20kW HOSORORO HYDROPOWER PROJECT

Outline

- Background
- History of Site
- Original Layout & Components
- Overview
- Objectives
- Off Taker
- Prior Consultations
- New Layout and Components – 2017
- Project Cost and Financing
- Proposed Schedule
- Job Opportunities
- Energy Sources Analyzed

Background

Part of GEA's mandate is:

- To advise and make recommendations to the Minister, regarding any measures necessary to secure the efficient management of energy and the source of energy in the public interest;
- To develop and encourage the development and utilisation of sources of energy other than sources presently in use;
- To carry out research into all sources of energy including those sources presently used in Guyana for the generation of energy, and securing more efficient utilization of energy and sources of energy.

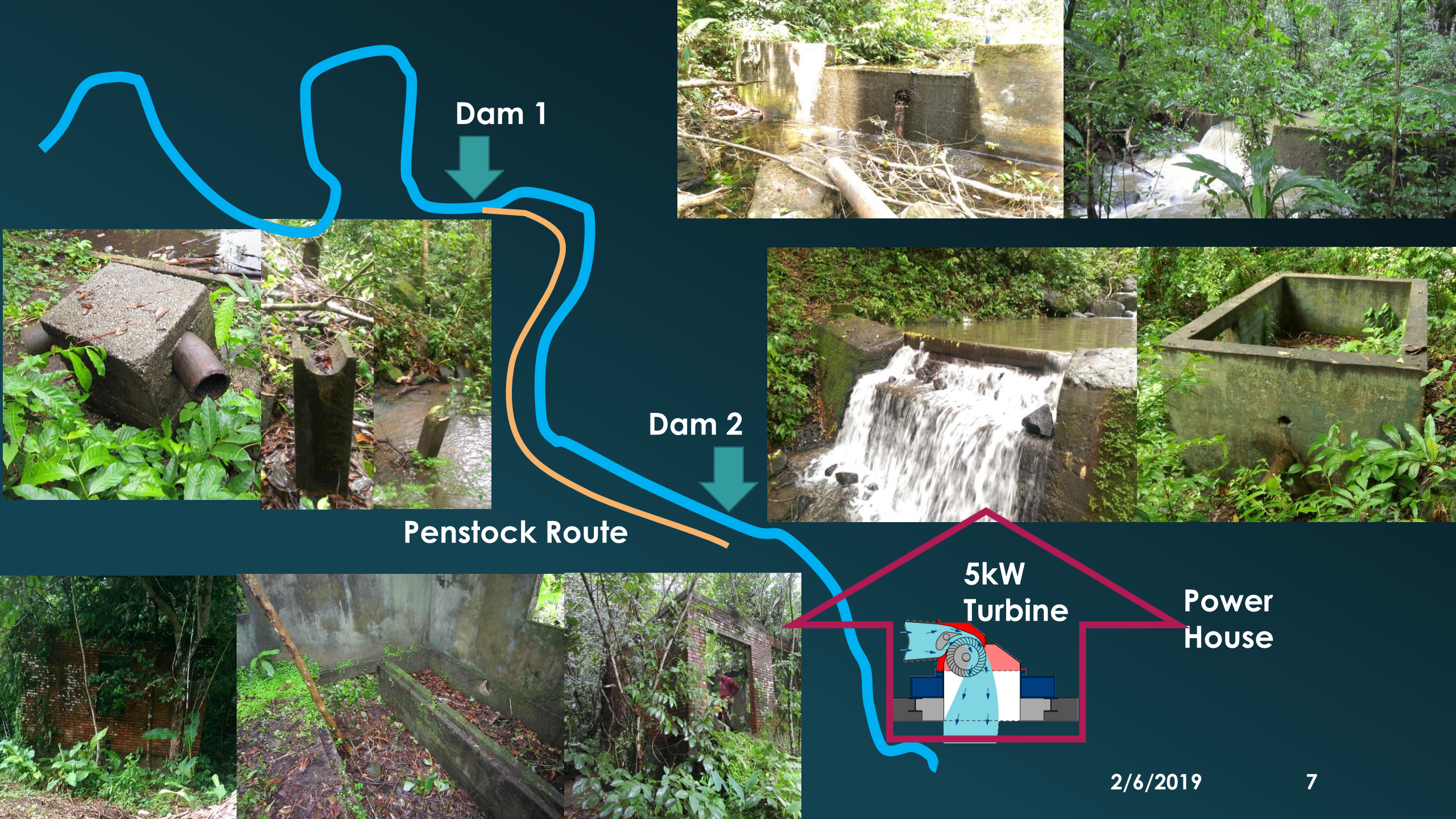
Background

- In April 1976, Montreal Engineering Company Ltd. (Monenco) conducted a comprehensive study that identified 67 potential sites with over 7,000 MW of hydropower potential in the country. Guyana is focused on studying and analyzing the various options for hydropower with the ultimate objective to develop some of its resources.
- In this context, the Hosororo Micro Hydropower Site was identified as candidate to be implemented under direct support of the GEA as a pilot/demonstration and capacity building opportunity for the GEA engineers.

History of Site

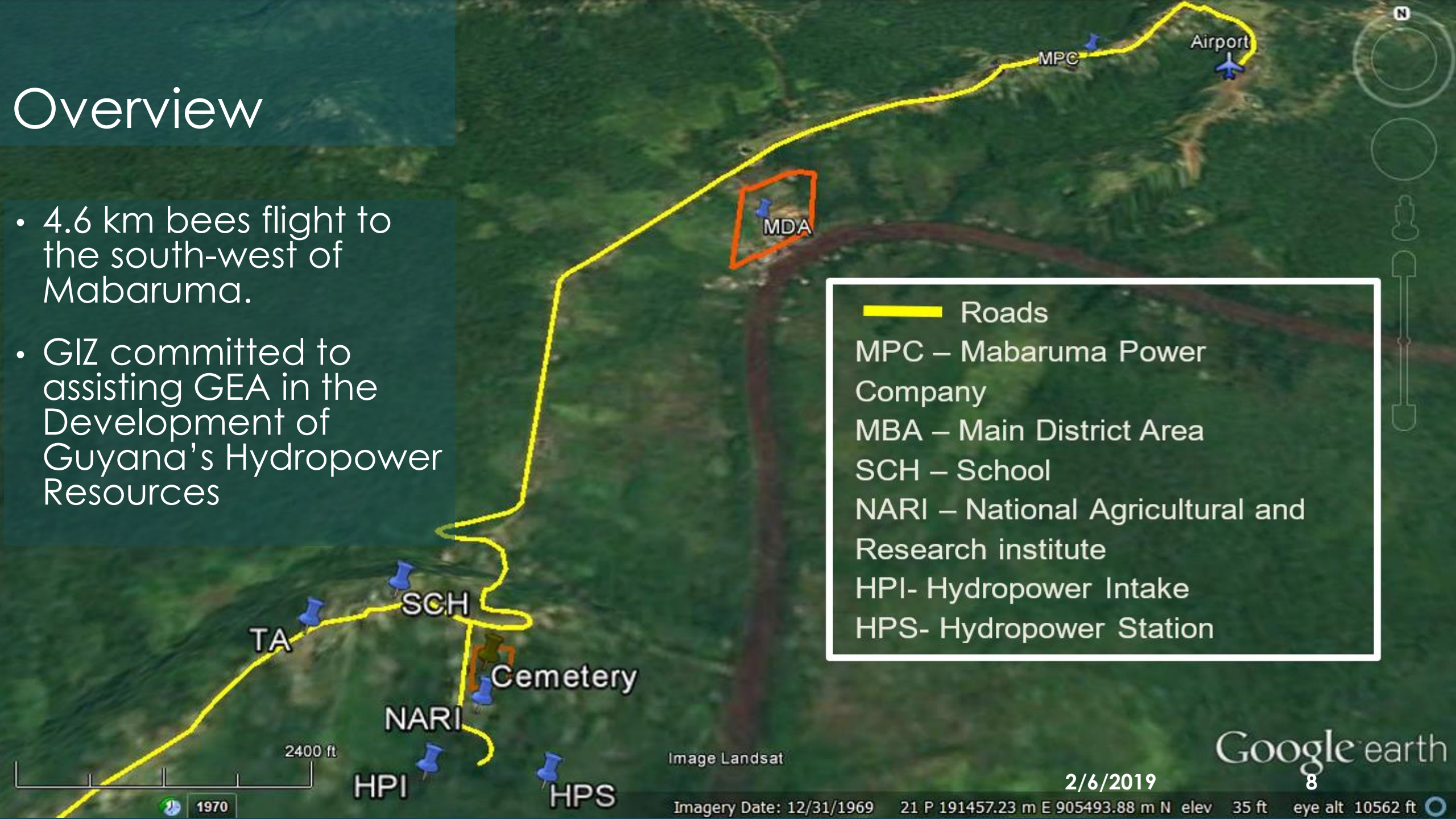
- In 1985, a study done by Terrence Fletcher and Associates Limited studied the option to install a hydropower plant at the creek and supply electricity to an agricultural produce processing facility to be built nearby.
- In the late 1980'ies, a powerhouse with a turbine of reportedly 5 kW capacity was installed using the upper of two existing concrete weirs. The project was abandoned some years after its inauguration for reasons that are still unclear.

Original Layout and Components in - 1985


Dam 1
Dam 2
Penstock Route
5kW
Turbine
Power
House

Overview

- 4.6 km bees flight to the south-west of Mabaruma.
- GIZ committed to assisting GEA in the Development of Guyana's Hydropower Resources



Roads
MPC – Mabaruma Power Company
MBA – Main District Area
SCH – School
NARI – National Agricultural and Research institute
HPI- Hydropower Intake
HPS- Hydropower Station

Overview

- Contracted a Hydropower Engineer to train GEA engineers
- Aim to study design and install a small hydropower Project

Objectives

- To increase the energy mix of the Mabaruma electrical grid with a clean and renewable source of energy
- To gain experience in applying hydropower engineering and other multi-disciplinary concepts for sustainable rural electrification;
- To gain understanding of run-of-the-river hydro technology;
- Promote and increase the use of renewable energy in Guyana;

Off taker

Mabaruma Electrical Grid

Prior Consultations

July – August 2015:

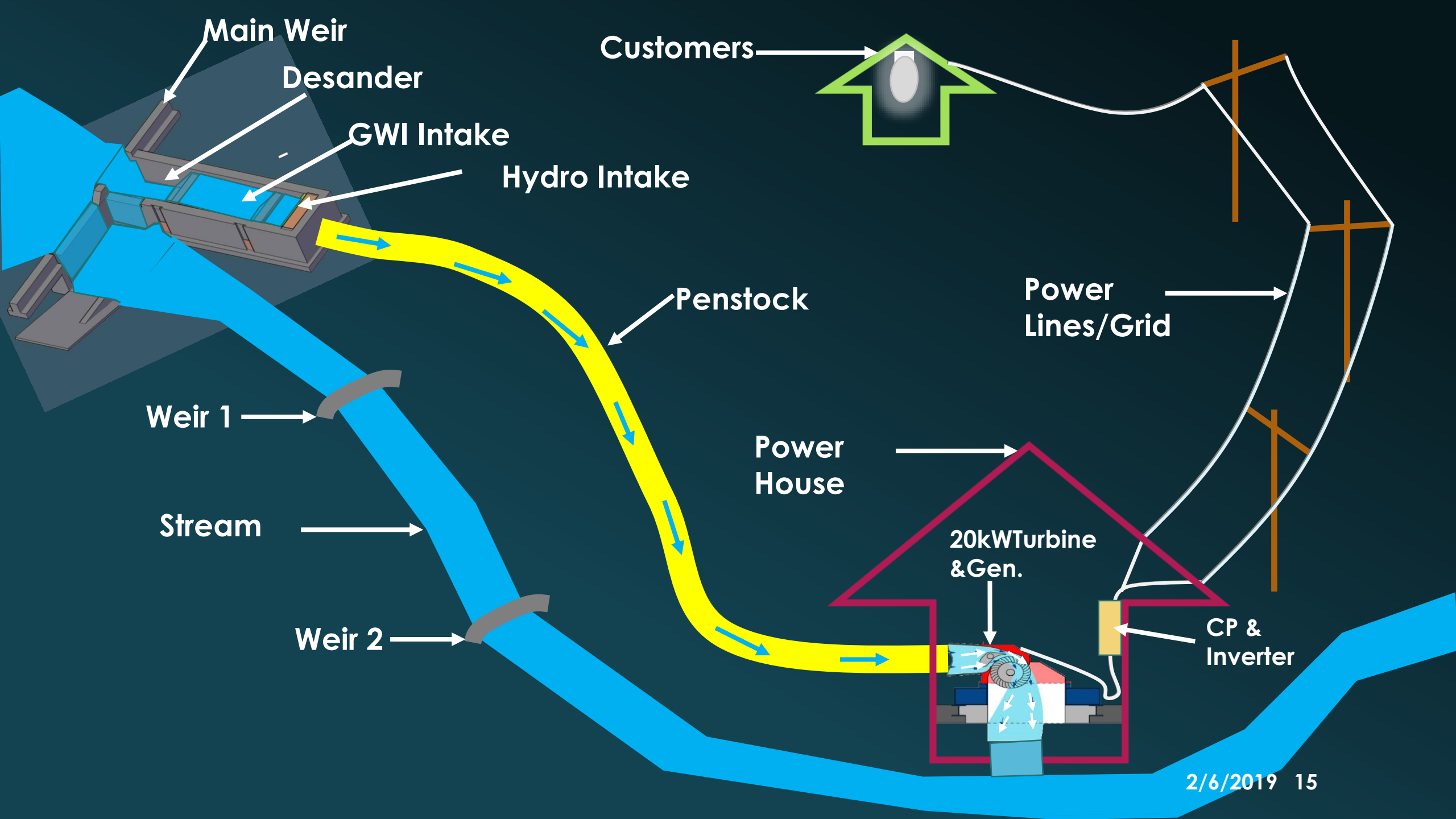
Power Company, NAREI, GWI, RDC

Prior Consultations

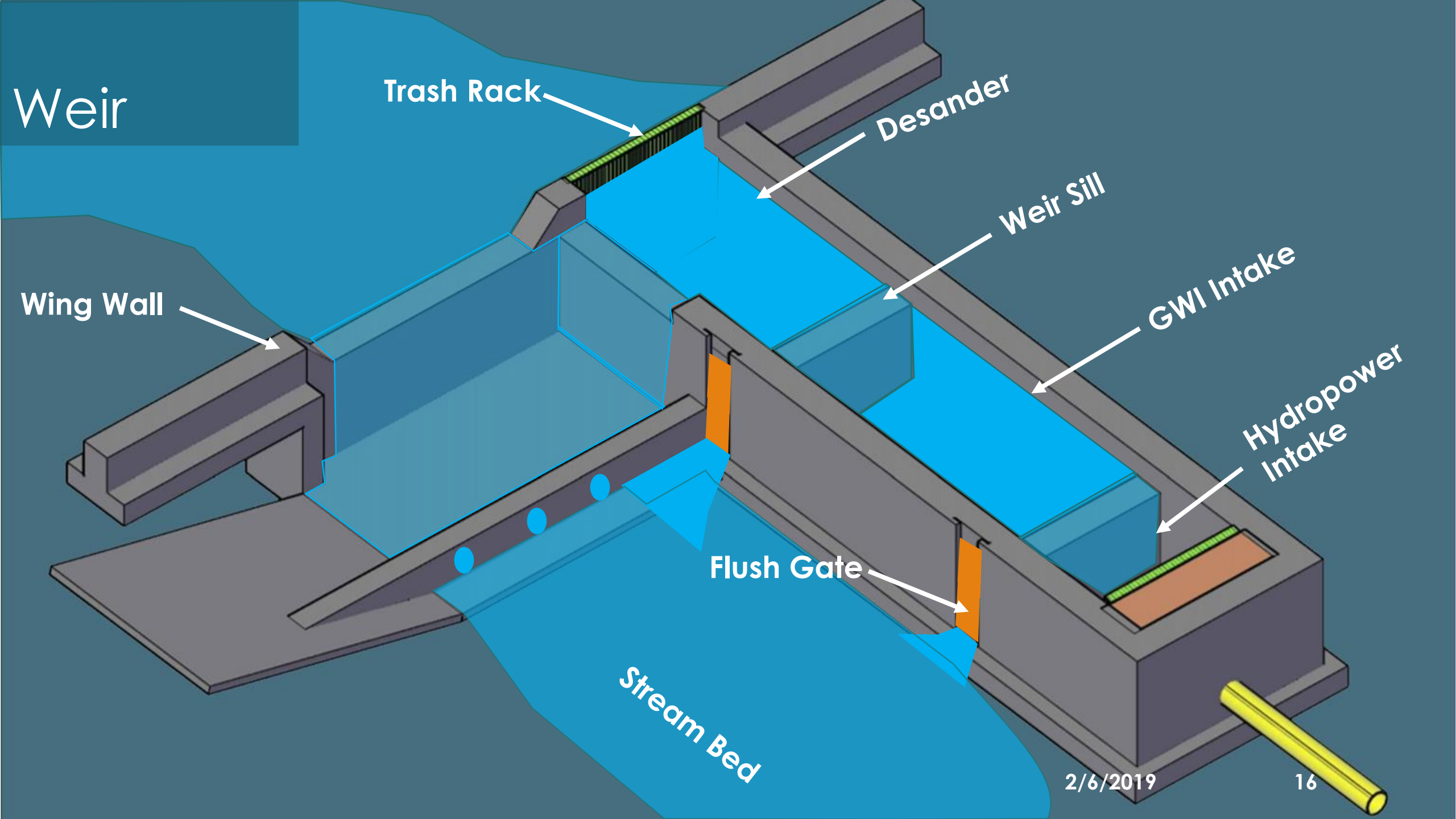
November 2016:

RDC, GWI, NAREI, Town Clerk, Ministry of Health, MoIPA, Power Company

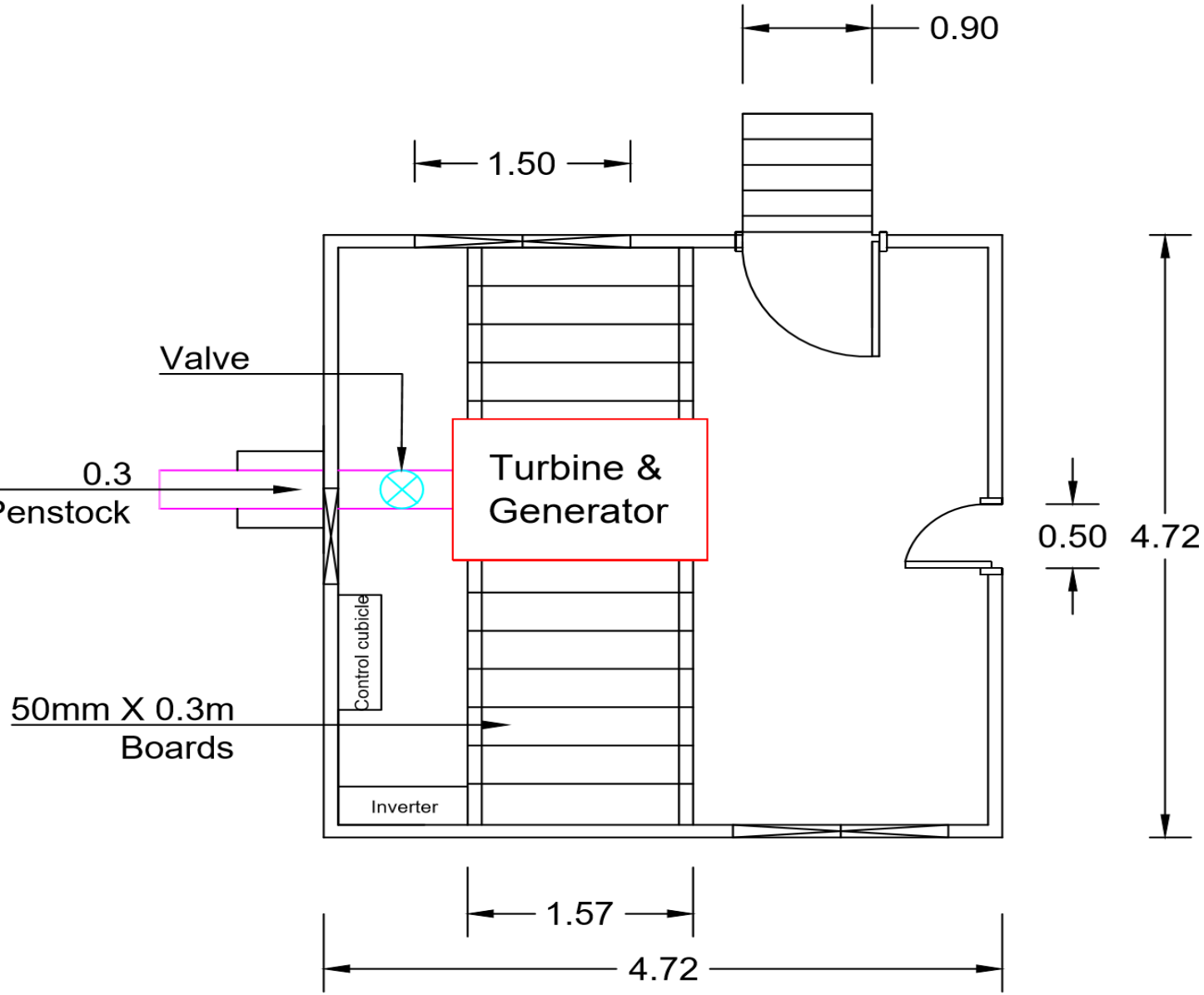
New Layout and Components - 2017


Main Weir
Desander
GWI Intake
Hydro Intake
Customers
Penstock
Power Lines/Grid
Weir 1
Power House
Stream
20kWTurbine &Gen.
CP & Inverter
Weir 2

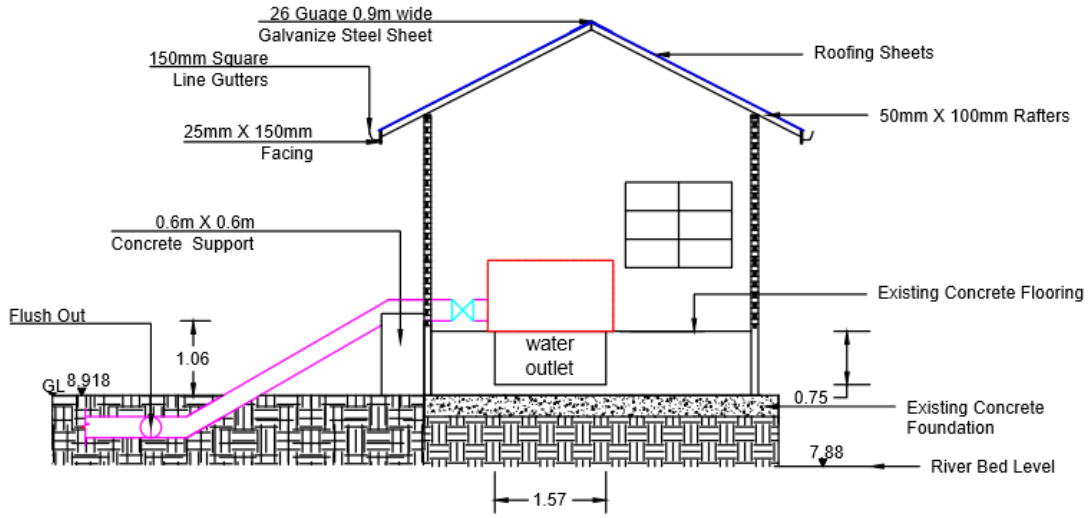
Weir


Trash Rack
Desander
Weir Sill
GWI Intake
Hydropower Intake
Wing Wall
Flush Gate
Stream Bed

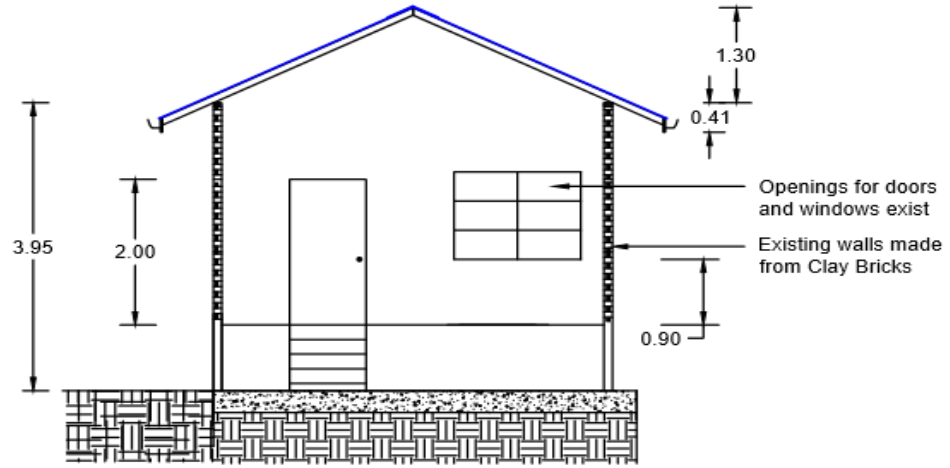

Power House
Tailrace
Tailrace Channel



Plan View



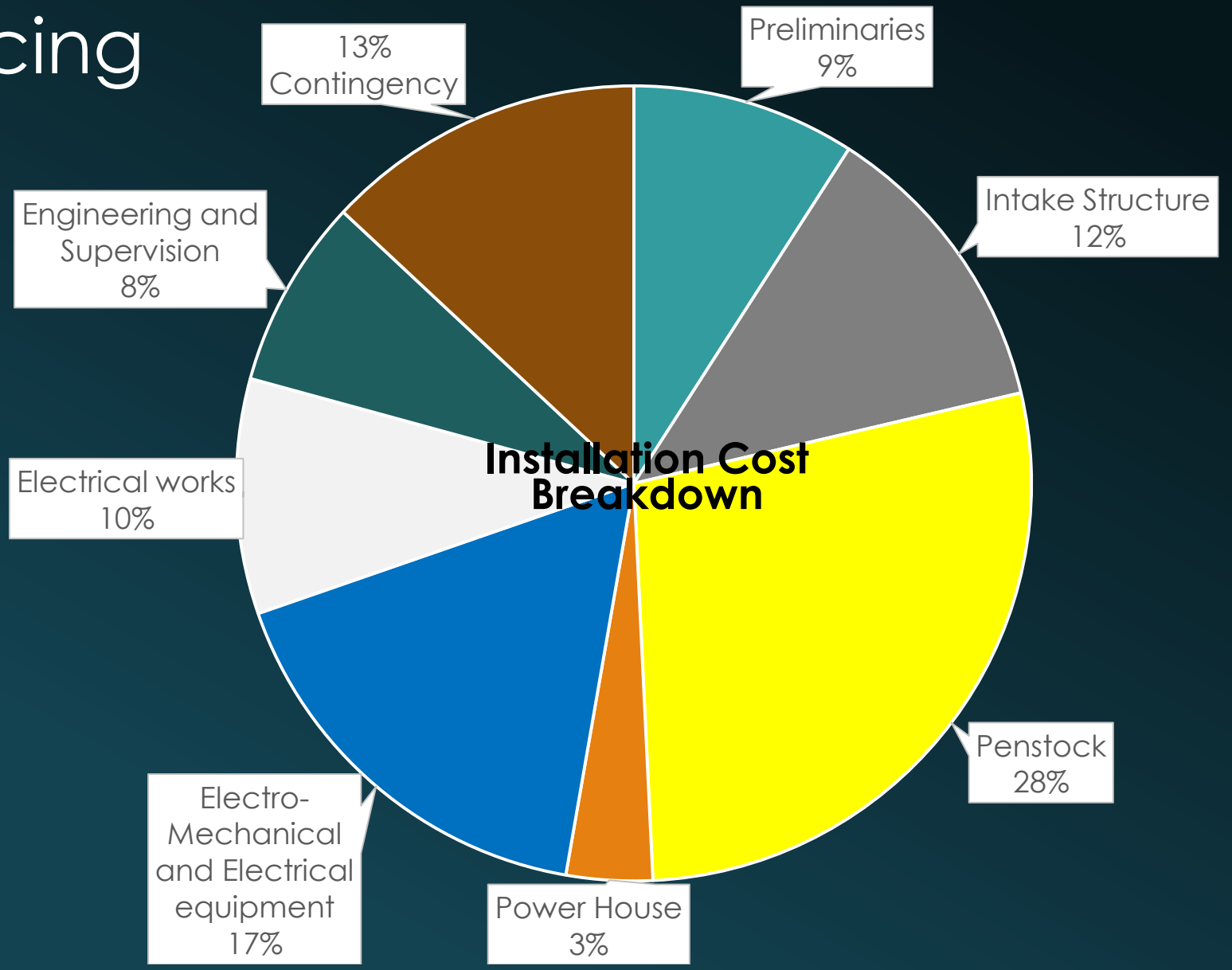
Western Elevation



Eastern Elevation

Project Cost & Financing

Financers	Amount
• GOG	USD 91,108
• GIZ/REETA	USD 74,067
TOTAL	**USD 165,175**



Project Schedule

PROPOSED PROJECT SCHEDULE

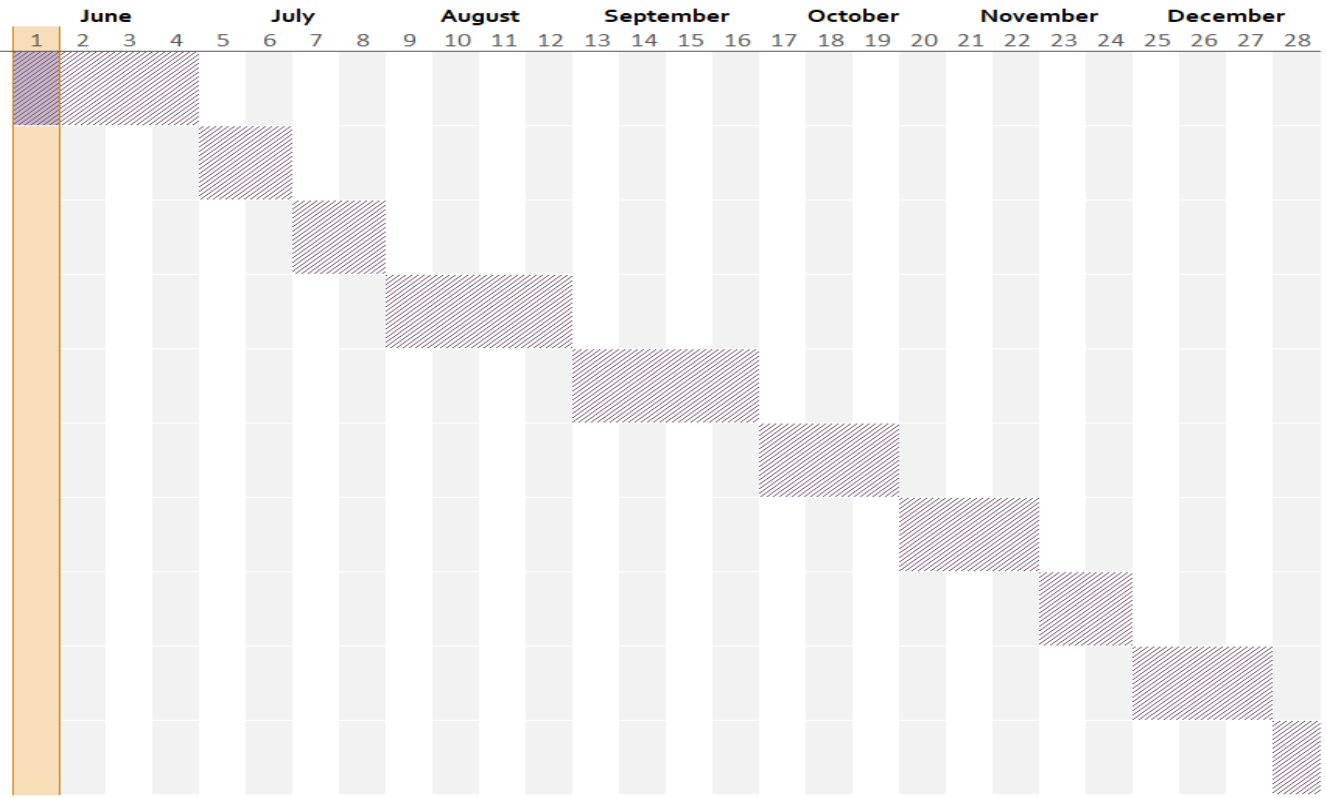
Activities and Duration (Weeks)

Period Highlight: 1

Plan Duration
Actual Start
% Complete
% Complete (beyond plan)
Actual (beyond plan)

ACTIVITY	PLAN START	PLAN DURATION	ACTUAL START	ACTUAL DURATION	PERCENT COMPLETE
Procurement of Materials	1	4	1	0	0%
Mobilisation	5	2	0	0	0%
Survey & Marking out of works	7	2	0	0	0%
Intake Structure	9	4	0	0	0%
Penstock	13	4	0	0	0%
Power House	17	3	0	0	0%
Installation of Electromechanical equipment	20	3	0	0	0%
Electricals and connection to the Grid	23	2	0	0	0%
Testing	25	3	0	0	0%
Comissioning	28	1	0	0	0%

PERIODS



Job Opportunities

- During Construction
  - Laborers
  - Electricians
  - Engineers
  - Masons
  - Carpenters
  - Surveyors
  - Security
  - Drivers
  - Cleaners
  - Caterers
  - Supervisors
  - Managers
  - H&S Officer
  - Logistics
  - Accountant

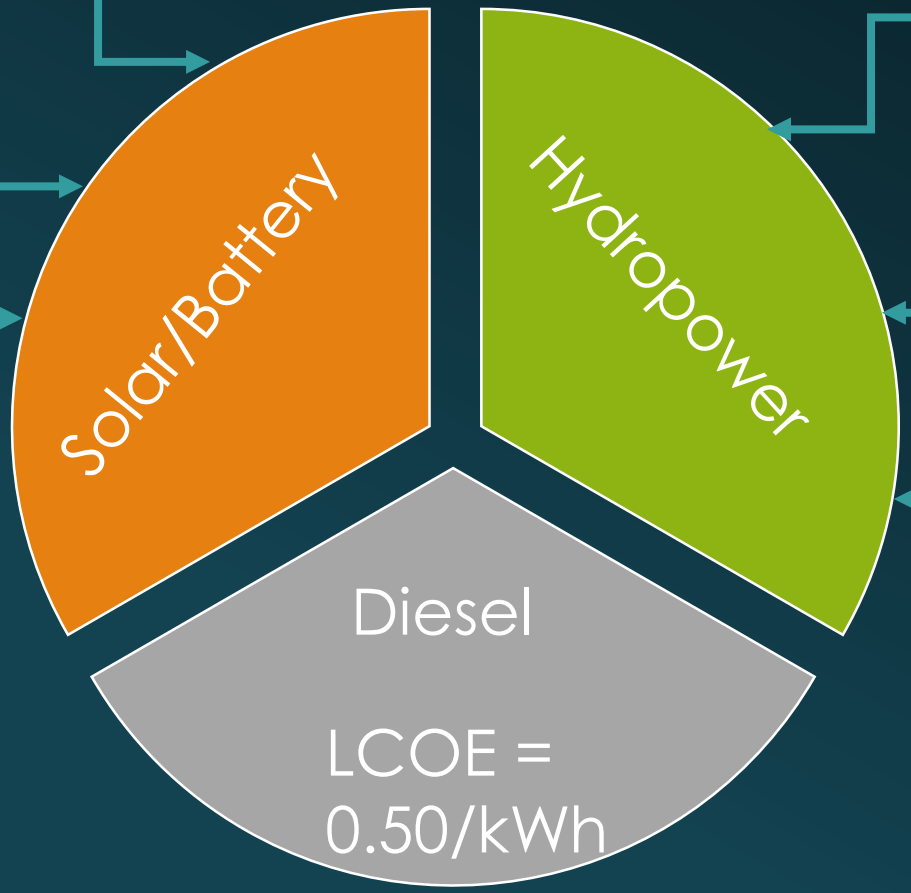
- After Construction
  - Maintenance Personnel
  - Operators
  - Engineer
  - Cleaners
  - Security
  - Electrician

Energy Sources Analyzed

LCOE= 0.36/kWh

Life Span = 20ys

Discount Rate = 8%



LCOE = 0.31USD/kWh

(0.21 USD/kWh with grant financing)

Life span = 20ys

Discount Rate = 8%

THANK YOU

QUESTIONS?

Project Facts

- Will the Plant provide everyone with electricity - No but will increase energy security.
- Construction Time – Estimated at 8 months
- Will locals be Employed – Yes, the contractor is required to employ locals once available
- Who are the Stakeholders utilizing the water source – GWI, MPLC, NAREI and Locals
- Owner of Land – NAREI (MOU with MPLC)

Project Facts

- Will the Hydro work the same as in the Wet and Dry – NO it will fluctuate throughout the year
- How much electricity will be generated in a year – estimated at 64 MWh (8% of the total energy demand)
- How much will customers Pay – Will be in Keeping with MPLC rates
- Will the rates for electricity go down- This is dependent on the cos of other energy sources.
- Will the Hydro work 24hrs – yes – 365 days in the year No

Project Facts

- Will there be environmental effects – yes but very minimal

Impacts During Construction

- Loss of Vegetation
- Modification of Flow
- Increase in Water Turbidity
- Destruction of Habitat
- Erosion
- Modification of Stream bed

Impacts During Operation

- Reduce Pollutants in the atmosphere
- Employment

Project Facts

- Will the Hydro work if the stream dries out – NO
- What is the Life Span of the Project – 20 years
- Who will be the Owner/Operator – HECI/MPLC
- Will the Hydro Contaminate the water – NO
- Will Riverine communities still have access to the water source – yes
- Will the Hydro Pose danger to locals – NO
- Will the Hydro withstand natural forces – yes was designed to do so
- What happens if the dam breaks - Water will flow in the stream without affecting anyone

Project Facts

- Will deforestation in the area affect the Hydro – Yes (will reduce rainfall)
- Will locals be able to continue swimming in the creek – yes
- What Happens if the Hydro Fails – failures are not anticipated but GEA remains committed to ensure continued operation
- Was the Area the best choice – yes based on the feasibility study, existing structure and minimal environmental impacts
- Will the facility have tourism value – yes
- Will the Hydro flood the area- Only a small area (<6 feet High and Area = 15' X 15')