Application File for the Amendment of the Environmental Permit

Orizaj Re-route
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1. INTRODUCTION

1.1. PROJECT OVERVIEW

The Trans Adriatic Pipeline (TAP) is the western section of the Southern Gas Corridor; a complex value chain of energy projects that link natural gas supplies from the second development stage of the Shah Deniz field in Azerbaijan to Europe. TAP ("the TAP Project") will connect with the Trans Anatolian Pipeline (TANAP) at the Greek-Turkish border and transport natural gas from the Caspian region via Greece, Albania and across the Adriatic Sea to southern Italy and further to Western Europe (refer to Figure 1.1).

Figure 1.1 TAP Overview

![TAP Overview](source:TAP, 2014)

The Albanian onshore section of TAP will start at the border with Greece, near Bilisht Qendër in the Korça region, and run to the Adriatic coast 17 km north-west of Fier. The total length of the onshore section in Albania will be approximately 215 km. In addition, a 37 km length of TAP will run offshore in the Albanian territory of the Adriatic Sea.

1.2. PROJECT ASSESSMENT

TAP AG, with a group of Albanian and international experts, developed a comprehensive Environmental and Social Impact Assessment (ESIA) report for the Albanian onshore and offshore section of TAP ("the Project") in accordance with Albanian law and in compliance with the Environmental and Social Policy of the European Bank for Reconstruction and Development (EBRD).

ESIA is the systematic process of identifying and assessing the potential effects on the biophysical, socio economic, and cultural heritage environment as a consequence of a project or development. As a planning tool, the ESIA aims to ensure that environmental, socioeconomic and cultural heritage issues throughout the entire project lifecycle are anticipated and considered by the project proponent, in this case TAP AG. It also serves as a framework for establishing project controls to reduce or prevent adverse impacts.
The TAP ESIA Albania was officially submitted to the National Licensing Centre (NLC) in Albania in January 2013, for review by the Ministry of Environment, Forests and Water Administration – National Environment Agency (NEA). The ESIA was approved in April 2013 and subsequently an Environmental Permit (for Activities Impacting on the Environment) was granted by NEA in May 2013.

TAP AG has disclosed the full ESIA report to affected communities and stakeholders along the pipeline route to enable their views and concerns to be considered during the design and development of the Project.

Since the Environmental Permit for the construction and operation of the Project and its supporting infrastructure was granted, TAP AG has continued with the detailed design and engineering investigations. Through this process, as the design has developed, some areas not previously assessed in the approved ESIA are now being proposed as part of the “new footprint” for the onshore Project. Addendums to the ESIA have been prepared to assess if any such areas of the new footprint that have the potential to cause significant impact to the biophysical, socioeconomic, and cultural heritage environments.

The first ESIA Addendum was prepared during April 2015 in response to the decision by NEA that revisions and modifications to the Project since the approval of the ESIA, and thus not previously assessed and permitted, are subject to a Preliminary Environmental and Social Impact Assessment (PESIA) - as detailed in a letter to the TAP Country Manager (ref. 1170 Prot., dated 03 December 2014). The first ESIA Addendum provided an assessment of one pipeline re-route to avoid a mining concession area L1577 and one new access road (AR444_New) in the Ostrovicë Mountains. These discrete areas were the focus of additional field surveys during 2014 to establish baseline conditions.

A second ESIA Addendum was prepared during October 2015 and provides an assessment of a proposed pipeline re-route in the Potom area located in the Ostrovicë Mountains and the additional Access Road (AR #460_3) connecting the village of Potom with the village of Backa (Trepollarë) in the proximity of KP 83. This area was the focus of an additional field survey conducted in July 2015 to establish baseline conditions.

A further two field surveys were conducted during October and November 2015 to investigate and establish baseline conditions for a number of proposed pipeline re-routes and access roads located between the settlements of Qafë and Poliçan (Berat region).

The fourth to ninth ESIA Addendums prepared on the basis of these field surveys to focus specifically on the (1) New Route on the Onshore Section of the Pipeline in the Polenë Area, (2) New Route on the Onshore Section of the Pipeline in the Mbrakulla Area, (3) New Route for the avoidance of the Mining Permit No. 1437, located in the Poliçanì Area, (4) Access Road #405_1 near the settlement of Sinaj, (5) New Route on the Onshore Section of the Pipeline – Çorovodë Micro-tunnel, and (6) New Route on the Onshore Section of the Pipeline in the Vërzhzezha Area respectively. Further details about these previous ESIA Addendums is included in Table 1.1.

During 2016, detailed engineering investigations revealed the existence of some local landslides along the TAP route. Specifically 4 locations were identified for which a more detailed evaluation
was needed. A team of engineers and ESIA experts carried a field survey during December 2016 to investigate and establish baseline conditions for environmental, socioeconomic and cultural heritage on the proposed re-routes.

This report, the tenth ESIA Addendum (see Table 1.1), has been prepared on the basis of the field survey carried out in December 2016 and focuses specifically on the proposed pipeline re-route in Orizaj (KP 113.0 to KP 114.2 on the January 2016 base case in 3D Km chainage, equivalent to KP 110.7 – KP 110.8 in 2D chainage) to avoid a landslide feature near the Osumi River. Orizaj is the nearest settlement to this area and therefore the name has been used as a reference to identify the pipeline re-route. It should be noted that the pipeline basecase in this section was also the subject of a previous ESIA Addendum prepared in February 2016 (ESIA Addendum no. 7 in Table 1.1 below) which covered an initial re-route (the Vërrezha re-route) designed to avoid the potential hydraulic hazards and landslides near the Osumi River. The re-route covered in the present report is intended to avoid another landslide feature near the Osumi River.

Figure 1.2 Overview of the 4 Proposed Pipeline Re-routes based on the December 2016 field survey. The Orizaj Re-route, presented in this Report, is labeled and marked in green

Table 1.1 provides a chronological list of the ESIA related addendums, prepared to date for the TAP Project, detailing the specific Project elements assessed in each one (report name highlighted in ‘bold’ refers to this ESIA Addendum).
## Table 1.1 List of Prepared ESIA Addendums

<table>
<thead>
<tr>
<th>Preparation Order</th>
<th>Report Name</th>
<th>Project Element(s)</th>
<th>Date Prepared</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>TAP Albania ESIA Report</td>
<td>-</td>
<td>April 2013</td>
</tr>
<tr>
<td>1</td>
<td>TAP Albania ESIA Addendum New Project Footprint</td>
<td>Mining concession pipeline re-route L1577 and new access road 444</td>
<td>April 2015</td>
</tr>
<tr>
<td>2</td>
<td>TAP Albania ESIA Addendum Potom Re-route</td>
<td>Potom area pipeline re-route</td>
<td>October 2015</td>
</tr>
<tr>
<td>3</td>
<td>TAP Albania ESIA Addendum Access Road 460_3</td>
<td>Access road 460_3 in Potom area</td>
<td>October 2015</td>
</tr>
<tr>
<td>4</td>
<td>TAP Albania ESIA Addendum Polenë Re-route</td>
<td>Pipeline re-route to avoid landslide</td>
<td>January 2016</td>
</tr>
<tr>
<td>5</td>
<td>TAP Albania ESIA Addendum Mbrakulla Re-route</td>
<td>Pipeline re-route to avoid landslide</td>
<td>January 2016</td>
</tr>
<tr>
<td>6</td>
<td>TAP Albania ESIA Addendum Mining Concession Area L1437 Re-route</td>
<td>Pipeline re-route to avoid mining concession area L1437</td>
<td>January 2016</td>
</tr>
<tr>
<td>7</td>
<td>TAP Albania ESIA Addendum Vërzhështë Re-route</td>
<td>Pipeline re-route to avoid potential hydraulic hazards and landslides near the Osumi River.</td>
<td>February 2016</td>
</tr>
<tr>
<td>8</td>
<td>TAP Albania ESIA Addendum Access Road 405_1</td>
<td>Access road 405_1 crossing the mining concession area L1437</td>
<td>February 2016</td>
</tr>
<tr>
<td>9</td>
<td>TAP Albania ESIA Addendum Çorovodë Micro tunnel</td>
<td>Tunnel in the Çorovodë area to avoid the Osumi river bed.</td>
<td>February 2016</td>
</tr>
<tr>
<td>10</td>
<td>TAP Albania ESIA Addendum Orizaj Re-route</td>
<td>Pipeline Re-route to avoid a local landslide.</td>
<td>March 2017</td>
</tr>
<tr>
<td>11</td>
<td>TAP Albania ESIA Addendum Osoja Re-route</td>
<td>Pipeline Re-route to avoid a local landslide.</td>
<td>March 2017</td>
</tr>
<tr>
<td>12</td>
<td>TAP Albania ESIA Addendum Sqepuri Re-route</td>
<td>Pipeline Re-route to avoid a local landslide.</td>
<td>March 2017</td>
</tr>
<tr>
<td>13</td>
<td>TAP Albania ESIA Addendum Terpollua Re-route</td>
<td>Pipeline Re-route to avoid a local landslide.</td>
<td>April 2017</td>
</tr>
</tbody>
</table>

Source: ERM, 2017
This ESIA Addendum has been prepared based on the centerline (re-route alignment) available at the moment of the field survey (December 2016). As per the best ESIA practice the field team surveyed the complete centerline length and investigated the surrounding areas as well (through the field survey, satellite imagery and desktop information). Thus, the baseline chapter and field findings included in the Addendum are not limited to the alignment presented in the figures and maps but actually cover a wider corridor that allows a better understanding of the baseline conditions (and impact evaluations).

As part of the standard international practice, subsequent to this ESIA Addendum, TAP may include minor changes to the route alignment (if deemed necessary). Typically, these potential changes are the result of the Post-ESIA detailed work (engineering planning phase; constructive design) and/or the implementation of the ESIA preventive and mitigation measures (e.g. avoidance of sensitive receptors identified in the ESIA).

These potential minor changes would not involve an increase of the impacts presented in the ESIA Addendum because the alignment will follow the corridor already evaluated and any change to the alignment will be subject to the standard preventive and mitigation measures and Environmental and Social Management Plans (ESMP) set for the overall TAP Project.

### 1.3. This Report

As previously mentioned, this report forms an addendum to the TAP ESIA Albania approved by NEA in 2013 and provides an assessment of the potential impacts of the new Project footprint on the biophysical, socioeconomic, and cultural heritage environments.

This report has been prepared in response to the formal direction from NEA that revisions and modifications to the TAP (“the Project”) since the approval of the ESIA, and thus not previously assessed and permitted, are subject to a Preliminary Environmental and Social Impact Assessment (PESIA). The requirement is “pursuant to the Annex II ‘The project that are subject of the preliminary process of the Environmental Impact Assessment’ of the [Albanian] Law No. 10 440, dated 07 July 2011, ‘On the Environmental Impact Assessment’, as amended with the Law No. 12/2015, dated 07.07.2015 “On the Environmental Impact Assessment'”, which defines the Reroutes of TAP Pipeline under the code 10. (Manufacture infrastructure) 1f) (oil and gas pipeline installations (Projects not included in Annex I) and gas transportation pipelines carbon dioxide, so the injection and storage in geological formations under the ground).

The Project revisions and modifications are the result of further detailed engineering analysis and engagement of the authorities and local communities to ensure the Project is technically feasible and avoids as many impacts to the biophysical, socioeconomic, and cultural heritage environments as possible.

In addition, this report has been prepared pursuant the Decision of Council of Ministers No. 686, dated 29.07.2015 “On the Approval of the Rules, Responsibilities, and Timelines for the Development of the Environmental Impact Assessment Procedures (EIA) and the Transferring Procedures of the Environmental Declaration” and the Decision of Council of Ministers No. 912, Dated 111.11.2015 “On the approval of the National Methodology of the ESIA Process”. Additional legislation taken into account in preparing this report is listed in Section 2 below.
Consistent with previous ESIA addendums, the report is structured as follows:

- **Section 1 Introduction.**
- **Section 2 Legal Framework.**
- **Section 3 Project Description:** details the new footprint features.
- **Section 4 Baseline Conditions:** establishes the existing environmental, social and cultural heritage conditions in the new footprint areas.
- **Section 5 Assessment of Impacts:** details the assessment of the significance of potential impacts of the new footprint features on the existing environmental, social and cultural heritage conditions.
- **Section 6 Environmental, Social and Cultural Heritage Management and Monitoring:** summarises mitigation and management measures to address any residual impacts of the new footprint features.

Additional supporting information is provided in the following annexes:

- **Annex 1 Baseline Feature Maps.**
- **Annex 2 Field Survey Summary Datasheets.**
- **Annex 3 Field Survey Notes.**

In recognition of the requirements of Decision of Council of Ministers No 686 dated 29.07.2015 “On Approval of the Rules, Responsibilities, and Timelines for the Development of the Environmental Impact Assessment Procedures (EIA) and the Transferring Procedures of the Environmental Declarations”, a number of requirements have been integrated into this report. These requirements and the sections where these have been addressed are presented in Table 1.2 below.

### Table 1.2 ESIA Addendum requirements based on the Decision of Council of Ministers No 686 dated 29.07.2015

<table>
<thead>
<tr>
<th>No.</th>
<th>Requirement</th>
<th>ESIA Addendum approach</th>
<th>Report Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Description of the vegetation in the Project area.</td>
<td>Description of vegetation and land uses found along the corridor, including photos and maps, are integrated in several sections and Annexes.</td>
<td>Section reference not found. Annex 1</td>
</tr>
<tr>
<td>2</td>
<td>Information regarding water resources in the Project area and its vicinity.</td>
<td>Water resources are described on the basis of surface waters (rivers &amp; streams) as well as on the presence (confirmed or expected) of water infrastructures such as irrigation channels, water wells, etc.). In addition, water requirements for the project are also evaluated.</td>
<td>Section reference not found. Section reference not found. Section reference not found. Annex 1</td>
</tr>
<tr>
<td>No.</td>
<td>Requirement</td>
<td>ESIA Addendum approach</td>
<td>Report Section</td>
</tr>
<tr>
<td>-----</td>
<td>----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>3</td>
<td>Identification of potential negative impacts on the environment including impacts on biodiversity, water, soil and air.</td>
<td>The ESIA Addendum includes a tailored selection of the impacts. The impacts have been provided based on the specificities of the proposed Re-route and the nature of the baseline features identified along the areas being evaluated. Biodiversity is evaluated through a number of different impacts (e.g. habitat degradation, fragmentation, species loss…). Air and noise impact assessments have been incorporated as standard impacts under the environmental impacts Section. Impacts on soils and water are covered under the socioeconomics section where the implications of the Re-route on the land uses and agriculture are presented..</td>
<td>Section reference not found. Section reference not found. Section reference not found.</td>
</tr>
<tr>
<td>4</td>
<td>Description of potential emissions (i.e. polluted waters, gases, dust, noise, vibrations) and waste generation.</td>
<td>A general description on the wastes and effluents is presented in the Project Description as well as along the Impact assessment chapter to describe the magnitude of operations.</td>
<td>Section reference not found. Section reference not found. Section reference not found.</td>
</tr>
<tr>
<td>5</td>
<td>Information about the potential duration of the expected impacts on environment.</td>
<td>A general description on timings expected is presented as part of the Project Description. Similarly along the Impact assessment chapter, where needed, considerations on the time requirements are also included (e.g. months/weeks needed for construction, time required for revegetation and reinstatement, etc.).</td>
<td>Section reference not found. Section reference not found. Section reference not found.</td>
</tr>
<tr>
<td>6</td>
<td>Potential spatial extent of negative environmental impacts, i.e. the physical distance between the Project Area and impacted parameters.</td>
<td>Within the Project Description and the Impact Assessment Chapters descriptions on temporary and permanent occupations are presented. Similarly, where appropriate, indications related to distances are included.</td>
<td>Section reference not found. Section reference not found. Section reference not found.</td>
</tr>
<tr>
<td>7</td>
<td>Rehabilitation plans for the impacted Project area and evaluation of the reinstatement, including respective cost estimates.</td>
<td>Specific preventive and mitigation measures, plans and procedures are presented within the Impact Assessment chapter as well as within the ESCHMM Chapter. These are based on the same principles set in the TAP ESIA 2013. In addition, in some cases post-ESIA management plans and procedures are also included. The lifetime of the pipeline may extend beyond 50 years. Therefore it cannot be foreseen today the cost to which decommissioning approaches will be taken at the time, however, TAP AG is committed that this will be state-of-the-art at the time when it occurs. Refer to Section 4.11 Decommissioning Phase of the TAP Albania ESIA for further details about decommissioning.</td>
<td>Section reference not found. Section reference not found. Section reference not found.</td>
</tr>
<tr>
<td>8</td>
<td>Management and implementation plans for the mitigation of negative environmental impacts.</td>
<td>Specific preventive and mitigation measures, plans and procedures are presented within the Impact Assessment chapter as well as within the ESCHMM Chapter. These are based on the same principles set in the TAP ESIA 2013. In addition, in some cases post-ESIA management plans and procedures are also included.</td>
<td>Section reference not found. Section reference not found. Section reference not found.</td>
</tr>
<tr>
<td>9</td>
<td>Possible cross border negative impacts.</td>
<td>Not applicable. Distances to the closes border are sufficient, so no transboundary impacts will be raised.</td>
<td>N/A</td>
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</table>

Source: ERM, 2017

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<th>AAL00-C10766-641-X-TAP-0001</th>
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<tr>
<td>Rev. No.:</td>
<td>0</td>
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<tr>
<td>Doc. Title:</td>
<td>TAP Albania ESIA Addendum – March 2017 Preliminary Environmental and Social Impact Assessment (PESIA): Orizaj Re-route</td>
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<td>Page:</td>
<td>13 of 88</td>
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2. LEGAL FRAMEWORK

To enhance consistency and uniformity across the TAP Project in Greece, Albania and Italy, all potentially significant effects of the pipeline on the biophysical, socioeconomic, and cultural heritage environment have been assessed against national legislation or the European Union (EU) regulatory impact assessment and environmental framework (whichever is more stringent). As best practice, TAP AG will use the EU framework as a benchmark in Albania, even though it is not currently a part of the EU.

Section 3 Legal Framework (ref: AAL00-ERM-641-Y-TAE-1005) of the TAP ESIA Albania discusses the legal framework within which the Project will be conducted and the environmental regulatory requirements that will apply to Project activities. Applicable international requirements, as well as the relevant international agreements to which Albania is a party, are also detailed.

The TAP ESIA Albania, and this ESIA Addendum, has been prepared to comply with Albanian national legislation and international environmental and socioeconomic requirements, with specific regard to the Environmental and Social Policy of the EBRD.

Albanian laws on Environmental Impact Assessment (Law No. 8990 repealed by Law No. 10 440) aim to protect the environment through prevention, minimization and compensation of damages from proposed projects which may cause direct or indirect significant adverse impacts on the environment due to their size, nature or location, before they are approved. Given the nature, extent and location of the Project in Albania, its authorization is subject to the environmental permitting procedure according to Albanian law.

Refer to Section 3 Legal Framework of the TAP ESIA Albania for further information on regulatory requirements and international compliance standards applicable to the Project.

In addition, this ESIA Addendum has been prepared taking into account the indications provided by the Albanian Government through a number of Decisions of the Council of Ministers. These Decisions are listed below and are considered relevant for the definition of detailed contents of this ESIA Addendum and the approach to the impact evaluation:

- Law No. 10 431, dated 09.06.2011 “On the Environmental Protection”;
- Decision of Council of Ministers No. 247, dated 30.04.2014 “On establishing the rules, requirements and procedures regarding the public disclosure and involvement in the Environmental decision-making.’

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• Decision of Council of Ministers No. 912, Dated 11.11.2015 “On the approval of the National Methodology of the ESIA Process”;
• Decision of Council of Ministers No. 575, dated 24.06.2015 “On the approval of the requests regarding the spoil waste management”; and
• Instruction No. 417, dated 25.06.2014 “On the tariffs of the Environmental Permits”.

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3. PROJECT DESCRIPTION

3.1. OVERVIEW

This section provides a brief description of the Project components being considered as part of the new footprint in the in the Orizaj re-route (KP 113.000 to KP 114.200 on the January 2016 base case in 3D Km chainage, equivalent to KP 110.700 – KP 110.800 in 2D chainage). As stated above, this section of the pipeline basecase was also the subject of a previous ESIA Addendum prepared in February 2016 covering an initial re-route designed to avoid hydraulic hazards and landslides near the Osumi River.

The description provided in this section reflects the level of design detail available at this stage of the Project development.

Note that construction and operation for this proposed Re-route is equivalent to the construction of the pipeline elsewhere along the TAP Albania corridor. Therefore this section is based on Section 4 Project Description (ref: AAL00-ERM-641-Y-TAE-1006) of the TAP ESIA Albania, which provides a detailed description of all the different components involved in the construction, operation and decommissioning phases of the Project in Albania. Refer to this document for further information. Section 4 Project Description of the TAP ESIA Albania also provides an overview of the Project construction and operation management.

It should be noted that the ESIA, and thus this report, considers the reasonable “worst case” in terms of potential impact on the biophysical, socioeconomic, and cultural heritage environment (i.e. the likely significant effects arising from the largest possible footprint) based on available technical input and engineering design documents provided by TAP AG at the time of conducting the assessment. The Project Description therefore establishes a series of development parameters and principles, from which the ESIA practitioners can form the “basis of assessment”. These parameters and principles enable the ESIA to strike a balance between adequately identifying the likely significant effects of the Project, while at the same time providing a degree of flexibility in design during the Project development and implementation. See Table 3.1 for key Project data considered in this assessment.

The remainder of this chapter is structured as follows:

- **Section 3.2 Pipeline Construction**: provides a summary of relevant TAP Albania pipeline construction data applicable and of interest to the re-route covered by this Addendum.
- **Section 3.3 Orizaj Re-route Alignment**: provides specific project data of the Orizaj Re-route and details of the locations.
- **Section 3.4 Orizaj Re-route Construction**: presents the main activities to be undertaken during the construction phase, schedule, resource consumption and emissions.
- **Section 3.5 Orizaj Re-route Operation and Maintenance**: presents the main activities to be undertaken during the operation and maintenance phase, schedule, resource consumption and emissions.
The lifetime of the pipeline may extend beyond 50 years. Therefore it cannot be foreseen today which decommissioning approaches will be taken at the time. However, TAP AG is committed that this will be state-of-the-art at the time when it occurs. Refer to Section 4.11 Decommissioning Phase of the TAP Albania ESIA for further details about decommissioning.

3.2. PIPELINE CONSTRUCTION

A summary of key Project data for the construction of the onshore pipeline in Albania is provided in Table 3.1. A full description of onshore pipeline construction and operation activities is included in Section 4 Project Description of the TAP ESIA Albania.

Table 3.1 Pipeline Construction – Key Project Data from TAP ESIA Albania

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipeline total length in Albania</td>
<td>215 km</td>
</tr>
<tr>
<td>Pipeline diameter</td>
<td>48 inch: from the Greek-Albanian border to compressor station CS03 (209 km)</td>
</tr>
<tr>
<td></td>
<td>36 inch: from compressor station CS03 to the landfall at the shore of the Adriatic Sea (6 km)</td>
</tr>
<tr>
<td>Design pressure of pipeline</td>
<td>95 barg (48”) / 145 barg (36”)</td>
</tr>
<tr>
<td>General minimum depth of pipeline (distance from top of pipe to surface)</td>
<td>1 m</td>
</tr>
<tr>
<td>Minimum depth of pipeline at road and railway crossings (distance from top of pipe to surface)</td>
<td>1.2 – 1.5 m</td>
</tr>
<tr>
<td>Construction working width (48”)</td>
<td>38 m</td>
</tr>
<tr>
<td>Reduced construction working width (physical constraints)</td>
<td>28 m or 22 m</td>
</tr>
<tr>
<td>Reduced construction working width (potential ridge modification)</td>
<td>18 m</td>
</tr>
<tr>
<td>Total time of construction</td>
<td>3.5 years</td>
</tr>
<tr>
<td>Permanent PPS (pipeline protection strip)</td>
<td>8 m (4 m from each side of the line)</td>
</tr>
<tr>
<td>Safety zone</td>
<td>40 m (20 m from each side of the line)</td>
</tr>
<tr>
<td>Enlarged Safety zone</td>
<td>400 m (200 m from each side of the line)</td>
</tr>
<tr>
<td>Estimated pipelaying rate</td>
<td>General: 100 – 300 m/day</td>
</tr>
<tr>
<td>Topsoil stockpile</td>
<td>2 m</td>
</tr>
<tr>
<td>Trench width</td>
<td>1.6 – 1.8 m</td>
</tr>
<tr>
<td>Trench depth</td>
<td>2.5 m</td>
</tr>
<tr>
<td>Steel pipe length</td>
<td>12 – 18 m</td>
</tr>
<tr>
<td>Hydrostatic testing sections</td>
<td>200 m – 10 km</td>
</tr>
<tr>
<td>Hydrostatic testing duration per test section</td>
<td>1 – 4 months</td>
</tr>
<tr>
<td>Pipeline land take by working strip</td>
<td>−7,940,000 m²</td>
</tr>
<tr>
<td>Consumption of aggregate material (trench bedding)</td>
<td>−3,000 m³/Km of pipeline</td>
</tr>
<tr>
<td>Consumption of steel</td>
<td>−140,000 t</td>
</tr>
<tr>
<td>Consumption of concrete</td>
<td>−4,000 t</td>
</tr>
<tr>
<td>Consumption of polyethylene tape (coating)</td>
<td>−2,500 t</td>
</tr>
<tr>
<td>Consumption of sand</td>
<td>−230,000 t</td>
</tr>
<tr>
<td>Consumption of diesel</td>
<td>−160,000 m³</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>Civil water required</td>
<td>~12 m³/day (60 l/person per day)</td>
</tr>
<tr>
<td>Water required for working strip dust suppression</td>
<td>5-10 m³/day</td>
</tr>
<tr>
<td>Hydrostatic testing water required</td>
<td>~245,000 m³</td>
</tr>
<tr>
<td>Water required for slurry mixing in HDD</td>
<td>~3,000 m³</td>
</tr>
<tr>
<td>Noise emission range</td>
<td>60 – 115 dBA, depending on specific equipment</td>
</tr>
</tbody>
</table>

Source: TAP ESIA Albania – Section 4 Project Description (TAP, 2012) – Reviewed and updated by ETG Technical Team February 2015

In addition to the data included in Table 3.1, Figure 3.1 shows the typical pipeline working strip and Figure 3.2 provides a summary of the pipeline construction teams and activities.

The pipeline construction is a sequential process and comprises a number of distinct operations. These can be broadly categorised under the following five headings:

- Team 1: Route surveying, preparation of working strip, top soil stripping and grading.
- Team 2: Pipe bending, stringing and welding.
- Team 3: Trench digging.
- Team 4: Pipelaying, installation and backfilling.
- Team 5: Site clean-up and restoration.
Figure 3.1  Typical Pipeline Working Strip

Source: TAP ESIA Albania (TAP, 2012)
Figure 3.2  Summary of Pipeline Construction Teams and Activities

Team 1 - Route Surveying, Set Out Team, Top Soil Stripping and Grading

Activities: Surveyors will put out flags and stakes to mark the route. Bulldozers and graders will clear away topsoil and stockpile in the working width. The graders and bulldozers will then level the right of way for the trench digging team.

Team 2 - Trench Digging Team

Activities: Excavators will dig out a 4 m wide trench for pipe. Trench will be dug to a depth of 2.2 m, allowing min 1 m burial depth from top of pipe. Bulldozers will then push excavated material to form windows and level the bedding in the base of the trench.

Team 3 - Pipe Bending, Stringing and Pipe Welding Team

Activities: Pipe transporters will simultaneously deliver a steady stream of pipe alongside the working strip. If required, pipe sections will be bent at the pipe yard site to delivery to the working strip. Welding teams will join pipe sections alongside the trench before lowering into the trench (see Team 4 activities). Larger sections will be welded together in the trench.

Team 4 - Pipe Laying, Installation and Backfilling Team.

Activities: Sides booms and cranes will lower large pipe sections and manoeuvre them into place. Pipe sections will be welded together in bottom of trench. Hydro test crews will carry out integrity tests using water abstracted from waterbodies. Bulldozers will then push excavated material to form windows and level the bedding in the base of the trench. Small backhoes and conveyors will re-emplace excavated material back into the trench. Handheld wacker plates will compact material under and around the pipe. Vibrating rollers will compact the material above the pipeline.

Team 5 - Clean Up and Restoration Team

Activities: The dozers and graders will spread the reinstated material above the pipeline and blend the material into the natural contours.

Source: TAP ESIA Albania (TAP, 2012)
3.3. ORIZAJ RE-ROUTE ALIGNMENT

Pipeline re-routes are modifications made to the alignment of the base case route during the detailed design of the Project. These are typically made for technical reasons or, where it is feasible, to avoid sensitive areas or resources (e.g. a site of cultural heritage importance). In this case, the Orizaj pipeline re-route is intended to avoid a landslide feature near the Osumi River.

References are made to kilometer points (KP) on the 3D January 2016 base case route, which is currently being used for construction and latest technical documentation of the project. In addition the KP in 2D are also referenced in the text because the 2D Km chainage is the one publically available on the TAP webpage.

Finally, note that ‘Markers’ in kilometers (also referred as KP) are used to reference particular points along the proposed re-route in 2D starting at KP 0, as shown on Figure 3.3 and Annex 2.

The Orizaj re-route is located a few kilometres to the West of Çorovodë, between KP 113.0 and KP 114.2 on the 3D January 2016 base case, (equivalent to KP 110.7 and KP 110.8 on the 2D route, January 2016) – refer to Figure 3.3. The pipeline re-route is approximately 850 m in length and is located between the national road (Berat-Çorovodë) and the Osumi river. The former proposed centreline was located on the North side of the road and, instead of travelling over flat terrains, and it ascended and descended a mountain shoulder (Figure 3.4).
Figure 3.3  Overview of Orizaj Re-route

Annex 1 (Field Survey Summary Datasheets) provides details and multiple photos along the proposed re-route. Figure 3.4 to Figure 3.7 provide details on the pipeline re-route location and, were possible, indicated the location of the base case route as well. All photographs used in these figures were taken during the field survey (December 2016) and the specific locations are presented in Annex 2, where all field waypoints are presented.
Figure 3.4  General view of the Orizaj re-route

Source: ERM, 2017 (modified Google Earth view)
Figure 3.5  View (east) of Orizaj Re-route

Figure 3.6  View (east) of Orizaj Re-route

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3.4. ORIZAJ RE-ROUTE CONSTRUCTION

3.4.1. Introduction

The following sections provide a summary of the most relevant aspects for the construction of the Orizaj Re-route. The information combines general data applicable to the entire TAP pipeline (e.g. construction methods, materials, etc.) as well as some details/estimates for the re-route where it is possible to disaggregate from the overall pipeline construction to this specific re-route.

The re-route will be constructed as part of the larger TAP project. Therefore the specific details provided (e.g. figures of raw material, effluents, machinery, number of personnel, timings, etc.) need to be understood as an estimate only. These details are presented with the objective to provide the reader details that allow for a better understanding of the type of activities the magnitude of the operations.

Also note that the principles for the construction and operation of the pipeline are largely equivalent along the entire TAP Albania pipeline. Thus, the expected emissions and wastes produced for the construction of the re-route (e.g. gases, dust, noise, vibrations, contaminated water…) would be equivalent to those expected for any section of the base case corridor with a similar length. This same principle applies when considering the resources needed for construction (e.g. concrete, coating, steel pipe sections, water for hydrotesting…) or the type of personnel and machinery.
3.4.2. Construction Duration and Timing

Time requirements for construction of the re-route would depend mainly on its length and specific technical challenges. In general, for a standard pipeline section such as the Orizaj Re-route a typical construction rate of 100 m per crew/day can be assumed. Based on this estimate the complete re-route would be built within 60 days.

Considering the length of the re-route, Table 3.2 provides an estimated on the time required for the various construction steps.

Figure 3.2 provides an example of the teams and construction activities including the route surveying. Detailed information regarding the different construction works can be found in Section 4.4.3 of the TAP Albania ESIA.

Table 3.2 Detailed Orizaj Re-route construction timings*

<table>
<thead>
<tr>
<th>Construction operations</th>
<th>Duration of works (weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1:</td>
<td></td>
</tr>
<tr>
<td>Route surveying, preparation of working strip, top soil stripping and grading.</td>
<td>2 weeks</td>
</tr>
<tr>
<td>T-2, 3 &amp; 4:</td>
<td></td>
</tr>
<tr>
<td>Pipe bending, stringing and welding</td>
<td>4-6 weeks</td>
</tr>
<tr>
<td>Trench digging</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Pipelaying, installation and backfilling.</td>
<td>4-6</td>
</tr>
<tr>
<td>T-5: Site clean-up and restoration 2 weeks</td>
<td>2 weeks</td>
</tr>
</tbody>
</table>

*The timings provided for each type of activity are an estimate only to provide context to the specific re-route. Note that several construction operations are being performed in parallel as the work progresses and thus total expected timings are around 60 days.

Source: ERM, 2017

The final, specific construction schedule will depend on various technical and contractual matters and will take into account environmental and socioeconomic factors.

3.4.3. Machinery, Equipment, Transportation and Traffic

The re-route construction works will require the same equipment and construction techniques as described for the onshore pipeline construction in the TAP Albania ESIA (See Chapter 4 of TAP Albania ESIA). As such, the major items of construction equipment needed are those typical of conventional civil engineering: bulldozers, heavy excavators, dump trucks, large heavy lift cranes, standby generators, excavators, side booms / pipelayers, rock breakers, etc. (refer to Annex 3.6 of the TAP Albania ESIA for further details about the equipment that could be used for the construction of the re-route and photographs).

Transportation along the re-route will include: (1) the labor material and equipment, (2) the steel pipelines, and 3) removal of surplus excavated material, if required.

Large earth moving machinery and other special items of equipment will be required to prepare the construction working strip, to excavate the trench and lay the pipeline.

Construction traffic will utilize the existing local road network (mainly the national road from Berat to Corovodë) including the roads upgraded a part of the overall Albania TAP onshore pipeline...
construction to access points along the pipeline distribution corridor. Additional new upgraded roads will not be required for the construction of the re-route. Construction traffic is not expected to pass through Orizaj village.

Traffic will then travel up and down the re-route construction strip. Construction materials such as prefabricated pipe joints and other raw materials will be stored at the already established pipe and storage yards which will be used to provide raw materials and services to a large portion of the TAP pipeline (including the entire Orizaj Re-route). Additional pipe yards or construction camps will not be required for the Orizaj Re-route.

The Buzuq Pipeyard (Pipeyard 5) and the Çorovodë Camp (Camp 4) will be located some 2-3 km to the South and less than one 1 km to the East respectively and will be used as the main yard and supply for the re-route. Materials will be transported on heavy goods vehicles from the pipeyard and camps to the construction corridor.

Each pipe will be around 12 to 18 m long and weigh between 7 and 12 tons.

Materials for civil construction will be temporarily stored within the construction corridor. Traffic Management Plans will be developed for each municipality to assess measures required to adequately manage traffic movements between pipeyards, camps and Right of Way sites. Traffic related to the Orizaj Re-route will be managed per the agreed Traffic Management Plan for the related pipeyard and Municipality.

Following is an estimate of construction traffic (per day) for a section such as the Orizaj Re-route.

- Between 2 and 4 two-way trucks movements per day over 10 days to transport pipe from the pipe yards to the construction working strip (total of 32 truckloads each carrying 2 pipes);
- Between 2 and 4 two-way trucks movements per day over 10 days to transport bedding and replacement material from the pipe yard to the working strip;
- Between 20 and 25 two-way staff transport (light vehicles and buses) and petrol transport per day from the construction camps to the working strip (this assumes all teams are working all at the same time, however it should be taken into account that in reality this is not the case as it is a step-wise process instead).

3.4.4. Construction camps, services and utilities

Additional camp facilities for personnel, construction equipment and material will not needed for construction of this re-route. Description of camp facilities available for TAP pipeline construction to be used for the re-route construction can be found in Section 4.3.6 of Chapter 4 Project Description of the main ESIA

3.4.5. Pre-construction activities

Before starting any construction work a topographic survey is completed and a pre-construction walkover survey with photographic records will be done to document existing condition of the pipeline.
route and the access roads. These records will be used as part of the standards against which the quality of the restoration work will be judged when construction work is completed. The extent of the Right of Way will be marked out, as well as the center of the trench line. Obstructions such as walls, fences and paths will be disturbed by the minimum amount necessary for safe working. Wall material will be carefully dismantled and stored for reuse. All obstructions/elements found along the RoW will be either compensated or reinstated depending on the nature of the element as per the standard procedures in place.

Records of buried facilities such as drains and irrigation pipe locations will be prepared and verified with the landowner/user to prevent accidental damage during pipeline construction. Existing third party services will be located, marked, and either safeguarded or diverted. Warning posts will be erected for overhead cables, and temporary crossing points clearly identified. Other pre-construction site activities will include:

- Assessment of construction materials quantities;
- Assessment of specific construction methods; and
- Installation of construction site and worksites.

3.4.6. Pre-commissioning: Pressure Testing during Construction (Hydrotesting)

Hydrotesting (or hydrostatic testing) will be used to test the integrity of the line pipe and welding, in addition to the integrity testing undertaken during the welding process. The test involves placing water inside the pipeline at a certain pressure to check that there is no pipe damage and that there will be no leaks.

After the pipeline has been filled and pressurised, and all the necessary parameters have been measured, the pipeline is dewatered and dried. A defect is identified comparing the measured pressure in the test section against the theoretical pressure of the tested pipeline section.

A detailed description of hydrotesting activities can be found in Section 4.4.1 of the TAP Albania ESIA.

The re-route will be hydrotested along with non re-routed sections of the pipeline, according to a hydrotest management plan that has defined 35 hydrotest sections across the whole of the pipeline. The duration of hydrotesting depends on elevation, ambient temperature and other factors. A detailed description of hydrotesting activities can be found in Section 4.4.1 of the TAP Albania ESIA. The water used for hydrotesting needs to be free of contaminants and not aggressive (pH between 5 and 8). Additives and chemicals will be used where required, after water sampling results have been received. Discharge will be in accordance with approved procedures and local legislation.

Water will be extracted from surface water sources with water flow of more than 3 cm/second. For this re-route, the water will be abstracted from the Osumi River at approximately KP 103. Extraction rates will consider the seasonal changes of river flows and will be subject to required permits.

Following successful testing, the used water will be discharged back into a receiving water body after having passed sedimentation pool, through which the water will flow very slowly in order to remove particles and sediment that may have gathered inside the pipe. These pools will be sized to provide

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a retention time of 5 minutes, which is considered enough time for allowing the solid particles to settle and remain in the bottom of the pond.

The discharge rate after finalisation of hydrotests will follow the same rules as applicable for abstraction. Environmental effects are expected to be minimal or negligible when discharge rates are under 10% of the receiving river flow. The discharged water quality is expected to be basically the same of the abstracted water.

Prior to the extraction or disposal of hydrotest water the contractor will obtain written approvals from relevant authorities.

It should also be noted that hydrotest water will be re-used in as many sections as feasible provided the specific circumstances allow (e.g. timings for the hydrotest in the various sections, relatively similar heights between sections, same river watershed).

3.4.7. Road Crossing

The re-route does not cross any major roads. It travels parallel the national road from Berat to Çorovodë for approximately 500 m from KP 0 to KP 0.5 and then separates from the road and goes through agricultural fields from KP 0.5 to the end of the re-route.

3.4.8. Construction workforce

At present, the maximum estimated number of personnel who will work on the Orizaj Re-route is 80. Working hours will be in accordance with local labor law.

The workforce will consist of approximately 80% Albanians, 85% of which will be from the directly affected areas, and 20% expatriates. The make-up of the teams for construction of this re-route will generally be 60% unskilled, 20% semi-skilled and 20% skilled workers.

In addition, approximately 4-8 security personnel from a private security company will be present at the working sites.

Re-route construction workers will be accommodated in the Camp 4 as described previously.

3.4.9. Use of Resources and Environmental Interferences during Construction and Pre-commissioning

The following subsections summarize the data considered relevant to the Orizaj Re-route, for further details refer to Section 4.9 of TAP Albania ESIA.

- Temporary land easement;
- Materials and fuel usage during construction;
- Water consumption;
- Air emissions;
- Noise emissions;
- Liquid and Solid Waste Generation, Handling and Disposal.

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3.4.9.1. **Temporary and permanent easement**

The temporary working strip for pipeline construction will in general be 38 m, with the option to reduce this to 28 m (defined as reduced working strip) where required by socioeconomic or environmental conditions, or where technical restrictions apply. Additional space is usually required at major road crossings, major watercourse crossings, or when required by terrain or soil conditions.

No additional land will be taken for camps, pipe yards, access roads or site access and temporary infrastructure as all these will be already in place as part of the overall TAP Project.

After construction the working strip will be restored to its original condition were possible. During the operation of the pipeline a number of permanent safety restrictions will apply (see Section 3.5) to the Pipeline Protection Strip (PPS), which is 8 m (4m either side of the pipe centreline), where farming of annual crops and associated shallow ploughing down to a maximum depth of 30 cm will be allowed but cultivation of deep routing system plants such as vineyards, fruit trees, or any other bushes or trees will be restricted. Similarly, no houses or construction will be allowed in that area.

Table 3.3 provides a summary of the potential land easement during construction and operation assuming different working strips.

**Table 3.3 Project Land Easement during Construction**

<table>
<thead>
<tr>
<th>Project component</th>
<th>Width (m)</th>
<th>Land easement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular working strip (0.85 km)</td>
<td>38 m</td>
<td>3.23 ha</td>
</tr>
<tr>
<td>Temporary land easement</td>
<td>outside the PPS</td>
<td>2.53 ha</td>
</tr>
<tr>
<td>Permanent easement</td>
<td>PPS (8 m)</td>
<td>0.7 ha</td>
</tr>
</tbody>
</table>

Source: ERM, 2017

A safety zone, where the construction of new third party structures along the pipeline, will be restricted to a safety zone of 40 m (i.e. 20 m from each side of the pipe centreline), however, it will be possible to re-build greenhouses in this zone following pipeline construction. Construction of clusters of houses will not be allowed in a strip of 200 m either sides of the pipe centerline (400 m strip).

3.4.9.2. **Materials and fuel usage during construction**

During construction of the re-route the following raw materials are expected to be used: aggregate, steel, concrete, coating and sand. The following table summarises the materials and fuel usage estimations for the re-route.

**Table 3.4 Raw Material Requirements**

<table>
<thead>
<tr>
<th>Raw Material</th>
<th>Re-route</th>
<th>Complete route (215 km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregate</td>
<td>2550</td>
<td>3,000 m³/km</td>
</tr>
<tr>
<td>Steel</td>
<td>550 t</td>
<td>140,000 t</td>
</tr>
<tr>
<td>Concrete</td>
<td>16 t</td>
<td>4,000 t</td>
</tr>
<tr>
<td>Coating</td>
<td>10 t</td>
<td>2,500 t</td>
</tr>
</tbody>
</table>
In order to avoid any damage to the pipeline coating, the padding material will consist of well graded, round aggregate material with an estimated volume of approximately 3,000 m³/km of pipeline route. If the excavated material from the trench is suitable (e.g. sandstone) it will be recycled for bedding and padding.

Where excavation disturbs topsoil, the first layer of excavated material (topsoil) will be stored separately so that it can be replaced on the surface when the Right of Way is reinstated.

Heavy equipment and motor engine driven equipment in use during the construction phase will be fuelled with diesel. Diesel fuel will be delivered via approved fuel road tankers.

An estimated consumption of 630 m³ of fuel has been estimated for equipment and vehicles.

3.4.9.3. Water consumption

The foreseen water consumption during construction phase is related primarily to the watering of the construction sites to reduce dust emissions due to earthmoving activities and for civilian uses. In the pre-commissioning phase water usage is related to the hydrotesting activities. At the beginning the civil water is typically sourced by the municipality (using tankers). Later on, water is typically sourced through on-site water wells. Water for dust suppression and hyrdotesting will be taken from permitted surface water bodies.

The following table shows the estimated water consumption during the construction activities

<table>
<thead>
<tr>
<th>Typology</th>
<th>Quantity</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil water</td>
<td>Max 4.8 m³/day</td>
<td>60 l/person per day and a maximum of 80 people</td>
</tr>
<tr>
<td>Industrial water (1)</td>
<td>35 m³/day</td>
<td>Working strip humidification (1 tanker/day -35m³)</td>
</tr>
<tr>
<td>Industrial water (2)</td>
<td>-</td>
<td>Hydrotesting (refer to Section 3.4.6)</td>
</tr>
</tbody>
</table>

(1) It should be noted that water requirements can be very variable depending on the specific site conditions (season/weather, protection from sun & wind, distance from receptors….). Thus this estimate is provided as a reference.

(2) Hydrotest can be 0 if water can be recycled from previous/adjacent hydrotest section, which is actually the expected scenario in most cases.

Source: ERM, 2017 (based on TAP ESIA, 2012)

3.4.9.4. Air emissions

During the construction activities, the air emission will be earth dust particles from soil movement, and pollutants from the exhausts of heavy equipment and vehicles. The earth dust will be produced during the excavation and backfilling activities and the earthworks related to the worksites. Other sources of dust emission will be the traffic movements, on the Working Strip, of trucks, minivans and heavy equipment. Pollutants will be produced by heavy equipment due to the fuel combustion in their engines, and released in the exhausted gas. The main pollutants produced will be NOx, CO, dust and SOx.
3.4.9.5. **Noise emissions**

Typical noise emissions generated by heavy construction equipment at the working strip and worksites are listed in Table 3.6. The reported pressure noise levels at 1 metre from the source are typical for the considered equipment.

**Table 3.6** Typical Noise Levels for Construction Equipment

<table>
<thead>
<tr>
<th>Type of Equipment</th>
<th>Power Noise Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavator</td>
<td>70 - 84 dBA</td>
</tr>
<tr>
<td>Backhoe loader</td>
<td>70 - 84 dBA</td>
</tr>
<tr>
<td>Crane</td>
<td>70 - 84 dBA</td>
</tr>
<tr>
<td>Pipelayer</td>
<td>70 dBA</td>
</tr>
<tr>
<td>Side-boom</td>
<td>84 – 99 dBA</td>
</tr>
<tr>
<td>Pipe bending machine</td>
<td>60 dBA</td>
</tr>
<tr>
<td>Engine generator</td>
<td>70 - 84 dBA</td>
</tr>
<tr>
<td>Pay-welder</td>
<td>70 - 84 dBA</td>
</tr>
</tbody>
</table>

*Source: TAP ESIA, 2012*

During the pre-commissioning phase, the main noise sources are compressors and pumps foreseen for the hydrotesting activities. The typical pressure noise levels at 1 metre from the source are typical for the considered equipment and are shown in the following Table 3.7.

**Table 3.7** Typical Noise Levels for Pre-commissioning Equipment

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Power Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine driven pump</td>
<td>84 - 99 dBA</td>
</tr>
<tr>
<td>Engine driven compressors</td>
<td>90 - 115 dBA</td>
</tr>
</tbody>
</table>

*Source: TAP ESIA, 2012*

3.4.9.6. **Liquid and Solid Waste Generation, Handling and Disposal**

Waste management will be carried out closely in line with the legal framework and under consideration of international best practice principles. Waste management practices for the re-route will follow the strategy described in the TAP Albania ESIA (refer to Section 4.9.7). As such, companies certified by the relevant authorities (Ministry of Environment Forestry and Water Administration) will be used for transportation, recycling and disposal of waste.

Most of the excavated soil will be used to backfill the pipeline trench and re-contour the pipeline RoW as much as possible. Excess natural material will be disposed in permitted sites agreed with Municipal Authorities. Since the re-route will use the workers camp established for the larger TAP Albania Project, wastewater and solid waste generated at the camps have not been considered in this Addendum.

Waste generated during construction of the re-route is likely to be classified into four categories for disposal as summarised in Table 3.8. Detailed lists of the types of waste are shown in Table 3.9 and Table 3.10.
Table 3.8  Categories of Waste Generated During Construction

<table>
<thead>
<tr>
<th>Inert</th>
<th>Domestic</th>
<th>Oily and Hazardous</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>These will include: earth (not including excavated material, which is destined to be backfilled when the area is restored), building rubble, unused construction material etc generated during preparation and restoration of worksites. These wastes pose no risk of pollution, but may be unsightly and need to be disposed of at a controlled disposal site.</td>
<td>The offices and administration buildings associated with the worksites (as well as the workers’ camps) will generate amounts of ‘domestic’ types of waste (i.e., food waste, paper and packaging etc.). This will be transported to a controlled municipal waste disposal site.</td>
<td>These will include: the oily wastes associated with vehicle maintenance (waste oil, material collected from waste water interceptors etc); unused or waste chemicals, paints and solvents; materials excavated from contaminated sites (if any); and, any other wastes, sludge or debris that are unsuitable for disposal in a municipal type landfill. Such wastes will be segregated for collection and disposal by specialist contractors at sites that are equipped and approved for such wastes.</td>
<td>These will include: Hydrotest water from the pipelines; “Black” and “grey” water from construction and operation camps; Hazardous liquid wastes (e.g., oils, solvents etc); Rainwater runoff from sealed surfaces and roofs; and Tunnelling machines cooling water.</td>
</tr>
</tbody>
</table>

Source: Preliminary Logistics Study Albania – Update APL00-ILF-100-F-TRP-0002. Rev.: 0D (7th December 2011)

Table 3.9 describes typical waste types generated by the Construction of the Pipeline. The re-route, provided it is a short section (850 m), involves only a small amount of waste when compared to the complete pipeline spread or the TAP Project.

At the moment of writing this document the specific plans and procedures for waste management are already in place and are applicable to the wastes generated during the re-route construction. A short summary of management and disposal is summarized within Table 3.9.

Table 3.9  Typical Wastes Generated during the Construction of the Pipeline

<table>
<thead>
<tr>
<th>Activity</th>
<th>Waste Generation</th>
<th>Disposal Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working width preparation</td>
<td>Hedges, timber, vegetation, fence posts, wire etc.</td>
<td>Reuse during reinstatement of dispose in accordance with applicable legislation</td>
</tr>
<tr>
<td>Pipe-string and bending</td>
<td>Pipe-bands and end caps.</td>
<td>Collect and send to licensed waste disposal or recycling site.</td>
</tr>
<tr>
<td>Welding, testing and coating</td>
<td>Spent welding rods, grinding wheels, visors, shot-blast.</td>
<td>Collect and send to licensed waste disposal site.</td>
</tr>
<tr>
<td>Trenching, lowering and laying of the onshore pipeline</td>
<td>Soil and rock</td>
<td>Set aside to be used in backfilling. Excess quantities reused or disposed in approved natural material disposal sites.</td>
</tr>
<tr>
<td>Trenching of the offshore pipeline</td>
<td>Soil and rock</td>
<td>Set aside to be used in backfilling or send to licensed waste disposal site</td>
</tr>
<tr>
<td>Reinstatement</td>
<td>Temporary stone roads. Temporary fencing, gates, trenches etc.</td>
<td>Re-use elsewhere within landholding.</td>
</tr>
<tr>
<td>Re-use if possible.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trenchless Crossing boring</td>
<td>Spoil and rock cuttings.</td>
<td>Store in pits, then reused or disposed in accordance with approved procedures and/or in approved natural material disposal sites.</td>
</tr>
<tr>
<td>Mess huts, miscellaneous, etc</td>
<td>Canteen refuse, safety equipment etc.</td>
<td>Incinerate or collect and send to licensed waste disposal site.</td>
</tr>
</tbody>
</table>

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Activity | Waste Generation | Disposal Recommendation
--- | --- | ---
Mobile site toilets | Sewage. | Disposal by appointed waste management contractor.

*Source: Spiecapag (based on TAP ESIA, 2012), 2017*

Table 3.10 describes the Construction Waste Inventory for the Orizaj Re-route. There are no relevant differences in length between the proposed re-route and the TAP pipeline section being re-routed. Therefore the quantities of waste produced for the construction are considered comparable and small when compared to the total waste produced for the complete TAP project.

**Table 3.10 Construction Waste Inventory**

<table>
<thead>
<tr>
<th>Waste Type</th>
<th>Hazardous</th>
<th>Chemicals (Hazardous)</th>
<th>Diesel, Fuel and Oil Wastes (Hazardous)</th>
<th>Non Hazardous</th>
<th>Inert (Non-hazardous)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NDT waste</td>
<td>Batteries Wet Batteries Dry</td>
<td>Adhesives</td>
<td>Glycols</td>
<td>Diesel generator lube oil</td>
<td>Light bulbs</td>
</tr>
<tr>
<td>Rags and oil absorbents</td>
<td>Activated carbon</td>
<td>General Chemicals</td>
<td>Solvents</td>
<td>Misc oils (incl hydraulic)</td>
<td>Medical</td>
</tr>
<tr>
<td>Pipeline coating chemicals</td>
<td>Cables/copper</td>
<td>Freighting foam</td>
<td>Hydro test fluids</td>
<td>Vehicle &amp; equip lube oil</td>
<td>Paint sludge</td>
</tr>
<tr>
<td>Aerosol cans</td>
<td></td>
<td></td>
<td></td>
<td>Glycol sludge</td>
<td>Paint and cans/brushes</td>
</tr>
<tr>
<td>Paper and card</td>
<td>Welding materials</td>
<td>Plastic bottles</td>
<td>Aluminium cans</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>Pipe-bands and end caps</td>
<td>Wood</td>
<td>Plastic 'epoxy' drums</td>
<td>Electrical/electronic comps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plastic bottles</td>
<td></td>
<td>Polystyrene</td>
<td>Filters (water)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plastic 'epoxy' drums</td>
<td></td>
<td>PPE and clothing</td>
<td>Food</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polystyrene</td>
<td></td>
<td>Concrete/foundations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPE and clothing</td>
<td></td>
<td>Concrete/foundations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete/foundations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Spiecapag (based on TAP ESIA, 2012), 2017*
3.5. ORIZAJ RE-ROUTE OPERATION AND MAINTENANCE

The re-route constitutes a small but integral portion of the TAP pipeline and therefore once commissioned the re-route will be subject to the operation and maintenance defined for the entire TAP pipeline.

The re-route does not include any BVS (Block Valve Station) or CS (compressor Station) and therefore operation and maintenance will be limited to (1) the pipeline internal inspection, which will be operated from the CS and (2) the monitoring and maintenance of safety permanent restrictions, which are summarized below:

- A permanent Pipeline Protection Strip (PPS) with a width of 8 m (i.e. 4 m either side of the centreline). Farming of annual crops and associated shallow ploughing down to a maximum depth of 30 cm will be allowed, but cultivation of deep rooting system plants such as vineyards, fruit trees, or any other bushes or trees will be restricted. Similarly, no houses or construction will be allowed. The PPS will also ensure that access is available for inspection of the pipeline and for pipeline maintenance at any time.

- A Safety Zone with a width of 40 m (i.e. a 20 m wide strip each side of the pipe centreline) where the construction of new third party structures along the pipeline will be restricted. However, it will be possible to re-build greenhouses or irrigation pump houses in this zone following pipeline construction.

- An Enlarged Safety Zone with a width of 400 m (i.e. a 200 m wide strip both sides of the pipe centreline) where the establishment of new clusters of houses and/or industrial infrastructure will be restricted (i.e. no facilities >100 people and no dwelling clusters >300 people).

4. BASELINE CONDITIONS

4.1. OVERVIEW

4.1.1. Environmental Baseline Overview

The environmental baseline for this report has been prepared based on the information gathered through a field survey (December 2016), the review of environmental data collected for the TAP ESIA Albania report (2013) and the additional ecological surveys performed by TAP during the post ESIA investigations. The criteria used to assess the sensitivity and importance of environmental resources and receptors in the ESIA is also used in the ESIA Addendum for consistency.

The environmental study area established for the TAP ESIA Albania consisted of a 500 m corridor centered on the 2012 base case route and a 500 m area from the boundary of all Project components. In addition, the study area was expanded in certain locations where mobile species of concern (e.g. bears, wolves, and certain bird species) are likely to be present, associated with a protected area, or may use other habitat in the wider area which may be directly or indirectly affected by Project activities. Section 6.5 of the TAP ESIA Albania report contains a summary of the environmental baseline data for the entire pipeline route in Albania (at the time of reporting) collected through desktop and field studies. The baseline data focused on habitat types, species present and
protected and designated areas. *Annex 4.1, 4.2 and 4.3* of the TAP ESIA Albania report contains maps of environmental field survey findings identified during the ESIA baseline study.

In 2015, TAP commissioned a series of surveys focusing on specific flora and fauna taxa along the entire pipeline route. When relevant data from any of these surveys reports was found within the study area of the re-route, data was integrated in the baseline and only the relevant reports cited. Specifically the following survey reports have been reviewed:

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Document Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic habitat and fish survey: Albania, 2015</td>
<td>AAL00-RSK-641-Y-TRS-0001</td>
</tr>
<tr>
<td>Bat surveys: Albania, 2015</td>
<td>AAL00-RSK-641-Y-TRS-0002</td>
</tr>
<tr>
<td>Migrating and breeding bird surveys: Albania, 2015</td>
<td>AAL00-RSK-641-Y-TRS-0003</td>
</tr>
<tr>
<td>Otter survey: impact assessment and recommended mitigation measures – Albania, 2015</td>
<td>AAL00-RSK-641-Y-TRS-0004</td>
</tr>
<tr>
<td>Albania flora survey report</td>
<td>AAL00-RSK-641-Y-TRS-0005</td>
</tr>
<tr>
<td>Large carnivore surveys: Albania, 2015</td>
<td>AAL00-RSK-641-Y-TRS-0006</td>
</tr>
<tr>
<td>Albania Environmental Method Statement for amphibians and Reptiles</td>
<td>AAL00-RSK-641-Y-TPK-0002</td>
</tr>
</tbody>
</table>

As stated above, for this report an additional field survey was conducted (December 2016) along the proposed new centerline section. The main objective was to walk / ground-truth the complete proposed re-route and also to describe the environmental features of the surroundings (i.e. to confirm if, as expected, these were equivalent to the type of features identified and evaluated in the TAP ESIA Albania). The environmental component of the field survey was performed by a local Albanian environmental expert under the direction of an ERM field team leader.

A baseline description is provided in *Section 4.2.1*. Large scale maps of the baseline features are provided in *Annex 2*, accompanying with detailed field survey findings and datasheets given in *Annex 1* and field survey notes presented in *Annex 3*.

The importance of habitats and species are assessed using the criteria developed for the TAP ESIA Albania report which were based on Albanian national law and international standards/ agreements (refer to *Annex 5.2.3* of the TAP ESIA Albania report for details of criteria used).

4.1.2. Socioeconomic Baseline Overview

The socioeconomic baseline for this report has been developed based on a field survey conducted in December 2016 in the study area and a review of socioeconomic data collected for the TAP ESIA Albania report (2013). The same study parameters and criteria for assessing the sensitivity and importance of socioeconomic resources and human receptors in the TAP ESIA Albania report are also used in this report.

The socioeconomic study area established for the TAP ESIA Albania consisted of a 2 km corridor centered on the 2012 base case route. *Section 6.6* of the TAP ESIA Albania report contains a summary of the socioeconomic baseline data for the entire pipeline route collected through desktop and field studies. The baseline data focused on describing the demographics, settlement patterns,
economy, livelihoods, land uses, infrastructure, public services and vulnerabilities. Annex 6.3.1 of the TAP ESIA Albania report contains detailed settlement maps of the socioeconomic findings identified during the TAP ESIA Albania report baseline study, as well as the results of the settlement profiling completed during the field surveys.

Information presented in the TAP ESIA Albania was gathered from secondary sources using publicly available information. Data presented for the different elements of socioeconomic study areas was gathered during three visits conducted in June 2011, September 2011 and July 2012. The field work undertaken in June and September 2011 in the study area included a settlement survey, a household survey, key informant interviews and focus group meetings encompassing the settlements within the 2 km corridor along the pipeline route. Subsequent field surveys in July 2012 included an additional settlement survey, key informant interviews, and ground truthing of new settlements that had entered into the study area since the 2011 baseline surveys (see Section 6.6 of the TAP ESIA Albania 2013).

As noted above, for this report an additional field survey has been carried out along the proposed new centerline section (December 2016). The socioeconomic study area established in this case consists in a 1 km corridor centered on the proposed re-route alignment (500 m on each side of the re-route). The main objective was to walk/ground-truth the complete proposed re-route and to identify the main sensitivities with regards to socioeconomic features (i.e. to confirm if, as expected, these were equivalent to the type of features identified and evaluated in the TAP ESIA Albania). The socioeconomic components of the survey were performed by an ERM consultant with extensive experience in performing field surveys for the TAP Project in Albania. A baseline description is provided in Section 4.2.2, where Figure 4.4 shows the socioeconomic study area for this report along with the location of the socioeconomic waypoints taken during the December 2016 field survey. Large scale maps of the baseline features are provided in Annex 1, accompanied with detailed field survey findings and datasheets given in Annex 2 and field survey notes presented in Annex 3.

4.1.3. Cultural Heritage Baseline Overview

The cultural heritage study area established for the TAP ESIA Albania consisted of a 2 km wide corridor on the 2012 base case route and a 50 m buffer area around all Project components outside the 2 km corridor along the pipeline. Section 6.7 of the TAP ESIA Report contains a description of the desktop studies and field studies conducted to collect the cultural heritage baseline data and a summary of the baseline data collected for the entire TAP Albania pipeline route. The types of cultural heritage resources considered in the TAP ESIA Albania report and this baseline chapter are presented in Table 4.1.
Table 4.1  Cultural Heritage Resource Types

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archaeological sites</td>
<td>The physical remains of ancient or historic human activity or occupation, most often including subsurface resources, and often indicated by the presence of surface artefacts or structural remains. These include ancient cist or tumulus graves, ancient settlements, and surface ceramic scatters, among others.</td>
</tr>
<tr>
<td>Monuments</td>
<td>Above-ground structures of public interest and/or historical significance such as historic churches, bridges, war memorials, and WWII era military facilities, among others.</td>
</tr>
<tr>
<td>Intangible Cultural Heritage (ICH)</td>
<td>Defined as sites that form part of the spiritual or cultural lives of modern populations such as roadside shrines, places of worship, and modern cemeteries, among others. Intangible cultural heritage (ICH) refers to customs, traditions and beliefs that make a people or a region distinctive and socially cohesive. Sites with ICH value often include the traditional forms of cultural heritage such as historic monuments, archaeological sites, and historic landscapes, but they may also include natural features such as flora, fauna and particular ecological zones.</td>
</tr>
</tbody>
</table>

Source: ERM, 2016

Albania is an archaeologically and historically rich country, with vestiges of both prehistoric indigenous cultures as well foreign imperial influences including the Greek, Roman, Byzantine, Ottoman and Austro-Hungarian empires. The cultural heritage baseline conducted for the TAP ESIA Albania identified cultural heritage sites within the study area dating from the Paleolithic Period through the twentieth century. An extensive review of Albania’s prehistory and history can be found in Annex 6.4 of the TAP ESIA Albania report. This review contains definitions and defining characteristics of the prehistoric and historic periods referenced in this report.

In addition to these types of cultural heritage resources, the TAP ESIA Albania desktop and field surveys identified a number of Areas of High Archaeological Potential (AHAPs). These consisted of areas around known cultural heritage resources likely to contain associated, but as yet undiscovered, resources. The Albanian archaeologists also identified AHAPs in areas that were likely to contain undiscovered archaeological resources based on a combination of geographic features (topography, proximity to water, etc.) and professional judgement. Annex 4.6 contains maps depicting the location of the cultural heritage resources and AHAPs identified during the TAP ESIA Albania report baseline study.

In order to assess the significance of impacts to cultural heritage resources for the TAP ESIA Albania, criteria were established for assessing the importance of the cultural heritage resources identified in the study area. Importance ratings were developed for each type of cultural heritage resource based on Albanian national law and international standards (Table 4.2).
Table 4.2  Cultural Heritage Site Importance / Quality Criteria

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archaeological Site</td>
<td>Limited informational value and/or cultural significance based on content and condition of site.</td>
<td>Moderate informational value and/or cultural significance based on content and condition of site.</td>
<td>High informational value and/or cultural significance based on content and condition of site.</td>
</tr>
<tr>
<td>Historic Monument</td>
<td>Limited visual, commemorative or art historical interest based on architectural style or degree of preservation.</td>
<td>Moderate visual, commemorative or art historical interest based on architectural style or degree of preservation.</td>
<td>High visual, commemorative or art historical interest based on architectural style or degree of preservation.</td>
</tr>
<tr>
<td>Intangible Heritage Sites</td>
<td>Limited cultural or religious significance to site users based on user criteria.</td>
<td>Moderate cultural or religious significance to site users based on user criteria.</td>
<td>High cultural or religious significance to site users based on user criteria.</td>
</tr>
</tbody>
</table>

Source: ERM, 2011

The cultural heritage baseline for this report was developed through a field survey conducted in December 2016 in the new Project footprint area and through a review of cultural heritage resource data collected for the TAP ESIA Albania report. The survey consisted of rapid site investigations of the proposed Project footprint cultural heritage elements and their immediate vicinity, and was conducted to ground truth or amend desktop findings. The investigations of cultural heritage components were performed by a local Albanian archaeologist under the direction of an ERM field team leader.

In order to maintain a consistent approach to baseline data collection and assessing potential impacts to cultural heritage resources, the same study area parameters and criteria for assessing the importance of cultural heritage resources used in the TAP ESIA Albania report are also used in this report.

4.2. ORIZAJ RE-ROUTE

4.2.1. Environmental Baseline

The Orizaj re-route is predominantly rural in nature and relatively undeveloped, where local livelihoods are mostly related to agriculture, rearing of livestock and firewood. The airshed in this area is thus considered not being significantly degraded as this is a rural area without significant sources of air pollution, being the presence of the road the most relevant one. The 2013 ESIA modelled air quality data from the EEA Interpolation dataset (Section 6.4.1.4 of the 2013 ESIA), having noted that low levels of expected NOx and SO2 concentrations are directly related to the absence of important air pollution sources in these rural areas. The same applies to existing noise levels (Section 6.4.2 of the 2013 ESIA), where due to the rural nature of the area and the activities conducted wherein background noise levels are relatively low, being the vehicles along the road the most important noise source.

The baseline survey undertaken for the pipeline re-route (approximately 0.85 km in length\(^1\)) in the Orizaj area found that the new alignment starts on a mosaic of agricultural land in the vicinity of the

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\(^1\) Pipeline re-route lengths are estimated in 2D.
settlement/quarter of Orizaj, after which it then runs for approximately 500 m parallel to the Osumi River along a flat riverbank (KP 0.1 – 0.5) covered with riparian vegetation corresponding to *Platanus orientalis* and *Liquidambar orientalis* woods (EU 92CO); to finally end across a mosaic of arable land (crop fields, orchards, vineyards) until it reaches the baseline route of the pipeline. Between KP 0.0 – 0.1 the Orizaj re-route crosses two small creeks, the eastern one descending from the Strora village with a watershed area of 2.77 km². Within 0-100 m to the North of the pipeline re-route, *Quercus ilex* forests (EU 9340) comprising of Mediterranean evergreen maquis shrubs are found – see Figure 4.1 and Table 4.3. Figure 4.1 also shows where Environmental Waypoints (WPE) were taken, and observations made, during the field survey (refer to Annex 2 for the corresponding field survey notes).

**Figure 4.1** Environmental Survey Coverage of the Orizaj Re-route

Note: Environmental Waypoints (WPE) identify where an observation or note was recorded during the field survey. WPE do not necessarily indicate a baseline sensitivity or key finding.

Source: ERM, 2017
Table 4.3  Summary of European Habitats Crossed by Orizaj Re-route

<table>
<thead>
<tr>
<th>No.</th>
<th>Habitat Code</th>
<th>Habitat</th>
<th>Re-route Chainage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>92CO</td>
<td><em>Platanus orientalis</em> and <em>Liquidambar orientalis</em> woods (Platanion orientalis; degraded)</td>
<td>KP 0.1 – 0.5</td>
</tr>
<tr>
<td>2</td>
<td>9340</td>
<td><em>Quercus ilex</em> forests (degradation stage as shrubs or maquis)</td>
<td>Expected to be marginally affected by working strip.</td>
</tr>
</tbody>
</table>

Source: ERM, 2017

The first 500 m of the riparian vegetation along the Osumi River is dominated by *Platanus orientalis* and *Salix* sp with the intrusion of maquis vegetation elements, such as *Pistacia lentiscus* and *Phyllirea latifolia*. The oldest trees of the oriental plane were found to be dead in many cases, and therefore the quality of the riparian habitat is low. The Aquatic Habitat and Fish survey (2015) confirmed at survey site RC5 (approximately 1 km downstream of the area where a river crossing is foreseen) the presence of greater diversity of riparian vegetation higher up the riverbanks, dominated by *P. orientalis* and the small flower tamarix (*Tamarix parviflora*); whilst bankside vegetation was sparse and consisted mainly of patches of horsetail (*Equisetum hyemale* and *Equisetum arvense*) and common water moss (*Fontinalis antipyretica*). The mosaic of agricultural land and crop fields with annual and perennial crops found at the start and end of the re-route are of low ecological value (Figure 4.2), although they may attract some fauna species such as badger (*Meles meles*) and red fox (*Vulpes vulpes*) for feeding. Fruit trees and annual and perennial crops serve as feeding and breeding ground for many passerine birds. Riparian vegetation plants provide shelter for otters, other mammals, and birds. Based on the 2015 Flora surveys along the original basecase route, other Red Data Book/Protected species that may be potentially present along/adjacent to the re-route include: Joint pine (*Ephedra distachya*), Black Walnut (*Juglans regia*), Wild majoram (*Origanum vulgare*), Holm oak (*Quercus ilex*), Male-fern (*Dryopteris filix-mas*), Common elder (*Sambucus nigra*) and Maidenhair fern (*Adiantum capillusveneris*). The Mediterranean evergreen shrubs found to the north are heavily impacted by grazing, chopping and fire. However, the thick and dense maquis, provide shelter and feeding for a number of fauna species, and the reportedly occasional presence of the wolf (*Canis lupus*) makes the habitat to be considered of medium ecological value.

Figure 4.2  Habitat/Flora Photos of Environmental Survey of the Orizaj re-route
All the habitats described above, present along the pipeline re-route, are considered to be of low sensitivity except for the *Quercus ilex* forest located adjacent to the north, which is of medium sensitivity (Table 4.4).
Fauna species expected to be present in the area are equivalent to those defined in the TAP ESIA Albania (detailed lists and evaluation criteria can be found in Annex 6.2.1.2 of the TAP ESIA). The most relevant species identified for the area include wolf (*Canis lupus*), Hermann’s tortoise (*Testudo hermannii*), Yellow-bellied toad (*Bombina variegata*), Greek stream frog (*Rana graeca*) and Balkan frog (*Pelophylax kurtmuelleri*). An assessment of their importance, following the ESIA importance / sensitivity criteria is presented in Table 4.5.

Although direct observation of wolf presence was not recorded during the field survey, anecdotal evidence from local shepherds has indicated its presence according to the 2013 report. The Aquatic Habitat and Fish survey in 2015 found that the most abundant species in the area was the endemic Osum Riffle Minnow (*Alburnoides fangfanga*), other species of interest found was the also endemic Pindus Stone Loach (*Oxynoemacheilus pindus*) but in lower numbers.

In addition to the species of conservation concern detailed above, the otter (*Lutra lutra*) is known to be present in the Osumi River, and although no dens or holts were observed during the survey, otter sprainting activity along this section was observed to be high (i.e. 3 sprainting sites and 6 spraints found; Figure 4.3). The otter is expected to be found at least seasonally for commuting and foraging, and its presence was confirmed by previous investigations conducted during the ESIA process as well as the post ESIA (2015) otter surveys upstream and downstream from the re-route section.

---

**Table 4.4 Quality of Habitats Present within the 1 km corridor (500+500 m) of Orizaj Re-route**

<table>
<thead>
<tr>
<th>Re-route Chainage</th>
<th>Habitat Type</th>
<th>Relevant Habitat Quality Criteria²</th>
<th>Habitat Quality Assessment (Sensitivity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KP 0 – 0.1</td>
<td>Complex cultivation</td>
<td>L L L L M M M</td>
<td>Low</td>
</tr>
<tr>
<td>KP 0.5 – 0.85</td>
<td>Quercus ilex forests (degradation stage as shrubs or maquis)</td>
<td>L L M M M M</td>
<td>Medium</td>
</tr>
<tr>
<td>KP 0.1 – 0.5</td>
<td>Riparian habitats dominated by oriental plane (<em>Platanus orientalis</em>) and willow trees (<em>Salix spp.</em>)</td>
<td>L L L L L M M</td>
<td>Low</td>
</tr>
</tbody>
</table>

*Source: ERM, 2017*

---

² Refer to Section 8.5.1 in Annex 8.1 of the TAP Albania ESIA report - Habitat assessment criteria (as per EBRD criteria) - : (1) Protection status; (2) Naturalness; (3) Fragility; (4) Representativeness; (5) Structure and function; (6) Species association – reliance; (7) Diversity.; (L: Low, M:Medium, H: High).

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Table 4.5  Importance of Species Present within the 1 km corridor (500+500 m) of the Orizaj Re-route\(^3\)

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Latin Name</th>
<th>Relevant Species Importance Criteria(^4)</th>
<th>Species Quality Assessment (Importance)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Wolf</td>
<td>Canis lupus</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Otter</td>
<td>Lutra lutra</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Wild boar</td>
<td>Sus scrofa</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>Badger</td>
<td>Meles meles</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Beech marten</td>
<td>Martes foina</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>Red fox</td>
<td>Vulpes vulpes</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>Thomas’ pine vole</td>
<td>Microtus thomasi</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Common buzzard</td>
<td>Buteo buteo</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Common kestrel</td>
<td>Falco tinnunculus</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Passerine birds</td>
<td>Order: Passeriformes</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>European Green Lizard</td>
<td>Lacerta viridis</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>Common Wall Lizard</td>
<td>Podarcis muralis</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Slow Worm</td>
<td>Anguis fragilis</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Hermann’s tortoise</td>
<td>Testudo hermanni</td>
<td>M</td>
<td>HL</td>
</tr>
<tr>
<td>Yellow-bellied toad</td>
<td>Bombina variegata</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Greek stream frog</td>
<td>Rana graeca</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>Balkan frog</td>
<td>Pelophyllax kurtmuelleri</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Osum Riffle Minnow</td>
<td>Alburnoides fangfangae</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>Pindus Stone Loach</td>
<td>Oxynoemacheilus pindus</td>
<td>M</td>
<td>H</td>
</tr>
</tbody>
</table>

Source: ERM, 2017

\(^3\) Species listed are indicative based on desktop reviews and field survey observations. Other species may also be present in the area.

\(^4\) Refer to Section 5.2.3.2 in Annex 5 of TAP Albania ESIA Report for details on the Species Importance Criteria used in this assessment: (1) Protection status; (2) Conservation status; (3) Genetic diversity; (4) Ecosystem functioning / services; ; (L: Low, M:Medium, H: High).

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4.2.2. Socioeconomic Baseline

4.2.2.1. Study area and field survey coverage

As described in Section 3.3, the Orizaj re-route is located in the central western section of the pipeline route (between KP 113.000 and KP 114.200 on the 3D January 2016 base case route, equivalent to KP 110.700 – KP 110.800 in 2D chainage) and some 6 km north-west of Çorovodë in Skrapar Municipality (Berat Region) (see Figure 1.2).

The pipeline re-route is approximately 0.85 km in length. Figure 4.4 shows the socioeconomic study area of the Orizaj Re-route and the Social Waypoints (WPS) taken during the field survey (refer to Annex 3 for the corresponding field survey notes).
Figure 4.4  Socioeconomic Study Area and Survey Coverage of the Orizaj re-route

![Socioeconomic Study Area and Survey Coverage of the Orizaj re-route](image)

Note: Social Waypoints (WPS) identify where a social observation or note was recorded during the field survey. WPS do not necessarily indicate a social sensitivity or key finding.

Source: ERM, 2017

### 4.2.2.2. Municipal Overview

The study area is located in the region of Berat and in the municipality of Skrapar (see Figure 1.2), as per the July 2015 local government reform (which divided Albania in a total of 61 municipalities). Table 4.6 summarizes some information about the municipality.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Municipality of Skrapar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (source: INSTAT, 2011)</td>
<td>12,403</td>
</tr>
<tr>
<td>Surface (source: Administrative Territorial Reform)</td>
<td>831.44 km²</td>
</tr>
<tr>
<td>Population Density</td>
<td>15 / km² (National Average: 105 /Km²)</td>
</tr>
</tbody>
</table>

Source: INSTAT (2011); Reforma Administrative Territoriale (2015)

Since the end of the communist system in the 1990s, the population in the Municipality of Skrapar has decreased. This is a result of the withdrawal of government agricultural subsidies and the subsequent migration of people from rural to urban areas seeking new employment opportunities.
The population decrease in the region is estimated to be about 50%. The largest population losses can be seen in mountainous areas with poorly accessed isolated settlements.

The decrease in population has resulted in the land being worked less intensively, reduced irrigation, and an increase in pasture / meadows which require less effort to maintain. It is estimated that about 50% of the agricultural land worked during the communist period has now been turned into pasture / meadows. Although recently even some of these areas have been abandoned as the local population has decreased further.

The region is characterized by hilly / mountainous terrain, with forested areas being common on the steep slopes and in the more remote parts. In most of the cases, the forested areas are characterized by the Mediterranean maccia and by a mixed forest of oak and *Carpinus orientalis*. Both types of formations are associated with a degradation process, resulting from overgrazing, too much logging or natural degradation, such as fires. Since 2000, forested areas have been afforded some protection through regulatory measures. As a result of these geographic factors, including whether the settlement is located in a mountainous or lowland area, accessibility and distance from a larger population center, the municipality of Skrapar is primarily composed of small settlements with the exception of larger population centers such as Çorovodë.

Land use in the municipality of Skrapar is therefore characterized by mainly grassland for pasture, small areas of seasonal crops close to the settlements and some small areas of perennial crops mainly vineyards and olive trees. The pasture / meadows are used for grazing livestock (sheep and goats); a practice that has increased so much in certain areas that overgrazing has occurred. Livestock associated products, such as cheese (feta and caccaval), are important for the local economy.

Mixed crop production is the main economic activity in the municipality followed by animal husbandry. Currently, agriculture activity in the municipality of Skrapar is characterized by the most profitable crops: fruit trees (vineyards, cherry, apple, etc.) that have a high commercial value, followed by crops produced for self-consumption and fodder, such as alfalfa, corn, wheat, and vegetables. Raki, a traditional alcoholic drink, is commonly produced in these areas.

4.2.2.3. **Infrastructures and Settlements**

The closest settlements to the re-route are Orizaj and Buzuk, located 600 m east and 900 m south of the re-route respectively. In addition, as stated above, the pipeline re-route is located at about 6 km northwest of the city of Çorovodë. All these settlements belong to the municipality of Skrapar (since the local government reform in July 2015). The socioeconomic characteristics of the area through which the re-route passes are typical for the region (as reported in the TAP ESIA Albania): ageing population, declining birth rates and high migration, resulting in an overall decrease in population numbers. With a population of 361 and 345 inhabitants (INSTAT 2008) respectively, Orizaj and Buzuk settlements are located on opposite sides of the Osumi River and on higher terrains. No residential buildings belonging to these settlements were found in the vicinity of the re-route.

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As shown in Figure 4.5 below, the re-route centerline runs parallel to the national road, just between the road and the Osumi River.

Figure 4.5 below show some of the infrastructure observed during the field survey.

**Figure 4.5 View of Orizaj re-route and infrastructure identified during field survey**

Source: ERM, 2017 (modified Google Earth view)

*Note: the red line represents the January 2016 base case. The blue line shows the proposed re-route.*

A summary of the infrastructure observed nearby the pipeline re-route is provided below:

- National road from Berat to Çorovodë located just on the right side of the proposed re-route (KP 0 to KP 0.5).
- Several small unpaved paths providing access to the arable land and agricultural houses identified throughout the terrains crossed by the re-route.
- A small irrigation channel that runs parallel to the re-route for the first 500 m (KP 0 to KP 0.5), just along the left side of the national road. It continues afterwards to cross the arable lands located in the small plain towards the end of the re-route.
- High voltage electric transmission lines along the Osumi valley providing electricity to the different settlements found in the valley, from Berat to Çorovodë. These lines were also found...
along the re-route as well as several powerline towers running parallel to the national road and the Osumi River (WPS062).

- Two abandoned warehouses identified at the end of the proposed re-route where the centerline crosses with the base case pipeline around KP 0.85 km (WPS065). These warehouses date back to socialist times in the 1970s and were probably used for storage in the region. They are the only building infrastructure found along the re-route (Ref. Section 4.2.3 Cultural Heritage for more detail). It should be noted that the proposed re-route has increased the distance of these warehouses to the centerline from 20 m to 45 m. Figure 4.6 below provides a general view from the national road towards the east (WPS061-KP 0.25) and shows the irrigation channel located at the foot of the road batter, between the road and the riparian vegetation, which is crossed by the proposed re-route (left picture). The photo on the right (WPS062) shows a high voltage power line that the re-route crosses. The national road is located between the two power lines visible on the photo.

**Figure 4.6 Infrastructure identified along the Orizaj Re-route**

![Figure 4.6 Infrastructure identified along the Orizaj Re-route](source: ERM, 2017. Left photo: WPS061; Right photo: WPS062.)

### 4.2.2.4. Land and Livelihoods

The land use included in the 1 km study area corridor presents a combination of perennial crops (primarily fruit trees, olive trees and vineyards), arable land (either abandoned or used for seasonal/annual crops), grasslands, and terrains defined as riparian vegetation closer to the Osumi River. The re-route starts on the edge of agricultural land and runs for approximately 300 m (KP 0.0 to KP 0.3) on terrain primarily composed of riparian vegetation along the Osumi River, after which it reaches a mosaic of agricultural land and crop fields from KP 0.3 to KP 0.85 where it joins the base case pipeline route. Figure 4.7 shows the representative land uses found along the Orizaj re-route.

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Figure 4.7 Representative Land Uses in the Orizaj Re-route

The Osumi River is an important surface water resource running parallel to the re-route and is used for irrigation for the settlements in the area. With regards to groundwater resources, no relevant aquifers are found in the area, with the only exception of the Quaternary aquifer associated to the Osumi River, which runs near the pipeline re-route. This aquifer is expected to be found on the flat areas near the river, where agricultural fields are observed.

Livelihoods along the pipeline re-route are mostly related to the land and associated natural resources characterized by low levels of land ownership and a reliance on subsistence farming, including both perennial crops (fruit and olive trees and vineyards) and seasonal crops (corn, alfalfa, etc.) (TAP ESIA Albania Report, 2013). In addition, although no livestock was observed, grazing activity was also confirmed due to the signs found on several fields crossed by the centerline.

The agricultural land located within the re-route 1 km study area corridor represents a total area of approximately 44 ha (27% of total), of which approximately 9 ha are occupied by perennial crops (i.e. fruit trees, olive trees, and vineyards) which some are shown in Figure 4.8 below (WPS060, WPS063 and WPS064). Perennial crops therefore represent approximately 5% of the total surface area within the 1 km corridor. Figure 4.8 presents a large scale satellite image of the last portion of the re-route covered with a mosaic of agricultural land and some grassland. The figure identifies the areas of perennial crops identified along the re-route.
Figure 4.8  Perennial crops along the Orizaj Re-route

Source: ERM, 2017 (modified Google Earth view).

Note: the red line represents the January 2016 base case. The blue line shows the proposed re-route.

Photographs showing the areas of perennial crops identified during the field survey along Orizaj Re-route are presented in Figure 4.9 below.

Figure 4.9  Perennial crops along the Orizaj Re-route

Source: ERM, 2017. Left to right photos: WPS060; WPS063; and WPS064

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4.2.3. Cultural Heritage Baseline

The cultural heritage baseline surveys identified two cultural heritage resources within the 1 km re-route study area: CH-586 and WPC045 (see Figure 4.10). Figure 4.10 also shows the Cultural Heritage Waypoints (WPC) taken, and observations made, along the pipeline re-route during the field survey (refer to Annex 3 for the corresponding field survey notes).

CH-586 is a small family cemetery located approximately 50 m to north of the pipeline re-route at KP 113 (3D), close to the crossing with the national road (Figure 4.11). It was identified during a previous field survey (2015) in the area. The cemetery is located on a river terrace overlooking the floodplain and road and is separated from the proposed pipeline route by a small ravine.

The cemetery belongs to a local family, the Lisi Buzuq family, and appears to contain 5 individual graves of family members. The graves are marked by rectangular, stepped, white, slab stone monuments topped by headstones. The headstones are inscribed with information about the deceased. The cemetery and its immediate surroundings appear to be maintained by the Lisi Buzuq family, the monuments appeared to be clean and the grass and brush around them was cut. This suggests the site is still used to bury members of the family and/or visited or used by the family for religious or social events.

Figure 4.10 Orizaj Re-route Cultural Heritage Baseline

Source: ERM, 2017

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Figure 4.11  CH-586 Lisi Buzuq Family Cemetery

The data collected during the field survey indicates that CH-586 is used by the Lisi Buzuq family as a burial ground or for religious or social events and likely represents a significant cultural heritage site for the family. However, due to its small size the cemetery does not likely represent a significant cultural heritage resource for the larger community in the area. Due to its cultural significance for the Lisi Buzuq family and evidence that the site is actively used and/or maintained by stakeholders, the importance of site CH-586 has been assessed as moderate.

Site WPC045 was identified during the December 2016 field survey. The site consists of Socialist Period storage buildings likely built in the 1970s (Figure 4.12). The buildings served as government warehouses for the region. The buildings are located approximately 60 m from KP 114.2 (3D) on the Orizaj Re-route (Table 4.7). Based on the cultural heritage resource importance criteria established for the TAP ESIA, the local Albanian archaeologist determined that site WPC045 is a cultural heritage resource of moderate importance due to its level of preservation and significance in local history.
Figure 4.12  Socialistic period storage buildings - Site WPC045

![Image of Socialist period storage buildings - Site WPC045](image)


Table 4.7  Summary of Key Cultural Heritage Findings

<table>
<thead>
<tr>
<th>CH-#</th>
<th>Resource Type</th>
<th>Description</th>
<th>Distance to Vërzelha Re-route Pipeline Centreline (m) (*)</th>
<th>Site Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH-586</td>
<td>Monument/ICH Site</td>
<td>Lisi Buzuq Family Cemetery</td>
<td>50</td>
<td>Moderate</td>
</tr>
<tr>
<td>WPC045</td>
<td>Archaeological Site/Historic Monument</td>
<td>Socials Period warehouses</td>
<td>60</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

Note (*): CH sites included in the table are located within the 1 km corridor as per the definition of the CH study area (see Section 4.1.3).

Source: ERM, 2017

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5. ASSESSMENT OF IMPACTS

5.1. OVERVIEW

5.1.1. Environmental Impact Assessment Overview

In order to maintain a consistent approach to assess impact significance, the methodology used in this ESIA Addendum to assess the potential impact of the new footprint is the same as that used in the TAP ESIA Albania. A detailed description of the impact assessment methodology for environmental aspects can be found in Section 5 Baseline and Impact Assessment Methodology (ref: AAL00-ERM-641-Y-TAE-1007) of the ESIA report and supporting documents.

The assessment criteria used are also the same for habitat and species sensitivity, as detailed in Annex 5, Table 5.2-18 and Table 5.2-20 of the ESIA respectively, as well as the magnitude of impacts for habitats and species as listed in Annex 5, Box 5.2-2 and Box 5.2-3 of the ESIA respectively. In addition, the overall impact assessment matrix is the same for habitats and species as listed in Annex 5, Table 5.2-19 of the ESIA.

This methodology was developed following international standards and tailored specifically to this Project. The methodology is valid for the ESIA Addendum report.

5.1.2. Socioeconomic Impact Assessment Overview

Potential socioeconomic impacts may arise from any changes related to the Project that affect what is referred to as the livelihoods framework of individuals, households, communities or societies.

In order to maintain a consistent approach to assess impact significance, the methodology used in this ESIA Addendum to assess the potential impact of the new footprint is the same as that used in the TAP ESIA Albania (2013). A detailed description of the impact assessment methodology for socioeconomic aspects can be found in Section 5 Baseline and Impact Assessment Methodology (ref: AAL00-ERM-641-Y-TAE-1007) of the TAP ESIA (2013) report and supporting documents. The criteria for assessing (1) sensitivity of receptors, resources and vulnerability and (2) the magnitude of socioeconomic impacts is consistent with the approach defined in TAP ESIA (2013) and specifically presented in its Annex 5, Table 5.2.23, as well as in Annex 5, Box 5.2-2.

Similarly to the environmental impact assessment methodology, the socioeconomic methodology was developed following international standards and was tailored specifically to this Project and is valid for the ESIA Addendum report.

5.1.3. Cultural Heritage Impact Assessment Overview

In order to maintain a consistent approach to assess impact significance, the methodology used in this ESIA Addendum to assess the potential impact of the new footprint is the same as that used in the TAP ESIA Albania. A detailed description of the impact assessment methodology for cultural heritage can be found in Section 5 Baseline and Impact Assessment Methodology (ref: AAL00-ERM-641-Y-TAE-1007) of the ESIA report and supporting documents.
The TAP ESIA Albania identified key potential impacts to cultural heritage for the construction, operation, and decommissioning phases of the TAP Albania Project. This report assesses impacts to cultural heritage resources from the proposed new footprint. The following potential construction phase impacts, which were identified during the TAP ESIA Albania, have been determined to be applicable to this assessment:

- Direct physical disturbance of or damage to cultural heritage sites.
- Degradation of or damage to cultural heritage sites due to pollution or vibration.
- Blockage of user access to cultural heritage sites.
- Negative effects on the setting or ambiance of cultural heritage sites.

Section 8.20.2 of the TAP ESIA Albania contains a detailed description of each potential impact source. Summary information of the potential sources and aerial extent of these impacts are provided below, in Table 5.1.

**Table 5.1  Potential Project Cultural Heritage Impacts**

<table>
<thead>
<tr>
<th>Potential Impacts</th>
<th>Description</th>
<th>TAP ESIA Albania Impact Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct physical disturbance of or damage</td>
<td>Ground disturbing construction activities such as topsoil stripping, grading, and trench excavation.</td>
<td>Pipeline Corridor: 38 m wide regular working strip or 22 - 28 m wide reduced working strip. Access Roads: up to 17 m width of access road land-take.</td>
</tr>
<tr>
<td>Degradation of or damage to cultural heritage sites due to pollution or vibration</td>
<td>Vibration related damage to cultural heritage resources from blasting, pile driving, hammering, and vehicle traffic. Pollution related damage due to dust, soot, vehicle exhaust.</td>
<td>50 m area around all Project components.</td>
</tr>
<tr>
<td>Blockage of user access to cultural heritage sites</td>
<td>Temporarily or permanently blocking or restricting stakeholder access to cultural heritage resources due to construction zones, road closures, etc.</td>
<td>Varies based on the specific Project component location, associated no-go areas, and the type and location of the cultural heritage resource.</td>
</tr>
<tr>
<td>Negative effects on the setting or ambiance of cultural heritage sites</td>
<td>Temporary or permanent changes to the setting or ambiance of a cultural heritage site such as noise pollution, increased vehicle traffic, or permanent infrastructure that change to resource setting or modify the surrounding landscape.</td>
<td>Varies based on the specific Project component location and the type and location of the cultural heritage resource.</td>
</tr>
</tbody>
</table>

Source: ERM, 2017

The significance of these potential impacts to individual cultural heritage resources is assessed through an analysis of the magnitude of the potential impact and the sensitivity of the cultural heritage resource. A detailed description of this analytical method can be found in Section 8.20.2 of the TAP ESIA Albania, including the matrix to determine the significance of impacts (Table 8.20-2).

The TAP ESIA Albania presents a number of mitigation measures to reduce potential Project impacts to cultural heritage resources. Table 5.2 provides a list of the recommended mitigation measures for each of the potential types of Project impacts to cultural heritage resources. A more detailed
description of each potential mitigation measure is given in Section 8.20.3 of the TAP ESIA Albania. In all instances the preferred method for mitigating impacts to cultural heritage resources is avoidance.

Table 5.2 Cultural Heritage Impact Mitigation Measures

<table>
<thead>
<tr>
<th>Potential Impacts</th>
<th>Cultural Heritage Resource</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct physical disturbance of or damage</td>
<td>Archaeological Sites</td>
<td>Avoidance; site evaluations; site marking/protection with barriers; Chance Finds Procedure; instructions in worker’s Code of Conduct; archaeological rescue excavations; and reduced working strip.</td>
</tr>
<tr>
<td></td>
<td>Historic Monuments</td>
<td>Avoidance; relocation, replacement, or compensation; Site marking/protection with barriers; instructions in worker’s Code of Conduct; and reduced working strip.</td>
</tr>
<tr>
<td>Degradation of or damage to cultural heritage sites due to pollution or vibration</td>
<td>Archaeological Sites, Historic Monuments, and Intangible Heritage Sites</td>
<td>Avoidance; conditions and structural integrity assessments; pollution prevention plans/physical protection; structural reinforcement for vulnerable resources; condition and structural integrity monitoring; use of low impact construction methods; vibration minimizing techniques for road traffic; restricting work in wet conditions; and structure repair/conservation.</td>
</tr>
<tr>
<td>Blockage of user access to cultural heritage sites</td>
<td>Archaeological Sites, Historic Monuments, and Intangible Heritage Sites</td>
<td>Avoidance; stakeholder engagement to identify timing of site use; construction scheduling to avoid restricting access during peak periods of use; and providing alternative access routes.</td>
</tr>
<tr>
<td>Negative effects on the setting or ambiance of cultural heritage sites</td>
<td>Archaeological Sites, Historic Monuments, and Intangible Heritage Sites</td>
<td>Avoidance; stakeholder engagement to identify timing of site use; construction scheduling to avoid impacts to site ambiance/setting during site use; noise monitoring; and instructions in worker’s Code of Conduct.</td>
</tr>
</tbody>
</table>

Source: ERM, 2017

The significance of potential impacts is determined based on the criteria in the impact significance matrix (Table 8.20-2 of the TAP ESIA Albania report). It was estimated that residual impacts for non-avoidance mitigation decrease by one level from the original impact significance rating. For example, a medium importance archaeological site within the Project footprint (large magnitude impacts) would sustain an unmitigated impact of major significance. If the impact on the site was mitigated through archaeological rescue, however, a portion of the site’s scientific information could be recorded, reducing the impact rating from major to a moderate residual impact.

5.2. ORIZAJ RE-route

5.2.1. Environmental Impact Assessment

The potential impacts stated in the TAP ESIA Albania report are still applicable for this proposed pipeline re-route. Box 5.1 presents the key considerations applicable for the assessment conducted in this addendum report. The key impacts of the Project pipeline re-route on terrestrial ecology remain the same as those presented in Table 8.11-1 of the TAP ESIA Albania report.
Box 5.1    Pipeline Re-route – Environmental Key Considerations

Sources of Impacts

- Construction phase: Preparation of the working strip; Trench excavation and temporary storage of excavated material, Movements of vehicles, equipment and personnel; Use of water and raw materials; Management of surface water run-off; Waste management.
- Operation and maintenance phase: Movements of vehicles, equipment and personnel; Waste management; Maintenance of 8 m Protection Strip.
- Decommissioning phase: Construction of temporary decommissioning facilities; Movements of vehicles, equipment and personnel; Waste management.

Potentially Impacted Receptors


Particular Baseline Conditions that are Potentially Influencing Impacts

- Areas of high human activity.

Project Factors that are Potentially Influencing Impacts

- Waste management, traffic management, working width for the pipeline corridor, timing of works, level of physical disturbance (i.e. noise, light, visual, vibration, water quality).

References

- Baseline is found in Section 4.2. Impact Assessment Criteria is defined in the Annex 5.2.3 of the TAP ESIA Albania report. Monitoring measures are described in Section 6.1.

Source: ERM, 2017

A general description of each impact is provided in Section 8.11.2 of the TAP ESIA Albania report.

5.2.1.1    Potential Impacts

5.2.1.1.1    Air Quality Impacts

Localised and temporary impacts on local air quality are expected due to atmospheric emissions during construction and decommissioning phases. The two main sources of atmospheric emissions that have the potential to adversely affect air quality during the re-route construction are the dust emissions from civil works and exhaust emissions from vehicles and equipment involved.

Civil works generating dust include:

- Earth movement and excavation related to widening and improvement of access/roads and ROW preparation.
- Dust resuspension due to wind action on exposed surfaced and vehicle transit on unpaved roads.

Exhaust emissions include:

- Exhaust emissions from engine-driven equipment associated with clearance, trenching and diesel fuelled generators during the hydrotesting of the new pipeline section. Typical equipment used include: bulldozers, heavy excavators, dump trucks, large heavy lift cranes, standby generators, excavators, side booms / pipelayers, rock breakers, etc. (Ref. Section 3.4.3)
• Exhaust emissions from vehicles and equipment involved in the transport of material, personnel, sub-contractors and suppliers.

The pollutants generated from these emission sources include Particulate matter (PM), Carbon monoxide (CO), Nitrogen oxides (NOx) and Sulphur dioxide (SO2).

Dust emissions are expected to occur on a discontinuous basis during the whole length of the re-route construction. Construction activities include excavation and civil works and minor access road construction activities. Dust emissions will result from activities such as pulverization and abrasion of surfaces, caused by trucks carrying soil and materials, mobilization of dust particles caused by wind erosion of unpaved surfaces, mechanical action on incoherent materials and works with excavators, bulldozers, etc. Construction is typically expected to last for 60 days approximately (a standard construction rate of 100 m per crew/day can be assumed). Therefore, any impacts arising from dust emissions related to civil works will be temporary and of short duration.

With regard to the spatial extent of the impacts, dust emissions will be mostly released in the proximity of the construction areas. This includes the re-route construction strip as well as the accesses to/from the Buzuq Pipeyard (some 2-3 km to the South), and Camp 4 (less than 1 km away). Dust emissions will be released low to the ground and are characterised by a minimum buoyancy and low dispersion; moreover, considering that they will only be emitted discontinuously during daytime, they are unlikely to cause significant adverse impacts at the closest human receptors.

As for exhaust gas emissions, a similar situation is expected where the construction traffic in the area of influence of the re-route will be limited to the duration of the activities. Minor exhaust emissions will be released from mobile vehicles involved in the preparation and construction activities and their emissions typically do not reach distances greater than 100 m from the source of emission. Therefore in the absence of close receptors they are unlikely to cause any noticeable adverse impacts.

5.2.1.1.2 Noise Impacts

Noise impacts as in the case for air quality are expected to be localised and temporary, considering the impact sources are the same, such as the preparation of the construction area, and the use of vehicles and traffic. Hence, temporary noise emissions from earthworks, backfilling and reinstatement, movements of vehicles, equipment and personnel during the 2 months construction phase will be the main sources of impact, which will prevalently affect the area adjacent to the construction/work site. Potential receptors in the area consist mainly of the Orizaj settlement which is located close to the TAP base case route but relatively far from the proposed re-route (some 300 m from the closest residential buildings) and fauna. Noise sources in this phase will not be continuous, and will depend on the number and types of machinery used for each activity. The typical noise levels at 1 m from the source are summarized in Table 3.6. During pre-commissioning, the main noise sources are compressors and pumps foreseen for the hydrotesting activities as well as the air blown out of the pipe at the drying stage, which will also be a source of noise. The nature of the impacts is thoroughly described in Section 8.5.3.1 of the 2013 ESIA.
5.2.1.1.3 Habitat Loss / Habitat Degradation
Assuming a standard 38 m working strip the total size of the area cleared during construction activities will be 3.2 ha. From this total, 1.9 ha comprises low quality riparian vegetation; whilst the remainder is agricultural land. The *Quercus ilex* forest (EU 9340), located to the north of the centerline, it is not expected to be affected as it is located outside the 38 m working strip.

Although natural vegetation will be encouraged to re-establish within the working strip post-construction, an 8 m pipeline protection strip will remain where no deep-rooted vegetation will be allowed to grow in order to allow for the regular surveillance and maintenance of the strip. As such, the losses and modification of habitat in the pipeline protection strip are considered to be minimal but permanent within the 8 m PPS.

5.2.1.1.4 Habitat Fragmentation
Riparian vegetation of low quality found in the sections KP 0.1–0.5 which may be of importance to otters and some other species finding food and shelter will be affected by fragmentation. Riparian habitats are by definition narrow and located along the rivers and thus these types of habitats will be particularly susceptible to fragmentation and edge effects. Though it is of low ecological importance, it seemingly is an important area for otters, as deduced from their observed sprainting activity.

5.2.1.1.5 Direct Species Loss
Species loss will mainly affect flora species from vegetation removal during the preparation of the working strip. Fauna species loss is likely only to be limited to those resulting from accidental strikes with vehicles and some from earth moving for species present in the soil and leaf litter.

Habitat loss and fragmentation will cause associated impacts such as reduction in habitat viability and quality, prey availability, and increased competition for food and space. These impacts are likely to be of higher significance along the riparian habitat of low quality, considering current disturbance levels are relatively high. Fauna and flora species loss may occur due to impacts associated with construction activities (i.e. habitat clearance) and affecting the habitat quality to sustain these life processes for the affected species.

5.2.1.1.6 Disturbance and Displacement of Species
It is anticipated that Project activities will cause disturbance to fauna species along the pipeline re-route location; especially for otters that use the adjacent river banks; which may actively avoid the area. However, impacts are considered to be temporary and limited to the construction period (2 months). Once construction has ceased and the RoW has been reinstated species are expected to be re-established and/or to use the area as a corridor along the Osumi.

5.2.1.1.7 Disturbance to the Surface Water Quality / Aquatic Flora and Fauna
The proximity of the proposed re-route to the Osumi River and small creeks raises some risks of disturbing the Osumi River. This risk is associated with (1) the use of hazardous materials (e.g. diesel for the machinery), (2) the generation of various types of wastes and (3) the clearing of the RoW in the vicinity of the river (which raises the risk of soil/silt mobilization to the river).

In all three cases the potential interference with the river is high due to the short distance between the centerline and the river channel. This is especially the case at the beginning of the re-route (KP
0-150 m) where the distance between the centerline and the river channel is around 30 m only. This type of situation also occurs in other sections of the TAP pipeline and requires careful management to avoid direct impact to superficial waters or through indirectly through contamination on the quaternary aquifer.

The events that could affect the surface water quality can be summarized as follows:

- Accidental spills or release of raw materials and wastes from the storage areas located near a watercourse. The probability of this type of events is typically very low and would result from an accidental situation. A number of mitigation measures were defined in the TAP Albania ESIA (2013) to cover the accidental situations (see Section 8.8.2.2.5), including the implementation of plans relative to the proper management of waste and hazardous materials.

- Leaks or release of small quantities from machinery or during transport. These incidents can typically occur during the construction activities and is associated to inappropriate implementation of procedures (e.g. refueling procedures) or due to leaks from machinery (e.g. oil leaks due to poor maintenance of machinery). These events involve small volumes and thus not expected to significantly affect the water quality of large rivers such as the Osumi. Section 8.8.2.2.5 of the TAP Albania ESIA (2013) provides mitigation measures to cover these types of situations.

- Silt laden water from the construction site (rainwater mainly) and from the crossing of the tributary of the Osumi river (open-cut technique planned) may enter the river and lead to increased turbidity and sediment dispersion, which could lead to a reduction of water quality and interfere with aquatic fauna (invertebrates, fishes...). However, the crossing of the tributary will be short (just few meters) and the tributary is expected to be a seasonal stream, which is an advantage if the crossing can be performed during late summer. The environmental protection measures required for the crossing of the watercourse are included as part of the Watercourse Crossing Management Plan and detailed within the Watercourse crossings and Sediment Runoff Section of the ESIA (2013) (see Section 8.8.2.2).

### 5.2.1.2. Mitigation Measures and Residual Impact

The impact categories and mitigation measures specified within the TAP ESIA Albania report are applicable to the Orizaj Re-route. Table 5.3 provides an overview of the specific impacts together with the most important mitigation and procedures defined in the TAP Albania ESIA. In addition site specific measures (i.e. specific to the Orizaj Re-route) are also provided together with relevant plans/procedures developed during the post-ESIA phase and currently covered under the TAP Environmental and Social Implementation Plans (ESIPs).
### Table 5.3 Environmental Residual Impacts - Orizaj Re-route

<table>
<thead>
<tr>
<th>Impact / Risk</th>
<th>Measures to Address the Impact / Risk</th>
<th>Significance of Residual Impact/ Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Air Quality</strong></td>
<td>• Proper vehicle maintenance&lt;br&gt;• Traffic Management Plan&lt;br&gt;• Emissions sources monitoring;&lt;br&gt;• Dust suppression techniques;&lt;br&gt;• Vehicle speed limits;&lt;br&gt;• Truck bed covering</td>
<td>Not significant to Minor&lt;br&gt;Construction traffic and machinery gaseous emissions are similar to existing traffic on countryside roads. Impact should be negligible with the anticipated mitigation measures in place.&lt;br&gt;Maximum concentrations of particulate pollutants are expected to remain below Albanian/European/IFC limits and within 0.7 km from construction locations, away from inhabited areas.</td>
</tr>
<tr>
<td><strong>Noise</strong></td>
<td>• Switch off equipment when not in use;&lt;br&gt;• Whenever feasible, schedule different noisy activities to occur concurrently;&lt;br&gt;• Locate stationary equipment (e.g. compressors) as far as practicable from nearby receptors).</td>
<td>Minor&lt;br&gt;Temporary disturbance is expected near relatively sensitive habitats such as adjacent riverbanks. Human receptors sufficiently distant from work areas.</td>
</tr>
<tr>
<td><strong>Habitat Loss / Degradation &amp; Habitat Fragmentation</strong></td>
<td>• Reduced working strip in sensitive habitats (e.g. along riparian vegetation identified in KP 0.1 – 0.5) to a minimum of 22 – 28 m, where possible.&lt;br&gt;• Reinstatement of habitats after construction activities.&lt;br&gt;• Blocking off vehicular access to the river bed and riparian vegetation areas through placement of rock barriers in order to allow biological restoration of the habitat.</td>
<td>Minor&lt;br&gt;Impacts from habitat loss, degradation and fragmentation to the pipeline re-route in the Orizaj area are not expected to be significant, since, habitats found in the area are considered:&lt;br&gt;• Of low to medium quality and heavily influenced by human activities although the occasional presence of wolves has been reported and otters are known to use the adjacent river banks.&lt;br&gt;• Not located within or near to any Protected Areas.&lt;br&gt;• Where natural regeneration is feasible near to its original state.&lt;br&gt;Impacts are likely to be limited to localized areas and temporary in nature.&lt;br&gt;With mitigation measures implemented and proven effective, it is expected that the impacts in these areas will be minor.</td>
</tr>
<tr>
<td><strong>Species loss</strong></td>
<td>• Micro-siting of pipeline route to be conducted to avoid important species and habitats, including aquatic habitats, where possible.</td>
<td>Not Significant&lt;br&gt;With mitigation measures implemented and proven effective, it is expected that the impacts in these areas will be significantly reduced.</td>
</tr>
<tr>
<td>Impact / Risk</td>
<td>Measures to Address the Impact / Risk</td>
<td>Significance of Residual Impact/ Risk</td>
</tr>
<tr>
<td>--------------------------------------</td>
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<td>--------------------------------------</td>
</tr>
</tbody>
</table>
| Species Disturbance and Displacement | • Pre-construction survey to be undertaken for otter holts at the Osumi River riparian area adjacent to the re-route.  
  • Avoid night-time construction work along the edge of the Osumi River.  
  • If otters are identified during the pre-construction survey, Avoid long term (> 3 days) impediment of water flow or construction of long-term barriers along the watercourse banks to avoid impeding otter movement.  
  • Pre-vegetation clearance surveys to be undertaken to reduce disturbance to birds during breeding season (April – July).  
  • Development of a Biodiversity Action Plan (as part of the larger TAP Project) and Biodiversity offset where corresponds. | Minor  
  Disturbance and displacement to species are not expected to be significant as impacts are likely to be limited to areas where the pipeline crosses or passes closely adjacent to the Osumi river, where otters may be present, and are temporary in nature.  
  With mitigation measures implemented and proven effective, it is expected that the impacts in these areas will be significantly reduced. |
## Impact / Risk

### Surface Water Quality / Aquatic Flora and Fauna

- Prohibition of vehicles to drive through watercourses.
- Operation under international standards ESMP.
- Waste Management Plan.
- Consideration for otters should be made as outlined above.
- Strict site run-off management and Spill Contingency Plan.
- Erosion and Sediment Control Plan (ESIA 2013) including a complete set of measures to avoid potential silting of the Osumi:
  - Maximizing distance between he RoW and river
  - Installation of surface run-off barriers (to prevent silting the river in the event of heavy rains)
  - Use of silt screens for the tributaries being crossed.
- Consideration of diversion of water flow during the crossing of the tributary river near the Osumi.

### Significance of Residual Impact / Risk

**Minor**

With mitigation measures implemented and proven effective, it is expected that no affection to the water quality will occur as a result of accidental spills of hazardous materials or wastes. In addition, the application of the mitigation measures will reduce significantly the impact on the fauna and flora of the Osumi River.

### Source: ERM, 2017

#### 5.2.2. Socioeconomic Impact Assessment

Box 5.2 presents the key considerations for the assessment conducted in this report. The potential impacts of the Project pipeline re-routing on sensitive receptors remains the same as those presented in *Sections 8.13 to Section 8.19* of the TAP ESIA Albania report.
Box 5.2 Pipeline Re-route - Socioeconomic Key Considerations

Sources of Impacts
- Temporary and permanent land easement for pipeline construction and operation respectively.
- Permanent land restrictions along the 8 m right of way (RoW), including prohibition of planting trees and building structures of any kind.
- Presence of the construction workforce.
- Movements of vehicles, equipment and personnel.
- Waste management.
- Special crossing including crossing of secondary roads, irrigation systems and electric lines.
- Use of contractors and subcontractors.
- Changes to the environment due to increased noise, decreased air quality and changes to the visual environment as a result of the Project may affect health and wellbeing.

Potentially Impacted Receptors
- Farmers
- Households reliant on local services and infrastructure (i.e. electricity, piped water, sanitation, etc.).
- Local irrigation management systems.
- Business and workforce in the study area.
- Road users.

Particular Baseline Conditions that are Potentially Influencing Impacts
- With the exception of large urban areas like Berat and Durres, mixed agricultural production is the main economic activity for 80%-100% of population in settlements along the pipeline route, including those in the Skrapar area, where the Orizaj re-route is located.
- Importance of trees (olive and fruit) and vineyards for local livelihood.
- High levels of land ownership but small land sizes: average total land between 1.5-5 ha per household spread over 3-10 land parcels.
- There is a lack of institutional capacity at local level to respond to demands for additional resources and services (electricity, water, solid waste and wastewater disposal).
- Limited access to health care especially in rural areas, with hospitals located in cities.
- Limited access to medical personnel.

Vulnerable Groups
- Households on a low income, including subsistence farmers.
- Elderly.

References
- Baseline is found in Section 6.6.5 of the TAP ESIA Albania report and Section 4.2 of this report. Impact Assessment Criteria is defined in Annex 5.2.4 of the TAP ESIA Albania report. Monitoring Measures are described in Section 9.4 of the TAP ESIA Albania report.

Source: ERM, 2017

A general description of each impact is provided in Section 8.13 to Section 8.19 of the TAP ESIA Albania report. In the following sections, each of the impacts outlined in these sections have been summarized, giving information on how receptors along the section of the pipeline re-route are likely to be impacted.

5.2.2.1. Potential Impacts

5.2.2.1.1 Economy and Employment
Most of the economic and employment impacts can be expected to occur during the pre-construction and construction phases of the pipeline. It is during this period that the Project will need to hire workers and purchase goods and services, potentially resulting in positive impacts on the local
economy. Temporary employment during the construction phase includes people directly employed by the primary contractor for the construction of the pipeline and other project components to be located in the area of the pipeline re-route. It also includes jobs supplying the goods and services needed to support the construction process, including food and transport services and support staff in construction camps.

5.2.2.1.2 Land and Livelihoods

The potential impact to existing livelihoods and land values as a result of Project related activities in the area where the new re-route will be implemented are just equivalent to those stated in the TAP ESIA Albania report.

Generally, the most sensitive resource in this region, in terms of land and livelihoods, are the areas of fertile, agricultural land and grasslands used for grazing livestock. Loss of land has the potential to not only affect the livelihoods of farming land owners, but also those involved in rental of agricultural land and crop sharing schemes. Shrubland and forested areas have a lower level of sensitivity, in terms of land and livelihoods, since these land uses are mostly only used for the collection of firewood by the local population.

The Orizaj re-route crosses approximately 550 m of agricultural fields nearby the Osumi River (from KP 0.3 to KP 0.85). The rest of the pipeline re-route crosses 300 m terrain primarily composed of riparian vegetation along the Osumi River.

The agricultural fields crossed by the re-route include seasonal crops, such as corn and alfalfa, and perennial crops, such as vines / grapes, olive and fruit trees. It is estimated that the establishment of the 38 m working strip will require the removal of 0.34 ha of perennial crops (see Figure 4.8).

Figure 5.1 shows some of the areas of perennial crops that will be crossed by the pipeline re-route in the proximity of the Osumi River.

Figure 5.1 Areas of Perennial crops crossed by the Orizaj Re-route

Source: ERM, 2017. Left to right photos: WPS060, WPS063; and WPS064
5.2.2.1.3 Infrastructure and Utilities

Impacts relating to the construction of the pipeline re-route (including road upgrades) will mostly imply temporary disruptions to local infrastructure and utilities (i.e. water distribution and irrigation channels, electricity transmission and local road networks) during the 2 months construction period.

The field survey identified an irrigation channel (WPS 064 in Figure 4.6) located at the foot of the road batter, between the road and the riparian vegetation. The proposed re-route travels parallel and very close to the channel for some 500 m. Afterwards, the route crosses the channel to the north (Figure 4.6). The presence of other small irrigation infrastructures associated to specific agricultural fields (e.g. small plastic or metal irrigation tubes) cannot be discarded as these are commonly used elsewhere. Similarly to the disruption to local roads, disruption to irrigation channels will require careful assessment and engagement with local communities.

Despite of the short distances between the re-route and the high voltage power lines (see WPS062 in Figure 4.6) no disruption will be caused to the powerlines.

With regards to the water usage no interferences with the local uses are expected because water sourcing will be managed through the plans established for the larger TAP project which already considers evaluating the sources to avoid competition with local communities. Specifically for the hydrotest water will be either recycled from other sections of the pipe (to minimize water abstraction) or taken from the Osumi River. Section 3.4.6 and Section 3.4.9 provide details on the hydrotest and sourcing of water for the construction. As per the established methodology water will be treated before being discharged back to the river therefore maintaining a desirable water quality.

5.2.2.1.4 Community Health and Safety

The presence of the Project could affect the health, safety and security of the communities in the area as a result of worker-community interactions. However, considering the small number of crew member (maximum of 80 people) and the limited duration of construction activities (about 60 days) interaction should be limited. There is also likely to be an increased risk of injury posed to the communities associated with construction activities. Any community concerns or perceptions with regard to reduced health and physical safety by the community also need to be addressed. There is a potential risk of site trespass at work fronts for the duration of construction. Work fronts will not be fenced routinely although signage will be erected. The risk of trespass is highest when work fronts are located closest to isolated houses or communities. In the case of the Orizaj re-route no houses have been identified in the vicinity of the work front. Nevertheless, these are under intense agricultural use and site trespassing could still result in accidents leading to injuries or even fatalities especially due to the presence of large pieces of machinery and open trenches.

5.2.2.1.5 Traffic and Transportation

During the development of the pipeline route, the Project has sought to avoid, minimize and mitigate impacts resulting from traffic movements (in line with EBRD PR4, IFC PS4 and IFC General EHS Guidelines 3 & 4) through route option appraisals (and selection), route-refinement and detailed impact assessments. TAP AG has identified appropriate routes for Project traffic, upgrade or construct new roads required to provide sufficient road capacity, and facilitate the safe movement of Project vehicles.

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The pipeline re-route does not cross the national road between Berat and Çorovodë however it is expected that temporary disruption of paths/tracks providing access to arable lands in the area will occur during the 60 days of construction.

5.2.2.1.6 Workers Management
Workers’ rights, including occupational health and safety, need to be considered to avoid accidents and injuries, loss of man-hours, labor abuses, and to ensure fair treatment, remuneration and working or living conditions. These issues should be considered not only for those who are directly employed by TAP AG but also its contractors (including sub-contractors) and throughout the Project supply chain.

5.2.2.2 Mitigation Measures and Residual Impacts

The impact categories and mitigation measures specified within the TAP ESIA Albania report are applicable to the Orizaj Re-route. Table 5.4 provides an overview of the specific impacts associated with the Orizaj Re-route. Mitigation stated in the TAP Albania ESIA is valid for the proposed re-route and should be considered together with the detailed plans, procedures and mitigation measures that have been detailed during the Post-ESIA works (i.e. combining general TAP ESIA measures and plans with the site specific measures as detailed in Table 5.4.)
Table 5.4  Socioeconomic Residual Impacts – Orizaj Re-route
<table>
<thead>
<tr>
<th>Impact / Risk</th>
<th>Measures to Address the Impact / Risk</th>
<th>Significance of Residual Impact / Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economy and employment</td>
<td>Mitigation and enhancement measures stated within TAP ESIA Albania (2013) report are considered sufficient and no additional measures are required. Applicable measures from TAP’s Local Content Plan and Employment Strategy include: - optimizing contract opportunities to Albanian companies; - fair and transparent recruitment process for all openings; and - job announcement through community engagement to ensure local accessibility as applicable.</td>
<td>Minor Positive</td>
</tr>
<tr>
<td></td>
<td>- Local economic impact due to purchasing by employees.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Local employment opportunities.</td>
<td></td>
</tr>
<tr>
<td>Land and livelihoods</td>
<td>Mitigation measures stated within TAP ESIA Albania report are considered sufficient and no additional measures are required. However, the following specific mitigation measure is recommended: - Reduced working strip in areas of more sensitive cropland (fruit trees, in KP 0.4 to KP 0.7) to a minimum of 22 - 28 m. - Livelihoods Restoration Plan identifying reliable cadastral data and landowners and secure land titles. - Information campaign / disclosure to local land users / owners.</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>- Affection to land and livelihood of the local population.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Loss of perennial crops</td>
<td></td>
</tr>
</tbody>
</table>

Minor Positive

- Most construction jobs on the Project will be short-term (3-7 months or less for pre-construction).
- Mitigation measures will help to increase local impacts of employment opportunities, particularly for unskilled labour positions. It is expected that these impacts will be experienced in larger urban centres where the labour force is usually concentrated or in areas near construction camps and sites.
- Local purchasing by employees expected to be relatively minor.

Moderate

- Removal of 0.34 ha of perennial crops (olive trees, vineyards and fruit trees) representing 20% of all the agricultural land within the working strip. It should be noted however that this percentage refers specifically to the proposed re-route and is not representative of the larger TAP Albania pipeline construction project.
- There are not any impacted households and communities through the length of the pipeline re-route. Closest houses are located over 350 m from the pipeline re-route.
- Affected individuals and households dependent on subsistence farming.
- Impacts experienced in the short term on seasonal/perennial crop owners due to establishment of working strip.
- Permanent loss of 700 m² of perennial crops due to permanent easement establishment.
- Stakeholders have a high level of concern regarding loss of access to land and the impact this will have on their livelihood in the short, medium and long term.
### Infrastructure and utilities

- **Disruption and damage to infrastructures and utilities during construction.**

  Mitigation measures stated within TAP ESIA Albania report are considered sufficient. However, the following specific mitigation measures from the TAP Infrastructure and Utilities Management Plan are recommended:
  - Close engagement with the local/regional electricity utility company to minimize disturbance to users, in particular with respect to the HV electric transmission line identified along the national road.
  - Impacts to abandoned storage buildings should be avoided (KP.0.85).
  - Avoidance and or reestablishment of irrigation infrastructure present in the agricultural lands.
  - Installing track/path crossings for accesses to arable lands.

### Community Health and Safety

- **Site trespass and injuries.**

  Mitigation measures stated within TAP ESIA Albania report are considered sufficient and no additional measures are required. Applicable measures include:
  - Install appropriate signage to alert of trespass risks.
  - Establish a specific traffic management plan and engagement with local stakeholders.

- **Traffic accidents.**

  Mitigation measures stated within TAP ESIA Albania report are considered sufficient and no additional measures are required. However, the following specific mitigation measure is recommended:
  - Traffic management plan (transportation / construction) for the national road from Berat to Çorovodë. Including installing appropriate traffic signage.

### Traffic and transportation

- **Disruption to existing road users on local roads.**

  Mitigation measures stated within TAP ESIA Albania report are considered sufficient and no additional measures are required. However, the following specific mitigation measure is recommended:
  - Traffic management plan (transportation / construction) for the national road from Berat to Çorovodë. Including installing appropriate traffic signage.

### Workers management

- **Workers accidents and injuries.**

  Mitigation measures stated within TAP ESIA Albania report are considered sufficient and no additional measures are required, in particular measures included in TAP’s Health and Safety Management Plan and TAP’s Workers Management Plan.

### Source: ERM, 2017

5.2.3. Cultural Heritage Impact Assessment

As aforementioned in Section 5.1.3, the potential impacts stated in the TAP ESIA Albania report are still applicable for this pipeline re-route. Box 5.3 presents the key considerations for the assessment conducted in this ESIA Addendum report.
Box 5.3 Pipeline Re-route – Cultural Heritage Key Considerations

**Sources of Impacts**
- Construction Phase: Ground-disturbing activities, including land-clearing and site preparation activities associated with Project facilities, excavation of the pipe trench, construction or upgrade of roads; Pollution and vibration; Movement of vehicles, equipment and personnel.
- Operation Phase: Pollution and vibration; Movement of vehicles, equipment and personnel. Excavation activities for maintenance and repair.
- Decommissioning Phase: Pollution and vibration; Movement of vehicles, equipment and personnel.

**Potentially Impacted Receptors**
- Archaeological sites, Monuments, and Sites with ICH value.

**Potential Baseline Conditions that are Potentially Influencing Impacts**
- Location and quality of cultural heritage sites identified within study area. Undiscovered cultural heritage.

**Project Factors that are Potentially Influencing Impacts**
- Prior re-routing studies and Project design to avoid cultural heritage sites, ESIA investigations to produce maps and information on cultural heritage sites in the study area, Cultural Heritage Management Plan, and the cultural heritage mitigation measures presented in this section.

**References**
- Baseline is found in Section 4.2.3 of this report. Impact Assessment Criteria is defined in Annex 5.2.5 of the TAP ESIA Albania report. Monitoring Measures are described in Section 9.4 of the TAP ESIA Albania report.

*Source: ERM, 2016*

### 5.2.3.1 Potential Impacts

The construction of the pipeline along the proposed re-routes could result in the following impacts to cultural heritage resources:

- Permanent direct physical impacts to cultural heritage resources within the 38 m wide regular or 28 m reduced pipeline working strip. In order to apply the cautionary principle, it is assumed that any resources within 26 m of the regular working strip or 18 m of the reduced working strip are within the working strip.
- Degradation or damage to cultural heritage resources within 50 m of the pipeline centreline due to vibration and/or pollution.
- Temporary restrictions on user access to cultural heritage sites due to pipeline or access road construction.
- Temporary negative effects on the setting or ambiance of cultural heritage resources during pipeline or access road construction.

The only cultural heritage resources located within the re-route's direct and/or indirect impact areas is site WPC045, a Socialist Period warehouse ruin. According to the observations made in the field the site appears to be abandoned and in general disrepair. Based on the types of Project impacts identified above, the socialist warehouses will not be impacted by the proposed Orizaj Re-route (Figure 5.2). As a result, construction of the pipeline route will not restrict user access to the site nor will the temporary changes to the resource setting caused by pipeline construction affect its cultural
value. Since the site is located 60 m from the proposed re-route centerline it is outside both the proposed working strip and the 50 m buffer for vibration and pollution impacts and, as such, will not be subject to any direct impacts.

**Figure 5.2 Cultural Heritage sites in the vicinity of the Orizaj Re-route**

CH-586 is outside the footprint of the regular working strip and will not be subject to direct physical disturbance from construction (note the cemetery is located on the opposite side of the national road). The distance between the cemetery and the pipeline, approximately 50 m, suggests that CH-586 will be subject to little or no vibration impacts. However, the monuments in the cemetery could be subject to pollution impacts due to construction exhaust and dust.

Construction of the pipeline will also result in some temporary indirect impacts on the setting and ambiance of the resource due to construction noise; pollution from dust and equipment exhaust; visual impacts due to the presence of construction equipment and personnel; and temporary changes to the nearby landscape. It is worth noting that the same impact would be expected without the re-route as in fact the implementation of this re-route leads to a small increase in the distance between the pipeline centreline and the cemetery.
In any case, considering the distance between the cemetery and the pipeline; the presence of the road between the pipeline and the resource; and the temporary nature of the impacts, the magnitude of indirect impacts will be small, resulting in unmitigated construction impacts of minor significance.

### 5.2.3.2. Mitigation Measures and Residual Impacts

A number of the cultural heritage mitigation measures presented in the TAP Albania ESIA report should be implemented along the pipeline re-route to avoid, reduce, or compensate for Project impacts to these resources. Table 5.5 provides a summary of the potential impacts to CH-586 from construction of the Orizaj re-route, recommended mitigation measures to reduce the significance of these impacts; and an assessment of the significance of post-mitigation residual impacts. Recommended mitigations include:

- CH-586 should be clearly marked for avoidance during pipeline construction.
- The conditions and structural integrity of the monuments within CH-586 cemetery should be assessed prior to construction. Information collected during the assessment will be utilized to establish the baseline conditions of the monuments and to develop vibration and pollution thresholds to be used during construction phase vibration and pollution monitoring at the site.
- During construction activities vibration and pollution monitoring should be conducted at CH-586. If monitoring indicates vibration and/or pollution levels exceed predetermined thresholds, construction will temporarily stop and vibration/pollution reducing alternative construction methods will be utilized.
- Stakeholder engagement should be conducted to determine significant periods of use, such as religious festivals and ceremonies, at CH-586 and construction activities should be scheduled to avoid these events. In addition, a procedure should be established to allow the family to contact the Project in the event that the cemetery needs to be used for a funeral or other unplanned religious ceremony or rituals and provisions made for a temporary suspension of construction activities during the funeral or ceremony.
- Instructions to avoid site of Cultural Heritage value should be included in Project staff and subcontractor’s induction training and Code of Conduct.
Table 5.5  Cultural Heritage Residual Impacts - Orizaj Re-route

<table>
<thead>
<tr>
<th>Impact / Risk</th>
<th>Measures to address the Impact / Risk</th>
<th>Significance of Residual Impact / Risk</th>
</tr>
</thead>
</table>
| **Direct physical disturbance of or damage to the entire resource due to pollution or vibration.** | - Evaluation / Documentation of structural integrity prior to start of construction.  
- Vibration and pollution monitoring during construction, with respect to thresholds established based on prior evaluation.  
- Avoidance during re-route construction integrated in induction training and Code of Conduct. | **Negligible**  
- Due to the distance between CH-586 and the small ravine and the pipeline re-route, the risk of causing vibration and / or pollution impacts is low.  
- The implementation of the recommended mitigation measures will reduce the risk of physical damage to grave markers in the cemetery to negligible. |
| Site affected: CH-586                                                        |                                                                                                       |                                       |

| **Temporary impacts to resource ambiance and setting during construction.**   | - Stakeholder engagement to determine periods of use and putting in place communication channels.  
- Construction scheduling based on stakeholder engagement findings.  
- Guidance in Code of Conduct.  
- Post construction landscape restoration. | **Negligible**  
- As for the basecase pipeline route, the proposed re-route will cause temporary, short term impacts to the setting of CH-586 due to the relative short distance to the cemetery...  
- Implementation of the recommended mitigation measures will reduce the magnitude of the indirect impacts, reducing the significance of Project impacts from minor to negligible. |
| Site affected: CH-586                                                        |                                                                                                       |                                       |

Source: ERM, 2017
6. ENVIRONMENTAL, SOCIAL AND CULTURAL HERITAGE MANAGEMENT AND MONITORING

6.1. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

*Error! Reference source not found.* provides a summary of the environmental impacts and mitigation measures identified in this report. This table should be read in conjunction with Table 9.1-1 of the TAP Albania ESIA where further details of Project mitigation and management measures are presented.

As per the requirements set in the Decision No.686 of the Council of Ministers (see *Error! Reference source not found.*) a cost estimate for the rehabilitation of the impacted project are cannot be determined at this stage given that the design life of the pipeline is 50 years and decommissioning approaches may change substantially during that time. TAP AG is, however, committed to implement industry best practice at the time. Refer to Section 4.11 Decommissioning Phase of the TAP Albania ESIA for further details about decommissioning.
### Table 6.1 Environment – Summary of Impacts and Mitigation Measures

#### Impact / Risk

<table>
<thead>
<tr>
<th>Measure to Address the Impact / Risk</th>
<th>Requirement: Legal and/or International Best Practice</th>
<th>Implementation Timeline / Performance Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality</td>
<td>Proper vehicle maintenance</td>
<td>Before and during construction</td>
</tr>
<tr>
<td></td>
<td>Traffic Management Plan</td>
<td>Same as stated in Table 9.1 of TAP ESIA Albania report.</td>
</tr>
<tr>
<td></td>
<td>Emissions sources monitoring;</td>
<td>Same as stated in Table 9.1 of TAP ESIA Albania report.</td>
</tr>
<tr>
<td></td>
<td>Dust suppression techniques;</td>
<td>Same as stated in Table 9.1 of TAP ESIA Albania report.</td>
</tr>
<tr>
<td></td>
<td>Vehicle speed limits</td>
<td>Same as stated in Table 9.1 of TAP ESIA Albania report.</td>
</tr>
<tr>
<td></td>
<td>Truck bed covering/sheeting</td>
<td>Same as stated in Table 9.1 of TAP ESIA Albania report.</td>
</tr>
<tr>
<td></td>
<td>Switch off equipment when not in use</td>
<td>Before and during construction</td>
</tr>
<tr>
<td></td>
<td>Whenever feasible, schedule different noisy activities to occur concurrently</td>
<td>Same as stated in Table 9.1 of TAP ESIA Albania report.</td>
</tr>
<tr>
<td></td>
<td>Location stationary equipment (e.g. compressors) as far as practicable from nearby receptors.</td>
<td>Same as stated in Table 9.1 of TAP ESIA Albania report.</td>
</tr>
<tr>
<td>Habitat and Species</td>
<td>Habitat loss, degradation and fragmentation.</td>
<td>Before and during construction</td>
</tr>
<tr>
<td></td>
<td>Direct species loss, disturbance and displacement.</td>
<td>Before and during construction</td>
</tr>
<tr>
<td></td>
<td>Blockage of riparian vegetation areas through placement of rock barriers in order to allow biological restoration of the habitat.</td>
<td>Before and during construction</td>
</tr>
<tr>
<td></td>
<td>Micro-siting of pipeline route to be conducted to avoid important species and habitats, including aquatic habitats, where possible.</td>
<td>Before and during construction</td>
</tr>
</tbody>
</table>

#### Measures to Address the Impact / Risk

- Proper vehicle maintenance
- Traffic Management Plan
- Emissions sources monitoring
- Dust suppression techniques
- Vehicle speed limits
- Truck bed covering/sheeting
- Switch off equipment when not in use
- Whenever feasible, schedule different noisy activities to occur concurrently
- Location stationary equipment (e.g. compressors) as far as practicable from nearby receptors.
- Habitat loss, degradation and fragmentation.
- Direct species loss, disturbance and displacement.
- Blockage of riparian vegetation areas through placement of rock barriers in order to allow biological restoration of the habitat.
- Micro-siting of pipeline route to be conducted to avoid important species and habitats, including aquatic habitats, where possible.
<table>
<thead>
<tr>
<th>Impact / Risk</th>
<th>Measures to Address the Impact / Risk</th>
<th>Implementation Timeline / Performance Milestone</th>
<th>Requirement: Legal and / or International Best Practice</th>
<th>Key Performance Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pre-construction survey to be undertaken for otter holts at the Osumi River riparian area adjacent to the re-route.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Avoid night-time construction work along the edge of the Osumi River.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Avoid long term (&gt; 3 days) impediment of water flow or construction of long-term barriers along the watercourse banks to avoid impeding otter movement.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Pre-vegetation clearance surveys to be undertaken to reduce disturbance to birds during breeding season (April – July).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Construction works to be performed, to the extent feasible, outside of the breeding seasons which are sensitive periods for key species (April – July, in the case of the birds, and February / March, in the case of otter and badger).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Development of a Biodiversity Action Plan (as part of the larger TAP Project) and Biodiversity offset where corresponds.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact / Risk</td>
<td>Measures to Address the Impact / Risk</td>
<td>Implementation Timeline / Performance Milestone</td>
<td>Requirement: Legal and / or International Best Practice</td>
<td>Key Performance Indicator</td>
</tr>
<tr>
<td>--------------</td>
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<td>-----------------------------------------------</td>
<td>----------------------------------------------------------</td>
<td>---------------------------</td>
</tr>
</tbody>
</table>
| Surface Water Quality / Aquatic Flora and Fauna | • Prohibition of vehicles to drive through watercourses.  
• Operation under international standards ESMP.  
• Waste Management Plan.  
• Consideration for otters should be made as outlined above.  
• Strict site run-off management and Spill Contingency Plan.  
• Erosion and Sediment Control Plan (ESIA 2013) including a complete set of measures to avoid potential silting the Osumi:  
  o Maximizing distance between he RoW and river  
  o installation of surface run-off barriers (to prevent silting the river in the event of heavy rains  
  o Use of silt screens for the tributaries being crossed.  
• Consideration of diversion of water flow during the crossing of the tributary river near the Osumi. | Before and during construction. | Same as stated in Table 9.1-1 of TAP ESIA Albania report. | • Micro-siting and compensation in the form of biodiversity offsets is acceptable to MoEFWA.  
• Records verifying implementation of mitigation measures.  
• Biodiversity Action Plan. |

*Source: ERM, 2017*
6.2. **SOCIOECONOMIC IMPACTS AND MITIGATION MEASURES**

Table 6.2 provides a summary of the environmental impacts and mitigation measures identified in this report. This table should be read in conjunction with *Table 9.1-1* of the TAP Albania ESIA where further details of Project mitigation and management measures are presented.
### Table 6.2 Socioeconomic - Summary of Impacts and Mitigation Measures

<table>
<thead>
<tr>
<th>Impact / Risk</th>
<th>Measure to Address Impact / Risk</th>
<th>Implementation Timeline / Performance Milestone</th>
<th>Requirement: Legal and/or International Best Practice</th>
<th>Key Performance Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economy and employment</strong></td>
<td>• TAP local content Plan strategy, objectives, goals and targets including:</td>
<td>Before construction</td>
<td>Same as stated in Table 9.1-1 of TAP ESIA Albania Report.</td>
<td>• € spent on Albanian goods and services.</td>
</tr>
<tr>
<td></td>
<td>• Capacity building program.</td>
<td></td>
<td></td>
<td>• Percentage of unskilled labour from within the country.</td>
</tr>
<tr>
<td></td>
<td>• Demand and supply side analysis.</td>
<td></td>
<td></td>
<td>• Percentage of contractors trained on socioeconomic policies.</td>
</tr>
<tr>
<td></td>
<td>• Optimise contract opportunities to Albanian companies.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• TAP Employment Strategy, including:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fair and transparent recruitment process for all openings.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Jobs announcement so that they are locally accessible.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Include Roma camps and community leaders in engagement activities (if present in area).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Land and livelihoods</strong></td>
<td>• Reduced working strip in areas of more sensitive cropland (fruit trees, in KP 0.4 to KP 0.7) to a minimum of 22 - 28 m.</td>
<td>Before construction and monitoring periodically during construction.</td>
<td>Same as stated in Table 9.1-1 of TAP ESIA Albania Report.</td>
<td>• Presentations and other information disclosure materials available and accessible.</td>
</tr>
<tr>
<td></td>
<td>• Livelihoods Restoration Plan identifying reliable cadastral data and landowners and secure land titles.</td>
<td></td>
<td></td>
<td>• Meeting minutes from consultations; signed compensation agreements; monitoring.</td>
</tr>
<tr>
<td></td>
<td>• Information campaign to local land users.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Restricted Information:** This document is property of Contractor. It must not be stored, reproduced or disclosed to others without written authorization from Contractor.
<table>
<thead>
<tr>
<th>Impact / Risk</th>
<th>Measure to Address Impact / Risk</th>
<th>Implementation Timeline / Performance Milestone</th>
<th>Requirement: Legal and/or International Best Practice</th>
<th>Key Performance Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infrastructure and utilities</strong></td>
<td>- Disruption and damage to infrastructures and utilities during construction.</td>
<td>Before construction and monitoring periodically during construction.</td>
<td>Same as stated in Table 9.1-1 of TAP ESIA Albania Report.</td>
<td>- Percentage of relevant grievances responded.</td>
</tr>
<tr>
<td></td>
<td>- TAP ESIA 2013 Infrastructure and Utilities Management Plan measures applicable to the infrastructure and utilities identified along this re-route: (1) the HV electric transmission lines identified along national road; (2) abandoned storage buildings identified in KP 0.85, and (3) irrigation channels and other irrigation infrastructures present in the agricultural lands; and (4) crossing of unpaved tracks/paths.</td>
<td></td>
<td></td>
<td>- Monthly reviews of engagements with local communities.</td>
</tr>
<tr>
<td></td>
<td>- Grievance mechanism in place for local stakeholders.</td>
<td></td>
<td></td>
<td>- Percentage of irrigation system reinstated after trench filling.</td>
</tr>
<tr>
<td></td>
<td>- Monitoring of grievance trends and response performance.</td>
<td></td>
<td></td>
<td>- Information disclosure material, meeting minutes from engagement, community grievance trend monitoring and response performance.</td>
</tr>
<tr>
<td></td>
<td>- Compensation to stakeholders as applicable.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Community liaison in place to communicate with / inform local stakeholders regarding possible disturbances to access to infrastructure and utilities.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Planned irrigation and road crossings in cooperation with local community.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Community Health and Safety</strong></td>
<td>- Site trespass and injuries.</td>
<td>Before and during construction, as needed.</td>
<td>Same as stated in Table 9.1-1 of TAP ESIA Albania Report.</td>
<td>Information disclosure material, meeting minutes from engagement, community grievance trend monitoring and response performance.</td>
</tr>
<tr>
<td></td>
<td>- Traffic accidents</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- TAP ESIA 2013 Community Health Management Plan measures including:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Install appropriate signage to alert of trespass risks (risks of entering a construction site).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Establish a specific Traffic Management Plan and disclose to local stakeholders (residents and local road users)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact / Risk</td>
<td>Measure to Address Impact / Risk</td>
<td>Implementation Timeline / Performance Milestone</td>
<td>Requirement: Legal and/or International Best Practice</td>
<td>Key Performance Indicator</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------</td>
<td>---------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Traffic and transportation    | • Traffic Management Plan and monitoring, especially the national road between Berat and Çorovodë which will be transited by Project vehicles.  
• Install appropriate traffic signage.                                                                 | Before and during construction, as needed.       | Same as stated in Table 9.1-1 of TAP ESIA Albania Report.                                | • Percentage of relevant grievances responded.  
• Information disclosure material, meeting minutes from engagement, community grievance trend monitoring and response performance. |
| Workers management            | • TAP ESIA 2013 Health and Safety Management Plan measures.  
• TAP ESIA 2013 Workers Management Plan measures, including:  
  • Establish a workers grievance mechanism  
  • Comply with TAP H&S management system related to worker H&S and labor rights  
  • Comply with legal framework and international standards related to worker H&S and rights. | Before and during construction, as needed.       | Same as stated in Table 9.1-1 of TAP ESIA Albania Report.                                | • Number of times where TAP Code of Conduct has been breached.  
• Worker grievance trends.  
• Community grievance trends.  
• Total recordable incidents, lost time incidents, and other H&S indicators.  
• Health checks parameters.  
• H&S monitoring and audits.  
• H&S performance evaluations for contractors. |

Source: ERM, 2017
6.3. CULTURAL HERITAGE IMPACTS AND MITIGATION MEASURES

Table 6.3 provides a summary of the cultural heritage impacts and mitigations measures identified in this report. The types of cultural heritage resources identified in the ESIA Addendum baseline and the magnitude and significance of potential Project impacts are similar to those identified in the TAP ESIA 2013 Albania report. As a result, the mitigation measures recommended to avoid, minimize, and mitigate impacts to cultural heritage resources have been aligned with those found in the TAP ESIA Albania report. Due to the similarities in resource types and impacts, cultural heritage management plan and mitigation tables presented in Section 9.2.7 of the TAP ESIA Albania report are applicable to the cultural heritage resources and Project impacts identified in this report.
## Table 6.3  Cultural Heritage - Summary of Impacts and Mitigation Measures

<table>
<thead>
<tr>
<th>Impact / Risk</th>
<th>Measure to Address Impact / Risk</th>
<th>Implementation Timeline / Performance Milestone</th>
<th>Requirement: Legal and / or International Best Practice</th>
<th>Key Performance Indicator</th>
</tr>
</thead>
</table>
| - Direct physical disturbance of or damage to the entire resource due to pollution or vibration. | - Guidance for avoidance in employee induction training and Code of Conduct.  
- Evaluation / Documentation of pre-construction conditions of CH-586 monument (structural integrity, etc.)  
- Vibration and pollution monitoring based on pre-established thresholds.  
- Stakeholder engagement to determine periods of use.  
- Construction scheduling based on stakeholder engagement findings.  
- Post construction landscape restoration. | Before, during, and after construction. | Same as stated in Table 9.1-1 of TAP ESIA Albania report. | - Records of stakeholder engagement activities; reports on results of consultations; action plans based on consultations.  
- Construction schedule incorporating results of stakeholder consultations to avoid impacting resource setting or ambiance during religious or ritual events.  
- Reports documenting pre-construction conditions of resources.  
- Monitoring logs, recorded vibration and pollution levels.  
- Percentage of delivery of Code of Conduct to project management and construction staff.  
- Photographic documentation of pre- and post-construction landscape documenting restoration efforts. |
| - Temporary impacts to resource setting and ambiance during construction. | | | |

*Source: ERM, 2016*
ANNEX 1: Field Survey Summary Datasheets
# Cultural Heritage Findings Summary Datasheet

<table>
<thead>
<tr>
<th>Project:</th>
<th>Project Feature Investigated:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAP Re-routes 2017</td>
<td>Orizaj Re-route</td>
</tr>
<tr>
<td></td>
<td>Approx. length: 0.850 km</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specialist:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iris Pojani</td>
<td>10/12/2016</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Archaeological Site:</th>
<th>Observations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No archaeological sites were identified along the pipeline re-route.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monuments:</th>
<th>Observations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warehouses of socialist times were identified but not visited (WPC045).</td>
<td>Socialist storage buildings were built in the 1970s and served as warehouses for the region. The proposed re-route has increased the distance from the centerline from 20 m to 45 m.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sites with Intangible Cultural Value:</th>
<th>Observations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group of graves belonging to a family near the national road (WPC586 or CH-586).</td>
<td>The graves appear represent a small family cemetery rather than a larger community cemetery. The cemetery appears to be still in use/visited and represent an important cultural heritage site to the descendants of the deceased persons.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Areas with High Archaeological Potential (AHAP):</th>
<th>Observations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No areas with AHAP were identified along the pipeline re-route.</td>
<td>The area is not considered as a high potential, however the existence of unknown sites cannot be fully discarded.</td>
</tr>
</tbody>
</table>

**Conclusions and key aspects:**

The warehouses/storage socialist buildings are the only one type of evidence identified on the pipeline re-route along the Osumi river. This type of element is equivalent to other cultural heritage resources identified in the ESIA (2013) and therefore the general mitigation measures presented in the ESIA (2013) are valid and applicable, along with relevant plans/procedures developed during the post-ESIA phase such as TAP’s Environmental and Social Implementation Plans (ESIPs). Specific relevant measures would include:

- Particular care should be taken during the construction activities to avoid disturbance of cultural assets, which is an essential part of the historical memory. The warehouses, although not registered as cultural monument, should be considered as such and thus fenced off and marked for avoidance.

- The small family cemetery (CH-586) should be marked for avoidance during the construction activities in the area. If it is determined that the cemetery is within 50 m of any working area, the monuments in the cemetery should be subject to vibration and pollution monitoring.
Provided the short distance between the project activities vibration and pollution monitoring would be recommended.

In addition, as per the standard procedures and ESIA (2013) particular care should be taken during the construction phase, where continuous monitoring will be required. Should any element with potential be identified stop work protocol will be followed by chance find procedure.

Photos:

WPC043: General view of the Re-route nearby the national road Çorovodë-Berat.

WPC045: Warehouses located approx.1.8 m S of the Re-route. (view NE)
Biological Environment Findings Summary Datasheet

Project: TAP Re-routes 2016
Project Feature Investigated: Orizaj Re-route
Approx. length: 0.850 km

Specialist: Ferdinand Bego
Date: 10/12/2016

Habitats:
The Orizaj Re-route starts on the mosaic agricultural land in the vicinity of the settlement/quarter of Vërzezha (Fushë). Then it runs parallel to the Osumi River along the flat riverbank covered with riparian vegetation dominated by *Platanus orientalis* and *Salix sp.*, with the intrusion of maquis vegetation elements, such as *Pistacia lentiscus* and *Phyllirea latifolia*. After the first 500m section through riparian vegetation, which in some places becomes thicker and denser, the Orizaj Re-route goes across the mosaic arable land (crop fields, orchards, vineyards) until it reaches the baseline route of the pipeline.

Observations:
The first 500m of the riparian vegetation along the Osumi River is dominated by *Platanus orientalis* and *Salix sp.* Trees and provides an important habitat for otters (*Lutra lutra*). Although no dens or holts were observed, the otter sprainting activity observed along this section is considered high (3 sprainting sites and 6 spraints). The oldest trees of the oriental plane were infested and are dead, and therefore the quality of the riparian habitat is somehow lost.

Mosaic agricultural land and crop fields are of low ecological value, although they may attract some species such as badger and red fox for feeding. Mosaic agricultural land and crop fields with annual and perennial crops serve as feeding and breeding ground for many passerine birds. The Osumi River is used as feeding ground by otters (*Lutra lutra*). The high sprainting activity of otter observed during the field survey is a strong indication of the importance of the site for otters.

Key Fauna Species (Latin/English):
Mammals: badger (*Meles meles*), otter (*Lutra lutra*), red fox (*Vulpes vulpes*), Thomas' pine vole (*Microtus thomasi*).


Reptiles: Although no reptile species were observed during the field survey of 10.12.2016, several species were reported during the field survey of October, 11th, 2015 in the site, such as Hermann’s tortoise.
(Testudo hermanni), Erhard’s wall lizard (Podarcis erhardii), Dalmatian wall lizard (Podarcis melleri), common wall lizard (Podarcis muralis), Balkan wall lizard (Podarcis taurodus), and European green lizard (Lacerta vividz).

Amphibians: No amphibian species were recorded, however few species such as Balkan frog (*Pelophylax kurtmuelleri*/*Rana balcanica*), yellow-bellied toad (*Bombina variegata*), and stream frog (*Rana graeca*) were observed during the field survey in the area in 11.10.2015.

<table>
<thead>
<tr>
<th>Key Flora Species (English/Latin):</th>
<th>Observations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oriental plane (<em>Platanus orientalis</em>), willow (<em>Salix sp</em>), poplar (<em>Populus sp</em>), elm (<em>Ulmus sp</em>), Mastic (<em>Pistacia lentiscus</em>), green olive tree (<em>Phyllirea latifolia</em>), pink rockrose (<em>Cistus incanus</em>), walnut (<em>Juglans regia</em>), White Pampas Grass (<em>Erianthus ravennae</em>), wild blackberry (<em>Rubus ulmifolius</em>).</td>
<td>Plant species, such as <em>Rubus ulmifolius</em>, <em>Juglans regia</em> and <em>Prunus</em> spp, including crops and fruit trees, are used as food sources for numerous bird species, as well as for foxes and badger. Riparian vegetation plants provide shelter for otters, other mammals, and birds.</td>
</tr>
</tbody>
</table>

**Hydrobiology:**
The Osumi River runs parallel to the Orizaj Re-route.

**Observations:**
This section of Osumi River is used by otter (*Lutra lutra*), at least seasonally for commuting and foraging, as its presence along the Osumi River has been confirmed by previous investigations conducted during the ESIA process.

<table>
<thead>
<tr>
<th>Designated Areas:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No existing or proposed protected areas are crossed by, or in the vicinity of the Orizaj Re-route.</td>
<td></td>
</tr>
</tbody>
</table>

**Area in need of a Construction Restriction Period**
The first section of the Orizaj Re-route passing through riparian vegetation is considered to require, to the extent feasible, the implementation of a construction restriction period during the breeding season (March-July).

Considering the importance of the area for otters, it is also recommended to verify any existing shelter/holts they may use along this section of the Osumi River before construction activities begin.

Additionally, as a general protection measure, it is recommended that no night-time construction activities are undertaken.

<table>
<thead>
<tr>
<th>Conclusions and key aspects:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The species and habitats observed along the Orizaj Re-route are consistent with those expected in this area, and in accordance with the ESIA (2013) findings. The species and habitats considered as most relevant, under conservation parameters, are listed above.</td>
<td></td>
</tr>
</tbody>
</table>
The findings and mitigation measures provided in the TAP Albania ESIA (2013) are valid and applicable to this re-route, along with site specific measures and relevant plans/procedures developed during the post-ESIA currently covered under TAP’s Environmental and Social Implementation Plans (ESIPs).

Applicable mitigation measures, already considered in the ESIA (2013), include:

- Ensure impacts and risks associated to recorded fauna are dealt with as per the Management Plans included in the ESIA (and the specific management plans and procedures developed subsequently), with special focus on detecting the presence of otter shelters/holts along this section of the Osumi River.
- Avoid long term (> 3 days) impediment of water flow or construction of long-term barriers along the watercourse banks to avoid impeding otter movement.
- Reduce working strip in sensitive habitats to a minimum of 22 – 28 m where possible to minimize habitat clearance.
- Construction works to be performed, to the extent feasible, outside of the breeding seasons which are sensitive periods for key species (April – July, in the case of the birds, and February / March, in the case of otter and badger).
- Reinstatement of habitats after construction activities.
- Strict site run-off management and spill contingency plan.
- Erosion and Sediment Control Plan including measures to avoid potential silting of the Osumi River.

Photos:

- **WPE058**: Otter (*Lutra lutra*) spraint on a stone.

- **WPE059**: *Pistacia lentiscus*
WPE059: Orizaj Re-route running parallel with Osumi River: riparian vegetation and elements of maquis. (view E)

WPE060: Orizaj Re-route running parallel with national road and Osumi River: riparian vegetation dominated by *Platanus orientalis*. Degraded maquis vegetation uphill. (view W)

WPE061: Otter (*Lutra lutra*) footprint.

WPE062: Footprints of otter (*Lutra lutra*) and fox (*Vulpes vulpes*) on the muddy riverbank.

WPE063: Riparian vegetation of *Platanus orientalis*.

WPE062: Feeding sign of badger (*Meles meles*) in the crop field with perennial crops.
WPE062: Orizaj Re-route heading to vineyards and crop fields of annual and perennial crops. (view W)

WPE063: Intersection of the re-route with pipeline baseline route passing downhill through crop fields. (view N)

WPE062: Signs of Microtus thomasi presence in crop fields with perennial crops.

WPE063: Intersection of the re-route with pipeline baseline route: crop fields of annual and perennial crops. (view E)
- Warehouses

Where the re-route joins the ESIA centerline two warehouses are found. Due to the proposed re-route the distance from the centerline to these has increased from approximately 20 m to 45 m (KP 0,85).

Within the terrains crossed by the re-routes several small/unpaved roads provide access to the arable lands.

Conclusions and key aspects:

The proposed re-route crosses areas with characteristics equivalent to those proposed in former Albania ESIA centerline. Therefore the findings and mitigation measures provided in the TAP Albania ESIA (2013) are valid and applicable to this re-route, along with site specific measures and relevant plans/procedures developed during the post-ESIA phase currently covered under TAP’s Environmental and Social Implementation Plans (ESIPs).

Key elements of interest would be the management impacts on: (1) permanent crops, (2) temporary disruption of unpaved access roads (3) and management of the potential temporary disruption of powerlines and irrigation channels.

It is recommended to evaluate the possibility of minimizing the clearance of fruit trees and vineyards.

Applicable mitigation measures, already considered in the ESIA, include:

- Reducing the working strip to the extent possible in areas of more sensitive croplands.
- Establishing a Livelihoods Restoration Plan identifying reliable cadastral data and landowners.
- Information campaign / disclosure to local land users / owners.
- Close engagement with the local/regional electricity utility company to minimize disturbance to users.
- Avoidance and or reestablishment of affected irrigation infrastructure.
- Installing track/path crossings for accesses to arable lands.
- Establish a specific traffic management plan and engagement with local stakeholders.

Photos:

WPS060: Start of the proposed re-route. The national road is located 15 m behind the drystone wall. (view N)

WPS061: General view from the national road towards the east. The proposed centerline crosses the riparian vegetation on the right. The irrigation channel is located at the foot of the road batter, before the riparian vegetation.
<table>
<thead>
<tr>
<th><strong>Socioeconomic Findings Summary Datasheet</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project:</strong> TAP Re-routes 2017</td>
</tr>
<tr>
<td><strong>Specialist:</strong> Ferran Climent</td>
</tr>
<tr>
<td><strong>Settlements:</strong> Re-route locate within the Skrapar Municipality. Closest villages include: Orizaj, Buzuk</td>
</tr>
<tr>
<td><strong>Observations:</strong> Orizaj is the closest village (located some 600 m to the east). Buzuk is located some 900 m to the south (on the opposite side of the Osumi River and at a higher altitude. No residential housing is found in the vicinity of the re-route. Only some warehouses have been identified (refer to “Infrastructure”).</td>
</tr>
<tr>
<td><strong>Land Cover/Uses:</strong> The land cover/uses crossed by the alignment include: Agricultural fields (yearly crops and fruit trees), Grasslands, Riparian/riverine environment</td>
</tr>
<tr>
<td><strong>Livelihood:</strong> Livelihoods along the re-route are mostly related to the land and associated natural resources: Agriculture, Grazing livestock</td>
</tr>
<tr>
<td><strong>Infrastructure / Construction:</strong> The area is easily accessible through several to unpaved access roads. Noted infrastructure includes: National Road, Irrigation Channel, High Voltage Power line, Small unpaved paths providing access to the agricultural houses.</td>
</tr>
</tbody>
</table>
WPS062: Power line (the national road is located between the two towers seen in the photo). (view N)

WPS063: Fruit orchard located parallel to the national road. (view E)

WPS064: Vineyard crossed by the centerline and irrigation channel. (view E)

WPS065: General view from the end of the re-route towards the E. The location of the road can be identified on the left of the photo.
ANNEX 2: Baseline Feature Map
METHODOLOGY USED TO DERIVE THE EU HABITATS CARTOGRAPHY

The following section presents a brief description of the methodology used for the preparation of the EU Habitats cartography and provides guidance for its interpretation.

The CORINE land cover and general habitats cartography (1:100,000 scale) was used as a primary source to define areas (polygons) with potentially similar habitat characteristics within the Study Area. This approach is aligned with the methodology and classification system used in the TAP ESIA Albania (2013) and is a good tool to provide general descriptions for broader areas (e.g. the complete TAP Project).

These polygons were defined along each Project feature and included a buffer of 1 km (i.e. 500 m each side of the centreline). Each CORINE polygon should ideally be largely covered by one single type of habitat. However, this was not always the case and often polygons included a combination of land uses and habitats. In these cases and where the actual distribution of landscape features allowed, the polygons were divided in more homogeneous portions through the use of satellite imagery. By increasing homogeneity in each polygon accuracy in the subsequent classification of habitats would also be increased. A common example of this was the subdivision of several polygons into either grasslands or forests instead of a combination of these two.

The polygons were reviewed and classified accordingly based on the specific field information (i.e. ground-truthing along each of the Project features). Where no relevant EU Habitat coverage was found the polygons were discarded. For those polygons with relevant portions of EU Habitat, the most abundant habitat was used to define the EU Habitat type. In some cases, however, where several EU habitats were ‘equally’ distributed within a polygon, all of them were considered and the polygon was explicitly presented as a combination of habitats.

The above methodology provides a good general view of the distribution of EU Habitats and indicates those areas where these are more abundant. This methodology is aligned with the works performed in the TAP ESIA and objective of the ESIA Addendum, however, for an accurate use/interpretation of this EU Habitats cartography the following limitations should be considered:

- The EU Habitats presented in the cartography show only those areas where specific EU Habitats cover a large proportion of the terrain. However, because most of the Study Area is characterized by a dense mosaic of different land uses and habitats, small patches of EU Habitats can be actually found scattered within the entire Study Area.

- The habitats found within the Study Area include a combination of transitional forms between non-EU Habitats and EU Habitats. Thus, the actual definition of the EU Habitats and its delineation has to be considered as a synthesis. The delineation of the EU Habitats was based on expert judgement during both, the field survey and the interpretation of the satellite imagery (because of this, the reader might find some potential discrepancies between the detailed field notes and the EU Habitats mapping).

- As stated above, where several EU Habitats were identified within the same polygon area the most abundant one was used to define the habitat type. However, in some cases, the cartography has been defined as a combination of different habitats.

- The field survey showed that the EU Habitats are, in a lot of cases, degraded habitats (largely due to grazing, forestry activities and other local practices). This information was captured during the field survey and can be confirmed in the Field Notes where needed.
LEGEND

BASECASE ROUTE (JANUARY 2016)

BASECASE KILOMETER POINT (3D*)

ORIZAJ RE-ROUTE

RE-ROUTE KILOMETER POINT (2D*)

CORRIDOR (500 + 500M)

FIELD SURVEY DECEMBER 2016

ENVIRONMENTAL SURVEY WAYPOINT (WPE)

SOCIOECONOMIC SURVEY WAYPOINT (WPS)

CULTURAL HERITAGE SURVEY WAYPOINT (WPC)

ENVIRONMENTAL

RIVER AND SURFACE WATER

- RV-1 (MAIN RIVERS)

- RV-2 (TRIBUTARY OF THE MAIN RIVERS)

- RV-3 (SMALLER STREAMS TRIBUTARY OF RV-2))

EU HABITATS

- GALIO-CARPINETUM OAK-HORNBEAM FORESTS (9170)

- PLATANUS ORIENTALIS AND LIQUIDAMBAR ORIENTALIS WOODS (PLATANION ORIENTALIS) (92C0)

- QUERCUS ILEX FORESTS (DEGRADATION STAGE AS SHRUBS OR MAQUIS) (9340)

CULTURAL HERITAGE SITE

LOW IMPORTANCE

MEDIUM IMPORTANCE

HIGH IMPORTANCE

SOCIAL

SETTLEMENT

MUNICIPALITY

(*) NOTE:

KPs along the proposed re-route are provided in 2D
KPs along the basecase route are provided in 3D
ANNEX 3: Field Survey Notes
**Way Point Code** | **Date** | **Project Component** | **Photo** | **Cultural Heritage Database Number (CH-#)** | **Cultural Heritage Importance** | **Coordinates** | **Observations / Remarks** | **Potential for unknown sites**
---|---|---|---|---|---|---|---|---
3A | CH | WPC043 | 10/12/2016 | Orizaj Re-route | WP-462_2 | no | 4429436 | 4488644 | Starting point near river Osum - Buzuq | Low potential
3A | CH | WPC044 | 10/12/2016 | Orizaj Re-route | WP-464_1 | no | 4429129 | 4488510 | Land planted with fruit trees | Low potential
3A | CH | WPC045 | 10/12/2016 | Orizaj Re-route | WP-464_1 | no | 4423659 | 4488536 | End of re-route, socialist storage buildings | Low potential
2A | CH | WPC055 | 11/10/2015 | Orizaj Re-route | CH-586 | Moderate | 4429469.627 | 448864.693 | Crossing point national road at Lisi Buzuq | Moderate potential for culturally sensitive site

**CH WP numbering is continuous from previous surveys.**
## Environmental (ENV) Field Survey Notes

<table>
<thead>
<tr>
<th>Way Point Code</th>
<th>Survey Date</th>
<th>Discipline</th>
<th>Way Point Code</th>
<th>Way Point Code</th>
<th>Way Point Code</th>
<th>Survey Date</th>
<th>Disciplines / Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 ENV WPE058</td>
<td>10/12/2016</td>
<td>Crisp Re-route</td>
<td>9361</td>
<td>9361</td>
<td>4429452</td>
<td>4488222</td>
<td>Well developed Riparian vegetation dominated by Platanus orientalis and Salix along the river bank. ESO Platanus orientalis and Liquidambar orientalis woods (Platanion orientalis). Platanus orientalis, Salix sp., Populus canadensis, Erianthus ravennae. Lutra lutra (spraints in two sprainting points close to each other), Lutra lutra (footprints), Mustela putorius, Mustela nivalis, Mustela erminea. Good habitat quality for otter. High sprainting activity (4 spraints in two sprainting points, 1m distance).</td>
</tr>
<tr>
<td>A1 ENV WPE059</td>
<td>10/12/2016</td>
<td>Crisp Re-route</td>
<td>9351, 9352</td>
<td>9351, 9352</td>
<td>4429417</td>
<td>4488205</td>
<td>Intersection of the re-route with the Baseline route, close to Buzuqi village. Riparian vegetation dominated by Platanus orientalis. ESO Platanus orientalis and Liquidambar orientalis woods (Platanion orientalis). Quercus ilex forests (degradation stage as shrubs or maquis). Platanus orientalis, Salix sp., Populus canadensis, Liquidambar orientalis, Phyllirea angustifolia, Lutra lutra (footprints), Turdus merula, Motacilla cinerea. Otter habitat of medium quality. No den or holt found, but the site is used as forage place during commuting.</td>
</tr>
<tr>
<td>A1 ENV WPE060</td>
<td>10/12/2016</td>
<td>Crisp Re-route</td>
<td>9366, 9367</td>
<td>9366, 9367</td>
<td>4429420</td>
<td>4488112</td>
<td>Riparian vegetation dominated by Platanus orientalis along the river bank. ESO Platanus orientalis and Liquidambar orientalis woods (Platanion orientalis). Platanus orientalis, Lutra lutra (spraints and footprint), Vulpes vulpes (footprints/tracks). Otter habitat of medium quality. No den or holt found, but the site is used as forage place during commuting.</td>
</tr>
<tr>
<td>A1 ENV WPE061</td>
<td>10/12/2016</td>
<td>Crisp Re-route</td>
<td>9368</td>
<td>9368</td>
<td>4429228</td>
<td>4488187</td>
<td>Well developed Riparian vegetation dominated by Platanus orientalis along the shallow and river bank. ESO Platanus orientalis and Liquidambar orientalis woods (Platanion orientalis). Platanus orientalis, Lutra lutra (spraints and footprint), Vulpes vulpes (footprints/tracks). Otter habitat of medium quality. No den or holt found, but the site is used as forage place during commuting.</td>
</tr>
<tr>
<td>A1 ENV WPE063</td>
<td>10/12/2016</td>
<td>Crisp Re-route</td>
<td>9362</td>
<td>9362</td>
<td>4425704</td>
<td>4488485</td>
<td>Intersection of the re-route with the Baseline route. Mosaic arable land (annual and perennial crop fields, with scattered fruit trees along the hedgerows). Agriculture land. Rubus ulmifolius, Ficus carica, Juglans regia, Vulpes vulpes (footprints/tracks), Microtus thomasi (presence signs), Fringilla coelebs, Corvus cornix, Fringilla coelebs, Erithacus rubecula. Feeding site for badger and foxes, but no den site found.</td>
</tr>
</tbody>
</table>
## Socioeconomics (SOC) Field Survey Notes

<table>
<thead>
<tr>
<th>Key Point Code</th>
<th>Date</th>
<th>Project Component</th>
<th>Way Point Code</th>
<th>X_GK_Z_4 Y_GK_Z_4</th>
<th>Observations / Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A SOC WPS060</td>
<td>10/12/2016</td>
<td>Orizaj Re-route</td>
<td>457</td>
<td>4428316 4488684</td>
<td>Start of the proposed reroute. Fruit tree plantation located some 10m from the national road.</td>
</tr>
<tr>
<td>3A SOC WPS061</td>
<td>10/12/2016</td>
<td>Orizaj Re-route</td>
<td>470</td>
<td>4429596 4488822</td>
<td>Area with absence of arable lands. The proposed re-route travels along a section of riparian vegetation parallel to the national road.</td>
</tr>
<tr>
<td>3A SOC WPS062</td>
<td>10/12/2016</td>
<td>Orizaj Re-route</td>
<td>469</td>
<td>4429221 4488595</td>
<td>Tower of the power line found along the road and the proposed re-route.</td>
</tr>
<tr>
<td>3A SOC WPS063</td>
<td>10/12/2016</td>
<td>Orizaj Re-route</td>
<td>460</td>
<td>4429219 4488552</td>
<td>Fruit tree plantation located along the re-route between the national road and Osumi river.</td>
</tr>
<tr>
<td>3A SOC WPS064</td>
<td>10/12/2016</td>
<td>Orizaj Re-route</td>
<td>461</td>
<td>4426415 4488493</td>
<td>Mosaic agricultural lands combining permanent plantations (vineyards), yearly crops and grasslands. A small irrigation channel is also found together with vineyards crossed by the centerline and irrigation channel.</td>
</tr>
<tr>
<td>3A SOC WPS065</td>
<td>10/12/2016</td>
<td>Orizaj Re-route</td>
<td>459</td>
<td>4428701 4488500</td>
<td>End of the proposed re-route with mosaic agricultural lands and evidences of grazing.</td>
</tr>
</tbody>
</table>