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Health.*



**Milwaukee County Behavioral Health Division
Replacement Hospital Program Study**

**Final Report: Narrative Volume 1
7.27.2015**

**Milwaukee County Behavioral Health Department
Replacement Hospital Program Study
Author: Francis Murdock Pitts FAIA, FACHA
July 27, 2015**

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Executive Summary

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Executive Summary

Zimmerman Architectural Studios (ZAS) and their sub-consultant architecture+ (a+) were engaged by the Milwaukee County Mental Health Board on February 28, 2015 to assist the County in determining the size and cost of facilities needed to support the County's Behavioral Health Division's (BHD) mission.¹

The County's opportunities to improve and broaden mental health services while providing greater economic efficiencies and therapeutic efficacy are the subject of a number of reports and studies furnished to the ZAS/a+ team at the outset of this engagement. The recommendations within this report are cognizant of and consistent with the major findings of those studies.²

This portion of the Study is focused on what the County's needs would be if it were to replace the existing County Hospital's inpatient facilities. There have been discussions of a subsequent report that may detail the space needs and costs associated with BHD's outpatient, community support and central administration functions.

On the basis of current and future bed-utilization patterns and acknowledging the operating efficiency break points for small mental health services, a+/ZAS was directed to develop a space program for an 96 bed hospital that included an additional 26 treatment recliners in a Psychiatric Crisis Service (PCS) organized with the following inpatient units:

¹ See Appendix C for Mission Statement.

² See Appendices A and B for list of prior reports and summary of major conclusions.

	Beds/Unit	# of Units	Total Beds
Acute Adult Inpatients	24	1	24
Acute Adult Inpatients	18	2	36
Child and Adolescent Unit	18	1	18
PCS Observation Beds	18	1	18
		Subtotal	96
PCS Treatment Recliners			26
		Total	122

This study was conducted using a methodology that is informed by both external datasets, applicable codes and regulations, and the needs expressed by the leadership of the individual operating departments of the hospital. Study participants from the hospital were involved in an initial visioning session designed to establish priority goals and objectives. A detailed questionnaire distributed to each operating department was the source for an initial needs statement and quantification of variables that would drive the size, quality and configuration of facilities for individual departments.³ Two additional rounds of face-to-face interviews were scheduled to discuss and amplify the questionnaire responses and to review the program statement developed by architecture+ in response to user input. The study methodology utilizes comparisons with peer institutions and a predictive modeling tool to modulate and validate needs expressed during the questionnaire and interview process.

On April 26, 2015 the Mental Health Board determined that a Request for Proposal would be issued for a alternate providers to develop and operate the inpatient service that was the subject of this programming study. Recognizing that the operational needs of a alternate provider could differ from those developed using this study's methodology, the ZAS/a+ team was asked to abridge this study in a manner that provided a valuable guidance document for the County's use and that preserved the study's integrity so that it could be readily built upon in a manner consistent with the eventual direction selected by the County at the conclusion of the pending RFP process. Accordingly this study has been concluded in a manner where the logical next step would be to review this program with the eventual provider and to adjust it based upon their input.

A new free-standing inpatient facility designed to accommodate the patient cohort described in prior reports and in the data supplied by the County to ZAS/a+

³ See Appendix C for list of departments and working-group organization.

would be 166,373 building gross square feet in size (bgsf).⁴ Using 122 beds as a divisor, reflecting the relatively unique comparative variable provided by the PCS, this size provides 1,364 square feet (sf) per bed. This size is slightly higher than the overall average for our peer dataset but almost exactly matches the 1,348 sf for comparable peer facilities in the data set.⁵ A deeper comparative analysis of inpatient unit and adjunctive therapy space allocations finds that the 1,025 sf/bed programmed for Milwaukee by ZAS/a+ is nearly equal to the average of 1,028 sf/bed for all hospitals in the data set.⁶

architecture+ bases our projection of probable construction costs for psychiatric hospitals on a standardized analysis of the actual cost of construction of hospitals in our dataset. Costs in the dataset are harmonized using nationally published location cost factors and historical cost indexes. Using this methodology, all costs in the dataset are restated as though each hospital was built in Milwaukee, Wisconsin with a bid date during the first quarter of 2017. Based on this analysis a+/ZAS recommend that a \$472/sf average cost should be used and project construction costs for the Milwaukee replacement hospital at \$78,500,000.⁷ With the addition of 26% to this for soft costs total project costs would be \$98,950,000 plus land acquisition and debt servicing costs.⁸ The methodology used to arrive at these projections can be found on pages 18 and 19 of this report.

The conclusions stated in this summary are valid for a public safety net hospital operated by Milwaukee County as a public provider. Alternate providers generally have a focus on a different patient cohort and shorter lengths of stay. Alternate providers also have very different abilities with respect to capital structures and much shorter investment time horizons. Accordingly, capital and square footage allocations for alternate providers are not likely to initially reflect the investments necessary for the Psychiatric Crisis Service, nor should they be expected to invest in as many square feet per bed or dollars per square foot in construction as a public provider.

⁴ See Appendix I for the complete space program.

⁵ See Appendix H.

⁶ See Appendix H.

⁷ See Appendix L for the construction costs dataset and the Construction Costs narrative of this report for further discussion of the methodology utilized.

⁸ See Appendix M for a List of Soft Costs

Report (Volume 1 of 2)

Methodology

Zimmerman Architectural Studios (ZAS) and their sub-consultant architecture+ (a+) were engaged by the Milwaukee County Mental Health Board on February 28, 2015 to assist the County in determining the size and cost of facilities needed to support the County's Behavioral Health Division's (BHD) mission.⁹

The County's opportunities to improve and broaden mental health services while providing greater economic efficiencies and therapeutic efficacy are the subject of a number of reports and studies furnished to the ZAS/a+ team at the outset of this engagement. The recommendations within this report are cognizant of and consistent with the major findings of those studies.¹⁰

In general, prior studies¹¹ have concluded that mental health services in the County would be improved with concurrent reductions in bed need for the care of high acuity and indigent patients at the Milwaukee County Mental Health Complex (MCMHC) or elsewhere through a series of strategies that

- increased community-based outpatient service capacity,
- optimized the use and mission of initial crisis response and in treatment in the Psychiatric Crisis Service (PCS) and Observation Beds, and
- improved collaboration and communications to ensure availability of system-wide inpatient capacity using existing private hospital beds

In September of 2014 the Human Services Research Institute, Technical Assistance Collaborative, and the Public Policy Forum recommended that *"Using the upper range of beds needed in the system to meet demand (188 beds), 54 to 60 adult inpatient beds should be maintained to serve high--acuity and/or indigent patients and roughly 128 to 134 beds should be maintained to serve low- to moderate--acuity patients."*

The State of Wisconsin, Department of Health Services' authored Report on Mental Health Service Delivery in Milwaukee County (December 2014) discussing high acuity/ indigent patient bed need concluded that

"The (HSRI) report indicates general agreement among stakeholders that 54-60 adult inpatient beds are needed to serve the highest acuity adults. However, it could be argued that fewer beds would be needed if a greater emphasis were placed on crisis services and other community based programs since the current facility has a staffed

⁹ See Appendix C for Mission Statement.

¹⁰ See Appendices A and B for list of prior reports and summary of major conclusions.

¹¹ See Appendices A and B, List of Prior Studies and Summary of Milwaukee County Clinical Services Reports

operating capacity of 60 adult beds and operates beyond the scope of a true “safety net” facility.”

While reports have indicated a need for 54-60 beds, there is a strong community commitment for the provision of 60 beds capacity for inpatients currently served by the County.

This portion of the Study is focused on what the County’s needs would be if it were to replace the existing MCMHC’s inpatient facilities. There have been discussions of a subsequent report that may detail the space needs and costs associated with BHD’s outpatient, community support and central administration functions.

On the basis of current and future bed-utilization patterns and acknowledging the operating efficiency break points for small mental health services, a+/ZAS was directed to develop a space program for an 96 bed hospital that included an additional 26 treatment recliners in a Psychiatric Crisis Service (PCS) organized with the following inpatient units:

	Beds/Unit	# of Units	Total Beds
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		Total	122

This study was conducted using a methodology that is informed by both external datasets, applicable codes and regulations, and the needs expressed by the leadership of the individual operating departments of the hospital.

Study participants from the hospital were involved in an initial visioning session that included a review of hospitals developed recently elsewhere and project drivers encountered in those new hospital projects. The visioning process was designed to establish priority goals and objectives.¹²

¹² These are summarized in Appendix C. *BHD - Consolidated Facilities Plan, Mission and Vision*

User Groups were identified by evaluating the operating departments of the Hospital and identifying significant operating or clinical interrelationships. Forty-five hospital departments were organized into eight user groups with recommendations on representation and charge being distributed to the project's steering committee.¹³

A detailed questionnaire was developed and distributed to each operating department. Responses to the questionnaire¹⁴ became the source for an initial needs statement and quantification of variables that would drive the size, quality and configuration of facilities for individual departments.¹⁵ Two additional rounds of face-to-face interviews were scheduled to discuss and amplify the questionnaire responses and to review the program statement developed by architecture+ in response to user input.

The study methodology utilizes comparisons with peer institutions and a predictive modeling tool to modulate and validate needs outputs from the questionnaire and interview process. The results of this benchmarking, modeling, and comparative analysis is discussed later in this report.

On April 26, 2015 the Mental Health Board determined that a Request for Proposal would be issued for alternate providers to develop and operate the inpatient service that was the subject of this programming study. Recognizing that the operational needs of an alternate provider could differ from those developed using this study's methodology, the ZAS/a+ team was asked to abridge this study in a manner that provided a valuable guidance document for the County's use and that preserved the study's integrity so that it could be readily built upon in a manner consistent with the eventual direction selected by the County at the conclusion of the pending RFP process. Accordingly this study has been concluded in a manner where the logical next step would be to review this program with the eventual provider and to adjust it based upon their input.

Benchmarking and Peer Institutions

Predicting or benchmarking the size of a psychiatric hospital is an art, not a science. Comparisons can only be safely made with an understanding of the underlying facts about the individual hospitals being compared. The outcome of such analysis needs to be understood in the context of the significant factors that can influence a hospital program's size and sf/bed comparative metrics:

- Number of beds: In general, the greater the number of beds in a hospital the fewer square feet are needed per bed. Hospitals with under 100-120 beds are

¹³ See Appendix D - User Group Organization

¹⁴ See Appendix E - User Group Organization

¹⁵ See Appendix C for list of departments and working-group organization.

significantly less efficient users of support and common, adjunctive therapy, clinical ancillary and administrative spaces than larger hospitals.

- Number of beds on an inpatient unit: In general, the greater the number of beds in an inpatient unit the fewer square feet are needed per bed. Inpatient Units with 16 beds are, as an example, significantly less efficient users of on-unit nursing support and common, adjunctive therapy, clinical ancillary and administrative spaces than are 24 bed units. A smaller 16 bed unit will have 23% more square feet per bed than a 24-bed unit.
- Number of private beds: A higher percentage of private beds will increase a hospital size by 100 bgsf/bed for every bed that is in a private versus a semi-private room.
- Use of medical model bedrooms: In some regions, and particularly for psychiatric hospitals associated with general hospitals, bedroom sizes are increased in order to accommodate potential use as medical/surgical beds. This can nearly double the space allocated for individual bedrooms.
- Sub-cluster model inpatient units: In hospitals designed to operationalize around inpatient units organized using 8-12 bed semi-autonomous sub-clusters, the size of the resulting hospital can increase by as much as 48 bgsf/bed.
- Corridor width: A simple move from the permissible 6 foot wide corridor in an inpatient unit to the frequently requested 8 foot wide corridor will add as much as 11% to the size of an inpatient unit.
- Acuity, Average Length of Stay, Treatment Objectives: Higher acuity, a longer average length of stay, and intensive on-site/off-unit adjunctive therapy treatment will all increase the amount of space needed per bed.
- Public/Private, For Profit/Not for Profit: Investment time horizons, staffing levels, acuity, and the cost of capital are all variables impacted by the basic nature of the hospitals organization. All have a tendency to result in public hospitals being built with a higher number of square feet per bed.

architecture+ uses a number of tools to either predictively model the size of a proposed hospitals program or to cross-check that program against peer institutions.

- A predictive modeling tool that was developed in the early 1990's and revised in 2010 and again in 2012 on behalf of a one of the world's largest multi-site providers of mental health services. This tool was built to predict probable size of hospitals in terms of the total hospitals size and the size of individual departments within the hospital. The source data for developing the original modeling tool was a national survey of psychiatric services providers cross-referenced against support and administrative departments for a wider range of healthcare providers. This analysis provided a formula for calculating the size of each individual department based upon department specific variables. The 2012 tool refresh used regression analysis techniques to analyze departmental size data against a simpler set of variables and developed both natural logarithmic and simple arithmetic formulas develop departmental size predictions in a manner consistent with the evidence in the dataset. It is

augmented by calculations that add or subtract space based upon a number of independent variables that account for significant differences between and among hospitals in the dataset. The results of these numbers are highly reliable for free-standing hospitals that are publicly operated. The results are less reliable for smaller hospitals operated on a for profit basis.¹⁶

- A second evaluation tool is a heads-to-heads benchmarking comparison of the projected program's total size against that of other institutions. The Comparisons from the data set yield comparative data for entire hospitals in terms of bgsf/bed.¹⁷
- A third evaluation tool compares solely the amount of space provided per bed for inpatient units and adjunctive therapies. This tool has significant value for smaller hospitals with unit sizes that are typical of those in the balance of the data-set.¹⁸

A new free-standing inpatient facility designed to accommodate the patient cohort described in prior reports and in the data supplied by the County to ZAS/a+ would be 166,373 building gross square feet (bgsf) in size.¹⁹ Using 122 beds as a divisor, reflecting the relatively unique comparative variable provided by the PCS, this size provides 1,364 square feet (sf) per bed. Overall, the hospital, as programmed, is significantly smaller than the predictive modeling tool results shown in Appendix G. Much of this variance is attributable to the Milwaukee program including far less clinical ancillary and adjunctive therapy space than the typical state hospital data informing the modeler. This 1,364 sf per bed programmed is, however, slightly higher than the overall average for our whole-hospital peer dataset but almost exactly matches the 1,348 sf for comparable peer facilities in the dataset.²⁰ A deeper comparative analysis of inpatient unit and adjunctive therapy space allocations finds that the 1,025 sf/bed programmed for Milwaukee by ZAS/a+ is nearly equal to the average of 1,028 sf/bed for all hospitals in the data set.²¹

The conclusions stated in this summary are valid for a public safety net hospital operated by Milwaukee County as a public provider. Alternate providers generally have a focus on a different patient cohort and shorter lengths of stay. Alternate providers also have very different abilities with respect to capital structures and much shorter investment time horizons. Accordingly, capital and

¹⁶ See Appendix G - Benchmarking Tool

¹⁷ See Appendix H1 BGSF vs Peer Hospitals

¹⁸ See Appendix H - Clinical Space BGSF per Bed for Similar Facilities

¹⁹ See Appendix I for the complete space program.

²⁰ See Appendix H.

²¹ See Appendix H.

square footage allocations for alternate providers are not likely to initially reflect the investments necessary for the Psychiatric Crisis Service, nor should they be expected to invest in as many square feet per bed or dollars per square foot in construction as a public provider.

Licensure, CMS Conditions of Participation and Accreditation

Regulations and standards guiding the design and construction of the County's new hospital are derived from a variety of sources:

- The first of these are the State of Wisconsin's own regulations as promulgated in DHS 124.
- It is a mandate of both DHS 124 and Federal reimbursement statute that the hospital be accredited by the Joint Commission for the Accreditation of Healthcare Organizations (JCAHO) or a similarly accredited agency. JCAHO's *Environment of Care Standards*, in turn, require compliance with other national standards.
- The ability to secure federal funding for the facility requires that the facility meet the regulatory requirements stipulated by the Centers for Medicare and Medicaid Service (CMS).
- As a public amenity, the new hospital is required by the Americans with Disabilities Act to meet the standards of the the *ADA Accessibility Guidelines (ADAAG)*.
- Finally, the County's ability to secure a building permit requires that the project meet the requirements of the State of Wisconsin's Building Code and it's attendant reference standards.

Details regarding the applicability of additional reference standards derived from these statutory and reimbursement Certificate of Participation (CoP) conditions are outlined below.

State of Wisconsin Regulations

As specified in DHS 124, the physical environments of hospitals are required to meet a series of minimum standards. These appear to be fairly similar to those enumerated in the FGI guidelines and these are summarized in Appendix F.

While DHS 124 specifically excludes the Milwaukee County Hospital from it's requirements, it is not settled law that operators providing beds for the County's use would also be excluded.

JCAHO Environment of Care Standards

The Joint Commission on the Accreditation of Healthcare Organizations is the Nation's prevalent accrediting organization for hospitals. Accreditation by JCAHO is required by State regulation and either accreditation or equivalence is a Certificate of Participation (CoP) by CMS. JCAHO has established standards for the hospital environment which are enumerated in the *current edition of the Comprehensive Accreditation Manual for Behavioral Health Care (CAMBHC)*. These are also accessible via the *Environment of Care: Essentials for Health*

Care, Current Edition and abstracted with a focus on behavioral health care facilities in their *Standards for Behavioral Health Care*.

JCAHO requires compliance with the NFPA Life Safety Code, NFPA-102 (EC1.5.1). JCAHO also requires compliance with the ADAAG (see EC 3.1 Intent Commentary). While the standard of providing care in the “least restrictive environment” is inherent in the Olmstead decision, additional weight is given to the need for a “least restrictive environments approach by the intent language of EC 3.1.8.

Centers for Medicare and Medicaid Service (CMS)

CMS regulations govern the granting of a Certificate of Participation (CoP), which is a pre-requisite for federal reimbursement funding under the Medicaid and Medicare programs. The principal impacts of the CoP requirements are that a facility be JCAHO accredited and that a facility be designed to meet the requirements of the NFPA Life Safety Code, NFPA-101: 2000 Edition.

FGI Guidelines for Design and Construction of Hospital and Health Care Facilities

The FGI Guidelines are a national consent document that is amended approximately every four years. This document has been adopted by over forty States as the basis for regulatory language guiding the design and construction of hospitals. The current edition of the Guidelines was promulgated in 2014.

A summary table comparing key requirements of the 2010 and 2014 editions of the *FGI Guidelines*, is appended to this document.²²

Life Safety Code, NFPA 101

As indicated below, NFPA’s Life Safety Code: NFPA-101, 2000 Edition has been adopted as a reference standard by almost all of the regulatory and accrediting organizations governing the design of the hospital. Chapter 18, New Healthcare Occupancies provides the primary guidance for life safety features. The use of locked doors in exits is permissible if staff has keys to these exits.

Wisconsin State Building Code

The State of Wisconsin has adopted the International Building Code.

ADA Accessibility Guidelines (ADAAG)

²² See Appendix F - Space Checklist Based Upon Applicable Licensing and Accreditation Standards

As a public accommodation, the new hospital is subject to the requirements of the Americans with Disabilities Act. The *ADA Accessibility Guidelines* (ADAAG) are promulgated by the Federal Access Board as the regulatory standards for achieving physical compliance with the ADA. These guidelines, as amended through are available at the Access Board's web site <http://www.access-board.gov/adaag/html/adaag.htm>, as are proposed modifications to the standards.

Key items of the ADAAG impacting the hospital include a requirement that at least 10% of patient rooms and bathrooms be completely accessible and a requirement that accessible grab bars be used wherever accessibility is mandated. At this time, only open loop grab bars meet the ADA requirement for accessibility. Open loop grab bars pose an additional risk factor in the hospital environment and their use is prohibited by the *FGI Guidelines*.

Further Conditions for Medicare/Medicaid Participation

Laws and regulations governing reimbursement opportunities for the Commonwealth's new state hospital are a complicated mix of federal and state sources. Federal legislation is primarily embodied in Title XVIII, XIX, and XXI of the Social Security Act, as amended. Significant amendments include the Balanced Budget Act of 1997 and the Disproportionate Share Hospital Payments act. Relevant Federal regulations are published and updated quarterly in the Federal Registrar. Relevant sections are listed below. A variety of State legislation, which either are required by or support Federal legislation, in combination with various state acts governing mental health, insurance and health care policy and finance are codified in the state regulations.

- 42 Code of Federal Regulation, including Centers for Medicare and Medicaid Service (CMS) Regulations and Rules of the Administrator, and State Waiver and Demonstration Programs

Federal and State laws and regulations provide for different reimbursement rules depending upon the age of the patient. There are three major categories: Children and Adolescents – age less than 21 years old; Adults – age 21 to 64 years old; and Elders – age 65 years and older. The specific group of federal and state regulations that govern reimbursement will depend upon the age group.

- Children and Adolescents – age less than 21 years old

Federal law provides for reimbursement through Medicaid as defined by the State Waiver and Demonstration Program Plan for this population. In addition to the State Plan, reimbursement is available from commercial insurance products.

- Adults – age 21 to 64 years old

Federal law excludes reimbursement through Medicaid for this population when services are provided in an Institution for Mental Disease (IMD). An IMD is defined as a facility of more than 16 beds that is primarily engaged in providing treatment services for individuals diagnosed with mental illness. The State Waiver and Demonstration Program Plan may have established reimbursement for some portion of a patient's stay in an IMD. In addition, reimbursement is available from commercial insurance products.

- Elders – age 65 years and older

Federal law provides for reimbursement through Medicare for eligible members of this population, even when services are provided in an IMD. In addition, reimbursement is available from commercial insurance products.

The combination of federal and state laws and regulations for each group establish different parameters as to the scope and amount of reimbursement available.

Space Program

architecture+ uses standard planning protocols in the development of space programs. The program is broken down first by functional relationship, then by department and finally by individual rooms. The size and quantity of each room is stated with rooms sizes being expressed as net square feet, meaning the space within the walls enclosing the room. Department sizes, including internal circulation and the walls between rooms comprising the department are projected using time tested planning factors and expressed as departmental gross square feet (dgsf). Finally, the size of the whole building, including mechanical and electrical spaces, exterior walls, structure and vertical circulation are projected using a 1.25 planning factor and expressed as building gross square feet (bgsf).

The space program for this project is summarized on the following pages and can be reviewed in its entirety in Appendix I.

FULL PROGRAM

96 BED HOSPITAL (plus 26 PCS)					
Program	NSF	Multiplier	Total DGSF	DGSF/ Bed	Comments
Patient Units - Mentally III					
Acute Adult Adult Units (One 24-Bed Unit)	10,640	1.55	16,491	687	
Acute Adult Adult Units (Two 18-Bed Units)	17,974	1.55	27,860	774	
Adolescent	11,654	1.55	18,064	1,004	
PCS	17,416	1.55	26,995	614	
Sub-Total	57,684		89,410	733	aggregated
Patient Therapy/Activity					
Leadership	120	1.30	156	1	
Leisure Activities	5,730	1.30	7,449	61	
Life Skills	1,010	1.30	1,313	11	
Library /Resource Center	220	1.30	286	2	
Vocational Services	0	1.30	0	0	
Public Relations/Community Educ'r	100	1.30	130	1	
Community Transition Services	0	1.30	0	0	
Volunteer Services	0	1.30	0	0	
Café	0	1.30	0	0	
Salon/Spa	0	1.30	0	0	
Shared Support	1,026	1.30	1,334	11	
Sub-Total	8,206		10,668	87	
Clinical Ancillaries					
Admission/Shared Support	0	1.35	0	0	
Clinic/Physician's Services	0	1.35	0	0	
Dental Clinic	0	1.35	0	0	
Radiology	0	1.35	0	0	
Lab/Phlebotomy	120	1.35	162	1	
Speech Language Services	0	1.35	0	0	
Shared Support	160	1.35	216	2	
Infection Control	120	1.35	162	1	
Pharmacy	1,625	1.35	2,194	18	
Sub-Total	2,025		2,734	22	
Dietary					
Kitchen/Support	3,055	1.15	3,513	29	
Office/Staff	308	1.30	400	3	
Sub-Total	3,363		3,914	32	
Administrative Services					
Admin/Clinical Admin	928	1.30	1,206	10	
Nursing Admin/Nursing Supervisors	248	1.30	322	3	
Human Resources/Payroll	140	1.30	182	1	
Fiscal/Accounting/Business Office	128	1.30	166	1	
Legal Affairs	1,220	1.30	1,586	13	
Lobby Services	1,496	1.30	1,945	16	
Other Shared Resources	1,162	1.30	1,511	12	
Sub-Total	5,322	1.30	6,919	57	
Information Technology & Integration					
Information Technology/MHIS	776	1.30	1,009	8	
Medical Records	0	1.30	0	0	
Quality Assurance/UM/Incident Reporting	192	1.30	250	2	
Switchboard/Communications	264	1.30	343	3	

FULL PROGRAM

96 BED HOSPITAL (plus 26 PCS)					
Program	NSF	Multiplier	Total DGSF	DGSF/ Bed	Comments
Education & Conferencing	3,241	1.30	4,213	35	
Shared Support	450	1.30	585	5	
Sub-Total	4,923		6,400	52	
Facilities Management					
Environmental Services	894	1.15	1,028	8	
Laundry & Linen	910	1.15	1,047	9	
Maintenance Shops	4,282	1.15	4,924	40	
Materials Management	3,478	1.15	4,000	33	
Security and Fire Safety	680	1.15	782	6	
Transportation (Bldg & Grounds)	0	1.15	0	0	
Shared Support and Locker Facilities	1,500	1.15	1,725	14	
Sub-Total	11,744		13,506	111	
Total Net SF (NSF)			93,267		
Total Depart Gross SF (DGSF)			133,549		
Mechanical/Electrical and Connect	(x1.13)		17,361		
Building Gross SF on Other Progra	(x1.12)		15,463		
Total Building Gross SF (BGSF)			166,373		
Number of Patient Beds			122	96+26 PCS	
DGSF/Bed			1,095		
BGSF/Bed			1,364		

As discussed in the Benchmarking and Peer Institutions portion of this report, program size variations can result from a variety of decisions that are particular to an individual project. The attached program reflects a number of variables that have a specific impact upon the program’s size:

- The hospital is relatively small by bed count when compared to peer institutions in our datasets.
- Half of the inpatient units have fewer beds than typical.
- Inpatient units are programmed with sub-clusters.
- All bedrooms are private.
- We were asked to use the US Veterans’ Administration’s Program standards for the dining rooms and serveries. At 30 nsf/bed, the VA Standard would have added 10 nsf per bed plus 100/nsf for every servery and pantry. We compromised by using 25 nsf/bed for the dining room.

The program size compares favorably to a currently planned institution with a similar mission and patient population on the West Coast.

Space availability for active therapy is a frequent driver of facility size. A minimum of 20 hours per week of availability per patient is a generally accepted minimum standard arising out of federal case law and court master directives. An analysis of the program prepared for this facility accommodates as many as 108 hours per patient per week of active treatment for adults (45 of these hours are available on unit with an additional 63 hours available off unit). Similarly, the program accommodates as many as 234 hours of active treatment per patient per week for adolescents (108 of these hours are available on unit with an additional 126 hours available off unit).²³

Finally, the PCS and Observation suite programmed in this report compares favorably to existing PCS space use and reflects a more efficient layout attributable to new construction as opposed to reuse of existing space:

	Existing	Proposed	
PCS	17,500	18,129	
OBS	13,000	8,494	
	30,500	26,623	

²³ See Appendix K - Therapy Space Use and Hours

Staffing

Psychiatric hospital planning and design both impact, and are impacted by, hospital staffing. The program and the plan need to accommodate the staffing levels that are deemed appropriate by both the clinical care plan and the hospital's business plan. A poorly planned or programmed hospital can either provide too few facilities for staff, or it can increase the need for staffing by creating unreasonable inefficiencies.

Staffing size is impacted by a number of independent variables:

- In general, the fewer the number of beds located in a hospital, the larger the staff size will be per bed.
- Unit size is a significant driver of staff size. The smaller the number of beds on an inpatient unit, the larger the staff size that is needed per bed. Similarly, inattention to coverage ratios mandated by clinical protocols, regulation, law or by collective bargaining agreement can inadvertently increase the size of staff needed.
- Higher patient acuity will generally increase the size of staff needed. For example, children's units and psychiatric emergency services both traditionally require more staff per bed than an intermediate stay adult inpatient unit.
- Contracting for services with outside vendors and service providers will generally reduce on-site staffing.

In a large public hospital, staffing ration of between 2.0-3.0 FTE's per bed are fairly typical with 1.0 of these FTE's associated with administrative and support service roles and the remaining 1.0-2.0 FTE's per bed associated with direct care and adjunctive therapies staff.

In Appendix J, architecture+ projects probable staffing size for the proposed hospital and it's on-site support and administrative functions. The projected staffing does not include staffing for any outpatient, community support or central department administration. This staffing model projects the needs for a staff of 454.5 people, or 337.24 FTE's. This is the equivalent of 2.76 FTE per bed with a 122 bed count reflecting the staffing needed for the PCS.

Appendix J also projects the number of offices and workstations that would be required by a staff of this size and composition and compares this on a department by department basis with what is actually carried in the program. We project that a total of 109 workstations and 27 offices would be required by the projected staff. The program provides 185 workstations and 38 offices. The additional workstations and a small number of the additional offices are anticipated in the program as hoteling spaces available for use by post-graduate medical education students not a part of the staff count, staff from outside the hospital or staff who's home base is located elsewhere in the hospital. There is a possibility that a close examination of the office assignments might yield a decrease of as many as 5 of the offices provided; this is a small matter at this

early stage of the programming and planning process, but should be revisited as the project advances.

Probable Construction Cost

architecture+ is able to reliably project probable construction costs and project costs relatively early in a planning process by utilizing our psychiatric hospital dataset. Appendix L shows output from the dataset with actual costs of construction for projects expressed on both a per bed and on a per square foot basis. Given the important variables impacting square feet per bed discussed on page 7 and 8 of the benchmarking section of this report, we have come to understand that cost per square foot are a far more reliable predictor of future costs than costs per bed. The most accurate projections of cost are obtained by multiplying cost per square foot by the project's projected size in square feet and this is the methodology utilized in this report.

Before applying the raw data to a project, we normalize the dataset so that all hospitals are displayed with costs adjusted assuming construction at the same site and at the same time. These adjustments, using industry adjustment standards established by the R.S.Means Company for inflation and geographic location, allow us to portray each of the projects in the dataset as though it were constructed in Milwaukee with a bid date during the first quarter of 2017. (We are projecting annual construction cost inflation between Mean's 2015 index and the projected bid date using an additional 4% per annum inflation rate.)

The dataset shows adjusted costs ranging from a low of \$320 per square foot to a high of \$736 per square foot. Given that range, it is important to understand the conditions that lead to such disparity so that one can focus on the projects in the dataset that are most similar to the proposed Milwaukee County Hospital in order to target probable costs. At the high and low ends of the dataset, it is relatively easy to eliminate projects from consideration. The highest costing project, the Massachusetts State Hospital in Worcester, made significant investments in finishes, amenities, and materials that are not likely to be duplicated elsewhere. The lowest costing project, Butner in North Carolina, can similarly be eliminated from serious consideration because significant investments in the millions of dollars were made in addition to the quoted construction cost to make improvements after construction and before occupancy. The next lowest costing project is the Bryce Hospital in Tuscaloosa, Alabama. Our analysis suggests that this hospital would cost \$334/sf if built in Milwaukee with an early 2017 bid date. However, this project represents a difficult to repeat level of value engineering, design control, and construction cost acquisition and control.

Highlighted in yellow are a range of projects with a level of finish and amenity that are comparable to the expectations emerging in Milwaukee County. All are public hospitals. None is ornate. The hospitals in this group range from \$456-507/sf. The average cost for these projects is \$472/sf which is slightly

higher than the \$452 for the entire dataset. Using this \$472/sf average cost/sf figure from this analysis and the 166,373 bgsf programmed for the replacement hospital, we would project construction costs for the Milwaukee replacement hospital at \$78,528,000 (166,373 x \$472 = \$78,528,000).

As discussed at the bottom of page 9 of this report, an alternate provider is likely to see the project differently in terms of total square feet and investment per square foot.

On the basis of past experience, we would estimate that a private provider not yet familiar with the MCMHC program might initially benchmark the facility at around 96,500 bgsf ,and then increase that amount to 115,000 to 129,000 after further analysis.

Based upon both the likelihood of an alternative provider building a smaller facility and spending fewer dollars per square foot, the County is likely to see proposals reflecting costs at the lower end of the range shown here:

	lowest hospital in dataset	lowest probable range	highest probable range	highest hospital in dataset
Probable Cost (as programmed)	\$55,600,000	\$74,900,000	\$83,200,000	\$122,500,000
Probable Cost (with cuts by alternative provider)	\$38,400,000	\$51,700,000	\$57,500,000	\$84,600,000

Soft costs need to be added to these construction costs in order to arrive at an all-inclusive project costs. Excluding land acquisition, soft costs generally add an additional 25-30% to construction costs. The most conservative estimator that we have worked with uses the table shown in Appendix M to project soft costs when calculating total project costs. Using that table, soft costs would add an additional 31.1% to the project’s construction costs. The table reflects costs for a general hospital where furniture, equipment and signage costs are higher than in a psychiatric hospital. Appendix M allocates of \$41.40 per square foot for furnishings and equipment. Our own recent experience with psychiatric hospitals suggests that it would be more reasonable to budget \$18.00 per square foot for furniture and equipment and to budget an additional \$3.50 per square foot for signage and way-finding systems. This difference accounts for 5% of the soft cost multiplier calculated using Appendix M. Accordingly, we recommend that soft costs be estimated at 26% of construction costs.

Based upon our \$78,528,000 construction cost projection, we calculate total project costs at \$98,946,000²⁴ plus land acquisition costs and debt servicing costs.

²⁴ \$78,528,000 x 1.26 = \$98,946,000

Exhibits in Volume 2

- Appendix A - List of Prior Studies
- Appendix B - Summary of Milwaukee Clinical Services Reports
- Appendix C - Behavioral Health Division - Consolidated Facilities Plan: Mission and Vision
- Appendix D - User Group Organization
- Appendix E - Questionnaire Responses and Data
- Appendix F - Space Checklist Based Upon Applicable Licensing and Accreditation Standards
- Appendix G - Benchmarking Tool and Inpatient Census Modeller
- Appendix H - Clinical Space (BGSF)/Bed for Similar Facilities
- Appendix H1: BGSF vs. Peer Hospitals
- Appendix I - Space Program: Summary and Department by Department Space Lists
- Appendix J - Staffing Projection and Staff Workstations in Program
- Appendix K - Therapy Space Use and Hours
- Appendix L - Construction Costs for Comparable Projects Adjusted for Geography and Inflation
- Appendix M - Soft Costs to Be Added to Construction Cost to Calculate Project Costs