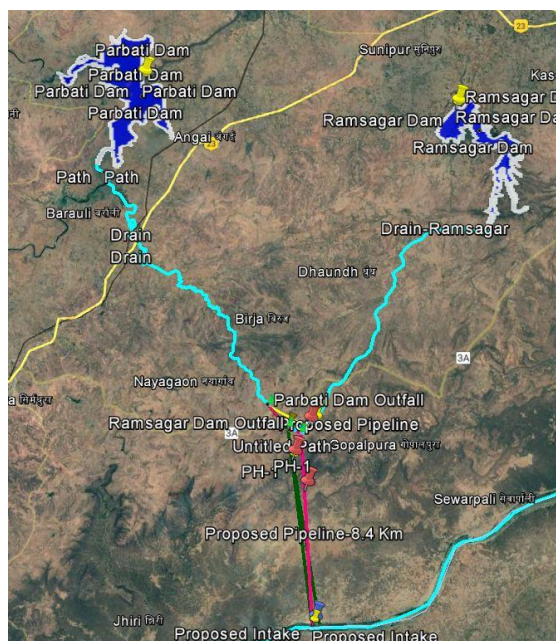




Government Of Rajasthan
WATER RESOURCES

WATER RESOURCES DEPARTMENT, GOVERNMENT OF RAJASTHAN

ALTERNATE LAYOUT STUDY



KALITEER LIFT SCHEME

DISTRICT-DHOLPUR, HIMACHAL PRADESH

PREPARED BY

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Ministry of Jal Shakti

Details of Alternative Sites considered and basis of selecting the proposed site

Alternative Study for Selection of Layout

Selection of Diversion Site

The river Chambal is an interstate river with nearly 40% catchment area in Rajasthan and the rest in Madhya Pradesh and Uttar Pradesh. Therefore, in order to harness the full potential of Chambal river particularly during monsoon it is desirable to have diversion sites on the said river after duly considering a host of factors before arriving at final conclusion.

As can be seen from the figure below, the proposed intake is situated on the outside bend, as the bed load is transported to the inside and the arrangement of the intake structure outside allows the bed load to be largely diverted from the intake. Further, the most favourable site for the intake structure is somewhat downstream of the apex of the bend. The spiral flow is strongest here, causing most of the bed load to be transported towards the inner bank. Both these conditions are satisfied by the proposed intake location which is given hereunder.

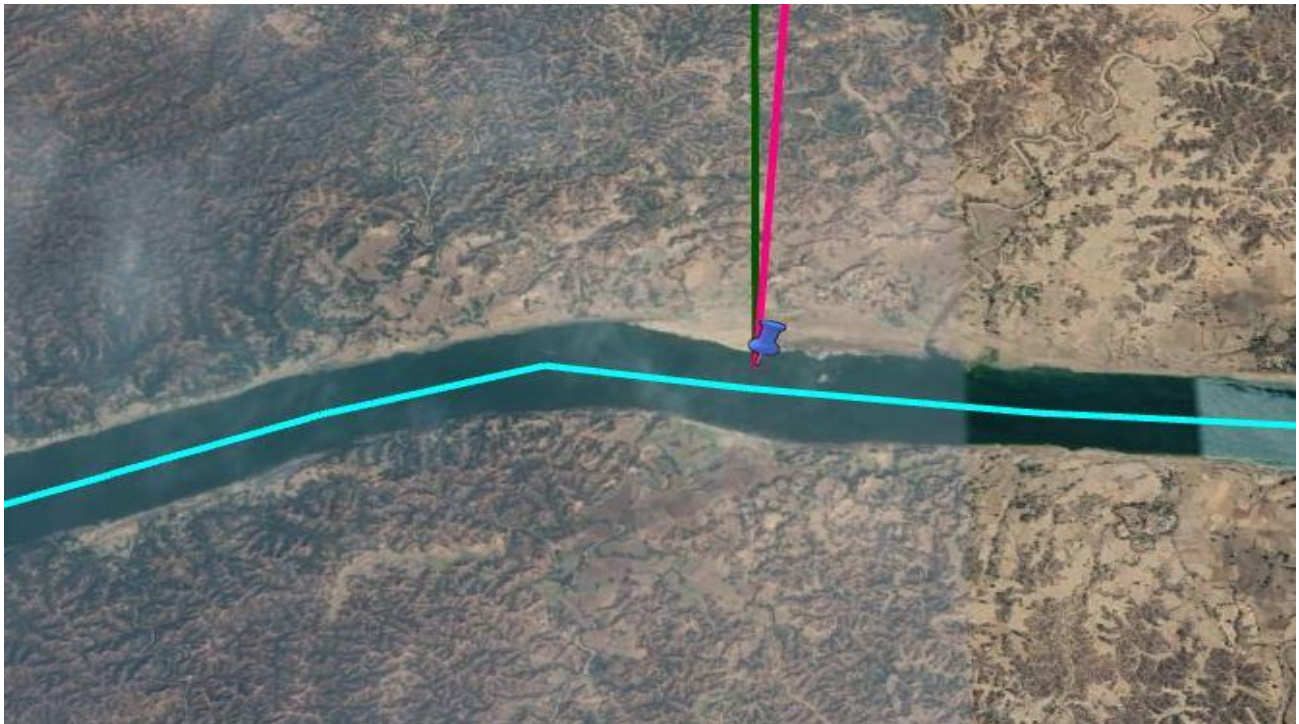


Figure 1: Location Map of Proposed On Shore Intake cum Pump House

Kaliteer Lift Scheme is envisaged in tandem with Ramsagar and Parbati dams. However, the

layout of the project has been finalised based on the site visit, reconnaissance survey and surface geology and the different alternate layouts are identified as below:

After having examined numerous project alternatives and successively eliminating the inferior alternatives based on the toposheets, Google Earth and desk studies considering various parameters such as inhabitations, forest area, existing water bodies & utilities, mining area etc., the following three competitive alternative project configuration for water conductor system from proposed Intake on Chambal River to Parbati and Ramsagar Dam were identified.

Selection of Water Conveyance System

A total of four (4) competing alternatives were considered for water conveyance system and the final alignment was selected on the basis of some parameters and the same is described in the ensuing paras.

Alternative-1: This initial option is in line with the concept proposed by department which involves construction of an intake across Chambal River. Surplus monsoon water of Chambal is then transferred from this intake to Parbati and Ramsagar Dams in the Parbati basin through lifting. The total quantum of water (both for Parbati & Ramsagar) is lifted from a low of El. +138 m at the proposed intake across Chambal river to an elevation of El. +303.28 m in two stage pumping and then it drops into Bohre ka Taal, a natural pond constructed during state time. From Bohre Ka Taal, the water flows for 15.7 Km through a natural drain which ultimately joins the Ramsagar Dam. However, for Parbati Dam the water is again pumped from Bohre Ka Taal from an El. + 293 to El. + El. 309.6 over a length of 1.89 Km which then outfalls into a 17 Km drain which ultimately culminates into Parbati Dam. The details of this alignment are further illustrated as below.

Table 1: SEQUENCE OF ALIGNMENT 1

ALTERNATIVE	NODE		DESCRIPTION	LENGTH	
	FROM	TO			
1	1 PROPOSED INTAKE AT CHAMBAL	2 PUMP HOUSE-1	PUMPING MAIN (LIFT FROM El. + 138 M to El. + 223.64 M)	7.20	KM
	2 PUMP HOUSE-1	3 BOHRE KA TAAL OUTLET	PUMPING MAIN (LIFT FROM El. + 223.64 M to El. + 303.28 M)	1.27	KM
	FOR RAM SAGAR DAM				
	4 BOHRE KA TAAL	5 RAM SAGAR DAM	NATURAL GRAVITY DRAIN	15.7	KM
	FOR PARBATI DAM				
	6 BOHRE KA TAAL PUMP HOUSE-2	7 PARBATI DAM OUTLET	PUMPING MAIN (LIFT FROM El. + 293 M to El. + 309.6 M)	1.89	KM
	7 PARBATI DRAIN OUTLET	8 PARBATI DAM	NATURAL GRAVITY DRAIN	17	KM



Figure 2: Alignment 1

Alternative-1(a): This option is modification of the Alignment -1 based on the concept as proposed by the department wherein the water is lifted in single stage as opposed to two stage pumping as in case of Alignment 1. It also involves construction of an intake across Chambal River. Surplus monsoon water of Chamabl is then transferred from this intake to Parbati and Ramsagar Dams in the Parbati basin through lifting. The total quantam of water (both for Parbati & Ramsagar) is lifted from a low of El. +138 m at the proposed intake across Chambal river to an elevation of El. +303.28 m in single stage pumping and then it drops into Bohre ka Taal, a natural pond constructed during state time. From Bohre Ka Taal, the water flows for 15.7 Km through a natural drain which ultimately joins the Ramsagar Dam. However, for Parbati Dam the water is again pumped from Bohre Ka Taal from an El. + 293 to El. + El. 309.6 over a length of 1.89 Km which then outfalls into a 17 Km drain which ultimatley culminates into Parbati Dam. The details of this alignment are further illustrated as below.



Figure 3: Alignment 1(a)

Table 2: SEQUENCE OF ALIGNMENT 1(a)

ALTERNATIVE	NODE		DESCRIPTION	LENGTH	
	FROM	TO			
1(a)	1 PROPOSED INTAKE AT CHAMBAL	2 BOHRE KA TAAL OUTLET	PUMPING MAIN (LIFT FROM EL. + 138 M to EL. + 303.28 M)	8.47	KM
	FOR RAM SAGAR DAM				
	3 BOHRE KA TAAL	4 RAM SAGAR DAM	NATURAL GRAVITY DRAIN	15.7	KM
	FOR PARBATI DAM				

ALTERNATIVE	NODE		DESCRIPTION	LENGTH	
	FROM	TO			
	5 BOHRE KA TAAL PUMP HOUSE	6 PARBATI DAM OUTLET	PUMPING MAIN (LIFT FROM El. + 293 M to El. + 309.6 M)	1.89	KM
	6 PARBATI DRAIN OUTLET	7 PARBATI DAM	NATURAL GRAVITY DRAIN	17	KM

Alternative-2: This alternative is a slight modification of the originally proposed alternative-1. The same water conductor system as envisaged in alternative-1 is proposed in this alternative as well from the proposed intake structure across Chambal river till the proposed pump house - 1. However, for Ramsagar Dam the water is lifted from pump house-1 till a drain which joins Bohre ka Taal and from there its flows under gravity to reach the Ramsagar Dam. However, for Parbati Dam the quantum of water to be transferred to Parbati Dam is directly lifted from pump house-1 all the way to the drain which outfalls into Parbati Dam instead of lifting all the water to Bohre Ka Taal and then lifting it again to Parbati Dam,. For the same quantam of water transferred using this alternative configuration this arrangement entails savings for the state due to lower power consumption.

Table 3: SEQUENCE OF ALIGNMENT 2

ALTERNATIVE	NODE		DESCRIPTION	LENGTH	
	FROM	TO			
2	1 PROPOSED INTAKE AT CHAMBAL	2 PUMP HOUSE-1	PUMPING MAIN (LIFT FROM El. + 138 M to El. + 223.64 M)	7.20	KM
	FOR RAM SAGAR DAM				
	2 PUMP HOUSE-1	3 BOHRE KA TAAL OUTLET	PUMPING MAIN (LIFT FROM El. + 223.64 M to El. + 303.28 M)	1.27	KM
	4 BOHRE KA TAAL	5 RAM SAGAR DAM	NATURAL GRAVITY DRAIN	15.7	KM

ALTERNATIVE	NODE		DESCRIPTION	LENGTH	
	FROM	TO			
	FOR PARBATI DAM				
	2 PUMP HOUSE-1	6 PARBATI DRAIN OUTLET	PUMPING MAIN (LIFT FROM EL. + 223.64 M to EL. + 309.6 M)	2.53	KM
	6 PARBATI DRAIN OUTLET	7 PARBATI DAM	NATURAL GRAVITY DRAIN	17	KM

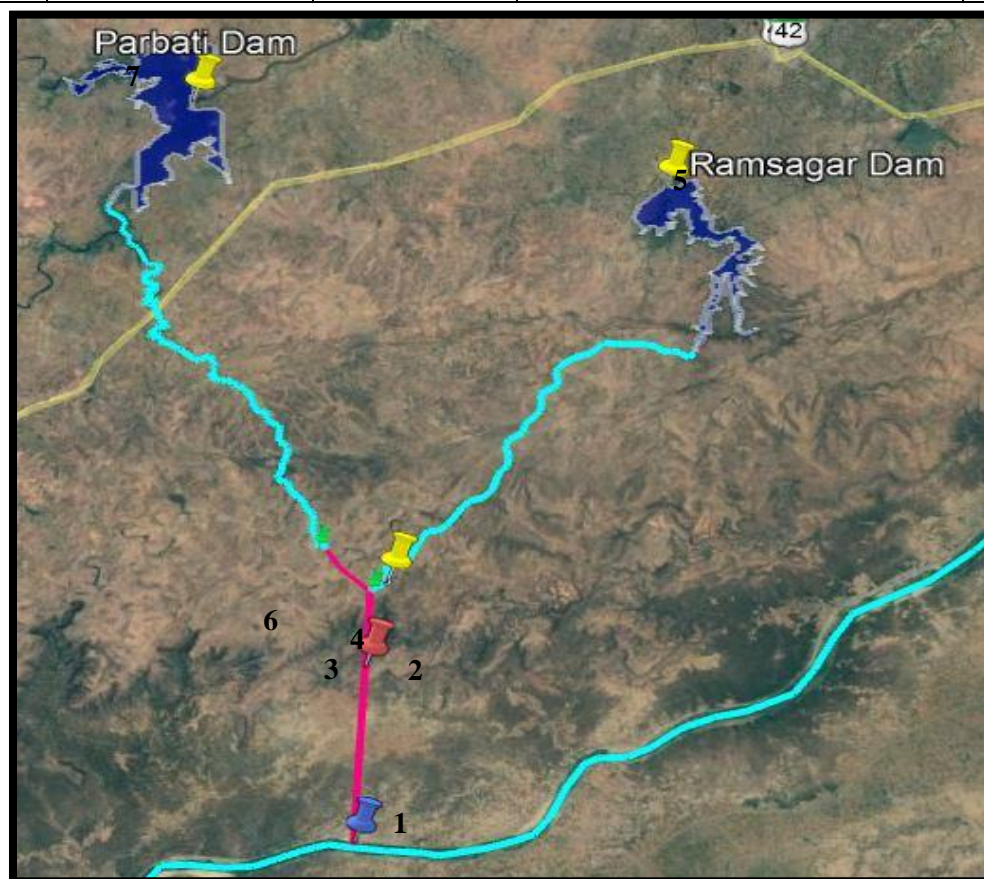


Figure 3: Alignment 2

Alternative-3: In this alternative as well surplus water of Chambal river during monsoon will be transferred to the water deficit areas of Dholpur district from the proposed intake across Chambal river. Water will be transferred through a combination of pumping mains and gravity natural drains and pipes and tunnels to the existing Parbati and Ramsagar reservoir in Parbati basin. In this alternative only the location of Pump House-1 has been shifted while the other system configuration and mechanism are same as that of alternative-2.

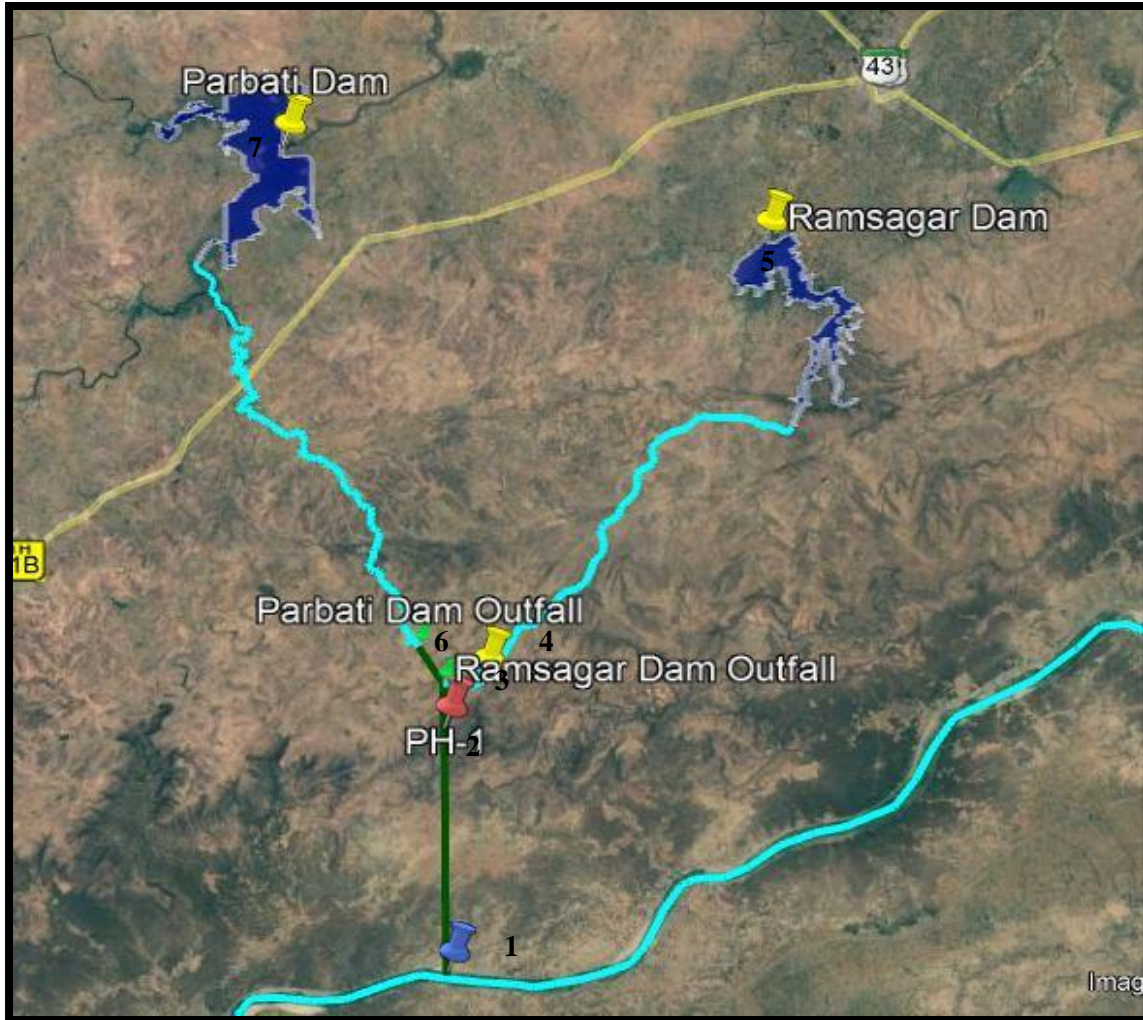


Figure 4: Alignment 3

Table 4: SEQUENCE OF ALIGNMENT 3

ALTERNATIVE	NODE		DESCRIPTION	LENGTH	
	FROM	TO			
3	1 PROPOSED INTAKE AT CHAMBAL	2 PUMP HOUSE-1	PUMPING MAIN (LIFT FROM El. + 138 M to El. + 223.64 M)	8.7	KM
	FOR RAM SAGAR DAM				
	2 PUMP HOUSE-1	3 BOHRE KA TAAL OUTLET	PUMPING MAIN (LIFT FROM El. + 223.64 M to El. + 303.28 M)	0.8	KM
	4 BOHRE KA TAAL	5 RAM SAGAR DAM	NATURAL GRAVITY DRAIN	15.7	KM
	FOR PARBATI DAM				
	2 PUMP HOUSE-1	6 PARBATI DRAIN OUTLET	PUMPING MAIN (LIFT FROM El. + 223.64 M to El. + 309.6 M)	1.6	KM
	6 PARBATI DRAIN OUTLET	7 PARBATI DAM	NATURAL GRAVITY DRAIN	17	KM

Table 5: Comparison of Water Conveyance System Alternatives

Table-Comparison of Alternatives						
Sl. No.	Description	Unit	Alternative-1	Alternative-1 (a)	Alternative-2	Alternative-3
1	Conveyance System					
a.	Pumping Main	Km	10.36	10.36	11	11.1
b.	Natural Stream	Km	32.7	32.7	32.7	32.7
TOTAL			43.06	43.06	43.7	43.8
2	Cost of Civil Works	Crores	886.98	820.12*	799.65	813.21
3	Water Availability	MCM	496.82	496.82	496.82	496.82
4	Power Requirement	MW	62	54	54.5	54.5
5	Annual Energy Cost	Crores	68.45	59.62	60.17	60.17
6	Civil Works (Cost/MCM)	Crores	1.78	1.65	1.61	1.64

As can be seen from table 1 below the alternative-1(a) is the alignment with the lowest annual energy expenditure whereas Alternative-2 is having the lowest initial capital requirement and also one of the lowest O&M if not the lowest. Accordingly, Alternative-2 has been selected out of these four (4) competing alternatives since the initial investment is the lowest coupled with the fact that annual O&M is also one of the lowest while delivering the same output as compared to the other competing alternatives. Therefore, Alternative-2 has been selected to be the most techno-economically feasible alignment. The line diagram describing the alternative-2 is illustrated below.

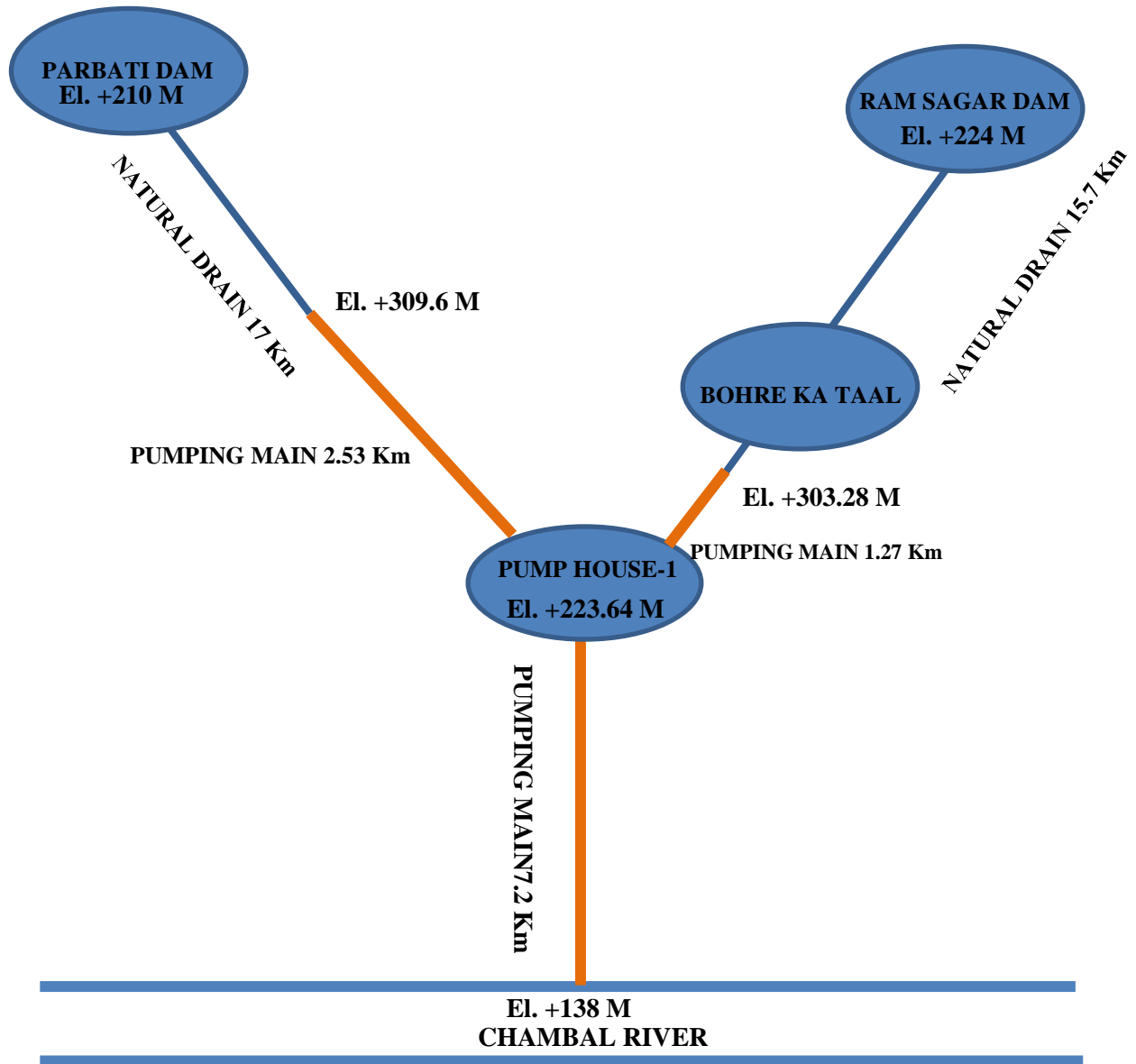


Figure 5: Line Diagram of Alternative-2 of Kaliteer Lift Scheme


 (विजय कुमार शर्मा)
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 धौलपुर