

OCEAN STUDIES  
EDUCATIONAL BUILDING  
LEED CHARETTE

UC Santa Barbara

January 4<sup>th</sup> 2006

UC SANTA BARBARA

OCEAN STUDIES EDUCATIONAL BUILDING LEED CHARETTE

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## EXECUTIVE SUMMARY



## Executive Summary

A preliminary LEED Sustainability Eco-Charette was undertaken on January 4<sup>th</sup> 2006 to assess the LEED potential of the new Ocean Studies Educational Building. The Charette involved members of the client and design team, and was facilitated by Bharat Patel of DMJM H&N.

The project will be registered under the recently launched LEED NC 2.2 scheme.

The conclusion of the Eco-Charette was that there were 48 potentially achievable LEED points that could be achieved by the project, along with a further 10 possible points that could potentially become achievable as the design progressed.

## PROJECT INTRODUCTION



## Project Introduction

As a collaboration between the Channel Islands National Marine Sanctuary (CINMS) and the University of California, Santa Barbara (UCSB) this new facility will be a state-of-the-art educational facility that connects invited participants to the Channel Islands National Marine Sanctuary and the Marine Science Institute at the University of California, Santa Barbara through compelling, hands-on programming. The estimated total building program area. 16,073 sq. ft, and the building construction budget (2008 dollars) is \$7,128,000

The facility will function as both an Outreach Center for Teaching Ocean Science (OCTOS) and the primary administrative office for operation of the sanctuary (CINMS). The combination will be a unique learning center that brings together science process, environmental policy, and the human connection by focusing on the special marine ecosystem of the Channel Islands.

The project will include a live Deep Reef Habitat, supplemental dry exhibits and a virtual immersion experience through use of a multimedia interactive technology theater, as well a research classroom and administrative support spaces.

The UCSB Campus has become recognized as a leader in the field of green building design and construction. As such, the University has established a goal to achieve a Silver Certification for new buildings. In consideration of the environmental message and mission of this unique project, the Building Committee has proposed that the goal be elevated to LEED GOLD.

The project will be registered under the recently launched LEED NC 2.2 scheme.

## PURPOSE OF CHARETTE



## Purpose of Charette

As the first step in the ongoing process to achieve LEED Gold Certification, a conceptual LEED Design Charette was undertaken on January 4<sup>th</sup> 2006 at UC Santa Barbara. The Charette was facilitated by Bharat Patel of DMJM H&N.

As the conceptual design for the building had yet to be developed, this initial LEED Charette was primarily held as a brain storming session to discuss and evaluate different sustainable design strategies that could be utilized to minimize energy use and maximize the LEED potential of the project, based upon the building program, function and the proposed site.

## CHARETTE OVERVIEW



# Charette Overview

## Global Sustainability Issues

In order to focus the group on sustainability and bring all of the Charette participants to the same level of understanding with regard to sustainability and green building design, Mr Patel presented an overview of global sustainability issues.

A manual was handed to the participants in attendance, and the interpretation of sustainability was presented.

The impact of buildings according to Department of Energy (DOE) contributes to the following:-

- Buildings use 64% of all electricity generated in the US
- Buildings contribute to 30% of green house gases.
- Buildings produce 136 million tons of demolition waste.
- Buildings use 40% of raw materials annually

The consequences that flow from the above finding, were discussed which included global warming. A wider discussion followed surrounding the impact of global warming and the measurable ramifications that would follow:

- Ice sheet melting in the arctic circle effect the eco-cycle
- Rise in temperature of the oceans causing
  - Expansion of ocean water that cause massive flooding to low lying areas, Florida, Pacific Islands. According to the IPCC the pacific islands with a population of 7 million are at 3 times as much risk than the global north, whilst only 0.06% of the world emissions that causes the problem.
  - More severe weather conditions around the globe. In America low level areas will have high insurance premiums for property
  - The building is an ocean studies building therefore it will be used as a teaching tool and its relation to global warming. Studies conducted by the nearby ocean labs at Monterey show species that that once lived on the colder waters of the pacific ocean can no longer been found and the creatures that live on the warmer conditions have flourished.

Another study examined was the one carried out in South Africa examining endangered plants species and its relationship with climate change. Samples were taken, and while some species could adapt to the higher temperatures and others could migrate by means of wind carrying seeds others using bird droppings as a means of conveyance, the majority of the species would do neither and would become eradicated. A lost species.

The next study to be considered focused on humans. Rich nations can adapt by building for severe conditions however studies in Africa have demonstrated that the severe drought caused by global warming had contributed to ten of thousands of deaths. While plants and birds see no borders, man made boarders forces the demise of cultures. A new category is created: Environmental Refugees.

## Project Specific Sustainability Opportunities

In order to ensure that the users and client values were incorporated within the charette process, the group first brainstormed the key client values for the project.

It was concluded that the cornerstone of the client's philosophy is the connection with nature, and that a thoughtful design process is the key to realizing the client's vision by attempting to maximize this connection with nature. The following methods were noted as methods of providing this connection within the design:

- 1) Operable Windows with natural ventilation
- 2) To encourage natural ventilation – ceiling fans should be considered
- 3) Investigate the use of mixed mode there may be some areas that require air conditioning while others require natural ventilation
- 4) There was no need of having a dropped ceiling, expose all services, in classrooms ensure that acoustics is acceptable.
- 5) The building will be used as an educational tool
- 6) Minimize the use of finishes, for example if concrete is used use pozzalines etc to give it a white or a colored look. This would eliminate the need for paint and the need for maintenance.
- 7) Raised floor should be considered if there is a high churn rate.
- 8) Use of wire mesh glazing system should be considered to maximize daylight while minimizing heat gain.
- 9) Sea water should be used to provide pre cooling to the chiller system should air-conditioning be used.

Once the wider aspects of sustainability were understood the next stage would be to move to the formal LEED check list. The group discussed each of the LEED credits in turn, brainstorming the various design opportunities associated with each.

The site opportunities were discussed and the brainstorming session then continued to minimize the energy usage, water usage, and the wider environmental impacts which result as a consequence of careless use of resources.

It was recognized that the roof offered a number of sustainable design opportunities, and it was therefore suggested that the following be investigated further as the design progresses.

- a. Green Roofs
- b. Use of Sod
- c. Use of vines planted at the ground level and grown up to the roof and spread on the roof.
- d. Consider the use of salt water plant, because saltwater from the lab can be piped to these plants.
- e. Use of a cool roof i.e. Sarnafil roof
- f. PV should not be used due to the shadows of adjacent buildings
- g. Solar hot water system should be studied.

### **Campus-wide Credits**

UCSB intends to negotiate the following LEED credits as Campus-wide credits. The decision as to whether these credits will be accepted is expected to be made by late spring. Proposed Credits include:

#### Sustainable Sites

Credit 1: Site Selection

Credit 4.1: Alternative Transportation, Public Transportation Access Credit

Credit 4.2: Alternative Transportation, Bicycle Storage & Changing Rooms

#### Energy & Atmosphere

Prerequisite 1: Fundamental Building Commissioning (the UCSB inhouse commissioning plan has been accepted, but a commissioning report is still necessary in order to qualify for the prerequisite)

Prerequisite 3: CFC Reduction in HVAC and R equipment (the UCSB central plant qualifies)

Prerequisite 2- Environmental Tobacco Smoke (ETS) Control (campus policy)

#### Innovation and Design Process

Credit 1.1 Green Building Outreach

Credit 1.2 Green Procurement

Credit 1.3 Sustainable Curriculum

Credit 1.4 Green Site Maintenance

## PRELIMINARY LEED CHECKLIST



## Preliminary LEED Checklist

The LEED Charette utilized the LEED NC 2.2 checklist to focus the brainstorming discussions.

The following LEED scorecard summarizes the discussions of the Charette and the preliminary assessment of the LEED credits that can be achieved.



# LEED-NC

## LEED-NC Version 2.2 Registered Project Checklist

University of Santa Barbara California - Ocean Studies Educational Building

Yes ? No

### 12 1 1 Sustainable Sites 14 Points

Y						
				Prereq 1	<b>Construction Activity Pollution Prevention</b>	Required
1				Credit 1	<b>Site Selection</b>	1
1				Credit 2	<b>Development Density &amp; Community Connectivity</b>	1
			1	Credit 3	<b>Brownfield Redevelopment</b>	1
1				Credit 4.1	<b>Alternative Transportation, Public Transportation Access</b>	1
1				Credit 4.2	<b>Alternative Transportation, Bicycle Storage &amp; Changing Ro</b>	1
1				Credit 4.3	<b>Alternative Transportation, Low-Emitting and Fuel-Efficient</b>	1
1				Credit 4.4	<b>Alternative Transportation, Parking Capacity</b>	1
1				Credit 5.1	<b>Site Development, Protect of Restore Habitat</b>	1
1				Credit 5.2	<b>Site Development, Maximize Open Space</b>	1
1				Credit 6.1	<b>Stormwater Design, Quantity Control</b>	1
1				Credit 6.2	<b>Stormwater Design, Quality Control</b>	1
1				Credit 7.1	<b>Heat Island Effect, Non-Roof</b>	1
1				Credit 7.2	<b>Heat Island Effect, Roof</b>	1
	?			Credit 8	<b>Light Pollution Reduction</b>	1

Yes ? No

### 4 1 Water Efficiency 5 Points

1				Credit 1.1	<b>Water Efficient Landscaping, Reduce by 50%</b>	1
1				Credit 1.2	<b>Water Efficient Landscaping, No Potable Use or No Irrigatic</b>	1
		?		Credit 2	<b>Innovative Wastewater Technologies</b>	1
1				Credit 3.1	<b>Water Use Reduction, 20% Reduction</b>	1
1				Credit 3.2	<b>Water Use Reduction, 30% Reduction</b>	1

Yes ? No

### 11 2 Energy & Atmosphere 17 Points

Y				Prereq 1	<b>Fundamental Commissioning of the Building Energy Sys</b>	Required
Y				Prereq 2	<b>Minimum Energy Performance</b>	Required
Y				Prereq 3	<b>Fundamental Refrigerant Management</b>	Required
8				Credit 1	<b>Optimize Energy Performance</b>	1 to 10
			1	Credit 2.1	<b>On-Site Renewable Energy</b>	1 to 3
1				Credit 3	<b>Enhanced Commissioning</b>	1
1				Credit 4	<b>Enhanced Refrigerant Management</b>	1
1				Credit 5	<b>Measurement &amp; Verification</b>	1
			1	Credit 6	<b>Green Power</b>	1

continued...

Yes ? No

**6 1** **Materials & Resources** **13 Points**

Y						
					Prereq 1	<b>Storage &amp; Collection of Recyclables</b> Required
			1		Credit 1.1	<b>Building Reuse</b> , Maintain 75% of Existing Walls, Floors & R 1
			1		Credit 1.2	<b>Building Reuse</b> , Maintain 100% of Existing Walls, Floors & F 1
			1		Credit 1.3	<b>Building Reuse</b> , Maintain 50% of Interior Non-Structural Ele 1
1					Credit 2.1	<b>Construction Waste Management</b> , Divert 50% from Dispos: 1
1					Credit 2.2	<b>Construction Waste Management</b> , Divert 75% from Dispos: 1
			1		Credit 3.1	<b>Materials Reuse</b> , 5% 1
			1		Credit 3.2	<b>Materials Reuse</b> ,10% 1
1					Credit 4.1	<b>Recycled Content</b> , 10% (post-consumer + ½ pre-consumer) 1
	?				Credit 4.2	<b>Recycled Content</b> , 20% (post-consumer + ½ pre-consumer) 1
1					Credit 5.1	<b>Regional Materials</b> , 10% Extracted, Processed & Manufactu 1
1					Credit 5.2	<b>Regional Materials</b> , 20% Extracted, Processed & Manufactu 1
			1		Credit 6	<b>Rapidly Renewable Materials</b> 1
1					Credit 7	<b>Certified Wood</b> 1

Yes ? No

**10 5** **Indoor Environmental Quality** **15 Points**

Y						
					Prereq 1	<b>Minimum IAQ Performance</b> Required
Y					Prereq 2	<b>Environmental Tobacco Smoke (ETS) Control</b> Required
		?			Credit 1	<b>Outdoor Air Delivery Monitoring</b> 1
		?			Credit 2	<b>Increased Ventilation</b> 1
1					Credit 3.1	<b>Construction IAQ Management Plan</b> , During Construction 1
1					Credit 3.2	<b>Construction IAQ Management Plan</b> , Before Occupancy 1
1					Credit 4.1	<b>Low-Emitting Materials</b> , Adhesives & Sealants 1
1					Credit 4.2	<b>Low-Emitting Materials</b> , Paints & Coatings 1
1					Credit 4.3	<b>Low-Emitting Materials</b> , Carpet Systems 1
1					Credit 4.4	<b>Low-Emitting Materials</b> , Composite Wood & Agrifiber Produ 1
1					Credit 5	<b>Indoor Chemical &amp; Pollutant Source Control</b> 1
1					Credit 6.1	<b>Controllability of Systems</b> , Lighting 1
1					Credit 6.2	<b>Controllability of Systems</b> , Thermal Comfort 1
1					Credit 7.1	<b>Thermal Comfort</b> , Design 1
		?			Credit 7.2	<b>Thermal Comfort</b> , Verification 1
		?			Credit 8.1	<b>Daylight &amp; Views</b> , Daylight 75% of Spaces 1
		?			Credit 8.2	<b>Daylight &amp; Views</b> , Views for 90% of Spaces 1

Yes ? No

**5** **Innovation & Design Process** **5 Points**

1					Credit 1.1	<b>Innovation in Design</b> : Provide Specific Title 1
1					Credit 1.2	<b>Innovation in Design</b> : Provide Specific Title 1
1					Credit 1.3	<b>Innovation in Design</b> : Provide Specific Title 1
1					Credit 1.4	<b>Innovation in Design</b> : Provide Specific Title 1
1					Credit 2	<b>LEED® Accredited Professional</b> 1

Yes ? No

**48 8 3** **Project Totals (pre-certification estimates)** **69 Points**

**Certified** 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

## ONGOING LEED ACTION SUMMARY



## Ongoing LEED Action Summary

To compliment the LEED Scorecard, the following table summarizes the LEED actions associated with each credit, and those responsible both for the current action and the overall development of the final LEED documentation element.

**UCSB OCEAN STUDIES EDUCATIONAL BUILDING – LEED POTENTIAL CREDIT ANALYSIS**  
**PRELIMINARY CONCEPT PHASE – LEED NC 2.2**  
**January 4<sup>th</sup> 2006**

LEED CREDIT NUMBER	DESCRIPTION	POINTS	ACTION/METHODOLOGY TO OBTAIN CREDIT
<b>SUSTAINABLE SITES</b>			
Prereq #1	<u>CONSTRUCTION ACTIVITY POLLUTION PREVENTION</u> – To reduce negative impacts on water and air quality	Required	<u>Action Required By:</u> General Contractor <u>Action:</u> Develop and implement sediment and erosion control plan. <u>Deliverable:</u> Sediment and Erosion Control Plan <u>Deliverable Produced by:</u> General Contractor
SS 1	<u>SITE SELECTION</u> – Avoid development of inappropriate sites. Site shall not be: – Prime farmland – Land lower than 5’ below 100 year flood line – Habitat for threatened or endangered species – Within 100 feet of any water – Previously public parkland	1	<u>Action Required By:</u> Civil Engineer <u>Action:</u> Civil Engineer to confirm that site meets credit criteria. <u>Deliverable:</u> Standard LEED letter <u>Deliverable Produced by:</u> Civil Engineer
SS 2	<u>DEVELOPMENT DENSITY &amp; COMMUNITY CONNECTIVITY</u>  Channel development to urban areas.	1	<u>Action Required By:</u> E+D+R / Wolf <u>Action:</u> Undertake density calculation for project and surrounding areas <u>Deliverable:</u> Standard LEED letter <u>Deliverable Produced by:</u> E+D+R / Wolf
SS 3	<u>BROWNFIELD REDEVELOPMENT</u>  Rehabilitate damaged sites.	0	Not achievable by project

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**LEED CREDIT**

<b>NUMBER</b>	<b>DESCRIPTION</b>	<b>POINTS</b>	<b>ACTION/METHODOLOGY TO OBTAIN CREDIT</b>
SS 4.1	<u>ALTERNATIVE TRANSPORTATION – Public Transportation Access</u> - Locate within ½ mile of rail, ¼ mile of bus service.	1	<p><u>Action Required By:</u> E+D+R / Wolf  <u>Action:</u> E+D+R / Wolf to develop campus plan showing location of new building and the two nearby public or campus bus services.</p> <p><u>Deliverable:</u> Standard LEED letter and Campus site plan  <u>Deliverable Produced by:</u> E+D+R / Wolf</p>
SS 4.2	<u>ALTERNATIVE TRANSPORTATION</u> – Provide secure bicycle storage and changing rooms for 5% of staff.	1	<p><u>Action Required By:</u> E+D+R / Wolf  <u>Action:</u> E+D+R / Wolf to incorporate bike racks and changing facilities within scheme</p> <p><u>Deliverable:</u> Standard LEED letter &amp; Site Plan  <u>Deliverable Produced by:</u> E+D+R / Wolf</p>
SS 4.3	<u>ALTERNATIVE TRANSPORTATION – Low emitting and Fuel Efficient</u> - Provide alternate fuel vehicles for 3% of occupants/provide fueling stations for alternative fuel vehicles.	1	<p><u>Action Required By:</u> E+D+R / Wolf  <u>Action:</u> E+D+R / Wolf to incorporate within scheme</p> <p><u>Deliverable:</u> Standard LEED letter &amp; Site Plan  <u>Deliverable Produced by:</u> E+D+R / Wolf</p>

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<b>NUMBER</b>	<b>DESCRIPTION</b>	<b>POINTS</b>	<b>ACTION/METHODOLOGY TO OBTAIN CREDIT</b>
SS 4.4	<u>ALTERNATIVE TRANSPORTATION</u> – Size parking to meet requirements of zoning, provide carpool spaces	1	<p><u>Action Required By:</u> E+D+R / Wolf</p> <p><u>Action:</u> E+D+R / Wolf to ensure parking capacity meets criteria.</p> <p><u>Deliverable:</u> Standard LEED letter and calculation</p> <p><u>Deliverable Produced by:</u> E+D+R / Wolf</p>
SS 5.1	<u>REDUCED SITE DISTURBANCE – Protection of Natural Habitat</u>	1	<p><u>Action Required By:</u> E+D+R / Wolf</p> <p><u>Action:</u> E+D+R / Wolf to incorporate 20% of development footprint as open space within site plan</p> <p><u>Deliverable:</u> Standard LEED letter and site plan</p> <p><u>Deliverable Produced by:</u> E+D+R / Wolf</p>
SS 5.2	<u>REDUCED SITE DISTURBANCE</u> – Maximize Open Space	1	<p><u>Action Required By:</u> E+D+R / Wolf</p> <p><u>Action:</u> E+D+R / Wolf to develop scheme based upon chosen compliance method.</p> <p><u>Deliverable:</u> Standard LEED letter and site plan</p> <p><u>Deliverable Produced by:</u> E+D+R / Wolf</p>
SS 6.1	<u>STORMWATER MANAGEMENT</u> – Quantity Control -	1	<p><u>Action Required By:</u> Civil Engineer</p>

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<b>NUMBER</b>	<b>DESCRIPTION</b>	<b>POINTS</b>	<b>ACTION/METHODOLOGY TO OBTAIN CREDIT</b>
	Reduce rate and quantity of runoff 25%.		<p><u>Action:</u> Civil Engineer to evaluate the size and discharge rate of the new and existing detention ponds and demonstrate a 25% reduction on the rate and quantity of stormwater runoff</p> <p><u>Deliverable:</u> Standard LEED letter &amp; Calculation  <u>Deliverable Produced by:</u> Civil Engineer</p>
SS 6.2	<u>STORMWATER MANAGEMENT</u> – Quality Control - Construct treatment system to remove 80% of TSS and 40% of TP.	1	<p><u>Action Required By:</u> Civil Engineer</p> <p><u>Action:</u> Civil Engineer to implement a stormwater management plan that reduces impervious cover, promotes infiltration, and captures and treats the stormwater runoff from 90% of the average annual rainfall<sup>1</sup> using acceptable best management practices (BMPs), and removing 80% of the total suspended solids.</p> <p><u>Deliverable:</u> Standard LEED letter &amp; Calculation  <u>Deliverable Produced by:</u> Civil Engineer</p>
SS 7.1	<u>HEAT ISLAND EFFECT – (NON ROOF)</u> – Provide shade or light colored pavement for 30% of site’s non roof area.	1	<p><u>Action Required By:</u> E+D+R / Wolf / Campbell &amp; Campbell</p> <p><u>Action:</u> ; E+D+R / Wolf / Campbell &amp; Campbell to develop site to comply with credit requirements</p> <p><u>Deliverable:</u> Standard LEED letter and site plan  <u>Deliverable Produced by:</u> E+D+R / Wolf / Campbell &amp; Campbell</p>
SS 7.2	<u>HEAT ISLAND EFFECT – (ROOF)</u> – Use compliant high reflectance and high emissivity roofing for 75% of	1	<p><u>Action Required By:</u> E+D+R / Wolf / Campbell &amp; Campbell</p> <p><u>Action:</u> E+D+R / Wolf to specify Energy Star roof</p>

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NUMBER	DESCRIPTION	POINTS	ACTION/METHODOLOGY TO OBTAIN CREDIT
	roof/50% vegetated.		and use high-albedo roofing, with Solar Reflectance Index.of 78 for low sloped roofs.  <u>Deliverable:</u> Standard LEED letter <u>Deliverable Produced by:</u> E+D+R / Wolf
SS 8	<u>LIGHT POLLUTION REDUCTION</u> – Eliminate light trespass from building.	1 (P)	<u>Action Required By:</u> E+D+R / Wolf / KSG  <u>Action:</u> E+D+R / Wolf / KSG to review program requirements and assess whether credit criteria can be achieved..  <u>Deliverable:</u> Standard LEED letter and calculation <u>Deliverable Produced by:</u> E+D+R / Wolf / KSG
<b>WATER EFFICIENCY</b>			
WE 1.1	<u>WATER EFFICIENT LANDSCAPING</u> – Reduce potable water consumption for irrigation by 50%.	1	<u>Action Required By:</u> E+D+R / Wolf / Sullivan Partnership / Campbell & Campbell  <u>Action:</u> Select landscaping to minimize water requirements and investigate use of graywater for irrigation to eliminate potable water use for landscaping.  <u>Deliverable:</u> Landscaping Water Use Calculation  <u>Deliverable Produced by:</u> Sullivan Partnership
WE 1.2	<u>WATER EFFICIENT LANDSCAPING</u> – Eliminate potable water used for landscape irrigation.	1	<u>Action Required By:</u> E+D+R / Wolf / Sullivan Partnership / Campbell & Campbell  <u>Action:</u> Select landscaping to minimize water requirements and investigate use of graywater for

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NUMBER	DESCRIPTION	POINTS	ACTION/METHODOLOGY TO OBTAIN CREDIT
			irrigation to eliminate potable water use for landscaping. <u>Deliverable:</u> Landscaping Water Use Calculation <u>Deliverable Produced by:</u> Sullivan Partnership
WE 2	<u>INNOVATIVE WASTEWATER TECHNOLOGIES</u> – Reduce potable water use for sewage conveyance by 50% or treat 100% of wastewater.	0	Not achievable by project
WE 3.1	<u>WATER USE REDUCTION</u> – Reduce water use 20% from baseline for building.	1	<u>Action Required By:</u> Sullivan Partnership <u>Action:</u> Use low flow fittings, <u>Deliverable:</u> Standard LEED letter & Calculation <u>Deliverable Produced by:</u> Sullivan Partnership
WE 3.2	<u>WATER USE REDUCTION</u> – Reduce water use 30% from baseline for building.	1	<u>Action Required By:</u> Sullivan Partnership <u>Action:</u> Use low flow fittings & dual flush toilets. <u>Deliverable:</u> Standard LEED letter & Calculation <u>Deliverable Produced by:</u> Sullivan Partnership
<b>ENERGY AND ATMOSPHERE</b>			
Prereq #1	<u>FUNDAMENTAL BUILDING COMMISSIONING</u> – Commissioning team outside design team to: <ul style="list-style-type: none"> <li>– Review design intent/basis</li> <li>– Incorporate commissioning requirements into construction documents</li> <li>– Develop/utilize commissioning plan</li> </ul>	Required	<u>Action Required By:</u> DMJM H&N <u>Action:</u> Develop and implement commissioning plan in line with requirements <u>Deliverable:</u> Standard LEED letter, Commissioning plan & report

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<b>NUMBER</b>	<b>DESCRIPTION</b>	<b>POINTS</b>	<b>ACTION/METHODOLOGY TO OBTAIN CREDIT</b>
	<ul style="list-style-type: none"> <li>– Verify installation, performance, training, O&amp;M documentation</li> <li>– Complete report</li> </ul>		<u>Deliverable Produced by:</u> DMJM H&N
Prereq #2	<u>MINIMUM ENERGY PERFORMANCE</u> – Design to meet ASHRAE ST. 90.1	Required	<u>Action Required By:</u> Sullivan Partnership / KSG <u>Action:</u> Design to meet ASHRAE 90.1 <u>Deliverable:</u> Standard LEED letter & Calculation <u>Deliverable Produced by:</u> Sullivan Partnership / KSG
Prereq #3	<u>CFC REDUCTION IN HVAC &amp; R EQUIPMENT</u> – No CFC refrigerants permitted.	Required.	<u>Action Required By:</u> Sullivan Partnership / KSG <u>Action:</u> Specify refrigerants that contain no CFC <u>Deliverable:</u> Standard LEED letter & incorporation into specification <u>Deliverable Produced by:</u> Sullivan Partnership / KSG
EA 1	<u>OPTIMIZE ENERGY PERFORMANCE</u> – Compare to ASHRAE ST. 90.1 baselines for energy use reductions. 15% = 1 point 20% = 2 points 25% = 3 points 30% = 4 points etc.	8	<u>Action Required By:</u> Sullivan Partnership / KSG <u>Action:</u> Design to minimize energy use within building with a goal of achieving 8 points <u>Deliverable:</u> Standard LEED letter & Calculation <u>Deliverable Produced by:</u> Sullivan Partnership / KSG
EA 2.1	<u>RENEWABLE ENERGY</u> – Provide at least 5% of building's total energy from renewable service.	0	Not achievable by project

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**LEED CREDIT**

<b>NUMBER</b>	<b>DESCRIPTION</b>	<b>POINTS</b>	<b>ACTION/METHODOLOGY TO OBTAIN CREDIT</b>
EA 3	<p><u>ENHANCED COMMISSIONING</u> – Require additional commissioning by team independent of design team to:</p> <ul style="list-style-type: none"> <li>– Review design prior to CD phase</li> <li>– Review near CD completion</li> <li>– Review submittals</li> <li>– Provide manual to owner</li> <li>– Provide O&amp;M support plan for one year after construction completion</li> </ul>	1	<p><u>Action Required By:</u> DMJM H&amp;N</p> <p><u>Action:</u> Undertake Commissioning review of DD documents and final construction documents.</p> <p><u>Deliverable:</u> Standard LEED letter, Commissioning reports and re-commissioning manual.</p> <p><u>Deliverable Produced by:</u> DMJM H&amp;N</p>
EA 4	<p><u>ENHANCED REFRIGERATION MANAGEMENT</u> - HVAC systems with no HCFC and/or Halon free fire suppression.</p>	1	<p><u>Action Required By:</u> Sullivan Partnership / KSG</p> <p><u>Action:</u> Specify refrigerants that contain no HCFC and implement refrigeration management methodology</p> <p><u>Deliverable:</u> Standard LEED letter, incorporation into specification and development of TSAC refrigeration report.</p> <p><u>Deliverable Produced by:</u> Sullivan Partnership / KSG</p>
EA 5	<p><u>MEASUREMENT AND VERIFICATION</u> – Install monitoring/metering system for:</p> <ul style="list-style-type: none"> <li>– Lighting and controls</li> <li>– Constant and variable motor loads</li> <li>– VFD operation</li> <li>– Chiller efficiency</li> <li>– Cooling load</li> <li>– Air/water economizer and heat recovery cycles</li> <li>– Air distribution static pressure and volume</li> <li>– Boiler efficiency</li> <li>– Building process energy systems and equipment</li> </ul>	1	<p><u>Action Required By:</u> Sullivan Partnership / KSG</p> <p><u>Action:</u> Expand basic DDC system and monitor energy meters to provide monitoring requirements as required to comply with Credit requirements.</p> <p><u>Deliverable:</u> Standard LEED letter &amp; incorporation into Contract Documents.</p> <p><u>Deliverable Produced by:</u> Sullivan Partnership / KSG</p>

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	– Indoor water risers and outdoor irrigation		
EA 6	<u>GREEN POWER</u> – Provide 50% of building electricity from renewable source provider.	0	Not achievable by project
<b>MATERIALS AND RESOURCES</b>			
Prereq. #1	<u>STORAGE AND COLLECTION OF RECYCLABLES</u> – Provide on-site area for storage/separation of paper, cardboard, glass, plastics, metal.	Required	<u>Action Required By:</u> E+D+R / Wolf <u>Action:</u> Incorporate Recyclables Storage within scheme <u>Deliverable:</u> Standard LEED letter <u>Deliverable Produced by:</u> E+D+R / Wolf
MR 1.1	<u>BUILDING REUSE</u> – Maintain 75% of existing building walls, floor, and roof.	0	Not achievable by project
MR 1.2	<u>BUILDING REUSE</u> – Maintain 100% of existing building walls, floor, and roof.	0	Not achievable by project
MR 1.3	<u>BUILDING REUSE</u> – Maintain 100% of shell/structure and 50% of non-shell/non-structure.	0	Not achievable by project
MR 2.1	<u>CONSTRUCTION WASTE MANAGEMENT</u> – Recycle or salvage 50% of construction waste.	1	<u>Action Required By:</u> E+D+R / Wolf <u>Action:</u> Require in project specifications. <u>Deliverable:</u> Standard LEED letter and calculation <u>Deliverable Produced by:</u> General Contractor
MR 2.2	<u>CONSTRUCTION WASTE MANAGEMENT</u> – Recycle or	1	<u>Action Required By:</u> E+D+R / Wolf

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	salvage 75% of construction waste.		<u>Action:</u> Require in project specifications. <u>Deliverable:</u> Standard LEED letter and calculation <u>Deliverable Produced by:</u> General Contractor
MR 3.1	<u>RESOURCE REUSE</u> – Use salvaged, refurbished, or reused materials, products, furnishings for at least 5% of building materials.	0	Not achievable by project
MR 3.2	<u>RESOURCE REUSE</u> – Use salvaged, refurbished or reused materials, products, furnishings for at least 10% of materials.	0	Not achievable by project
MR 4.1	<u>RECYCLE CONTENT</u> – Use materials that sum of post-consumer content plus ½ of post-industrial content equals 5% of value of materials.	1	<u>Action Required By:</u> E+D+R / Wolf / Englekirk + Sabel  <u>Action:</u> Require in project specifications. Include recycle content in specs/materials selection for Fly Ash in Concrete, Aggregate, Gypsum Board, Resilient Flooring, Carpet, Rebar Steel, and others.  <u>Deliverable:</u> Standard LEED letter and calculation to show compliance with ISO 14201 <u>Deliverable Produced by:</u> General Contractor
MR 4.2	<u>RECYCLE CONTENT</u> – Use materials that sum of post-consumer content plus ½ of post-industrial content equals 10% of value of materials.	1 (P)	<u>Action Required By:</u> E+D+R / Wolf / Englekirk + Sabel  <u>Action:</u> Require in project specifications. Include recycle content in specs/materials selection for Fly Ash in Concrete, Aggregate, Gypsum Board, Resilient Flooring, Carpet, Rebar Steel, and others. Possible with careful material selection,

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NUMBER	DESCRIPTION	POINTS	ACTION/METHODOLOGY TO OBTAIN CREDIT
MR 5.1	<u>REGIONAL MATERIALS</u> – 20% of building materials manufactured within 500 miles of site.	1	<p>primarily in finishes, to reach this 10% goal. May compete with MR 3.1 for potential applicable uses.</p> <p><u>Deliverable:</u> Standard LEED letter and calculation to show compliance with ISO 14201  <u>Deliverable Produced by:</u> General Contractor  <u>Action Required By:</u> E+D+R / Wolf / Englekirk + Sabel</p> <p><u>Action:</u> Englekirk + Sabel to investigate local materials (including concrete and steel) to meet requirements and incorporate within the specifications.</p>
MR 5.2	<u>REGIONAL MATERIALS</u> – Of the 20% of materials in credit 5.1, 50% extracted within 500 miles	1	<p><u>Deliverable:</u> Standard LEED letter and calculation  <u>Deliverable Produced by:</u> General Contractor  <u>Action Required By:</u> E+D+R / Wolf / Englekirk + Sabel</p> <p><u>Action:</u> Englekirk + Sabel to investigate local materials (including concrete and steel) to meet requirements and incorporate within the specifications.</p> <p><u>Deliverable:</u> Standard LEED letter and calculation  <u>Deliverable Produced by:</u> General Contractor</p>

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MR 6	<u>RAPIDLY RENEWABLE MATERIALS</u> – Use rapidly renewable materials for 5% of total value of all building materials.	0	Not achievable by project
MR 7	<u>CERTIFIED WOOD</u> – Use 50% of wood-based materials from certified sources.	1	<p><u>Action Required By:</u> E+D+R / Wolf</p> <p><u>Action:</u> All form lumber/barricades and limited building wood products on site are specified to be from certified sources if concrete or steel structural systems are used for the building. If wood frame system is used for construction, specifications must control sources for lumber products to get the 50% from Certified Sources – does have cost impact</p> <p><u>Deliverable:</u> Standard LEED letter and calculation</p> <p><u>Deliverable Produced by:</u> E+D+R / Wolf</p>
<b>INDOOR ENVIRONMENTAL QUALITY</b>			
Prereq. #1	<u>MINIMUM IAQ PERFORMANCE</u> – Meet minimum requirements of ASHRAE 62.	Required	<p><u>Action Required By:</u> Sullivan Partnership / KSG</p> <p><u>Action:</u> Incorporate requirements within mechanical design - location of air intake is important.</p> <p><u>Deliverable:</u> Standard LEED letter and calculation</p> <p><u>Deliverable Produced by:</u> Sullivan Partnership /</p>

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Prereq. #2	<u>ENVIRONMENTAL TOBACCO SMOKE (ETS) CONTROL</u> – Zero exposure of non-smokers to ETS.	Required	KSG <u>Action Required By:</u> Sullivan Partnership  <u>Action:</u> Incorporate requirements within mechanical design - location of air intake is important.  <u>Deliverable:</u> Standard LEED letter and calculation <u>Deliverable Produced by:</u> Sullivan Partnership
EQ 1	<u>OUTDOOR AIR DELIVERY MONITORING</u> – Install permanent CO <sub>2</sub> monitoring system for mechanically ventilated spaces and comply with ASHRAE 62-1:2004.	1 (P)	<u>Action Required By:</u> Sullivan Partnership  <u>Action:</u> Sullivan Partnership to investigate how mechanical systems can be developed to comply with ASHRAE 62.1:2004 and naturally ventilated areas have CO <sub>2</sub> monitoring  <u>Deliverable:</u> Standard LEED letter and calculation <u>Deliverable Produced by:</u> Sullivan Partnership
EQ 2	<u>INCREASED VENTILLATION</u> – Provide 30% more outside air than required by ASHRAE 62.1:2004.	1 (P)	<u>Action Required By:</u> Sullivan Partnership  <u>Action:</u> Sullivan Partnership to investigate how mechanical systems can be developed to exceed ASHRAE 62.1:2004 outside requirements by 30%.  <u>Deliverable:</u> Standard LEED letter and calculation <u>Deliverable Produced by:</u> Sullivan Partnership

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<b>NUMBER</b>	<b>DESCRIPTION</b>	<b>POINTS</b>	<b>ACTION/METHODOLOGY TO OBTAIN CREDIT</b>
EQ 3.1	<u>CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT PLAN</u> – Plan for construction and pre-occupancy: <ul style="list-style-type: none"> <li>– Meet SMACNA IAQ Guide</li> <li>– Protect materials from moisture damage.</li> <li>– Minimum filtration levels for HVAC equipment.</li> <li>– Replace filters prior to occupancy.</li> </ul>	1	<u>Action Required By:</u> E+D+R / Wolf <u>Action:</u> Require in project specifications. <u>Deliverable:</u> Standard LEED letter <u>Deliverable Produced by:</u> General Contractor
EQ 3.2	<u>CONSTRUCTION IAQ MANAGEMENT PLAN</u> – Meet SMACMA IAQ Guideline for Occupied Buildings Under Construction. Require pre-occupancy 2 week flush out, replace filters at end of flush-out.	1	<u>Action Required By:</u> E+D+R / Wolf <u>Action:</u> Require in project specifications. <u>Deliverable:</u> Standard LEED letter <u>Deliverable Produced by:</u> General Contractor
EQ 4.1	<u>LOW-EMITTING MATERIALS</u> – Low VOC adhesives and sealants.	1	<u>Action Required By:</u> E+D+R / Wolf <u>Action:</u> Require in project specifications. <u>Deliverable:</u> Standard LEED letter <u>Deliverable Produced by:</u> E+D+R / Wolf
EQ 4.2	<u>LOW-EMITTING MATERIALS</u> – Low VOC paints and coatings.	1	<u>Action Required By:</u> E+D+R / Wolf <u>Action:</u> Require in project specifications. <u>Deliverable:</u> Standard LEED letter <u>Deliverable Produced by:</u> E+D+R / Wolf
EQ 4.3	<u>LOW-EMITTING MATERIALS</u> – Low VOC carpet systems.	1	<u>Action Required By:</u> E+D+R / Wolf <u>Action:</u> Require in project specifications. <u>Deliverable:</u> Standard LEED letter <u>Deliverable Produced by:</u> E+D+R / Wolf
EQ 4.4	<u>LOW-EMITTING MATERIALS</u> – Composite wood having	1	<u>Action Required By:</u> E+D+R / Wolf <u>Action:</u> Require in project specifications.

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NUMBER	DESCRIPTION	POINTS	ACTION/METHODOLOGY TO OBTAIN CREDIT
EQ 5	<p>no urea-formaldehyde resins.</p> <p><u>INDOOR CHEMICAL AND POLLUTANT SOURCE CONTROL</u> – Design to minimize pollutant contamination of occupied areas by:</p> <ul style="list-style-type: none"> <li>– Entry grills/grates to capture dirt</li> <li>– Isolate copy rooms/separate exhaust.</li> <li>– Isolate/drain any chemical storage area/separate exhaust.</li> </ul>	1	<p><u>Deliverable:</u> Standard LEED letter  <u>Deliverable Produced by:</u> E+D+R / Wolf  <u>Action Required By:</u> E+D+R / Wolf /Sullivan Partnership</p> <p><u>Action:</u> Incorporate requirements into MEP design</p> <p><u>Deliverable:</u> Standard LEED letter  <u>Deliverable Produced by:</u> Sullivan Partnership</p>
EQ 6.1	<u>CONTROLLABILITY OF SYSTEMS</u> – Lighting	1	<p><u>Action Required By:</u> KSG</p> <p><u>Action:</u> KSG to develop lighting design to provide individual lighting controls for 90% (minimum) of the building occupants to enable adjustments to suit individual task needs and preferences.</p> <p>AND</p> <p>Provide lighting system controllability for all shared multi-occupant spaces to enable lighting adjustment that meets group needs and preferences.</p> <p><u>Deliverable:</u> Standard LEED letter  <u>Deliverable Produced by:</u> KSG</p>

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EQ 6.2	<u>CONTROLLABILITY OF SYSTEMS</u> – Thermal Comfort	1	<p><u>Action Required By:</u> Sullivan Partnership</p> <p><u>Action:</u> Sullivan Partnership to develop design to provide individual comfort controls for 50% (minimum) of the building occupants to enable adjustments to suit individual task needs and preferences. Operable windows can be used in lieu of comfort controls for occupants of areas that are 20 feet inside of and 10 feet to either side of the operable part of the window. The areas of operable window must meet the requirements of ASHRAE 62.1-2004 paragraph 5.1 Natural Ventilation.</p> <p>AND</p> <p>Provide comfort system controls for all shared multi-occupant spaces to enable adjustments to suit group needs and preferences.</p> <p><u>Deliverable:</u> Standard LEED letter</p> <p><u>Deliverable Produced by:</u> Sullivan Partnership</p>
EQ 7.1	<u>THERMAL COMFORT - -Design</u> - Comply with ASHRAE 55:2004 for thermal comfort including humidity.	1	<p><u>Action Required By:</u> Sullivan Partnership</p> <p><u>Action:</u> Incorporate requirements into MEP design</p> <p><u>Deliverable:</u> Standard LEED letter and Demonstrate design compliance in accordance with the Section 6.1.1 Documentation.</p> <p><u>Deliverable Produced by:</u> Sullivan Partnership</p>
EQ 7.2	<u>THERMAL COMFORT - -Verification</u> – Undertake Thermal Comfort Survey of users post occupation and	1 (P)	<p><u>Action Required By:</u> UCSB / Sullivan Partnership</p>

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	undertake remedial actions as necessary		<p><u>Action:</u> UCSB to determine whether Thermal Comfort Survey is wanted. If so, Sullivan Partnership to incorporate requirements within specification</p> <p><u>Deliverable:</u> Standard LEED letter, Thermal Comfort Survey report</p> <p><u>Deliverable Produced by:</u> Sullivan Partnership / General Contractor</p>
E 8.1	<u>DAYLIGHT &amp; VIEWS</u> – Achieve daylight factor of 2% (excluding direct sunlight) in 75% of all space occupied for critical visual tasks.	1 (P)	<p><u>Action Required By:</u> E+D+R / Wolf / Sullivan Partnership</p> <p><u>Action:</u> Undertake Daylighting Calculation for all areas of “critical visual tasks” to assess whether criteria can be achieved.</p> <p><u>Deliverable:</u> Standard LEED letter and calculations</p> <p><u>Deliverable Produced by:</u> Sullivan Partnership</p>
E 8.2	<u>DAYLIGHT &amp; VIEWS</u> – Achieve direct line of sight to vision glazing for building occupants in 90% of all regularly occupied spaces.	1 (P)	<p><u>Action Required By:</u> E+D+R / Wolf</p> <p><u>Action:</u> Undertake daylight and views calculation to assess whether the credit criteria can be achieved.</p> <p><u>Deliverable:</u> Standard LEED letter and calculations</p> <p><u>Deliverable Produced by:</u> E+D+R / Wolf</p>

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LEED CREDIT NUMBER	DESCRIPTION	POINTS	ACTION/METHODOLOGY TO OBTAIN CREDIT
<b>INNOVATION AND DESIGN PROCESS</b>			
ID 1.1	<u>INNOVATION</u> – 40% water use reduction	1	<p><u>Action Required By:</u> Sullivan Partnership</p> <p><u>Action:</u> Maximize water reduction for Credit 3.2.</p> <p><u>Deliverable:</u> Standard LEED letter and calculations</p> <p><u>Deliverable Produced by:</u> Sullivan Partnership Reduction of water use beyond the LEED Targeted level, showing additional conservation efforts for a limited resource.</p>
ID 1.2	<u>INNOVATION</u> – Adoption of Campus-wide innovation credits.	1	<p><u>Action Required By:</u> UCSB / Design Team</p> <p><u>Action:</u> Design Team to incorporate campus-wide LEED innovation credits. These include</p> <ul style="list-style-type: none"> <li>• Green Building Outreach</li> <li>• Green Procurement</li> <li>• Sustainable Curriculum</li> <li>• Green Site Maintenance</li> </ul>
ID 1.3	<u>INNOVATION</u> – Adoption of Campus-wide innovation credits.	1	<p><u>Action Required By:</u> UCSB / Design Team</p> <p><u>Action:</u> Design Team to incorporate campus-wide LEED innovation credits. These include</p> <ul style="list-style-type: none"> <li>• Green Building Outreach</li> <li>• Green Procurement</li> <li>• Sustainable Curriculum</li> <li>• Green Site Maintenance</li> </ul>

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ID 1.4	<u>INNOVATION</u> – Adoption of Campus-wide innovation credits.	1	<p><u>Action Required By:</u> UCSB / Design Team</p> <p><u>Action:</u> Design Team to incorporate campus-wide LEED innovation credits. These include</p> <ul style="list-style-type: none"> <li>• Green Building Outreach</li> <li>• Green Procurement</li> <li>• Sustainable Curriculum</li> <li>• Green Site Maintenance</li> </ul>
ID 2.1	<u>LEED ACCREDITED PROFESSIONAL</u> – At least one principal participant of project team is LEED accredited.	1	LEED Accredited Professional is part of team.

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<b>CREDIT SUMMARY</b>		<b>CREDITS</b>	<b>POTENTIAL CREDITS</b>	<b>REACH CREDITS</b>
Sustainable Sites		12	1	
Water Efficiency		4	0	
Energy and Atmosphere		11	0	
Materials and Resources		6	1	
Indoor Environmental Quality		10	5	
Innovation and Design Process		5	0	
		<hr/>	<hr/>	
		48	10	
Certified	= 26-32 Points			
Silver	= 33-38 Points			
Gold	= 39-51 Points			
Platinum	= 52-69 Points			

## CHARETTE CONCLUSIONS



## Charette Conclusions

Following the brainstorming session and the preliminary LEED Credit Appraisal it is believed that through innovative design and construction methods, and the full commitment of the client, design and construction team that the project can achieve its goal of LEED Gold. The initial appraisal suggest that 48 points could be achieved, along with a further 10 potential points that may become achievable following further investigation as the design progresses.

## MEETING ATTENDANCE RECORD



## Meeting Attendance Record

The following is a record of meeting attendees.

Name	Affiliation	Phone Number	E-Mail Address
Bharat Patel	DMJM H&N	213.593.8250	<a href="mailto:Bharat_patel@dmjmhn.aecom.com">Bharat_patel@dmjmhn.aecom.com</a>
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