APPENDIX L:
CLASSROOM UTILIZATION & MODEL

Lesley University
Centennial Campus Planning Studies 2008

CLASSROOM NEEDS PROJECTION

Two major initiatives of Lesley University's strategic planning: the planned growth of enrollment in Cambridge campus-based programs and the relocation of AIB to Cambridge will place significant demands on the University's inventory of classrooms. A review of the utilization of Lesley's general-purpose classrooms over the past five years identified that the registrar data from fall of 2007 was closest to the average utilization of the period and therefore the best data set to use for analysis and planning. To project future space requirements, a classroom needs projection model was developed allowing different assumptions on growth to be tested. This paper outlines the measures needed to meet Lesley's future classroom needs.

The projected enrollment growth in on-campus programs is indicated in the following table:

Table One – Lesley University On-Campus Enrollment Projections – 2008

School	On-Campus FTE Enrollment 2007	Projected FTE Enrollment 2013	Enrollment Increase from '08 to '13	Projected FTE Enrollment 2018	Enrollment Increase from '13 to '18
Lesley College	700	850	21%	1,100	29%
AIB	520	520	0%	600	15%
SOE	529	584	10%	645	10%
GSASS	707	781	10%	862	10%
ALD	158	254	61%	410	61%
TOTAL	2,614	2,989	14%	3,617	21%

Notes:
Lesley College and AIB enrollment are established in the Strategic Plan
SOE and GSASS enrollment Increases 2 percent per year
ALD Enrollment increases 10 percent per year, most of this growth in on-line courses

Lesley's multi-node campus requires a multi-pronged analysis of classroom utilization. Currently, the University has 32 classrooms, accommodating 998 seats and totaling 22,117 net assignable square feet (NASF).

With the exception of the 4 to 6:30 period in the evening schedule, classroom utilization at Lesley University is less intensive than normative standards indicate. This latent excess capacity is a positive situation when thinking about adjusting the classroom stock to accommodate growth. The table below provides a comparison of key Fall 2007 utilization data with normative utilization targets.

Table Two – Lesley CR Facts and Normative Targets

Utilization Fact	Cambridge Campus '07	Normative Target	DLC+A Database*
Usage Hours per Week - Day Program	13.4	26	19.9
Mean Station Occupancy - Day Program	63%	65%	59%
Usage Hours per Week - Eve Program	11.4	19.5	N/A
Mean Station Occupancy - Eve Program	47%	65%	N/A

* Benchmarks taken from 11 classroom utilization studies of institutions with 1,054 to 4,571 enrollments.

A significant change in Lesley's classroom inventory will occur when the University begins to use several rooms in Sherrill Hall on the newly-acquired Brattle campus.

- Sherrill Hall Classrooms:
  - Sherrill 106, 107, 109, 110, 111 – five classrooms of 16 stations each
  - Sherrill 108 – a classroom of 24 seats
  - Sherrill 207, 209 – two classrooms of 60 seats each
  - Sherrill 304 – a caseroom of 120 seats

These 9 additional rooms will provide a significant resource towards meeting Lesley's growth projections. The new rooms will create an inventory of 41 rooms, accommodating 1,342 seats and totaling 30,315 net assignable square feet (NASF).

In order to determine the appropriate number and size of classrooms to accommodate the growth and change projected in the University's planning, an arithmetical model has been developed and refined. The model incorporates all future classrooms in Cambridge (on the Quad, Porter and Brattle campuses), all course sections (Lesley, AIB and EDS) offered in Fall 2007 and the means to project enrollment driven changes to the number of course sections and section sizes. This model can help answer the following questions:

- Can the classroom needs of the AIB program be accommodated in the Cambridge campus classroom inventory?
- What adjustments to the classroom inventory will be required to handle the projected growth in enrollment?

Accommodating AIB Classroom Demands in Cambridge

The model below shows the number of classrooms required in each of nine size ranges to accommodate all courses offered during the day on the Cambridge, EDS and Boston campuses assuming the utilization rates achieved in the Fall of 2007. The model consists of two parts, the first estimates the number of classrooms of each size required, the second table projects the space required and how the result compares to the existing inventory. Numbers in column O of the second table indicate the adjustment in the number of rooms suggested in each size category.

Table Three – Classrooms Needed for All LU and EDS Day Courses Assuming Fall '07 Utilization Rates

A-1 Projected Classroom Need, Day - AIB & EDS COURSES ADDED

		=D^+1		=INT((B x u) + (B^ x u)/2)-1	from schedule	=(G + I^) / z	=(G + I^) - (H x z)	=(G + I^ - I) / H
A	B	C		D	G	H	I	J
Size Category	**Modeled CR Size**	**Corresponding Actual Section Size Range @ 63% Target Occupancy**			**Weekly CR Hours in Range TOTAL**	**Required (Modeled) CRs @ 13.4 Hrs / Week**	**Remainder Hours to be accommodated[1]**	**Projected Mean Utilization (Hrs / Wk)[2]**
A	**10**	1	to	8	55	**4**	1.4	13.4
B	**20**	9	to	14	139	**10**	6.4	13.4
C	**30**	15	to	21	172	**13**	4.2	13.4
D	**40**	22	to	27	89	**7**	0.0	13.3
E	**50**	28	to	33	47	**4**	0.0	11.8
F	**60**	34	to	49	5	**1**	0.0	5.0
G	**100**	50	to	100	0	**0**	0.0	0.0
Totals and Mean:					**507**	**39**	**0.0**	**13.0**

r Assumption Inputs:

u	**63%**	= Target Mean Station Occupancy
z	**13.4**	= Target Mean Usage Hours per Week (DAY)
	0%	= Future section size growth (changes distribution of CR sizes)
	0%	= Future CR hour growth (increases column G by this %)
	0%	= Total future enrollment growth based on two above percentages (enrollment = contact hours)

Make entries in shaded cells only:
blue data inputs
salmon planning inputs

A-2 Projected Classroom Need, Day - AIB & EDS COURSES ADDED

			= B x H		= K x L		= K - N
A	B	H	K	L	M	N	O
Size Category	**Modeled CR Size**	**Required (Modeled) CRs**	**Modeled Number of Stations**	**Recom-mended NASF / Sta**	**Modeled NASF**	**Existing + Sherrill CRs**	**Required (Modeled) minus Existing**
A	**10**	**4**	40	30	1,200	**4**	**0**
B	**20**	**10**	200	25	5,000	**6**	**4**
C	**30**	**13**	390	21.5	8,385	**5**	**8**
D	**40**	**7**	280	19	5,320	**11**	**-4**
E	**50**	**4**	200	19	3,800	**10**	**-6**
F	**60**	**1**	60	18.5	1,110	**3**	**-2**
G	**100**	**0**	0	17	0	**2**	**-2**
Totals:		**39**	**1,170**		**24,815**	**41**	**-2**

63%	= Target Mean Station Occupancy
13.4	= Target Mean Usage Hours per Week (DAY)
0%	= Future section size growth
0%	= Future CR hour growth

Assuming no changes to the Fall '07 utilization rates indicated, accommodating in Cambridge all Day courses offered in the Fall of 2005 at both the Cambridge and Boston campuses would require 39 classrooms (7 more than now existing) comprising 1,170 student stations (73 more than existing) and consuming 33,435 NASF (6,647 more than existing).

As can be seen in sub-table A-2, with the Sherrill Hall classrooms added to the inventory, there is an excess of two rooms. Should Lesley continue to be successful in improving classroom utilization particularly at the Porter campus, there would be additional excess capacity. The following pair of tables models the classroom need assuming utilization rates that meet utilization targets similar to those from studies in the DLC+A Database, as noted on page 2. The peer institutions in this database are predominantly small, independent residential colleges, similar in many ways to the University's undergraduate programs, Lesley College and AIB, the predominant users of classrooms during the daytime hours. Higher utilization rates may be possible, but given increasing activity in co-curricular programs, such as athletics, often scheduled during the afternoon hours, we feel these levels are appropriate assumptions for Lesley's future.

Table Four – Classrooms Needed for All LU Day Courses Assuming Normative Utilization Rates

B-1 Projected Classroom Need, Day - AIB & EDS COURSES ADDED, IMP. UTIL.

		=D^ +1		=INT((B x u) + (B^ x u)/2)-1	from schedule	=(G + I^) / z	=(G + I^) - (H x z)	=(G + I^ - I) / H
A	B	C		D	G	H	I	J
Size Category	**Modeled CR Size**	**Corresponding Actual Section Size Range @ 60% Target Occupancy**			**Weekly CR Hours in Range TOTAL**	**Required (Modeled) CRs @ 20 Hrs / Week**	**Remainder Hours to be accommodated[1]**	**Projected Mean Utilization (Hrs / Wk)[2]**
A	**10**	1	to	8	55	**3**	0.0	18.3
B	**20**	9	to	14	139	**7**	0.0	19.9
C	**30**	15	to	20	160	**8**	0.0	20.0
D	**40**	21	to	26	92	**5**	0.0	18.4
E	**50**	27	to	32	50	**3**	0.0	16.7
F	**60**	33	to	47	11	**1**	0.0	11.0
G	**100**	48	to	100	1	**1**	0.0	1.0
Totals and Mean:					**508**	**28**	**0.0**	**18.1**

Assumption Inputs: Make entries in shaded cells only:

60%	= Target Mean Station Occupancy
20	= Target Mean Usage Hours per Week (DAY)
0%	= Future section size growth (changes distribution of CR sizes)
0%	= Future CR hour growth (increases column G by this %)
0%	= Total future enrollment growth based on two above percentages (enrollment = contact hours)

blue data inputs

salmon planning inputs

B-2 Projected Classroom Need, Day - AIB & EDS COURSES ADDED, IMP. UTIL.

			= B x H		= K x L		= K - N
A	B	H	K	L	M	N	O
Size Category	**Modeled CR Size**	**Required (Modeled) CRs**	**Modeled Number of Stations**	**Recom-mended NASF / Sta**	**Modeled NASF**	**Existing + Sherrill CRs**	**Required (Modeled) minus Existing**
A	**10**	**3**	30	30	900	**4**	**-1**
B	**20**	**7**	140	25	3,500	**6**	**1**
C	**30**	**8**	240	21.5	5,160	**5**	**3**
D	**40**	**5**	200	19	3,800	**11**	**-6**
E	**50**	**3**	150	19	2,850	**10**	**-7**
F	**60**	**1**	60	18.5	1,110	**3**	**-2**
G	**100**	**1**	100	17	1,700	**2**	**-1**
Totals:		**28**	**920**		**19,020**	**41**	**-13**

60%	= Target Mean Station Occupancy
20	= Target Mean Usage Hours per Week (DAY)
0%	= Future section size growth
0%	= Future CR hour growth

At benchmark utilization rates, the university would need a significantly smaller classroom inventory, even with the added demand of AIB and EDS classroom use. Under the assumptions indicated, accommodating all Day courses offered in the Fall of 2007 at both the Cambridge and Boston campuses would require 28 classrooms (4 fewer than existing and 13 fewer than the future inventory). Of course, achieving these utilization rates would involve significant changes in classroom scheduling practices and faculty and student expectations. The Registrar's office has implemented revised scheduling guidelines which will work toward these targets, but full realization of these utilization levels will likely take several years to accomplish. This indication of latent "excess capacity" achieved through more rigorous resource management suggests the viability of a middle ground to improved utilization. The excess capacity available in the future classroom inventory will help the University accommodate or partially accommodate its other major strategic component affecting classroom use – enrollment growth.

Accommodating Enrollment Growth

The classroom model has been refined to perform what-if scenarios regarding enrollment growth reflected through increasing the amount of weekly classroom hours and through increasing section sizes. In the tables below, the enrollment assumption is for the FY '18 period using the goals identified in the University's new strategic plan. The strategic plan calls for 39 percent growth for Lesley College and AIB. As these are the two populations that use the classroom inventory most heavily during the day, their growth, totaling 72 percent over existing levels, will directly impact demands on classroom space. The model below shows how these demands can be accommodated assuming section size growth of 26 percent over the existing array and a 10 percent increase in the number of classroom hours (number of sections). This balance is the critical issue for planning purposes – a decision on the desired section size is usually made balancing pedagogical and efficiency/financial objectives. The assumptions below suggest an increase in undergraduate teaching faculty and/or faculty loading.

Table Five – Classrooms Needed for All LU and EDS Day Courses at FY '18 Enrollment Levels and Improved Utilization Rates

C-1 **Projected Classroom Need, Day - AIB & EDS COURSES ADDED, IMPROVED UTILIZATION, STRATEGIC GROWTH ASSUMED**

		=D^ +1		=INT((B x u) + (B^ x u)/2)-1	from schedule	=(G + I^) / z	=(G + I^) - (H x z)	=(G + I^ - I) / H
A	B	C		D	G	H	I	J
Size Category	**Modeled CR Size**	**Corresponding Actual Section Size Range @ 60% Target Occupancy**			**Weekly CR Hours in Range TOTAL**	**Required (Modeled) CRs @ 14 Hrs / Week**	**Remainder Hours to be accommodated[1]**	**Projected Mean Utilization (Hrs / Wk)[2]**
A	**10**	1	to	8	29	**2**	1.0	14.0
B	**20**	9	to	14	92	**7**	0.0	13.3
C	**30**	15	to	20	183	**13**	1.0	14.0
D	**40**	21	to	26	102	**7**	5.0	14.0
E	**50**	27	to	32	69	**5**	4.0	14.0
F	**60**	33	to	47	83	**6**	3.0	14.0
G	**100**	48	to	100	1	**1**	0.0	4.0
Totals and Mean:					**559**	**41**	**0.0**	**13.6**

Assumption Inputs:

60%	= Target Mean Station Occupancy
14	= Target Mean Usage Hours per Week (DAY)
26%	= Future section size growth (changes distribution of CR sizes)
10%	= Future CR hour growth (increases column G by this %)
39%	= Total future enrollment growth based on two above percentages (enrollment = contact hours)

Make entries in shaded cells only:

blue	data inputs
salmon	planning inputs

C-2 **Projected Classroom Need, Day - AIB & EDS COURSES ADDED, IMPROVED UTILIZATION, STRATEGIC GROWTH ASSUMED**

			= B x H		*= K x L*		*= K - N*
A	B	H	K	L	M	N	O
Size Category	**Modeled CR Size**	**Required (Modeled) CRs**	**Modeled Number of Stations**	**Recom-mended NASF / Sta**	**Modeled NASF**	**Existing + Sherrill CRs**	**Required (Modeled) minus Existing**
A	**10**	**2**	20	30	600	**4**	**-2**
B	**20**	**7**	140	25	3,500	**6**	**1**
C	**30**	**13**	390	21.5	8,385	**5**	**8**
D	**40**	**7**	280	19	5,320	**11**	**-4**
E	**50**	**5**	250	19	4,750	**10**	**-5**
F	**60**	**6**	360	18.5	6,660	**3**	**3**
G	**100**	**1**	100	17	1,700	**2**	**-1**
Totals:		**41**	**1,540**		**30,915**	**41**	**0**

60%	= Target Mean Station Occupancy
14	= Target Mean Usage Hours per Week (DAY)
26%	= Future section size growth
10%	= Future CR hour growth

These assumptions suggest a classroom inventory with the same number of rooms as that assumed in the future inventory. However to best fit the projected array of sections sizes, the inventory should be adjusted to develop a different mixture of seat counts. This could be done by subdividing some large classrooms and potentially combining some small rooms. Adjusting some room sizes will better fit the projected pattern of section sizes, increasing the number of 20, 30 and 60 seat rooms while reducing those in the 10, 40, 50, and 100 seat ranges. In practice, retaining the larger rooms will support pedagogical flexibility and innovation, as in the current use of large classrooms by relatively small sections in SOE and GSASS to enable group breakouts and movement/role-playing techniques.

Table Six explores the assumption that faculty growth will be limited for efficiency/financial reasons. In this case, section sizes will need to increase significantly to handle the projected enrollment growth. Under this scenario, the University would need nine fewer rooms than assumed in the future inventory, with stable or reduced numbers in all but the 60-seat size. This category would need to increase by 8 rooms.

Table Six – Classrooms Needed for All LU Day Courses at FY '18 Enrollment Levels and Improved Utilization Rates - Increase in Faculty Constrained

D-1 **Projected Classroom Need, Day - AIB & EDS COURSES ADDED, IMPROVED UTILIZATION, STRATEGIC GROWTH, NO FACULTY EXP.**

		=D^ +1		=INT((B x u) + (B^ x u)/2)-1	from schedule	=(G + I^) / z	=(G + I^) - (H x z)	=(G + I^ - 1) / H
A	B	C		D	G	H	I	J
Size Category	**Modeled CR Size**	**Corresponding Actual Section Size Range @ 60% Target Occupancy**			**Weekly CR Hours in Range TOTAL**	**Required (Modeled) CRs @ 14 Hrs / Week**	**Remainder Hours to be accommodated[1]**	**Projected Mean Utilization (Hrs / Wk)[2]**
A	**10**	1	to	8	26	**2**	0.0	13.0
B	**20**	9	to	14	80	**6**	0.0	13.3
C	**30**	15	to	20	100	**7**	2.0	14.0
D	**40**	21	to	26	128	**9**	4.0	14.0
E	**50**	27	to	32	71	**5**	5.0	14.0
F	**60**	33	to	47	96	**7**	3.0	14.0
G	**100**	48	to	100	5	**1**	0.0	8.0
Totals and Mean:					**506**	**37**	**0.0**	**13.7**

r Assumption Inputs:

u	**60%**	= Target Mean Station Occupancy
z	**14**	= Target Mean Usage Hours per Week (DAY)
	39%	= Future section size growth (changes distribution of CR sizes)
	0%	= Future CR hour growth (increases column G by this %)
	39%	= Total future enrollment growth based on two above percentages (enrollment = contact hours)

Make entries in shaded cells only:

blue	data inputs
salmon	planning inputs

D-2 **Projected Classroom Need, Day - AIB & EDS COURSES ADDED, IMPROVED UTILIZATION, STRATEGIC GROWTH, NO FACULTY EXP.**

			= B x H		= K x L		= K - N
A	B	H	K	L	M	N	O
Size Category	**Modeled CR Size**	**Required (Modeled) CRs**	**Modeled Number of Stations**	**Recom-mended NASF / Sta**	**Modeled NASF**	**Existing + Sherrill CRs**	**Required (Modeled) minus Existing**
A	**10**	**2**	20	30	600	**4**	**-2**
B	**20**	**6**	120	25	3,000	**6**	**0**
C	**30**	**7**	210	21.5	4,515	**5**	**2**
D	**40**	**9**	360	19	6,840	**11**	**-2**
E	**50**	**5**	250	19	4,750	**10**	**-5**
F	**60**	**7**	420	18.5	7,770	**3**	**4**
G	**100**	**1**	100	17	1,700	**2**	**-1**
Totals:		**37**	**1,480**		**29,175**	**41**	**-4**

60%	= Target Mean Station Occupancy
14	= Target Mean Usage Hours per Week (DAY)
39%	= Future section size growth
0%	= Future CR hour growth

When the model is run to assess the impact of enrollment growth through FY '18, the University, through the acquisition of the Sherrill Hall classrooms, has ensured that there will be sufficient classroom space to accommodate the ambitious enrollment targets. The profile of classroom sizes will need to be adjusted based on actual faculty growth, the desired section size and learning environment.

Accommodating Evening Courses

As indicated earlier, the current major scheduling problem at Lesley is the heavy classroom demand related to evening courses, particularly in the 4 PM to 6:30 PM time slot. Similar models were developed to project needs for this component of the course load. There are fewer hours available for scheduling during the week in the evening period, and only two time slots to fit sections into. By far the most popular time slot for Lesley's evening students (and faculty) is the 4 to 6:30 period. It is at this time that Lesley maximizes its use of classrooms, particularly at its Porter node. If more of this load can be shifted to the later 6:45 to 9:15 time slot and greater utilization made of the Oxford node classrooms, evening courses and projected growth could be accommodated in the existing inventory.

Table Seven – Classrooms Needed for All LU Evening Courses at FY '18 Enrollment Levels Assuming Current Utilization Rates

E-1 **Projected Classroom Need, Evening - CURRENT UTILIZATION, STRATEGIC GROWTH, MODEST FACULTY EXP.**

		=D^ +1		=INT((B x u) + (B^ x u)/2)-1	from schedule	=(G + I^) / z	=(G + I^) - (H x z)	=(G + I^ - I) / H
A	B	C		D	G	H	I	J
Size Category	**Modeled CR Size**	**Corresponding Actual Section Size Range @ 47% Target Occupancy**			**Weekly CR Hours in Range TOTAL**	**Required (Modeled) CRs @ 11.4 Hrs / Week**	**Remainder Hours to be accommodated[1]**	**Projected Mean Utilization (Hrs / Wk)[2]**
A	**10**	1	to	6	35	**3**	0.8	11.4
B	**20**	7	to	10	96	**8**	5.6	11.4
C	**30**	11	to	15	57	**5**	5.6	11.4
D	**40**	16	to	20	77	**7**	2.8	11.4
E	**50**	21	to	24	68	**6**	2.4	11.4
F	**60**	25	to	36	92	**9**	0.0	10.5
G	**100**	37	to	100	0	**0**	0.0	0.0
Totals and Mean:					**425**	**38**	**0.0**	**11.2**

r Assumption Inputs:

u	**47%**	= Target Mean Station Occupancy
z	**11.4**	= Target Mean Usage Hours per Week (EVE)
	15%	= Future section size growth (changes distribution of CR sizes)
	6%	= Future CR hour growth (increases column G by this %)
	22%	= Total future enrollment growth based on two above percentages (enrollment = contact hours)

Make entries in shaded cells only:
blue data inputs
salmon planning inputs

E-2 **Projected Classroom Need, Evening - CURRENT UTILIZATION, STRATEGIC GROWTH, MODEST FACULTY EXP.**

			= B x H		= K x L		= K - N
A	B	H	K	L	M	N	O
Size Category	**Modeled CR Size**	**Required (Modeled) CRs**	**Modeled Number of Stations**	**Recom-mended NASF / Sta**	**Modeled NASF**	**Existing CRs**	**Required (Modeled) minus Existing**
A	**10**	**3**	30	30	900	**5**	**-2**
B	**20**	**8**	160	30	4,800	**6**	**2**
C	**30**	**5**	150	25	3,750	**5**	**0**
D	**40**	**7**	280	22	6,160	**12**	**-5**
E	**50**	**6**	300	22	6,600	**11**	**-5**
F	**60**	**9**	540	22	11,880	**1**	**8**
G	**100**	**0**	0	22	0	**4**	**-4**
Totals:		**38**	**1,460**		**34,090**	**44**	**-6**

47%	= Target Mean Station Occupancy
11.4	= Target Mean Usage Hours per Week (EVE)
15%	= Future section size growth
6%	= Future CR hour growth

Excess capacity is evident when the model is run with these assumptions. Even with the 22 percent increase in enrollment projected for the programs that are primarily offered in the evening, just 38 rooms are needed, six fewer than available. Again, adjustments should be made to improve the fit of sections to rooms. These adjustments would be coordinated with adjustments for the day program.

Next Steps to Meet Classroom Needs

1. Identify possible room size adjustments
2. Develop implementation plan to coordinate classroom size, teaching technology, and furnishing upgrades
3. Coordinate projects with academic building renovations.