AYGM

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Environmental and Social Impact Assessment



70069878-ESIA
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HABITAT CLASSIFICATION MAPS (CHAPTER 8: ECOLOGY

APPENDIX O

CULTURAL HERITAGE ASSET FIGURES (CHAPTER 9: CULTURAL HERITAGE)

APPENDIX P

CULTURAL HERITAGE SITE WALKOVER SURVEY (CHAPTER 9: CULTURAL HERITAGE)

APPENDIX Q

REPRESENTATIVE PHOTOGRAPHS (CHAPTER 10: LANDSCAPE AND VISUAL)

APPENDIX R

RAW DATA FOR EMISSIONS FROM MODAL SHIFT (CHAPTER 14: CLIMATE CHANGE)

APPENDIX S

VULNERABILITY ASSESSMENT (CHAPTER 14: CLIMATE CHANGE)

APPENDIX T

ENVIRONMENTAL PERMITS (CHAPTER 19: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN)

APPENDIX U

ENVIRONMENTAL STANDARDS (CHAPTER 19: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN)

APPENDIX V

MANAGEMENT OF CHANGE PROCEDURE (CHAPTER 19: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN)

APPENDIX W

KEY PERFORMANCE INDICATORS (CHAPTER 19: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN)

1

INTRODUCTION

PUBLIC

1 INTRODUCTION

1.1 THE PROJECT

1.1.1. The Turkish General Directorate of the Infrastructural Investment (AYGM) intends to construct a new high speed railway line from Halkali to Ispartakule and from Isparakule to Çerkezköy (herein referred to as 'the Project'), in two different tenders and sections. The Project will be located within the region of Istanbul and the province of Tekirdag (the land upon which the railway is to be built is herein referred to as 'the Site'). Once operational the Project would be operated by TCDD Taşımacılık (TCDD Transport) (and TCDD).

1.1.2. The Project will provide passenger and freight services connecting Istanbul (at the existing Halkali Station) to the district of Cerkezköy and will link to the under-construction Çerkezköy-Kapikule railway, which is partially funded by the European Union (EU). The Project, together with the in construction Çerkezköy-Kapikule railway, will be part of the Trans-European Transport Network (TEN-T) connecting to Turkey's European border (at Kapikule). The Project and the Çerkezköy-Kapikule railway will together form one integrated railway system with full interoperability.

1.1.3. The European Bank for Reconstruction and Development (EBRD) and the Asian Infrastructure Investment Bank (AIIB), collectively called the 'Lenders', are considering financing components of the Project, specifically the construction of the railway between Ispartakule and Çerkezköy only.

1.1.4. The Project and this ESIA has therefore been developed on behalf of AYGM in accordance with these Lenders policies and requirements, as summarised **Section 1.6**.

1.1.5. For the purposes of this ESIA, the term 'Project' refers to the following (a detailed description of the Project is provided in **Chapter 2: Description of the Project**):

- A new double track 9km line (i.e. two new lines) between Halkali Station and Ispartakule Station. In order for the Project to pass under the proposed Kanal Istanbul project a 6km twin-bored tunnel will be constructed in this section. The twin-bored tunnel will contain two high-speed tracks with one line for each direction (though bi-directional operation will also be possible, if necessary). The twin-bored tunnel tracks will suitable for use by both conventional and high-speed trains. Conventional trains will re-join the existing railway prior to Ispartakule Station;
- A new double track 67km line from Ispartakule to a location adjacent to the east of Çerkezköy Station (approximately 1km from the centre of Çerkezköy);
- Modification of existing infrastructure, but not buildings, at the 3 existing stations (Halkali (0km), Ispartakule (9km from Halkali) and Çatalca (32km from Halkali)), including the provision of footbridges, platforms and additional tracks;
- New ancillary structures, inclusive of bridges, viaducts, tunnels, overpasses and underpasses;
- Supporting power supply systems, inclusive of overhead lines and substations; and
- Supporting electrification, signalling and control systems.

1.1.6. The Project, in comparison with the projected usage of the existing railway line, would see the following changes to trains per hour by the forecast year of 2041:

- Halkali – Çatalca:
  - An 80% increase in passenger trains, with no change in freight train numbers.
- Çatalca – Çerkezköy:

- An 80% increase in passenger trains and a 45% increase in freight trains.

1.2 PROJECT NEED

1.2.1. The principal need for the Project is to increase the freight and passenger rail capacity in the strategically critical area of Thrace. The area is critical as a European-Asian meeting point of the European rail network and, under future growth scenarios, is set to become an increasing bottleneck unable to meet the demand of future populations.

1.2.2. The Project is a response to key transport sector policies and strategic infrastructure initiatives which are summarised below.

1.2.3. Through the TEN-T policy, the EU aims to build an effective EU-wide transport infrastructure network. The TEN-T policy addresses the implementation and development of a Europe-wide network of railway lines, roads, inland waterways, maritime shipping routes, ports, airports and railroad terminals. The ultimate objective is to close gaps, remove bottlenecks and technical barriers, as well as to strengthen social, economic and territorial cohesion in the EU. The Project would form a part of and thus aid the development of the TEN-T. The Project, together with the in construction Çerkezköy-Kapikule railway, will be part of the TEN-T connecting Istanbul (at Halkali) to Turkey's European border (Kapikule), enhancing the EU-wide transport network, removing a bottleneck, and strengthening economic growth. The Project, together with the Çerkezköy to Kapikule railway, will provide connections to Sofia (Bulgaria), which is located within the Orient / East-Mediterranean corridor of the TEN-T Network.

1.2.4. The Project is a subcomponent of the TRACECA Project (Transport Corridor Europe-Caucasus-Asia). The aim of the TRACECA Project is to strengthen economic relations, trade and transport in the regions of the Black Sea basin, South Caucasus and Central Asia.

1.2.5. The Project is one of the key Major Infrastructure Projects identified in Turkey's Sector Operational Programme for Transport (SOPT) (2014-2020), which is based on relevant existing Turkish Government and European Union strategies, including Turkey's 11th National Development Plan (2019-2023). The SOPT has the following five priorities;

- To enhance the sustainability and safety of national transport systems;
- To improve the efficiency of national transport systems;
- To promote a shift from individual transportation to sustainable, accessible and extensive modes of mass transportation on both a national and urban level;
- To progressively align the Turkish transport sector with the EU transport Acquis, integrate with the Single European Transport Area; and
- To ensure the efficient use of the financing provided by the EU, the donors and the financing provided at the national level in the transport sector of Turkey.

1.2.6. The SOPT Programme focuses on freight railway activities that are most relevant for connecting with the Ten-T network, which includes the Project:

- The Thracian component of the expansion of the TEN-T: The TEN-T consists of the infrastructure for railway transport, inland waterway transport, road transport, maritime transport, air transport and multimodal transport. The comprehensive network shall consist of all existing and planned transport infrastructures of the TEN-T as well as measures promoting the efficient and socially and environmentally sustainable use of such infrastructure; and
- Compliance with EU transport policies and directives (EU 1315/2013).

1.2.7. In addition, Turkey's 11th National Development Plan stated that the Project, together with the in-construction Çerkezköy-Kapikule railway, will increase export opportunities, facilitate trade, reduce the costs of transporting goods and materials, and establish a 'flexible, safe, reliable and integrated transport system' for Turkey.

1.3 AIMS OF THE PROJECT

1.3.1. The requirements for the Project are associated with socioeconomic, demographic and infrastructure demands forecasted for Turkey as well as commitments for trans-national infrastructure policies. The Project objectives are as follows:

- Contribute towards the achievement of:
  - Enhancement of the sustainability and safety of the national transport system;
  - Improved efficiency of the transport system;
  - Facilitation of a shift from individual to sustainable, accessible and inclusive modes of public transport at the national level; and
  - To facilitate further integration of Turkey with the Single European Transport Area.
- Solve the capacity constraints of the railway link between the Orient / Eastern Mediterranean Corridor and the indicative extension of the TEN-T railway network of the Anatolian region of Turkey. This will maximise the potential for developing a seamless transition from Europe to eastern Anatolia via the third Bosphorus Bridge.
- Remove the railway capacity limitations and encourage a modal shift from the current heavy reliance on road transport to railway transportation by:
  - Improving the level of service provided by TCDD Transport to its passengers / customers by reducing travel time and increasing train frequency;
  - Increasing capacity and the level of service for freight customers; and
  - Reducing the passenger and freight traffic loads on highways, thereby reducing the risk of accidents on said highways.

1.4 PROJECT SETTING

1.4.1. The Project is located in the north western of Turkey, and within the province of Tekirdag, in the region of Thrace, and the region of Istanbul. These regions are largely urbanised, containing the largest city in Turkey (Istanbul). There is an existing rail network in these regions which has a single-track layout throughout and connects Istanbul (Halkali station) to the Bulgarian border (Kapikule station). The Project alignment is broadly aligned with this existing railway, which can be divided into sections as follows:

- Halkali – Ispartakule; and
- Ispartakule – Çerkezköy.

1.4.2. There is also an established road network connecting the city of Istanbul to the Bulgarian border, as well as providing links to the major port of Tekirdag and Istanbul's international and national airports.

1.4.3. The Project alignment is shown on Figure 1-1 below.



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Proposed Railway Route
- Disctrict



Note:

Drawing Status: FINAL

Job Title: HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title: Figure 1-1 - Project Location Plan

Scale at A4: 1:500,000

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LW	JW	DG	22/02/2021

0 2 4 8 12 16
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Drawing Number: Figure 1-1

Path: \\uk.wspgroup.com\central data\Projects\700698xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 1-1 - Project Location Plan.mxd

1.5 NATIONAL EIA REQUIREMENT

1.5.1. A National EIA was prepared for the Project in 2017. This was prepared in accordance with Turkish EIA regulations, which have been detailed in **Chapter 4: Lender's Performance Requirements, EU Standards, Legislative and Policy Context**.

1.5.2. The National EIA was approved in 2017. The Project has changed since the preparation of the National EIA, to include a tunnel crossing under the proposed Kanal Istanbul project in the Halkali-Ispartakule section. The Ispartakule-Çerkezköy section was not affected by the Kanal Istanbul project. The Ministry of Environment and Urbanisation has confirmed that the National EIA prepared in 2017 remains valid as it was performed for a 2km wide corridor, within which the alignment of the tunnel under the Kanal Istanbul is contained. The confirmation letter from the Ministry of Environment and Urbanisation is provided in **Appendix A.**

1.6 LENDERS ENVIRONMENT AND SOCIAL REQUIREMENTS

The Lenders are considering financing the section of the Project between Ispartakule and Çerkezköy, the "Lenders' Project", in accordance with their respective policies outlined below.

AIIB

The Lenders' Project will be compliant with AIIB's Environmental and Social Framework (approved 2016 and amended 2019). In accordance with AIIB's provisions regarding development partners policies, the AIIB has elected to apply the EBRD's Environmental and Social requirements on the Project. These requirements are outlined below and detailed in **Chapter 4: Lender's Performance Requirements, EU Standards, Legislative and Policy Context**.

EBRD

1.6.1. The EBRD Environmental and Social Policy (2014) establishes the environmental and social requirements for the defined set of business activities considered for financing by the Bank, i.e. the Lenders' Project, which consists of the new railway and associated systems between Ispartakule and Çerkezköy only. The Halkali to Ispartakule section intersects the proposed Kanal Istanbul project and therefore includes a tunnel crossing under the proposed canal. This section is not part of the Lenders' Project as they are not considering financing this section. The Halkali-Ispartakule section is considered an associated facility under the EBRD Environmental and Social Policy (2014) and therefore, to the extent appropriate, an assessment to identify and characterise the environmental and social effects of this section is required even if the EBRD does not finance this section.

1.6.2. This ESIA includes an assessment of both the Lenders' Project and the associated facility ('the Project').

CATEGORISATION

1.6.3. The EBRD Environmental and Social Policy (2014) categorise projects as A, B, C and FI to determine the nature and level of environmental and social investigation, information disclosure and stakeholder engagement required. The categorisation corresponds to the nature, location, sensitivity, scale and likely significance of adverse effects of the project in question.

1.6.4. EBRD has assigned a Category A status in accordance with the Environmental and Social Policy (2014) to the Lenders' Project, as it is a greenfield project that could result in potentially significant

adverse environmental and/or social effects. EBRD's Category A is equivalent the AIIB's Category A, if AIIB's Environmental and Social Framework (2019) were applied.

1.6.5. Category A(6) projects as defined by the Environmental and Social Policy (2014) include:

"Construction of motorways, express roads and lines for long-distance railway traffic; airports with a basic runway length of 2,100 metres or more; new roads of four or more lanes, or realignment and/or widening of existing roads to provide four or more lanes, where such new roads, or realigned and/or widened sections of road would be 10 km or more in a continuous length."

1.6.6. The Project falls under Annex I(7(a)) of the EU's Environmental Impact Assessment (EIA) Directive (2014/52/EU) as follows:

"Construction of lines for long-distance railway traffic and of airports with a basic runway length of 2,100m or more."

1.6.7. The categorisation as a Category A project means that a comprehensive Environmental and Social Impact Assessment (ESIA), and review of associated documents must be carried out, followed by the public disclosure of the ESIA, for 120 days.

ESIA

1.6.8. This ESIA has been undertaken in accordance with, and has been prepared to comply with, the Lenders' Environmental and Social requirements, specifically the EBRD Environmental and Social Policy (2014) and Performance Requirements (PRs) (2014) and will be disclosed, together with other disclosure documents, as set out in **Chapter 5: Approach to ESIA.**

1.6.9. The PRs also require substantive EU standards to be applied including:

- EU Directive 2014/52/EU – The EIA Directive;
- EU Directive 2000/60/EC - The Water Framework Directive;
- EU Directive 2008/98/EC – The Waste Framework Directive;
- EU Directive 2006/118/EU – The Groundwater Directive;
- EU Directive 2009/147/EC – The Birds Directive;
- EU Directive 92/43/EEC – The Habitats Directive;
- EU Directive 2008/50/EC – The Ambient Air Quality Directive; and
- EU Directive 89/391/EEC – the Occupational Health and Safety Framework Directive.

1.6.10. Where Turkish regulations differ from EU substantive environmental standards, the Project will be expected to meet whichever is the more stringent.

1.6.11. Further details on the legislative and policy requirements are provided in Chapter 4: Lender's Performance Requirements, EU Standards, Legislative and Policy Context.

NATIONAL REGULATORY REQUIREMENTS

1.6.12. This ESIA will conform to Turkish Environmental and Social regulations, inclusive of, but not limited to, the following:

- The Environment Law 1983 (as amended in 2006, 2018 and 2020);
- Regulation on Environmental Impact Assessment (EIA Regulation) 2014 (as amended in 2016, 2017 and 2019);
- Regulation on Waste Management 2015 (as amended in 2017);

- Regulation on Control of Pollution of Water and its surroundings by Hazardous Substances 2005 (as amended in 2010);
- Regulation on the Control of Hazardous Wastes 2005 (as amended in 2010 and 2013);
- Regulation regarding Point Source Land Pollution and Soil Contamination Control 2010;
- Regulation on the Management of Surface Water Quality 2012 (as amended in 2015 and 2016); and
- Regulation on Environmental Permit and License 2014 (as amended in 2016 and 2019).

1.7 AYGM

1.7.1. In August 2020 AYGM took over the role of detailed designer and developer for the Project from TCDD. TCDD has been responsible for the design and development of the Project prior to August 2020. AGYM will be responsible for the development and delivery of Project until the completion of the construction phase.

1.7.2. AGYM is a Directorate of the Turkish government. AYGM's responsibilities are inclusive of the development and construction of railways, ports, airports and logistics centres.

1.7.3. AYGM's organisational structure for the Project is shown in Figure 1-2.

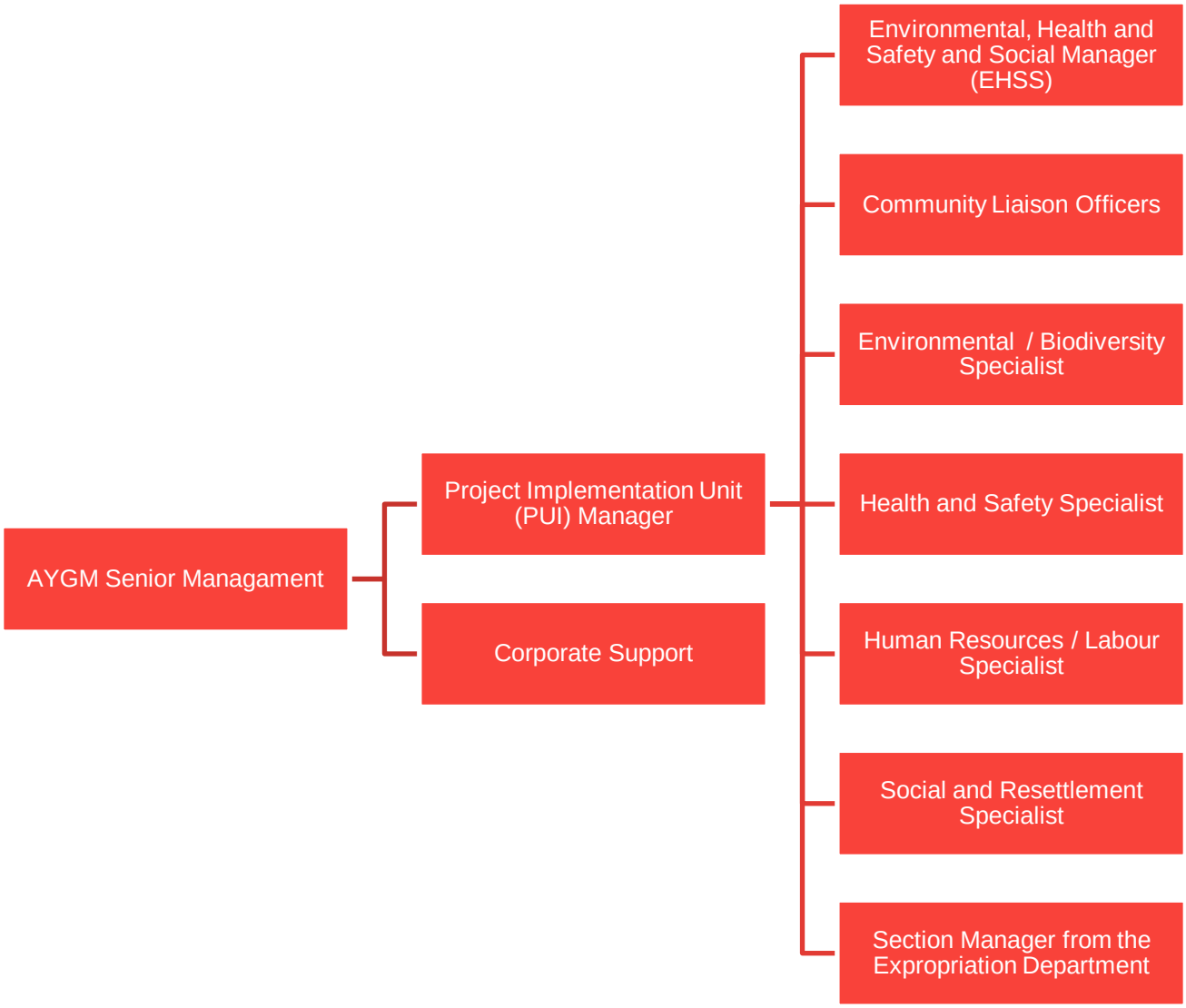


Figure 1-2 - AYGM's Project Implementation Unit (PIU) Organisational Structure

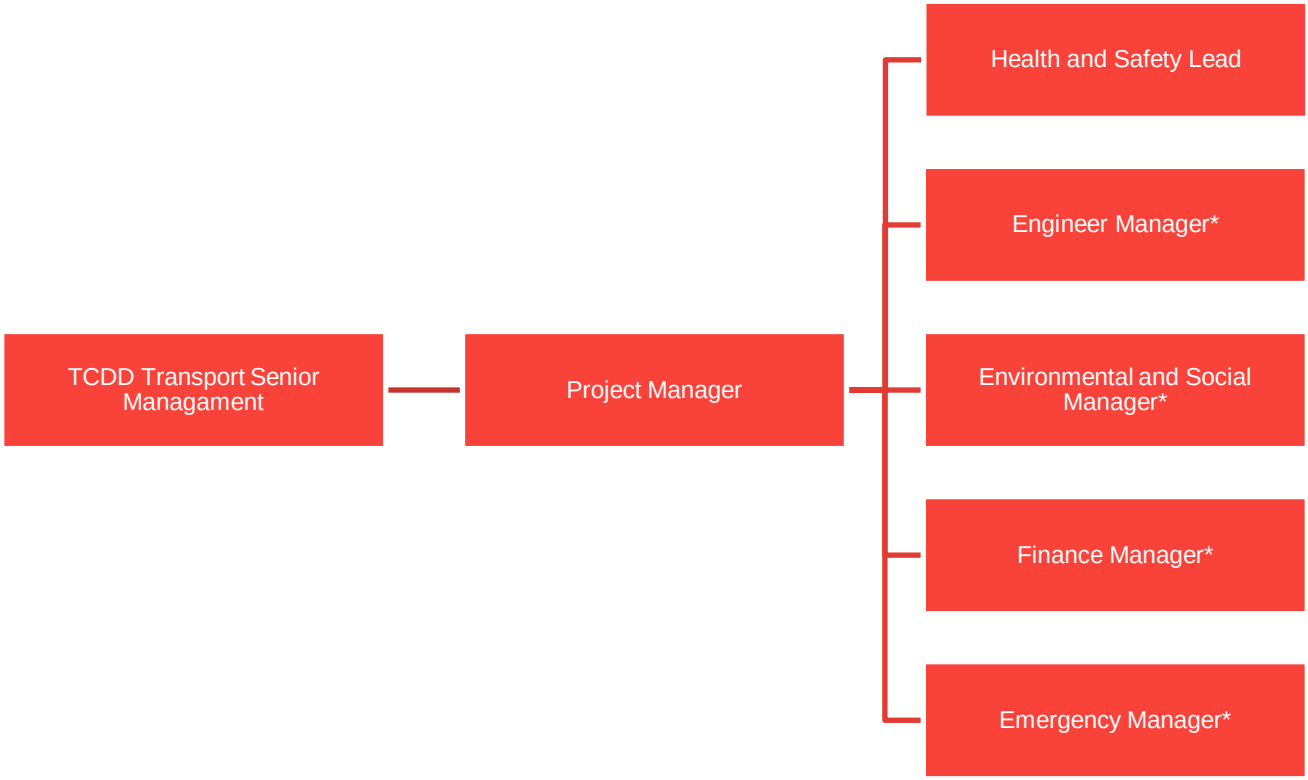
1.8 TCDD TRANSPORT AND TCDD

1.8.1. TCDD Transport (and TCDD) will be responsible for the operation of the Project.

1.8.2. TCDD, State Railways of The Republic of Turkey, falls under the jurisdiction of the Ministry of Transport and Infrastructure. TCDD will be responsible for the operation and maintenance of railway infrastructure.

1.8.3. TCDD Transport is a subsidiary organisation to TCDD who will work in collaboration with TCDD. TCDD Transport will be responsible for the operation and maintenance of the railway for passengers and freight.

1.8.4. The expected Project organisational structure of TCDD Transport is shown in Figure 1-3.



*Part of TCDD Transport's wider railway operations.

Figure 1-3 - TCDD Transport's Project Operational Organisational Structure

1.9 FEASIBILITY STUDY

1.9.1. A Feasibility Study for the Project was completed in June 2018, prior to the preparation of this ESIA. This study has informed the preparation of elements of this ESIA, particularly the consideration of alternatives to the Project. There have been substantial design evolutions since the study was undertaken, in particular as a response to the proposed Kanal Istanbul project, and the design revision to the Project to include a tunnel crossing under the Kanal Istanbul project, which affects the Halkali to Ispartakule section only.

1.10 RESPONSIBLE BODIES

1.10.1. A function of key organisations and their function in relation to the Project, are presented in Table 1-1 below.

Table 1-1 - Summary of Responsible Bodies

Organisation	Project Function	Reporting Line
The Turkish Government	National Government	Not Applicable
Regional Governments of Istanbul and Thrace (Tekirdag)	Local Authorities	National Government

Organisation	Project Function	Reporting Line
Ministry of Environment and Urbanisation	Project Approval	National Government
TCDD	Detailed Designer and Developer of the Project (prior to August 2020) Responsible for the operation and maintenance of railway infrastructure. Note: TCDD will work together with TCDD Transport. TCDD Transport will be responsible for the operation and maintenance of the railway for passengers and freight.	The Turkish Government
AYGM	Detailed Designer and Developer of the Project (post August 2020)	The Turkish Government
TCDD Transport	Responsible for the operation and maintenance of the railway for passengers and freight. Note: TCDD Transport will work together with TCDD. TCDD will be responsible for the operation and maintenance of railway infrastructure.	The Turkish Government
ECORYS	Preparation of the Feasibility Study	EIB and EC
SWECO	Preparation of the National EIA	TCDD
WSP	Preparation of International ESIA	AYGM
-	Contractor (to be awarded)	AYGM
Local Businesses, Mukhtars, Residents and Other Stakeholders	Those stakeholders with the potential to be permanently or temporarily effected affected as a result of the Project.	AYGM

1.11 PURPOSE OF THE ESIA

1.11.1. The ESIA has been prepared in line with Lenders' requirements, EU substantive environmental standards and Turkish environmental standards that are relevant to this Project. The purpose of this ESIA is to systematically identify environmental and social impacts throughout the Project lifecycle, and to develop and establish a methodology to implement mitigation measures, to avoid or reduce the impacts. This ESIA incorporates an Environmental and Social Management Plan (including supporting plans), that sets out the measures that will be implemented during construction and operation to reduce the impacts of the Project.

1.11.2. The ESIA has been informed by and/or is supported by the following reports included as part of the overall ESIA Disclosure Package:

- Stakeholder Engagement Plan (SEP);
- Resettlement Action Plan (RAP);
- Biodiversity Management Plan (BMP);
- Contractor Management Plan (CMP); and
- Emergency Response Framework (ERF).

1.11.3. This ESIA presents the findings of the assessment of the following environmental and social topics, including the potential for significant effects and suitable mitigation measures. A summary of the chapters and the appendices are included in Table 1-2 and 1-3.

Table 1-2 - Summary of Chapters

Chapter	Description
Chapter 1: Introduction	Introduction to the Project.
Chapter 2: Description of the Project	Description of the Project, baseline information and construction activities and programme.
Chapter 3: Consideration of Alternatives	Alternative modes, locations and technologies that have been considered for the Project
Chapter 4: Lenders Performance Requirements, EU Standards, Legislative Policy and Context	Lenders' requirements and national and international environmental and social legislation that is of relevance to the Project.
Chapter 5: Approach to the ESIA	ESIA methodology for the environmental assessment and provides a record of the consultation undertaken to inform the ESIA.
Chapter 6: Air Quality Chapter 7: Noise and Vibration Chapter 8: Ecology Chapter 9: Cultural Heritage Chapter 10: Landscape and Visual Chapter 11: Surface Water Environment	Technical assessments of environmental and social topics.

Chapter	Description
Chapter 12: Geology and Hydrogeology Chapter 13: Materials and Waste Chapter 14: Climate Change Chapter 15: Social Chapter 16: Major Accidents and Disasters Chapter 17: Cumulative Effects	
Chapter 18: Summary	Presents a summary of the potential effects and suitable mitigation measures identified in each assessment.
Chapter 19: Environmental and Social Management Plan	Represents a commitment by AYGM and TCDD Transport (and TCDD) to ensure the environmental and social sustainability of the Project. The Environmental and Social Management Plan (ESMP) applies to the Project's full lifecycle.

Table 1-3 - Appendices

Appendices
Appendix A: Confirmation of National EIA (Chapter 1)
Appendix B: 2018 Feasibility Study: Alternatives Scoring (Chapter 3)
Appendix C: Glossary (Chapter 6: Air Quality)
Appendix D: Traffic Data (Chapter 6: Air Quality)
Appendix E: Emissions (Chapter 6: Air Quality)
Appendix F: Wind Roses (Chapter 6: Air Quality)
Appendix G: Full PM Monitoring Data (Chapter 6: Air Quality)
Appendix H: Air Quality Figures (Chapter 6: Air Quality)
Appendix I: Construction and Operation Noise Modelling Data (Chapter 7: Noise and Vibration)
Appendix J: Noise Modelling Results (Chapter 7: Noise and Vibration)
Appendix K: Noise Monitoring Forms (Chapter 7: Noise and Vibration)
Appendix L: Critical Habitat Assessment (Chapter 8: Ecology)
Appendix M: Biodiversity Management Plan (Chapter 8: Ecology)
Appendix N: Habitat Classification Maps (Chapter 8: Ecology)
Appendix O: Cultural Heritage Asset Figures (Chapter 9: Cultural Heritage)
Appendix P: Cultural Heritage Site Walkover Survey (Chapter 9: Cultural Heritage)

Appendices

Appendix Q: Representative Photographs (Chapter 10: Landscape and Visual)

Appendix R: Raw Data for Emissions from Modal Shift (Chapter 14: Climate Change)

Appendix S: Vulnerability Assessment (Chapter 14: Climate Change)

Appendix T: Environmental Permits (Chapter 19: Environmental and Social Management Plan)

Appendix U: Environmental Standards (Chapter 19: Environmental and Social Management Plan)

Appendix V: Management of Change Procedure (Chapter 19: Environmental and Social Management Plan)

Appendix W: Key Performance Indicators (Chapter 19: Environmental and Social Management Plan)

1.11.4. This ESIA, which has been prepared to comply with Lenders' requirements, utilises information from the National EIA for the Project (2017) and information from further studies and designs that were prepared for the Project.

1.11.5. Upon completion of the ESIA and supporting documents an ESIA disclosure package will be available for public review and comment for 120 days (as detailed in **Chapter 5: Approach to ESIA**), after which the documentation will be revised, where appropriate, in response to the comments received.

2

DESCRIPTION OF THE PROJECT

PUBLIC

2 DESCRIPTION OF THE PROJECT

2.1 INTRODUCTION

2.1.1. This chapter provides a description of the Project and includes the design, construction and operational / maintenance phases. It also sets out the key assumptions used for the assessments, where the detailed information is yet to be confirmed.

2.2 OVERVIEW OF THE PROJECT

2.2.1. The Project is composed of two sections (i) Halkali- Ispartakule and (ii) Ispartakule-Çerkezköy which together will provide a new 76km high speed electric rail link connecting Istanbul (at the existing Halkali Station) to just before the existing Çerkezköy Station to the west. Halkali Station is located within Istanbul province and Çerkezköy is located in Tekirdag province, both in the north-west of Turkey. The Project will accommodate passenger and freight trains. The location of the Project is shown in Figure 2-1.

2.2.2. The Project will consist of:

- A new double track 9km line (i.e. two new lines) between Halkali Station and Ispartakule Station. In order for the Project to pass under the proposed Kanal Istanbul project a 6km twin-bored tunnel will be constructed in this section. The twin-bored tunnel will contain two high-speed tracks with one line for each direction (though bi-directional operation will also be possible, if necessary). The twin-bored tunnel tracks will suitable for use by both conventional and high-speed trains. Conventional trains will re-join the existing railway prior to Ispartakule Station;
- A new double track 67km line from Ispartakule to a location adjacent to the east of Çerkezköy Station (approximately 1km from the centre of Çerkezköy);
- Modification of existing infrastructure, but not buildings, at the 3 existing stations (Halkali (0km from Halkali), Ispartakule (9km from Halkali) and Çatalca (32km from Halkali)), including the provision of footbridges, platforms and additional tracks;
- New ancillary structures, inclusive of bridges, viaducts, tunnels, overpasses and underpasses;
- Supporting power supply systems, inclusive of overhead lines and substations; and
- Supporting electrification, signalling and control systems.

2.2.3. The key design parameters and specifications for Project are shown in Table 2-1.

2.2.4. The Project will link to the Çerkezköy to Kapikule railway section, which is currently under construction, and is funded by the EU. The Project will be fully integrated with the Çerkezköy to Kapikule railway section and will have full interoperability. The Project is part of the Trans-European Transport Network (TEN-T) connecting to Turkey's European border (at Kapikule). The Project, together with the Çerkezköy to Kapikule railway, will provide connections to Sofia (Bulgaria), which is located within the Orient / East-Mediterranean corridor of the TEN-T Network.

2.2.5. The Project is also a subcomponent of the TRACECA Project (Transport Corridor Europe-Caucasus-Asia). The aim of the TRACECA Project is to strengthen economic relations, trade and transport in the regions of the Black Sea basin, South Caucasus and Central Asia.



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Railway Station (Current)
- Existing Railway Route
- Proposed Railway Route



Note:

Drawing Status: FINAL

Job Title: HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title: Figure 2-1 - Project Location

Scale at A4: 1:300,000

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Stage 1 check	Stage 2 check	Originated	Date
JK	JW	DG	22/02/2021

0 1.25 2.5 5 7.5 10 Km

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Table 2-1 - Design Parameters

Parameter		Specification / Number
Line Type		Electric
Gauge		1,435mm
Distance Between Line Axes		4.5m
Steel Rail Type		60E1 (UIC60)[1]
Sleeper / Travers Type		B70 Reinforced Concrete
Axle Load		22.5 tonnes
Electrification		25 kilovolts (kV) Monophase 50 hertz (Hz)
Signalling		European Rail Traffic Management System (ERTMS) – Level 1
Minimum Horizontal Curve Radius		2,200m
Maximum Vertical Slope		1.6 %
Design Speed (Maximum)	Passenger Trains	200km/h
	Freight Trains	120km/h
Structures	Bridges	9
	Viaducts	2
	Tunnels	8
	Overpasses	17
	Underpasses	26
Railway Corridor[2]		50m
Platform Width		14.5m

[1] Manufactured according European Standard EN 13674-1 (2011).
[2] The 50m railway corridor for the Project cover the area required for the railway track and the overhead line system but excludes additional areas of permanent land that may required (such as for embankments, cuttings and station parking).

2.3 THE EXISTING SITE

EXISTING RAILWAY

2.3.1. The Project broadly follows the route of existing railway (referred to as 'online' for the purpose of this assessment). Areas of the Project deviate from the existing railway in order to adhere to the needs and optimisation of a high-speed railway, such as adhering to maximum gradient and minimum curve radius, that is required to allow rolling stock to operate safely and passengers to remain comfortable at higher speeds, without a risk of derailment or discomfort.

DESCRIPTION OF THE PROJECT SURROUNDINGS

2.3.2. The following sections describe the Project from east to west. The Project will consist of new structures (including rail track), new electrification systems, new signalling systems and new control systems (these are described in **Sections 2.4** to **2.7**).

2.3.3. The alignment of the Project, the existing railway, and the existing stations are shown in Figure 2-1.

Section from Halkali – Ispatarkule (chainage 0+000 to 9+373)

2.3.4. The Project starts at Halkali Station. Halkali Station is the largest station in Turkey, located approximately 20km away from the centre of Istanbul. The Station complex covers an area of approximately 6,500m^2.

2.3.5. Halkali Logistic Centre and the Historic Electric Train Maintenance Depot are located in close proximity to the Station as shown in Figure 2-10 (1/5). Halkali Station is within an urban environment, with residential and industrial areas located to the north, south and east. Çekmece Nuclear Research and Training Centre (ÇNAEM) is located 400m to the west of the Station, and is used for research, development, application and training in the nuclear field. Additionally, the Lake Küçükçekmece waterbody is located approximately 200m to the south of the station, at its closes point. Further details on Lake Küçükçekmece are included within **Chapter 11: Surface Water**.

2.3.6. The Station operates as the main terminal for international rail services to and from Europe. International, high speed, regional, intercity, sleeper and freight traffic run from, or terminate at, Halkalı Station. Typically, the following passenger trains operate from Halkali Station per day:

- 3 passenger trains between Halkali and Cerkezkoy (on the existing railway);
- 4 high speed passenger trains operate between Halkali and Ankara;
- 128 passenger trains between Halkalı and Gebze (referred to as the 'Marmaray Line')[3]

2.3.7. The Station hosts approximately 15,000 - 20,000 passengers per day. In addition, 1 freight train per day runs between Halkali and Çerkezköy.

2.3.8. The Project will primarily be in a tunnel between Halkali Station and Ispartakule Station. The tunnel alignment is located below the current alignment of the existing railway, and follows the boundary of the Lake Küçükçekmece waterbody, passing under stream / creek to the north.

[3] 4 trains per hour operate in each direction between 06:00 and 22:00.

2.3.9. The Project alignment then returns to the surface, and passes through an area characterised by farmland, prior to entering Ispartakule Station.

2.3.10. Ispartakule Station is located on the western side of the Lake Küçükçekmece waterbody. The Station is located north of the E80 highway and is within an urbanised residential and industrial area (see Figure 2-10 (1/5)).

2.3.11. Ispartakule Station is a small station with 1 platform and 2 tracks and is considered to be a heritage asset (described further in **Chapter 9: Cultural Heritage**).

2.3.12. Halkali Station and Ispartakule Station are shown in Figure 2-2 and Figure 2-3, respectively.



Figure 2-2 - Halkali Station

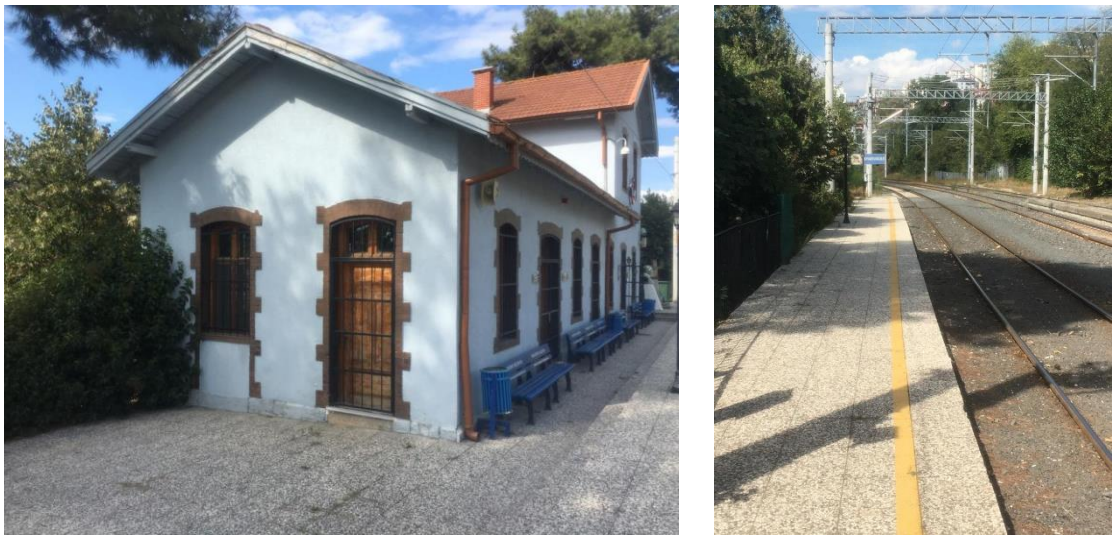


Figure 2-3 - Ispartakule Station

Section from Ispatarkule – Çatalca (chainage 9+373 to 31+800)

2.3.13. From Ispartakule Station the Project alignment follows a northern route, it passes under the Ömerli urban area in a tunnel (as shown in Figure 2-10 (1/5)). The alignment surfaces to the west of Ömerli it then passes to the south of Yesibayu, then through a large area of farmland, with small villages. This section of the Project alignment ends at Çatalca Station.

2.3.14. The Çatalca Station is located to the west of the town of Çatalca, with an area of farmland, an area of woodland and the D569 highway located between them (see Figure 2-10 (2/5)). Çatalca Station is a small station with 1 platform and 2 tracks and is considered to be a heritage asset (described further in **Chapter 9: Cultural Heritage**).

2.3.15. Çatalca Station is shown in Figure 2-4.



Figure 2-4 - Çatalca Station

Section from Çatalca – Çerkezköy (chainage 31+800 to 76+000)

2.3.16. From Çatalca Station, the alignment is initially located adjacent to the existing railway alignment. It crosses Karasu Creek, a waterbody, via a bridge at two locations (chainage 35+143 and 37+150), as shown in Figure 2-10 (3/5). At chainage 37+942 the Project alignment diverges northwards from the existing railway alignment, though a rural area, before converging back toward the existing railway alignment, and once more being located adjacent to the existing railway at chainage 42+450.

2.3.17. The alignment passes to the south of Kabakca, and Kabakca Station, on an alignment adjacent to the existing railway as shown in Figure 2-10 (3/5). At chainage 45+104 it then diverges to the north on an alignment to the south of Bekirli as shown in Figure 2-10 (3/5).

2.3.18. The alignment passes through an area of dense woodland to the west of Bekirli (chainage 53+000) which continues as the alignment passes to the north of Sinekli, as shown in Figure 2-10 (4/5), and north of Cayirdere as shown in Figure 2-10 (4/5). The woodland area ends to the west of Cayirdere and transitions into farmland on the approach to the border with the Tekirdag province as shown in Figure 2-10 (5/5).

2.3.19. The Project ends on the outskirts of Çerkezköy, just before Çerkezköy Station at the location shown in Figure 2-10 (5/5). Here the Project connects with the currently under construction Çerkezköy to Kapikule railway.

2.3.20. Between Çatalca and Çerkezköy the Project alignment is located in close proximity to local road infrastructure.



Figure 2-5 - Outskirts of Çerkezköy, Location of Project End[4]

EXISTING TRAINS

Passenger Trains

2.3.21. Typically, passenger trains consist of 6 cars, and each car typically has 60 seats[5], resulting in a maximum seated capacity of 360 passengers per train.

2.3.22. Projections for daily passenger train movements both with and without the Project are provided in **Section 2.11**.

Freight Trains

2.3.23. Typically, the freight trains consist of 20 cars.

2.3.24. Projections for daily freight train movements both with and without the Project are provided in **Section 2.11**.

4 Atkins (2020). Technical Due Diligence - Halkalı Çerkezköy Railway Line.

[5]Typical capacity for a standard car for the TCDD Transport TVS2000 train type.

2.4 STRUCTURES

RAIL TRACK

2.4.1. The Project will have a double line electrified rail track that will be 76km in length between Halkali Station and a location just to the east of Çerkezköy Station. The rail track will be designed for passenger and freight use.

2.4.2. The distance between the two-line central axis of the rail track will be 4.5m. The gauge of the rail track will be 1,435mm with an axel load of 22.5 tonnes.

2.4.3. The minimum horizontal curve of the rail track will be 2,200mm. The maximum vertical slope of the rail track will be 16%.

2.4.4. As well as the rail track itself, which will be made of steel, specification 60E1 (UIC60)[1], the following key components are required for the high-speed rail track:

- Ballast – Aggregate materials used as a base for the rail track and to also facilitate drainage;
- Sub-ballast – Crushed stone materials to complement the ballast layer, designed to be permeable enough to prevent saturation of the subbase while resisting freezing and thawing;
- Concrete Layer – A material that easily conforms to any mould while providing a high resistance. The foundation layer will provide a base of reinforced concrete to provide a base for the rail track; and
- Sleepers – Used between two rail tracks to keep the correct space of gauge (1,435mm for this Project). The sleepers will be prestressed concrete sleeper type B70.

2.4.5. Each of these key components will be supported by a series of subcomponents such as rail pads, under sleeper pads, baseplates and ballast maps.

2.4.6. There are several mineral quarries located near the alignment (as detailed in **Chapter 13: Materials and Waste, Table 13-3**), that have the potential to provide a local supply of materials for the Project, such as granite and basalt for the ballast.

2.4.7. An example section drawing of the rail track in included in Figure 2-6. Information regarding the electrification system, including the catenaries, is provided in **Section 2.5.**

2.4.8. A siding will be provided near Çatalca Station (between chainage 31+620 and 33+050) which will be used for the storage and maintenance of trains.

2.4.9. For the purposes of this ESIA it is assumed that the existing railway will remain and be used for maintenance and emergency purposes. The existing railway (used by conventional trains) will be diverted onto the new high-speed rail tracks to pass under the proposed Kanal Istanbul project in the twin bore tunnel and will re-join the existing railway just before Ispartakule Station.

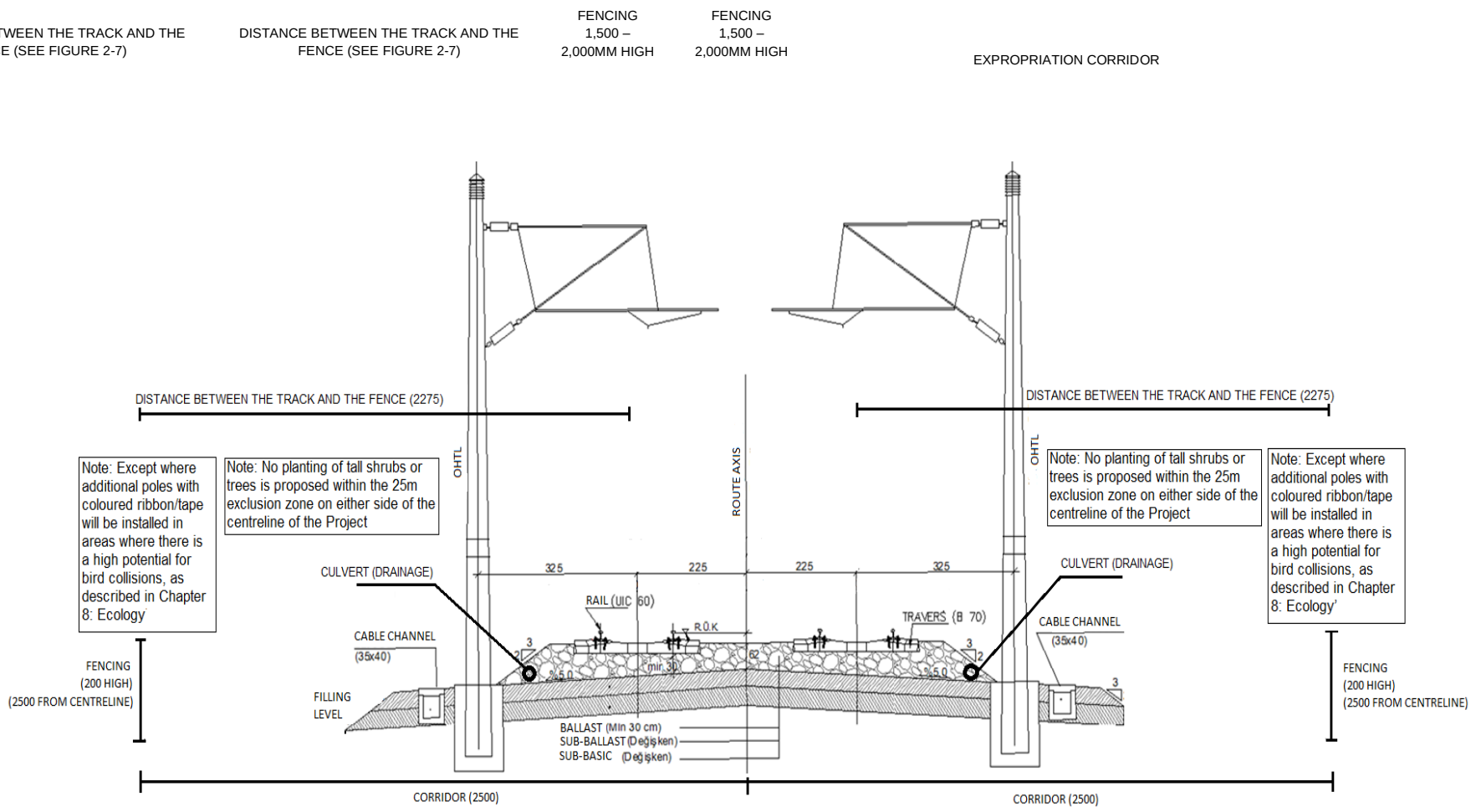


Figure 2-6 - Example Rail Track Section Drawing

FENCING

2.4.10. Throughout the Project alignment fencing, that is between 1.5 and 2m in height, will be provided in the expropriation corridor as shown in Figure 2-8. This is a safety measure to prevent people and fauna having access to the line and therefore will reduce the risk of collisions with trains. As specified in the Project 'Technical Specification for Fencing' the fencing will consist of:

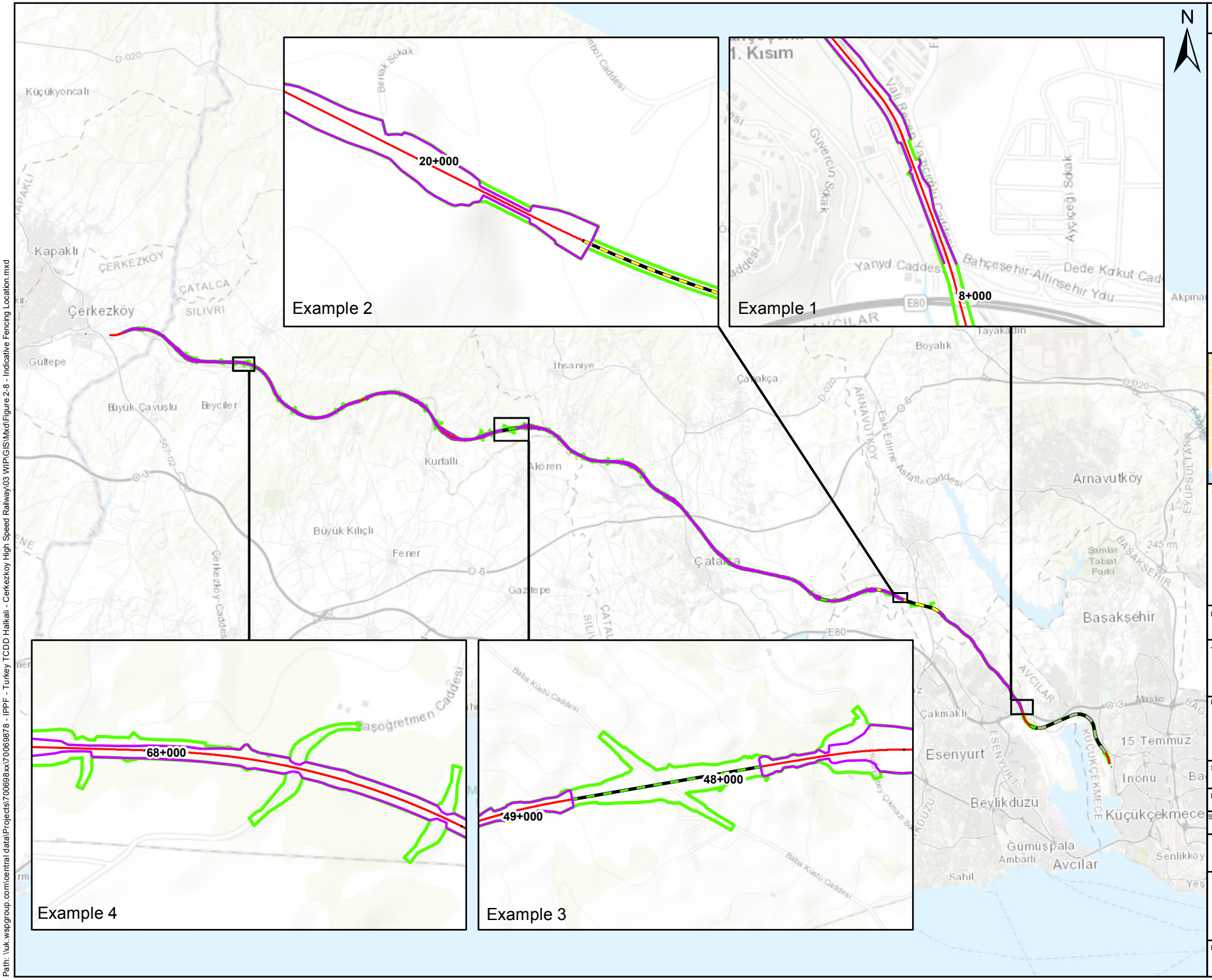
- 3mm diameter galvanised steel wire;
- 50mm square mesh structure; and
- Circular galvanised steel fence posts (installed on concrete foundations).

2.4.11. An example of the typical fencing to be provided is shown in Figure 2-7. Further information on safety measures incorporated into the Project are provided in **Chapter 15: Social**.

2.4.12. The Project provides underpasses and overpasses, to allow safe access across the alignment as shown in Figure 2-10. The bridges, viaduct and tunnels will also provide locations where the existing railway, vehicles, people and fauna can pass either under or over the Project alignment. The culverts and other drainage system will also allow the passage of smaller fauna, such as rodents. The detailed design will also include reptile passes at specified locations. Further information on fauna is provided in **Chapter 8: Ecology**. Details of the bridges, viaducts, underpasses and overpasses are provided in this section, between **paragraphs 2.4.20** and **2.4.54**.



Figure 2-7 - Example Fencing



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Note:

Drawing Status: FINAL

Job Title: HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title: Figure 2-8 - Indicative Location of Fencing

Scale at A4: 1:300,000

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DG			
Stage 1 check	Stage 2 check	Originated	Date
BR	JW	DG	19/03/2021

Drawing Number: Figure 2-8

Path: \\uk.wspgroup.com\central data\Projects\70069878-xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-8 - Indicative Fencing Location.mxd

DRAINAGE

2.4.13. The Project alignment will be served by a new drainage system consisting of interceptor ditches, side ditches, box culverts and manholes that will drain the track and ancillary structures along Project alignment. In summary:

- Interceptor ditches – these will drain water from the track to the side ditches;
- Side ditches – these will be located either side of the track, especially in areas where the track is located in an embankment;
- Box culverts – these will enable water to flow underneath the Project alignment;
- Manholes – these will be located along the Project alignment for inspections and / or maintenance of the drainage system.

2.4.14. The drainage system will discharge into the existing drainage network or soakaways along the Project alignment. Soakaways will only be used where the existing drainage network is poor. The soakaways will consist of an excavated hole which is filled with gravel (or similar). Water will filter through the soakaway and slowly percolate, in a controlled manner, into the surrounding ground.

2.4.15. During the operational phase of the Project, the maintenance of trains will be carried out at the existing maintenance station at Halkali (as described in **Section 2.11**). Appropriate drainage and treatment systems are currently installed at this existing facility to manage risks to water quality and that waste products, such as waste oil, are disposed of correctly (such as with appropriate pre-treatment or to a designated facility) and with the necessary agreements from the DSi Regional Directorates.

2.4.16. Further information relating to drainage and flood risk is provided in **Chapter 11: Surface Water Environment**.

STATIONS

2.4.17. There are 3 stations along the Project alignment, Halkali, Ispartakule and Çatalca, which are already operational stations. There will be no change to the buildings at these stations, but some works are required to the platforms and access arrangements to accommodate freight and passenger trains operations, on both the conventional and high-speed line, as detailed in Table 2-2.

2.4.18. As the Project overall will be compliant with the 'Technical Specifications for Interoperability' (TSIs) (European Rail Agency), the new platforms and new footbridges will be compliant with the 'Persons with Disabilities and Persons with Reduced Mobility TSI'.

Table 2-2 - Stations

Station Name	Chainage Along Project Alignment	Scope of Station Works
Halkali	0+000	▪ 1 platform (14.5m wide); and ▪ Two additional rail tracks.
Ispartakule	9+373	▪ 1 footbridge; and ▪ 1 platform (14.5m wide); and ▪ Two additional rail tracks.

Station Name	Chainage Along Project Alignment	Scope of Station Works
Çatalca	31+800	▪ 1 footbridge; ▪ 1 platform (14.5m wide); and ▪ Two additional rail tracks.

2.4.19. The existing stations along the Project alignment where the trains will stop (Halkali, Ispartakule and Çatalca), will be equipped with security guards and gates. Halkali Station has allocated seats for the elderly, disabled and those with reduced mobility, and it has warning signs, marking and announcements for better accessibility. Ispartakule and Çatalca Station buildings are heritage assets (described further in **Chapter 9: Cultural Heritage**). At present these historic stations do not currently have design measures in place for accessibility, but staff are available to help passengers requiring assistance to trains. Further information on accessibility is provided in **Chapter 15: Social**.

ANCILLARY STRUCTURES

2.4.20. The ancillary structures associated with the Project are summarised previously in Table 2-1. These include bridges, viaducts, tunnels, overpasses and underpasses. The locations of the ancillary structures along the Project alignment are shown in Figure 2-10.

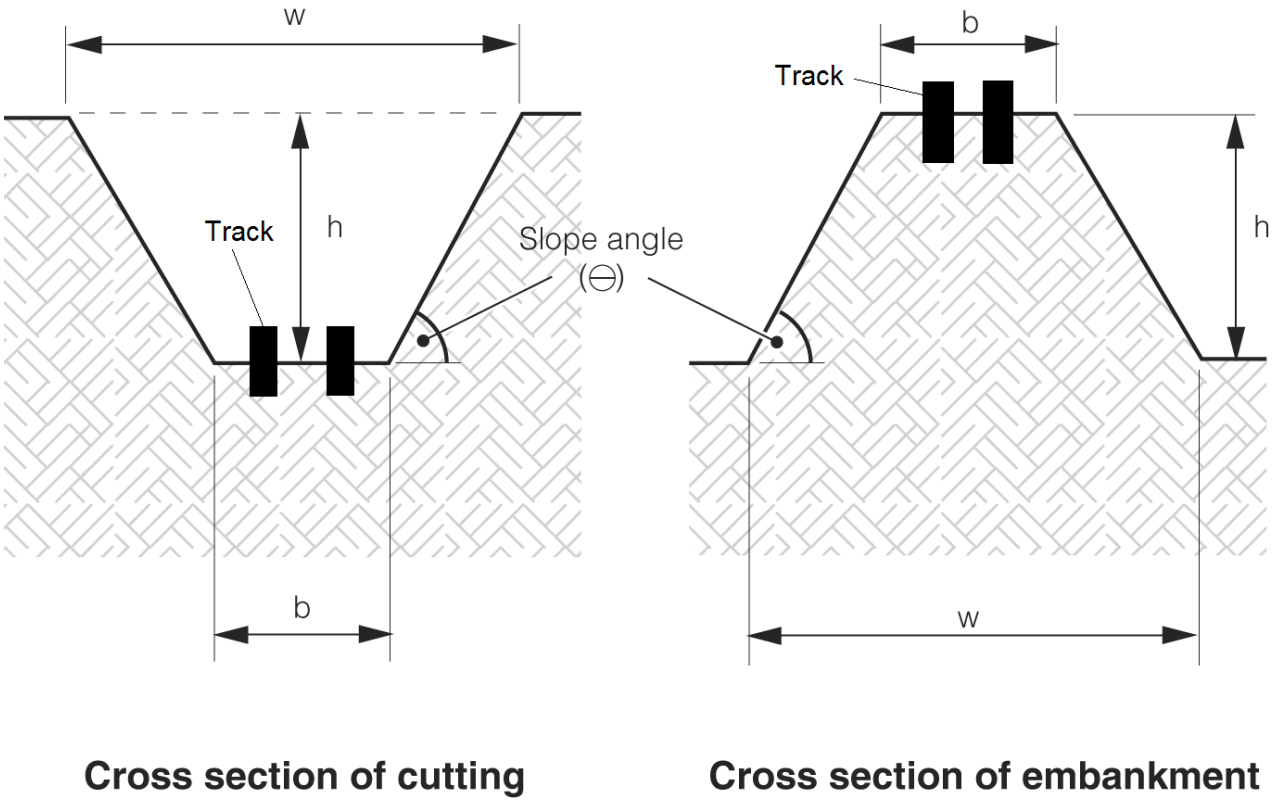
2.4.21. Whilst a large number of ancillary structures will be provided along the Project alignment to maintain local access across the Project, it should be acknowledged that some existing access roads will be impacted during operation, namely in Omerli, Yesilbayir and Bahsayis. Further information on access impacts during operation are provided in **Chapter 15: Social**.

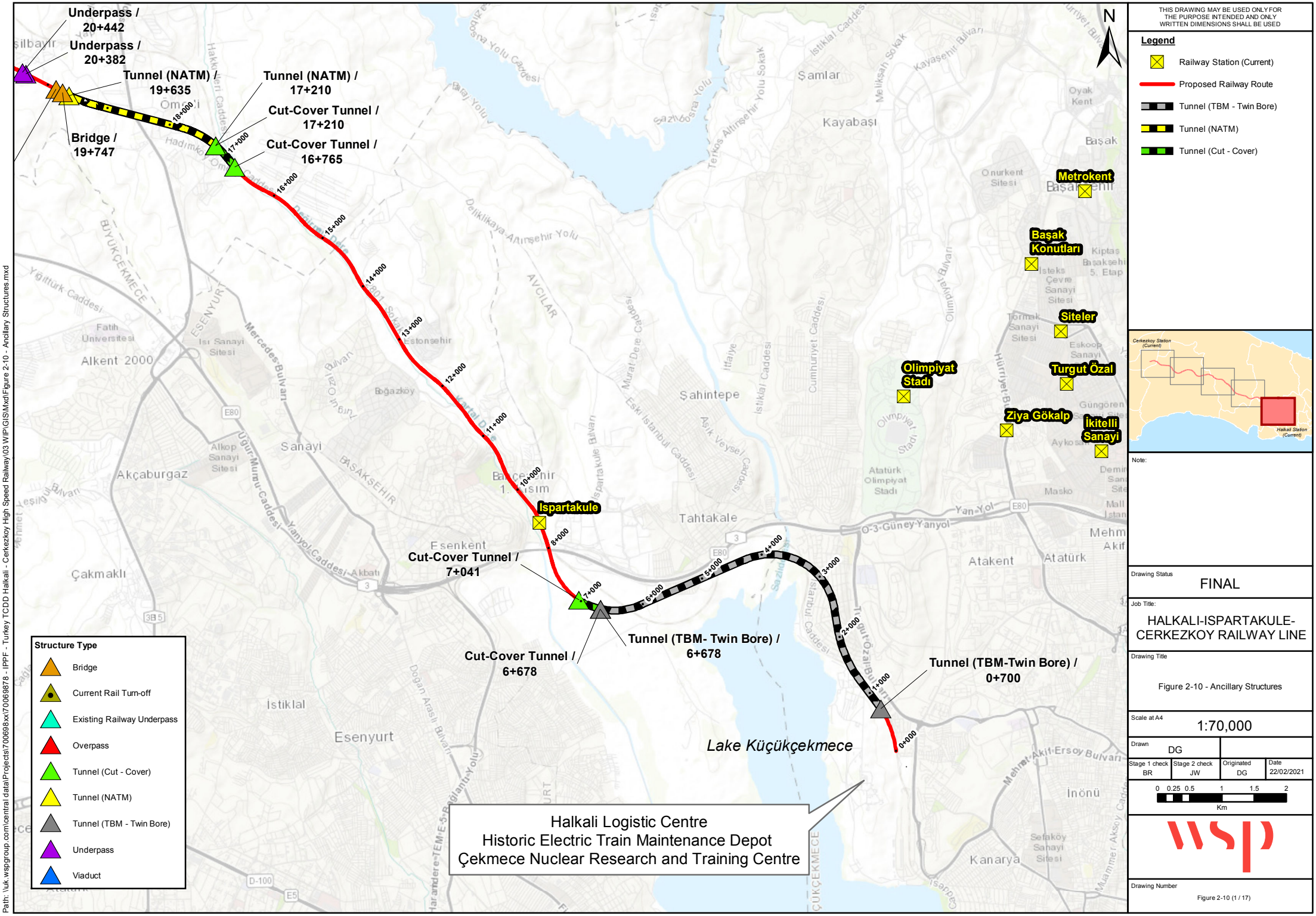
2.4.22. There will be no level crossings (where a railway line crosses a road or path at grade) as part of the Project.

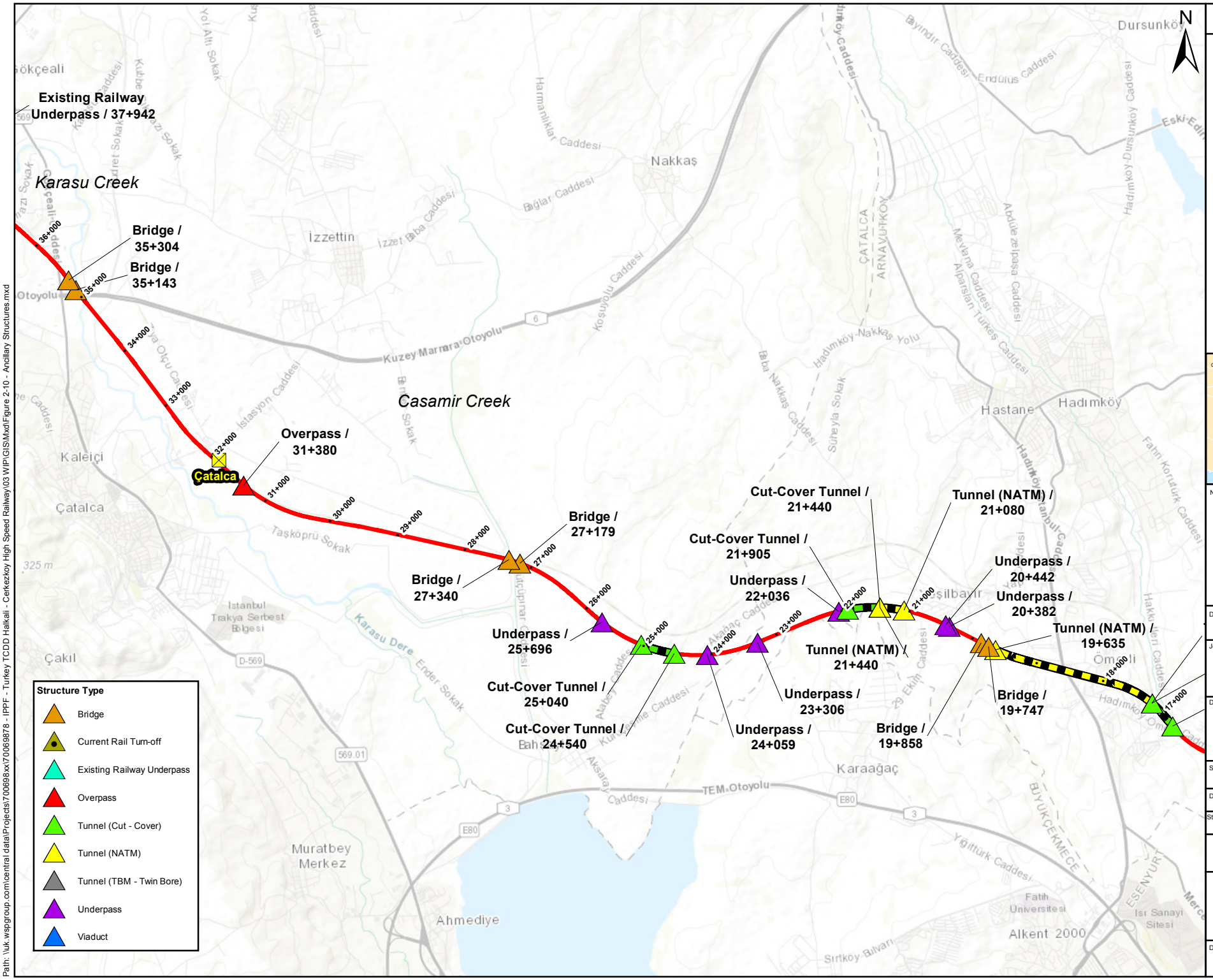
2.4.23. The specifications and locations of the ancillary structures are shown in Table 2-3 to Table 2-6. Further details on each of the ancillary structures are provided in the following sections.

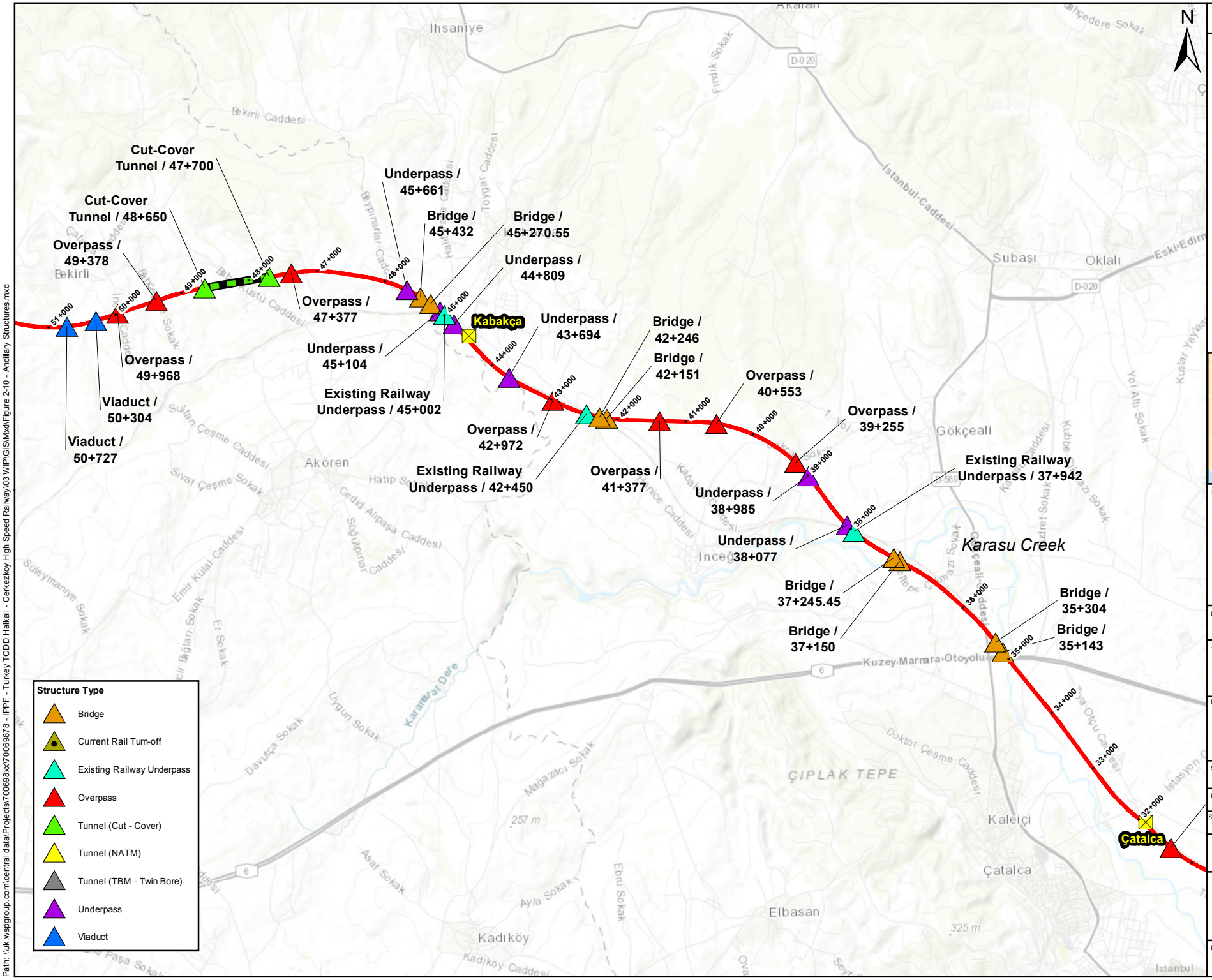
2.4.24. Together with the ancillary structures, the Project will require earthworks (cuttings and embankments) due to the substantial variances in ground level across the Project alignment. This includes cuttings which will be a maximum of 20m deep and embankments up to a maximum of 10m high, compared to the ground level, a cross section of a cutting and an embankment is shown in Figure 2-9.

Figure 2-9 - A Cross Section of a Cutting and an Embankment




Underpass / 20+442
Underpass / 20+382
Tunnel (NATM) / 19+635
Bridge / 19+747
Tunnel (NATM) / 17+210
Cut-Cover Tunnel / 17+210
Cut-Cover Tunnel / 16+765
Ispartakule
Cut-Cover Tunnel / 7+041
Cut-Cover Tunnel / 6+678
Tunnel (TBM- Twin Bore) / 6+678
Tunnel (TBM-Twin Bore) / 0+700
Metrokent
Başak Konutları
Siteler
Turgut Özal
Olimpiyat Stadı
Ziya Gökalp
İkitelli Sanayi
Lake Küçükçekmece
Halkali Logistic Centre
Historic Electric Train Maintenance Depot
Çekmece Nuclear Research and Training Centre
N
Structure Type
Bridge
Current Rail Turn-off
Existing Railway Underpass
Overpass
Tunnel (Cut - Cover)
Tunnel (NATM)
Tunnel (TBM - Twin Bore)
Underpass
Viaduct
THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED
Legend
Railway Station (Current)
Proposed Railway Route
Tunnel (TBM - Twin Bore)
Tunnel (NATM)
Tunnel (Cut - Cover)
Note:
Drawing Status
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Job Title:
HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE
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Figure 2-10 - Ancillary Structures
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Path: \\uk.wspgroup.com\central data\Projects\70069878xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-10 - Ancillary Structures.mxd

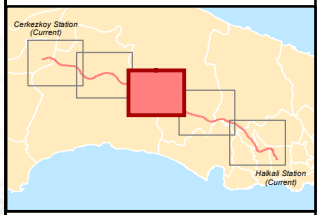

Existing Railway Underpass / 37+942
Karasu Creek
Bridge / 35+304
Bridge / 35+143
Casamir Creek
Overpass / 31+380
Çatalca
Bridge / 27+179
Bridge / 27+340
Underpass / 25+696
Cut-Cover Tunnel / 25+040
Cut-Cover Tunnel / 24+540
Underpass / 24+059
Underpass / 23+306
Cut-Cover Tunnel / 21+905
Cut-Cover Tunnel / 21+440
Tunnel (NATM) / 21+440
Underpass / 22+036
Tunnel (NATM) / 21+080
Underpass / 20+442
Underpass / 20+382
Bridge / 19+858
Bridge / 19+747
Tunnel (NATM) / 19+635
Kuzey Marmara Otoyolu
TEM Otoyolu
Nakkaş
Hastane
Hadımköy
Karaağaç
Ahmediye
Muratbey Merkez
Kaleiçi
Çakıl
Dursunköy
İzzettin
Ömerli
Alkent 2000
Fatih Üniversitesi
Istanbul Trakya Serbest Bölgesi
Structure Type
Bridge
Current Rail Turn-off
Existing Railway Underpass
Overpass
Tunnel (Cut - Cover)
Tunnel (NATM)
Tunnel (TBM - Twin Bore)
Underpass
Viaduct
N
THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED
Legend
Railway Station (Current)
Proposed Railway Route
Tunnel (TBM - Twin Bore)
Tunnel (NATM)
Tunnel (Cut - Cover)
Note:
Drawing Status
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Job Title:
HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE
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Figure 2-10 - Ancillary Structures
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Path: \\uk.wspgroup.com\central data\Projects\700698\xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-10 - Ancillary Structures.mxd



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Legend

- Railway Station (Current)
- Proposed Railway Route
- Tunnel (TBM - Twin Bore)
- Tunnel (NATM)
- Tunnel (Cut - Cover)



Note:

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Job Title: HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

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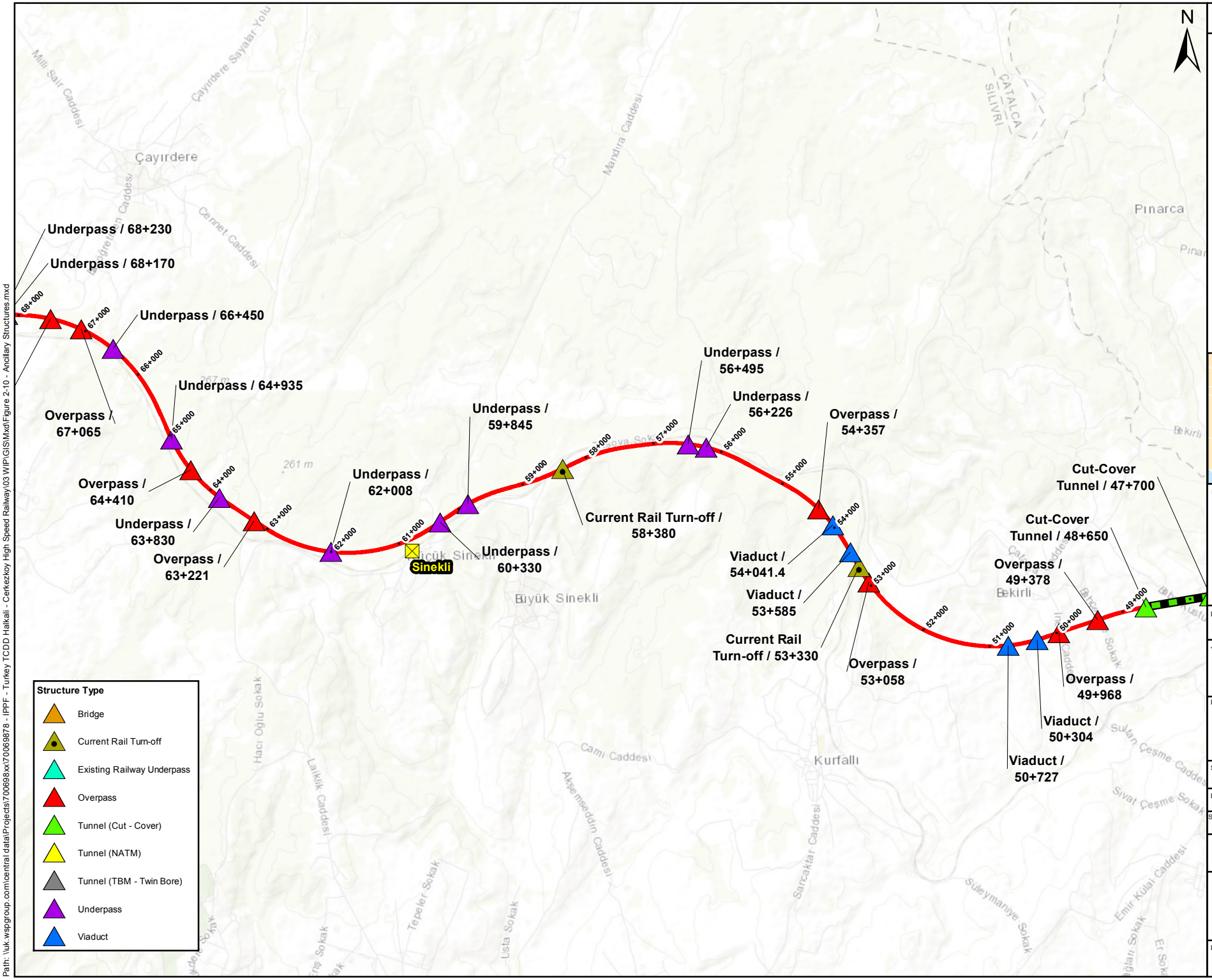
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Drawing Number: Figure 2-10 (3 / 17)

Path: \\uk.wspgroup.com\central data\Projects\70069878-xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-10 - Ancillary Structures.mxd


Underpass / 68+230
Underpass / 68+170
Underpass / 66+450
Underpass / 64+935
Overpass / 67+065
Overpass / 64+410
Underpass / 63+830
Overpass / 63+221
Underpass / 62+008
Underpass / 59+845
Underpass / 60+330
Sinekli
Current Rail Turn-off / 58+380
Underpass / 56+495
Underpass / 56+226
Overpass / 54+357
Viaduct / 54+041.4
Viaduct / 53+585
Current Rail Turn-off / 53+330
Overpass / 53+058
Cut-Cover Tunnel / 47+700
Cut-Cover Tunnel / 48+650
Overpass / 49+378
Overpass / 49+968
Viaduct / 50+304
Viaduct / 50+727
68+000
67+000
66+000
65+000
64+000
63+000
62+000
61+000
59+000
58+000
57+000
56+000
55+000
54+000
53+000
52+000
51+000
50+000
49+000
Çayırdere
Pınarca
Bekirli
Büyük Sinekli
Kurfallı
Çayırdere Sayalar Yolu
Millî Şair Caddesi
Cennet Caddesi
Mandıra Caddesi
ÇATALCA
SİLİVRİ
261 m
Hacı Oğlu Sokak
Laikilik Caddesi
Cami Caddesi
Aksemseddin Caddesi
Tepeler Sokak
Usta Sokak
Sarcaklar Caddesi
Süleymaniye Sokak
Sivat Çeşme Sokak
Sultan Çeşme Caddesi
Emir Kulaı Caddesi
Structure Type
Bridge
Current Rail Turn-off
Existing Railway Underpass
Overpass
Tunnel (Cut - Cover)
Tunnel (NATM)
Tunnel (TBM - Twin Bore)
Underpass
Viaduct
N
THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED
Legend
Railway Station (Current)
Proposed Railway Route
Tunnel (TBM - Twin Bore)
Tunnel (NATM)
Tunnel (Cut - Cover)
Cerkezkoy Station (Current)
Halkali Station (Current)
Note:
Drawing Status
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Job Title:
HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE
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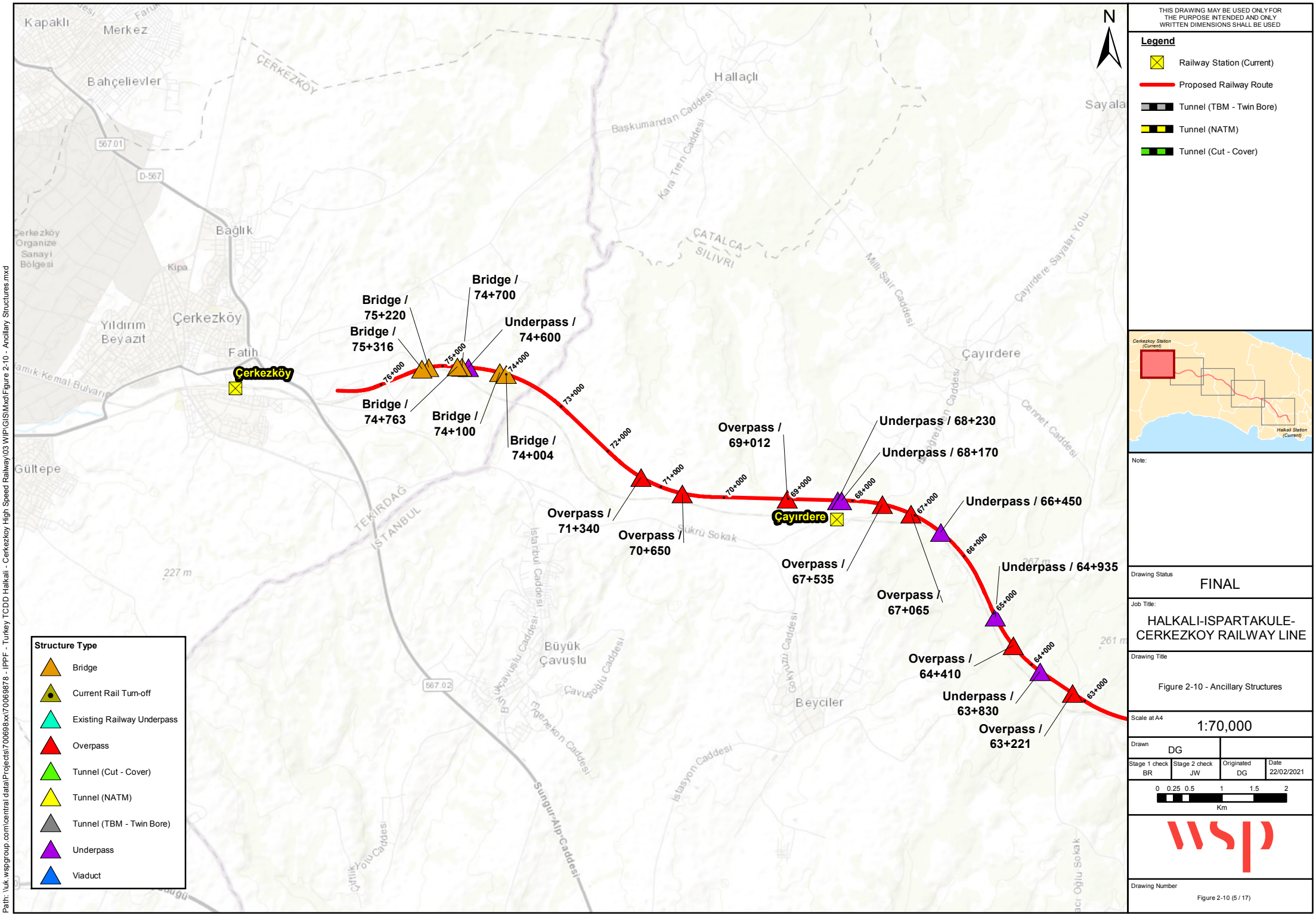

Çerkezköy
Bridge / 75+220
Bridge / 75+316
Bridge / 74+763
Bridge / 74+700
Bridge / 74+100
Bridge / 74+004
Underpass / 74+600
Overpass / 71+340
Overpass / 70+650
Overpass / 69+012
Çayırdere
Underpass / 68+230
Underpass / 68+170
Overpass / 67+535
Overpass / 67+065
Underpass / 66+450
Underpass / 64+935
Overpass / 64+410
Underpass / 63+830
Overpass / 63+221
76+000
75+000
74+000
73+000
72+000
71+000
70+000
69+000
68+000
67+000
66+000
65+000
64+000
63+000
Kapaklı
Merkez
Bahçelievler
Bağlık
Kıpa
Yıldırım Beyazıt
Fatih
Gültepe
Hallaçlı
Çayırdere
Büyük Çavuşlu
Beyciler
Sayala
ÇERKEZKÖY
TEKİRDAĞ İSTANBUL
ÇATALCA SİLİVRİ
Başkumandan Caddesi
Kara Tren Caddesi
Milli Şair Caddesi
Çayırdere Sayalar Yolu
Cennet Caddesi
Şükrü Sokak
İstanbul Caddesi
Çavuşoğlu Caddesi
Uçcavuşlu Caddesi
Değirmenkon Caddesi
İstasyon Caddesi
Sungur Alp Caddesi
Çiftlik Yolu Caddesi
Gökyüzü Caddesi
567.01
D-567
567.02
227 m
261 m
267 m
N
Structure Type
Bridge
Current Rail Turn-off
Existing Railway Underpass
Overpass
Tunnel (Cut - Cover)
Tunnel (NATM)
Tunnel (TBM - Twin Bore)
Underpass
Viaduct
THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED
Legend
Railway Station (Current)
Proposed Railway Route
Tunnel (TBM - Twin Bore)
Tunnel (NATM)
Tunnel (Cut - Cover)
Cerkezkoy Station (Current)
Halkali Station (Current)
Note:
Drawing Status
FINAL
Job Title:
HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE
Drawing Title
Figure 2-10 - Ancillary Structures
Scale at A4
1:70,000
Drawn
DG
Stage 1 check
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Stage 2 check
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Figure 2-10 (5 / 17)
Path: \\uk.wspgroup.com\central data\Projects\70069878xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-10 - Ancillary Structures.mxd

Table 2-3 - Bridges and Viaducts

Structure Number	Start (chainage)	End (chainage)	Length (m)	Purpose	Width (m)	Minimum Height (m)	Maximum Height (m)
1	19+747	19+858	111.2	Bridge: Passes over a steep valley / gorge which contains the seasonal Beylikçayi Creek watercourse.	12	0	24.5
2	27+179	27+340	161.2	Bridge: Passes over Camasir Creek watercourse and adjacent to existing rail bridge.	12	1	4.38
3	35+143	35+304	161.2	Bridge: Passes over Karasu Creek watercourse.	12	0.55	4.55
4	37+150	37+245	95.6	Bridge: Passes over Karasu Creek watercourse.	12	6.9	10.43
5	42+151	42.246	95.6	Bridge: Passes over an existing dirt road, bridge and the seasonal B. Simaran Creek watercourse.	12	7.75	11.17
6	45+271	45+432	161.2	Bridge: Passes over slight elevation gradient and the Kaarasu Creek watercourse.	12	9.23	11.26
7	50+304	50+727	423.6	Viaduct: Passes over a steep valley / gorge which contains agricultural fields and the seasonal T252t252nI252k Deres watercourse.	12	5.65	28.9
8	53+585	54+041	456.4	Viaduct: Passes over a steep valley / gorge which contains forested areas and the seasonal Di254LIK246pr252 Creek watercourse.	12	4.46	39.97
9	74+005	74+100	95.6	Bridge: Passes over a forested bank and Ambar Creek watercourse.	12	7.06	11.42
10	74+700	74+763	62.8	Bridge: Passes over a forested Bank and Ambar Creek watercourse.	12	4.12	8.22
11	75+220	75+316	95.6	Bridge: Passes over two existing dirt roads and Ambar Creek watercourse. Adjacent to existing railway bridge.	12	3.28	11.35

Table 2-4 - Tunnels

Structure Number	Start (chainage)	End (chainage)	Length (m)	Type and Purpose (Tunnel Construction Techniques are shown in Figure 2-12)	Tunnel Diameter or Width x Height (m)
1	0+700	6+678	5,987 (right tube), 5,968 (left tube)	Tunnel (TBM-twin bore): Tunnel passes under residential areas and the proposed Kanal Istanbul project. The tunnel will contain two high-speed tracks with one line for each direction (though bi-directional operation will also be possible, if necessary). The twin-bored tunnel tracks will be suitable for use by both conventional and high-speed trains.	8.3 (per tunnel)
2	6+678	7+041	363	Cut and cover tunnel: Creating the exit from the TBM-twin bore tunnel and passes underneath agricultural fields before opening into agricultural fields. This cut and cover tunnel will be suitable for use by both conventional and high-speed trains.	8.6 (per tunnel)
3	16+765	17+210	445	Cut and cover tunnel: Passes under existing road infrastructure and residential areas.	25

Structure Number	Start (chainage)	End (chainage)	Length (m)	Type and Purpose (Tunnel Construction Techniques are shown in Figure 2-12)	Tunnel Diameter or Width x Height (m)
4	17+210	19+635	2,425	New Austrian Tunnelling Method (NATM) Tunnel: Adjoins the previous tunnel, passes underneath residential and commercial / industrial areas. Emerges prior to gorge and bridge area.	'Horseshoe Shaped'
5	21+080	21+440	350	NATM Tunnel: Passes through an area of hills.	25
6	21+440	21+905	465	Cut and cover tunnel: Adjoins the previous tunnel, passes through an area of hills	25
7	24+540	25+040	500	Cut and cover tunnel: Passes underneath two existing roads (a main road and dirt road).	10.5 x 6.5
8	47+700	48+650	950	Cut and cover tunnel: Passes through major hill, underneath existing main road and agricultural fields / structures.	10.5 x 6.5

Table 2-5 - Overpasses

Structure Number	Start (chainage)	End (chainage)	Length (m)	Purpose	Width (m)	Minimum Height (m)	Maximum Height (m)
1	31+380	31+438	57.6	Local Access Overpass: Intersects existing dirt road.	10	7.46	8.05
2	39+255	39+283	28	Agricultural Overpass: Present in agricultural field.	10	7.81	8.01
3	40+553	40+581	28	Local Access Overpass: Intersects existing dirt road.	10	7.92	8.12
4	41+377	41+405	28	Local Access Overpass: Intersects existing dirt road.	10	7.72	7.92
5	42+972	43+030	57.6	Agricultural Overpass: Present in agricultural field.	10	7.78	10.33
6	47+377	47+405	28	Agricultural Overpass: Passes over forested area of slight elevation.	10	8.03	8.23
7	49+378	49+406	28	Local Access Overpass: Intersects existing dirt road.	10	7.74	7.94
8	49+968	49+996	28	Main Access Overpass: Intersects existing main road.	10	7.73	7.83
9	53+058	53+086	28	Main Access Overpass: Intersects existing main road.	10	7.98	8.18
10	54+357	54+385	28	Local Access Overpass: Intersects existing dirt road.	10	7.92	8.12
11	63+221	63+249	28	Main Access Overpass: Intersects existing main road.	10	7.98	8.18
12	64+410	64+438	28	Local Access Overpass: Intersects existing dirt road.	10	6.83	6.93
13	67+065	67+093	28	Agricultural Overpass: Present in agricultural fields.	10	7.97	8.17
14	67+535	67+563	28	Local Access Overpass: Intersects existing main road.	10	7.94	8.14
15	69+012	69+040	28	Local Access Overpass: Intersects existing dirt road.	10	8.84	9.04

Structure Number	Start (chainage)	End (chainage)	Length (m)	Purpose	Width (m)	Minimum Height (m)	Maximum Height (m)
16	70+650	70+678	28	Local Access Overpass: Intersects existing dirt road.	10	8.31	8.51
17	71+340	71+358	28	Agricultural Overpass: Present in agricultural fields.	10	8.98	8.18

Table 2-6 - Underpasses

Structure Number	Start (chainage)	End (chainage)	Length (m)	Purpose	Width (m)
1	20+382	20+387	5	Agricultural Underpass: Present in agricultural field.	7
2	20+442	20+452	10	Agricultural Underpass: Present in agricultural field.	6
3	22+037	22+044	7	Local Access Underpass: Intersects an existing dirt road.	5
4	23+306	23+313	7	Agricultural Underpass: Present in agricultural field.	5
5	24+060	24+067	7	Agricultural Underpass: Present in agricultural field.	5
6	25+696	25+703	7	Local Access Underpass: Intersects an existing dirt road.	5
7	37+942	37+948	6	Existing Railway Underpass: Intersects existing railway line.	8
8	38+077	38+084	7	Local Access Underpass: Intersects existing dirt road.	5
9	38+985	38+992	7	Local Access Underpass: Intersects existing dirt road.	5
10	42+450	42+456	6	Existing Railway Underpass: Intersects existing railway line.	8
11	43+694	43+701	7	Local Access Underpass: Intersects existing dirt road.	5
12	44+809	44+816	7	Main Access Underpass: Intersects existing main road.	5
13	45+002	45+008	6	Existing Railway Underpass: Intersects existing railway line.	8
14	45+104	45+111	7	Local Access Underpass: Intersects existing main road.	5
15	45+661	45+668	7	Local Access Underpass: Intersects existing dirt road.	5
16	56+226	56+233	7	Local Access Underpass: Intersects existing dirt road.	5
17	56+495	56+502	7	Agricultural Underpass: Present in forested area.	5
18	59+845	59+852	7	Local Access Underpass: Intersects existing main road.	5
19	60+330	60+337	7	Agricultural Underpass: Present in forested area.	5

Structure Number	Start (chainage)	End (chainage)	Length (m)	Purpose	Width (m)
20	62+008	62+015	7	Agricultural Underpass: Present in forested area.	5
21	63+830	63+837	7	Local Access Underpass: Intersects existing dirt road.	5
22	64+935	64+943	5	Agricultural Underpass: Intersects existing dirt road.	4
23	66+450	66+457	5	Agricultural Underpass: Present in agricultural fields.	4
24	68+170	68+177	5	Agricultural Underpass: Present in forested area.	4
25	68+230	68+237	5	Agricultural Underpass: Present in forested area.	4
26	74+600	74+607	7	Local Access Underpass: Intersects existing dirt road.	5

Bridges

2.4.25. The 9 bridges will cross over watercourses and roads. Further information on the dimensions and purpose of each of the bridges is provided in Table 2-3.

2.4.26. In addition to national requirements the detailed design of the bridges, which is to be undertaken by the Contractor, will be in accordance with[6]:

- Eurocode 1 EN 1991-2:2003 – Traffic Loads on Bridges;
- Eurocode 2 EN 1992-1:2004 – Design of Concrete Structures (Part 1-1 and 1-2);
- Eurocode 2 EN 1992-2:2005 – Design of Concrete Structures (Part 2);
- Eurocode 2 EN 1992-3:2006 – Design of Concrete Structures (Part 3);
- Eurocode 8 EN 1998-1:2004: Design of Structures for Earthquake Resistance (Part 1)
- Eurocode 8 EN 1998-2:2005: Design of Structures for Earthquake Resistance (Part 2)
- International Union of Railways Leaflet UIC 772-2 (1989) – Code for the use of Rubber Bearings for Rail Bridges;
- American Association of State Highway and Transportation Officials (AASHTO) (2011, as ammended in 2012; 2014 and 2015) – Guide Specifications for Load and Resistance Factor Design (LRFD) Seismic Bridge Design; and
- International Union of Railways Leaflet UIC 774-3 (2001) – Track/Bridges Interaction Recommendation for Calculations.

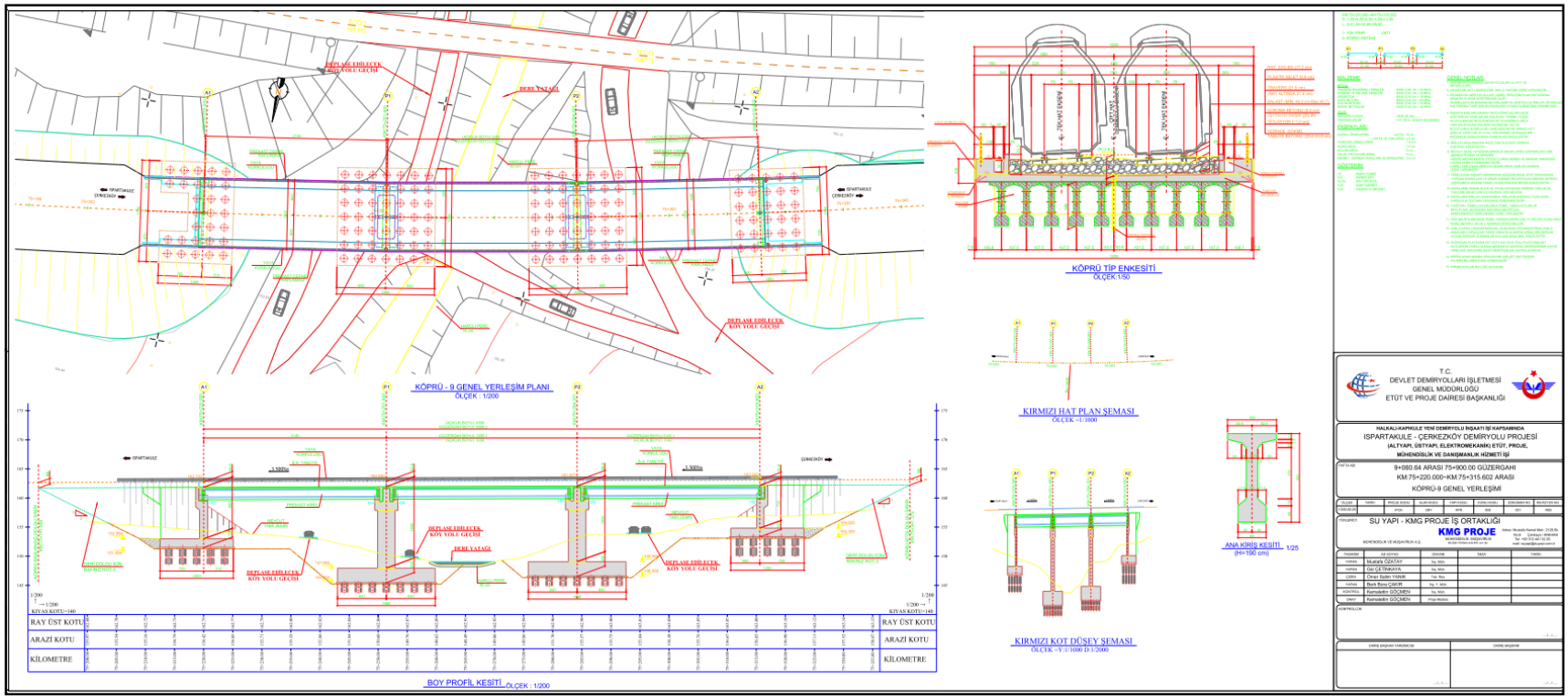
2.4.27. The above Eurocodes, International Union of Railways Leaflets and AASHTO Guide will also be applied by the Contractor to the detailed design of the viaducts.

2.4.28. Where required, the bridges and viaducts will be supported on piled peirs and arches, respectively.

2.4.29. An example section drawing of a bridge is included in Figure 2-11.

[6] TCDD (2020). Technical Specification for Infrastructure and Superstructure for the Halkali-Ispartakule- Çerkezköy Section.





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Note:

Drawing Status
FINAL

Job Title:
HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title
Figure 2-11 - Example Bridge Section

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Drawing Number
Figure 2-11

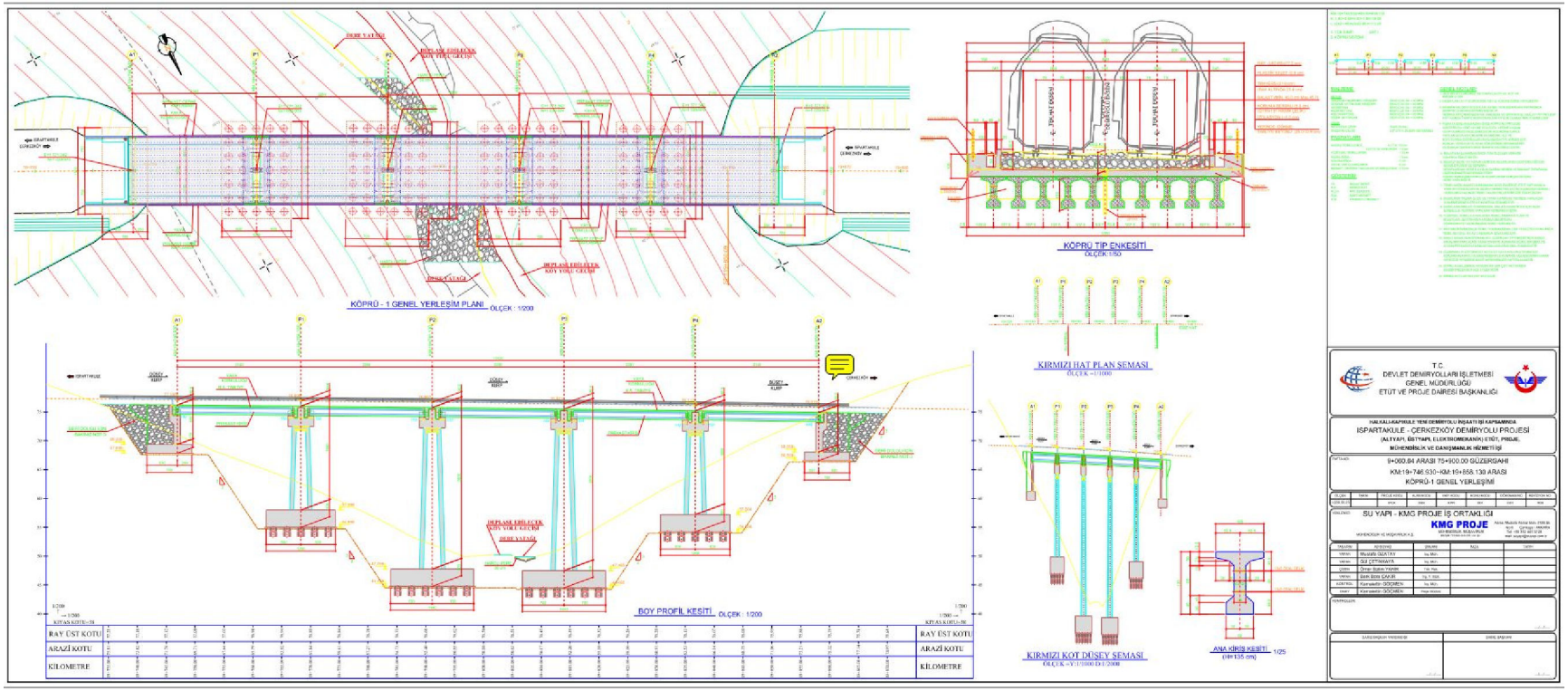
Path: \\uk.wspgroup.com\central data\Projects\700698\xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-11 - Example Bridge Section Drawing.mxd

Viaducts

2.4.30. The 2 viaducts will pass over agricultural fields and forested areas through areas of steep elevation profile. Further information on the dimensions and purpose of each of the viaducts is provided in Table 2-3.

2.4.31. An example section drawing of a viaduct is included Figure 2-12.





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HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title
Figure 2-12 - Example Viaduct Section

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Drawing Number
Figure 2-12

Path: \\uk.wspgroup.com\central data\Projects\700698\xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-12 - Example Viaduct Section Drawing.mxd

Tunnels

2.4.32. The 8 tunnels will pass under the following: the proposed Kanal Istanbul project, agricultural fields, existing road infrastructure, commercial / industrial areas, residential areas and through hilly areas towards Çerkezköy. Further information on the dimensions and purpose of each of the tunnels is provided in **Table 2-4**.

2.4.33. The tunnels will be constructed using the following techniques (which are shown in **Figure 2-13**):

- TBM-twin bore;
- Cut and cover tunnel; and
- NATM tunnel.

Tunnel Boring Machine (Twin Bore)

2.4.34. The TBM-twin bore tunnel will passes under residential areas and the proposed Kanal Istanbul project. The tunnel would begin at ground level at chainage 0+700 and reach a maximum depth of 54m below sea level under the proposed Kanal Istanbul project before re-emerging into a cut and cover tunnel at chainage 6+678.

2.4.35. A TBM will be used to excavate the tunnel, creating circular cross section through a variety of soil and rock strata. The TBM will have a rotating cutting wheel which will break the soil and rock. The material will then be transferred to rear of the machine for removal.

2.4.36. Once excavated the tunnel will be lined with precast concrete segments. In addition, a waterproof membrane will be installed to prevent groundwater intrusion and corrosion of the concrete. The waterproof membrane will consist of two layers, a protective felt layer and a further Polyvinyl chloride (PVC) membrane.

Cut and Cover Tunnel

2.4.37. There will be 5 cut and cover tunnels along the Project alignment. One of the cut and cover tunnels will connect to the TBM-twin bore tunnel.

2.4.38. The cut and cover tunnelling approach involves excavating a trench from the existing ground level, the construction of a tunnel, and then returning the surface to its original state. It is an economical construction technique, that is typically reserved for relatively shallow tunnels (those with a depth of approximately 20m).

2.4.39. As with the TBM-twin bore tunnel the cut and cover tunnels will be lined with precast concrete segments and a waterproof membrane will be installed.

NATM Tunnel

2.4.40. The first NATM tunnel (Tunnel 4) will connect to Tunnel 3 (cut and cover tunnel) and will pass underneath residential and commercial / industrial areas. Due to the length of this NATM tunnel (2,425m) it will contain two emergency side passages. These side passages will be used in the event of an emergency by the applicable emergency services.

2.4.41. The second NATM tunnel (Tunnel 5) will pass underneath an area of hilly terrain.

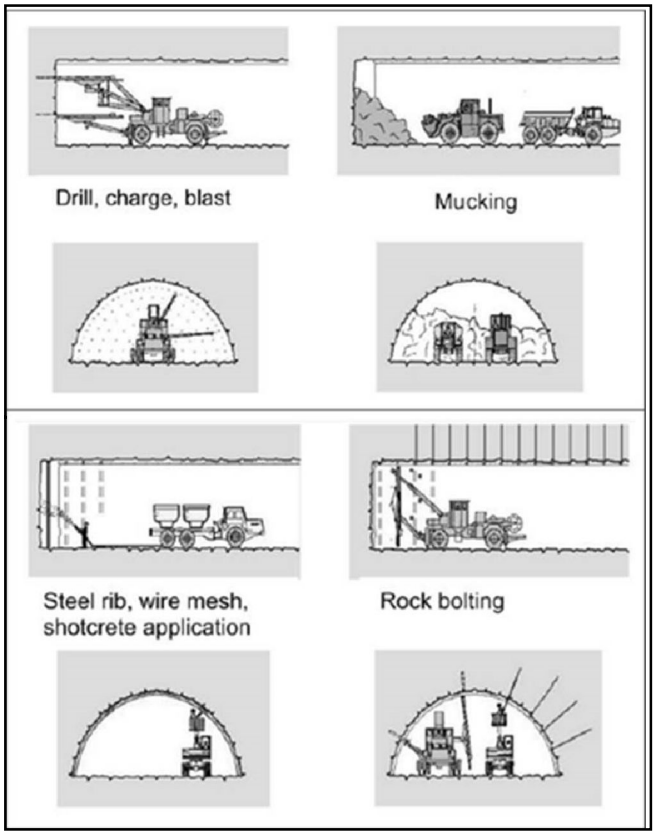
2.4.42. The NATM construction approach involves the excavation of sections of material with excavators, the use of rock bolts to stabilise the excavated sections, followed by the application of a sprayed concrete lining. The section is then reinforced with steel grids and bracing before the further

application of sprayed concrete. A waterproof membrane will also be installed. Blasting works will likely be undertaken in areas where cuttings are to be created as part of the construction process for the NATM tunnels (tunnels 4 and 5). Blasting involves the controlled use of explosives (or other methods such as gas pressure blasting pyrotechnics) to break rocks. As the Contractor is yet to be appointed the details of the blasting works, including location, the size and frequency of events are unknown.

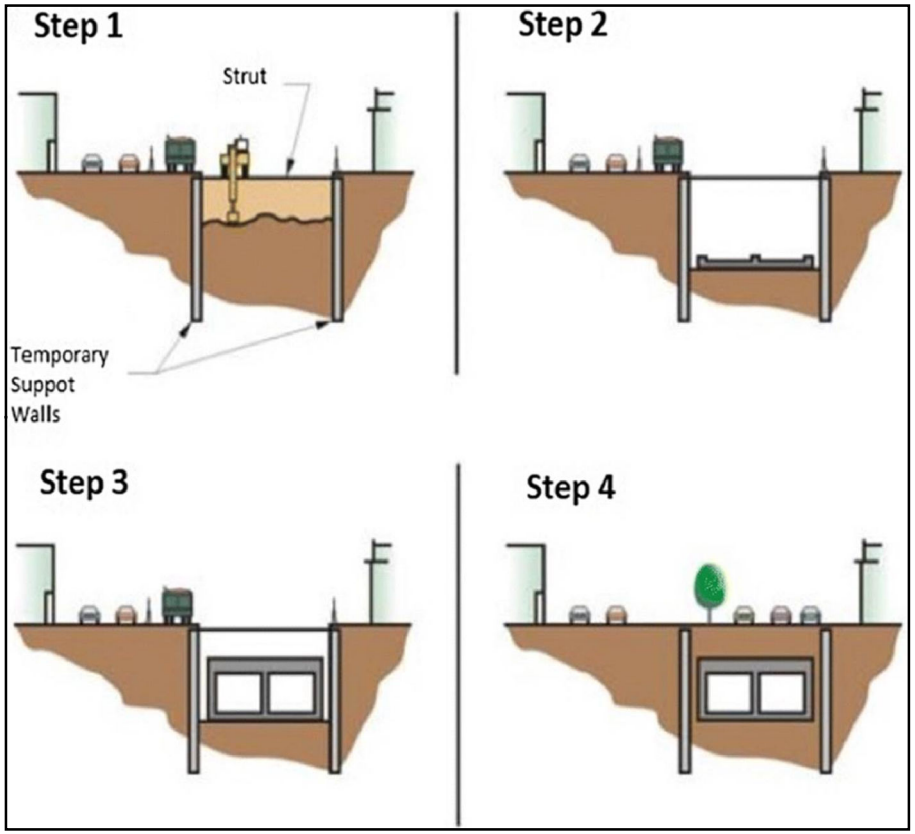
Summary of Tunnel Impacts

2.4.43. The construction of these tunnels has the potential to result in various impacts on nearby human receptors, the key impacts considered in this assessment are as follows:

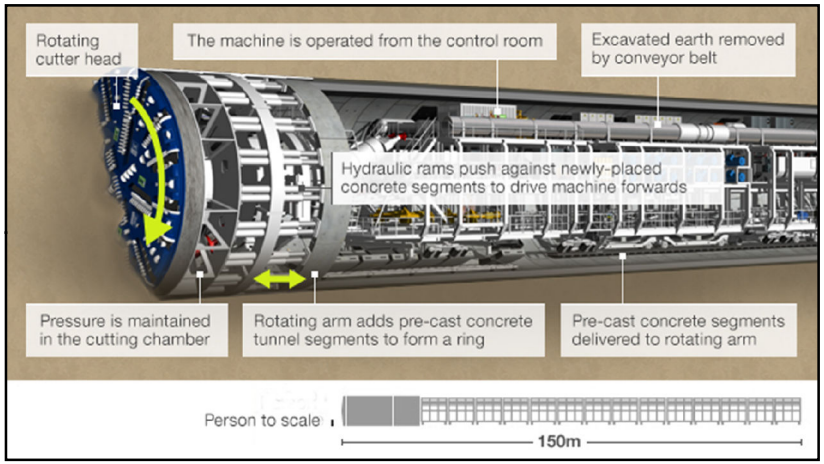
- The noise and vibration impact, including that associated with blasting, is considered in the **Noise and Vibration assessment** (**Chapter 7**), together with the noise associated with the use of construction machinery (the indicative construction machinery is listed in **section 2.9**);
- The air quality impacts, particularly dust, is considered in the **Air Quality assessment** (**Chapter 6**);
- Potential impacts to below-ground heritage assets and previously unrecorded archaeological remains (**Chapter 9**);
- Visual impacts, including those associated with the cut and cover technique, are considered in the **Landscape and Visual assessment** (**Chapter 10**);
- Pollution risks to watercourses, including those associated with disposal, discharge and potential spills during the construction phase (**Chapter 11**);
- Impacts associated with increased water demand as a result of the construction activities (**Chapter 11**); and
- The cumulative impacts on these receptors is considered in (**Chapter 17**).



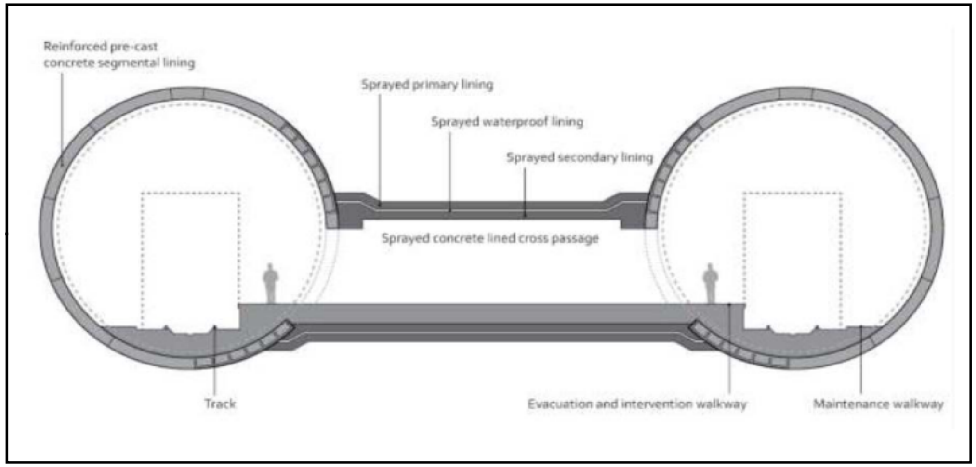
Type 1 - New Austrian Tunnel Method



Type 2 - Cut and Cover



Type 3 - Twin Bore Tunnel



Type 3 - Cross Section of Typical Twin Bore Tunnel with Cross Passage Escape Route

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Note:

Drawing Status: FINAL

Job Title: HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title: Figure 2-13 - Tunnel Construction Techniques

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Stage 1 check	Stage 2 check	Originated	Date
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Drawing Number: Figure 2-13

Path: \\uk.wspgroup.com\central data\Projects\700698xx\700698878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-13 - Tunnel Construction Techniques.mxd

2.4.44. Each of the tunnels will contain:

- Lighting system (as specified below);
- Walkways, which will enable maintenance access and access to the emergency exits;
- Emergency exits (including emergency cross passages (all tunnels) and side passages (Tunnel 4), as outlined in the **Environmental and Social Management Plan (ESMP)**);
- A fire protection system, which will be designed in consultation with the Fire Authority;
- A fire and emergency alarm system, which will be designed in consultation with the Fire Authority and the General Directorate of Security;
- Hot axle box detectors for measurement of axle temperature prior to trains entering the tunnels; and
- Tunnel ventilation (as outlined in the **ESMP**).

Tunnel Lighting System

2.4.45. The lighting system for all tunnels will be designed so as each individual light is operated independently from the others. The lighting system will consist of high-level lighting, normal lighting, walkway lighting and emergency lighting.

2.4.46. Normal lighting and walkway lighting will be operated automatically according to the train location, based on information from the signalling system. When trains are not present, lighting will be inactive. High-level lighting will be active at all times. Emergency lighting will be active for a minimum of 90 minutes when the fire and emergency alarm is raised (or tested).

2.4.47. The lighting system will be operated from a control centre. Lighting levels will be as follows:

- High-level lighting – located at the entrance and exits to the tunnels, with an average lighting level of 10 lux[7];
- Normal lighting – located throughout the tunnels, with a minimum lighting level of 5 lux;
- Walkway lighting – located over walkways, with a minimum lighting level of 5 lux; and
- Emergency lighting – located throughout the tunnels, with an average lighting level of 10 lux.

2.4.48. The detailed design of the tunnel light system will be in accordance with the standards set by the Worldwide Railway Organisation (Union Internationale des Chemins de fer (UIC)).

Tunnel Ventilation System

2.4.49. The ventilation system for the tunnels will comprise of longitudinal system which is supported by jet fans. The jet fans will induce a flow of air through the tunnels. The jet fans will used under normal operation arrangements and in the event of a fire. In the event of a fire the jet fans would remove smoke from the tunnels.

Overpasses

2.4.50. Of the 17 overpasses (passing over the Project alignment):

- 4 will be used for agricultural access, inclusive of machinery and livestock;

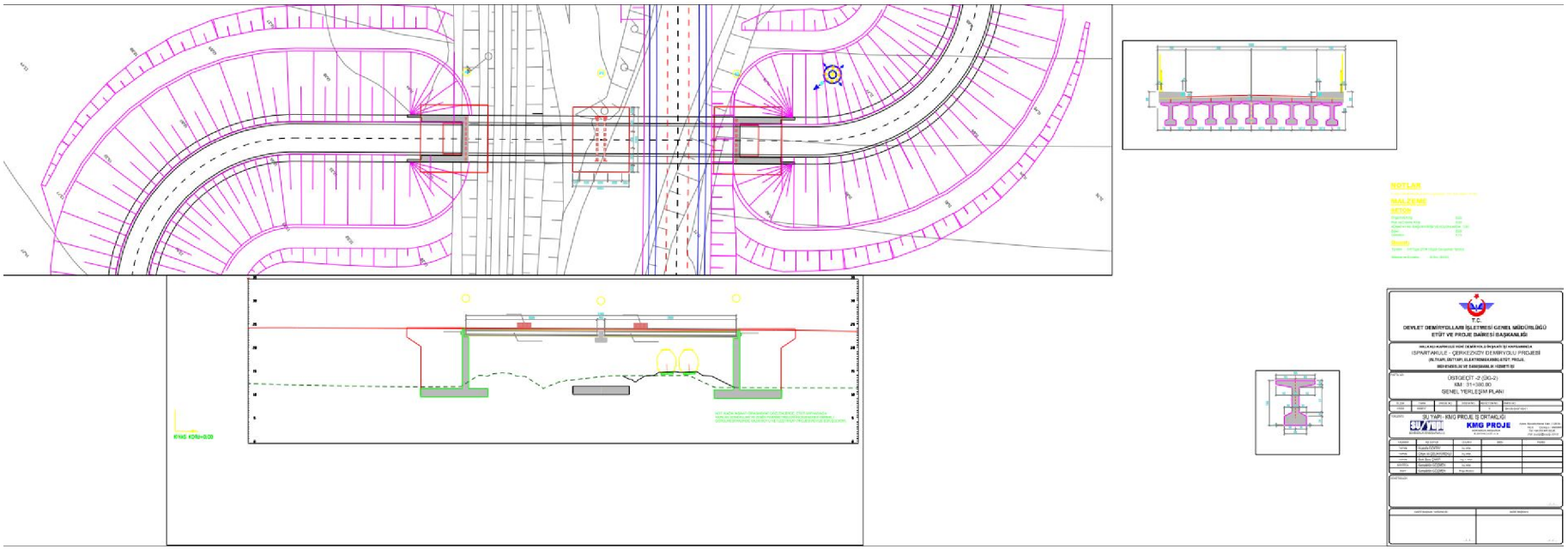
[7] Luminous flux per unit area.

- 1 will be used for forest access, inclusive of machinery;
- 9 will be used for local access to local villages and residential dwellings; and
- 3 will be used for main roads.

2.4.51. Further information on the dimensions and purpose of each of the overpasses is provided in **Table 2-5**.

2.4.52. An example section drawing of an overpass is included in **Figure 2-14**.





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Note:

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FINAL

Job Title:
HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title
Figure 2-14 - Example Overpass Section Drawing

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Figure 2-14

Path: \\uk.wspgroup.com\central data\Projects\700698xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-14 - Example Overpass Section Drawing.mxd

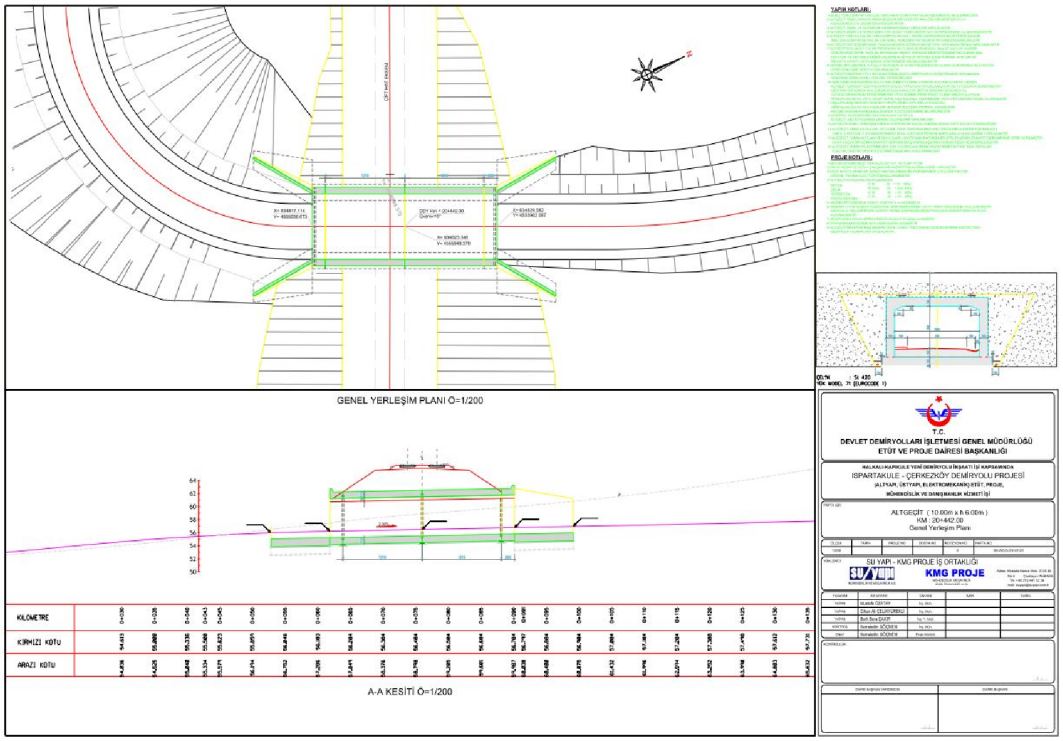
Underpasses

2.4.53. The 26 underpasses (passing under the Project alignment) will be used as follows:

- 11 will be used for agricultural / forestry access, inclusive of machinery and livestock;
- 11 will be used for local access to local villages and residential dwellings;
- 3 will be used for the existing railway; and
- 1 will be used for a main road.

2.4.54. Further information on the dimensions and purpose of each of the underpasses is provided in **Table 2-6**. An example section drawing of an underpass is included in **Figure 2-15**.





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Job Title:
HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title
Figure 2-15 - Example Underpass Section Drawing

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RB	JW	DG	22/02/2021

Drawing Number
Figure 2-15

Path: \\uk.wspgroup.com\central data\Projects\700698xx\700698878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-15 - Example Underpass Section.mxd

2.5 ELECTRIFICATION

OVERHEAD LINE SYSTEM

2.5.1. The electricity for the overhead line system will provided by transformers which will be located close to the substation in Halkali (adjacent to the east of the Project alignment near chainage 1+500) and Kabakca (adjacent to the north of the Project alignment near chainage 44+000). At each location one transformer will be provided. The Halkali transformer will be located at ground level above the TBM-twin bore tunnel and the Kabakca transformer will be located adjacent to the track and within the railway corridor. The detailed design of the transformers will be the responsibility of the Contractor. The designs must be accordance with both 'EN 50329: Railway Applications – Fixed Installations – Traction Transformers' and the Project 'Technical Specification for Construction of Substations'.

2.5.2. The location of the transformers is shown on **Figure 2-16** and **Figure 2-17**. Further information on the substations is provided in **Paragraph 2.5.7** to **2.5.8.**

2.5.3. The overhead line system will use alternating current at 25 kV and 50 Hz.

2.5.4. The overhead line system will be inclusive of the following key pieces of systems and equipment:

- Support masts with associated foundation bases – singular trackside columns which will support the overhead lines;
- Portal structures with associated foundation bases – two support masts which will span the length of the high-speed railway;
- Cantilevers – horizontal or near horizontal components which will support the catenaries projecting from the support masts;
- Isolation and sectioning switches – switches which will shut off, for reasons of safety, the supply of electricity to a specific section of the high-speed railway;
- Contact wires – which will act as the interface for the train pantograph[8] and carry the current along with the Catenaries
- Catenaries – the longitudinal wires which will support the contact wires and also carry the current;
- Droppers – wires which will be suspended vertically from the catenaries at regular intervals to support the contact wires;
- Neutral section – a length of non-conducting material incorporated into the contact wires to separate electrical sections of the overhead line system; and
- Tensioning devices – in order to keep the wires taught.

2.5.5. The track will act as the current return path for the overhead line system.

2.5.6. The height of the overhead line system will be a maximum of 6m[9].

[8] The apparatus mounted on the roof of an electric train.
[9] The contact wire will be a nominal 5.30m above the rail track.

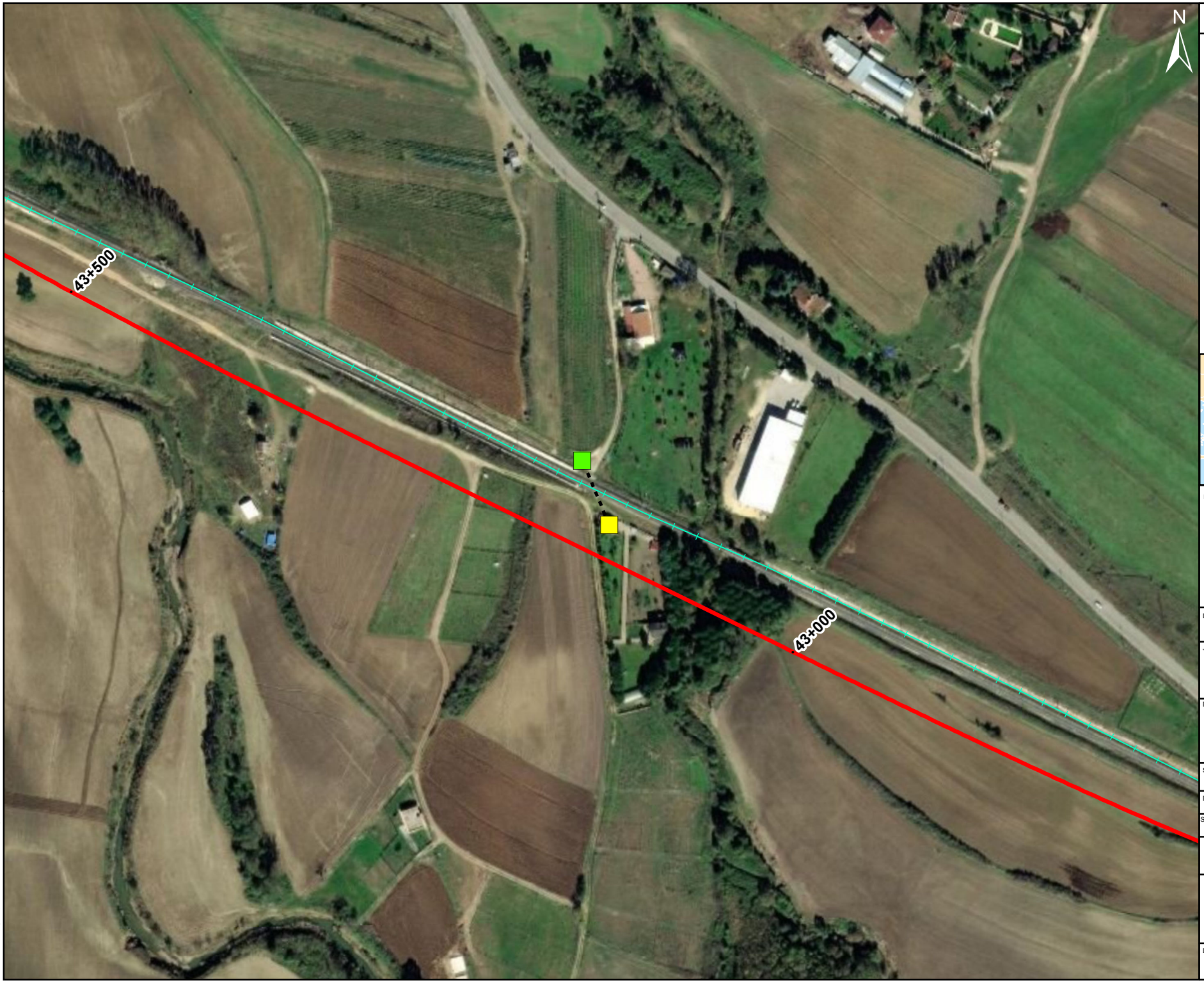
SUBSTATIONS

2.5.7. A number of substation improvements at Halkali and Kabakca are required to provide suitable transformers connection:

- Halkali (near chainage 2+500) – Upgrading of the existing 154kV connection point; and
- Kabakca (near chainage 43+100) – Demolition of the existing substation and the construction of a 154kV connection point, together with the replacement of the existing 154kV 2-phase power system with a 3-phase power system.

2.5.8. The substations will be located outside of the expropriation corridor and AYGM will be responsible for obtaining wayleave (rights of way) and undertaking any arranging additional land acquisition. The Contractor will also be responsible for liaising with the Turkish Electricity Generation and Transmission Corporation (TEAS) regarding connecting the substations to the transformers by overhead lines.

2.5.9. The location of the substations, the transformers and indicative connections are shown on **Figure 2-16** and **Figure 2-17**.



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Substation
- Transformer
- Proposed Railway Route
- Indicative Overhead Line Connection
- Existing Railway Route



Note:

Drawing Status: FINAL

Job Title: HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title: Figure 2-16 - Location of Transformer and Substation Near Kabakca (indicative only)

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Path: \\uk.wspgroup.com\central data\Projects\700698xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-16 - Location of Transformer and Substation Near Kabakca.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Substation
- Transformer
- Tunnel (TBM - Double Tube)
- Indicative Overhead Line Connection
- Existing Railway Route



Note:

Drawing Status
FINAL

Job Title:
HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title
Figure 2-17 - Location of Transformer and Substation Near Halkali (indicative only)

Scale at A4
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Figure 2-17

Path: \\uk.wspgroup.com\central data\Projects\700698xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-17 - Location of Transformer and Substation Near Halkali.mxd

TRACTION POWER SYSTEM

2.5.10. The overhead line system will connect to the traction power system, which is a component of the train. The traction power system will convert the electrical energy, collected from the contact wires, into mechanical energy, thus enabling the wheels to turn and, therefore, the train to accelerate and brake.

2.5.11. TCDD had previously undertaken a Traction Power Modelling Study[10] to inform the traction power system design.

TRACTION SCADA SYSTEM

2.5.12. The Traction Supervisory Control and Data Acquisition (SCADA) System will provide centralised control and monitoring systems for the electrification systems (overhead line system and traction power system). Traction SCADA System for this Project will be operated from control centres in Çerkezköy and Halkali. The Çerkezköy Control Centre is being developed as part of the under construction Çerkezköy to Kapikule railway section and the Halkali Control Centre currently serves the Marmaray railway[11].

2.5.13. The Traction SCADA System be inclusive of, but not limited to:

- Features for operations – including controlling the overhead line system and traction power system;
- Features for safety – including controlling isolation and sectioning switches, providing surveillance of the railway structures and systems;
- Features for communications – including providing public announcements;
- Features for security – including network security measures to prevent the SCADA System from being compromised;
- Features for user interface – including controlling in-car and train door information screens; and
- Emergency features – associated with managing the fire and emergency alarm systems.

2.6 SIGNALLING SYSTEM

2.6.1. The Project will be designed to be compliant with the (TSIs (European Rail Agency) and fitted with an ERTMS Level 1 signalling system.

2.6.2. There are no signalling systems on the existing railway line that are located near the railway corridor, nor are improvements proposed as part of this Project. However, where the conventional trains will be able to use the high-seed tracks between Halkali Station and a location adjacent to the east of Çerkezköy Station the trains will adhere to the ERTMS Level 1 signalling system installed for the Project.

2.6.3. The installed signalling system for the Project will be equipped with national signalling systems, with Automatic Train Stop (ATS) train protection systems.

[10] TCDD (2017). Traction Power Modelling Study - 14 Transformatör Merkezleri Güç Hesaplamalari.
[11] The Marmaray Line is an existing intercontinental commuter railway running from Halkali to Gebze.

2.6.4. The signalling system will also:

- Interface with the Centralised Traffic Control (CTC) system between the high-speed line and conventional line; and
- Connect to the Çerkezköy Control Centre.

2.7 CONTROL SYSTEMS

GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS – RAILWAY

2.7.1. The Global System for Mobile Communications – Railway (GSM-R) will enable voice communications between the passenger and freight trains and the wider railway communication systems listed.

2.7.2. The GSM-R will supply the wayside radio infrastructure required to enable coverage of the line between Halkalı and Çerkezköy. The GSM-R system will provide capability to support European Train Control System (ETCS) Level 2 train control functionality. The GSM-R will consist of:

- Radio equipment;
- Uninterruptable power supplies;
- Antenna towers and foundations;
- Base transmission stations;
- Necessary equipment housings;
- Control equipment.

2.7.3. The GSM-R will include radio frequency for the Project alignment, station buildings and adjoining infrastructure up to a distance of 300m either side of the Project alignment.

2.7.4. In addition, GSM-R dispatcher equipment will be provided at the Çerkezköy Control Centre as part of the under construction Cerkezköy to Kapikule railway section. Additional equipment and software upgrades to the GSM-R hub (Master Switching Centre) in Ankara will also be provided.

TELECOMMUNICATIONS SYSTEM

2.7.5. The telecommunications system will provide telephone communications and data communication systems between the overhead line system, traction power SCADA system, signalling system and the GSM-R system.

Telephone Communications System

2.7.6. The telephone communications system will provide voice communications between the transformers, substations, the CTC system and the control centres. The telephone communications system will consist of:

- Telephones;
- A telephone switchboard
- Dispatcher type terminals; and
- A voice recording system.

Data Communication System

2.7.7. The data communication system will interface with the network management systems for the under construction Çerkezköy to Kapikule railway section and the Marmaray railway. The data communication system will be based on Internet Protocol (IP) industrial ethernet technology and will

provide system redundancy and diversity to allow maximum availability with a Mean Time Between Failures (MTBF) of a minimum of 150,000 hours. The system will support a full range of data standards to ensure network system functionality.

2.8 PROJECT LAND REQUIREMENTS

2.8.1. **Table 2-7** provides an overview of the Project's impacts on land and thus persons with the expropriation corridor. The expropriation corridor includes both the 50m railway corridor for the Project and the permanent land required (such as embankments, cuttings and station parking) for the Project. These figures are primarily based on the results of the household survey and update Asset inventory undertaken in 2020 to inform the **Resettlement Action Plan (RAP)**.

Table 2-7 - Land Requirements

Statistic	Unit
Total Land Size to be Acquired	5,391,151m^2
Total Number of Land Parcels to be Acquired	1,256 (904 private; and 352 public)
Total Number of Households Affected	3,228
Total Number of Informal Users Affected (by the land expropriation)	347

2.8.2. The information presented in the table above excludes any temporary or permanent land that may be required outside of the expropriation corridor. For example, any land required for construction compounds or construction access roads (as detailed in **paragraphs 2.9.17** to **2.9.21**). The Contractor will be responsible for the location of these construction compounds and construction of access roads.

2.8.3. It is also possible that the numbers presented in the table may rise during the expropriation process as currently unidentified shareholders and informal users are recognised through the legal challenging of the expropriation cases.

2.8.4. Further information on the land and persons impacted by the Project are provided in the **RAP**.

2.9 OVERVIEW OF THE CONSTRUCTION PHASE

2.9.1. Throughout all construction activities the Contractor will comply with the **Contractor Management Plan (CMP)** and the **ESMP** (**Chapter 19**).

2.9.2. The **CMP** outlines the relationship between AYGM, the Contractor and its sub-contractors associated with the Project, as well as how the overall Project will be managed.

2.9.3. The **ESMP** (**Chapter 19**) represents a commitment by AYGM (including their Contractor and associated sub-contractors) and TCDD Transport and applies to the Project's entire lifecycle. The ESMP presents the potential impacts and associated mitigation measures and management procedures for the Project, as is informed by the baseline information and assessments presented in the technical assessments **(Chapters 6-17)**. The **ESMP** (**Chapter 19**) sets out:

- The environmental, health and social aspects of the Project that need to be managed;
- The proposed mitigation measures;

- The responsibilities for implementing and monitoring the measures; and
- The targets and / or indicators of success.

2.9.4. The Contractor will be required to develop the ESMP into the **Construction Environmental and Social Management Plan** (CESMP) prior to the start of the construction phase. TCDD Transport will be required to develop the ESMP into the **Operational Environmental and Social Management Plan** (OESMP) prior to the start of the operational phase.

CONSTRUCTION PROGRAMME

2.9.5. The Project is due to be tendered in 2021, with construction commencing in 2021, and the Project becoming fully operational in 2026. The construction programme allows for pre- and post-construction activities such as mobilisation, enabling works, testing and commissioning.

2.9.6. A detailed construction programme will be prepared by the appointed Contractor.

KEY CONSTRUCTION ACTIVITIES

2.9.7. At the time of writing the construction activity details are not fully known, assumptions have been made based on experience from the construction of the Cerkezkoy to Kapikule railway section. It is assumed that many of these activities will take place concurrently at multiple locations along the Project alignment. The assumed likely key construction activities are summarised below:

- Enabling works;
- Access roads;
- Construction compounds and construction workers accommodation;
- Security measures;
- Temporary drainage;
- Construction plant and vehicles;
- Wheel washing;
- Materials storage, transportation and waste disposal;
- Demolition, including of buildings within the expropriation corridor (as detailed in the **RAP**) and at the existing Kabakca substation;
- Quarrying resources (as described in **Chapter 12: Geology and Hydrogeology** and **Chapter 13: Materials and Waste**);
- Excavations;
- Blasting works;
- Ground / soil improvements;
- Earthworks;
- Laying subbase;
- Construction of ancillary structures:
    - Bridges – likely to consist of reinforced earth embankments joining the bridges to the land, construction of piers to support the bridges (using cofferdams where the piers are to be located within watercourses, as discussed further in **Chapter 8: Ecology** and **Chapter 11: Surface Water Environment**) and the lifting in of pre-cast beams and decks (which will have been constructed off-site). The bridge piers would be supported on piles.
    - Viaducts - likely to consist of reinforced earth embankments joining the viaducts to the land, construction of arches to support the viaducts (no arches will be located within watercourses)

and the lifting in of pre-cast beams and decks which will have been constructed off-site). The viaduct arches would be supported on piles.
    - Tunnels (as described in **paragraphs 2.4.32** to **2.4.52**).
    - Overpasses and underpasses – likely to consist of reinforced earth embankments which will support a single span bridge (which will have been constructed off-site).
- Permanent drainage;
- Laying ballast;
- Laying the foundation and tracks;
- Concrete works;
- Installation of systems;
- Installation of transformers and construction / improvement works to substations;
- Vegetation planting; and
- Reinstatement of temporary areas.

Enabling Works

2.9.8. Enabling works will consist of site clearance and preparation. This will include the vegetation removal, breaking of hardstanding, topsoil stripping and sub-soil excavation along the Project alignment and the construction compounds.

2.9.9. Enabling works would be undertaken as one of the first construction activities, running in parallel with the activities associated with access roads, establishment of the construction compounds and construction workers accommodation, the establishment of security measures and barriers and the establishment of temporary drainage.

Access Roads

2.9.10. Construction vehicles, construction plant and materials will reach the access roads in proximity to the Project alignment via the main road network, using the E80 (between Halkali and Çerkezköy), D569 (around Çatalca), O-6 (around Çatalca), D020 (between Kabakca and Çerkezköy) and the D567 (in proximity to Çerkezköy).

2.9.11. The Contractor will be responsible for the construction of access roads, or upgrades to the existing roads to enable access to the Project alignment and construction compounds.

2.9.12. As detailed in the Project 'Technical Specification for Construction Work', with the which the Contractor must comply, the Contractor will ensure the works are planned to enable them to be delivered safely and, in a manner, which minimises congestion, road safety risks and disruption for all road users. As a minimum, the Contractor will:

- Limit works on the road network to not occupy more than 1 single lane, therefore always enabling one-way traffic, where practicable;
- Provide temporary roads around the construction areas, where necessary;
- Should temporary roads be necessary, roadblocks will be provided to prevent access to the areas where construction activities are taking place;
- There will be no night-time driving except in exceptional circumstances;
- Construct temporary vehicle bridges with sufficient capacity for the existing vehicle usage;
- Construct temporary pedestrian bridges which will include appropriate safety measures, such as railings and be a minimum with of 1m; and
- Provide, illuminated and non-illuminated signals, and guardrails.

2.9.13. The Contractor will ensure that road users are informed of any works which will affect access.

2.9.14. **Figure 2-18** shows the access roads along the Project alignment which will likely be impacted during the construction phase (those where the Project is not tunnelled). In total it is expected that approximately 137 access tracks / roads will be impacted. These access roads will likely be impacted by restricting usage to one-way traffic, diversions onto temporary or other roads or the use of temporary bridges. Of these approximately 64% are access tracks to agricultural land, 8% are access tracks to forested areas, 8% are crossing associated with major highways and 7% access tracks to the existing railway. The remaining are access roads to residential properties and local communities. Specific measures will be put in place by the Contractor to ensure access is maintained to Bahçeşehir, Çatalca, Çayırdere, Deliklikaya, İnceğiz, Sinekli and Yeşilbayır during the construction phase.

2.9.15. Where practicable temporary structures, such as bridges, will be constructed to enable the use of the existing railway during construction. However, it will be necessary to have some temporary closures of the existing railway, notably where the Project will pass over or under the existing railway. Local users of the existing railway will be informed about all alternative transport methods, in advance of works commencing.

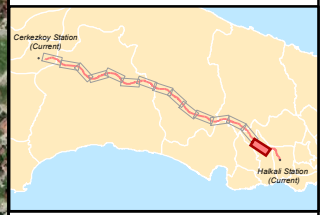
2.9.16. Further information on construction safety measures are detailed in **Chapter 15: Social.**



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Access Tracks / Roads
- Existing Railway Route
- Proposed Railway Route
- Tunnel (TBM - Double Tube)
- Tunnel (NATM)
- Tunnel (Cut - Cover)



Note:

Information provided based on OpenStreetMap data.

Drawing Status

FINAL

Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

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Figure 2-18 (1 / 15)

Path: \\uk.wspgroup.com\central data\Projects\700698\xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\MXD\Figure 2-18 - Access Tracks Roads.mxd



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Note:

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Drawing Status

FINAL

Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

Scale at A4

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Figure 2-18 (2 / 15)

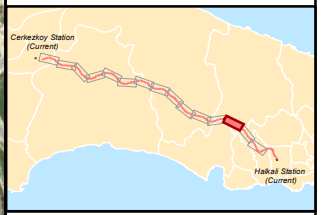
Path: \\uk.wspgroup.com\central data\Projects\70069878\xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\MxdFigure 2-18 - Access Tracks Roads.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Access Tracks / Roads
- Existing Railway Route
- Proposed Railway Route
- Tunnel (TBM - Double Tube)
- Tunnel (NATM)
- Tunnel (Cut - Cover)



Note:

Information provided based on OpenStreetMap data.

Drawing Status

FINAL

Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

Scale at A4

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Figure 2-18 (3 / 15)

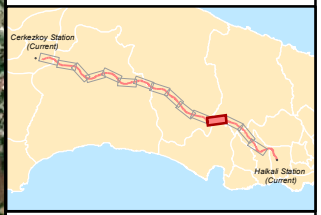
Path: \\uk.wspgroup.com\central data\Projects\70069878\xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-18 - Access Tracks Roads.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Access Tracks / Roads
- Existing Railway Route
- Proposed Railway Route
- Tunnel (TBM - Double Tube)
- Tunnel (NATM)
- Tunnel (Cut - Cover)



Note:

Information provided based on OpenStreetMap data.

Drawing Status

FINAL

Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

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Drawing Number

Figure 2-18 (4 / 15)

Path: \\uk.wspgroup.com\central data\Projects\700698xx\700698878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-18 - Access Tracks Roads.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Access Tracks / Roads
- Existing Railway Route
- Proposed Railway Route
- Tunnel (TBM - Double Tube)
- Tunnel (NATM)
- Tunnel (Cut - Cover)



Note:

Information provided based on OpenStreetMap data.

Drawing Status

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Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

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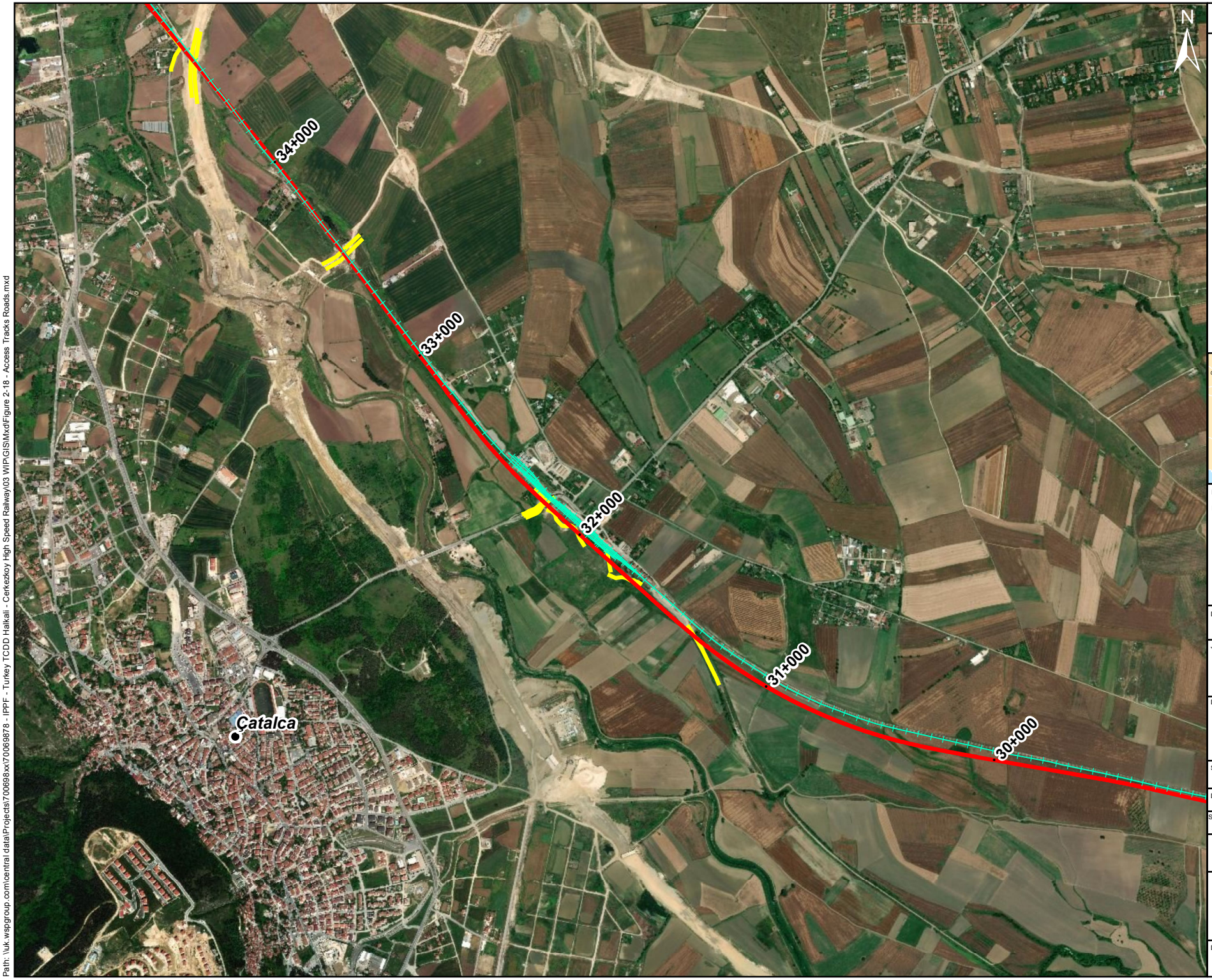
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Figure 2-18 (5 / 15)

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THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Access Tracks / Roads
- Existing Railway Route
- Proposed Railway Route
- Tunnel (TBM - Double Tube)
- Tunnel (NATM)
- Tunnel (Cut - Cover)



Note:

Information provided based on OpenStreetMap data.

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Job Title: HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title: Figure 2 - 18 - Access Tracks / Roads

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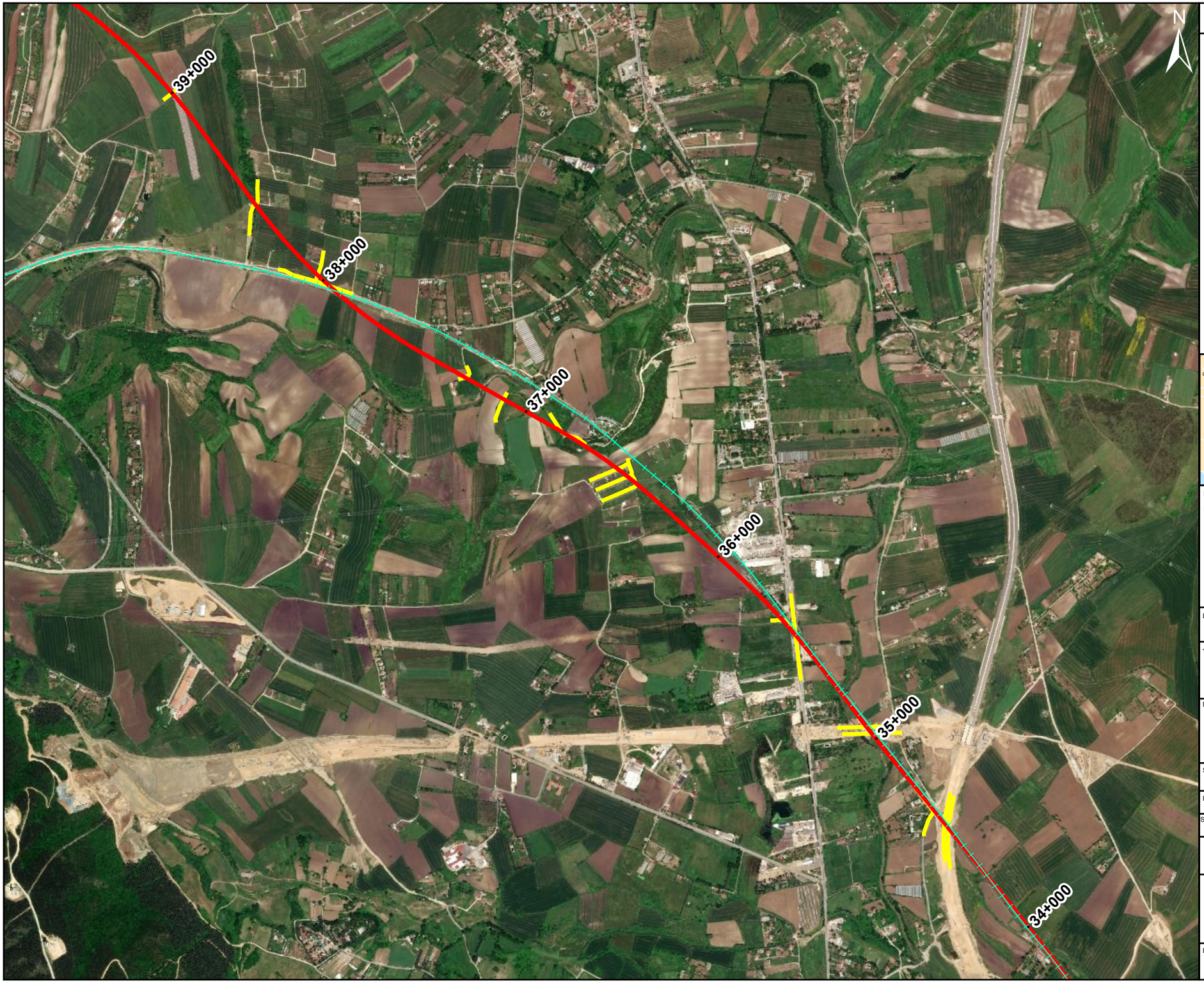
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Drawing Number: Figure 2-18 (6 / 15)

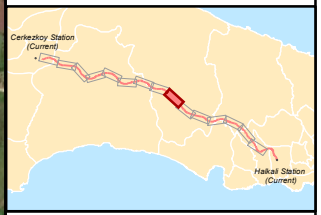
Path: \\uk.wspgroup.com\central data\Projects\70069878xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-18 - Access Tracks Roads.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Access Tracks / Roads
- Existing Railway Route
- Proposed Railway Route
- Tunnel (TBM - Double Tube)
- Tunnel (NATM)
- Tunnel (Cut - Cover)



Note:

Information provided based on OpenStreetMap data.

Drawing Status

FINAL

Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

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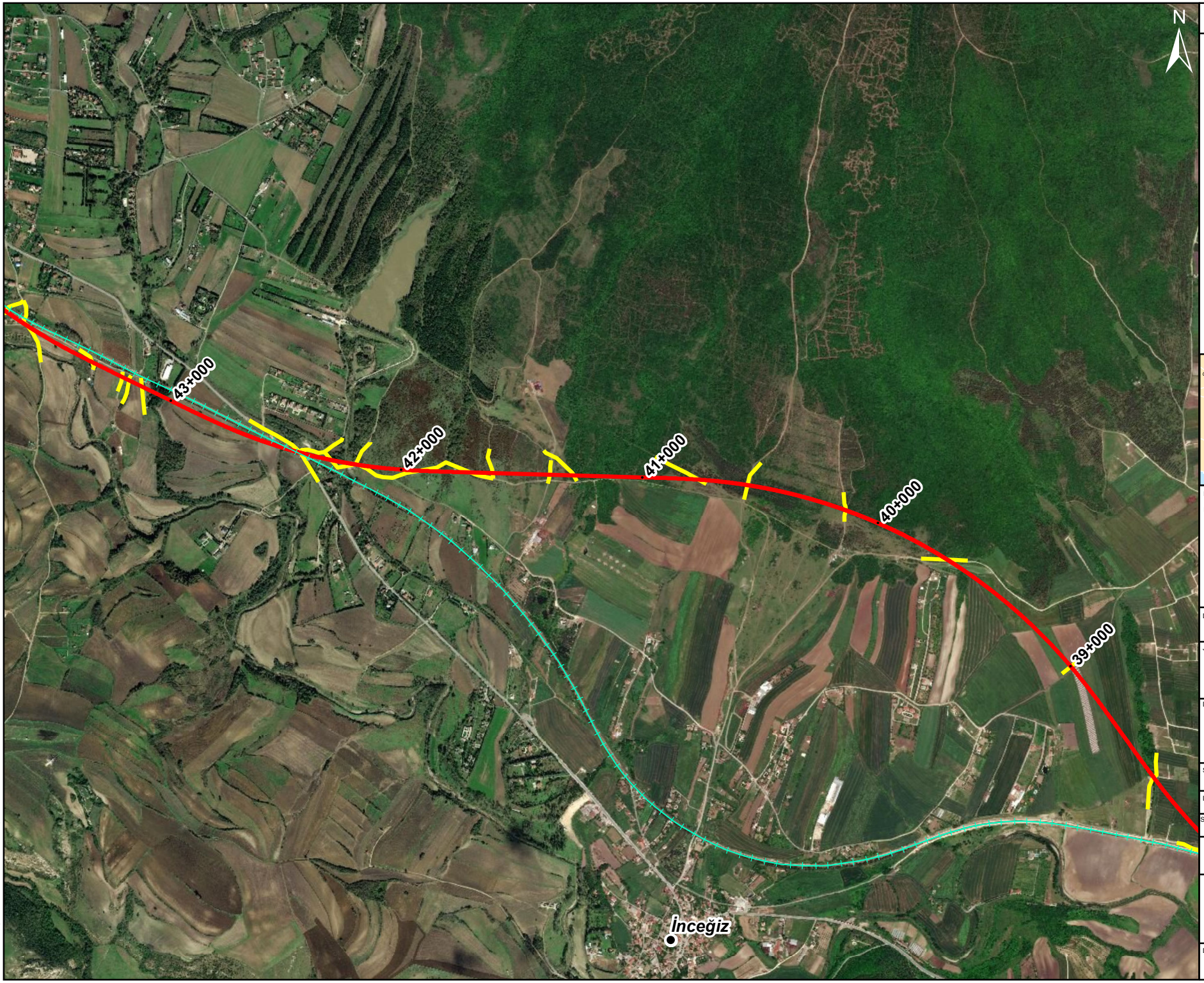
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Figure 2-18 (7 / 15)

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THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Access Tracks / Roads
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Note:

Information provided based on OpenStreetMap data.

Drawing Status

FINAL

Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

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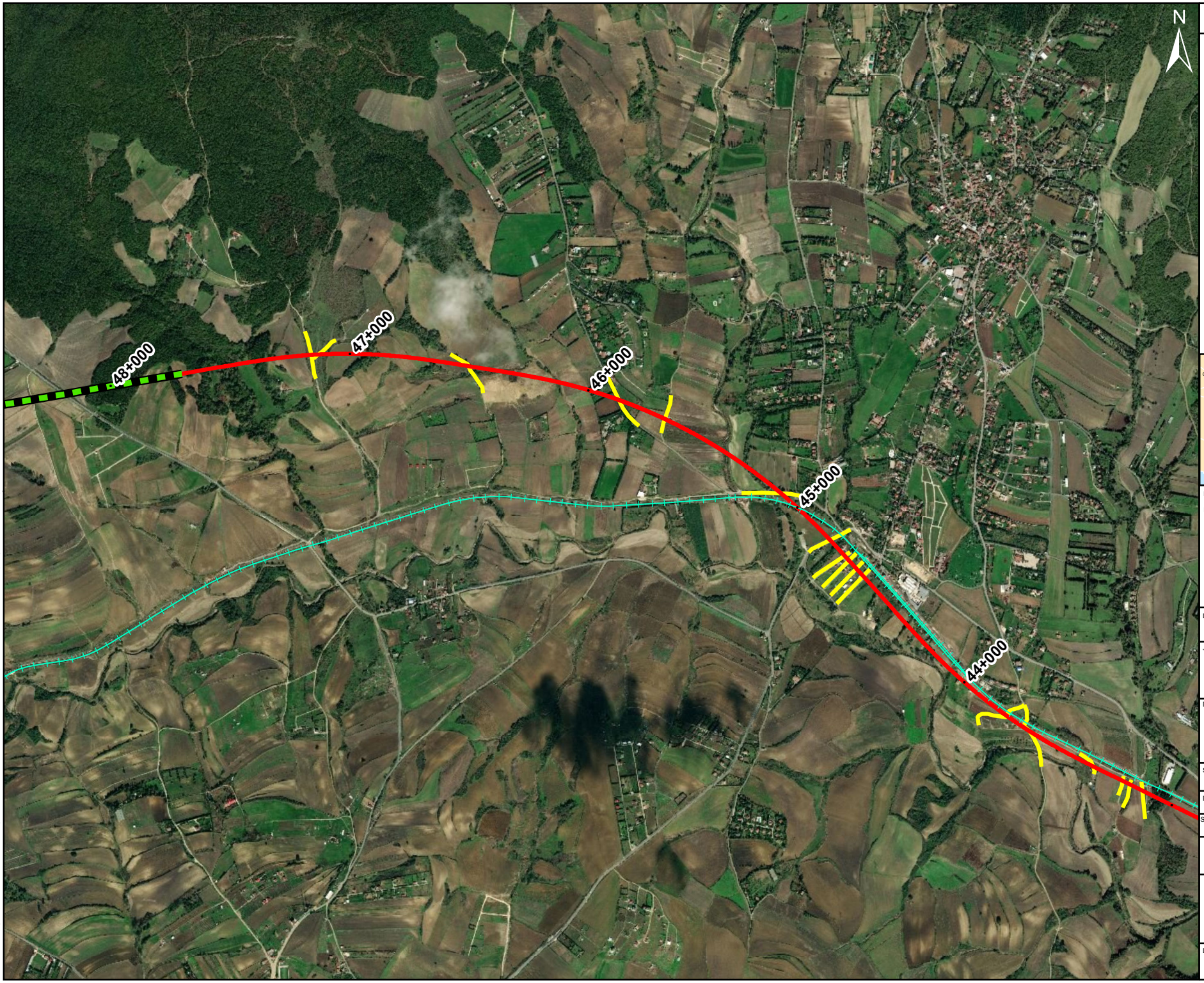
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Figure 2-18 (8 / 15)

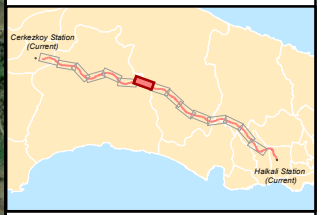
Path: \\uk.wspgroup.com\central data\Projects\70069878xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-18 - Access Tracks Roads.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Access Tracks / Roads
- Existing Railway Route
- Proposed Railway Route
- Tunnel (TBM - Double Tube)
- Tunnel (NATM)
- Tunnel (Cut - Cover)



Note:

Information provided based on OpenStreetMap data.

Drawing Status

FINAL

Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

Scale at A4

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Stage 1 check	Stage 2 check	Originated	Date
PR	JW	DG	22/02/2021

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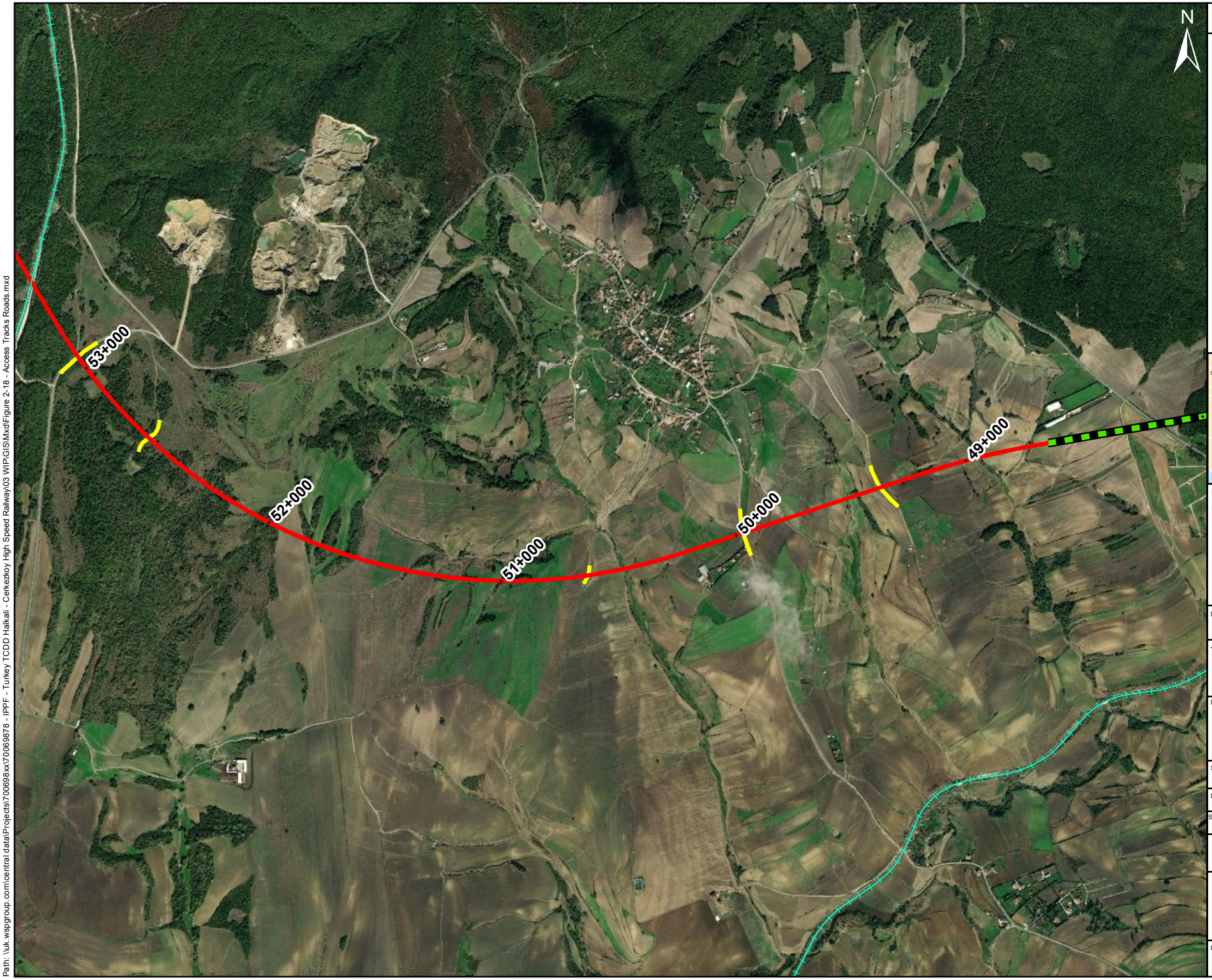
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Drawing Number

Figure 2-18 (9 / 15)

Path: \\uk.wspgroup.com\central data\Projects\70069878xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-18 - Access Tracks Roads.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
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- Tunnel (TBM - Double Tube)
- Tunnel (NATM)
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Note:

Information provided based on OpenStreetMap data.

Drawing Status

FINAL

Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

Scale at A4

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PR	JW	DG	22/02/2021

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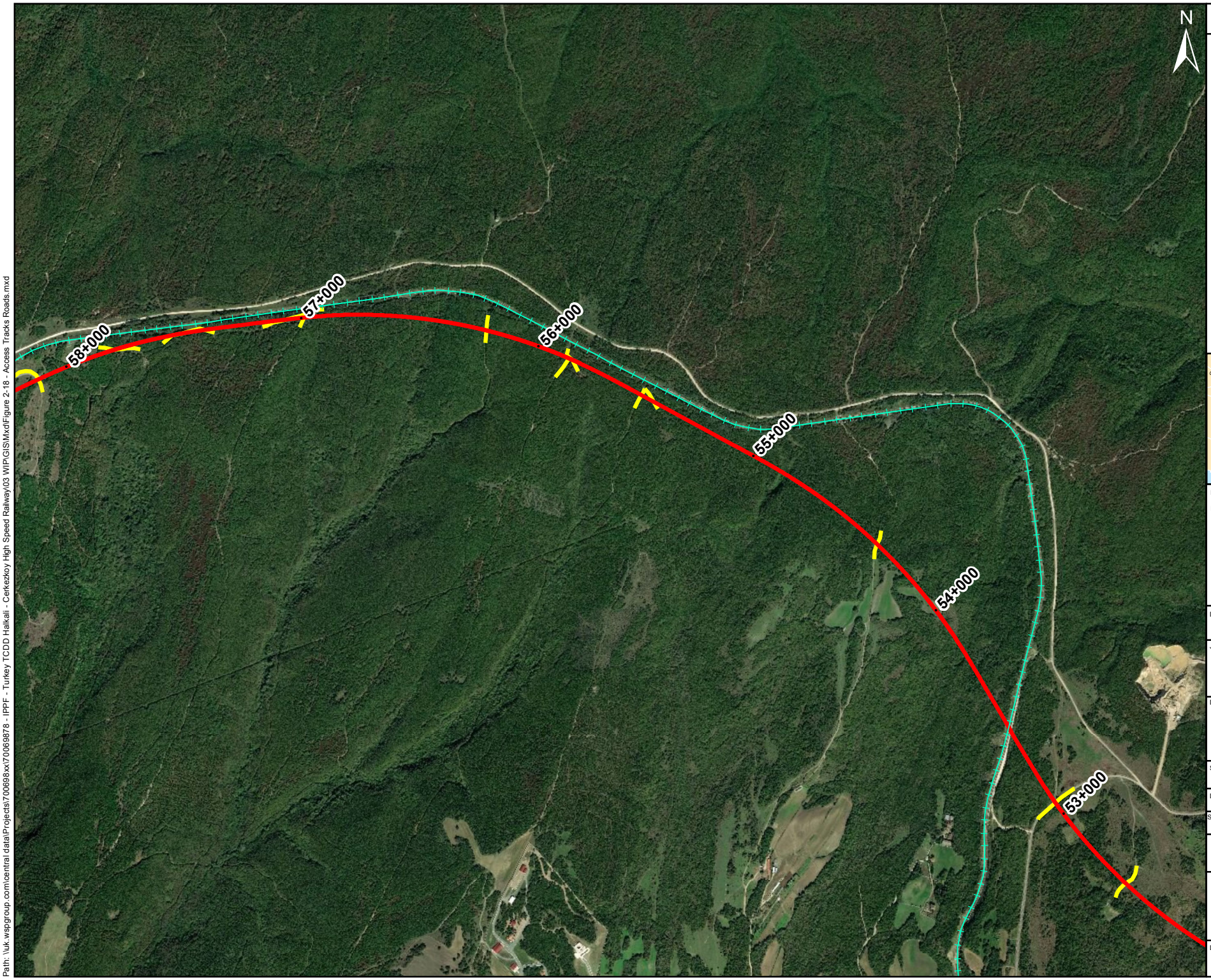
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Drawing Number

Figure 2-18 (10 / 15)

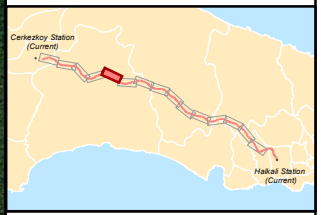
Path: \\uk.wspgroup.com\central data\Projects\70069878\xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-18 - Access Tracks Roads.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Access Tracks / Roads
- Existing Railway Route
- Proposed Railway Route
- Tunnel (TBM - Double Tube)
- Tunnel (NATM)
- Tunnel (Cut - Cover)



Note:

Information provided based on OpenStreetMap data.

Drawing Status

FINAL

Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

Scale at A4

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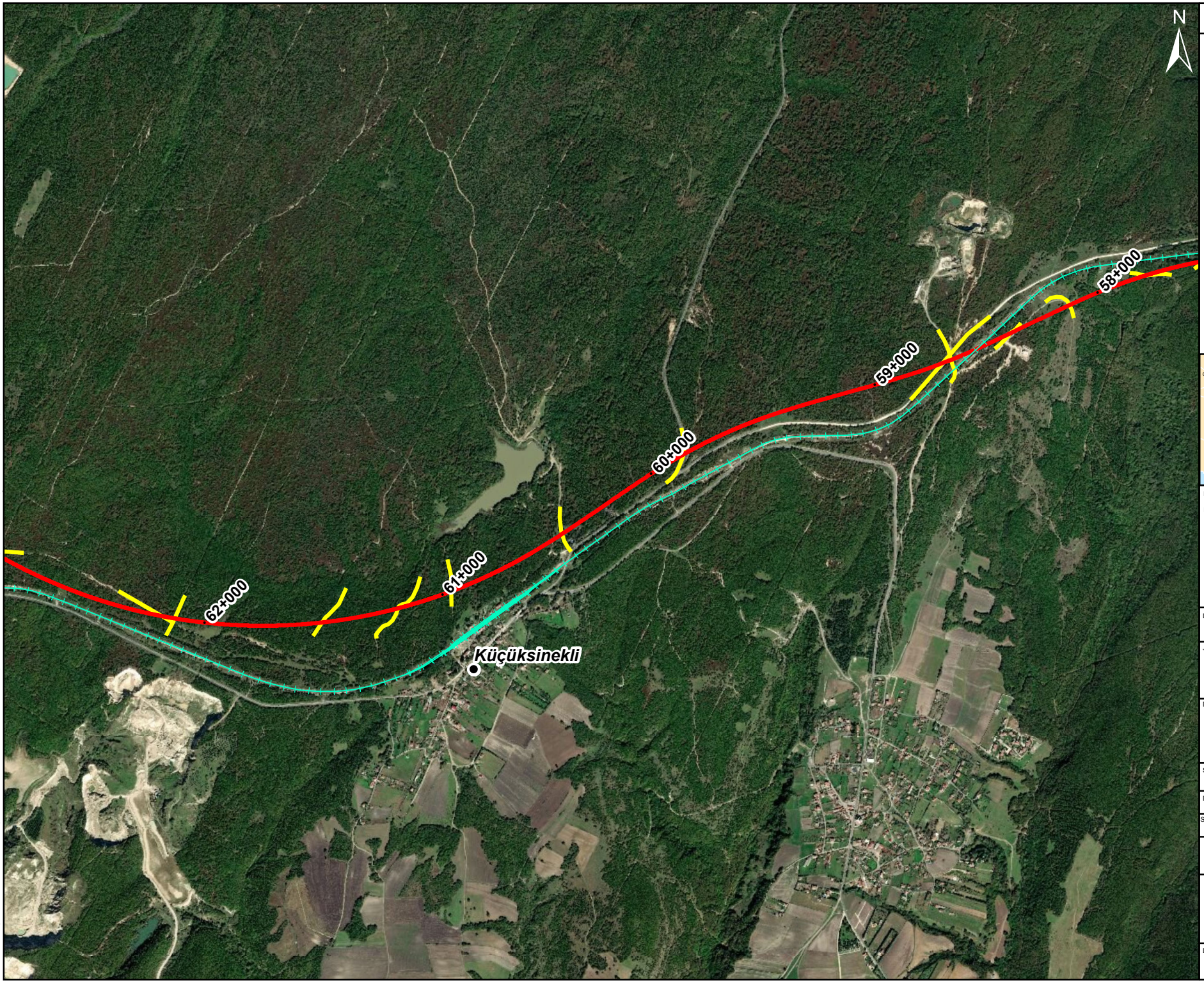
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Drawing Number

Figure 2-18 (11 / 15)

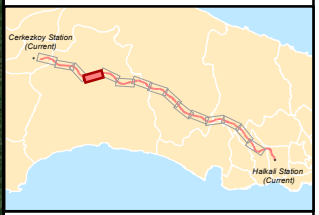
Path: \\uk.wspgroup.com\central data\Projects\700698xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-18 - Access Tracks Roads.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Access Tracks / Roads
- Existing Railway Route
- Proposed Railway Route
- Tunnel (TBM - Double Tube)
- Tunnel (NATM)
- Tunnel (Cut - Cover)



Note:

Information provided based on OpenStreetMap data.

Drawing Status

FINAL

Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

Scale at A4

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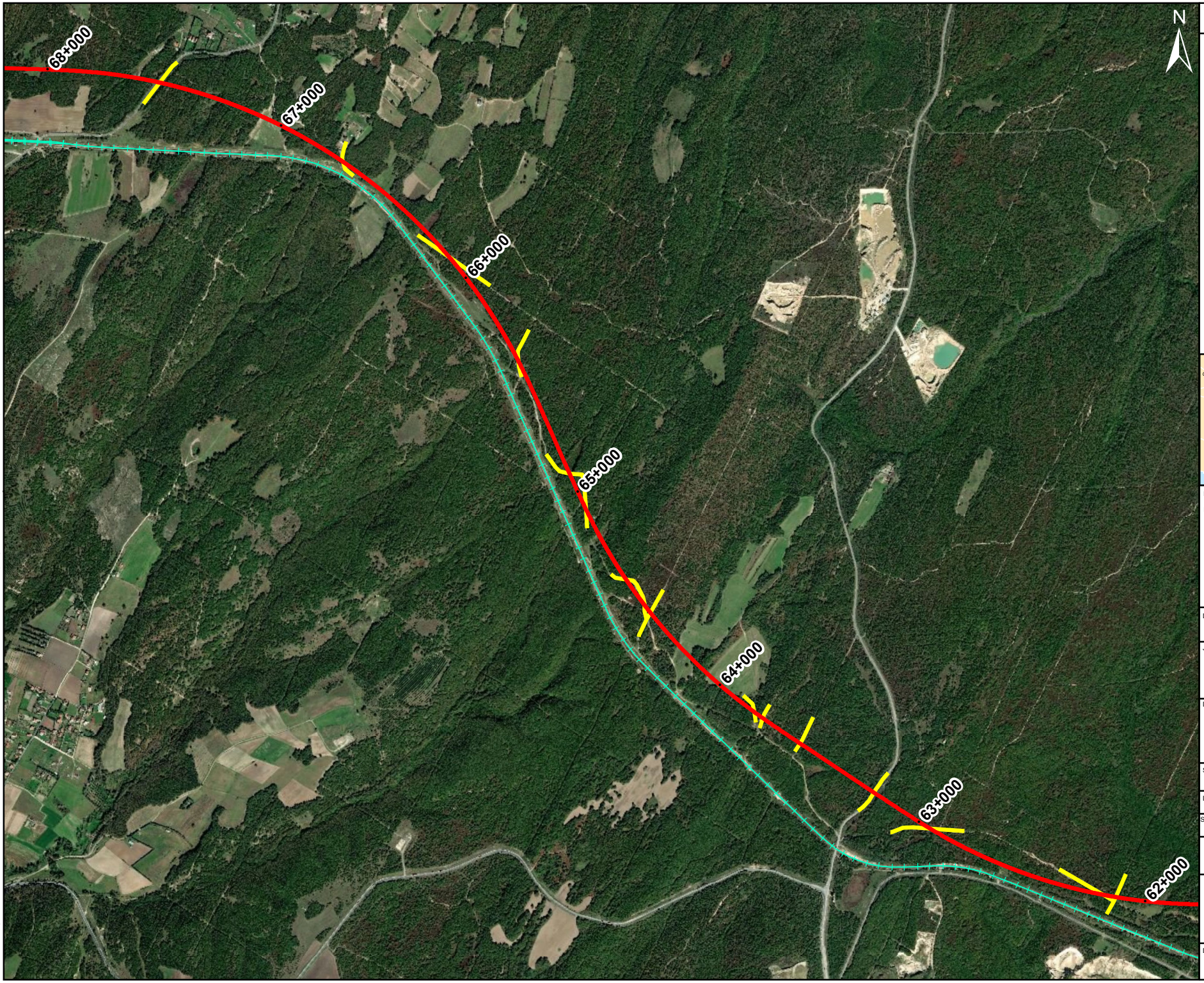
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Drawing Number

Figure 2-18 (12 / 15)

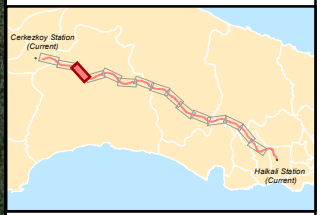
Path: \\uk.wspgroup.com\central data\Projects\70069878xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-18 - Access Tracks Roads.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Access Tracks / Roads
- Existing Railway Route
- Proposed Railway Route
- Tunnel (TBM - Double Tube)
- Tunnel (NATM)
- Tunnel (Cut - Cover)



Note:

Information provided based on OpenStreetMap data.

Drawing Status

FINAL

Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

Scale at A4

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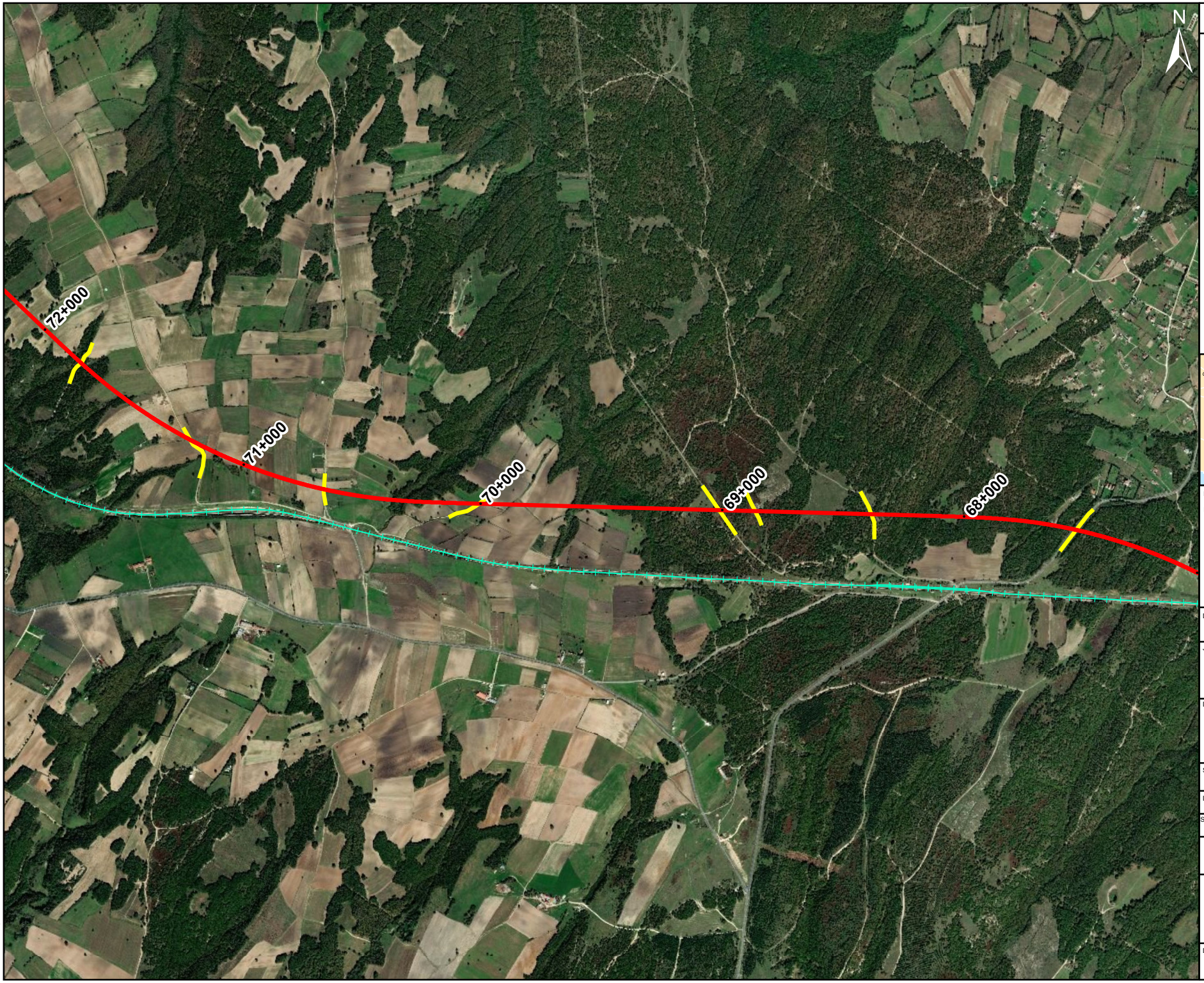
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Figure 2-18 (13 / 15)

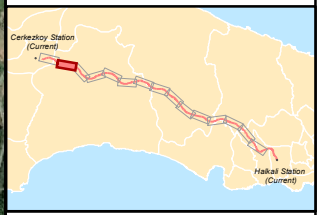
Path: \\uk.wspgroup.com\central data\Projects\70069878xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-18 - Access Tracks Roads.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Access Tracks / Roads
- Existing Railway Route
- Proposed Railway Route
- Tunnel (TBM - Double Tube)
- Tunnel (NATM)
- Tunnel (Cut - Cover)



Note:

Information provided based on OpenStreetMap data.

Drawing Status

FINAL

Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

Scale at A4

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PR	JW	DG	22/02/2021

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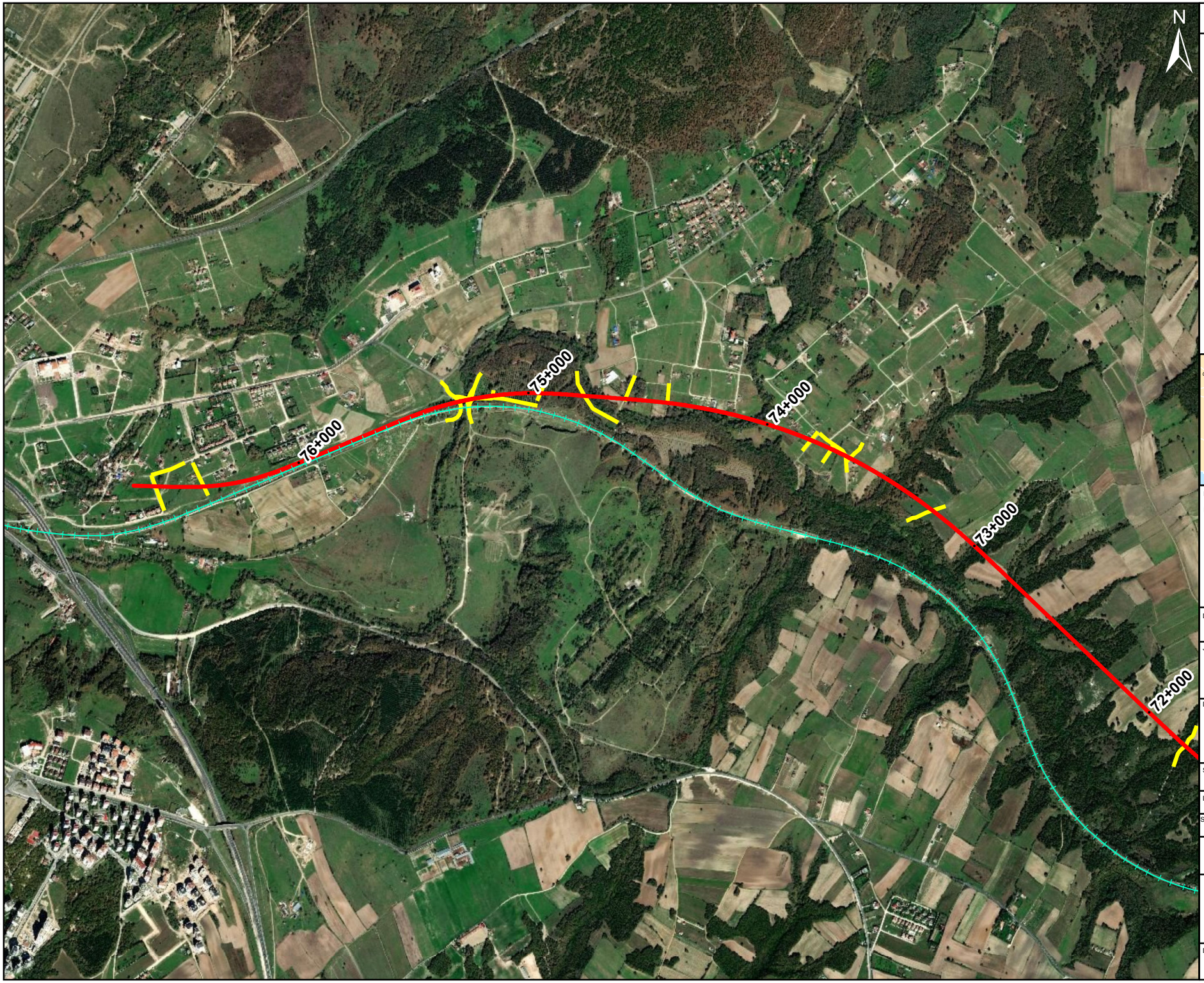
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Drawing Number

Figure 2-18 (14 / 15)

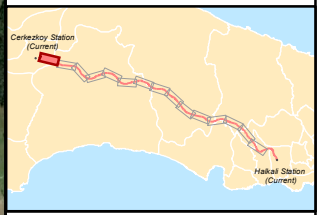
Path: \\uk.wspgroup.com\central data\Projects\70069878\xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-18 - Access Tracks Roads.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Town
- Access Tracks / Roads
- Existing Railway Route
- Proposed Railway Route
- Tunnel (TBM - Double Tube)
- Tunnel (NATM)
- Tunnel (Cut - Cover)



Note:

Information provided based on OpenStreetMap data.

Drawing Status

FINAL

Job Title:

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title

Figure 2 - 18 - Access Tracks / Roads

Scale at A4

1:20,000

Drawn			
DG			
Stage 1 check	Stage 2 check	Originated	Date
PR	JW	DG	22/02/2021

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Drawing Number

Figure 2-18 (15 / 15)

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Construction Compounds and Construction Workers Accommodation

2.9.17. The Contractor will be responsible for negotiating agreements with landowners, to temporarily use land for the construction compounds. The selection of suitable locations will be in accordance with environmental, social and economic criteria, that the Contractor will be required to apply, as set out in the **CMP** and the **ESMP**. As the Contractor had not been commissioned at the time of writing, the compound locations are not yet available, however, 3 potential locations have been identified based on assumptions from the under construction Çerkezköy to Kapikule railway section and agreed with the Project Team.

2.9.18. There are likely to be 3 construction compounds along the Project alignment, based on the number of compounds that were required for the under construction Çerkezköy to Kapikule railway section. It is assumed that a compound will be required at either end of the Project alignment, located at Esenyurt (near Halkali) and Çerkezköy, with a further third compound located centrally along the Project alignment near Kabakca. All 3 compounds are expected to cover an area of between 5,000m^2 and 9,000m^2, and be located alongside existing road infrastructure.

2.9.19. There will be an estimated total construction workforce of 1,100 workers. It is expected that approximately 550 of the construction workers will be from the local communities, 450 will be Turkish national construction workers and the remaining 100 will be international construction workers. The Turkish nationals and the international construction workers will occupy the construction compounds, in construction workers accommodation (approximately 185 workers per construction compound). Of the 1,1000 workers it is estimated that 15% will be professional workers (such as engineers), 35% skilled workers (such as welders), 25% semi-skilled workers (such as construction drivers) and 25% unskilled workers (such as labourers). The Contractor will be required to employ a Health, Safety and Environment (HSE) team, who will as part of the series of sub-plans for the **CESMP**, develop a **Health and Safety Plan** and a **Construction Workers Accommodation Management Plan.**

2.9.20. Each construction compound will contain dormitories, offices, healthcare facilities, sport facilities, parking, storage areas, fuel stores, waste segregation facilities, and catering / canteen facilities.

2.9.21. Table 2-8 and Figure 2-19 shows the details of the three potential construction compounds.

Table 2-8 - Potential Construction Compounds

Possible Construction Compound	Possible Closest Settlement	Possible Approximate Distance from the Alignment
1	Located approximately 1km from the edge of Esenyurt, near Halkali.	Adjacent or <300m east of the Project alignment.
2	Located approximately 1.5km from the edge of Kabakça.	Adjacent or <100m south of the Project alignment.
3	Located approximately 2.8km from the edge of Çerkezköy.	Adjacent or <500m south of the Project alignment.



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Train Stations (Current)
- Proposed Railway Route



Note:

Drawing Status: FINAL

Job Title: HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title: Figure 2-19 - Potential Location of Construction Compounds (indicative only)

Scale at A4: 1:300,000

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Stage 1 check	Stage 2 check	Originated	Date
JK	JW	DG	22/02/2021

0 1.25 2.5 5 7.5 10 Km

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Drawing Number: Figure 2-19

Path: \\uk.wspgroup.com\central data\Projects\700698xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-19 - Potential Construction Compounds.mxd

Workforce Provisions

2.9.22. The Contractor will provide offices, dining halls and accommodation for construction and administration workers within each construction compound. The furnishing and maintenance of these facilities will be undertaken by the Contractor. The provision of utilities (water, electricity and plumbing), wastewater and waste management as well as telecommunications to these facilities and the wider construction compounds / expropriation corridor will also be the responsibility of the Contractor. Back-up generators will be available in the event of an emergency. Non-potable water for workforce provisions such as flushing toilets, will either be pumped from groundwater or sourced from the local water network (water pipes), while drinking water for construction workers will be sourced from bottled containers which will be delivered to the construction compounds. The pumped groundwater will need be filtered to remove particles, and if used for any other purposes besides flushing toilets, it will require further treatment (such as ultraviolet treatment or chemical additions), unless groundwater testing depicts good water quality.

2.9.23. Based on the under construction Çerkezköy to Kapikule railway section it is expected that the following provisions will be used / generated by the construction compounds (including the construction workers accommodation):

- Water: 240,000 litres per day (potable (bottled containers) and non-potable water (pumped from groundwater and sourced from the local water network (water pipes));
- Electricity: approximately 3,900kW/h per day;
- Fuel (typically diesel): approximately 80,000 litres per day;
- Solid waste: 600kg per day (of which approximately 3% would be construction waste and approximately 97% would be municipal waste from the construction workers accommodation); and
- Wastewater: approximately 240,000 litres per day (1 collection per day for each construction compound).

2.9.24. Further details on water usage for the Project is provided in **Chapter 11: Surface Water Environment**.

Security Measures

2.9.25. As detailed in the Project 'Technical Specification for Construction Work', with the which the Contractor must comply, the Contractor will provide security provisions inclusive of security personnel and security fencing. Further information on construction safety measures are detailed in **Chapter 15: Social**.

Temporary Drainage

2.9.26. Temporary drainage facilities will be constructed during the construction phase. Existing drainage channels and culverts will be cleaned, expanded and/or reinforced. Further information on the flood risk is provided within **Chapter 11: Surface Water**.

Construction Plant and Vehicles

2.9.27. The Contractor will be responsible for the provision of construction plant and vehicles during the construction phase of the Project, these are likely to include:

- Backhoe loaders.
- Breakers (for rocks and road surfaces);

- Concrete / cement mixers;
- Concrete / cement batching plants;
- Concrete pumps;
- Conveyors;
- Cranes;
- Diesel generators;
- Dozers;
- Exactors;
- Hydraulic hammer rigs;
- Piling rigs;
- Tamping machine;
- TBM;
- Trucks and wagons; and
- Vibratory rollers.

2.9.28. Concrete will be delivered to the areas where construction activities are taking place either by concrete / cement mixers, or the materials (i.e. water, sand, aggregates and cement) will be delivered and mixed onsite using concrete batching plants. As the Contractor is yet to be appointed the details how concrete will be delivered to site, including the possible location of construction batching plants are unknown. Once onsite the concrete will be transferred into the in-situ locations using concrete pumps.

2.9.29. Different combinations of plant and vehicles will be used for different construction activities and the specific locations of these activities will also change throughout the construction phase of the Project.

2.9.30. Assumptions have been made at this stage with regard to size, number, type and location of construction plants and vehicles. These assumptions are outlined in **Chapter 6: Air Quality** and **Chapter 7: Noise and Vibration**.

Wheel Washing

2.9.31. As detailed in the Project Technical 'Specification for Construction Work', with the which the Contractor must comply, the Contractor will implement a wheel washing system. This will remove accumulated dust and mud from construction plant and vehicles before they depart from the construction compounds / areas where construction activities are taking place. This help to keep the surrounding access roads clean.

Materials Storage, Transportation and Waste Disposal

2.9.32. Construction materials will be stored onsite in the construction compounds. Stockpiles material will be stored with a maximum height of 5m.

2.9.33. Earthworks arising from the Project will initially be stockpiled before being tested for suitability for re-use. If the earthwork material is unsuitable for re-use the onward storage location for these arisings will be determined by the Contractor, and subject to approval by the relevant authorities.

2.9.34. In addition, in accordance with the Regulation on Waste Management (2015) (amended 2017) the Contractor will segregate waste and keep records to demonstrate disposal of Project waste arisings to licenced waste facility operators.

2.9.35. Further information on materials storage, transportation and waste disposal is provided in **Chapter 13: Materials and Waste**.

Water Supply and Wastewater Discharge

2.9.36. In addition to the potable and non-potable water required for the construction compounds and construction worker accommodation (described in paragraphs 2.9.22 and 2.9.23) non-potable water will be required to undertake the construction activities. Such activities will include concrete / cement preparation (if batching plants are used), wheel washing and cooling water provision for the TBM. Non-potable water will either be pumped from groundwater or sourced from the local water network.

2.9.37. Wastewater generated from the construction activities, inclusive of any dewatering activities, will be discharged in accordance with national legislation, such as the Regulation on Control of Water Pollution (2004) and the Regulation on Environmental Permits and Licences (2014).

2.9.38. Further details on water supply and wastewater discharge during the construction phase is provided in **Chapter 11: Surface Water Environment**.

Quarrying Resources

2.9.39. Quarried resources from are likely to be required to obtain material for the Project, as the arisings from the tunnel, and other excavations, may not prescribed quality standards for required construction materials. Several quarries have been identified for the supply of sand, gravel, basalt, granite and limestone within the South Marmara region, as detailed in **Chapter 12: Geology and Hydrogeology** and **Chapter 13: Materials and Waste**.

Demolition

2.9.40. In total 64 properties (households) will be demolished as part of the Project. Details of these properties are provided in the **RAP**. It has been assumed that all properties within the expropriation corridor will be demolished unless those properties are located above a tunnel.

2.9.41. Secondary structures (sheds, animal shelters, water tanks etc.) will be relocated before being demolished, where practicable. Furthermore, property owners will have the opportunity to salvage demolished material.

2.9.42. The Kabakca Substation will also be demolished as part of the Project.

Excavations

2.9.43. Along the Project alignment earthworks will be required in the areas where embankments and cuttings created and near the tunnel entrance / exits.

2.9.44. There is the potential for pre-existing contamination within the soils along the Project alignment, particularly in the areas surrounding the existing railway, existing roads and industrial areas which is discussed further in **Chapter 12: Geology and Hydrogeology.**

2.9.45. After the completion of the excavations, the soil / rock will be compressed, and geotextile and suitable filing material will be laid respectively.

Ground / Soil Improvements

2.9.46. The areas along the Project alignment that are within areas of current landslides and old landslides, are likely to be more susceptible to risks associated with soil instability and landslides as discussed further in **Chapter 12: Geology and Hydrogeology**. Therefore, the detailed design of the Project

will incorporate measures to reduce the likely release of loose material or material with the potential to become loose in-situ including:

- Slope stabilisation – including mulching (straw mulching), brushwood mulching, erosion control blankets, soil binders (e.g. polyacrylamide) and gravelling;
- Retaining walls – to retain loose materials on slopes where it would not naturally be held, for example on near vertical or vertical slopes;
- Sediment traps and basins – which will intercept and retain sediment-laden runoff;
- Drainage channels – which will divert run-off water;
- Treatment systems – to remove material contained within the run-off water; and
- Revegetation – The **ESMP** includes the requirement for a **Landscape Management Plan** which will include measures to increase the stability of the loose materials and surfaces which become exposed during the construction phase of the Project.

Earthworks

2.9.47. The central axis will be marked on the site according to the approved specifications, upon which the earthworks will be based. Fill material will be supplied and transported to the Project in accordance with the measures outlined in **Chapter 13: Materials and Waste**. The ground will be watered, compressed and stability tested after completion of the earthworks.

Laying Subbase

2.9.48. A geotextile will be installed prior to the subbase layer. The sub-base will consist of crushed aggregate materials onto which the drainage, ballast, foundations and rail track will be laid. Once the subbase is laid, it will be watered, compressed and stability tested.

Permanent Drainage

2.9.49. Drainage works will be carried out after the laying of the subbase. The drainage works will consist of a new drainage system of interceptor ditches, side ditches, box culverts and manholes that will drain the track and ancillary structures along Project alignment as described in paragraphs **2.4.13** to **2.4.16**.

Laying Ballast

2.9.50. All ballast materials will either be re-used waste material from tunnelling / excavations, provided they meet the required specification, or will be obtained from approved local quarries in accordance with the measures outlined in **Chapter 13: Materials and Waste**. Two layers of ballast will be layered and levelled.

Laying the Foundation and Rail

2.9.51. The concrete foundation will be laid on the first layer of ballast at specified intervals. Rails will be mounted on the sleepers with connectors. Connectors will be compressed with a tamping machine and preliminary tamping completed. After mounting, the second layer of ballast will be laid, after which connectors will be compressed and the rail line welded.

Concrete Works

2.9.52. Concrete will either be delivered to the areas where construction activities are taking place either by concrete / cement mixers or the materials (i.e. water, sand, aggregates and cement) will be delivered and mixed onsite using concrete batching plants. As the Contractor is yet to be appointed

the details how concrete will be delivered to site, including the possible location of construction batching plants are unknown. Once onsite the concrete will be transferred into it's in-situ location using concrete pumps.

2.9.53. Any precast concrete segments for the tunnel linings will be delivered by trucks.

Construction of the Structures and Systems

2.9.54. In parallel to the activities described above, the Contractor will construct and install the structures and systems listed in Sections 2.4 to 2.7. The Contractor will be responsible for preparing **Construction Plans** and **Method Statements** for each key structure / system.

Vegetation Planting

2.9.55. No planting of tall shrubs or trees is proposed within the 25m exclusion zone on either side of the centreline of the Project. This is to avoid disruption from potential vegetative contact with the power supply and catenary posts. Shrubs below 1m mature height or grasses are to be planted or seeded on all exposed earthworks to within 1m of the trackside to help reduce soil erosion and runoff.

2.9.56. All planting will be in accordance with the **Landscape Management Plan**, which will outline species, density and locations for vegetation planting.

Reinstatement of Temporary Areas

2.9.57. Upon completion, areas used as construction compounds and / or for construction access will be returned to their original use and state.

CONTRACTOR RESPONSIBILITIES

2.9.58. Each construction day will begin with a tool-box talk focusing on health, safety and environmental (HSE) matters.

2.9.59. The Contractor will be responsible for taking all necessary precautions to maintain the safety of construction activities, construction plant, construction facilities, the construction workforce and the local communities. This includes provision of appropriate lighting, providing appropriate safety signage and barriers, and providing a first aid department to manage workplace accidents. The Contractor will also be responsible for providing private site security (inclusive of security fencing) and fire protection, in co-ordination with the Fire Authority and the General Directorate of Security. Further information on construction safety measures are provided in **Chapter 15: Social**.

2.9.60. The Contractor will provide waste segregation (i.e. for metals, wood, plastics etc.) facilities. Collection will occur once containers are full (an as required basis) by the respective municipality. A recycling company will take the waste to shared licenced recycling sites. Waste that cannot be recycled will be delivered to existing licenced landfill sites. Liquid waste arisings disposal will be coordinated with the respective municipality. Further information on materials and waste are provided in **Chapter 13: Materials and Waste**.

2.9.61. The Contractor will clean all public roads and surfaces immediately in the event of contamination / spillage caused by vehicles owned by the Contractor or their subcontractors.

2.9.62. Further details on the contractor responsibilities are provided in the **ESMP** and the **Contractor Management Plan**.

2.10 COMMISSIONING AND TESTING

2.10.1. Upon completion of the construction process commissioning and testing of the Project will commence. This will include:

- Progressive verification and validation through inspection and testing in a safe way that all rail systems and structures operate correctly and meet the Project requirements including all specifications and standards**;**
- Verification that all safety requirements are met including specific tests to show that safety features operate correctly**;**
- Specific tests of fault conditions to show that redundancy features and emergency and protective features work as intended and that single fault conditions do not have catastrophic consequences**;**
- Integration testing to show that the railway, as a whole, performs safely and meets operational requirements through:
  - Undertaking test runs, whereby the speed in gradually increased to reach the maximum speed for the trains; and
  - Undertaking test runs, whereby the number of trains operating on the line is gradually increased to reach the maximum number of trains**.**
- Practicing the implementation of the **Emergency Response Framework**, including the associated **Operational Emergency Response Plan** applicable to the operational phase of the Project:

2.10.2. All of the commissioning and testing should be clearly documented as to:

- Details of the test procedure, equipment and methodology**;** and
- A clear description of the pass/fail criteria; and
- Recording of actual results so that there is a clear audit trail showing successful completion of commissioning and testing.

2.11 OPERATION AND MAINTENANCE

OPERATION

2.11.1. Operation of the Project will be the responsibility of TCDD Transport.

2.11.2. TCDD will be responsible for the operation and maintenance of railway infrastructure.

2.11.3. TCDD Transport will be responsible for the operation and maintenance of the railway for passengers and freight.

2.11.4. Once operational, the Project travel times for both passenger and freight trains will be reduced. The passenger experience will also increase with the use of high-speed passenger trains. This travel time reduction alongside the increased service quality will attract passengers to use rail services over other transport models (car and bus). This will inherently lead to increases in service frequency which in turn will attract more passengers.

2.11.5. As the Project overall will be compliant with the TSIs (European Rail Agency), the passenger trains will be compliant with the 'Rolling Stock - Locomotives and Passengers TSI' and the freight trains the 'Rolling Stock – Freight Wagons TSI'.

Forecast Usage for The Project ('with Project')[12]

Passenger Trains

2.11.6. Projections for average daily passenger train movements with and without the Project (numbers are for trains running in one direction – each way), are shown in the table below.

Table 2-9 – Average Daily Passenger Train Numbers (Halkali – Çerkezköy)

Year	Without Project (the existing railway)	With Project
2020	3 trains	-
2026	7 trains	11 trains
2030	8 trains	13 trains
2041	10 trains	18 trains

2.11.7. Passenger trains which will use the Project will likely include the TCDD Transport E4300 and E68000 locomotives (or a more recent version). TCDD Transport will define the type of locomotives prior to the operational phase commencing. Typically, the passenger trains will comprise 6 cars, containing 1 first class car, 1 business class car, 1 bistro car and 3 standard economy cars. Based on this configuration of cars the seat capacity of each passenger train will be approximately 348 people. The typical capacity of each car is as follows:

- First class car – 45 seats;
- Business class car – 12 seats;
- Bistro car – 36 seats; and
- Standard economy car – 85 seats.

2.11.8. The passenger trains will be accessible for elderly, disabled and those with reduced mobility and will include, allocated seats.

2.11.9. The maximum speed of the passenger trains will be 200km/h.

2.11.10. **Table 2-10** shows the anticipated growth in passenger numbers as a result of the Project.

[12] Passenger and freight projections are derived from an assessment undertaken by an independent specialist and based on a defined set of assumptions regarding predicted future use of the railway

Table 2-10 - Passenger Numbers and Projections (Halkali – Cerkezkoy)

Year	International		Domestic		Total	
	Without Project	With Project	Without Project	With Project	Without Project	With Project
	(thousands of passengers)					
2019	200	200	424	424	624	624
2020	204	204	508	508	712	712
2021	208	208	559	559	767	767
2022	212	212	587	587	799	799
2023	216	216	616	616	833	833
2024	221	221	647	647	868	868
2025	225	225	979	979	1,205	1,205
2026	230	230	1,028	1,846	1,258	2,075
2030	249	249	1,250	2,243	1,499	2,492
2035	275	275	1,449	2,601	1,723	2,875
2040	303	303	1,680	3,015	1,983	3,318
2050	370	370	2,048	3,675	2,417	4,045
2055	408	408	2,261	4,057	2,669	4,465

Freight Trains

2.11.11. Projections for average daily freight train movements with and without the Project (numbers are for trains running in one direction – each way), are shown in the table below.

Table 2-11 - Average Daily Freight Train Numbers

Year	Without Project (the existing railway)	With Project
Halkali – Çatalca		
2020	1 train	-
2026	2.4 trains	2.4 trains
2030	2.7 trains	2.7 trains

Year	Without Project (the existing railway)	With Project
2041	3 trains	3 trains
Çatalca – Çerkezköy		
2020	1 trains	-
2026	3.4 trains	3.3 trains
2030	4.2 trains	6.2 trains
2041	5.5 trains	8 trains

2.11.12. It is likely that the TCDD Transport E68000 locomotives will also be as freight trains. Typically, the freight trains will consist of 20 cars. The maximum speed of the freight trains will be 120km/h.

2.11.13. It is expected that approximately 50% of the freight trains will be used for the transportation of containers, with the remaining 50% used for the transportation of containers, vehicles, chemicals / petrochemicals and consumer goods.

Overall Trains

2.11.14. Table 2-12 shows the anticipated total growth in train numbers as a result of the Project (numbers are for trains running in one direction – each way).

Table 2-12 – Total Existing and Proposed Average Daily Train Numbers (Cerkezkoy – Halkali)

Year	Without Project (the existing railway)	With Project
Halkali – Çatalca		
2026	9.4	13.4
2030	10.7	15.7
2041	13	21
Çatalca – Çerkezköy		
2026	10.4	14.3
2030	12.2	19.2
2041	15.5	26

MAINTENANCE

2.11.15. Maintenance of the Project would be the responsibility of TCDD Transport (and TCDD), and would involve routine, planned maintenance and system testing, as well as ad-hoc maintenance and repairs. It is likely that the maintenance regime of would be inclusive of, but not limited to:

- Replacement of the ballast on a 20-year basis;
- Replacement of component parts of the Overhead Line System on a 40-year basis;
- Replacement of component parts of the catenaries (part of the Overhead Line System), for example the contact wires, on a regular basis. There will be different wear rates for each electromechanical component part;
- Replacement of component parts of the Substations on a 40-year basis; and
- Replacement of the GSM-R on 15-year basis, with the supporting radio frequency cabling being replaced on a 25-year basis and the antenna towers on a 30-year basis.

2.11.16. The design life of structures such as the rail track, platforms, footbridges, and all ancillary structures is approximately 100 years.

2.11.17. Maintenance activities would be planned to enable them to be delivered safely and, in a manner that minimises disruption, where practicable. The maintenance of trains will be carried out at the existing maintenance station at Halkali.

2.11.18. The siding near Çatalca Station (between chainage 31+620 and 33+050) will be used for the storage and maintenance of trains.

2.12 OTHER KEY PROJECTS IN THE SURROUNDING AREA

In addition to the below key projects, further information on other existing or proposed projects within the surrounding area are included within **Chapter 17: Cumulative Effects**.

KANAL ISTANBUL

2.12.1. Kanal Istanbul is the proposed construction of a 40km artificial canal on the European side of Istanbul, connecting the Black Sea and Marmara Sea.

2.12.2. The Kanal Istanbul project's southernmost point is the Marmara Sea, from there it enters Küçükçekmece Lake, and then connects to the Sazlıdere Reservoir, and from there it connects to the Black Sea, on an alignment to the east of the Terkos Lake. This Kanal Istanbul project will be located in the Avcılar, Küçükçekmece, Başakşehir and Arnavutköy districts.

2.12.3. Between Halkali and Ispartakule section, the Project will pass under the Kanal Istanbul project in a 6km twin-bore tunnel (Tunnel 1). The width of the Kanal Istanbul project will vary between 360m and 1,050m. The Kanal Istanbul project will have a depth of 25m below sea level (BSL). Tunnel 1 will pass beneath it at a depth of 40m BSL, an allowance of 15m between the two structures. 20 depicts the location of Tunnel 1, shown in red, relative to the Kanal Istanbul project, shown in blue. Tunnel 1 will be suitable for use by both conventional and high-speed trains.

2.12.4. The aim of the project is to relieve naval congestion in the Bosphorus, and it is expected to have a capacity of approximately 160 vessels a day. The current capacity of the Bosphorus is approximately 130 vessels per day.

2.12.5. The National EIA for the Kanal Istanbul project was approved by the Ministry of Environment and Urbanisation in January 2020. Once the tender process is complete the preparatory work will take

approximately one and a half years. The construction is expected to take an additional five and a half years and the Kanal Istanbul project is expected to be completed within seven years.

2.12.6. There will be a spatial and temporal overlap between the Project and its area of influence and Kanal Istanbul which is considered in **Chapter 17: Cumulative Effects**.



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Legend

- Proposed Railway Route
- Tunnel (TBM - Twin Bore)
- Tunnel (NATM)
- Tunnel (Cut - Cover)
- Kanal Istanbul Project Indicative Location



Note:

Drawing Status: FINAL

Job Title: HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Drawing Title: Figure 2-20 - Tunnel 1 and Kanal Istanbul Project Location

Scale at A4: 1:250,000

Drawn			
DG			
Stage 1 check	Stage 2 check	Originated	Date
BR	JW	DG	22/02/2021

0 1 2 4 6 8 Km

wsp

Drawing Number: Figure 2-20

Path: \\uk.wspgroup.com\central data\Projects\700698xx\70069878 - IPPF - Turkey TCDD Halkali - Cerkezkoy High Speed Railway\03 WIP\GIS\Mxd\Figure 2-20 - Tunnel 1 and Kanal Istanbul Project Location.mxd

CERKEZKOY – KAPIKULE HIGH SPEED RAILWAY

2.12.7. The Çerkezköy – Kapikule high speed railway is currently under construction and will provide a high-speed double track rail link from Çerkezköy to Kapikule at the Turkey/Bulgaria border. The Project and the Çerkezköy – Kapikule high speed railway are planned to be incorporated along with other future projects including the Yavuz Sultan Selim 3rd Bridge Rail Connection to develop one integrated transboundary high-speed rail system linking Europe to Asia. Each section will exist independently, but the design of each will ensure integration with future sections as they are developed forming one system.

2.12.8. As the Çerkezköy - Kapikule railway line construction is already proceeding independent of the Project and is not essential for the viability of the Project, nor does it exist solely because of the Project it is not considered to be an "associated facility" as per the ESP (2014) Performance Requirement 1. The overall benefits will however be enhanced when both rail sections are in operation.

2.12.9. There will be a spatial and temporal overlap between the Project and its area of influence and the Çerkezköy - Kapikule railway which is considered in **Chapter 17: Cumulative Effects**.

YAVUZ SULTAN SELIM 3RD BRIDGE RAIL CONNECTION

2.12.10. The Yavuz Sultan Selim 3rd Bridge Rail Connection project aims to provide rail connections for existing railway infrastructure between the Thracian region and Anatolia, as well as existing port infrastructure. This rail connection will connect the Yavuz Sultan Selim 3rd Bridge rail connection with Halkali Station via the new Istanbul airport, merging with the Project. Due to the potential for spatial and temporal overlap with the Project and its area of influence, this connection is considered in **Chapter 17: Cumulative Effects**.

2.12.11. At this stage, a detailed implementation schedule for the Yavuz Sultan Selim 3rd Bridge Connection project is yet to be defined, but it is anticipated it will be constructed by 2030 at the earliest.

2.12.12. Together, with the Çerkezköy - Kapikule section, and the connection to Yavuz Sultan Selim Bridge, the Project will form the most important railway corridor in Turkey. It will attract increased freight traffic, due to the need to carry freight to and from the Anatolian part of Turkey, taking advantage of the Yavuz Sultan Selim Bridge, and existing connections to Sofia (Bulgaria), Edirne and Kars (east of Turkey) to Azerbaijan, Iran and Georgia, and to Syria and Iraq in the south.

3

CONSIDERATION OF ALTERNATIVES

PUBLIC

3 CONSIDERATION OF ALTERNATIVES

3.1 INTRODUCTION

3.1.1. This chapter outlines the main alternatives to, and within the Project, such as alternative modes of transport, route alignments, and structures that have been considered by TCDD[13] and AYGM, together with the principal reasons for proceeding with the options selected for the Project.

3.1.2. The alternative for this Project were considered prior to the undertaking of this ESIA, have been reviewed as part of this ESIA and are presented in detail within the National EIA for the Project (2017)[14] and the Feasibility Study for the Project (2018)[15].

3.2 REQUIREMENT FOR THE CONSIDERATION OF ALTERNATIVES

3.2.1. The EIA Directive states that an EIA should include:

"… a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment".

3.2.2. EBRD PR1 states that an ESIA should include:

"… an examination of technically and financially feasible alternatives […], including the non-project alternatives, and document the rationale for selecting the particular course of action proposed".

3.3 DO-NOTHING SCENARIO

3.3.1. A 'do-nothing' scenario has been considered as an alternative to the Project. The following conditions are likely to remain or occur if the Project were not to proceed:

- The upgrade of the Halkali to Kapikule Railway Line (HKRL) network would remain incomplete and would fail to meet all the objectives of the HKRL upgrade programme;
- Transport and infrastructure baseline conditions would remain unchanged, with a preference for individual road transport modes over public (and railway based) transport modes;
- Rail traffic capacity, travel times and train frequency would remain unchanged and be unable to meet the increasing demands of population growth, economic growth and improved socio-economic integration with Europe and Anatolia;
- Due to the Project and HKRL's strategic location, Turkey would be unable to integrate into the Single European Transport Area or facilitate the integration and alleviation of capacity constraints of the Trans-European Transport Network (TEN-T) railway network extension and the Orient / Eastern Mediterranean Corridor network; and
- Accident risk on highways would remain unaltered, with increased demand and traffic under future growth scenarios likely resulting in a future increased accident risk.

[13] Prior to August 2020, when TCDD had responsibility for the design development of the Project.
[14] Sweco Mühendislik Müşavirlik ve Tasarım Ltd. Şti.(2017). Halkali – Kapikule Railway Project EIA Report.
[15] Feasibility Study for Halkalı-Kapıkule Railway Line Project Revised Report (2018).

3.3.2. In summary, the current Thracian railway network does not have the capacity to deal with the increased demands from a growing population and economy, or to meet strategic public transport objectives such as integrating the Turkish rail network with the adjacent European network. Without implementation, the objectives of the Project could not be achieved.

3.4 ALTERNATIVE NON-RAIL OPTIONS

ROAD ALTERNATIVE

3.4.1. There is currently a heavy reliance on road transport, due to the capacity constraints on the rail network, slow journey times due to speed restrictions, and a low frequency of trains. The two main state highways which follow a similar route from Turkey's European border to Istanbul are the D100 (between the Bulgarian border, Edirne, Istanbul) and further eastbound the E84 (between the Greek border at Ipsala Tekirdağ, Marmara Ereğlisi after which it connects to the D100 towards Istanbul). The highways are shown in Figure 3-1. These highways could be improved as an alternative to the high-speed railway; however, this would not support national policy which seeks to 'promote a shift from individual to sustainable, accessible and inclusive modes of public transport at both national and urban level'[16].

3.4.2. The increased rail capacity, journey time reductions and journey frequency increases would incentivise a move away from carbon-intensive private road vehicle travel for both passengers and freight. A reduction in road travel throughout the region, currently the preferred travel method, would have positive impacts through the reduction in emissions associated with road vehicles and inherently improved road safety. A rail option has therefore been selected in preference to a road option.

3.4.3. Furthermore, since the development of the 2018 Feasibility Study for the Project [17] the Çerkezköy to Kapikule section of the railway has commenced constructed, which further supports the preference for a rail option for this Project. Together, the Çerkezköy to Kapikule section and the Project will provide connections to Sofia (Bulgaria) and the wider Orient / East-Mediterranean corridor of the TEN-T.

[16]TCDD (2014). Transport Sectoral Operational Programme (IPA-II Period 2014-2020).
[17] Feasibility Study for Halkalı-Kapıkule Railway Line Project Revised Report (2018).

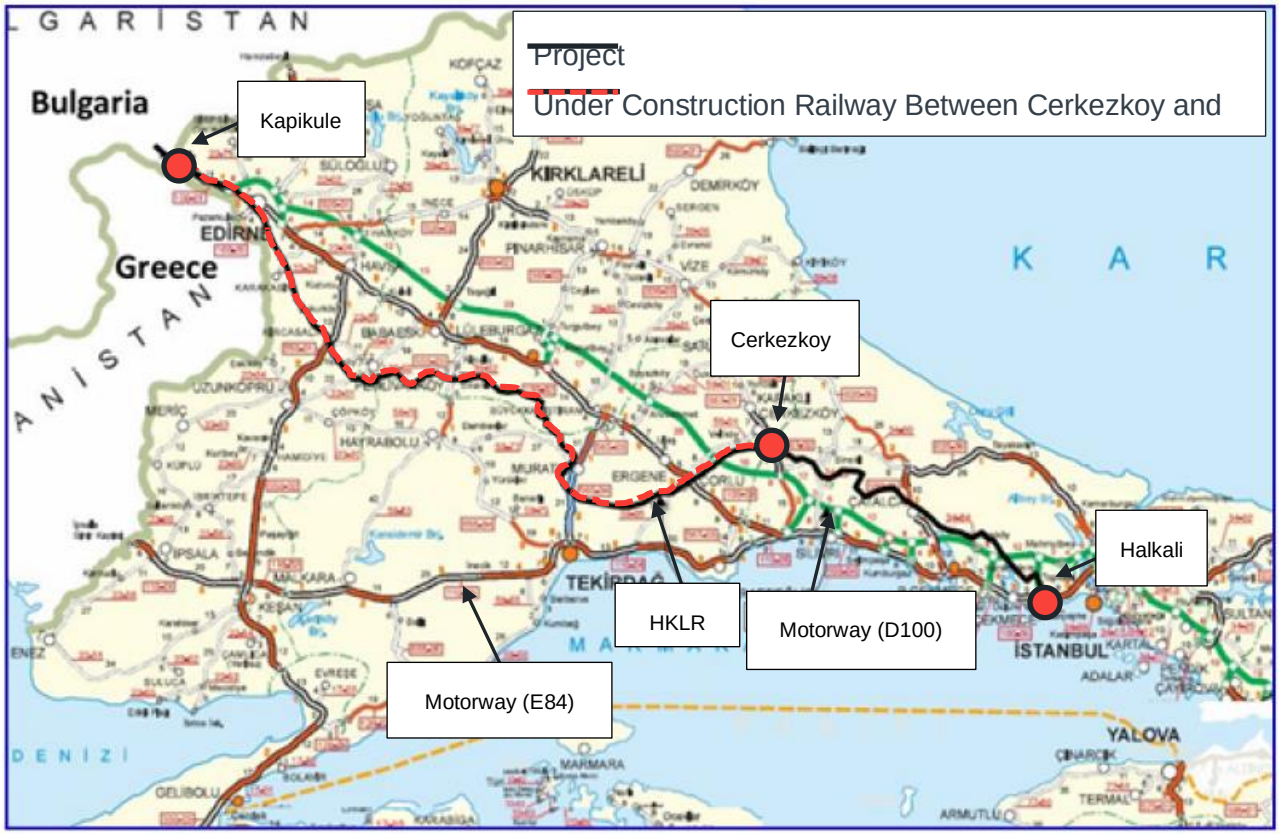


Figure 3-1 - Road Alternative

3.5 ALTERNATIVE RAIL OPTIONS

3.5.1. In 2008 a rail alternative, from Halkali to Kapıkule, was considered for the Project. This alternative was to run to the north of the existing railway towards Boyalık before looping back to join the alignment of the existing railway near Bekirli. This alternative was not considered to be economically viable and was discounted. Subsequently, a further 10 alternative rail scenarios were considered. These further alternative rail scenarios are described in **paragraph 3.5.2** onwards. A high-level review of the 2008 rail alternative indicates that this alternative had the potential to have greater social and environmental effects than the further alternative rail scenarios, for example as:

- The route would passed through a greater number of urban areas and communities, which is likely to have resulted in the need for a greater amount of expropriation, and increased the potential adverse air quality and noise and vibration effects on nearby receptors during the construction phase;
- The route would have likely passed through several dense forested areas, such as to the south and north of Arnavutköy, to the north of Kizılcaali and to the north, east and south-east of Subaşi, resulting in the need for a large amount of deforestation; and
- Whilst likely avoiding the Büyükçekmece Lake Important Bird and Biodiversity Area (IBA), the route would likely have passed through a greater proportion of the Küçükçekmece Basin IBA and Terkos Basin IBA.

3.5.2. A total of 10 rail alternative scenarios, spanning Halkali to Kapıkule, were considered for the Project prior to 2015, these were number 1 to 9B. These considered differing rail technologies and infrastructure as well as variants of route alignments:

- Alternative 1 continued use of the existing railway with some improvements to align with the TEN-T policy (a 'business as usual' approach);
- Alternatives 2, 3 and 5 were based on improvements to the existing railway alignment;
- Alternatives 4 and 6 were based on a new high-speed railway with a new alignment; and
- Alternatives 7, 8 9A and 9B were based on a new high-speed railway largely along the existing alignment from Halkali to Çerkezköy, and a new high-speed alignment between Çerkezköy and Kapikule (since under-construction).

3.5.3. Three 3 of the 10 rail alternatives were developed further and presented within the 2018 Feasibility Study for the Project [18], which was commissioned by the EUID-MoTMC[19] and undertaken by TCDD and Ecorys. The 3 that were developed further were chosen due to preferred design feasibility, investment calculations and demand forecasts. These alternatives were numbered 1, 7 and 8. The location of each of the alternatives is shown in **Figure 3-2** and described in more detail below.

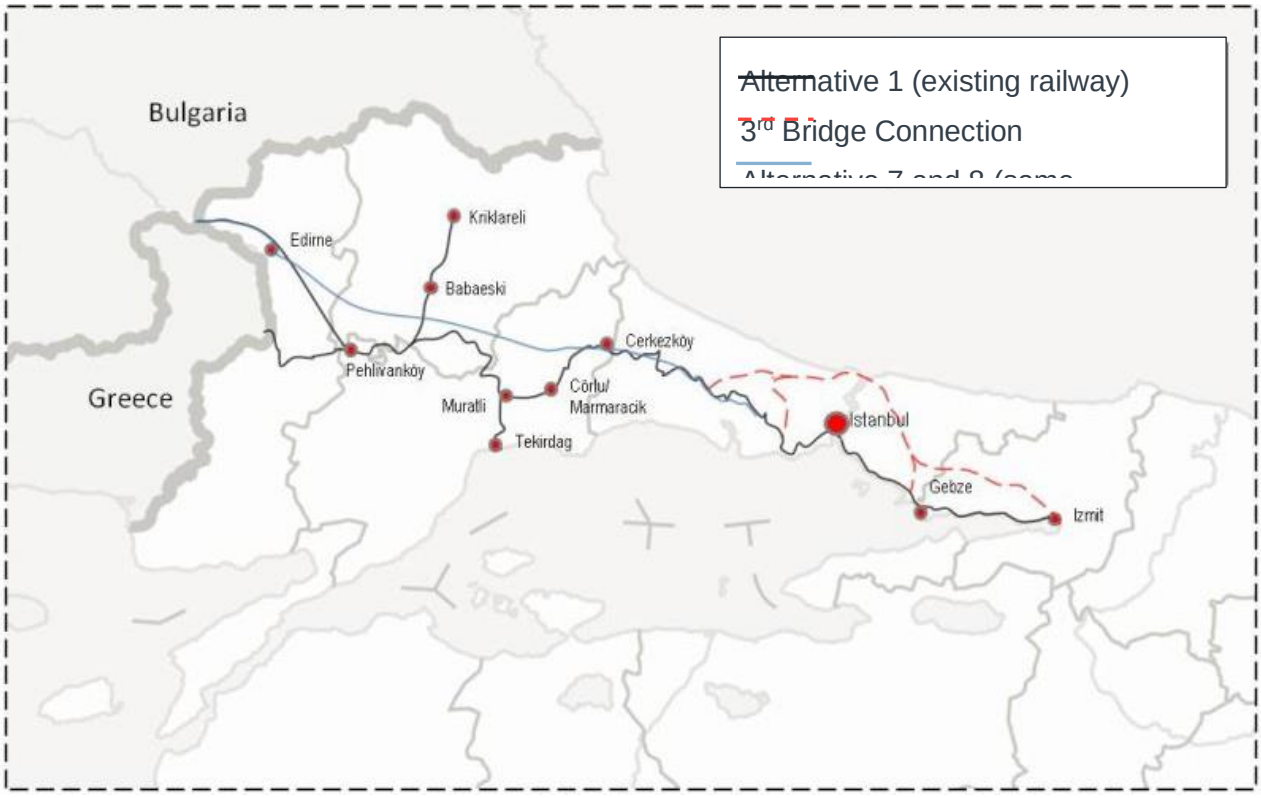


Figure 3-2 - Rail Alternatives 1, 7 and 8

[18] Feasibility Study for Halkalı-Kapıkule Railway Line Project Revised Report (2018).
[19] The Department for European Union Investments (EUID) and the DG Foreign Relations and European Union Affairs, Ministry of Transport, Maritime Affairs and Communications, Republic of Turkey.

ALTERNATIVE 1

3.5.4. A 'business as usual' approach involving the rehabilitation and utilisation of the existing railway. This alternative takes the form of a largely single-track railway. The railway has recently been upgraded and runs through a heavily developed area between Halkali and Catalca with a more rural setting around Çerkezköy. Capacity is limited and currently runs below its designed speed of 120km/h along significant portions of the railway, with congestion around stations in particular. Traffic forecasts have anticipated this alternative not accommodating demand by 2023 or being able to accommodate trains above 450m in length.

3.5.5. There would need to be some improvements to align the existing railway with the TEN-T policy. The improvements would be largely related to the signalling and train control systems.

ALTERNATIVE 7 (SUBSEQUENTLY REFINED TO FORM THE PROJECT)

3.5.6. This alternative involves the construction of a 200km/h high-speed railway. The alternative includes both the Çerkezköy to Kapikule section (since under-construction), and the section of railway between Halkali and Çerkezköy. The alignment closely follows the existing railway for much of the Halkali to Cerkezkoy section, with some alignment optimisation to enable it to operate as a high-speed railway. This option was developed further to form the Project.

3.5.7. Alternative 7 comprised a double track layout between Ispartakule and Çerkezköy, and a 4-track layout between Halkali and Ispartakule. It would be electrified and have full interoperability with other proposed key transport infrastructure developments, namely the proposed Istanbul 3rd Airport and the Yavuz Sultan Selim 3rd Bridge Rail Connection. The alternative 7 alignment is 229.4km long, including 5 tunnels and 177 other structures (inclusive of bridges and viaducts).

3.5.8. Alternative 7 has undergone a series of design iterations since the feasibility stage, it is now being developed as two separate phases, that will have full interoperability; the Project and the separate Çerkezköy to Kapikule railway project. The design has also been revised to reduce the 4-track layout between Halkali and Ispartakule, to a double track layout, and the majority of this section will be in a tunnel under the Kanal Istanbul. The National EIA for the Project (2017) assessed an earlier design iteration of Alternative 7, with the 4-track layout between Halkali and Ispartakule. The Ministry of Environment has been notified of the design revisions to this section, including the introduction of the twin-bored tunnel under the Kanal Istanbul, and confirmed that the National EIA approval remains valid.

ALTERNATIVE 8

3.5.9. This alternative follows the same alignment as Alternative 7. The differing elements are a reduction in design speed to 160km/h and some differences in structures along the railway alignment. The Alterative 8 alignment includes the construction of a tunnel and 187 additional structures (inclusive of bridges and viaducts).

REVIEW AGAINST TEN-T CRITERIA

3.5.10. The Project, in whatever design form is pursued, is required to meet the objectives of TEN-T policy, as it forms part of the TEN-T network. There are a series of requirements for rail networks within the TEN-T network which must be met by 2030:

- Electrified tracks and sidings;
- 1,435 mm gauge;

- Connection to freight terminals;
- Compliance with technical specifications outlined in EU Directive 2008/57/EC;
- Implementation of noise and vibration mitigation measures;
- Although there is no absolute requirement for double track, double track must be provided if bottlenecks are experienced;
- Freight train speed of 100km/h;
- Minimum allowance of freight train length of 740 m; and
- 22.5 tonnes axle load.

3.5.11. Alternative 1 was identified as no having the capacity to carry the projected volume of passenger / freight trains or provide a sufficient modal shift from road network, as a primary form of travel, to rail. In the absence of alternative rail connections to the TEN-T network, this would remain the major connection to the TEN-T network, and subject to its policy requirements, and would require significant investment in upgrades by 2030.

3.5.12. Alternatives 7 and 8 were identified as being capable of: alleviating current capacity issues; providing appropriate capacity to carry future projected passenger / freight trains; and with a further progressed design, would be able to alleviate difficulties in achieving TEN-T criteria compliance. Additionally, it was also recognised that there is the potential for these alternatives to help alleviate capacity and congestion on the surrounding road network.

3.5.13. The 2018 Feasibility Study for the Project concluded that, based on the comparison against TEN-T criteria, Alternative 7 (which was subsequently refined to form the Project) was the most appropriate of the alternatives considered as it met the Project aims, provided sufficient capacity for future demand and complied with TEN-T policy. Alternative 7 and 8 were both assessed in the National EIA (2017). The design of Alternative 7 has evolved since the National EIA was prepared, into its current design iteration which forms the Project (**Chapter 2: Project Description** provides further details).

FEASIBILITY STUDY SCORING

3.5.14. Alternatives 1, 7 and 8 were assessed and scored using multi-criteria analysis in the 2018 Feasibility Study by TCDD and Ecorys. Scores were given on a low / negative to high / positive scale. A summary of the scoring for the alternatives is shown in **Appendix B.**

3.5.15. Alternative 1 scored the highest for both environmental and social criteria, however this is not considered to be a suitable alternative, as it would constrain the socio-economic development of the surrounding areas. Furthermore, it would not provide the much-needed alleviation of capacity constraints on the road network, which would prevent Alternative 1 from meeting the Project objectives.

3.5.16. Alternative 7 and 8 had very similar social and environmental scores, although Alternative 7 had a slightly lower environmental score than Alternative 8. However, Alternative 7 was selected as the preferred alternative, as it achieved a greater reduction in congestion on the road network. The refinements to the design of Alternative 7 since the feasibility stage, namely the reduction in the number of tracks between Halkali and Ispartakule, and the introduction of the twin bored tunnel at this section, will have reduced the air quality, noise, landscape and visual, and expropriation impacts of the Project at this location.

3.6 ALTERNATIVES TO MINIMISE RESETTLEMENT

3.6.1. The cost benefit analysis in the 2018 Feasibility Study concluded that both Alternatives 7 and 8 are economically feasible and beneficial for society. Expropriation costs for the acquisition of affected assets and land were included in the evaluation of construction costs associated with each of the alternatives. No expropriation costs were identified in relation to Alternative 1. Expropriation costs of 206 million euros and 204 million euros for Alternative 7 and Alternative 8, respectively, were included in the cost benefit analysis. These expropriation costs were based upon high-level initial information and reflected a valuation in accordance with Turkish regulatory requirements, as opposed to Lenders' requirements.

3.6.2. In addition, a Multi Criteria Analysis was used to establish an overview of all relevant impacts of the Project and assist with choosing the best alternative for improvement of the railway. For social impacts, the sub-criteria included welfare distribution impacts, gender impacts, construction impacts, and number of people to be displaced.

3.6.3. Overall in relation to social impacts, Alternative 1 scored the highest (i.e. lowest social impact) mainly due to the lack of construction needs, reducing impacts on the existing rail services. The scores for both Alternative 7 and 8 were at similar levels lower than Alternative 1 (i.e. higher social impact). However, Alternative 7 was expected to result in slightly fewer people being displaced compared to Alternative 8 (i.e. Alterative 7 had a slightly higher score than Alterative 8).

MINIMISING PHYSICAL DISPLACEMENT

3.6.4. The Project design has aimed to minimise physical displacement where possible, reducing land acquisition where practicable to avoid the acquisition of residential properties.

3.6.5. The Project alignment follows the existing railway before diverging at chainage 16+900 in Ömerli Village, Arnavutkoy. This approach minimises the need for expropriation in this area, as TCDD already owns the railway, its immediate buffer surrounding, and some land parcels adjacent to the line. Extending the width of this current alignment to fit the high-speed railway line will require less additional land, compared to proposing a completely separate alignment that would require the expropriation of other land.

3.6.6. Aligning the Project to the existing railway takes advantage of an infrastructure corridor where residential development and private land ownership is lower, thus minimising physical resettlement. Furthermore, following the existing railway will reduce the risk and magnitude of severance and access restrictions, that would occur if there were two distinct alignments located far apart. Instead the Project will have two alignments that are mainly located close together, forming one transport corridor.

3.6.7. In addition, the tunnel underneath the Kanal Istanbul project will avoid the expropriation of households in residential areas of Yarımburgaz (to the east of the tunnel) and a further small residential area to the west of the tunnel (to the south of Ispartakule).

3.7 Micro Routing of the Project

3.7.1. Separate to the 2018 Feasibility Study for the Project[20] a micro-routing analysis was undertaken as part of the ESIA in order to identify opportunities to minimise the extent of expropriation caused by the Project. This was undertaken to ensure compliance with EBRD Performance Requirement 5 (PR5), namely to "avoid or, at least minimise, involuntary resettlement wherever feasible by exploring alternative project designs". A summary of the micro-routing analysis is provided below.

3.7.2. The Project includes the construction of a 3km tunnel from chainage 16+765 to 19+635 in Ömerli Village (Figure 2-9, 2/5), to avoid the Hadımköy Organized Industrial Zone (OIZ). The OIZ provides considerable tax and location advantages for the manufacturing of intermediate goods, leading to increased investment in the surrounding area. The infrastructure works have been completed for this OIZ, which aims to boost production in factories, so avoiding this Zone will maintain the economic benefits provided to the surrounding area.

3.7.3. The Project alignment diverges to the north of the existing railway between chainage 38+000 and 42+200 and is located approximately 1.4km from the existing railway at its furthest point. This divergence allows the Project alignment to avoid Incegiz Village and allows the alignments to be located in a more rural area instead.

3.7.4. Project alignment also diverges to the north of the existing railway between chainage 45+100 and 53+500. This allows the Project to follow a more direct route, achieve a better curvature and avoid the urban areas of Kurfalli and Bekirli.

3.7.5. Between chainage 65+200 and 66+500, the Project is located less than 1 km north of the existing railway. This divergence provides a more direct route, better curvature and reduces the loss of woodland, although some expropriation is required to achieve this alignment.

3.8 KANAL ISTANBUL CROSSING ALTERNATIVES

3.8.1. The Project needs to cross the alignment of the proposed Kanal Istanbul project which intersects the Project between Halkali and Ispartakule, as described in **Chapter 2: Project Description**. The Project will therefore be required to either pass over Kanal Istanbul on a bridge or pass under it in a tunnel.

3.8.2. The bridge option would require a substantial structure, due to the width of the Kanal Istanbul project (approximately 300m where the Project needs to cross), and the need for large vessels (maximum air draft 58m) to pass beneath it. The bridge would also need to be able to accommodate heavy rail freight loads. Therefore, it is likely that the required structure would have a large visual impact. Bridges can also be subject to the risk of water vessel collisions, and if they are constructed with piers in the channel, they can be subject to scour. Bridges are also more exposed to climatic factors, such as extreme weather, heatwaves, wind-induced loading, temporary closures (for example due to high winds) than a tunnel.

[20] Feasibility Study for Halkalı-Kapıkule Railway Line Project Revised Report (2018).

3.8.3. A tunnel option was would have a lower visual impact, compared to a bridge, with the majority of the structure not being visible, other than localised visual impacts around the tunnel portals.

3.8.4. An immersed tunnel[21] is unlikely to be feasible as it would reduce the depth of the Kanal Istanbul project, which requires a maximum boat draft of 17m. Immersed tube tunnels can be vulnerable to mobile sediments, high channel velocities, and generally have a higher impact on the aquatic environment.

3.8.5. A bored tunnel[22] would pass beneath the Kanal Istanbul project, and thus would not affect its depth or capacity to accommodate large vessels. It would also have a lower impact on the aquatic environment than an immersed tunnel. Its visual impact would be localised and limited to the portals, and it would be less exposed to climatic and channel processes. This is the crossing method that has been selected for the Project.

[21] An immersed tunnel is a term used to describe a tunnel which is constructed in a series of segments. The connection to the land surface would typically be connected to a cut and cover tunnel to overcome the level between the water and the land surface.
[22] A bored tunnel is a term used to describe a tunnel which is constructed in-situ using a tunnel boring machine.

4

EBRD PERFORMANCE REQUIREMENTS, EU STANDARDS, LEGISLATIVE AND POLICY CONTEXT

PUBLIC

4 EBRD PERFORMANCE REQUIREMENTS, EU STANDARDS, LEGISLATIVE AND POLICY CONTEXT

4.1 INTRODUCTION

4.1.1. The purpose of this chapter is to outline the national and EU environmental and social legislative requirements, and Lenders environmental and social policy requirements, which the Project has been structured to be in accordance with.

4.2 NATIONAL EIA

4.2.1. A national EIA for the Project was prepared in 2017. The national EIA is compliant with Turkish EIA regulations, requirements and processes, and was approved in 2017.

4.2.2. The design has evolved since the preparation of the national EIA, and this ESIA is based on the revised design. The key design variation between the national EIA and this ESIA, is the introduction of a tunnel under the Kanal Istanbul, which was required following the approval of the Kanal Istanbul project in 2020, as it will intersect the Project alignment.

4.2.3. The Ministry of Environment and Urbanisation has confirmed that the National EIA remains valid, following the introduction of the tunnel. The confirmation letter from the Ministry of Environment and Urbanisation is provided in **Appendix A**.

4.3 EBRD PERFORMANCE REQUIREMENTS

4.3.1. The EBRD's project requirements are as follows:

- The Project will be structured to be compliant with all applicable national legislation, transport strategies and EU substantive environmental standards. These requirements include, but are not limited to, the following:
  - The EIA Directive 2014 (2014/52/EU) and other EU Directives detailed in Section 4.3, and the Turkish Regulation on Environmental Impact Assessment (the EIA Regulation) 2014 and other national regulations detailed in section 4.5. If and when the host country (Turkey) regulations differ from EU substantive environmental standards, the Project will be expected to meet the most stringent of these;
  - EBRD's Environmental and Social Policy (ESP) and Performance Requirements (PRs) 2014;
  - and
  - Relevant international conventions and protocols relating to environmental and social issues, as transposed into national legislation.
- Public consultation and stakeholder engagement will be tailored for the Project, be meaningful and allow for disclosure of information and public participation in decision-making (in accordance with PR10);
- Disclosure of the ESIA in accordance with EBRD's Access to Information Policy (2019);
- The Project shall include reasonable measures to minimise or mitigate any adverse change in the environmental and social effects and impacts on public health and safety, especially in respect of any disproportionate effects as a result of the Project on any group of people as a result of their gender, age, disability, socio-economic status and / or other characteristics.

4.3.2. The Project will be required to comply with the following PRs, The PRs cover key environmental and social issues in order to ensure that the Project will operate in compliance with the highest international standards in relation to said issues:

- 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 people (not applicable to this Project as no people who possess the characteristics of indigenous people as defined by PR7 are present in the Project area);
- PR8: Cultural heritage;
- PR9: Financial intermediaries (not applicable to this Project as there are no financial intermediaries involved in the Project); and
- PR10: Information disclosure and stakeholder engagement.

4.3.3. The Project will also have consideration of the EBRD Strategy for the Promotion of Gender Equality – 2016 – 2020. The objective of this Strategy is to increase women's economic empowerment and equality of opportunities in the EBRD Countries of Operation. In relation to the Project, this strategy will be implemented in conjunction with the national Laws on gender equality.

4.4 ASIAN INFRASTRUCTURE AND INVESTMENT BANK ENVIRONMENTAL AND SOCIAL FRAMEWORK

4.4.1. The Project will be compliant with AIIB's Environmental and Social Framework 2016. The AIIB have elected to apply the EBRDs Environmental and Social requirements on the Project. This is in addition to their Project-affected People's Mechanism (PPM), which provides an opportunity for an independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by AIIB's failure to implement its Environmental and Social Policy (ESP), when their concerns cannot be addressed satisfactorily through Project-level grievance redress mechanisms, or AIIB Management's processes.

4.5 INTERNATIONAL CONVENTIONS

4.5.1. Turkey has ratified several international environmental and social conventions and protocols that are of relevance to the Project, as set out in **Table 4-1**.

Table 4-1 - Turkey Ratified International Environmental and Social Conventions

Convention	Date of Ratification	Applicable
United Nations Framework Convention on Climate Change 1992	2004	Yes, climate change effects are considered in Chapter 14 of the ESIA.
Kyoto Protocol 1997	2009	Yes, climate change effects are considered in Chapter 14 of the ESIA.

Convention	Date of Ratification	Applicable
Paris Agreement 2015	Not yet ratified.	Yes, climate change effects are considered in Chapter 14 of the ESIA.
Convention on Biological Diversity 1992	1996	Yes, ecology effects are considered in Chapter 8 of this ESIA.
Convention Concerning the Protection of the World Cultural and Natural Heritage 1972	1983	Yes, ecology effects are considered in Chapter 8 and cultural heritage is considered in Chapter 9 of this ESIA.
Convention on the Conservation of Migratory Species of Wild Animals 1979	Not yet ratified.	Yes, ecology effects are considered in Chapter 8 of this ESIA.
Convention on the Conservation of European Wildlife and Natural Habitats 1979	1984	Yes, ecology effects are considered in Chapter 8 of this ESIA.
Agreement on the Conservation of Populations of European Bats	Not yet ratified.	Yes, ecology effects are considered in Chapter 8 of this ESIA.
Protocol on Water and Health 1999	Not yet ratified.	Yes, surface water environment effects are considered in Chapter 11 of this ESIA.
The Vienna Convention for the Protection for the Ozone Layer 1989	1991	Yes, air quality effects are considered in Chapter 6 of this ESIA.
Global Forest Resources Assessment	Participation since 2010.	Yes, ecology effects are considered in Chapter 8 of this ESIA.
Stockholm Convention on Organic Pollutants	2001	Yes, air quality effects are considered in Chapter 6, surface water environment in Chapter 11 and geology and hydrogeology in Chapter 12 of this ESIA.
Convention on Long-range Trans-Boundary Air Pollution (CRLTAP)	1983	Yes, air quality effects are considered in Chapter 6 of this ESIA.
World Heritage Convention	1972	Yes, cultural heritage effects are considered in Chapter 9 of this ESIA.
International Covenant on Economic, Social and Cultural Rights	1966	Yes, Social effects are considered in Chapter 15 of this ESIA.

Convention	Date of Ratification	Applicable
Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)	1993	Yes, Social effects are considered in Chapter 15 of this ESIA.
Right to Organise and Collective Bargaining Convention, 1949 (No. 98)	1952	Yes, Social effects are considered in Chapter 15 of this ESIA.
Forced Labour Convention, 1930 (No. 29)	1998	Yes, Social effects are considered in Chapter 15 of this ESIA.
Equal Remuneration Convention, 1951 (No. 100)	1967	Yes, Social effects are considered in Chapter 15 of this ESIA.
Abolition of Forced Labour Convention, 1957 (No. 105).	1961	Yes, Social effects are considered in Chapter 15 of this ESIA.
Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	1967	Yes, Social effects are considered in Chapter 15 of this ESIA.
Minimum Age Convention, 1973 (No. 138)	1998	Yes, Social effects are considered in Chapter 15 of this ESIA.
Worst Forms of Child Labour Convention, 1999 (No. 182)	2001	Yes, Social effects are considered in Chapter 15 of this ESIA.

4.6 EU ENVIRONMENTAL STANDARDS

EU EIA DIRECTIVE

4.6.1. A review against the EU EIA Directive's (2014/52/EU) requirements has been undertaken to assess whether the Project activities are listed in Annex I or II of the EIA Directive. EU EIA Annex I projects have a mandatory requirement for EIA; Annex II projects require a project by project assessment referred to as 'screening', using national law and indicative thresholds to determine whether EIA is required.

4.6.2. The following is of relevance for the Project:

- Annex I – Projects referred to in Article 4(1) (7(a)): Construction of lines for long-distance railway traffic and of airports with a basic runway length of 2,100 m or more.

4.6.3. As the Project comprises a long-distance railway it therefore falls under Annex I of the EIA Directive and therefore EIA is required. **Table 4-2** below lists the requirements under the EIA Directive and the location of these elements within the ESIA.

Table 4-2 - EIA Assessment Requirements and their location within the ESIA

EIA Directive Requirement for Assessment	Location within this ESIA
Article 3	
a) Population and Human Health	Chapter 15: Social
b) Biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC	Chapter 8: Ecology
c) Land, soil, water air and climate	Chapter 6: Air Quality Chapter 10: Landscape and Visual Chapter 11: Surface Water Environment Chapter 12: Geology and Hydrogeology Chapter 14: Climate Change
d) Material assets, cultural heritage and landscape	Chapter 9: Cultural Heritage Chapter 10: Landscape and Visual Chapter 13: Materials and Waste
e) The interaction between the factors referred to in points (a) to (d)	Chapter 17: Cumulative Effects
Article 5	
a) A description of the project comprising information on the site, design, size and other relevant features of the project	Chapter 2: Description of the Project
b) A description of the likely significant effects of the project on the environment	Technical Chapters 6-17
c) A description of the features of the project and / or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment	Technical Chapters 6-17
d) A description of the reasonable alternatives to studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment	Chapter 3: Consideration of Alternatives
e) A non-technical summary of the information referred to in points (a) to (d)	Non-Technical Summary

EIA Directive Requirement for Assessment	Location within this ESIA
f) Any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected	Chapter 2: Description of the Project Technical Chapters 6-18

EU WATER FRAMEWORK DIRECTIVE

4.6.4. The purpose of the Directive (2000/60/EC) is to establish a protection framework for surface and groundwater and prevent further deterioration of water resources.

4.6.5. The following is of relevance for the Project:

- Article 2 – Defines water resource types, chemical/quality status, pollutants and others;
- Article 4 – States the need for programmes and measures to prevent the deterioration of the status of water bodies and the obligation of states to protect said resources;
- Article 8 – Establishes a programme for monitoring water status and protected areas;
- Article 16 – Strategies against the pollution of surface water; and
- Article 17 – Strategies against the pollution of groundwater.

EU WASTE FRAMEWORK DIRECTIVE

4.6.6. The objective of the Directive (2008/98/EC) is to prevent or reduce adverse environmental effects associated with the generation and management of waste, in order to reduce the overall effects of resource use and improve the efficiency of said use thereby protecting the environment and human health.

4.6.7. The Directive sets out the basic concepts and definitions in relation to waste management, such as defining waste itself and different waste criteria, and establishes the Waste Hierarchy. The following articles within the directive are of relevance to the Project:

- The Directive defines the elements of the Waste Hierarchy (Article 4) and the requirements in relation to these components (waste prevention, re-use, recycling, recovery and disposal);
- Article 14 – Costs: Responsibility for the costs of waste management shall be borne by the producer of the waste;
- Article 15 – Responsibility for Waste Management: Details responsibilities for the waste transfer process such as the need to ensure professional waste collection and transport results in delivery to appropriate treatment installations;
- Article 17 – Control of Hazardous Waste: Obligations to ensure the production, collection and transportation of hazardous waste, as well as its storage and treatment, are carried out in conditions providing protection for the environment and health;
- Article 18 – Ban of mixing of hazardous waste: Obligations to ensure that hazardous waste is not mixed, either with other categories of waste, substances or materials;
- Article 28 – Waste Management Plans: Outlines the requirements for competent authorities to establish Waste Management Plans (WMPs) and details the required contents of said WMPs.
- Article 29 – Waste Prevention Programmes: Integrate Waste Prevention Programmes into WMP or other environmental policy.

EU GROUNDWATER DIRECTIVE

4.6.8. The purpose of the Directive (2006/118/EC) is to prevent and control groundwater pollution, it also aims to support groundwater components of Directive 2000/60/EC.

4.6.9. The following articles are of relevance to the Project:

- Article 3 - Outlines the criteria to use when assessing groundwater chemical status, including the determination of threshold values. Annex II of the Directive contains guidelines for the establishment of threshold values, as well as pollutants to assign thresholds for;
- Article 4 - Outlines the procedure to use when assessing groundwater chemical status; and
- Article 6 – Details measures to prevent or limit inputs of pollutants into groundwater.

EU BIRDS DIRECTIVE

4.6.10. Annex I of the Directive (2009/147/EC) lists 194 migratory species and sub-species of a threatened nature that must be subject to protections.

EU HABITATS DIRECTIVE

4.6.11. Annex II, IV and V of the Directive (92/43/EEC) list over 1,000 animal and plant species and 200 habitat types that must be subject to protections.

Appropriate Assessment

4.6.12. Appropriate Assessment is required by Article 6(3) of the EU Habitats Directive. Appropriate Assessment tests whether a plan or a project is likely to have significant adverse impacts on a European Sites such as the following:

- Special Protected Area (SPA) – Designated to protect birds;
- Special Area of Conservation (SAC) – Designated to protect habitats; and
- Ramsar Site – Designated to protect wetlands.

4.6.13. Although none of the above sites are within connectivity distance of the Project, due consideration will be given to the principles of the EU Habitats Directive within the assessment of impacts to the protected areas potentially affected by the Project. Appropriate Assessment is not required for this ESIA as the Project has scoped out European Designated Sites from further assessment (due to their distance from the Project).

EU AMBIENT AIR QUALITY DIRECTIVE

4.6.14. The Directive (2008/50/EC) sets legally binding target values, for EU member states, for concentrations of major air pollutants (lead, nitrogen dioxide, particulate matter, sulphur dioxide, benzene, carbon monoxide, toxic heavy metals, polycyclic aromatic hydrocarbons and ozone) which all have assigned limit values.

4.6.15. The following articles are of relevance to the Project:

- Article 13 – The requirement to ensure that pollutants levels to not exceed the limit values detailed in Annex XI of the Directive; and
- Article 24 – Short-term Action Plans: Identifies the need to action plans in order to deal with risks of increased pollutants for short term activities.

4.7 Other International Guidelines

4.7.1. The Project has also considered the following international guidelines to complement those described above where further guidance is appropriate or specific guidance is absent:

- European Commission (2011), Non-paper – Guidelines for Project Managers: Making Vulnerable Investments Climate Resilient.
- International Finance Corporation and World Bank Group (2007), Environmental, Health, and Safety Guidelines for Railways;
- International Finance Corporation and World Bank Group (2007), Environmental, Health and Safety Guidelines: Noise Management;
- The International Standards Organization (2009), ISO 31000:2009: Risk Management - Principles and Guidelines; and
- The International Standards Organization (2017), 1996-2:2017: Description, Measurement and assessment of Environmental Noise.

4.7.2. Further guidelines pertinent to detailed components of the technical assessments are presented within each of the **Technical Chapters** (**6 – 17**).

4.8 TURKISH ENVIRONMENTAL and social STANDARDS

4.8.1. This section summarises key Turkish legislation that applies to this ESIA. Further, topic-specific, legislation is included in the relevant Chapters in this ESIA. This section also details the main administrative bodies responsible for the environmental and social sector.

ADMINISTRATIVE BODIES IN THE TURKISH ENVIRONMENTAL SECTOR

4.8.2. The main administrative bodies with responsibilities for the environmental sector are as follows:

- The Ministry of Environment and Urbanisation is the main regulatory body in the environment sector. The Ministry sets policy in relation to:
  - Environmental protection;
  - Prevention of pollution;
  - Monitoring facilities and plants;
  - Issuing of permits;
  - Sustainable development;
  - Research and environmental monitoring / reporting; and
  - Climate Change.
- Other administrative bodies with environmental and social responsibilities are:
  - General Directorate of Hydraulic Works;
  - General Directorate of Infrastructure Investments;
  - General Directorate of Mapping;
  - General Directorate of Meteorology;
  - General Directorate of Mining and Petroleum Affairs;
  - Ministry of Agriculture and Forestry;
  - Ministry of Family, Labour and Social Services;
  - Ministry of Culture and Tourism; and
  - Municipal Councils.

THE ENVIRONMENT LAW NO.2872 (1983)

4.8.3. The Environment Law No.2872 entered into law in 1983, being amended in 2006, 2018 and 2020. The Law forms the basis for all major environmental regulations in Turkey, inclusive of all the regulations summarised below.

REGULATION ON ENVIRONMENTAL IMPACT ASSESSMENT (EIA REGULATION) No: 29186 (2014)

4.8.4. The Regulation entered into law in 2014, being amended in 2016, 2017 and 2019. The Regulation sets out the procedures and principles of EIA in Turkey and the authority of the Ministry of Environment and Urban Planning to determine rule on the status of EIA projects, or delegate this decision to local authorities. The regulation also covers provision on the topics of EIA reports, EIA procedures and processes, monitoring and inspection regimes, and effective EIA and environmental management procedures.

REGULATION ON WASTE MANAGEMENT NO. 29314 (2015)

4.8.5. The Regulation entered into law in 2015, being amended in 2017, and aims to ensure efficient waste management throughout a product's life cycle. Measures regarding waste reduction, reuse and recycling are outlined. The regulation covers areas inclusive of electronics, packaging, vehicles and batteries.

REGULATION ON CONTROL OF POLLUTION OF WATER AND ITS SURROUNDINGS BY HAZARDOUS SUBSTANCES NO. 26005 (2005)

4.8.6. The Regulation entered into law in 2005, with amendments in 2010, with the aim to decrease and reduce pollution of water resources. It sets standards and principles in determining hazardous substance pollution and methods to reduce said pollution of water resources. Additionally, a hazardous substances discharge inventory is outlined.

REGULATION ON THE CONTROL OF HAZARDOUS WASTES NO. 25755 (2005)

4.8.7. The Regulation entered into law in 2005, with amendments in 2010 and 2013. The purpose of the regulation is to control the production and transportation of hazardous wastes, minimise their production, and control their disposal. The regulation also outlines technical requirements for the management and inspection of hazardous wastes and their disposal. The regulation prohibits the importation of hazardous waste.

REGULATION REGARDING POINT SOURCE LAND POLLUTION AND SOIL CONTAMINATION CONTROL NO. 27605 (2010)

4.8.8. The Regulation entered into law in 2010. The regulation sets forth the procedures and principles to prevent soil contamination, locate soil contamination and monitor and remediate contaminated soil sites. The regulation has four main principles:

- Soil pollution is preventable;
- Sets out standards for stage and use of materials / soils;
- Prevention of mixing of contaminated and non-contaminated soils; and
- Measures can be taken to prevent soil pollution.

REGULATION ON THE MANAGEMENT OF SURFACE WATER QUALITY NO. 28483 (2012)

4.8.9. The Regulation entered into law in 2012, being amended in 2015 and 2016, and sets out standards and procedures for the determination of water quality. It also sets out standards and procedures for the monitoring of water quality and quantity, the provision concerning sustainable water use and the maintenance / achievement of good surface water status.

REGULATION ON ENVIRONMENTAL PERMIT AND LICENSE NO. 29115 (2014)

4.8.10. The Regulation entered into law in 2014, being amended in 2016 and 2019, and sets out the principles and procedures for the Turkish environmental permitting and licensing regime for a series of activities and facilities set out in two annexes (1 and 2).

REGULATION ON AIR QUALITY ASSESSMENT AND MANAGEMENT NO. 27219 (2008)

4.8.11. The Regulation entered into law in 2008, being amended in 2009. The Regulation is based on the EU Directive 96/62/EC and establishes the main principles for the preservation of air quality.

REGULATION ON THE CONTROL OF INDUSTRIAL AIR POLLUTION NO. 27277 (2009)

4.8.12. The Regulation entered into law in 2008 with amendments in 2010, 2011 and 2012. The Regulation sets the principles for control of soot, smoke, dust, gas, steam and aerosol emissions as a result of industrial and energy production.

LAW ON SOIL PRESERVATION AND LAND UTILISATION NO.5403 (2005)

4.8.13. The Law determines soil and land classification, land utilisation and land and soil preservation. The Law prohibits the use of agricultural lands for other purposes as well as introducing measures for sustainable use and protection of soils. Soil preservation boards are responsible for overseeing that land use is within compliance with the regulation (for each province).

REGULATION ON THE ASSESSMENT AND MANAGEMENT OF ENVIRONMENTAL NOISE NO. 27601 (2010)

4.8.14. The Regulation entered into law in 2010, being amended in 2011 and 2015. The Regulation aims to prevent and reduce harmful effects of environmental noise on human health. It does this through establishing a process to determine exposure levels to noise, noise mapping, environmental noise assessments and other measures which will feed into noise action plans. The regulation covers all generated noise which human receptors are exposed to.

ENERGY EFFICIENCY LAW NO.5627 (2007)

4.8.15. The Law has the purpose of increasing efficiency in energy sources and energy use in order to use energy effectively, avoid waste, reduce energy costs and increase environmental protection.

LABOUR LAW NO. 4857 (2003)

4.8.16. The Law was enacted in 2003, being amended in 2003, 2005, 2006, 2008, 2009, 2011, 2012, 2014, 2015 and 2016. The purpose of this Law is to regulate working condition and labour rights. The law covers establishment of contract between employer and employee, equal opportunity and discrimination, notice for termination of an employment contract, minimum wage, dismissal process, and overtime pay.

CONSTITUTION OF THE REPUBLIC OF TURKEY (1982)

4.8.17. The Constitution has been amended approximately 19 times between 1982 and 2017. The purpose the Constitution is to ensure freedom and rights of individuals and society. The Constitution covers key aspects on prohibition of forced labour, freedom of association, compensation for land expropriation, working conditions, right to organise labour unions, right to strike etc.

4.8.18. Article 46, Subsection 3 of Section 3 ("Social and Economic Rights and Responsibilities") addresses expropriation issues. The article states that whenever a development project serves public interest, the government is authorised to initiate and execute an expropriation process.

TURKISH PENAL CODE NO. 5328 (2005)

4.8.19. The Turkish Penal Code specifically Articles 5 and 122, states that that "no discrimination shall be made between persons with respect of sex" to ensure gender equality and the 2001 Turkish Civil Code adopted the legal measures to ensure gender equality in family.

THE EQUAL OPPORTUNITIES COMMISSION FOR WOMEN AND MEN LAW NO. 5840 (2009)

4.8.20. In 2009, an Equal Opportunities Commission in the Turkish Grand National Assembly composed of parliamentarians from different political parties, was established. The Commission works towards the adoption of tools that would eliminate gender-based discrimination at all levels of public life. It also accepts individual applications and complaints on gender-based discrimination from all segments of the Turkish society.

OCCUPATIONAL HEALTH AND SAFETY LAW NO. 6331 (2012)

4.8.21. The Law was enacted in 2012, being amended in 2014, 2015 and 2017. The objective of this Law is to regulate duties, authority, responsibility, rights and obligations of employers and workers in order to ensure occupational health and safety at workplaces and to improve existing health and safety conditions.

SOCIAL ASSISTANCE AND ENCOURAGEMENT OF SOLIDARITY LAW NO. 3294 (1986)

4.8.22. The aim of this Law is to aid people who are poor and indigent, to ensure that income distribution is fair by taking measures to reinforce social justice, and to promote social assistance.

SOCIAL SERVICES AND CHILD PROTECTION AGENCY LAW NO. 2828 (1983)

4.8.23. The Ministry of Family and Social Services is a responsible party to protect the rights of vulnerable groups and provide social services to them. This Law defines the duties, responsibilities, activities and incomes of the social services and the social services that are given to the family, child, people with disabilities, elderly and other persons in need of protection, care or assistance.

REGULAR CASH SUPPORT FOR TURKISH CITIZENS WHO ARE 65 YEARS OF AGE OR OLDER AND POOR AND ALONE LAW NO. 2022 (1976)

4.8.24. The Law was enacted in 1976, being amended in 2008 and 2014. As part of this Law, the elderly who are 65 of age or older and who are poor and/ or alone should receive cash support regularly from the Ministry Family and Social Services. Social services define "the elderly who are poor" as elderly who "face social or economic deprivation and is in need of protection, care, and assistance".

SOCIAL SECURITY AND GENERAL HEALTH INSURANCE LAW NO. 5510 (2006)

4.8.25. The Law was enacted in 2006, being amended in 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016 and 2017.The Law covers the individuals to benefit from social insurance and universal health insurance, employers, health - care service providers, real persons and any kind of public and private legal artificial persons and other institutions and organization not having legal personality in terms of the implementation of this Law.

EXPROPRIATION LAW NO. 2942 (1982)

4.8.26. The Law was enacted in 1982, being amended in 2001. The Law sets out the procedures for expropriation of immovable property in possession of natural and private legal entities by the State and public legal entities in circumstances where public interest requires, as well as procedures and methods for calculation of the expropriation price, registration of the immovable property and the right of way in the name of the authority, and settlement of related disputes.

FOREST LAW NO. 6831 (1956)

4.8.27. The Law was enacted in 1956, being amended in 2003, 2004, 2013 and 2020. In accordance with the Forest Law, the Project must obtain permission from the Ministry of Forestry and Water Affairs to perform activities in forests or lands classified as forest and is required to indemnify damages to public forests resulting from the construction of the railway. According the Law the Ministry has the authority to give permission for the use of forestland (49-year lease periods).

4.8.28. In addition to the Law itself, the regulation on “Permits to be Given on Land Considered Forest Areas” (Official Gazette dated 22.03.2007, No. 26470) settles the methods and principles of the approvals, permits and easement rights to be given.

PASTURE LAW NO. 4342 (1998)

4.8.29. The Law was enacted in 1998, being amended in 2004, 2008 and 2013. The acquisition of pasture lands stated as public common property will be made according to the Article 30 for this Project. These areas will be released from pasture qualification and their land use allocation changed by the Ministry of Agriculture and Forestry.

CADASTRAL LAW NO. 3402 (1987)

4.8.30. The Cadastral Law determines the boundaries and legal status of immovable assets based on the national coordinate system and the cadastral or the topographic cadastral maps in order to register land and to constitute the basis of the spatial information system as the Civil Law (No. 4721) stipulates.

4.8.31. The Cadastral Law also defines the process for the identification of landowners without registered title deeds or where there is confusion over land ownership.

LAND REGISTRY LAW NO. 2644 (1934)

4.8.32. The Law was enacted in 1934 and amended at numerous times between 1934 and present. Land Registry Law (No. 2644) is the main land title regulation. Land registration in Turkey is based on the Cadastral Law (No. 3402).

AGRICULTURAL REFORM LAW ON LAND ARRANGEMENT IN IRRIGATED AREAS NO. 3083 (1984)

4.8.33. The Law was enacted in 1984, being amended in 2001 and 2014. The Law covers matters regarding land consolidation and allocation of land for other purposes rather than agriculture in case of need. It is stipulated in the Law that in areas where agricultural production has no longer economic viability due to fragmentation, land consolidation works will be realised to prevent fragmentation that will result in having an effect both on the livelihood and the work force of any family.

LAW ON SOIL PROTECTION AND LAND USE NO. 5403 (2005)

4.8.34. The Law was enacted in 2005, being amended in 2008 and 2014. Sets the principles for agricultural lands to be improved, protected against misuse, properly categorised and prevented against fragmentation.

RESETTLEMENT LAW NO. 5543 (2006)

4.8.35. The Law provides for government-assisted resettlement in the rural and urban areas.

THE NOTIFICATION LAW NO. 7201 (1959)

4.8.36. The Law, with its amendments in 2003, 2008 and 2011, provides the basis for a process of notification for property owners. It consists of specific procedures to be followed to reach a range of public and private owners, including those whose addresses are unknown.

4.8.37. According to the Law, provisions for notification include mail to known addresses; seeking support from local authorities; publication through an advertisement placed in a national newspaper published throughout the country in significant numbers; and electronic communications. The Law provides guidance for communicating with different categories of stakeholders, including resident owners, absentee owners, owners outside Turkey, and various public agencies.

LAND REGISTRY CODE NO. 28738 (2013)

4.8.38. This Code aims to keep the land registry records in order with respect to the Civil Law (No. 4721). It comprises of the principles and procedures pertaining to ownership, limited real and individual rights of immovable assets, and their entry, amendment, cancellation and rectification to the land registry.

4.8.39. Articles 24 and 25 of this Code protect the rights of the illiterate, disabled and non-Turkish speaking right holders.

LAW OF POPULATION SERVICES NO. 5490 (2006)

4.8.40. According to Article 11 of this Law, all Turkish citizens are required to register their residence, including those who live abroad. Assets ownership reflects the residential registration.

4.8.41. People who change their residence are required to inform the changes to the population registration offices in counties to which they move.

4.9 NATIONAL AND INTERNATIONAL TRANSPORT AND INFRASTRUCTURE STRATEGIES

4.9.1. The following national and international strategies, policies and infrastructure networks are of relevance to the Project:

- **The 11th Development Plan of Turkey (2019-2023)** – which sets out the medium-term priorities for regional policy in Turkey;
- **National Strategy for Regional Development (2014-2023)** – which seeks to ensure national-level co-ordination for regional development and competitiveness, and strengthen the linkages between spatial and socio-economic development policies;
- **White Paper: Roadmap to a Single European Transport Area (2011)** – A paper of 40 initiatives to build a competitive transport system that will increase mobility and remove barriers for growth and employment;
- **The Act on Liberalisation of Railway Transport in Turkey (2013)** – Replacement of the state monopoly on the Turkish railway with a competitive market environment;
- **The Energy Efficiency Strategy Paper 2012-2023 (2012)** – which sets a target reduction of energy consumed per GDP (energy intensity) of 20% by 2023 (compared to 2008 levels) and meeting at least 20% of energy demands in new buildings from renewable energy resources;
- **National Energy Efficiency Action Plan (NEEAP) (2017-2023)** – which closely mirrors policies and practices of the EU in relation to energy efficiency with the aim to help Turkey reduce energy consumption by 14% by 2023;
- **National Climate Change Action Plan (2011)** – of which the Turkish Ministry of Transport and Communication is a member, who's objective is to cut greenhouse emissions and implement climate change mitigation and adaptation through a robust framework of commitments;
- **Transport and Communication Strategy: Horizon 2023** – which aims to provide an uninterrupted and high-quality transport network connecting Asia and Europe. The strategy focuses on developing transport infrastructure, promoting internodal transport and facilitating a more liberal approach to transport activities;
- **Transport Sectoral Operational Programme (2014-2020)** – which acts as a major instrument for providing financial assistance from the EU to the Turkish transport sector. The general objective of the programme is to contribute to EU integration with Turkey via economic and social development of the transport system;
- **Indicative Strategy Paper for Turkey (2014-2020)** – which is an EU strategy for assigning the priority of financial assistance to Turkey, one component being transport and infrastructure;
- **The National Programme for the Adoption of the Acquis (NPAA) (2008)** – A multi-national EU plan for the alignment of domestic regulations with EU regulations;
- **Transport Infrastructure Needs Assessment Turkey**;
- **Trans-European Transport Network (TEN-T) (2013)** – Policy addressing the implementation and development of a European-wide network of railway lines, roads, airports, and waterways. The objective is to improve connectivity, close gaps and remove bottlenecks and barriers in the European network; and
- **Transport Corridor Europe-Caucasus-Asia (TRACECA) (1993)** – an international transport programme involving the European Union and 12 member States of the Eastern European, Caucasian and Central Asian region. The programme aim is to strengthen economic relations, trade and transport in the regions of the Black Sea basin, South Caucasus and Central Asia.

5

APPROACH TO ESIA

PUBLIC

5 APPROACH TO ESIA

5.1 INTRODUCTION

5.1.1. This chapter outlines the approach to the **Environmental and Social Impact Assessment (ESIA)**, in particular the objectives and overall strategy for the ESIA. Scoping has been an ongoing process, which is documented within this chapter. The chapter sets out the evidence base associated with the topics and elements of topics that have been scoped out of the assessment.

5.1.2. The approach to consultation is also outlined, together with the approach to proportionate assessment, including the assessment criteria and the methodology for assessing cumulative effects.

5.1.3. A national EIA that is compliant with national EIA requirements and processes was prepared in April 2017 and has been referred to throughout this ESIA (the 'National EIA for the Project (2017)'). The National EIA for the Project (2017) was prepared for the alignment between Halkali and Kapikule, which includes both the Project and the under construction Çerkezköy – Kapikule railway. There will be some variation between the National EIA for the Project (2017) and this ESIA, because the National EIA for the Project (2017) assessed a longer alignment, than is required for the Project. Furthermore, the design in the Halkali - Ispartakule section has changed in response to the Kanal Istanbul project, which will intersect the railway corridor, and there will be some variation due to the need to assess the Project against the Lender's Environmental and Social requirements.

5.2 OBJECTIVES OF THE ESIA

5.2.1. The key objectives of the ESIA are as follows:

- Set the legal and policy framework;
- Set, document and respond to the consultation process;
- Consider the alternatives to the Project;
- Establish baseline environmental and socio-economic conditions of the Project and the surrounding area;
- Identify likely significant effects during the design process so that where practicable adverse effects can be avoided, prevented, reduced or offset prior to the assessments within the ESIA;
- Identify, predict and assess the environmental effects associated with the Project: beneficial and adverse; permanent and temporary; planned and unplanned[23]; direct and indirect and short / medium / long term; significant or not significant;
- Identify, predict and qualitatively assess the cumulative effects of the Project including those associated with other developments; and
- Identify suitable mitigation measures to prevent, reduce or offset likely significant adverse effects on the environment and identify the likely significant residual effects following the implementation of these measures; and

[23] Such as leaks / spills of oil and lubricants from the Heavy Good Vehicles (HGVs) and construction machinery and landslides.

- Identify management and monitoring measures where likely significant residual effects are identified.

5.3 APPROACH TO THE ASSESSMENT OF THE PROJECT

5.3.1. This section outlines the phases of the Project that have been assessed, together with the approach to identifying baseline conditions, future baseline conditions, cumulative effects and design tolerances. It also sets out the overarching approach to the ESIA, together with project-specific requirements for the assessment of effects.

5.3.2. The maximum extent of the Project boundary and the footprint / height / depth / length of structures has been assessed to allow for a worst-case scenario analysis of effects.

5.3.3. In order to avoid duplication of assessment, particularly with respect to the **Cumulative Effects Assessment** (**Chapter 17**), assumptions have been made in relation to measures to be implemented under existing or pending consents.

BASELINE SCENARIO

5.3.4. Baseline information (environmental characteristics and conditions) has been collated, based on site visits undertaken and desk-based information available at the time of the assessment. **Technical Chapters 6 – 17** provide details of the baseline information. The methodology used in the baseline assessment, any consultations undertaken, the temporal and spatial extent and any limitations establishing the baseline are described in **Technical Chapters 6 – 17**.

5.3.5. The baseline conditions for the purpose of the ESIA are defined below. If baseline years vary across the ESIA the justification is provided in **Technical Chapters 6 – 17**.

5.3.6. The dates of the site visits and the dates when data sources were accessed are provided in **Technical Chapters 6 – 17**.

FUTURE BASELINE

5.3.7. The assessment has also taken into consideration how the current baseline conditions may change over time without the presence of the Project, known as the future baseline. The future baseline scenario is summarised in **Technical Chapters 6 – 17**.

5.3.8. Due to the limitations, necessary assumptions and lack of evidence associated with the future baseline (i.e. it cannot be accurately measured), a detailed consideration of the effects of the Project against the future baseline would generally not result in a robust assessment. However, consideration has been given, in descriptive terms, within each topic chapter to likely significant effects arising in relation to the future baseline.

TEMPORAL SCOPE

5.3.9. This ESIA has considered effects that are anticipated to arise during the construction of the Project (the construction phase) which is assumed to last to between 2021 and 2025 and following its completion (the operational phase). The Project's anticipated effects can broadly be summarised as follows:

- Effects during the construction period that may arise as a result of construction activities such as demolition / rehabilitation, temporary use of land (such as for site compounds), construction of new buildings, changes in traffic movements and temporary closures or diversions to roads; and

- Effects during the operational period that may arise as a result of operational activities such as vehicle movements to and from the Stations along the Project alignment or noise and air emissions associated with railway activities.

5.3.10. Consideration has been given to impacts (changes in the environment) associated with the Project in comparison to the baseline conditions identified in the baseline assessments (conditions that would exist without the presence of the Project).

5.3.11. For the purpose of the assessment the following baseline years are used:

- Construction Years – 2021 to 2025;
- Opening Year (fully operational) – 2026; and
- 15 Years After the Opening Year (the Design Year) – 2041 (applicable to specific technical chapters including **Chapter 6: Air Quality**, **Chapter 7: Noise and Vibration**, **Chapter 8: Ecology** and **Chapter 10: Landscape and Visual).**

5.3.12. As detailed in **Paragraphs 5.3.7** and **5.3.8** consideration has been given, in descriptive terms, within each topic chapter to the future baseline.

SPATIAL SCOPE OF THE ESIA

5.3.13. As detailed within **Chapter 2: Description of the Project** the expropriation corridor includes both the 50m railway corridor for the Project and the wider areas of permanent land that are required (such as embankments, cuttings and station parking) for the Project. The expropriation corridor excludes any land that is temporarily required for construction compounds or construction access roads, and assumptions have been made regarding these in **Chapter 2: Description of the Project**. The expropriation corridor, together with the construction compounds and construction access roads is considered to be the defined parameter for the assessments undertaken.

5.3.14. Therefore, if the design were to evolve such that the Project alignment, inclusive of the railway, electrification infrastructure, and fencing deviate from the expropriation corridor, supplementary environmental and social assessment documentation, to evaluate the design change, will be required to demonstrate that there has been no change to the potentially significant environmental and social effects associated with the Project (as described in the **Environment and Social Management Plan** (ESMP)). The supplementary assessment documentation must also identify any further mitigation, that may be required to ensure the change would not change the potentially significant environmental effects associated with the Project.

5.3.15. The study areas for each topic are outlined in **Technical Chapters 6 – 17**.

ASSESSMENT CRITERIA

5.3.16. The classification of each effect identified has been assessed based on the magnitude of change (or impact) due to the Project and the sensitivity/value of the affected receptor to change, as well as other factors that are outlined in more detail below. The classification of residual effects has been assessed taking into consideration the extent to which proposed mitigation measures will prevent, reduce or, if possible, offset adverse effects or enhance beneficial effects.

5.3.17. In the context of ESIA impacts and effects are described as:

- Impact – the magnitude of change on a receptor as a result of the Project, such that it is a deviation from the baseline conditions.

- Effect – the impact on a receptor considered in combination with the sensitivity / value of said receptor.

5.3.18. The assessments of likely effects for each of the technical topics are presented in technical chapters **Technical Chapters 6 – 17** and have taken into account criteria to determine whether or not the likely effects have the potential to be significant. Where possible and appropriate effects have been assessed quantitatively. The following criteria have been taken into account when classifying the likely effects:

- Relevant legislation and planning policy;
- International, national, regional and local standards;
- Likelihood of occurrence of the effect;
- Geographical extent of effect;
- Sensitivity and/or value of the receptor;
- Magnitude and complexity of impact;
- Whether the effect is temporary or permanent;
- Duration (short, medium or long-term), frequency and reversibility of effect;
- Whether the effect is direct or indirect, secondary or transboundary;
- Inter-relationship between different effects (both cumulatively and in terms of likely effect interactions); and
- The consultation outcomes.

RISKS

5.3.19. Key risks have been identified and assessed within the **Technical Chapters 6 – 17.** Risk are defined as the likelihood of an impact occurring combined with effect or consequence(s) of the impact on a receptor should the risk occur. The potential key risks / unplanned events, identified and assessed include:

- Risk of faunal collisions (**Chapter 8: Ecology**);
- Risk of fluvial flooding, pollution to water bodies from the increased sedimentation, spillage of fuels or other harmful substances and discharge of foul effluent (**Chapter 11: Surface Water Environment** and **Chapter 15: Social** and **Chapter 16: Major Accidents and Disasters**);
- Risk to waters from the increased water demand (**Chapter 11: Surface Water Environment**);
- Risk of seismic activity / earthquakes, landslides, groundwater flooding (**Chapter 12: Geology and Hydrogeology** and **Chapter 16: Major Accidents and Disasters**);
- Health and safety risks (**Chapter 14: Climate Change**, **Chapter 15: Social** and **Chapter 16: Major Accidents and Disasters)**;
- Risk of fires, extreme temperatures, severe weather (**Chapter 14: Climate Change** and **Chapter 16: Major Accidents and Disasters**);
- Risks from surrounding chemical sites, dam breaches, mine and storm caverns (**Chapter 16: Major Accidents and Disasters**);
- Risk of transport accidents, electricity failure, malicious cyber-attacks, property or bridge demolition accidents, tunnel failure (**Chapter 15: Social** and **Chapter 16: Major Accidents and Disasters**).

MAGNITUDE OF IMPACT

5.3.20. The magnitude of impact for each identified receptor is predicted as a deviation from the established baseline conditions, as a result of the Project. The magnitude of these impacts is also defined within

Technical Chapters 6 – 17 and has been determined where available and appropriate by quantifiable data, available appropriate national and international standards or limits (World Health Organisation (WHO) Limits, EU Quality Standards, etc.) and professional judgement. The scale used is defined in Table 5-1 below. Where topic specific methodology deviates from this approach, for example as a result of using topic specific guidance, this is set out in the assessment methodology section of the technical chapter.

Table 5-1 - Description of the Magnitude of an Impact

Magnitude of an Impact	Adverse / Beneficial	Criteria
Very Large	Adverse	Loss of resource and / or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute.
Large	Adverse	Loss of resource, but not negatively affecting the integrity; partial loss of / damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Moderate	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one or more key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one or more key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of an adverse impact occurring.
Slight	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No Change	n/a	No loss of alteration of characteristics, features or elements.

5.3.21. The magnitude of change identified is based on the peak potential magnitude of change i.e. the greatest likely magnitude of change that may be experienced by a sensitive / valuable receptor (existing or proposed).

SENSITIVITY / VALUE OF RECEPTORS

5.3.22. The sensitive / valuable receptors considered within the ESIA are identified within **Technical Chapters 6 – 15**. The sensitivity of these receptors to change is also defined within **Technical Chapters 6 – 15** and has been determined where available and appropriate by quantifiable data, the

consideration of existing designations and professional judgement. The categories used (very high, high, medium, low, and negligible), unless otherwise stated, are shown in Table 5-2. Where topic specific methodology deviates from this approach, for example as a result of using topic specific guidance, this is set out in the assessment methodology section of the Technical Chapter.

5.3.23. Table 5-2 below defines the level of sensitivity of receptors.

Table 5-2 - Description of the Sensitivity / Value of a Receptor

Sensitivity	Criteria
Very High	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, very local scale.

5.4 CLASSIFICATION OF EFFECTS

5.4.1. Determining the classification of effects has been undertaken using professional judgements (assumptions and value systems) that underpin the attribution of significance. Each effect has been assessed against the magnitude of change and the sensitivity / value of the receptor as shown in Table 5-3.

Table 5-3 - Matrix for Classifying Effects

		Magnitude of Impact				
		No Change	**Slight**	**Moderate**	**Large**	**Very Large**
Environmental Sensitivity	**Very High**	Neutral	Minor	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Minor	Minor or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Minor	Minor	Moderate	Moderate or Large
	Low	Neutral	Neutral or Minor	Neutral or Minor	Minor	Minor or Moderate
	Negligible	Neutral	Neutral	Neutral or Minor	Neutral or Minor	Minor

5.4.2. The terms as used within Table 5-3 have been defined below, applying to both beneficial and adverse effects:

5.4.3. Very Large effect: Only adverse effects are normally assigned this level of significance. They represent key factors in the assessment process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category;

- Large effect: These effects are considered to be very important considerations and are likely to be material in the decision-making process;
- Moderate effect: Effects that may be important but are not likely to be key in the decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor;
- Minor effect: These effects may be raised as local factors and are unlikely to be critical in the decision-making process. They are important in enhancing the subsequent design of the Project; and
- Neutral: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

5.4.4. Unless otherwise stated in the relevant chapter of this ESIA, effects that are classified as moderate, large or very large are considered to be significant effects. Effects classified as minor or below are not considered to be significant.

5.4.5. Within the assessment's distinction is provided regarding the nature of each effects, including whether the effect is likely to be:

- Permanent or temporary; and
- Direct or indirect.

5.4.6. Effects are described as either temporary or permanent, according to the duration the effect is expected to last:

- Very short term: Less than 2 years;
- Short term: 2 to 5 years;
- Medium term: 5 to 10 years;
- Long term: 10 to 15 years; and
- Very long term: More than 15 years.

5.4.7. Temporary effects are those of very short, short or medium duration. Permanent effects are those of long-term or very long-term duration.

5.4.8. Direct effects arise as a direct consequence of the Project, for example a building demolition or an increase in construction traffic. Indirect effects are those which are not a direct result of the Project but occur away from the original effect, such as employment opportunities generated through the procurement of goods and services from local businesses.

5.4.9. Tables summarising the likely significant effects associated with each technical topic area, required mitigation measures and residual effects are provided at the end of each technical chapter. The tables provide a clear distinction of the type of effect, notably:

- Beneficial or adverse; and

- Significant or not significant.

5.4.10. Any variation to these definitions arising for example from differences in topic methodology or guidance is explained in **Technical Chapters 6 – 17**.

INHERENT AND ADDITIONAL MITIGATION AND MONITORING

5.4.11. Where the Project has already incorporated construction, design or operational measures which mitigate effects these have been included as 'inherent mitigation'. Inherent mitigation is only considered prior to the assessment of the effect where this has been provided in documentation (i.e. the Technical Specification) or confirmed by the Project Team, thus ensuring a proportionate approach is adopted.

5.4.12. Additional mitigation describes actions that will require further activity in order to achieve the anticipated outcome. Examples include additional design measures, for example to comply with proposed lighting limits or developing a travel plan for the Project.

5.4.13. Where the potential for likely significant adverse effects have been identified in the assessment, measures to prevent or reduce and, if possible, offset likely significant adverse effects on the environment are described.

5.4.14. Monitoring is typically required where there are significant adverse residual effects. In some cases, for instance where there is uncertainty of residual effects remain, it may also be appropriate to implement monitoring.

5.4.15. Effects have been assessed following the inclusion of additional mitigation measures. If any significant effects remain after implementation of mitigation measures, this is recorded within the ESIA.

5.4.16. Proposed additional mitigation and monitoring measures are set out within technical chapters where necessary.

5.4.17. Both inherent and additional mitigation are included in the **ESMP**.

CUMULATIVE EFFECTS

As per the EIA Directive, Annex I(C), Paragraph 5, the ESIA has assessed the cumulative effects of the Project. Cumulative effects are categorised as follows:

- In-combination Effects: Those arising from the Project in-combination with other projects; and
- Effect Interactions: Those arising from inter-relationships within the Project.

5.4.18. There is no single widely accepted methodology or best practice for assessing cumulative effects although various guidance documents exist, such as the IFC Good Practice Handbook on Cumulative Impacts Assessment and Management[24]. The approach used has been adopted based on the principles of the relevant guidance, previous experience, the types of receptors being assessed, the nature of the Project, the other developments under consideration and the information

[24] IFC (2013). Good Practice Handbook on Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets.

available to inform the assessment. The assessment of cumulative effects is presented in **Chapter 17: Cumulative Effects**.

5.4.19. The following principles have been considered when assessing the significance of cumulative effects in relation to both effect interactions and in-combination effects:

- The nature of the receptors affected;
- How the effects identified combine to affect the condition of the receptor;
- The probabilities of the effects occurring in relation to each other in such as way so as to produce cumulative effects; and
- The ability of the receptor to absorb further effects.

5.4.20. The resulting determination of significance based on this is therefore an illustration of how multiple effects may lead to an increased residual effect, compared to viewing the effects in isolation.

5.4.21. Further details regarding the scope and methodology of the assessment of cumulative effects, the identification of relevant other projects and a description of those included within the assessment are provided in **Chapter 17: Cumulative Effects**.

5.5 CONSULTATION AND STAKEHOLDER ENGAGEMENT

5.5.1. A **Stakeholder Engagement Plan** (SEP) has been developed for the Project, as required under PR 1 and PR 10. It will be publicly disclosed and available for questions, comments and suggestions together with this **ESIA**, after which it will be regularly updated throughout the life of the Project.

CONSULTATION UNDERTAKEN FOR THE NATIONAL EIA

5.5.2. Consultation was undertaken during the preparation of the National EIA for the Project (2017), in accordance with national requirements. This is summarised in Table 5-4; further details are provided in the SEP and **Resettlement Action Plan** (RAP).

Table 5-4 - National EIA Public Participation Meetings

In total, two rounds of public consultation meetings were conducted as part of undertaking the National EIA for the Project (2017) as described below:

National EIA Public Participation Meetings (08/09/2015-10/09/2015):

Initial consultation meetings were conducted at locations along the Project alignment (Istanbul, Tekirdag, Kirklareli and Edirne) and organised in accordance with Turkish EIA regulations, requirements and processes in order to inform local residents about the Project and its potential effects. Leaflets were also prepared in order to provide information about the Project and its likely significant effects and these leaflets were distributed during the meetings. The meetings were chaired by the Provincial Directorates of the Ministry of Environment and Urbanisation. Meeting times and venue selection were coordinated with the Provincial Directorates of the Ministry of Environment and Urbanisation to ensure maximum participation from local residents. The meetings were announced in local and national newspapers, as well as being displayed on provincial websites.

National EIA Public Participation Meetings (15/03/2016-17/03/2016):

This second round of meetings was used to inform local residents about the project and its environmental impacts. The meetings were performed at different locations (Silivri, Ergene, Babaeski and Havsa Municipalities) to those in the first round of meetings, in order to inform more people located along the existing railway about the Project. The venue and date of the meetings

were announced in four local newspapers (one local newspaper for each province) on 11 March 2016.

The main issues raised at both rounds of meetings were concerns over land acquisition to facilitate the Project, in particular for passenger stations. TCDD reiterated the that land acquisition studies will be carried out in accordance with the Expropriation Law No.2942.

Official Opinions on the EIA:

Official opinions on the EIA were sought from: General Directorate of Nature Protection and National Parks, General Directorate of Forestry, General Directorate of Environmental Management, State Hydraulic Works, General Directorate of Preservation of Cultural Heritage, during the EIA procedure.

5.5.3. In addition to the national EIA Public Participation Meetings summarised above, TCDD also completed 16 further additional public information meetings between July 2019 and May 2020. These are summarised in the **SEP** and **RAP**.

CONSULTATION UNDERTAKEN FOR THIS ESIA

5.5.4. A series of consultation meetings were undertaken by WSP during the development of the ESIA in July and August 2020. All the consultation meetings were conducted face to face outside considering the COVID-19 related restrictions, including social distancing and use of masks.

5.5.5. Key vulnerable groups were identified as part of the SEP and were consulted with to ensure an inclusive engagement approach.

5.5.6. The purpose of these consultation activities was to:

- Inform the ESIA;
- Obtain views and concerns of the local community on the Project; and
- Involve local communities in the decision-making process during the design, construction and operation stage.

5.5.7. The Governorship and Mukhtar meetings are summarised in Table 5-5, and the Focus Group consultations are summarised in Table 5-5.

Table 5-5 - ESIA Consultation Activities - Governorship and Mukhtar

Initial Governorship Meetings

The initial governorship meetings were conducted with the following:

- İstanbul Governorship - 30/06/2020
- Tekirdağ Governorship - 02/07/2020
- Başakşehir District Governorship and Municipality - 29/06/2020
- Arnavutköy District Governorship and Municipality - 29/06/2020
- Büyükçekmece District Governorship and Municipality - 01/07/2020
- Çatalca District Governorship and Municipality - 29/06/2020
- Silivri District Governorship and Municipality - 30/06/2020
- Çerkezköy District Governorship and Municipality - 01/07/2020

Overall, all the district governors expressed their support for the Project and did not raise any major concerns. During the meetings, information was provided about the Project and the Project

alignment was shown to the local governors. Key issues raised were mainly related to the potential effects of construction activities on nearby settlements across the Project alignment. In Çerkezköy District, land related issues were raised particularly as the line would divide the land parcels and therefore agricultural lands could become unusable.

Mukhtar Meetings

- The meetings with the Mukhtars were conducted with the following: Bahçeşehir 2. Kısım Mukhtarship (ex name Hoşdere) - 01/07/2020
- Şamlar Mukhtarship (Tatarcık) - 01/07/2020
- Deliklikaya Mukhtarship - 02/07/2020
- Ömerli Mukhtarship - 02/07/2020
- Yeşilbayır Mukhtarship - 03/07/2020
- Karaağaç Mukhtarship - 04/07/2020
- Bahşayış Mukhtarship - 02/07/2020
- Nakkaş Mukhtarship - 02/07/2020
- Ferhatpaşa Mukhtarship - 02/07/2020
- İzzettin Mukhtarship - 05/07/2020
- Kaleiçi Mukhtarship - 04/07/2020
- Gökçeali Mukhtarship - 05/07/2020
- İnceğiz Mukhtarship - 04/07/2020
- Kabakça Mukhtarship 04/07/2020
- Akören Mukhtarship - 03/07/2020
- Bekirli Mukhtarship - 03/07/2020
- Kurfallı Mukhtarship - 04/07/2020
- Büyük Sinekli Mukhtarshi - 03/07/2020
- Küçük Sinekli Mukhtarship - 03/07/2020
- Çayırdere Mukhtarship - 03/07/2020
- Gazi Mustafa Kemal Paşa (GMKP) Mukhtarship - 04/07/2020
- İstasyon Mukhtarship - 03/07/2020

The meetings were conducted to inform Mukhtars about the Project, conduct a survey about the existing baseline situation of the affected settlements and to obtain their concerns and views about the Project. The Mukhtars stated construction noise to be the most important concern, followed by construction dust, construction traffic and disruption to roads and access. Most of the land across the settlements are not currently irrigated (with some minor exceptions in Şamlar and Kabakça). Every Mukhtar stated that finding replacement cultivated agricultural land will be difficult.

Focus Group Consultations

5.5.8. Fourteen focus groups were conducted as part of the ESIA, including five community meetings and nine meetings with women in the local communities. The objective of the focus groups was to ensure views and concerns of local community including women, were taken into account for the Project. A list of the focus groups has been provided in **Table 5-6.**

Table 5-6 - Focus Groups

Type of Focus Group	No.	Date	Location	Attendees
Community Focus Group	1	25/07/2020	Silivri District Büyük Sinekli neighbourhood	Charcoal business owners (2 men).
	2	10/07/2020	Arnavutköy Yeşilbayır neighbourhood	Retired households living with family (9 men).
	3	14/07/2020	Çatalca Gökçeali neighbourhood	Three men and three women (housewives, an employee, a retired person).
	4	21/07/2020	Silivri district, Çayırdere neighbourhood	Local farmers (majority men, 3 women).
	5	25/07/2020	Çatalca district, Kabakça neighbourhood	Seasonal agricultural workers (4 men).
Women Focus Group	1	16/07/2020	Arnavutköy district, Deliklikaya neighbourhood	Total of 4 women (all housewives).
	2	27/07/2020	Çatalca district, Bahşayıs neighbourhood	Total of 4 women (1 teacher and 3 housewives).
	3	18/07/2020	Çatalca district, Gökçeali Mahallesi, Yeltepe Mevkii	Total of 4 women (an unemployed person, 2 housewives and a retired person).
	4	20/07/2020	Çatalca district, İnceğiz neighbourhood	Total of 9 women (7 housewives, an unemployed worker and a seasonal worker).
	5	09/07/2020	Çatalca district, İzzettin neighbourhood	Total of 2 women (both housewives).
	6	13/07/2020	Çatalca district, Kabakça neighbourhood	Total of 8 women (6 housewives and 2 unemployed persons).
	7	20/07/2020	Silivri district, Bekirli neighbourhood	Total of 4 women (all housewives).
	8	21/07/2020	Silivri district, Çayırdere neighbourhood	Total 10 women (8 housewives, 1 person seeking employment and a retired person).

Type of Focus Group	No.	Date	Location	Attendees
	9	21/07/2020	Silivri district, Çayırdere neighbourhood	Total 8 women (6 housewives and 2 retired persons).

5.5.9. The key issues and concerns raised during the focus groups regarded:

- Lack of Project information available to potentially affected persons.
- Lack of consultations with potentially affected persons.
- Concerns around the potential effects of the construction phase of the Project in relation to noise, emissions and overseas workers moving in and out of the Project area.
- Concerns around the potential effects on health, safety and security of women and harassment mainly in relation to the construction phase.
- Concerns around the potential effects on local lands and livelihoods.
- Concerns around the lack of access rights to agricultural land.

5.5.10. The majority of settlements believed that better transport access would be beneficial for their communities.

Household Survey

5.5.11. A household survey was undertaken as part of the preparation of the Resettlement Action Plan. Key issues and concerns raised during the household survey included:

- Land expropriation;
- Construction noise;
- Train noise;
- Disruption to roads and access; and
- Community safety around the rail.

5.5.12. Major concerns around the land acquisition process were in relation to: details about expropriation price; worries about loss of land; and restricted access and passing points for agricultural machinery, cattle and charcoal activities.

5.5.13. These concerns, as raised during the ESIA consultations, have been considered throughout this ESIA. Further information has been provided to potentially affected persons during the ESIA consultations, and this will continue during the 120-day disclosure period. Following the implementation of the SEP, stakeholder engagement will also continue during the design, construction and operation of the Project.

DISCLOSURE OF THE ESIA AND SUPPLEMENTARY DOCUMENTATION

5.5.14. In according with EBRD requirements, for Category A Projects, the **ESIA** and supplementary documentation will be disclosed for a period of 120 days. The disclosed information will include:

- **Draft ESIA** (including the **ESMP**);
- **Non-Technical Summary** (NTS) of the ESIA;
- **Environmental and Social Action Plan** (ESAP);
- **SEP**;

- **RAP**;
- **Biodiversity Management Plan** (BMP);
- **Contractor Management Plan** (CMP); and
- **Emergency Response Framework** (ERF).

5.5.15. The draft ESIA report will be available for review and comment by stakeholders through a variety of mechanisms as outlined in the **SEP**. During the disclosure period, consultation will be undertaken with those likely to be affected by the Project, as outlined in the **SEP**. In light of the current COVID-19 situation, AYGM will liaise with local health authorities to ensure all the related guidelines are followed.

5.5.16. It is thought likely that at least some level of COVID-19 restrictions will remain in-place during the disclosure period and alternative consultation methods have been introduced as part of the **SEP** in response to this.

5.5.17. Further information on the disclosure process is set out in the **SEP.**

POST DISCLOSURE OF THE ESIA AND SUPPLEMENTARY DOCUMENTATION

5.5.18. Following completion of the disclosure period, feedback gained throughout will inform the continued development of the Project. If applicable the disclosure documentation (such as the **ESIA** (including the **ESMP**) and the **SEP**) will be updated to capture the feedback gained throughout the disclosure period.