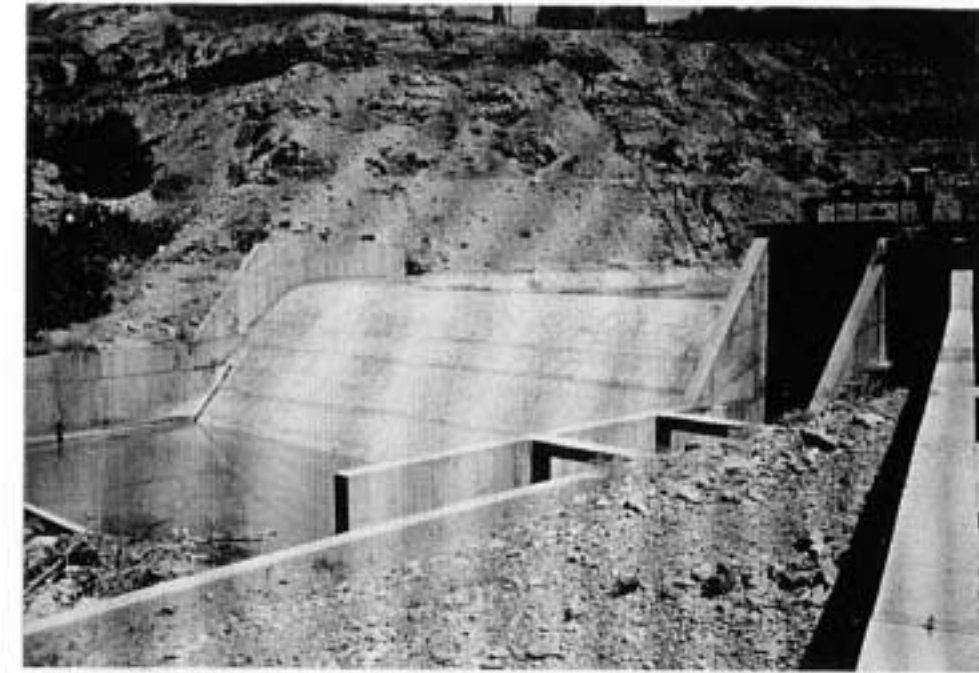
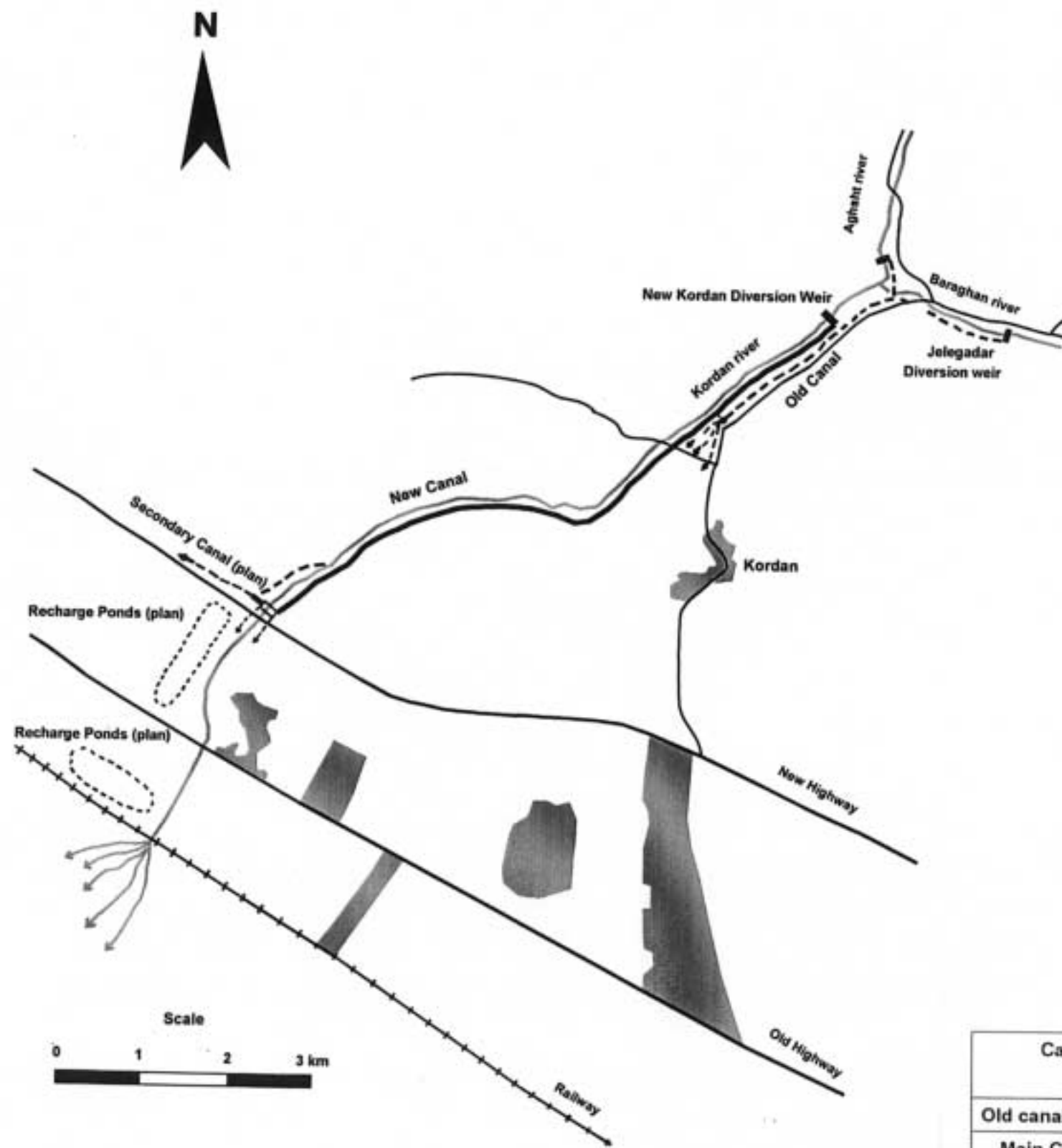


Canal length and design capacity

Main canal	Secondary canal	Capacity (m <sup>3</sup> /s)	Length (km)
Left canal		6.0	26
Right canal		12.0	12
	Frrakh abad (FC4)	4.5	8.5
	Fardis	5.5	15
	Shahrial and Robartkareen	4.5	22.5

Source; Karaj Irrigation Company. The length is estimated on the 1/50,000 map based on the interview survey with the company.

Figure 6.3.2 Existing Karaj Irrigation Project



Canal length and design capacity

Canal	Length (km)	Design capacity (m <sup>3</sup> /s)	Remark
Old canal system			
Main Canal	4	Form 3.0 to 4.0	Earth canal
New canal system			
Main canal	8	6.0	Lining (Average B=1.0, H=1.2)
Secondary canal	13	3.0	Under construction, earth type
Left branch			Under planning
Right branch			Under planning

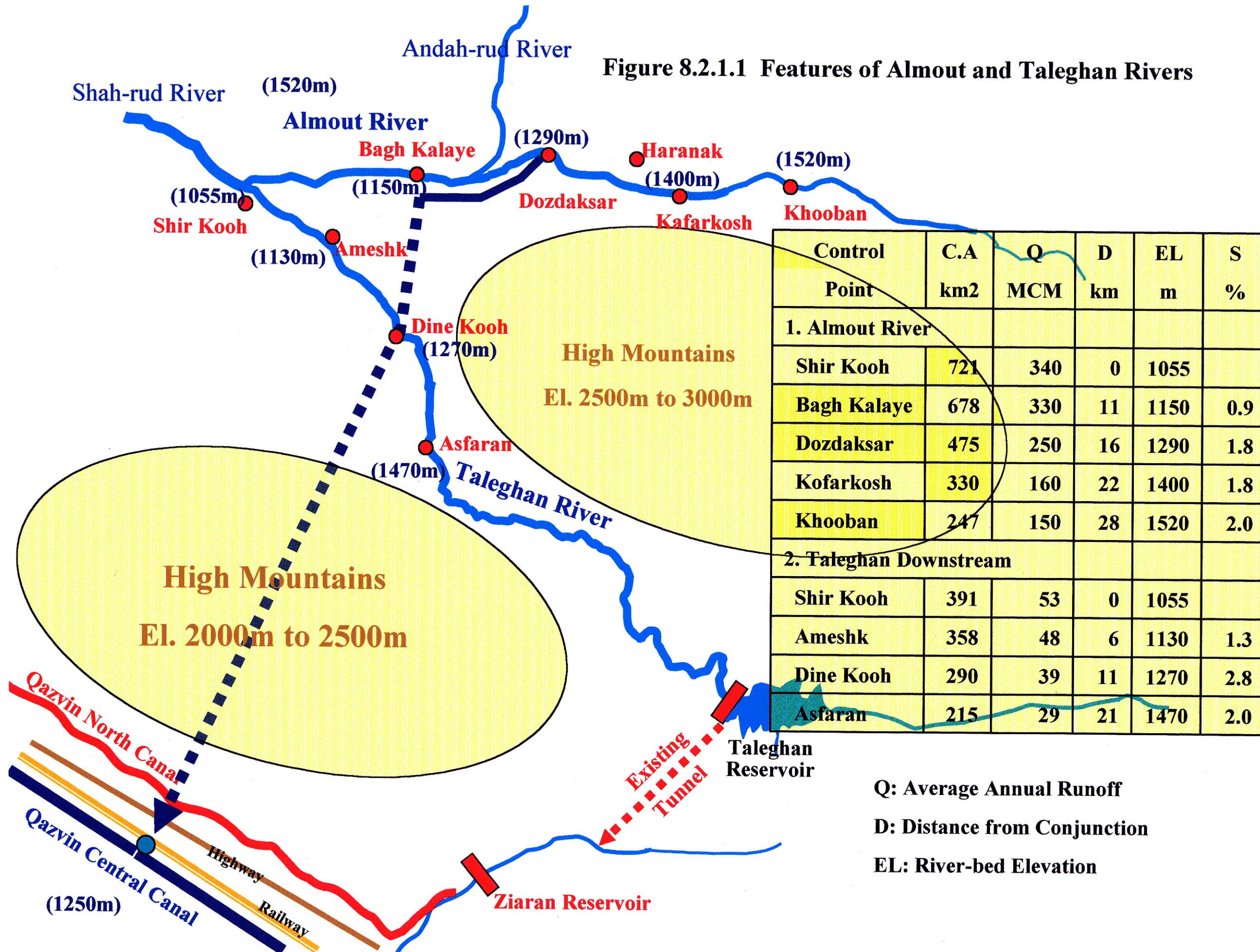
Source: Based on the interview survey with the related offices.

Figure 6.3.3 Existing Kordan Irrigation Project

<b>Chapter 8. Almout Water Diversion Project</b>		
<b>No.</b>	<b>Title of Drawings/Figures/Tables</b>	<b>Page</b>
8.2.1.1	Features of Almout and Taleghan Rivers	8-1
8.2.1.1	Almout and Taleghan River Systems	8-2
8.2.2.1	Geologic Conditions of Almout River Basin	8-3
8.3.2.1	Alternative Almout Water Diversion Plans (1)	8-4
8.3.2.2	Alternative Almout Water Diversion Plans (2)	8-5
<b>(Almout Diversion Dam Work)</b>		
8.4.1.1	Geologic Conditions of Almout Diversion Damsite	8-6
8.4.1.2	Location of Borrow Areas	8-7
8.4.1.3	Location Map	8-8
8.4.1.4	Site Plan	8-9
8.4.1.5	Elevation of Diversion Dam and Intake	8-10
8.4.1.6	Sluiceway Section and Roller Gate Section	8-11
8.4.1.7	Fish Ladder Section and Overflow Dam Section	8-12
8.4.1.8	Profiles of Intake and Settling Basin	8-13
8.4.1.9	Alternative Spillway Plan (Rubber Dam Plan)	8-14
<b>(Pipeline &amp; Tunnel Work)</b>		
8.4.2.1	Geological Map of Almout Diversion Tunnel	8-15
8.4.2.2	Almout Diversion Pipeline (1/2)	8-16
8.4.2.3	Almout Diversion Pipeline (2/2)	8-17
8.4.2.4	Almout Diversion Tunnel	8-18
8.4.2.5	Regulating Pond	8-19
8.5.2.1	Tunnel Boring Machine (1/2) (For Reference)	8-20
8.5.2.2	Tunnel Boring Machine (2/2) (For Reference)	8-21
8.5.2.3	Tunnel Steel Foam	8-22
8.5.2.4	Tunnel Muck Yard at Taleghan River	8-23



Figure 8.2.1.1 Features of Almount and Taleghan Rivers





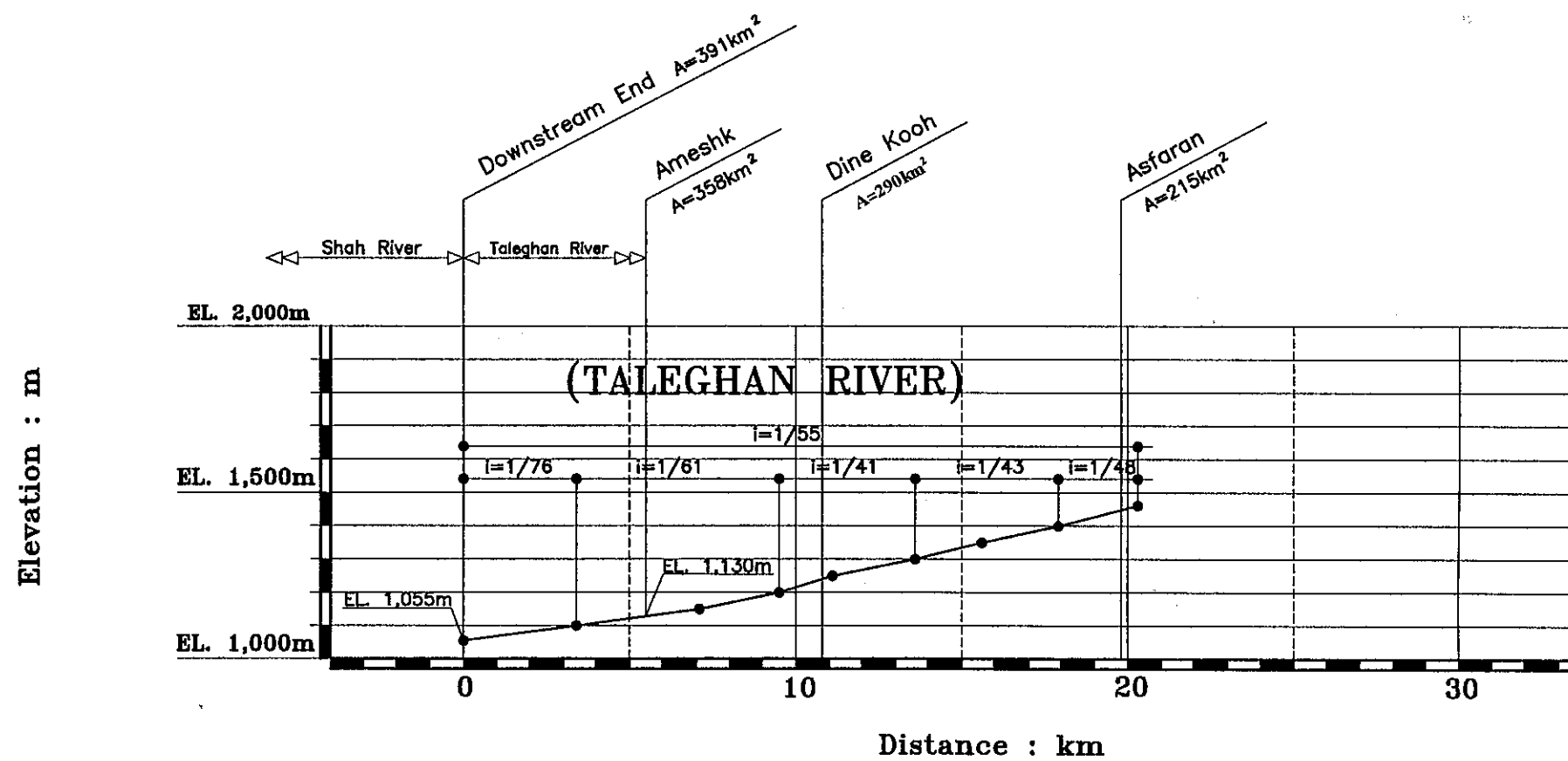
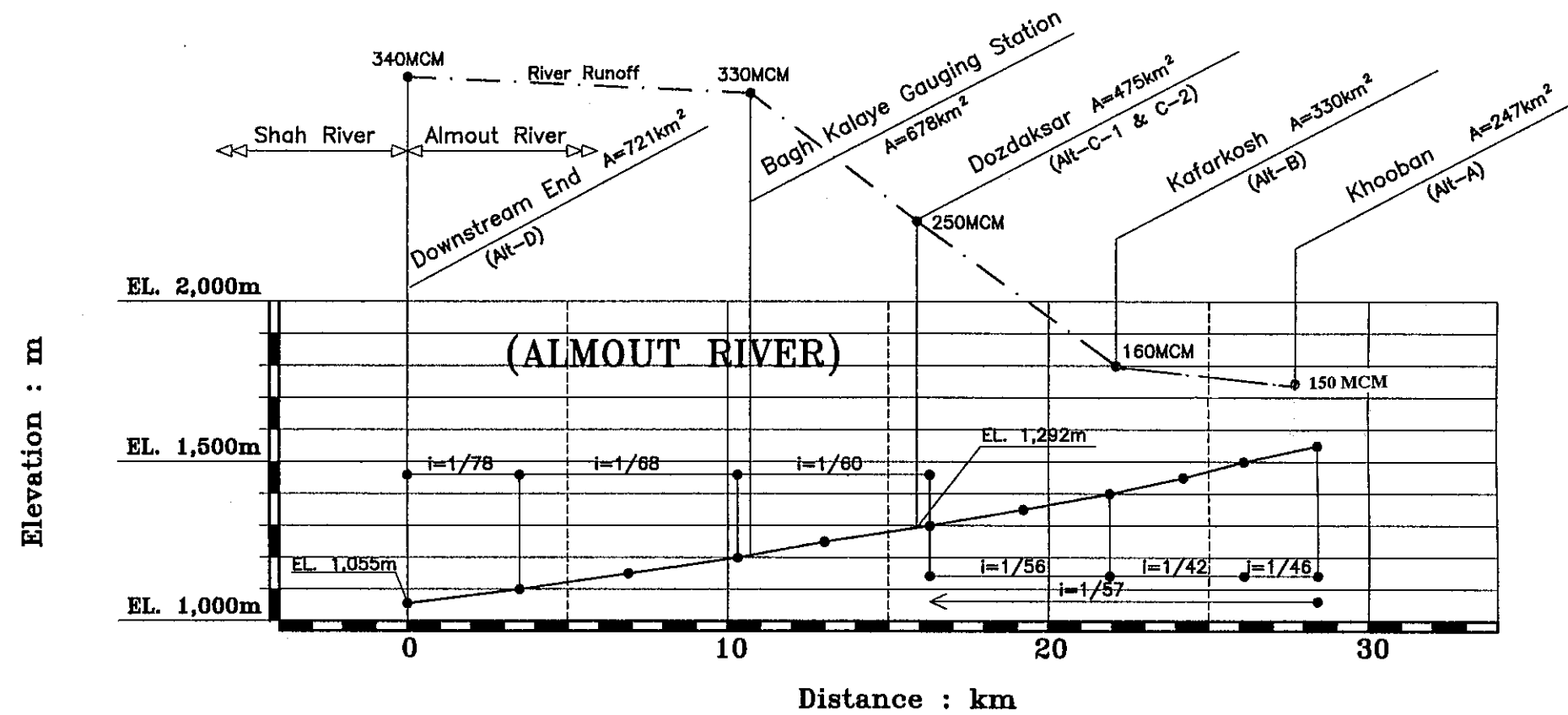
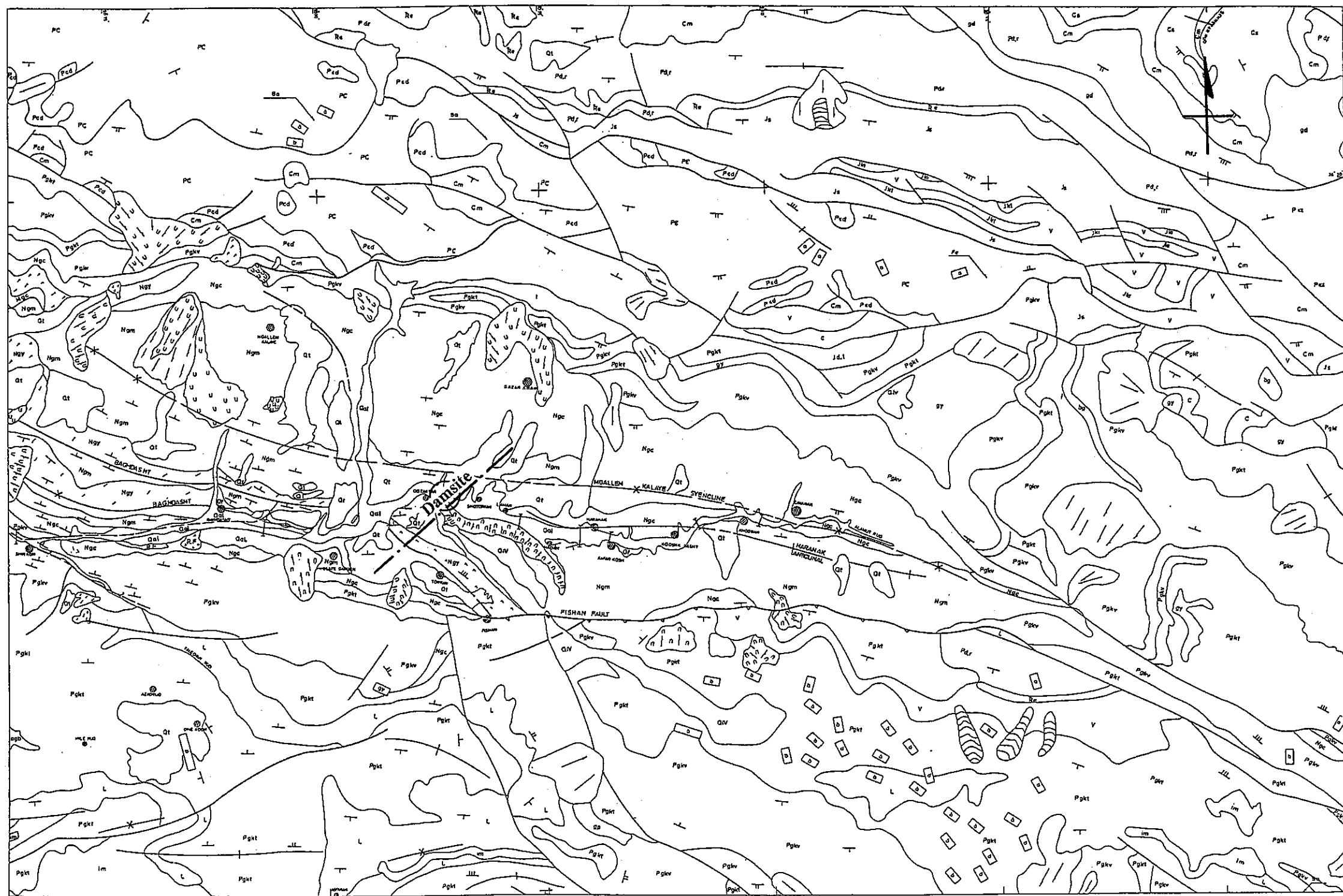


Figure 8.2.1.1 Almut and Taleghan River Systems



**LEGEND**

- |                     |      |   |
|---------------------|------|---|
| <b>RECENT</b>       | Qal  | RECENT ALLUVIUM & FLOOD - PLAIN DEPOSITS  |
|                     | St   | SCREE & TALUS   |
|                     | Tt   | INTERMEDIATE & OLD TERRACES   |
|                     | M    | MORAINES  |
|                     | V    | VOLCANIC ROCKS INCLUDING BASALT AND TRACHYTE LAVA AND AGGLOMERATE   |
| <b>NEOGENE</b>      | U    | UPPER RED AND HEZARDARREH FORMATION   |
|                     | Ngm  | RED MUDSTONE AND SILTSTONE (Ngm) AND CONGLOMERATE OR BRECCIA (Ngc), INTERCALATION OF GYPSIFEROUS RED OR GREY MUDSTONE (Ng2)                                       |
| <b>PALEOGENE</b>    | Pgkv | BASIC LAVAS (Pgkv); INTERCALATIONS OF ANDESITIC AND ACID TUFFS (L)  |
|                     | Pgkt | MAINLY ACID AND ANDESITIC TUFFS AND TUFFACEOUS MUDSTONES (Pgkt); BASALT AND ANDESITE LAVAS (v); LIMSTONE AND CALCAREOUS TUFF (L), CONGLOMERATE (C) AND GYPSUM (G) |
| <b>JURASSIC</b>     | Jk1  | WELL-BEDDED GREY OR PALE GREY LIMSTONE, IN PART WITH CHERT (Jk1) INTERCALATED VOLCANICS (v)   |
| <b>TRIASSIC</b>     | Jt   | SIENKSHAK FORMATION, MOSTLY GREY OR GREY-BROWN MUDSTONE AND SILTSTONE WITH LAYERS OF SANDSTONE AND, LOCALLY, COAL (Jt); VOLCANICS (v)                             |
| <b>PERMIAN</b>      | Re   | ELIKAH FORMATION, MASSIVE BUFF DOLOMITIC LIMSTONE, MOSTLY   |
|                     | Pd,r | RUTCH FORMATION, UNDIVIDED PERMIAN ROCKS (Pd,r); BASIC VOLCANICS (v)  |
| <b>TRIASSIC</b>     | L    | MOBARAK LIMSTONE  |
| <b>LATE PERMIAN</b> | Pc   | WELL-BEDDED GREY LIMSTONE (C); BASIC VOLCANICS (v)  |
| <b>ROCKS</b>        | Im   | RED AND GREEN SANDSTONE AND SHALE (PC) WITH LAYERS OF STROMATOLITE LIMSTONE, DOLOMITE (Pcd)   |
| <b>INTRUSIVE</b>    | Im   | MONZONITE (Im)  |
|                     | Dg   | GABBRO AND DOLERITE (Dg)  |
|                     | a    | ACID QUARTZ-PORPHYRY, FELSITE, OR UNDIVIDED PALE DYKES (a)  |
|                     | b    | BASALT, ANDESITE OR UNDIVIDED DARK DYKES (b)  |

**GEOLOGICAL SYMBOLS**

- |                   |   |
|-------------------|---|
| VERTICAL STRATA   | + |
| OVERTURNED STRATA | + |
| MEASURED DIP      | + |

**AERIAL PHOTO INTERPRETED DIP**

- |                      |   |
|----------------------|---|
| LINE BOUNDARY        | + |
| 0-25                 | + |
| 25-45                | + |
| OVER 45              | + |
| 90                   | + |
| ANTICLINE AX.        | + |
| SYNCLINE AX.         | + |
| LANDSLIDE            | + |
| POTENTIAL SLIDE AREA | + |
| ACTIVE LANDSLIDES    | + |

**Figure 8.2.1 Geologic Conditions of Almut River Basin**

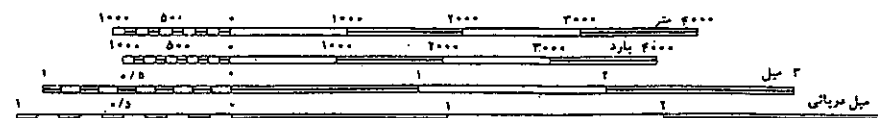
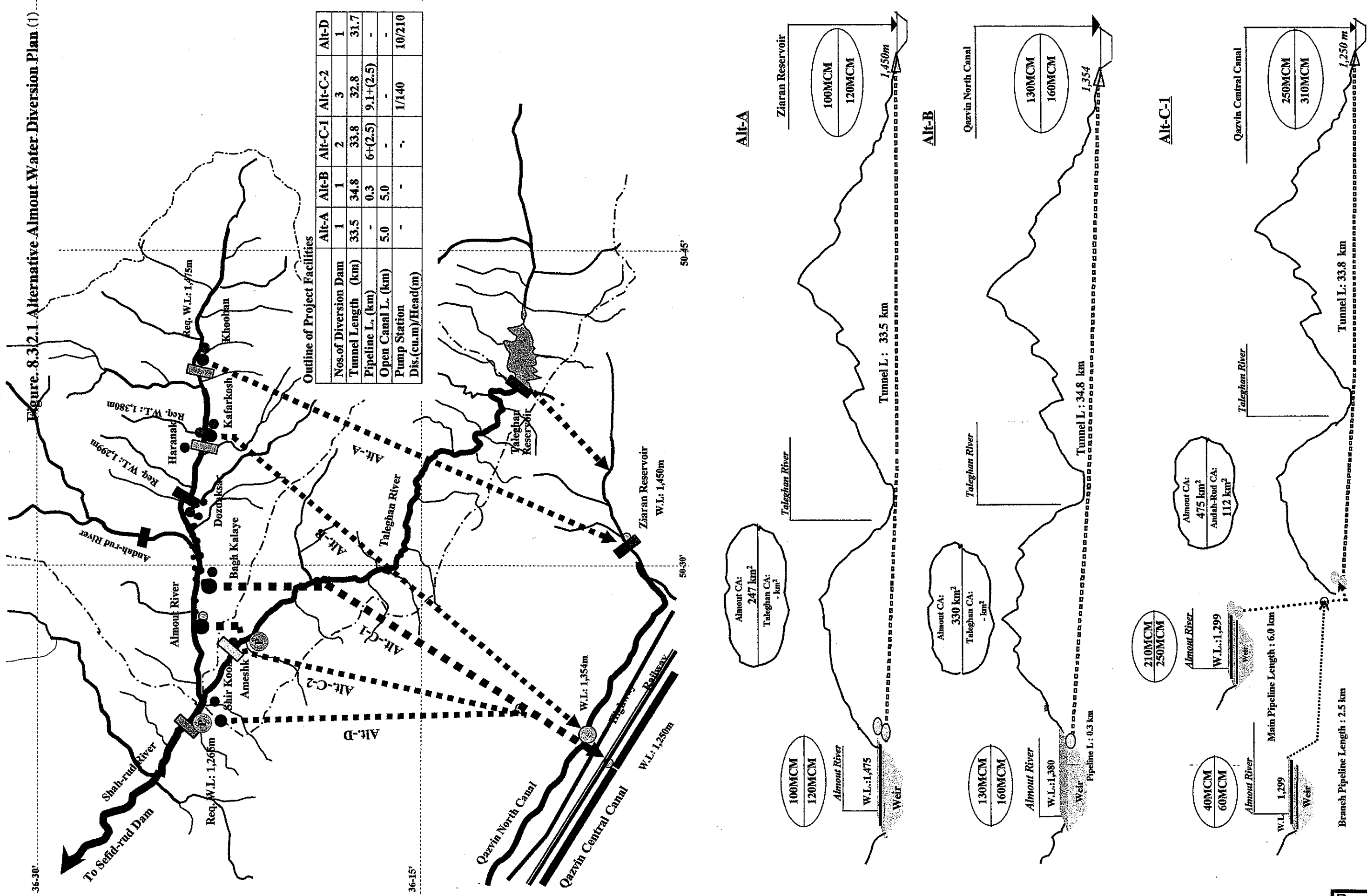


Figure 8.3.2.1 Alternative Almut Water Diversion Plan (1)



Outline of Project Facilities

	Alt-A	Alt-B	Alt-C-1	Alt-C-2	Alt-D
Nos. of Diversion Dam	1	1	2	3	1
Tunnel Length (km)	33.5	34.8	33.8	32.8	31.7
Pipeline L. (km)	-	0.3	6+(2.5)	9.1+(2.5)	-
Open Canal L. (km)	5.0	5.0	-	-	-
Pump Station	-	-	-	1/140	-
Dis. (cu.m)/Head(m)	-	-	-	1/140	10/210

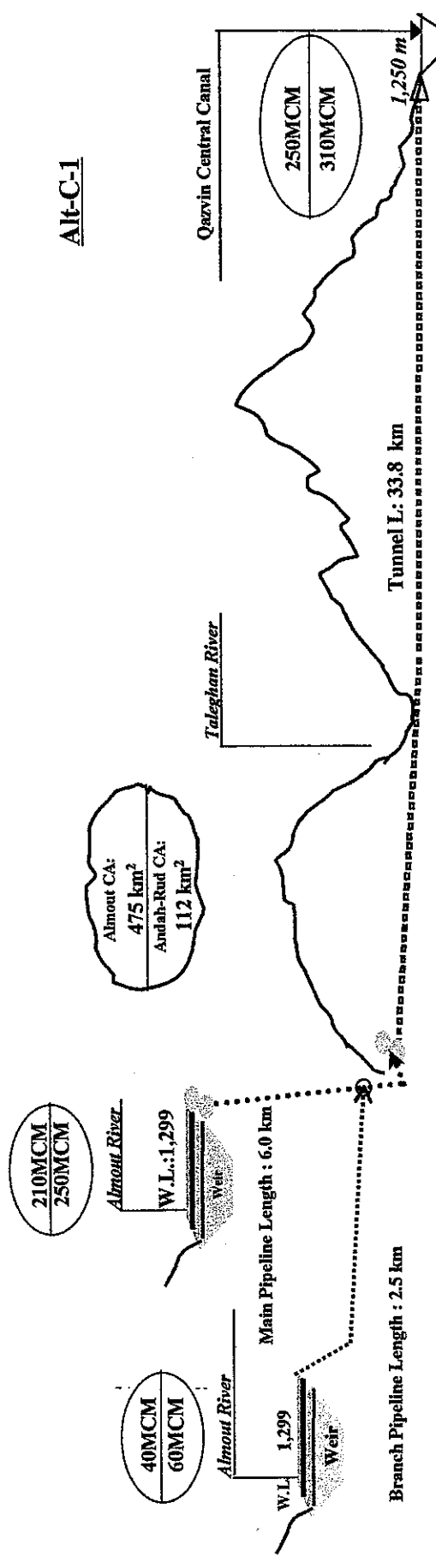
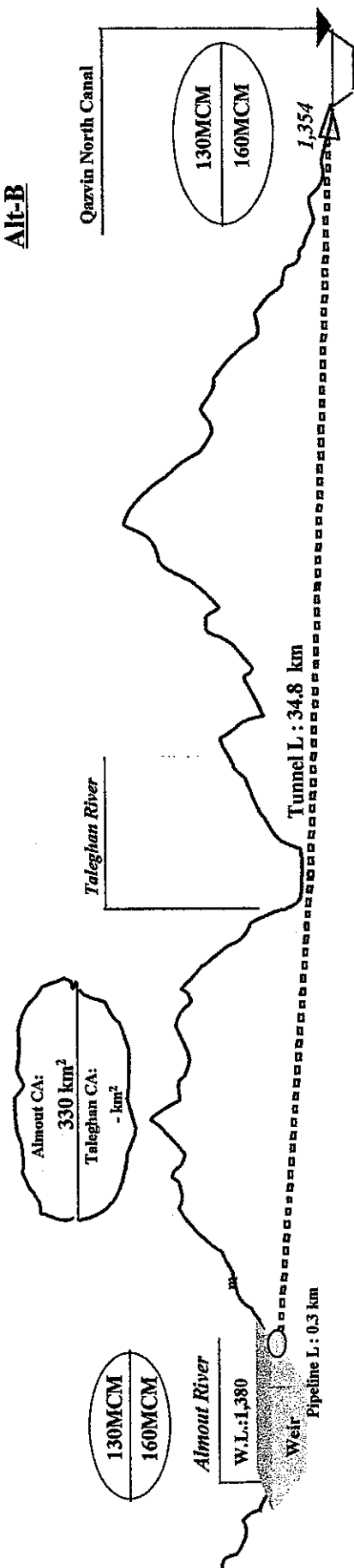
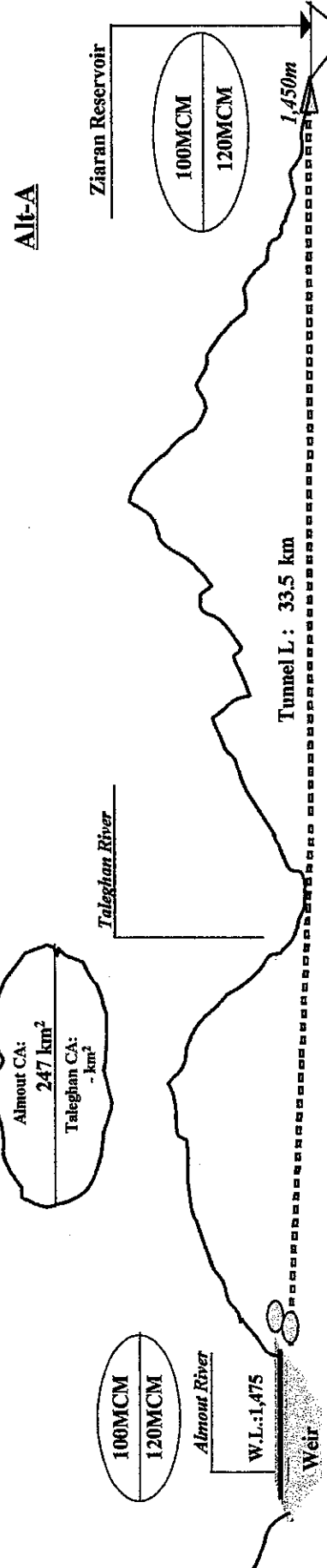
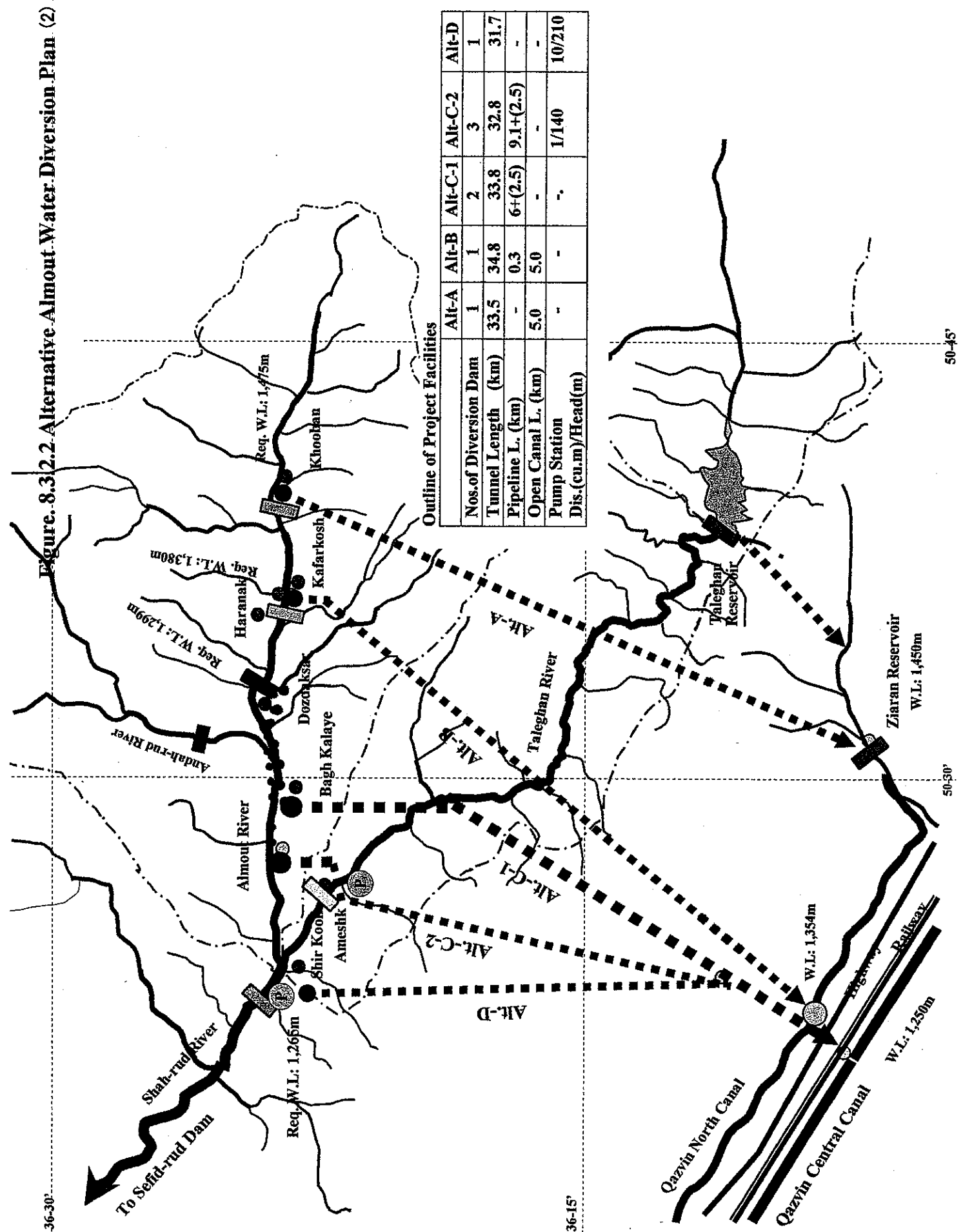
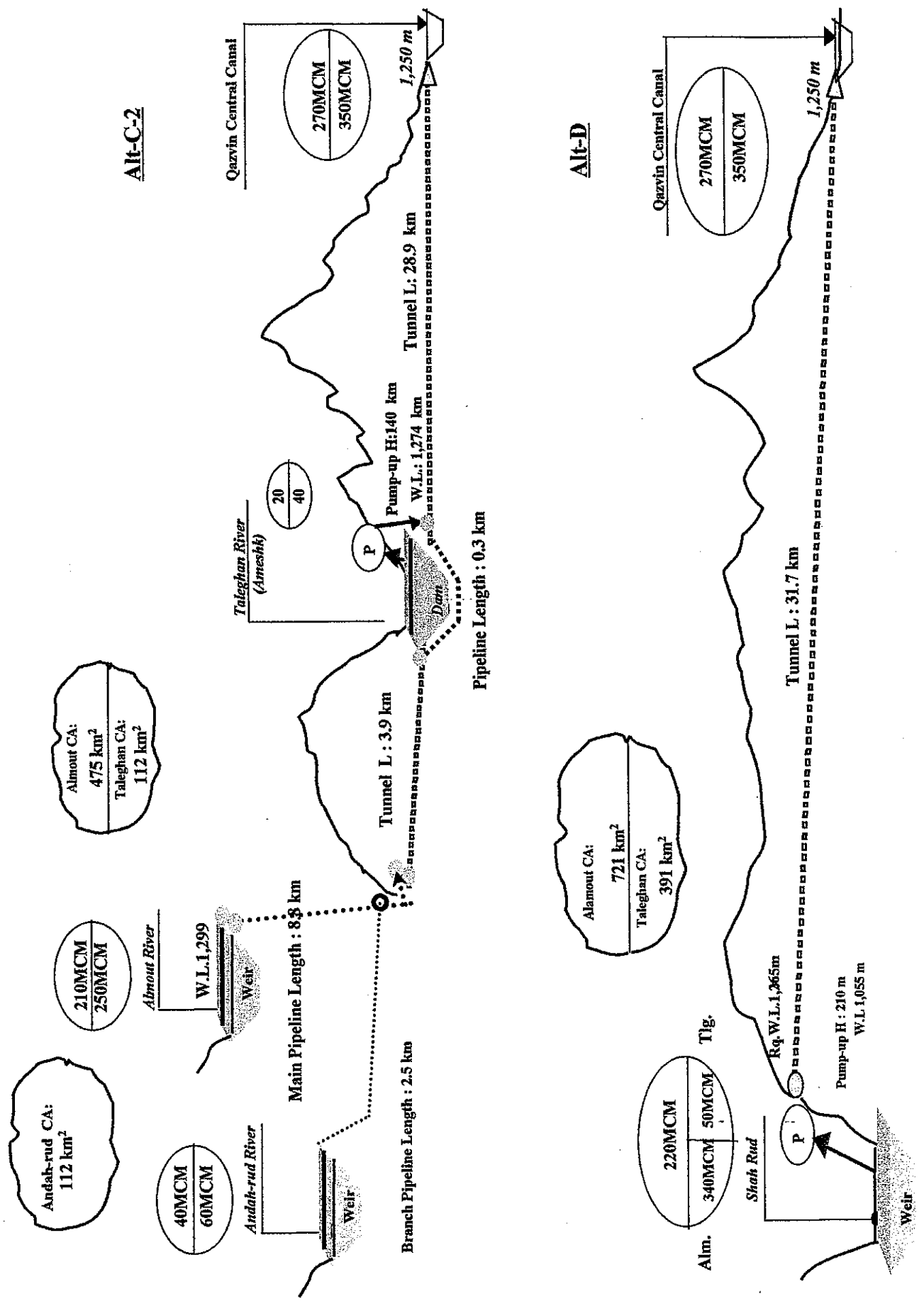


Figure 8.32.2. Alternative Almort Water Diversion Plan (2)

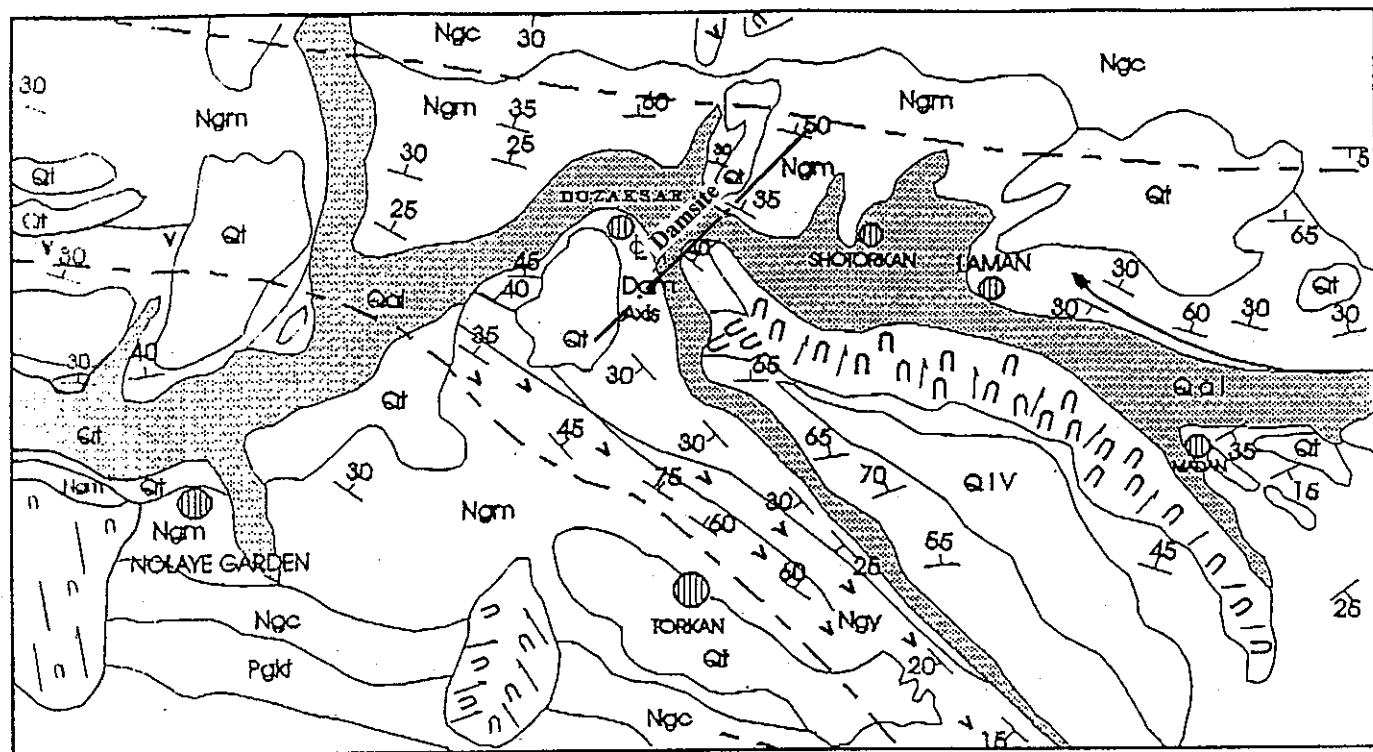


Outline of Project Facilities

	Alt-A	Alt-B	Alt-C-1	Alt-C-2	Alt-D
Nos. of Diversion Dam	1	1	2	3	1
Tunnel Length (km)	33.5	34.8	33.8	32.8	31.7
Pipeline L. (km)	-	0.3	6+(2.5)	9.1+(2.5)	-
Open Canal L. (km)	5.0	5.0	-	-	-
Pump Station Dis. (cu.m)/Head(m)	-	-	-	1/140	10/210

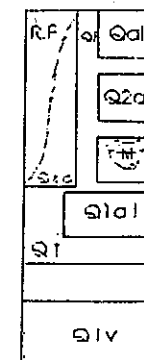






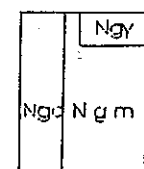
Geologic Plan

**LEGEND**



Qal: Recent alluvium, river beds.  
 Qf : alluvium fan.  
 R.F : Rock fall.  
 Qsc: Scree & talus.  
 Q2al: Alluvium & flood-plain deposits.  
 M : Moraine (perhaps in part pleistocene).  
 Q1al: Alluvium, flood-plain & deltaic deposits.  
 Qt : Intermediate & old terraces.  
 Volcanic rocks including basalt and trachyte lava and agglomerate.

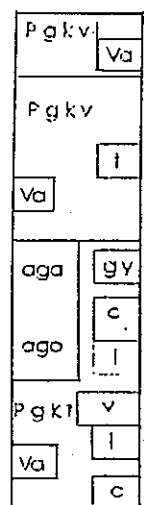
**NEOGENE**



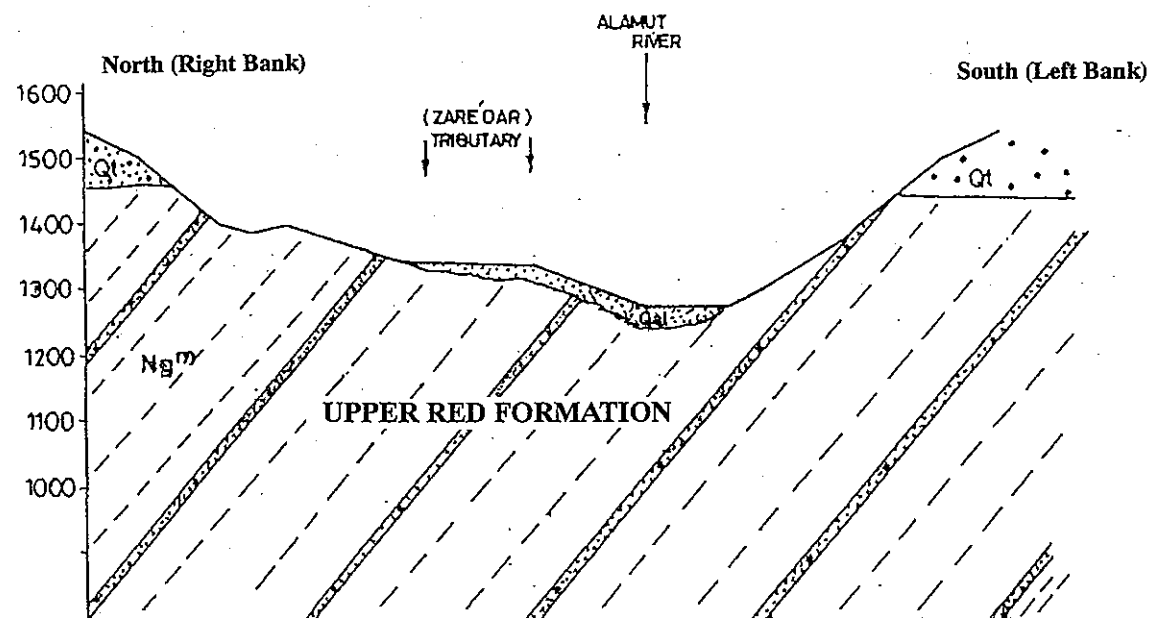
**UPPER RED FORMATION :**  
 Red mudstone and siltstone (Ngm) and conglomerate or breccia (Ngc).  
 Intercalation of gypsiferous red or grey mudstone (Ngy).

**KARAJ FORMATION :**

**PALEOGENE**



Mainly vitreous andesite lavas (Pgv) in upper part.  
 Basic lavas (Pgv) ; intercalation of andesitic and acid tuffs (t),  
 trachyandesite-dacite lava (va).  
 Mainly acid and andesitic tuffs and tuffaceous mudstones (Pgt); intercalation  
 of basic agglomerate (agb) and acid agglomerate (agg),  
 Basalt and andesite lavas (v) , limestone and calcareous tuff (L) .  
 Conglomerate (C) and gypsum (gy)



Distance (m)	0.000	0.150	0.400	0.500	0.600	0.850	0.950	1.000	1.150	1.350	1.550	1.700	1.950	2.000	2.050	2.300	2.350	2.600	2.750	
Ground EL. (m)	1540	1500	1400	1390	1400	1360	1340	1340	1340	1300	1,298	1,298	1,298	1,298	1300	1380	1400	1500	1540	
Geological Description	Qal: Recent Alluvium, River Bed										Qt: Old Terraces									
	Upper Red Formation: Brown To Reddish Brown Marl With Inter Bedded Thin With Inter Bedded Thin Layer Semi-Consolidated To Consolidated Conf. Or Sandstone. Slightly Stable To Unstable.																			

Geologic Section along the Centerline of Alamut Diversion Dam

Figure 8.4.1.1 Geologic Conditions of Alamut Diversion Damsite