B129

[MOBILE-CARE NET]

Creating a network of decentralized healthcare provider spaces with mobile medical equipment supports by utilizing existing railroad infrastructure to serve rural areas of China

[EXISTING PROBLEM]

Centralized regional medical centers in China have all the best equipment and resources. Township level clinics in rural areas can only provide basic health services forcing patients to travel long distance to gain access for higher care.
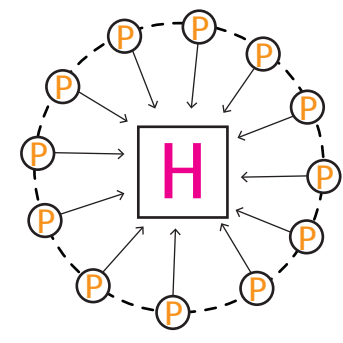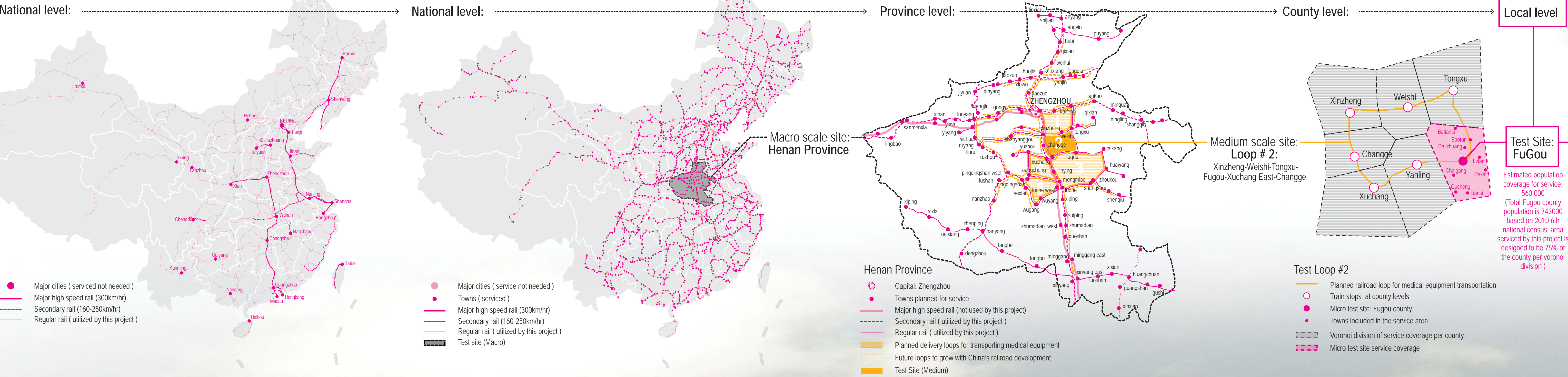
[PROPOSED SOLUTION]

Create a network of de-centralized facilities at township level near train stations. Such facility will be used by community as public space at the same time able to be converted into clinics. Medical equipment will be transported on train along existing railroad to support these facilities.
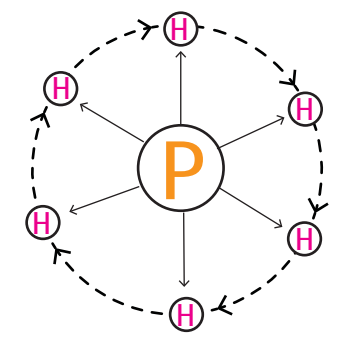
[PROGRAM]

* The proposed facility functions as outpatient clinic
** Program area will self adapt to fit population size
*** Major program components / departments:

FIXED COMPONENT: Built structure, modular construction

Imaging	Pharmacy	Non-invasive OR	Endo	Sterile support	Lab
Clinic exam	Lobby/Public space	Building support	Treatment	Pediatrics
OB/GYN	Gastroenterology	Cancer treatment	Infusion	Fever/Flu

MOBILE COMPONENT: Equipment & suite, Transported by train

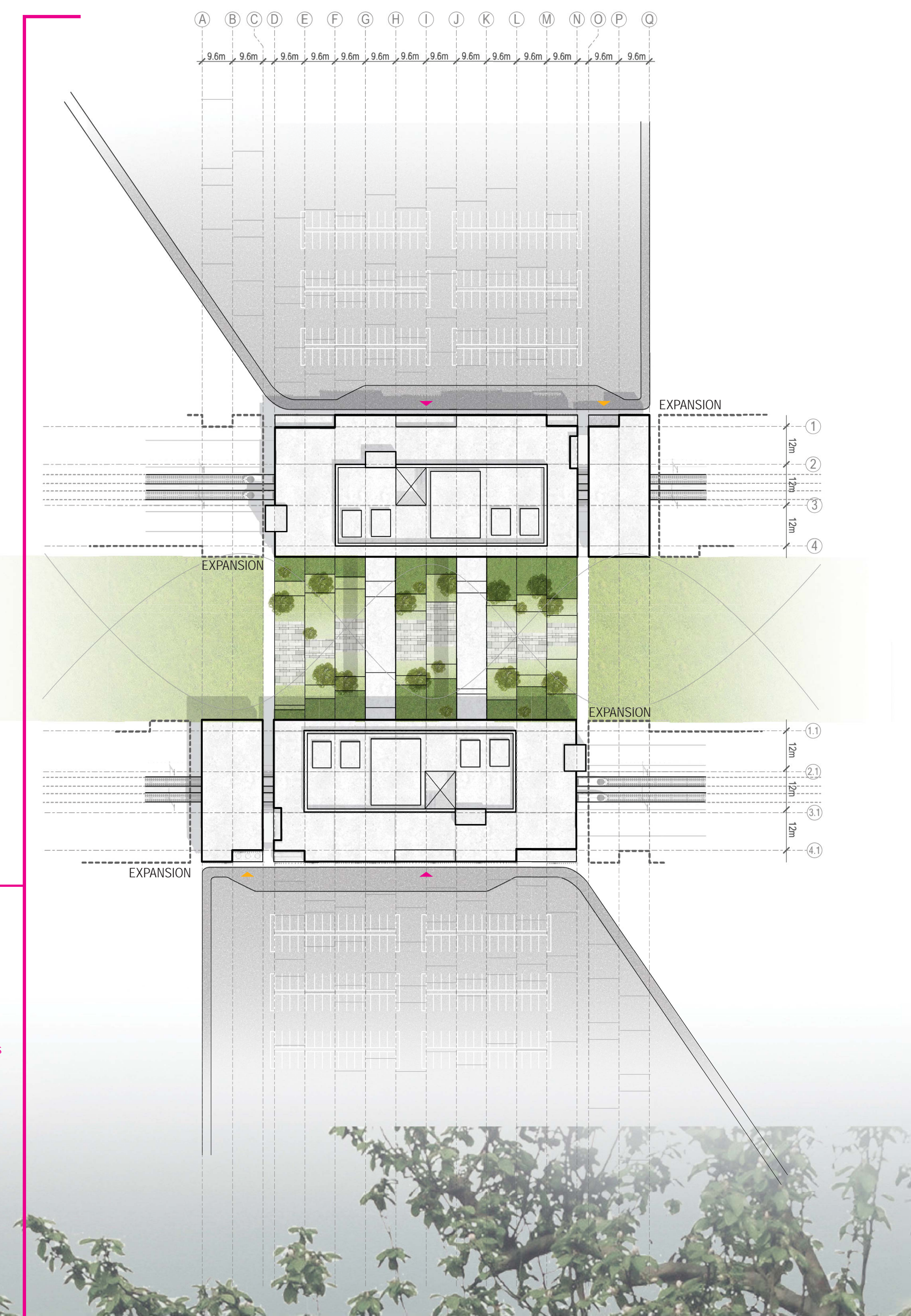| MRI	CT	Dental	Vision	Lab	OR Boom / Table

[ACOUSTICS]

Acoustic consideration:
L1=Average train noise level (15m from source) : 80 decibel
L2=Design facility exterior noise level: 60 decibel
r1=15m
r2=Distance required to position the facility on site away from existing railroad and train station:
$r2=r1*10^{((L1-L2)/20)} = 150m$

Existing Fugou Train station

Planned service facility
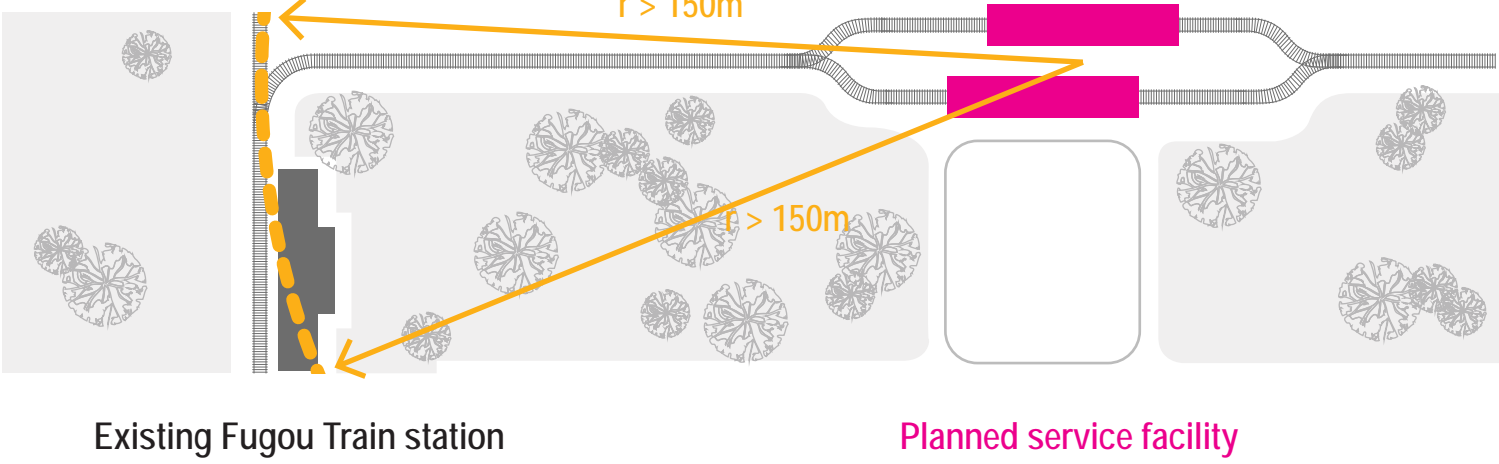
[DESIGN METRICS]

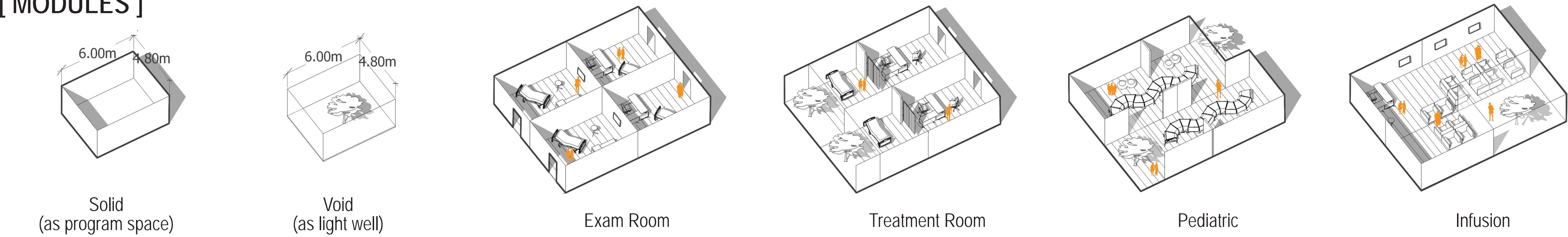| Field	Metrics	Units	2020	2015	Requirement	Fugou site metric
Medical Service	Average stay at Grade 3 level hospital	Day	<8	10.2	expected	Population Served: ~560,000
	Hospital acquired infection	%	<3.2	3.5	expected	Building Area: ~20,000 sqm
	Repeated visit within 30 days	%	<2.4	2.65	expected	
Medical Service System	Bed # per 1000 residents	Bed	<6	5.11	expected	Staff number: ~117
	Practicing (Assitant) Doctor # per 1000 residents	Person	>2.5	2.22	expected	Site coverage: ~80,000 sqm
	Registered nurse # per 1000 residents	Person	>3.14	2.37	expected	
	General practitioner # per 10000 residents	Person	>2	1.38	Required	
	Non-public hospital bed # to total bed #	%	>30	19.4	expected	

* Based on the 'Thirteenth Five-Year Plan' document 2016 - public health division issued by the State Council of China

[PLANNING LOGIC]

National level:

National level:

Province level:

County level:

Local level:

Macro scale site: Henan Province

Medium scale site: Loop # 2: Xinzheng-Weishi-Tongxu-Fugou-Xuchang East-Changge

Test Site: FuGou

Estimated population coverage for service: 560,000 (Total Fugou county population is 743000 based on 2010 6th national census, area serviced by this project is designed to 75% of the county per voronoi division)

Henan Province

- Capital: Zhengzhou
- Towns planned for service
- Major high speed rail (not used by this project)
- Secondary rail (utilized in this project)
- Regular rail (utilized in this project)
- Planned delivery loops for transporting medical equipment
- Future loops to grow with China's railroad development
- Test Site (Medium)

Test Loop #2

- Planned railroad loop for medical equipment transportation
- Train stops at county levels
- Micro test site: Fugou county
- Towns included in the service area
- Voronoi division of service coverage per county
- Micro test site service coverage

National level legend:
- Major cities (serviced not needed)
- Major high speed rail (300km/hr)
- Secondary rail (160-250km/hr)
- Regular rail (utilized by this project)

National level legend:
- Major cities (service not needed)
- Towns (serviced)
- Major high speed rail (300km/hr)
- Secondary rail (160-250km/hr)
- Regular rail (utilized by this project)
- Test site (Macro)

EXPANSION

Shell rooms pre-designed to accomodate specific equipment. During non-testing period, spaces will be used by the community for recreational purposes.

Equipment train arrives per patient exam schedule, spaces are prepared for its medical function.

Movable wall panels open for equipment to be transported.

Equipment transported to the designed location via track system.

Room ready for use. After procedure is done, train will take equipment to the next stop.
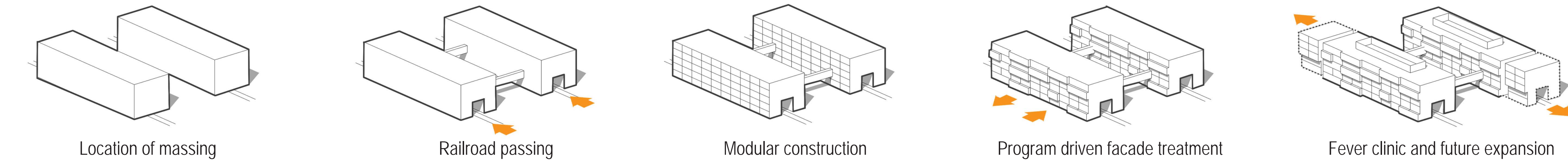
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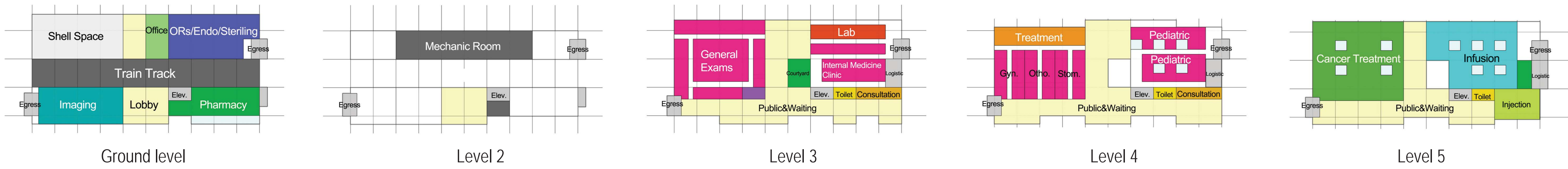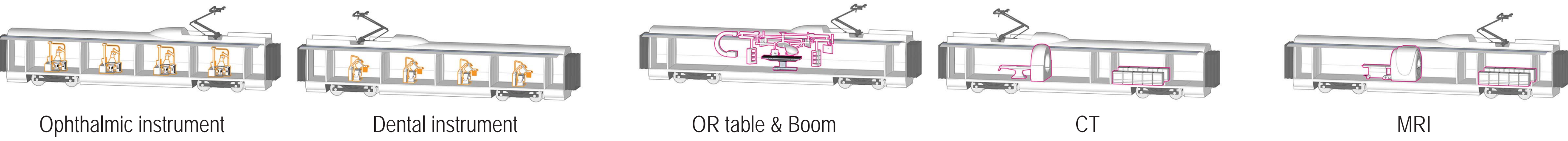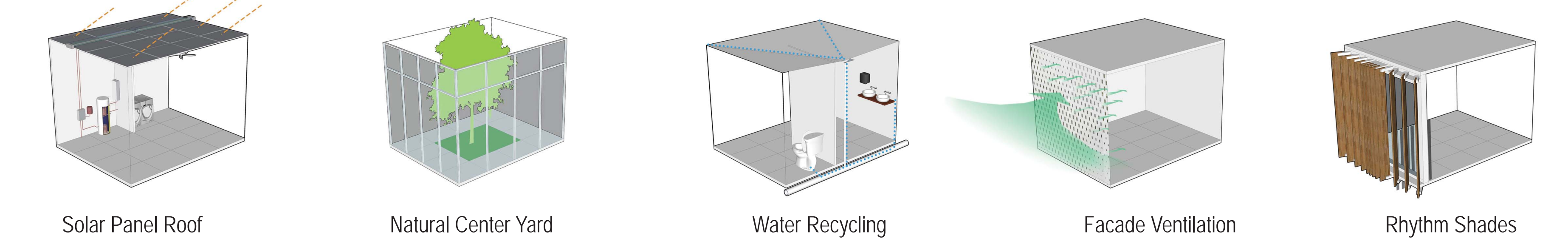
[MODULES]

6.00m 4.80m
6.00m 4.80m

Solid (as program space)

Void (as light well)

Exam Room

Treatment Room

Pediatric

Infusion

[MASSING]

Location of massing

Railroad passing

Modular construction

Program driven facade treatment

Fever clinic and future expansion

[DEPARTMENT PLAN]

Shell Space | Office | ORs/Endo/Sterling
Train Track
Imaging | Lobby | Elev. | Pharmacy | Egress

Ground level

Mechanic Room | Elev. | Egress

Level 2

General Exams | Lab | Internal Medicine Clinic | Consultation | Public&Waiting | Egress

Level 3

Treatment | Pediatric | Consultation | Public&Waiting | Egress

Level 4

Cancer Treatment | Infusion | Injection | Public&Waiting | Egress

Level 5

[EQUIPMENT TRAIN]

Ophthalmic instrument

Dental instrument

OR table & Boom

CT

MRI

[SUSTAINABILITY]

Solar Panel Roof

Natural Center Yard

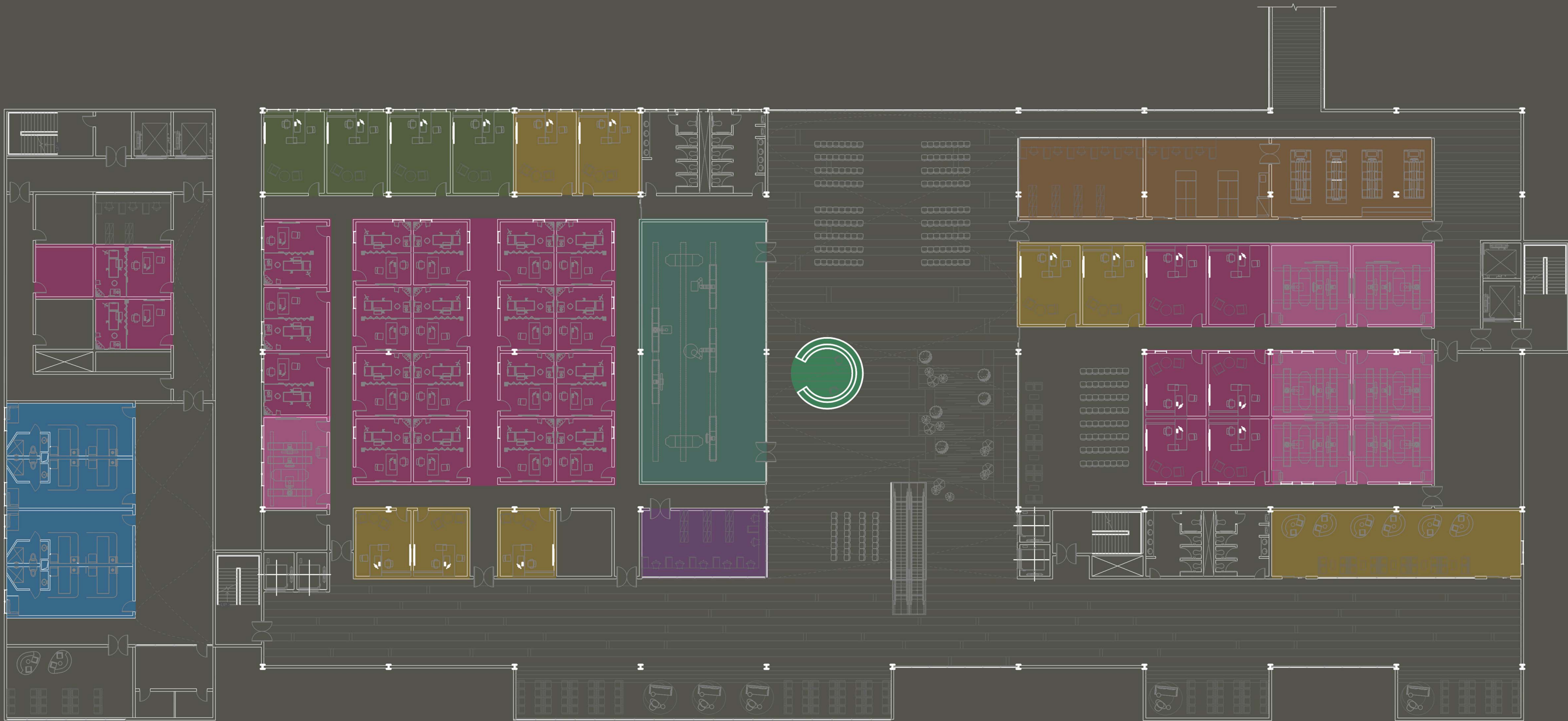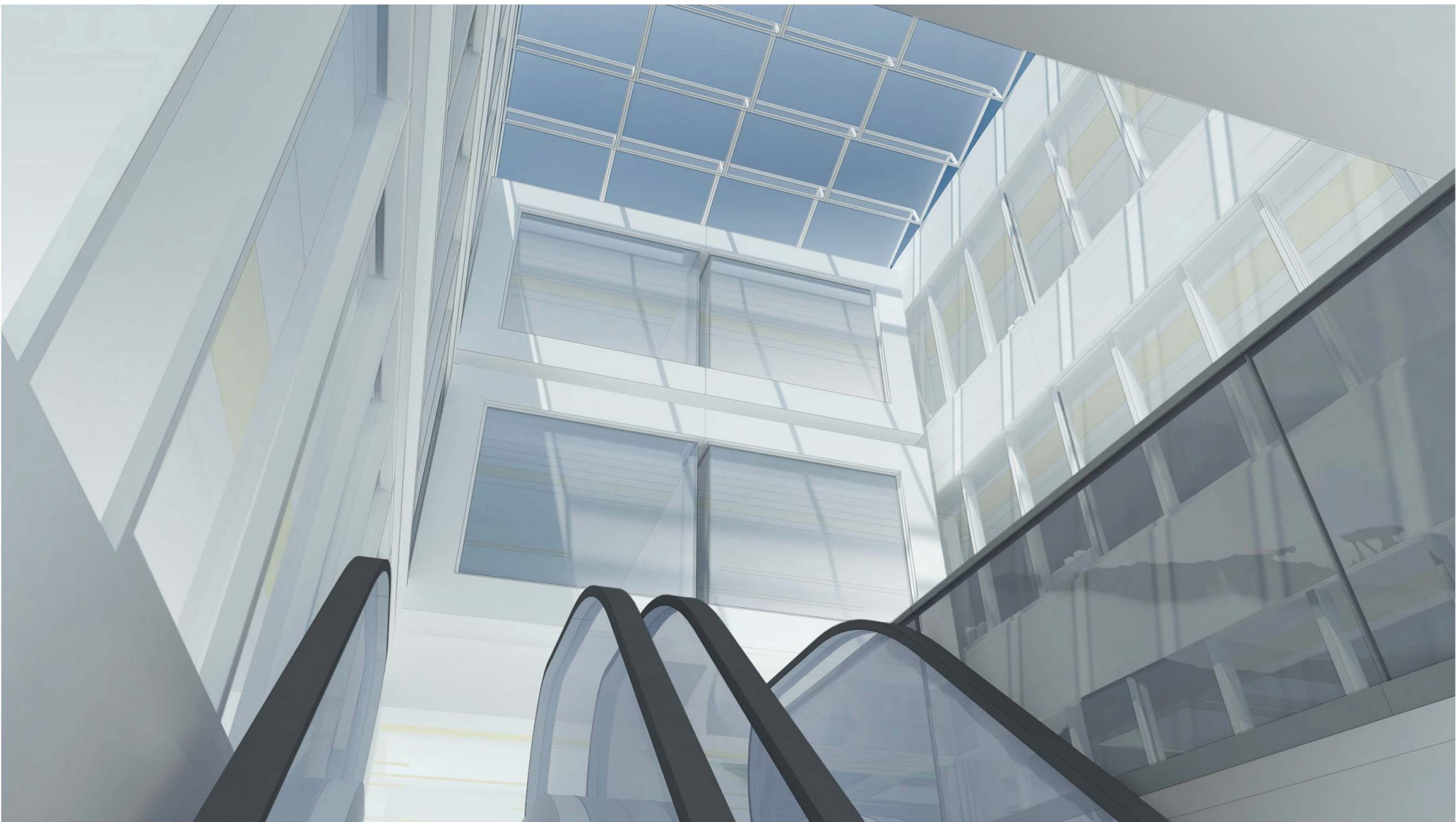Water Recycling

Facade Ventilation

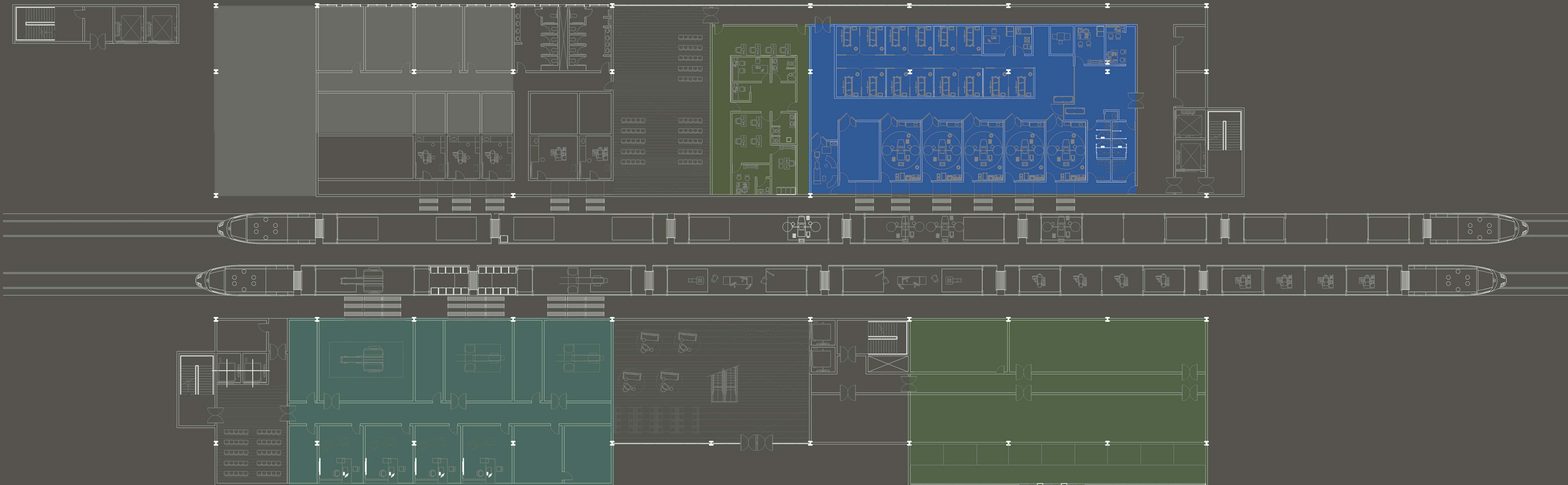Rhythm Shades

[CIRCULATION]

[INTERIOR - LOBBY]

[FLOOR PLAN - LEVEL 3]
Lobby & Exam

[FLOOR PLAN - GROUND LEVEL]
Imaging, OR, Pharmacy

Electronic monitoring
Exam
Registration
OR
Observation
Imaging
Shell
Office
Pharmacy
Consult
Lab

0 10 20 30m