PRACTICAL DESIGN APPLICATIONS FOR RESOURCE-CHALLENGED REGIONS

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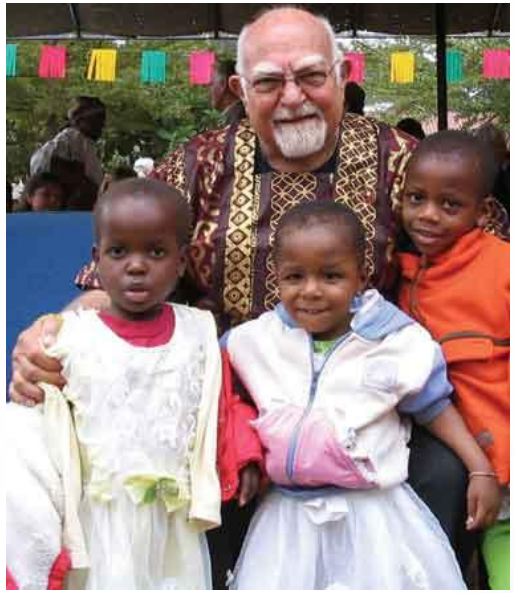
PRACTICAL DESIGN APPLICATIONS FOR RESOURCE-CHALLENGED REGIONS

- Overview of Common Challenges
- Case Study in Kenya

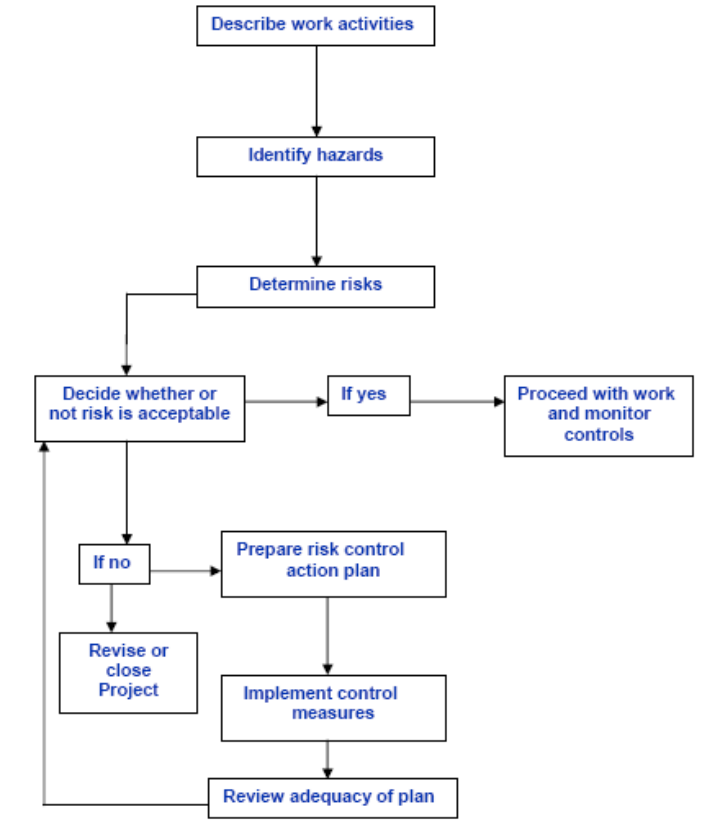


Father D'Agostino,
Nyumbani founder

COMMON CHALLENGES

- Decentralization of healthcare in Africa = more labs (?)
  - Biosafety expertise
  - Design & Construction expertise
  - Laboratory equipment access
  - Laboratory equipment maintenance expertise/ access
  - Knowledgeable contractors
  - $$$
  - Availability of services
    - electricity, waste disposal, gas, etc.
  - Access to biosafety training

DESIGN/ BUILD/ OPERATE AROUND RISK ASSESSMENT STILL APPLIES



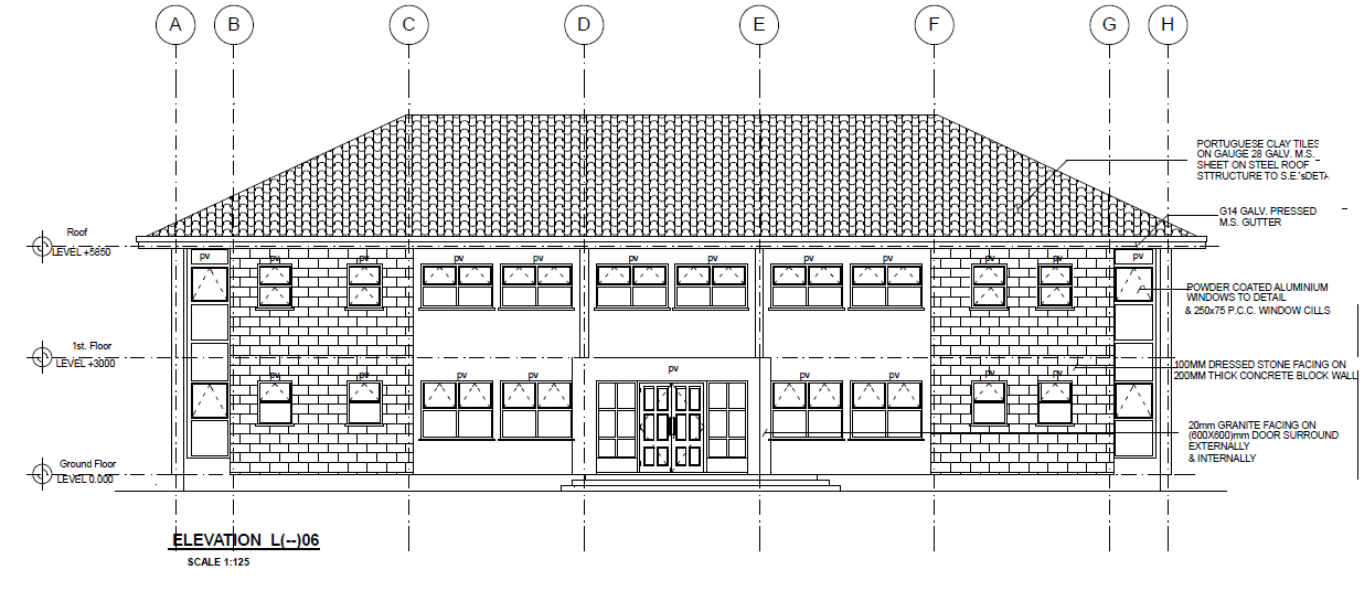
CWA 15793

CASE STUDY: DESIGN/BUILD HIV/TB DIAGNOSTIC LAB

- Nyumbani Children's Home and Diagnostic Lab; Nairobi, Kenya
- Previously offered HIV diagnostics to ~4,000 people/ year
- BSL2-like facilities, very little biosafety knowledge
- Needed TB diagnostic capabilities beyond sputum slide testing
- Raised USD 400,000 for design/ construction of new diagnostic/ clinical facility

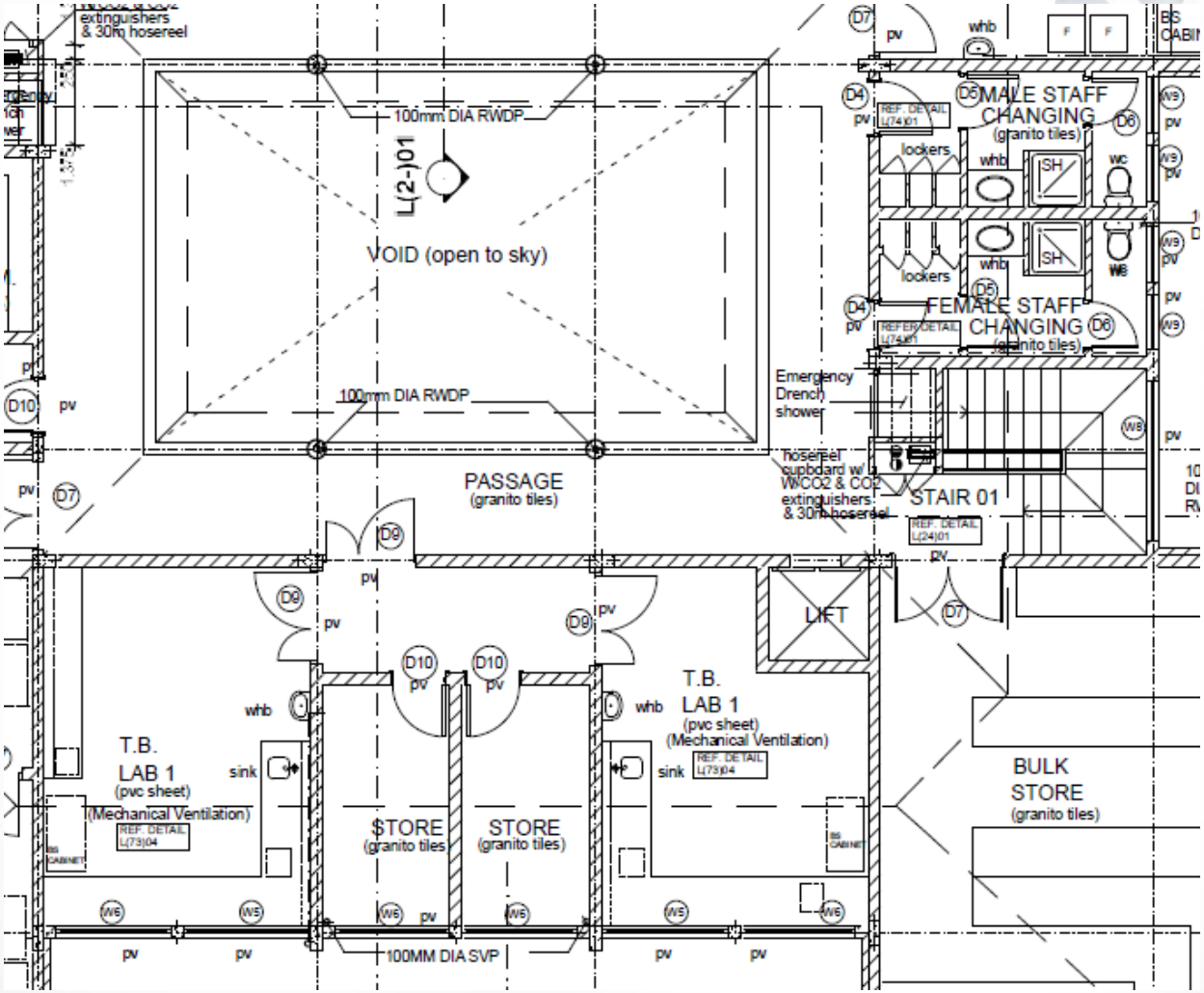
THE CHALLENGE & GOAL

- **Challenge**: How to design and build and operate a facility on a tight budget with limited expertise to meet good biosafety guidelines?
- **Goal**: ISO 15189 Accreditation



STICK TO THE BASICS

- Laboratory spaces still need:
  - Negative inward airflow
  - Sealed penetrations
  - Smooth, seamless surfaces
  - Double door entry
  - Solid SOPs
  - Good biosafety training
- Personnel still need:
  - Comprehension of biorisk management
  - Rigorous biosafety training
  - Robust SOPs and Biosafety Manual



STRUCTURE, ARCHITECTURAL

- *"Surfaces of walls, floors and ceilings should be water-resistant and easy to clean. Openings through these surfaces (e.g. for service pipes) should be sealed to facilitate decontamination of the room(s)."* WHO
- Resources and budget demanded block wall structure
- Heavy high-gloss paint
- Sealed penetrations
- Cleanable work surfaces

MEETING LIGHTING/ PENETRATION REQUIREMENTS

BEFORE

AFTER

MEETING HANDWASHING SINK REQUIREMENTS

BEFORE

AFTER

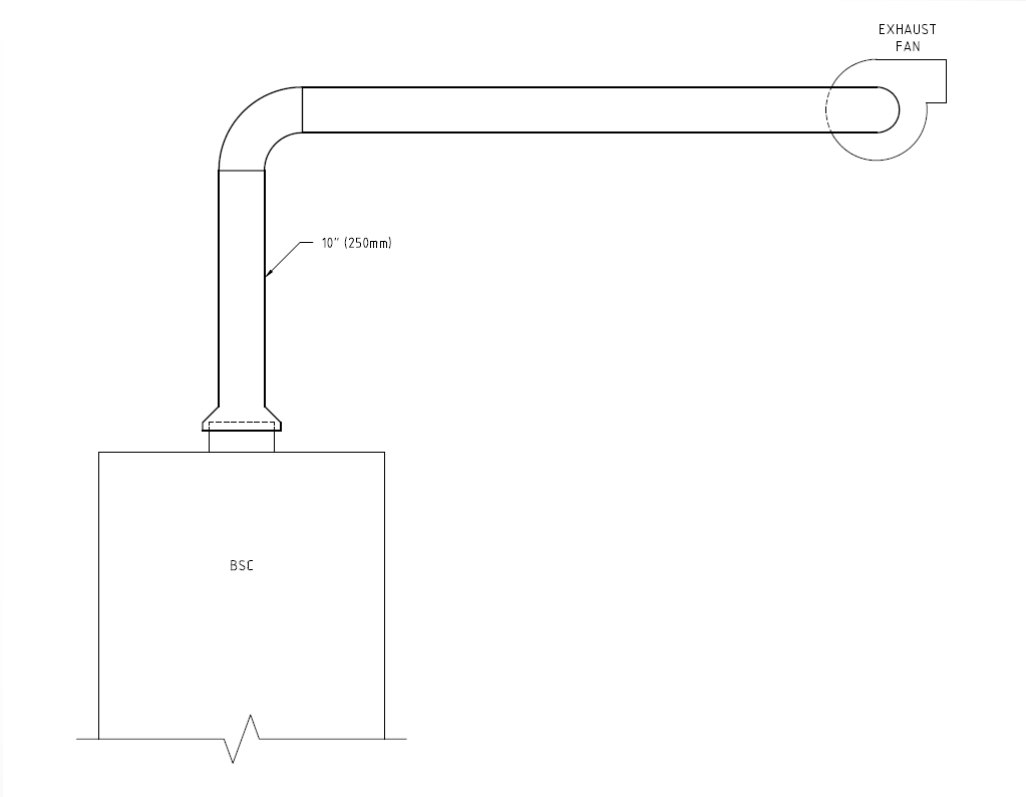
MEETING ELECTRICAL REQUIREMENTS

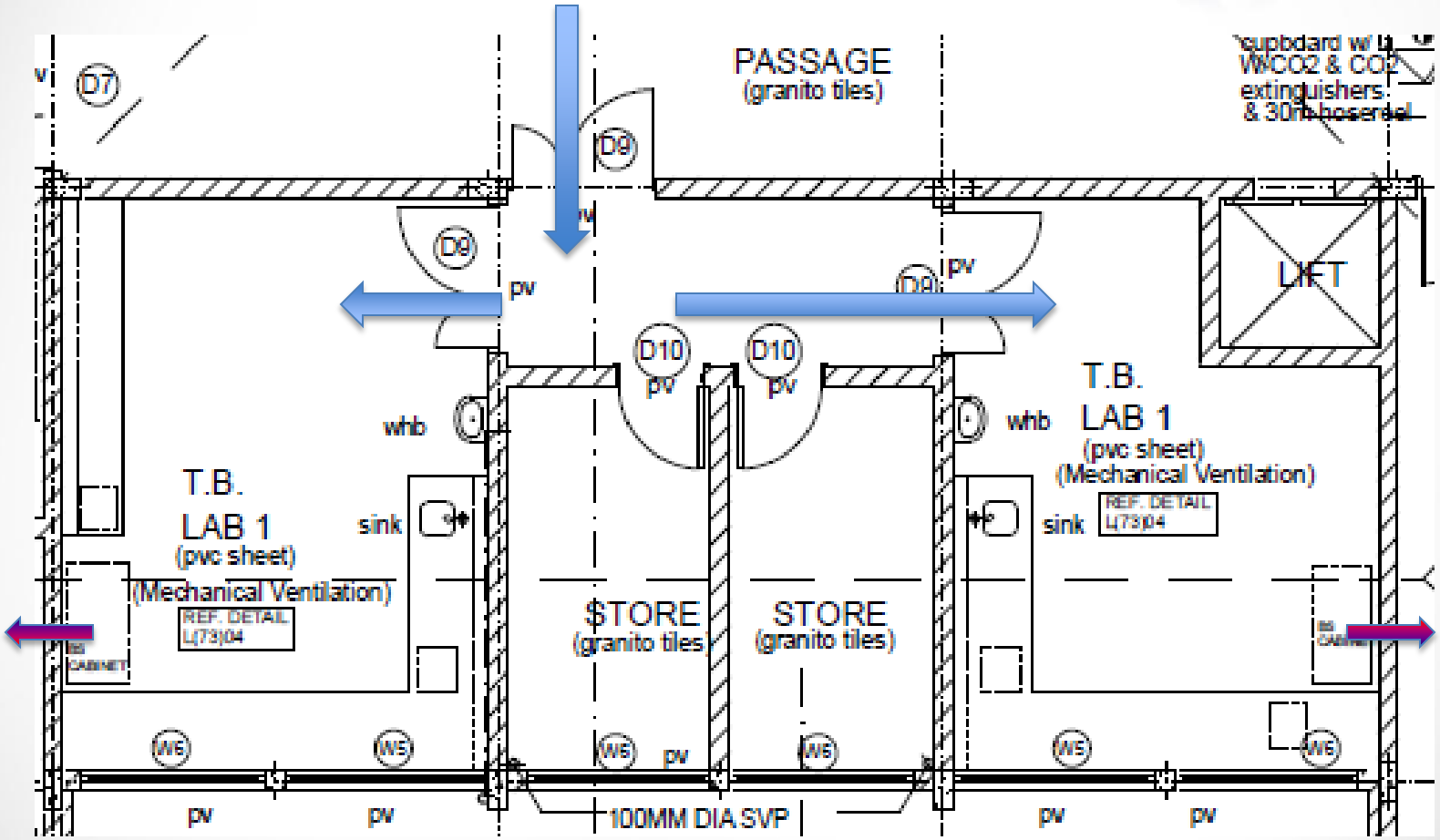
BEFORE

AFTER

MEETING AIR HANDLING REQUIREMENTS

- *"There must be a controlled ventilation system that maintains a directional airflow into the laboratory room. A visual monitoring device with or without alarm(s) should be installed so that staff can at all times ensure that proper directional airflow into the laboratory room is maintained."* WHO





MEETING EXHAUST REQUIREMENTS

- *"The exhaust air from Class I or Class II biological safety cabinets, which will have been passed through HEPA filters, must be discharged in such a way as to avoid interference with the air balance of the cabinet or the building exhaust system."* WHO

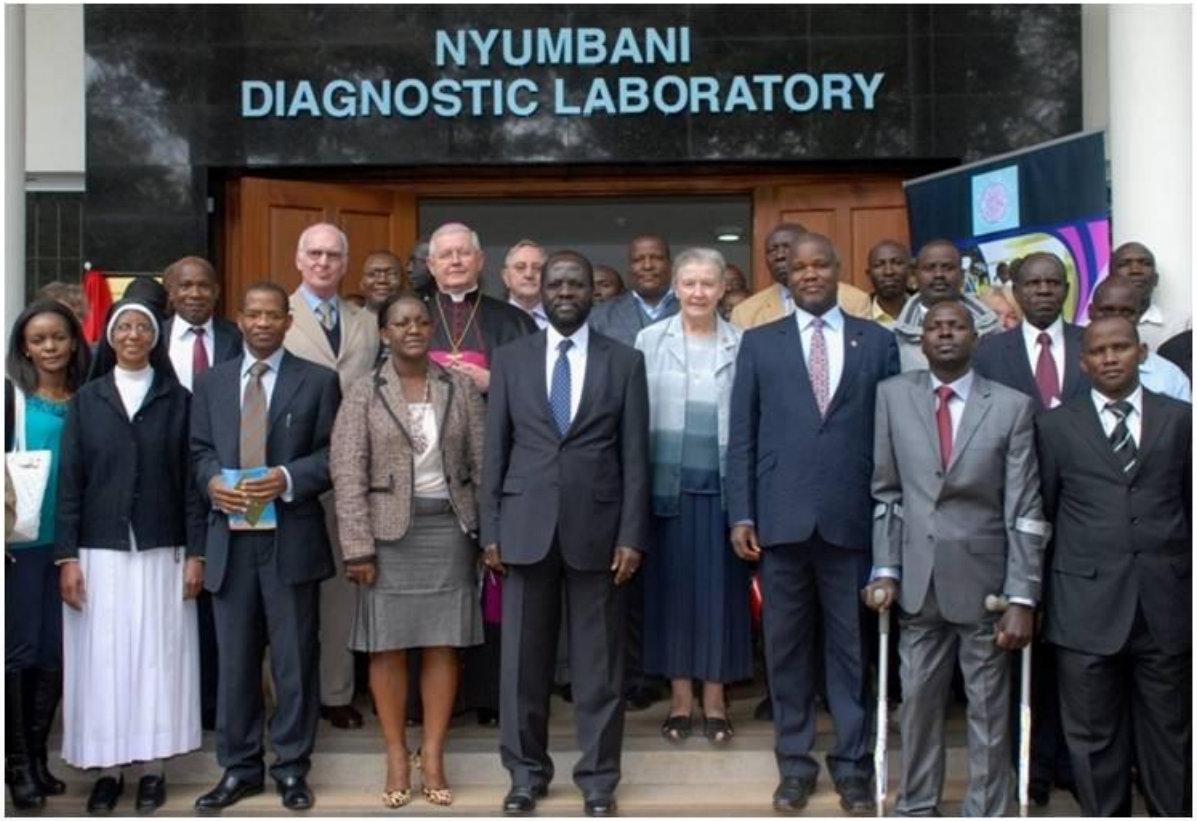
BEFORE

AFTER

SUMMARY

- Total budget (minus lab equipment) approx. USD $450,000
- Facility verified against WHO Biosafety Manual 3rd Ed. BSL3 Design Guidelines
- Initial Biosafety Training executed- provided means for recurring training (AfBSA)

Dedication Day



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