IPRO 327
Design of a water distribution system for Pignon, Haiti

Illinois Institute of Technology
Spring 2007

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LIFE in PIGNON

- 15,000 + people
- Drinking water comes from hand-pump operated wells or nearby river.
- Existing 45,000 gallon (cistern?) from old distribution system
- Source not fully secure
- Poor road infrastructure

NEEDS of PIGNON

Sustainable Water Distribution System

- A water distribution system to supply 20 gallons per person per day to the town
- Technical support to design the system
- Easier access to the system including more public fountains and more private household connections
- Ability for future growth of the system

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GOALS OF THE IPRO

- Accurately estimate town's population
- Map the town, including all roads and buildings
- Determine elevations at critical points in the town
- Create an accurate model of the water distribution system
- Produce a report summarizing the details of the system
- Send all deliverables to the Haiti Outreach offices in Pignon, Haiti

ORGANIZATION

- Originally, we were divided into 4 groups:
  - Mapping, End User, Fundraising/Admin, and Design

- There was no set team leader, and by the end of the semester it became apparent that this hindered much of our progress

NEED FOR A TRIP

- Needed first hand information
- Specific, technical information
- Also, could go no further on what we had

ORGANIZATION CHART

Group 1: Topographical Mapping	Group 2: Site Map, Existing Structures, End User	Group 3: Fundraising and Administration	Group 4: Design	Spring Break
Convert collected data into topographic maps: 100 hrs	convert site map to topo map: 40 hrs	Get Funding: 60 hrs	Research pumps and fountains: 30 hrs	Survey needed points: 40 hrs
Make other useful maps 30 hrs	estimate population: 20 hrs	Keep Accounts of all money received: 30 hrs	Identify and acquire needed software: 10 hrs	Locate current fountans, pipes: 10 hrs
Prepare list of needed data for next trip to site: 10 hrs	Determine average Haitian water usage: 25 hrs	Keep up to date with all deliverables: 40 hrs	Design pump improvements: 20 hrs	Examine link from source to pump, pump to cistern: 15 hrs
Collaborate with design team on what file type needed for maps: 2 hrs	Required v. Current Capacity: 40 hrs	Inform team of deadlines: 5 hrs	Work with End User Group on current system issues: 30 hrs	Examine other possible water sources: 20 hrs
Deliver useable maps to design team: 5 hrs	Identify locations of existing fountains and wells: 25 hrs	Help organize trip: 10 hrs	Design pipe network path: 35 hrs	Check water quality: 10 hrs

ADJUSTMENTS TO ORGANIZATION

- After Spring Break, we changed End User Group to Water Purification
- Due mainly to an overlap of work in the beginning of the semester
- Based on information brought back

OBSTACLES

- Funding
  - Money was needed for surveying trip, but because of short time before trip, was difficult to raise
- Software
  - Design of our system was impossible by the CAD programs available at school.
- Short Time
  - This cut into everything. For this project, there was simply a lot of information, leading to a very high learning curve.

OBSTACLES OVERCOME

- Funding – asked for large donations from on-campus sources
- Software – got trial versions
- Time – divided up tasks, prioritized

ETHICS and DIFFICULTIES

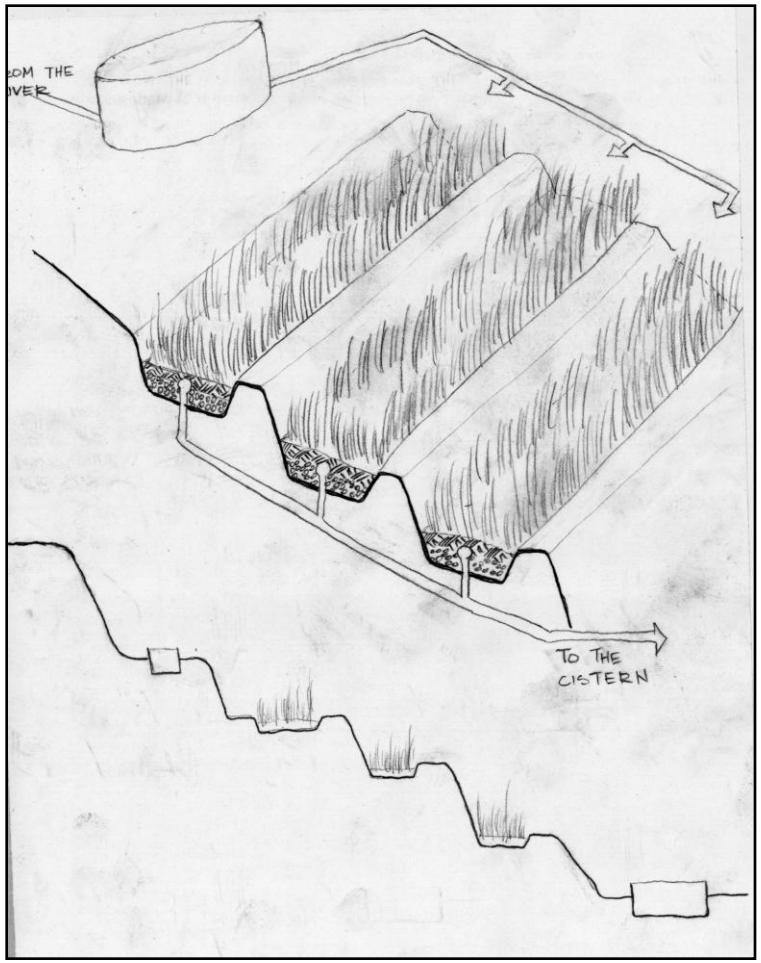
- Software
  - Used Specialty Software
  - Could have pirated
  - Instead used trial versions
- Workload
  - Optimal: Everyone does the same amount
  - Solution: Split into groups
- Ethical Responsibilities as Engineers
  - Design a working system that will fulfill the needs of the client

ETHICS and DIFFICULTIES

- Plagiarism
  - Could have taken credit for someone else's work
  - Did not arise because everything was created from scratch
- Donations In Haiti
  - Many Haitians asked the group for money
  - Specifically instructed by Haiti Outreach not to give out any money
  - Create an economy of dependence

ETHICS and DIFFICULTIES

- Political Situation in Pignon
  - Multiple mayors
  - Who do we work with?
- Working with Haiti Outreach
  - Haiti Outreach is an NGO
  - Blurred boundaries between this IPRO and HO
  - What are the IPRO's specific responsibilities?
  - Where does the money we raised go?



IN THE FIELD

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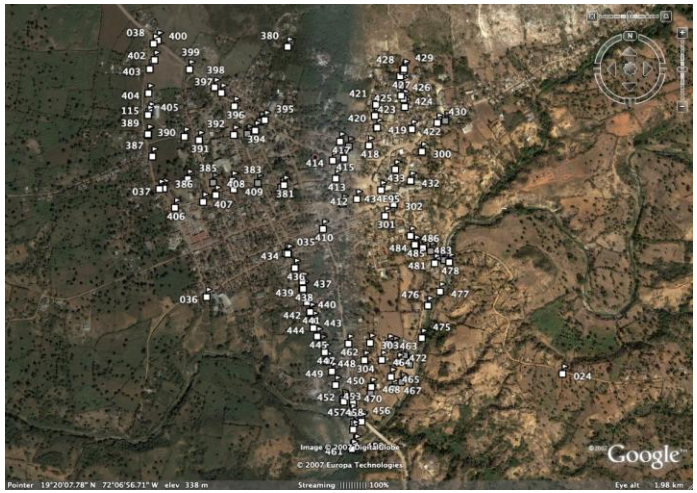
RESULTS

- RAISED $5000 IN DONATIONS
- ACQUIRED SOFTWARE FOR SYSTEM DESIGN
- COMPLETED ACCURATE POPULATION ESTIMATE
- SURVEYED THE TOWN OF PIGNON
- CREATED SCALE MAPS, INCLUDING TOPOGRAPHIC
- COMPLETED PELIMINARY WATER SYTEM DESIGN
- RESEARCHED ALTERNATIVE SOURCING FOR SYSTEM



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