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In developing the design alternatives, FP&C retained the services of Blitch Knevel and NBBJ Architects to develop the designs for the proposed UMC site in the area bounded by Canal Street, S. Galvez Street, Tulane Avenue and S. Claiborne Avenue. The Design Team developed the designs as part of the continuing refinement of the Functional Space Program (Master Plan) for the new UMC, which Adams Management Services Corporation (Adams) originally created in May 2007 (Adams 2007). The Schematic Design effort retained as its focus the project vision set forth during the initial master planning effort:

> *The revitalization of the Medical Center of Louisiana will create a landmark for human-centered experiences by reinforcing existing and forging new links among the universities, healthcare providers, business and the community.*

A. Design Principles

The "Hospital" component of the new UMC has two major functions: 1) Inpatient Beds, and 2) Diagnostic and Treatment (D&T). In addition, the UMC has an outpatient clinic function. While these areas are distinct components for the purposes of developing a master space program, the vision of the new facility as design moves forward has focused on the integration and appropriate placement/adjacencies of these functions to:

- Reinforce the facility's existing service lines and areas of expertise (such as Trauma, Mother and Child, and Behavioral Health),
- Create opportunities for growing service lines through co-location of related areas (such as Cancer Care), and
- Provide flexibility to develop new service lines in response to the future healthcare needs of the community they serve.

Inpatient Beds

The inpatient beds encompass the full spectrum of inpatient care needs, from medical/surgical and Intensive Care Unit (ICU) beds to behavioral health and acute rehabilitation beds. The proposed project would have 424 inpatient beds. The design principles for the inpatient units include:

- Private patient rooms and bathrooms;
- Creation of a universal template to standardize inpatient beds and allow long term flexibility;
- Implementation of a semi-open flexible nursing core;
- Focus on creating healing environments which support patients and families through design, materials and natural light;

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- Balance of decentralized and team care areas;
- Operational efficiency and flexibility; and
- Support for academic activities integrated with bedded care.

Diagnostic and Treatment

The D&T component of the new facility encompasses a wide range of services focused on both the inpatient and outpatient populations, as well as the full range of logistical and ancillary support services needed to run the facility. The D&T functions provide initial access to the facility through Central Admitting, Emergency/Trauma, Radiology, as well as Surgical/Interventional Services. Some guiding principles in programming and designing these components include:

- Infrastructure to support the most advanced technology available;
- Creation of efficiencies through adjacencies of related diagnostic services and parallel outpatient services;
- Appropriately sized services to meet projected volumes and reasonable growth;
- Allow for logical, simple expansion and integration with new service lines;
- Ease of access for patients walking, in wheelchairs, and in beds;
- Provide intuitive layout and way-finding; and
- Focus on creating healing environments, which support patients and families through design, materials and natural light.

B. Design Development Process

Functional Relationships

In an idealized Academic Medical Center, there is a strong functional relationship between the four main program components of Inpatient, D&T, Outpatient Clinics, and Research and Teaching. In planning the sequence of healthcare delivery, it is critical to position D&T so that it is accessible to both Inpatient and Clinics. Figure 1 shows this relationship.

As shown in Figure 2, once the idealized relationships were determined, the design team analyzed the actual shapes of the proposed buildings when placed in various layouts that mimic the idealized functional relationships. Given the critical adjacencies, arrangements for the program components are limited.

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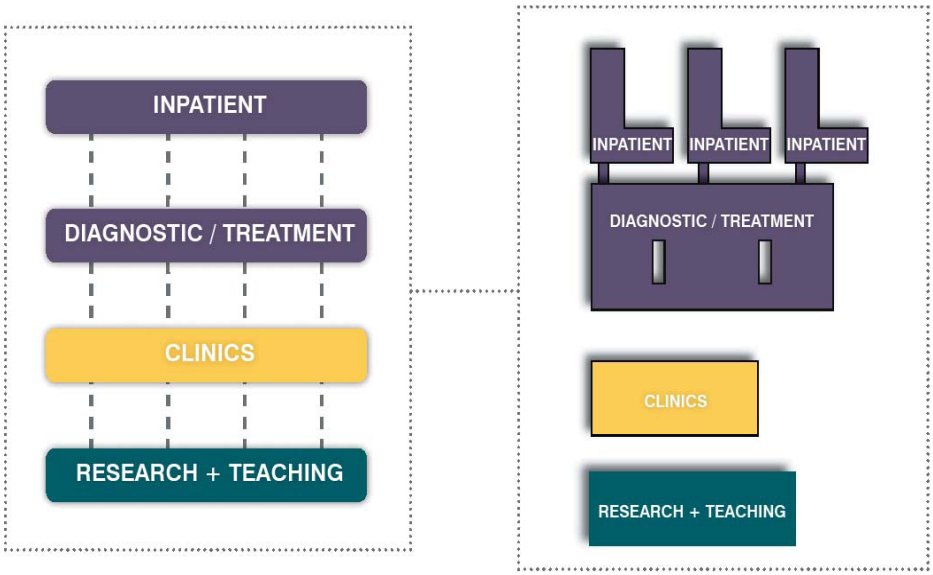
Figure 1 Idealized Functional Relationships for an Academic Medical Center

Figure 2 Idealized Medical Center and Medical Center Design Configuration



The design team compared three different options to the idealized medical center layout in order to determine the best configurations for the proposed UMC. The E-Configuration (Figure 3) creates an E-shaped circulation that links the major functional/program elements. The proximity of the Inpatient, D&T, and Clinic functions is good.

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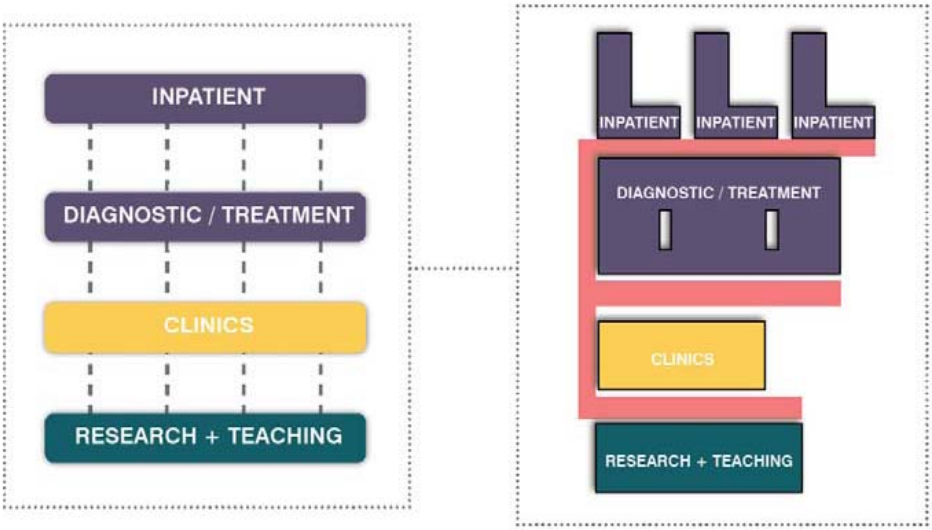
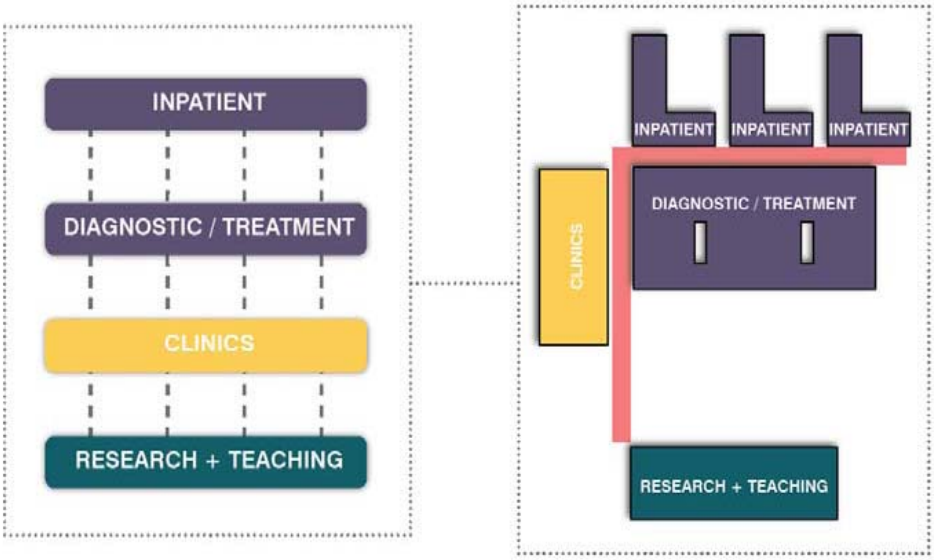
Figure 3 E-Configuration



The L-Configuration (Figure 4), creates an L-shaped circulation that maintains the proximity provided by the E-Configuration between the Inpatient and D&T functions. It provides closer proximity between the Inpatient and Clinic functions.

Figure 4 L-Configuration



The third option, the T-Configuration (Figure 5), turns the D&T function so that it is perpendicular to the Inpatient towers. This results in longer travel distances from parts of D&T to the Inpatient beds. This could be a hardship on patients, staff, and family.

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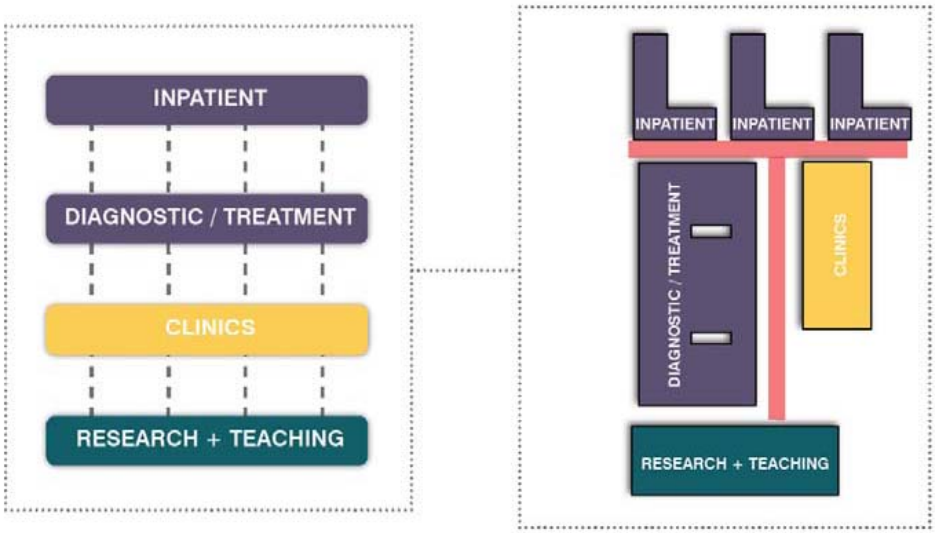
Figure 5 T-Configuration



Stacking Scenarios

Once the design team identified the most favorable functional relationships and building configurations, they evaluated four stacking scenarios to determine the optimal relationship between height and distribution of the buildings. These scenarios included a 12-floor, 8-floor, 6-floor, and 4-floor D&T configuration. The design team evaluated all of these stacking scenarios using the following criteria:

- **Departmental adjacencies and efficiency** – creation of horizontal and vertical adjacencies that promote increased efficiency, continuum of care and effective care models, as well as enhance areas of expertise and Centers of Excellence;
- **Travel distances** – minimize the travel distances between the Inpatient beds and Clinics with the Diagnostics and Treatment, areas of expertise, and Centers of Excellence;
- **Circulation and Wayfinding** – development of a simple logical circulation system, which addresses the needs of patients, families/public, staff, and materials;
- **Future Expansion** – creation of a model that allows for logical future growth or addition of new service lines, in a cost-effective, minimally disruptive manner, and maintains the overall facility organization and image;
- **Environmental Impact** – such as shadows, views/aesthetics, and scale;
- **Structural Systems/Foundations** – Structural and foundation systems vary for taller building masses vs. lower buildings, which have higher site coverage. The

type of structural system employed and its relative weight would greatly influence the piling and foundation strategies;

- **Building Skin** – Exterior building skin impacts quality of space and availability of light for occupant;
- **Selection of building envelopes need to address** – energy efficiency; ease to repair in case of storm damage; be lightweight and not adversely contribute too much dead load; not susceptible to water damage; withstand hurricane wind pressures; and afford ease of construction and installation;
- **Shelter in place -** all critical services would be on the second floor or higher, and would be at 22-feet above the existing grade, which would allow for hospital operations to continue for a minimum of seven days in the event of a major flood;
- **Finishes** - Industry standard finishes would be included in the cost estimate. Although Leadership in Energy and Environmental Design or LEED certification has not been identified as a goal for this project, reasonable efforts would be made to select sustainable materials and processes that would not adversely affect the project scope or budget;
- **Site work/Site circulation** – providing intuitive access and site circulation to entries, parking, and service components;
- **Mechanical and Electrical Systems** – creation of concepts which simplify distribution of mechanical and electrical systems, minimize duct and cable runs, and allow for standardized assembly, construction, maintenance, and expansion. The mechanical design would exceed the energy code by 30 percent; and
- **Image/Visibility** – identifiable image, which instills a sense of confidence and technology, while maintaining a human scale and creating a healing environment.

The 4-story scheme resulted in excessive travel distances and high footing costs. The 8-story scheme did not provide an ideal scenario for integration of Inpatient and D&T functions. The results of the evaluation showed that the 6-story stacking model best met the requirements of the proposed project. The design team also tested the 6-story stacking diagram for site fit.

Orientation on the Site

Once the design team identified the stacking configuration for the proposed project, they developed 20 configurations for building placement on the site. The configurations were created by placing the various functional relationship configurations on the site oriented to the four main streets – Canal Street, S. Galvez Street, Tulane Avenue, and Claiborne Avenue. The ten configurations that orient the facility towards Claiborne Avenue and S.

Galvez Street were eliminated because of the desire to acknowledge the significance of Canal Street as the ceremonial entrance. The design team evaluated the remaining options using the following criteria:

- **Expandability of major program element** – The design needs to accommodate a minimum of 50 percent expansion for the diagnostic/testing and inpatient towers. In addition, the design developed strategies for future clinics and structured parking.
- **Orientation to major institutions and streets** – The building placement needs to acknowledge the significance of Canal as the ceremonial entrance. The intent is for the buildings to create a campus-like environment that encourages links to the Health Sciences Campus and the proposed adjoining Veterans Affairs Medical Center.
- **Ease of circulation between major program elements –** The placement of the clinic entries and hospital entries needs to accommodate at grade and elevated pedestrian circulation. In addition, internal campus pedestrian links need to connect to surrounding perimeter pedestrian connections.
- **Clarity of Wayfinding** – The design needs to demonstrate a clarity of wayfinding for outpatient, inpatient, visitor, vendor, service, emergency ambulance, emergency walk-in, shuttle, and staff vehicular circulation
- **Central Energy Plant Placement –** The design assumes that the central energy plant placement is at the corner of Claiborne and Tulane Avenues.
- **Helipad Location –** The design addresses the need for helicopter access and approach.
- **Consideration of Culturally and Historically Significant Structures –** The design needs to consider alternatives that explore potential for preserving Deutsches Haus and Orleans House.

Materials

As part of the process for identifying materials for the proposed UMC, the Design Team looked at the context of the facility and took into consideration the patterns, shading, color, and texture of other institutional and non-institutional buildings in the Mid-City area. The design team reviewed the character and physical attributes of the Mid-City Historic District to ascertain any cues for an appropriate expression for the exterior materials selection. In reviewing the district's character a definitive pattern emerged: the majority of the structures are free standing wood framed residential structures with wood skin, and larger commercial and institutional buildings, schools and churches, are

comprised of brick and stucco. Table 2-1 shows the results of the detailed comparison of two candidate building materials.

Table 1 Detailed Comparison of Two Candidate Building Materials

	Brick, or Masonry Veneer Cavity Wall Construction	Pre-Cast Concrete Panels
Air and Water Infiltration	Excellent when constructed properly; cavity must be divided into compartments, must include a continuous air barrier, must have weeps that both allow water to drain out and pressure to build within the cavity, and must have ventilation	Excellent when panels have double sealant joints and a weep tube
Durability and Maintenance	Very durable, but would require re-pointing on approximately 20 year intervals	Panel sealant joints must be replaced every 20-30 years, less labor intensive than re-pointing brick
Impact resistance	Has not been tested or passed the American Society for Testing and Materials (ASTM) 1886/1996 missile type 'D' test	Has been tested and has passed the ASTM 1886/1996 missile type 'D' test, with little or no repair of the panel faces required
Quality, Constructability and interface with other exterior systems (windows, etc)	Requires skilled field labor for high quality construction, and has several detailed construction requirements to ensure quality and durability	Fabricated off-site in a controlled factory environment; skilled field labor is limited to sealant joint work
Impacts on structural framing	Requires higher gauge structural stud framing on facades with higher than normal floor to floor heights, to support brick veneer weight without excess stud deflection	

Source: NBBJ 2009b

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The design Team recommended the pre-cast concrete panels as the exterior material for the UMC because the panels simulate stucco, which is consistent with existing large-scale Mid-City institutional buildings, without the maintenance requirements of stucco, and the panels meet the requirement to withstand hurricane force winds and impacts.

Design Sustainability

Sustainable approaches were used in the design and construction of the proposed UMC. These approaches would improve operational efficiencies, reduce energy consumption and cost, and add long-term value. The design team considered sustainable approaches in six categories:

- **Flexibility –** The design would pursue adaptable planning principles that ensure the long-term facility use.
- **Sustainable Site Planning –** The design team is considering a series of sustainable site technologies, such as, rainwater and stormwater collection, Brownfield redevelopment, reduction of heat island effect, pervious paving, bio-swales, and bio-infiltration. Climate-sensitive site design and orientation would contribute to a lower building energy use.
- **Healthier Indoor Air Quality and Materials –** To the greatest extent possible, low-emitting materials would be considered and minimizing exposure to hazardous indoor pollutants and chemicals. Where options are available for materials, those with less or no known risk would be preferred.
- **Energy Efficiency –** The State of Louisiana requires new construction to achieve an energy performance 30 percent greater than what is required in the 2004 edition of American National Standards Institute (ANSI) and American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) (ANSI/ASHRAE/ IESNA 90.1-2004). This mandate heightens the energy performance criteria for the new facility. The design team is exploring opportunities for passive conditioning strategies, as disaster preparedness is a key priority for this facility.
- **Water Use and Conservation –** The design team is evaluating strategies for reducing the usage of potable water, irrigation and waste water system. Reducing demand for potable water would enable the hospital to operate more efficiently under both normal and extreme circumstances.
- **Healing Environments –** Ensuring patient and staff access to nature is a key design goal. The design team is looking for opportunities for gardens as part of the design.