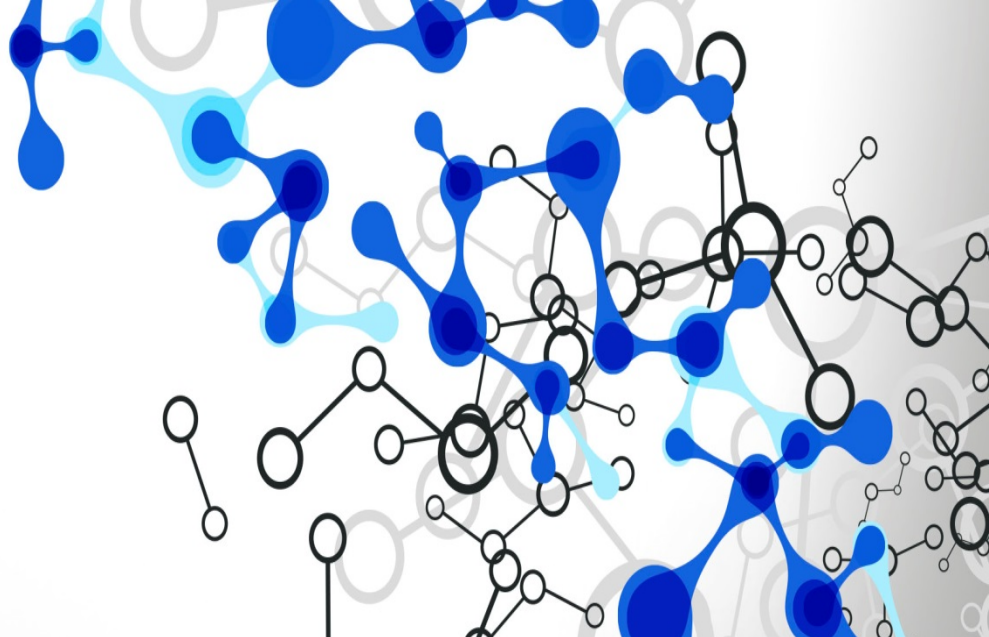




IBCTR

INTERNATIONAL BIOLOGICAL
and CHEMICAL THREAT REDUCTION



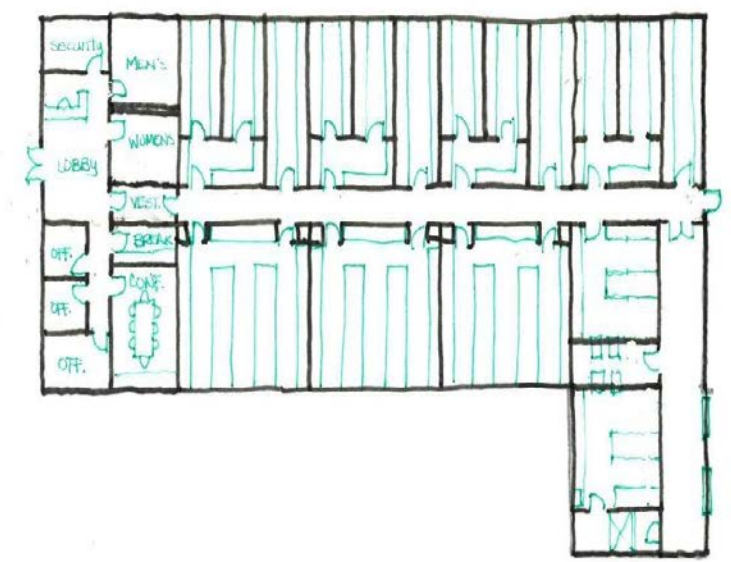
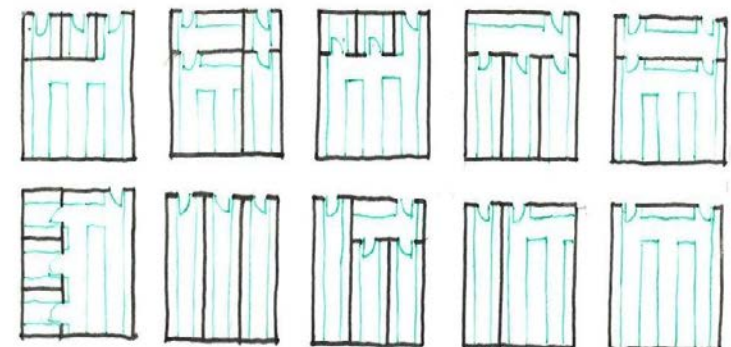
New Approach for Designing Public and Animal Health Laboratories

Bill Arndt

Mark Fitzgerald

Ross Ferris





INTRODUCTION

Innovative Design



INTRODUCTION

Reduce Time



INTRODUCTION

Reduce Travel



INTRODUCTION

Reduce Cost



- Training
- SOP Development
- Operation & Maintenance Plans
- Flow Analysis
- Adjacencies
- Biosafety & Biosecurity
- Site Integration

INTRODUCTION

Focus Efforts on Needs



- Uninformed Design
- Design at a Distance
- Cultural Differences
- Language Barriers

CURRENT DESIGN STRATEGIES

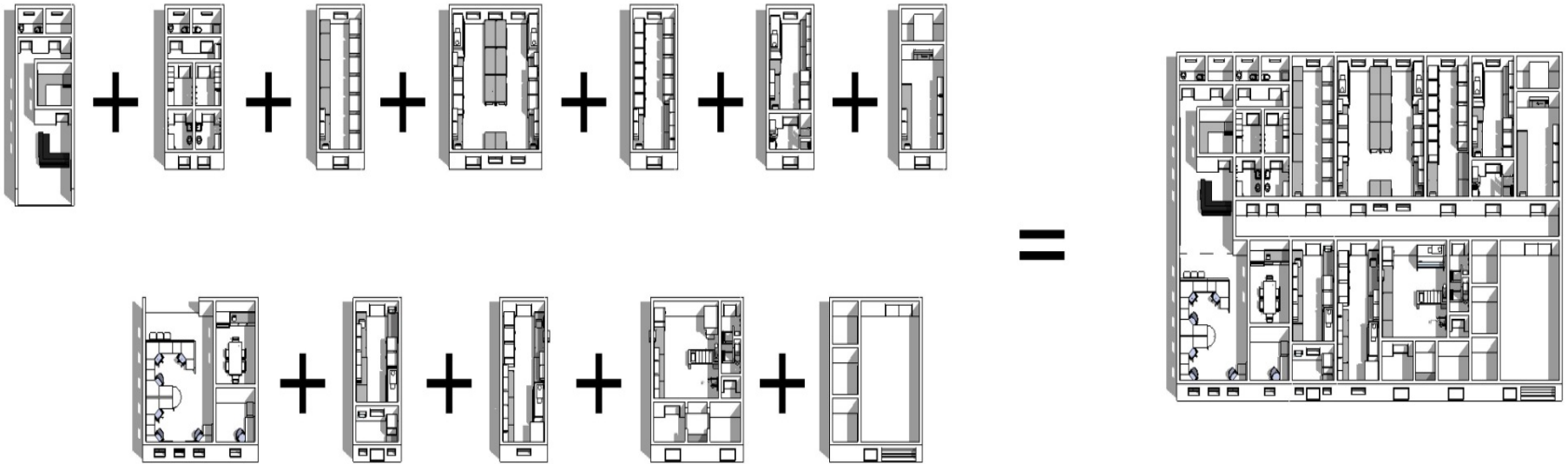
Traditional Design Process Challenges



- Sustainability
- Climate
- Maintenance
- Dimensional Constraints
- Delivery and Transport

CURRENT DESIGN STRATEGIES

Prefabricated Design



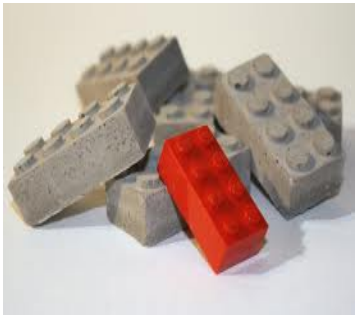
PROTOTYPE LABORATORY DESIGN CONCEPT

Overview & Description



+

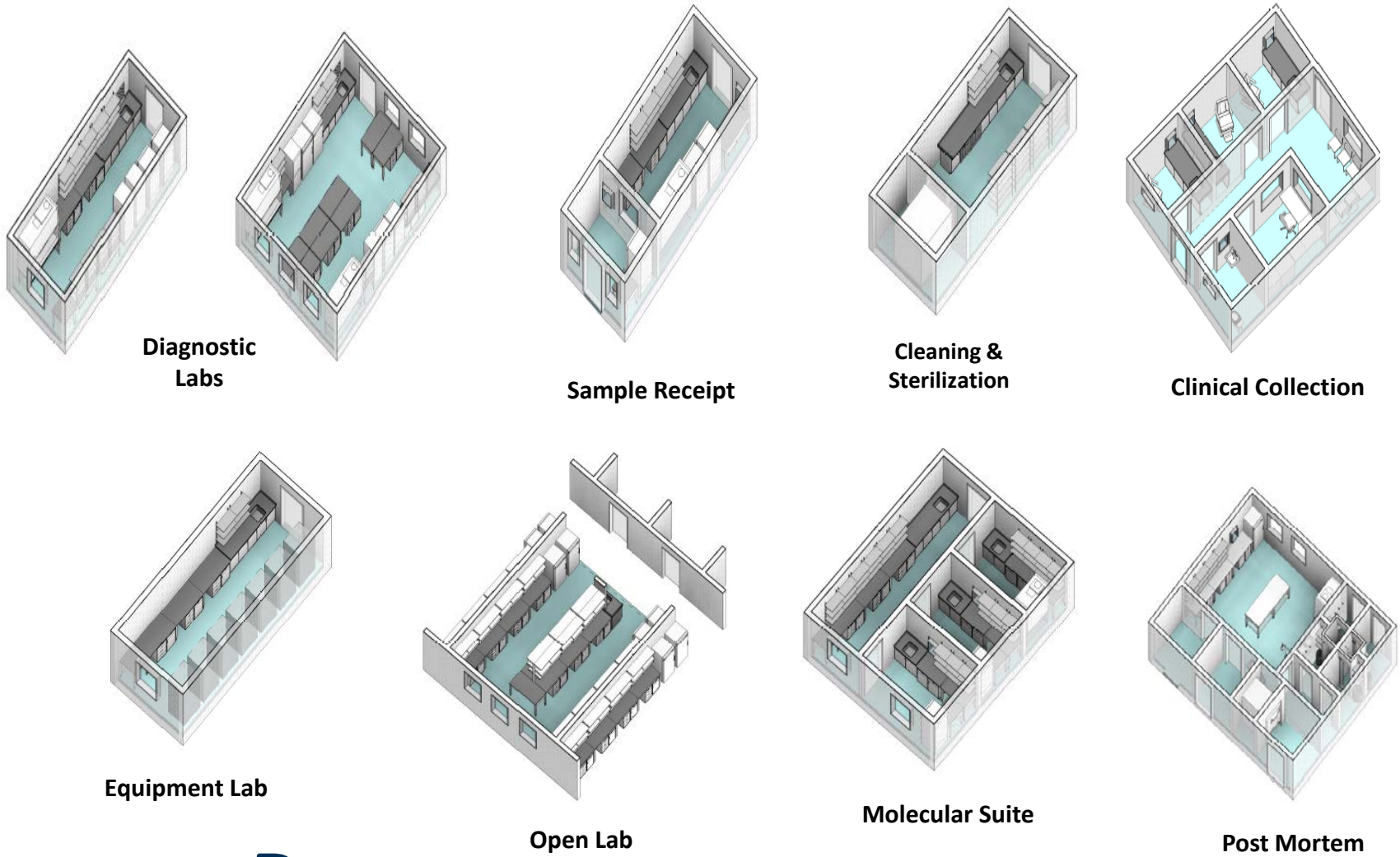
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- Design
- Scalable
- Repeatable
- Predictable Costs
- Peer Review
- Maintainable
- Ease of Manufacture
- Sustainable

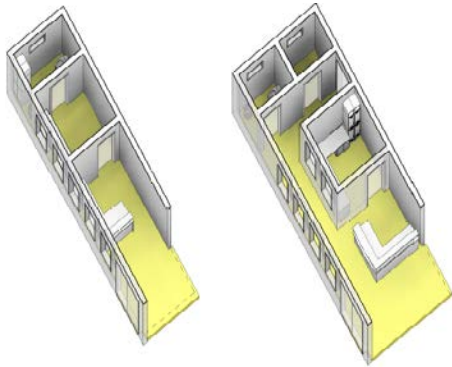
PROTOTYPE DESIGN

Key Concepts

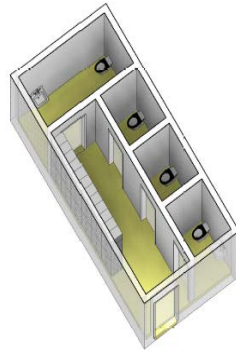


PROTOTYPE DESIGN

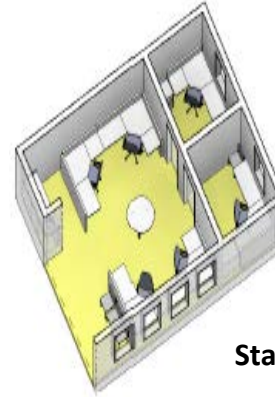
Key Components – Laboratory Spaces



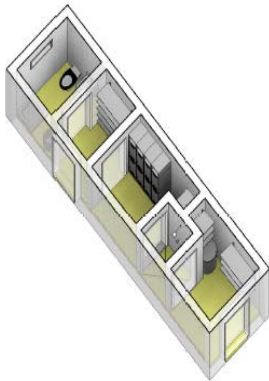
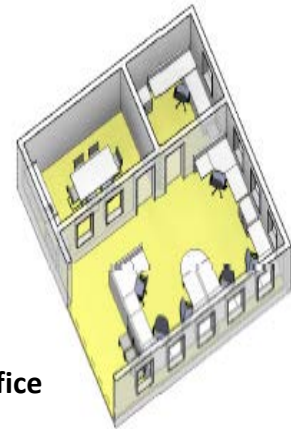
Secure Entry



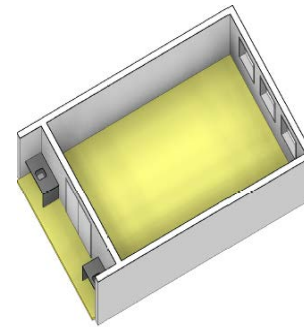
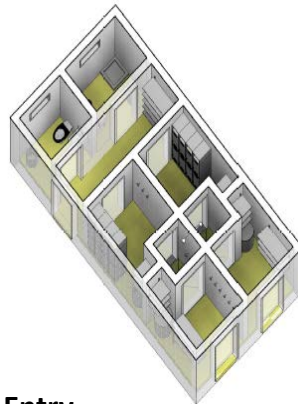
Wash Room



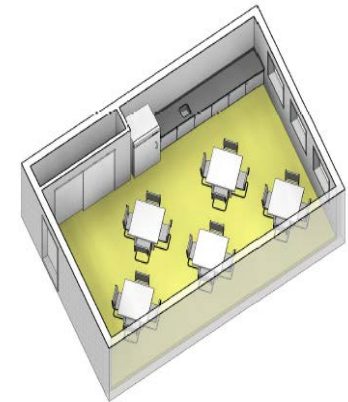
Staff Office



Lab Entry



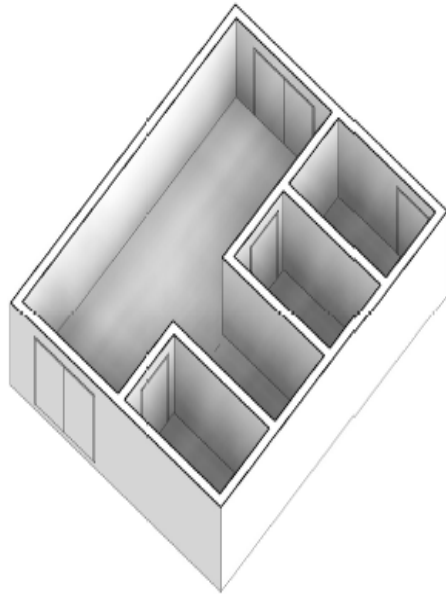
Multifunctional Room



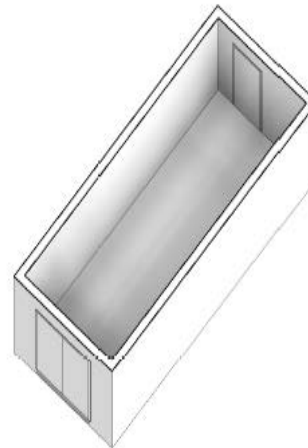
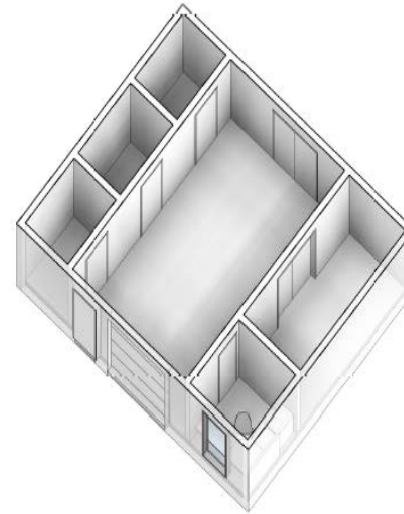
Break room

PROTOTYPE DESIGN

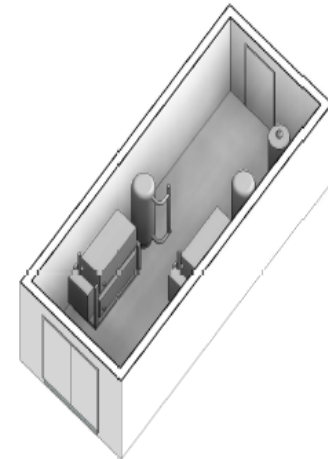
Key Components – Amenity Spaces



Loading & Storage

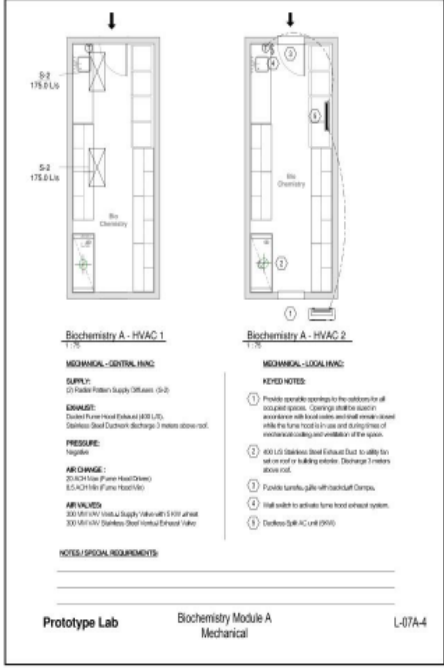
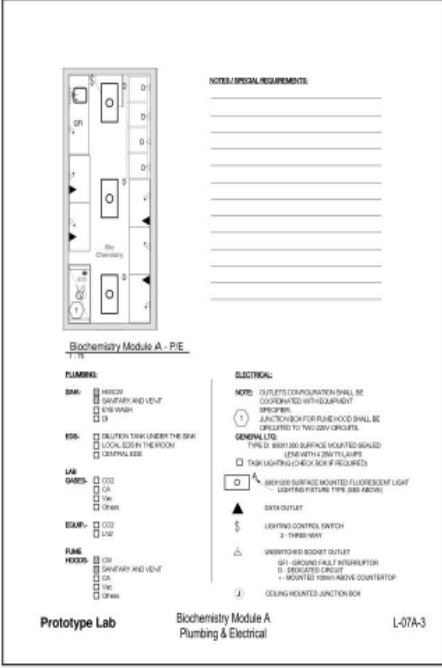
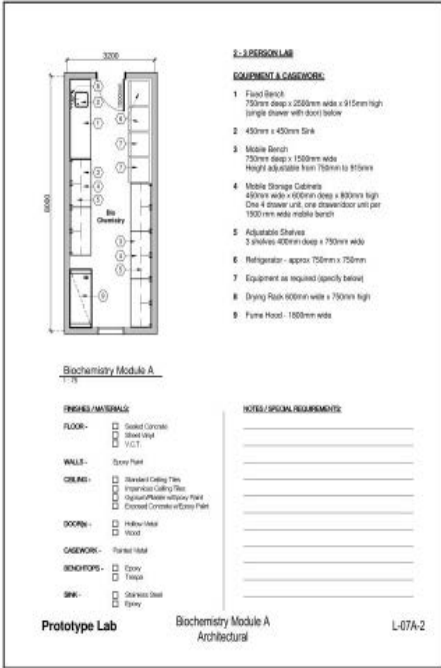
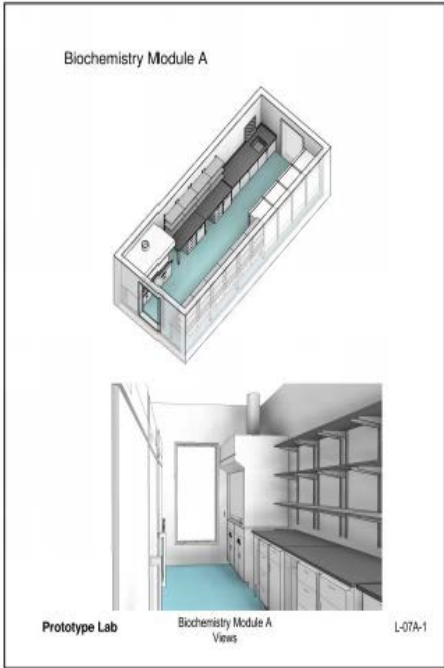


Electrical & Plumbing



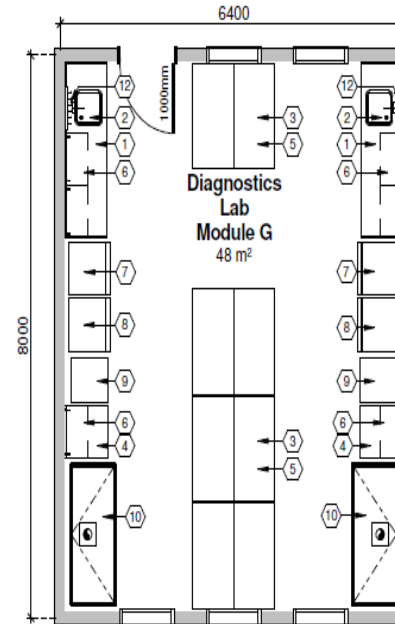
PROTOTYPE DESIGN

Key Components – Support Spaces



PROTOTYPE DESIGN

Module Drawing Sets

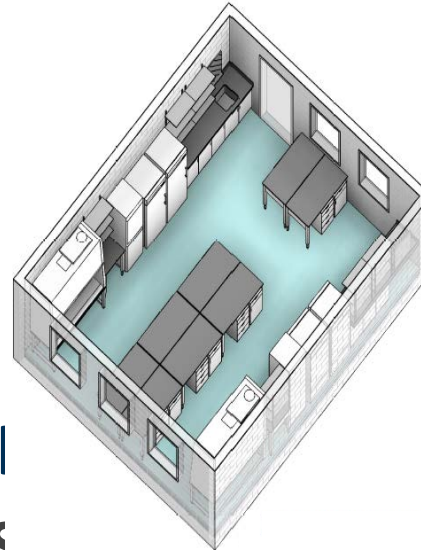


Diagnostics Module G

1 : 75

EQUIPMENT & CASEWORK:

- 1 Fixed Bench
750mm deep x 2500mm wide x 915mm high
(single drawer with door) below
- 2 450mm x 450mm Sink
- 3 Mobile Bench
750mm deep x 1500mm wide
Height adjustable from 750mm to 915mm
- 4 Mobile Bench
750mm deep x 750mm wide
Height adjustable from 750mm to 915mm
- 5 Mobile Storage Cabinets
450mm wide x 600mm deep x 800mm high
One 4 drawer unit, one drawer/door unit per
1500 mm wide mobile bench
One drawer/door unit per 750 wide mobile bench
- 6 Adjustable Shelves
3 shelves 400mm deep x 750mm wide
- 7 Refrigerator - approx 750mm x 750mm
- 8 Freezer - approx 750mm x 750mm
- 9 Equipment as required
- 10 Biosafety Cabinet 1800mm
Ducted / Thimble Connected / Recirculating
- 12 Drying Rack 600mm wide x 750mm high



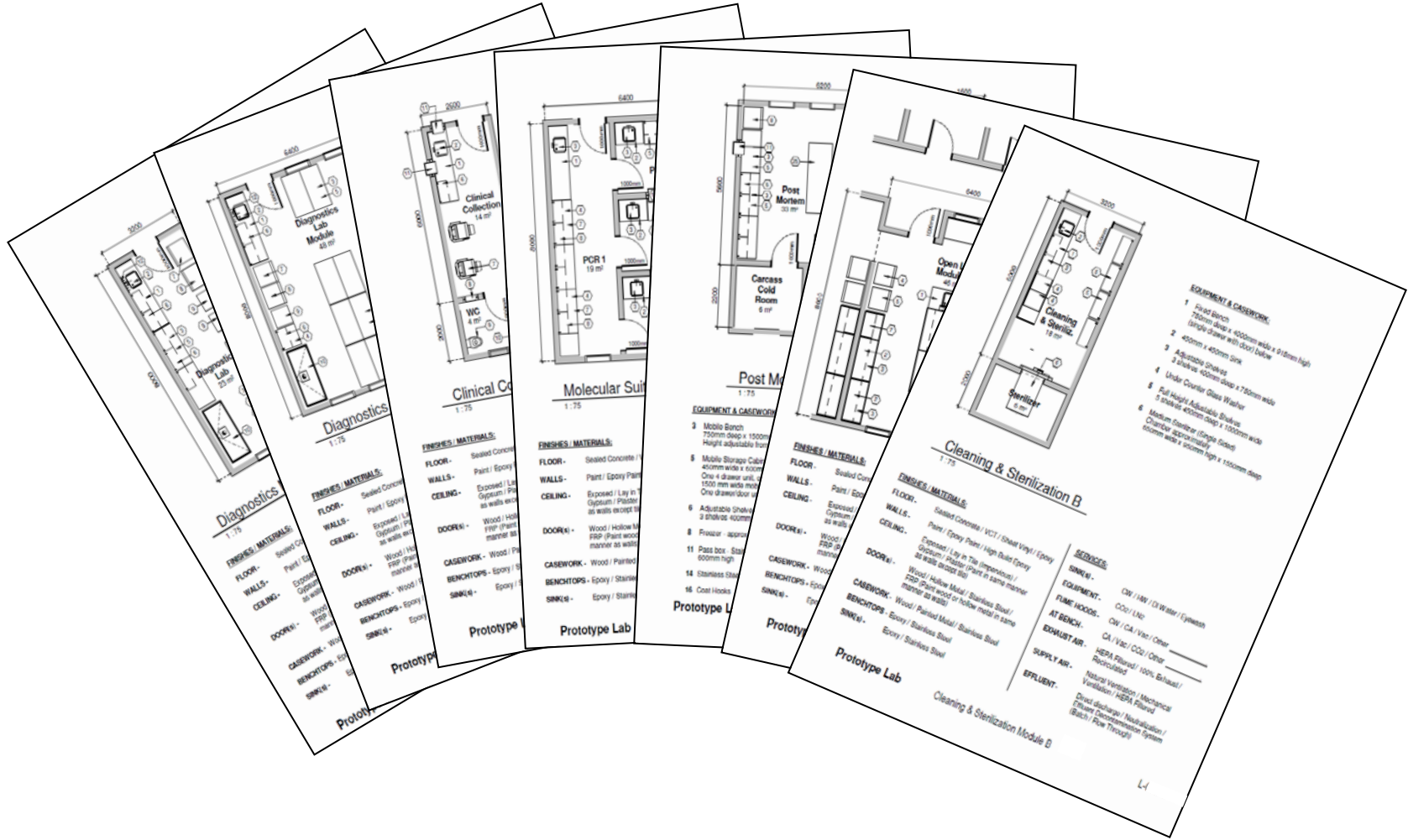
FINISHES / MATERIALS:

- FLOOR** - Sealed Concrete / VCT / Sheet Vinyl / Epoxy
- WALLS** - Paint / Epoxy Paint / High Build Epoxy
- CEILING** - Exposed / Lay in Tile (Impervious) / Gypsum / Plaster (Paint in same manner as walls except tile)
- DOOR(s)** - Wood / Hollow Metal / Stainless Steel / FRP (Paint wood or hollow metal in same manner as walls)
- CASEWORK** - Wood / Painted Metal / Stainless Steel
- BENCHTOPS** - Epoxy / Stainless Steel
- SINK(s)** - Epoxy / Stainless Steel

SERVICES:

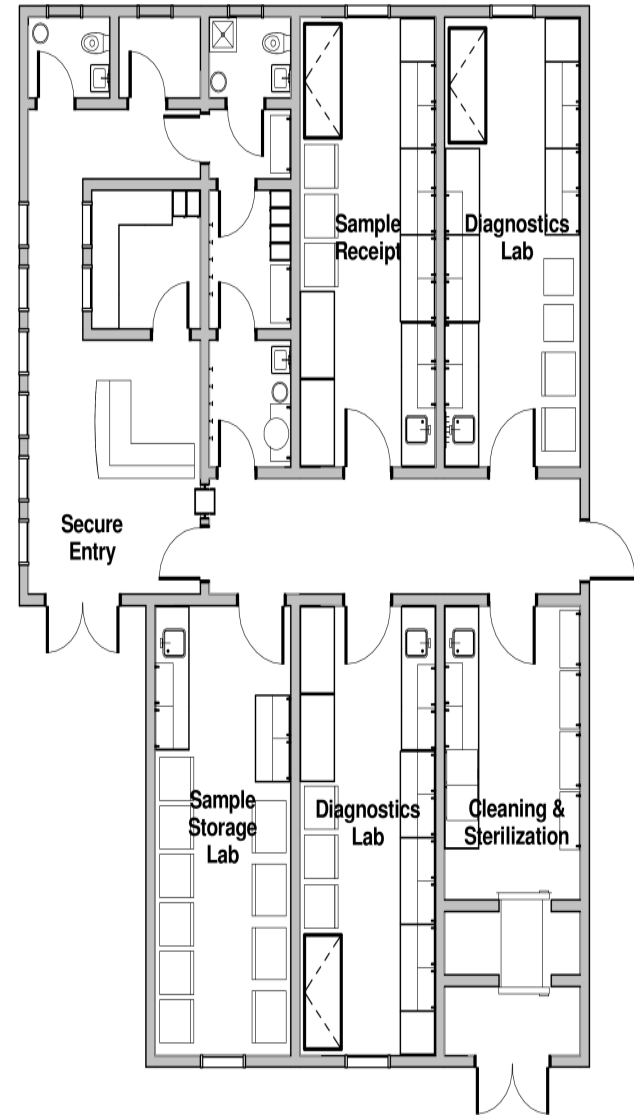
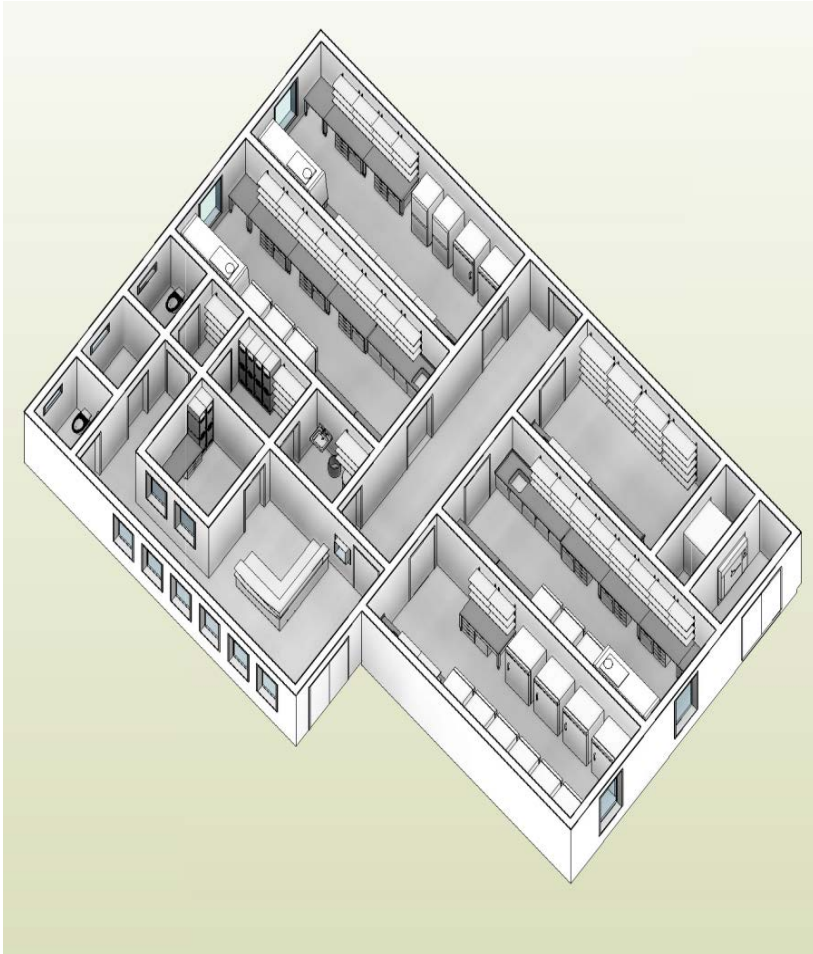
- SINK(s)** - CW / HW / DI Water / Eyewash
- EQUIPMENT** - CO2 / LN2
- FUME HOODS** - CW / CA / Vac / Other _____
- AT BENCH** - CA / Vac / CO2 / Other _____
- EXHAUST AIR** - HEPA Filtered / 100% Exhaust / Recirculated
- SUPPLY AIR** - Natural Ventilation / Mechanical Ventilation / HEPA Filtered
- EFFLUENT** - Direct discharge / Neutralization / Effluent Decontamination System (Batch / Flow Through)

PROTOTYPE DESIGN
Module Drawing Set



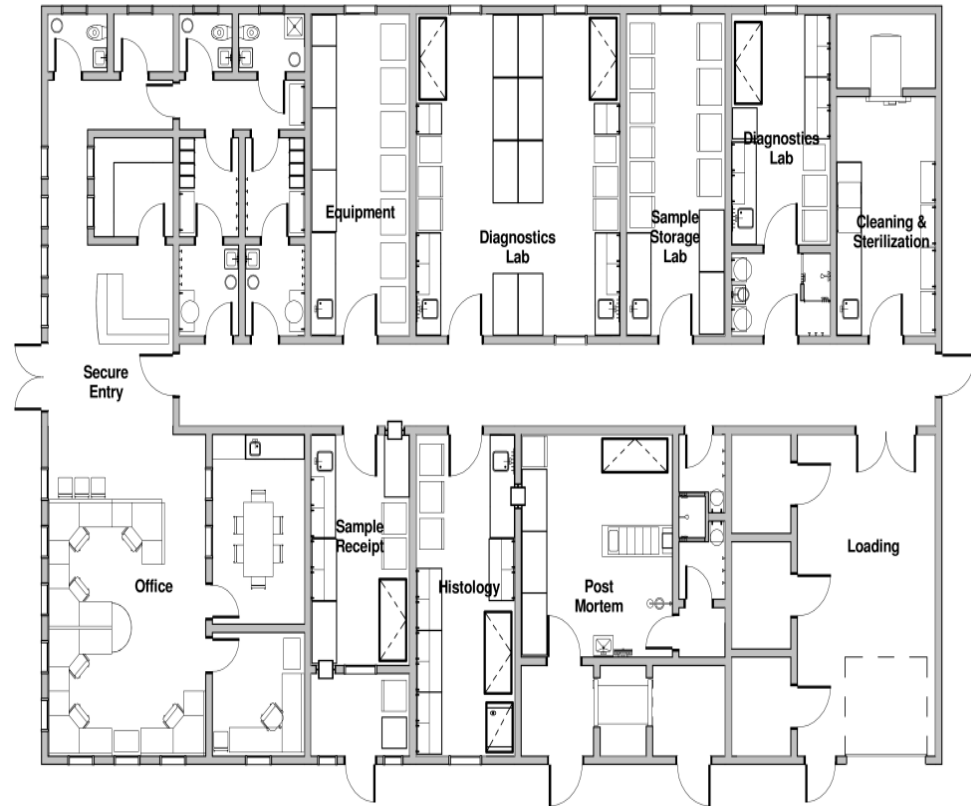
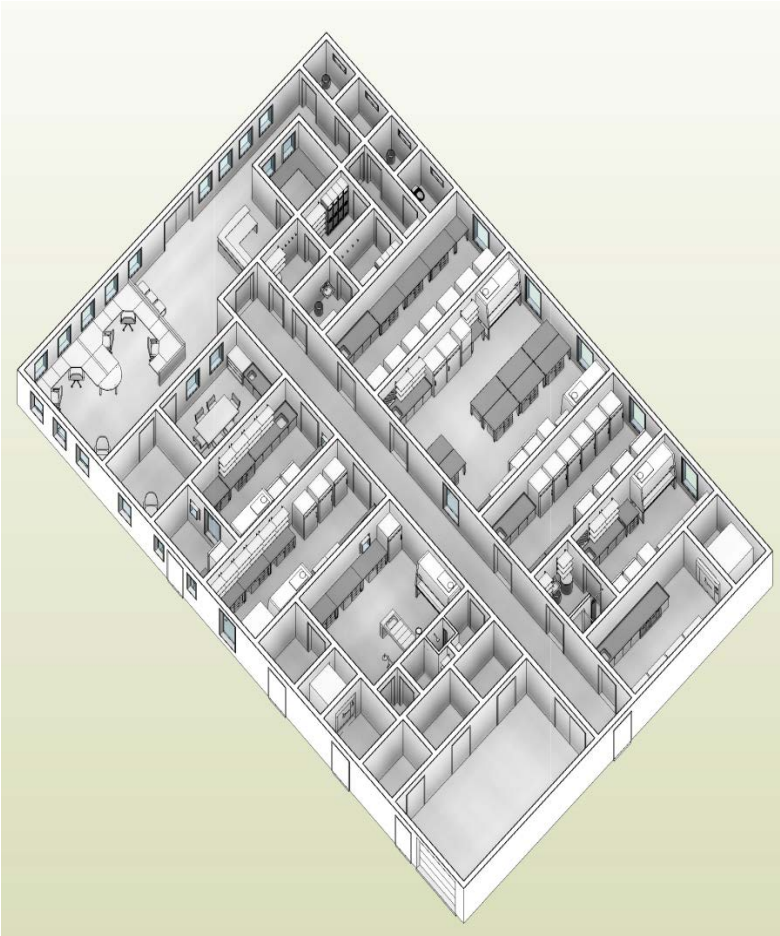
PROTOTYPE DESIGN

Module Catalogue



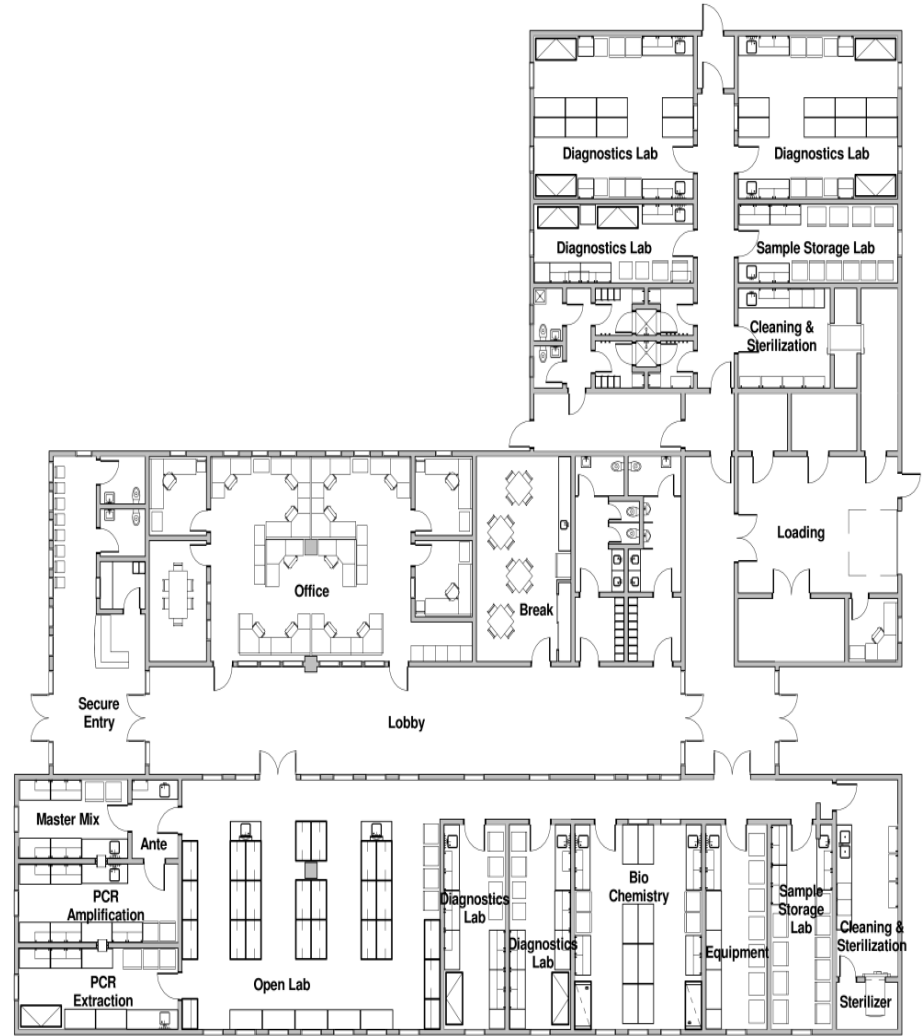
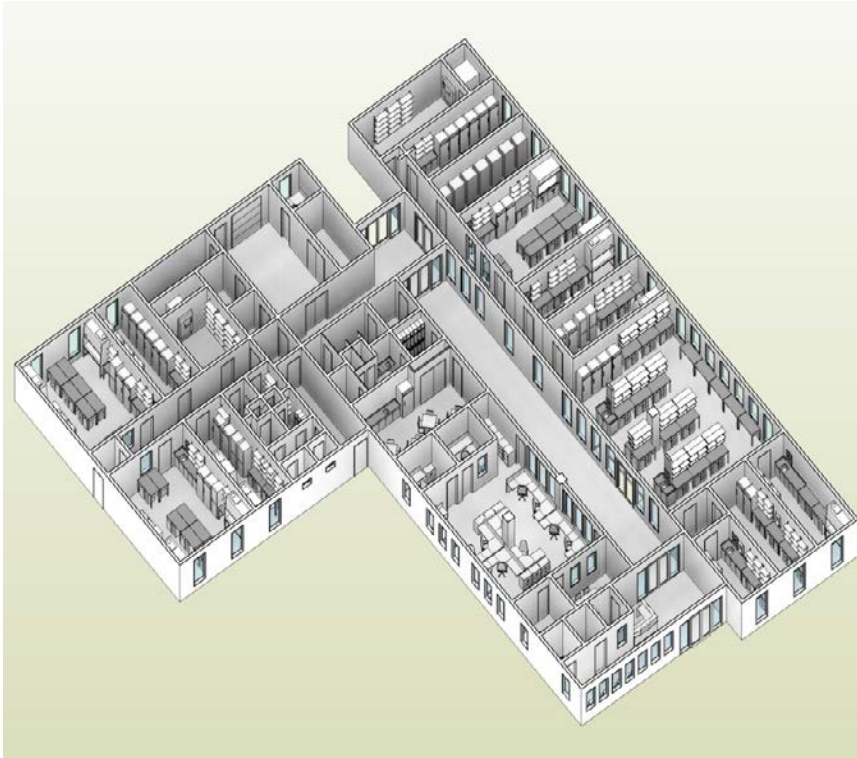
PROTOTYPE CONCEPT

Design Examples – District Lab



PROTOTYPE CONCEPT

Design Examples – Regional Lab



PROTOTYPE CONCEPT

Design Examples – Central Lab

Functional Space Program

Spaces Required	Quantity	Area per Space M ²	Total area M ²
Laboratory Spaces			
L.01A	1	25	25
L.01B	0	25	0
L.01C	0	25	0
L.01D	0	25	0
L.01E	1	50	50
L.01F	1	50	50
L.01G	0	50	0
L.02A	1	25	25
L.02B	0	25	0
L.02C	0	25	0
L.03A	0	20	0
L.03B	1	25	25
L.03C	0	40	0
L.03D	0	50	0
L.04A	0	25	0
L.04B	0	50	0
L.04C	0	50	0
L.04D	0	75	0
L.05A	1	25	25
L.05B	0	50	0
L.06A	1	50	50
L.06B	0	75	0
L.07A	0	25	0
L.07B	0	25	0
L.07C	0	50	0
L.08A	1	25	25
L.08B	0	50	0
L.09A	0	25	0
L.09B	1	25	25
L.09C	0	25	0
L.09D	0	50	0
L.10A	1	25	25
L.10B	0	25	0
L.10C	0	25	0
L.11A	0	50	0
L.11B	0	50	0
L.11C	0	50	0
L.11D	0	50	0
L.12A	1	25	25

Functional Space Program

Spaces Required	Quantity	Area per Space M ²	Total area M ²
Administrative and Amenity Spaces			
A.01A	1	25	25
A.01B	0	40	0
A.01C	0	50	0
A.02A	1	45	45
A.02B	0	45	0
A.02C	0	45	0
A.02D	0	45	0
A.02E	0	60	0
A.02F	0	60	0
A.02G	0	60	0
A.02H	0	60	0
A.03A	1	15	15
A.03B	0	30	0
A.03C	0	15	0
A.03D	0	30	0
A.04A	1	30	30
A.04B	0	40	0
A.05A	0	25	0
A.05B	0	40	0
A.06A	0	25	0
A.06B	0	40	0
A.06C	0	50	0

Functional Space Program

Spaces Required	Quantity	Area per Space M ²	Total area M ²
Support Spaces			
S.01	0	25	0
S.02	1	50	50
S.03	0	75	0
S.04	0	25	0
S.05	1	25	25
S.06	1	10	10
S.07	1	10	10
S.08	17	3.06	52.02

Total Interior Area With Example Selections 612.02

PROTOTYPE DESIGN

Space Program



Cost Estimating

Building Areas	Quantity	Cost per M ²	Total per area
Amenity Areas	125	2,000	250,000
Laboratory Areas	400	4,500	1,800,000
Support Areas	163	2,000	326,280

Total Area Cost 2,376,280

Total Cost for Building Furnishings & Equipment 3,785,505

Furnishings	Quantity	Cost per Lin M or Unit	Total per item
Workstations	6	2,000	12,000
Desk Chairs	6	300	1,800
Side Chairs	20	200	4,000
Meeting Tables	4	500	2,000
Drawer Units	5	300	1,500
File Cabinets	2	300	600
Lockers (1/2 height)	18	150	2,700
Shelving (per linear M)	5	1,000	5,000
Toilets/Urinals	3	500	1,500
Sinks	4	500	2,000
Casework (per linear M)	9	1,500	13,350
Refrigerator (food)	1	1,500	1,500

Total Furniture Cost 47,950

Equipment & Casework	Quantity	Cost per Lin M or Unit	Total per item
Biosafety Cabinets	5	14,000	70,000
Refrigerators	13	3,500	45,500
Freezers	23	5,000	115,000
Misc Equip (incubator etc)	15	5,000	75,000
Special Equip (necropsy tables, glass washers etc)	3	20,000	60,000
Sterilizers (Medium)	1	150,000	150,000
Passboxes	3	20,000	60,000
Sinks	17	1,000	17,000
Fixed Casework (per linear M)	36	5,000	182,250
Adjustable Casework (per linear M)	110	3,500	385,875
Mobile Storage Units	146	1,000	146,000
Shelving (per linear M)	89	1,000	89,250

Total Equipment & Casework Cost 1,395,875

PROTOTYPE DESIGN

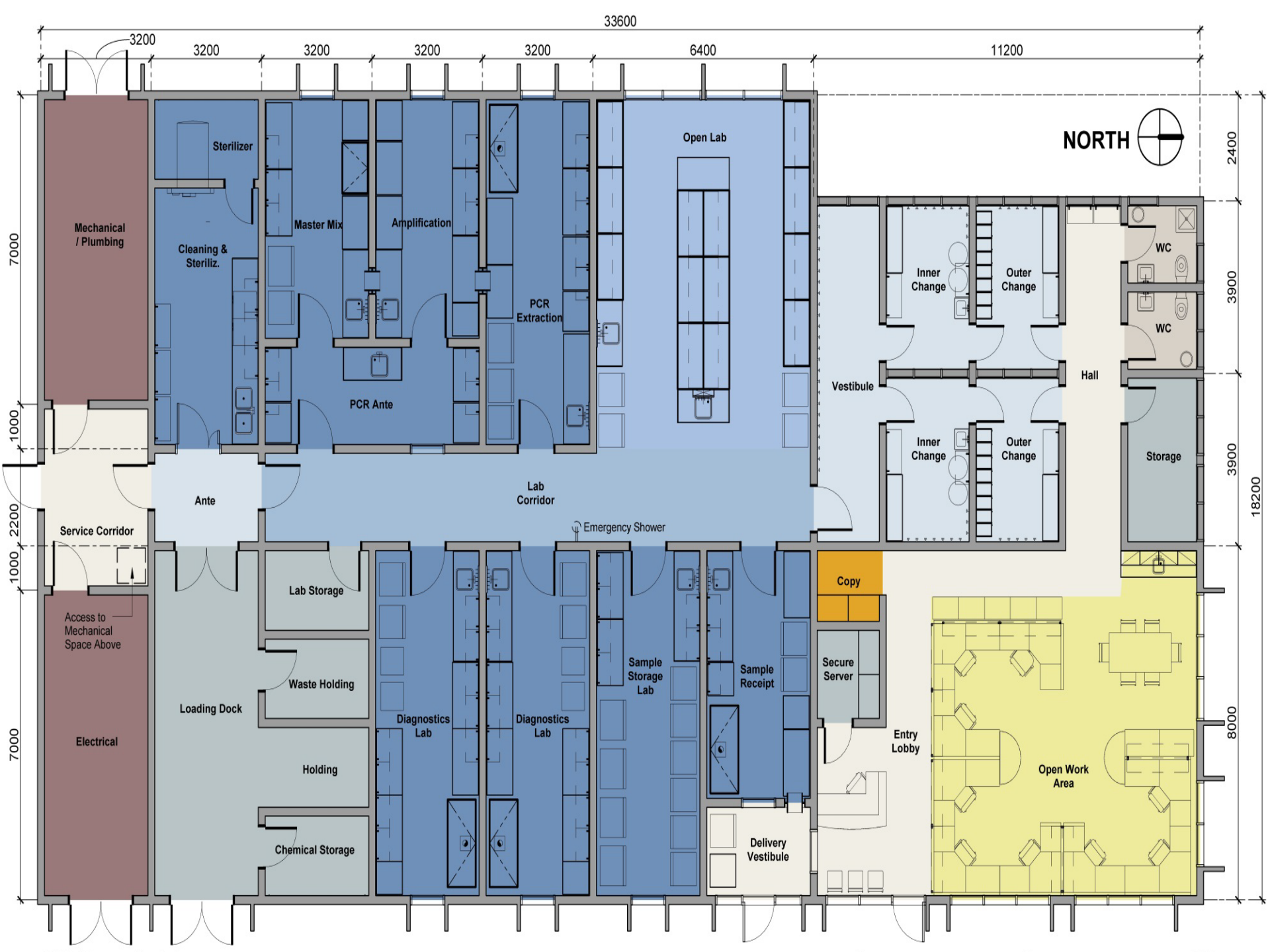
Cost Estimation



- Kenya
- Diagnostic Focus
- 595m²
- 30% Design Complete – Sep 2014
- Minimal Changes to Original Concept
- Locally Sustainable

KENYA

Animal Diagnostic Laboratory





- Baghdad, Iraq
- Diagnostic Focus
- 8,000m²
- 30% Design Complete – Jun 2014
- Adds Critical Capacity for Country and the Region
- Locally Sustainable

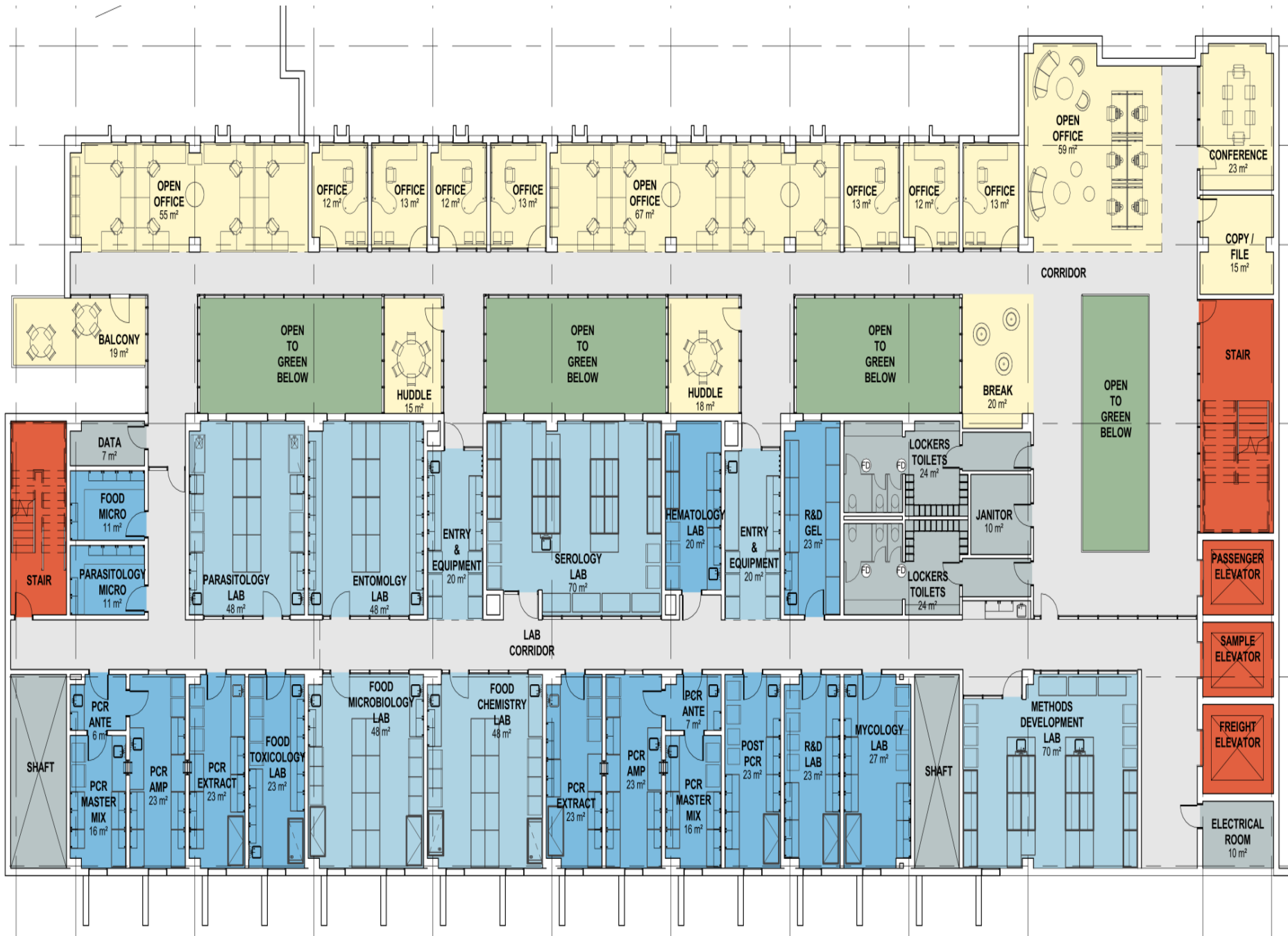
IRAQ

Central Veterinary Laboratory



IRAQ

Central Veterinary Laboratory





- Save Time
- Reduce Travel
- Improve Consistency
- Reduce Costs
- Focus Efforts
- Locally Sustainable
- Promote Best Practices: Lab Design, Biosafety, and Biosecurity

PROTOTYPE DESIGN CONCEPT

Summary

Thank you

Questions