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Volume III  Master Development Plan  for the York Street Campus of the Denver Botanic Gardens

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Foreword

Colorado hosts many important and widely recognized cultural facilities, among them Denver Botanic Gardens. Each of these cultural gems offers joy and enlightenment to hundreds of thousands of visitors annually. Many are from our favorite Mile High City, its suburban neighbors, Colorado and surrounding states. In addition, visitors from throughout the nation and the globe travel to Denver for business or pleasure, and discover that Denver Botanic Gardens is world class in its collections, unique in its displays and gardens and a key repository of knowledge on horticulture in a high, dry climate.

Denver Botanic Gardens is a 56-year-old institution, with 48 years of history at its central York Street home. This Master Development Plan is focused on York Street - the location with the greatest burden of aging facilities and infrastructure, blessed with the greatest concentration of gardens. We have important collections and displays at three other sites: Chatfield Reservoir, Mount Goliath, and Centennial Gardens. Both Chatfield and Mount Goliath have strategic plans well underway. Centennial Gardens, in its LoDo location, is operated under a partnership with the City of Denver.

As a governing Board of Trustees, it is our responsibility to honor the longstanding values of Denver Botanic Gardens and to oversee, protect and enhance the physical and horticultural assets of the institution. Our institutional values, rooted in our historic mission of "Connecting People with Plants," are focused on horticulture, education, conservation and research. Our civic values challenge us to maximize our role in the Greater Denver community by ensuring our offerings are both relevant and joyful to locals and visitors alike. Our cultural values encourage us to serve as the local leader and regional resource for matters pertaining to the world of plants, including the conservation and protection of precious natural resources in a world continually experiencing change.

As will be illustrated to the careful reader, our examination began with a review of our historic roots, our evolved values and our perceptions of our proper role in the community – as recorded in the 2004 Long Range Framework Plan. The next step was to take careful stock of our physical assets in the Facility and Program Assessment Report. The Master Development Plan is the conclusion of those introspective efforts, establishing a series of guiding objectives for the Board and the staff to follow over the next 10-25 years. Our charge is to carefully shepherd this institution and those funds entrusted to us by the voters of Denver, the Scientific and Cultural Facilities District and our individual and corporate donors towards fulfilling our dreams and objectives.

Master Plans are not timeless. They should be taken as a road map for the future, guiding and focusing our efforts on key objectives. The Master Development Plan will become the central, guiding focus of Denver Botanic Gardens for the next many years. It will be at the heart of Board deliberations and management evaluations. It was our guide in seeking funding in the successful 2007 Denver municipal bond election and it will be our guide in our upcoming capital campaign. Our promise as the stewards and trustees of this valued Denver cultural icon is to use those funds wisely and to realize as much of the Master Development Plan as our energies and your generosity will allow.

Jerry D. Ladd
Chairman of the Board of Trustees
Denver Botanic Gardens
A. Executive Summary

“When we build, let us think that we build forever. Let it not be for present delight, nor for present use alone; let it be such work as our descendants will thank us for...”

John Ruskin

The 25-year Denver Botanic Gardens Master Development Plan concludes a five-year, three-part comprehensive planning process begun in 2002, the 50th anniversary of the Gardens’ founding. The process has been inclusive and collaborative, guided by the Long Range Planning Committee with the active engagement of the Board of Trustees, Denver Botanic Gardens staff, neighborhood representatives and city government officials. This effort addresses the central question, “What role should the Denver Botanic Gardens play as this great city and region evolve through the first quarter of the 21st Century?”

The Master Development Plan is a benchmark document which represents the critical next step in a comprehensive undertaking that began with the Long Range Framework Plan. It is geared to preserving and protecting the essential historic foundation of the Denver Botanic Gardens as well as defining immediate, interim and long-term facility and program priorities. The plan also recommends strategies for improvement that will strengthen the Gardens’ mission of “connecting people with plants.” The document will inform Trustees as they make policies that set the course for future development, allowing them to direct staff and outside consultants as they implement the Master Development Plan. The fully integrated Master Development Plan addresses programmatic and physical elements of the York Street campus, providing a conceptual vision for long-term development of the gardens and supporting facilities.

The Master Development Plan is based on the Core Values of the Denver Botanic Gardens:

- Sustainability
- Relevance
- Diversity
- Transformation
The Planning Process

The Master Development Plan is the final volume of a three-part planning document initiated in 2002 by the Trustees and staff of the Denver Botanic Gardens. Volume I (Long Range Framework Plan) and Volume II (Long Range Program and Facility Assessment Report) provide necessary context for both reading and implementing the Master Development Plan. The following pages summarize these first two volumes.

Volume I: Long Range Framework Plan
The 2004 Framework Plan is a principle-based living document, which defines and discusses the principles that will guide future growth and change based on an analysis of DBG’s mission and unique history.

Volume II: Long Range Program and Facility Assessment Report
Part One - Program Assessment
This report details the space requirements for each department, illustrating location and adjacency requirements. It provides general guidelines for space needs for the next five years and is based on 2004 assumptions for programs, staff projections and visitation.

Volume II: Long Range Program and Facility Assessment Report
Part Two - Facility Assessment
This report documents existing conditions of the buildings, garden structures and systems of the York Street campus and recommends a three-tier prioritization for repairs and upgrades.

Volume III: The Master Development Plan
The Master Development Plan overlays planning and horticultural principles to the Framework Plan’s Guiding Principles, applying them to the assessments and recommendations of the Program and Facility Assessment Report. This 25-year blueprint for the York Street campus addresses programmatic, physical (architecture and infrastructure) and horticultural elements of the Gardens.
2004 Long Range Framework Plan
Document Summary

Focusing Lens
Change is inevitable in the lifespan of any institution. The ability to accurately forecast or predict over a 25-year horizon requires a tool that adapts to changing conditions while allowing the institution to adhere to its vision, Core Values and Guiding Principles.

The Long Range Framework Plan for the Denver Botanic Gardens is that tool, providing the necessary support to fully integrate programs in horticulture, education, research and conservation in tandem with its physical development. This is a focusing lens, enabling DBG to make decisions that preserve the unique urban character of its architecture, horticulture and landscape. Based on a broad, mission-based set of principles, it will direct redevelopment to areas in need of preservation, maintenance or change.

Institutional Memory / Living Document
The Framework Plan is a detailed historic record, documenting the formative principles and actions that have defined Denver Botanic Gardens throughout its 55-year history. This accessible, archival document will grow and evolve with the Gardens – serving as a record and reflecting the commitment of preceding leaders. It will serve as archive of the past, chronicle of the present and framework for the future.

Guiding Principles
Based on an understanding of the past and a commitment to mission, the Guiding Principles are a prescriptive set of recommendations that will direct and integrate planning and future development. These principles emerged from a thorough review and analysis of the physical conditions and the architectural and horticultural history of the Gardens, as well as input from important stakeholders. These six principles are a framework for physical enhancements at the York Street campus for the next quarter century.

- Emphasis on core Mission: “connecting people with plants”
- Garden and Building Program
- Oasis in the City
- Preservation and Stewardship of Existing Assets
- Neighborhood Protections and Civic Role
- Institutional Sustainability

Planning Principles
A successful botanic garden integrates site and program and these Planning Principles speak to both. Siting reflects a unique sense of place, a Rocky Mountain regional focus and a green, urban oasis. The program addresses the cultural/horticultural connection between people and plants, the importance of education, research and public enrichment and the diversity of plant life in nature, reinforcing the connection between site and mission.

- Site Influences and Borders
- Garden Program
- Arrival Sequence and Entry
- Circulation
- Structure
- Enclosure

Horticultural Principles
The marriage of landscape and architecture defines the York Street site. Just as the Planning Principles represent the architecture of the Gardens, the Horticultural Principles define the landscape. The Framework Plan reflects and strengthens the Gardens’ original design intent, celebrating its location at the junction of the High Plains and the Rocky Mountains.

A commitment to the Horticultural Principles, applied with equal focus to the gardens as a whole and to each core garden will result in consistency and a thoroughly integrated experience.

- Commitment to Best of Class
- Rocky Mountain Horticulture Focus
- Four Season Interest
- Consistent and Complimentary Systems
- Balance and Contrast in the Gardens
- Unify and Strengthen Core Gardens
EXECUTIVE SUMMARY

2004 Long Range Program Assessment

Document Summary

What is a Program Assessment?

The Program Assessment report is both a quantitative and qualitative documentation of facility and site requirements of the York Street campus now and for the near future. It provides a 5-year guideline for space needs, based on 2004 assumptions for programs, staff projections and visitation. Broken down by department, the report includes staff counts and square footage calculations as well as goals, functional adjacencies and programmatic needs.

Why Program?

Four primary factors triggered the need to undertake the programming process:

- To objectively document needs without design preconception
- To identify and prioritize pressure points collectively and by department
- To understand the facility resources needed to maximize DBG’s institutional and programmatic assets
- To build consensus around the future needs of DBG and communicate them to all constituencies

Programmatic Objectives

Maximizing the green oasis, garden-in-the-city character of the York Street campus and celebrating its horticultural diversity entails disciplined programming, consistent with the 21st Century mission of DBG and the vision for the site. Special events, educational programming and school visits should be crafted to highlight the interdependence of diverse ecosystems in a globally sustainable landscape. The opportunity to transform Denver Botanic Gardens into a model of fully integrated sustainability - horticulture, building materials, energy sources and water consumption - is important to the Gardens’ long term focus.

Programmatic Objectives include the following:

- Highlight Rocky Mountain regional horticulture
- Leverage program to engage a more diverse audience
- Serve as a local and regional resource
- Attract visitors and enhance their experience
- Optimize operations
- Promote interaction between research, horticulture and education
- Improve event staging
- Be a better neighbor

General Program Observations

Due to budget and operational constraints, the Denver Botanic Gardens physical plant has been managed conservatively in terms of capital improvements and expansion programs. The result is a facility in which many spaces assume multiple uses to serve a variety of constituents. This approach works successfully until a space cannot meet user or schedule needs, or cannot accommodate new operational, technological or programmatic pressures. The existing facility has been pushed to its limits, deferred maintenance has resulted in unacceptable facility conditions and the ability of the facility to support the mission has been compromised.
2004 Long Range Facility Assessment

Document Summary

What is a Facility Assessment?

The Facility Assessment report documents existing conditions of the buildings, garden structures and infrastructure systems of the York Street campus. It is based on a comprehensive review of existing sources – DBG’s document and drawing archives, interviews with staff, on-site inspections and a thorough review of existing conditions.

Each building and garden structure was evaluated according to a series of standards: the Framework Plan’s Guiding Principles, landmark designation, dedication and physical integrity. The evaluation provided the basis for recommended next steps categorized into three classifications: immediate, interim and long-term priorities.

Facility Assessment Objectives

- Create an inventory and document each structure on the York Street campus
- Make a recommendation about each structure’s future
- Outline existing conditions that need to be addressed if the system or structure is appropriate for continued use

Facility Assessment Next Steps

Immediate issues are considered mission critical and require timely correction. Interim recommendations should be addressed prior to, or as part of, long-range planning efforts. Long-term items are those that should be addressed as part of the 25-year plan.

Mission Critical Priorities

- Replace boilers, cooling systems and controls for the greenhouses including back-up redundancy - Boiler replacement in 2006
- Update heating and cooling systems for the Boettcher Conservatory and repair deterioration - Significant work completed in 2007
- Repair leaking water systems and pools in the gardens - Ongoing effort with a majority of the work completed
- Repair or replace irrigation systems and controls - Funding secured by City Bond in 2007 vote with work scheduled for Fall 2008
- Replace existing greenhouses with updated, state-of-the-art greenhouses and systems - Design to begin early 2008

Interim Priorities

- Repair or replace deteriorating roofs - Completed in Fall 2007
- Repair and correct moisture penetration issues and deterioration on the main facility - Significant work completed in 2007

Long-term Goals

- Develop improved visitor services and amenities
- Renovate historic main facility to its original elegance
- Restore original intent of garden structures
- Conceal and convert garden operations, including service yard and temporary buildings, into improved horticultural facilities
- Consolidate administrative and educational functions, adapting administrative spaces to more public use
- Improve assembly capabilities through upgrades to Entry Lobby and Mitchell Hall
- Improve on-site parking and pedestrian connections
- Consider Community Gardens and its relationship to DBG’s mission in future planning - Planning in progress in partnership with Denver Water
2007 Master Development Plan

Document Overview

What is the Master Development Plan?

This Master Development Plan is a blueprint for the programmatic, physical and horticultural development of Denver Botanic Gardens to enhance the operational mission for the next 25 years and beyond. This document is the product of an analysis of The Gardens’ guiding principles, history and mission, a comprehensive assessment of the departmental program and facilities, and a thorough systems analysis of the historic facilities, all filtered through the DBG community.

Planning Filters

Through the summer of 2007, the design team engaged the DBG staff, administration, trustees, volunteers, neighborhood and city representatives in a series of interactive sessions to fully process the knowledge gained from the previous investigations, reassess priorities and programmatic needs, and explore opportunities for sustainable practices in both operations and development of additional infrastructure. This process generated a comprehensive set of planning filters with which to assess the strengths and weaknesses of the entire site. The application of these four filters to the overall site generated an understanding of the opportunities are for future development.

The four filters used to analyze the Denver Botanic Gardens site are:

- Areas of Stability
- Areas of Integration
- Areas of Reinterpretation
- Areas of Change

Each of these filters are further defined in the following text accompanying the associated diagrams.
Areas of Reinterpretation
Reprogramming key buildings and infrastructure will maximize their contribution to the mission and principles of the Denver Botanic Gardens’ York Street campus. These areas include: Boettcher Memorial Hall, Anna’s Overlook and the Ornamental Grass Berm.

Areas of Change
Enhancements to under-utilized areas of the Gardens will have the most impact in advancing the visitor’s experience, the mission and the ability to enhance the integration of DBG with the neighborhood. These areas include: Drop Dead Red, Monet Garden, Entry Plaza, Amphitheater Boundaries, Community Gardens and the Horticulture and Operations Facilities.

Additional Planning Criteria
The York Street campus of the Denver Botanic Gardens is a well-established institution that has been serving the Denver community for almost 50 years. Planning for further development of this valuable resource must be sensitive to the need for continued operations of The Gardens throughout the construction process.

With this additional set of criteria to consider, the analysis of the site was further examined to develop a solution which creates minimal impact of the project development on the operations and maintenance of the facility. The resulting strategy for addressing these operational needs is a development plan for a series of projects scaled to limit major impacts from construction activities to DBG’s off season. This strategy also creates a design solution with elements that are sensitive to the scale of the existing Garden structure.

Organization of the Report

Section A: Introduction and Executive Summary
- Summarizes the need, purpose, use and organization of the planning process
- Provides the planning history and criteria for analysis in future development

Section B: Gardens
- Discusses connections and the application of horticultural principles and examines core garden themes and collections

Section C: Infrastructure
- Examines visible and unseen constructed systems which support the buildings and gardens
- Presents opportunities to integrate sustainable practices

Section D: Buildings and Structures
- Articulates strategies for restoration, renovation and improvements to existing structures
- Proposes new buildings and support structures to support programmatic needs
B. Gardens

“The many great gardens of the world, of literature and poetry, of painting and music, of religion and architecture, all make the point as clear as possible: the soul cannot thrive in the absence of a garden.”

Thomas Moore

The York Street campus of Denver Botanic Gardens is truly a garden in the city. Located on a 23-acre parcel in the midst of mature residential neighborhoods and two city parks, the campus is both a neighborhood amenity and a regional attraction. Its unique urban context, compact footprint and geographic location, together with the strong sense of intimacy found throughout the gardens truly define DBG and distinguish it from other institutional botanic gardens. These characteristics, along with key design elements, are assets that DBG can build upon as it moves into the next quarter century.

Exceptional elements that define DBG:

- The unmistakable Mid-Century Modern imprint of the Boettcher Memorial Conservatory designed by Victor Hornbein serves as the celebrated landmark for the Gardens as well as a timeless precedent of innovative design.

- Landscape architect Garrett Eckbo's original design for the outdoor gardens defines a series of outdoor rooms and expresses a strong, three-dimensional, abstract, yet deliberate composition of landscape features and waterways punctuated by complimentary axial circulation.

An intimate urban garden, DBG offers visitors an anthology of world garden experiences from a tropical conservatory to semi-arid, dry land and high alpine gardens. The garden’s human scale offers escape from the intensity of city life. Finally, proximity to diverse audiences allows DBG to use its extensive resources as a teaching garden emphasizing Rocky Mountain horticulture's role and influence in similar environments around the world.

The Master Development Plan addresses three key issues pertaining to the gardens:

- Connections
- Horticultural Principles
- Core Garden Themes and Collections
Connections

Denver Botanic Gardens' adjacency to two of Denver's renowned urban parks - Cheesman Park at the western border and Congress Park to the east - offers the opportunity to connect these public spaces physically, visually and aesthetically. In partnership with Denver’s Department of Parks and Recreation and Denver Water, landscape and architectural design solutions should be explored to maximize the public’s enjoyment of this grand civic space.

Cheesman Park Connection

The Master Development Plan proposes to restore and revitalize the historic west access to the Gardens from Cheesman Park through a new entry gate aligning with the Cheesman Memorial Pavilion and the primary east-west promenade through the Gardens.

Opening the west gate and improving the shared boundary with Cheesman Park is consistent with the Cheesman Park Master Plan Draft which identifies the importance of new gardens east of the Pavilion:

"Provide an enhanced entrance/garden area between the Cheesman Memorial Pavilion and Denver Botanic Gardens, possibly in collaboration with reconstruction of DBG's West Gate."

Construction of a new entry gate will re-establish a critical physical connection between the Gardens and Cheesman Park. New visual connections to the Pavilion and Rocky Mountains beyond are also key to a successful design solution. DBG in partnership with Denver Parks and Recreation can renew physical, visual and historic connections through the thoughtful re-envisioning of the entire edge between the two properties.

Denver Water and Congress Park Connection

Congress Park lies to the southeast of DBG and adjoins the Denver Water property to the north, including several playing fields that cap existing reservoirs. DBG, the Community Gardens and Denver Water are jointly exploring the opportunity to relocate the Community Gardens to the site of the new recycled water storage tank.

The location of the new Mordecai Family Children’s Garden on the east side of York Street, adjacent to the Morrison Center, will also enhance the physical connection and relationship between the Gardens, the Denver Water property and Congress Park. Signaled crosswalks across York and Josephine Streets will provide safe passage for pedestrians. DBG and Denver Water should explore the opportunity to create a generously landscaped path along the north edge of the main reservoir and playing fields to further enhance the proposed connection.

Denver Botanic Gardens should maximize the use of its real estate and reinforce the relationship between Congress Park and the York Street campus by improving the eastern edge of the DBG property and relocating the Community Gardens. Furthermore, improvements and well planned, deliberate landscape applications to these borders and adjacencies will add to the Gardens’ street appeal, neighborhood presence and horticultural impact.
Context Aerial of Existing Conditions
Pedestrian Connection

New DBG / Neighborhood Integrated Landscapes

DBG Formal Demonstration Garden

Views to Mountains

Cheesman Park

Perennial Border

Align DBG Gate w/ Cheesman Memorial Pavilion beyond

Denver Botanic Gardens

Perennial Border

Align DBG Gate w/ Cheesman Memorial Pavilion beyond
Horticultural Principles

The 2004 Long Range Framework Plan established a set of Horticultural Principles reflecting landscape architect Garrett Eckbo’s signature design philosophy. Eckbo believed that at its best, landscape is the “arrangement of environments for people.” His approach at Denver Botanic Gardens - the ordered layering and massing of plants to convey a sense of structured movement and procession - reflects this modern, thoroughly disciplined philosophy. A commitment to the Horticultural Principles outlined below will convey a stronger consistency and resonance throughout the Gardens. As the Gardens evolve every element should be filtered through these principles to further achieve a rich, multi-sensory experience for the visitor.

The Horticultural Principles defined in the Framework Plan and described here are:

Commitment to Best of Class
(Refer to page E2 DBG Framework Plan)

Best of Class is an adherence to an exemplary level of professional craftsmanship in both gardens and structures. Both should demonstrate the highest level of expertise, sense of unity and consistency in order to guarantee aesthetic and educational impact. This total design approach will consistently be applied to both landscape and architectural design as the Gardens execute the objectives of the Master Development Plan.

Rocky Mountain Horticultural Focus
(Refer to page E3 DBG Framework Plan)

The Gardens must continue to build on the distinctive character of the Rocky Mountain region, reflecting its unique combination of soil, climate, geography, hydrology and plant habitat. Using a regional focus, the Gardens can create fresh and innovative interpretations of the diversity of garden types expressed with a Colorado palette of plants and materials. DBG should continue to be innovative by using water-smart gardening practices and showcasing the important symbolic, interactive and celebratory use of water.

Four Season Interest
(Refer to page E4 DBG Framework Plan)

Colorado is blessed with a strong four-season climate. Therefore, every sequence and space in the Gardens should be considered for its role and appearance at each season. This design approach applies a structural and architectural awareness of plant material as well as an understanding of a plant’s seasonal attributes so that individual garden rooms and their underlying structures are expressive even in the dormant seasons. Emphasis of four-season interest will expand DBG’s educational platform and provide year-round delight.
Reinforce Garden Signature with Consistent, Complimentary Systems  
(Refer to page E5 DBG Framework Plan)

Denver Botanic Gardens’ confined urban footprint requires simplifying and clarifying the vocabulary of the secondary systems that support individual gardens. Pathways, bridges, signage and supporting furnishings should reinforce the unique character of DBG’s individual gardens as they relate to one another in order to emphasize a stronger, more connected whole. Doing so ensures attention is directed to the main event, the gardens themselves. This commitment to design and artistic excellence and the application of design standards and guidelines will reinforce and compliment the garden signature.

Balance and Contrast in the Gardens  
(Refer to pages E6-7 DBG Framework Plan)

The discipline of composition is essential to any garden plan, defining the difference between an ordinary space and one of transcendent beauty. The committed use of balance and contrast, based on Eckbo’s original design tools of scale, rhythm, repetition, color, texture and light, yield dramatic and inspiring spaces. The elements of sun and shade, formal and natural, and horizontal and vertical exemplify the use of balance and contrast elevating the DBG garden experience to its highest order.

Unify and Strengthen Core Collections  
(Refer to pages E8-13 DBG Framework Plan)

To maximize visitor enjoyment of the horticultural diversity of the Gardens, the design of each and every Collection should be filtered through the Framework Plan’s Planning Principles: boundary, program, arrival, entry, circulation, structure and enclosure.

Relocating certain core gardens so that they reside within a larger Collection will enhance the visitor’s experience. For example, relocating the rose garden and cutting garden and connecting the Waring House to the Romantic Garden, will unify and strengthen this core collection. Exploring the Denver Botanic Gardens should be akin to investigating the galleries of a great museum, a sequential journey uncovering an engaging narrative that relates the distinct yet connecting themes of diverse materials and cultural traditions.
Core Garden Themes and Collections

The Core Gardens are the foundation of DBG’s horticultural priorities. These unique and inspiring gardens comprise the nine core themes of the York Street campus. Each theme plays a pivotal role in creating a world class experience at the Gardens.

The Core Themes include:
- Neighborhood Gateway Gardens
- Arrival Gardens and Entry Courtyard
- Waterways and Aquatic Gardens
- Romantic Gardens / Western Garden Traditions
- Colorado Rocky Mountain Ecosystems
- Eastern Garden Traditions
- Mordecai Family Children’s Garden
- Specialty Gardens
- Interior Gardens

As each collection matures, it is important to anticipate change and evolution. This is achieved by preserving and continuing to elevate those elements of the Gardens that reflect its unique character while accommodating rotating garden displays that continually build new energy and synergies within each Core Collection.

Applying the principles outlined in the Framework Plan and this Master Development Plan will advance the institutional goal of creating a transformative visitor experience.

Criteria for every Core Collection include:
- Relevance to the mission and garden narrative
- Contribution to the legacy of historic assets
- Display Best of Class and four-season interest
- Transformative in their ability to captivate and inspire
- Unique reflection of plant and material selection
- Provide balance between art and science of horticulture
- Demonstrate best management practices in horticulture
Master Development Plan

Waterways and Aquatic Gardens

DBG is a world leader in aquatic gardening, displaying more than 450 species and varieties of aquatic plants. These gardens are showcased by the signature Eckbo waterways, which comprise the linear core of the garden layout. Improving both the physical and visual access and aesthetic value of the aquatic gardens and waterways is key to strengthening this important feature.

The symbolic and celebratory use of water at DBG is a key narrative to impart to the visitor. The message reinforces water’s importance as a life force in semi-arid Colorado capable of transforming the landscape into a green oasis. The use of waterways throughout the Gardens reinforces its life-giving, cleansing, spiritual and restorative properties.

Focused enhancements to the waterways include:

- Redirecting core garden displays to actively interface with adjacent waterways.
- Maximizing educational opportunities to reinforce water’s vital role in the Rocky Mountain region and in the life of our planet.
- Extending the waterways into the arrival courtyard, reinforcing its importance as a major organizing principle of the Gardens.

Neighborhood Gateway Gardens

The Neighborhood Gateway Gardens create the important first impression for visitor or passer-by traveling along York or Josephine Streets. Together these landscapes serve as the Gardens’ public face and should be designed with four-season interest to illustrate the best of DBG. Eliminating the visual noise created by the existing surface parking lot and reducing its heat island effect on the neighborhood are additional benefits of the new garden.

This civic garden will also enhance event programming at the Gardens by accommodating special DBG and neighborhood functions such as the annual Plant Sales and seasonal markets. The green roof will be designed to accommodate additional cars for concert evenings and other garden events when extra parking stress is placed on the neighborhood.

DBG Entry Courtyard

The Arrival Garden will be a highpoint overlooking DBG. This garden will serve as the arrival from the garage below and provide access to a new pedestrian bridge, allowing visitors to connect easily between the parking lot and the main campus.

The Entry Courtyard is meant to transport the visitor from the noisy and intense outside world into the calm, oasis of the Gardens. It will serve as a gathering place where families and school groups can meet, visit and anticipate the promise of the larger garden experience.

A new Orientation Pavilion will acquaint visitors with the Gardens layout, introducing daily programs and educational opportunities. The adjacent buildings will cater to visitor needs providing ticketing, membership services, access to guest services, a Bistro and a new Gift Shop and Bookstore.
Romantic Gardens / Western Garden Traditions

Simplifying and consolidating the traditional western garden collection - currently spread throughout the campus - will enhance its educational impact, creating a unified sequence of visitor experiences. This extensive collection includes the Rose Garden, Cutting Garden, Victorian Secret Garden, Lilac Garden, Perennial Walk, Herb Garden, Scripture Garden, Woodland Mosaic and the signature Romantic Garden.

The Western Gardens anchor the southeast quadrant of the property, complimenting the English country house character of the historic Waring House. Physically connecting the Waring House to the rest of the Romantic Garden, fusing architecture with landscape, will strengthen the experience of the visitor in this Core Theme. The transformation of the surface parking lot, north of the Waring House into Waring Green will add to the graciousness of the estate, fitting more appropriately into the Morgan’s Historic Neighborhood.

Colorado Rocky Mountain Ecosystems

This re-organized theme is designed as a sequential experience, echoing the Colorado landscape as the visitor is transported from the high plains to lush alpine meadows. This theme defines DBG’s Rocky Mountain regional focus and is comprised of the Yuccarama, Water-Smart Garden, Ornamental Grasses, Wildflower Treasures, Laura Smith Porter Plains Garden, Western Panorama, Sacred Earth, Dry Land Mesa, Gates Montane Garden, Dwarf Conifer Garden and the signature Rock Alpine Garden.

Several gardens will be relocated while others will be consolidated to strengthen DBG’s message and educational content. Watersmart gardening practices will continue to be employed throughout the Gardens, while the Water-Smart Garden will become a more unified feature in the Colorado Rocky Mountain Ecosystems themed collection. This collection of gardens will embrace the central waterways, reinforcing the symbiotic relationship between water and land in the West.

Eastern Garden Traditions

This theme includes June’s PlantAsia and the signature Japanese Garden, expanded to include a new Bonsai Pavilion and a new Japanese Tea Garden to compliment the existing Tea House. The enhanced Japanese Garden - bordered by the Montane and Water Gardens - will anchor the northwest quadrant of the property serving as a strong diagonal counterpoint to the Western Gardens at the southeast corner.

A new east entrance to the Japanese Garden near the Bonsai Pavilion, will reinforce the depth and beauty of the collection reorienting views to capture the full extent of these gardens and mitigate the impact of the residential towers to the north. This new orientation invites the visitor to absorb the tranquility and fine detail of this world class collection. New emphasis on the collection will reinforce the importance of the Tea House by improving visibility and adding programmatic opportunities.

June’s PlantAsia will remain in its current location. An expansion along the western edge, absorbing a section of the existing Lilac Garden, will better accommodate the collection.
Mordecai Family Children’s Garden

Slated to break ground in the summer of 2009, the new Mordecai Family Children’s Garden will bring families together to explore, enjoy, and learn. Freely-interpreted alpine, riparian and grassland gardens will form the backbone of a progression of exploratory environments where children will use all their senses in learning and free play. A home garden will bring nature into the “backyard”, where families can share the joys of growing and eating. Garden gathering spaces will foster community bonds formed by young families who visit the Gardens frequently. Flexible garden spaces will create opportunities for Denver Botanic Gardens to connect with new family communities. A renovated Morrison Discovery Center will support educational programs and drop-in visitation. The Mordecai Family Children’s Garden will be the first new garden designed according to the full requirements of the Planning and Horticultural Principles as outlined in the 2004 Long Range Framework Plan.

Specialty Gardens

Utilizing the horticultural opportunity to feature various other garden styles, themes and plant collections of aesthetic and scientific significance, the Specialty Gardens distributed throughout the campus will become another powerful garden experience with strong connections to the message of sustainability. Representing a diverse collection of unique experiential gardens and world flora that flourish in high altitude, semi-arid environments and life zones that share Colorado’s characteristic climatic and geographic conditions, the Specialty Gardens will re-emphasize DBG’s core mission of “connecting people with plants.” The Specialty Gardens are comprised of the Amphitheater, Oak Grove, Sensory Garden, South African Garden, Event Garden, Plant Select® Garden, Trial Garden and seasonal and rotating displays.

Interior Gardens

The interior garden experience begins in the signature DBG building, the Boettcher Memorial Conservatory, where visitors are invited to explore a tropical ecosystem with more than 1,000 exotic specimens common to tropical forests throughout the world. From the Tropical Conservatory, the visitor will experience climatic and elevation changes as they move through a new Orchid and Bromeliad Pavilion, state-of-the-art Greenhouses and Alpine House. For the first time, the working greenhouses will be accessible to the visitor. Display greenhouses running the length of a Great Hall will provide interactive educational experiences that pair with the various ecosystems of the working greenhouses. The indoor experience terminates in a new Alpine House which will complement the internationally acclaimed Rock Alpine Garden collection. Replacement of the existing greenhouses and enhancement to the indoor experience will create a more compelling public zone reinforcing DBG’s mission expanding educational opportunities throughout the year.
C. Infrastructure

“Various forms by standing in relationship to each other decide the composition of the whole...singly they will have little meaning...but as a group they serve as the building material of the whole composition.”

Garrett Eckbo

Site infrastructure encompasses every constructed element of the gardens and buildings. These elements range from life safety systems to the walkways and perimeter fencing that provide enclosure and shape the visitor experience. Infrastructure also includes invisible utility systems that are the lifeblood of any development—water, power, communications, waste removal and storm drainage.

Many elements of Denver Botanic Gardens’ infrastructure show the effects of inconsistent maintenance or benign neglect, typical of a 40-year-old facility. The 2004 Facility Assessment Report together with the Master Development Plan review these support systems, evaluate their current condition and provide direction for replacement or repair. All system proposals are analyzed with an eye to providing environmentally sustainable responses. Doing so advances the Gardens’ educational mission and addresses long-term management, operations and maintenance costs.

Enhancements to the site’s infrastructure will enable DBG to identify and implement a broad range of sustainable strategies. A multi-dimensional upgrade process considers relationships between all systems at the building, campus and municipal scale. Solutions should take into account the Gardens’ relationship to its context such as the surrounding city fabric, connection to city transportation systems and proximity to the Denver Water recycled water reservoir and Cheesman Park. This approach also anticipates system adjacencies and sequencing within the Gardens, cascading resources to, throughout and from the site.

Infrastructure systems addressed include:

- Arrival
- Parking
- Site Enclosure
- Service Areas and Access
- Circulation
- Site Lighting
- Visitor Services
- Waterways
- Life Safety
- View Corridor
- Utility Distribution
- Natural Heat Exchange Systems
- Renewable Energy
- Materials and Resources
- Performance Measurement

Aerial of Denver Botanic Gardens and the Mile High City
Arrival

Denver Botanic Gardens’ central location offers access via all forms of responsible transportation including walking, cycling, public transit and environmentally-friendly vehicles. A goal of the Master Development Plan is to identify the infrastructure necessary to enhance the visitor and staff arrival experience by creating convenient access and incentives for every form of preferred transportation.

Pedestrian
The primary pedestrian arrival sequence begins outside the Gardens’ front gate along the city sidewalks. Enhanced DBG signature landscaping adjacent to these walkways will provide a safe and attractive buffer to the roadway traffic. A renewed York Street Entry will offer the community a gracious front door to the Gardens. The secondary entry is on the west side of the Gardens at Cheesman Park. In association with Denver Parks and Recreation, the west entry will be rebuilt to enhance this arrival point and restore the historic connection between this great Denver civic park and the Gardens.

Bicycle
Visitors arriving by bicycle have the same approach and introductory experience to the Gardens as those on foot; from the east via the York Street Entry or from the west via Cheesman Park. The bike paths located in Cheesman Park are part of the city-wide bicycle routes, including 7th Avenue and 12th Avenue, located respectively south and north of the Gardens. Enhanced and secure bicycle parking will be provided at both entries. Readily-accessible employee bicycle storage will be provided at the replacement Greenhouse parking structure.

Public Transportation
Several regional bus routes within a quarter of a mile of the Gardens, including a stop at the main entry, offer many opportunities for DBG to partner with RTD in providing incentives for public transportation users. Access to public transportation increases the focus of moving people, not cars, allowing resources to be directed towards enhancing the visitor experience.

School and Private Bus
A loading zone for school and private buses is located parallel to York Street on the west side of the street. Adjacent to the main entry gate, the loading area can accommodate three to four school-sized buses without requiring large groups of children and/or adults to cross the street.

Automobile
A comprehensive transportation plan is required to effectively manage automobile traffic and parking concerns. The parking component of this plan is reviewed in greater detail on the following page. To further sustainable initiatives, DBG can plan for incentives related to alternate fuel vehicles, such as the potential installation of recharging stations and preferred parking for low and zero-emissions vehicles.
Parking

Visitor Parking
A parking structure for 325 cars, provided by two underground levels will replace the current 191 car surface lot. In addition to the underground parking, 86 flexible spaces on the new green roof of the parking structure could be used as overflow parking for concerts and events to minimize visitor parking in adjacent neighborhoods. This total of 411 spaces will be a significant increase in capacity over the current surface lot. Controlled access gates and a closed-circuit surveillance system will be incorporated into the design of the parking structure to improve security. As part of an improved arrival and entry sequence, the new parking structure will be linked to the main entry via a pedestrian bridge, enabling visitors to safely bypass traffic on York Street.

Employee/Additional Parking
180 new parking spaces for employees and volunteers will be located on two levels located below the replacement Greenhouses and Horticulture building with direct access to staff offices. These spaces could also be used as VIP parking for Gardens' events. In addition, this Master Development Plan reserves future parking for 88 cars below the new Gallery, Library and Research Center.
Site Enclosure

Enclosure is a formal principal that brings scale and structure to the Gardens and delineates DBG within its neighborhood context. The articulation of the property boundaries provide physical protection and serve as the foundation for an aesthetic edge.

Landscaping along all property borders should be developed in relation to the adjacent gardens to enhance visual screening both into and out of the property. With this goal in mind, the Gardens will be working with Denver Parks and Recreation to develop the park side of the Cheesman Park border as a strong transitional landscape. Chain link and barbed wire boundary fencing along the west and north property lines should be replaced with ornamental iron fencing with turned-out pickets for improved aesthetics and security. The existing south border, currently articulated by of a series of walls and fences belonging to adjacent residential properties will be abutted with new iron fencing to create a consistent semi-transparent screen with the existing neighborhood walls serving as backdrop.

While defining the property boundary and providing an appropriate level of security, the edge will continue to reinforce the Gardens’ connection to its urban setting. Enclosure along public streets will be completed with historic ornamental iron fencing, full-privacy ashlar flagstone walls or a combination that speaks to the architecture of adjoining structures. The Amphitheater’s sound wall will become a permanent site element, constructed with ashlars stone to screen and absorb sound from events, and will create an opportunity to incorporate donor recognition panels.
Service Areas and Access

Existing Denver Botanic Gardens’ service areas present numerous challenges from delivery and security to the distribution of materials. The existing single-bay loading dock is inadequate to handle the number of deliveries. Security is difficult to maintain due to constant use and limited space. The Master Development Plan provides a new three-bay loading dock where each bay can be secured and monitored until the delivery is distributed. In addition, the restoration and remodel of Boettcher Hall will include a direct route from the loading dock to the lobby and adjacent event venues.

Direct access through the Greenhouse structure allows Operations to serve outdoor event spaces. This building also has separate access adjacent to the service yard and storage areas at the west end of the facility for garden maintenance. A new freight elevator will connect the Greenhouses with the service yard and storage areas of the building.

A new event storage facility will be built into the existing berm of ornamental grasses. This central garden location will expedite outdoor event staging and boost operational efficiency.
Circulation

Primary
The primary pathway system orients the DBG visitor from entry to exit. Vehicular service is also provided by this central path system, with minimum 10-foot wide pathways and a 15-foot inside radius at intersections to accommodate full-sized pick-up trucks. Current accessibility requirements will be met, including the selection of surface construction and materials that weather Colorado’s multiple freeze-thaw cycles, require minimal maintenance and allow for easy snow removal. Accessibility requirements must also be met along the primary path through Boettcher Hall, Boettcher Memorial Conservatory and replacement Greenhouses.

Secondary
The secondary pathway system provides access to many of the individual gardens. This route allows service access for garden-maintenance vehicles, requiring a minimum width of 5-foot with a 4-foot inside radius at intersections. The selected construction and material of these pathways should reflect the character of the adjacent garden, while meeting current accessibility requirements and allowing for snow removal.

Tertiary
Tertiary pathways meander through individual garden areas. The varied use of materials for these paths are an expression of unique garden character and create meaningful contrast to the more formal design of the primary and secondary circulation systems.
Site Lighting

The selection of light sources and lighting systems for Denver Botanic Gardens will play an important role in supporting the sustainability and energy use goals of the Master Development Plan. Lighting also enhances the visual interpretation of the gardens and exhibitions. The proposed lighting plan aims to expand site, pathway and landscape lighting to improve outdoor programming of the Gardens for evening use, for visitor safety, and to provide the infrastructure to extend the Blossoms of Light display further into the Gardens. Specification of durable lighting systems that provide flexible options for adjusting the quantity and quality of illumination is important to respond to the unique and changing requirements of the Gardens.

Light Sources

Appropriate light sources will be selected for exterior lighting requirements with an emphasis on the use of efficient, low-maintenance LED lighting technology where possible. Infrastructure based electricity will most likely power primary and secondary pathways and accent lighting, while tertiary pathways through individual gardens could be independent of the grid using a battery-powered solar system.
Visitor Services

Denver Botanic Gardens currently lacks several visitor support services. The Master Development Plan considers present and future visitorship and provides expanded services with the renovation of existing facilities and all future structures.

The full build-out of the Master Development Plan will provide convenient access to restroom facilities, shade structures, drinking fountains, general information, refreshments and DBG retail. The gift shop at the York Street Entry will offer convenient shopping without requiring paid admission. Each ticketing location will provide information and limited concessions. The Bistro near the York Street Entry and the centralized Garden Café will provide visitors a choice of two locations for year-round food service. Concessions planned within the Central Garden Service Berm will serve event-based outdoor garden functions.
Waterways

The waterways are a signature design element of the Gardens. The system circulates water from the cascading Pylon Fountain, through concrete runnels and into a series of formal and natural aquatic gardens. The following proposes a more efficient and effective use of the existing system. Opportunities include reducing energy consumption, preventing water loss and improving water quality.

Reduce Energy Consumption
The waterways currently consume excessive amounts of energy by pumping water from the southwest corner of the property to the system's head at the Pylon Fountain. Implementation of a series of control points and weirs throughout the open water system will retain water at various points in the gravity flow system and reduce required pump activity.

Prevent Water Loss
The use of potable water offsets daily water loss from surface evaporation and soil infiltration. Adequately sealing the base and beds of the waterway and repairing the underground storage reservoir beneath the fountain will significantly reduce soil infiltration. Additionally, reconfiguring the Pylon Fountain, where water is currently pumped vertically eleven feet, will reduce water loss to evaporation and significantly reduce required pumping power.

Improve Water Quality
Substantial opportunity lies in the waterways' ability to showcase horticulture's role in nature and how plants improve water quality. Plants play a critical function in the management and cleaning of water, from pollution remediation to water treatment and oxygen production. By using these ecologically-based water refinement techniques, DBG will improve water quality in the system. This would allow the use of stormwater or recycled water without affecting biological sensitivities.
Life Safety

Improved life safety systems need to be implemented throughout the Gardens to ensure visitor safety. These systems will include emergency phones connected to the information desk and a public address system to notify patrons in case of emergency. Access and circulation for emergency services must also be identified. Ambulances and fire truck circulation is limited to the primary access zone, while secondary circulation through the central garden pathways can accommodate first-aid response carts.

View Corridor

The Denver View Plane ordinance limits building height in order to preserve and protect panoramic mountain views from various parks and public places. The reference point for the Cheesman Park and Denver Botanic Gardens view corridor has an elevation of 5,383 feet and is established at the DBG Overlook’s flag pole, as illustrated in the map above. The ordinance states that no part of a structure shall exceed an elevation of 5,383 feet plus one foot for each 100 feet that the structure is horizontally distant from the reference point.

There are both existing and proposed structures that extend into this view corridor, and time to engage the public process must be built into the schedule for all future structures. Great care has been taken to protect the visibility of the existing landscape from any proposed structures - such as locating buildings behind existing structures, building into existing land berms, using transparent building materials and keeping structures as low to the earth as possible. The existing reference point must be re-established from a point on the green roof of the proposed York Street parking structure.
Utility Distribution

The existing utility systems were installed in the 1970’s and have lost most of their integrity through years of routine maintenance and replacement. The systems enter the site at numerous locations and meander randomly throughout the Gardens, making it difficult for the staff to locate the utilities when repairs and maintenance are required or to map out expanded service for new or reconfigured areas.

The primary goal of the utility distribution system is to minimize the disturbance to the site while providing efficient service distribution to new and existing buildings and garden areas. Each system will be addressed in greater detail in the following pages. The proposed utility distribution will use a perimeter loop around the site for potable and recycled water main lines and conduits for dry utilities. The system will provide flexibility for expansion and reconfiguration by branching off the primary loop.

Utilities that primarily serve buildings will distribute from a central hub located along the main path at the west end of the Boettcher Conservatory. This hub should be installed during the construction of the replacement Greenhouses in order to bring all utility service feeds from the north and avoid disturbance to existing structures during any future expansion of Garden facilities.
Dry Utilities Systems (Electric, Telephone, Fiber Optic, Gas)

The proposed dry utility system would route feeds into the central hub located in a vault along the main path at the west end of the Boettcher Conservatory. The main feeds to the central utility hub will come from the north, between the Conservatory and the replacement Greenhouses and Horticulture building. Site utilities will be distributed through conduits along the perimeter utility corridor and routed along primary or secondary pathways for lateral service access. This network will minimize disturbance to the Gardens during maintenance or expansion.

Building and Irrigation Water Systems

The proposed irrigation system will contain two parallel main line pipes, one for potable water and one for non-potable recycled water. This system will be planned and mapped to provide minimal disturbance to the established Gardens. With this system, buildings and irrigated areas that need one or both types of water can easily tap into the twin-looped network anywhere within the gardens. This system will be an efficient and effective network to implement potable water conservation goals. Modern piping materials will ensure a much more efficient system, utilizing watertight seals to minimize potential leakage. Denver Botanic Gardens will need to work with Denver Water to establish timing for tapping into the recycled water network.
Drainage System

Due to the existing development and topography of the site, no significant changes to the historic routing of Denver Botanic Gardens' drainage system need to be made. Drainage and storm sewer improvements in most cases will follow historic, gravity fed drainage patterns and tie directly into the public storm sewers. Where possible, storm runoff will be routed via the central waterway into a new dry pond located at the southwest corner of the site.

Designed for overflow to detain and treat site storm water, the dry pond will improve water quality before it is released into Denver's existing storm sewer system. This dry pond can also be used as an education exhibit to inform visitors on the role plants play in cleaning water and demonstrate how the landscape responds to the extreme conditions of wet and dry.

Sanitary Sewer System

Currently, the only buildings on the property west of York Street that are connected to the city's sanitary sewer are the Boettcher Center, Monet Cafe and Waring House. Many of the proposed structures will provide additional restrooms and plumbing that require connection to the sanitary sewer system for waste removal. This system will be routed along primary circulation pathways to minimize impact to the Gardens during installation and maintenance. The additional load will connect into the existing site infrastructure which drains to the City's main lines north of the site. On the east side of York, the Morrison Center has a sewer connection that will be upsized to accommodate additional load from expansion of its facilities and new restrooms in the Arrival Pavilion at the Mordecai Family Children's Garden entry.
Natural Heat Exchange Systems

Ground Source Heat Pumps and Geo-Exchange Ground Loops

Ground source heat pumps are a reliable alternative to traditional HVAC systems, offering significant performance efficiencies and a much cleaner source of heating and cooling. The technology relies on the earth’s natural, renewable thermal energy by looping a waterline through the ground. Taking advantage of the earth’s constant temperature, heat pumps exchange heat with the ground loop during summer and winter. They extract heat in the winter and function as a heat sink in the summer. The product can be either temperature conditioned air or water. In addition to heating and cooling, other applications where DRG could consider using a heat pump and geo-exchange ground loop include refrigeration, radiant hot water systems and snowmelt. The best way for the Gardens to tap the thermal ground source will be to install vertical bores, 200-500 feet deep at 15-20 foot intervals.

Heat pump technology offers a number of significant benefits, most importantly the opportunity to reduce and possibly eliminate the use of natural gas. In addition, maintenance costs are typically 50-percent lower than traditional HVAC systems. Added to a 40-percent reduction in operating costs, the result is a much lower life cycle cost.

Water Main Heat Exchange

An alternative source for the heat pump technology would involve a partnership with Denver Water to develop a cost-effective system to exchange heat with the adjacent water main to the north of the site or the proposed recycled water main to the south. Heat exchange with the water line would be a completely closed process. The proposed system would divert and return a portion of the water supply to a sealed heat exchange chamber with only negligible temperature change to the water source. The implementation of this strategy would serve as the primary system for the major buildings on the property.

Earth Tubes

Earth tubes are a passive ground-cooled ventilation system that take outside air through a stretch of underground ductwork prior to entering an interior space. A series of underground concrete or plastic pipes laid in the year-round 55 degree earth beneath the building will pre-cool or pre-heat ventilation air drawn into the occupied spaces.
Renewable Energy

The use of clean and renewable energy is instrumental to achieving DBG’s sustainability goals. Wind power and solar radiation are the most viable sources of renewable energy for Colorado. The output for both photovoltaic systems and wind turbines is electricity, allowing easy integration into the existing infrastructure. The compact York Street site precludes mid- to large-scale installations, but newer technology and higher demand for urban installations has led to significant development in building integrated systems. A balance of small on-site and larger off-site installations, combined with commercial grid-based systems, can effectively and economically meet renewable energy goals.

Solar Power Opportunities

In Denver, the solar potential to produce electricity with photovoltaic (PV) systems is rated 7 out of 10, with output capacity of 186 kilowatt-hours per square foot annually. With retail costs, available rebates and current utility costs, the payback period for solar power installations ranges from 7 to 15 years. This rapidly evolving field and associated technology breakthroughs are expected to continue. As cutting edge technologies, such as high-output solar-concentrated PV dishes, molecular-based thin-film and nano PV applications become economically viable, demonstration projects should be integrated into the power profile of the Denver Botanic Gardens.

On-site Application

Small-scale high-efficiency photovoltaic panel arrays can be installed on existing flat roofs to offset lighting loads. Building-integrated systems, such as PV glazing, can be seamlessly incorporated into traditional building components, sharing the installation costs with the construction of the building envelope. Solar shading trellis systems along walkways and gathering pavilions can provide technology demonstrations. The similarity of photovoltaics and photosynthesis is a relevant and transformative application, which could be integrated into DBG’s education programs.

Off-site Application

Larger grid-connected “Solar Farm” applications, capable of offsetting a significant percentage of DBG’s electric demand, are ideal applications for consideration at satellite garden locations, such as DBG at Chatfield.

Wind Energy Opportunities

Denver resides in a Class 2 wind zone with annual wind speeds averaging 10 mph. While this is slightly under the commercial production classification threshold, the opportunity for wind generated power within the Gardens is both viable and appropriate.

On-site Application

A single vertical axis turbine designed for an urban application and varying wind directions, integrated with the weather station monitoring systems, would provide both on-site energy production and educational opportunities. A site lighting display powered by a series of vertical axis turbines is also appropriate. While the energy produced would be a small percentage of the Gardens’ total electric demand, the payback period would be within 15 years.

Off-site Application

The national wind challenge is to increase total wind production to 20-percent of total electrical demands. The Denver Botanic Gardens, in conjunction with the City of Denver, should specify that part or all of their electrical demand be generated by grid-based wind farms.
The Master Development Plan recommends new visitor amenities, facility enhancements and updated infrastructure to fulfill Denver Botanic Gardens’ mission over the next 25 years. An environmental cost/benefit analysis should be considered as materials and resources are introduced to the site.

Every phase of a product’s life-cycle - including extraction and processing of raw materials, manufacturing, transportation, maintenance, recycling and return to the environment - carries important environmental and health consequences. Many immediate solutions have been identified for reducing environmental impact through better product selection and waste management within current operations and maintenance procedures. The flow of materials and waste has a tangible impact on the experience of the Gardens, requiring these policies to continually grow and strengthen.

New construction offers opportunities for integrated design and construction practices that radically transform the life-cycle of materials and mechanical, electrical or structural systems.

### Procurement Opportunities
- Develop standard protocol for procurement of all operational consumables (natural cleaning products, biodegradable paper products, recycled materials, etc.)
- Identify opportunities and replacement strategies focused on durable goods with recycled content and end-of-life recyclability (signage, IT equipment, etc.)
- Maintain emphasis on and demonstrate use of organic and locally harvested food in the Garden Cafe

### Waste Management Opportunities
- Eliminate all unnecessary material purchase and use
- Develop recycling systems which eliminate the concept of waste. Establish visible and interactive on-site means for collection and storage of all recyclable materials
- Use organic waste from garden activities, daily operations and the surrounding community to showcase the benefits of natural compost

### Building Material Opportunities
- Mandate demolition materials be diverted from landfills
- Specify locally-sourced materials and products to reduce transportation energy and support our local economy
- Reduce the use of virgin materials for new construction and divert all construction waste from landfills
- Specify rapidly renewable materials (bamboo, cottons, cork, etc.)

### Materials and Resources

#### Procurement Opportunities
- Develop standard protocol for procurement of all operational consumables (natural cleaning products, biodegradable paper products, recycled materials, etc.)
- Identify opportunities and replacement strategies focused on durable goods with recycled content and end-of-life recyclability (signage, IT equipment, etc.)
- Maintain emphasis on and demonstrate use of organic and locally harvested food in the Garden Cafe

#### Waste Management Opportunities
- Eliminate all unnecessary material purchase and use
- Develop recycling systems which eliminate the concept of waste. Establish visible and interactive on-site means for collection and storage of all recyclable materials
- Use organic waste from garden activities, daily operations and the surrounding community to showcase the benefits of natural compost

#### Building Material Opportunities
- Mandate demolition materials be diverted from landfills
- Specify locally-sourced materials and products to reduce transportation energy and support our local economy
- Reduce the use of virgin materials for new construction and divert all construction waste from landfills
- Specify rapidly renewable materials (bamboo, cottons, cork, etc.)
Performance Measurement

Several programs have established common measurement tools for sustainability. The following applicable programs briefly describe key measurement tools adopted by botanic gardens and/or the City and County of Denver. Denver Botanic Gardens - as a developing site, sustainable operation and key community entity - can apply the best prescriptive measures to customize the most effective program.

Agenda 21

Agenda 21 is a global action plan for sustainable development into the 21st Century adopted by Botanic Gardens Conservation International (BGCI). It forms the basis for a “global partnership” to encourage cooperation among nations as they support strategies for sustaining life on earth.

Chapters the BGCI has reviewed for relevance include:

- Protecting and promoting human health
- Changing consumption patterns
- Combating deforestation
- Managing fragile ecosystems
- Conserving biological diversity
- Protecting the quality and supply of freshwater resources
- Transferring to environmentally sound technology
- Promoting education and public awareness

LEED©

The United States Green Building Council's Leadership in Energy and Environmental Design (LEED) Green Building Rating System is the nationally accepted benchmark for the design, construction and operation of high performance green buildings. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water conservation, energy efficiency, materials selection and indoor environmental quality. Denver Botanic Gardens does not fall into one specific category - rather it can apply future projects to the track that best fits a particular program. Two potential tracks are described below.

LEED for Existing Buildings

Recognized, performance-based benchmark for building owners and operators to measure operations, improvements and maintenance on a consistent scale. LEED-EB strategies that apply to DBG include:

- Whole-building green cleaning program
- Occupant educational programs
- On-going indoor air quality measurement
- Building exterior maintenance program
- Building operation and performance measurements
- Procurement and waste management

LEED for New Construction

Performance standards to certify the design and construction phases of commercial and institutional buildings, in both the public and private sectors. LEED-NC strategies that apply to DBG include:

- Building-wide energy efficiency
- Sustainable building material selections
- Integration of natural ventilation, day-lighting and views
- Water efficiency
- Controllability of building systems
- Management

Architecture 2030

Data from the U.S. Energy Information Administration illustrates that buildings are responsible for nearly one-half of all greenhouse gas (GHG) emissions. Seventy-six percent of all electricity generated by U.S. power plants supplies the Building Sector.

The 2030 Challenge asks the architecture and building community to adopt the following targets:

- All new buildings, developments and major renovations shall be designed to meet an energy performance standard of 50-percent of the regional average for that building type
- An equal amount of existing building area shall be renovated annually to meet an energy performance standard of 50 percent of the regional average for that building type
- The energy performance standard for all new buildings shall be increased by 10 percent every five years leading to carbon-neutral by 2030

Greenprint Denver

Greenprint Denver is a long-term, citywide initiative to promote the importance of sustainable development and ecologically-friendly practices throughout the community.

The City aims to integrate environmental impact considerations into its programs and policies through its comprehensive action agenda:

- Reduce greenhouse emissions and utilize renewable energies
- Increase city forest coverage
- Reduce waste
- Implement city green building policy
- Green motor fleet
- Promote and leverage mass transit
- Improve, protect and conserve water
- Promote “green” economic development
D. Buildings and Structures

“We shape our buildings thereafter they shape us.”

Winston Churchill

The York Street site of Denver Botanic Gardens continues to be defined by signature attributes unique to the region. The unmistakable Mid-Century Modern imprint of Victor Hornbein’s conservatory resonates with landscape architect Garrett Eckbo’s original design for the outdoor gardens, resulting in the marriage of architecture and landscape.

The Master Development Plan respects the historic fabric of the site and requires preservation of the existing buildings that contribute to this historic character. Based on the institution’s priorities, the MDP evaluates the highest and best use of the existing buildings and proposes strategies to restore, renovate and reprogram them to enhance their service to the Gardens.

New facilities are proposed to further enhance the property in the coming years. The proposals balance the character of each garden with supporting buildings and structures, simplifying and strengthening the Gardens and reinforcing the unique qualities of this remarkable civic asset.
Master Development Site Plan

The following proposals for buildings and structures are described on the corresponding pages:

D-6  ♦  Boettcher Memorial Conservatory
D-8  ♦  Boettcher Memorial Hall
D-12  ♦  Greenhouse Replacement
D-16  ♦  York Street Arrival Gardens and Parking Structure
D-18  ♦  York Street Entry
D-20  ♦  Event/Education Pavilion
D-22  ♦  Central Garden Service Berm
D-23  ♦  Environmental Learning Pyramid
D-24  ♦  Cheesman Park Entry
D-25  ♦  Garden Café
D-26  ♦  Tea House Restoration and Bonsai Pavilion
D-28  ♦  The Waring House
D-29  ♦  Cactus and Succulent House
D-30  ♦  The Morrison Discovery Center
D-31  ♦  Gallery, Library and Research Center
Integrated Building Design

Integrated building design is a holistic process to devise high-performance solutions that optimize form, function, time, economics and environmental resources. Integrating building elements and systems within an existing facility and infrastructure reinforces the value of collaboration among owners, operators and design professionals. Large efficiencies will come from the simple knowledge of how energy and resources are being consumed and identifying opportunities to reduce waste.

Integrated design concepts often describe a building as an organism, adapting to its environment and using climate and its surroundings as a resource. This symbolism is particularly relevant at DBG and should become a powerful educational tool and transparent part of the overall visitor experience. This approach invites the best use of both low-tech strategies and advanced technologies, resulting in the highest benefit and lowest lifecycle environmental impact. Many of these strategies are complementary and can be used with the renewable energy sources described in the previous chapter.

The integrated design process will remain consistent even as technologies, strategies and resources change. As the Master Development Plan is implemented, each project will assess and determine the most appropriate design approach and available technology.

Building Materials

Preservation and Reuse – Rehabilitate existing buildings to extend their life, reduce the use of virgin materials and celebrate their historic value.

Embodied Energy – Select materials with low embodied energy, taking into account extraction, manufacturing, delivery and installation processes.

Recycled Content – Reduce the use of raw materials by choosing materials with high recycled content and the ability to be recycled.

Regionally Manufactured – Identify regional materials and local suppliers to reduce transportation, thus limiting energy use.

Low-Emitting Materials – Specify building materials and interior finishes with little or no off-gassing properties, improving indoor air quality and reducing pollution.

Rapidly Renewable – Use materials that are quickly replenished - such as bamboo, cork and wheat board - to mitigate the depletion of non-renewable and long-term renewable resources.

Envelope Design

Orientation – Locate buildings to optimize solar exposure, natural ventilation, daylighting and views.

Envelope – Insulate, seal and orient the building to improve interior conditions and reduce heating and cooling loads.

Glazing – Select optimal glazing for visibility and thermal requirements. In greenhouses, glazing selection will also depend on high light transmittance for optimal plant growth.

Building Integrated Photovoltaics (BIPV) – Design BIPV modules into the building envelope to reduce material consumption and electricity costs.

Sun Shades – Integrate elements to reduce thermal heat gain in the summer and allow heat gain during the winter based on shade depth, angle and orientation.

Green Roofs – Integrate plantings to reduce thermal gain/loss in building roofs and provide pleasant occupiable spaces. Vegetation also protects the roof membrane, reduces stormwater runoff and cools through shade and evapotranspiration, reducing the heat island effect.
Climate Control Systems

**Evaporative Cooling** – Employ systems which use the evaporation of water to convert warm, dry air to moist, cool air. The most affordable means of cooling, this method is particularly effective in a dry climate such as Denver.

**Indirect Evaporative Cooling** – Use evaporatively cooled air to chill supply air without adding moisture.

**Mist Cooling** – Provide piped misting systems that pressurize water through small nozzles, creating a microfine mist which evaporates and cools the surrounding air temperature.

**Passive Thermal Mass** – Design building elements to absorb solar heat and slowly release it as the space cools and heating is desired.

**Ground and Air Source Heat Pumps** – Take advantage of systems capable of providing both heating and cooling by means of ground conditioned air or water.

**Radiant Heat** – Integrate a heating source with an active thermal mass that emits heat in a constant, clean and efficient method. Sourcing heat from roof top solar thermal collectors would provide a renewable water-based heating system.

**Natural Ventilation** – Use operable windows and louvers to supply natural ventilation to the occupied spaces, reducing mechanical loads. Earth tubes (page E-10) use the ground’s temperature to pre-cool or pre-heat the naturally ventilated air supply.

Lighting Systems

**Daylighting** – Offset electric lighting requirements with daylight, providing views to building occupants. Use elements such as light shelves to bring daylight into deep spaces and operable shades to allow occupant control of daylight.

**Efficient Fixtures** – Meet lighting requirements with high efficiency fixtures including relamping of existing fixtures. Current efficient technologies include compact fluorescents (CFL) and light emitting diodes (LED).

Water Use

**Efficient Fixtures** – Use waterless or low-flow plumbing fixtures and recycled, non-potable water where possible.

Controls

**Measurement and Verification** – Integrate systems to monitor energy, water and other operational consumption.

**Automation and Optimization** – Install sensors, timers, programming and protocols to reduce energy use.

- **Space-based** – Use occupancy sensors, daylight sensors, photocells and thermostats to measure environmental conditions and adjust systems accordingly
- **Centralized Controls** – Implement a software-based building control system to monitor, maintain, optimize and report building system performance
Boettcher Memorial Conservatory

Restoration Strategy

The historic Boettcher Memorial Conservatory is the signature structure of the York Street campus. Its exceptional tropical collection invites visitors to experience an exotic ecosystem - far different from Colorado's. When it opened in 1966 the Boettcher Memorial Conservatory was hailed as Denver's first modern building and a mere seven years later, it was declared a Denver landmark. The Conservatory’s landmark status will instruct every aspect of the restoration and renovation of both the structure and its systems.

This building’s structural, roofing, glazing, mechanical and electrical systems were thoroughly evaluated in 2005 and the findings are presented in the report: Rehabilitation and Restoration of the Boettcher Conservatory. The following are the findings and recommendations of the investigation.

The structure is sound, though in need of attention to avoid significant deterioration over the coming years. The lightweight concrete used in the construction of the geometric frame is showing its 40-plus years. Freeze-thaw cycles, exacerbated by the extreme climate difference between the Conservatory’s tropical interior environment and Colorado’s harsh weather, have taken a toll on the concrete structure.

The Plexiglas tetrahedron-shaped units present multiple challenges. Each of the individual units are cracking and leaking due to the effects of strong winds and thermal expansion and contraction. The single layer of acrylic offers minimal insulation and significant air infiltration adds to the building's energy loss. Inconsistent repair and replacement of the glazing units has damaged the mounting system and compromised the concrete structure.

The mechanical, electrical and plumbing systems are all at the end of their life and require total replacement.

A full renovation of the Conservatory is an opportunity to preserve the building's historical significance and distinctive design while reducing future maintenance and significantly improving energy efficiency. Fundamental to this next step is the design of a replacement building envelope and environmental control systems that respond to maintenance of a tropical environment within Colorado’s climate.

This replacement envelope will retain the historic form and character preserving this Denver architectural landmark. Options include:

- Careful and full replacement of the Plexiglas units
  - Aesthetically identical to the existing building
  - Would not eliminate the temperature differential or freeze-thaw effects on the concrete
  - Would require higher energy demand, frequent maintenance and ongoing replacement of Plexiglas units

- Removal of the Plexiglas units and installation of a new glass envelope mounted to the exterior of the existing concrete frame
  - The concrete frame would be climate controlled within the interior of the Conservatory, eliminating the stresses of freeze-thaw

To supplement an advanced, environmentally responsive envelope, new climate control systems must be designed to maintain the proper temperature and humidity within the Conservatory and increase its energy efficiency. Recommended systems include:

- Cooling through direct spray misting and evaporative pads coupled with enhanced ventilation
- A new heat pump system to supplement the natural passive solar heating
- Automated shade and insulating curtain systems to further enhance climate control

Improvements to the building envelope, coupled with new climate control systems, will significantly reduce the energy requirements of the Conservatory. Further investigation will be conducted to determine the optimal solution that restores, maintains and preserves this landmark building. Upgrades should preserve the structure’s historic aesthetic while providing a highly efficient and appropriate environment for the prized tropical collection.
Boettcher Memorial Hall and Conservatory - Main Level

1/32” = 1'-0"
Boettcher Memorial Hall

<table>
<thead>
<tr>
<th>Public Spaces</th>
<th>14,940 SF</th>
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<tbody>
<tr>
<td>Garden Operations</td>
<td>5,200 SF</td>
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<tr>
<td>Service &amp; Core</td>
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</table>

Restoration Strategy

Following decades of compromise, Boettcher Hall will be repositioned as the gateway to the Denver Botanic Gardens. Long deferred maintenance and sensitive restoration will yield a facility that will delight the visitor from the moment of entry.

The Lobby will extend to include the Garden Court, restoring the grand space of the original design, uncluttered in its original integrity. Upon entering the Lobby, the visitor will enjoy a wonderful view extending to a Gallery that will more fully accommodate that are available local, national and international botanic exhibits.

The restored Lobby will provide clear orientation to expanded restrooms and to Mitchell and Gates Halls, which will both remain as important event spaces. A smaller event space will be integrated as the Helen Fowler Library moves into a future building to the north. The proximity of these event spaces to one another and to the catering kitchens creates a unified suite of venues on the main floor of Boettcher Memorial Hall - restoring the original integrity to this important landmark space.

As part of the restoration, a Bistro will occupy the existing gift shop, realizing the design intent of Hornbein’s original drawings. Locating the Bistro adjacent to the front entry eliminates the compromised and makeshift Lobby Café.

New lighting systems will be fully integrated to highlight the historic architectural features. With careful restoration, this treasured landmark can be reprogrammed to meet the current needs of the institution, while maintaining its historic character and important relationship to the Gardens.

Service & Core

Garden Operations 5,200 SF
Public Spaces 14,940 SF
Boettcher Memorial Hall - Main Level

N 1/32" = 1'-0"
Departmental Reorganization

Classrooms currently located in Boettcher Memorial Hall's lower level will move to the new Event/Education Pavilion located in the gardens west of the amphitheater. This relocation will extend classrooms into the gardens and will free space for Marketing, Public Relations and Special Events to relocate from the Waring House. They will reside adjacent to the Development office, enhancing critical synergy between these departments.
Greenhouse Replacement

<table>
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<tr>
<td>Horticulture Office / Support</td>
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<tr>
<td>Horticulture Display</td>
<td>13,700 SF</td>
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<tr>
<td>Service &amp; Core</td>
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<tr>
<td>Parking</td>
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Replacement Strategy

The 2004 Facility Assessment report identifies replacement of the existing greenhouses as one of the top mission-critical priorities for the Gardens. The replacement Greenhouses will promote interaction between research, horticulture and education by adding production capacity, support space and an engaging public zone.

The interactive public zone - the Great Hall - will engage the visitor with a full spectrum of horticultural diversity, beginning in the tropical Conservatory and terminating in the new Alpine House. This geographically relevant alpine installation will showcase the Rocky Mountain ecosystem and attract visitors as one of the only North American Alpine Houses. Visitors will have views into the working greenhouses, educating them on interesting back-of-house activities. The Display Greenhouses flanking the Great Hall will house seasonally rotating exhibits to encourage repeat visits.

Limiting exterior activity and visitor disruption is an important component of the new Horticulture building. A double-height interior service yard will internalize existing outdoor operations and conveniently connect to a service drive to the gardens and a consolidated outdoor nursery. The replacement facility will accommodate two levels of parking for staff and volunteers, freeing the York Street parking structure for visitors. Both the service yard and parking will be structured beneath the replacement Greenhouses conserving valuable garden land.

Horticultural operations require substantial storage space, currently scattered throughout the service yard and adjacent temporary buildings. The replacement structure will provide a deep, continuous storage zone with easy access for day-to-day operations and garden equipment. Seasonal items for Blossoms of Light and Plant Sales will be stored on the second-level of the structure with access from the interior parking area.

A new service ramp, located between the Greenhouse and the Conservatory, will add direct access from the service and operations areas into the heart of the gardens. This new drive provides staff with a vital link to back-of-house areas. The door accessing the gardens from the service ramp will be recessed and screened from the visitor. Consolidating and refining these back-of-house functions allows DBG to maximize public space, enhance operational convenience and efficiency and minimize disruption to the visitor experience.

The foundation of the Greenhouse building - parking and storage - will provide a platform for new engineered greenhouse structures that will architecturally complement the Conservatory. The adjacent office and support spaces will anchor the greenhouses to the south and eliminate the current temporary structures in the service lot.

This new facility will advance the Gardens ability to nurture, propagate and care for its diverse horticultural collections. The introduction of an interior public zone will increase DBG’s four-season appeal and reinforce the mission of “connecting people with plants”.

Davies Alpine House at Kew Gardens

Conceptual greenhouse integrated with headhouse
### Conceptual Design

Transforming the surface parking lot on the east side of York Street into an unobtrusive, underground parking structure topped by a green roof will allow DBG to minimize the impact of parking on the neighborhood, extend the gardens and enhance the visitor’s first impression. The arrival structure will enhance safety, initiate the arrival sequence and add to the beauty of the gardens. The green roof will also reduce the heat island effect and decrease stormwater runoff, minimizing the environmental impacts of the existing surface lot.

Automobile access will be from both York and Josephine Streets at new light-controlled, traffic-calming intersections. Visitors will ascend in a naturally-lit structure to the Arrival Garden on the green roof. The adjacent Children’s Garden entry will offer families safe and direct access without interaction with traffic.

The southern portion of the green roof will consist of reinforced turf that will provide flexible landscaped space for neighborhood and seasonal garden events such as the popular Plant Sales. This space will also allow for overflow event parking to mitigate pressure on the neighborhood. Perimeter plantings and gateway gardens northwest of the structure will frame the green roof, welcoming visitors to the Denver Botanic Gardens and enhancing DBG’s front door to the community.

The parking structure will anchor a light, open-air pedestrian bridge that allows visitors to safely cross York Street and descend in a seamless arrival sequence to the main entrance. The bridge could support photovoltaics or vegetation and will be a strong visual gateway to Denver Botanic Gardens.
York Street Entry

### Entry and Ticketing, Gift Shop/Bookstore, Visitor Services and Orientation Pavilion

**Conceptual Design**

The York Street Entry is an important component of the enhanced entry processional. The arrival area will be expanded, with plantings buffering York Street’s traffic, allowing for visitors to safely gather. Visitor services - ticketing, membership, information, audio tours and wheelchairs - flank this gateway, providing convenient access for visitors.

Inside the Gardens, an entry courtyard will welcome the visitor and graciously accommodate their needs. A new gift shop will display books and garden merchandise in an elegant glass pavilion. In the recessed area currently housing the Down Under Café, a terraced sculptural water feature will act as both an acoustical buffer and a gathering area, reconnecting the upper and lower levels. The existing gift shop will be restored as a Bistro with outdoor seating overlooking the water feature. Completing the quadrangle of visitor amenities, a new Orientation Pavilion will offer a shaded gathering spot where large maps and Garden happenings can be displayed.

<table>
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<tr>
<th>Public Spaces</th>
<th>5,100 SF</th>
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*Ticketing and entry at New York Botanic Gardens*

*Café and entry sequence at New York Botanic Gardens*

*Gift Shop / Bookstore visibility*
York Street Entry - Upper Level (Plaza Level at Parking Structure)

1/32" = 1'-0"

York Street Entry - Main Level (Upper Level at Parking Structure)

1/32" = 1'-0"

Section at York Street Entry and Parking Structure

1/32" = 1'-0"
Event/Education Pavilion

Conceptual Design

The Master Development Plan proposes a new Event/Education Pavilion within the gardens, west of and adjacent to the amphitheater. The Pavilion will offer flexible space that can be subdivided or opened to the outdoors to accommodate a range of group sizes and activities. Operable glass walls will visually connect the space to the gardens, provide natural ventilation and create a quiet architectural presence that will not compete with the beauty of the surroundings.

Most major events and concerts occur in the evening or on weekends, allowing the Pavilion to easily serve the dual purpose of event and educational space. The easily reconfigured room will accommodate a variety of table arrangements for events such as the Fete des Fleurs, eliminating the need for a tent in this location. The Pavilion will be an exceptional place for rental prior to an amphitheater concert and the green roof could double as premier seating for concerts.

The Program Assessment report identified the existing classrooms as too small and unsuitable due to poor heating and ventilation systems. The new Pavilion will accommodate classroom and school group staging functions. Its central location will directly access educational opportunities in the gardens and the adjacent Environmental Learning Pyramid. The Pavilion can function as a home base for student groups, providing dedicated storage areas for coats, lunches, backpacks and typical classroom supplies.

The multipurpose, adaptable nature of this building will create an active indoor space within the gardens. Users will connect directly to the surrounding gardens for educational opportunities and visual delight. The subtle architecture will sit lightly in the Gardens, as a backdrop for the sculptural amphitheater and the rich horticultural displays.
Central Garden Service Berm

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<th></th>
<th>SF</th>
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<td>Service &amp; Core</td>
<td>920</td>
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Conceptual Design

The complex operation of the Gardens, particularly during events, puts stresses on staff involved in the movement of supplies and equipment. In addition, the public restrooms within Boettcher Hall are inadequate for events, requiring the use of portable toilets. To conveniently accommodate these utilitarian requirements without changing the landscape of the gardens, a structure is proposed beneath the existing berm of ornamental grasses.

The northern portion of the berm will house concessions for amphitheater events, vending machines, recycling and trash receptacles. The southern area will provide restrooms for visitors walking through the gardens or attending an amphitheater event. This space will also allow for event storage such as tables and chairs. The architecture will be unobtrusive, barely visible except for a delicate glass trellis covering the path as it passes through the berm.

Building built into the landscape
Environmental Learning Pyramid

**Conceptual Design**

Anna’s Overlook currently hosts a small weather station that provides the inspiration for the Environmental Learning Pyramid. The new structure will be a high-tech building that houses interactive digital displays of environmental data, showing the interconnectedness of plants, humans, climate and the environment.

The structure will be built underground allowing horticultural displays to be maintained on the berm. The exhibit area’s windows will look out to the adjacent water feature and the north quadrant of the pyramid could be glass, illuminating the space with soft northern light. Digital displays will illustrate climate maps and current weather conditions. A classroom could be integrated into the design and a wind turbine on the berm could provide an additional educational tool. Anna’s Overlook will become the exclamation point as an observation deck atop the pyramid.

This concept expands upon the current weather station to create a space that engages the visitor in the complex relationships between plants, people and the environment, particularly with the prospect of global climate change. The interactive space can employ technology to further visitor understanding of the surrounding gardens and related global ecosystems.
Cheesman Park Entry

Replacement Strategy

Re-establishing connections to adjacent parks is an important principle of the Master Development Plan. The Gardens’ west gate provides an opportunity for restoration of this historic connection between Cheesman Park and DBG. The current Cheesman Park Master Plan also prioritizes this important link. Denver Botanic Gardens and Denver Parks and Recreation can work together to apply design principles and integrated landscapes that will reunite the two spaces.

The current gated entry is located more than twenty feet south of the central axis of the Cheesman Memorial Pavilion and DBG’s main east-west pathway. The Master Development Plan proposes a new entry gate re-aligned with this important axis. The new location will focus the view west to the neoclassical pavilion and east to the gardens. In consultation with Denver Parks and Recreation, the selective removal of trees will enrich the visual connection to the pavilion and the Rocky Mountains beyond.

The new entry will feel intimate and welcoming, providing enclosed space for visitor services including ticketing and sales of small concessions. The design will relate to the York Street Entry, with a trellis covering the structure to provide shade while maintaining a light, garden pavilion atmosphere. The success of the connection depends upon opening the gate regularly to encourage visitor flow between Cheesman and the Gardens. This entry could include a card reader system for member access and corresponding security surveillance. Security is particularly important after hours and should be achieved in a way that is coherent with the aesthetics of the Gardens. Finally, an integrated landscape design on the border between the two parks will create a seamless transition and invite visitors to explore both sides.

Integrated landscape to strengthen park connection

Public Spaces 350 SF

Historic Cheesman Park Photo

Rendering of formal gardens at DBG’s Centennial Gardens

Plan 1/32” = 1'-0”

East Elevation at Cheesman Connection 1/32” = 1'-0”
Garden Café

Conceptual Design

The existing Monet Café is a small, neglected building whose architectural character is out of context with the site. It lacks cooling and heating, prohibiting four-season use, and is restricted by its small space. Despite these limitations, the Monet Deck remains a favorite spot to enjoy an outdoor meal on a pleasant afternoon.

The Master Development Plan proposes replacing this facility with a four-season Garden Café including a corresponding outdoor patio, adjacent to the scenic lily pond. The Café’s increased size allows for a working kitchen that can expand the menu offerings and indoor seating to accommodate visitors year-round.

The Café could enrich its connection to the nearby Kitchen Garden by offering cooking demonstration classes using seasonal produce. Sustainable principles could be showcased through the preparation of local, organic foods - possibly grown in the Community Gardens - and through the integration of on-site composting, demonstrating an additional connection to the gardens.

The building’s operable glass walls will provide natural ventilation and uninterrupted views of the gardens and lily pond. The transparent structure will be unobtrusive, allowing the gardens to maintain their strong presence. The creation of an integrated, year-round restaurant venue will provide a pleasant environment for a memorable meal and allow visitors to extend their stay in the Gardens.

Outdoor dining adjacent to water and gardens

Operable walls provide view, light and air

Section at Garden Café

Garden Café - Main Level

Public Spaces 4,000 SF
Kitchen 520 SF
Service & Core

BUILDINGS AND STRUCTURES • D-25
Tea House Restoration and Bonsai Pavilion

Conceptual Design

The authentic Japanese Tea House was designed for DBG in 1979 in collaboration with the design for the Japanese Garden. Originally constructed in Japan, each piece of the Tea House was carefully disassembled and shipped to Denver where it was reassembled by skilled Japanese artisans on its current site. Insufficient infrastructure to the Tea House has severely reduced activities within and around this vital feature of the garden. Improvements to the infrastructure will allow four-season incorporation of the Tea House and surrounding gardens into DBG's educational programming.

Expanding the garden to the south and east of the Tea House will reinforce the significance and beauty of this historic building. The garden area could be cultivated as a Tea Garden and a new Bonsai Pavilion will be an eastern anchor for this expanded Japanese Garden.

The Bonsai Pavilion will house a collection to be donated to the Gardens and could also allow for expansion of this collection. The design of the Bonsai Pavilion will be contemporary, invoking Japanese tradition and materials. Security is an important consideration for this precious collection. Operable gates will be integrated into the design, allowing for an open-air experience during the day while fully securing the collection after hours. The interior will allow for pedestal display of the specimens, which could be extended into the garden. The new Bonsai Pavilion will elevate the Japanese horticultural collection and be a counterpoint to the historic Tea House.
Integration of existing Tea House and new Bonsai Pavilion at Eastern Tradition Garden

East/West Elevation at Bonsai Pavilion
1/16" = 1'-0"

North/South Elevation at Bonsai Pavilion
1/16" = 1'-0"
Restoration of the Waring House

The historic Waring House is the important connection between the York Street campus and Morgan's Historic district to the south. The Jacques Benedict designed structure and adjacent lawn present an elegant face to the community on Ninth Avenue. However, the surface parking lot off York Street is out of character. Waring Green - a gracious lawn in the English country house tradition - will provide a more appropriate transition to the gardens, enhancing DBG’s connection to the community.

Only Executive Offices will remain in the Waring House allowing the first floor to be restored and returned to public use for meetings and small community events. The Carriage House will be reprogrammed as support space, housing dressing rooms for concerts and weddings. Simplifying the Waring House program will strengthen its historic interior and its value as a gateway to the community. Reconnecting the house with the Romantic Gardens allows visitors to experience the gardens within their appropriate architectural context.
Cactus and Succulent House

Conceptual Design

Originally built as a display space for alpine plants, this building currently houses succulents and essential mechanical equipment. Out of context in the Rock Alpine Garden, the succulents will be appropriately relocated so that the structure can be reintegrated into the central theme of the alpine experience. At the high point of the invaluable Colorado Rocky Mountain Ecosystem collection, the building will be reprogrammed as a shady place for visitors to pause and view the surroundings. An interactive, educational exhibit on alpine plants and their environment will strengthen the visitor’s understanding of the alpine ecosystem.
Morrison Center

Conceptual Design

The Morrison Center currently houses a greenhouse, an educational classroom and support spaces. A separate Master Plan for the Mordecai Family Children’s Garden on this site is currently underway. As a part of this developing design, the Morrison Center will be renovated to become the Morrison Discovery Center, elevating its role as an educational facility. Flexible, highly interactive and hands-on, the Center will be a place for youngsters to learn about Colorado’s ecosystems, horticulture, climate and sustainability.
Gallery and Research Center

| Research, Herbaria and Records | 7,860 SF |
| Library                      | 5,000 SF |
| Public Spaces                | 7,100 SF |
| Service & Core               |          |
| Parking                      | 88 SPACES |

Conceptual Design

The anticipated relocation of the Community Gardens will allow the site north of Boettcher Hall to be developed as a Gallery and Research Center. The Research Center component will include DBG’s Library, Herbaria, Research department and Plant Records. By combining the complementary Library and Herbaria programs, the new building will elevate these spaces as visitor destinations.

The Helen Fowler Library contains over 30,000 titles that cover topics from botany to landscaping. The current Library is too small to house all of these resources and due to its location in the northeast corner of Boettcher Memorial Hall, many visitors are unaware of the extensive collection. Providing an expanded space with a welcoming face to the community will improve DBG’s ability to share this wealth of knowledge with the public. The Library also holds a notable collection of rare books and botanic artwork that will be showcased in an elegant and transparent display.

DBG’s extraordinary Herbaria consist of The Kathryn Kalmbach Herbarium of Vascular Plants and the Denver Botanic Gardens Herbarium of Fungi, containing 39,000 and 22,000 dried plant specimens respectively. The Herbaria document and preserve plants and fungi found in Colorado, providing a unique educational resource for visitors. However, because the Herbaria are currently housed in the lower level of Boettcher Memorial Hall, visitor awareness and access to the collection is limited. The new visible and approachable location will also provide important adjacencies to the Library and the Research department.

The Research and Herbaria’s offices and labs, along with Plant Records which document and map the plants in the gardens, will be expanded and relocated to the upper level of this building. This arrangement separates the private staff spaces from the public zone of the lower level. Parking for the facility will be provided underground. The building could include after-hour access independent from the secured main entry, providing a potential location for adult/evening classrooms.

Boettcher Hall’s renovated historic lobby will extend via a bridge to the Gallery, terminating in a space specifically designed to accommodate traveling exhibits of botanic art. With museum quality lighting and humidification, art will be properly protected and displayed. The Gallery’s adjacency to the Herbaria also provides an opportunity to exhibit herbarium specimens. A secluded Event Garden will extend the Gallery and become a premier gathering spot.

The design of the Gallery and Research Center will echo and complement adjacent Boettcher Memorial Hall. The structure will be a gateway to the Gardens from the north and a wonderful streetfront connection to the community.
Gallery and Research Center - Main Level

1/32" = 1'-0"
CLOSING AND NEXT STEPS
E. Closing and Next Steps

Day follows night. Spring follows winter. The cycle of life is keenly focused with Denver Botanic Gardens. The horticulture staff and volunteers may tend today’s garden, but they prepare for tomorrow’s.

As this Master Development Plan was approved unanimously by the Board of Trustees in November of 2007, there was a palpable sense of optimism and expectation. The Plan was paired with a new branding platform and a capital campaign. The voters of the City of Denver provided a powerful boost in a bond package that will enable the Gardens to build and repair essential infrastructure. All of the tools needed to make the Plan a reality are now at hand.

So there is talk about a new beginning. The air seems fresh and full of promise. Like the Gardens themselves, however, the next cycle in the life of this institution may best be described as a period of acceleration, a time of refinements, redefinitions and increasing connection to a broad audience. Our history speaks of visionaries and leaders who built a magical place on sacred land that has become world renowned.

The four core values of the new branding platform spell out the intention of the Gardens in the years ahead. We will create programs, actions, approaches that ensure relevance. What happens here will matter. We will address contemporary issues with a resonating voice. We will celebrate diversity. That means engaging people of all ages, ethnicity and backgrounds. It also means showcasing biodiversity, garden diversity, and global diversity. As we discuss and demonstrate the need for diverse plant life, we will correlate it to the strength that comes from human diversity.

As we build and create, we will make sustainability our watchword. From building materials to energy sources, we will employ resources and practices that honor our relationship to the natural world. We will build our endowment and ensure that programs and staffing meet the needs of new demands and facilities. Above all, what we do here will have the power of transformation. The true legacy of our efforts will be the resonance of the experiences we provide. When a visitor understands water smart plants and incorporates them into a home garden, our work will matter. When someone has a deeper appreciation of natural beauty or understands the importance of photosynthesis, our work lives on. Transformation has occurred.

We will extend our energy in new ways to Denver Botanic Gardens at Chatfield and Mount Goliath. Each has a nuanced story to tell with a distinct voice and unique experiences.
The Master Development Plan compels us now to discover new allies and revive longstanding bonds. We will need the support of the entire community to raise the funds and attract the expertise to fulfill the promise of this Plan. Our capital campaign will have four phases. In Roots, we will use the bond funds provided by the citizens of Denver to build new, publicly accessible greenhouses that will lead to the first alpine house in North America. Visitors will be able to move from the tropics to tundra as they venture through a four seasons complex that begins with the Boettcher Conservatory and moves west. In this first phase, we will also build a new irrigation system, ensure accessibility throughout the Gardens and add important public safety features, including a public address system and new lighting on the west side of the Gardens.

In Stems, the second phase, projects include the Mordecai Family Children’s Garden, an expanded parking structure with a grade level green roof, a new visitors’ center, and a new Cheeseman Park entrance. The Boettcher Memorial Center will be rehabilitated and updated. We will bring the Waring Mansion into the Gardens by connecting it through the Romantic Garden and building a traditional green to showcase this historic home. We will give new life and location for the Community Gardens. Plus, we will expand the Japanese Garden by building a bonsai pavilion and tea garden.

In phase three, Leaves, a new education pavilion will serve as a flexible, transparent public space on the west side of the amphitheater. The nearby berm will discretely house a storage facility and restrooms. Anna’s Overlook will sit atop a science pyramid with interactive technology, energy and climate displays. A restaurant worthy of its setting will be built adjacent to the Monet Pool that will enable chefs to demonstrate the preparation of vegetables from the nearby Kitchen Garden.

And in Flowers, the final stage, the past and future will come together in harmony. The Boettcher Conservatory will be revived and prepared for healthy longevity. A new building will be constructed at the northeast corner of the property that will combine a new library, research center and herbaria.

Throughout, the gardens themselves will hold the narrative, connecting people with plants in a continuously conscious manner. New interpretation, themes and designs will refresh and engage the visitor. Technology will seamlessly tell our story to a global audience.

We enter this new journey for a cherished institution with conviction, passion and joy. To build is to keep a flame alive, from those who dreamed to those who are awakening.

With a map to chart our course and with the support of friends, we set out to ensure Denver Botanic Gardens will forever flourish.

Brian Vogt  
Chief Executive Officer  
Denver Botanic Gardens
Green Roof/Parking Structure

Master Development Site Plan

N.T.S.

Amphitheater
Event/Education Pavilion
Environmental Learning Pyramid
Perennial Walk

Mordecai Family Children's Garden

Morrison Center

York Street

Cheesman Park
Cheesman Entry

Tea House
Tea Pavilion
Bonsai Pavilion

Japanese Garden

Tea Garden Cafe

Oak Grove

Colorado Rocky Mountain Ecosystems
June's PlantAsia
Central Garden Service Barn

Greenhouses
El Pomar Waterway

Romantic Gardens

Morrison Center

Cheesman Park
Cheesman Entry

11th Avenue
9th Avenue