

(5) RATING FOR STATE OF NATURE AND HAZARDS ASSESSMENT

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Rating for State of Nature and Hazards Assesment (215), Upper Lobeysa Canal (2/2)

Attribute		Description/ measurement	asurement	and the second		2) (17)	1000 1000	1-21 10		) (07)	2	1471 1071		1	╁	┦		╞	-			
Vegetation		tough root	Thick	moderate	sparce, barren		2 1 - 															
		anchoring.	Ð	(c)	cultivated (5)	Ś	3 2 2	ŝ	ŝ	2	0 0	5.3						-	-			
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unco (smaller)		s, 6	6 - 20 (5)	21 - 30 (8)	>31 (10)	5	8	5	Ś	2	- 2	10 8										
Nearby drainage	Bron	engine	under cuting	A∎n6	active gully					<u> </u>	<b></b>					<u></u>						
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material		massive debris, soil	collumum. dejuns with	debns w/ wet mud or 3 m	logse debris, rock debris				:						<u>.                                    </u>							
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-	ê	ପ	(5)	<ul> <li>temporanty</li> <li>(8)</li> </ul>	(00)	0	- 10 - 10	0		0	0	0										
Possible wash out/ rock fail		not litually (0)	possible	probable	m danger (5)	0	0	0	0	0	0	·				-	:					
Extering slide, creep failure (w < 0 m)	<b>e</b> ge ()	nul erosion	old slide near-by (<10 years) (5)	new slide within 20 m (B)	zone of major or active stide (10)	0		- ი ი	0 0	0	0	•	0									T
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Rating for State of Nature and Hazards Assesment (3/15), Lower Lobeysa Canal 111111111

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nor (key)         possible         probable         in danger         0 <t< td=""><td></td><td>6</td><td>6</td><td>(2)</td><td>(8)</td><td>(01)</td><td>0</td><td>0</td><td>0</td><td>Ö</td><td>3</td><td>0</td><td>5</td><td>80</td><td>ъ 20</td><td></td><td></td><td></td><td></td><td>•</td><td>٥</td><td>0</td><td>&gt;</td><td>╧</td><td></td></t<>		6	6	(2)	(8)	(01)	0	0	0	Ö	3	0	5	80	ъ 20					•	٥	0	>	╧	
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Rating tor State of Nature and Hazards Assesment (5/15), Baji Canat (2/3)

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Attribute	Attribute	Description/ measurement	pasurement		-1	20 (20 (20	(21) (22)	2) (23)	3) (24)	<u>8</u>	8	9	(2)	(07)		3	2	170	2	5	tent tont tont tent tont	2		<u>ارد</u>
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Rating for State of Nature and Hazards Assesment (6/15). Bajo Canal (3/3)

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Rating for State of Nature and Hazards Assesment (7/15). Phangyuf Canal (1/3)

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Rating for State of Nature and Hazards Assesment (8/15), Phangyui Canal (2/3)

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Rating for State of Nature and Hazards Assesment (10/15), Gemkha Canal 

	Altribute		Description/ measurement	easurement	•		(I) (	(2) (3)	(4)	(2)	(6) (7)	) (8)	(6)	(10)	(11) [12)	ត		_			-		
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- benkling         - 10         0         0         0         0         5         5         3         0           entents out         model         model         model         model         model         model         model         model         model         0         0         0         0         0         0         0         0         0         0         0         0         0 <th0< td=""><th></th><td>**</td><td>**</td><td>4</td><td>44</td><td>*</td><td></td><td></td><td></td><td></td><td></td><td>÷</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td><b>.</b></td></th0<>		**	**	4	44	*						÷									<b>.</b>		
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Naiskha Canal Naiskha Canal Attributio Description Vegetation up Costription vegetation 0 (00) Stope Angle (3) - (3) (3) Maufby drainage none simple Maufby drainage (0) Stope surface (0) (3)	neasurement hick (0) (1) (1) (2) (2) (3) (3) (3) (3) (3) (3) (3) (3	Rating R	Rating for State of Nature and Hazards Assessment (11/15).         Naiakha Canal         spare       (1)       (2)       (3)       (4)       (5)       (6)       (7)       (3)         spare       cultivated       0       0       5 </th <th>of Nature and Nalakha Canal (1) (2) ( 0 0 5 5 5</th> <th>d Hazar al</th> <th>ds Ass</th> <th>esmen</th> <th>1 (11/15</th> <th>ġ.</th> <th></th> <th>:</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	of Nature and Nalakha Canal (1) (2) ( 0 0 5 5 5	d Hazar al	ds Ass	esmen	1 (11/15	ġ.		:						
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Attribute		Description/ measurement	neasurement	moderate	sparce, barren	ε	8	<u>6</u>	(c) (t)	9	S -	<u></u>	5	(21) (21) (11) (01)	Ē	2	2			ł		
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Constant	0	(C)	(5)	(B)	(10) urecular with				יי היי	^  		<b>&gt;</b>		n	2	~	 					1
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material		massive debris,	collovium.	debris w/ wel	loose debris, rock debris						<u>·</u>					:						
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Bed rock	massive resistant	jointed hard R. massive soft R.	not observed & others	Weatherd R.	crushed, decomposed,						•	. _ <del></del>										
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Deformation of structure	ever V	E C E	med., deform. 3 - 6 m	med, - major deform, repaired. territorekiv	onide sues					<u> </u>	· 		<u> </u>									
	0	3	(5)	(B)	(10)	0	0	0	0	0	0 0	0	0	0	0	0	0				-	. 1
Possible wash out		not literty	possuble (3)	probable (4)	n dang <del>u</del> (5)	0	0	0	0		0	0   0	0	0 	ہ: 	0	o	-				- 1
Existing slide, creep faiture (w < 0.m)	<b>9</b> 00 (9)	All erosión	old skde rear-by (< 10 years) (5)	new slide within 20 m (8)	zone of major or active slide (10)	Ö	0	0	0	0	0 0	0	0	, , <b>0</b>	<b>0</b>	0	0					1
Total Po	Total Point (Vulnerability Index)	bility Index)				8	8	렁	8	46 3	38 34	4 35	3	3	3	\$\$	9°					
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# Rating for State of Nature and Hazards Assesment (12/15), Rutekha Canal

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Rating for State of Nature and Hazards Assesment (13/15), Maphekha Canal

Attribute			1			111	6 0 0	(9)	(2) (	(8)	(8)	(6)	(10)							
		Description/ measurement			1		-+-	<b>-</b>	+-	- <b>-</b>	+-				-					
Vegetation		tough root	<del>Х</del>	moderate	sparce, bairen cultivaled		 		. •	<u>.</u>										
		ancromo	(0)	(3)	(2)	0	3	5	0	0	0	0	ღ							Τ
3			6 - 20	21 - 45	> 45		د ب	, ,	. 4	ע  ע		· •C	Ś	2						
Stope Angle		ê		(5)	() ()		0 ·	+-		╀	, 	ŗ				 				
unop (seaucep)		°, ē	6 - 20 (5)	(8)	(01)	ω	5.5	2	6	8 10	8	2	2	_		-			-	
Nearby drainage	200 B	alqme	under cutting	gully !	active guily											<b></b> .				
			Or rill swarm	\ 	J.	 ['			 · .											
			2	Þ			<u> </u>								<u></u>					
	ę	6	> ©	)@	(01)	0	0 0	6	0	0	0	n	0					-		T
Slope surface		Smooth	uava-nu	punou	inegular with		.' :													
	1	e 	6	scattered (4)	(5)	0	0 0	0	0	4	0	4	0			_			-	
thickness		€ € V	0-5m	5-10m	£ 01 <		• 	•	u	น 	v	¥	v.							
Surface cover		(0)	6	(2)	6	רי מי	0 0	-†-	0		+-	>	, ,	-		-				
matenal		massive debris,	coltwww.	debra w/ wet	koose debris. rock-debris															
		3	A 1 m block	Dioch									<u>, i</u>							
	,	(2)	(2)	(8)	(10)	80	8	8	Ŷ	8) 	2	6				╉			-	
Bed rock	masswo	jointed hard R.	nol observed	Weatherd R.	crushed.					. <u>.</u>	- <u>-</u>			· · .						:
	resistant	Tassive son r.	5	foluated	begilitzed					<u> </u>	<u> </u>									
			2		6	ø	ം പ	00 	ø		8 8	8	ø					-	-	
	Ô	ŝ		S	.02			_		_		. <b></b>								
Orientation of	0	nearly itat (3)	Not clear (5)	(8)	(10)		<u> </u>			 				:						
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	7			7/						<u></u>										
			4			; ; ;		. <u></u>				•	C						•	
						0	ν Ο	0 0			2  _ _ >		2	-			<b> </b>			
Cutting + banking	· · ·	E g		e 2 0	E ()	0	0	0	0	0	0	0	0							
height Deformation of	Jone	NO.	med. deform.	med major	down warp		 										. <del>.</del>			
structure		E N V	E	ceruint repared						<u>.</u>	<u> </u>		1						<u> </u>	
	6	(2)	3	(8)	()	0	ọ	0 0	0	n	0 - 	n 								
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rock fail Eviation alido, creen	none	Ĭ	old slide near-by	2	zone of major or				•											
(allure (w < 5 m)			(< 10 years)	within 20 m	active slide	0	•	0	0	ω	0	-	0	-			_ .			
		the Inday'				4			;	1			ţ		:					

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Vegetation Up Skope Angle (degreea) down Nearby drainage none	lough root	And A			_				>	Ī	1	╉	-	Ţ	ł	_	1-	-	Т
	ŝ	<b>.</b>	moderate	sparce, burren															
		¢	6	(5)		0	0	0	ч <b>റ</b>	0								-	T
	s> 6	6 = 20	2; - 45 (5)	45 (E)	5	Ś	- v	ດະ 	c)										
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		te no	Quilty .	active guilty	ļ	<u> </u>			. 	<b> </b>									
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(heckness	εņ v	e 9-6	5-10.1	E (1)	с С	0	с С	3 3	5	<del>с</del> о									
material	masawe debns,	coliumum,	debns w/ wet	loose debris,															
. <del>1917</del> 2	3		E C S DOM	5 ST 10 ST 1											:				<u> </u>
•	ĉ	(S)	\$ @	(10)	5 5	<u>.</u> S	S	2	Ś		_		-+						
Bed rock nasewe	<u> </u>	not observed	Weathend R.	crushed.												_,			
rossetant	K masswe soft R.	Siefficial State	open-cracked, foliated	becomposed arguitzed	<u> </u>			·								·			_
					- u	C	Ľ	ίς. 	¢	0									
( <b>0</b> )	ĉ	ŝ	3	(D_)	╉	+-			<u>}</u>	- 		T		-	-	-			1
Orientation of	neenty Tlat	Of Clear (5)	Ř.	ç (ç									<u> </u>						
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	1	<u> </u>	T,																
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	/ 2	/ \ \ \	2	\$	v	د 	ŭ	ي 	v.	v									
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Deformation of none		med., deform.	med major	COM MBD		-													
structure .	E 17	804 m	celorm, repared temocranity	Seems acive		<del></del>				-									
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Possible wash out	not lakely	endiateod	probable	in danger	-	-	· .	 	с 	C			÷						
_		6	(4) Anu alida	(C)	-	>	,		┢	,	-		-			 			
Existing silds, creap none failure (w.s. 6m)		(< 10 years)	within 20 m	active slide		<u></u>	· .				·		`.						-
(0)	0	(5)	(8)	(10)	0		0	 	<b>○</b>   _ ·		-			-				-	
Total Point (Vulnerability Index)	bility index)	•			30	26 24	ŝ	31 34	3	8									

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Rating for State of Nature and Hazards assesment (14/15), Naykoyuwa Canal

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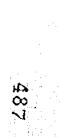
Rating for State of Nature and Hazards Assesment (15/15), Rumina Canal

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Nonserver         Text         modeline         S S							ł	ĺ						-	:	L	~	-	-	_			-
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000         000 <td>3</td> <td></td> <td></td> <td>6-20</td> <td>21-45</td> <td>&gt; 45</td> <td>(</td> <td></td> <td></td> <td>·</td> <td></td> <td></td> <td></td> <td>:</td> <td>· . </td> <td>:</td> <td>:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	3			6-20	21-45	> 45	(			·				:	· . 	:	:						
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Motion         motion<	down		\$ e			10×	ŝ	S	 			80		 ·						_	_	÷	
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(1)         (2) <td>pe surface</td> <td></td> <td>amooth</td> <td>nn-even</td> <td>mound</td> <td>irregular with</td> <td></td> <td><u>.</u></td> <td>•</td> <td></td>	pe surface		amooth	nn-even	mound	irregular with		<u>.</u>	•														
(1)         (1) <td></td> <td></td> <td></td> <td></td> <td>scarered</td> <td>mid-slope flat</td> <td>(</td> <td>&lt;</td> <td></td> <td></td> <td>-</td> <td>- <b>-</b></td> <td></td> <td>:</td>					scarered	mid-slope flat	(	<			-	- <b>-</b>											:
Office         - (3) <t< td=""><td></td><td></td><td></td><td>- 0</td><td>(4)</td><td>3</td><td>Ţ</td><td>╡</td><td>+</td><td>-</td><td>╉</td><td>&gt;  - -</td><td></td><td>╁</td><td>+</td><td></td><td></td><td></td><td>-</td><td>-</td><td>  .</td><td>-</td><td>Ι</td></t<>				- 0	(4)	3	Ţ	╡	+	-	╉	>  - -		╁	+				-	-	.	-	Ι
Main         Total (Main         Color)         Color (Main         Data defen, color (Main         Color (Main <td>Inckness</td> <td></td> <td>E n V</td> <td>E</td> <td>5 - 10 m</td> <td>E 2 .</td> <td>•</td> <td></td> <td></td> <td></td> <td></td> <td>. v</td> <td></td> <td></td> <td></td> <td>÷</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Inckness		E n V	E	5 - 10 m	E 2 .	•					. v				÷							
Method         Control         Control <th< td=""><td>face cover</td><td></td><td>ô</td><td>ē</td><td>6</td><td>(n) (</td><td></td><td>,</td><td></td><td></td><td></td><td>2</td><td></td><td>1-</td><td>┟╴</td><td>+</td><td>┞</td><td></td><td>┢╍</td><td>-</td><td></td><td></td><td></td></th<>	face cover		ô	ē	6	(n) (		,				2		1-	┟╴	+	┞		┢╍	-			
Obsile         Control         Control <th< td=""><td>matenal</td><td>20</td><td>Isswe debrie, 1</td><td>colluvium.</td><td>Cebris w/ wet</td><td>I IOOSA GEORIS,</td><td>- </td><td></td><td></td><td></td><td>:</td><td><u> </u></td><td></td><td></td><td></td><td></td><td></td><td></td><td>_</td><td></td><td></td><td></td><td></td></th<>	matenal	20	Isswe debrie, 1	colluvium.	Cebris w/ wet	I IOOSA GEORIS,	- 				:	<u> </u>							_				
(1)         (1) <td></td> <td></td> <td></td> <td>debris will</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td></td> <td>÷</td> <td></td> <td></td> <td></td> <td></td> <td></td>				debris will										_				÷					
MARINE         MORENT VERT         Control Control         Wallhact R.         Control Control         Control Contro         Control Con	4			X I B DOCK	DIOCK IN T		v	v	v						<u>.</u>								:
Immuno         Contraction         Contraction <t< td=""><td></td><td>• •</td><td>6</td><td>(2)</td><td>(a)</td><td>(n1)</td><td><u>}</u></td><td></td><td>,</td><td>-</td><td>+</td><td>┢</td><td></td><td>ŀ</td><td>-</td><td> -</td><td>-</td><td></td><td>ŀ</td><td>-</td><td>-</td><td></td><td></td></t<>		• •	6	(2)	(a)	(n1)	<u>}</u>		,	-	+	┢		ŀ	-	-	-		ŀ	-	-		
Image: second	5 rock		mted hard R.	not observed	Weatherd H.	CONSIDER.			:	:	·				<u> </u>								
(0)         (3) <td></td> <td></td> <td>SSAVE SOLF.</td> <td>&amp; others</td> <td>open-cracked,</td> <td>uncomposed.</td> <td></td> <td></td> <td>•</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>•</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>			SSAVE SOLF.	& others	open-cracked,	uncomposed.			•								•						
(0)         (0) <td></td> <td></td> <td>م کر م ا ا ا</td> <td></td> <td>CALIFIC</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td><u></u></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>			م کر م ا ا ا		CALIFIC										<u></u>								
(0)         (10)         (10)         (10)         (10)           (10)         (1)         (10)         (10)         (10)         (10)           (10)         (1)         (10)         (10)         (10)         (10)         (10)           (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)           (11)         (11)         (11)         (11)         (11)         (11)         (11)         (11)         (11)         (11)           (11)		W	ŧ	Ę	(8)	(10)	. eo	80	ø	<del>.</del>		-								_			
(0)       (1)       (1)       (1)         (1)       (1)       (1)       (1)       (1)         (1)       (1)       (1)       (1)       (1)       (1)         (1)       (1)       (1)       (1)       (1)       (1)         (1)       (1)       (1)       (1)       (1)       (1)       (1)         (1)       (1)       (1)       (1)       (1)       (1)       (1)       (1)         (1)       (1)       (1)       (1)       (1)       (1)       (1)       (1)       (1)       (1)         (1)       (			Coarty flat	not clear	520	~ 20°																	
Mind         Constraint         Constraint <td></td> <td>: </td> <td> } 6</td> <td>ź</td> <td>(8)</td> <td>(01)</td> <td></td> <td></td> <td><u></u>-</td> <td></td>		: 	 } 6	ź	(8)	(01)			<u></u> -														
3         5	Constant of	÷ -	•		4	4				<del>.</del> .		<u>.</u>	-			<b>-</b>							
7     7     7       6     7     5     5     5     5     5       7     7     7     7       7     7     7     7       8     5     5     5     5     5       7     7     13     14       10     13     14     0     0     0     0       13     14     16     16     17       13     14     170     170     0     0     0       10     13     110     0     0     0     0     0       10     13     14     170     170     0     0     0       10     13     14     170     170     0     0     0       10     13     14     170     170     0     0     0       10     13     13     110     13     13     13       10     13     13     13     13     13     13       11     13     13     3     3     3     3       11     13     13     3     3     3     3       13     13     3     3     3     3     3		1  K	e.	Ĭ	Ĩ	Ĺ											••••						
1     2     5     5     5     5     5     5     5       1     3     3     5     5     5     5     5     5     5       1     0     0     0     0     0     0     0     0     0       1     0     0     0     0     0     0     0     0       1     0     0     0     0     0     0     0       1     0     0     0     0     0     0       1     0     0     0     0     0     0       1     0     0     0     0     0     0       1     0     0     0     0     0     0       1     0     0     0     0     0     0       1     0     0     0     0     0     0       1     0     0     0     0     0     0       1     0     0     0     0     0     0       1     0     0     0     0     0     0       1     0     0     0     0     0     0       1     0     0     0     0 <td>:</td> <td>     </td> <td>Т</td> <td>:</td> <td>T</td> <td></td> <td></td> <td></td> <td></td> <td><u> </u></td> <td></td> <td>- : - :</td> <td></td> <td></td> <td>;</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	:	   	Т	:	T					<u> </u>		- : - :			;								
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IV. MONITORING DATA

# IV. MONITORING DATA

1. Monitoring Guideline for the Experimental Facilities

2. Monitoring of the Experimental Facilities

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(1) Monitoring Data of Groundwater Scheme

(2) Monitoring Data of Spring Water Scheme

(3) Monitoring Data of River Water Scheme

1) Civil and Operation Monitoring Data

Pump Operation Schedule

Civil and Operation Monitoring Data

2) Analysis of Operation Monitoring Data

3) Specification of Pump Unit

4) Design Dimension and O/M

# 1. Monitoring Guideline for the Experimental Facilities

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# JAPAN INTERNATIONAL COOPERATION AGENCY ROYAL GOVERNMENT OF BHUTAN

# THE STUDY ON GROUNDWATER DEVELOPMENT IN WANGDUEPHODRANG DISTRICT

# MONITORING GUIDELINE FOR THE EXPERIMENTAL FACILITIES

490

**MARCH 1995** 

PACIFIC CONSULTANTS INTERNATIONAL CHUO KAIHATSU CORPORATION

# THE STUDY ON GROUNDWATER DEVELOPMENT IN WANGDUEPHODRANG DISTRICT OF BHUTAN

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# MONITORING GUIDELINE FOR THE EXPERIMENTAL FACILITIES

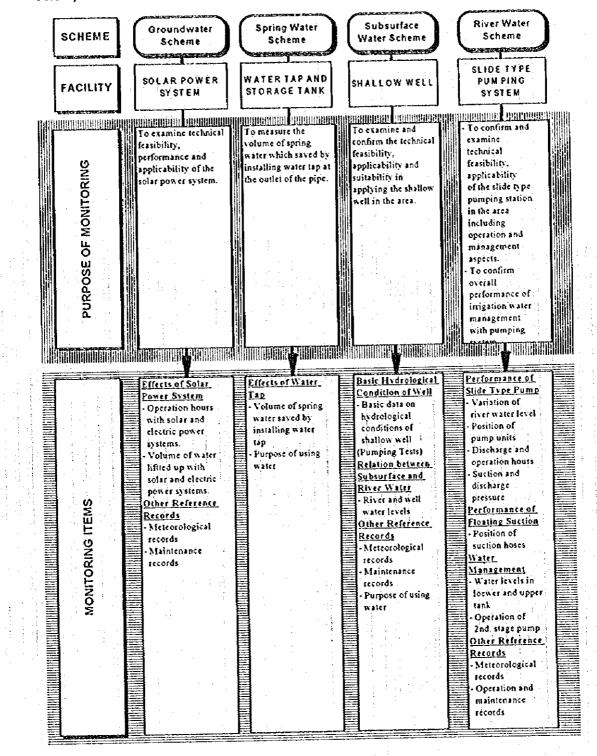
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## GENERAL INSTRUCTIONS

This Guideline was prepared to show how to operate the monitoring operation for experimental facilities and the monitoring purpose and items are summarized as shown below,



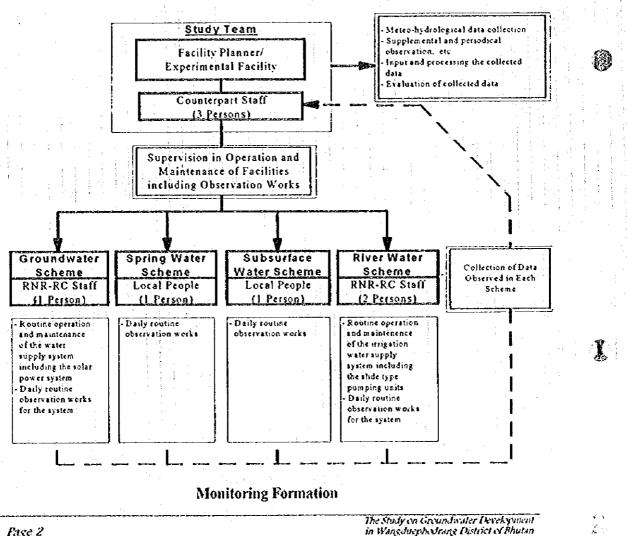
### Monitoring Purposes and Items

Since the solar powered pumping facility and the slide type pumping station are located in the farm yard of RNR-RC in Bajo, the operation of such facility will be conducted by the staff of the RNR-RC in Bajo. Therefore, the routine and periodical observation works are recommended to be conducted by such RNR-RC in Bajo. However, it is considered necessary to perform inspection by qualified engineers to technician during the operation period in order to ensure the proper operation.

As for the spring water storage facility in the Phangyul area and the shallow well pumping facility in the Bajo area, since the facilities constructed in these areas are not complicated but simple, it is considered possible to operate facility with a certain skill as well as to monitor their performance. The routine monitoring works of these facilities will be conducted by local peoples to utilise these facilities.

The meteorological records required for monitoring will be collected by the counterpart staff in RNR-RC office, and compiled by them. In order to ensure the observation works of the experimental facilities, the observation works will be carried out by RNR-RC staffs and local people at each site of experimental facility under the management and control of the project's counterpart staff. The observation data will be recorded in the monitoring record books of each experimental facility whenever such monitoring works are done.

The formation of the above monitoring system is illustrated as shown below;



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Three (3) counterpart staff of the project will be assigned and they will be in charge of overall controlling and managing such necessary monitoring works to be conducted by the RNR-RC staff and local people. Technology transfer to such project counterpart staff was carried out through on-the-job training in the course of the construction of the experimental facilities.

The required number of the staff and local people to be assigned for executing monitoring works of each experimental facility is tabulated below.

Experimental Facility	RNR-RC staff	Local People
Solar Powered Pumping Facility	1	-
Spring Water Storage Facility	-	1
Shallow Well Pumping Facility River Pumping Station	2	-
Total	3	22

It is should be noted that it is indispensable to assign the RNR-RC staff and local people in order to proceed with such necessary monitoring works successfully.

The monitoring format sheets were prepared for each monitoring operation. Those format sheets are summarized below;

Monitoring Format Sheet B-2 : Monitoring Format Sheet C-1 : Monitoring Format Sheet C-2 :	Groundwater Scheme Spring Water Scheme (1) Daily Format Spring Water Scheme (2) for 1 Week Interval Subsurface Water Scheme (1) Daily Water Level Subsurface Water Scheme (2) Pumping Test Subsurface Water Scheme (3) Step Drawdown Test
Monitoring Format Sheet D-2 : Monitoring Format Sheet D-3	River Water Scheme (1) Daily River Water Level River Water Scheme - Lower Pumping Station (1) River Water Scheme - Lower Pumping Station (2) River Water Scheme - Upper Pumping Station

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Guideline for Monitoring the Experimental Facilities

# A. GROUNDWATER SCHEME

#### A.1 Monitoring Item

The monitoring item for the groundwater scheme is shown in the monitoring format sheet A and summarized as shown below;

- Daily Monitoring
  - a) Climate
  - b) Power System Switching Box
  - c) Pumping Operation
- Pump Maintenance
  - e)-1 Cleaning the surface of solar panel (weekly)

e)-2 Retightening of bolt and nut (weekly)

e)-3 Check wiring, bolt and nut

Every pumping operation and maintenance should be done by staff of RNR-RC, therefore, necessary description for monitoring item should be described by the same staff according to the monitoring format sheet.

A.2 Instruction of Daily Monitoring

Monitoring Format Sheet A

a) Climate

a) 1 Weather

Whether should be described as Fine, Cloudy, Rainy or Snow at the start of 1st pumping operation.

a)-2 Temperature

Mean daily temperature should be described according to the observation data of the meteorological station at RNR-RC every day.

a)-3 Sun shine hrs

Daily sun shine his should be described according to the observation data of the meteorological station at RNR-RC every day.

b) Fower system switching box

Electric switching box should be checked as for solar power system or public line power system at the start of every pumping operation. The description should be done as shown below;

1. Solar 2. Fublic 1. Solar (2.) Fublic in case of using the solar power system in case of using the public line power system

Guideline for Monitoring the Experimental Facilities

- c) Fumping operation
- c)-1 Operation start time

The start time and minutes of pumping operation should be described at the start of every pumping operation.

c)-2 Cumulative flow mater

The value of cumulative flow mater should be described at the start of every pumping operation, based on the indicator of cumulative flow mater which was installed at outlet pipe from the water tank.

c)-3 Operation end time

The end time and minutes of pumping operation should be described at the end of every pumping operation.

c)-4 Cumulative flow mater

The value of cumulative flow mater should be described at the end of every pumping operation, based on the indicator of cumulative flow mater which was installed at outlet pipe from the water tank.

d) Remark

The special topic should be described if any.

A.3 Instruction of Maintenance

e)-1 Cleaning of solar panel

Condition of the surface of the solar panel should be confirmed by visual inspection and any kind of stains should be cleaned up in every week.

e)-2 Ratightening of bolt and nut

The distortion of the solar panel support should be checked by visual inspection weekly and the retightening of bolt and nut should be required if necessary.

e)-3 Check of the wiring, bolt and nut

The condition of the wiring, bolt and nut should be checked monthly and necessary countermeasure must be done if necessary

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## **B.** Spring Water Scheme

#### B.1 Monitoring Item

The monitoring item for the spring water scheme is shown in "MONITORING FORMAT SHEET B-1" and in "MONITORING FORMAT SHEET B-2", and summarized below:

- Daily Monitoring
  - a) Climate
  - b) Water Level in the Water Storage Tank
- Spring Water Discharge and Volume Stored in the Tank (Every week)
- The daily monitoring on climate and water level in the water storage tank should be conducted by the village people at the same time everyday, while the spring water discharge and the volume of water stored in the water storage tank should be measured by the counterpart staff once a week periodically.

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#### **B.2** Instructions of Daily Monitoring

Monitoring Format Sheet B-1

a) 👘 Date

The observation should be conducted by the village people at a same time everyday.

b) Time

The time of measuring should be noted whenever the observation is conducted.

c) Climate

The weather should be noted as "Fine", "Cloudy", "Rainy" or "Snow" when the observation is made.

#### d) Water Level

The water level of the spring water stored in the water storage tank should be measured everyday. A transparent vinyl hose is set vertically on the tank wall and a steel gauge plate is fixed beside the hose on the wall. The water height in the transparent hose shows the water level in the tank. The villager who is assigned for reading the gauge everyday can read the gauge at the height of water in the hose. The gauge reading should be made to meter order with two (2) decimal points. a) Date

The date of the observation should be noted.

b) Time

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The time of the observation should be noted when the valve operation is started.

c) Climate

The weather should be noted as "Fine", "Cloudy", "Rainy" or "Snow" when the observation is made.

d) Spring Water Discharge

d)-1 Volume Filled in a Minute

The spring water discharge is measured in the following manner.

- The measurement is conducted with a stopwatch and a bucket.
- The volume of spring water filled within a minute is measured for three (3) times, and the average of these three (3) measured values is taken as a spring discharge.

#### d)-2 Discharge

The average value obtained in the above manner should be noted.

e) Valve Operation

In order to measure the volume of spring water stored in the water storage tank, the water levels and the readings of commutative flow meter should be observed before and after the valve operation to release the stored water once a week

e)-1 Water Level

The water level of the water in the tank should be read before and after the valve operation. The water height in the transparent vinyl hose on the tank wall is read on the steel gauge plate beside the hose. The height should be read in meter order with two (2) decimal points.

e)-2 Commutative Flow Meter

The commutative flow meter which is installed at the outlet of the storage tank should be read and its readings should be noted before and after the valve operation.

# C. SUBSURFACE WATER SCHEME

C.1 Monitoring Item

The monitoring item for the subsurface water scheme is shown in "MONITORING FORMAT SHEET C-1", "MONITORING FORMAT SHEET C-2" and "MONITORING FORMAT SHEET C-3", and summarized below:

- Daily Monitoring Water Levels in the Chang Chhu and the Shallow Well

- Fumping Test

- Step Drawdown Test

#### C.2 Instructions of Daily Monitoring

Monitoring Format Sheet C-1

To grasp the relationship water levels in the Chang Chhu and the shallow well and the seasonal variation of water level in the shallow well, it is necessary to observe such water levels daily. As shown in "MONITORING FORMAT SHEET C-1", the water levels are read as gauge height of the staff gauges installed in the river and the shallow well to a meter order with two decimal points. The time of the observation is also required to be noted.

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C.3 Instructions of Pumping Test

Monitoring Format Sheet C-2

a) Water Level at Chang Chhu

The water level of the Chang Chhu should be read on the staff gauge installed in the river before starting the pumping test.

b) Water Level at Well

The water level of the shallow well should be read on the staff gauge installed in the well before starting the pumping test.

c) Commutative Flow Meter

The readings of the commutative flow meter should be noted when the pumping test is started and ended to know the discharge of the pump.

d) Temperature

The water and air temperatures should be measured and noted when the pumping test is started.

e) Continuous Fumping Test

The pumping test consists of the continuous pumping test and the recovery water level test. The former is conducted first to observe the drawdown of the well water level; and the latter is then made to observe the recovery of the well water level.

#### e)-1 Pumping up Level

As soon as the pumping up test is commenced, the drawdown of the water level starts, and such water level should be observed with time durations mentioned in the time column beside the pump up level column. Careful attention should be paid at the initial stage of the test, because time pitch of the observation is shorter in the initial stage. The observation should be continued for 12 hr (720 min) as stated in the monitoring format.

#### e)-2 Drawdown

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The drawdown is considered as the difference in height from the initial well water level. It should be calculated deducting the present well water level from the initial level.

#### Recovery Water Level Test

The recovery water level test should be conducted to observe the recovery of the well water level after the continuous pumping test.

#### f)-1 Recovery Level

Immediately after completing the continuous pumping test, the recovery water level test should be commenced, and the well water level rising should be observed. The well water level should be read on the staff gauge at the time after the continuous pumping test as specified in the time column beside the recovery level column. Careful attention should be paid because the velocity of rising water level is expected to be fast at the initial stage of the test. This observation should be continued for 12 hr (720 min) as shown in monitoring format.

#### f)-2 Fluctuation Level

The fluctuation level of well water is considered as the difference of water level from the previous observation. It should be calculated deducting the previous water level from that of the present observation.

#### f)-3 Drawup

The drawup is considered as the difference in height from the water level observed at initial time of the test. It should be calculated deducting the initial water level from that of the present.

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C.4 Instructions of Step Drawdown Test

Monitoring Format Sheet C-3

The step drawdown test should be conducted to observe the variation of well water level of the various different discharges.

a) Water Level at Chang Chhu

The water level at Chang Chhu should be noted when the step drawdown test is conducted.

Guideline for Akonitoring the Experimental Facilities

#### b) Water Level at Well

The water level at well should be noted when the step drawdown test is conducted.

c) Commutative Flow Meter at Start

When starting the step drawdown test, the commutative flow meter should be read, and the pump discharge at starting time should be confirmed.

d) 1st. Step

d)-1 Commutative Discharge

The commutative discharge of pump should be read when the 1st. step of test is commenced.

d)-2 Water Temperature

The water temperature should be measured when the 1st step of test is commenced.

d)-3 Dynamic Water Level

As soon as the 1st step of pumping up is commenced, the drawdown starts, and the water level should be observed with time durations mentioned in the time column beside the pump up level column. Careful attention should be paid especially at the initial stage of the step, because time pitch of the observation is shorter in the initial stage. The observation should be continued for 3 hr (180 min) as stated in the monitoring format.

d)-4 Drawdown

The drawdown is considered as the difference in height from the initial well water level. It should be calculated deducting the present well water level from the initial level.

The procedures from item d)-1 to d)-4 should be conducted for the further steps of the test. The step drawdown test should be conducted with five (5) steps of pumping up at all.

## D. RIVER WATER SCHEME

D.1 Monitoring Item

The monitoring item for river water scheme is shown in the monitoring format sheets  $D-1 \sim D-4$  and summarized as shown below;

Daily river water level at the Chang Chhu (FORMAT SHEET D-1) Time, Climate and water level

- Lower pump operation (FORMAT SHEET D-2 and D-3)
  - a) River water level and water temperature at the Chang Chhu
  - b) Water level at the lower tank
  - c) Necessary parameter of the lower pump
  - d) Any special topic

#### The lower pump maintenance (FORMAT SHEET D-2) Monthly, 6 monthly, annual, 2 years

- Upper pump operation (FORMAT SHEET D-4)
- a) Water level and water temperature at the lower tank
  - b) Water level at the upper tank
  - c) Necessary parameter of the upper pump
  - d) Any special topic

#### The upper pump maintenance (FORMAT SHEET D-4) Monthly, 6 monthly, annual, 2 years

Every pumping operation and maintenance should be done by staff of RNR-RC, therefore, necessary description for monitoring item should be described by the same staff according to the monitoring format sheet.

D.2 Instructions of Daily River Water Level at the Chang Chhu Monitoring Format Sheet D-1

It may not be always to operate the pump system due to seasonal cropping pattern and daily rainfall. Even if pump is not operated, it is necessary to measure the river water level at the Chang Chhu for the purpose of clarifying the river condition at the site. Following items should be monitored daily according to the monitoring format sheet D-1.

Time

The river water level should be measured at around  $8 \sim 9$  o'clock in the every morning and time and minutes should be described.

Climate

Climate should be described as Fine, Cloudy, Rainy or Snow at the same time as mentioned above.

River water level at the Chang Chhu

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The reading of gauge height should be described as for the river water level at the Chang Chhu

#### D.3 Instructions of Lower Pump Operation

Monitoring Format Sheet D-2 Monitoring Format Sheet D-3

2 set of pump were installed as shown in the format sheet D-3 and 2 type of pumping operation such as single pump or double pump operation are expected.

a) Monitoring item for the Chang Chhu

a)-1 River water level at the Chang Chhu

The river water level at the Chang Chhu should be described at the start time of every pumping operation based on the gauge height in the river.

a)-2 River water temperature

The river water temperature at the start time of every pumping operation should be measured using the thermometer more than 5 minutes and described.

b) Water level at the lower tank

b)-1 Water level at the start time

The water level of the lower tank should be measured when pumping operation is started, based on the staff gauge which is installed at the lower tank.

b)-2 Water level at the end time

The water level of the lower tank should be measured when pumping operation is finished, based on the staff gauge which is installed at the lower tank.

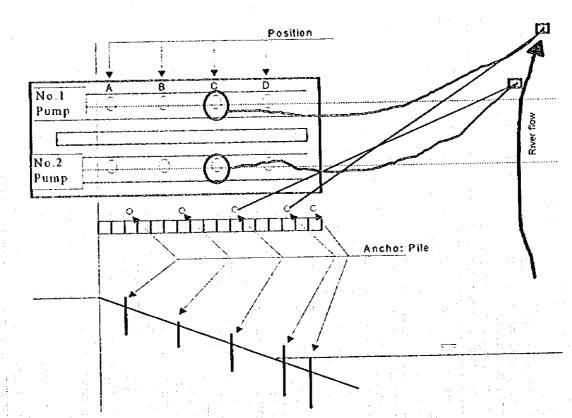
c) The lower pumping operation

c)-1 Fosition

The position of pump should be described according to the indicator of "A" ~ "D" as shown in the format sheet D-3 for both pump. In case of single use, the blank of "-" should be described for the position for No.1 or No. 2 pump.

The following items should be sketched in the format sheet D-3 as shown below;

- Position and direction of stream line of river flow
- Position of suction hose with number of suction hose connected
- Fosition of pumping unit
- The anchor and wire
- Special topic if any



c)-2 Operation start time

The start time and minutes of pumping operation should be described at the start of every pumping operation.

c)-3 Cumulative flow mater at start

The value of cumulative flow mater should be described at the start of every pumping operation, based on the indicator of cumulative flow mater which was installed at outlet pipe from the pump.

c)-4 Suction pressure

The suction pressure should be measured after 10 minutes running from the switched on, based on the indicator at the pump.

c)-5 Delivery pressure

The delivery pressure should be measured after 10 minutes running from the switched on, based on the indicator at the pump.

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c)-6 Ampere

The ampere should be measured after 10 minutes running from the switched on, based on the ampere mater of the control panel.

c)-7 Voltage

The Voltage should be measured after 10 minutes running from the switched on, based on the voltage mater of the control panel.

c)-8 Bearing temperature

The temperature of bearing should be measured using the thermometer when pumping operation is finished.

c)-9 Stuffing box temperature

The temperature of stuffing box should be measured using the thermometer when pumping operation is finished.

c)-10 Operation end time

The end time and minutes of pumping operation should be described at the end of every pumping operation.

c)-11 Cumulative flow mater

The value of cumulative flow mater should be described at the end of every pumping operation, based on the indicator of cumulative flow mater which was installed at outlet pipe from the pump.

d) Remark

The special topic should be described if any.

D.4 Instructions of Lower Pump Maintenance -> Monitoring Format Sheet D+2

The following items should be maintenance periodically

- Monthly maintenance
  - Adjustment of leakage from joints.
  - Examination and exchange of oil
  - Check of shaft temperature
  - 6 monthly maintenance
    - Check and adjustment of shaft center
      - Check of vibration and noise

Annual maintenance

- Check of shaft sleeve and exchange of grand packing
- Check and exchange of mechanical-seals
- · Exchange of oil for bearing shaft

2 Years maintenance

· Overhaul and exchange O-ring, Gasket, V-ring and others

- Check of wearing at revolving part
- · Check of inside casing
- · Adjustment of all the others parts

D.5 Instructions of Upper Pump Operation 🔿

### MonitoringFormat Sheet D-4

Although the upper pump has not been installed yet, After the installation the following items should monitored.

a) Monitoring item for the lower tank

a)-1 Water level at start

The water level at the lower tank should be measured at the start time of every upper pumping operation based on the gauge height in the tank.

a)-2 Water level at end

The water level at the lower tank should be measured at the end time of every upper pumping operation based on the gauge height in the tank.

a)-3 Water temperature

The water temperature at the start time of every upper pumping operation should be measured using the thermometer more than 5 minutes and described.

b) Water level at the upper tank

b)-1 Water level at the start time

The water level of the upper tank should be measured when upper pumping operation is started, based on the staff gauge which is installed at the upper tank.

b)-2 Water level at the end time

The water level of the upper tank should be measured when upper pumping operation is finished, based on the staff gauge which is installed at the upper tank.

- c) The upper pumping operation
- c)-1 Operation start time

The start time and minutes of pumping operation should be described at the start of every pumping operation.

c)-2 Operation end time

The end time and minutes of pumping operation should be described at the end of every pumping operation.

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#### c)-3 Bearing temperature

The temperature of bearing should be measured using the thermometer when upper pumping operation is finished.

c)-4 Stuffing box temperature

The temperature of stuffing box should be measured using the thermometer when upper pumping operation is finished.

d) Remark

The special topic should be described if any.

#### D.6 Instructions of Upper Pump Maintenance

The following items should be maintenance periodically

- Monthly maintenance
  - · Adjustment of leakage from joints.
  - Examination and exchange of oil
  - Check of shaft temperature
- 6 monthly maintenance
  - · Check and adjustment of shaft center
    - Check of vibration and noise
- Annual maintenance
  - Check of shaft sleeve and exchange of grand packing
    - · Check and exchange of mechanical-seals
    - Exchange of oil for bearing shaft
- 2 Years maintenance
  - Overhaul and exchange O-ring, Gasket, V-ring and others
  - · Check of wearing at revolving part
  - Check of inside casing
  - · Adjustment of all the others parts

# MONITORING FORMATS FOR EXPERIMENTAL FACILITIES

1. Monitoring Format Sheet A :Groundwater Scheme

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- 2. Monitoring Format Sheet B-1 : Spring Water Scheme (1) Daily Format
- 3. Monitoring Format Sheet B-2 : Spring Water Scheme (2) for 1 Week Interval
- 4. Monitoring Format Sheet C-1 : Subsurface Water Scheme (1) Daily Water Level
- 5. Monitoring Format Sheet C-2 : Subsurface Water Scheme (2) Pumping Test
- 6. Monitoring Format Sheet C-3 : Subsurface Water Scheme (3) Step Drawdown Test
- 7. Monitoring Format Sheet D-1 : River Water Scheme (1) Daily River Water Level
- 8. Monitoring Format Sheet D-2 : River Water Scheme Lower Fumping Station
  (1)
- 9. Monitoring Format Sheet D-3 : River Water Scheme Lower Pumping Station (2)
- 10. Monitoring Format Sheet D-4 : River Water Scheme Upper Fumping Station

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MONITORING FORMAT SHEET A : GROUNDWATER SCHEME

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	Date :						
Ľ		at the station of the		a)-2 Temperature	ے د <mark>ر</mark>	a)-3 Sun shine hrs	hrs
<u>a</u>	Cumaic	(2)-1 WGULL	Let constitute	2nd oncration	3rd operation	4th operation	5th operation
			1 St Updiation	1 Salar 2 Public	l Solar 2. Public	151 Optimum 2. Public 1 Solar 2. Public 1. Solar 2. Public 1. Solar	1.Solar 2.Public
<u>6</u>	Electric Switching box	hing box	1. Solar 2. Fuoric	1.001.1.2			
		and the start time	and a second	••	••		•••
	Suiduny						
3	A Onvration	c)-2 Cumulative flow meter			7		
5				•	•	•	
-		c)-3 Operation and time	•				
		Construction of the motor	and the second				
		C)-+   CUITINIAN C ALON MICH					
13		- Romark - Second Second			and the second		
9							
		Weckly	c)-1 Cleaning the surface of solar panel	rface of solar panel		Note:	
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Anintenance		c)-2 Retightening of bolt and nut	bolt and nut			n ben an de service and a long and an
)		Monthly	e)-3 Check wiring, bolt and nut	olt and nut			
	1						
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	Date :								
				a ser a s	a)-2 Temperature	°c	a)-3 Sun shinc hrs	hrs	
<u>a</u>				tet arxiration 2nd operation	2nd operation	3rd opcration	4th operation	5th operation	
	Etenere Switching box	tching		l Solar 2 Public	1.Solar 2.Public	1.Solar 2.Public	Solar 2.Public 1.Solar 2.Public 1.Solar 2.Public 1.Solar 2.Public 1.Solar 2.Public	I. Solar 2. Publi	o
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			c)-4 Cumulative flow meter	an an ann an ann ann ann an an an an an					
13			Remark						1
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<u></u>	c) Maintenance	<u> </u>		c)-2 Retightening of bolt and nut	bolt and nut				
			Monthly	c)-3 Check wiring, bolt and nut	olt and nut				1
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MONITORING FORMAT SHEET B-1 : SPRING WATER SCHEME (1) DAILY FORMAT (1/2)

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(p)	Water level (m)																								-							
<u>ວ</u>	Climate																			×.	-				:						e E	
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	Climate   Water level (m)		*			and a second division																	· · · · · · · · · · · · · · · · · · ·						and the second second			
c)	Climate						[									- <b>-</b>			1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -				1						and the second of the		a she a chur a	
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	Date	I-Apr	2-Apr	3-Apr	4-Apr	S-Apr	6-Apr	-7-Anr	S-An	9-Apr	10-Apr	11-Apr	-12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	-18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24:Apr	25-Apr	26-Apr	27-Apr	28-Apr	29-Apr	30-Apr	
d)	Climate   Water level (m)																															
c)	Climate							T																								
(q	Time	. <b></b>	 					Ţ.													••					•						•••
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MONITORING FORMAT SHEET B-1 : SPRING WATER SCHEME (1) DAILY FORMAT (2/2)

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Date         Time           1-Jul         :           2-Jul         :           3-Jul         :				-			-	i		And familian and a set of the			limate l	Climate   Water level (m)
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 In			3-Aug				3-Sep							
			4-Aug				4-Sep				4-Oct			
<ul> <li>Inl .</li> </ul>			2-Aug				5-Sep				-Oct			
			6-Aug				6-Sep				50 6-0	••		
			T-Aug				7-Sep				7-061			
- Jul-7			9 VII				8-Sen				8-Oct			
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			24-Aug	•••	 	· ·	24-Scp	••			24-06	•••		
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29-Jul		.	ZV-AUE		 		30-Sen				30-Oct			-
30-Jul			30-Aug								11-04		<b>.</b>	

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MONITORING FORMAT SHEET B-2 : SPRING WATER SCHEME (2) FOR 1 WEEK INTERVAL

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		( <b>)</b>	· · ·	d) Spring Water D	ter Discharge			c) Valve	e) Valve Operation	2	
	Ë	1		ALI Volume of Water Filled in a Minute		d>2		At Start	-	At End	Remarks
	}		L	2nd.		Discharge	e)-1 Water Level	e)-2 Cumulative Flow Meter	e)-l Water Level	e)-2 Cumulative Flow Meter	
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AONITORING FORMAT SHEET C-1 : SUBSRFACE WATER SDHEME (1)	DAILY WATER LEVEL (1/2)
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4-Mar				4-Apr	•••			4-May				III			
S.M.S.				S-Apr	•••			S-Mav				III			
IPINI-C				6-Anr			-	6-May	-			6-Jun			
6-Mar				- V - L				7-May	••••			7-Jun			
7-Mar					•			X-Mav	 			8-Jun	••		
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EME (1)	
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MONITORING FORMAT SHEET C-1 : SUBSRFACE WATER SDHEME (1)	EL (2/2)
C-1 : SUBS	DAILY WATER LEVEL (2/2)
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## MONITORING FORMAT SHEET C-2 : SUBSURFACE WATER SCHEME (2) PUMPING TEST

D	ate :	Time			PUMPING		loud , Rain , Snow )	
	-	vel at Chang Chhu			131	b) Water Level at V		in.
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ستحصيصهم ويشاده		live flow mater at S			<u>m'</u>	A DESCRIPTION OF A DESC	ter Temp.	<u>``c</u>
c)-2 Cu		tive flow mater at e	COLUMN TWO IS NOT THE		m <sup>*</sup>	and the second sec	mperature	C
	e	) Continuous pump	ing test	a tari na tara		f) Recovery	water level test	
Time		e)-1 Pump up level	e)-2 Drawd	lown	Time		f)-2 Fluctuation level	нэ глам ир
(hr) (n	nin)	(gauge height)			(hr) (min)	(gauge height)		
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	225	n m		m	22		m	<u>.</u>
4 hr	240	m		m	4 hr 24		m	n
	260	m		m	26	0 m	. m	<u>n</u>
<b> </b>	280			m	28		m	<u>n</u>
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i Date:	i unc		a) Water Level	el at Chang Chhu		m[b) Water Level	rel at Well :	m	c) Cumulat	Cumulative Discharge at Start	al otart.			
	1sr Step	-		2nd Step		and a second second	3rd Step			4th Step			5th Step	
d -1 Cumulati	Cumulative discharge		c)-1 Cunula	c)-1 Cumulative discharge		[)-1 Cumulat	<ol> <li>Cumulative disclurge</li> </ol>		g)-1 Cumul	g)-1 Cumulative discharge		h)-1 Cumul	h)-1 Cumulative discharge	
	imp.	<u></u>	c)-2 Water Temp.	cinp.	<b>D</b> 0	()-2 Water Temp.	cnp.	° S	g)-2 Water Temp.	Temp.	<u></u>	h)-2 Water Temp	Temp.	
Time	d)-3 Dynamic	d)-4 Drawdown	Time	c)-3 Dynumic water level	c)-4 Drawdown	Time	D-3 Dynumic water level	1)-4 I)rawdown	Time	g)-3 Dynamic water level	g)-4 Drawdown	Time	h)-3 Dynamic water level	h)-4 Drawdown
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MONITORING FORMAT SHEET D-1 : RIVER WATER SCHEME (1) DAILY RIVER WATER LEVEL (1/2)

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Climate Chang Chhu (m)	· · · · · · · · · · · · · · · · · · ·																															
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Water level at Chang Chhu (m)																			a se								2.					Q1.
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MONITORING FORMAT SHEET D-1 : RIVER WATER SCHEME (1) DAILY RIVER WATER LEVEL (2/2)

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	·	MONITORING FORMAT SHEET		D-2 : RIVER WATER SCHEME - LOWER PUMPING STATION (1)	TER SCHEME	- LOWER	VINUM	IG STA	(1) NOL		
Date :							·		241- 200201 A	7th committee	
			Ist operation	Ist operation - 2nd operation	3rd opcr	4th oper:		noncration	- 1200		
concert.			No.1 No.2	No.1 No.2	No.1 No.2	L oN	No.2 No.1	N0.2	No. 1 No.2	I ON	NO.2
a) Chang	a)-1	River Water Level	B	B	m		a	E	ε		٤
	a)-2	Water Temp.	ာ		<b>5</b>		• •	Ĵ,	Ū.		<b>ب</b> ا
b) Lower Tank (b)-1	k  9)-1	Water level at start		E	B		B	m	<b>u</b>		ε
	-7 (q	Water level at end	E	m	<b>B</b>		u	Ξ	E		Ξ
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	c)-2	Operation start time			•••	••		• • •	•••	••	
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are sa é	7 0	Suction Pressure					-				
c) Lower Pump c)-5	np c)-5	:									
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(P		Remark									
			🗆 🗆 🖂 🖂 🗆	L Adjustment of leukage from joints	m joints.		Note:			-	:
		Monthiv	C Examin	<ul> <li>Examination and exchange of oil.</li> </ul>	șe of oil.						
ಮಾನ್ರತಿಕ			Check o	Check of shaft temperature.							
:		6 Monthly	Check a	Check and adjustment of shalts center [1] Check of vibration and noise	shafts center. use		:	· · · · · · · · · · · · · · · · · · ·			
			Check o	Check of shaft sleeve and exchange of grand packing.	exchange of gran	nd packing.		:		÷	
c) winner		Ycarly	Check a	Clicck and exchange of Mechanical-scals.	Vechanical-seals.	· · · · ·	<del></del>		•		
- <b>1</b> - <b>1</b> - <b>1</b>	: 	and the state of the formula of the strength of the state of the strength of t	L'Exchan	L Exchange of oil for bearing shaft.	ng shaft.						
*.Cates				L Overhauf and exchange O-ring. Gasket. V-ring. and others.	D-ring, Gasket, V	-ring. and othe	7S.			:	
	. : 	2 Years	Check o	Check of wearing at revolving part	lving part.						
			Check o	Check of inside casing.							
				ר אפןעאוויכווי טי און וויכ טווכו איזיאי	ci puis.	-					

Date:   MONITORING FORMAL SHEET 0-3 : KIVER WALER SCHEME - LOWER PUMPING STATION (2)	No.1 Pump	No.2 Pump	Note	

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MONITORING FORMAT SHEET D-4 : RIVER WATER SCHEME UPPER PUMPING STATION 

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Adjustment of leakage from joints.  Examination and exchange of oil.  Check of shaft temperature.  Check and adjustment of shafts center.
<ul> <li>Check and agustment or sharts center.</li> <li>Cleck of vibration and noise.</li> <li>Check and exchange of Mechanical-seals.</li> <li>Check and exchange of Mechanical-seals.</li> <li>Exclange of oil for bearing shaft.</li> <li>Overhaul and exchange O-ring. Gasket, V-ring, and others.</li> <li>Check of wearing at revolving part.</li> <li>Check of inside casing.</li> <li>Adjustment of all the other parts.</li> </ul>

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