Hidi Khola Hydropower Project (6.82MW)

LAMJUNG, NEPAL

Progress Report

Shrawan, 2081

Independent Power Producer (IPP):

White Lotus Power Limited

Minbhawan-31, Kathmandu, Nepal,

Project Name:	Hidi Khola Hydropower Project
Report for:	White Lotus Power Limited.

Preparation Review and Authorization

Prepared by	Reviewed by	Approved for Issue by
Er. Rajendra Bom	Eng. Prem P. Pandey	Ms. Suman Kumari Joshi

COMPANY DETAILS

Head office:

White Lotus Power Limited
P.O Box: 516

Sumeru House, Minbhawan-31,
Kathmandu, Nepal

Tel: +01-5242944,
Email: hidihydropower@gmail.com

Project Site Office:

Hidikhola Hydropower Project- 6.82MW
Jaluche, Lamjung

TABLE OF CONTENTS

TABLE OF TABLE

TABLE OF PICTURES

ABBREVIATIONS

BOQ	Bill of Quantity
Covid-19	Corona Virus Disease-2019
Cum/Sec.	Cubic meter per second
DED	Detail Engineering Design
DoED	Department of Electricity Development
DPR	Detail Project Report
E	East
FSR	Feasibility Study Report
GWh	Giga Watt Hour
HCE	Hydro-Consult Engineering Limited
HKHPP	Hidi Khola Hydropower Project
IDC	Interest During Construction
Km	Kilometer
KV	Kilo Volt
M	Meter
MS-IW	Milestone of Infrastructures Works
MW	Mega Watt
N	North
PDB	Plant & Design Build
RoR	Run of River
Sqm	Square meter

1. PROJECT DESCRIPTION

Hidi Khola Hydropower Project (HKHPP) is located in Lamjung district of Gandaki Zone/Province (04) of Nepal. The project components of HKHPP are located in Marsyandi Rural Municipality, Juluchhe Ward no. 7. The project lies between 28° 22' 22"N to 28° 23' 04"N and 84° 29' 12"E to 84° 31' 05"E. The headworks is located at left bank of Hidi Khola approximately 100m downstream of confluence Hidi Khola and a major kholsi. The powerhouse is located at the left bank of Nyadi River approximately 1 km downstream of the confluence of Nyadi River and Hidi Khola

Hidi Khola Hydropower Project (HKHPP) is a run-off river project located in hilly terrain of Lamjung district between the elevations of 2466 masl to 1740 masl. For the power generation of the project, the river is diverted by constructing a free flow sloping glacis weir and guided to the powerhouse through 1147.377 m long headrace pipe and 2082.452 m long penstock pipe comprising gravel trap, approach canal, settling basin and headpond. The installed capacity of the project is 6.82MW. The gross head of the project is 724 meters and the design discharge is 1.14 cubic meters per second.

2. PROJECT SALIENT FEATURES

S. N	ITEM	DESCRIPTION	UNIT
1	**Project**	Hidi Khola Hydropower Project	
1.1	**Project Location**		
	Province	4 (Gandaki)	
	District	Lamjung	
1.2	**Project boundary**		
	Latitude	28°22'22" N to 28°23'04" N	
	Longitude	84°29'12" E to 84°31'05" E	
2	**General**		
	Name of River	Hidi River	
	Nearest Town	Besisahar	
	Type of Scheme	Run-of-River (RoR)	
	Gross Head	726	m
	Rated Net Head	697.50	m
3	**Hydrology**		
	Catchment Area (HKHPP Intake)	21.8	km^2
	Design Discharge	1.14	m^3/s
	Design flood (1 in 100 Years)	90	m^3/s
	Average Annual Precipitation	2450	mm
4	**Power and Energy**		
	Design discharge	1.14	m^3/s
	Rated net head	697.50	m
	Capacity	6.82	MW
	Dry Energy	13.13	GWh
	Wet Energy	27.65	GWh

	Annual total Energy	40.78	GWh
5	**Diversion Weir**		
	Type of weir	Permanent Concrete Weir	
	Length of weir	9.0m	
	Crest Elevation	2466	masl
	Spillway type	Free overflow	
	Undersluice Opening (W X H)	2 X 2	m
	Undersluice Crest Level	2464.50	masl
6	**Intake Structure and Gravel trap**		
	Type of Intake	Orifice type side intake	
	No of Openings	2	
	Size of Intake (W x H)	1 m x 0.85 m	m
	Intake Sill Level	2464.65	masl
	Length of Gravel Trap	3.5	m
	Width of Gravel Trap (Avg.)	3.00	m
	Overall depth	6	m
	Particle size to be trapped	5	mm
	Flushing Channel	RCC Box	
7	**Settling Basin**		
	Type	Concrete, Double Bay	
	Dimension (L x B x H)	30.6 x 3.5 x 3.72	m
	Inlet transition length	12	m
	Particle Size to be settled	0.15	mm
	Trapping Efficiency	89.85%	
8	**Headrace pipe**		
	Type	Buried steel circular pipe	

	Internal Diameter	0.85	m
	Length	1147.377	m
	Steel thickness/ Type of lining	6	mm
	No of anchor blocks	19	
9	**Surge tank**		
	Type	Simple Surge	
	Effective Depth	9	M
	L x B	4 x 4.5	M
	Up Surge Level	2467.59	masl
	Down Surge Level	2456.26	masl
	Normal Operation Level	2466	masl
10	**Surge Offset Pipe**		
	Offset Pipe Internal Diameter	0.9	m
	Pipe Length	46.82	m
	Steel thickness	8	mm
	No of Anchor Blocks	1	
11	**Penstock Pipe (High Pressure)**		
	Type	Steel Pipe	
	Internal Diameter	0.8/ 0.675	m
	Length	2082.45m (1063.86/1018.59)	m
	Steel Thickness	8 to 18	mm
	Nos. of Anchor Blocks	25	
12	**Powerhouse**		
	Type	Surface	
	Size (L x W)	25.5 x 17.3	m

	Height	21.32	m
	Turbine Centerline	El. 1740	masl
13	**Tailrace**		
	Type	Box Culvert	
	Tailrace Length	12.77	m
	Size (W x D)	1 x 1.12	m
	Tailrace outlet level	1737.23	masl
14	**Turbine**		
	Type	Pelton, Horizontal Axis	
	Number	2	
	Rated Capacity per unit	3442.71	KW
	Turbine Axis Level	1740	masl
	Net Head	697.50	m
	Discharge per Unit	0.57	m^3/s
	Efficiency	91%	
15	**Governor**		
	Type	Digital Electronic Governor with PID	
	Adjustment for Speed Drop	Up to 10 %	
16	**Generator**		
	Type	Three phase, Synchronous	
	Rated Output Capacity per Unit	4050.24	KVA
	Power Factor	0.85	
	Voltage	6.6	kV
	Frequency	50	Hz

	No of Units	2	
	Excitation System	Brushless Excitation	
	Efficiency	97%	
17	**Transformer**		
	Type	Three Phase, Outdoor	
	Number	2	
	Rated Capacity	4.5	MVA
	Voltage Ratio	33/6.6	
	Vector Group	Dyn 11	
	Efficiency	99%	
	Frequency	50	Hz
18	**Transmission Line**		
	Voltage Level	33 kV	
	Length	16	km
	Conductor Type	ASCR Dog	
	From	Hidi Powerhouse	
	To	Khudi Substation	
19	**Project Cost**		
	Total Project Cost Including VAT, TAX and contingency	1,198,996,008.98	NRs
	Total Project cost including IDC	1,349,571,079.72	NRs
20	**Construction Period**	3 years	

3. KEY DATE

Table 57.1-1: Completed Milestones

S.N	Milestones	Date
1.	Survey License	2073/11/24 (March 7, 2017)
2.	Upgradation of License	2075/01/02 (April 15, 2018)
3.	Grid Connection Agreement	2075/07/15 (Oct 30, 2018)
4.	Power Purchase Agreement (PPA)	2075/10/04 (Jan18,2019)
5.	Generation License	2077/04/14 (July 29, 2020)
6.	Required Commercial Operation Date	2082/05/13 (Aug 29, 2025)
7.	Expression of Interest (EoI)	2078/07/29 (Nov 15 2021)
8.	Financial Closure or Facility Agreement	2078/09/14 (Dec 29, 2021)

4. CONTRACT PACKAGES

The construction work of this project has been divided as followings.

Table 7.1-1: Contract Packages

Lot No. 1	Infrastructures work	BOQ Model
Lot No. 2	Civil work	BOQ Model
Lot No. 3	Hydro mechanical work	Plant and Design Built (PDB)Construction Model
Lot No. 4	Electromechanical work	Plant and Design Built (PDB) Construction Model
Lot No. 5	Transmission line work	Plant and Design Built (PDB) Construction Model

5. UPDATED COST ESTIMATE

As per final DPR, total project cost with IDC is NRs.1.32 billion 25 thousand. However, it may be updated in case of variation.

6. SITE MOBILIZATION

The Access Road Excavation work has been mobilized to open the road track from Dahare to Hidi Khola HPP Powerhouse area on Falgun 06, 2078. The status of equipment, materials and personnel are as in the following tables.

Table 7.1-1: Employer's Mobilized Equipment List at Project Site

S.N	Name	Nos.	S.N	Name	Nos.
1.	Excavator- JCB 220 LC Xtra	1	5.	Total Station-Topcon GM 105	1 set
2.	Breaker	1	6.	Motorcycle-Hero XPULSE 200 DDS	1
3.	Excavator DOOSAN DX 225	1	7.	Mahindra Bolero DC4WD	1
4.	Breaker BLTB135A	1	8.	Auto Level AT-B4A	1 set

Table 7.1-1: Employer's Mobilized Materials stock at Project Site

S.N	Materials	Quantity	S.N	Materials	Quantity
1.	Diesel	1400 ltrs	3	Engine Oil	1 drum
2.	Lubricating Oil	5 drum	4.	Fuel Barrel	20 nos.

Table 7.1-2: Employer's Mobilized Personnel

S.N.	Position	Nos.	S.N.	Position	Nos.
1.	Project Manager	1	8.	Excavator Operator	1
2.	Civil Engineer	1	9.	Excavator Helper	1
3.	Surveyor	1	10.	Cook	1
4.	Mechanical Engineer	1	11.	Site supervisor	1
5.	Electrical Technician	1	12.	Driver	1
6.	Survey Helper	2		Total Personnel =13	
7.	Store Incharge	1			

Table 7.1-3: Civil Contractor's Mobilized Personnel

S.N.	Position	Nos.	S.N.	Position	Nos.
1.	Managing Director	1	8.	Excavator Operator	3
2.	Assistant Project Manager	1	9.	Tractor Driver	3
3.	Surveyor	2	10.	Tripper Driver	2
4.	Survey Helper	2	11.	Bolero Driver	1
5.	Crusher Incharge	1	12	Backhoe Driver	1
6	Crusher Helper	2	13	Civil worker	50
7.	Store Incharge	1		Total Personnel=70	

Table 7.1-4: Civil Contractor's Mobilized Equipment List at Project Site

S.N	Name	Nos.	S.N	Name	Nos.
1.	Crusher	1 Lot	15.	Water Pump scwp80 3 inch	1
2.	DG -125 kVA	1	16.	Submersible Pump 2 inch	2
3.	DG-32 kVA	1	17.	Submersible Pump 3 inch	1
4.	Excavators	3	18.	Submersible Pump 4 inch	7
5.	Total Station	2 set	19.	Air Compressor 23kw 3HP	1
6.	Level Machine	1	20.	Angle Grinder 710 w	1
7.	Tractor	3	21.	Angle Grinder 1300 w	2
8.	Sand Blasting Machine	1	22.	Welding Machine Single Phase	3
9.	Hil- Te Machine	1	23.	Welding Machine Three Phase	1
10.	Hil- Te Drill Big	1	24.	Cut off machine 2350w	2
11.	Magnetic Drill BJ-28 2080w	1	25.	Petrol Vibrator 3HP	3
12.	Rotatory Machine+Hill Te small	2	26.	Electrical Vibrator	3
13.	Chain Pulley- 5Ton	1	27.	Exhaust Fan - Big	2
14.	Chain Pulley 3 Ton	1	28.	Circular Saw machine1350W	2

Table 7.1-5:Civil Contractor's Mobilized Materials Stock at Project Site

S.N	Materials	Quantity	S.N	Materials	Quantity
1.	Diesel	1486 ltrs	4.	Fuel Barrel	20 nos.
2.	Lubricating Oil	5 drum	5.	Cement	641 bag
3	Engine Oil	40 drum			

Table 7.1-6: Projects Major Progress till this Month

PROGESS SUMMARY SHEET FOR CIVIL WORKS		
Item NO.	**Item Description**	**Remarks**
CW.01	Coffer Dam and River Diversion During Construction	**50%**
CW.02	Weir, Stilling basin and Undersluice including floodwall and protection works	**87%**
CW.03	Intake, Gravel Trap, Flushing Pipe and Gate	**18%**
CW.04	Approach Culvert	**0%**
CW.05	Settling Basin	**16%**
CW.06	Headpond and Emergency Spillway	**0%**
CW.07	Upstream Protection Works	**0%**
CWM1	Misc. Headworks	**7%**
	Total of Headworks	**59%**
CW.08A	Headrace Pipe civil works	**45%**
CW.08B	Penstock Pipe civil works	**40%**
CW.09	Siphon Flushing	**0%**
CW.10	Surge Tank and its Components	**47%**
CW.11	Kholsi Training	**0%**
CW.12	Concrete Casing in Buried Pipe	**36%**
CW.13	Saddle Support	**0%**
CWM2	Misc. Waterway	**0%**
	Total of Water Conveyance System	**35%**
CW.14	Powerhouse	**0%**
CW.15	Switchyard and Substation	**0%**

CWM3	Misc. Powerhouse	**0%**
	Total of Powerhouse, tailrace and Switchyard	**0%**
	Total of Civil works	**34%**
CW.16	General Items	**31%**
A	**Total Progress of Item No. CW.01 to CW.16**	**34%**

PROGRESS SUMMARY SHEET- HM WORKS		
S.N	**Particulars**	**Physical Progress**
1	Pipes Procurement from China	15%
2	Freight/ Custom/Transportation Till site	10%
3	Erection of Pipes and Procurment and Erection of Accessories	21%
4	Procurement and Erection of Hydraulic Steel struture (HSS)	2%
5	Estimated contract to be done	0%
	Total contract value for HM Works	**48%**

PROGRESS SUMMARY SHEET- EM WORKS		
S.N	**Particulars**	**Physical Progress**
1	**Contract and Advance Payment**	5%
2	Layout Drawings finalization	10%
2	Dispatch/ transportation/custom / installation	2%
4	Comissioning	0%
5	Estimated contract to be done (Substation)	0%
	Total contract value for EM Works	**17%**

PROGRESS SUMMARY SHEET- GENERAL WORKS

S.N	Particulars	Physical Progress
1	**Infrastructure works**	95%
	Road	
	Nyadi River Crossing	
	Access Road from Dahare to Hidi Powerhouse	
	Project Access Road	
	Site office and Camp facilities	
	Computers, printers, furnitures etc	
	General Equipment and office set up	
	Construction Power	
2	**General Works**	70%
	Land Acquisition	90%
	Socio-environmental mitigation cost	90%
3	**Construction project Management**	55%
4	**Financial**	60%

The total average physical progress is 50.45%

7. WORK PROGRESS

7.1. Lot No.1: Infrastructure works

This includes construction of access road up to powerhouse Site, construction of access road from powerhouse site to headworks, construction power, construction of camp facilities and drinking water supply system etc.

7.1.1. Access road

- The opening of the access road track from Naiche to Dahare is now 100% complete.
- Construction access road from Dahare to HKHPP Powerhouse area was started on 2078/11/06. A total of 7.4 km of road has been excavated, spanning from Dahare to the Powerhouse and from the Powerhouse to the Intake of

the Project. Additionally, 2 km feeder road has been excavated to facilitate access to the penstock alignment.

- A Composite Steel Girder Bridge with an RCC Deck, measuring 15.5 m in length and 4 m in width, has been successfully constructed at Nyadi River. This bridge serves the purpose of providing access to the project
- One excavator with breakers has been mobilized By Employer at site for regular maintenance of access road

Figure 7-1: Dahare to Powerhouse Road

Figure 7-2 Powerhouse to Intake Road

Figure 7-3 Composite steel girder with RCC deck bridge work on progress

Figure 7-4: Internet facility setup at site

7.1.2. Camp Construction

- A temporary camp had been constructed near Nyadi Khola crossing for use as site office and accommodation.
- A main camp has been constructed at Alaichibaari

Figure 7-5: Construction of Temporary camp

Figure 7-6: Employers Main Camp at Alaichibaari

7.1.3 Construction Power

- The installation, testing, and commissioning of construction power from Naiche to Dahare are complete. This process was carried out in collaboration with a neighboring project.
- The erection of poles and accessories, stringing of conductors, and the charging and testing of the 11 kV HT and 400V LT construction power line from the Powerhouse to the intake has been completed
- A 125 kVA distribution transformer has been installed at the intake site.

Figure 7-7: Construction Power (Electric Pole Installation at Dahare Village)

Figure 7-8: Electric Pole and accessories erection for construction power

Figure 7-9: Transformer Installation at Intake

Figure 7-10:Crusher setup and aggregate production

7.2. Lot No. 2: Civil Work

- The contract agreement for the civil construction works of the project was signed on 2080/03/07.
- Excavation, PCC, reinforcement works, formworks, and plum concreting and RCC have been completed at the weir.
- Concreting at the weir downstream apron,downstream cutoffs, downstream and upstream flood walls is in completed
- Rebar placing ,formworks and concreting near operating slab level of undersluice is on progress.
- Stone masonry at base of intake and gravel trap is completed
- Rebar placing, formworks and concreting at intake, gravel trap and approach culvert is on progress

- The stone masonry works at the desander main chamber are completed.
- Excavation and pipe placement from HAB 2 to CAB 3, CAB 4, CAB 5, CAB 6, to HAB 3, HAB 4, HAB 5, HAB 6, HAB 7, HAB 8, HAB 9, HAB 10, to HAB 11 have been completed. Meanwhile, PCC, Rebar placement, formworks and concreting of CAB 4, CAB 5, Siphon crossing, CAB 6, HAB 4, HAB 5, HAB 6, HAB7, HAB 8, HAB 9, HAB 10, and HAB 11 is also finished in the Headrace Pipe Alignment. Backfilling from HAB 2 to CAB 3, CAB4, CAB5,CAB 6,HAB 3, HAB4, HAB5,HAB 6,HAB 7, HAB 8, HAB 9, HAB 10 to HAB 11 is completed.
- Excavation from T block to surge tank is completed.
- Excavation, PCC, rebar placing, formwork, and RCC in the surge tank raft have been completed. Work on the shear wall is also in progress, with only 50% of the shear wall remaining.
- Excavation and pipe placement from CAB 13 to CAB 14,VAB 3, VAB 4 and VAB 5 to CAB15, CAB16, CAB17, CAB18, CAB19,CAB20, CAB21,VAB6, CAB22, VAB7, VAB8, VAB9, VAB10, CAB23 have been completed. Meanwhile, PCC, Rebar placement, formworks and concreting of CAB 14,VAB 3,VAB 4,CAB18, CAB19,CAB20, CAB21,VAB6, CAB22, VAB7, VAB8, VAB9, VAB10, CAB23 is finished in the Penstock alignment. Backfilling from CAB 13 to CAB 14, VAB 3,VAB 4 and CAB20 to CAB21, VAB6, CAB22, VAB7, VAB8, VAB9,VAB10 and CAB23 is completed.
- Excavation of Penstock alignment from CAB23 to VAB11 to VAB 12 to CAB and Bifurcation is in progress.

7.3. Lot No.3: Hydro-mechanical Work

- The contract agreement for the procurement of pipes was signed on 2080/03/07. All the pipes have been manufactured, tested, painted, and transported up to Site

- The contract agreement for the unloading of pipes at Naiche, transportation of pipes from Naiche to the site, and the erection of pipes and their accessories was signed on 2080/04/22 (17th Aug 2023)
- The contract agreement for Supply and erection of Gates, Trashracks and Stoplogs was signed on 2080/10/03 (17th January 2024)
- The contractor has completed the transportation of all the pipes to the site and is currently engaged in erecting pipes and bends, installing stiffeners, installing silt flushing pipes, performing steel lining works, etc. Additionally, the contractor has supplied and installed the bottom seal beams, frames, and top seal beam of the undersluice gate and undersluice stoplogs. The bottom seal beam of the intake gate has also been installed.

Figure 7-11: Work Progress at Weir, Stilling basin and Undersluice including floodwall and protection works

Figure 7-12: Work progress in Intake, Gravel Trap, Flushing Pipe and Gate, Approach canal

Figure 7-13: Stone Masonry at Desander

Figure 7-14: Headrace Pipe erection near HAB 02

Figure 7-15: Headrace Anchor Block CAB3, CAB4, CAB5 and CAB6 including Siphon crossing

Figure 7-16: Headrace Anchor Block HAB 03 and Road crossing

Figure 7-17: Headrace Anchor Block HAB 04

Figure 7-18: Headrace Anchor Block HAB 05

Figure 7-19: Headrace Anchor Block HAB 06

Figure 7-20: Headrace Anchor Block HAB07

Figure 7-21: Headrace Anchor Block HAB08

Figure 7-22: Headrace Pipe erection in between HAB09 and HAB08

Figure 7-23:Penstock Pipe Anchor Block CAB 14

Figure 7-24: Penstock Pipe Anchor Block VAB 03

Figure 7-25: Penstock Pipe Anchor Block VAB 04

Figure 7-26: Penstock Pipe Anchor Block CAB20

Figure 7-27: Penstock Pipe Anchor Block CAB 21

Figure 7-28: Penstock Pipe Anchor Block VAB 06

Figure 7-29: Penstock Pipe Anchor Block CAB 22

Figure 7-30: Penstock Pipe Anchor Block VAB 07

Figure 7-31: Penstock Pipe Anchor Block VAB 09

Figure 7-32: Penstock Pipe Anchor Block VAB10

Figure 7-33: Penstock Pipe Anchor Block CAB23

7.4. Lot No.4: Electro-mechanical Work (E/M)

- The agreement for electromechanical works was signed on 14th December 2023 with Flovel Energy Private Limited India for the design, manufacturing, supply, transportation to the project site, erection, testing, and commissioning of electromechanical equipment. The contractor has already supplied the powerhouse layout, first stage layout, second stage layout, power transformer general arrangement and foundation details, generator drawings, data sheets, curves, QAP, and control room layout drawings.
- The earthing material has been dispatched and has already arrived at the site.

7.5. Lot No. 5: Transmission Line Work

- The Transmission Line Survey license and ElectricicityTransmission lisence has been obtained from the Department of Electricity Development (DoED
- The presentation of the Terms of Reference for the Brief Environmental Study (BES) at DoED has been successfully completed.Brief IEE has been already approved by DoED, Ministry of Energy , Water Resources and Irrigation.
- The 33 kV Transmission line from Hidikhola HPP will be connected to the Nyadi HPP 132 kV Switchyard, utilizing the 132 kV Transmission line on a sharing basis to connect to the Khudi Substation.

Figure 7-34: Discussion with Locals for Transmission Line Route

Figure 7-35: Public hearing for BES of 33 KV TL

7.6. Land Acquisition

- The land required for exchange with government land has already been purchased and handed over. Private land acquisition work is also completed.

7.7. Work related to Corporate Social Responsibility

- The company has carried out the works on Corporate Social Responsibility in the affected areas of the project with the mutual understanding with locals. Company has conducted following CSR works;

Table 7.7-1: Work Related to CSR

S.N.	CSR Program	No of locals benefited	Location	Expenses in NPR	Status
FY 2077/078					
1.	Private Teacher Management at Shree Naya Jyaoti Primary School	58	MRM-6, Naiche	54,000	Completed
FY 2078/079					
1	Facilitate the drinking water and Shed for Sheep and shepherd at the sheep farm.	58	MRM-6, Naiche	2,73,000	Completed
2	Wall construction of community building	50	MRM-6, Dahare	400,000	Planned
3	Forest management, plantation	50	MRM-6, Dahare	50,000	Planned
4	Plaster of school building	50	MRM-6, Dahare	100,000	Planned
5	Forest management, plantation	58	MRM-6, Naiche	80,000	Provided 395000
FY 2080/081					
1	Road construction at Diyikuna	108	MRM-6, Naiche,Dahare	400,000	Provided

7.8. Visitors/ Supervision/Inspection

- Team Developer, Design Consultant and Due Diligence Consultant has regular visit to the site to monitor the work of the project.

8. NEXT PLANS

- Continue Civil and Hydromechanical works
- Manufacturing of Electromechanical items
- Transmission Line works

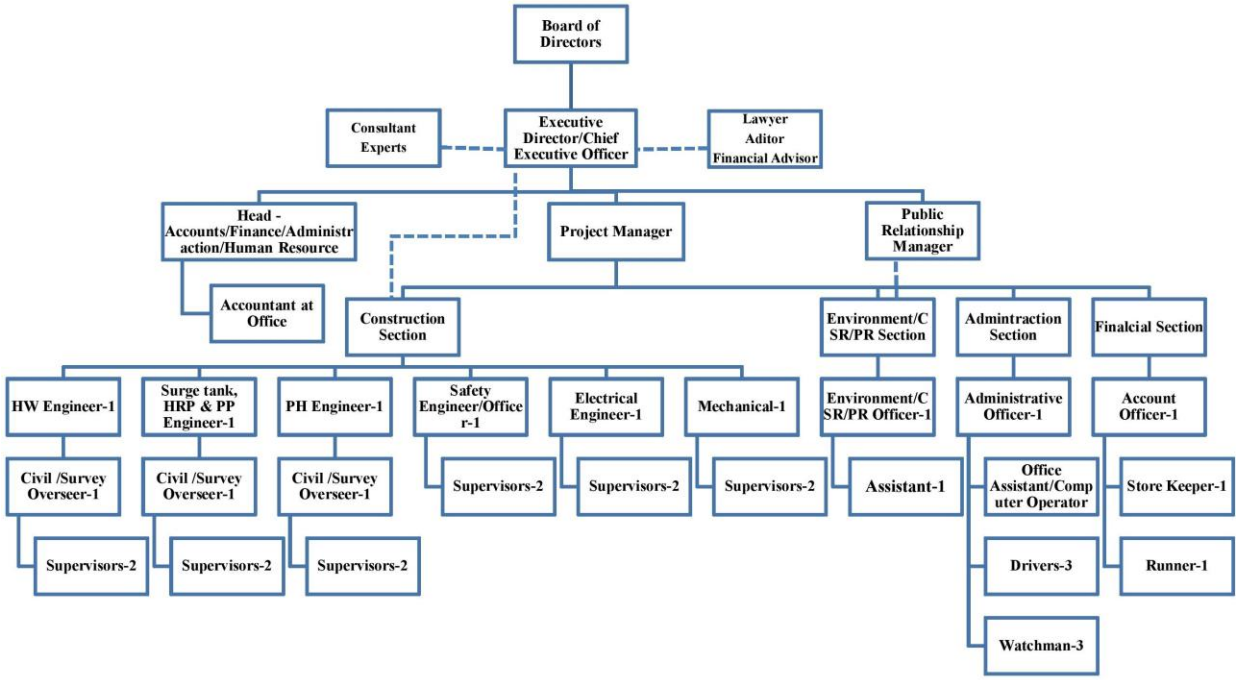
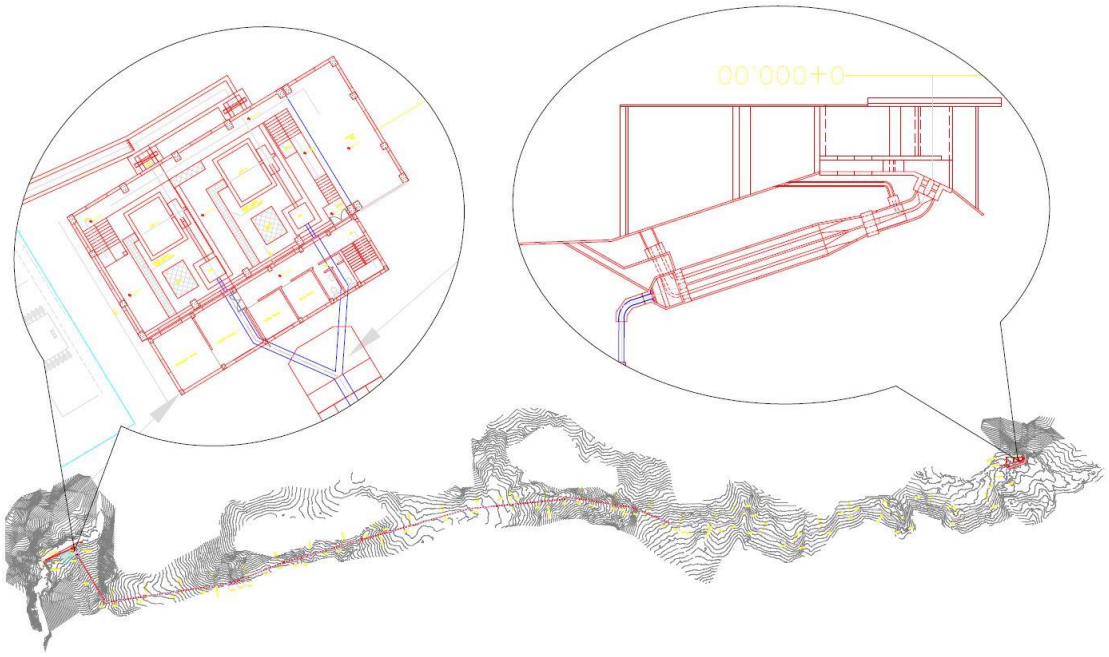


Figure 8-1: Organizational Structure

9. OVERALL PROJECT LAYOUT



Picture 7.8-2: Project Layout