



## CRITICAL ACCESS HOSPITAL PROTOTYPE



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## INTRODUCTION

Hospitals by nature are complex, technically sophisticated, and mechanically intensive structures that are expensive to build and maintain. Therefore, it is understandable that hospital replacement is accomplished on a limited basis. The design and construction of hospitals is a major undertaking for all involved. Hundreds of decisions must be made before and during new construction. These decisions determine how successfully the facility will function when completed, and how successfully it can be maintained once put into service.

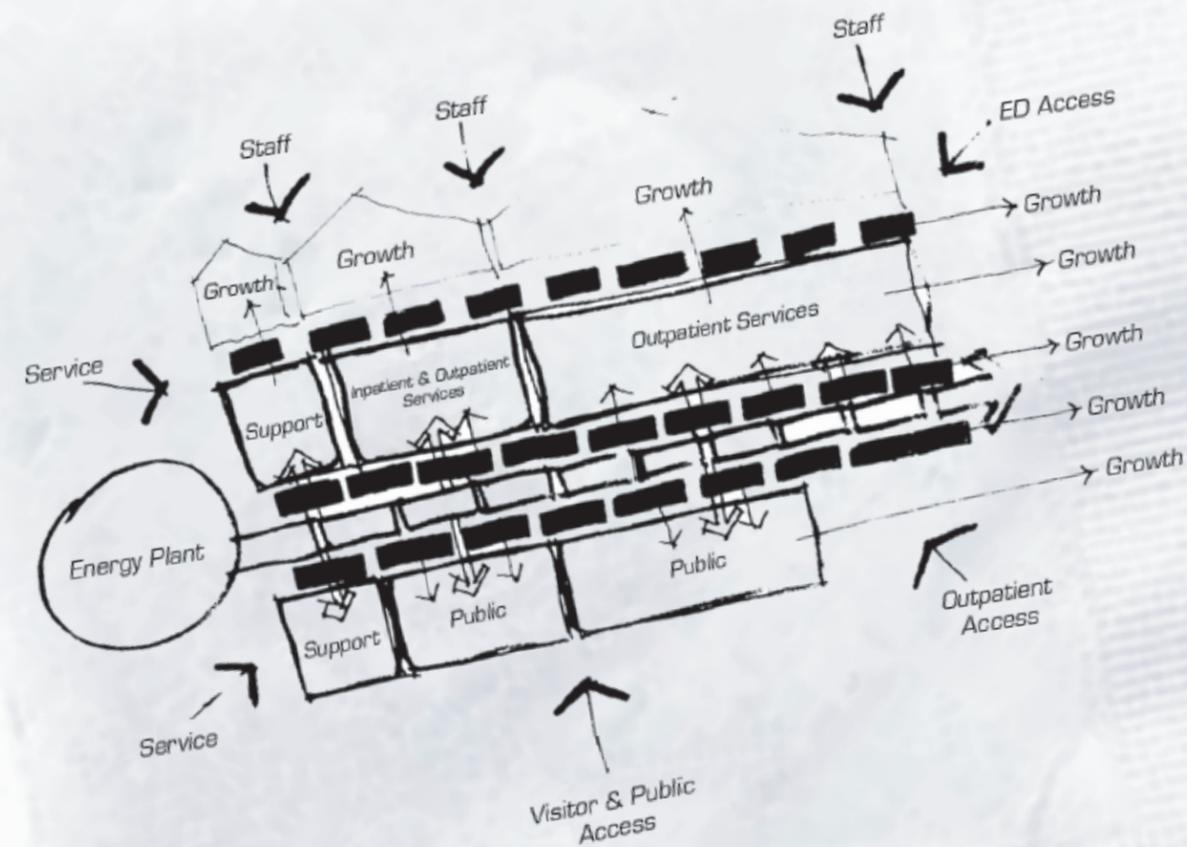
This report is addressed to the medical industry, and therefore intended as a guide to assist in the planning, design, and construction of a Critical Access Hospital (CAH). In this context, a successful CAH is defined as one that provides effective and flexible space, is safe for patients/staff/visitors, respecting its surrounding environment, has support of the community and governmental agencies, constructed in a cost-effective manner; and can endure the test of time.

Many of the hospitals that have received CAH certification operate in facilities that require replacement or renovation. It has been demonstrated that more often than not it is less expensive to replace old hospitals that do not meet existing building codes than to renovate them. The HUD, FHA Section 242, program gives rural America the ability to refinance outstanding capital debt and undertake capital improvements.

## HOSPITAL PROTOTYPES

BBH Design, Research Triangle Park, North Carolina received an architectural-engineering services contract from the Division of Engineering Services (DES), Health Resources Service Administration (HRSA), Department of Health and Human Services (DHHS), and the Office of Rural Health Policy (ORHP), to develop two alternative prototype designs for 25 and 15 bed Critical Access Hospitals.

The intent of the prototype is to provide guiding principals to assist the hospital in development of a replacement facility. The schematic designs will permit the hospital to add or subtract from the designs based on their specific needs.



NAPKIN SKETCH: ORIGINAL CONCEPT OF MODULAR DESIGN ALLOWING FOR FLEXIBILITY AND GROWTH

## CRITICAL ACCESS HOSPITAL PROTOTYPE

## PROCESS

Most architectural firms follow the philosophy of William Pena. In his book *Problem Seeking* he defines Programming as a five-step process: establishing goals; collecting and analyzing the facts, testing the concepts, determining the needs, and stating the problem. It is the process leading to a statement of an architectural problem and the requirements to be met in offering a solution.

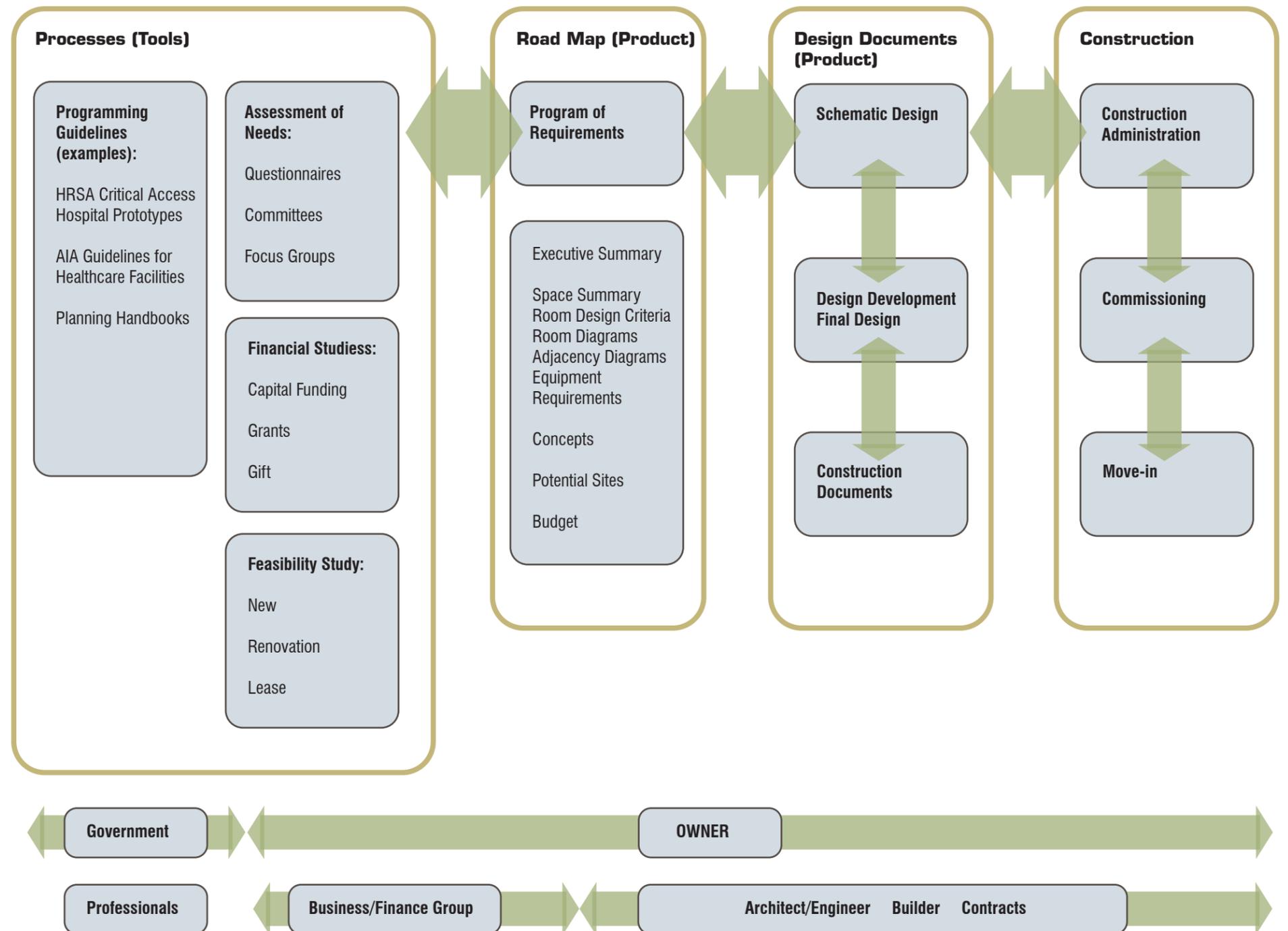
Programming is the process of information gathering, assimilation, and decision making to provide a Road Map towards building solutions. This is a graphical representation of the process to develop the road map. The architectural design team can provide the guidance and coordination necessary to create the processes, gather the information, and provide a Program of Requirements document that will facilitate the design of highly complex buildings. Designing the hospital is a process that takes the program and envisions solutions to the owner's needs from concept, through schematic design, to final approval of the design development.

The Conceptual Design phase follows Programming, and is often considered as part of the Programming phase. The Conceptual Design allows the designer to test basic assumptions concerning the overall organization of the facility and layout of its individual spaces by type.

During Schematic Design, the initial programming information is translated into a well-designed building in terms of size and character. This includes room-by-room floor plans, first detailing of the exterior design identifying character and materials, and description of infrastructure components. During the Schematic Design the programming effort continues to further develop and refine the overall project and equipment needs.

**This report provides design development for the CAH prototypes through the Schematic Design phase.**

The Design Development phase serves as a bridge between Schematic Design and the final phases of design. After the Owner has approved the final design, the designer will produce Construction Documents and Specifications. These are the documents used for obtaining construction contract bids.



## CRITICAL ACCESS HOSPITAL PROTOTYPE

# PROGRAM REQUIREMENTS

The contract with DHHS required the prototypes to include the following programs:

- Parking
- Site access and circulation
- Medical/Surgical Patient Bed Rooms
- Service areas for Nursing Unit(s)
- Patient Isolation (Skilled Nursing)
- Emergency Facility
- Patient Seclusion (ED)
- Biohazard Wash-down Area (ED)
- Surgical Facility
- Service Areas for Surgery
- LDR or LDRP
- Imaging Facility
- Rehabilitation Facility
- Pharmacy (In-patient)
- Laboratory (minimum)
- Dietary Facilities
- Administration and Public Areas
- Multi-purpose room
- Staff Library and Dictation space
- Specialty Outpatient Clinic space
- Medical Records
- Central Services
- General Storage
- Linen Services
- Facilities for Cleaning & Sanitizing Carts
- Employee Facilities
- Housekeeping Rooms
- Engineering Service & Equipment Areas
- Other spaces as necessary

Building Gross Square Foot Maximum is 50,000 to 60,000 square feet.

It is recognized these programs may or may not be required for each individual CAH. Verification or alterations to the program should be done in the initial phase with the Designer.

The following spreadsheet shows space requirements by program for each prototype. The prototype standards are based on national "Rules of Thumb" criteria for estimating gross square footage for each major department. This information is tabulated to determine a Building Total using a grossing factor times the Departmental Total.

**Example:** **Inpatient Beds**  
 LDRP 800 Departmental Gross Square Feet (DGSF) per LDRP bed.  
 For the 25 Bed CAH – 2 LDRP Rooms x 800 DGSF = 1,600 DGSF

**Skilled Nursing** 550 DGSF per bed.  
 For the 25 Bed CAH – 23 Inpatient Rooms (includes 2 Isolation Rooms) x 550 DGSF = 12,650 DGSF

**Total Inpatient Beds** 1,600 DGSF + 12,650 DGSF = 14,250 DGSF

**Departmental Totals:** For the 25 Bed CAH – 44,448DGSF

**Building Total:** For the 25 Bed CAH 44,448 DGSF x 1.30 grossing factor (space for mechanical chases, public toilets, elevators, etc.) = 57,782 square feet.

These standard sizes are used to develop block diagrams which lead to floor plans.

## Department of Health and Human Services - Office of Engineering Services

### CAH Hospital Space Standards

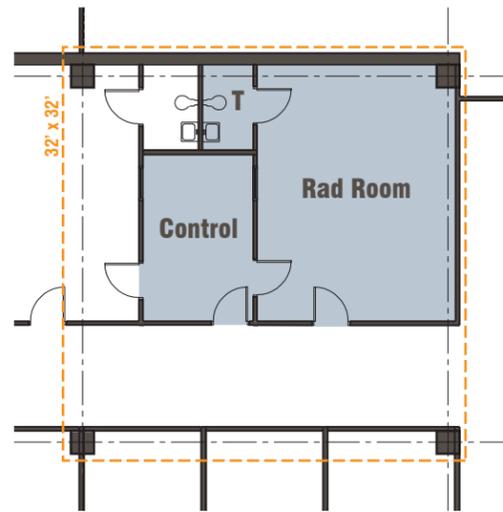
#### "Rules of Thumb" for Estimating "Gross" Space Needs

Hospital Service		Space Driver	Rules of Thumb				25 BED			15 BED		
			Square Feet				Square Feet			Square Feet		
			Min	Norm	High	Driving Unit	Norm	Units	Driving Unit	Norm	Units	Driving Unit
<b>Inpatient Beds</b>												
OB: LDR or LDRP	LDR		700	800	900	DGSF/Bed	1600	2	DGSF/Bed	0	0	DGSF/Bed
Psych & Chemical Dependency	Beds		500	600	700	DGSF/Bed			DGSF/Bed			DGSF/Bed
Skilled Nursing/Transitional Care	Beds		450	550	600	DGSF/Bed	12650	23	DGSF/Bed	8250	15	DGSF/Bed
Rehabilitation	Beds		500	600	700	DGSF/Bed			DGSF/Bed			DGSF/Bed
							14,250			8,250		
<b>Diagnostic &amp; Treatment</b>												
Emergency Services	Trx Sns		450	600	800	DGSF/Trx Station	3600	6	DGSF/Trx Station	3600	6	DGSF/Trx Station
Laboratory	Beds		20	30	40	DGSF/Bed	750	25	DGSF/Bed	750		DGSF/Bed
Pharmacy												
	Inpatient Beds		9	11	13	DGSF/Bed	275	25	11 DGSF/Bed	275		11 DGSF/Bed
Radiology/Medical Imaging												
	R & F Equip		800	1100	1500	DGSF/Room	1100	1	DGSF/Room	1100	1	DGSF/Room
	CT Equip		1200	1500	2000	DGSF/Room	1500	1	DGSF/Room	1500	1	DGSF/Room
	Ultrasound Equip		600	800	1200	DGSF/Room	800	1	DGSF/Room	800	1	DGSF/Room
	Mammography Equip		600	800	1000	DGSF/Room	800	1	DGSF/Room	800	1	DGSF/Room
Rehab Services												
	PT/OT/Other/Speech/Audiology Stations		300	400	500	DGSF/Trx Station	400	1	DGSF/Trx Station	400	1	DGSF/Trx Station
	Cardiac Rehab Stations		300	400	500	DGSF/Trx Station			DGSF/Trx Station			DGSF/Trx Station
Surgery												
	Inpatient Surgery Theatre's		2900	3100	3500	DGSF/OR	6200	2	DGSF/OR	6200	2	DGSF/OR
	Outpatient Surgery Theatre's		2800	3000	3500	DGSF/OR			DGSF/OR			DGSF/OR
							15,425			15,425		
<b>Outpatient</b>												
Clinics	Exam Rooms		400	500	600	DGSF/Room	4000	8	DGSF/Room	4000	8	DGSF/Room
Physician Offices	Physicians		200	240	300	DGSF/Physician	960	4	DGSF/Physician	960	4	DGSF/Physician
<b>Administration</b>												
Administration	FTE's		260	275	300	DGSF/FTE	825	3	DGSF/FTE	825	3	DGSF/FTE
Business Office	FTE's		135	160	210	DGSF/FTE	320	2	DGSF/FTE	320	2	DGSF/FTE
Conference	Rooms		300	400	500	DGSF/FTE	400	1	DGSF/FTE	400	1	DGSF/FTE
Data Processing	FTE's		135	160	210	DGSF/FTE	320	2	DGSF/FTE	320	2	DGSF/FTE
Human Resources	FTE's		135	160	210	DGSF/FTE	320	2	DGSF/FTE	320	2	DGSF/FTE
Infection Control	FTE's		135	160	210	DGSF/FTE	160	1	DGSF/FTE	160	1	DGSF/FTE
Information Services	FTE's		135	160	210	DGSF/FTE	160	1	DGSF/FTE	160	1	DGSF/FTE
Medical Records	FTE's		150	180	190	DGSF/FTE	360	2	DGSF/FTE	360	2	DGSF/FTE
Medical Library			150				150	1		150	1	
							3015					
<b>Support</b>												
Admitting/Waiting/Registration	FTE's		150	160	175	DGSF/FTE	320	2	DGSF/FTE	320	2	DGSF/FTE
Central Sterile Processing	Theatres		600	700	800	DGSF/OR	1400	2	DGSF/OR	1400	2	DGSF/OR
Employee/Staff Lockers/Showers	Total FTE's		0.2	0.3	0.37	SF/TOTAL FTE'S	336		DGSF/TOTAL FTE'S	336		DGSF/TOTAL FTE'S
Employee/Staff Lounge	Total FTE's		0.53	0.6	0.7	DGSF/FTE	192		DGSF/FTE	192		DGSF/FTE
Engineering Services	Total Facility DGSF		750	1000	1250	BGSF/DGSF	1300		BGSF/DGSF	1300		BGSF/DGSF
Food Services: Kitchen	Beds		40	50	55	DGSF/BED	1250	25	DGSF/BED	1250		DGSF/BED
Food Service: Dining	Beds		20	25	30	DGSF/BED	625	25	DGSF/BED	625		DGSF/BED
Housekeeping/Enviro. Services	Beds		15	15	15	DGSF/BED	375	25	15 DGSF/BED	375		15 DGSF/BED
Linen (Clean/Soiled)	Beds		11	12	13	12 DGSF/BED	300	25	12 DGSF/BED	300		12 DGSF/BED
Material Mgmt: Purchasing	Beds		24	28	35	DGSF/BED	700	25	DGSF/BED	700		DGSF/BED
							14,773			14,773		
<b>Departmental Totals</b>							44448			38448		
<b>Grossing Factor</b>							1.30			1.30		
<b>Building Total</b>							57,782			49,982		

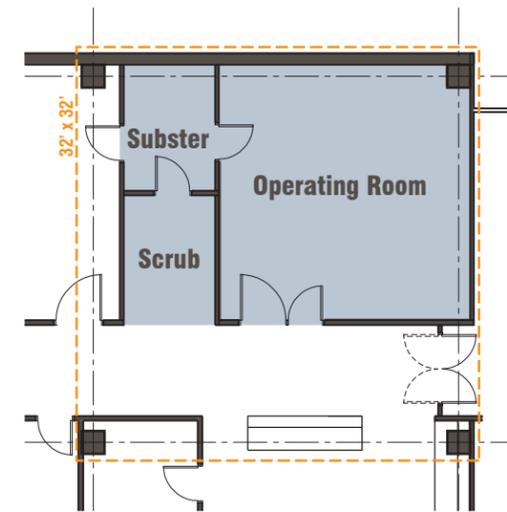
## CRITICAL ACCESS HOSPITAL PROTOTYPE

## UNIVERSAL HEALTHCARE SPACE 32' MODULE

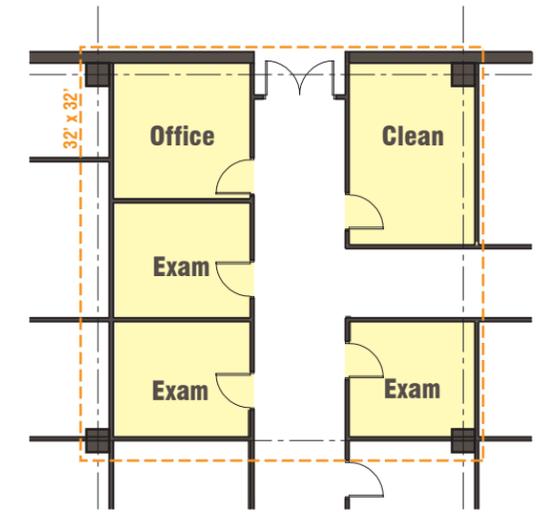
Development of a flexible and a universal space module to accommodate changes to diagnostic and treatment modalities and to enable growth and change for all functions.



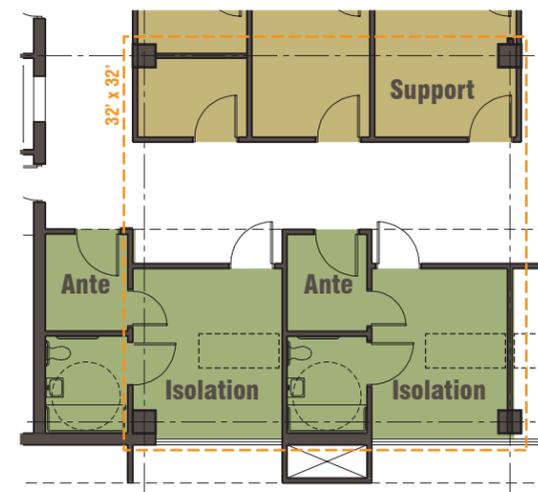
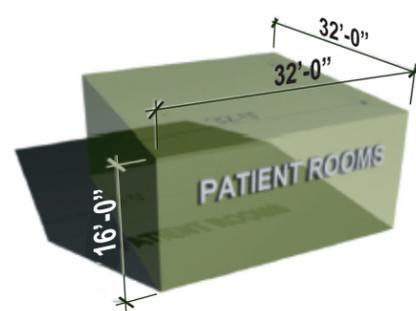
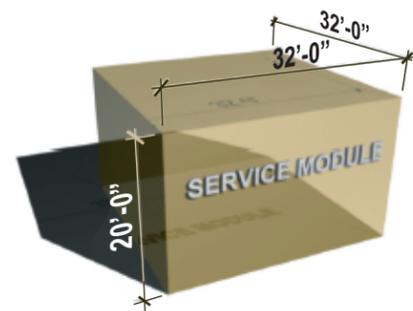
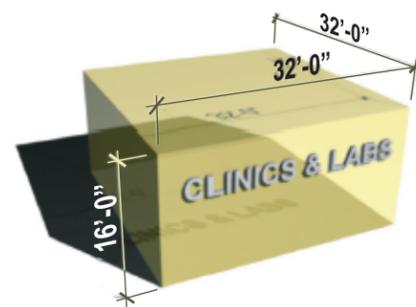
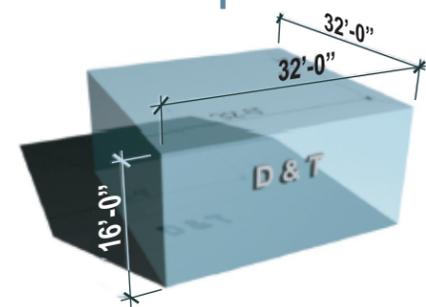
Radiology Room Layout



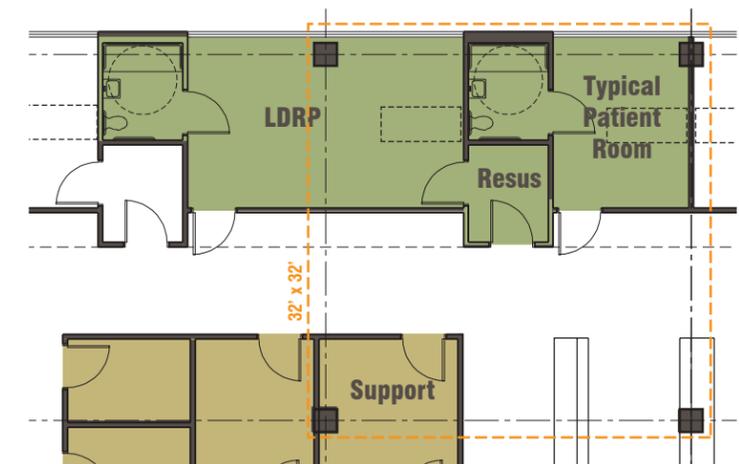
Operating Room Layout



Clinic Layout



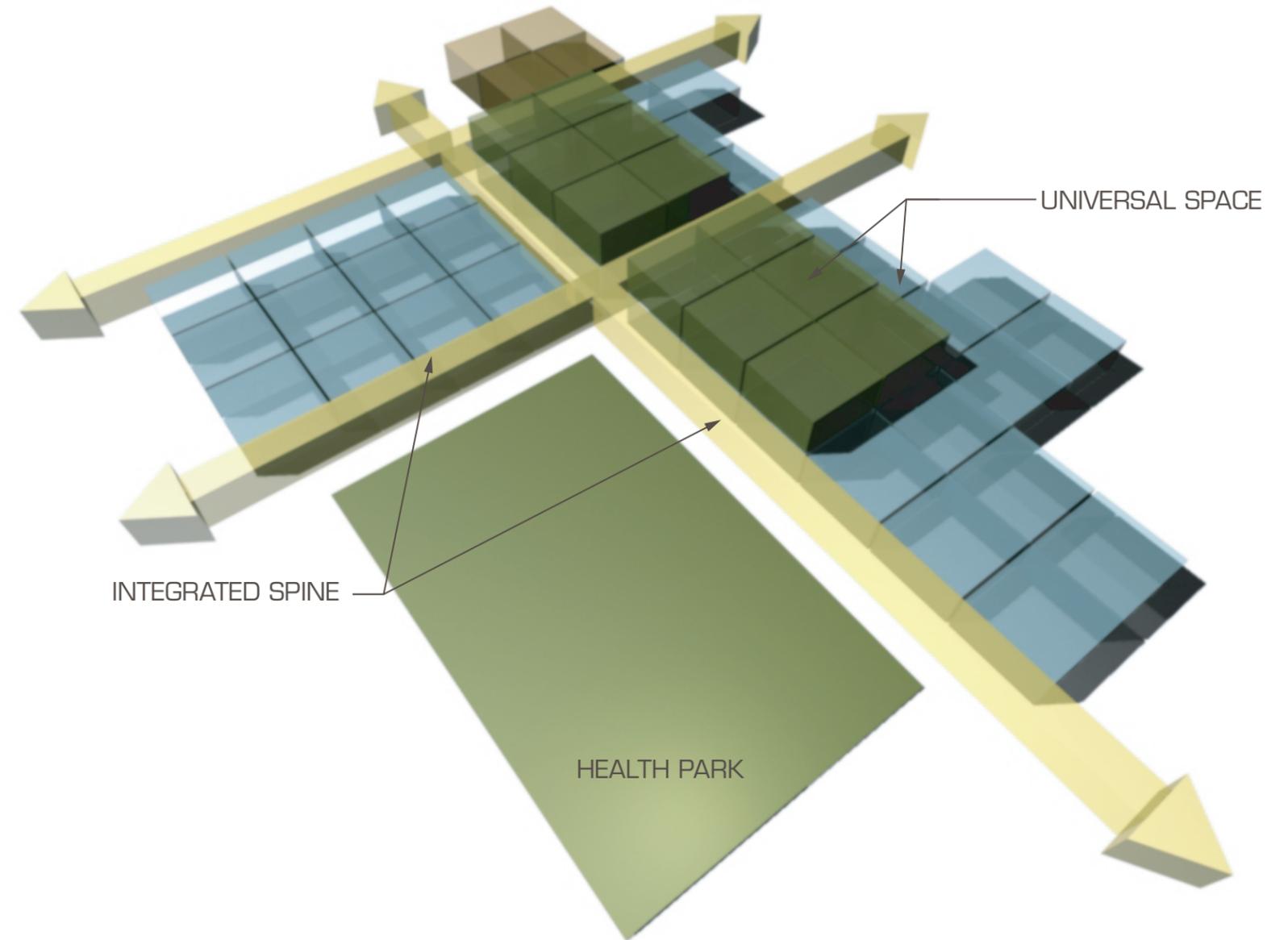
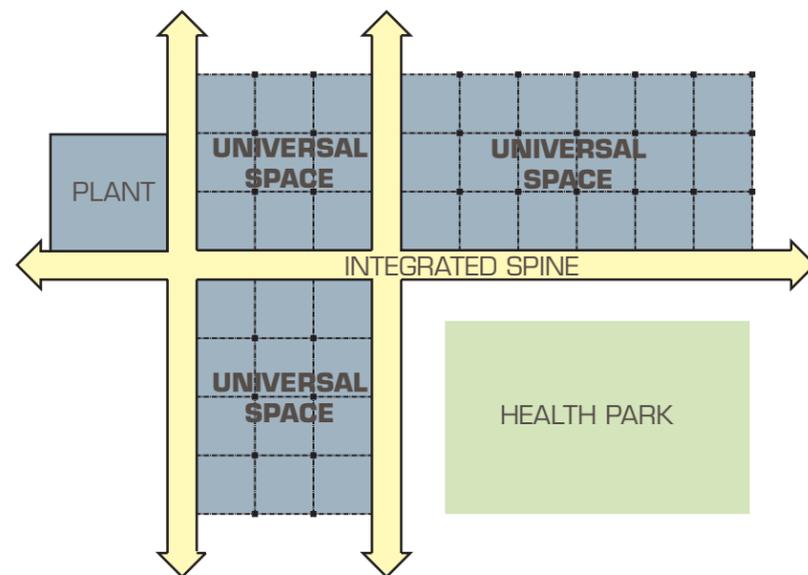
Isolation Room Layout



Typical Patient & LDRP Room Layout

## SYSTEM LAYOUT

- Spine: A two story 32' x 20' system designed as a circulation and distribution channel (for mechanical, plumbing/fire protection, electrical, and electronic systems) carries all infrastructure components horizontally and vertically from the point of service (power plant and roof top) to clinical, administrative/public, nursing units and non-clinical of the building; and serves as a public connector to all medical, administrative and service components of the building.
- Universal Space: The clinical area is framed by a 32' x 32' x 16' (high) structural grid that allows space for horizontal and vertical growth and change. Level two clinical (nursing) is framed as a 32' x 32' x 16' system that aligns with that of the first floor and is designed to expand vertically (for future bed unit) and horizontally to the east to accommodate incremental growth of the proposed nursing unit.



## INTEGRATED SPINE - CIRCULATION

### Outside Entry Points

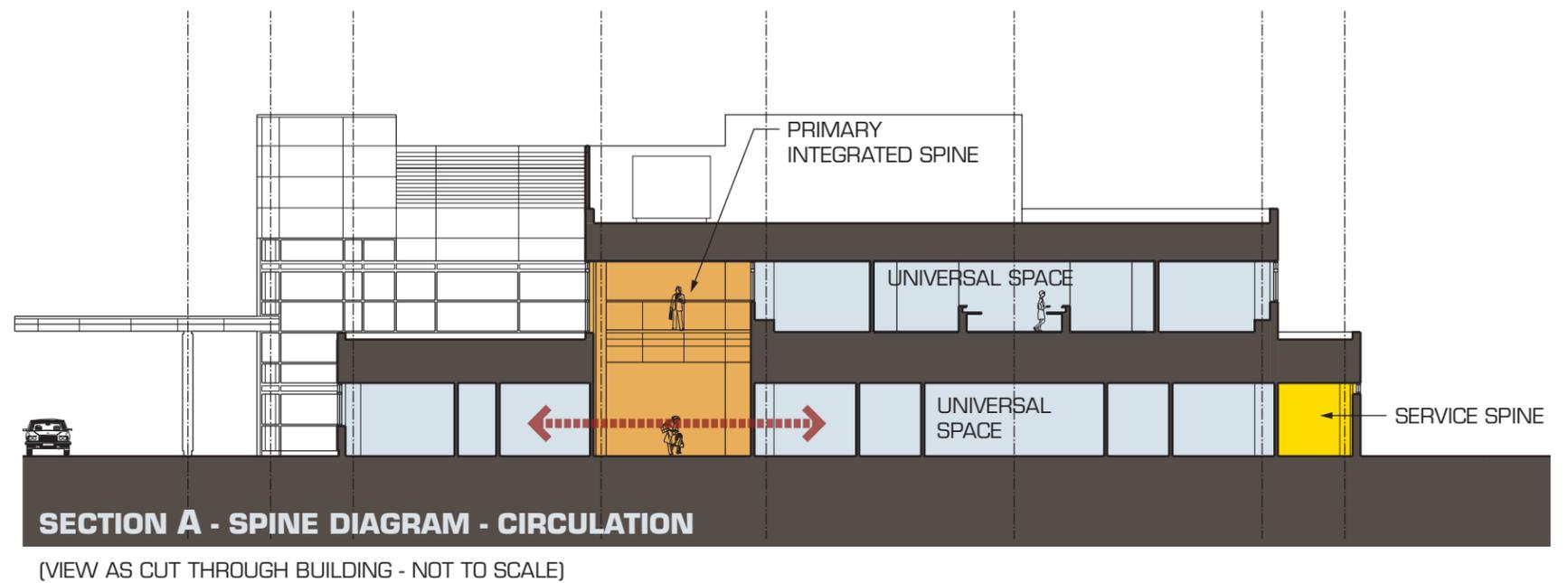
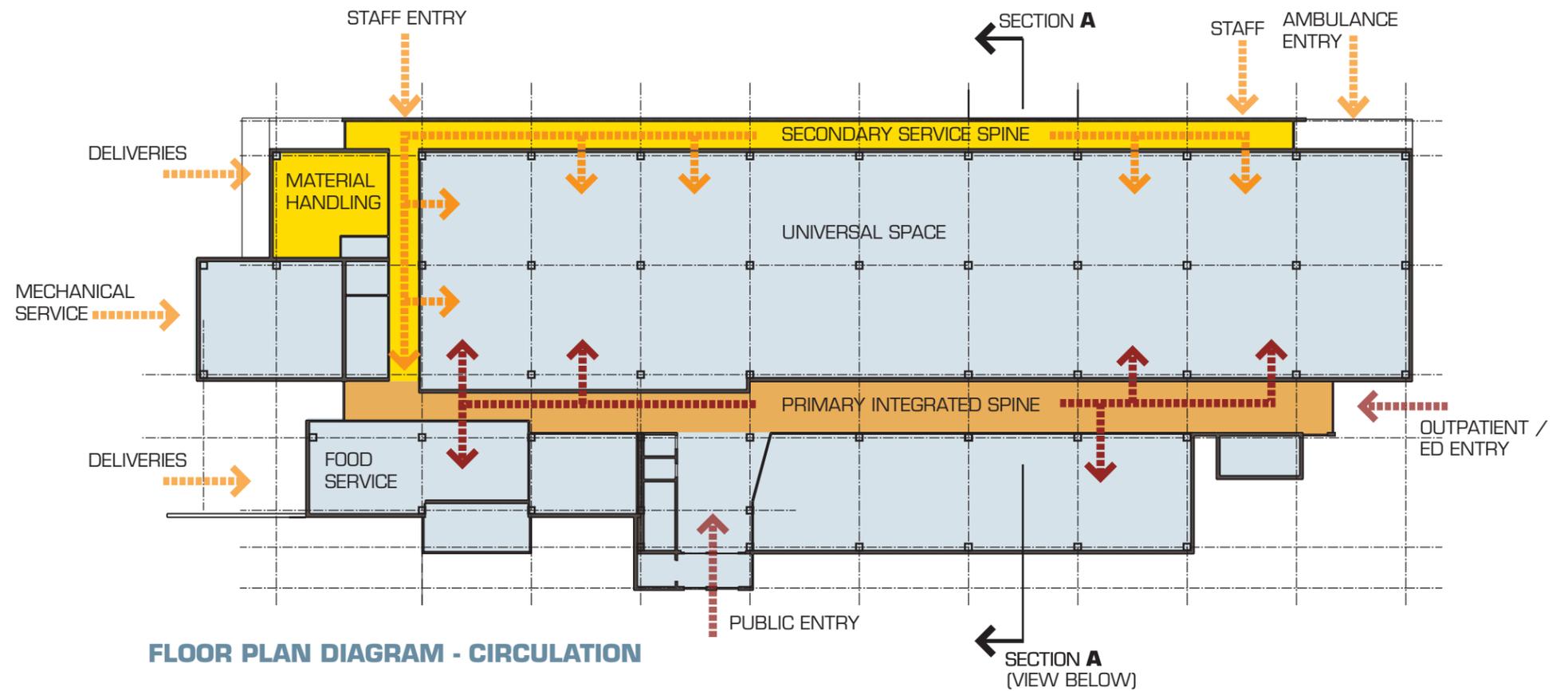
- Segregation of visitors, outpatients, staff, service & emergency intake.
- Clearly identifiable and convenient entry points (planning, design and signage) for visitors, emergency, outpatient, staff and service.
- Segregation of service and public traffic.

### Way Finding

- Segregation of functions convenient and clearly identifiable to visitors & patients.
- Signage should serve to augment good planning and design and not relied upon as the sole solution for way finding.

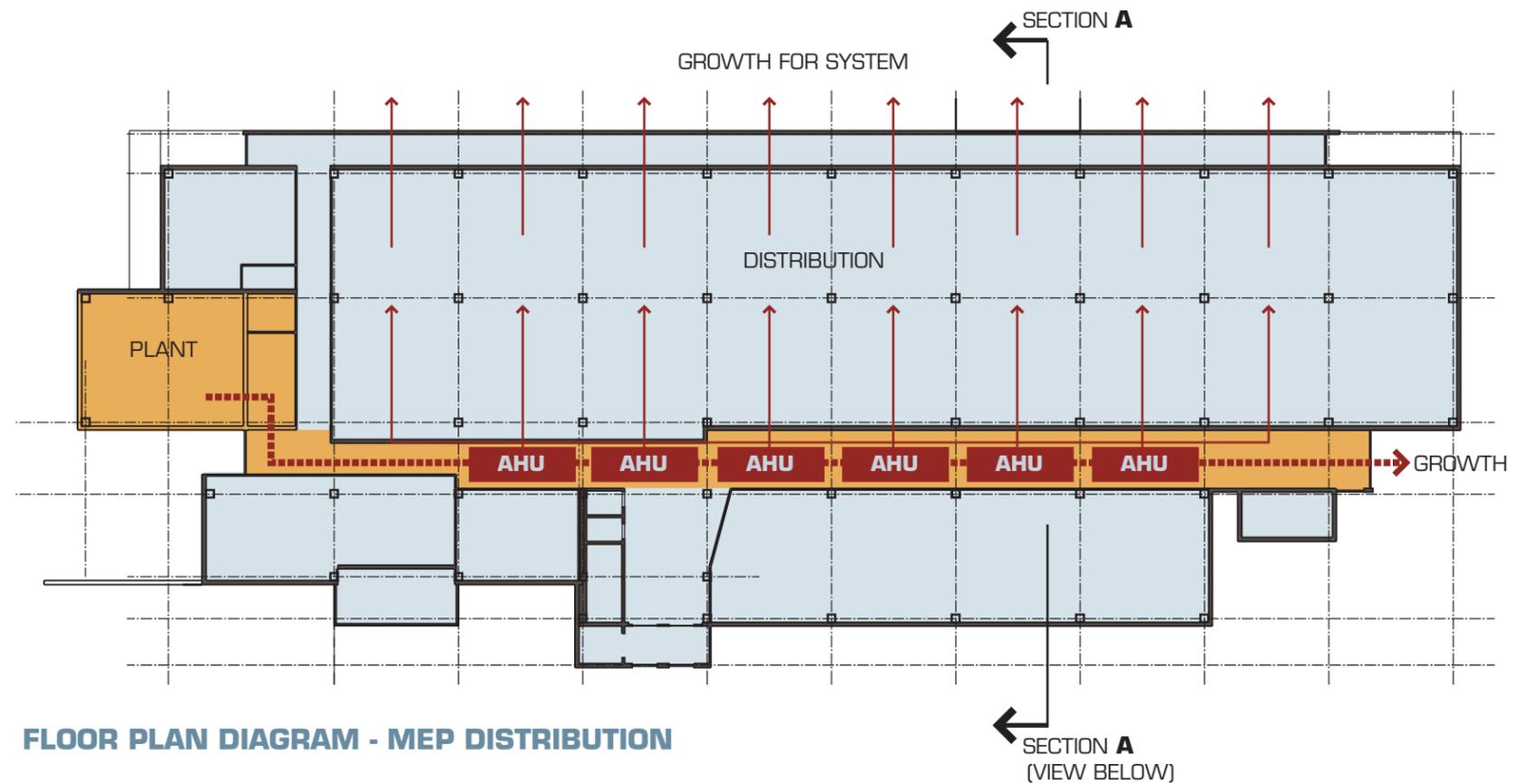
### Internal Circulation

- Separation of patient transport (beds/stretchers) from public and outpatient traffic.
- Minimization of cross traffic between service/materials, patients and visitors.
- Minimization of travel distances for outpatients, bed transport, service transport, and staff.

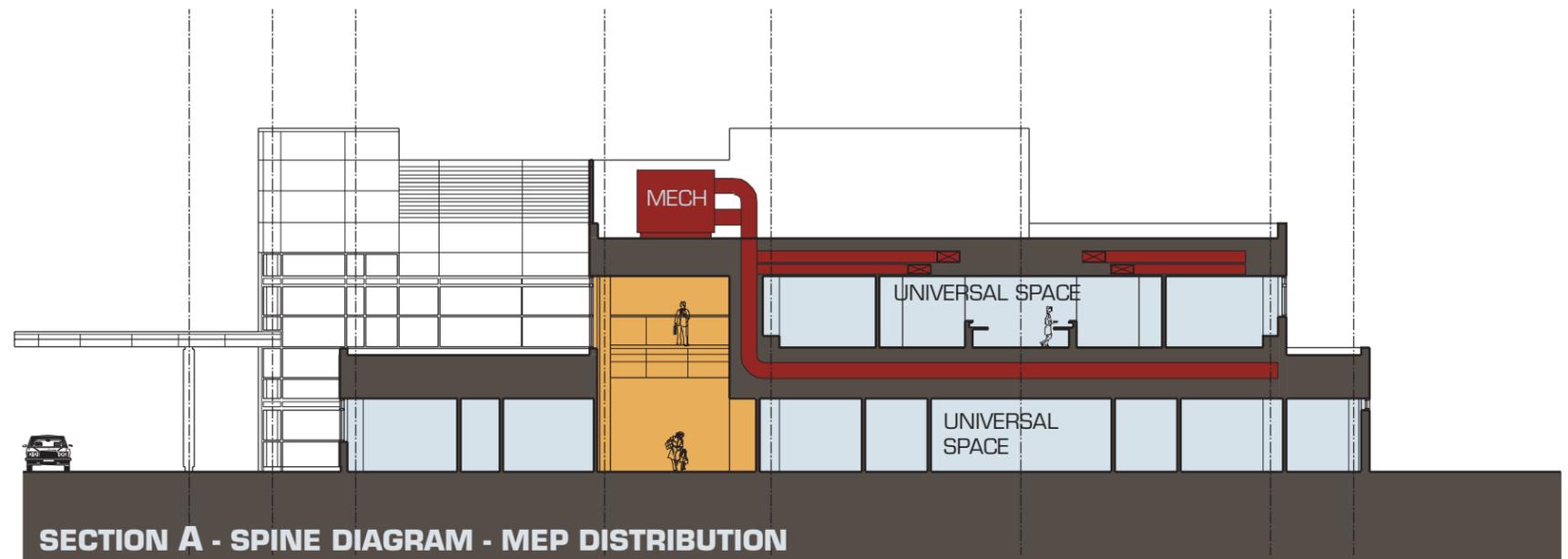


## INTEGRATED SPINE - MECHANICAL, ELECTRICAL, & PLUMBING DISTRIBUTION

- Provide for direct runs for main feeds (mechanical, electrical, plumbing, fire protection, IT)
- Plan for expandability of energy plant and major feeds with minimal operational disruption of site and functions.
- Structural- simplified layout and consistent bay spacing for medical, administrative, support functions.
- Plan for future expansion of systems (horizontal and vertical).
- Cost efficiency in planning/design (e.g. structural bays, HVAC, plumbing, etc).
- Reduction of maintenance requirements through the use of materials, systems and planning.
- Accessibility of systems for change, growth and maintenance.



FLOOR PLAN DIAGRAM - MEP DISTRIBUTION

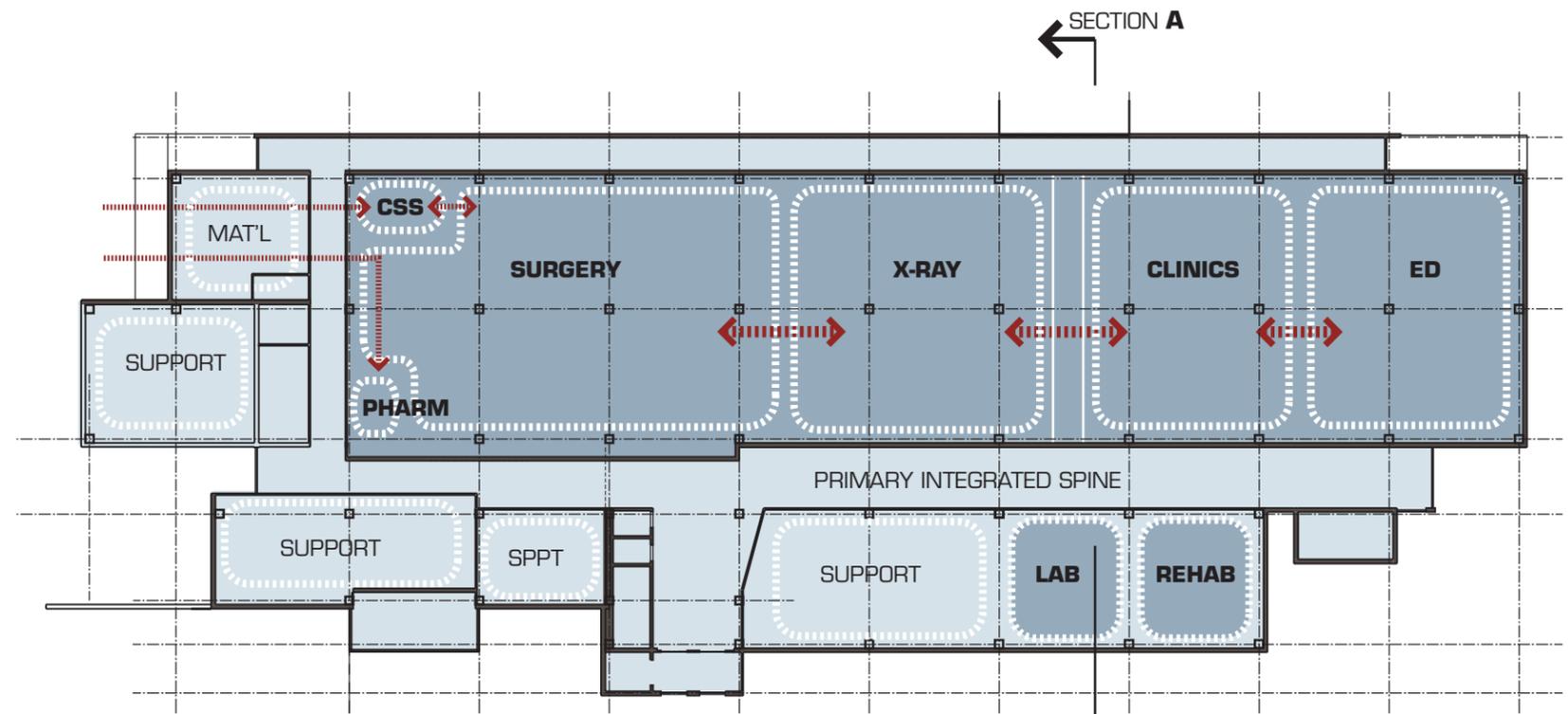


SECTION A - SPINE DIAGRAM - MEP DISTRIBUTION

(VIEW AS CUT THROUGH BUILDING - NOT TO SCALE)

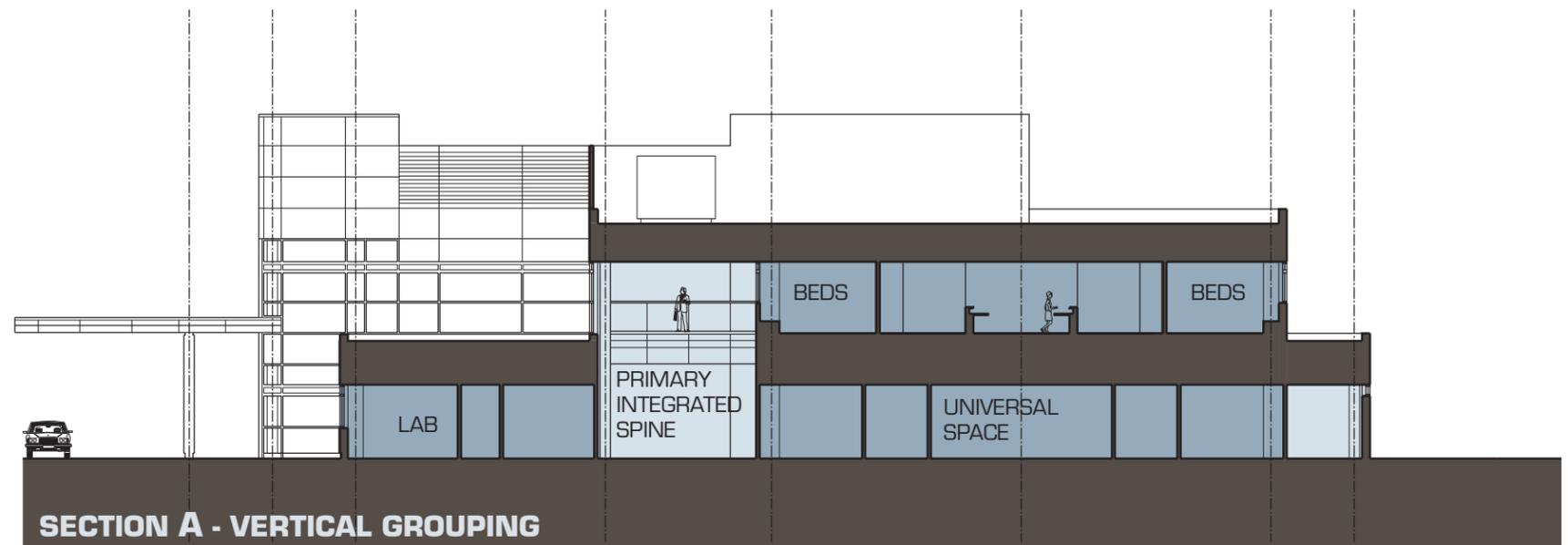
## SPACE UTILIZATION

- Space zoning to centralize like functions (service, diagnostic and treatment, administrative, public).
- Development of a flexible and a universal space module (to accommodate changes to diagnostic and treatment modalities while minimizing operational disruption and cost).
- Development of a space planning module (to enable growth and change for all functions).
- Segregation of service and public traffic.
- Accommodation for mobile technologies (e.g. Mammography, CT, MRI, Lithotripter, etc) that are conveniently located for Outpatient/Inpatient access and proximate to related Departments (e.g. Radiology, Clinics, etc).
- Planning/design that promotes patient privacy and dignity.
- Enabling of operational efficiency :
  - Centralization of functions
  - Selection of materials and systems
  - Reduced redundancy (space, equipment, and FTEs)
  - Leverage scarce resources (physicians, nursing, technicians, therapists, etc)
  - Promotion of a healing environmental (addressing light, view, sound, green space, etc)



**FLOOR PLAN DIAGRAM - HORIZONTAL GROUPING**

SECTION A  
(VIEW BELOW)



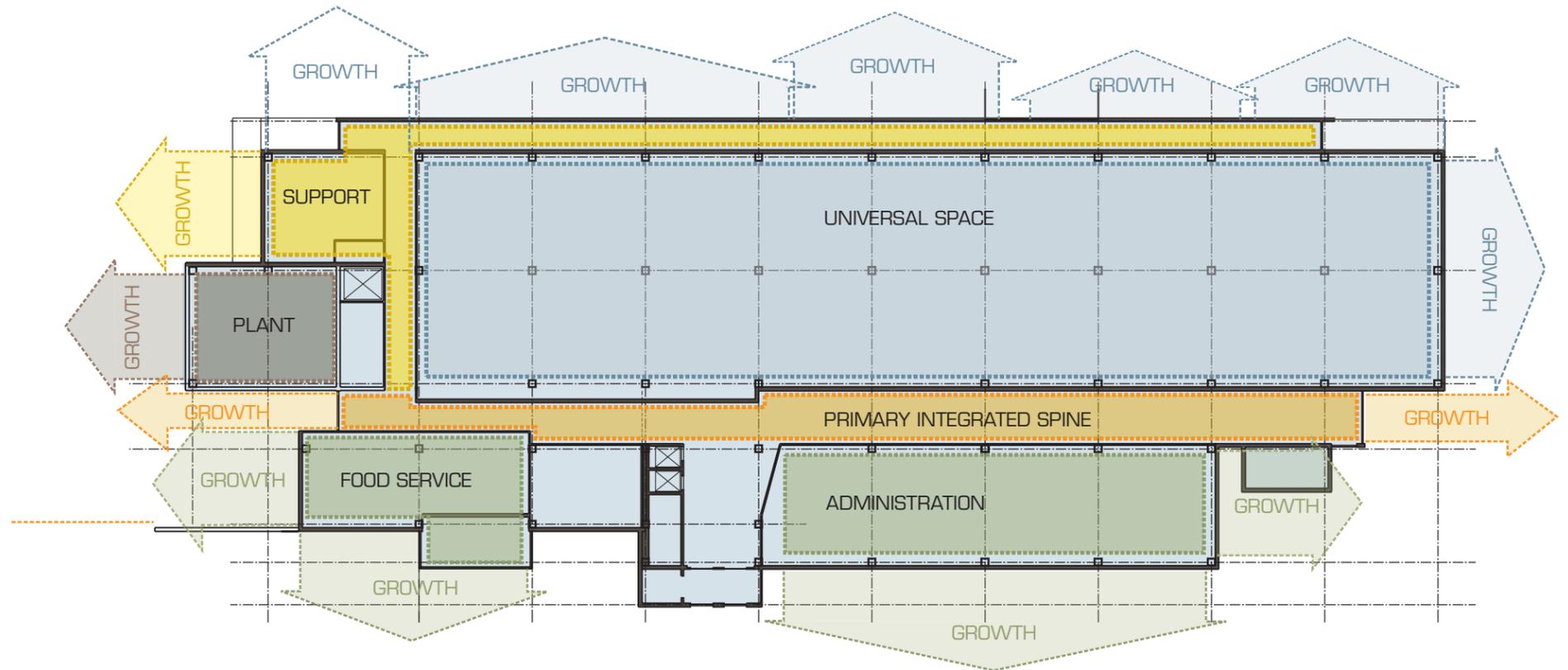
**SECTION A - VERTICAL GROUPING**

(VIEW AS CUT THROUGH BUILDING - NOT TO SCALE)

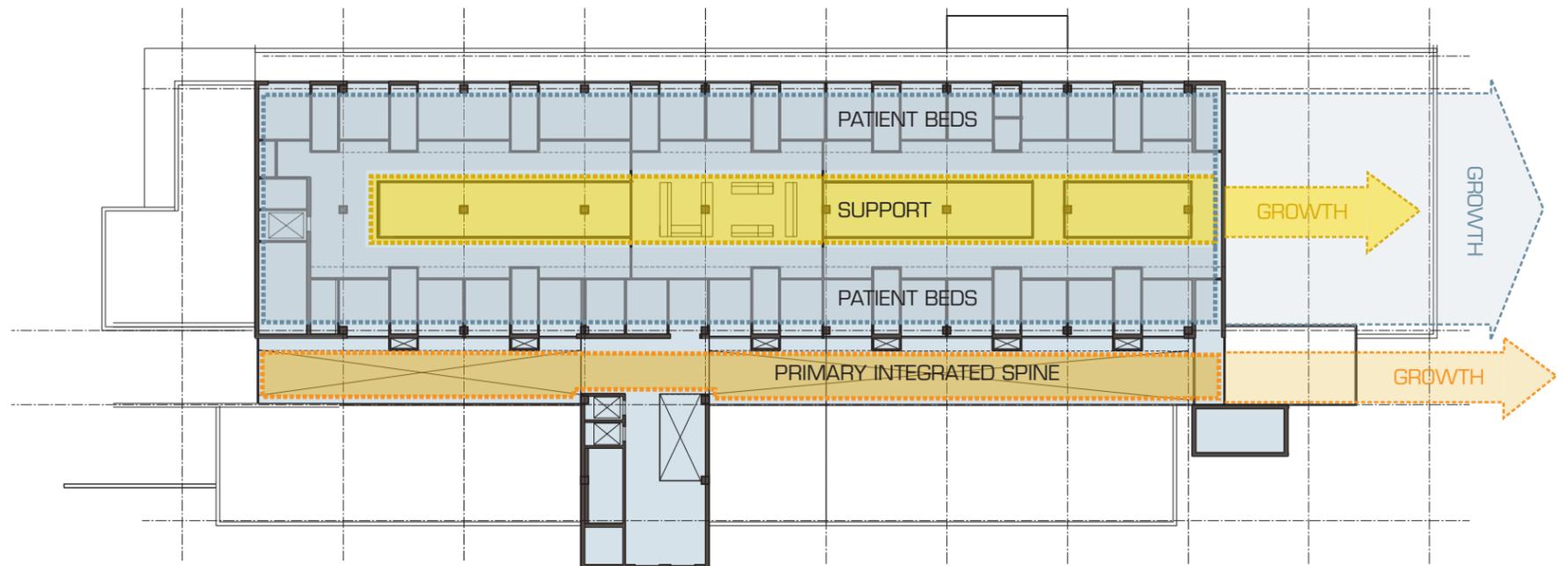
## FLEXIBILITY

### ACCOMODATION FOR FUTURE GROWTH AND CHANGE

- Horizontal Growth (clinical programs)
  - Clinical Functions: Clinical space is designed on a 32 x 32 ft grid structured to enable incremental expansion in the future.
  - Primary Spine: The spine is designed as a 32 x 20 ft grid that can expand incrementally to the east and west to accommodate changing space and program needs. The spine houses fixed elements including mechanical, electrical plumbing lines and primary public circulation pathway.
- Horizontal Growth (support functions)
  - Material management and plant engineering and other support functions can expand incrementally to the north and west.
  - Administration, business office and allied health functions can expand incrementally to the east and south.
  - Dietary (kitchen and dining) and public space (lobby, toilets, etc) can expand incrementally to west and south.
- Vertical Growth:
  - Level 2 Nursing Floor will be structured to enable to accommodate an additional bed floor above.
  - Mechanical Units serving the second level bed unit are placed above the spine to enable ongoing operation of the proposed medical unit during expansion. Units would be relocated to the roof of the future bed unit to so not to obstruct view from future patient rooms.
  - Level 1 single story clinical space will be structured to enable horizontal growth for bed floor above.



FIRST FLOOR PLAN DIAGRAM - FLEXIBILITY



SECOND FLOOR PLAN DIAGRAM - FLEXIBILITY

# HEALTH PARK SITE PLAN

## TWO STORY SCHEMES

The CAH prototype was conceived as a Health Park. The health park concept attempts to be a restorative environment for building occupants, the surrounding community, the global community and natural resources.

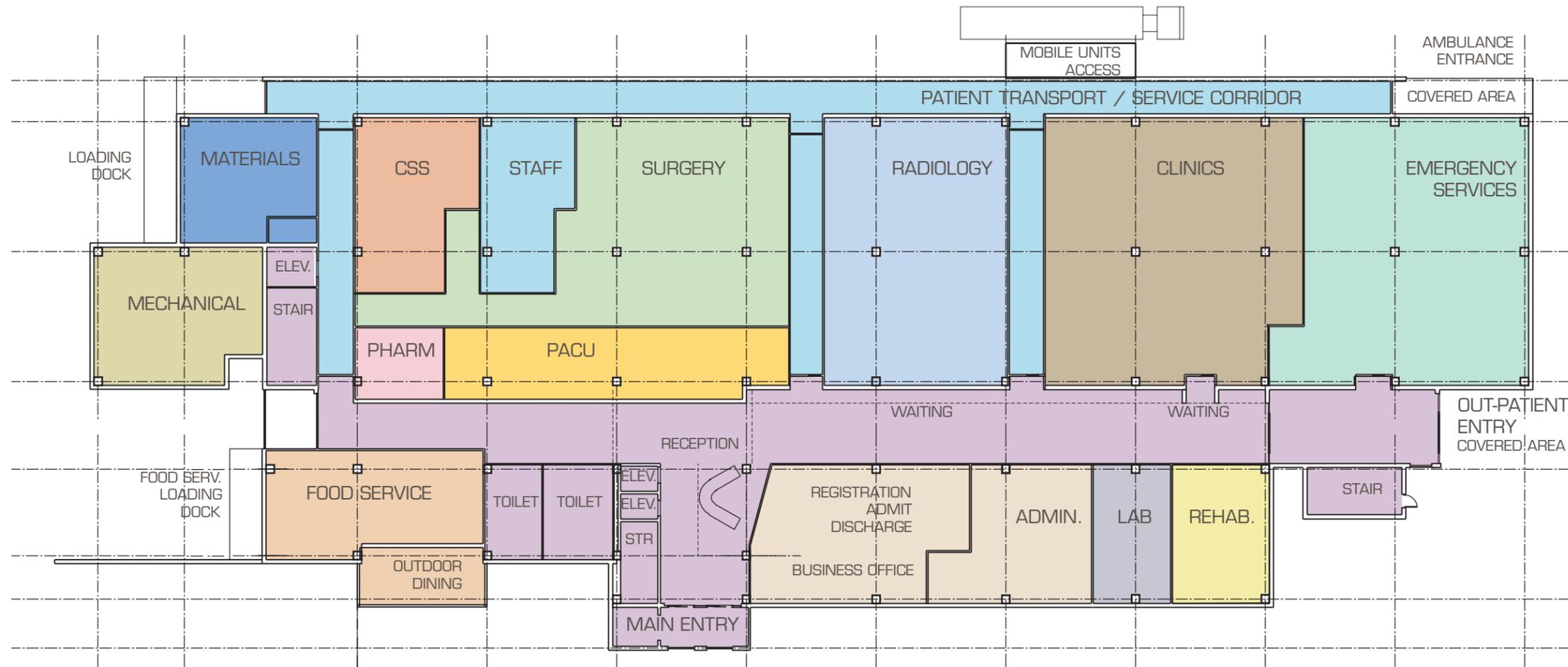
The complex provides a walking loop for the community as well as rehabilitation patients. The path circulates around constructed wetlands that empty into a water retention pond. The pond provides an opportunity for respite connecting visitors to the natural environment. Water captured in the pond provides non-potable water collection for reuse in cooling equipment or irrigation. Surrounding plantings will utilize native, non-invasive, water-efficient landscaping.

The walking path is connected to sidewalks that provide opportunities for alternate transportation (i.e. mass transportation, bicycles). Large shade trees reduce the heat islands created by expansive parking lots. Parking is relegated mainly to one edge of the building so that the site can be preserved along the other edges. The natural preserves serve as opportunities to connect patients to the surrounding landscape through views.



# DEPARTMENTAL BLOCK PLAN: FIRST FLOOR

SCHEME A  
2 STORY 25 BEDS



0 16' 32' 64'  
SCALE: 1/32" = 1'-0"

- |  |  |
|--|--|
| <span style="color: blue;">■</span> MATERIALS        | <span style="color: teal;">■</span> EMERGENCY DEPARTMENT |
| <span style="color: green;">■</span> SURGERY         | <span style="color: tan;">■</span> ADMINISTRATION        |
| <span style="color: pink;">■</span> PHARMACY         | <span style="color: orange;">■</span> FOOD SERVICE       |
| <span style="color: lightblue;">■</span> RADIOLOGY   | <span style="color: olive;">■</span> MECHANICAL          |
| <span style="color: grey;">■</span> LABORATORY       | <span style="color: purple;">■</span> PUBLIC AREA        |
| <span style="color: brown;">■</span> CLINIC          | <span style="color: lightblue;">■</span> PATIENT / STAFF |
| <span style="color: yellow;">■</span> REHABILITATION | <span style="color: orange;">■</span> CSS                |
|  | <span style="color: yellow;">■</span> PACU               |

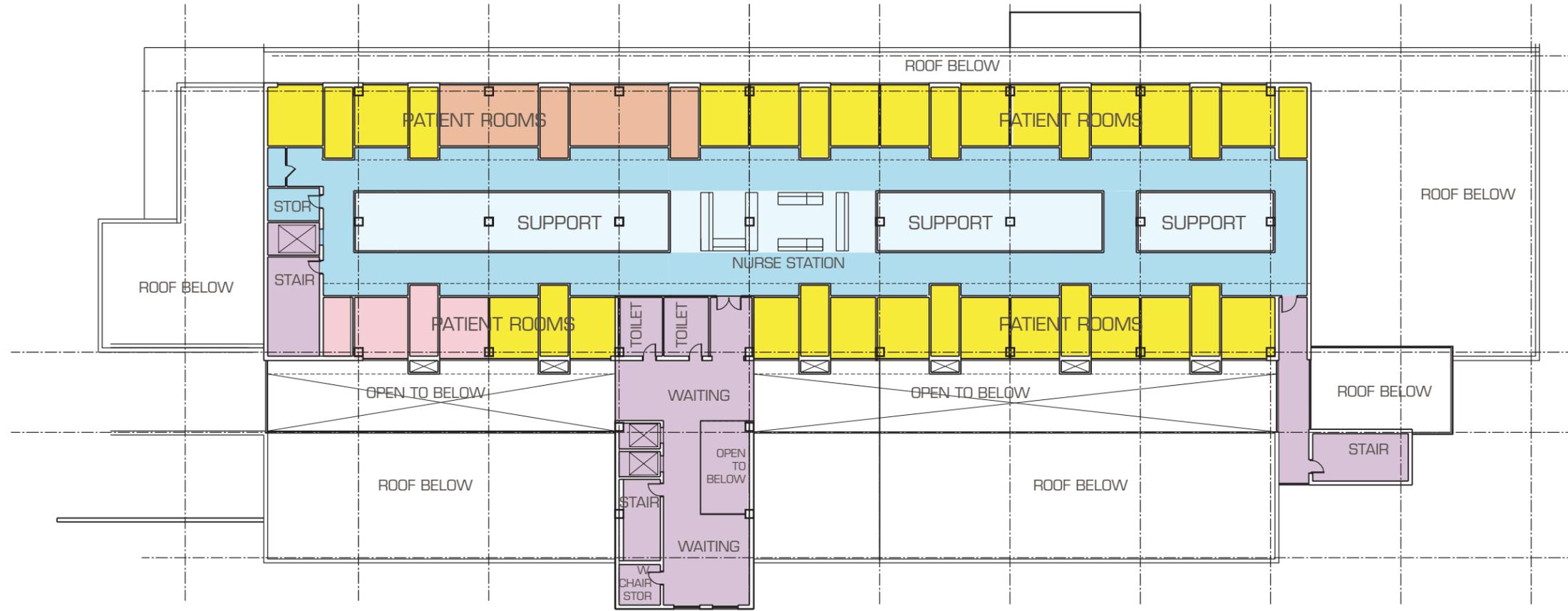
CRITICAL ACCESS HOSPITAL PROTOTYPE

PREPARED BY **BBH DESIGN**

# DEPARTMENTAL BLOCK PLAN: SECOND FLOOR

**SCHEME A**  
2 STORY 25 BEDS

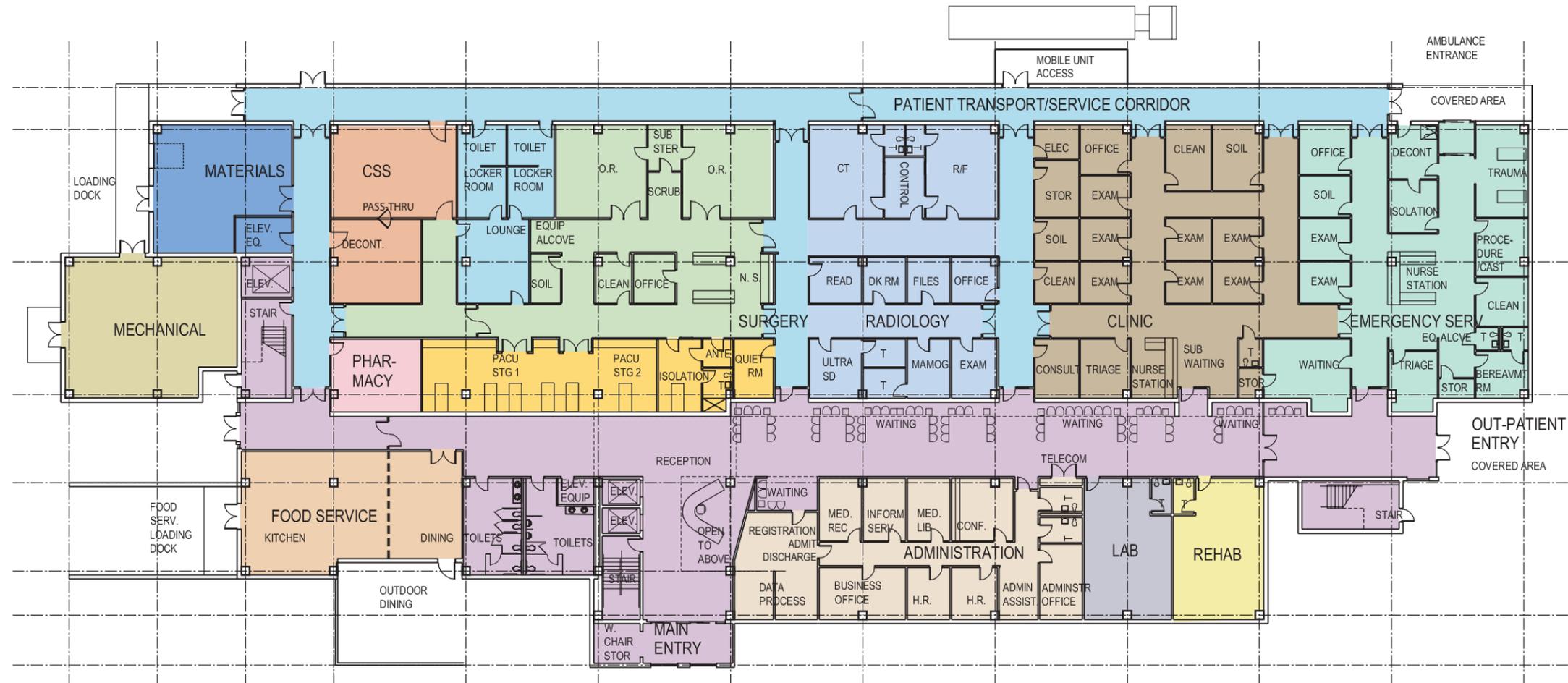
NOTE: LDRP & ISOLATION ROOMS  
ADJACENT TO PATIENT ELEVATOR



- SKILLED NURSING ROOMS
- ISOLATION ROOMS
- LDRP ROOMS
- PUBLIC AREA
- PATIENT / STAFF
- SUPPORT

# FIRST FLOOR PLAN

SCHEME A  
2 STORY 25 BEDS



- |  |  |
|--|--|
| <span style="color: blue;">■</span> MATERIALS        | <span style="color: lightgreen;">■</span> EMERGENCY DEPARTMENT |
| <span style="color: lightgreen;">■</span> SURGERY    | <span style="color: lightblue;">■</span> ADMINISTRATION        |
| <span style="color: pink;">■</span> PHARMACY         | <span style="color: orange;">■</span> FOOD SERVICE             |
| <span style="color: lightblue;">■</span> RADIOLOGY   | <span style="color: yellowgreen;">■</span> MECHANICAL          |
| <span style="color: greyblue;">■</span> LABORATORY   | <span style="color: purple;">■</span> PUBLIC AREA              |
| <span style="color: brown;">■</span> CLINIC          | <span style="color: cyan;">■</span> PATIENT / STAFF            |
| <span style="color: yellow;">■</span> REHABILITATION | <span style="color: orangebrown;">■</span> CSS                 |
|  | <span style="color: yelloworange;">■</span> PACU               |

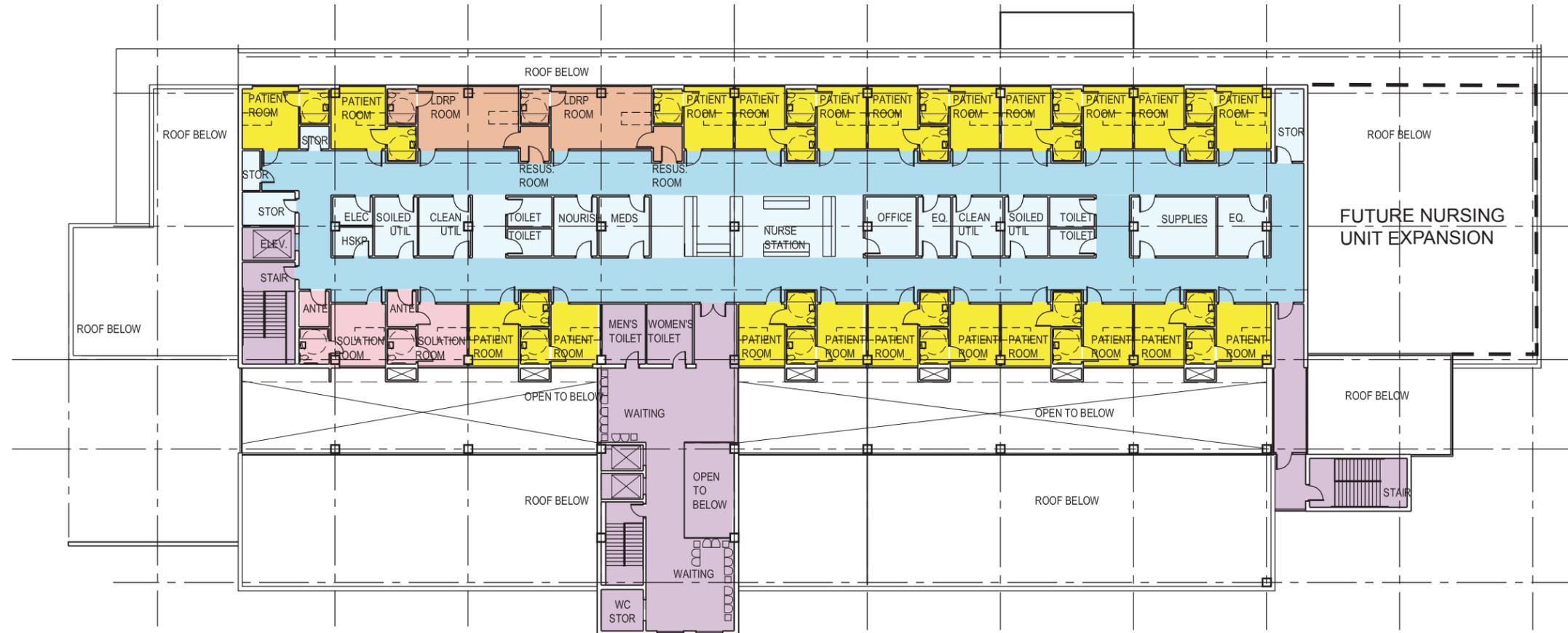
CRITICAL ACCESS HOSPITAL PROTOTYPE

PREPARED BY **BBH DESIGN**

# SECOND FLOOR PLAN

**SCHEME A**  
2 STORY 25 BEDS

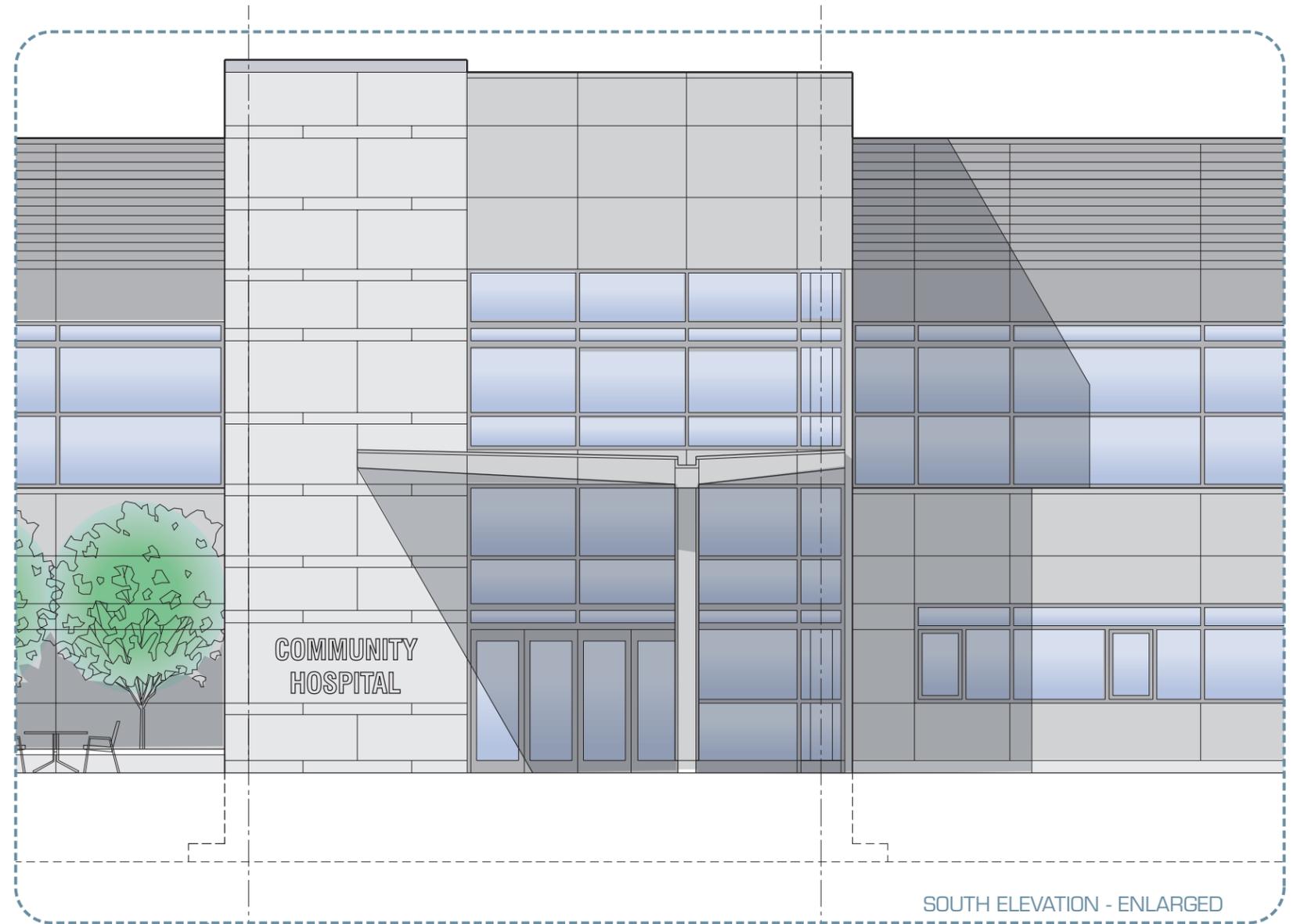
NOTE: LDRP & ISOLATION ROOMS  
ADJACENT TO PATIENT ELEVATOR



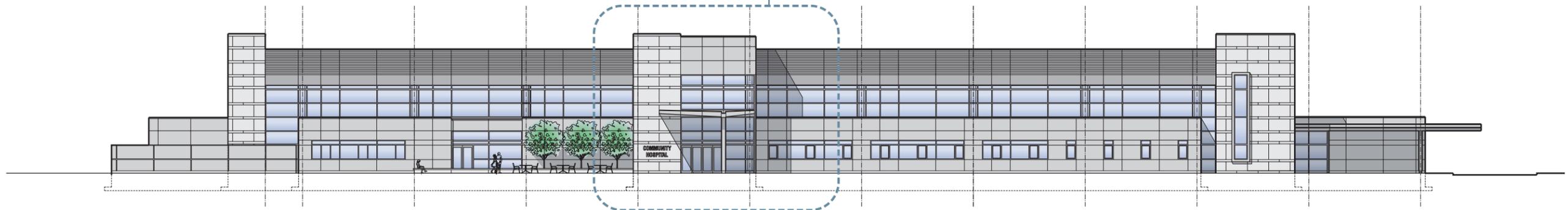
- SKILLED NURSING ROOMS
- ISOLATION ROOMS
- LDRP ROOMS
- PUBLIC AREA
- PATIENT / STAFF
- SUPPORT

# ELEVATIONS

SCHEME A  
2 STORY, 25 BEDS



SOUTH ELEVATION - ENLARGED



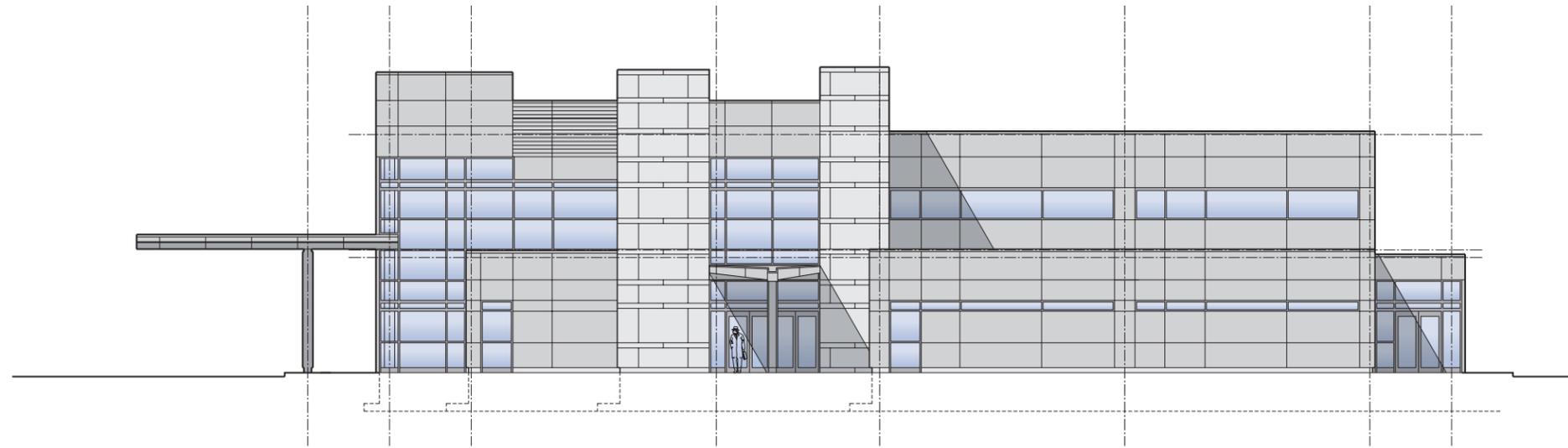
SOUTH ELEVATION

**CRITICAL ACCESS HOSPITAL PROTOTYPE**

PREPARED BY **BBH DESIGN**

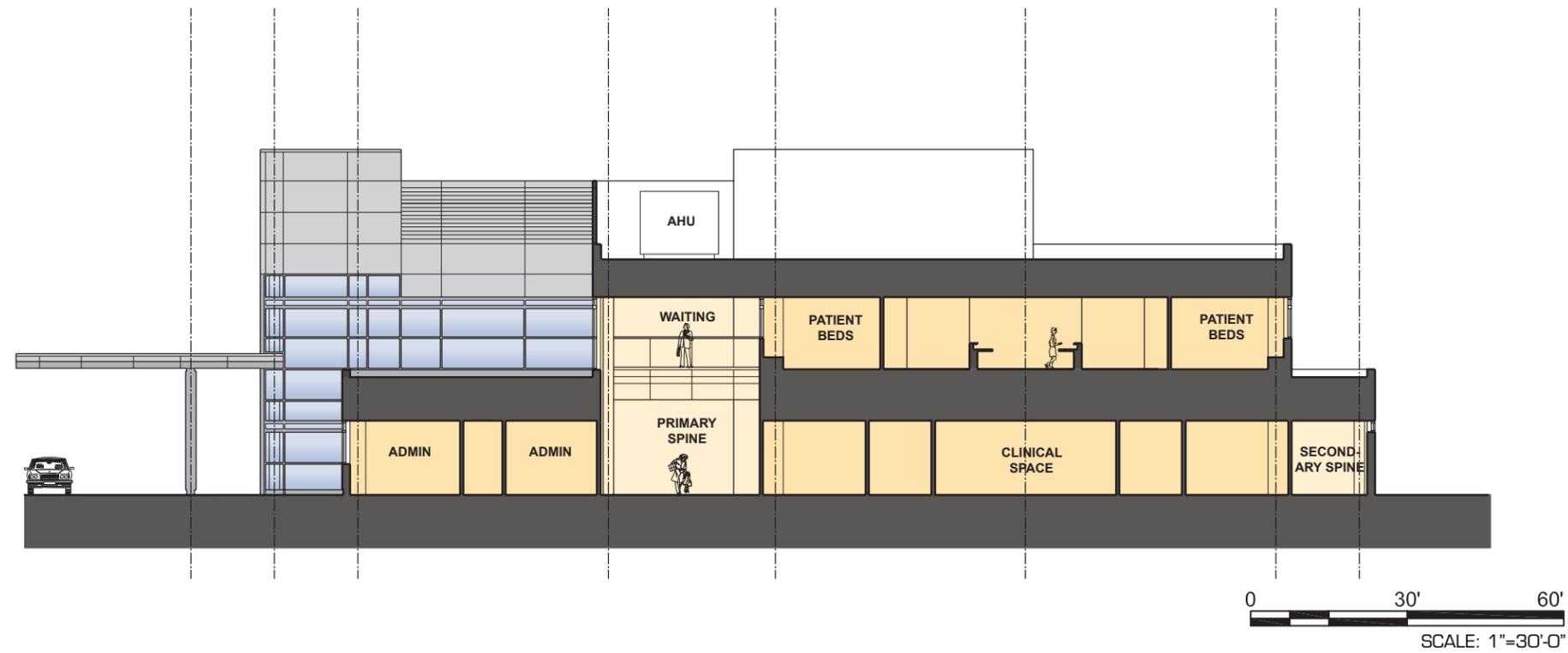
# EAST ELEVATION

2 STORY, 25 BEDS



# SECTION

2 STORY, 25 BEDS



CRITICAL ACCESS HOSPITAL PROTOTYPE

PREPARED BY **BBH DESIGN**

**RENDERING**

**SCHEME A**  
**2 STORY, 25 BEDS**



**CRITICAL ACCESS HOSPITAL PROTOTYPE**

PREPARED BY **BBH DESIGN**

**RENDERING**

**SCHEME A**  
**2 STORY, 25 BEDS**



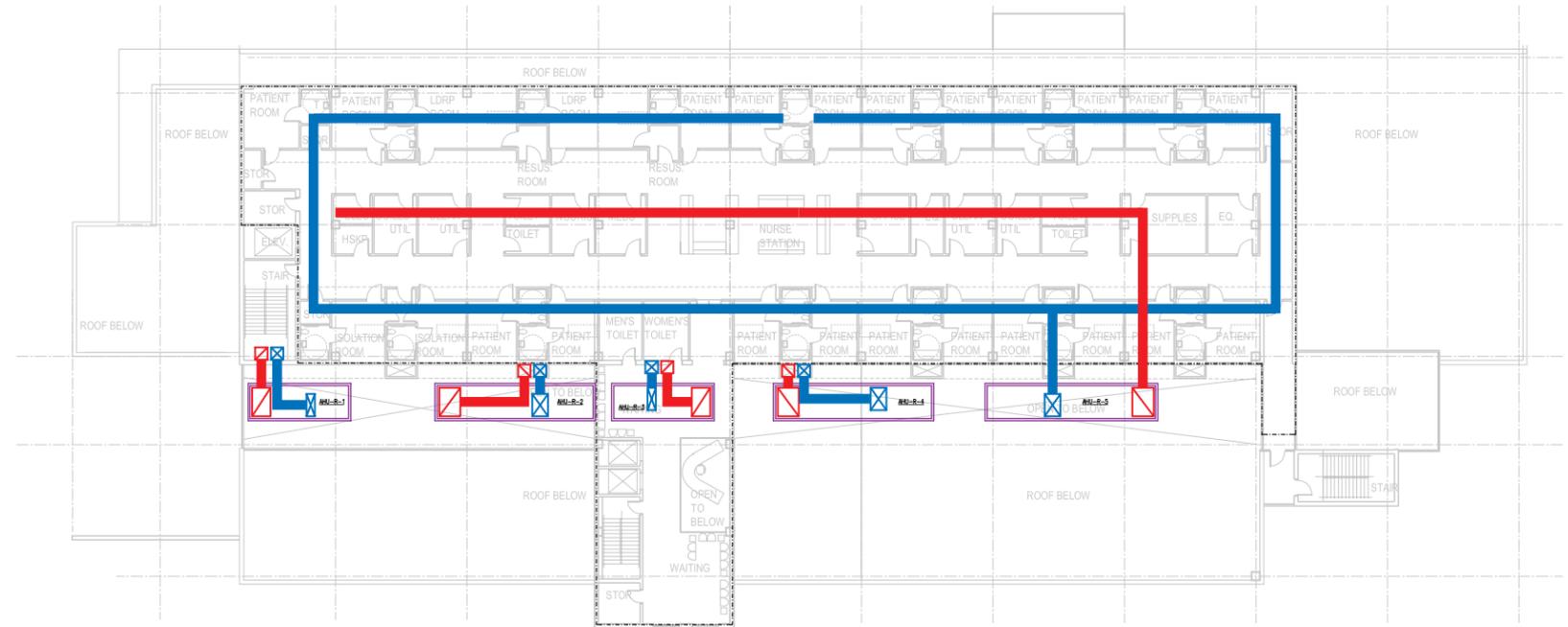
VIEW OF TWO STORY SCHEME FROM THE SOUTH

**CRITICAL ACCESS HOSPITAL PROTOTYPE**

PREPARED BY **BBH DESIGN**

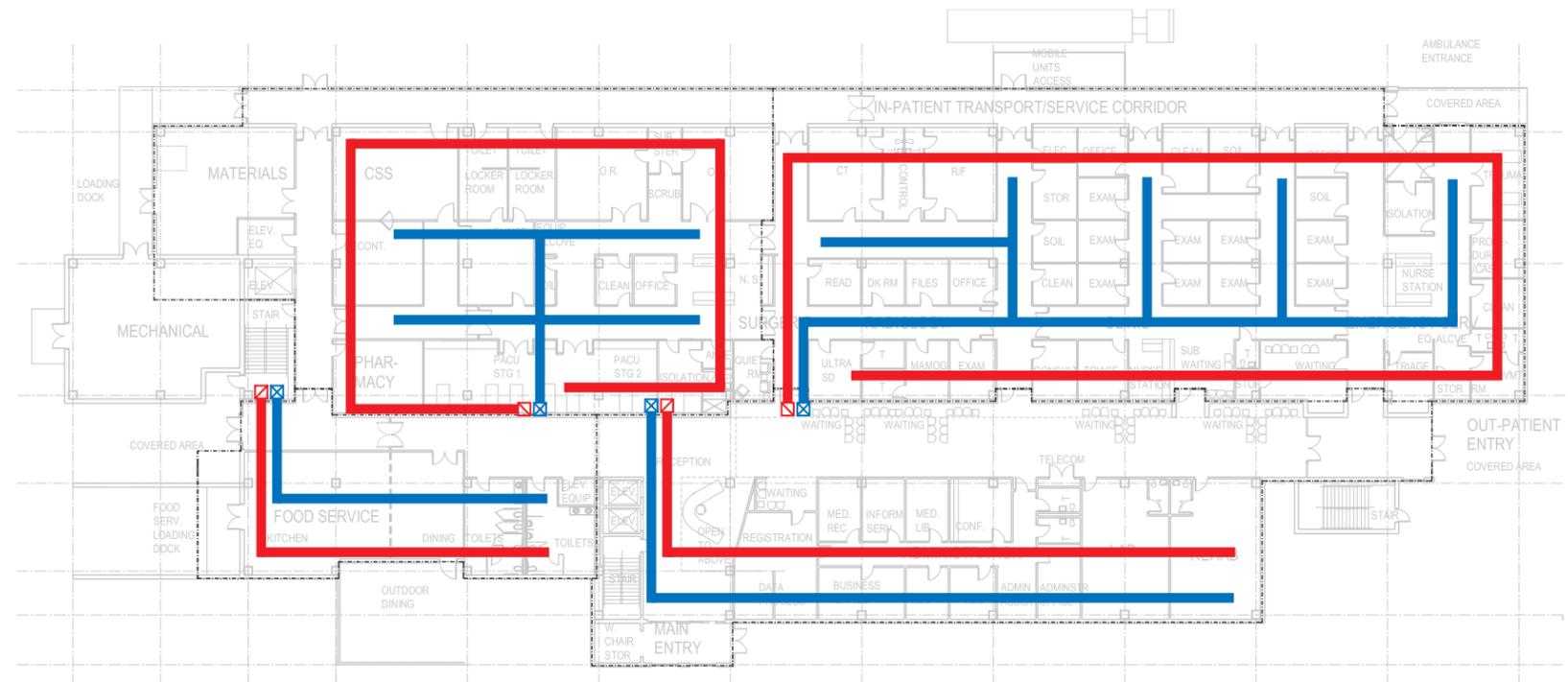
# HVAC PLANS

## SCHEME A 2 STORY 25 BEDS



SECOND FLOOR HVAC PLAN

-  RETURN AIR LINE / SHAFT
-  SUPPLY AIR LINE / SHAFT
-  AIR HANDLING UNIT ON ROOF ABOVE SPINE



FIRST FLOOR HVAC PLAN

### CRITICAL ACCESS HOSPITAL PROTOTYPE

PREPARED BY **NEWCOMB & BOYD**

# HEALTH PARK SITE PLAN

## SCHEME B 1 STORY, 25 BEDS

The CAH prototype was conceived as a Health Park. The health park concept attempts to be a restorative environment for building occupants, the surrounding community, the global community and natural resources.

The complex provides a walking loop for the community as well as rehabilitation patients. The path circulates around constructed wetlands that empty into a water retention pond. The pond provides an opportunity for respite connecting visitors to the natural environment. Water captured in the pond provides non-potable water collection for reuse in cooling equipment or irrigation. Surrounding plantings will utilize native, non-invasive, water-efficient landscaping.

The walking path is connected to sidewalks that provide opportunities for alternate transportation (i.e. mass transportation, bicycles). Large shade trees reduce the heat islands created by expansive parking lots. Parking is relegated mainly to one edge of the building so that the site can be preserved along the other edges. The natural preserves serve as opportunities to connect patients to the surrounding landscape through views.

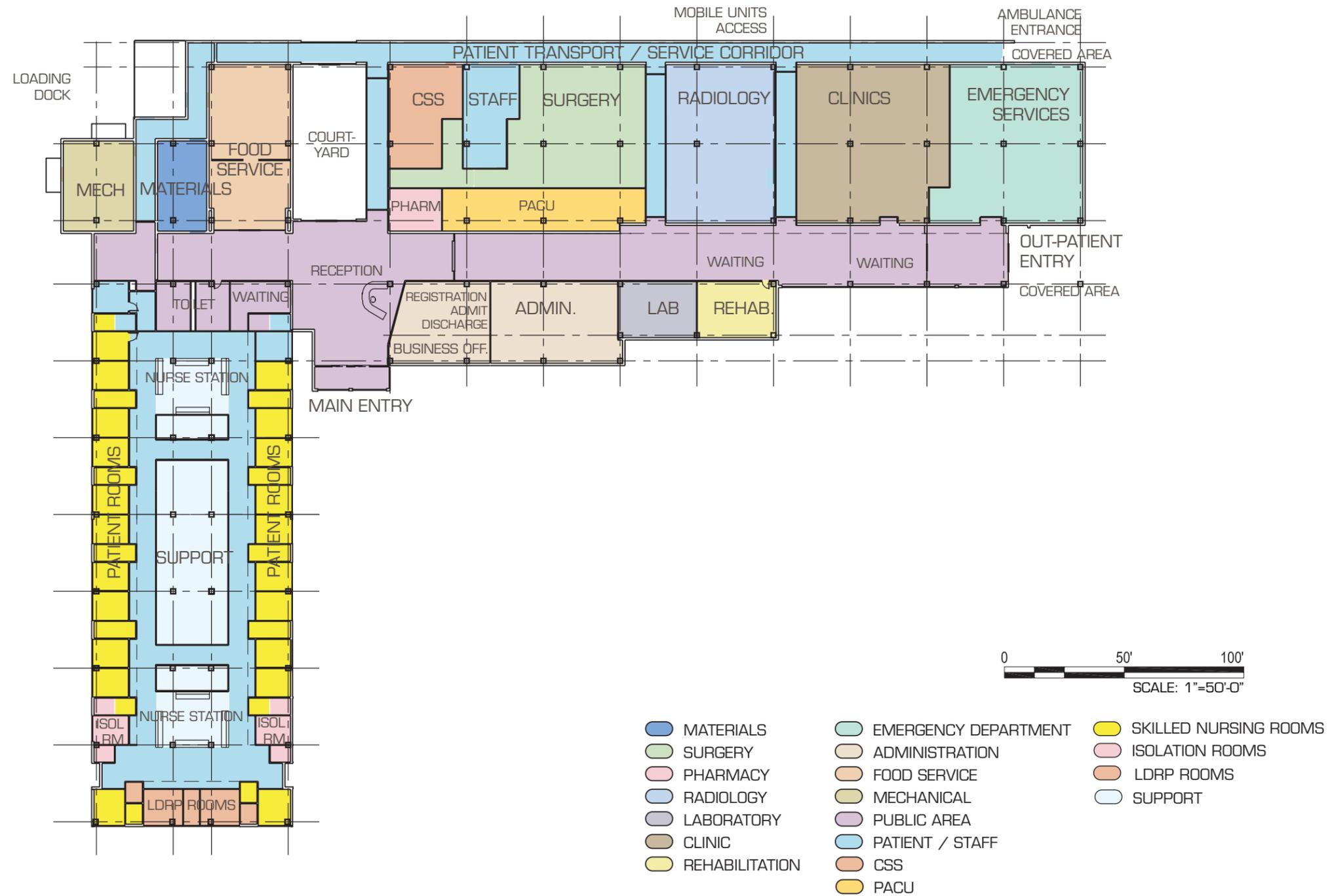


### CRITICAL ACCESS HOSPITAL PROTOTYPE

PREPARED BY **BBH DESIGN**

# DEPARTMENTAL BLOCK PLAN

**SCHEME B**  
1 STORY 25 BEDS



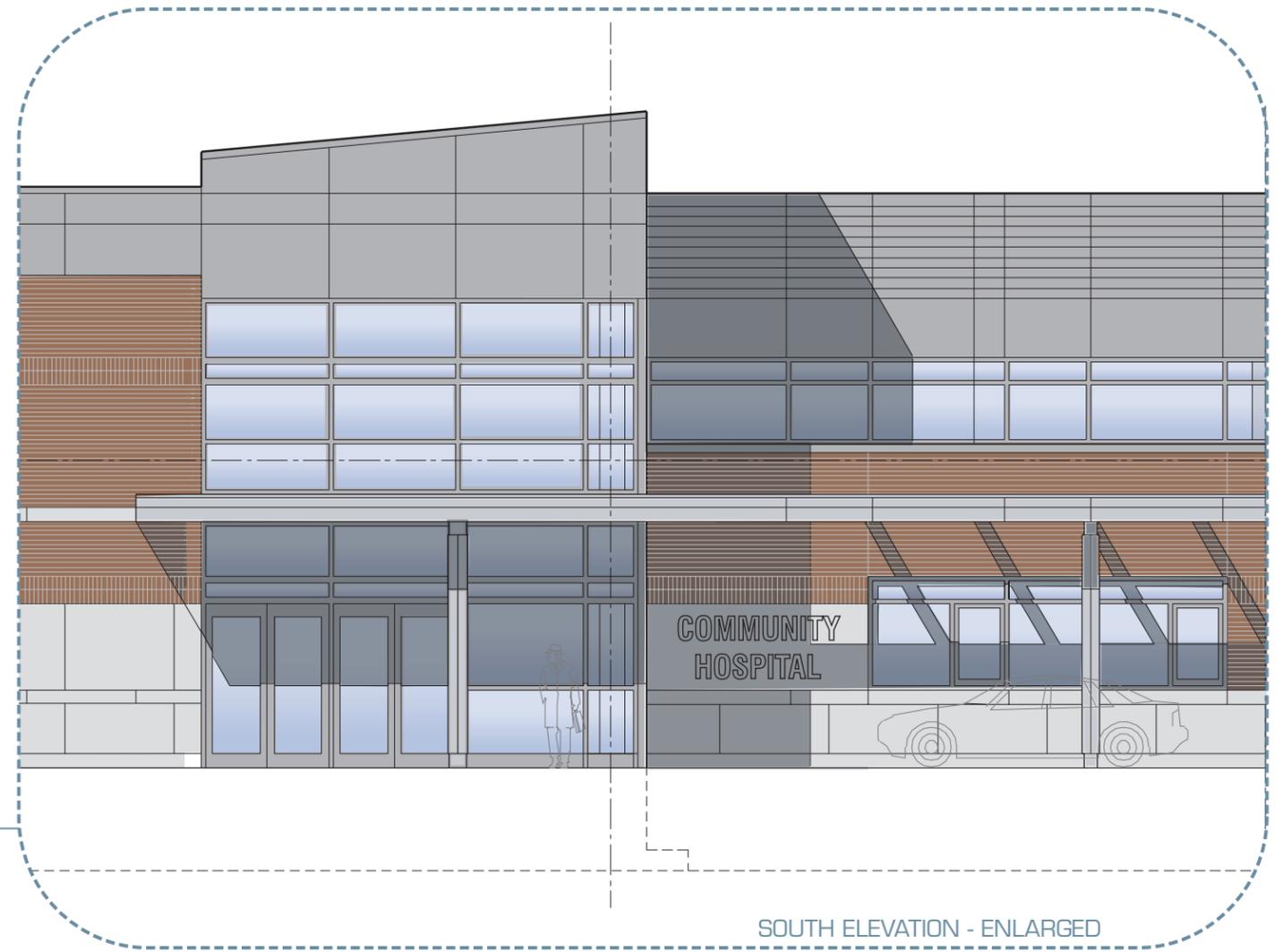
**CRITICAL ACCESS HOSPITAL PROTOTYPE**

PREPARED BY **BBH DESIGN**

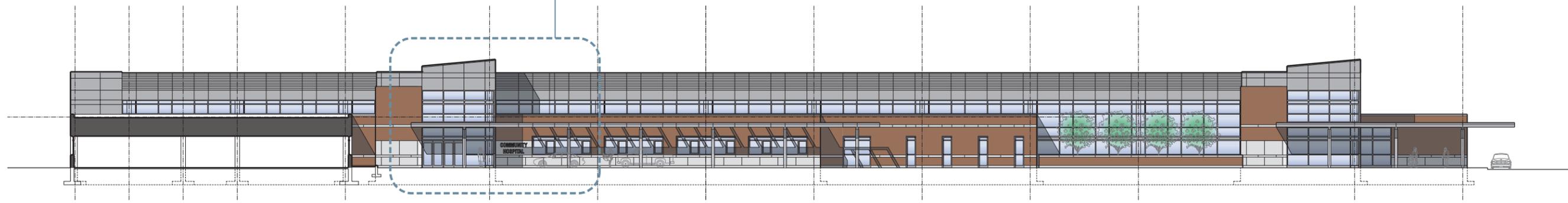


# ELEVATIONS

SCHEME B  
1 STORY, 25 BEDS



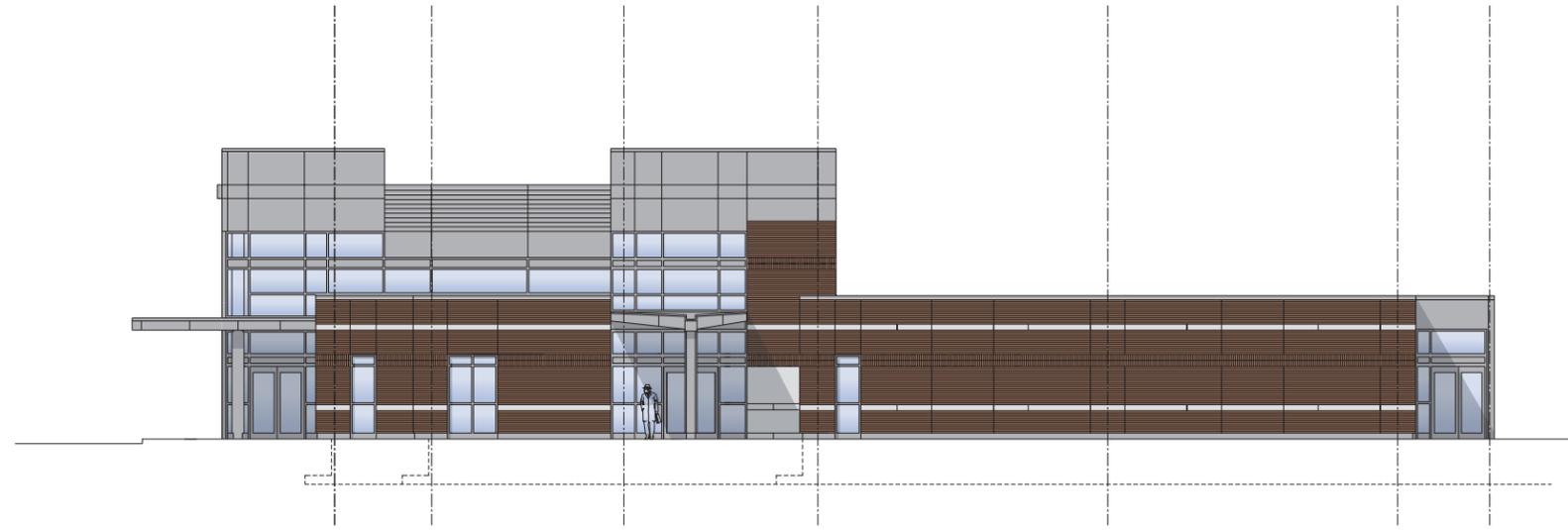
SOUTH ELEVATION - ENLARGED



SOUTH ELEVATION

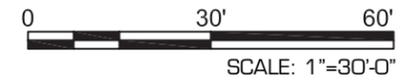
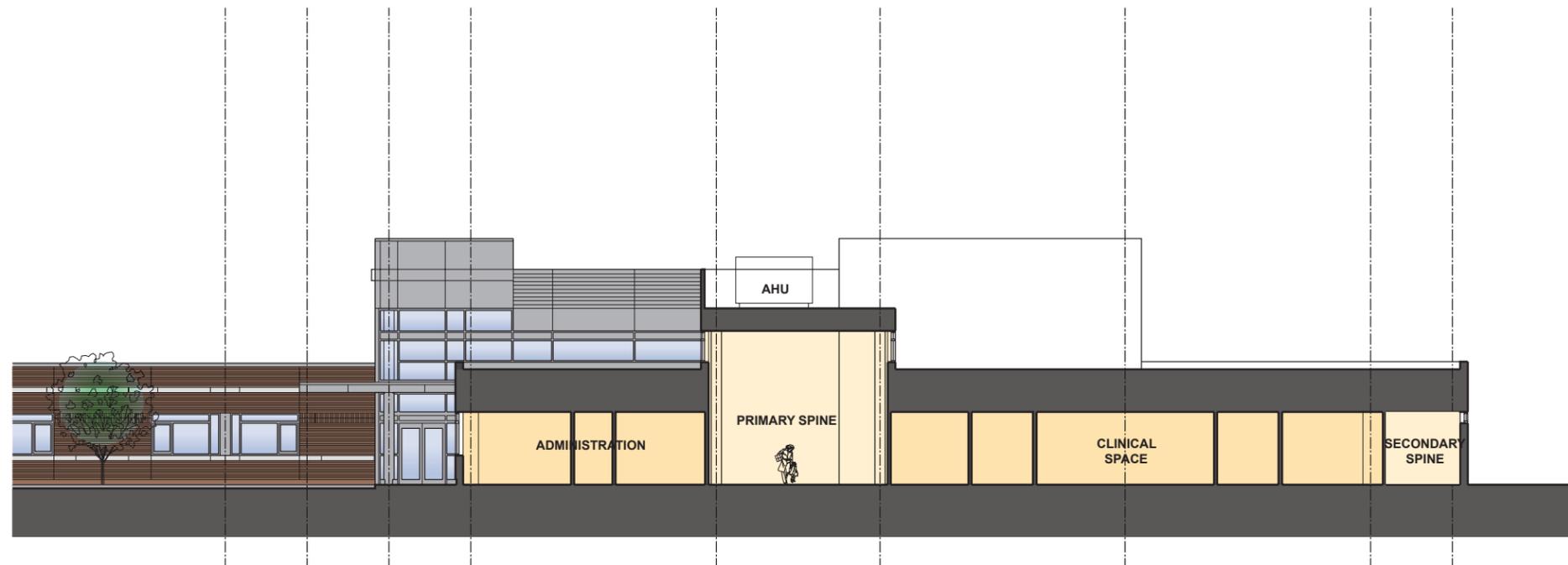
# EAST ELEVATION

SCHEME B  
1 STORY, 25 BEDS



# SECTION

SCHEME B  
1 STORY, 25 BEDS



**RENDERING**

**SCHEME B**  
**1 STORY, 25 BEDS**



VIEW OF ONE STORY SCHEME FROM THE SOUTHEAST

**CRITICAL ACCESS HOSPITAL PROTOTYPE**

PREPARED BY **BBH DESIGN**

**RENDERING**

**SCHEME B**  
**1 STORY, 25 BEDS**



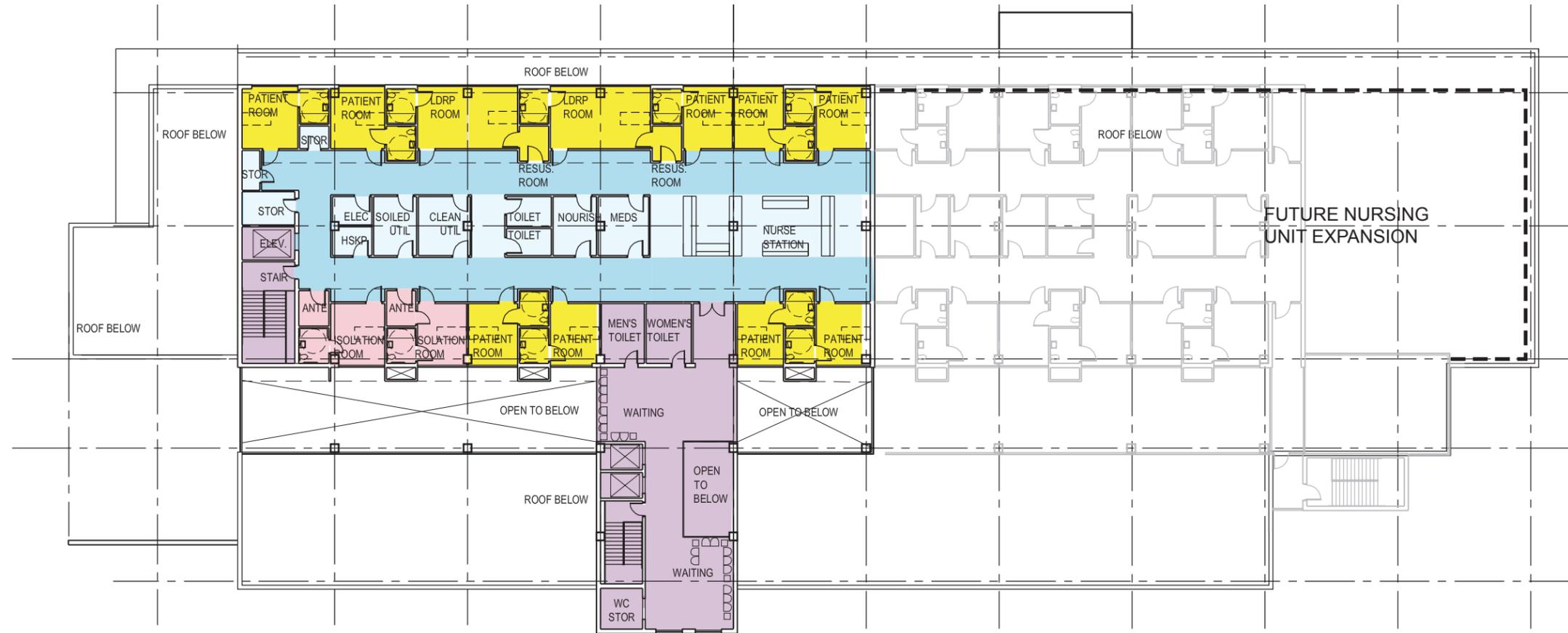
**CRITICAL ACCESS HOSPITAL PROTOTYPE**

PREPARED BY **BBH DESIGN**



# SECOND FLOOR PLAN

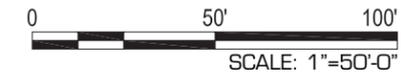
SCHEME C  
2 STORY 15 BEDS



- SKILLED NURSING ROOMS
- ISOLATION ROOMS
- PUBLIC AREA
- PATIENT / STAFF
- SUPPORT

# FIRST FLOOR PLAN

**SCHEME D**  
1 STORY, 15 BEDS

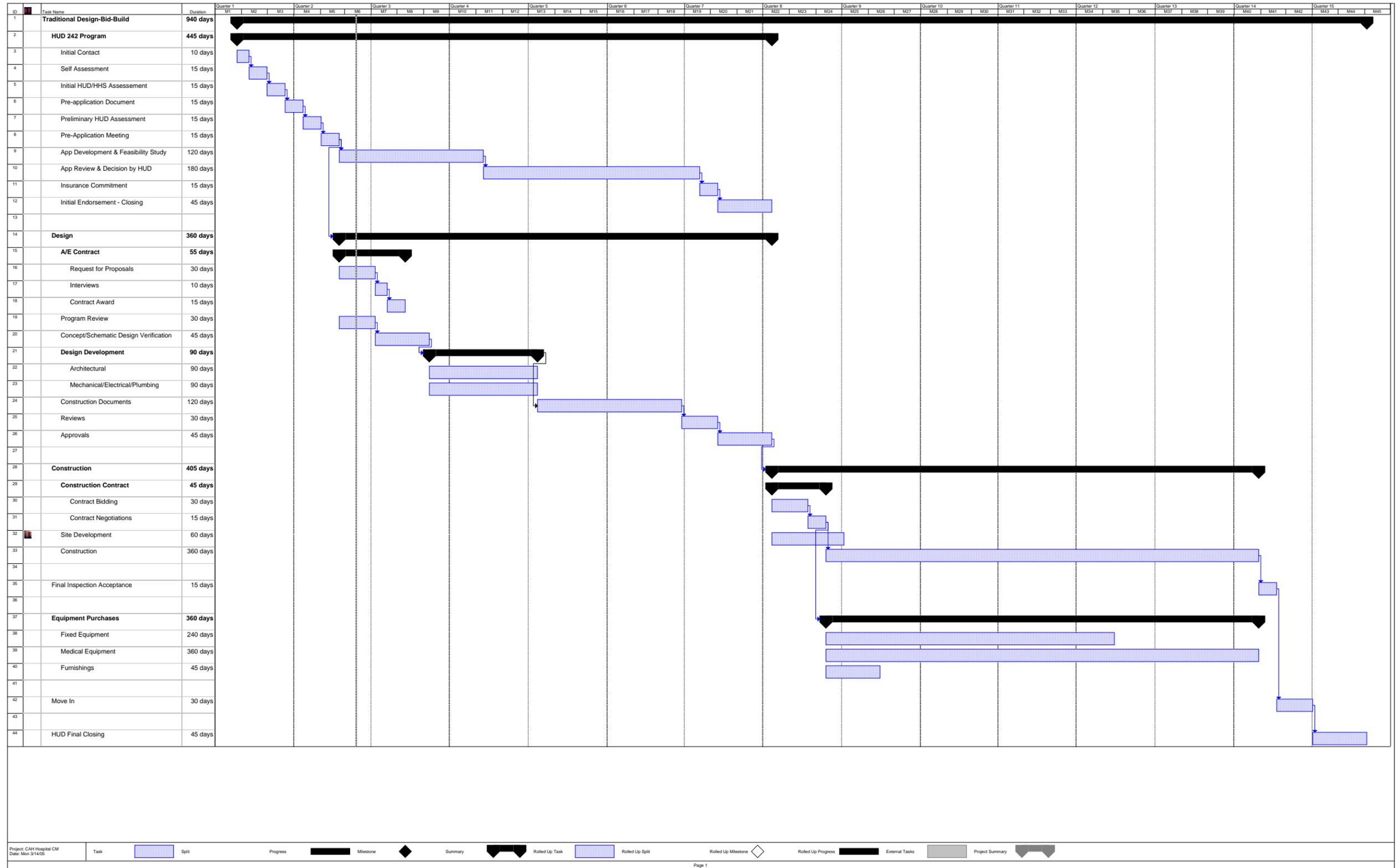


- |  |  |   |   |
|--|--|---|---|
| <span style="color: blue;">■</span> MATERIALS        | <span style="color: lightgreen;">■</span> SURGERY  | <span style="color: lightblue;">■</span> EMERGENCY DEPARTMENT | <span style="color: yellow;">■</span> SKILLED NURSING ROOMS |
| <span style="color: pink;">■</span> PHARMACY         | <span style="color: lightblue;">■</span> RADIOLOGY | <span style="color: lightorange;">■</span> ADMINISTRATION     | <span style="color: lightblue;">■</span> SUPPORT            |
| <span style="color: purple;">■</span> LABORATORY     | <span style="color: lightblue;">■</span> CLINIC    | <span style="color: lightorange;">■</span> FOOD SERVICE       |   |
| <span style="color: yellow;">■</span> REHABILITATION | <span style="color: lightblue;">■</span> PACU      | <span style="color: lightgreen;">■</span> MECHANICAL          |   |
|  |  | <span style="color: purple;">■</span> PUBLIC AREA             |   |
|  |  | <span style="color: lightblue;">■</span> PATIENT / STAFF      |   |
|  |  | <span style="color: lightorange;">■</span> CSS                |   |

**CRITICAL ACCESS HOSPITAL PROTOTYPE**

PREPARED BY **BBH DESIGN**

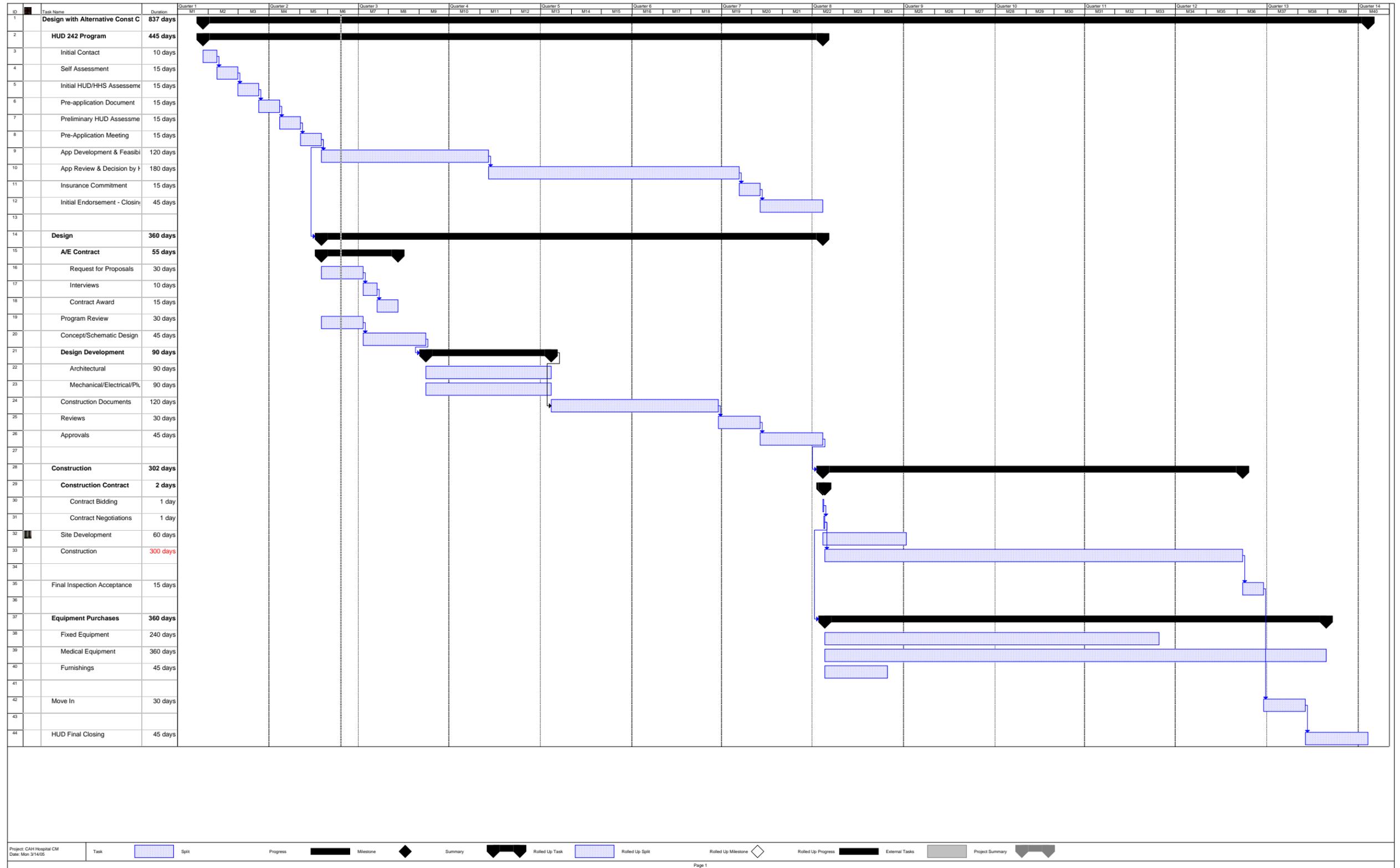
**TIME LINE**  
**TRADITIONAL DESIGN-BID-BUILD**



**CRITICAL ACCESS HOSPITAL PROTOTYPE**

# TIME LINE

## DESIGN WITH ALTERNATIVE CONSTRUCTION CONTRACT



# CRITICAL ACCESS HOSPITAL PROTOTYPE

**BUDGET\***

**2 STORY, 25 BEDS**

Task	Unit	Cost/Unit	Cost		Task Total
			Building	Operations	
<b>Design</b> (Architecture, Engineering, Consultants: Medical Planner, Data, Landscaping, etc.)					
Design Development					
Construction Documents					
Construction Administration					
	1	10%	\$ 1,375,411		\$ 1,375,411
Note: Design fees could be reduced if the prototypes are used and there is minimal site work.					
<b>Site Development</b> (Allowances)					
Clearing	1	\$ 11,250	\$ 11,250		
Infrastructure	1	\$ 112,500	\$ 112,500		
Parking/Helicopter Pad	1	\$ 112,500	\$ 112,500		
Landscaping	1	\$ 33,750	\$ 33,750		
<b>Sub-total</b>			\$ 270,000	\$ -	\$ 270,000
<b>First Floor - Hospital</b>					
First Floor	39,100	\$ 225	\$ 8,797,500		
			\$ -		
			\$ -		
			\$ -		
<b>Sub-total</b>			\$ 8,797,500	\$ -	\$ 8,797,500
<b>First Floor - Mechanical/Dock</b>					
Mechanical Room	1,200	\$ 113	\$ 135,000		
Dock (1/2 space)	345	\$ 84	\$ 29,109		
<b>Sub-total</b>			\$ 164,109	\$ -	\$ 164,109
<b>Second Floor - Hospital</b>					
Second Floor	20,100	\$ 225	\$ 4,522,500		
			\$ -		
			\$ -		
			\$ -		
<b>Sub-total</b>			\$ 4,522,500	\$ -	\$ 4,522,500
<b>Total Site &amp; Construction</b>					
	60,745		\$ 13,754,109		
<b>Total Design, Site, &amp; Construction</b>			\$ 15,129,520	\$ -	\$ 15,129,520
. Total Hard Construction Cost is limited to less than \$12,000,000 (includes building and site costs, but not Architectural/Engineering fees).					
<b>Pre-Design Fees</b>					\$ 687,705
<b>Equipment</b> (Allowances) (Budget based on re-use of existing equipment)					
Fixed Equipment	1	\$ 900,000	\$ 900,000		
Medical Equipment	1	\$ 4,320,000	\$ 4,320,000		
Office Furnishings	1	\$ 360,000	\$ 360,000		
			\$ -		
<b>Sub-total</b>	3		\$ 5,580,000	\$ -	\$ 5,580,000
<b>Budget Total</b>					\$ 21,397,226

\* BUDGETS BASED ON 2004 COSTS ESCALATED BY 4% ANNUALLY FOR 3 YEARS.

**CRITICAL ACCESS HOSPITAL PROTOTYPE**

**1 STORY, 25 BEDS**

Task	Unit	Cost/Unit	Cost		Task Total
			Building	Operations	
<b>Design</b> (Architecture, Engineering, Consultants: Medical Planner, Data, Landscaping, etc.)					
Design Development					
Construction Documents					
Construction Administration					
	1	10%	\$ 1,278,534		\$ 1,278,534
Note: Design fees could be reduced if the prototypes are used and there is minimal site work.					
<b>Site Development</b> (Allowances)					
Clearing	1	\$ 11,250	\$ 11,250		
Infrastructure	1	\$ 112,500	\$ 112,500		
Parking/Helicopter Pad	1	\$ 112,500	\$ 112,500		
Landscaping	1	\$ 33,750	\$ 33,750		
<b>Sub-total</b>			\$ 270,000	\$ -	\$ 270,000
<b>First Floor - Hospital</b>					
First Floor	61,000	\$ 203	\$ 12,352,500		
			\$ -		
			\$ -		
			\$ -		
<b>Sub-total</b>	61,000		\$ 12,352,500	\$ -	\$ 12,352,500
<b>First Floor - Mechanical/Dock</b>					
Mechanical Room	1,200	\$ 113	\$ 135,000		
Dock (1/2 space)	330	\$ 84	\$ 27,844		
<b>Sub-total</b>	1,530		\$ 162,844	\$ -	\$ 162,844
<b>Total Site &amp; Construction</b>					
	62,530		\$ 12,785,344		
<b>Total Design, Site, &amp; Construction</b>			\$ 14,063,878	\$ -	\$ 14,063,878
. Total Hard Construction Cost is limited to less than \$12,000,000 (includes building and site costs, but not Architectural/Engineering fees).					
<b>Pre-Design Fees</b>					\$ 639,267
<b>Equipment</b> (Allowances) (Budget based on re-use of existing equipment)					
Fixed Equipment	1	\$ 900,000	\$ 900,000		
Medical Equipment	1	\$ 4,320,000	\$ 4,320,000		
Office Furnishings	1	\$ 360,000	\$ 360,000		
			\$ -		
<b>Sub-total</b>	3		\$ 5,580,000	\$ -	\$ 5,580,000
<b>Budget Total</b>					\$ 20,283,145

**BUDGET \***

**2 STORY, 15 BEDS**

Task	Unit	Cost/Unit	Cost		Task Total
			Building	Operations	
<b>Design</b> (Architecture, Engineering, Consultants: Medical Planner, Data, Landscaping, etc.)					
Design Development					
Construction Documents					
Construction Administration					
	1	10%	\$ 1,204,411		\$ 1,204,411
Note: Design fees could be reduced if the prototypes are used and there is minimal site work.					
<b>Site Development</b> (Allowances)					
Clearing	1	\$ 11,250	\$ 11,250		
Infrastructure	1	\$ 112,500	\$ 112,500		
Parking/Helicopter Pad	1	\$ 112,500	\$ 112,500		
Landscaping	1	\$ 33,750	\$ 33,750		
<b>Sub-total</b>			\$ 270,000	\$ -	\$ 270,000
<b>First Floor - Hospital</b>					
First Floor	39,100	\$ 225	\$ 8,797,500		
			\$ -		
			\$ -		
			\$ -		
<b>Sub-total</b>			\$ 8,797,500	\$ -	\$ 8,797,500
<b>First Floor - Mechanical/Dock</b>					
Mechanical Room	1,200	\$ 113	\$ 135,000		
Dock (1/2 space)	345	\$ 84	\$ 29,109		
<b>Sub-total</b>			\$ 164,109	\$ -	\$ 164,109
<b>Second Floor - Hospital</b>					
Second Floor	12,500	\$ 225	\$ 2,812,500		
			\$ -		
			\$ -		
			\$ -		
<b>Sub-total</b>			\$ 2,812,500	\$ -	\$ 2,812,500
<b>Total Site &amp; Construction</b>					
	53,145		\$ 12,044,109		
<b>Total Design, Site, &amp; Construction</b>			\$ 13,248,520	\$ -	\$ 13,248,520
. Total Hard Construction Cost is limited to less than \$12,000,000 (includes building and site costs, but not Architectural/Engineering fees).					
<b>Pre-Design Fees</b>					\$ 602,205
<b>Equipment</b> (Allowances) (Budget based on re-use of existing equipment)					
Fixed Equipment	1	\$ 900,000	\$ 900,000		
Medical Equipment	1	\$ 4,320,000	\$ 4,320,000		
Office Furnishings	1	\$ 360,000	\$ 360,000		
			\$ -		
<b>Sub-total</b>	3		\$ 5,580,000	\$ -	\$ 5,580,000
<b>Budget Total</b>					\$ 19,430,726

\* BUDGETS BASED ON 2004 COSTS ESCALATED ANNUALLY BY 4% FOR 3 YEARS.

**CRITICAL ACCESS HOSPITAL PROTOTYPE**

**1 STORY, 15 BEDS**

Task	Unit	Cost/Unit	Cost		Task Total
			Building	Operations	
<b>Design</b> (Architecture, Engineering, Consultants: Medical Planner, Data, Landscaping, etc.)					
Design Development					
Construction Documents					
Construction Administration					
	1	10%	\$ 1,116,661		\$ 1,116,661
Note: Design fees could be reduced if the prototypes are used and there is minimal site work.					
<b>Site Development</b> (Allowances)					
Clearing	1	\$ 11,250	\$ 11,250		
Infrastructure	1	\$ 112,500	\$ 112,500		
Parking/Helicopter Pad	1	\$ 112,500	\$ 112,500		
Landscaping	1	\$ 33,750	\$ 33,750		
<b>Sub-total</b>			\$ 270,000	\$ -	\$ 270,000
<b>First Floor - Hospital</b>					
First Floor	53,000	\$ 203	\$ 10,732,500		
			\$ -		
			\$ -		
			\$ -		
<b>Sub-total</b>	53,000		\$ 10,732,500	\$ -	\$ 10,732,500
<b>First Floor - Mechanical/Dock</b>					
Mechanical Room	1,200	\$ 113	\$ 135,000		
Dock (1/2 space)	345	\$ 84	\$ 29,109		
<b>Sub-total</b>	1,545		\$ 164,109	\$ -	\$ 164,109
<b>Total Site &amp; Construction</b>					
	54,545		\$ 11,166,609		
<b>Total Design, Site, &amp; Construction</b>			\$ 12,283,270	\$ -	\$ 12,283,270
. Total Hard Construction Cost is limited to less than \$12,000,000 (includes building and site costs, but not Architectural/Engineering fees).					
<b>Pre-Design Fees</b>					\$ 558,330
<b>Equipment</b> (Allowances) (Budget based on re-use of existing equipment)					
Fixed Equipment	1	\$ 900,000	\$ 900,000		
Medical Equipment	1	\$ 4,320,000	\$ 4,320,000		
Office Furnishings	1	\$ 360,000	\$ 360,000		
			\$ -		
<b>Sub-total</b>	3		\$ 5,580,000	\$ -	\$ 5,580,000
<b>Budget Total</b>					\$ 18,421,601

## ARCHITECTURAL DESIGN CRITERIA

### DIVISION 1 – GENERAL REQUIREMENTS

#### 1.1 SUMMARY OF THE WORK

- A. The Critical Care Hospital Prototype is a *Green Guide for Health Care* pilot project. The design intent is to protect the immediate health of building occupants, the surrounding community, and the health of the global community. As prototypes develop into projects, this is intended to be realized by owners through operations, architects through design, and contractors through construction.
- B. The project consists of site work, building, and off-site improvements. The site work includes fine grading, landscaping, utilities, and paving for a 7-10 acre site. The 1 or 2 story building is approximately 50,000 gross sf of type I-2 construction including outpatient clinics, diagnostic and treatment space, inpatient beds, support, and administration. The structural system and materials are subject to location and regulatory compliance. Refer to the MEP specification sections for mechanical and electrical systems.
- C. These specifications are provided for general consideration. Compliance with all applicable local and national codes and regulations is required and may supersede specs included herein.

### DIVISION 2 – SITE WORK

#### 02230 SITE CLEARING

- A. Demolish and remove from the site designated miscellaneous buildings and miscellaneous debris.
- B. Thin undergrowth and remove trees as directed. Dispose of debris.

#### 02300 EARTHWORK

- A. Limit site disturbance to construction area. Prepare site for construction. Furnish all labor, equipment, and materials; perform all operations required for preparation of subgrades, excavating and backfilling for buildings, utilities and structures, drainage course for slabs-on-grade.
- B. Furnish and implement an erosion control plan.

#### 02510 WATER DISTRIBUTION

- A. Provide a water system including all accessories and piping from an existing municipal or well. Provide and install water meters, water service lines, fittings and appurtenances, and installations and testing standards.
- B. GGHC Recommendation: Provide and install systems for use of non-potable water sources in the form of stormwater, greywater, and/or recycled site water for equipment cooling and landscape irrigation.

#### 02520 CONCRETE WALKS, WALLS, PADS, AND CURBS

- A. Concrete walks and curbs in selected colors.

#### 02530 SANITARY SEWERAGE

- A. Provide a gravity fed sewerage system including PVC pipe for gravity sewers, ductile iron for force

main sewers, standard precast manholes, cast iron frames and covers; pump station construction, pumps and alarms; and installation and testing standards.

- B. GGHC Recommendation: Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%.

#### 02630 STORM DRAINAGE

- A. Reinforced concrete pipe, precast and site built manholes and basins, and cast iron frames and grates, gray-iron cleanouts and installation and testing standards.

#### 02741 HOT-MIX ASPHALT PAVING

- A. Provide hot-mix asphalt with a history of satisfactory performance in geographical area and that are approved by authorities having jurisdiction where Project is located.
- B. Parking lot lines.

#### 02810 IRRIGATION SYSTEMS

- A. GGHC Recommendation: Design and installation of a complete and fully functional irrigation system fed from non-potable source such as stormwater, greywater, and/or recycled site water and the supplementary items necessary to complete the work required for their installation.

#### 02930 EXTERIOR PLANTS

- A. GGHC Recommendation: Landscaped areas to be regraded, imported topsoil added in order to receive native species and non-invasive vegetation to reduce or eliminate irrigation requirements.
- B. Landscaped areas to be regraded, imported topsoil added in order to receive grass, groundcover and, shrubs, and trees as shown on plans. All planting beds to receive bark mulch.

### DIVISION 3 – CONCRETE

#### 03300 CAST-IN-PLACE CONCRETE

- A. Provide 4,000 psi concrete with a maximum slump of 4". Contractor responsible for providing the mix design. Use Grade 60 reinforcing steel (epoxy coated when required). Contractor responsible for all concrete testing (strength, slump, and air content) Actual type and size of footing and foundation system used will be based on soil borings. Slab on grade floors.
- B. Install per applicable American Concrete Institute (ACI) standards.

#### 03450 ARCHITECTURAL PRECAST CONCRETE

- A. Provide 5,000 psi architectural precast concrete cladding units with accessories including cast-in anchors, coloring admixtures, non-shrink grout, vapor barrier, curing compounds, waterstops, and similar items. Finishes and color to match Architect's sample.
- B. Fabricate and install per applicable Precast Concrete Institute (PCI) standards and Architect's approval.

## CRITICAL ACCESS HOSPITAL PROTOTYPE

## ARCHITECTURAL DESIGN CRITERIA

### DIVISION 4 – MASONRY

#### 04810 UNIT MASONRY ASSEMBLIES

- A. CMU – ASTM C90, locally manufactured, normal weight, concrete masonry units. Mortar ASTM C 270, type N. Grout ASTM C476, 2000 psi. Reinforcing ASTM A 615, Grade 60. Color, finish and pattern to match architect's sample.
- B. Face brick – ASTM C 216, locally manufactured, Grade SW, Type FBX, 3-1/2 inches wide by 2-1/4 inches high by 7-1/2 inches long over metal stud framing and solid masonry where shown. Mortar ASTM C 270, high strength cement-lime mortar, Type S, concave tooled joints. Color and finish to match Architect's sample. Provide horizontal and vertical reinforcement to meet local code requirements.
- C. Furnish accessories including ties and anchors, masonry joint reinforcement, flashing, weeps, joints, insulation and cavity drainage.

### DIVISION 5 – METALS

#### 05120 STRUCTURAL STEEL

- A. All structural steel shall be fabricated and erected in accordance with the latest edition of the AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings".
- B. Structural steel frame and miscellaneous members to conform to ASTM A 992, Grade 50. All bolts, nuts and washers to conform to ASTM A 325 or ASTM A 490. Painting to consist of 1-coat of rust-inhibitive primer.

#### 05310 STEEL DECK

- A. Metal deck: manufactured and installed in accordance with Steel Deck Institute Design Specifications and Code of Recommended Standard Practice.
- B. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30.
- C. Composite Steel Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 30, with the minimum section properties indicated.
- D. Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

#### 05400 COLD-FORMED METAL FRAMING

- A. Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."

#### 05500 METAL FABRICATIONS

- A. Fabricate from 6063-T52 aluminum or ASTM A 36 steel, welded construction, all joints ground smooth, exterior steel hot dipped galvanized after fabrication, interior steel shop prime painted, and

aluminum satin finished.

- B. Handrails, gratings, channel frames, angle sills, handrail supports, loose lintels, plates, angles, and other special metal accessories required for support of miscellaneous items of construction.

#### 05511 METAL STAIRS

- A. Complete metal-pan stair assemblies including steel tube railings, stair framing, metal-pan stairs and other components necessary to support and anchor stairs and platforms on supporting structure. Apply shop primer to uncoated surfaces of metal stair components.

#### 05811 ARCHITECTURAL JOINT SYSTEMS

- A. Flexible neoprene roof bellow joint system; Exterior two single layered flexible extrusion joint system, one interior PVC and one exterior thermoplastic rubber; Interior extruded preformed thermoplastic rubber joint system.

### DIVISION 6 – WOOD AND PLASTICS

#### 06100 ROUGH CARPENTRY

- A. FSC certified, fire-retardant-treated and preservative-treated blocking, furring, nailers, plywood backboards for telephone and electrical equipment, and rough hardware.

#### 06402 INTERIOR ARCHITECTURAL WOODWORK

- A. All materials and workmanship for all finish carpentry and architectural millwork: AWI Premium grade in accordance with latest Edition "Architectural Woodwork Quality Standards", published by the Architectural Woodwork Institute.
- B. Provide interior architectural woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria."
- C. Standard Casework: .050" thick plastic laminate covered plywood and medium density fiberboard, per AWI Premium Grade. Provide matching PVC edge banding; T shape.
- D. Countertops: Solid surface with integral backsplash and rounded corners on the top surface.
- E. Cabinet Hardware: European style concealed self-closing hinges, heavy-duty fire knuckle wrap-around hinges, wire type door and drawer pulls, metal ball bearing drawer slides, adjustable shelf standards and brackets, locks, and miscellaneous items. Dull chrome finish.

### DIVISION 7 – THERMAL AND MOISTURE PROTECTION

#### 07210 BUILDING INSULATION

- A. Acoustical Insulation: Unfaced fiberglass or mineral wool blankets and semi-rigid boards, friction fit in cavities of sound controlling gypsum board and metal stud partitions.
- B. Thermal Insulation: Foil-faced fiberglass or mineral wool blankets and semi-rigid boards, friction fit in partition cavities and stick clipped to inside of exterior walls and undersides of roof decks.

## CRITICAL ACCESS HOSPITAL PROTOTYPE

## ARCHITECTURAL DESIGN CRITERIA

### 07270 FIRESTOPPING

- A. Safing: Mineral wool insulation at intersection of floor slabs and exterior walls and at intersection of fire-rated partitions and slabs above.
- B. Through-Penetration and Membrane Penetration Firestops: UL-listed assemblies of mineral wool insulation, sealant, and intumescent materials to protect penetrations of pipes, ducts, and conduit through fire-rated floors, walls and partitions.

### 07430 COMPOSITE WALL PANELS

- A. Provide preformed aluminum composite facing panel system with dry joints that comply with performance requirements indicated based on pretesting of installed panels using the following methods:
  - Air Infiltration ASTM E 283
  - Water Penetration: ASTM E 331
  - Structural Properties: ASTM E 330
  - Thermal: ASTM C 236
- B. Panel Flatness limited to a maximum 1/32" in 2'-0" on panel in any direction for assembled units.

### 07540 THERMOPLASTIC MEMBRANE ROOFING

- A. General: Adhered white thermoplastic polyolefin roofing membrane system with 15 year warranty from date of Substantial Completion.
- B. Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
- C. Extruded-Polystyrene Board Insulation: ASTM C578, medium density, square edged.

### 07620 SHEET METAL FLASHING AND TRIM

- A. Fabricate sheet metal flashing, scuppers and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of items indicated. Shop fabricate items where practical. Obtain field measurements for accurate fit before shop fabrication.
- B. Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

### 07811 SPRAYED FIRE-RESISTIVE MATERIALS

- A. Concealed cementitious SFRM approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Provide auxiliary fire-resistive materials that are compatible with SFRM and substrates.

### 07841 THROUGH-PENETRATION FIRESTOP SYSTEMS

- A. Provide all firestopping material required to close penetrations in fire-rated construction. Materials shall include resistant caulk, sealants and insulation.

### 07920 JOINT SEALANTS

- B. Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience. Color of exposed joint sealants as selected by Architect from manufacturer's full range.
- C. Miscellaneous Items: Backer rod, bond breaker tape, primers, cleaners, and other items required for proper installation.

## DIVISION 8 – DOORS AND WINDOWS

### 08110 STEEL DOORS AND FRAMES

- A. General: Custom doors and frames fabricated and installed per applicable National Association of Architectural Metal Manufacturers (NAAMM) standards.
- B. Door Frames: One-piece, continuous welded construction of not less than 16 gauge steel sheet. Knock-down frames not permitted.
- C. Lights: Minimum profile fixed and removable stops for 1/4-inch-thick glass and glazing.
- D. Fire-Rated Openings: UL construction and labels.
- E. Finish: Shop primed for field finish.

### 08211 FLUSH WOOD DOORS

- A. Wood doors: AWI Type SLC-5 construction stave lumber core door, fabricated with waterproof glue, lifetime guarantee.
- B. Wood doors: have plain sliced hardwood face veneers with matching side edge strips, AWI Premium Quality for natural finish, no heart wood.

### 08311 ACCESS DOORS AND FRAMES

- A. Metal Type: Standard and fire-rated wall, ceiling, and soffit types, for access to mechanical and electrical devices and controls.

### 08331 OVERHEAD COILING DOORS

- A. Manually operated insulated overhead coiling doors with weatherseals and locking device assembly. Color as selected by Architect from full range of industry colors.

### 08411 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

- A. Aluminum entrance doors: Medium Stile 2" thick doors with wide bottom rails.
- B. Aluminum frames for doors, sidelights, and transoms: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
- C. Doors: each have 3 heavy-duty ball pivots, pull handle, panic device, streamlined overhead closer, preparation for lock cylinders, threshold, and weather-stripping.
- D. Finish on Doors and Frames: Fluoropolymer 2 coat system.

## CRITICAL ACCESS HOSPITAL PROTOTYPE

## ARCHITECTURAL DESIGN CRITERIA

### 08460 AUTOMATIC SLIDING ENTRANCE DOORS

- A. General: Provide manufacturer's standard automatic entrance door assemblies including doors, sidelights, framing, headers, carrier assemblies, roller tracks, door operators, activation and safety devices, and accessories required for a complete installation.
- B. Provide door operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.

### 8710 DOOR HARDWARE

- A. Mortise and Cylindrical Locksets: heavy duty cylindrical type with level handles, finish as selected, keyed and masterkeyed into existing building keying system or as directed.
- B. Doors at egress stairs and at rooms serving 50 or more people shall be equipped with panic bolts.
- C. Other finish hardware: heavy duty type, including butts, pivots, closers, overhead stops, push plates, pulls, floor and wall stops, panic hardware, silencers electro-magnetic hold open devices, etc.

### 08800 GLAZING

- A. Solar-Control Low-E Insulating Glass Units as follows: Provide 1- inch sealed insulated glass, made up of 1/4-inch thick clear float glass with low-E coating on second or third surface. Use tempered glass where required. Performance criteria based on local region and applicable ASHRAE and LEED guidelines.
- B. Glass in interior doors and view windows: 1/4" thick polished. Use tempered glass where required.

### 08911 GLAZED ALUMINUM CURTAIN WALLS

- A. Provide glazed aluminum curtain-wall systems with operable units, including anchorage, capable of withstanding, without failure, applicable structural loads and thermal movements.
- B. Finish: Fluoropolymer 2 coat system.

## DIVISION 9 – FINISHES

### 09250 GYPSUM BOARD

- A. Gypsum board: 5/8" thick interior gypsum board complying with ASTM C 36/C 36 M. Use 5/8" Type "X" where fire ratings are required. Use 5/8" cementitious backer board as backing for tile and in wet areas. Use multiple layer construction where indicated, or as required to achieve fire ratings required by code.
- B. Prefill all joints, tape and fill all joints, and fill all fastener heads in gypsum board finish with the gypsum board manufacturer's prefill plus 3-coat joint system using polyindurate taping and fill material, and premixed vinyl based topping material. All joint finishing materials: asbestos free.
- C. Sheathing and Exterior Soffits: Glass-Mat Gypsum Sheathing Board, ASTM C 1177/C 1177M.

### 09265 GYPSUM SHAFT-WALL ASSEMBLIES

- A. Provide materials and components including gypsum liner panels and framing members complying with requirements of fire-resistance-rated assemblies indicated.

### 09310 CERAMIC TILE

- A. All tiles: Provide Standard grade tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
- B. Ceramic mosaic tile on walls and quarry tile floors where indicated. Grout all tile with chemical-resistant, water-cleanable, tile-setting and -grouting epoxy: ANSI A118.3.
- C. Provide marble thresholds at entrances to tiled areas.

### 09511 ACOUSTIC PANEL CEILINGS

- A. Acoustic board ceilings: Incombustible mineral fiber 2'-0" x 2'-0" x 5/8" lay-in panels, plastic faced with scrubbable finish where specifically noted. Select from manufacturer's full range of colors.
- B. Suspension systems: White finished intermediate duty direct-hung exposed tee suspension system in accordance with ASTM C635.
- C. Provide seismic bracing in accordance with ASTM E 580.

### 9651 RESILIENT FLOOR TILE

- A. Vinyl composition tile: 12" x 12" x 1/8" thick, selected from manufacturer's full range of colors and patterns. Provide manufacturers' product data for adhesives, including printed statement of VOC content.
- B. Resilient Base and Accessories: Cove and straight base and edge strips.

### 09652 SHEET VINYL FLOOR COVERINGS

- A. Sheet vinyl floor covering complying with heat welded seams and integral-flash-cove-base. Color and pattern selected from manufacturer's full range.
- B. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic cement based formulation provided or approved by floor covering manufacturer for applications indicated.
- C. Adhesives: Low emission water-resistant type recommended by manufacturer to suit sheet vinyl floor covering and substrate conditions indicated. Provide manufacturers' product data for adhesives, including printed statement of VOC content.

## CRITICAL ACCESS HOSPITAL PROTOTYPE

## ARCHITECTURAL DESIGN CRITERIA

### 09680 CARPET TILE

- A. Continuous filament, soil repellent, recycled material carpet tile with a pile weight of not less than 36 oz. per square yard.

### 09910 PAINTING

- A. Three coat systems for exposed surfaces including pipes and ducts but excluding shop and factory finished items.
- B. Interior Finish Coats:
  - a. Concrete and Concrete Block: Latex, semi-gloss sheen, smooth texture.
  - b. Gypsum board
    - 1) Washable: Latex, eggshell enamel.
    - 2) Scrubbable: Waterborne epoxy, semi-gloss sheen, smooth texture.
  - c. Metal: Latex, semi-gloss sheen, smooth texture.
  - d. Exposed wood: stain and 2 coats of satin varnish.

### DIVISION 10 – SPECIALITIES

#### 10155 TOILET COMPARTMENTS

- A. Overhead headrail type ADA compliant toilet partitions constructed of phenolic material with self-closing doors with latches, door bumper, hinges, pulls, etc. Provide urinal screens as required. Colors as selected by Architect from manufacturer's full range.

#### 10200 LOUVERS AND VENTS

- A. Provide 6" fixed drainable aluminum blade louvers with insect screens. Louvers shall be provided with all trim. Provide baked enamel finish.

#### 10265 IMPACT-RESISTANT WALL PROTECTION

- A. Plastic corner guards, crash rail, bumper guard and impact resistant handrails: ASTM D 1784, Class 1, textured, chemical- and stain-resistant, high-impact-resistant PVC or acrylic-modified vinyl plastic with integral color throughout; thickness as indicated.
- B. Impact Resistant Wall Coverings: ASTM D 1784, Class 1, textured, chemical- and stain-resistant, semirigid, high-impact-resistant PVC or acrylic-modified vinyl plastic sheet with integral color throughout; thickness as indicated.

#### 10505 METAL LOCKERS

- A. All welded, corridor metal lockers: Standard Double? tier with continuous sloping tops and powder coated finish. Colors as selected by Architect from manufacturer's full range.

#### 10520 FIRE PROTECTION SPECIALITIES

- A. Provide UL rated 5 pound, ABC fire extinguisher and wall mounting brackets in recessed cabinet type. Rating of cabinet to match wall rating.
- B. Trimless with Hidden Flanges: Frame of cabinet box overlaps surrounding wall finish, concealed from view by overlapping aluminum duo panel door with 1/8-inch float glass.

#### 10651 OPERABLE PANEL PARTITIONS

- A. Wood veneer manually operated paired-panel partitions with acoustical seals.

#### 10801 TOILET AND BATH ACCESSORIES

- A. Stainless steel (satin finish) recessed accessories including soap dispensers, towel dispensers, waste receptacles, toilet paper holders, grab bars, feminine napkin dispensers and disposals, and framed glass mirrors.

### DIVISION 11 – EQUIPMENT

#### 11160 LOADING DOCK EQUIPMENT

- A. Molded rubber dock bumpers; surface mounted edge of dock levelers.

#### 11460 UNIT KITCHENS

- A. Factory-fabricated unit kitchens with stainless steel cabinets, countertops, fixtures, appliances, and accessories.

### DIVISION 12 – FURNISHINGS

#### 12484 FLOOR MATS AND FRAMES

- A. Entrances carpet-type mats in surface-mounted frames.

#### 12485 FOOT GRILLES

- B. Recessed stainless steel foot grille with drain pan.

#### 12494 ROLLER SHADES

- A. Manually operated PVC-coated polyester roller shades.

### DIVISION 13 – FIRE PROTECTION

## CRITICAL ACCESS HOSPITAL PROTOTYPE

## **ARCHITECTURAL DESIGN CRITERIA**

### DIVISION 14 – CONVEYING SYSTEMS

#### 14240 HYDRAULIC ELEVATORS

- A. Hydraulic hospital elevator: 4500 lbs, 100 fpm. Provide manufacturer's standard elevator systems, including standard components published by manufacturer as included in standard pre-engineered elevator systems and as required for complete system.
- B. All designs, clearances, construction, workmanship and materials, unless specifically accepted, shall be in accordance with the requirements of the ASME A17.

END OF ARCHITECTURAL DESIGN CRITERIA

## DESCRIPTION OF MECHANICAL AND ELECTRICAL SYSTEMS

### I. HEATING, VENTILATING, AND AIR CONDITIONING

#### A. Air Conditioning Systems:

##### 1. Rooftop Air Conditioning Units:

- (a) Heating and air conditioning will be provided by rooftop air conditioning units. Rooftop units will be custom, factory-fabricated units. The heating source will be electric, and refrigeration will be air-cooled direct-expansion type designed to prevent coil freezing with low load and 100% outside air conditions. Air handling will be variable volume with high efficiency motors and airfoil supply and relief fans. Units shall be provided with pleated pre-filters and cartridge final filters.
- (b) Rooftop air conditioning units will be designed for airside economizer capability and 105°F condenser entering air temperature, and 15% additional heating capacity for morning pick-up from a cold start. Cooling coils will be designed for face velocities not in excess of 500 fpm. Condensate from each rooftop unit will be piped to the nearest roof drain using type L hard copper pipe and wrought copper fittings. System control panels will be located in each respective area.
- (c) Units will have extended height curbs with provisions for final cartridge filters.

##### 2. Ductwork:

- (a) Ductwork will conform to SMACNA recommendations.
- (b) Ductwork will be galvanized steel, except as follows:
  - Grease hood exhaust ductwork: 16 gauge carbon steel where concealed and type 304 stainless steel where exposed, all with welded longitudinal seams and transverse joints.
  - Laboratory fume hood exhaust ductwork: type 304 stainless steel, with welded longitudinal seams and transverse joints.
  - Dishwasher ductwork: type 304 18 gauge stainless steel where exposed and aluminum where concealed.

##### 3. Terminal Units:

- (a) Variable volume terminal units with electric resistance heating coils will provide heating and cooling to all spaces.
- (b) Operating rooms will be supplied through 2-position variable volume terminal units controlled by a wall-mounted occupied/unoccupied switch. During the occupied mode, a minimum air change rate of 25 air changes per hour will be maintained. During the unoccupied mode the airflow will be maintained at a lower minimum rate. Tracking return terminal units will be interlocked with the supply units to maintain a positive pressure in the operating rooms at all times.

##### 4. Return Air:

- (a) Air will be returned to the air handling units through eggcrate grilles via return air ductwork above the ceiling.
- (b) Return air from operating rooms will be ducted from sidewall registers located near the floor level with 1" throw away filters.

##### 5. Humidification:

Electronic humidifiers will be provided in the main duct of each air handling unit.

#### B. Automatic Temperature Control Systems:

- 1. A direct digital control system, including a PC-based operator station, will be provided to control air handling units, fans, coils, and terminal units.

END

### II. PLUMBING

#### A. Domestic Water Systems:

##### 1. Water Service:

- (a) The water service will be extended from 5' outside the building to the mechanical room. The water service will be provided with dual backflow prevention devices in accordance with local code. Pressure reducing valves will be provided, as required, to control excessive water pressure.

##### 2. Domestic Hot Water:

- (a) Water heaters will be packaged, vertical storage type with ASME tanks, automatic controls and safeties, and factory-installed insulation and jacket. Burners will be power type using natural gas. Thermostatic master mixing valves will be provided to limit maximum water temperature delivered to the fixtures, while maximizing firing efficiencies of the heating equipment. Hot water circulating pumps will be provided to maintain system temperature and conserve water.

## DESCRIPTION OF MECHANICAL AND ELECTRICAL SYSTEMS

### 3. Piping:

- (a) Domestic water piping within the building will be type L hard copper with wrought copper sweat type fittings, and joints using lead-free solder. Water piping below slabs on grade will be type K soft copper with no joints below slab.

### B. Drainage Systems:

#### 1. Piping:

- (a) Sanitary and rainwater drainage and vent piping above grade will be hubless cast iron pipe and fittings with heavy duty compression type couplings. Drainage and vent piping below grade will be service weight cast iron pipe and fittings with elastomeric compression joints.

#### 2. Grease Recovery System:

- (a) A large central inground grease interceptor will be located on the exterior of the building to receive and pretreat the kitchen waste system prior to connection to the sanitary system.

### C. Plumbing Fixtures:

#### 1. Water Closets:

- (a) Water closets will be elongated vitreous china, wall hung, manual flush valve type, 1.5 gallons per flush, with white open front seats.

#### 2. Urinals:

- (a) Urinals will be vitreous china, wall hung, manual flush valve type, 1 gallon per flush.

#### 3. Lavatories:

- (a) Lavatories will be vitreous china.

#### 4. Sinks:

- (a) Service sinks will be terrazzo, floor type with grid strainer, rim guard and faucet with hose thread outlet, vacuum breaker and wall brace.
- (b) Break room sink will be stainless steel, self-rimming, undercounter type with swing spout faucet, and flow restricted aerator.
- (c) Sinks in examination rooms, holding rooms, procedure rooms, nurse stations, soiled utility rooms, and similar areas will be stainless steel countertop type.

#### 5. Bathtubs:

- (a) Bathtubs will be enameled cast iron with slip-resistant surface. Tub/shower valves will be the pressure balanced mixing type, with 2.5 gpm flow adjustable shower head, and tub spout with diverter.

### 6. Showers:

- (a) Showers will be composed of pressure balanced valves set to prevent full hot, with metal lever handles, and 2.5 gpm adjustable showerheads.

### 7. Water Fountains:

- (a) Water cooler type will be electric, self-contained, wall hung type with non-CFC refrigerant.

### D. Natural Gas Systems:

#### 1. Gas Service and Distribution Systems:

- (a) The natural gas system will provide natural gas at 7" wc from the gas meter outside the building, through black steel pipe, to the water heaters, and kitchen equipment.

### E. Medical Gas Systems:

- 1. Medical gas systems will consist of the breathable compressed air system (cylinders), vacuum system (central pump), oxygen system (bulk tank), master alarms, and piping.

### F. Fuel Oil Systems:

- 1. An aboveground storage tank will be provided to allow the building to function normally for up to 5 days because of interrupted gas service.

END

## III. ELECTRICAL

### A. Primary Distribution System:

#### 1. Type of System:

- (a) Consideration should be given to the reliability of service from the local utility. The utility primary distribution system shall be loop, primary selective, or network type, with service from two separate substations if available and within the scope of the budget for the project.

## DESCRIPTION OF MECHANICAL AND ELECTRICAL SYSTEMS

### B. Interior Electrical Distribution System:

1. Electrical Service:
  - (a) Electrical service for the building will originate from pad-mount service transformers located outside the building. The local utility company will furnish and install the primary service conductors and service transformers. Service to the building will be 480/277V, 3-phase, 4-wire, wye connected, grounded neutral.
2. Service Equipment:
  - (a) Service equipment will consist of a switchboard. Service switchboards will be front and rear accessible, with individually mounted main and feeder devices. Switchboard bussing will be copper, and will be braced for the available fault current. Main and feeder devices will be insulated case draw-out type circuit breakers. Feeder devices will be molded case circuit breakers with adjustable trip units.
3. Panelboards:
  - (a) Branch circuit panelboards will be provided on each floor to serve the lighting and receptacles on the same floor. Each laboratory will be provided with a dedicated panelboard. Where required by local codes, each operating room and patient critical care area will be provided with a dedicated isolation panelboard.
  - (b) Protective devices in panelboards will be bolt-on type circuit breakers. Buswork will be copper. Lighting and receptacle panelboards will have a minimum 10% spare circuit breakers plus 20% spaces for future circuit breakers. From each flush-mounted panelboard, a minimum of two spare empty conduits will be provided.
  - (c) Panelboards serving electronic equipment will have an oversized neutral and an isolated ground bus in addition to the equipment ground bus. The service to panelboards serving electronic equipment will be supplied from k-rated isolation transformers, and will include oversized neutral conductors.
4. Cable Trays:
  - (a) Cable trays will be wire basket type, nominal 4" depth, aluminum or steel construction, with 6" rung spacing designed for a cable load of 75 pounds per foot.
5. Wiring Devices:
  - (a) Wall switches and duplex receptacles will be specification grade. Duplex receptacles in patient care areas will be hospital grade. Receptacles in pediatric locations will be tamper-resistant. Isolated ground duplex receptacles will be provided for electronic equipment. Receptacles will be installed a maximum of 50' on center in corridors. Two duplex outlets for electronic equipment power and 2 duplex outlets for normal power will be provided for each workstation in offices.
  - (b) Provide exterior receptacle on exterior of building for mobile MRI, lithotripsy, or oncology units.

### C. Lighting:

1. Generally, interior lighting will be fluorescent type. Downlights will be compact fluorescent. High bay areas will be provided with high intensity discharge (HID) type luminaires. Incandescent lighting will be used where limited dimming and special architectural effects are required. LED stencil face aluminum or recessed edge-lit type exit signs will be used.

### D. Emergency Power Supply System:

1. The emergency power supply system will include an engine-generator set, with control panel, automatic transfer switch systems, remote annunciator panel, and accessories to automatically supply power during a utility power failure. The system will assume the emergency power load within 10 seconds after a utility power loss.

### E. Lightning Protection System:

1. A lightning protection system will be provided, and will be the concealed type installed in compliance with UL master Label C requirements.

### F. Telecommunications Systems:

1. Telephone System:
  - (a) The telephone system will include provisions for raceway systems, telephone backboards, and outlet boxes.
2. Data Cabling System:
  - (a) Raceway systems, backboards and outlet boxes will be provided for computer network cabling.

### G. Fire Alarm System:

1. General
  - (a) The fire alarm system will be a supervised, local protective signaling system employing multiplex communication and individually addressable initiating devices.
  - (b) All wiring will be installed in metallic raceways. Wiring shall conform to NFPA 72 Article 760.

## DESCRIPTION OF MECHANICAL AND ELECTRICAL SYSTEMS

2. Control Equipment:
  - (a) Control equipment will be modular in construction, UL listed, and housed in a recessed steel cabinet. Operating voltage will be 24V dc. Standby power will be furnished by a 24 hour self-contained emergency battery power supply.
  - (b) A digital alarm communicator transmitter (DACT) will be provided to transmit fire alarms to a remote monitor station.
3. Remote Annunciators:
  - (a) Remote annunciators will be LCD display type to mimic all outputs from the main fire alarm control panel and will be provided at a location convenient to the building occupants and the fire department.

END

### IV. FIRE PROTECTION

- A. General:
  1. Design Criteria:
    - (a) The building will be protected throughout by automatic sprinklers.
- B. Sprinkler System:
  1. Piping will be sized by hydraulic calculations. Mechanical rooms, shops, locker rooms, and storage areas will be classified ordinary hazard. Other areas will be classified light hazard. Hydraulic design criteria will be in accordance with NFPA 13.
- C. Piping:
  1. Aboveground piping will be black steel with threaded, grooved, or welded fittings. Piping 2" and smaller will be schedule 40 and pipe 2.5" and larger will be schedule 10. No plain-end fittings, strap-on branch outlets, or couplings employing set screws will be used. Pump suction piping and piping subject to alternate wetting and drying will be galvanized. Underground piping will be cement-lined ductile iron with mechanical joints. Underground piping will be anchored with concrete thrust blocks and tie rods. Provide a post indicator valve with position monitor switch.
- D. Fire Pump (if required):
  1. Fire pumps will be electric motor driven and will include a motor controller with power transfer switch.

END

### V. SPECIALTY SYSTEMS

- A. Voice and Data Cabling Systems:
  1. The voice and data cabling system will be a manufacturer-certified system that warrants channel performance. It will support administrative telephone service and high speed data distribution. It will consist of backbone distribution cables, horizontal distribution cables, and patch cables.
- B. Nurse Call Systems:
  1. Audio/visual nurse call (AVNC) systems will provide for voice response to audio and tone calls for assistance from patients and staff. Features will include the following:
    - (a) Two-way voice communications.
    - (b) Code blue station.
    - (c) Emergency stations.
    - (d) Patient stations.
    - (e) Staff intercom stations.
    - (f) Zone light activation.
    - (g) Room status system.
- C. Security Systems:
  1. The electronic security systems will include an integrated system of intrusion, access control and alarm monitoring, and closed circuit television (CCTV) surveillance.
- D. Satellite Master Antenna Television (SMATV) Systems:
  1. One-way television distribution over single coaxial cable plant with sufficient capacity to support 60 channels of television programming (450 MHz).

END OF SECTION

**U.S. Department of Health and Human Services  
Health Resources and Services Administration**

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### **Document**

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