should only be built on the street limiting the field from north. Heavy vehicles and heavy machinery traffic roads should be selected as much as possible outside the roads passing through school and residential areas located at the north side of the project area. If not because there will be a traffic failing risk in this region and because of limited capacity barely meeting the needs of neighbourhood at north will be more problematic due to construction traffic.it will be helpful to determine a path to provide easy exit between guardhouse and highways (especially Manisa-Turgutlu road).

Depending on these measures to keep the entrance to the construction site at "*authorized*" level to close the area for other usages instead of authorized level entrances and to make marking specifying the prohibition on entry will eliminate the transition between the construction site and its surroundings. So it will eliminate possible risks on the social and economic life emerging from construction activities. In particular, the level of risk over residential areas and schools limiting the project field from north will be kept at negligible level.

During construction phase, the use of local human resources in favour of employment in jobs that do not require expertise and technical skills are required. This choice will also minimize the accommodation problems in the project field. Similarly, while the procurement policy is prepared, usage of local resources is essential to reduce the adverse impacts of the project. The preparation of solid and liquid waste management plan is necessary for solid, liquid and chemical wastes and displacement of these wastes that can have adverse effects on the environment health and city life. To do so, to comply with national environmental regulations and to implement a management plan within this framework is sufficient.

Since the construction site and mobility due to the construction area are inside the hospital borders limiting the construction site, contact between the construction site and social and economic environment which defined as the domain of the project is very limited. Therefore public safety risk that would threaten the social and economic environment is not an issue. Accordingly, public health risks are minimized. The epidemic has not been observed at Manisa metropolitan areas during the Republican era. Therefore, an epidemic is not expected to be obtained due to the presence of construction and especially from local employment. Despite of all these facts, if any epidemics occur the health infrastructure in the regional center Izmir which is very close to Manisa (39) km is sufficient. In addition, site management will set up offices related to occupational health and safety.

Upon implementation of procedure ensuring personnel discipline, project construction administration will be kept free from external effects and it will be possible to eliminate unwanted situations that can be caused by staff in the public area or to that project personnel may integrate. Therefore, "Guidelines of Principles of Behavior and construction Site Discipline" for the staff should be prepared.

Operation Phase

Measures are necessary to be taken in order to ensure access to the hospital. In order to meet the human and vehicle traffic, construction of new roads and widening of the existing roads are required. Since the capacity of existing roads is not sufficient to meet increased intensity. Infrastructure measures which will meet this capacity increase

should be supported by overpass and subways to ease entries and exits of pedestrians to the hospital and should be supported by disabled accesses.

The path of pedestrians and vehicles must be designed to allow access of disabled people and there should be design solutions to ensure that disabled people can easily access the services in the hospital.

Urban transport facilities to the project are must be increased by Metropolitan municipality in order to meet the increased demand. Since there is no need for people living in near neighbourhood of Şehzadeler County to go to city center and hospitals located at western for their health requirements, traffic density will be lower and urban traffic equilibrium will be established.

So, load over downtown will be decreased since the ones living in Şehzâdeler County will not be required to go to downtown to receive this health service and also some of the people who request to receive health service will move to this region. This opportunity should be mentioned among positive impacts of the project during efficient presentation of health service and due to optimization of intensities caused by urban mobility.

Since the project site is very close to the Manisa-Turgutlu state highway, possible patients that will use the hospital will enter the hospital without entering the downtown and this should also be mentioned among the positive factors.

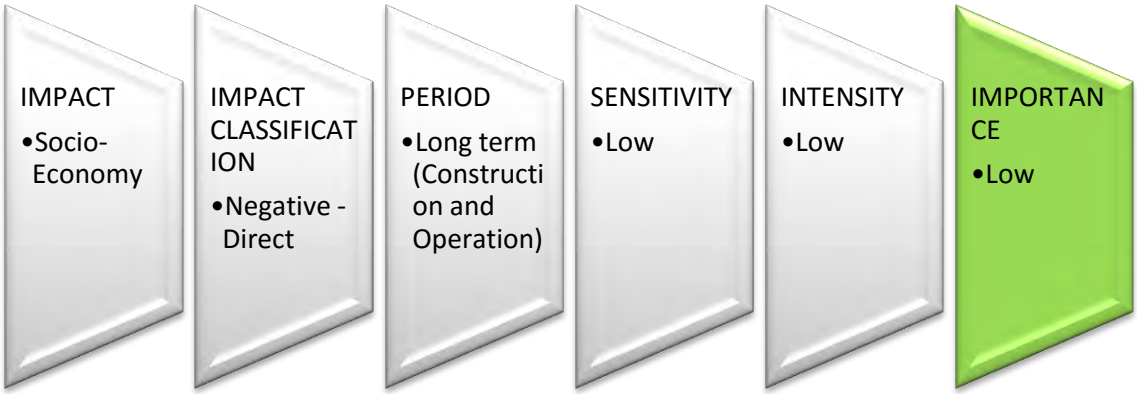
With the commissioning of the plant, occurrence of serious human and vehicle movements in the area has been recorded as an important social impact.With the commissioning of the project there will be an additional load on the Manisa-Turgutlu highway due to the entrance and exit from the hospital the design should be made to reduce the pressure on the road and it is required to regulate to prevent congestion caused by the intensity of the mentioned road.

The use of local human resources in favor of employment in jobs and procurement that do not require expertise and technical skills are required during the operational phase will contribute to the social and economic life of especially Şehzadeler municipality which is less developed county compared to other metropolitan districts of the city.The consideration of this priority has been seen as a major mitigation measures.

During the operation phase, a management plan covering the requirements of local legislation and business should be prepared to eliminate the solid, liquid and chemical wastes and to displace these wastes that can have adverse effects on the environment health and urban life.

5.7.4. Residual Impacts

As a result of implementation of impact mitigation and removal precautions.Aforementioned possible adverse impacts will be low or at negligeble levels. Regarding all social and economic impacts of the Project it is seen that the Project will create positive impacts during construction and operation phases. Adverse impacts of the Project have been mentioned in the following figüre.



5.8. Public and Worker Health and Safety

Since the construction site and mobility due to the construction area are inside the hospital borders limiting the construction site, contact between the construction site and social and economic environment which defined as the domain of the project is very limited. Therefore public safety risk that would threaten the social and economic environment is not an issue. Accordingly, public health risks are minimized. Besides site management will establish an office related with occupational health and safety. Job safety expert on-site doctor will be employed or service will be received from authorized expert companies under the scope of *"Occupational Health and Safety Law"*.

During the operation phase of the suggested facility, epidemics constitute a significant risk. The reasons of epidemics may be surgeries, wrong and improper waste management implementation, air-conditioning systems and inadequate sterilization. For this reason, during operation phase, priority will be given to advance isolation techniques, usage of personal protective equipment (mask. gloves. etc.), regular sterilization implementations, safe injection implementations, hygiene standards, controlled air-conditioning systems and proper waste management applications.

Upon implementation of procedure ensuring personnel discipline, project construction administration will be kept free from external effects and it will be possible to eliminate unwanted situations that can be caused by staff in the public area or to that project personnel may integrate.

For public and worker health and safety, management plans which are not limited with the following ones will be prepared and implemented.

- Occupational Health and Safety Plan.
- Safety Plan.
- Worker Accommodation Management Plan.
- Community Health and Safety Plan.
- Emergence Management Plan.
- Traffic Management Plan.
- Noise Management Plan. and
- Air Quality Management Plan.

During construction and operation phases of the project the following precautions will be taken related with community and worker health and safety in accordance with the Safety Plan.

- A site camp will be built for workers to be used during construction activities.
- Life conditions of workers will be in conformance with international standards, environmental hygiene will be ensured and health services facility, county and province facilities will be used. Site camp for workers' accommodation will be designed and arranged in conformance with processes and standards. This guide has been marked by IFC and EBRD.
- Priority in selection of workers will be given to the people who leave at near environment. So workers who have their own residences will be able to work for this project. Women employees should also be employed at proper positions.
- Human resources processes will be followed in employments of workers.
- Project companies will implement human resources processes in conformance with IFC PS2 & PS4 and EBRD PR2 & PR4 provisions and regarding the matters of employees' associations. mass negotiations, no discrimination and presenting equal opportunities, savings in amounts of personnel, child worker, working by force, unrecorded personnel and third person workers.
- Mobilization field will be designed and arranged in conformance with processes and standards related with workers' accommodation.
- Occupational health and safety requirements such as determination of accidents and work related illnesses, determination of physical, chemical, biological dangers, damage elimination, damage control and prevention will be followed throughout the construction phase.
- Dispute mechanism will be followed in conformance with given IFC PS2 guide.
- "*Management and Monitoring Plan*" will be developed by the Contractor.
- Required trainings will be given to whole personnel working at the construction site in order to prevent occupational accidents.
- Whenever required, protection equipment will be used by personnel (helmet, safety shoe, gloves, etc.).
- Warning signs will be used in related areas.
- Personnel having high quality education will be preferred.
- Construction vehicle drivers will be trained and certificated.
- Social opportunities will be in conformance with technical and hygienic conditions.
- There will be infirmary inside the construction site. Light injuries will be treated here and seriously injured personnel will be forwarded to near hospitals at Manisa downtown.
- Electrical devices will be regularly controlled and required repair, maintenance and renewal processes will be executed.
- Construction site will be properly lightened.

5.9. Cultural Heritage

5.9.1. Baseline

History of Manisa which is the second biggest province of Aegean Region goes back to B.C. 3000. Ulu Mosque and Social Complex, Mevlihane and Saruhan Bey Mausoleum located at Sandıkkale Ulu Mosque; Piedmonts are the arts which have been able to reach up to present. Manisa has been dominated by Saruhanoğulları for approximately 90 years then has been dominated by Ottoman Empire at Hızır Şah period. At this period, its social and economic life has been more regular and the province has been one of the provinces at which Ottoman Sultans' Sons are grown up.

Mesir Paste Festival of Manisa which is a 5 centuries tradition has been taken under protection of UNESCO. It has been unanimously decided to record "*Mesir Paste Festival of Manisa to Representative List of Intangible Cultural Heritage of Humanity*" at the hearing of 7th meeting of Inter Government Committee of UNESCO for Protection of Intangible Cultural Heritage held in Paris in between 3 and 7 December 2012.

As is mentioned in opinion of Manisa Museum Directorate at **Annex A**. there is no area located at the project site which is under the scope of 2863 numbered *"Code of Protection of Cultural and Natural Entities".* For this reason, no adverse impact over archaeological protection area is expected to be caused by the project.

5.9.2. Archaeological Incidental Findings Procedure

"Archaeological Incidental Findings Management Procedure" includes the phases to be followed if there is any archaeological findings available at the project are. A protocol should be signed with Ministry of Culture and Tourism related with the actions to follow and excavation studies to perform in case of incidental findings are met during construction phase of the planned facility. All archaeological studies to be performed under the scope of Manisa Training and Research Hospital Project will be assumed as approved by units managing the project and related bodies via this signed protocol.

In case of meeting archaeological findings during construction works, the following procedures will be followed:

- All construction activities in the project area will be stopped.
- Responsible engineer will be warned and engineer will inform this matter to the nearest museum directorate or provincial administrative officer at latest within 3 days.
- Informed mukhtar, administrative officer or related officers who have direct knowledge about these entities will take precautions required for storage and safety of these entities. Mukhtar will inform the nearest provincial administrative officer about the precautions within the same day and this provincial administrative officer will inform Ministry of Culture and Tourism within ten days and the nearest museum directorate by letter.
- Informed Ministry and Museum Directorate will immediately perform required transactions in accordance with provisions of Code of Protection of Cultural and Natural Entities.
- In this period, no construction and physical actives will be performed over protection areas.
- Construction will begin after permission is given by related authorities.

5.10. Traffic

In this section, effects and measures of plant construction and operation phases on traffic at the area that project is planned to be established are considered.

In order to identify the road network and traffic load of the existing transport infrastructure of the area where the project is planned. Roads located around the field has been identified according to their properties. The map of the road network and traffic volume data of General Directorate of Highways are examined and opinions were obtained from 2. Regional Directorate of Highways **(See. Annex A).** When planning of the connecting roads of the project is finalized, an application will be made by the contractor for the passageway permit document.

5.10.1. Baseline

Manisa Province which the project is planned to be established is under the responsibility and authority of 2nd Regional Directorate is an affiliated body of General Directorate of Highways.

99 % of the region's road network (5,460 km) is asphalt coated. Within the area, there are 1,089 km BHM coated. There are 1,531 km of divided roads in the region.

Within the borders of the region, there are 2,543,136 registered vehicles and road length per square kilometer is mentioned as approximately 70 meters. Regional map is given in **Figure 59.**

Figure 59. Map of General Directorate of Highways 2nd Regional Office

Distances to important centers from Manisa are given in **Table 79**.

Table 79. Distance of Manisa to Some City Centers

Province	Distance (km)
Adana	884
Ankara	563
Antalya	428
Bursa	286
Gaziantep	1,089
İstanbul	525
Konya	534
Kayseri	832

Source: Sayılarla Manisa. 2014.

İzmir Regional Directorate of Highways road network information is given in **Table 80.**

Table 80. İzmir Regional Directorate of Road Network Information

Road Network by Just Surface Type (km)								
2nd District İzmir	Asphalt Roads			Hardwood	Stabilized	Soil	Other Roads	Network Length
	Asphalt Concrete	Surface Coated	Total					
Highway	272	-	272	-	-	-	-	272
State Road	1,280	1,201	2,481	8	-	-	26	2,515
Province Road	123	2,496	2,619	18	18	-	15	2,670
Total	1,675	3,698	5,372	26	18	-	41	5,457

Total length of road network of Manisa Province is 1.091 km and 578 km of total road is state road and 513 km is provincial road. 279 km of state roads have surface pavement and 299 km are bıtumen hot pavement. 504 km of provincial road are surface pavement and 3 km are bitumen hot pavement.

For whole province, average Daily traffic load of state roads per year are given in **Table 81**.

Table 81. Average Daily Traffic Load per Year

Name of Highway	The number of Vehicles
İzmir-Manisa	31,000
Manisa-Akhisar	26,000
Akhisar-Gelenbe	12,000
Salihli-Gölmarmara-Akhisar	4,400
Manisa-Turgutlu	9,800
Manisa-Menemen	6,700
Salihli-Köprübaşı	3,000
Salihli-Alaşehir	8,200
Turgutlu-Salihli	18,200
Salihli-Kula-Manisa Border	11,600
Soma-Akhisar	6,600

Source: General Directorate of Highways 2nd Regional Office

Length of railway network of the region is 265 km and there are 10 stations namely; Akhisar-Bakır-Kapaklı-Kırkağaç-Saruhanlı-Ahmetli-Ayvacık-Muradiye-Kavaklıdere-Urganlı. 20 passenger trains and 6 load trains give service through railway. Number of passengers using trains is 1,488,095. Total amount of load carried by trains is 832,047 ton (3rd Regional Directorate of General Directorate of State Railways Administration).

Number of total motor vehicles registered by Manisa Police Department is 501,977. Distribution of these motor vehicles per vehicle types is shown in **Table 82**.

Table 82. Number of Registered Motor Vehicles (2014)

Type of the Vehicle	Number
Car	176,996
Bus	6,350
Minibus	6,588
Van	57,213
Truck	11,566
Tractor	78,150
Motorcycle	162,086
Land Vehicle	42
Special-purpose Vehicle	628
Tanker	450
Tow Truck	1,908
Total	***501,977***

According to the Manisa Police Department data, 5,406 accidents have been recorded throughout the whole province. People have been dead at 52 accidents, people have been wounded at 3,232 accidents and vehicle damages have occurred at 2,122 accidents.

Table 83. Traffic Accidents (2014)

Location of Accident		Total amount of accidents	Accidents with death		Accidents with injury		Accident with damage
			Accident	Dead	Accident	Injured	
Police Department	**Inner city**	5,406	52	64	3,232	5,287	2,122
	Upstate	4,311	17	20	2,703	4,081	1,591
Gendarmerie Region		1,086	37	47	847	1,619	-

Map showing the area over which Manisa Training and Research Hospital will be constructed and road status of Manisa downtown is presented at **Figure 60**. In present situation, mass transportation can be used to arrive at Project area.

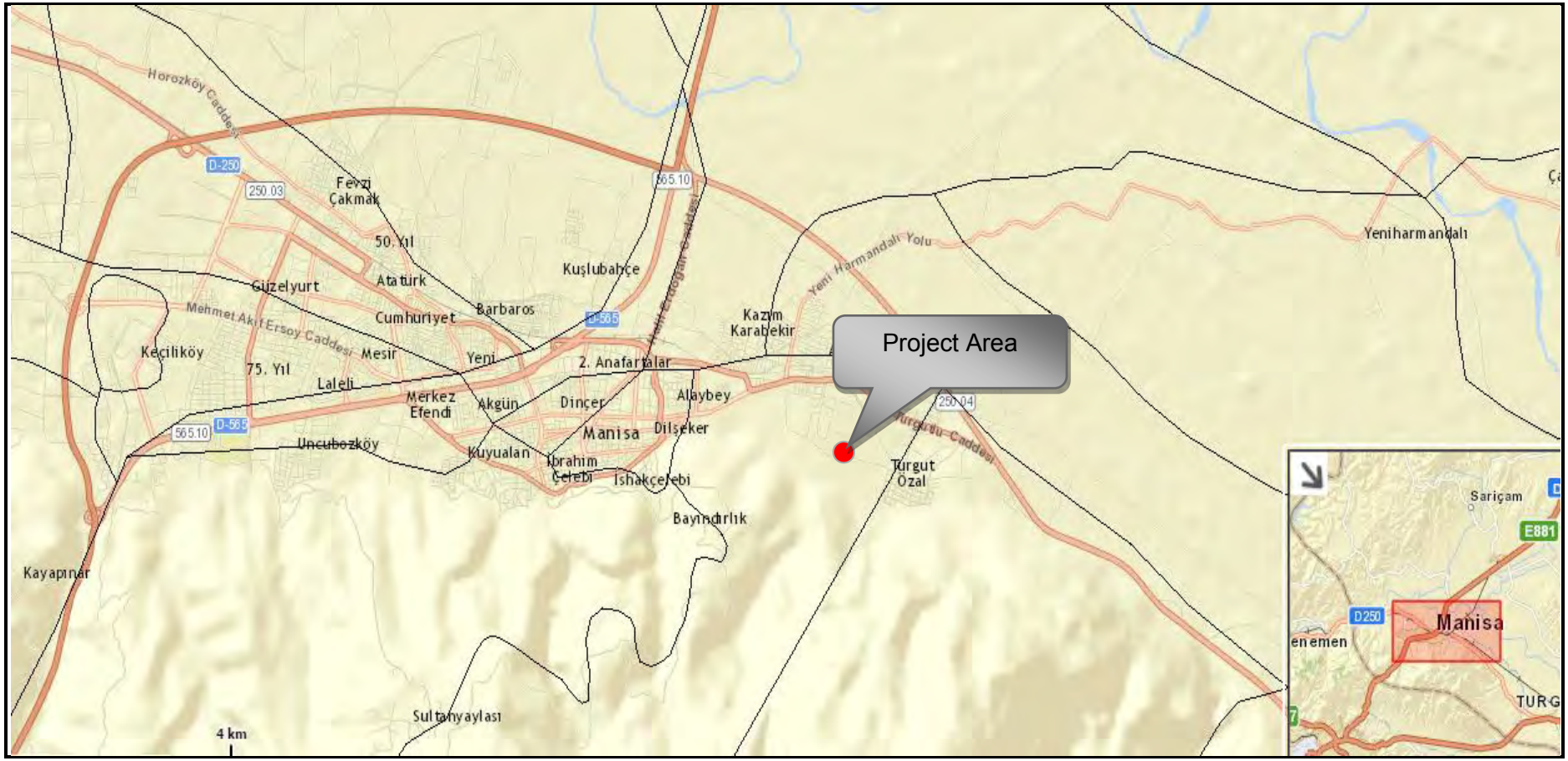
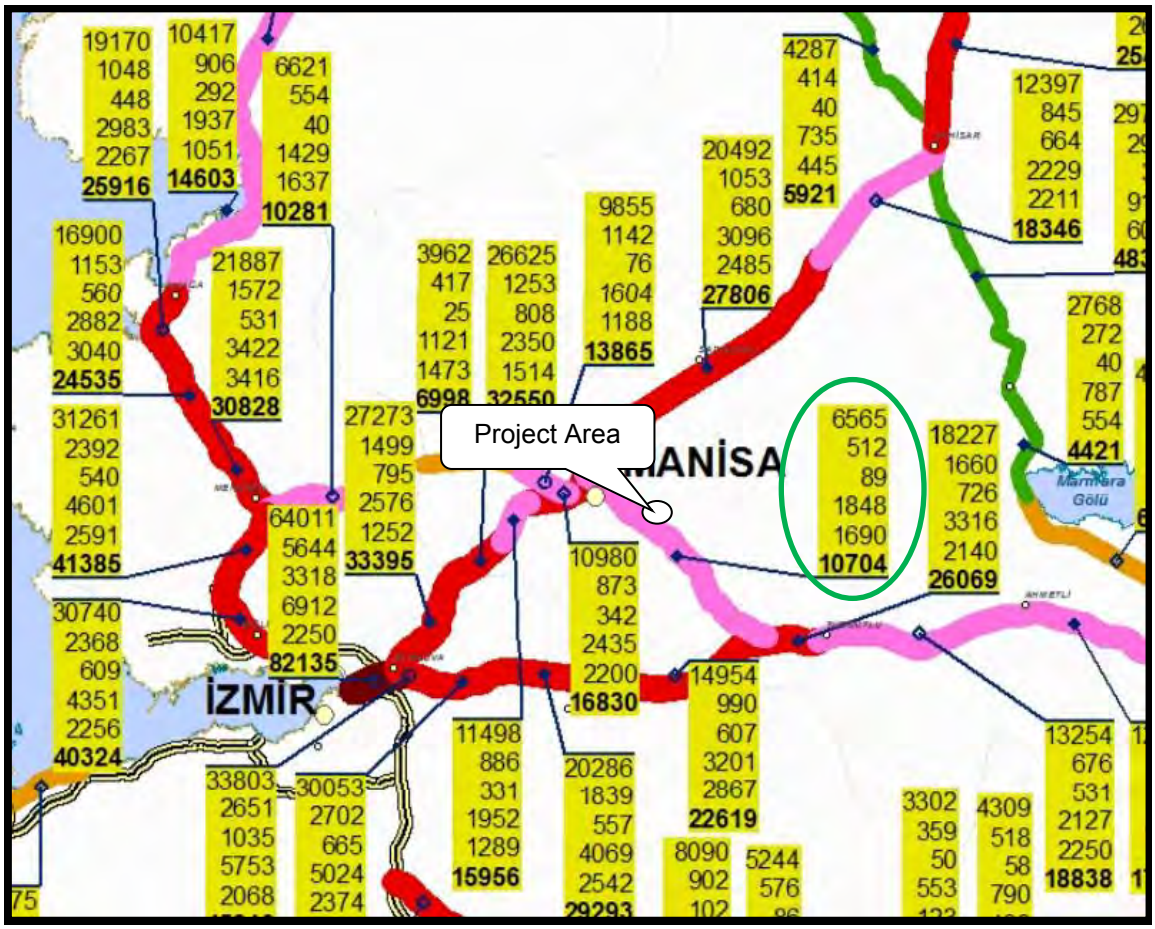


Figure 60. Map of Project Area and Road Network of Province of Manisa

Traffic volume map of Highways 2nd Regional Directorate is given in **Figure 61**. Borders of project area are shown over the map and traffic intensity of highways near the project area is shown in **Table 84**.



Source: www.kgm.gov.tr

Figure 61.Traffic Load Map

Table 84.Traffic Load Information of the Ring Road to the Project Area

Vehicle Type	Traffic Load
Car	6,565
Medium sized Commercial Vehicles	512
Bus	89
Truck	1,848
Truck-Trailer-Tractor-Side Trailer	1,690
Total	10,704

5.10.2. Impact Assessment

Construction Phase

In the construction phase of the project activities that will lead to an increase in traffic load are as follows:

- Transportation of staff to work area
- Transportation of construction materials
- Use of construction equipment

The accommodation needs of construction personnel will be fulfilled at a region located within the construction site. However, regarding the daily usage, it is expected that 10 cars and 10 mid-range commercial vehicles will move in and out of the construction site.

During the construction phase for the transport of the necessary materials, daily 10 trucks, 5 heavy construction equipment and 5 medium commercial vehicles are estimated to be used. Vehicles that will generate traffic load during construction are given in **Table 85**.

Table 85. Vehicles to Generate Traffic Load in the Construction Phase

Traffic Load Source	**Number and Type of Vehicle**
Staff Daily Use	10 cars / day
	10 medium-loaded commercial vehicles / day
Heavy Equipment and Transport Material	10 Trucks
	5 heavy machinery
	5 medium-loaded commercial vehicles
Total	**40 vehicles / day**

To access to the Project area, the road network mentioned in **Figure 61** can be used. Upon realization of the Project, 80 vehicles will be added daily over the current traffic. In this case, total traffic volume of the present road will be 10,784vehicles / day and traffic load over the present road will increase as 0.7 % together with the planned Project.

Operation Phase

At the operational phase of the project, the vehicles to check in and out of the health facility are expected to cause an increase in traffic load. Vehicle type envisaged to use the health facilities are given in the following articles:

- Private vehicles
- Staff Service
- Taxi
- Bus
- Ambulances and other hospital vehicles

The number of daily patients, visitors that will use the health facilities and therefore daily input and output number of hospital transport cannot be estimated so it cannot be calculated the traffic load increases in the operational phase. However, considering that the two-lane divided highways located in the eastern and northern part of the hospital, the road is considered to have sufficient capacity

Cumulative Impacts

Upon realization of the Project, 0.7 % increase in traffic load is at negligible level.

5.10.3. Mitigation Measures

In order to reduce the negative impacts on the traffic load during project construction and operation phases, following measures will be taken:

- In order to prevent negative effects on traffic in and around the project area, a Traffic Management Plan will be prepared to cover by the construction and operation period by ATM Manisa Health Investment and Management Company.
- As far as possible the roads that will be used during construction phase will not pass from the sensitive receptors like schools and residential units.
- Security and traffic warning signs will be placed around the project area.
- Speed limit rules will be complied.
- During construction, drivers of vehicles and personnel to use the machines will be informed for safe driving.
- Information to the relevant authorities will be given during the transportation of special cargo.
- Training about Safe loading / unloading and issues such as load limits will be given to the operators that will use special tools such as forklifts and license will be taken.
- There will be will sound alarm equipment for the vehicles that has limited rear view during driving back.
- Operating rules and procedures for right of way, pitch speed limits, vehicle inspection requirements will be determined and compliance will be ensured.
- Transport activities will not damage existing roads; formation of any conditions such as dust, smoke, unburned gas will be prevented, vehicles will not be loading more than permissible value, bridges, warning signs, culverts, asphalt and gravel covering the road will not be impaired. In case of any damage to the structure, damage costs will be borne by the contractor.

During the project`s shipping and transportation activities 2918 Road Traffic Act the Road Transport Directive and the Regulation on the Transport of Dangerous Goods by Road will comply with the provisions.

5.10.4. Residual Impacts

Transport operations during construction will be provided over designated routes and main highways. Considering the current traffic load on these roads, negative impact expected to occur over the roads will be negligible.

At the operational phase of the health facility.in the case that the construction of roads planned by the authorities and the formation of the Traffic Management Plan are realized then it is believed that the negative impact will be negligible.


IMPACT
•Traffic (Construction phase)
IMPACT CLASSIFICATION
•Olumsuz-Doğrudan
DURATION
• Short-term
SENSITIVITY
•Low
SEVERITY
•Negligible
IMPORTANCE
•Negligible
EFFECT
•Traffic (Operation Phase)
IMPACT CLASSIFICATION
•Negative - Direct
DURATION
•Long-term
SENSITIVITY
•Low
SEVERITY
•Negligible
IMPORTANCE
•Negligible

6. STAKEHOLDER ENGAGEMENT

6.1. Objective of Stakeholder Engagement Plan

This Stakeholder Engagement Plan has been developed with the aim of explaining strategy for engaging the various stakeholder groups and describing grievance mechanism which ensures open communication to receive feedbacks, opinions and concerns of the stakeholders.

The main objectives of the SEP are to:

- Identify stakeholders groups and communication methods
- Define requirements for stakeholder engagement;
- Ensure open communication with affected communities
- Present responsibilities and contact information
- Provide a grievance mechanism

6.2. Stakeholder Engagement Methodology

Stakeholder engagement studies on the project began with discussions with relevant governmental agencies prior to the ESIA. Stakeholder participation will continue during the ESIA period, construction period and operation period.

During the ESIA period;

- The stakeholder engagement plan has been prepared.
- Ads in national and local newspapers regarding stakeholder engagement have been given.
- By stakeholder participation meeting information about the project and its possible effects have been presented to the stakeholders.
- Making meetings and surveys, comments have been received from stakeholders.
- Official opinion about the project has been received by making official correspondences with relevant institutions.
- Field works have been performed by expert sociologists and the views of stakeholders have been taken during one on one meeting.
- Draft ESIA report and its annexes. Non-Technical Summary and Stakeholder Engagement Plan will be opened to the views of stakeholders on its Web site.

Construction and Operating period;

- Final ESIA document and attachments. Non-Technical Summary. Stakeholder Engagement Plan and Project Report Forms will be made available to stakeholders at the owner`s website, at related mukhtar offices and construction site.
- If necessary, an informative meeting with local people and authorities will be made.
- Stakeholder Engagement Plan will be updated as necessary.
- Stakeholder Engagement Plan and Grievance Mechanism will be used at the Communication with stakeholders.
- Relevant staff will receive training on Grievance Mechanism.

6.3. Stakeholder Analysis

Stakeholder identification and analysis are some of the most critical first steps of project process. Within the context of the specific management issues to be addressed, stakeholder identification and analysis provide a basic understanding of the social and institutional context in which the planning process will take place.

1. Stakeholder Definition;

The key stakeholders include;

- A wide range of governments and their directorates
- Local people.
  - ✓ People living in Manisa and closest settlement
- People who will use the hospital
- Retailers and other services suppliers for the hospital
- Employees (both employees of the company and subcontractors)
- Other hospitals
- Local businesses and economic sectors
- Mass media and communication networks
- Non-Governmental Organizations (NGOs)

2. Stakeholder Identification

Stakeholders are identified as below;

Table 86. List of Stakeholders

Stakeholder	Affiliation
Manisa Governorship	Highest provincial office in the region
Manisa Metropolitan Municipality	Highest local office in the region
Şehzâdeler Sub-Governorship	Highest administrative office in the district of the project
Şehzâdeler Municipality	Highest administrative office in the district of the project permissions, relations with province, municipal services
Manisa Metropolitan Municipality Environment and Protection Control Department	Permissions for waste management and excavation – audits related with location determination. excavation pouring and waste management
Manisa Metropolitan Municipality Zoning and Urbanization Department	Zoning permissions, audit of conformance with regional zoning plans.audit of implementation of local zoning plan, certifications related with construction, construction and structural audits
Manisa Metropolitan Municipality Transportation Department	Planning of transportation to project area, related permissions, mass transportation services, traffic services
Manisa Metropolitan Municipality Technical Works Department	Provision of contact with urban substructure of the project and provision of urban substructure requirements
Highways 2nd Regional Directorate (İzmir)	Permissions related with main roads accessing to project area
Highways 23rd Division Chief Office	Temporary usage of main roads accessing to project area, placement of warnings and alarm signals. road repair services
Manisa Provincial Environment and Urbanization Directorate	Transactions related with EIA Report audit for conformance with regional development plan and plan notes,audit of liquid and solid wastes,

Stakeholder	Affiliation
	chemical and medical wastes
4th Regional Directorate of Forest and Water Affairs	Taking precautions to protect environmental biological diversity and natural assets
Manisa Regional Office of Forestry and Water Works	Auditing of business place related with protection of biological diversity and natural assets.implementation of regulations. prevention of damage over near wetlands and natural assets
Manisa Provincial Directorate of Labor and Employment	Employment and job advertisement works. audit of occupational health and safety
4th Regional Spil Mount National Park Directorate of Forest and Water Affairs	National Park which is adjacent to the project is located inside the impact area so permission may be required to be taken from the administration during construction phase.
Manisa Chamber of Industry	Organization of relations with industrial establishments and sites located over the urban area. cooperation and service production about occupational health and safety matters
Manisa Chamber of Commerce	Receiving information and provision of cooperation related with supply services of the facility
Manisa Provincial Directorate of Heath	Provision of working permit.execution of institutl audits under the work and authority field of Ministry of Health
Manisa Chamber of Medicine	Works related with rights of workers and ethical audit for medical applications
Ahmet Bedevi Neighbourhood Headmen	Neighborhood is located to the adjacent of the project and located inside the impact area of the project.
Adnan Menderes Neighbourhood Headmen	Neighborhood is located to the adjacent of the project and located inside the impact area of the project.
Akpınar Neighbourhood Headmen	Neighborhood is located to the adjacent of the project and located inside the impact area of the project.
Kâzımkarabekir Neighbourhood Headmen	Neighborhood is located to the adjacent of the project and located inside the impact area of the project.
Nurlupınar Neighbourhood Headmen	Neighborhood is located to the adjacent of the project and located inside the impact area of the project.
Turgut Özal Neighbourhood Headmen	Neighborhood is located to the adjacent of the project and located inside the impact area of the project.
Yukarı Çobanisa Neighbourhood Headmen	Eastern neighbor of the impact area of the project.
Çobanisa Neighbourhood Headmen	Eastern neighbor of the impact area of the project.
Patients, Patients' Visitors and Families	During operation phase.

6.4. Grivance Mechanism

As part of good practice, Grievance Mechanism has been developed to deal with stakeholders concerns and complaints and to respond with more information and mitigation measures.as appropriate.

In the scope of the project, a grievance mechanism will be constituted with below properties;

- To provide channel throughout which affected and interested stakeholders can raise grievances
- To give written response (or verbal where applicable) to the grievances
- To track and register all community grievances that has been raised.

Project Performance Grievance Mechanism will be proposed to manage environmental and social impacts of the project and to receive the comments on environmental and social documents and implementations during construction and operation of the hospital as below;

This complaint procedure is developed about the personal or public damages and losses to occur during the activities and the personnel problems and this procedure will be followed by Community Liaison Officer (Officer).

The written complaints which are expressed by the regional inhabitants or those exposed to the activities are handled by the Officer. The oral complaints are also recorded by the Officer and these are read to the complaint owner and her approval is obtained and signed properly.

The response will be provided to the complainant within three days and the complaints will be evaluated within not later than fourteen (14) days period of time and together with the information about the matter which is subject of the complaint in question, if there is any damage and grievance, then the addressee will be answered with the information concerning the subject of how to handle and eliminate such damage or loss and grievance.

The satisfaction of the complaint owner is essential and the related principle should be solved and eliminated within three (3) days and not later than fourteen (14) days period of time, unless it is non-urgent. In case of reaching an agreement with the complainant, then this period could be extended as well. Whenever the necessity of extending the period occurs, then the agreement concerning this matter will be ensured in the mentioned fourteen (14) days period of time. However, if there is an unjust complaint and demand and if because of this reason the complaint could not be handled properly, then the Officer makes an application to the legal entity and looks for intermediation and will seek the consent of the complaint owner and then will conclude the issue without giving rise to any conflict at all.

In case of occurrence of any complaint, the mentioned complaint is also transferred to the executive of the project owner responsible for the administrative and social affairs and a copy of the answer which is given to the addressee is presented to that person within three (3) days period of time. The conclusion of the complaint which is concluded not later than fourteen (14) days period of time is notified to the Officer.

All of the complaints are recorded until the end of the work and the final report relating to the process of concluding the complaints and the complaints in question will be arranged and then maintained in computer environment. Upon request, such records are delivered to the Officer of the activity owner company.

The grievance mechanism will be advertised on site boards and on the Project website. For effective grievance management, written record of written and verbal complaints will be kept. A grievance register detailing all community grievances that have been raised will be formed. The record will include the date of the complaint, any follow-up actions taken, the final result, and how and when this decision was communicated to the people raising grievances.

Informational announcements about grievance mechanism will be posted at announcement board of municipalities and headman offices and websites of Project Company in order to enhance grievance progress. Also, the billboards on project site fence and security gate will include responsible people, phone numbers, email addresses which stakeholders can use for the communication.

7. MONITORING AND REPORTING PROGRAM

It is required to monitor the performance of Environmental and Social Impact Assessment during construction and operation phases then should be recorded. Environmental and social management applications specified within ESIA Report will be accepted as main guidelines by ATM and subcontractors and will be adopted for the related activities of the Project.

An Environmental and Social Monitoring Plan (ESMP) has been prepared for Manisa Training and Research Hospital Project (**See Annex-C**). The objective of ESMP which has been prepared in conformance with national legal framework and International standards and guidelines is to determine basic management and monitoring activities during the design (Project preparation), construction and operation phases of the Manisa Training and Research Hospital Project. Plan has been developed according to preventive and reducing measures mentioned in Environmental and Social Impact Assessment Report for possible negative environmental and social impacts of the Project.

The Monitoring Plan includes the following information;

- Environmental and Social Impact / Parameter
- Legal framework
- Project phase
- Details of preventive measures
- Responsible executor
- Monitoring frequency and method
- Objective and assessment criteria

Whenever required, internal audit, independent audit, field controls, questionnaire studies, grievance forms and environmental measurement / analysis methods will be used under the scope of monitoring activities. The monitoring studies will be stored and will be made available to shareholders whenever requested.

The responsibility of accomplishment of practices mentioned in Environmental and Social Impact Assessment Report and Environmental and Social Monitoring Plan belongs to the Contractor, namely ATM Sağlık Manisa Yatırım ve İşletme A.Ş. ATM will supply necessary resources and personnel for these implementations.

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