

Mining Mentor's in support of Engineers without Borders

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The Problem

- Population growth and increasing demand for resources places unique demands on supply of clean water and sanitation infrastructure world-wide.
- Today, more than two billion people lack access to these basic requirements.

EWB-USA

is a non-profit organization, founded in 2002 in Colorado

- technically support community-driven development programs worldwide
- form community-based partnerships to design and implement engineering infrastructure projects
- create life-changing experiences that enrich global perspectives for individuals and communities, and
- develop responsible leaders.
- 250 USA chapters, 14,700 members, 684 projects, 40 countries
 - 180 connected with colleges or universities
 - At least 4 in Montana, 2-professional, 2- Student Led

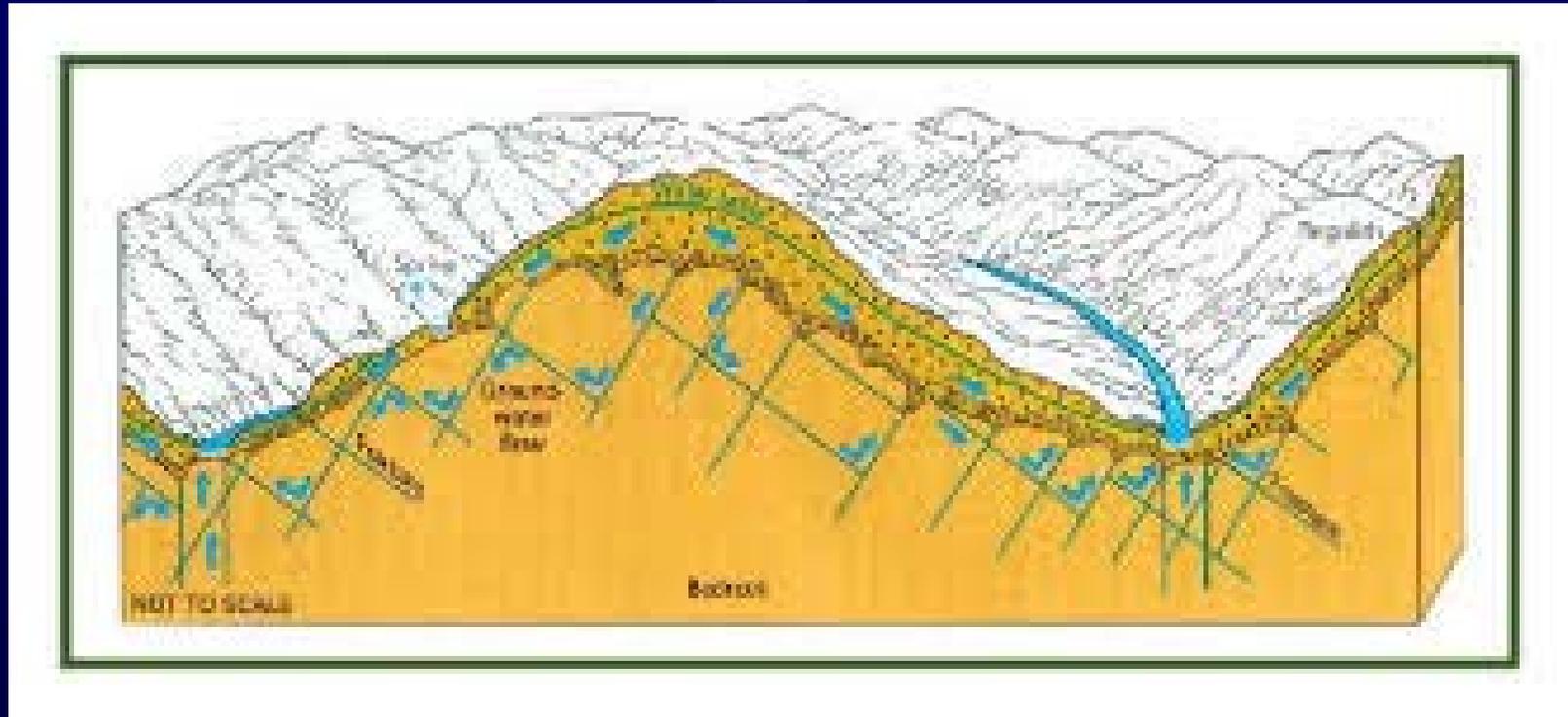
Student-led, Professionally Mentored

- In student-led EWB Chapters, students work in partnership with professional mentors willing to share time and wisdom, both here in the US and in-country.
- This collaboration builds student leaders while empowering local communities to develop and then maintain infrastructure resources they desperately need.
- Scientists and engineers who serve the mining industry have skills and experience well suited to the needs of EWB

Hands-on Engineering Work on Various Projects

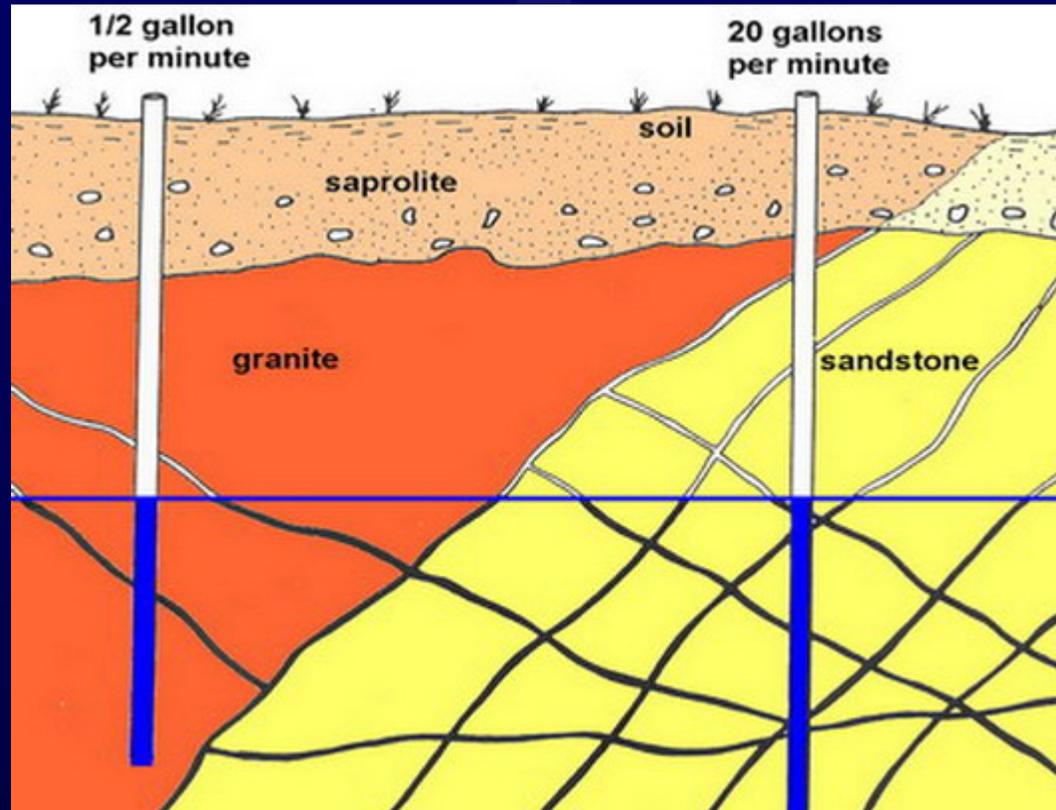
- Design, contracting/oversight of water supply projects
 - well/construction,
 - rainwater/cistern collection systems
 - small scale water distribution projects
- Sanitation projects such as composting latrines
- Civil works
- Transportation structures (i.e., bridges, small dams)
- Energy (i.e., solar and wind power) , and
- Agricultural Projects (i.e., irrigation, crop enhancement)

Example: Mentor Support of Groundwater Projects



Khwisero largely has
Bedrock Fracture Controlled Aquifers
Beneath Thick Unconsolidated Soils

Regional Hydrogeologic Model



Situation in Khwisero District
Variable Fracture Density and Hydraulic Conductivity
- Effect on Well Productivity

DRILLED WELL COMPONENTS

WELL CAP or SEAL

BOREHOLE

CASING

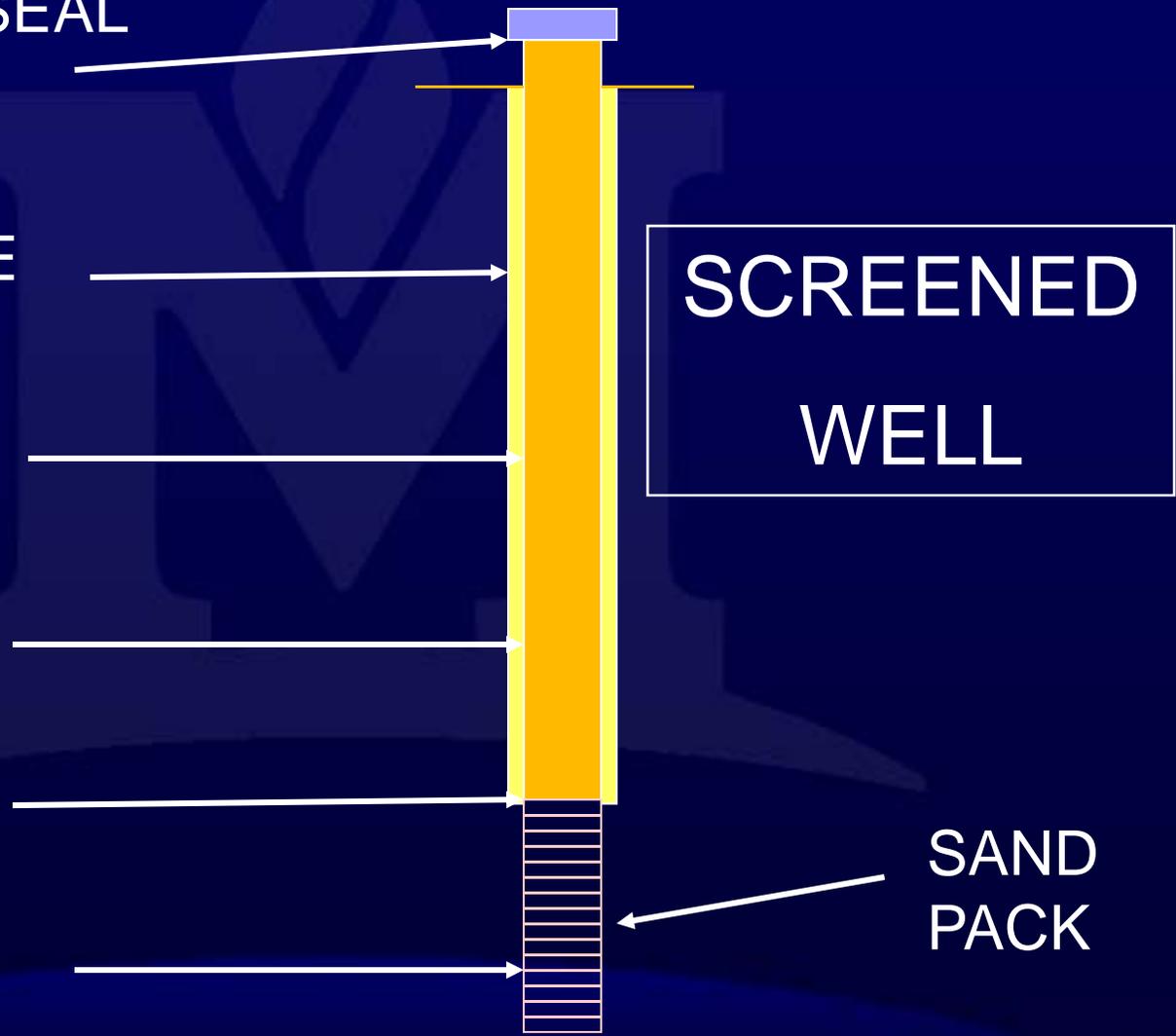
GROUT

PACKER

SCREEN

SCREENED
WELL

SAND
PACK

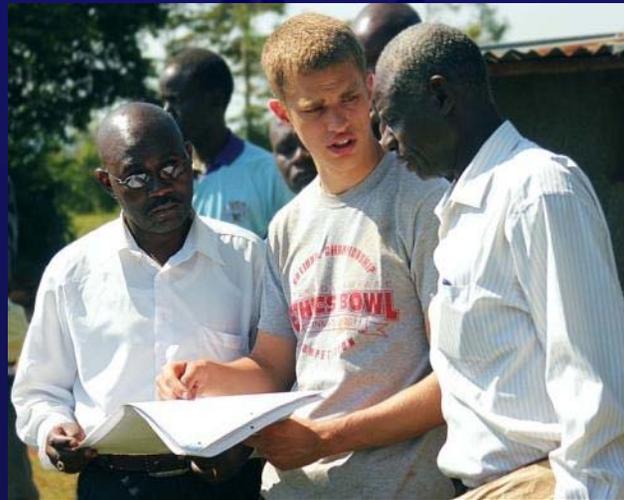


TYPICAL ROTARY WELL CONSTRUCTION SEQUENCE





Montana State University Engineers Without Borders



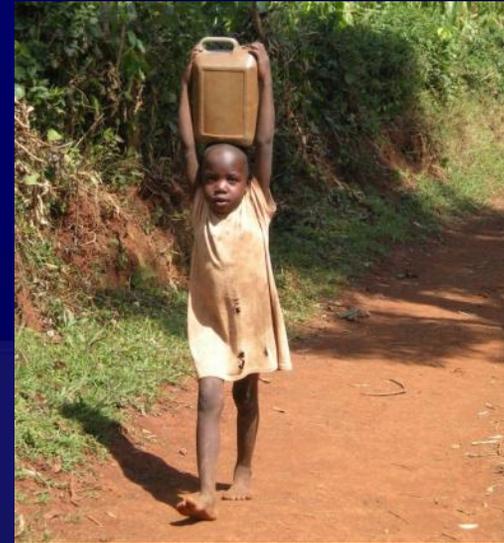
Connecting Montanan and Kenyan Communities

Khwisero, Kenya



Project Impetus

- Women and children walk miles a day to collect water
- Contaminated water leads to life threatening disease



Project Impetus

- Girls receive less education because they traditionally fetch water while boys are in school



Ten years and counting

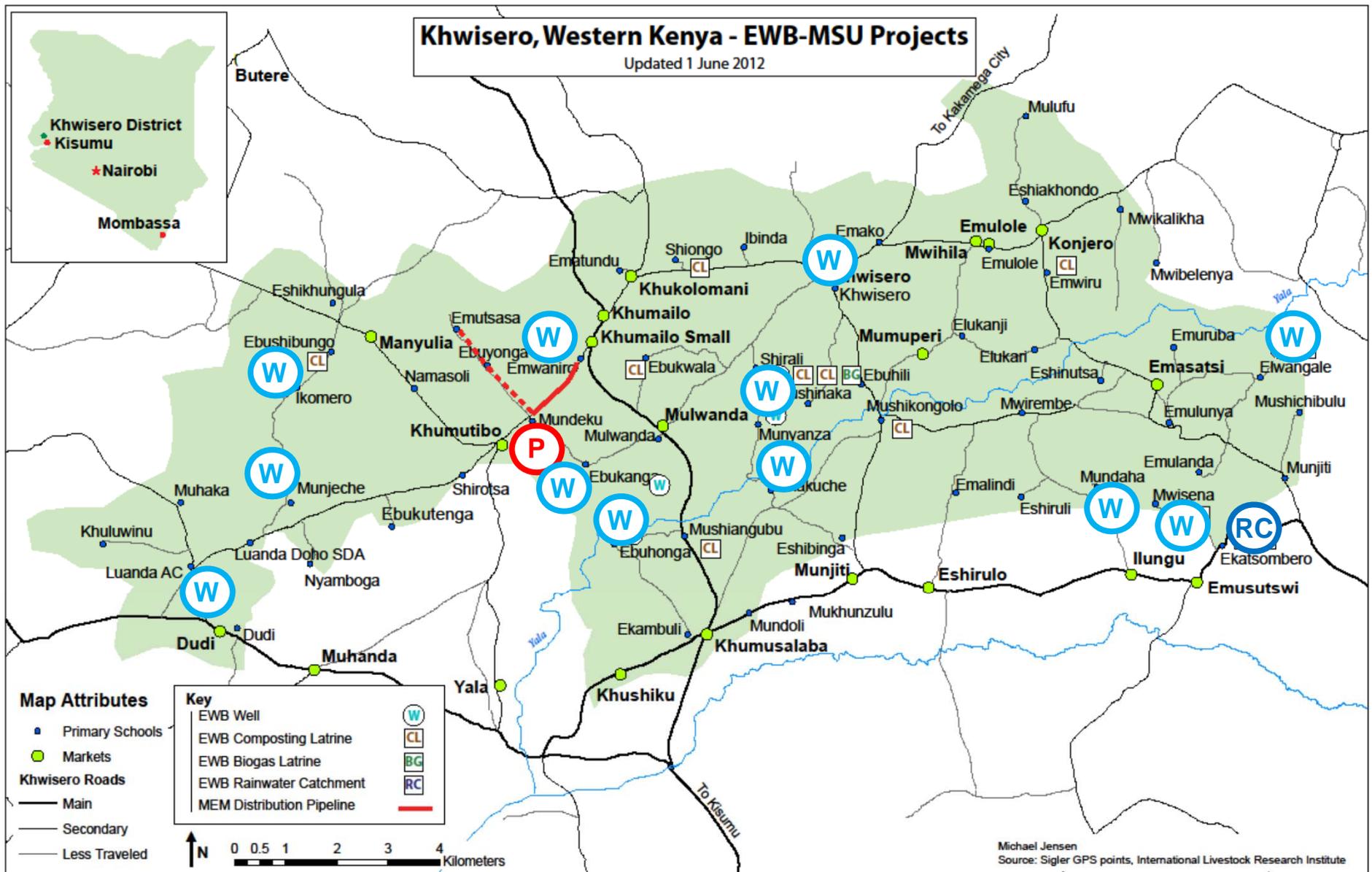
- Construct composting latrines
- Drill potable water wells at schools
- Increasing awareness and communication between Khwisero and Montana



Success by the Numbers 2004-2014

- 12 deep potable water wells
- 1 rainwater catchment with filtration
- 1 distribution pipeline
- 13 composting latrines
- 1 biogas latrine
- over 15,000 more Kenyans in and near 23 schools now have access to clean water and/or sanitation facilities

Water Project Locations















EKATSOMBERO RAIN CATCHMENT WATER PROJECT



DESIGNED & SPONSORED BY: **E.W.B. MSU. USA**

DEVELOPED BY: HAIKAL

INVESTMENTS & CONSULTING
SERVICES

SPONSORED BY: E.W.B. MSU. USA

SUPPLIED & INSTALLED BY: HAIKAL INVESTMENTS

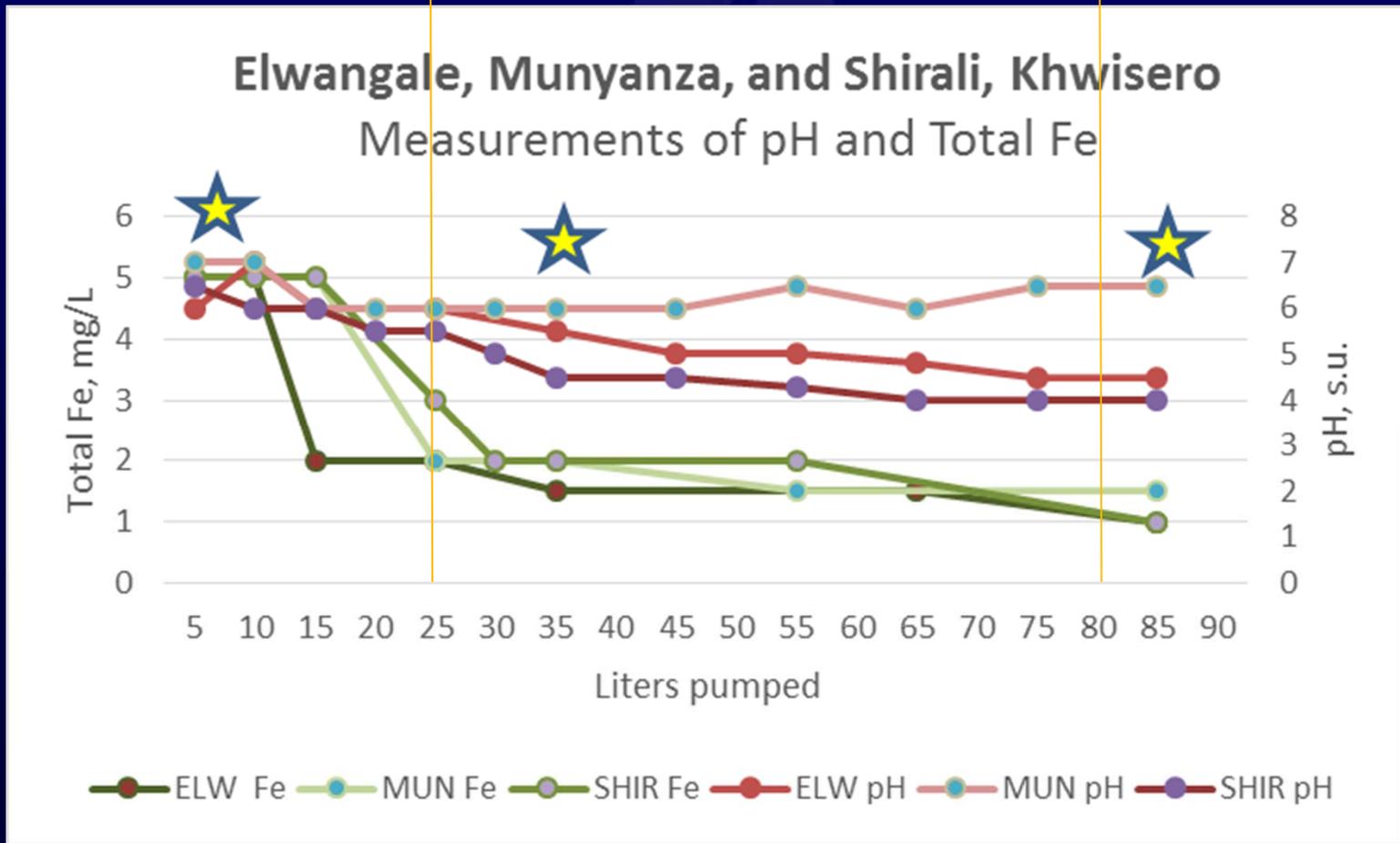


Iron contaminated water



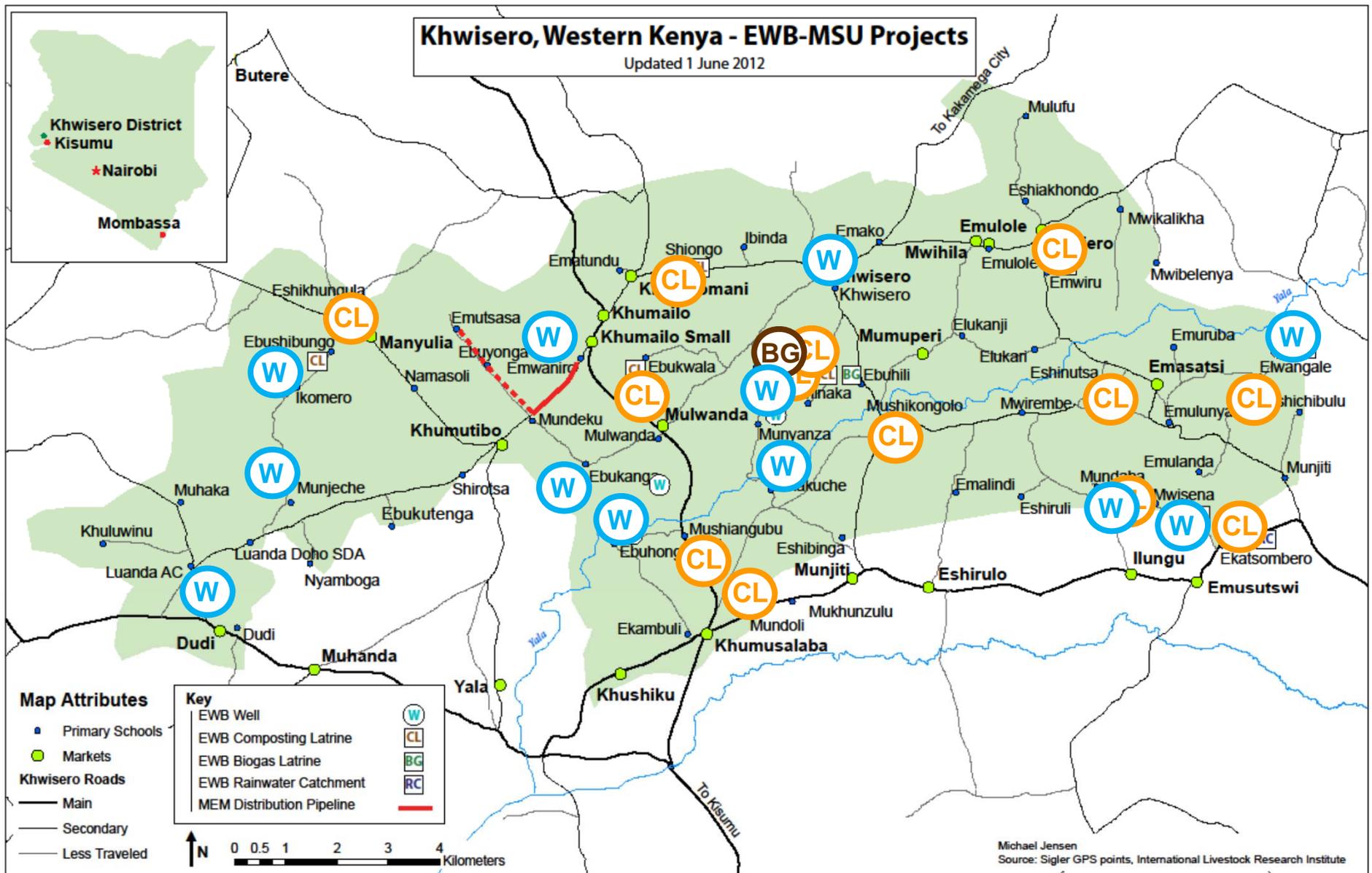
Estimated end of the riser/drawtube volume

Estimated end of the casing volume





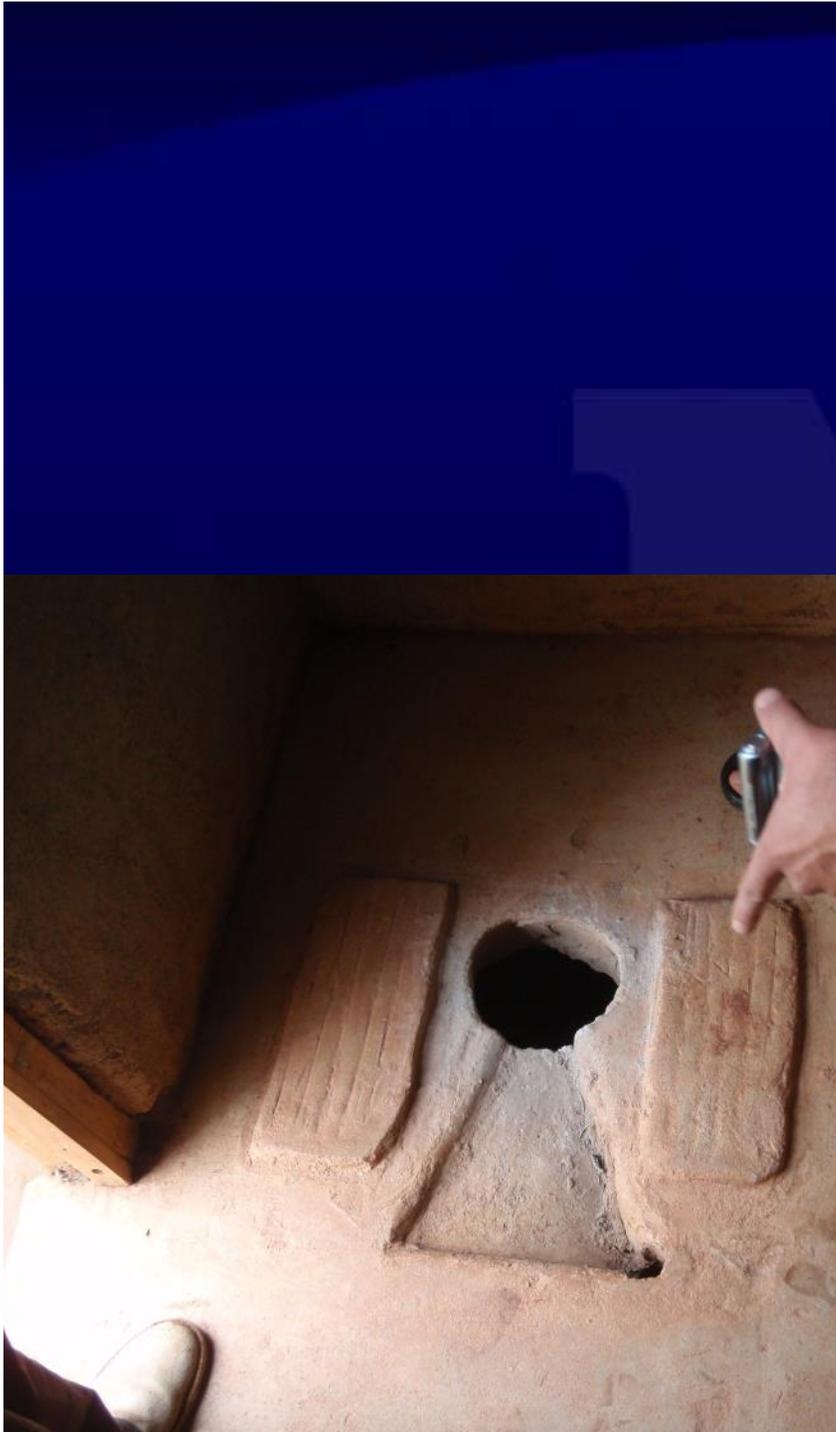
Sanitation Project Locations





















Success through Partnering with local communities

- Engage the local community in decision making





Education

■ Adult

- Well & latrine maintenance
- Accounting management
- Fellows program



■ Students



Empowering Communities

- Schools manage their wells and composting latrines
- Government grants for water distribution line
- Additional water distribution initiatives



Partnership Impacts

Empowering Students

- Student initiated and managed partnership
- Leadership
- Responsibility
- Real world application
- Importance of communication
- Fundraising



As Mentors We Found this Personally and Professionally Rewarding

- Forming international community based partnerships to implement engineering infrastructure
- Providing experience to and creating responsible engineering leadership.
- Creating the opportunity for new life-changing relationships among global communities.
- Meeting basic human needs of very genuine and extremely appreciative communities









Can You Get Involved?

- You bet!
- Professional mentors willing to help with project planning and engineering design
- Professional mentors willing to travel to Khwisero
- Even modest financial support helps



Questions?

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