



LEED Breadth

Introduction:

The Franklin Care Center is currently in the design phase and anticipated to achieve LEED certification. Currently, 39 LEED points have been identified by the architect as “likely” to achieve. 39 is the minimum number of points for a gold certified building, so if everything does not go according to plan during the remaining design or construction phases and a point is not obtained, the building will only receive silver certification. 11 LEED points are currently identified as “possible” to achieve. By creating a design to achieve one of these points there is a better chance that the Franklin Care Center will be rewarded LEED Gold Certification.

A perimeter and non perimeter control system will be designed for the Franklin Care Center. An average of one operable window and one lighting control zone per 200 sqft for every regularly occupied area within 15’ of the perimeter wall will be provided. A non perimeter system will also be designed ensuring that there is adequate controls for air flow, temperature and lighting in regularly occupied spaces that are not within 15’ of the perimeter of the building. The addition of these control systems will earn LEED Indoor Environmental Quality Credits 6.1 and 6.2 Controllability of Perimeter and Non-Perimeter Systems. The addition of this point will amount in 40 likely LEED points, and help contribute towards a LEED gold building.

Design Goals:

The main goal of this breadth work is to earn LEED Indoor Environmental Quality Credits 6.1 and 6.2. The minimum number of windows and controls for each area will be determined, if there is an existing design it will be taken into analyzed, and the system will be designed to earn Indoor Environmental Quality Credit 6.

Perimeter Space:

There are separate LEED criteria that need to be met for perimeter spaces, perimeter group or multi occupancy spaces, non-perimeter spaces, and non perimeter group or multi occupancy spaces. For all of these types of spaces, only spaces that are regularly occupied are relevant in this calculation. Spaces such as lobbies, corridors, storage areas or specialty rooms do not need to be accounted for. To determine the types of spaces in the Franklin Care Center a 15' line was drawn from the perimeter of the building. Since the Franklin Care Center has a courtyard in the center of the building another 15' line was taken from there. Each regularly occupied space that has at least 75% of its area fall within the line counts as a perimeter space. If a space has less than 75% in the perimeter of the building, then only the portion in the perimeter counts as perimeter space and the remaining area counts as a non-perimeter space. Group or multi occupancy spaces fall into their own categories. A group or multi occupancy space with at least 75% of its area within the 15' line is counted as a group perimeter space. A group space with less than 75% of its area in the perimeter counts as a non perimeter space, but must still meet the window requirement for the amount of perimeter area in that space. If any space within the perimeter of the building has no connection with the building exterior it will not be counted as a perimeter space, but may be counted as a non perimeter space if it is regularly occupied.

A list of perimeter, non perimeter, group perimeter and group non perimeter spaces as well as the calculations in this report can be found in Appendix C.

Requirements:

The requirements for each type of space are listed below:

Perimeter spaces: Must have 1 operable window and 1 lighting control on average every 200sqft

Group perimeter spaces: Must have 1 operable window on average every 200sqft. For spaces less than 10,000sqft, 3 lighting controls must be provided for every 2,500sqft. There are no group areas greater than 10,000sqft in the Franklin Care Center.

Non-perimeter spaces: Must provided lighting controls, air flow controls and temperature controls each equal to 50% of the number of occupants. The number of occupants is determined from ASHRAE 62.

Non-perimeter group space: For spaces less than 10,000 sqft, 3 lighting controls, 1 air flow control and 1 temperature control must be provided for every 2,500sqft.

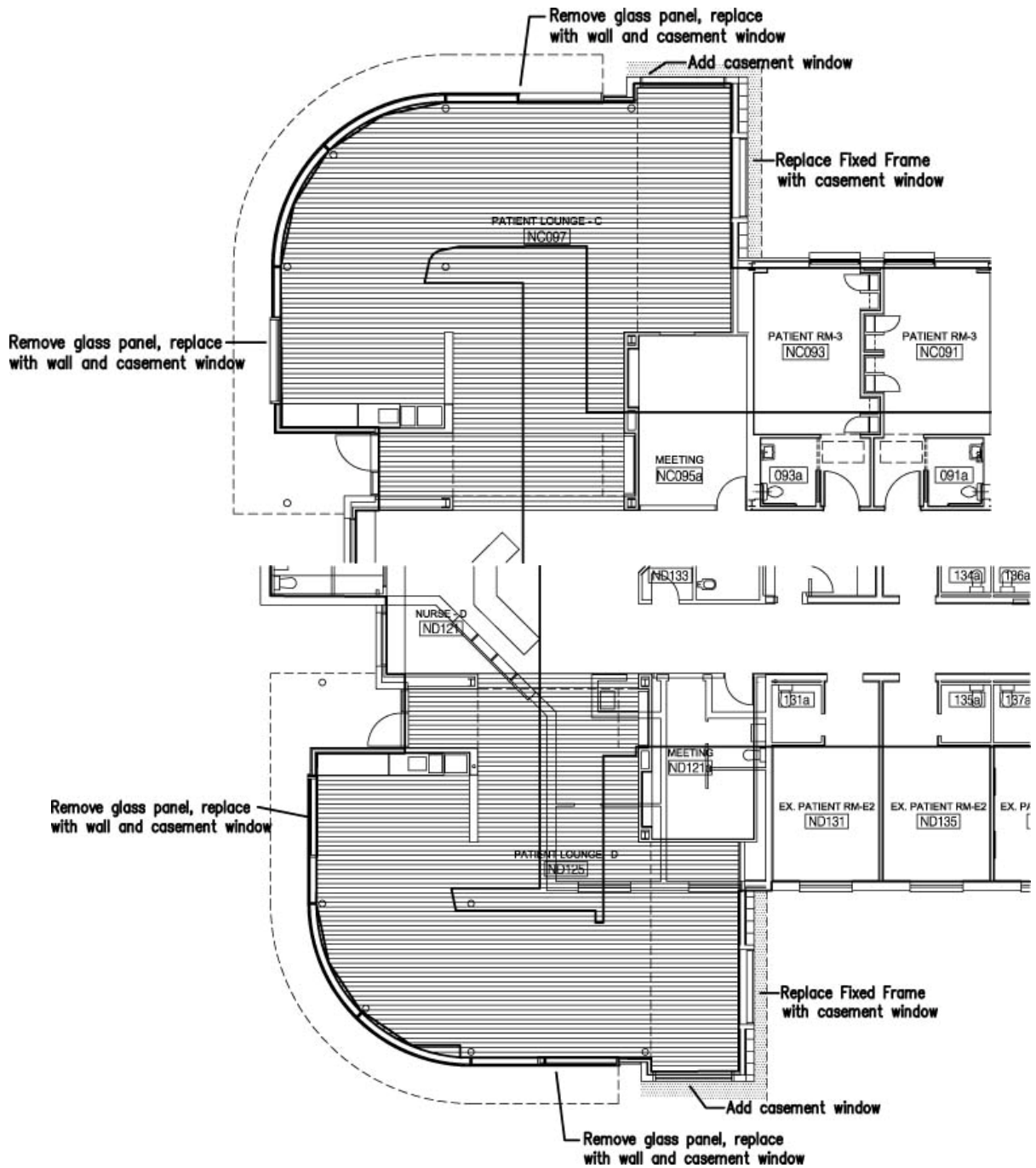
Windows:

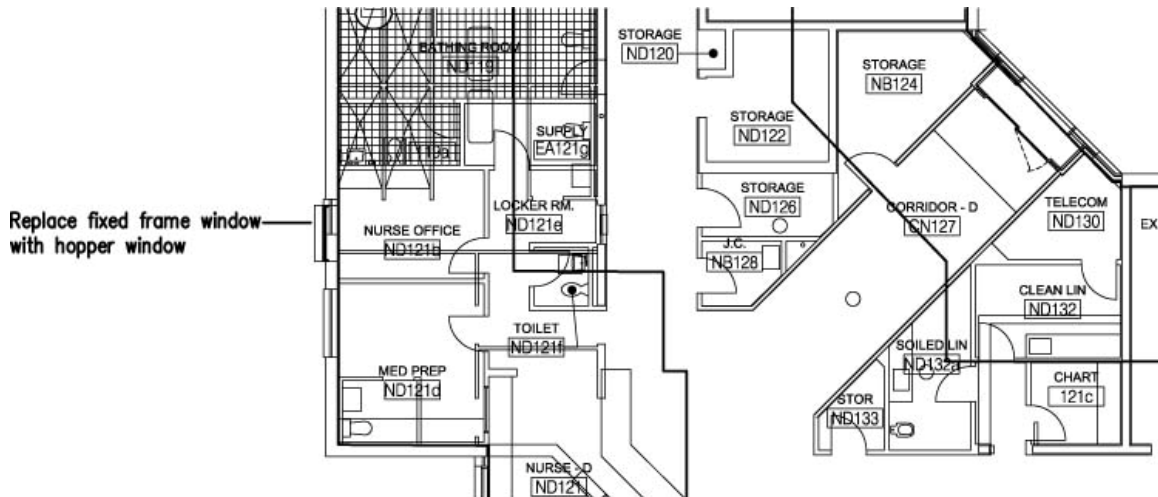
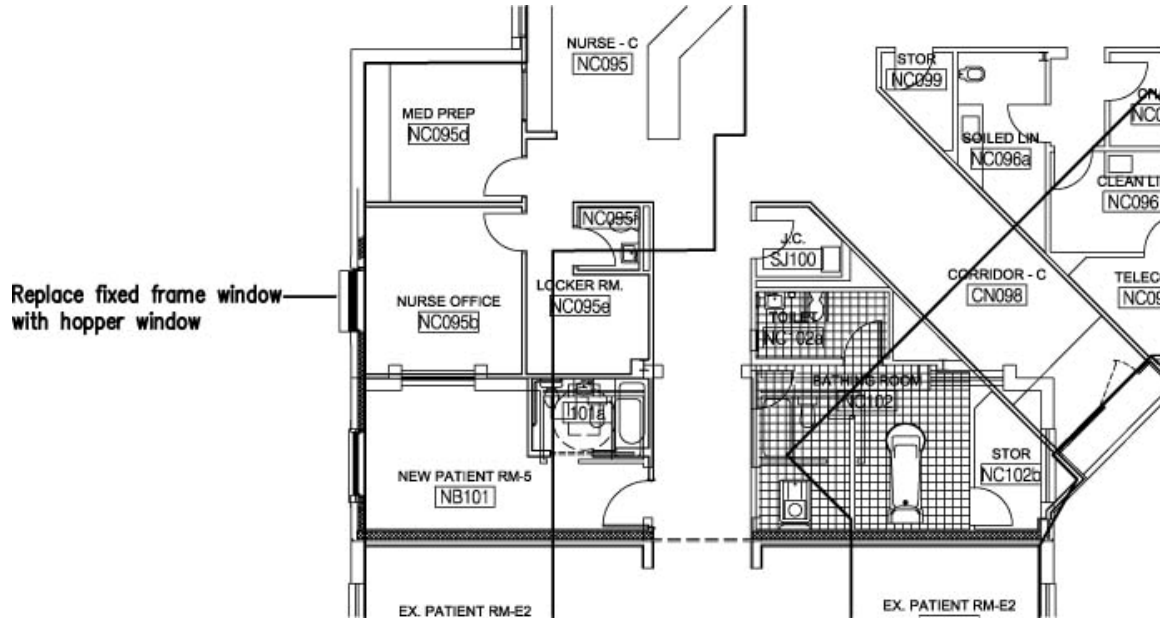
The architecture of the building has already been designed, although it can be altered, it would be easier to work around the existing design and avoid any major changes that may affect the layout or structure of the building. The following tables show the number of existing operable windows per type of space as well as the number of windows that will be required to earn LEED credit 6.1.

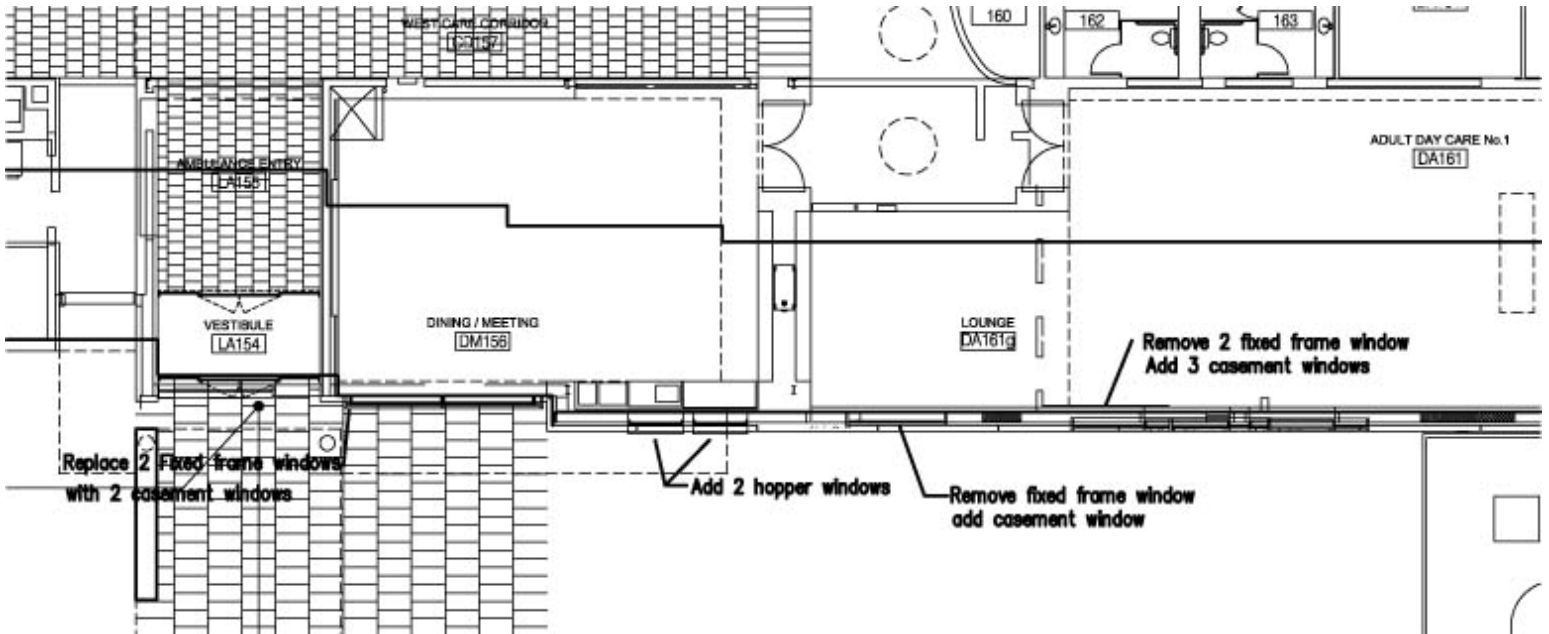
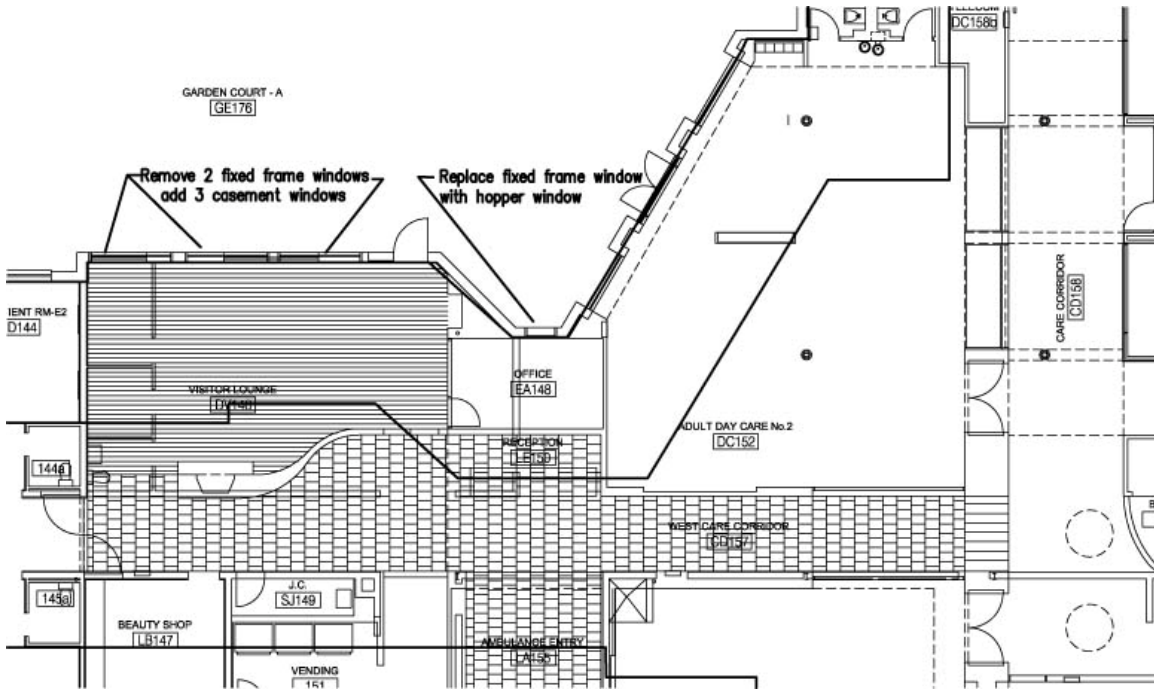
Perimeter Area (When 75% or more of a room is within the 15' offset line)						
Perimeter Area		Operable Windows		# of operable	# of operable	
sqft		qty	pass	windows needed	windows to add	
34827		139	NO	174	35	
Group or Multi-occupancy Perimeter Area (When 75% or more of a room is within the 15' offset line)						
Perimeter Area		Operable Windows		# of operable	# of operable	
sqft		qty	pass	windows needed	windows to add	
6553		17	NO	33	16	
Group or Multi-occupancy Non Perimeter Area (When less than 75% of a room is within the 15' offset line)						
Perimeter Area		Operable Windows		# of operable	# of operable	
sqft		qty	pass	windows needed	windows to add	
5240		0	NO	27	27	

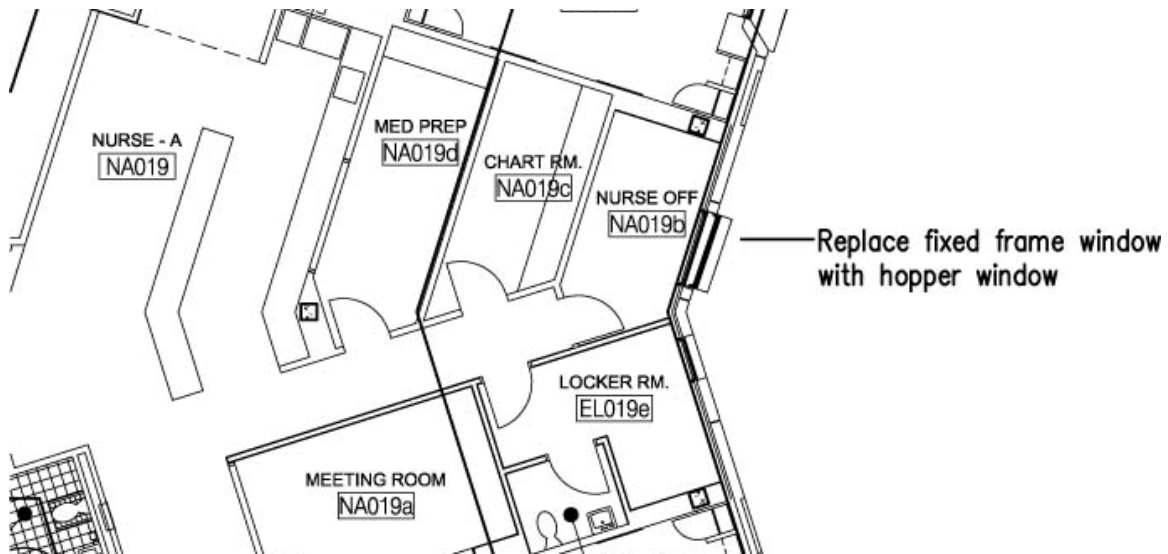
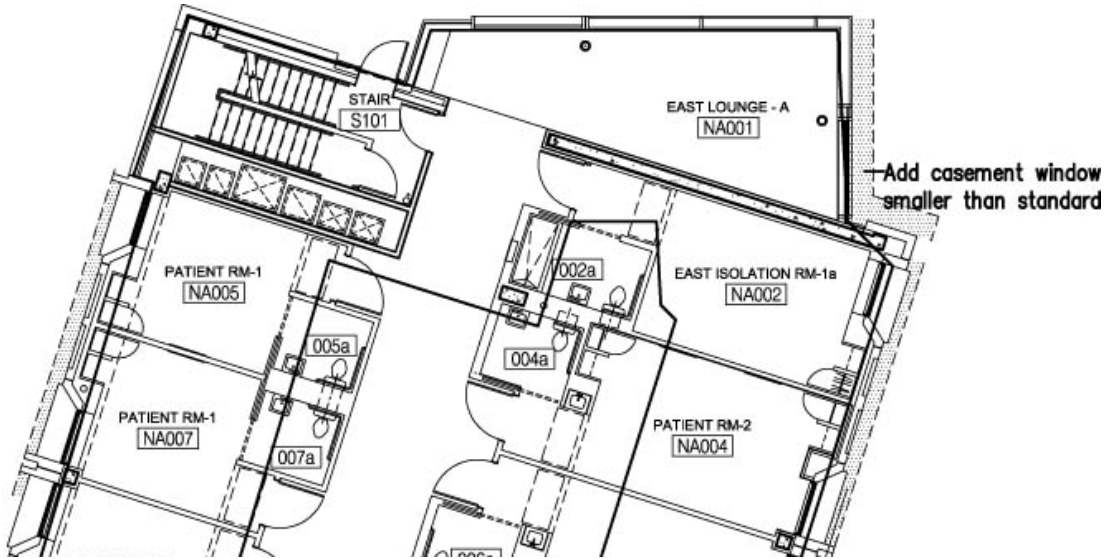
Many of these spaces had several fixed frame windows, however fixed frame windows do not operate and therefore do not count for this calculation. In spaces where this was the case, unless there was a specific need for a non operable window, many of these windows were changed to operable windows based on the size of the window. The Franklin Care Center's existing design uses smaller hopper windows, and slightly larger casement windows where operable windows are used. If an existing fixed frame window was close in size to either of these windows it was changed to that type of operable window. The fixed frame windows in the Medical Prep areas were not changed to operable windows since those rooms should be kept sterile.

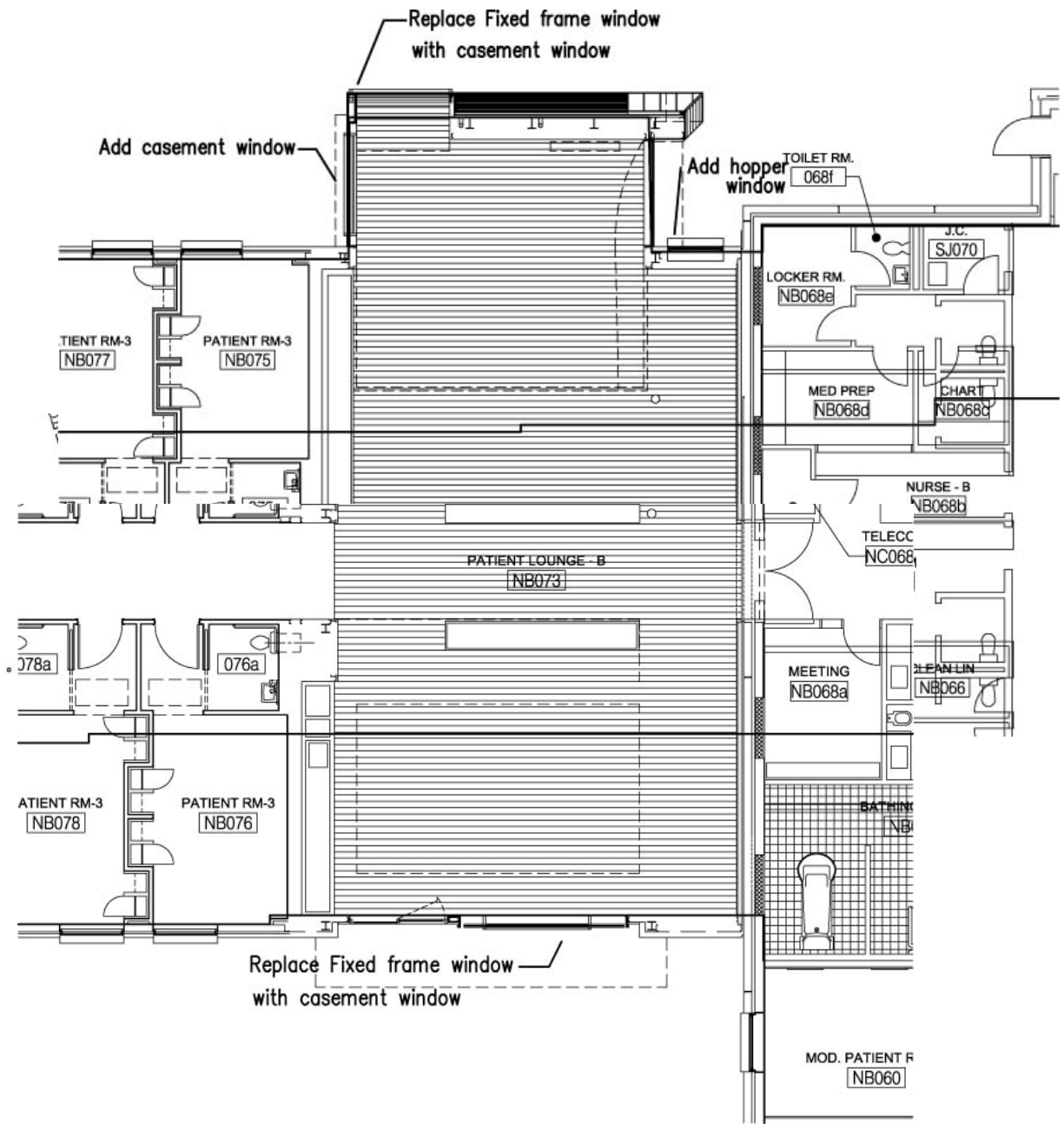
The following pages show images of the floor plans where non-operable windows were changed to operable windows, or operable windows were added. A list of types of windows in each room in the existing and new design can be found in Appendix C.

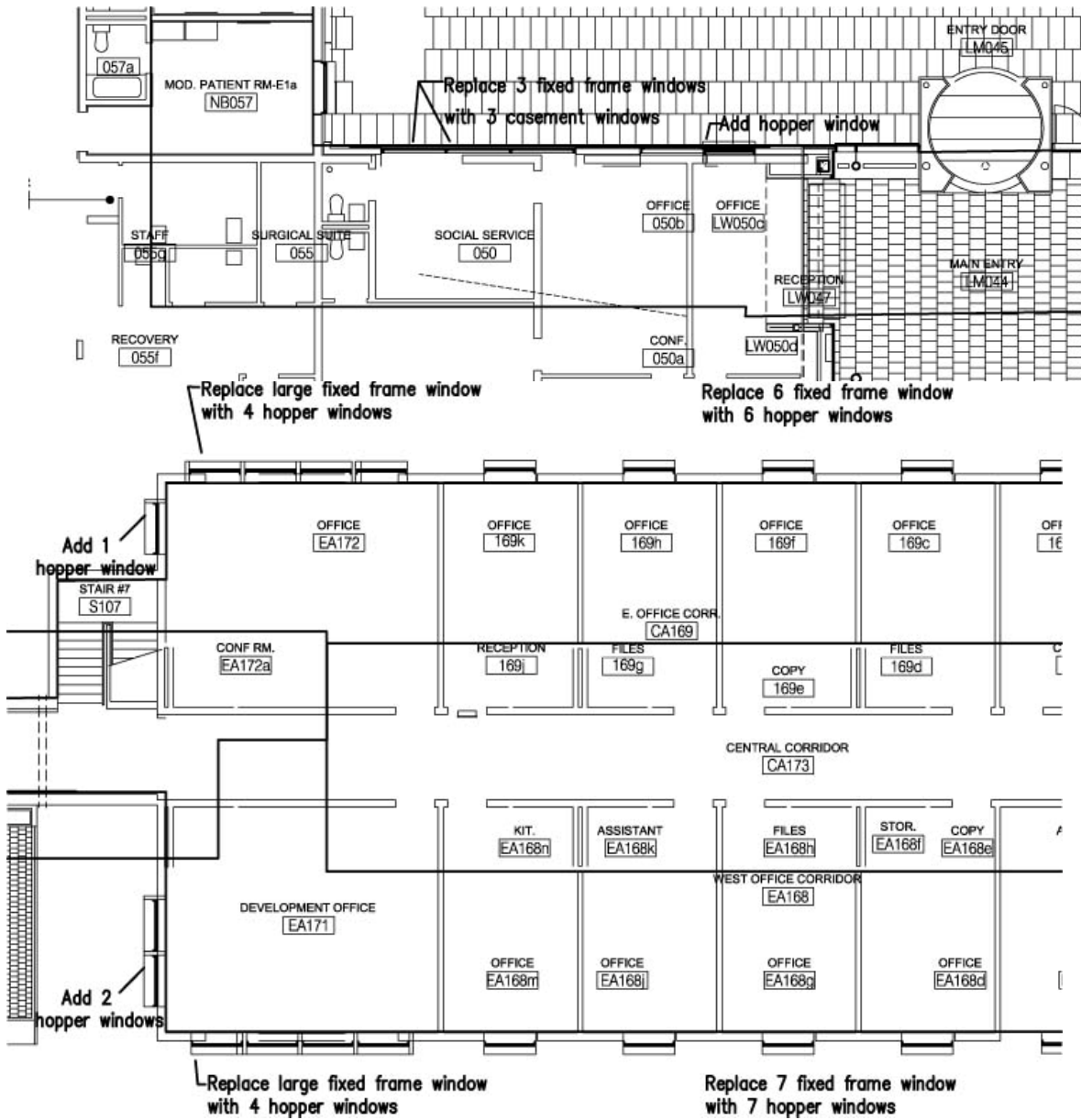












The following tables show the number of operable windows per type of space for the new perimeter system.

Perimeter Area (When 75% or more of a room is within the 15' offset line)					
Perimeter Area sqft	Operable Windows qty pass		# of operable windows needed	# of operable windows to add	
34827	174	YES	174	0	
Group or Multi-occupancy Perimeter Area (When 75% or more of a room is within the 15' offset line)					
Perimeter Area sqft	Operable Windows qty pass		# of operable windows needed	# of operable windows to add	
6553	33	YES	33	0	
Group or Multi-occupancy Non-Perimeter Area (When less than 75% of a room is within the 15' offset line)					
Perimeter Area sqft	Operable Windows qty pass		# of operable windows needed	# of operable windows to add	
5240	27	YES	26	0	

Lighting Control:

Since the Franklin Care Center is still in the design phase, the lighting control has not been finalized yet. The entire building will be controlled by a DALI system. Wattstopper ezDALI equipment was specified for the lighting design breadth, so it will continue to be used throughout the building. Wattstopper equipment used in the following design can be found in appendix A.

According to LEED criteria for Indoor Environmental Quality credit 6, the following lighting controls can each be counted as two separate controls: occupancy sensor, daylight control, dimming control and manual on/off switch. All other lighting controls count as one.

Perimeter Area: The perimeter spaces that are not group spaces include patient rooms, various types of offices and medical prep rooms. To obtain 1 lighting control per 200sqft for these spaces 1 Wattstopper ez DALI group control was placed in each room. This group control allows each group of luminaries in that space to be dimmed separately. Although this alone exceeded the number of lighting controls needed for LEED credit, a Wattstopper ultrasonic occupancy sensor was added to each office to conserve energy while the office is not in use.

The following partial floor plans show the layout of typical perimeter rooms:

LEGEND

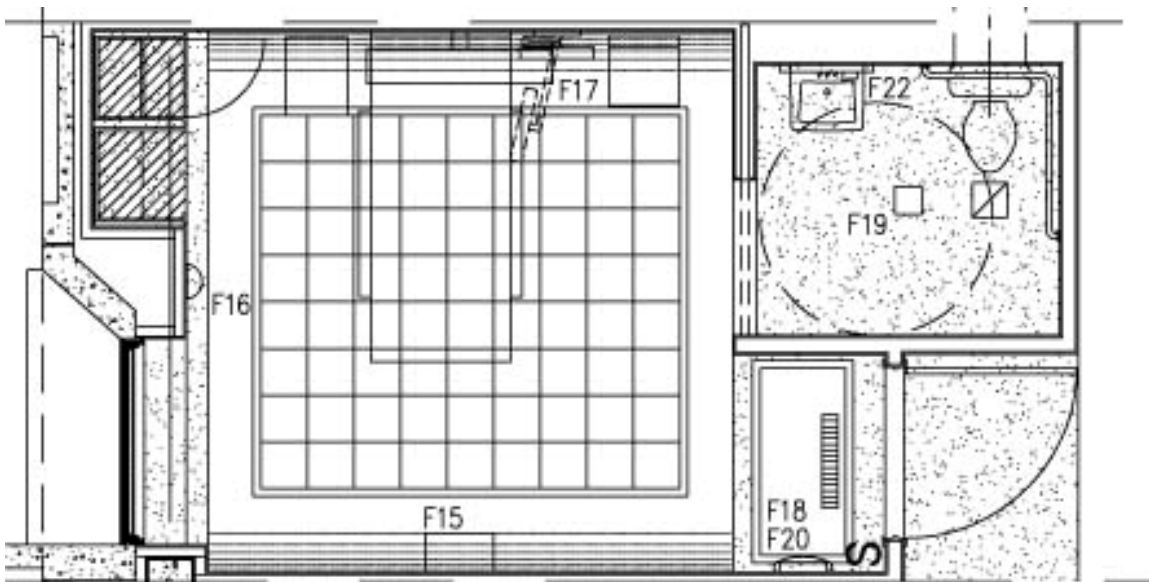
S – Wattstopper ezDALI group control

OC – Wattstopper ultrasonic occupancy sensor

Patient Rooms

In each patient room a Wattstopper ezDALI group control will be located adjacent to the doorway as shown in the plan below.

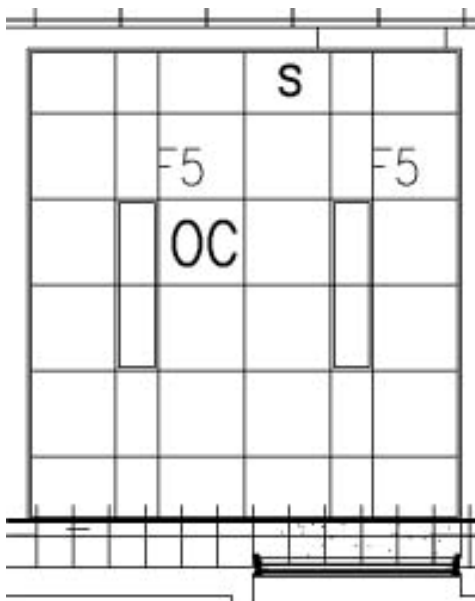
*Note: Additional lighting controls will be used for the bathroom spaces, however are not shown here since that is not a regularly occupied space.



Office and medical prep rooms

In each office a Wattstopper ezDALI group control will be located adjacent to the doorway, an ultrasonic occupancy sensor will be located about halfway into the room provided there is a clear line of sight. The occupancy sensor should not be located

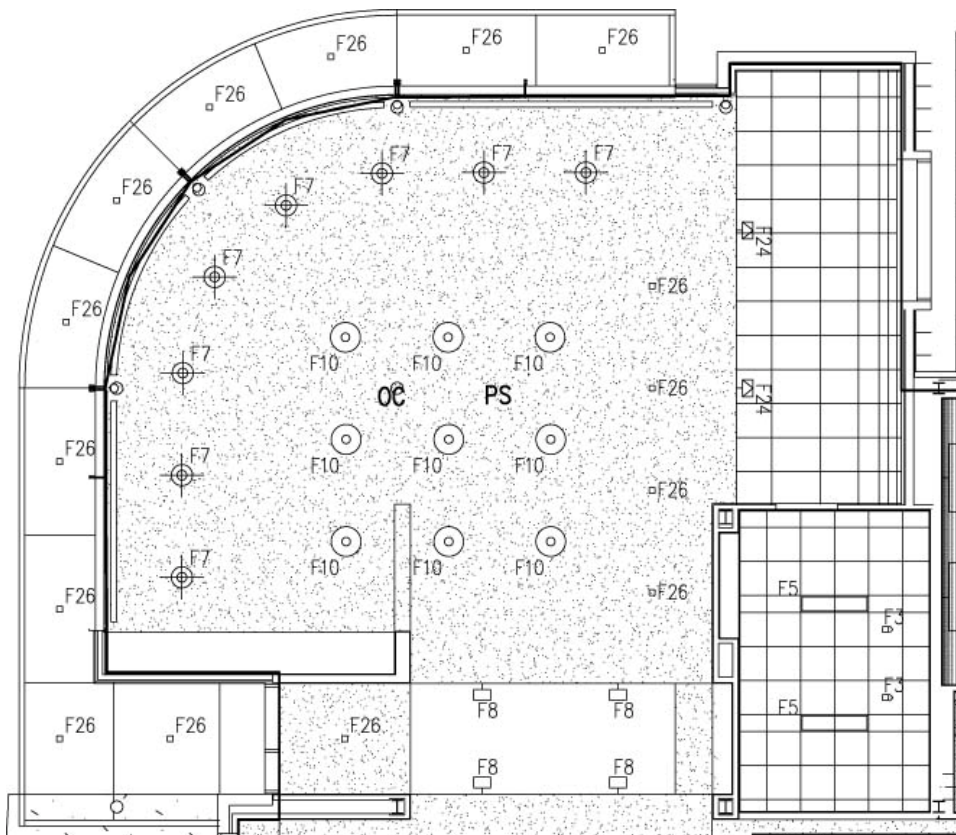
directly in front of the door to prevent misreadings from people walking by.



Perimeter Group or Multi-occupancy Area: The group occupancy areas include lounges and a beauty shop. Each space must have 3 lighting controls per every 2,500sqft, however none of the rooms are over 2,500 sqft, so no more than 3 lighting controls is necessary per room. 1 Wattstopper ez DALI group control was placed in each room, giving each room two controls according to LEED criteria. Every lounge will also have an occupancy sensor to conserve energy while it is not being occupied. Lounges that have glass curtain walls will have an additional control for daylight. A photosensor will be used to dim the electric lighting based on the amount of light entering through the façade. The beauty shop will have one group control and one automatic on/off switch since it will be open for specific hours every day.

Lounges

In each lounge one group control will be located near the entrance. An occupancy sensor will be located about halfway into the room and should not face directly out any doors. If the lounge also has a photosensor, the photosensor should be placed about 2/3's back from the window near the center of the room.



Beauty Shop

The DALI group control in the beauty shop will be located near the entrance. All fixtures will also be connected to the automatic on/off switch which will shut the lights off after the shop closes.

Non-perimeter Area:

The non-perimeter rooms are all part of the therapy suite. The physical therapy space falls in this area, while the rest of the rooms are different types of offices. The number of lighting controls for each of these spaces is determined by the number of occupants per space. The number of occupants per space was found in ASHRAE 62. Overall the non perimeter spaces had 22 occupants, making a minimum of 11 lighting controls necessary. In the 5 different offices one DALI group control and one occupancy sensor was placed in the same manner as for the perimeter spaces. The reception area only has a DALI group control, but no occupancy sensor since it should appear inviting at all times. The physical therapy area has one DALI group control and 2 photosensors as designed in the lighting design breadth.

Non-perimeter Group or Multi-occupancy Area:

The non-perimeter group spaces include lounges, a dining room, adult day care, conference room, and meeting rooms. Each space must have 3 lighting controls per every 2,500sqft, however none of the rooms are over 2,500 sqft, so no more than 3 lighting controls is necessary per room. 1 Wattstopper ez DALI group control was placed in each room, giving each room two controls according to LEED criteria. A DALI group and scene control was used in each conference room since it will be beneficial to have the option of preset scenes for different types of meetings and presentations. The lighting in the adult daycare rooms will also be connected to an automatic on/off switch since the daycare will be open during specific hours every day. All other rooms will have an occupancy sensor to conserve energy when the room is not in use. The occupancy sensors should be placed about halfway into the room while avoiding the direct line of sight out the door, as shown in the typical lounge above.

The following table shows the lighting controls per type of space for the newly designed system:

Perimeter Area (When 75% or more of a room is within the 15' offset line)					
Perimeter Area sqft	Lighting Control		# of lighting	# of controls	
	qty	pass	controls needed	to add	
34827	381	YES	174	0	
Non-Perimeter Area (When less than 75% of a room is within the 15' offset line)					
Perimeter Area sqft	Lighting Control		# of lighting	# of controls	
	qty	pass	controls needed	to add	
2421	27	YES	11	0	
Group or Multi-occupancy Perimeter Area (When 75% or more of a room is within the 15' offset line)					
Perimeter Area sqft	Lighting Control		# of lighting	# of controls	
	qty	pass	controls needed	windows to add	
6553	52	YES	30	0	
Group or Multi-occupancy Non-Perimeter Area (When less than 75% of a room is within the 15' offset line)					
Perimeter Area sqft	Lighting Control		# of lighting	# of controls	
	qty	pass	controls needed	windows to add	
5240	36	YES	27	0	

Temperature and Airflow:

There are additional requirements for temperature and airflow control of non-perimeter spaces. It is difficult to determine the placement of these controls at this time since the drawings are still in the design phase. Only one of each control is necessary in each group space to satisfy LEED criteria. However a calculation was done to determine the number of each type of control in the remaining non-perimeter spaces. The number of each type of control needed was determined for these spaces and is shown in the chart below:

Room Name	Room Number	Area sqft	Lighting Control Type	# Occupants	Airflow controls	Temperature Controls
Med. Prep	NA019d	131	One DALI group control	1	1	1
Physical Therapy	DT159a	1500	One DALI group control and 2 photosensors	15	4	5
Occupational Therapy	DT159b	340	One DALI group control and one occupancy sensor	2	2	1
Reception	DT159s	100	One DALI group control	3	1	1
Director	DT159r	100	One DALI group control and one occupancy sensor	1	1	1
Speech	DT159n	125	One DALI group control and one occupancy sensor	1	1	1
Phycatrist	DT159k	125	One DALI group control and one occupancy sensor	1	1	1
				Total Controls	11	11

As long as the above number of airflow and temperature controls are provided in each space, credit 6.2 Non-perimeter Control System, will be earned.

Conclusions

By adding windows and a lighting control system to the existing design for the Franklin Care Center LEED Indoor Environmental Quality Credit 6.1, Controllability of Perimeter Systems, will be earned. By also meeting the number of airflow and temperature controls calculated above credit 6.2 Controllability of Non-perimeter Systems can also be earned. By earning LEED credit 6, there is a better chance that the Franklin Care Center will be awarded LEED gold certification after construction.