

AUSTIN CENTRAL LIBRARY

INTEGRATIVE SUSTAINABLE DESIGN CHARRETTE BRIEFING

Location:

Austin History Center
810 Guadalupe St.
Austin, TX 78702

Charrette Dates:

November 2&3, 2009



EXECUTIVE SUMMARY

In envisioning the new Austin Central Library, the Lake | Flato/Shepley Bulfinch Joint Venture established a clear direction:

1. **A Community Building:** *a building that draws people in and serves the community*
2. **A Smart, Sustainable Building:** *flexible, resource efficient*
3. **A Landmark Building:** *civic, timeless, expressive/reflective*

The two-day Integrative Sustainable Design Charrette built on that seminal vision. With a breadth of interdisciplinary team members and City of Austin representatives participating, the charrette put in motion a process to create a cohesive roadmap, underscored by guiding principles, measurable goals and metrics. The results will serve as the initial common reference point for the entire team. They also mark the beginning of a living document that will capture the evolution of the goals and metrics as they are shaped and refined during the design process. The resulting transparency will ensure that decisions are documented and aligned with the evolving goals and metrics.

Lake | Flato Architects facilitated the session assisted by project sustainability consultants Center for Maximum Potential Building Systems. Materials distributed to the team in advance presented the project in the context of “a civic landmark that serves the people of Austin as an open and welcoming yet secure resource for information and services, as well as a model of the City of Austin’s commitment to sustainable design.” While the City of Austin mandates that the project achieve a LEED Silver certification, the team acknowledged the opportunity to exceed that minimum requirement.

The two-day charrette affirmed the original direction and enriched it with greater depth of *guiding principles, clarity of metrics, acknowledgement of challenges and commitment to follow-through* on immediate next steps.

GUIDING PRINCIPLES

- **Austin Central Library as Icon of Civic Values and Stewardship, Beacon of Sustainable Design Leadership and Place of Community-Connected Inspiration**
 - Set the benchmark for City of Austin environmental initiatives
 - Demonstrate 21st century technologies and solutions
 - Extend influence of library’s vision beyond project boundaries through collaborative opportunities
 - Establish library as an educational experience about local flora and fauna, energy, climate, water
- **Form and Function**
 - Design the best daylight library and subterranean garage ever
 - Provide a view for all regularly occupied spaces

- Create indoor/outdoor spaces that are seamless
- Create interactive spaces that engage children
- Devise solutions that provide multiple functions
 - Building as the integral light fixture and shading device
 - Landscape as wastewater treatment infrastructure
- Integrate systems, such as solar and shade systems
- Prefer design solutions with potential to decrease O&M costs
- **Flexible, Adaptable, Low-Maintenance Systems**
 - Design for resiliency and uncertainty
 - Design for long life, loose fit
 - Design to ensure future flexibility; future-proof
 - Design the most efficient systems commensurate with load; *the most efficient piece of equipment is one that is not running*
 - Design for passive systems first to achieve as high a level of energy performance and comfort and rely on mechanical systems as secondary mode
- **Regionally and Climatically Appropriate and Regenerative Design Solutions**
 - Maximize natural ventilation and daylight
 - Specify local, regional materials
 - Establish water balance as the basis to gauge water performance
 - Ensure that any water that leaves the site is cleaner than when it came to the site

MEASURES OF SUCCESS/METRICS

The team developed an introductory set of clear metrics for each sustainable design focus area, listed below. Although the list is short, each metric represents a significant and substantial leadership in what are understood to be the most critical areas of the project's design. The list is to be augmented as design progresses.

- Daylight + Lighting
 - Provide daylight in more than 75% of regularly occupied spaces
 - Afford views to the outdoors for all staff at a minimum
 - Exceed LEED metric for night illumination to achieve exceptional nocturnal stewardship
- Energy Flows & Energy Future
 - Design at minimum 60% reduction from CBECS US Library Average
 - Purchase 100% renewable energy
 - 13% onsite renewable energy
- Site, Landscape & Water
 - Zero storm discharge from site
 - Use non-potable water sources for all uses other than drinking and cleaning
 - Bike parking to equal or exceed the number of car spaces provided
 - 100% native planting ("native" defined as within Shoal Creek watershed)
- Construction & Materials



- Minimum 50% regional materials
- Recycle 95% or more of construction waste

ATTENDEES

Austin Public Library Staff
John Gillam, Heidi Ruiz
Center for Maximum Potential
Building Systems –
Sustainability Consultant
Gail Vittori, Dylan Siegler
City of Austin Staff – Owner
Cynthia Jordan
Clanton & Associates – Lighting
Design
David Roederer, Dane
Sanders
Coleman & Associates –
Landscape Architect
Aan Coleman
Datum Engineers – Structural
Engineer
Michael Brack
Encotech Engineering –
Plumbing Engineer

David Mitchell, Ali Khataw
Integrated Design Lab –
Daylighting
Joel Loveland
Jose I. Guerra Inc. – Mechanical
Engineer
Rick Guerra
Lake | Flato – Architect
David Lake, Greg Papay,
Bob Harris, Steve Raika,
Jonathan Smith, Betsy
Johnson
Meridian Energy Systems – Solar
Consulting Services
Andrew McCalla, Charley
Farmer
Monarch Design/Consulting –
LEED Consultant
Michele Van Hyfte

Natural Systems International –
Sustainability Consultant
(Ecology)
Michael Ogden, Pete Muñoz
P.E. Structural Consultants –
Structural Engineer
David Powell
Shepley Bulfinch – Architect
Sidney Bowen, Hilary
Mattison, Kelly Brubaker,
Lynn Petermann
Supersymmetry – Sustainability
Strategist (Energy Systems)
Ron Perkins
Urban Design Group – Civil
Engineer
Laura Toups

BACKGROUND ON THE INTEGRATIVE DESIGN PROCESS

The Integrative Design Process is an approach that involves all of a building project's stakeholders—including the technical planning, design, and construction team—in developing and refining project objectives, systems, and materials. Team members are not isolated in their respective specialties, but instead collaborate with others of diverse expertise and perspectives. Throughout all phases of design and construction, the integrative team evaluates the design for cost, quality, flexibility, efficiency, environmental impact, productivity, creativity, and occupant experience.

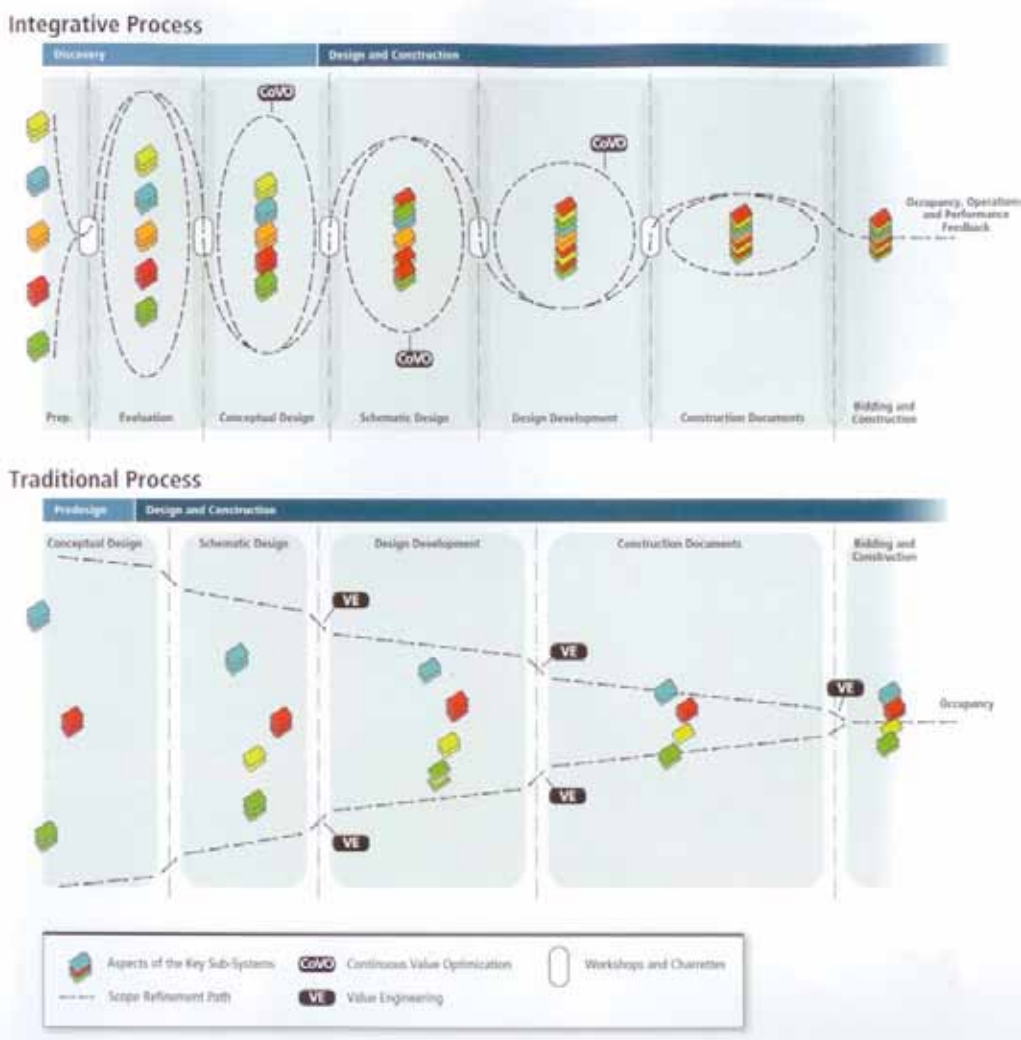


Figure 1: Integrative vs. Traditional Design Processes (from Reed, Bill G. and 7Group, *The Integrative Design Guide to Green Building*, Wiley, 2009)



Steve Raike of Lake | Flato introduced the agenda and framed the two-day session in the context of working outside individual comfort zones to develop an evolving road map to inform the design. The interconnections between disciplines and between systems were emphasized. Background information about the project's program, goals, and influential precedents was provided in presentations by Sidney Bowen of Shepley Bulfinch and David Lake of Lake | Flato. Gail Vittori then introduced the integrative design process and expectations for the two-day session. Results of the charrette would be seen as a living document to be consulted and revised throughout the design process. Details are provided in Appendix A.

CHARRETTE OBJECTIVES

In preparation for the charrette, the planning team established the following goals:

1. Understand the site, program, schedule, and established project goals in the context of sustainable design
2. Review other green library projects, technologies, and techniques
3. Identify opportunities to align with City of Austin civic and green initiatives
4. Experience and explore the site to provide the project team with a common reference point
5. Align the team around quantitative and qualitative performance objectives
6. Determine initial sustainable design strategies, design process, and measurable success factors
7. Prepare a preliminary assessment of the building and its operations measures using LEED 2009

Themes that resonated both at the charrette's outset and throughout the two-days both set the tone and provided inspiration:

- o A legacy project
- o Aim high and stay high
- o Connect to nature; building as portal to downtown and to the environment
- o A great place to read
- o Austin's opportunity to create a true living room—a porch—for its community
- o A building that is loved
- o What has been done is possible
- o All regulations are subject to change
- o Boldly pragmatic

CMPBS provided a summary presentation, *Sustainable Design for Libraries: Projects and Precedents*, noting significant libraries in the U.S. and internationally while providing a snapshot of sustainable design achievement among existing facilities. Dylan Siegler provided an overview of green initiatives underway in Austin that might prove relevant to the project,

particularly the Austin Climate Protection Plan. Details are found in Appendix B. How can the project be viewed as a visible benchmark for the City's civic aspirations?

EXPERIENCE/EXPLORE THE SITE

During the Day 1 morning session, the team traveled to the downtown site to experience and examine its significant features and surroundings. The team identified the following site characteristics that will need to be addressed further as design progresses:

- Power lines that surround the site closely on all sides
- Event lawn planned for the south side of the Seaholm site
- Existing underground vault
- Interaction with Shoal Creek
- Shade from surrounding high rise buildings
- Options for building orientation
- Proximity to Lady Bird Lake to promote potential lake source cooling



Figure 2 : Aerial view of the site and surrounding features

SUSTAINABLE DESIGN FOCUS TEAMS

During the Day 1 afternoon session, the group heard presentations by six Sustainable Design Focus Teams, which had been assigned in advance. The teams coalesced around professional expertise and discipline, and were loosely themed after six of the American Institute of Architects' 10 Measures of Sustainable Design:

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Prepared by the Center for Maximum Potential Building Systems, Austin, TX

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- Land Use and Site Ecology
- Bioclimatic + Regional Design
- Light and Air
- Water Cycle
- Energy Flows and Energy Future
- Materials and Construction

Each Focus Team spent 20 minutes presenting material developed together prior to the charrette that addressed potential strategies, design process, and metrics applicable to their roles on the project. In addition to their area of expertise, each Focus Team had been asked to consider three cross-cutting categories, also themed after the AIA principles:

- Long Life, Loose Fit + Maintainability/Operability:
- Health/Wellness + Productivity
- Pedagogy: Building as Teaching Tool

Six small, interdisciplinary breakout groups then spent 10 minutes developing three critical questions/issues for the Focus Team presenters, and reported back to the group.

SUMMARY FINDINGS

Day 2 provided an opportunity for the Sustainable Design Focus Teams to flesh out and refine their design approaches in light of the critical comments and questions provided by the larger group on Day 1. The goal was to develop and document an aspirational starting place for the design that establishes a sense of opportunity and general direction for further investigation. At the same time, the team recognized a call to be “boldly pragmatic”: to think expansively and creatively while considering the constraints of program and cost.

In work sessions throughout the morning, each of four Sustainable Design Focus Teams: Site, Landscape & Water; Lighting & Daylighting; Energy Flows/Energy Future; and Materials & Construction developed final informal presentations for the team. (The groups for Water & Site and Lighting & Daylighting, respectively, were combined on Day 2 to reflect the interconnectedness of these design areas.) The charrette culminated in the reports, which outlined each group’s final set of strategies and metrics to inform the design. An outline of the reports is found below.

Site, Landscape & Water

- Site:
 - Exceed LEED metric for bike parking to equal or exceed the number of car spaces provided
 - Inspire connectivity and restoration of adjacent green spaces (especially Shoal Creek)

- 100% native planting (defined as within Shoal Creek watershed)
- Enhance habitat: Perform urban wildlife/habitat assessment
- Use existing water features
- Exceed LEED metric for night illumination to achieve exceptional nocturnal stewardship
- Landscape
 - “Land-challenged” on tight site; not much room for landscape at grade
 - Porches form transition spaces from landscape to conditioned core
 - Porches also to be used for circulation
 - Biofiltration plantings at eastern edge near bike path

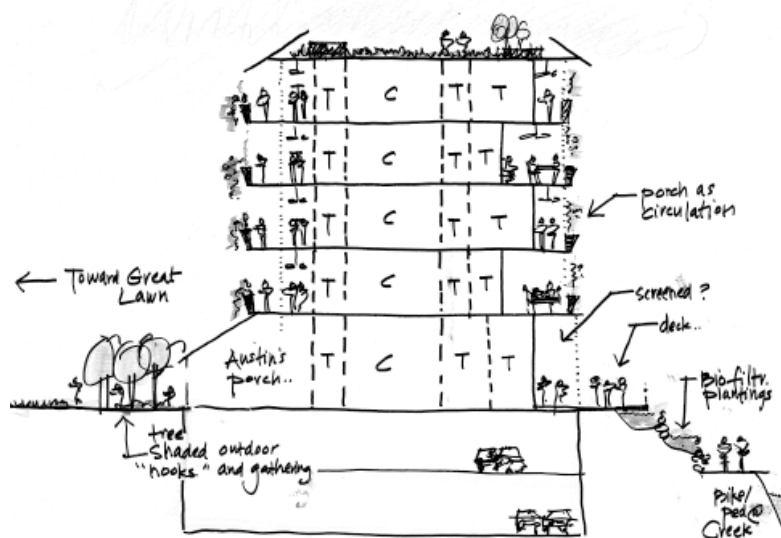


Figure 3: Proposed Landscape Design Concept (by Aan Coleman)

- Water Cycle
 - Set the standard for water use for all libraries everywhere
 - Zero storm discharge from site
 - Use existing vault for non-potable storage
 - Use city water for drinking and cleaning
 - Use non-potable water sources for all other uses
 - Non-potable supply hierarchy:
 - Treated effluent
 - Rainwater
 - City water
 - Treated wastewater (grey and black) constitutes primary water supply loop for flushing and irrigation
 - Black and grey water is combined into a treatment train

- o Iconic presence of the building in the cityscape
- o Active zone interacts with street at Cesar Chavez
- o Quality of light as it falls on the site is taken into consideration
- o Determine what needs light/wants light on site, i.e. occupants, not stacks, receive views



Figure 5: Views Diagram (by Joel Loveland)

- o Daylighting
 - o Most functions (75%) fall in best daylight/view quadrant
 - o The other 25% is service and some library collections
 - o Diagrams show stepped roof rising toward the north, with light canyons "daylight alleys"
 - o Massing model shows "going to light" and people welcomed to come from all four streets, with only two doors
 - o Gain certainty on Austin weather expectations (overcast days percentage)
- o Lighting
 - o Interior illumination
 - o Focus on light colored surfaces
 - o Provide light for specific tasks and "adaptive lighting" for flexibility
 - o Controls approach will provide key to dynamic, adaptive, and therefore responsive lighting



- Site illumination
 - Only want light outside that we actually need; provide minimum light level needed for activity
 - Respectful of neighbors (including non-humans)
 - Integral to landscape
- Energy use vs. lighting power density
 - Rather than focus on a particular lighting power density (0.5 w/sf had been mentioned as a goal based on USGBC headquarters precedent), think of lighting as portion of overall energy use/efficiency goals
 - Model will help determine

Energy Flows/Energy Future

- Guiding principles:
 - Use passive systems to achieve as high a level of comfort and efficiency as possible—mechanical solutions seen as secondary
 - Naturally ventilated armature progressively more conditioned/mechanically reliant toward the core (hierarchy of conditioned space); push conditioned air outward to avoid need for dehumidification
 - Study alternatives to the City of Austin district chiller to meet aggressive energy and climate goals
 - Lake water cooling
- Critical success factors
 - 13% onsite renewable energy
 - = 35,000 sf of PVs
 - Does not incorporate solar thermal, which is assumed to be included to offset heating load
 - Roof area is in high demand
 - Design at minimum 60% reduction from US Library Average
 - = 35-40 Kbtu/sf/year
 - @ 12 cents/kwh cost assumption
 - \$315,000/year savings
 - +\$68,000 savings from PVs (35,000 sf)
 - = 30-40% better than IECC 2006/ASHRAE 90.1-2004
 - Technology energy reduction
 - Solar laptop recharge zone is possible
 - Purchase 100% renewable power
 - Optimize glazing solar heat gain coefficient = PPG Solarban 70 glazing
- Questions and Challenges
 - Discover plug load from existing library to identify percent reduction goal
 - Consider optimal onsite renewable energy goal; 13% as place-holder
 - Consider location of PVs and solar thermal, i.e. screens, roof overhangs
 - Gain certainty on Austin weather expectations (overcast days percentage)

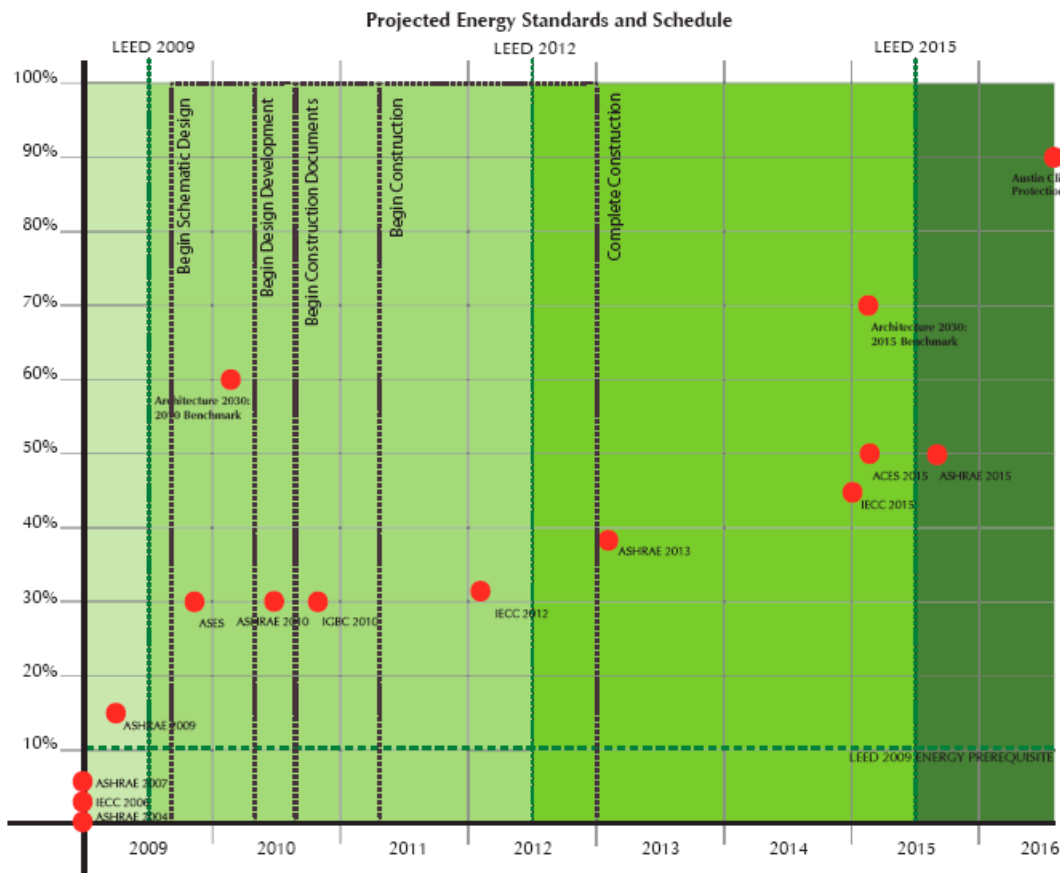


Figure 6: Projected Energy Standards and Approximate Schedule for Austin Central Library

Construction & Materials

- Attempt to avoid high rise designation (75')
- Naturally ventilate and daylight garage
- Bring mass elements to building core to form a building "heavy zone"
 - Organize functions of building into heavy/light zones vertically
 - Thermal mass for heating & cooling, peak and off peak
 - Consider "Ultracore" = box beams with conveyance function
- Lightweight skin, thin structural profile at perimeter
 - Heavier durable elements toward base, bearing on grade
- Use all materials honestly, purposefully and minimally
 - Target 50% regional materials
- No tolerance for adverse IAQ impact (focus on fasteners)
- Consider displacement floor system to avoid ugly ductwork
- Perform carbon impact study on structural system similar to cost analysis typically performed
- Develop lifespan/durability matrix for systems and materials

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- Create an “ultra bay” that corresponds to auditorium and flexible bay up through building
- Use structural system to reinforce the civic nature of the building by leveraging structure to create a monumental space
- Austin is a city supportive of recycling, library is also greatly about recycling reflect the latter by building with the former
 - Environmental culture hub
- Use water as building material?
 - Consider the use of wedges under structure for water storage
 - Stacks and water storage have structural affinity
- Recycle 95% or more of construction waste
- Look for creative reuse of onsite materials—soil and structure
- Marry library structural system spacing with garage spacing
- Design garage to be future expansion for library (i.e. stacks, storage)

PRELIMINARY LEED REVIEW

The concluding discussion of Day 2 was the development of a projected LEED 2009 Checklist for the library, led by Michele Van Hyfte. The project is required by the City of Austin to achieve a LEED Silver level of certification. The minimum number of points required for Silver is 50, Gold is 60, and Platinum is 80. The initial checklist reflects 82 points designated as achievable, four points considered unachievable, and 24 points considered “maybe,” requiring further information to come to certainty. Please see Appendix C for the complete preliminary LEED checklist.

NEXT STEPS

- Assess on-site resources for potential reuse prior to demo/site-clearing
- Develop study re: alternatives to district chiller (water source system or other recommendations) and approach appropriate agencies
- Communicate with Shoal Creek stakeholders (Friends of Shoal Creek Trail, City of Austin) and Waterfront Overlay Task Force
- Approach Austin Energy re: assistance with energy systems and controls (lighting)
- Create a pro forma of systems anticipated for use during schematic design
- Develop an overall communications/meeting strategy

APPENDIX A: PROJECT PROGRAM & SCHEDULE INTEGRATIVE DESIGN PROCESS

Sidney Bowen of Shepley Bulfinch explained the project's site and program challenges.

- Library program is expected to required 250,000 square feet of space, but 80,000 square feet are currently planned as shell
- Site is shrinking; what was originally thought to be usable site is being whittled down
- Relatively simple program
- Make the building an incredible demonstration efficiency in space planning

PROGRAM AREA	SQUARE FEET
Lobby/public	5,000
Café (possible commercial kitchen)	2,500
Giftshop/bookstore	1,500
Reading room	2,500
Outdoor reading terrace	2,000
350-seat auditorium and support	12,000
Multipurpose/group study	6,500
Technology center	4,500
Youth services	16,000
Collections/reader seating	50,000
Staff/admin	21,000
Service/Building Support	13,000

David Lake of Lake | Flato Architects introduced the project's conceptual ideals, followed by a discussion of program and potential massing strategies.

- Living room for the city
- Benchmark for sustainability
- Library as a journey
 - Seek knowledge, stretch yourself
 - Begin with high aspirations and keep to them
 - Building performance
 - Building *soul*
 - Create the soul—systems and character will come from commitment to sustainability
- Daylight
 - Libraries are no longer designed according to the Louie Kahn “take the book to light” but the presence of light is still central
 - Get the light further into the building
 - Afford a connect to nature/outdoors, especially important in Austin
 - Shoal Creek, first hike and bike trail in Austin in 1950s
- Multiple uses and flexibility/adaptability

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- Quiet vs. noisy parts of the program
- Changing face of libraries; books vs. computers
- What if the following shape the building?
 - The building connected to Shoal Creek
 - Birding, amenities
 - Portal to the environment as well as downtown
 - Notion of quiet; oasis of quiet; presence of light
 - Porch—lantern—beacon—interactive
 - Beautifully daylight
 - Open after hours for readings, music, theater
 - *Great place to read*
 - Hub of hike and bike system, start of road and bike races
 - Journey with clarity as well as magic
- Touchstones for the project
 - Porch concept
 - Always open, always connected to nature
 - Interface with nature, informal, reconfigurable
 - Lantern/beacon, visible from Lady Bird Lake
 - Healing of Shoal Creek
- Measure of success: It's a destination
 - "Oh you're going to Austin? Have you seen the new library?"
- General precedents
 - Garden rooms
 - Photovoltaics
 - Roof as promontory with views of downtown
- Specific precedents
 - UT School of Nursing
 - Barcelona Biblioteca Jaume Fuster
 - Minneapolis Library
 - Salt Lake City Library
- What not to do
 - Dark/light contrast is not welcoming
 - Sloped glass
 - Atriums/overhead daylight
 - Department store open spaces with no sense of purpose/integrity

Gail Vittori of the Center for Maximum Potential Building Systems introduced the integrative design process and expectations for the two day session, urging the team to embrace "bold pragmatism."

- Bold Pragmatism
 - Charrette creates an aspirational roadmap
 - Stewardship of precious public dollars
 - Relevance when the doors open, in 50 years, in 100 years
 - Align around what we collectively believe is right and necessary
- Create guiding Principles and Values
 - Example: Austin Central Library needs to be able to evolve, change and be reconfigurable

- Devise measurable Goals/Critical Success Factors
 - Example: Austin Central Library will have XX% reduced energy than ASHRAE 90.1 and YY% daylight
 - Operable windows – if so, where, how?
 - LEED certification level: If platinum is desired, strategize *now*
 - Percent of daylighting
 - Improve quality of water leaving the site
- Anticipated Challenges
 - First cost vs. life cycle cost
 - Constructive dialogue with City of Austin considering program difficult to fit into budget
 - Value engineering
 - Ensure that sustainable strategies are integrated and may not be VE'd out
 - Schedule
 - Make the big decisions that are going to define form, not needing to slip in something big later
- Smart Goals
 - **Specific**
 - **Measurable**
 - **Attainable/Aspirational**
 - **Relevant**
 - **Timely and TIMELESS**



APPENDIX B: SELECTED CASE STUDIES AND LOCAL GREEN CONTEXT



Seattle Central Library – Seattle, WA

362,987 sq ft

LEED-NC Silver certification (34 points)

- *Rem Koolhaas, OMA*
- *May 2004*
- *\$165.9 million*
- *\$450.60 / Sq. Ft.*



Lake View Terrace Library – Lake View Terrace, CA

10,700 sq ft (52 points)

LEED-NC Platinum certification

- *Peter Devereaux, AIA, Harley Ellis Devereaux*
- *June 2003*
- *\$4.4 Million*
- *\$411.21 / Sq Ft*



Santa Monica Main Library - Santa Monica, CA

104,000 sq ft

LEED-NC Gold certification

- *Moore Ruble Yudell*
- *December 2007*
- *\$57.7 Million*
- *\$554.81 / Sq. Ft.*