Space Projection Model Instructions

PURPOSE OF THE MODEL

The Space Planning Model provides a fair and equitable assessment of space needs at Texas' public universities, technical colleges, the Lamar State Colleges, and public health-related institutions. It is used to assess the need for new construction and to determine whether an institution's new construction will qualify for maintenance and operation funding provided by general revenue. Understanding the concepts of the Space Model will assist the institution in its planning efforts.

THE MODEL

This active model responds to an institution's evolving characteristics that drive its need for space. The model is sensitive to an institution's unique characteristics among programs, levels of instruction, total current fund and research expenditures, and clinical space. It responds to both economies and diseconomies of scale resulting from:

(1) large numbers of classrooms and class labs of varying size that can more efficiently be matched to large numbers of classes;

(2) small enrollments which demand certain minimum space requirements; and

(3) institutional complexities resulting from research or public service activities.

USES OF THE MODEL

- **BOARD REVIEW**
  The Texas Higher Education Coordinating Board uses the model as part of its review process in the consideration of proposals for facilities projects that would generate new space.
- **RESOURCE ALLOCATION**
  The model is also used for the allocation of the Infrastructure Formula Funds, Higher Education Assistance Fund, and in the evaluation of requests for Tuition Revenue Bonds.

PUBLIC UNIVERSITIES, TECHNICAL COLLEGES, AND LAMAR STATE COLLEGES

In October 1992, the Texas Higher Education Coordinating Board approved the *Space Projection Model for Higher Education Institutions in Texas* for public universities, technical colleges, and the Lamar State Colleges. The model predicts the net assignable square feet (NASF) of educational and general (E&G) space an institution needs in five categories: teaching, library, research, office, and support space. In 1997, the Legislature incorporated the model into the funding formulas for general academic institutions. It is also used in the legislative Higher Education Assistance Fund allocation formula.

Because of its importance, the Commissioner of Higher Education appointed an advisory committee to review the model and report any findings and recommendations. The Board approved changes to the model in July 1998. In September 1999, the Commissioner requested the University Formula Advisory Committee to include the model in its review of the infrastructure formula; the Board adopted a change to the Library Factor recommended by the Committee in April 2000. The Board approved the most recent change, to the Teaching Factor, in April 2002. This document describes the model reflecting the Board's actions.

HEALTH-RELATED INSTITUTIONS

In October 1992, the Texas Higher Education Coordinating Board approved the *Health-Related Space Projection Model.* This model predicted the need for educational and general (E&G) space in net assignable square feet (NASF) of health-related institutions in four categories: teaching, research, office, and support space. The model is used by the Board to make decisions related to the approval of proposals providing additional space.

In June 1998, the Senate Finance Committee asked the Coordinating Board to review the model to ensure that it accurately reflected the space needs of health-related institutions. To address those concerns, the Health-Related Space Projection Model Advisory Committee was appointed by the Commissioner of Higher Education to review the model and report its findings and recommendations. The committee included a representative from each of the affected institutions and met between June 1998 and January 1999. In September 1999, the Commissioner requested that the Health-Related Formula Advisory Committee include the model in its review of health-related formulas. The Commissioner adopted many of the committee's recommendations and presented them to the Coordinating Board at its April 2000 meeting. This document describes the model as adopted by the Coordinating Board at that meeting. No further changes have been made in the model since that time.

Academic Five-Factor Model

The five-factor academic space projection model predicts the educational and general (E&G) space required for a public university, technical college, or state college to fulfill its missions of teaching, research, and public service. Auxiliary space, such as dormitories, bookstores, intercollegiate athletics, or other auxiliary enterprises, is not included.

The base unit of the model's factors is room type.[1] Only E&G space receives appropriations for maintenance and operations, and it is the only space predicted by this model. Room types are grouped into the five space categories in the model and are associated with the specific data that drive each particular type of space.

Each factor is based on drivers or elements that are used to compute the predicted space in each category. These data are developed from various institutionally provided information and their certified state reports.

FACTORS	**DRIVERS/PREDICTORS**
Teaching space	Level and program areas of an institution's funded semester credit hours
Library space	Faculty, students, approved programs, and holdings
Research space	Research expenditures and students' reported semester credit hours
Office space	Faculty, staff, and current fund E&G expenditures
Support space	A percentage of the total prediction for all the other factors

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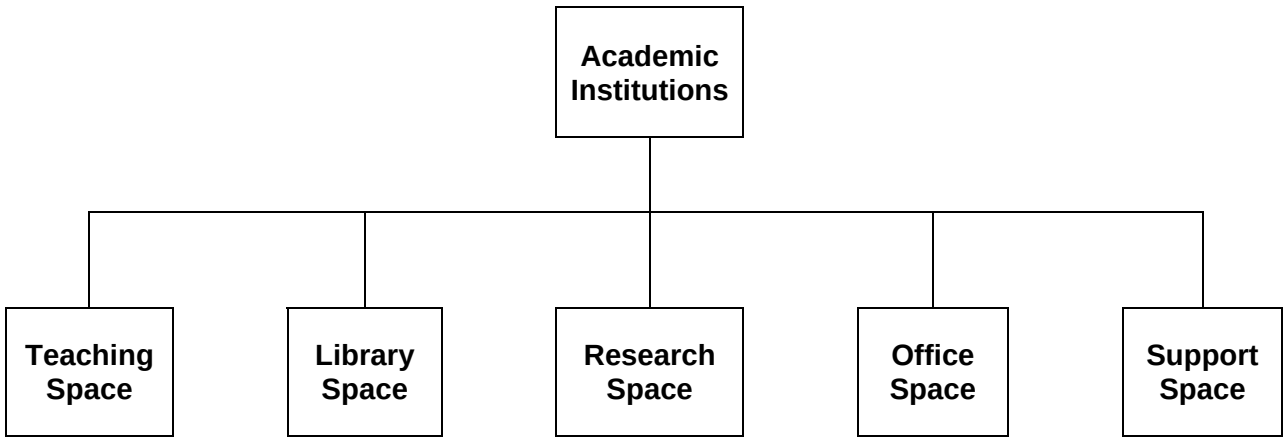
Academic Five-Factor Model



[1] Room types are taken from the National Center for Higher Education Management Systems' (NCHEMS) *Higher Education Facilities Inventory and Classification Manual* and described in the Coordinating Board's *Texas Higher Education Facilities Inventory Procedures Manual.*

Factor 1 - Teaching Space

Teaching space includes rooms used for instruction and are represented in the institution's facilities inventory by room type. The following room types are considered in this factor:

Room Type	Description
100	classrooms
210-235	class labs, special class labs, and self-study labs
500	physical education, demonstration, audiovisual, and animal quarters
600	assembly, exhibition, lounge, meeting rooms, and locker rooms

The predicted teaching space depends on two factors:

- funded semester credit hour production by program area
- funded semester credit hour production by level of course

A full-time-student equivalent (FTSE) is calculated for each program area and course level based on credit hours. FTSE are calculated using the Coordinating Board's standard methodology of contact hours divided by 300 and semester hours divided by 15. A reduced allowance is made for the graduate levels because these students require less special or general use space, classrooms, and class labs.

Level	Credit Hours	FTSE Allowance
Undergraduate	15	100%
Master's and professional (law and optometry)	12	70%
Doctorate-level programs	9	40%

Teaching space is assigned to one of four different programmatic areas based on space requirements. Figure 2 presents these program areas and the CIP codes that are included in each area. Program Area 4 is used as the base for all calculations, and additional NASF are added to this calculation depending upon the program area**.** Figure 1 presents how the base NASF for Program Area 4 is determined and the additional NASF allowed for each program area.

Figure 1
Base by Program Area 4

Room Type	Room Category	Square Feet per FTSE
Classroom	110	11
Class Lab	210	8
Special Class Lab	220	3
Self Study Lab	230	3
P.E. etc.	500s	10
Assembly, etc.	600s	5
Subtotal		**40**
Service Space		5
Total	**Program Area 4**	**45** (BASE)
Program Area 1		**BASE + 45 = 90**
Program Area 2		**BASE + 30 = 75**
Program Area 3		**BASE + 15 = 60**
Program Area 4		**BASE = 45**

An economy of scale variable is applied to those institutions with more than 15,000 undergraduate FTSE. A factor of .98 is used for the first 1,000 FTSE above 15,000, and the factor decreases .02 for each increase of 1,000 undergraduate FTSE. It is only applied to the predicted undergraduate space.

Teaching space is assigned to one of four different programmatic areas based on space requirements. Figure 1 presents these program areas and the CIP codes that are included in each area.

Figure 2
Fall 2005
Program Area Summary for Public Universities

Program Area	CIP Codes 2003	CIP Codes 2004/5	Description	NASF Allowance Teaching Space per FTSE: Under-graduate	Masters/ Professional	Doctorate
1	*01*	01	Agriculture, Agriculture Operations and Related Sciences	90	63	36
	02					
		04	Architecture and Related Services			
	50	50	Visual and Performing Arts			
2	*03*	03	Natural Resources and Conservation	75	52.5	30
	04	14	Engineering			
	14	15	Engineering Technologies/Technicians			
	15	21	Technology Education/Industrial Arts/Technology Education			
	21	46	Construction Trades			
	17	47	Mechanic and Repair Technologies/Technicians			
	48	48	Precision Production			
	49	49	Transportation and Materials Moving			
3	*08*	09	Communication, Journalism and Related Programs	60	42	24
	09	10	Communications Technologies/Technicians and Support Services			
	10	11	Computer and Information Sciences and Support Services			
	11	19	Family and Consumer Sciences/Human Services			
	19	26	Biological and Biomedical Sciences			
	20	32	Basic Skills			
	26	40	Physical Sciences			
	32	41	Science Technologies/Technicians			
	40	42	Psychology			

Figure 2
Fall 2005
Program Area Summary for Public Universities

Program Area	CIP Codes 2003	CIP Codes 2004/5	Description	NASF Allowance Teaching Space per FTSE: Under-graduate	Masters/ Professional	Doctorate
	41	51	Health Professions and Related Clinical Sciences			
	42	60	Dental, Medical and veterinary Residency Programs			
	51					
	All other programs that are not space intensive:					
	05	05	Area, Ethnic, Cultural, and Gender Studies			
	08	12	Personal and Culinary Services			
	12	13	Education			
	13	16	Foreign Languages, Literatures and Linguistics			
	16	22	Legal Profess and Studies			
	22	23	English Language and Literature/Letters			
	23	24	Liberal Arts and Sciences, General Studies and Humanities			
	24	25	Library Science			
	25	27	Mathematics and Statistics			
	27	28	Reserve Officer Training Corps			
	28	29	Military Technologies			
	29	30	Multi/Interdisciplinary Studies			
	30	31	Parks, Recreation, Leisure and Fitness Studies			
	31	33	Citizenship Activities			
4	***32***	34	Health-Related Knowledge and Skills	**45**	**31.5**	**18**
	33	35	Interpersonal and Social Skills			
	34	36	Leisure and Recreational Activities			
	35	37	Personal Awareness and Self-Improvement			
	36	38	Philosophy and Religious Studies			
	37	39	Theology and Religious Vocations			
	38	43	Security and Protective Services			
	39	44	Public Administration and Social Service Professions			
	42	45	Social Sciences			
	43	52	Business, Management, Marketing, and Related Support Services			
	44	53	High School/Secondary School Diplomas and Certificates			
	45	54	History			
	52					

Technical Colleges and the Lamar State Colleges

The space factors for academic programs at the Texas State Technical Colleges (TSTC), Lamar State College-Orange, Lamar State College-Port Arthur, and Lamar Institute of Technology are the same as those used by the universities but have additional program areas for vocational courses**.** Figure 3 presents the space factors for the four vocational program areas.

Figure 3
Vocational Program Areas Space Factors

Vocational Program Area	Programs			NASF per FTSE
1	Auto mechanics Auto body repair Construction & industrial trades	Agriculture Fire protection technology Machine shop	Air conditioning and heating Cosmetology	120
2	Vocational Nursing	Allied Health	Printing and Graphic Arts	90
3	Secretarial Business data processing Drafting and design	Instrumentation Culinary arts Radio & TV repair	Electronics Home economics	60
4	Law enforcement Mental health Management	Commercial pilot Technology Marketing	Cooperative work experience Occupational health & safety	45

Factor 2 - Library Space

Library Space for Public Universities

Library space includes all room type 400s -- reading/study rooms, stack space, and associated service areas -- and all room type 300s with a 41 (library) usage code. Library space is calculated primarily using the Association of College and Research Libraries (ACRL) standards for college libraries. Figure 4 presents the calculation variables for volumes.

Figure 4 Calculation Variables (Volumes)	
Volume Predictor	**Volumes**
Basic Collection	85,000
Allowance per FTE faculty	100
Allowance per FTE student	15
Allowance per undergraduate major field	350
Allowance per master's if highest degree offered	6,000
Allowance per master's if not highest degree offered	3,000
Allowance per 6th year specialist degree field	6,000
Allowance per doctoral field	25,000

Predicted university library space depends upon two factors: the number of volumes and the number of users. Figure 5 lists the amount of NASF allowed per volume and per user.

Figure 5 University Library Space Allowance Factors	
Number of Volumes	**NASF per Volume**
For the first 150,000 volumes	0.10
For the next 150,000 volumes	0.09
For the next 300,000 volumes	0.08
For holdings above 600,000 volumes	0.07
For law library holdings	0.25
Type of User	**NASF per User**
FTE student	6.25 NASF
FTE faculty	3.0 NASF

NASF is calculated for each factor, and the sum is then multiplied by 12.5 percent to determine staff needs.

Staff Space = 12.5% of the total space calculated ***(TS1)***

Total Space ***(TS2)*** = TS1 + Staff Space

The result is then multiplied by 17 percent to account for unforeseen needs.

Additional Library Space = 17% of TS2

Total Space ***(TS3)*** = TS2 + Additional Library Space

The final value is obtained by multiplying the outcome by 0.95. According to the ACRL, libraries that provide 90 to 100 percent of the NASF predicted by the formula are graded "A" in terms of space. By applying a 95 percent adjustment to the NASF sum, the model predicts a reasonable amount of NASF to meet the needs of the institution.

Total Predicted Library Space = TS3 X 0.95

Library Space for Technical Colleges and Lamar State Colleges

The library calculation for the TSTC campuses, Lamar State College-Port Arthur, Lamar State College-Orange, and Lamar Institute of Technology is dependent upon the FTSE reported by each institution. Each FTSE is provided 50 volumes at 0.10 NASF for each stack space and 6.25 NASF for study space. To account for staff needs, 12.5 percent of the sum of the stack space and study space is added.

Stack Space = FTSE x (50 volumes x .10 NASF)
Study Space = FTSE x 6.25 NASF
Staff Space = 12.5 percent of the total space calculated
Total Predicted Library Space = Stack Space + Study Space + Staff Space

Factor 3 – Research Space

Research space includes all non-class (research) laboratories and service rooms (room type 250 and 255). Predicted research space is determined using one of two methods, depending on which method yields the greatest NASF prediction.

Method 1

Multiply 9,000 NASF for every inflated $1 million in average research expenditures reported by the institution. The inflated rate is determined by the Consumer Price Index from September 1991 (the year the space model was developed) to the September that corresponds to the fall enrollment data being used for the model. An average of the last three years' research expenditures is used for this calculation. For example:

September 1991 factor = 137.2
September 2002 factor = 181.0
Inflation rate = (181.0 – 137.2) / 137.2 = 31.92%
Divisor = $1,000,000 X ($1,000,000 X 0.3192) = $1,319,242

Method 2

For each FTSE the institution reports, allot 3 NASF.

Factor 4 - Office Space

Office space includes all offices, conference rooms, and associated service areas (room type 300s). Type 300 rooms reported with a 41 (library) usage code used in the library factor formula are omitted from the office space calculation to eliminate duplication. Predicted office space is determined using one of two methods, depending on which method yields the greatest NASF prediction.

Method 1

The first method depends on the FTE faculty reported by the institution. The source for FTE faculty is the Coordinating Board's CBM-008 Faculty Report. The staff FTE is estimated to be 1.8 times FTE faculty for universities and 1.25 times FTE faculty for the Texas State Technical Colleges, Lamar State College - Orange, Lamar State College - Port Arthur, and Lamar Institute of Technology. Each FTE faculty is allowed 190 NASF, and staff FTE is allowed 170 NASF each.

Figure 6 presents how the space needs for FTE faculty and staff FTE are determined.

Figure 6 Determination of Faculty FTE and Staff FTE Space Need		
Type of Space	**Faculty Space Need**	**Staff Space Need**
Office	120 NASF	120 NASF
Conference Room	30 NASF	20 NASF
Service Area	20 NASF	10 NASF
Departmental Administration	20 NASF	20 NASF
Total	**190 NASF**	**170 NASF**

Method 2

The second method is dependent upon the current E&G expenditures reported by the institution. For each $1 million (adjusted for inflation) reported, 3,500 NASF is allowed.

Factor 5 - Support Space

Support space is calculated at 9 percent of the sum of predicted space from the teaching, library, research, and office factors. Support space includes all data processing/ computer rooms, shops, storage, vehicle storage, and associated service areas (room type 700s).

Example of Space Model Calculations
"Mountainside University"

Mountainside University provides the following Fall 2002 data to the Coordinating Board:

Figure 1 Student Credit Hours				
Level	**Program Area 1**	**Program Area 2**	**Program Area 3**	**Program Area 4**
Undergraduate	31,590	6,201	82,515	154,707
Master's	2,315	601	115	5,148
Doctoral	1,008	115	2,702	84
Professional	0	0	6,258	4,364
Source: CBM004 Report				

Figure 2 Program Breakdown	
Level	**Number of Programs**
Undergraduate Programs	74
Master's if Highest Degree Offered	50
Master's if Not Highest Degree Offered	54
6th Year Specialist Fields	0
Professional/Doctoral Fields	56
Source: Program Inventory File maintained by the Coordinating Board	

Figure 3 Research Expenditures	
Year	**Expenditures**
2002	$16,206,376
2001	$13,454,632
2000	$12,891,033
Source: Mountainside University Fiscal Officer	

Number of Full-Time Equivalent (FTE) Faculty = 1,145.16 (Source: CBM008 Report)
Law Library Volumes = 175,900 (Source: Mountainside University Fiscal Officer)
Current E&G Expenditures = $243,030,459 (Source: Mountainside University Fiscal Officer)

Predicted Teaching Space

Mountainside University's student credit hours are the basis for calculating predicted teaching space. First, the full-time student equivalent (FTSE) is calculated by dividing the number of credit hours for each program area and level by the appropriate Coordinating Board credit hour standard for that level:

Figure 4
Calculated Teaching Space

		Undergraduate	Master's	Doctoral	Professional	Total
Credit Hour Standard		**15**	**12**	**9**	**12**	
Program Area 1	**Reported Credit Hours**	**31,590**	**2,315**	**1,008**	**0**	**34,913**
	Calculated FTSE	2,106.00	192.92	112.00	0	2,410.92
Program Area 2	**Reported Credit Hours**	**6,201**	**601**	**115**	**0**	**6,917**
	Calculated FTSE	413.40	50.08	12.78	0	476.26
Program Area 3	**Reported Credit Hours**	**82,515**	**115**	**2,702**	**6,258**	**91,590**
	Calculated FTSE	5,501.00	9.58	300.22	521.50	6,332.31
Program Area 4	**Reported Credit Hours**	**154,707**	**5,148**	**84**	**4,364**	**164.303**
	Calculated FTSE	10,313.80	429.00	9.33	363.67	11,115.80
Total Reported Credit Hours		**275,013**	**8,719**	**3,909**	**10,622**	**297,723**
Total Calculated FTSE *(Credit Hours / Standard)*		18,334.20	681.58	434.33	885.17	**20,335.28**

The NASF can be calculated by multiplying the FTSE for each program area and level by the corresponding NASF per FTSE specified by the Coordinating Board. Because Mountainside University has more than 15,000 undergraduate FTSE, the economy of scale coefficients must be applied to each 1,000 FTSE increment above 15,000.

Figure 5
Calculated FTSE

First 15,000 Undergraduate FTSE

	FTSE	NASF per FTSE	Total NASF
Program Area 1	2,106.00	90	189,540
Program Area 2	413.40	75	31,005
Program Area 3	5,501.00	60	330,060
Program Area 4	6,979.60	45	314,100
Total	**15,000.00**		**864,675**

There are 18,334.20 undergraduate FTSEs at Mountainside University. The 15,000 FTSE limit is reached after the FTSEs in Program Areas 1, 2, 3 and 6,979.60 FTSEs from Program Area 4 have been accounted for, so the economy of scale coefficients are applied to the additional 3,334.20 FTSEs in Program Area 4:

Figure 6
Adjustment for >15,000 Undergraduate FTSE

FTSE Increment	Coefficient	Result	NASF per FTSE	Total NASF
1,000	0.98	980	45	44,100
1,000	0.96	960	45	43,200
1,000	0.94	940	45	42,300
334.20	0.92	307.46	45	13,836
			Total	**143,436**

Total predicted teaching space for the undergraduate level is:

Calculated FTSE NASF	864,675
NASF Adjustment	+ 143,436
Predicted Undergraduate	**= 1,008,111 NASF**

Predicted teaching space for the Master's, Doctoral, and Professional levels do not use economies of scale coefficients, so the calculation is more straightforward:

Figure 7
Master's Level FTSE

	FTSE	NASF per FTSE	Total NASF
Program Area 1	192.92	63	12,154
Program Area 2	50.08	52.5	2,629
Program Area 3	9.58	42	402
Program Area 4	429.00	31.5	13,514
Total	**681.58**		**28,699**

Figure 8
Doctoral Level FTSE

	FTSE	NASF per FTSE	Total NASF
Program Area 1	112.00	36	4,032
Program Area 2	12.78	30	383
Program Area 3	300.22	24	7,205
Program Area 4	9.33	18	168
Total	**434.33**		**11,788**

Figure 9 Professional Level FTSE			
	FTSE	**NASF per FTSE**	**Total NASF**
Program Area 1	0.00	63	0
Program Area 2	0.00	52.5	0
Program Area 3	521.50	42	21,903
Program Area 4	363.67	31.5	11,456
Total	**885.17**		**33,359**

The sum of the predicted teaching space for the undergraduate, master's, doctoral, and professional level FTSE results in the total predicted teaching space for Mountainside University:

Predicted Undergraduate Space	=	1,008,111 NASF
Predicted Master's Space	+	28,699 NASF
Predicted Doctoral Space	+	11,788 NASF
Predicted Professional Space	+	33,359 NASF
Total Predicted Teaching Space	**=**	**1,081,957 NASF**

Predicted Library Space

Mountainside University's FTE faculty, FTSE, and program levels are the basis for calculating predicted library space. First, the predicted number of volumes is calculated for each factor and summed:

Figure 10 Calculated Library Space			
Factor	**Amount Reported**	**Volumes per Factor**	**Volumes Calculation**
Basic Allowance		85,000	85,000
Per Faculty FTE	1,145.16	100	114,516
Per Student FTE	20,335.28	15	305,029
Per UG Major Field	74	350	25,900
Master's if Highest Degree Offered	50	6,000	300,000
Master's if Not Highest Degree Offered	54	3,000	162,000
6th Year Specialist Field	0	6,000	0
Professional/Doctoral Field	56	25,000	1,400,000
Total Calculated Volumes			**2,392,445**

The calculated volumes are used to determine the total space required to store library holdings. The first 150,000 volumes receive 0.10 NASF per volume. Lower NASF-per-volume coefficients are applied to subsequent volumes. Law library holdings are permitted 0.25 NASF per volume:

Figure 11 Calculated Volumes			
Number of Volumes	**NASF per Volume**	**Mountainside Volumes**	**Total NASF**
For the first 150,000 volumes	0.10	150,000	15,000
For the next 150,000 volumes	0.09	150,000	13,500
For the next 300,000 volumes	0.08	300,000	24,000
For holdings above 600,000 volumes	0.07	1,792,445	125,471
For law library holdings	0.25	175,900	43,975
Total NASF for Volumes			**221,946**

Space needs for faculty and students is then calculated:

Figure 12 Calculated Faculty and Student Space			
Type of User	**NASF per User**	**Number of Users**	**Total NASF**
FTE Faculty	3.00	1,145.16	3,435
FTE Student	6.25	20,335.28	127,096
Total NASF for Users			**130,531**

The sum of the NASF for Volumes and NASF for Users is multiplied by 12.5 percent to determine staff space needs.

NASF for Volumes	221,946	NASF for Volumes	221,946
NASF for Users	+ 130,531	NASF for Users	130,531
	x 0.125		= 352,477
NASF for Staff	**= 44,060**	NASF for Staff	+ 44,060
		Total NASF	**= 396,537**

The result is then multiplied by 17 percent to determine additional space for unforeseen needs.

Total NASF	396,537	
	x 0.17	
Additional Library Space	**=**	**67,411 NASF**

Total NASF	396,537	
Additional Space	+ 67,411	
Total Library Space	**=**	**463,948 NASF**

Predicted library space is obtained by multiplying the outcome by 0.95.

Total Library Space	463,948	
	x 0.95	
Total Predicted Library Space	**=**	**440,751 NASF**

Predicted Research Space
Predicted research space is calculated two ways. The method that yields the greatest amount of space is used.

Method 1
The first method is based on the average of the last three years of reported research expenditures *. An inflated $1 million is determined from the consumer price index:

September 1991 Factor from Consumer Price Index = 137.2

September 2002 Factor from Consumer Price Index = 181.0

Inflation Rate = (181.0 - 137.2) / 137.2 = 31.92%

Divisor $1,000,000 x ($1,000,000 x 0.3192) = $1,319,242

* Research expenditures include the expenditures reported in the institution's Annual Financial Report (AFR) plus any foundation or 501c3 and TEES pass-through expenditures reported on the Annual Research Expenditures Report to the Coordinating Board.

The average research expenditures figure is divided by the inflated $1 million amount. For every inflated $1 million in average research expenditures, 9,000 NASF is allowed.

Average Research Expenditures 2002	$16,206,376
Average Research Expenditures 2001	+ $13,454,632
Average Research Expenditures 2000	+ $12,891,033
Average Research Expenditures 3 years	= $42,552,041
	÷ 3
	= **$14,184,014**

Number of Inflated $1 million =

Average Research Expenditures, 3 years	$ 14,184,014
Inflated $1 million	÷ $ 1,319,242
	= $ 10.75

Total NASF for Method 1

9,000	**NASF**
x 10.75	
= 96,750	**NASF**

Method 2
The second method is based on the number of calculated FTSE. For each FTSE, 3 NASF are allotted:

Total NASF for Method 2

20,335.28	
x 3	**NASF**
= 61,006	**NASF**

In the case of Mountainside University, Method 1 results in a higher predicted research space:

Total Predicted Research Space = 96,750 NASF

Predicted Office Space
Predicted office space is calculated two ways. The method that yields the greatest amount of space is used.

Method 1
The first method is dependent upon the FTE faculty reported by the institution. The staff FTE is estimated to be 1.8 times the FTE faculty for universities. FTE faculty is allowed 190 NASF each, and staff FTE is allowed 170 NASF.

Reported FTE Faculty	1,145.16
Factor	x 1.8
Calculated Staff FTE	**2,061.29**

Figure 13
Calculated Office Space

FTE Type	NASF per FTE	Number of FTEs	Total NASF
FTE Faculty	190	1145.16	217,580
FTE Staff	170	2,061.29	350,419
Total NASF for Method 1			**567,999**

Method 2
The second method is based on the current E&G expenditures reported by the institution. For each $1 million (adjusted for inflation) reported, 3,500 NASF is allotted.

Reported Current Expenditures	= $243,030,459
Divided by Inflated $1 million	÷ $ 1,319,242
Number of Inflated $1 million	**= 184.22**

Total NASF for Method 2 =	
NASF	184.22
NASF Allotment	x 3,500
Total NASF Method 2	**= 644,770**

In the case of Mountainside University, Method 2 results in a higher predicted office space:

Total Predicted Office Space = 644,770 NASF

Predicted Support Space
Predicted support space is calculated at 9 percent of the sum of predicted space from the teaching, library, research, and office factors:

Figure 14 Support Space	
Predicted Space	**Total NASF**
Teaching	1,081,957
Library	440,751
Research	96,750
Office	644,770
Total Other Predicted Space	**2,264,228**

Total Other Predicted Space 2,264,228
Factor x 0.09
Total Predicted Support Space = 203,781 NASF

Calculating Space Surplus/Deficit
Mountainside University's total predicted E&G NASF for fall 2002 is:

Figure 15 All Predicted Space	
Predicted Space	**Total NASF**
Teaching	1,081,957
Library	440,751
Research	96,750
Office	644,770
Support	203,781
Total Predicted Space	**2,468,009**

The actual amount of E&G NASF currently reported by Mountainside University in its Facilities Inventory File maintained by the Coordinating Board is used in identifying the actual space. Below is a sample of the data report details.

Figure 16 Total Campus Space by Room Type		
TYPE OF ROOM	**NASF**	**E&G NASF**
Classrooms:		
110 Classroom	215,523	215,523
112 Classroom Service	20,364	20,364
SUBTOTAL	**235,887**	**235,887**
Class Laboratories:		
210 Class Laboratory	115,984	115,984

Figure 16 (con't) Total Campus Space By Room Type		
TYPE OF ROOM	**NASF**	**E&G NASF**
215 Class Laboratory Service	68,278	68,278
220 Special Class Laboratory	45,821	42,698
225 Special Class Laboratory Service	10,554	9,845
230 Individual Study Laboratory	164,228	160,847
235 Individual Study Laboratory Service.	8,476	8,476
SUBTOTAL	**413,341**	**406,128**

Actual space is calculated for teaching, library, research, office, and support space, according to the room types associated with each factor. Mountainside University's Facilities Inventory File is used to calculate actual space for the five factors (using the room types shown in Figure 17).

Figure 17 Total Actual Space		
Actual Space	**Total NASF**	**Room Type**
Teaching	1,097,559	100, 210-235, 500,600
Library	401,348	400, 300 with 41 use code
Research	115,872	250, 255
Office	597,480	300
Support	275,157	700
Total Actual Space	**2,487,416**	

The total actual space calculated needs to be adjusted to include E&G NASF that has been approved by the Coordinating Board, but is still under construction and, therefore, not included in the university's Facilities Inventory File. Assume that Mountainside University has 157,864 E&G NASF approved but not online:

Actual Space in Facilities Inventory	2,487,416 NASF
E&G Space Approved but Not On-Line	+ 157,864 NASF
Total Adjusted Actual E&G NASF	**= 2,645,280 NASF**

To determine the surplus/deficit for Mountainside University, subtract the total predicted E&G NASF by the space model from the total actual E&G NASF:

Adjusted Actual Space	2,645,280 NASF
Predicted Space	- 2,468,009 NASF
Space Model Surplus/(Deficit)	**= 177,271 NASF Surplus**

The result is considered a surplus because Mountainside University has more actual E&G NASF than the space model predicts it needs.

Health-Related Institutions
Five-Factor Model

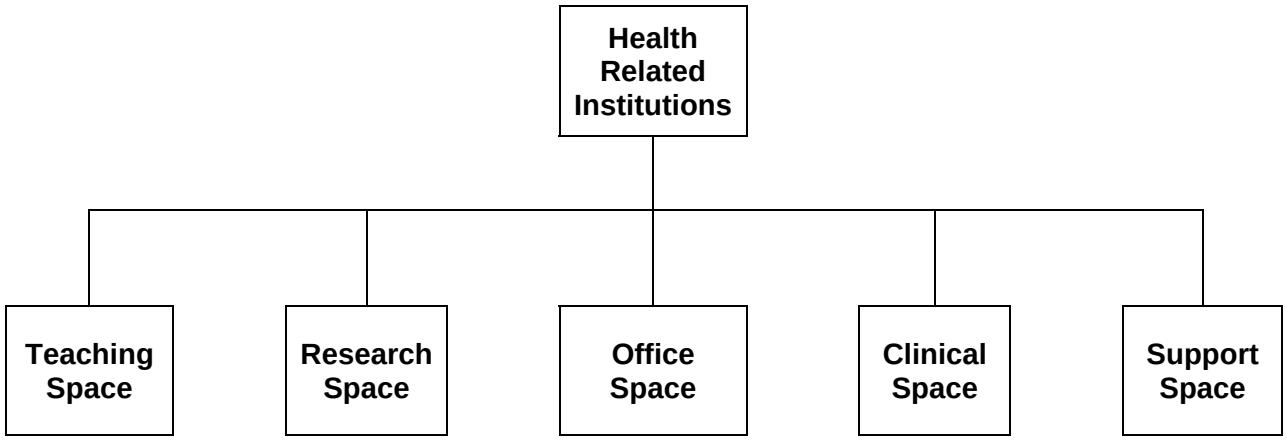
The five-factor health space projection model predicts the educational and general (E&G) space required for a public health institution to fulfill its missions of teaching, research, and public service. Auxiliary space, such as housing, bookstores, or other auxiliary enterprises, is not included.

The base unit of the model's factors is room type.[2] Only E&G space receives appropriations for maintenance and operations, and it is the only space predicted by this model. Room types are grouped into the five space categories in the model and are associated with the specific data that drive each particular type of space.

Each factor is based on drivers or elements which are used to compute the predicted space in each category. These data are developed from various institutionally provided information and their certified state reports.

FACTORS	DRIVERS/PREDICTORS
Teaching space	Reported headcount for each level and educational category
Research space	Research expenditures and full time equivalent faculty
Office space	Faculty, non-faculty, and current fund E&G expenditures
Clinical space	Actual clinical space
Support space	A percentage of the total prediction for all the other factors and library space

Health Related Institutions Five-Factor Model



Factor 1 - Teaching Space

Teaching space includes those rooms used for instruction and are represented in the institution's facilities inventory by room type. The following room types are considered in this factor:

Room Type	Description
100	classrooms
210-235	class labs, special class labs, and self-study labs
500	physical education, demonstration, audiovisual, and animal quarters
600	assembly, exhibition, lounge, meeting rooms, and locker rooms

[1] Room types are taken from the National Center for Higher Education Management Systems' (NCHEMS) *Higher Education Facilities Inventory and Classification Manual* and described in the Coordinating Board's *Texas Higher Education Facilities Inventory Procedures Manual.*

The predicted teaching space depends on two factors:

- reported headcount by educational category
- reported headcount by level of course

There are seven educational categories and four levels of course. Predicated teaching space is determined by multiplying reported headcounts by its appropriate NASF per Headcount factor. **Figure 1** presents the NASF per Headcount factors for each level of course by educational category.

Educational Category	Figure 1 NASF per Headcount by Level of Course			
	Undergraduate	**Grad/Residents**	**Post Doctoral**	**Fellow/Trainee**
Medical	120	30	30	30
Dental	120	120	30	30
Public Health	75	75	30	30
Biomedical Science	65	55	30	30
Nursing	75	75	30	30
Allied Health	75	75	30	30
Pharmacy	65	55	30	30

Factor 2 - Research Space

Research space includes all non-class (research) laboratories and associated service rooms (room type 250 and 255) and all animal quarters and associated service areas (room type 570 and 575 rooms). Predicted research space is determined using one of two methods, depending on which method yields the greatest NASF prediction.

Method 1

Multiply 9,000 NASF for every inflated $1 million in average research expenditures * reported by the institution. The inflated rate is determined by the Consumer Price Index from September 1991 (the year the space model was developed) to the September that corresponds to the Fall enrollment data being used for the model. For example:

September 1991 factor	137.2
September 2002 factor	181.0
Inflation rate	(181.0 – 137.2) ÷ 137.2 = 31.92%
Divisor	$1,000,000 X ($1,000,000 X 0.3192)
	= $1,319,242

An average of the last three years' research expenditures is used for this calculation.

Method 2

For each full time equivalent (FTE) faculty the institution reports, allot 250 NASF.

* Research expenditures include the expenditures reported in the institution's Annual Financial Report (AFR) plus any foundation or 501c3 and TEES pass-through expenditures reported on the Annual Research Expenditures Report to the Coordinating Board.

Factor 3 - Office Space

Office space includes all offices, conference rooms and associated service areas (room type 300s). Predicted office space is determined using one of two methods, depending on which method yields the greatest result. If the method 1 result is greater than the method 2 result, then the method 1 result is the predicted value. If the method 2 result is greater than the method 1 result, then the results from method 1 and method 2 are averaged to obtain predicted office space.

Method 1

The first method depends on the institution's current E&G expenditures. Current expenditures are reported in the institution's annual financial statement. Space for auxiliary uses such as sales and correctional off-site managed care are subtracted from reported expenditures to obtain current E&G expenditures. For each $1 million of E&G expenditures (adjusted for inflation), 1,600 NASF is allowed.

Method 2

The second method depends on the FTE faculty reported by the institution. The source for FTE faculty is the Coordinating Board's CBM-008 Faculty Report. The non-faculty FTE is estimated by multiplying the reported FTE faculty for each institution by the ratio of FTE non-faculty to FTE faculty shown in each institution's Legislative Appropriations Request. FTE faculty is allowed 190 NASF each, and non-faculty FTE is allowed 170 NASF each.

Figure 2 presents the ratios of FTE non-faculty to FTE faculty for each institution as of Fall 2002. **Figure 3** presents how the space needs for FTE faculty and non-faculty FTE are determined.

Figure 2 Ratio of FTE Non-Faculty to Faculty	
Institution	**Ratio**
Texas Tech University Health Science Center	3.16
The University of Texas Health Science Center at Tyler	2.50
The University of Texas Health Science Center at Houston	3.02
The University of Texas Health Science Center at San Antonio	2.06
The University of Texas M.D. Anderson Cancer Center	2.50
The University of Texas Medical Branch at Galveston	2.50
University of North Texas Health Sciences Center at Fort Worth	2.60
Texas A&M University Health Science Center	3.51

Figure 3 Determination of Faculty FTE and Non-Faculty FTE Space Need		
Type of Space	**Faculty Space Need**	**Non-Faculty Space Need**
Office	120 NASF	120 NASF
Conference Room	30 NASF	20 NASF
Service Area	20 NASF	10 NASF
Departmental Administration	20 NASF	20 NASF
Total	**190 NASF**	**170 NASF**

Factor 4 - Clinical Space

Clinical space includes all health care rooms located in student health care centers, medical centers, teaching hospitals, and veterinary facilities (room type 800s). A formula has not been developed to predict clinical space because health-related institutions in Texas offer different clinical arrangements. The actual clinical space reported in the institution's facilities inventory maintained by the Coordinating Board is considered the predicted clinical space in this model.

Factor 5 - Support Space

Support space includes all data processing/ computer rooms, shops, storage, vehicle storage, and associated service areas (room type 700s) and all study/library space and associated service areas (room type 400s). Predicted support space is calculated at nine percent of the sum of predicted space from the teaching, research, office, and clinical factors plus a library factor. Single-program institutions such as The University of Texas Health Center at Tyler are assigned 25,000 NASF for libraries. Multi-program institutions such as Texas Tech Health Science Center are assigned 50,000 NASF.

Multi-Campus Adjustment

A multi-campus adjustment is applied to those institutions that have operations in locations other than the main campus. Institutions that are eligible for the adjustment must have instructional programs that are carried out on branch campuses recognized by the Legislature. **Figure 4** indicates the institutions and campuses that may receive the adjustment for fall 2002.

Figure 4
Branch Campuses Eligible for the Multi-Campus Adjustment

Texas Tech University HSC	Texas A&M University HSC	UT HSC at San Antonio	UT HSC at Houston
Amarillo	McAllen	Edinburg	Brownsville
El Paso	Temple	Harlingen	
Midland		Laredo	
Odessa			

For each qualifying remote campus, institutions receive a multi-campus adjustment equal to 100 percent of the first 10,000 E&G NASF on that remote campus and 25 percent of all E&G NASF in excess of the first 10,000 NASF.

Example of Space Model Calculations
"Mountainside University Health Science Center"

Mountainside University Health Science Center provides the following Fall 2002 data to the Coordinating Board:

Educational Category	Figure 1 Headcount by Level of Course			
	Undergraduate	**Grad/Residents**	**Post Doctoral**	**Fellow/Trainee**
Medical	251	266	0	80
Dental	165	15	64	11
Public Health	0	0	0	0
Biomedical Science	0	54	0	0
Nursing	157	56	0	0
Allied Health	75	243	0	0
Pharmacy	0	198	28	0
(Source: University Fiscal Officer)				

Figure 2 Research Expenditures	
Year	**Expenditures**
2002	$89,578,354
2001	$80,214,654
2000	$69,256,546
Source: University Fiscal Officer	

Number of Full-Time Equivalent (FTE) Faculty **= 857.48** (Source: CBM008 Report)
Current E&G Expenditures **= $627,864,112** (Source: University Fiscal Officer)
Auxiliary Expenditures **= $624,358** (Source: University Fiscal Officer)

Predicted Teaching Space

Mountainside University Health Science Center's reported headcount is the basis for calculating predicted teaching space. Predicated teaching space is determined by multiplying reported headcounts by its appropriate NASF per Headcount factor:

Figure 3 Calculated NASF Undergraduate Level			
	Reported Headcount	**NASF per Headcount**	**Total NASF**
Medical	251	120	30,120
Dental	165	120	19,800
Public Health	0	75	0
Biomedical Science	0	65	0
Nursing	157	75	11,775
Allied Health	75	75	5,625
Pharmacy	0	65	0
Total	**648**		**67,320**

Figure 4 Calculated NASF Grad/Residents Level			
	Reported Headcount	**NASF per Headcount**	**Total NASF**
Medical	266	30	7,980
Dental	15	120	1,800
Public Health	0	75	0
Biomedical Science	54	55	2,970
Nursing	56	75	4,200
Allied Health	243	75	18,225
Pharmacy	198	55	10,890
Total	**832**		**46,065**

Figure 5 Calculated NASF Post Doctoral Level			
	Reported Headcount	**NASF per Headcount**	**Total NASF**
Medical	0	30	0
Dental	64	30	1,920
Public Health	0	30	0
Biomedical Science	0	30	0
Nursing	0	30	0
Allied Health	0	30	0
Pharmacy	28	30	840
Total	**92**		**2,760**

Figure 6 Calculated NASF Fellow/Trainee Level			
	Reported Headcount	**NASF per Headcount**	**Total NASF**
Medical	80	30	2,400
Dental	11	30	330
Public Health	0	30	0
Biomedical Science	0	30	0
Nursing	0	30	0
Allied Health	0	30	0
Pharmacy	0	30	0
Total	**91**		**2,730**

The sum of the calculated NASF for the undergraduate, grad/residents, post doctoral, and fellow/trainee levels for Mountainside University Health Science Center:

Predicted Undergraduate Space	=	67,320 NASF
Predicted Grad/Residents Space	+	46,065 NASF
Predicted Post Doctoral Space	+	2,760 NASF
Predicted Fellow/Trainee Space	+	2,730 NASF
Total Predicted Teaching Space	**=**	**118,875 NASF**

Predicted Research Space

Predicted research space is calculated two ways. The method that yields the greatest amount of space is used.

Method 1

The first method is based on the average of the last three years of reported research expenditures *. An inflated $1 million is determined from the consumer price index:

September 1991 Factor from Consumer Price Index = 137.2

September 2002 Factor from Consumer Price Index = 181.0

Inflation Rate = (181.0 - 137.2) ÷ 137.2 = 31.92%

Divisor $1,000,000 x ($1,000,000 x 0.3192) = **$1,319,242**

* Research expenditures include the expenditures reported in the institution's Annual Financial Report (AFR) plus any foundation or 501c3 and TEES pass-through expenditures reported on the Annual Research Expenditures Report to the Coordinating Board.

The average research expenditures figure is divided by the inflated $1 million amount. For every inflated $1 million in average research expenditures, 9,000 NASF allowed.

Average Research Expenditures 2002	$89,578,354
Average Research Expenditures 2001	+ $80,214,654
Average Research Expenditures 2000	+ $69,256,546
Average Research Expenditures 3 years	= $239,049,554
	÷ 3
	= **$79,683,185**

Number of Inflated $1 million =

Average Research Expenditures 3 years	$79,683,185
Inflated $1 million	÷ $ 1,319,242
	= 60.40

Total NASF for Method 1

9,000 NASF
x 60.40
= 543,607 NASF

Method 2

The second method is based on the number reported full time equivalent (FTE) faculty. For each FTE faculty, 250 NASF are allotted:

Total NASF for Method 2

857.48
x 250 NASF
= 214,370 NASF

In the case of Mountainside University Health Science Center, method 1 results in a higher predicted research space:

Total Predicted Research Space = 543,607 NASF

Predicted Office Space

Predicted office space is calculated two ways. The method that yields the greatest amount of space is used.

Method 1

The first method is based on the current E&G expenditures reported by the institution, minus any included auxiliary expenditures. For each $1 million (adjusted for inflation) reported, 1,600 NASF is allotted.

Reported Current Expenditures	=	$627,864,112
Minus Auxiliary Expenditures	=	$624,358
Total Current Expenditures	=	$627,239,754
Inflated $1 million	÷	$ 1,319,242
Number of Inflated $1 million	**=**	**475.45**

Total NASF for Method 1 =

Number of Inflated $1 million	=	475.45
NASF Allotment	x	1,600
Total NASF Method 1	**=**	**760,727**

Method 2

The second method is dependent upon the FTE faculty reported by the institution. The staff FTE is estimated by multiplying the reported FTE faculty by the ratio of FTE staff to FTE faculty shown in Mountainside University Health Science Center's Legislative Appropriations Request (LAR). FTE faculty is allowed 190 NASF each, and staff FTE is allowed 170 NASF.

Reported FTE Faculty	857.48
Factor (from LAR)	x 2.50
Calculated Staff FTE	**2,143.70**

Figure 7
Calculated Office Space

FTE Type	NASF per FTE	Number of FTEs	Total NASF
FTE Faculty	190	857.48	162,921
FTE Staff	170	2,143.70	364,429
		Total NASF for Method 2	**527,350**

If the method 1 result is greater than the method 2 results, then the method 1 result is the predicted value. If the method 2 result is greater than the method 1 result, then the results from method 1 and method 2 are averaged to obtain predicted office space. In the case of Mountainside University Health Science Center, method 1 yields the greatest result.

Total Predicted Office Space = 760,727 NASF

Predicted Clinical Space

Because a formula has not been developed to predict clinical, the actual clinical space reported in the Mountainside University Health Science Center's facilities inventory, maintained by the Coordinating Board, is considered the predicted clinical space in this model.

Total Predicted Clinical Space = Total Actual Clinical Space = **82,597 NASF**

Predicted Support Space

Predicted support space is calculated at nine percent of the sum of predicted space from the teaching, research, office, and clinical factors, plus a library factor. The library factor used is 50,000 NASF because Mountainside University Health Science Center is a multi-program institution.

Figure 8
Support Space

Predicted Space	Total NASF
Teaching	118,875
Research	543,607
Office	760,727
Clinical	82,597
Total Other Predicted Space	**1,505,806**

Total Other Predicted Space		1,505,806 NASF
Factor	x	0.09
Subtotal		135,523 NASF
Library Factor	=	50,000 NASF
Total Predicted Support Space	**=**	**185,523 NASF**

Multi-Campus Adjustment

Mountainside University Health Science Center has a recognized branch location in Tuscaloo, Texas. This location reports 50,000 E&G NASF. The multi-campus adjustment for the university is equal to 100 percent of the first 10,000 E&G NASF on that remote campus and 25 percent of all E&G NASF in excess of the first 10,000 NASF.

Reported E&G NASF		50,000 NASF
100 percent of first 10,000 NASF	-	10,000 NASF
Excess E&G NASF	=	40,000 NASF
25 percent of Excess	x	0.25
		10,000 NASF

Total Multi-Campus Adjustment = 10,000 NASF + 10,000 NASF = 20,000 NASF

Calculating Space Surplus/Deficit

Mountainside University's total predicted E&G NASF for Fall 2002 is:

Figure 9
All Predicted Space

Predicted Space	Total NASF
Teaching	118,875
Research	543,607
Office	760,727
Clinical	82,597
Support	185,523
Multi-Campus Adjustment	20,000
Total Predicted Space	**1,711,329**

The actual amount of E&G NASF currently reported by Mountainside University Health Science Center in its Facilities Inventory File maintained by the Coordinating Board is used in identifying the actual space. Below is a sample of the data report details.

Figure 10
Total Campus Space By Room Type

TYPE OF ROOM	NASF	E&G NASF
Classrooms:		
110 Classroom	21,523	21,523
112 Classroom Service	3,364	3,364
SUBTOTAL	**24,887**	**235,887**
Class Laboratories:		
210 Class Laboratory	25,984	25,984
215 Class Laboratory Service	4,278	4,278
220 Special Class Laboratory	1,821	1,821
225 Special Class Laboratory Service	115	115
230 Individual Study Laboratory	2,847	2,847
235 Individual Study Laboratory Service.	684	684
SUBTOTAL	**35,729**	**35,729**

Actual space is calculated for teaching, research, office, clinical, and support space, according to the room types associated with each factor. Mountainside University Health Science Center's Facilities Inventory File is used to calculate actual space for the five factors.

Figure 11 Total Actual Space		
Actual Space	**Total NASF**	**Room Type**
Teaching	98,976	100, 210-235, 500, 600
Research	468,335	250-255
Office	726,594	300
Clinical	82,597	800
Support	183,613	700, 400
Total Actual Space	**1,560,115**	

The total actual space calculated must be adjusted to include E&G NASF that has been approved by the Coordinating Board, but is still under construction and, therefore, not included in the university's Facilities Inventory File. Assume that Mountainside University Health Science Center has 157,864 E&G NASF approved but not online:

Actual Space in Facilities Inventory	1,560,115 NASF
E&G Space Approved but Not On-Line	+ 57,864 NASF
Total Actual E&G NASF	**= 1,617,979 NASF**

To determine the surplus/deficit for Mountainside University Health Science Center, subtract the total predicted E&G NASF by the space model from the total actual E&G NASF:

Actual Space	1,617,979 NASF
Predicted Space	- 1,711,329 NASF
Space Model Surplus/(Deficit)	**= (93,532) NASF Deficit**

The result is considered a deficit because Mountainside University Health Science Center has less actual E&G NASF than the space model predicts it needs.