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Integrated Water Resources Management / Akhouryan River
Construction of Kaps Reservoir and Gravity Irrigation System

German Financial Cooperation with Armenia

Presentation to National Water Policy Dialogue 6.5.2014

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Partners

- Government of the Republic of Armenia
  - represented by the State Committee of Water Economy under the Ministry of Territorial Administration
- Government of the Federal Republic of Germany
  - represented by the Federal Ministry of Cooperation and Development, administered through KfW Entwicklungsbank
- implemented by a consortium of consultants
  - CES Consulting Engineers Salzgitter GmbH
  - AHT GROUP AG Management & Engineering
  - Yerevan State University of Architecture and Construction

Project ToR

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- Task I Analyse and Update of 2009 Feasibility Study “IWRM / Akhouryan River, Phase 1”
- Task II Detailed design and assistance to tendering “IWRM / Akhouryan River, Phase 1”
- Task III Construction supervision for Phase 1 contracts
- Task IV Feasibility Study for the Irrigation System of “IWRM / Akhouryan River, Phase 2”
- Task V Management Plan for the Akhouryan River Basin

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Current Status of Activities

- Task I: Submitted Dam Planning and Pipeline & Conveyance Study Interim Reports
- Task IV: Submitted Draft Feasibility Report
- Task V: Conducted Status Quo Workshop

Ongoing / expected:

- Task I: Draft Feasibility Report expected end of May
- Task V: Draft Akhouryan Basin Management Plan mid of May
- All Tasks: Stakeholder workshop second half of June
- Completion Tasks I, IV, V end of June / mid July
- Start Task 2 (Final design) depends on appraisal of Project

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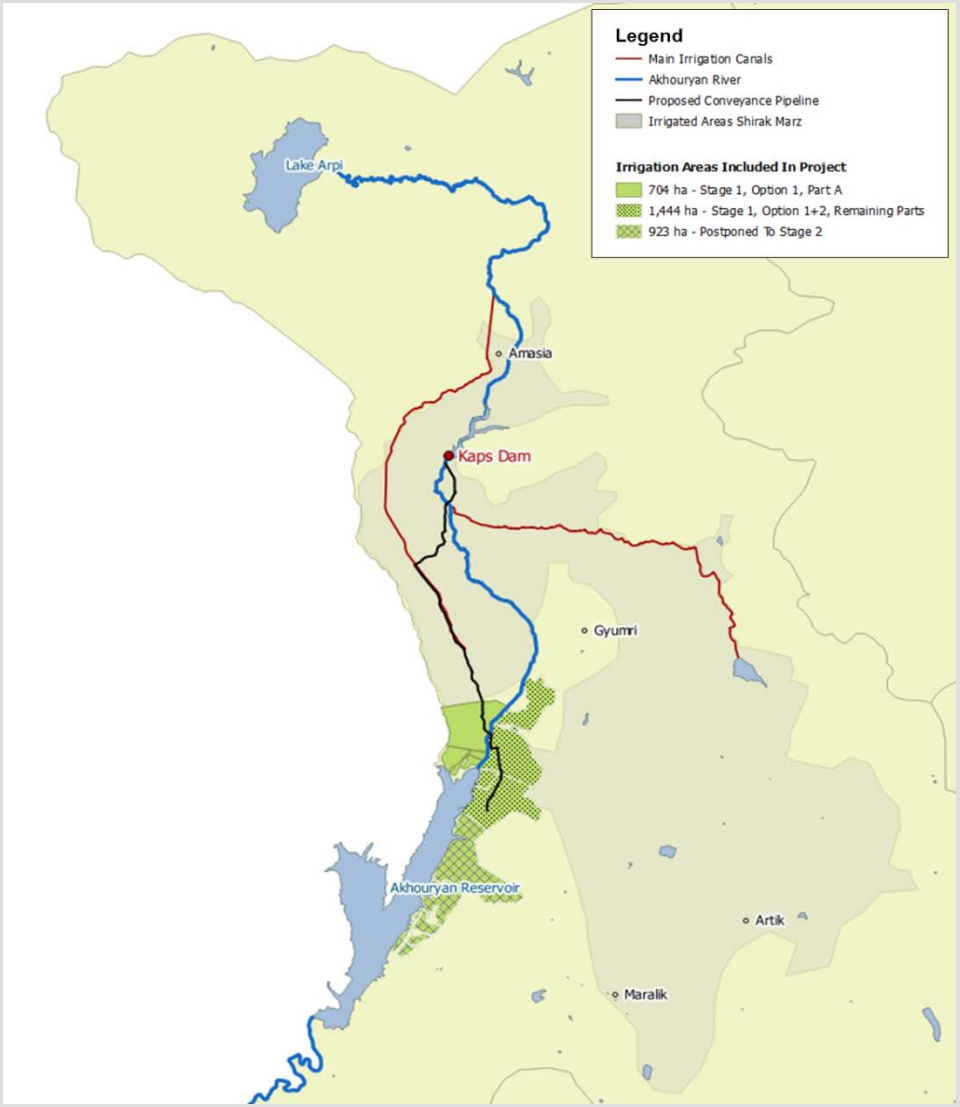
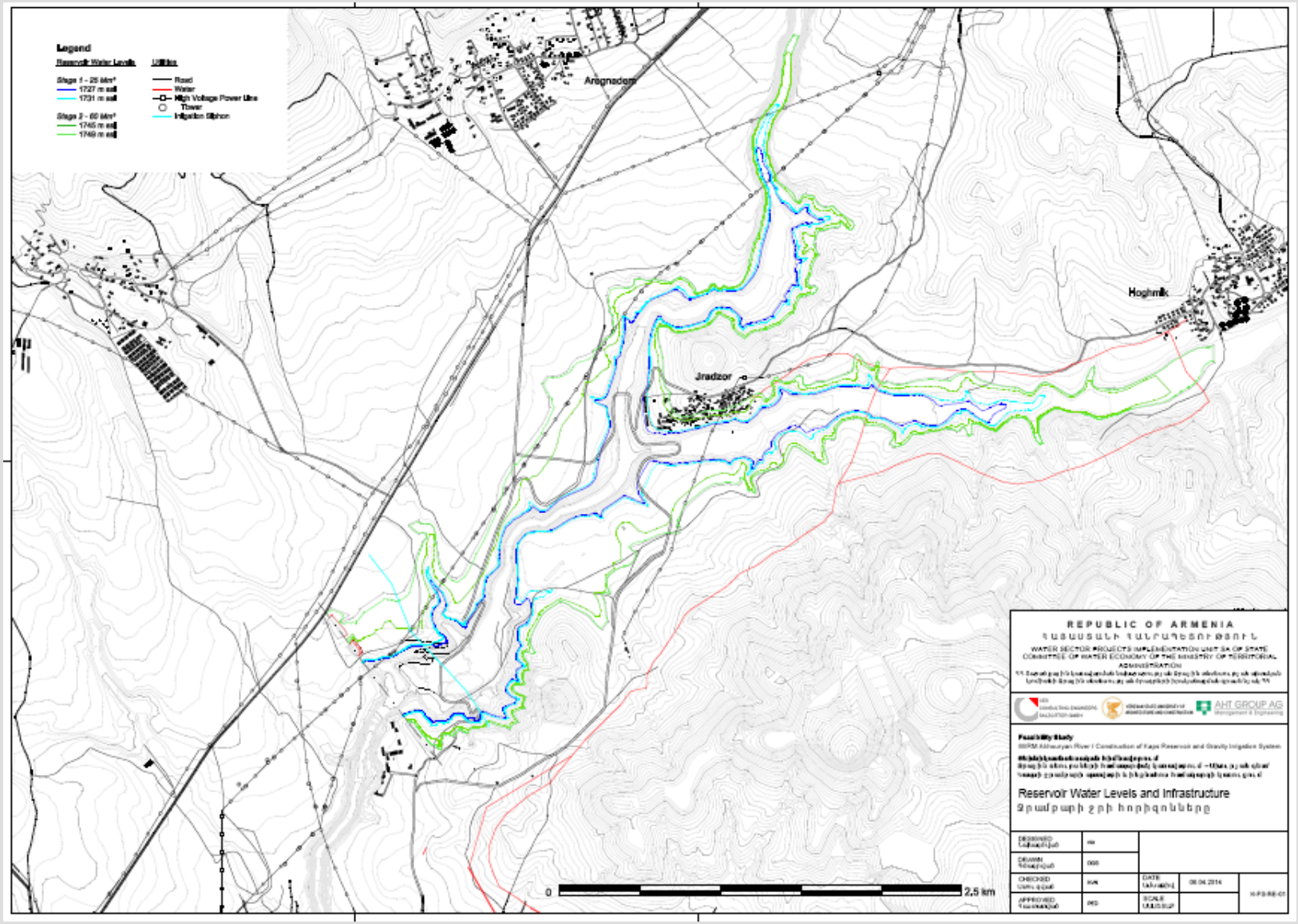
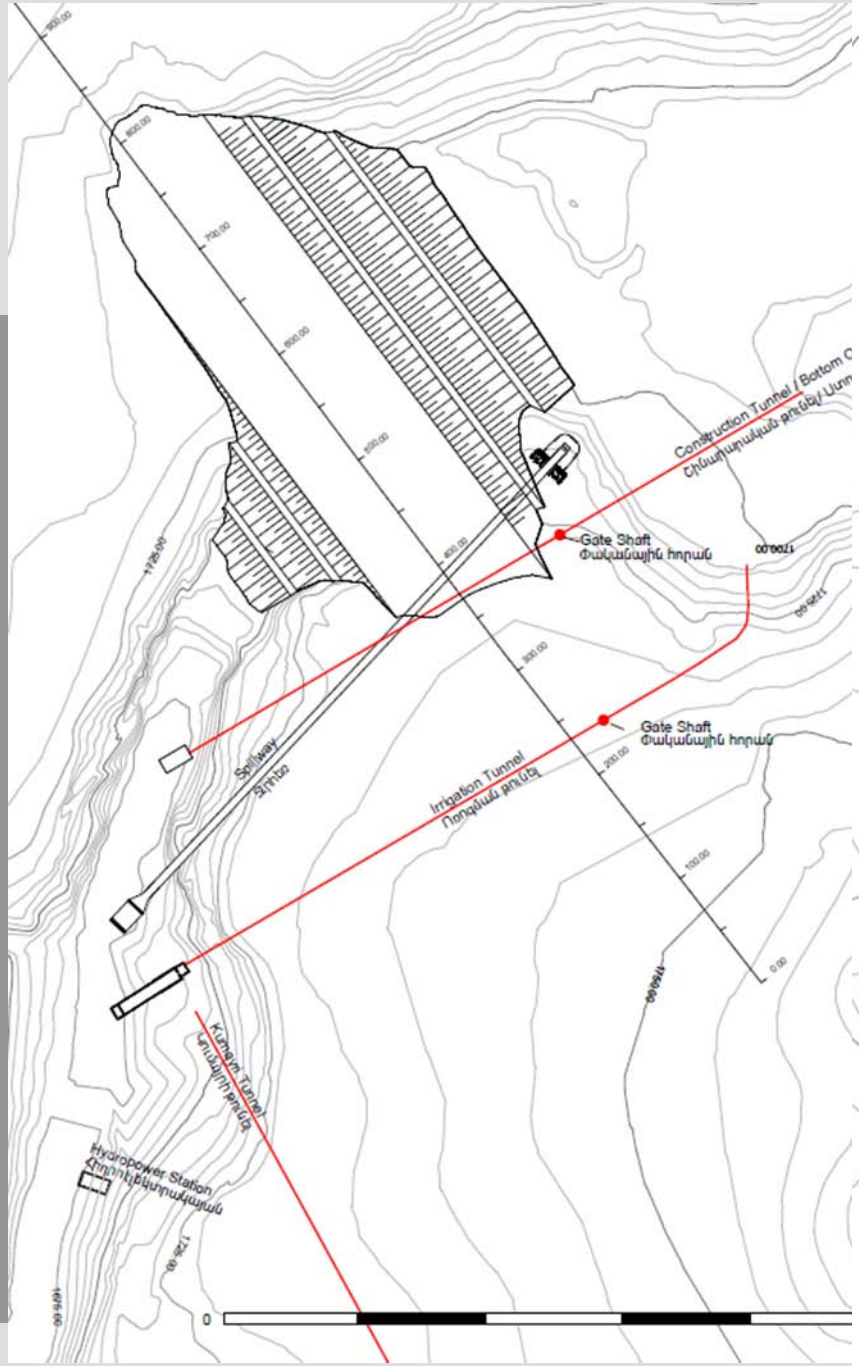
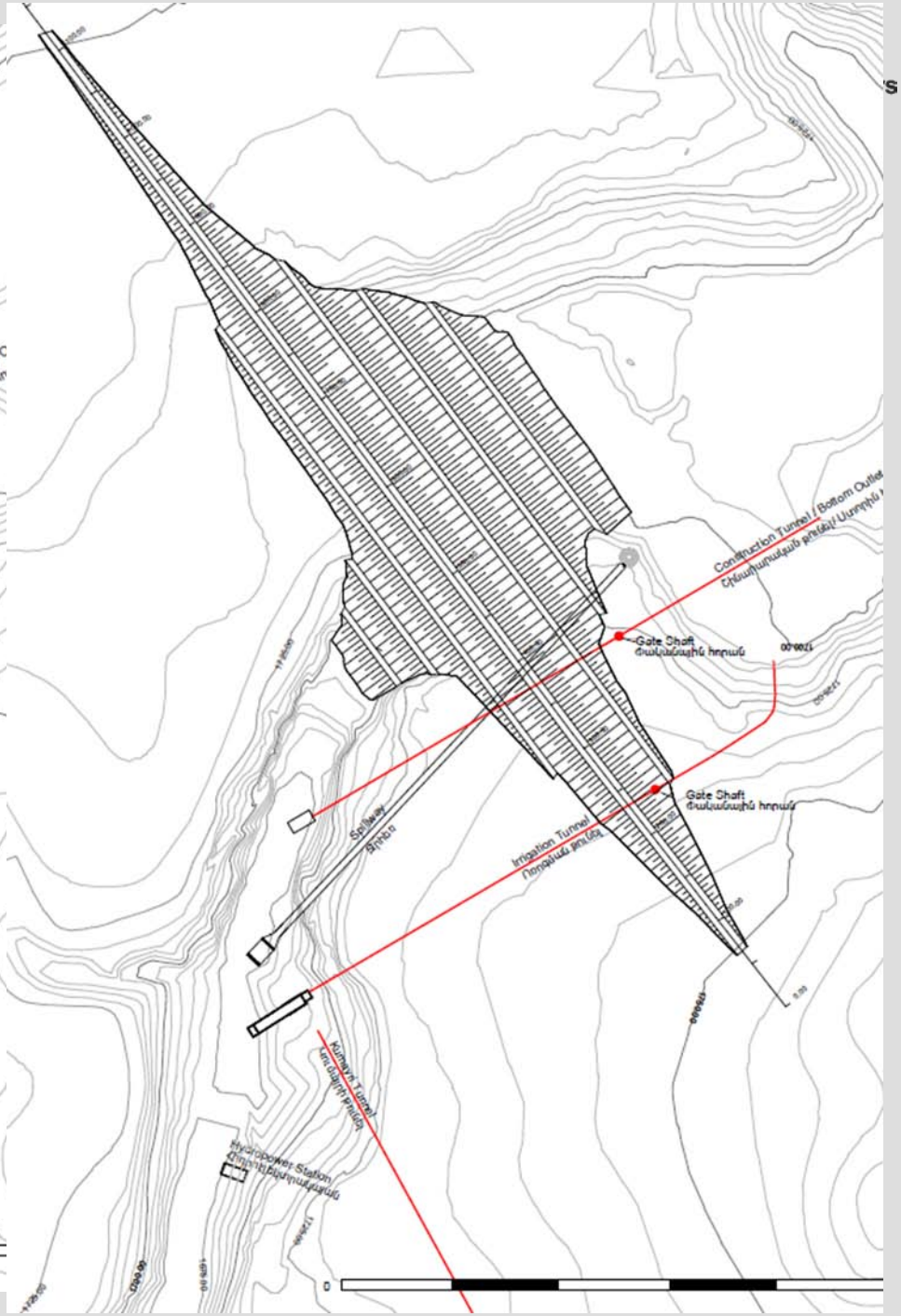



Legend
Reservoir Water Levels
Utilities
Road
Water
High Voltage Power Line
Tower
Irrigation Station
Aregnadzor
Hoghmik
Jradzor
0
2.5 km
REPUBLIC OF ARMENIA
WATER SECTOR PROJECTS IMPLEMENTATION UNIT SA OF STATE COMMITTEE OF WATER ECONOMY OF THE MINISTRY OF TERRITORIAL ADMINISTRATION
AHT GROUP AG
Reservoir Water Levels and Infrastructure


Construction Tunnel / Bottom Outlet
Շինարարական թունել/ Ստորին ելք
Gate Shaft
Փականային հորան
Spillway
Ջրառ
Irrigation Tunnel
Ոռոգման թունել
Gate Shaft
Փականային հորան
Kornayq Tunnel
Կոռնայք թունել
Hydropower Station
Հիդրոէլեկտրակայան
0


Construction Tunnel / Bottom Outlet
Gate Shaft
Փականային հորան
Spillway
Ջրառ
Irrigation Tunnel
Ոռոգման թունել
Gate Shaft
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Kornayq Tunnel
Կոռնայք թունել
Hydropower Station
Հիդրոէլեկտրակայան
0

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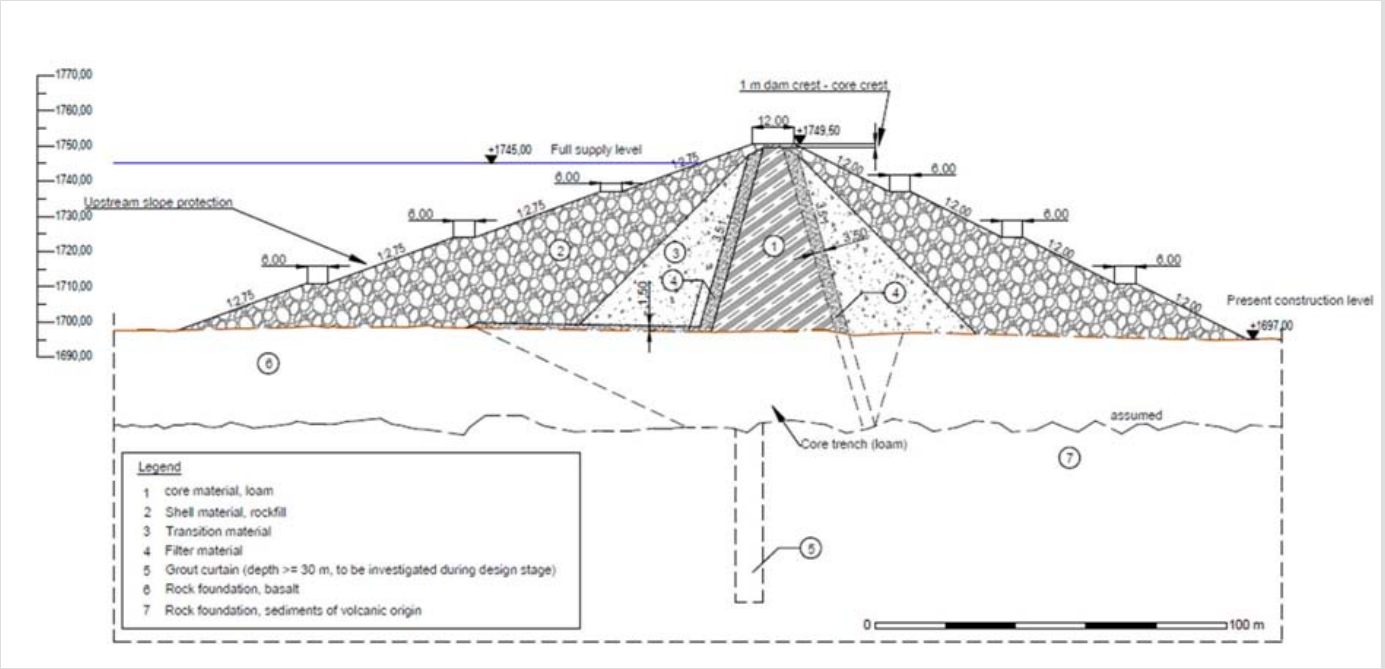

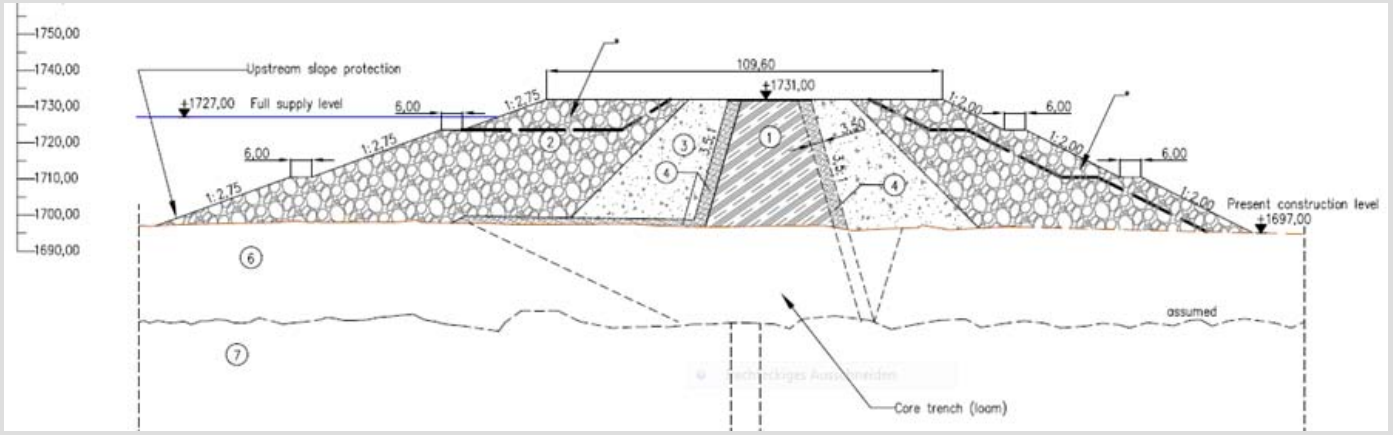

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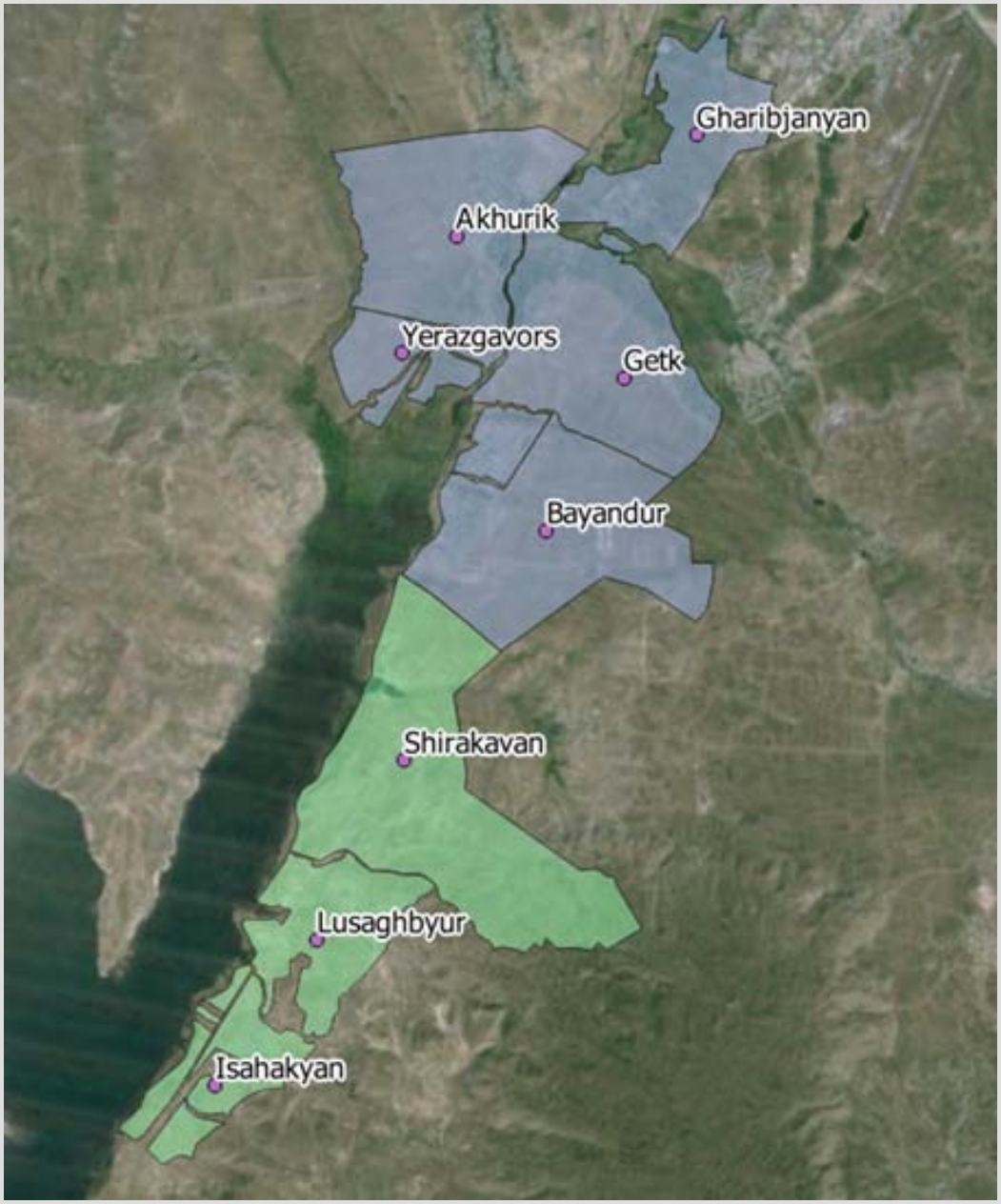
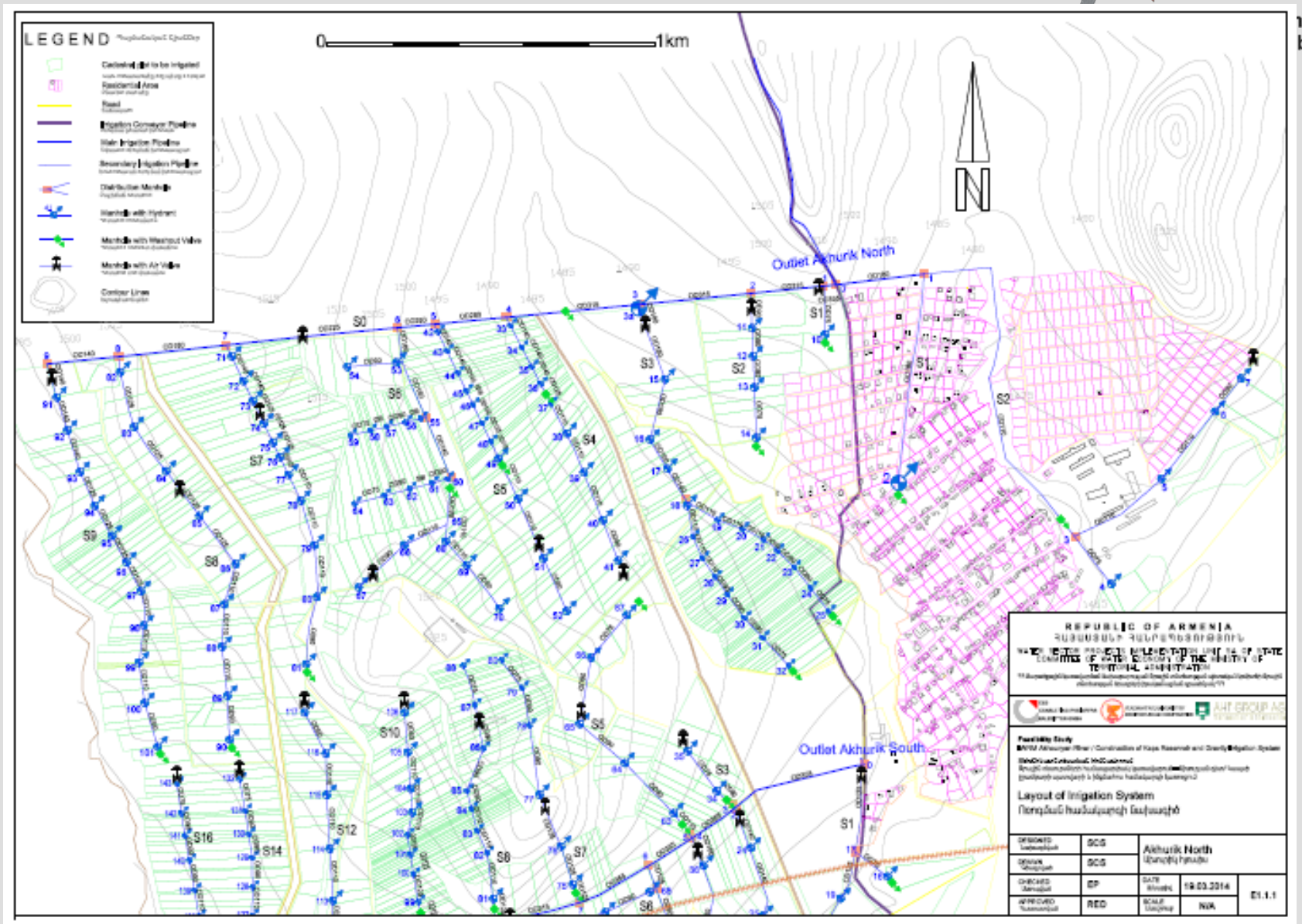
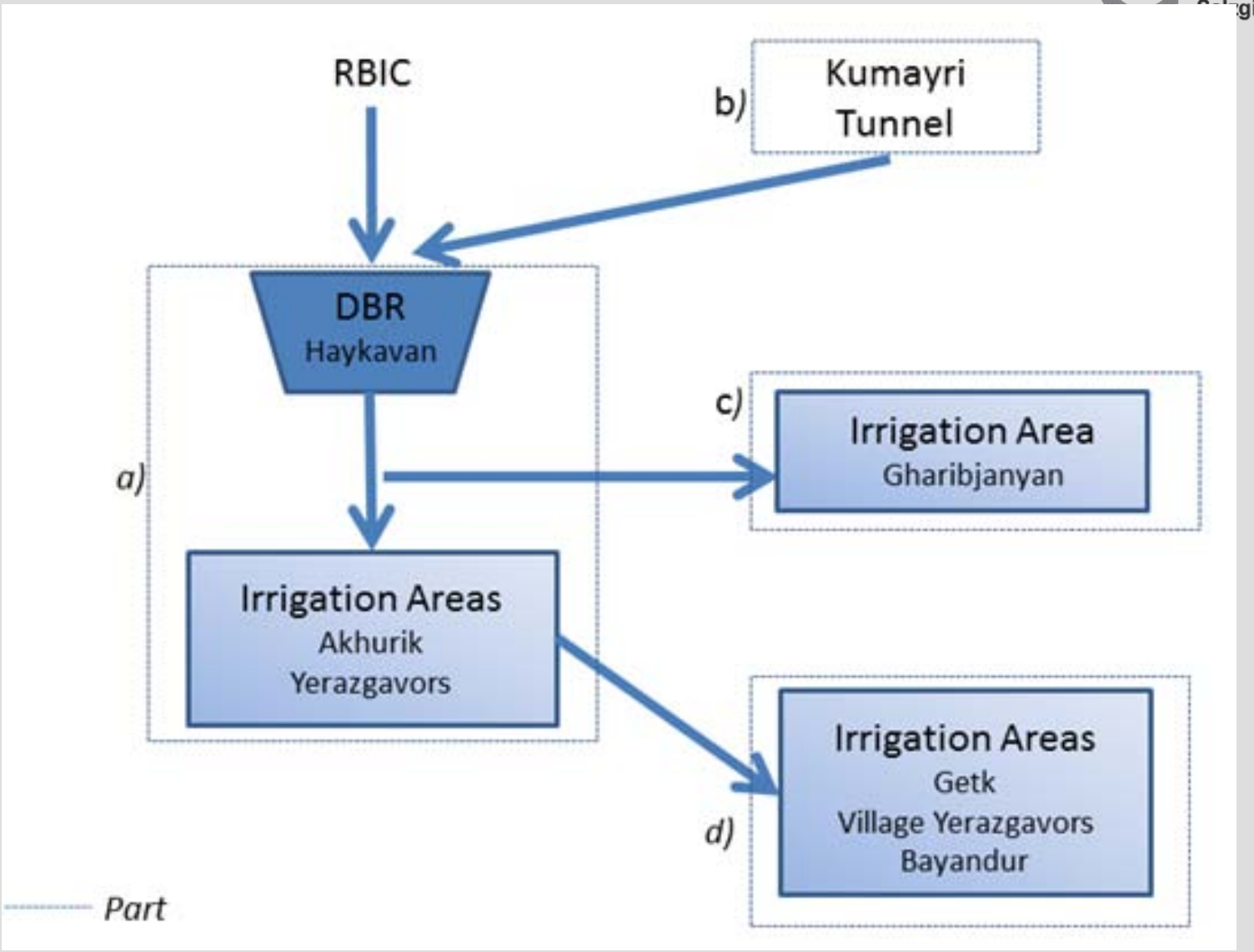
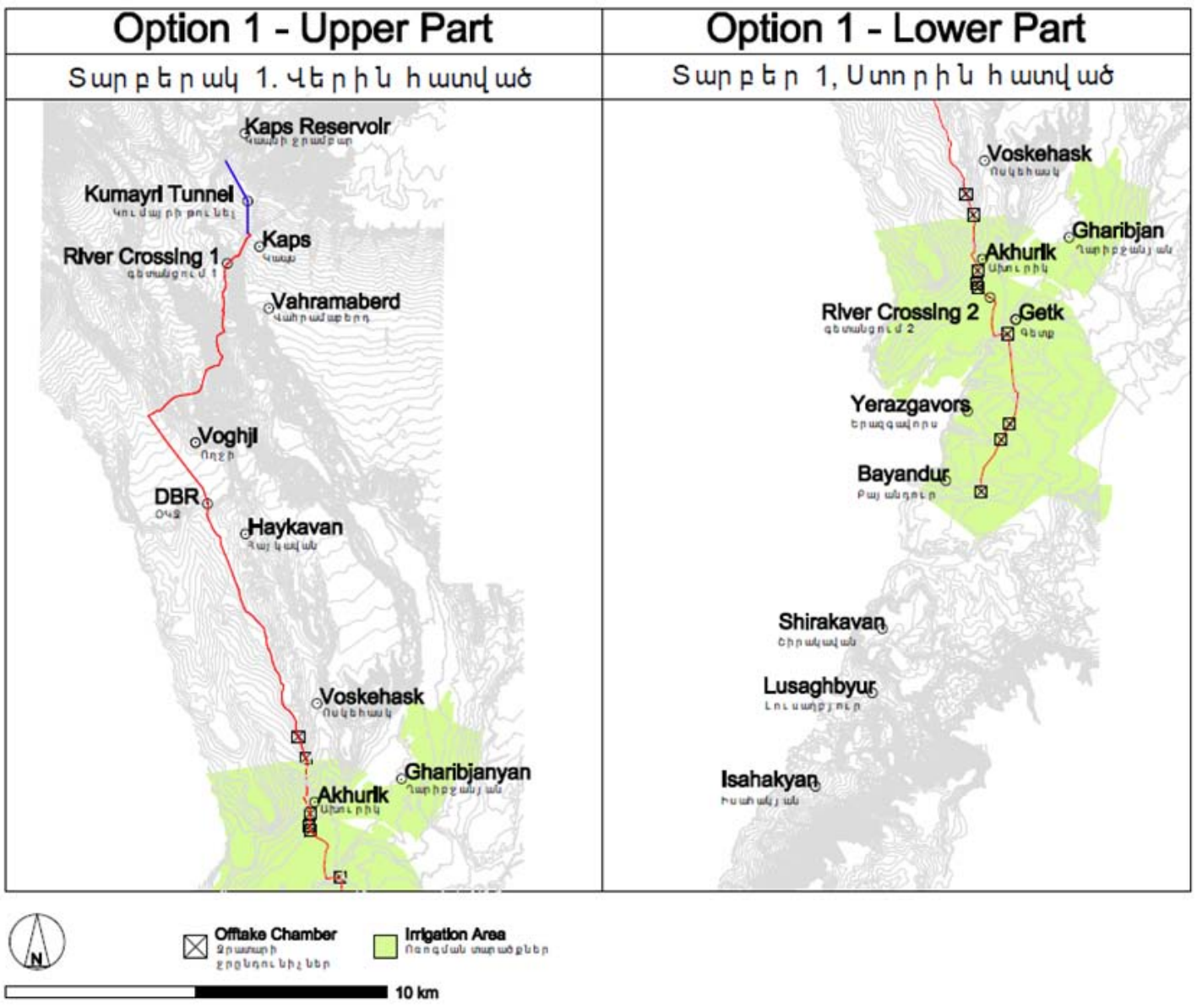



LEGEND
0
1km
N
Outlet Akhurik North
Outlet Akhurik South
S0
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S12
S14
S16
REPUBLIC OF ARMENIA
Layout of Irrigation System
Akhurik North
19.03.2014
N/A
E1.1.1


RBIC
b)
Kumayri
Tunnel
DBR
Haykavan
a)
c)
Irrigation Area
Gharibjanyan
Irrigation Areas
Akhurik
Yerazgavors
Irrigation Areas
Getk
Village Yerazgavors
Bayandur
d)
Part


Option 1 - Upper Part
Տարբերակ 1. Վերին հատված
Option 1 - Lower Part
Տարբեր 1, Ստորին հատված
Kaps Reservoir
Kumayri Tunnel
Kaps
River Crossing 1
Vahramaberd
Voghji
DBR
Haykavan
Voskehask
Gharibjanyan
Akhurik
Voskehask
Gharibjan
Akhurik
River Crossing 2
Getk
Yerazgavors
Bayandur
Shirakavan
Lusaghbyur
Isahakyan
Offtake Chamber
Irrigation Area
10 km

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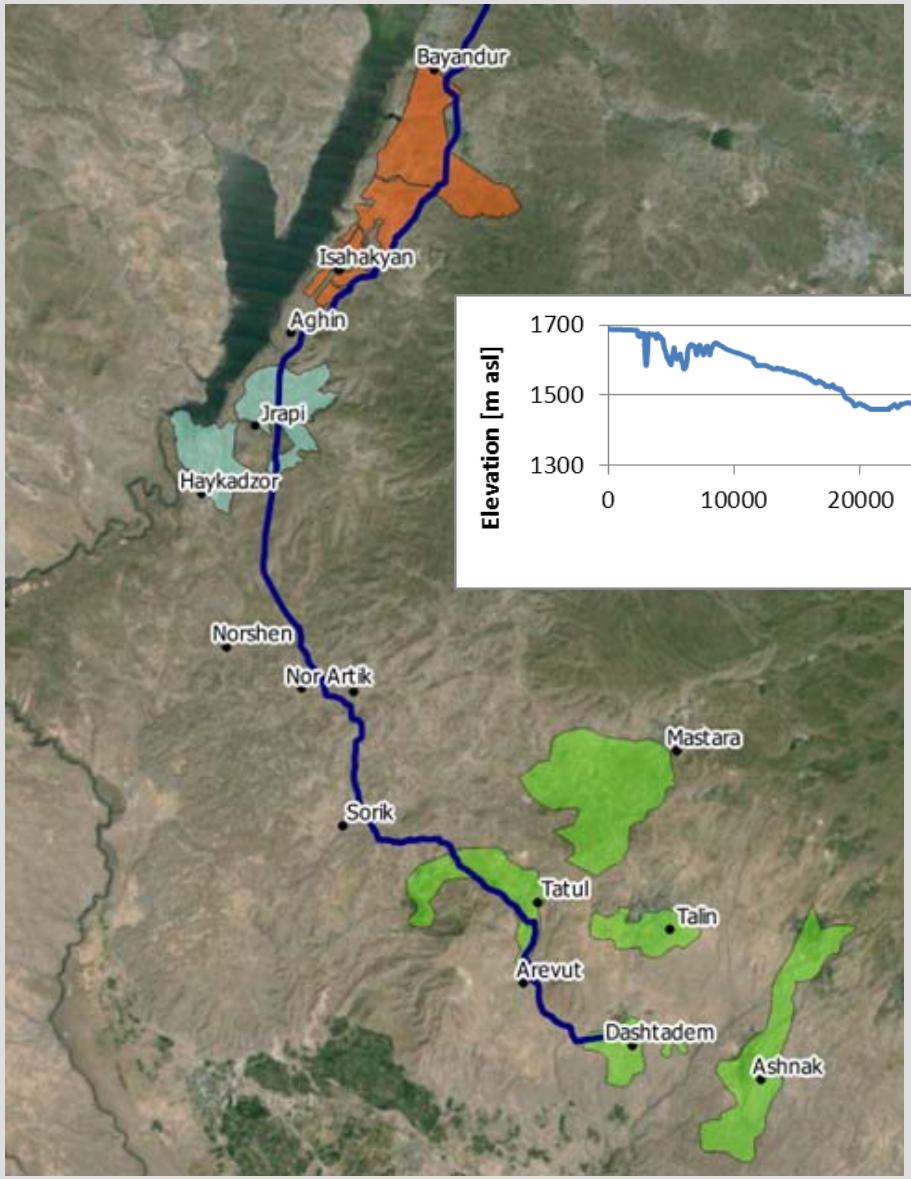

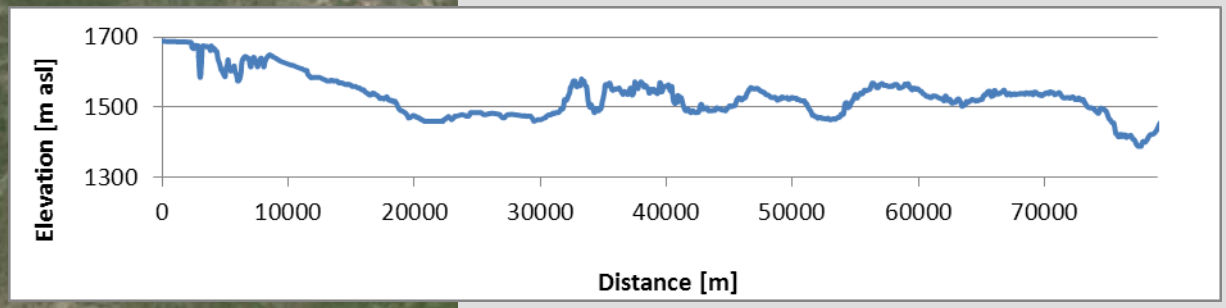

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IWRM Issues

- Reliability of hydrological data
- Lake Arpi operation
- Environmental flow
- Transboundary issue

Reliability of Hydrological Data

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Lake Arpi Operation

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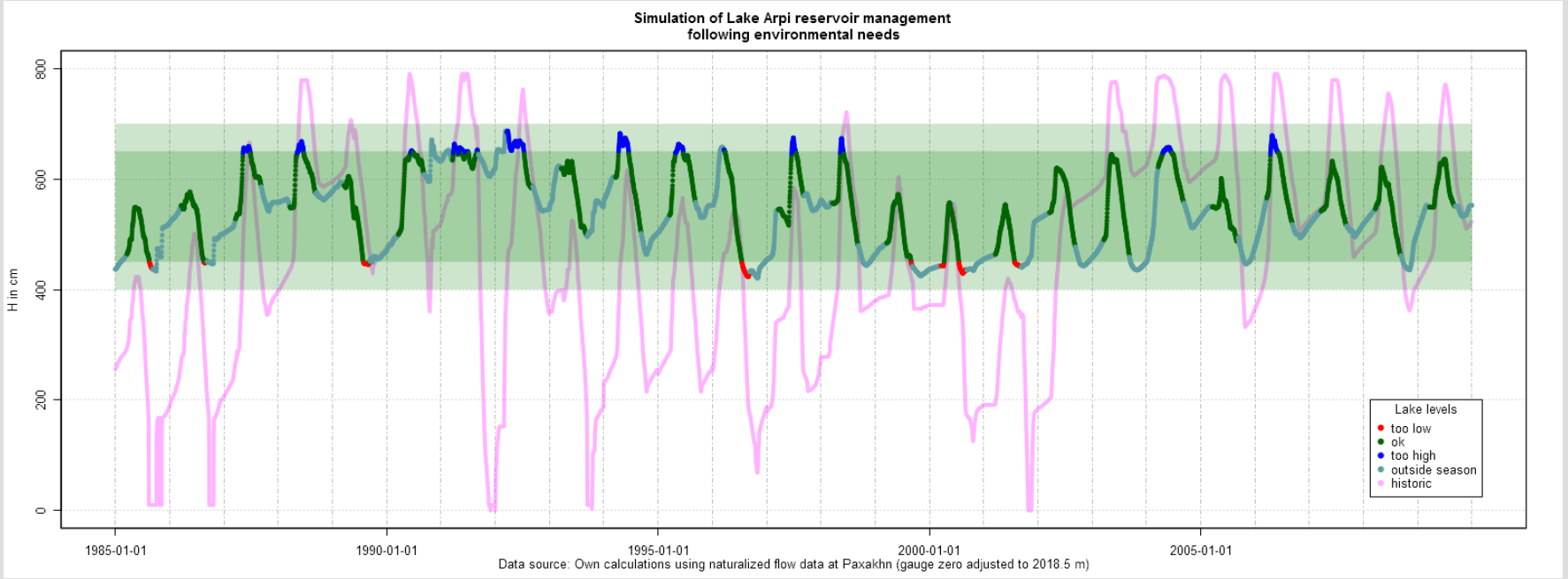

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Environmental Flow

- Decree N 927-N of 30 June 2011request for gauged catchments the lowest 10-day moving average (of available daily discharge data) during the months November to January
- Naturalised flows at Kaps (i.e. after eliminating the impact of Lake Arpi sluice operations), the processing of about 60 years of daily records (1953 – 2011) gave the following results:

Month	Date	Value	Month	Date	Value
Jan	01/01/2012	2.01	Jul	26/07/1980	0.61
Feb	02/02/2012	2.37	Aug	15/08/1979	0.38
Mar	01/03/2012	2.63	Sep	05/09/1978	0.47
Apr	06/04/1981	4.39	Oct	11/10/1990	0.75
May	21/05/1989	4.12	Nov	05/11/2011	1.92
Jun	27/06/1985	0.75	Dec	29/12/2011	**1.91**

Transboundary Issues

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- Bilateral agreement between Soviet Union and Turkey for the planning, design and construction of Akhouryan Reservoir specifies the mean annual inflow requirement from Akhouryan River with 150 Mm^3
- Mean annual downstream release of Stage 2 Kaps Dam (60 Mm^3 capacity) and allowing for the irrigation abstractions of Shirak MIC is estimated at 134 Mm^3
- Additional contribution comes from return flow from irrigation system (30% of Shirak MIC & Lower RBIC, 15% of new irrigation systems), return flow from Gyumri Water Supply and Sanitation System (50%) and Karkashun River (Catchment area 1,060 km^2 with mean annual runoff of 54 Mm^3)
- Total mean annual inflow into Akhouryan Reservoir is estimated at 234 Mm^3 exeeding the flow requirement of 150 Mm^3 by far.

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Thanks