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GENERAL DIVISION OF MINES



"SUSTAINABLE DEVELOPMENT IN THE MINERALS INDUSTRY"
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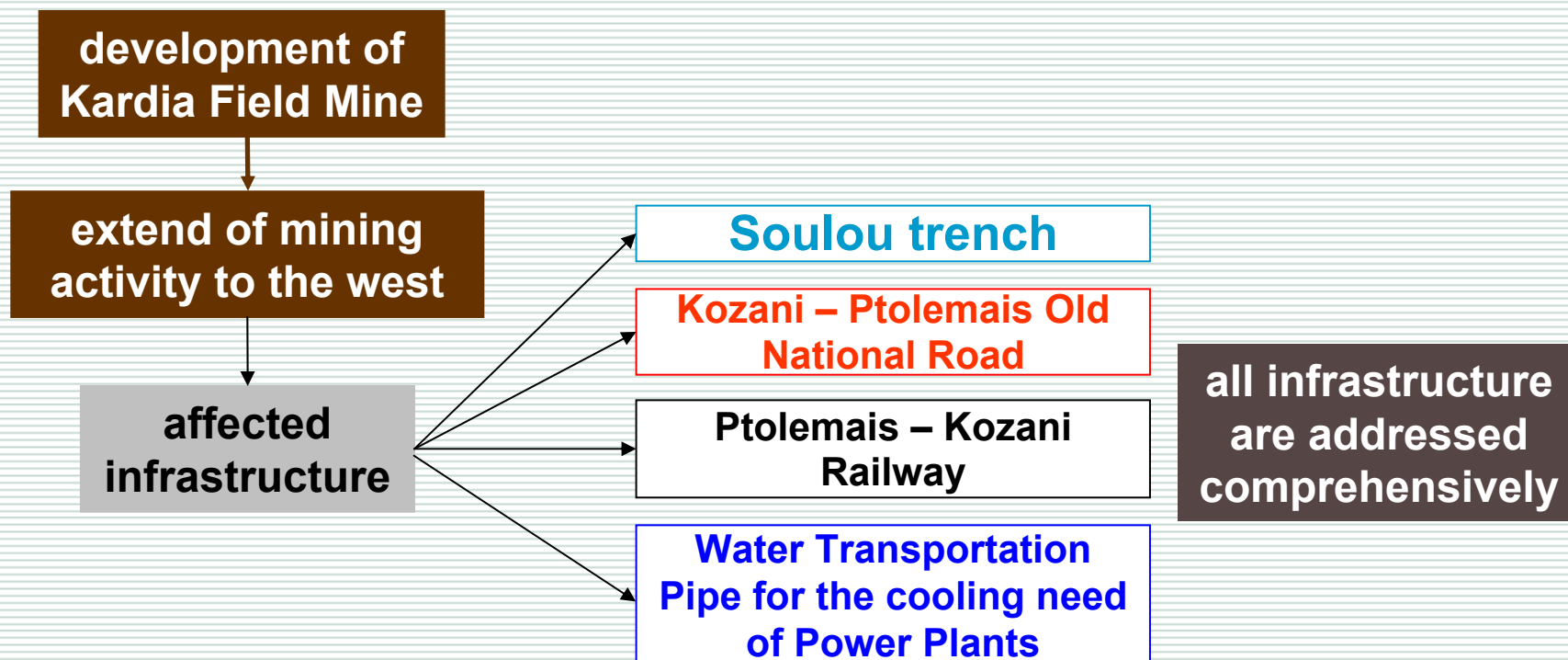
Relocation of Soulou trench, in PPC's mines, Ptolemais, Greece

G.Giouli, K.Mahtis and A.Sokratidou
Public Power Corporation, Greece



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Purpose of Soulou trench relocation





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Important remarks

**was constructed 60 year ago to
drain the marshy area Sarigkiol,**

is used for irrigation needs,

**flows through a significantly
lignite bearing region,**

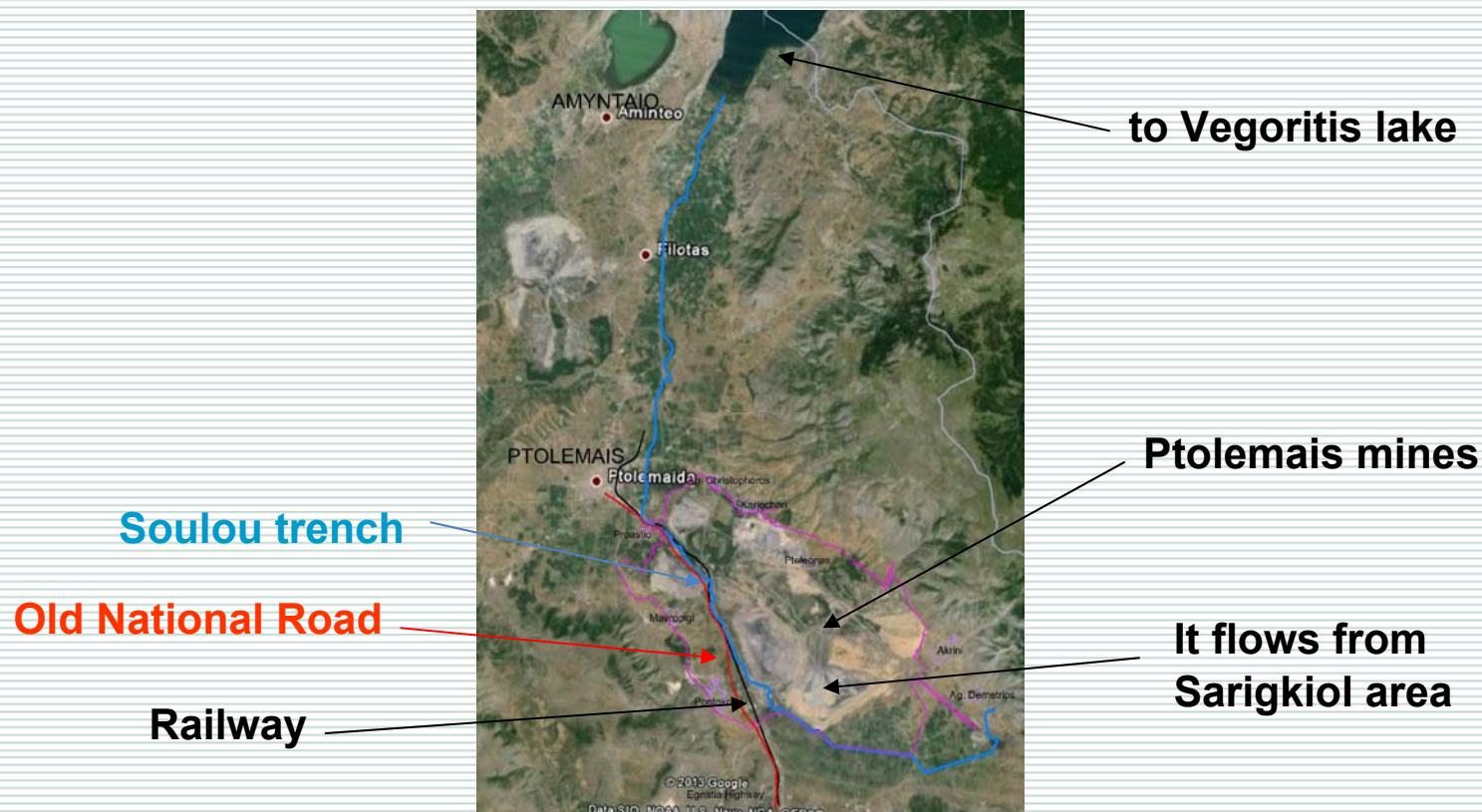
**is close to PPC's mines
(Mavropigi, South Field and
Kardia Field) in operation,**

SOULOU TRENCH



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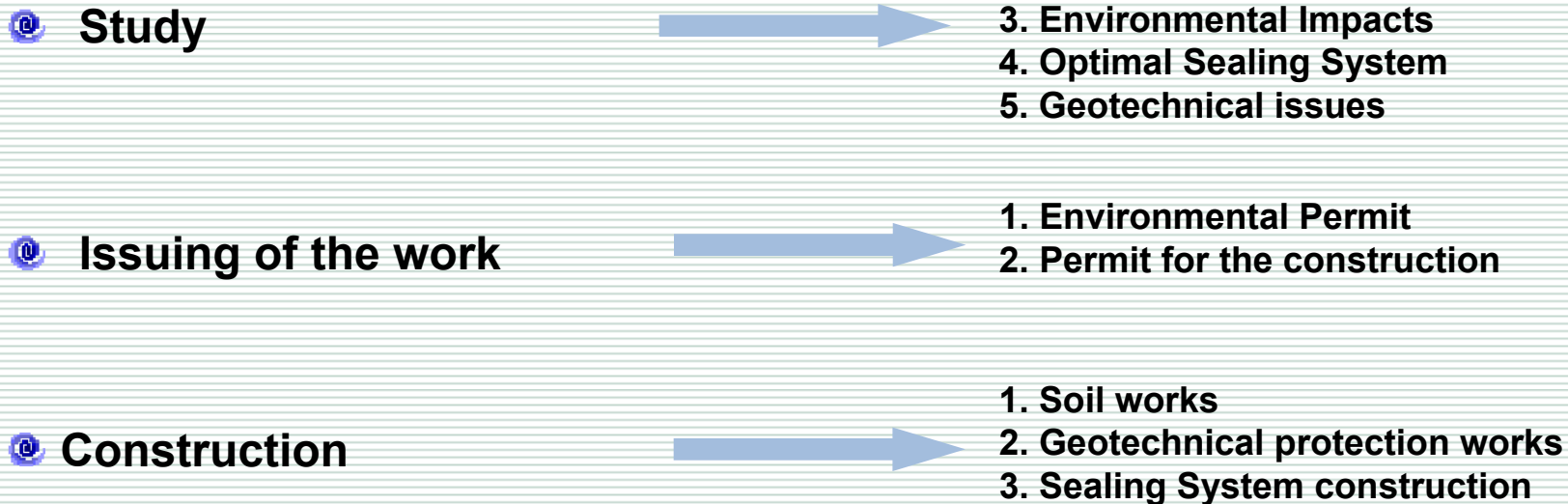
Soulou identity





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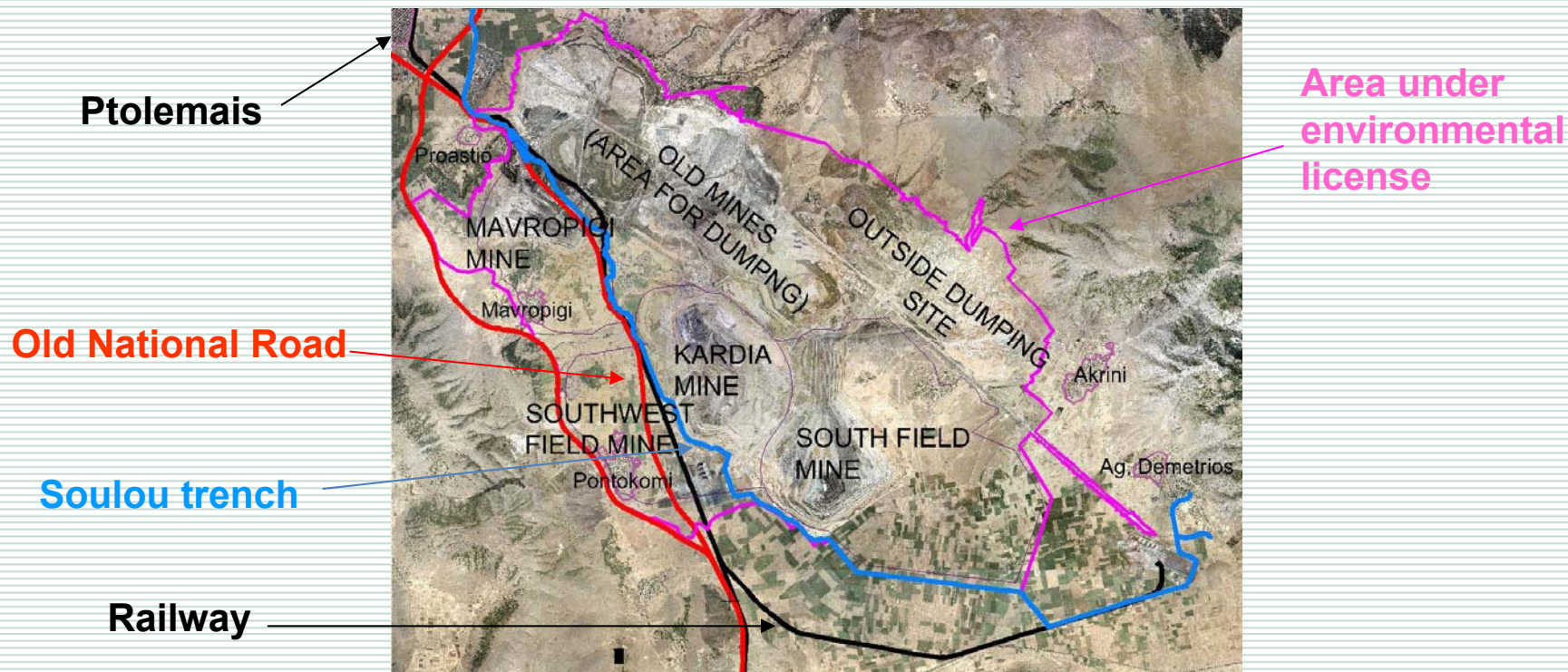
Steps of the project





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Soulou trench bed before the relocation



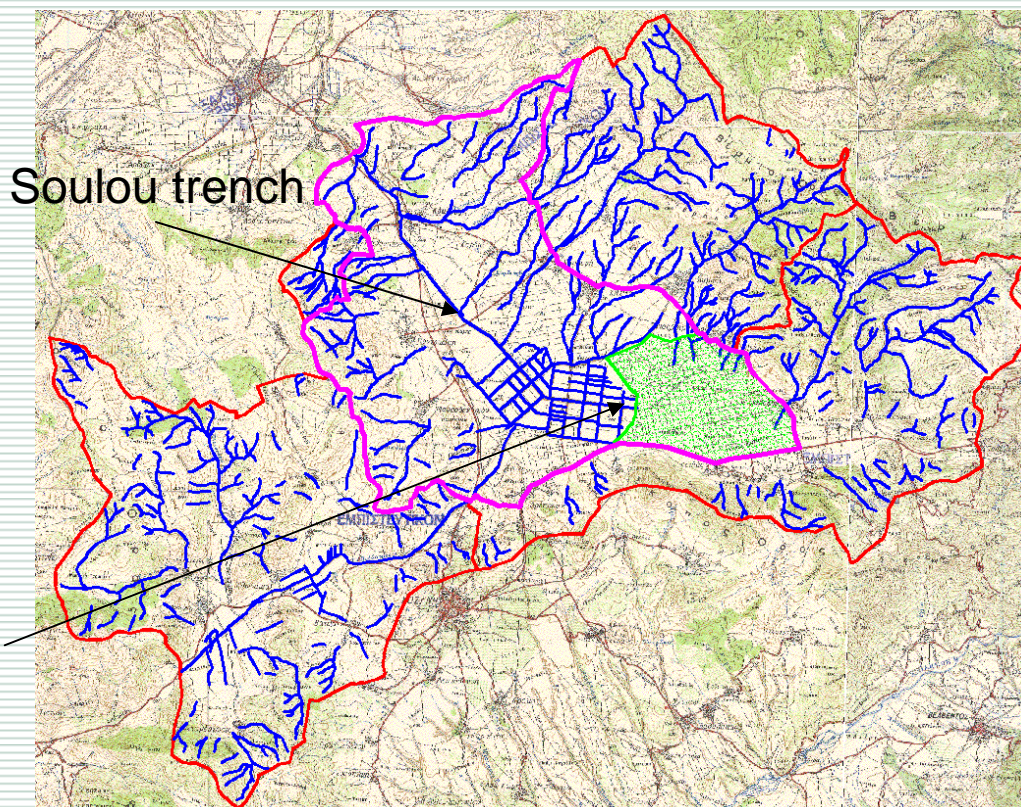


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Soulou hydrology

Soulou trench belongs to the Water District of West Macedonia, Greece, Sarigkiol sub-basin, (closed to Ptolemais basin).

Sarigkiol area (green)





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Soulou trench flow flux evaluation

Karstic formation

Relief change
due to mining
activities

some sub-basin have
little involvement in
Soulou's trench flux

→ **Active surface: ~ 230 km²**

The method of watermark flood was used

→ **Flood flux: ~ 28.30 m³/s**

According to landowners of the region, no
flood has occurred during the past 50 years

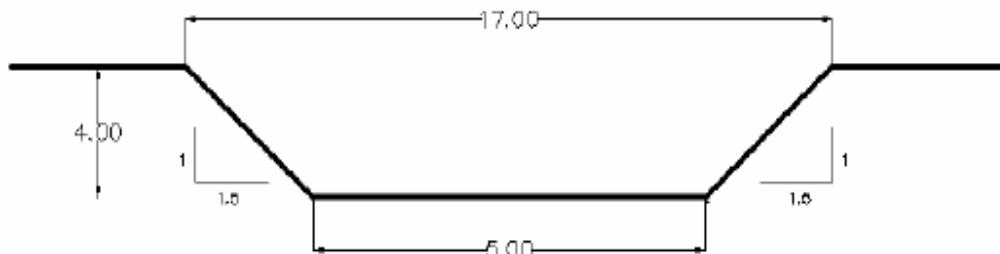
→ **Final flood flux: ~ 30.00 m³/s**



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Soulou trench new bed specification

1. Trapezoidal cross section of the bed with 5 m bottom width,
2. Slopes' inclination 1.0 : 1.5 (height : base), and
3. According to hydraulic calculations a pit depth of 3.29 m.





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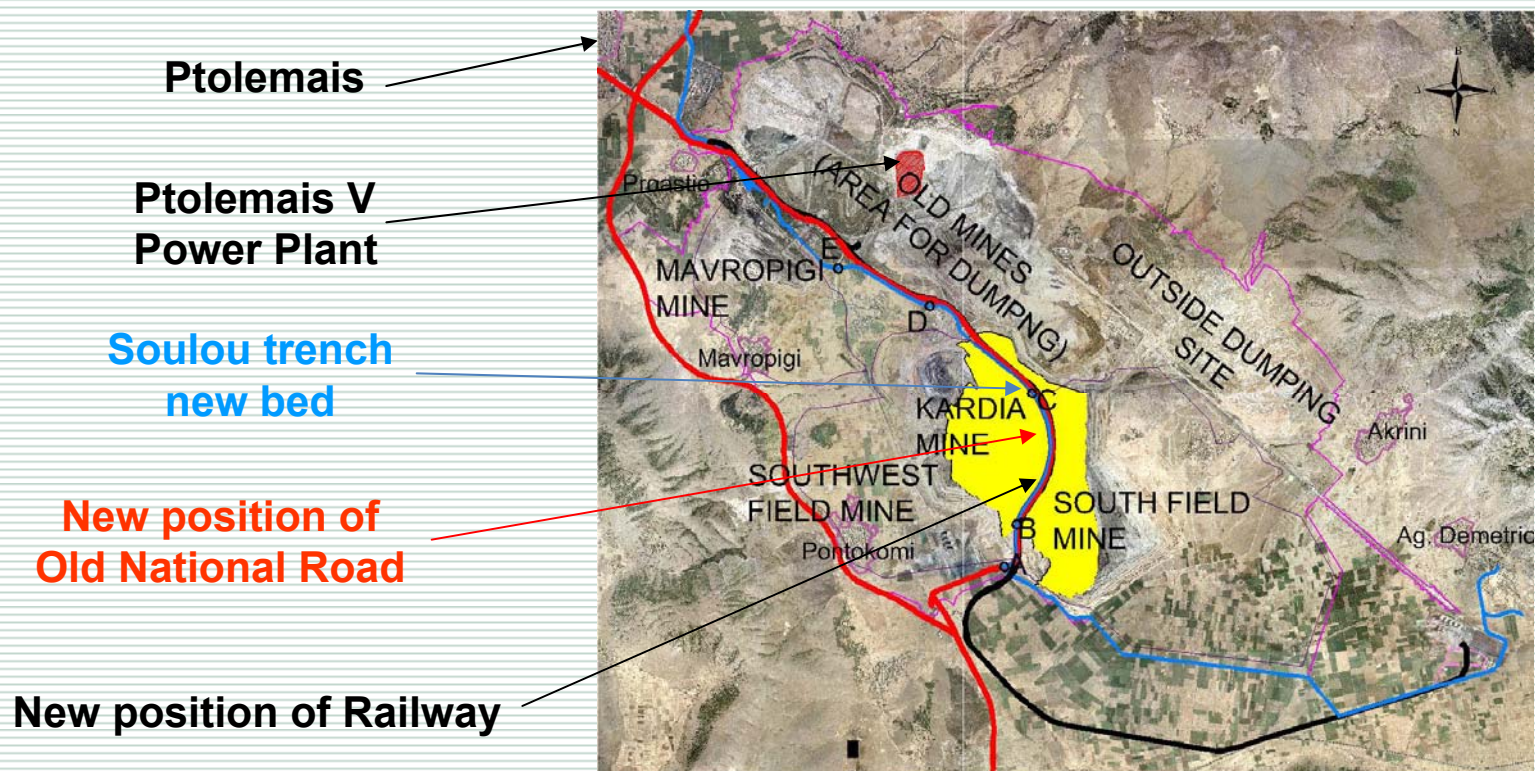
Soulou trench alternatives

ALTERNATIVE		RESULT
zero solution	to continue the development of mining, without any relocation	the destruction of Soulou trench, will stop the flow of water and the mines excavation will flood, fact that would seriously jeopardize human lives and equipment
construction of pumping and discharge pipe	no surface flow of Soulou trench	disturbance of the ecological balance of the area
bed location, either NE or SW of the mines (out of the mines area).		diversions / variants of all infrastructure (affected by the development of mines) should be addressed comprehensively
bed location, on the boundary of South Field and Southwest mines		the proper operation of mines is ensured, dumps of the waste materials are used, new trench is located close to the old one.



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Soulou trench new bed





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Soulou trench bed geotechnical investigation

Part of the new trench and the other infrastructure (railway, national road, pipeline) will be implemented over relatively **recent dumps** of mine waste materials.



Any **failure** on the stability of the dumps will **endanger human** life and jeopardize mine equipment.



The **safety** of the infrastructure depends on the **geotechnical condition** of the dumps.

MAIN ISSUES

- A. Estimate of subsidence, (size and development over time),**
- B. Determine construction time, to avoid failures**

RESULTS

Expected subsidence:
80 % between 2010 - 2012,
17 % between 2012 - 2015,
2 % between 2015 to 2017.



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Soulou trench new bed waterproofing

According to the waterproofing investigation the system must have:

- A. low permeability** to minimize the leakage,
- B. sufficient strength** to minimize the risk of failure, and
- C. adequate protection** to minimize the risk of corrosion - cracking.

MAIN CONCLUSIONS

A. geological barrier of:

thickness ≥ 1 m and $K \leq 10^{-9}$ m / sec,

B. construction method:

"Bath Method" or "Steps Method" or combined solution

C. formation of dumps in operation

to fulfill construction needs



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Soulou trench new bed issuing

Environmental Impact Assessment for Soulou trench relocation has been elaborated and submitted in 2006.

Environmental Impact Assessment for Ptolemais Mines has been elaborated and submitted in 2009.

The Ministry for Environment, Energy and Climate Change decided that Soulou trench is a **consequent work** of the mines

Environmental Permit has been issued for both projects, according to the Ministerial Degree, in 2011

Request for the Soulou trench relocation has been submitted in 2011, in the West Macedonia Prefecture.

Permit for the works of water resources utilization **has been issued**, in 2012.



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Soulou trench old bed





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Soulou trench new bed under construction



Milos Island

30 June – 3 July 2013



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Soulou trench new bed under construction

Excavating the old dumps

Formation of new dumps





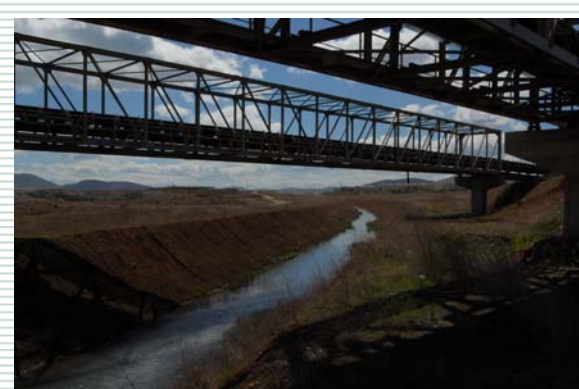
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Soulou trench new bed





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Soulou trench new bed





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Soulou trench new bed

Slope's rehabilitation





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