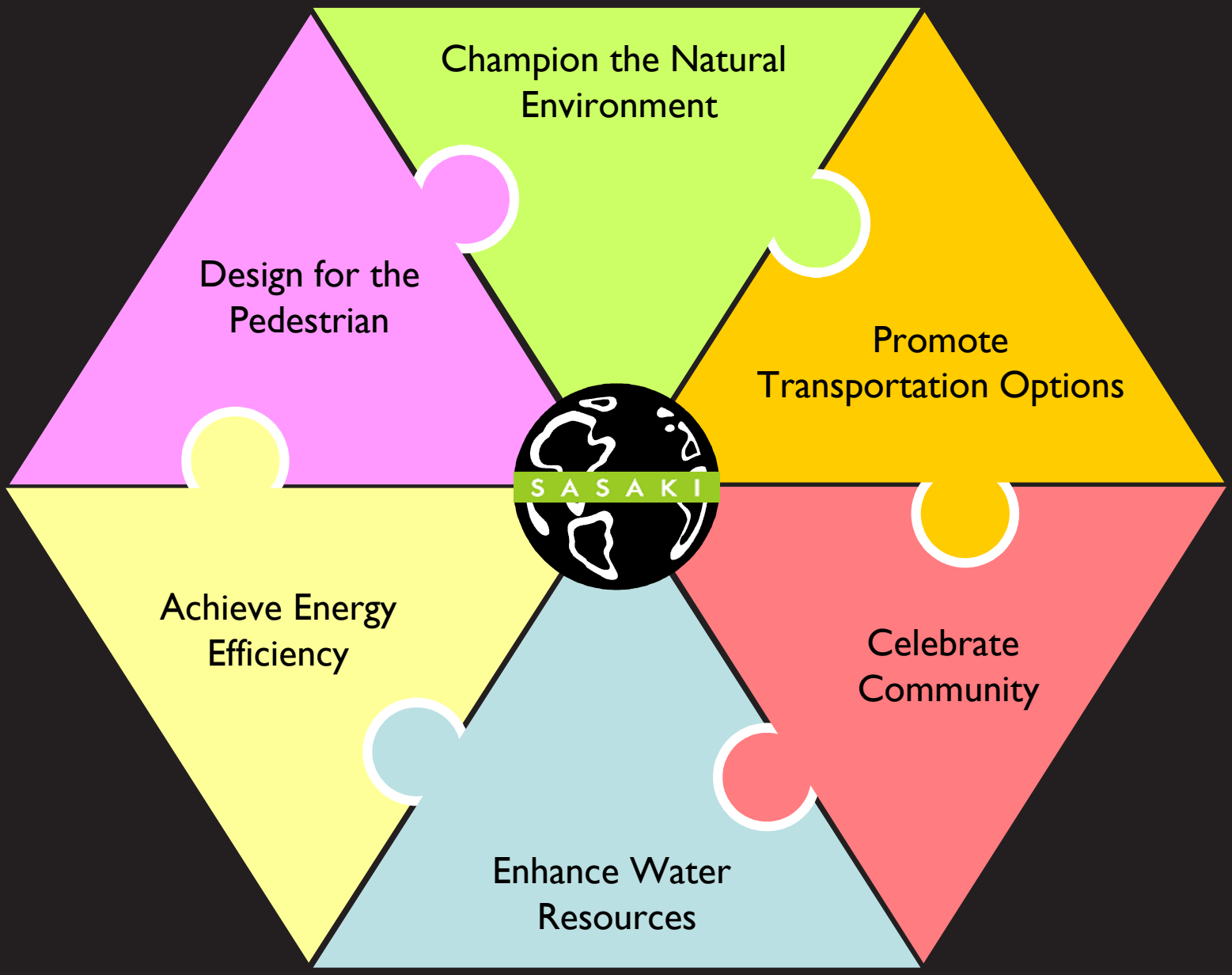
Sasaki Green



A SUSTAINABLE PLANNING GUIDE

Prepared By Tufts University Students:

Meenakshi Jacob • Audra Ladd • Craig Nicholson
Jesse McEntee • Jennifer Wood

This summary report was prepared by a team of Tufts University graduate students enrolled in the Field Projects: Planning and Practice course within the Tufts University Department of Urban and Environmental Policy and Planning Department..

Field Projects: Planning and Practice endeavors to integrate theory and practice by providing students with an opportunity to work on real-world challenges in their areas of interest, while offering community organizations and agencies access to expert analysis and advice on strategic objectives and priority issues. The Field Projects course combines research, practical planning and problem-solving in a community setting, accompanied by the exploration – through reading, lecture, role playing, class exercise and guest speaker – of related topics in weekly meetings.

Sasaki Green

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TUFTS UNIVERSITY

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Abstract

Practitioners of sustainable planning and design use a number of guides to implement site master plans, the most popular being the United States Green Building Council's LEED (Leadership in Energy and Environmental Design) rating system. Sasaki Associates, an international interdisciplinary planning and design firm, is developing an internal protocol to integrate relevant content of the guides and track planners' sustainability initiatives on a more formal basis. In January 2006, Sasaki Associates began working with five students from Tufts University's Urban and Environmental Policy and Planning department to begin development of an internal sustainability guide.

The Sasaki Sustainable Planning Guide created by the students presents methodologies undertaken in the guide's development, including Sasaki's six sustainability principle framework; Champion the Natural Environment, Create Transportation Options, Celebrate Community, Enhance Water Resources, Achieve Energy Efficiency, and Design for the Pedestrian. Drawing from a range of case studies and existent sustainable building and planning guides, the Sasaki Sustainable Planning Guide provides a history of Sasaki Associates, a project description, and as heart of this guide, a checklist intended for tracking sustainability within the firm. The Tufts students present recommendations for Sasaki Associates including identification of an internal facilitator of the guide, utilization of the guide as a pilot program for sustainability initiatives throughout the firm, and evaluation of potential for applying the guide across all Sasaki projects.

Acknowledgements

This project would not have been possible without the support and assistance of the following dedicated individuals and organizations:

We would like to thank Saskai Associates, Inc. and its Planning Green Team. More specifically, Willa Kuh and Erin Bray were the Sasaki representatives that worked hand in hand with us as guides and mentors throughout the project. We would also like to thank the Field Project professors and teaching assistants: Rusty Russell, Molly Mead, Sarah Reich, and Audra Vernon.

In addition we would like to acknowledge the entire Field Project's class who contributed to this project in various capacities.

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Executive Summary

History of Sustainable Planning

Over the past decade, there has been growing interest in sustainable planning and design. The United States Green Building Council has harnessed this momentum through its LEED (Leadership in Energy and Environmental Design) rating system, which provides a framework for measuring building performance and sustainability. Building design and construction, however, are only part of the development process. Large scale site development elements, such as pedestrian oriented design of civic infrastructure and water resource management of campus planning, are equally important. For promoting sustainable planning and design, a comprehensive guide that successfully discusses all of these planning issues has yet to emerge.

Sasaki Associates

In 1953 Sasaki Associates was founded by Hideo Sasaki, a landscape architect, who believed that the environment is equally important in the design process as compared to other, more traditional elements. Sasaki Associates, by integrating its founder's multidisciplinary approach, is inherently dedicated to sustainable planning, yet an internal protocol to track planners' sustainability initiatives does not exist. Though existent sustainable planning guides offer some assistance, Sasaki does not have its own guide to follow that is tailored to its unique philosophy.

Purpose

The purpose of the Sasaki Sustainable Planning Guide is to present a methodology that address environmentally sustainable site development through Sasaki's six sustainability principles; Champion the Natural Environment, Create Transportation Options, Celebrate Community, Enhance Water Resources, Achieve Energy Efficiency, and Design for the Pedestrian. Ultimately, the guide will assist Sasaki planners in reducing the overall ecological footprint of their projects. The Sasaki Sustainable Planning Guide has been created specifically for members of Sasaki's planning and urban design discipline who constitute Planning Green, an association of Sasaki planners that promotes innovative sustainable planning and design practices.

The Sasaki Sustainable Planning Guide provides a brief history of Sasaki Associates and cites examples of recent Sasaki projects such as the Dallas Area Rapid Transit Mall and Massachusetts Audubon Society. This is followed by an exhaustive project description that outlines the objective and scope of the guide. Finally an overview of sustainability as a concept and introduction to the six sustainability principles is presented.

An evaluation of existing sustainable planning guides includes the LEED rating systems, the Yale LAND Code, Hellmuth, Obata + Kassabaum, Inc.'s Guidebook to Sustainable Design, and the Minnesota Sustainable Design Guide. A description of the benefits and drawbacks of each guide and an explanation of how each guide contributes to the Sasaki Sustainable Planning Guide is provided.

Executive Summary (cont.)

The Six Principles of Sustainability

Each major principle and their corresponding sub-categories are presented in greater detail throughout this guide. Outlined is the rationale for why each principle and sub-category was chosen, as well as reasoning for mandatory requirements to be considered on all projects. The team identified the following mandatory sustainable planning recommendations to be incorporated on every project:

Transportation Options:

- Strive to locate all sites within a half mile of direct access to public transportation and existing commercial and civic infrastructure.
- Consider pervious surface materials for every project that requires parking.

Energy Efficiency:

- Optimize passive solar opportunities for heating, cooling, and daylighting by locating and orienting the building, and configured occupied spaces and openings, to maximize opportunities for daylighting and desired solar heat gain.
- Supply 30% of the building's total energy load through building-integrated or directly-connected renewable or other low impact energy sources.

Enhance Water Resources:

- Recycle storm water into building and landscaping systems.
- Reduce impervious surface area through the use of pervious concrete mixes for parking lots.

Champion the Natural Environment:

- Make anti-sprawl development techniques a priority in championing the natural environment.
- Preserve/enhance the natural character of the site and protect biodiversity.

Celebrate Community:

- Consider the unique qualities and challenges of a community and incorporate these elements into every design. Walk-ability, human scale design, green building technology, public spaces, access to public transportation, and economic opportunity should be goals of every project.

Design for the Pedestrian:

- Utilize strategies that promote access and walk-ability while enhancing the pedestrian experience.
- Locate buildings so as to shape walk-able streets while providing easy access to public amenities, commercial centers, civic institutions and open space.

Executive Summary (cont.)

The core of the Sasaki Sustainable Planning Guide is the checklist. It takes the form of a three-stage checklist (Sasaki Proposed, Client Agreed, and Final Evaluation) that Sasaki planners can use to track sustainable initiatives. The content of the checklist combines existing sustainable guides and sustainability elements that the Tufts team believed were most worthy of inclusion.

For long-term viability of the Sasaki Sustainable Design Guide, it is recommended that Sasaki:

- Identify an internal facilitator of the guide who will track usage and update content.
- Use the guide as a pilot program for sustainability initiatives throughout the firm. Because the guide will initially be used by only a small portion of Sasaki employees, the guide should be shared with other disciplines that could utilize it and provide insight on its content and layout.
- Evaluate potential for guide's incorporation into all Sasaki projects.

Finally, the recommendations in this guide are made with an awareness that the field of sustainable planning is constantly evolving in terms of both technology and theory. This version of the Sasaki Sustainable Planning Guide is a snapshot of the most important elements at this point in time and will need to be updated in the future as the field progresses.

The Project

Five students from Tufts University's Department of Urban and Environmental Policy and Planning were engaged by Sasaki Associates Inc., a global planning and architecture firm in the spring semester of 2006 to assist the firm in creating a sustainable planning guide. This guide would help Sasaki planners integrate sustainable planning and design elements into their site and master planning projects.

What is Site Planning?

Site planning is a term that is generally used by Landscape Architects. Planners use the term master plan, which is applied in the context of a master plan for an individual site, neighborhood, or community. Site and master plans address a variety of issues on a larger scale than that of individual building design, ranging from building location siting, to water resource management to developing appropriate transportation infrastructure.

The Firm

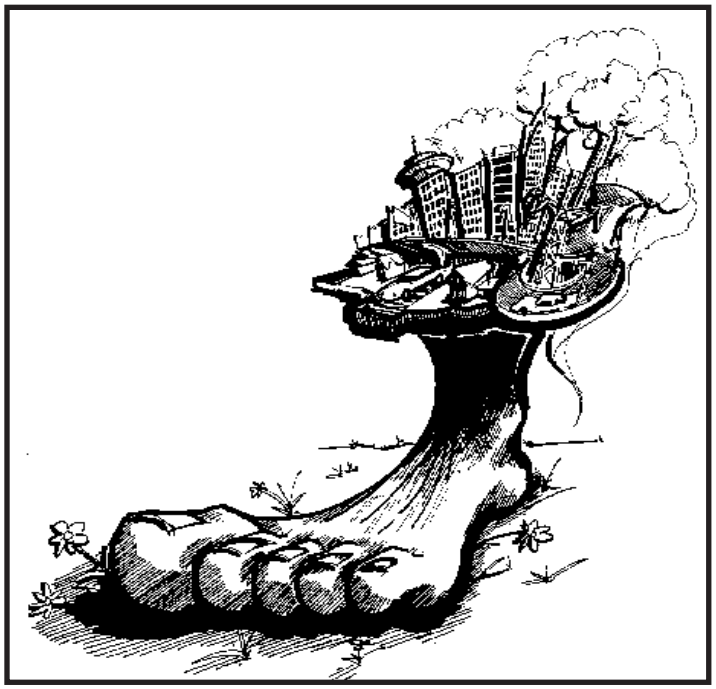
Sasaki Associates Inc. has two offices, one in Watertown, Massachusetts and one in San Francisco, California and employs over 270 professionals in the areas of Planning and Urban Design, Landscape Architecture, Architecture, Interior Design, Civil Engineering, and Graphic Design. The firm has designed and built projects around the world, ranging from the Olympic Green for the 2008 Beijing Olympic Games to the Waterfront Park and Master Plan for the Municipality of Kuwait to the reshaping of Fort Devens in Massachusetts.

Sasaki Green is an interdisciplinary division of the firm whose focus is on sustainable planning and design. Planning Green is an association of individuals within the planning discipline that promote innovative sustainable planning and design practices throughout the firm. Willa Kuh and Erin Bray were the Tufts team's primary points of contact for developing the Sasaki Sustainable Planning Guide.

Definition of Sustainability

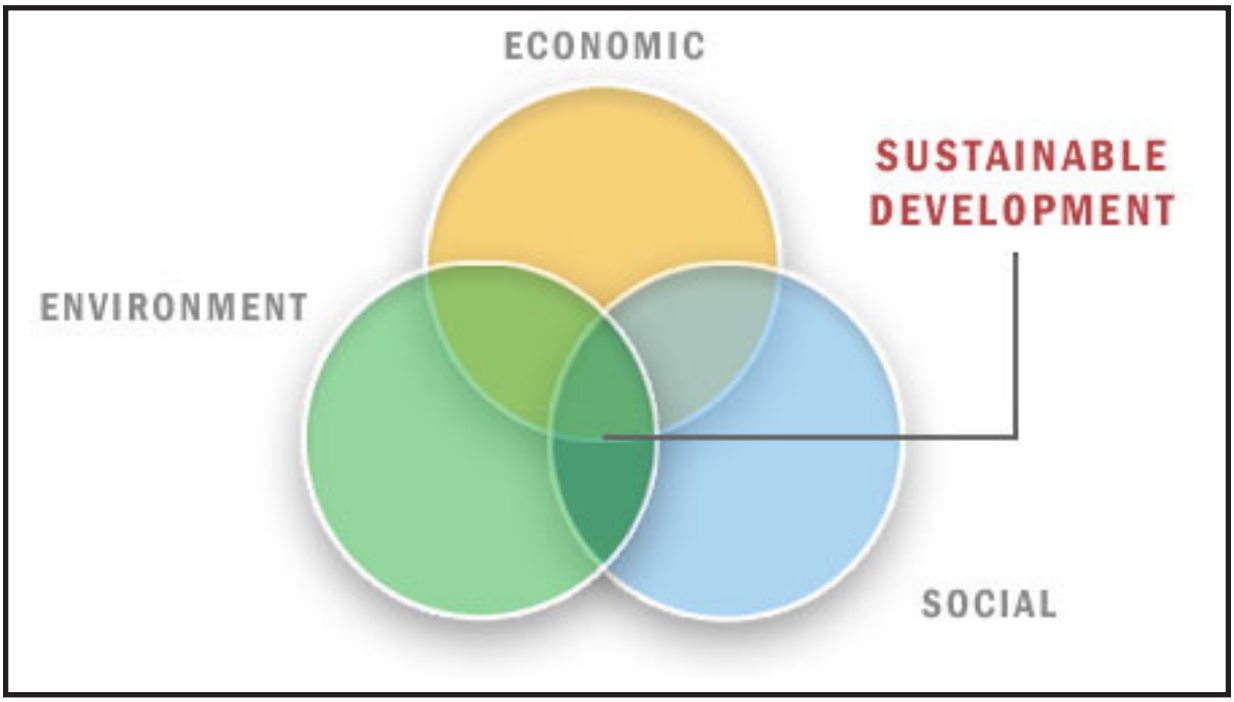
Sustainability is a broad term used in several discussions within policy, planning, and scientific fields. The Tufts team's first task was to define 'sustainability' in the framework of this project. To do this, the team started with a definition of sustainability that pertains to site planning. The most frequently quoted definition is from the report Our Common Future: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." For this project, sustainability was confined within a context in which planners and architects could use it to create a master plan for institutional, municipal, or private clients.

The overriding objective of the project was to create a tool that memebrs of the planning discipline could utilize on any project to make elements of the project more sustainable thereby limiting its overall ecological footprint.



Wackernagel, Mathis and William Rees, "Our Ecological Footprint: Reducing Human, Impact on the Earth," 1996.

[1] World Commission on Environment and Development (WCED). Our common future. Oxford: Oxford University Press, 1987 p. 43.



http://www.copelandbc.gov.uk/

Scope and Methodology

The scope of the project was initially limited to a review of existing sustainable design and planning guides, an assessment of the applicability of these guides, and the construction of a guide that Sasaki could use internally. The physical and organizational design of the guide, as well as the content of the guide was left open to the Tufts team's discretion.

The team's methodology for research and data compilation was based on the following four steps:

- Review existing sustainable development guides, such as the Minnesota Design Guide, the LEED guides, the Yale Land Code, and the HOK guide.
- Examine how other firms were implementing and measuring sustainable planning and design.
- Understand how Sasaki integrated sustainable design into current project undertakings.
- Compile the findings into a user-friendly format that could be easily assimilated into Sasaki's current planning framework.

With Sasaki's help, the team identified and obtained the leading sustainable design and planning guides in current use. These guides ranged from state-wide master planning documents to international firm internal design guides to academic land planning codes. All guides were reviewed by each member of the Tufts team to ensure equal understanding of subject-matter. Throughout this review, the team discussed the benefits and drawbacks of each guide in terms of content covered, ease of use, organization of document, and applicability to the current project. From this, some elements of each guide's design were incorporated into the data capture template that the team created.

An essential element of the data gathering process was compiling the information in a format that Sasaki could easily incorporate into their current philosophical framework. The Tufts team assessed how Sasaki currently constructed their sustainability work by reviewing a number of Sasaki master planning projects and obtaining information about the firm's sustainability principles. The six principles, as defined by Sasaki, are Celebrate Community, Achieve Energy Efficiency, Promote Transportation Options, Design for the Pedestrian, Enhance Water Resources, And Champion the Natural Environment. After this review, the Tufts team decided to use the six principles of sustainability as the primary organizing ideology. The Tufts team populated a Microsoft Excel workbook by capturing the research from the design guide and internal project review. The information was captured in a uniform structure for every principal with an emphasis on information about major subcategories of the principle, and how to implement and measure design and planning efforts. The body of the workbook was created this way because as it can be virtually impossible for a project to incorporate all aspects of each principle. However, there is significant overlapping of concepts that can cross over from principle to principle and can also be applied differently given the proper context.

To effectively tet the team's findings, the team applied the content to a completed Sasaki project. An example of this is the Dallas Area Rapid Transit Mall Project in Dallas Texas, which will be explored in more detail in the Case Study Section, integrated two subcategories: Alternative public transportation options as well as Proximity to existing commercial and civic infrastructure. If the workbook had been available in the planning stage, other options such as pervious paving material for sidewalks and streets (e.g. porous concrete mixes) as well as facilitation of larger city-wide transit issues to be addressed (e.g. holding public hearings to allow community members to share their visions for the Transit Mall as well as raise larger transportation justice concerns) could have been implemented.

Yale Land Code
(Balmori, Diana and Benoit, Gaboury. 2004)

The goal of the Yale LAND Code, meant to be used in conjunction with LEED and EPA green building guidelines, is to "create a clear practical path for developing a site in line with natural processes" (Balmori, Diana and Benoit, Gaboury. 2004). The guide is narrative based and contains eight sets of guidelines for a variety of site development topics, including environmental engineering, air pollution and micrometeorology, as well as legal guidelines. Each set of guidelines contains five sub-sections: "Rationale," "Recommendations," "Benefits," "Strategies," and "Supporting Literature." The strength of the Yale LAND Code lies in the fact that it provides meticulous information on large scale site development options, which few other guides accomplish. The guide offers rationale, strategies, and existing literature, which is extremely useful for practitioners, especially when users are seeking to understand the underlying principles of each guideline. The wide ranging recommendations and underlying logic of the Transportation Options, Enhance Water Resources, and Champion the Natural Environment sections of the Sasaki Sustainable Planning Guide have roots in the Yale LAND Code. For instance, the Yale LAND Code has an extensive chapter on sustainable drainage systems and blackwater management strategies, including soil permeability charts and diagrams. These elements take precedence in the Sasaki Sustainable Planning Guide recommendations under the Enhancing Water Resources principle.

While the Yale LAND Code provides helpful background information for recommended strategies, employment of these practices would be difficult to carry out using solely the information provided in the Yale LAND Code; no measurement techniques or performance tracking strategies are presented.

HOK Sustainable Design Guide
(Hellmuth, Obata + Kassabaum, Inc. 1998)

Hellmuth, Obata + Kassabaum is a world renowned design, architecture, and planning firm that created this interdisciplinary design guide to aid professionals in adopting sustainable design strategies. The guide begins with a list of environmental facts that illustrate the damaging consequences of poor physical design; one example being three-fourths of the world's wood consumption goes into buildings (Hellmuth, Obata + Kassabaum, Inc. 1998). A substantial introduction articulates the rational for various sustainable design measures, but the core of this guide is the Project Actions components, which explains each stage of a project and indicates specific mandatory measures and how costs, fees, maintenance, and design member involvement are impacted by each measure. Letters listed next to and below each strategy provide the following information:

"E," "LA," and "A," indicate involvement of an engineer, landscape architect, and architect for on-site wastewater sewage treatment. The letters "O," "$C," and "$F" specify consultation requirement with owner, affects construction costs, and affects fees.

The drawback of the HOK Sustainable Design Guide from the perspective of the planner is that it primarily pertains to specific building construction rather than large scale site planning. Nevertheless, it played an important role in identifying specific design techniques for the Energy Efficiency, Enhancing Water Resources, and Champion the Natural Environment sections of the Sasaki Sustainable Planning Guide, such as soil erosion control plans and sprawl mitigation strategies.

Existing Metrics (cont.)

Minnesota Sustainable Design Guide
(Regents of the University of Minnesota, Twin Cities Campus, College of Architecture and Landscape Architecture 2002)

The Minnesota Sustainable Design Guide (MSDG) was produced to assist and educate a range of participants in the building construction process, including architects, contractors, and the general public. The MSDG sets priorities and goals, creates performance measures, and is meant to be used as an organizational and management tool in addressing environmental concerns throughout all project phases. For example, in the Sustainable Sites section, a goal such as "Reduce sprawl due to new development," which is a powerful yet vague description, coexists with specific strategies that can help achieve this goal. In this case, Site Selection, Brownfield Redevelopment, and Alternative Transportation are all potential tactics.

The MSDG contains not only a scored checklist and narrative, but a case study section. The scoring system used in the checklist is not as rigid as that of the LEED guides. For instance, the MSDG allocates points if a site is within ¼ mile to public transport and existing retail and public uses, while LEED-ND only gives points if the site is within ¼ or ½ mile of pre-determined uses. The Achieve Energy Efficiency section of the Sasaki Sustainable Planning Guide adopted many strategies from the MSDG, such as solar power harnessing techniques and utilization of high efficiency motors in mechanical equipment.

U.S. Green Building Council (USGBC) Standards

The USGBC provides the most comprehensive suite of green building design standards through the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. This system is rapidly becoming the industry standard for sustainable development throughout the United States. The project team utilized several of the USGBC LEED standards in the development of the Sasaki Sustainable Planning Guide.

The LEED standards are most similar in design to the Minnesota Sustainable Design Guide in that the LEED system provides a point-scoring system for projects. The LEED Standards differ from the other metrics evaluated during this project in that the standards promote competition among projects and foster an entire community of certified professionals educated through the USGBC LEED certification process. The benefit of this program is its national recognition. Additionally, through its scoring and ranking system, LEED promotes a market based approach towards achieving sustainability across new construction (LEED-NC), existing buildings (EB), commercial interiors (CI), core and shell projects (CS), homes (H), and for neighborhood developments (ND, currently in pilot stage).

Although the point system leads to certification of developments at either the basic, silver, gold or platinum level, the approach, which advocates hope will promote competition among the development community, has not yet achieved significant levels of nationwide implementation. This is typically attributed to the high cost of entry for project consideration. Combined, registration and certification fees alone can approach $10,000 which depending on the scale of a project may, or may not be a considerable expense; however, coupled with the expense of developing energy models and research in order to demonstrate that criteria have been achieved, this program quickly becomes a moderate expense for a developer. The cost of achieving LEED certification could more appropriately be applied towards the implementation of strategies on-site that further enhance the sustainability of a plan rather than the pursuit of the LEED rating itself.

The competitive nature of this program has the potential to see economic resources steered towards earning certification when those resources might be applied more sustainably to enhancing features with the development that promote energy efficiency or enhance water or natural resources.

Taken individually, the LEED standards referenced above are applicable to specific project types. The weakness of the existing LEED standards is that, although promoting effective strategies for achieving sustainability at the level of the building design and development, the standards are not effective at encouraging the implementation of sustainability across community master plans. The parameters for achieving basic certification are rapidly becoming common building practice required by most municipal building codes (or encouraged by other programs) and the bar for entry should be set much higher. Additionally, the distribution of weights within the point scoring system itself are not properly adjusted. Certain aspects of the building process should be weighted more heavily than others. These standards promote green buildings, but do not go far enough at promoting projects that are socially, economically and environmentally sustainable. Lastly, the LEED standards do not promote a full understanding of the context within which a project should be understood. The standards should be modified to redistribute weights based on the physical location of a project as a strategy. For example, minimizing heat island effects is much more contextually relevant in an urban setting than it is in a rural setting. Similarly, providing points for limiting parking at a rural site should not garner additional points for that project versus an urban infill development without any parking allocation.

The LEED ND standard is the USGBC's most recent effort at incorporating issues of sustainability beyond the single building footprint through an understanding of the principles of smart growth, new urbanism, and green building. Given that our team relied heavily on the draft LEED ND standard for suggesting strategies for sustainable development at the community level, we further summarize this specific standard.

Existing Metrics (cont.)

USGBC LEED-ND LEED for Neighborhood Developments Rating System – Preliminary Draft, (US Green Building Council 2006)

The USGBC, the Congress for the New Urbanism, and the Natural Resources Defense Council (NRDC) have come together to develop a national set of standards for neighborhood location and design based on the combined principles of smart growth, urbanism, and green building (US Green Building Council 2005). Although the LEED Green Building Rating System addressed issues of sustainability for individual buildings, until the creation of this draft document, there was no USGBC standard by which developers of neighborhoods could evaluate their overall project. To rate each individual building through the initial LEED program would be too cumbersome a task. This rating system focuses on the elements that bring buildings together into a neighborhood, and relate the neighborhood to its larger region and landscape (US Green Building Council 2005). The hope of this program is to develop a LEED-ND label that will serve as a motivating factor in the initial site planning and decision-making process (in order to provide an incentive to developers to choose better locations), design and construction of new residential, commercial and mixed developments (US Green Building Council 2005).

According to the USGBC, the hope with this new rating system is to encourage developers and community leaders to "revitalize existing urban areas, reduce land consumption, reduce automobile dependence, promote pedestrian activity, improve air quality, decrease polluted storm water runoff, and build more livable, sustainable, enduring communities for people of all income levels."

LEED ND is currently a draft document that has been circulated for comments. The comment period has ended and the LEED ND core committee is processing feedback and currently entering the one year pilot phase that will test the rating system on the ground with a group of projects at various stages of planning and construction. The pilot phase is expected to last for approximately one year followed by additional comment periods.

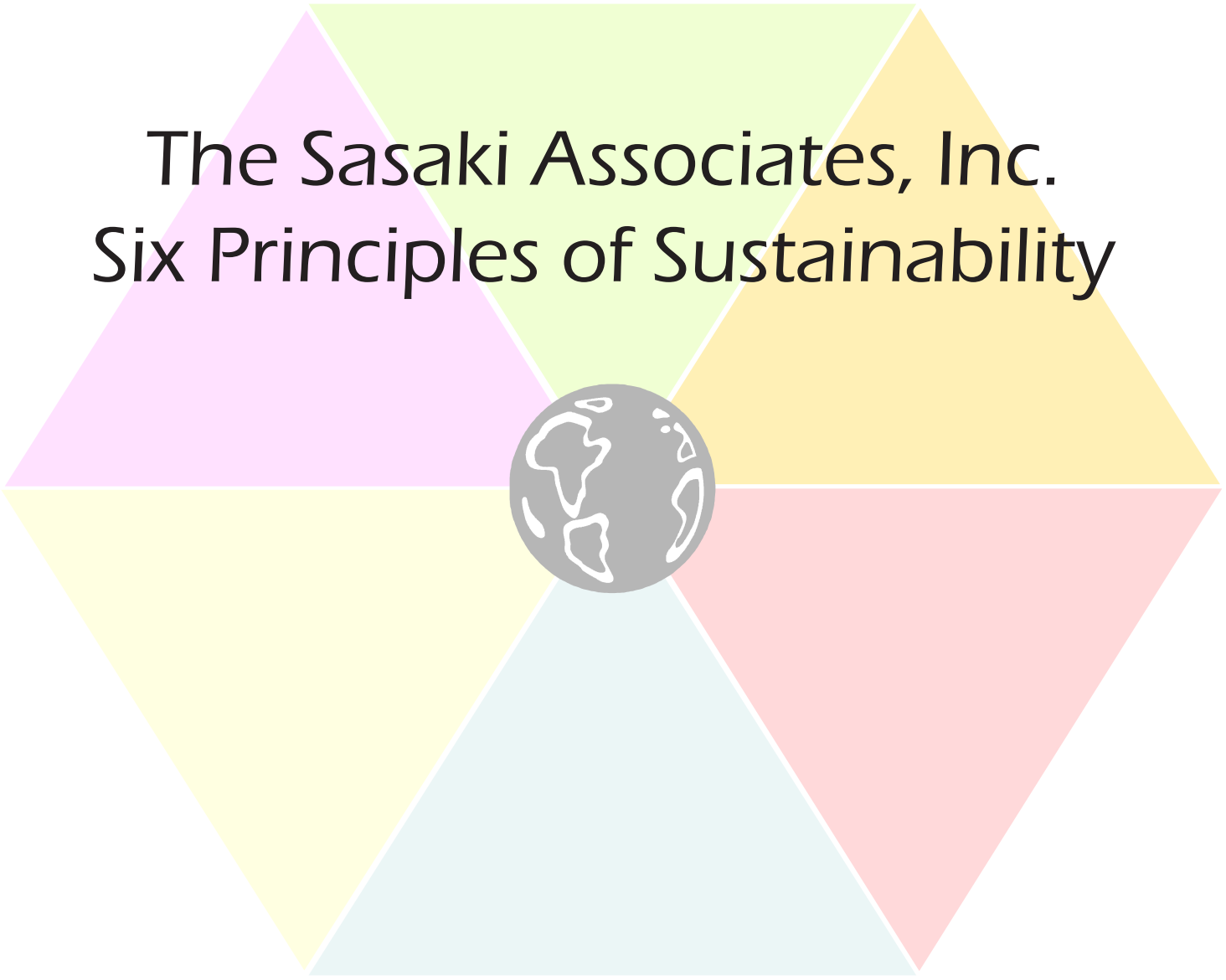
There are some concerns with this rating system in that it guides the planning and entitlement process but does not take into account the fact that the physical development of a site may not occur for years after plan acceptance. A critique of LEED ND provided to our team by Sasaki Associates articulates this point and calls for the modified LEED ND rating system to address this concern. Another concern with this rating system is that they are too focused on urban design and do not account for developments on the fringe. Additionally, Sasaki takes issue with the fact that this rating system seems weighted towards the principles of New Urbanism and that other design forms may meet the guidelines and should be included in the discussion. Lastly, the system is weighted more towards urban design principles and not towards environmental preservation. The point system is not as balanced as it should be across the principles that are provided within the draft.

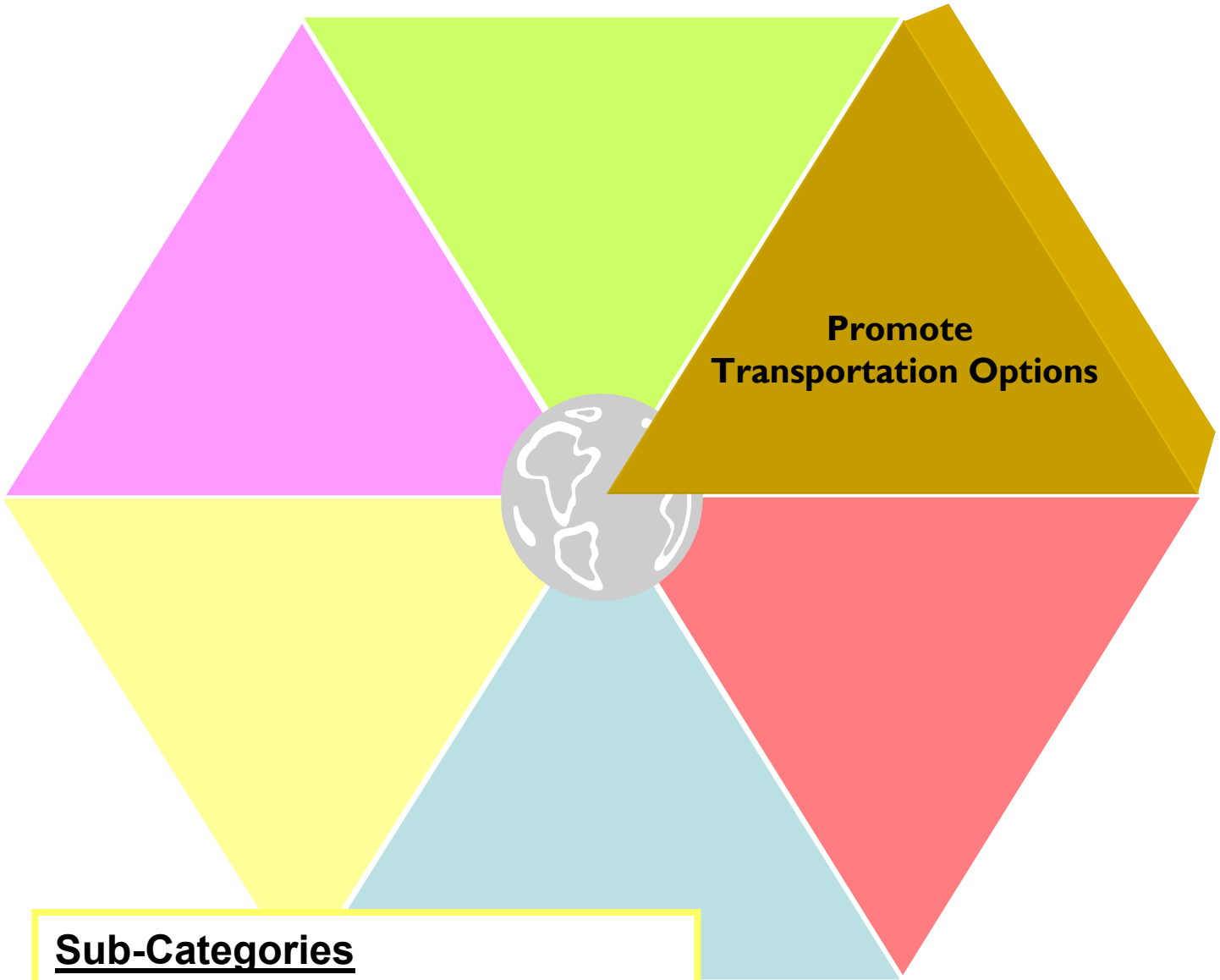
We have found this rating system to be helpful in that it has provided insight into strategies for implementing sustainable design beyond the issues of environmental protection, energy efficiency, and green building standards by also recognizing the need for community development and the recognition of collections of buildings and their relationship to one another as important to sustainability. However, this ranking system focuses primarily on green development and falls short of addressing contextual issues of sustainability such as social and economic strategies.

Existing Metrics (cont.)

Sustainability Guide Review				
	Yale Land Code	**HOK Sustainable Design Guide**	**Minnesota Sustainable Design Guide**	**LEED Guides**
Strength	• Focused on large-scale site development, providing in-depth rationale, strategies and background information.	• Specificity of resource investment and personnel requirements.	• User-friendly and scoring system that allows for higher degrees of innovation than LEED-based systems.	• Given that there is a suite of guides, they are applicable across multiple project types (i.e. commercial buildings, new homes, and now with LEED ND, entire neighborhoods). • Scoring system allows for competitive market and project comparison despite differing locations.
Weakness	• No measurement of performance tracking strategies.	• Primarily pertains to only building construction.	• Primarily focused on building design and operation.	• Does not allow for innovation in green design. Standards are very stringent and sometimes unattainable across varying projects.
Contribution to Sasaki Sustainable Planning guide	• Contributed significantly to the underlying logic of the Transportation Options, Enhance Water Resources, and Champion the Natural Environment sections.	• Provided specific design techniques for the Energy Efficiency, Enhancing Water Resources, and Champion the Natural Environment sections.	• Contributed many strategies to the Achieve Energy Efficiency section.	• Contributed many strategies to the Design for the Pedestrian and Celebrate Community Sections.
Attempt to Quantify Sustainability?	No	No	Yes- Point system	Yes- Point system

The Sasaki Associates, Inc.
Six Principles of Sustainability





Sub-Categories

- Parking
- Alternative & Public Transportation
- Proximity to Existing Civic and Commercial Infrastructure

Transportation

Sustainable transportation options are increasingly important due to high costs of fuel, changes in land use patterns, and rising parking demand. Transportation options present a valuable opportunity in the design of new development as well as the renovation of existing facilities and have broad impacts that can last far into the future in arenas such as traffic congestion, public health, community livability, air and water pollution, and habitat loss.

Rationale for Sub-Categories:

Parking:
Though parking may be necessary in some site designs, measures can be taken to reduce its negative impacts. Parking lots are one of the highest contributors of storm water run-off which transports sediment, nutrients, bacteria, and trash into aquifers, streams, lakes, and other bodies of water. Parking can also be an indicator of automobile dependence; when sustainable modes of transportation are built into the infrastructure of a site, it ensures that future use and development will grow around sustainable transportation. For example, a residential development that is designed for walk-ability as opposed to single user automobiles will be more likely to retain that infrastructure. When parking is necessary, installation of sustainable drainage systems (SUDS) and the use of alternative parking surfaces, such as pervious concrete mixes and paver blocks ensure long-term performance and minimal costs. Pervious parking surfaces allow water to be absorbed and filtered into the water table. SUDS, such as bioswales, satisfy flood management requirements at a fraction of the cost of traditional water management infrastructure.

Alternative and Public Transportation:
Designing transportation options based on walking and biking alleviates traffic congestion, reduces auto emissions, and facilitates human interaction within a community. Examples of infrastructure that promote these types of transportation are wide sidewalks, safe crosswalks, conveniently located bicycle storage facilities, and designated bicycle lanes. When human powered transportation options are minimal, ridesharing programs and facilities that service renewable energy fueled vehicles should be provided. Access to public transportation lowers the infrastructure costs associated with new development, such as parking, as well as reduces air pollution. A site located near public transportation ensures that people of all ages and socioeconomic backgrounds have access to jobs, business opportunities, and city centers. Transit oriented development helps guarantee that urban centers stay productive while rural areas maintain their character.

Proximity to Existing Commercial and Civic Infrastructure:
New development located within a half mile of commonly used commercial and civic facilities, such as a supermarket or post office, reduces both parking demand and traffic and automobile dependence. Giving users the option to walk to commonly used facilities has a two-fold benefit: supporting the local economy and providing options for social interaction with community members.

Promote Transportation Options

Universal Considerations

Sasaki should always consider parking design and availability of public transportation in site selection and development. The ubiquity of parking demand makes it a promising target for reform; even incremental measures that mitigate its deleterious effects can be extremely beneficial. Pervious surfaces must be a consideration on all Sasaki projects that involve this transportation element. Finally, sites should have direct access to public transportation in order to significantly reduce automobile emissions and promote future pedestrian oriented development.

Project: Dallas Area Rapid Transit Mall, Dallas, TX

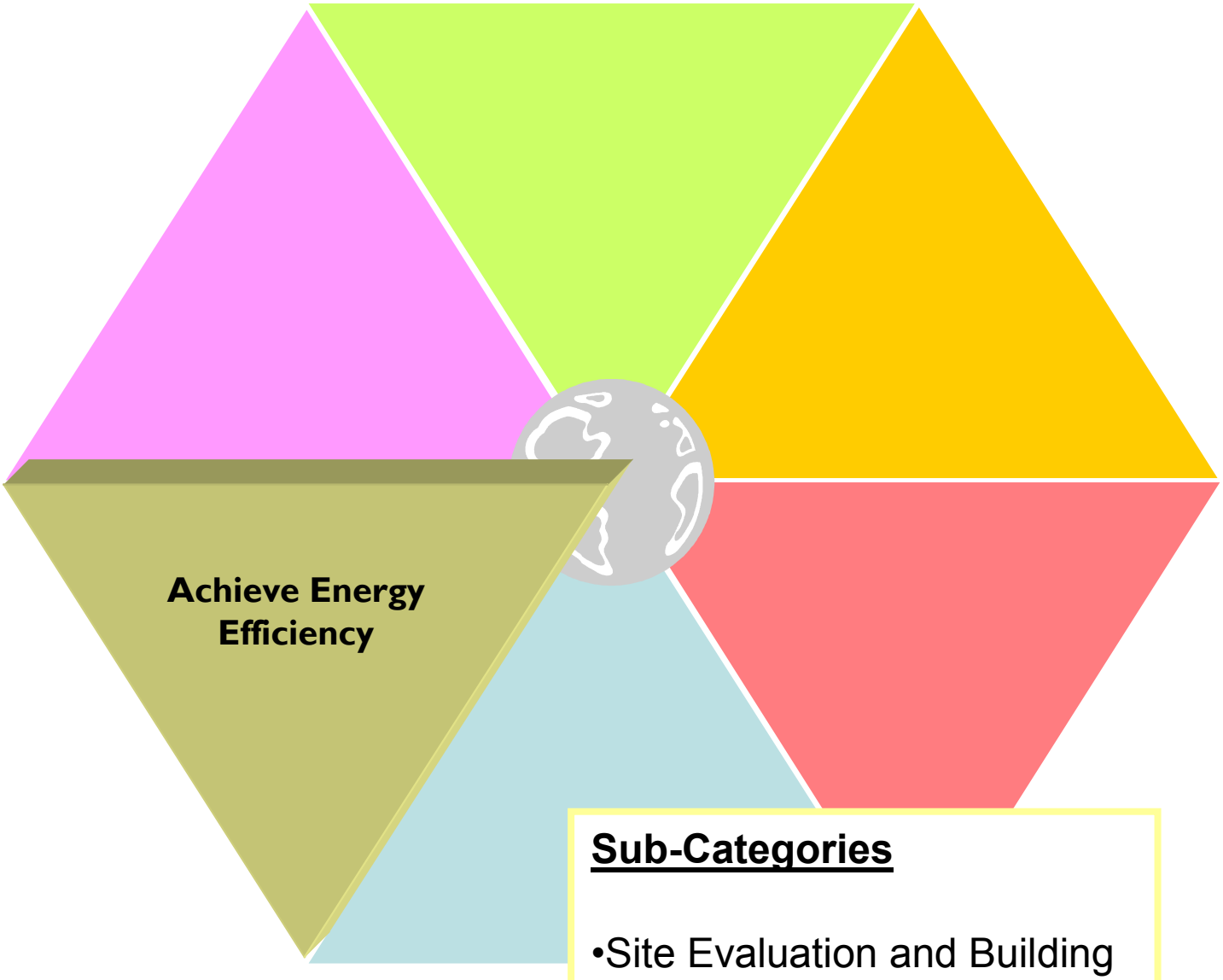
Description: Sasaki created the urban design framework and the landscape architecture for a mile-long transitway mall, which links several districts with the downtown core and forms a major open space corridor.

Principles Applied:
Alternative and Public Transportation, Non-motorized recreation options:

- Public squares mark the location of each transit station, while blocks between stations are designed to distinguish the transitway, local access, and pedestrian zones.
- Improvements were designed to support the development of ground-level retail uses, to animate the street, and to provide a safe environment during off-peak hours.

Proximity to existing commercial and civic infrastructure:

- The entire length of the mall is unified with street trees, special streetscape treatments, and a dynamic public arts program.
- Project phasing allowed for impact on local merchants to be minimized.



Sub-Categories

- Site Evaluation and Building Siting
- Building Design
- Renewable Energy
- Lighting and Energy Use
- Materials: Reduce, Reuse, Recycle

Achieve Energy Efficiency

Energy

The integration of energy efficient methodologies is an essential component of sustainable design because it promotes reduced dependence on non-renewable energy sources, such as coal and oil. Energy considerations are essential to every step of the process; whether it is the basic design of south facing windows for passive solar heating and light or more advanced measures, such as installation of a green roof. Buildings consume a significant amount of energy due to inefficient design and failure to take advantage of renewable energy resources. In the United States, building operations account for 36% of total energy use, 65% of electricity consumption, and 30% of all greenhouse gas emissions (US Green Building Council 2006).

Rationale for Sub-categories

Site Evaluation and Building Siting:
Site evaluation and building siting involve consideration of all features of the landscape and site layout. Examples include reusing existing buildings, locating buildings so they can take advantage of passive solar energy, and insulating buildings through strategic placement of vegetation.

Building Design:
Energy efficient buildings can increase cost savings, reduce operating costs, and benefit public health, productivity, as well as community. For example, specific heating, cooling, and ventilation choices such as regulation of outside air in accordance with occupancy, activities, and operations can reduce energy usage and increase overall health for building occupants. In addition, building construction that incorporates energy efficient technologies, such as glazing with a high visible transmittance for day-lighting and Energy Star compliant roofing material, reduce heating and cooling energy needs.

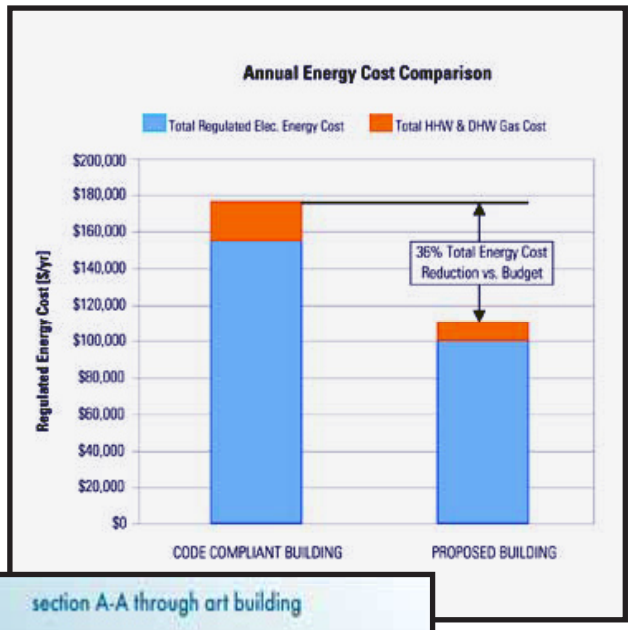
Renewable Energy:
Using renewable energy sources depends upon a shift from current non-renewable energy sources such as coal, oil, and natural gas to renewable sources such as solar, wind or hydro. In some instances, it may be produced on-site; an evaluation of the site conditions can determine when this is the case. For instance, many high schools in Vermont are installing wood-chip burning furnaces. The school's geographic location provides for a viable option for this renewable fuel. While this may be appropriate for VT, it may not be in Texas where solar power is a more likely energy source, making these options site specific.

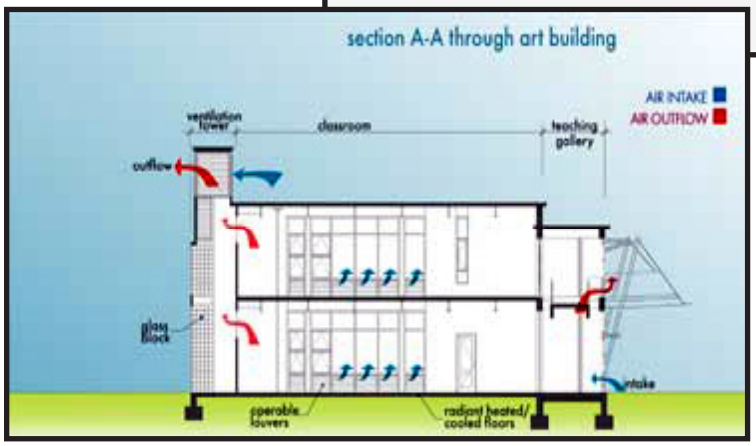
Lighting and Energy Use:
There are several methods that can be employed to reduce lighting related energy use. The architectural plan can be structured to take advantage of strategies that maximize the amount of daylight that penetrates into occupied spaces. Energy efficient lighting mechanisms, such as outdoor lighting provided by a renewable source should be installed along with roof monitors, clerestory windows, atriums, and courtyards.

Materials:
Reduce, Reuse, and Recycle: Innovative materials promote the use of salvaged, refurbished, and recycled materials in addition to efficient waste management techniques that protect natural resources. Ensuring that at least 20% of materials are manufactured, extracted, harvested, or recovered within a 500 mile radius of the project is an effective way to reduce a development's footprint. It is helpful to develop a construction waste management plan that quantifies material diversion goals to recycle demolition and land clearing waste (i.e. establishing a percentage of waste that the project aims to recycle).

Universal Considerations

Sasaki should identify strategies for improving the space utilization and energy efficiency of existing facilities before recommending new construction. The use of innovative, passive, and radiant systems for heating, cooling and ventilation is incorporated by utilizing natural ventilation and passive energy designs for a minimum of eight months per year. Any or all options for Alternative and Renewable Energy Sources including photovoltaic, solar, wind, geothermal, and hydro should be implemented. This can also be accompanied with an architectural plan using appropriate strategies to maximize the amount of useful, controlled daylight penetrating into occupied spaces. Some examples include the effective use of roof monitors, clerestory windows, atriums and courtyards. Lastly, using regionally available materials and resources, particularly those that are salvaged, refurbished, and/or recycled should be employed for every project.





Project: Evergreen Valley College Performing/Visual Arts Center, San Jose, CA

Description: A new 68,000 square foot arts center containing an arts building, a music building and a theater center. From the start of programming, the client and design team collaborated to define the project's major sustainable goals.

Principles Applied:

Site Evaluation and Building Siting:

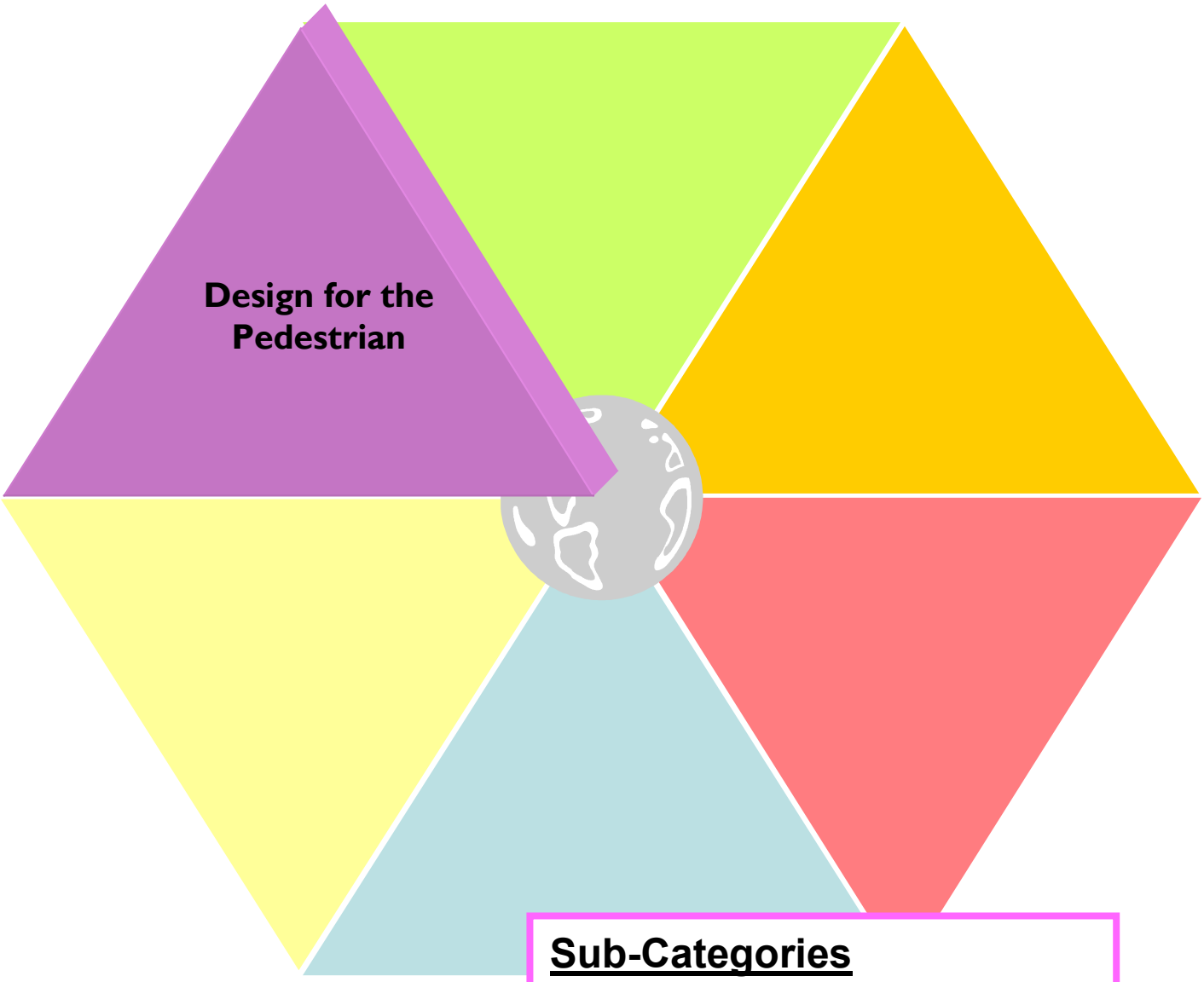
- The building was sited for solar orientation for improved heating, cooling and daylighting.
- Reduction of parking and design for extensive bicycle parking.

Lighting and Energy Use:

- Maximum glazing in occupied rooms with exterior sunshades for daylighting.
- Use of high efficiency lighting systems with automatic daylight dimming controls.

Building Design:

- Natural ventilation with radiant heated and cooled floors.
- Displacement Ventilation Systems in theater and performance spaces.



Sub-Categories

- Walkability
- The Pedestrian Experience
- The Built Environment

Design for the Pedestrian

Place-making that seamlessly integrates the built environment, civic space, and the natural environment through a program focused around the human scale, improves the viability of a project. Research has confirmed that residents are willing to pay premiums for houses in neighborhoods with more connective street networks and smaller blocks, greater pedestrian accessibility to commercial uses, more evenly distributed mixed land uses in the neighborhood, and close proximity to operating light rail stations (Song and Knapp, 2000). Sound human scale design provides interconnectedness of the building to the sidewalk and the street and is vital to the success of each of Sasaki's projects across all of their client groups.

Rationale for each sub-category

Walk-ability:
Activities of daily living should occur within walking distance, allowing independence for those who do not (or choose not to) drive. An interconnected network of streets should be designed to promote walking, reduce the number and length of automobile trips, and conserve energy. Pedestrian access encourages residents to walk, lowers vehicle miles traveled, and improves human health (Song and Knapp [225], Frank and Englke [18]). Additionally, walk-able communities require smaller building setbacks, smaller amounts of paved surfaces, and typically encourage more densely clustered development patterns. The end results are fewer vehicle miles traveled, reduction in land consumption per capita, as well as quality of life and public health improvements, and reduced dependency on fossil fuels (Litman, 2004).

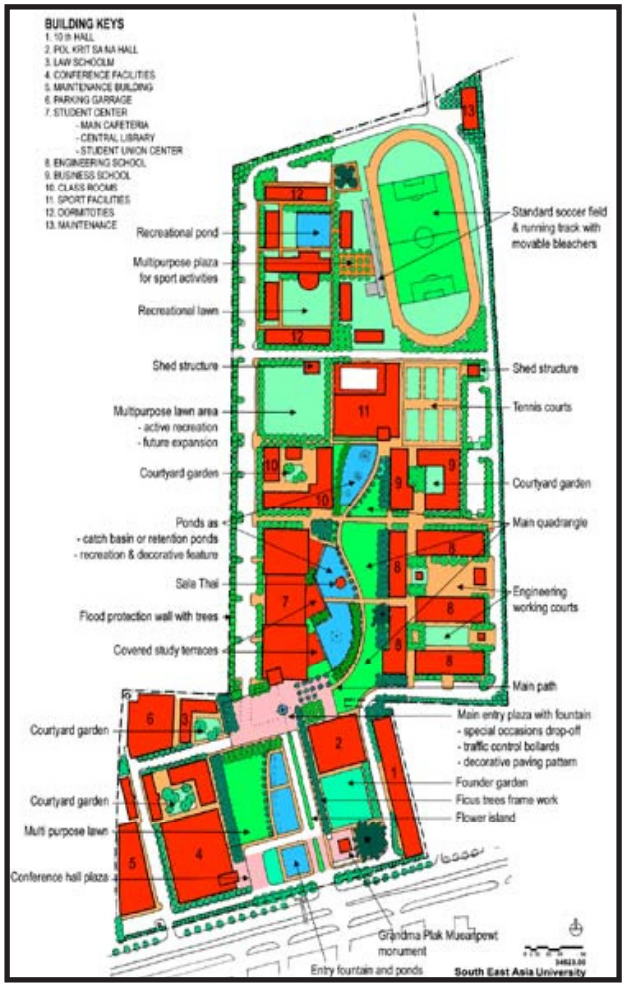
The Pedestrian Experience:
An area that enhances the pedestrian experience and exhibits a sense of scale that is welcoming and accommodating are desirable characteristics of a community. Streets and squares should be safe, comfortable, and interesting to the pedestrian. When properly designed, they encourage walking and enable neighbors to know each other and protect their communities. More attractive, safe and walk-able streets increase community livability (Forkenbrock and Weisbrod, 2001). Residents on streets with higher traffic volumes and speeds are less likely to know their neighbors, and show less concern for their local environment, than residents on streets with less vehicle traffic (Appleyard, 1981). To the degree that improved walkability increases community cohesion, it may help reduce crime and other social problems in an area (Litman, 2002).

The Built Environment:
Architectural projects should be linked to their surroundings and located to enhance the pedestrian experience and promote walk-ability and connectivity. Buildings should be welcoming and inviting to pedestrians on the street. Concentrations of civic, institutional, and commercial activity should be in neighborhoods and districts, not isolated in remote, single-use complexes. Sasaki should promote compact development, include residential components with a variety of housing types and utilize site structures to shape the walk-able streets by designing the project so that building front facades will face the public space. Schools should be sized and located to enable children to walk or bicycle to them.

Design for the Pedestrian

Universal Considerations

Sasaki planners should utilize strategies that promote access and walk-ability while enhancing the pedestrian experience across all client groups and projects. In order to achieve this, Sasaki should recognize and utilize successful local and historical patterns of neighborhood development and building design in the planning process. During the design phase of a project, Sasaki planners should locate buildings so as to shape walk-able streets while providing easy access to public amenities, commercial centers, civic institutions and open space.



Project: South East Asia University Campus Master Plan, Bangkok, Thailand

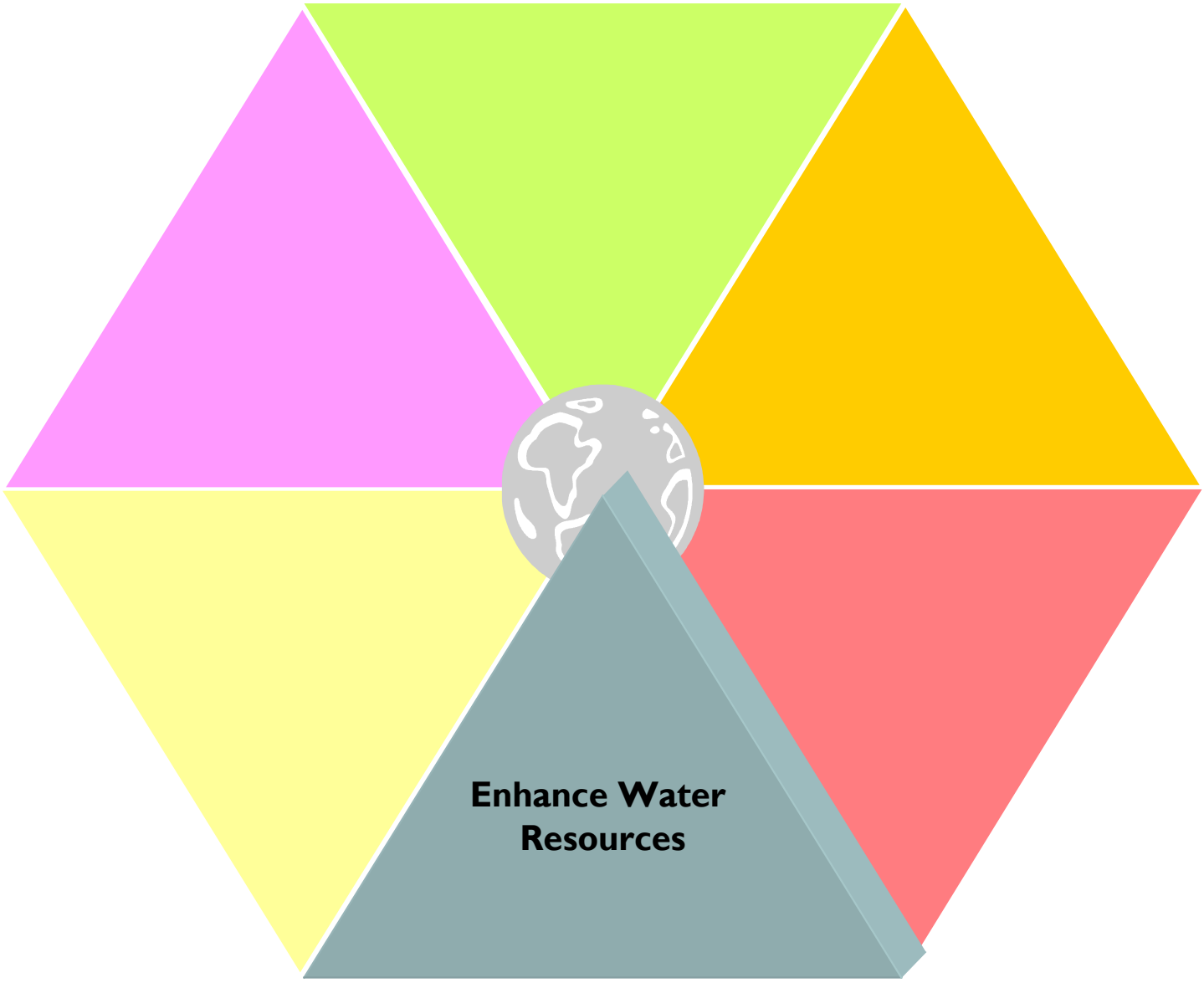
Description: Over 2.7 hectares of new civic space, defined by a sequence of connected ponds and water features, will be introduced at the center of the campus, creating a setting for quiet contemplation, casual interaction and active recreation. Sasaki's master plan incorporates an environmentally conscious strategy that responds to the campus' environmental conditions. The strategy uses natural systems to create a more comfortable on-campus environment, conserve energy, and reduce water consumption and wastewater.

Principles Applied:
Compact development/ Diversity of Uses:

- The development of the campus will preserve a compact form. Major campus destinations will be concentrated within a maximum five-minute walking distance.

Building Access, Design, and Location to Shape Walkable Streets/ Pedestrian Network:

- New buildings will be sited in courtyard arrangements to provide shade and airflow between buildings.
- Pedestrian arcades will be incorporated along the ground floors of new buildings to provide shade and sun protection.



Sub-Categories

- Enhance and Preserve Natural Water Features
- Maintain Site Drainage
- Conserve Water Resources: Re-use and Reduction of Use

Enhance Water Resources

Enhancing Water Resources

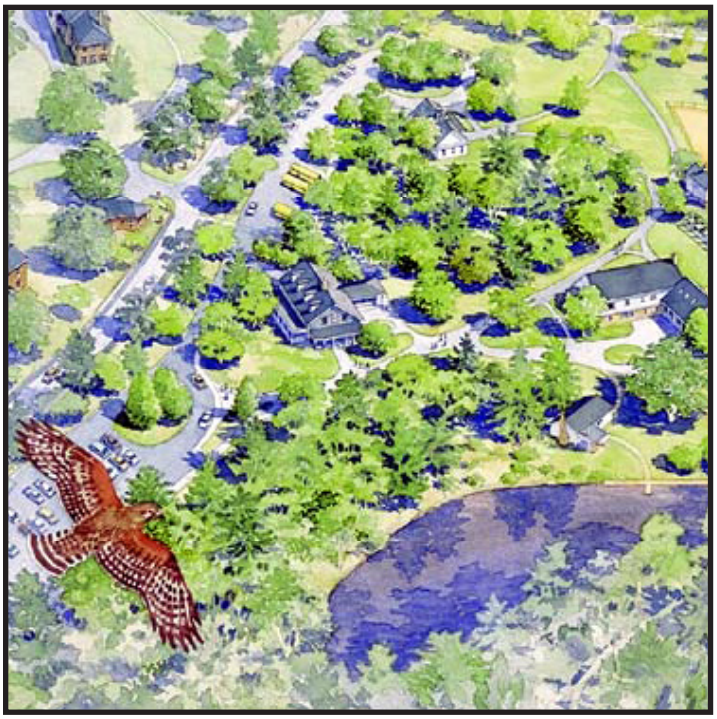
Water resource enhancement is a critical element of the planning process, whether it is through design or construction. Water is an operational necessity for drinking, heating, waste, and irrigation, as well as an integral landscape and ecological feature, in the form of ponds, streams, and wetlands. Lack of adequate planning of water resources has serious effects on site management and quality of life for those living and working on the site. For instance, a facility that fails to account for adequate flood management in its selection of parking surface type will not only risk polluting the aquifer, but is more likely to have detrimental effects on local soil quality and plant life.

Rationale for each sub-category

Enhancing Natural Water Features:
The goals of enhancing natural water features are to preserve and improve critical water-related areas such as wetland buffers and to create a personal connection between the users of a site and the water area. Environmental, health, and aesthetic benefits arise from making natural water features more visible, either by restoring them from a dilapidated state (a formerly diverted stream) or creating them (a visible retention pond instead of an underground storage tank).

Managing Site Drainage:
Inadequate planning for site drainage is extremely costly and has significant health and safety implications. Three key issues that fall under the site drainage category are adequate management of storm water, impervious surface reduction, and eroded areas restoration. Numerous natural and developed techniques are available to manage site drainage; using native plants to absorb and filter water and re-using storm water for green-roofs or toilet water are both excellent options. Zoning requirements for parking, street widths and building heights, buffer zones, setbacks, and municipal infrastructure all affect site drainage.

Water Conservation:
Fresh water is increasingly scarce and costly due to general mismanagement and therefore is one of the strongest future concerns of building and site owners. Almost every site has cost-effective opportunities to improve the use of this resource: whether it is a simple regular building maintenance plan that eliminates leaks and uses only water conserving appliances, or more complex efforts such as creating on-site water reclamation systems.



Universal Considerations

Sasaki should ensure that site drainage is managed in a way that preserves and enhances natural water features and reduces the overall amount of fresh water used. This can most effectively be achieved by recycling storm water into building and landscaping water systems. For example, filtered storm water can be channeled to wetland areas or ponds, captured in rain barrels and used for plant irrigation, or recycled into grey-water building systems. The reduction of impervious surfaces through the use of pervious concrete mixes for parking lots allows water to drain over a larger area while it is filtered by the pervious material, thus re-supplying the water table naturally.

Project: Massachusetts Audubon Society, Drumlin Farm Sanctuary , Lincoln, MA

Description: As part of the property master plan, Mass Audubon constructed a new access drive and parking facility at the Drumlin Farm Wildlife Sanctuary to provide a greater measure of safety for visitors and staff while minimizing the impacts to the associated wetlands, flood plain, streams, meadows, and forest habitat.

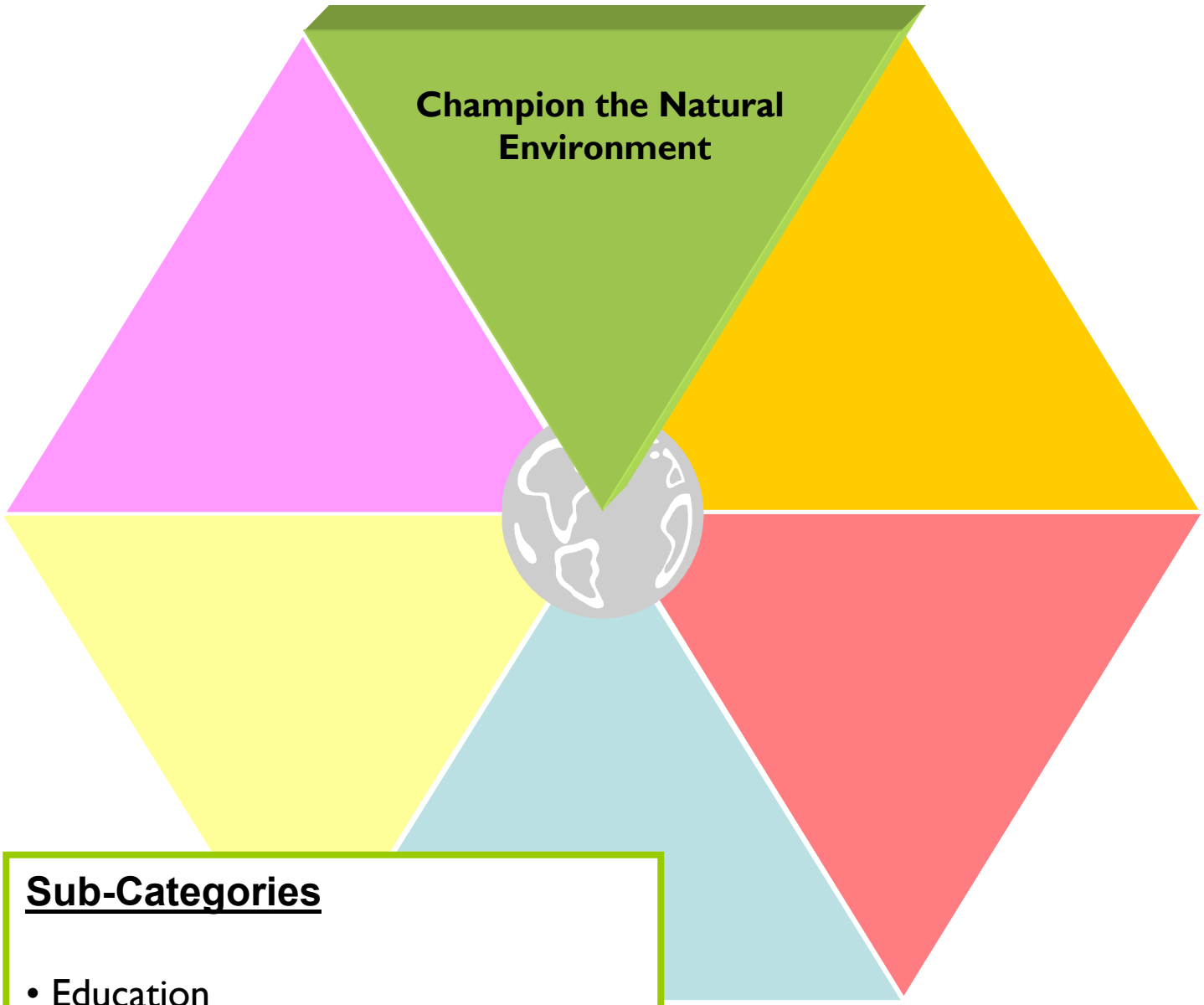
Principles Applied:

Enhance Natural Water Features:

- Due to the project's close proximity to sensitive and valuable resources, initiatives to protect natural systems were observed throughout the design process. The proposed development has been sited to remain as far as feasible away from these natural resources and to minimize the number of mature trees that need to be removed during construction.

Manage Site Drainage:

- All runoff from the impervious areas is directed through Vegetated Filter Strips or Water Quality Swales which line their edges.
- The elimination of all curbing allows sheet flow from these surfaces and minimizes concentrated flow erosion and contaminant build up.
- Runoff is collected by closed drainage and directed through perforated piping and infiltration trenches. Ultimately all runoff is directed to one or more of the five Bioretention areas on the site, which collect and infiltrate the first flush stormwater volume. This initial flush contains the highest concentrations of Total Suspended solids and Hydrocarbons, the contaminants typically responsible for the degradation of wetland habitats.
- Larger uncontaminated storm flows are metered out and discharged to the adjacent wetlands and existing watercourses at flow rates equal to or less than existing.



Sub-Categories

- Education
- Restore/Maintain and/or Enhance the Natural Character of the Site
- Sprawl Reduction
- Watershed Management
- Pollution
- Plant Ecology

Champion the Natural Environment

Land, air, and water resources are being depleted due to a rapidly increasing population, urban sprawl, and continuous industrialization. Development does not need to cease; instead development practices need to assimilate ecologically sound development standards. Sites need to develop in line with natural features of the land, such as leaving wildlife corridors intact, as well as locate in already ecologically disturbed Brownfield sites. Creation of clear objectives in the form of a master plan with quantifiable benchmarks and timeframes at the onset of a project can ensure that the maximum amount of the natural character of the site is maintained.

Rationale for each sub-category

Education:
The most important first step to any project is to educate the community about the proposed project. Education not only demonstrates the value of the project, but brings to light the important ecological factors in the area through community participation. Education addresses how each project phase will be implemented in a way that protects and preserves the natural environment. Methods include charettes as well as notifications in the local newspaper and signage.

Preserve/Enhance the Natural Character of the Site:
Regardless of the scale, building affects and transforms the land. Sasaki should plan development that effectively integrates the construction with the site in order to minimize the impact on natural resources as well as make the most of social connections and human comfort. Creating a building envelope so that all construction activities occur within its boundaries minimizes the destruction to the property and protects vegetation.

Sprawl Reduction:
Sprawl isolates individuals, prevents lower income residents from obtaining affordable housing outside of poor neighborhoods, and pushes industry outside of the urban core, making employment inaccessible as well as displacing many species and possibly pushing some into extinction. Creating a footprint that is smaller than allowed by zoning is a way to maximize land use.

Watershed Management:
Site design and development for new construction and renovation can be done creatively in order to protect water quality and hydrologic function. Maintaining wide buffers along streams and valley bottoms minimize disturbance to the watershed.

Pollution:
Greenfield development may not appear to be a significant contributor to air and water pollution; however, large scale development leads to non-point source pollution, which can significantly reduce local and regional ecological quality.

Ecology:
Biodiversity of a site is often threatened with development. It is imperative that plans be designed to preserve as many native plants and animal species as possible. It is also important to mitigate fragmentation effects that result from the placing of buildings and infrastructure. This can be done by composing a landscape design that promotes natural vegetation and encourages active management of the site in order to maintain its biodiversity. Creating larger but fewer planting islands promotes large common root systems and helps to protect other plants from wind, sun, and reflective heat.

Champion the Natural Environment

Universal Considerations

Sasaki should make anti-sprawl development techniques a priority in championing the natural environment. Though it is unreasonable to assume that all development can be adaptively reused or occur on Brownfield sites, many Greenfield sites have aspects that can be adapted and reused. The negative effects of sprawl are not limited to the sphere of land use planning; sprawl also creates social and economic inequity by isolating individuals from affordable housing and job opportunities. Air and water pollution also needs to be reduced as these are possibly the two most important factors associate with human as well as ecological health.

Project: The Virginia Biosphere, Delmarva Peninsula, VA

Description: The Virginia Coast Reserve occupies 45,000 acres of barrier islands along the Atlantic coast of the Delmarva Peninsula, the land between the Chesapeake Bay and the Atlantic Ocean. The Nature Conservancy developed a replicable strategy for working with local public agencies and landowners to plan for the protection of the lands surrounding their core habitats. The Virginia Coast Reserve was selected as the prototype location for the implementation of TNC's land protection strategy.

Principles Applied:
Watershed Management/Plant Ecology:

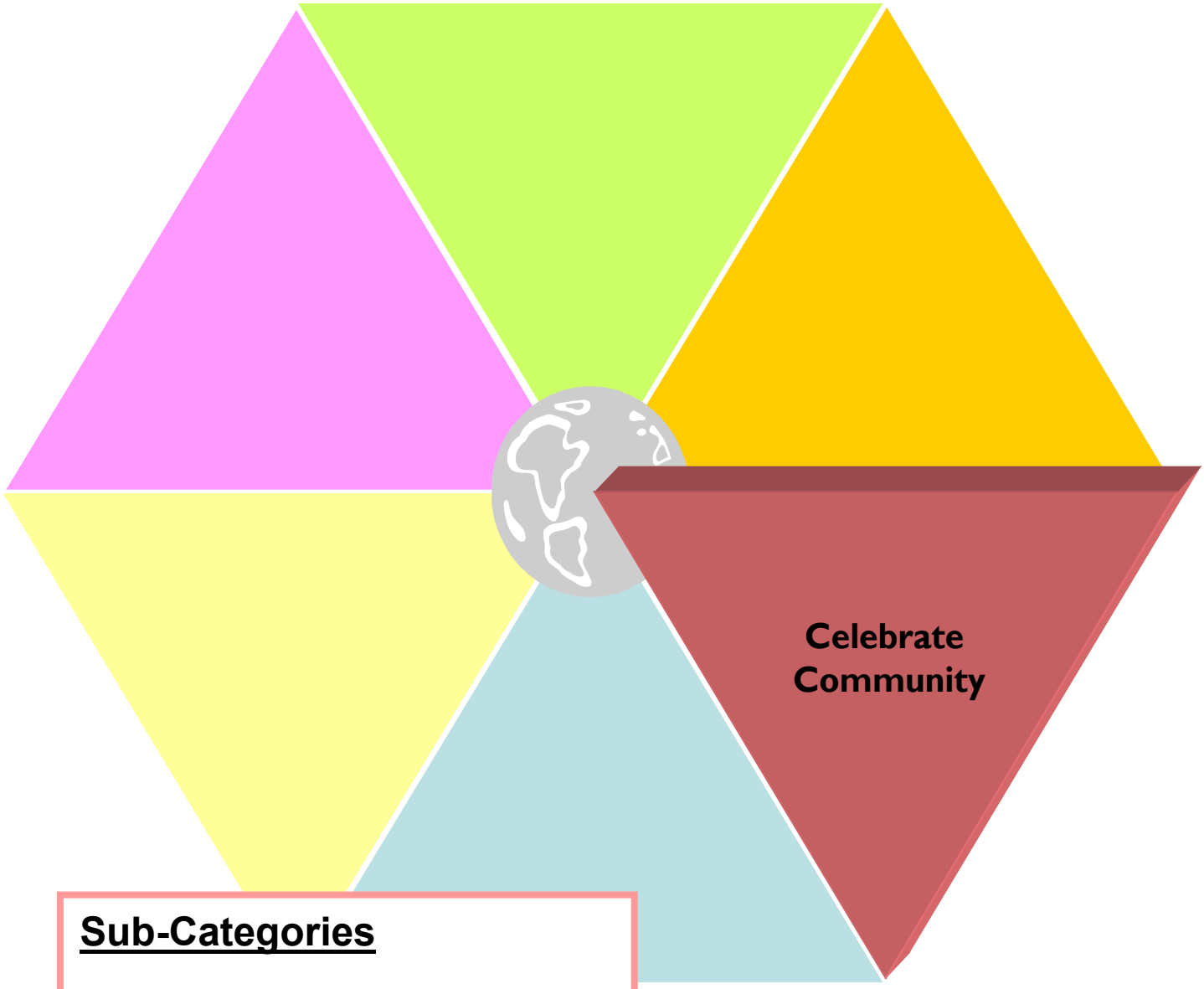
- Through an analysis of the land's natural structure – soils, flood zones, watersheds, and vegetation – and the study of the area's built environment – farms, roadways, historic development patterns – a series of planning tools were created.

Sprawl Reduction:

- A comprehensive land management plan defined areas of land within which any anticipated activity should trigger a more comprehensive review to ensure that development actions do not compromise the larger goals. The rationale used to determine these areas combined visual cohesiveness, land use, and the relationship to watershed areas.
- Design guidelines provided a framework for the built environment and included prototypical details of distinctive settlement patterns.

Restore, Maintain, and Enhance the Natural Character of the Site:

- A concept master plan gave focus to the goals and actions most critical to achieving the physical and visual dimensions of a sustainable community. The plan addressed the built and natural structure of the environment, reinforcing the existing towns and villages as centers for community and cultural resources. The roadway corridors and the sequence of open, wooded, and settled areas were identified for protection.



Sub-Categories

- Placemaking
- Connectivity
- Diversity & Opportunity
- Health & Safety

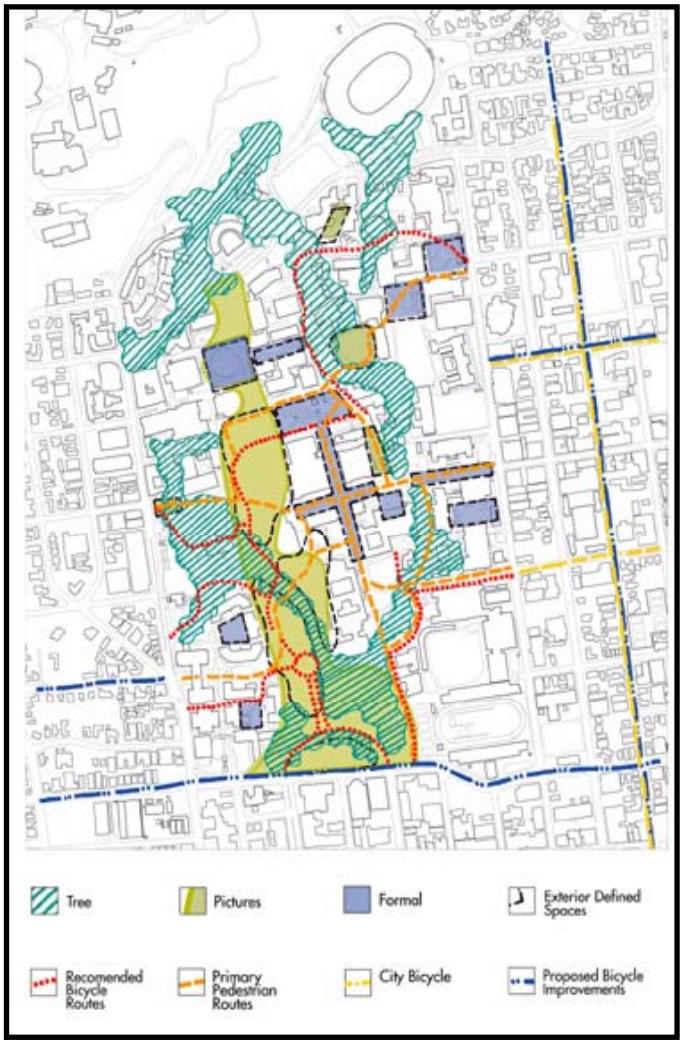
Celebrate Community

How people live, work, congregate, and travel through a space is a critical element of the planning and design process that has been historically undervalued by architects and planners. The social, economic, and environmental viability of a project relies on how well it accommodates the needs of its current and future residents. The success of a site or building is ultimately defined by those who plan it. Incorporating socio-economic, cultural, civic, and family criteria into the planning and design process helps to ensure this success.

Rationale for each sub-category

Place-making/Connectivity:
Place-making is implementing planning and design to create places for community residents to actively use and feel connected to. A planner can encourage place-making by incorporating local history, climate, architecture, and ecology into new project design. Public meeting spaces such as parks and plazas should be designed to preserve open space but also to encourage lively, healthy and secure human interaction. Simple principles of actively used open space, walk-ability, and proximity to commonly used facilities enables people to participate and build relationships in their community and helps to vest people in the physical natural and social environments.

Encourage Diversity & Opportunity:
Incorporation of a variety of residential, commercial, transportation and recreational options within a safe walking distance provides many benefits to the residents and visitors of a community. Diversification of housing by structure type and income level allows for people from a variety of economic backgrounds and family types to live in the same community. A mixture in the types of local business improves the variety of goods and services available to a community thereby reducing the distance people must travel for shopping needs. By using design to celebrate the social, ethnic, economic, and architectural diversity of a community, a planner can encourage a healthier and more sustainable way of life.



Universal Considerations

All Sasaki plans should consider the unique qualities and challenges of a community and incorporate these elements into every design. Walk-ability, human scale design, green building technology, public spaces, access to public transportation, and economic opportunity should be goals of every project from a single civic building redesign to the creation of a town or region master plan.

Project: UC Berkeley New Century Plan and Landscape Heritage Plan , Berkeley, CA

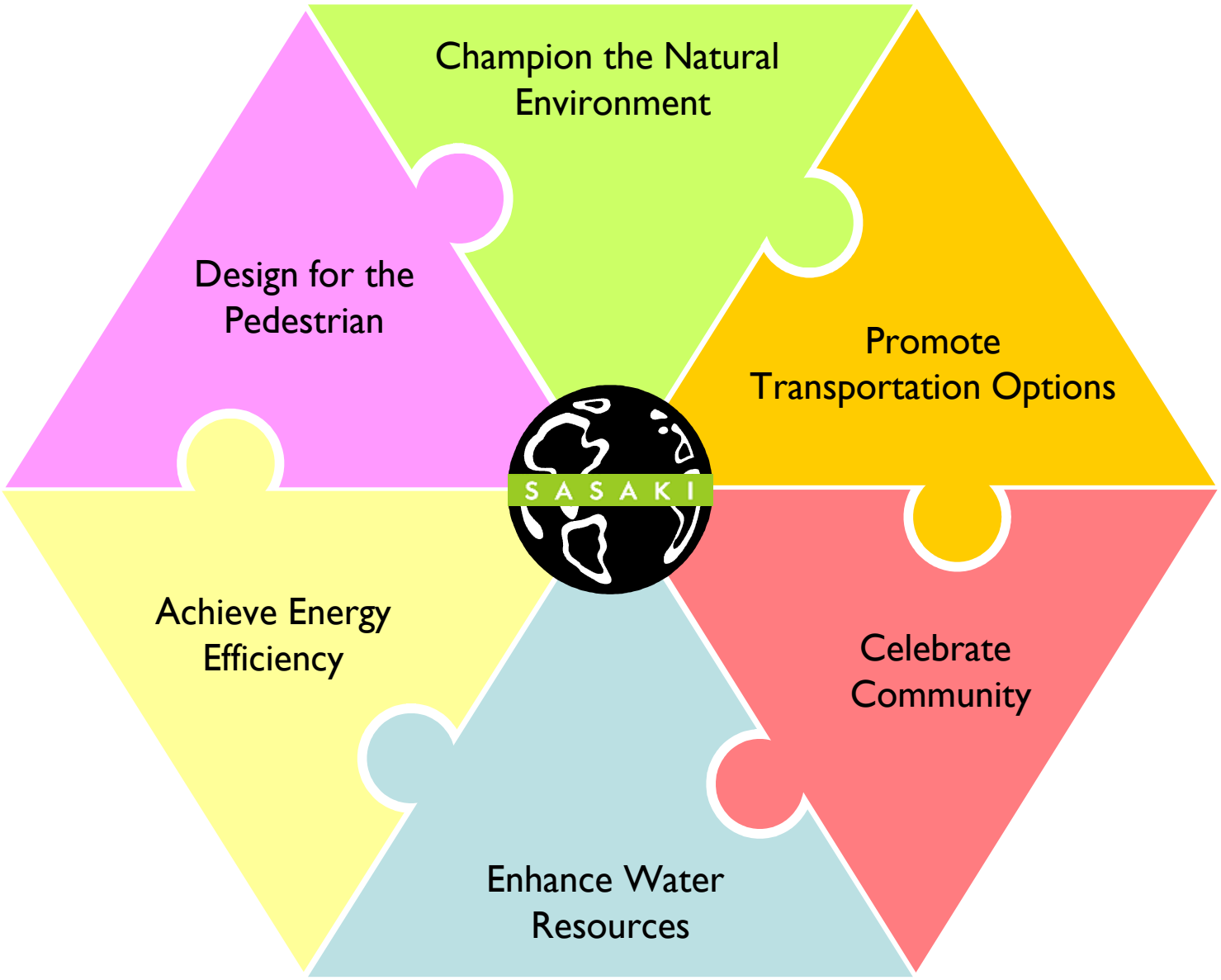
Description: Sasaki worked with University staff to develop a master plan and urban design program for the massive revitalization of the campus, defining the "civic structure" of buildings and open spaces, and reclaiming the integrity of natural systems traversing the campus. The plan creates new and improved public spaces that work with the marvelous and challenging terrain, while also outlining physical design policies that will ensure the restoration and preservation of the historic open spaces and natural systems.

Principles Applied:
Development Density & Community Connectivity/Access to Public Space:

- Reinvigorating and protecting the natural creek system.
- Using the natural topography to reduce the scale and mass of campus buildings.

Diversity of Uses/Housing :

- Locating essential services with convenient walk/bicycle travel.
- Enhancing shuttle operations and consolidating transit stops.
- Enhancing outdoor environmental quality by restoring view corridors.


Champion the Natural Environment
Promote Transportation Options
Celebrate Community
Enhance Water Resources
Achieve Energy Efficiency
Design for the Pedestrian
SASAKI

Conclusion

Interdisciplinary planning and design are key concepts at Sasaki that were pioneered by its founder, Hideo Sasaki. He insisted that every project be designed and built within an applicable historical, cultural, geographical, social, environmental, and economic framework. The six principles are a framework that allows for Sasaki Associates, Inc. to promote this vision of sustainability into the future. The Tufts team views the Sustainable Planning Guide as a tool to assist the firm in their quest to honor the memory of Hideo Sasaki and continue his legacy through practical and interdisciplinary work.

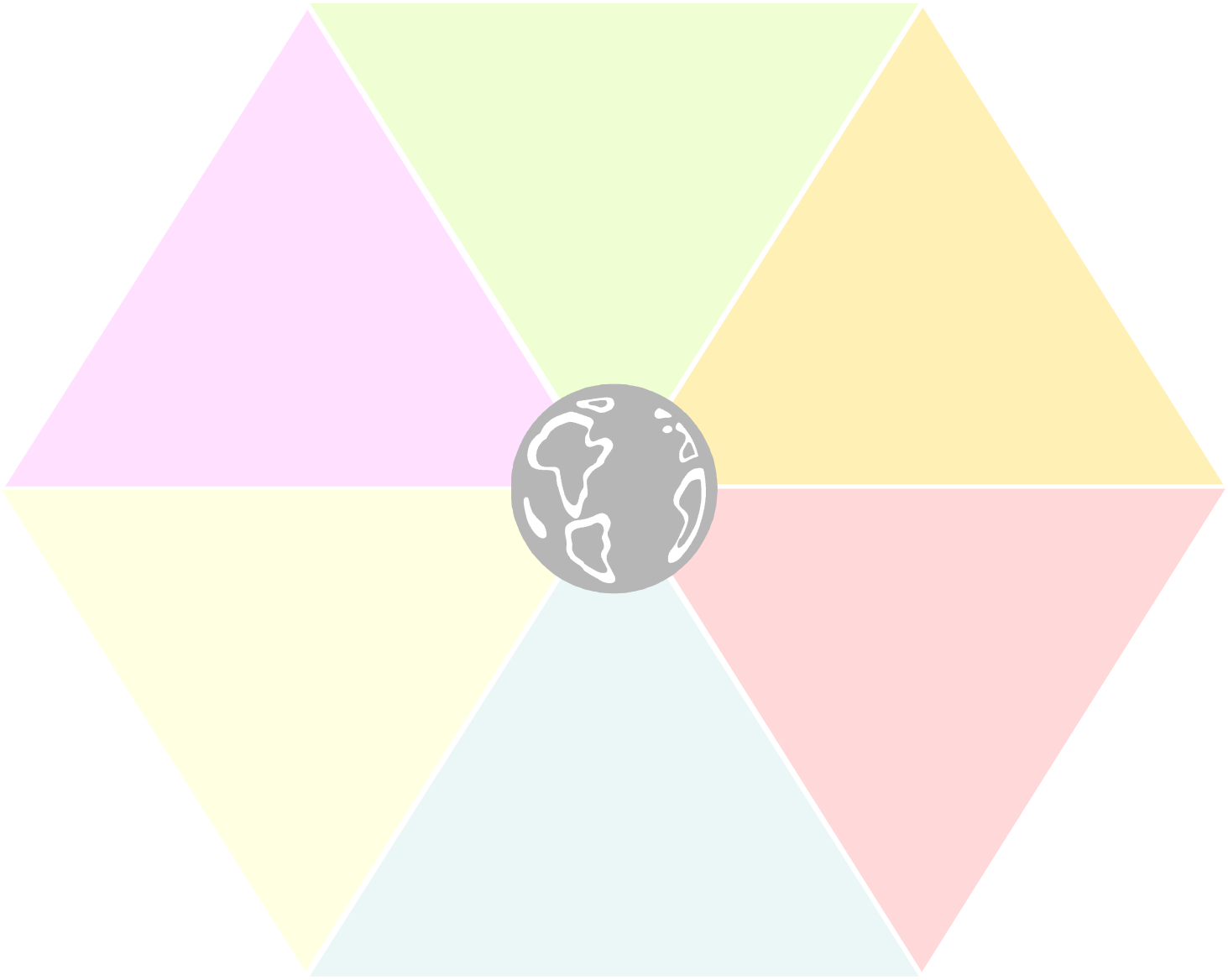
Sustainability is a concept that is relatively new to the field and many planners have not learned the concept in a formal, academic setting, but through practice. The Executive Summary can serve as a tool for the planners in the firm to implement sustainability in their projects by embracing the six principles. It provides the framework for planners to understand the principle of sustainability, why it matters, and where it matters most.

Once the concepts are understood in a comprehensive manner, the checklist can be used to steer planners through the key elements of sustainability within each principle. It is understood that not every project can implement every recommendation of each sub-category, but the team has highlighted key factors that are essential to each project. It is the expectation of the Tufts team that the use of the workbook become a requirement of every project from pre-development through post-development. Regardless of the degree of use, it can serve as an internal project tracking form, which will help Sasaki capture the essence of each project and can eventually lead to a Best Practices Guide for Sustainability within the firm. Case study material can also be built upon through the use of the workbook. Should a planner seek an example of how a principle was implemented in a certain development context, the Best Practices Guide can serve as a resource.

The Tufts team anticipates that the guide will create a byproduct in the form of an internal personal resource assessment. Sasaki Associates is a large, bi-coastal firm with tremendous experience and expertise. The utilization of the guide can lead to the creation of a database of expertise within the firm. This not only builds internal capacity, but also creates cost saving measures for the firm by taking advantage of skills within the firm rather than seeking guidance from outside consultants. It also provides an opportunity for the Planning Green Team to be expanded.

Although this guide will first be launched within the Planning Green Team, the Tufts team suggests that other disciplines within the firm utilize the workbook and expand upon it in ways which are relevant to their own practices.

On a global level, Sasaki Associates has a wide range of clients from large to small, international to local. The guide is flexible enough to serve as a tool to assist their talented staff in providing the best product possible for each client and to create awareness in sustainable practice. It is also an opportunity for Sasaki to have a world wide impact on communities by creating equitable, livable habitats that will sustain through the years.



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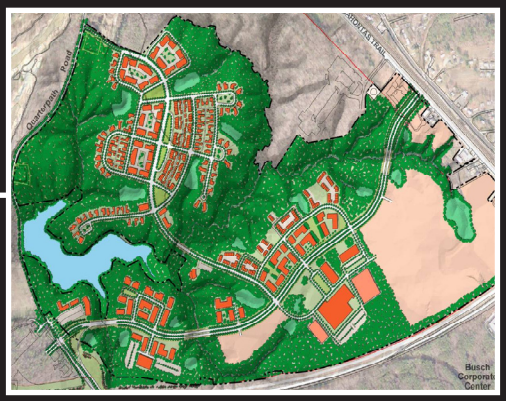

What is Sustainability?

Hideo Sasaki pioneered the concept of interdisciplinary planning and design. It is in that spirit that Sasaki Green strives to incorporate the tenets of sustainability within master planning and urban design projects worldwide.

This report provides information on how sustainability can be achieved in the wide variety of Sasaki Associates projects. The narrative portion of the report is linked to a more detailed Sustainability Checklist that should be relied upon during project evaluation, implementation and follow-up.