MACE RANCH INNOVATION CENTER

DESIGN GUIDELINES

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LAND ARCHITECTS
# TABLE OF CONTENTS

1. **Introduction**
   - a. Purpose and Intent
   - b. Overall Project Vision, Goals and Objectives
   - c. Mace Ranch Innovation Center Design Principles
   - d. Sustainability Goals and Objectives

2. **Land Use**
   - a. Overall Goals and Objectives
   - b. Proposed Land Uses
   - c. Density Goals

3. **Urban Design and Open Space**
   - a. Overall Objectives and Goals
   - b. Urban Design and Landscape Typologies
   - c. Planting Design Principles
   - d. Low Impact Site Development
   - e. Site Furnishing and Materials

4. **Streetscape/Circulation/Mobility**
   - a. Overall Objectives and Goals
   - b. Circulation Framework
   - c. Transit
   - d. Bike and Pedestrian Circulation
   - e. Streetscape Design

5. **Building Design**
   - a. Overall Goals and Objectives
   - b. Building Form and Placement
   - c. Building Wall
   - d. Ground Floor Treatment
   - e. Architectural Character
   - f. Building Performance

6. **Parking and Service and Loading**
   - a. Overall Goals and Objectives
   - b. Parking
   - c. Service and Loading
   - d. Lighting
1 INTRODUCTION

The Mace Ranch Innovation Center comes in the aftermath of a determination by the Innovation Park Task Force that there is an increasing demand for space for technological research and development uses and inadequate sites within the City of Davis to accommodate current and future demand. The Project site is of an adequate size to address the City's need for an innovation and technology park and is ideally located contiguous to the City boundary, located on major transportation corridors at the intersection of Mace Boulevard and Interstate 80, and has fiber optic and other essential utilities immediately available. Additionally, agricultural lands with newly adopted conservation easements immediately abut the property to the east and north; therefore, annexation and development of the property will result in a distinct urban edge leading up to a logical permanent growth boundary. The years that the City has spent researching and planning for this use and the strong merits of this site together warrant development of the Mace Ranch Innovation Center is warranted.

The Mace Ranch Innovation Center will be an area where leading-edge technology institutions cluster and connect with start-ups, businesses incubators, and accelerators as well as the University of California, Davis. The Center will offer a mix of building types and uses including office, research and development, prototyping, light manufacturing, flex space and support retail. By including an integrated array of uses at the same site in close proximity, the area will grow into a true center of innovation where “research to market” processes can thrive. The Project will utilize and extend the existing adjacent infrastructure including fiber optics, which will allow it to be technically wired to provide adequate capacity to meet growing business needs.

The Mace Ranch Innovation Center will also be a model for sustainability. An important aspect of the planning process has been utilizing urban forms, transportation management systems, and LEED building practices that reduce energy consumption, vehicle miles travelled, and greenhouse gas emissions. The Project incorporates onsite energy generation components such as solar and is designed to capitalize on emerging technologies. Open spaces, both planned and natural, will be used in a manner that is drought conscious, aims to handle and filter storm water, utilize strategic plantings for shade and air purification, and encourages groundwater recharge through the use of impervious surfaces. Lastly, the Center
respects, protects and connects the City to agriculture with onsite research and food production through the use of appropriate setbacks, view sheds, and bicycle trail connections.

Sustainable design features, including LEED building standards, groundwater recharge, energy and water efficiency, and access to non-automotive forms of transportation will be incorporated. The Center will also include supportive retail uses such as cafes and recreational facilities and may include uses such as lodging and a conference center. The result will be an innovative and connected campus-like environment that will allow the City of Davis to retain, grow and attract research and technology companies.

**Purpose and Intent of the Design Guidelines**

The purpose of this document is to work in concert with the Project’s zoning that establishes a Planned Development (PD) on ±212 acres of the property. While the PD establishes the permitted uses on the site, these guidelines provide a comprehensive overview of the design criteria and development standards required to implement the desired physical form of the project and its key features. The Guidelines address land use, site design, sustainability, architectural character, landscaping, circulation and parking to create a vibrant and innovative employment center comprised of high quality architecture and diversity of types and scales of open space.

These guidelines function to:

- Implement the City of Davis General Plan Goals and Innovation Task Force goals for the project.
- Establish a strong design framework within which developers, builders, and architects can conceive and produce high quality design and construction.
- Create a design framework to allow the City to approve development projects on individual sites within the Project.

**Objectives for the Guidelines**

- The design of buildings, streets and roadways, and public spaces for the MRIC should conform to a set of guidelines with the following objectives:
FIG. VIEW FROM THE OVAL LOOKING EAST

FIG. VIEW OF TRANSIT CENTER PLAZA
FIG. VIEW OF PAVILION AT THE OVAL OPEN SPACE
• Provide an integrated, sustainable, high-quality campus-like project offering a variety of lot sizes that will respond to the current and future needs of technology start-ups, industry leaders, research and development, and products manufacturing firms; allowing for a full range of research to market uses.

• Develop an aesthetically beautiful architectural building and landscape design that incorporates energy and water efficiency, provides for non-automotive forms of transit, and is situated to receive and utilize recycled water when available.

• Develop a strong open space network that is developed around sustainable landscape strategies and provides a rich diversity of spaces.

• Create a viable retail component, including hotel and conference center that will primarily serve the needs of the innovation center and support the businesses and employee needs of the center.

• Encourage recreation and non-automotive modes of transportation by creating trail connections and improvements that enhance and encourage pedestrian/bicycle circulation and connectivity between the project site and surrounding areas.

• Provide convenient, sufficient and inconspicuous parking to serve the center while making them feel as real open spaces that also provide important energy and site storm water management features.

Overall Design Guidelines Principles
The development of the plan for a rich and robust Innovation Center was developed with the following design principles from the earliest concepts to the finalized site plan and design guidelines. These principles include:

1. Provide Services for Creating a Strong and Enjoyable Work Environment

The network of design elements that define a great working environment will require attention in all phases of the Mace Ranch Innovation Center including: a strong pedestrian and bicycle network, a focus on transit access, great diversity of open spaces, convenience of
local retail and services, day care facilities and other features that will allow for greater interaction

2. Develop an Environment for World Class Innovation Programs and Companies
Design for innovation must take into account the lives of research teams working long hours and in isolated settings and provide the services that support their needs and invite them to enjoy a mixed-use urban setting. This includes designing for 18 or 24 hour use, accommodating research, labs, high tech office, and manufacturing, assuring an identity and sense of place with design of convivial open space and retail settings, and designing for safety without excessive controls or gates.

3. Begin with Open Space
Open space will be the defining element of the plan, including one major public green along with smaller parks, squares, pedestrian promenades and a system of welcoming, safe and attractive streets and bicycle paths. The guidelines are especially developed with a strong attention to the manner in which buildings frame and enliven courtyards and plazas, while providing major viewsheds to the surrounding ag lands, bypass, and mountains and hills in the distance.

4. Design Buildings and Landscapes that Endure
This principle commits the design and development team to an approach that celebrates and integrates naturally historic resources, provides sustainable design for sites and buildings, establishes long term management strategies and plans for a critical mass of development to support urban services.

Sustainability Goals and Objectives
The Mace Ranch Innovation Center’s overarching sustainability objectives includes the practical and responsible application of building efficiency, low impact development, and smart growth planning strategies to reduce energy use and greenhouse gas emissions, conserve resources, encourage alternative means of transportation, and foster a rich social network for the users. A Sustainability Framework Plan (under a separate cover) has been prepared for the Project and serves as a roadmap for the measures and strategies put forward
in this document. The goals and principles listed in this document serve to further incorporate those strategies into the site and building designs.

The City of Davis General Plan provides policy direction and support for natural resource conservation and energy efficiency. The City has adopted standards and guidelines to address local, regional and global climate change impacts of future development.

The long-range goals and objectives for sustainability initiated by the City Council address land use policy through the implementation of Tier 1 of the 2010 California Green Building Standards Code and the City’s greenhouse gas emissions targets. The MRIC Project will comply with the Davis General Plan policy and Tier 1 of the California Green Building Standards Code (adopted by the City January 1, 2011).

The MRIC project team developed this set of design guidelines using a project-specific sustainability framework that sets goals, objectives and detailed implementing actions and performance standards that are at a minimum, consistent with relevant plans and policies already adopted by the City of Davis (e.g., General Plan, Climate Action and Adaptation Plan) or required in CALGreen Tier 1). The areas in which the proposed Project exceeds these goals are specifically noted.

The overall Sustainability Goals and Principles are listed below. These are also included in the various chapters/topics to reinforce the close relationship between the MRIC Design Guidelines and sustainability objectives.

**Goal 1:** Serve as a model for low-carbon, climate-resilient development that also enhances the fiscal, economic and equitable sustainability of the broader community.

- Achieve lower GHG emissions per capita for employees and visitors of the Project compared to baseline levels, in support of the City of Davis’ long-term goals to achieve carbon neutrality.

- Encourage innovative site and building design that encourages a healthy and interconnected natural and built environment, conserves natural resources, and promotes equitable and efficient communities.

- Promote a high level of indoor air quality through the eliminating harmful materials
in building materials.

- Contribute to resource conservation during construction through the use of sustainable materials and cost-effective resource conservation methods.

- Promote and demonstrate resiliency to the effects of climate change and other challenges through project design.

**Goal 2:** Strive for carbon neutral transportation through the use of innovative designs, infrastructure, technologies, and programs.

- Work towards reducing automobile dependency and reduce vehicle trips generated within the Project by 10 percent compared to original project trip generation forecasts\(^1\), working towards the communitywide goal of achieving 50 percent non-single-occupancy-vehicle (SOV) mode share for residential and commercial development by 2035.

- Achieve maximum connectivity and safety for pedestrians, bicyclists, and transit users.

- Incentivize the use of clean, energy-efficient, active (i.e., human powered), and economically sustainable means of travel.

**Goal 3:** Design and construct high-performance buildings, public lighting, and on-site renewable energy systems that work towards achieving Zero Net Energy by completion of the MRIC development build-out.

- Establish as possible high-performance buildings to go beyond the 2013 Title 24 Building Energy Efficiency Standards, or equivalent. High-performance buildings will also incorporate energy consumption feedback mechanisms in order to encourage resident and employee engagement and minimize wasted energy use.

- Other building loads not covered by Title 24 will also achieve high levels of efficiency, (i.e. 100 percent high efficiency lighting, ENERGY STAR appliances and equipment), and lighting will be adaptive where practicable.

**Goal 4:** Maximize water and wastewater efficiency through the use of conservation, reuse,
and integrated landscaping and stormwater management strategies.

- Meet or exceed 2013 CALGreen Tier 1 water use efficiency requirements for indoor water use.

- Minimize use of potable water in outdoor landscaping and maximize the use of non-potable water.

- Work towards achieving zero net water usage through use of best management practices and innovative technologies.

- Incorporate creative low-impact development (LID) solutions to meet stormwater treatment and water quality requirements.

- Create synergy with other project design goals and existing community sustainability initiatives.

- Preserve and promote the health of future residents and employees and the local ecosystem.

- Ensure appropriately sited and programmed open spaces and parks, in order to meet the recreational needs of new residents and workers while maximizing habitat connectivity, public health, active transportation connectivity, and stormwater management.

- Provide access to local agriculture, including on-site agriculture in the form of community gardens, working orchards, and other options.

- Reduce landfilled waste by maximizing on-site opportunities for waste reduction, reuse, recycling, and composting.

- Incorporate opportunities to educate and empower future residents and employees to increase awareness of resource consumption and their carbon footprint.
2 LAND USE

OVERALL GOALS AND OBJECTIVES

The Mace Ranch Innovation Center will be an area where leading-edge research and manufacturing cluster and connect with start-ups, businesses incubators, and accelerators as well as a diversity of research and educational units of the University of California, Davis.

The Center will offer a mix of building types and uses including office, research and development, prototyping, manufacturing, flex space and support retail. By including an integrated array of land uses at the same site in close proximity, the area will grow into a true center of innovation where “research to market” processes can flourish.

The following chapter sets forth the land uses for the project, as well as defines the approach of innovation for those uses and the density goals that will be achieved.

Land Uses

The land uses define a mix of building types to meet user needs, including corporate headquarter buildings and larger format manufacturing and research facilities. The land uses are organized within an urban design framework to:

- Deliver office and corporate spaces that are highly flexible and technologically advanced. They will include new collaborative spaces, flex spaces, and dry and wet labs.

- Develop space for research/incubator start-ups that may be subsidiaries of larger and more established companies in Davis, Sacramento, or even the Bay Area.

- Include programs that are scientific, technical and research focused. It is anticipated that these programs may be UC Davis spin-off research labs, incubators and internships.
FIG. MRIC INNOVATION PROCESS: RESEARCH TO MARKET

FIG. PROGRAMS CONNECT TO KEY UC DAVIS RESEARCH AREAS

- wildlife reclamation
- advancing manufacturing
- robotics/discovery
- water conservation
- bio/med tech
- food production/ag tech
- industrial engineering
- nanotech/exploration
FIG. DIVERSITY OF PROPOSED INNOVATION PROGRAMS

Advanced Manufacturing

Prototyping

Laboratory Research

Data and Computer Technology Research
• Given its size and location, be suitable for research programs for green technology and sustainable agricultural/food technology research
• Integrate spaces for prototyping and manufacturing with research facilities to allow for greater ease of advanced product development; permitting manufacturing facilities on site will allow for the establishment of “research to market” companies.

• Provide manufacturing uses both connected to research facilities and as stand-alone uses.

• Include a hotel with conference center, supportive retail, and other amenities for all users and visitors at the site.

The underlying zoning proposed for the Project’s PD is Innovation and Technology (IT), standards for which are proposed. Pursuant to this Zoning Designation the Mace Ranch Innovation Center will provide for construction of approximately 2.6 million square feet of industrial research office and development space, of which there may be up to 260,000 square feet (10%) of supportive commercial. The supportive retail component will be geared toward serving the needs of those businesses within the Center and may include formal and convenience dining, dry cleaning, shipping, fitness, hotel and convention space, as well as other small supportive retail uses. The Project will not include any residential uses.

Creating Innovative Workplaces
The overall objective of the project is to develop a center that will have innovative and engaging workplaces by:

• Developing courtyard and plaza spaces between buildings to create more collaborative and interactive places for the true exchange of ideas and fostering innovation, creating real places for people.

• Providing access to amenities such as cafes, outdoor recreation, trails, and fitness facilities that the new modern worker/creative class requires.
Proposed Zoning

Project PD Boundary:  
Mace Ranch Innovation Center (MRIC):  
Mace Triangle PD Boundary
Anticipated Building Uses

- Research/Office/RD: 1,510,000 sqft
- Manufacturing/Research: 884,000 sqft
- Ancillary Retail: 100,000 sqft
- Hotel/Conference: 160,000 sqft

Program Total by Use: 2,654,000 sqft
• Providing a wide diversity of open spaces that accommodate large recreational activities as well as smaller scale, intimate, passive uses.

• Developing state of the art research and corporate workplaces that provide complete accessibility to the latest broadband technology with sufficient infrastructure to exceed demand and allow for growth.

**Density Goal**
The Core Area of the Project (see Diagram) will achieve a density of 0.7 FAR (Floor Area Ratio), with the site as whole attaining a 0.5 FAR consistent with the General Plan and previous business parkland strategies by:

• Phasing the Project over time, which will allow for a strong initial first phase that may be at a lower FAR, but then provide higher density in later phases to create the desired FAR.

• Establishing higher density areas closer to existing urbanized areas, onsite plazas, key major open spaces and the transit plaza to encourage a cross-pollenization of ideas and collaboration.
FIG. CORE AREA AROUND TRANSIT CENTER

Core Area

Building in Designated Core of Project
3 URBAN DESIGN AND OPEN SPACE

URBAN DESIGN AND OPEN SPACE GOALS AND OBJECTIVES

The agriculture and the agrarian grid in the landscape define the Sacramento region and the area around the City of Davis. The Vision for the urban design and open space framework for the project is centered on this highly identifiable and character providing feature. The Mace Ranch Innovation Center is designed around a strong grid open space system that creates a network of recreation spaces, promenades, plazas, and gardens that are appropriate to their location and respond to their adjacent uses. The Project proposes a mixture of research, office, incubator and manufacturing structures of various sizes and configurations that are designed in a campus-like setting.

Open space plays a central role in the overall development plan with the objectives of bringing people together in safe, attractive surroundings, establishing a character of green streets and gracious public space settings, encouraging a high degree of interaction between various companies and entities, and designing such spaces for appropriate activities, maintenance and safety. It is anticipated that these open spaces will serve a wide range of constituents with a variety of active and passive uses.

The Mace Ranch Innovation Center will be designed so that the creative workplaces developed within the buildings are complimented by the innovative design of the site. The site and urban design concept is grounded on four primary principles: Interaction, Sustainability, Contextual sensitivity and Responsiveness.

Interaction
Creating places for informal gatherings and exchange of ideas. Buildings in the planned development are grouped around a common plaza. These plazas are interconnected by public entries and lobbies, allowing easy connections for people to move easily within and between the buildings. These places are to be designed for informal recreation, eating lunch, or just relaxing in the sunshine. The main plaza of the Project has its primary focus as transit center for commuters, and will also contain supportive retail such as outdoor cafes to help define place and center for the community that is working on the site.
Sustainability
Minimize the use of water through the use of drought tolerant plantings, reclaim water for irrigation, generate energy, create habitat, produce food, provide integrative storm water management, incorporate a transit center within the development and perhaps most importantly, create an environment that is beautiful, humane, socially interactive, supports the community and is built to last.

Contextual Sensitivity
Borrow the aesthetics and functionality of the surrounding agrarian landscape – shelterbelts and orchards – to promote an aesthetic that fits the surrounding context. Rather than imposing an alien landscape on the site, the development should feel as if it was gracefully carved out of the agricultural context.

Responsiveness
Create open spaces and commons that are humanely suited for the occupants and visitors of the center as well as the community. Blur the boundaries between private and public by providing on-site trails for pedestrians and bicyclists that link to regional trail systems. Promote spaces that support the programmatic desires of the occupants, visitors and community – ball fields, places for informal play, community gardens, recreational trails, and places to dine and socialize.

Urban Design and Landscape Typologies
Primary landscape typologies will characterize the site and distinguish the development. The typologies will provide a sense of hierarchy, breaking the site down into interconnected systems that combine to create spaces that embrace the principles.

Agriculture Edge/Buffer
Rather than adopting a conventional buffer strategy that seeks to draw a line in the landscape between two separate land uses, we propose to blur this boundary by bringing the adjacent agriculture use into the site through planting food producing orchards around the perimeter of the MRIC. The orchards will be genuine “working” fields and contribute to the character of the region. Stitched within the orchards, bicycling and running paths will be incorporated,
**Green Space**

Total Green Space – 64.6 Acres  
Green Space Site Coverage = 30% of Total Site

1. The Oval ___________ 5.1 ac  
2. North-South Commons ___________ 6.9 ac  
3. East-West Commons ___________ 6.7 ac  
4. Courtyard Plazas ___________ 2.9 ac  
5. Perimeter Green/Open Space ___________ 22.88 ac  
6. Agriculture Buffer Area ___________ 20.12 ac  

Total: 64.6 ac
providing outlets for recreation, exercise, and opportunities to observe the orchard operations. While the orchards will harmoniously buffer the development, sight lines into the project will constantly change as tree rows open and close views from adjacent streets and Interstate 80.

Windbreak/Shelterbelt Buffer
Borrowing from agricultural landscape practices, shelterbelts will delineate the western edge of the Project, shelter the site from winter winds and offer shade during the summer. They will also mark the edges of the dominant north-south axes through the site, creating structure, visual clarity and order for the various Project parcels.

Streetscapes/Allees
Formal allees of street trees line the roadways crisscrossing the MRIC. Linking the site together, allees will provide shade, create visual clarity for way finding and break down the scale of the streets and surrounding development to humanize the experience. Planted medians and street edges will provide storm water capture and filtration, reducing runoff while beautifying the streets.

The “Oval”
The Oval, the largest of the open spaces, establishes a grand landscaped entrance into the site and is the centerpiece of the Project. The Oval will feature a multi-use flexible space with open fields, providing the community and the occupants at MRIC with a venue for recreation, ranging from a place to walk the dog to organized soccer tournaments to concerts.

The Commons
The Commons are the keystone landscape spaces of the site. They are intended to create habitat, provide spaces for recreation, community gatherings, social and business meetings, and potential for community gardening in the northern area of the north south commons. They will be an important part of the City of Davis’ open space network, and provide amenities to the community and employees within MRIC.

While all of the Commons are united together by allees and shelterbelts, each area will have its own distinct character that responds to the surrounding context. The North Commons will
FIG. PROPOSED OPEN SPACE TYPES

Courtyards  Allees

Spaces Promoting Varied Activities  Ag Buffer Orchards

Commons  The “Oval”
feature community gardens and open meadows to enhance the visual connection to the heritage agricultural fields to the North. The East Commons will be highlighted by the presence of the regional canal with framed views to downtown Sacramento and the Sierras beyond.

A riparian/ecology corridor through the East West Commons will celebrate the flow of water through the site, help to restore a stretch of endangered Central Valley habitat, and create opportunities for people to interact with nature through tranquil trails and bird watching. Open areas adjacent to the riparian corridor will help establish views along the important east-west axis.

The South Commons will be the most refined and socially active of the open areas, creating gathering spaces for the adjacent transit center, office buildings and links to the courtyards where everything from business meetings to yoga classes may be taking place.

Courtyards and Plazas
Courtyards and plazas between buildings form the social backbone within the MRIC. They establish a sense of destination at each building and create localized places to gather. The courtyards will be scaled down to humanize the large spaces that surround them, providing a sense of comfort and enclosure while offering views out to the surrounding commons or agriculture. They will be inherently social spaces that will function at multiple scales, from larger ceremonial spaces to intimate gatherings. They could feature themes relative to their adjacent building or landscape use such as a Culinary Court outside the cafeteria or the Aromatic Court adjacent to the community garden. When possible, courtyards will connect with and be open to the commons, establishing walking links throughout the site minimizing the interface with vehicular roadways.

Planting Design Principles
The landscape design for the Mace Ranch Innovation Center emphasizes drought-tolerant, native and edible landscaping and provides trees for beauty, definition of
spaces, habitat enhancement, and comfort. Its inspiration comes from the agricultural landscapes that surround the City of Davis.

Guidelines include:

• Plant materials should be selected from the Project approved plant list, with an emphasis on native plants and drought tolerant plants.

• Design should consider year-round interest and seasonal character through careful use of flowering plants and leaf colors.

• Street trees should be placed in the parkway strips between the curb and sidewalk, and in medians where provided.

• For parking areas that incorporate trees, fast growing trees with large canopies will incorporated to meet the 50% shade requirement as per the City of Davis requirements.

Low Impact Development Landscape (LID)

LID refers to storm water management techniques that use vegetation and open space to optimize natural hydrologic processes and reduce stormwater runoff. Through means such as infiltration and evapotranspiration, LID strategies manage water and water pollutants at the source and thereby reduce or prevent urban runoff impacts.

• Large canopy trees should be used where appropriate to intercept rainwater, encourage root uptake, help groundwater recharge, and facilitate evapotranspiration.

• Infiltration and conveyance trenches should be incorporated in planting strips with native vegetation to provide detention, infiltration and beauty.

• Bioretention systems in conjunction with vegetated swales should be incorporated where possible. These systems use special soil mixes that promote tree root growth, runoff treatment, and infiltration.
• Interconnected vegetated swales should be incorporated in the large parkways and medians as part of the roadway system to the extent possible.

• Permeable pavers, porous pavement, and other permeable materials are encouraged for walkways, plazas, courtyards, and parking areas where possible in order to help reduce local temperature gradients and reduce runoff.

• Perimeter open space buffer areas should allow for vegetated swales to convey stormwater into the storm drains and treatment systems.

• Drainage channels and swales should be designed to reduce the velocity of the stormwater flow and help to remove pollutants through the use of vegetated swales, water detention, landscape open space, gravel filters.

Irrigation and Water Conservation

The irrigation system should be designed to conserve water resources by efficiently and uniformly distributing water. Drip irrigation, fertilizing, and chemical control required for landscape reduces the need for water.

• Irrigation designs should be based upon appropriate California Department of Water Resources ordinances and tailored to meet the climate zone of the City of Davis.

• Irrigation should be provided for plant establishment. All public areas and rights of way should have an automatic irrigation system. Use of low volume spray heads and drip irrigation should be maximized.

• Irrigation design should accommodate hydrozones, separating high, medium, and low-water use plants.

• Moisture sensors should be installed at appropriate intervals.

• Shrubs and trees should be irrigated with a drip system to provide deeper and more even watering.

• Except for areas supporting native bee habitat and working agricultural fields, planting areas should be mulched with 3-4 inches of organic material, such as wood chips, to reduce evaporation, keep soil temperature even, and control weeds.
**Drought Tolerant Landscape**

- Plant selection should emphasize the use of native or drought tolerant, long lived, pest resistant plant species that are well adapted to the area.
- Turf should be limited to active uses and recreational areas. Native grasses and low groundcover should be considered as alternatives for other areas.
- Maintenance will be done through the use of toxin-free organic or biological fertilizers and weed/pest control products.

**On Site Food Production**

The MRIC will have functioning orchards planted in the proposed Project Ag Buffer areas at the northern and eastern edges of the site. Where possible and as long it is consistent with the commitment to drought tolerant landscapes and water conservation, food producing trees and other plant materials will be encouraged.

**Lighting**

Landscape lighting should be used carefully to avoid light pollution while providing safety. The objective is to provide lighting for public areas that improve nighttime visibility, avoid glare, and increase the ability to see the night sky.

- Outdoor site light fixtures are encouraged to the extent possible to be bi-level LED that will reduce the demand for electricity, or similar product with greater reduction.
- In general, lighting will be designed to minimize light levels for any given application and to direct the lighting onto high use areas. Low-level pedestrian scaled fixtures should be utilized to the maximum degree possible.
- High efficiency fixtures are encouraged to direct light where it is needed and to avoid excessive glare and reduce impacts on the night sky and open space.
FIG. PROPOSED AG BUFFER

Section A-A | North Buffer

Section B-B | East Buffer

A

B

Mace Ranch Innovation Center Design Guidelines
• Lighting fixtures should be equipped with optics and cut off shields that direct the light to the ground. Spillover of light on adjacent properties or areas should be avoided.

• Light fixtures should utilize energy-efficient fixtures that provide pleasing light colors.

Site Furnishings and Materials

Site furniture adds an important level of detail and design that enlivens public spaces and provides opportunities for people to gather and interact. Well-placed site amenities enhance the usability and appearance of the overall character of the development.

• Seating, tables, bollards, bicycle racks, trash receptacles, flagpoles, light standards, paving, and tree grates should be considered as part of the initial site design and as a comprehensive family of elements, with the goal of creating a cohesive palette. Site furniture should be compatible in size, design, and color with the surrounding architecture and landscape design.

• Variety in selections within the same family of styles is encouraged to maintain consistency but avoid an overly institutional feel.

• A variety of seating should be provided for the different public spaces, including benches, seat walls, grassy steps, and movable seating.

• Public art is encouraged in the project site in a variety of ways such as murals, street furniture, signage, and sculpture.

Paving

Paving surfaces and hardscape design should complement the design scheme of pedestrian-oriented spaces.

• Alternative paving treatments such as concrete unit pavers, brick, flagstone, decomposed granite, or textured concrete is encouraged.

• Pervious paving will be incorporated to the extent feasible.
FIG. STREET & SITE FURNITURE
• Recycled and waste products will be considered in the construction process where conventional concrete or asphalt paving is used.

**Plant Materials**

Plant materials for the project will either be native or drought tolerant species. A careful selection is provided to ensure a range of biodiversity, color, form and aesthetic quality.
FIG. PROPOSED PLANT MATERIALS

Acer macrophyllum

Quercus lobata Valley Oak

Salix lassiantra

Schoenoplectus Acutus

Salix

Schoenoplectus acutus

Stipa Gigantea

Arbutus marina

Cornus sericea yellow twig
FIG. PROPOSED PLANT MATERIALS

Acer macrophyllum  
Aesculus californica  
Alnus rhombifolia

Cercis occidentalis  
Cornus sericea in bloom  
Cornus sericea occidentalis

Lagerstroemia indica  
Miscanthus  
Platanus racemosa fall color
4 CIRCULATION, MOBILITY & STREETSCAPE

The MRIC development exists in a policy environment that places a strong emphasis on future reductions in vehicle trips; vehicle miles traveled (VMT), and associated greenhouse gas (GHG) emissions and energy consumption; as well as an emphasis on safety for users of all transportation modes and the creation of livable street design.

Both statewide and at the local level in the city of Davis, transportation is the single largest source of GHG emissions. Transportation accounted for about 38 percent of statewide GHG emissions in 2014, and approximately 53 percent of community emissions in Davis in 2006. Key statewide policies that address transportation GHG emissions include the following:

- **Executive Order B-30-15** set a statewide goal to reduce GHG emissions 40 percent below 1990 levels by 2030.
- **Executive Order S-3-05** set a statewide goal to reduce GHG emissions 80 percent below 1990 levels by 2050.
- **SB 375** (Sustainable Communities and Climate Protection Act of 2008) set regional VMT and associated GHG emissions reduction targets for light duty passenger vehicles through an integrated approach to regional transportation and land use planning. In 2012, the Sacramento Area Council of Governments (SACOG) adopted a new Metropolitan Transportation Plan and Sustainable Communities Strategy (MTP/SCS) designed to achieve regional SB 375 VMT reduction targets of 7 percent by 2020 and 16 percent by 2035, compared to 2008 levels.
- **Article 22.15** of the Davis Municipal Code established transportation system management requirements for employers located in the City. These requirements “promote alternative commute modes and reduce the total number of vehicle trips.” All major employers (100 or more employees) and major projects are required to file a transportation management plan (TMP). The TMP goal is to designate measures that
FIG. PROPOSED BIKE AND VEHICULAR CIRCULATION
will result in an average vehicle ridership (AVR) of 1.5 for peak period commute trips.

**General Policies Circulation and Mobility:**

Generally, the project is also subject to the following guiding local policies, in the General Plan Transportation Element and Climate Action and Adaptation Plan, that relate to transportation and mobility:

- Provide a comprehensive, integrated, connected transportation system that provides choices between different modes of transportation.

- Improve air quality, reduce carbon emissions, and improve public health by encouraging use of clean, energy-efficient, active (i.e., human powered), and economically sustainable means of travel. (Davis General Plan Transportation Element)

- Promote the use of electric vehicles and other non/low-polluting vehicles. (Davis General Plan Transportation Element)

- Develop and maintain a work trip-reduction program designed to reduce carbon emissions, criteria pollutants, and local traffic congestion. (Davis General Plan Transportation Element)

- Apply best practices in designing sustainable/green streets or “Complete Streets”; transit oriented development, and other circulation improvements to minimize travel. (Davis General Plan Transportation Element, Davis Climate Action and Adaptation Plan, UC Davis Climate Action Plan, SACOG Sustainable Communities Strategy)

- Provide incentives and facilities for car and bike sharing programs. (Davis Climate Action and Adaptation Plan)

- Provide incentives for fuel-efficient or alternative fuel vehicles (e.g., parking incentives).
Reduce VMT as follows:

- 10 percent below 2010 by 2015 from households. (Davis Climate Action and Adaptation Plan)

- 39 percent below 2010 by 2035 citywide. (Davis General Plan Transportation Element)

Achieve at least the following mode share distribution for all trips by 2035. (Davis General Plan Transportation Element)

- 10 percent of trips by walking.
- 10 percent of trips by public transportation.
- 30 percent of trips by bicycle

**Transportation Demand Management**

To achieve the project goals and objectives, the project will need to implement a comprehensive set of design features and TDM strategies intended to further reduce vehicle trips and VMT (and therefore GHG emissions), encourage the use of alternative modes, build safe infrastructure, and provide initial incentives and infrastructure for using electric vehicles and other non-polluting vehicles. All TDM will be approved as part of the Project Entitlements and will include extensive monitoring provisions.

**Circulation Framework**

The Project’s proposed circulation network provides a hierarchy of streets, bicycle paths, trails, transit, and pedestrian promenades designed to support a wide range of uses and activities. The network fosters easy connectivity and looks for ways to reduce the needs for automobile travel within the Project Area and the larger community/City.

The circulation framework for the Center features a modified grid with three primary and one secondary connection to the existing bordering roadway system. The primary southern access point will connect to County Road 32A and will be the principal point of entry for transport vehicles and goods movement traffic. A secondary access point is located along
Country Road 32A at the intersection where the existing park and ride lot is located which will serve to access those uses in the southwest of the Project.

The other two primary access points intersect with Mace Boulevard and link the Project to the adjacent neighborhood by extending Alhambra into the site; these points of access will be mainly for employees.

**Transit**

The Project is also designed to be accessible for those utilizing mass transit or non-automotive forms of transportation. Specifically, the Center is proximate to a Yolo Bus stop at the park-and-ride lot, from which landscaped pedestrian connection will be improved to the site and its primary north-south pedestrian promenade. There is an existing transit stop on Mace Boulevard adjacent to the Project and a transit plaza/hub is proposed in the heart of the Center to allow for a centralized stop to accommodate all users.

The Transit Plaza will serve as a primary drop off/pick up area for local shuttles to downtown Davis and the Amtrak Station, provide Unitrans bus stops for local public transit, carpool drop-offs, taxi (Uber/Lyft), and other more direct destination shuttles (e.g. UC Davis, Sacramento Airport). In addition, some car-share parking spots and dedicated carpool/vanpool drop-offs will be located here to facilitate the use of alternative modes of transportation. It is expected that as driverless cars enter into the market, opportunities to capitalize on their use will be greatly beneficial to the MRIC.

**Transit infrastructure & incentive actions include the following:**

*Extend Transit Service*

Partner with Unitrans to provide direct transit service to the Project via new or realigned route(s) that connect the MRIC to the downtown, UC Davis, and other key destinations.

*Construct Bus Stops*

Construct project bus transit stops at the Transit Center and potentially other key intersections with high-quality amenities, including benches, shelters, bike racks, and real-time passenger information displays with transit information.
Trip Planning Assistance

Require property managers and future employer tenants to join the Yolo TMA and designate a Transportation Coordinator to assist employees with trip planning.

Improve Shuttle Connections

Coordinate with the City of Davis to provide fair-share funding for improved shuttle connections with the Downtown, UC Davis, the Davis Amtrak Station and other local/regional destinations.

Transit Subsidies

Encourage employers to provide transit subsidies for long-distance commute trips by employees and residents, with a focus on travel via Amtrak/Capitol Corridor.

Wireless Connection

Provide free public wireless connection to enable ease of transit/ride share usage for employees and visitors.

Bike and Pedestrian Circulation

The Project proposes a safe and highly integrated and bicycle path/network system that will be conveniently linked to the existing pedestrian trails system and a regional bike trail. The Yolo Causeway Bike Path connecting Davis to Sacramento abuts the Project site and will provide excellent nonautomotive access from the Project to West Sacramento as well as to downtown Davis and other key places within the City.

- All bike paths will be located in corridors/greenbelts that are adjacent to open spaces with minimal vehicular interruptions.
- Bicycle parking will be provided near all entrances to buildings and it is expected that many companies that are based here will provide shower facilities and changing rooms to encourage the use of bicycles as a primary means to get to the site.
- A bike storage and repair area will also be provided near the Transit Plaza to allow for safe storage of bikes and to facilitate any bike repairs that may be needed by the users.
FIG. BICYCLE AMENITIES
• Bike share facilities will be established on the site and coordinated with the City of Davis bike share program.

**Streetscape Design**

Access and Circulation to the site will be through Mace Boulevard and County Road 32A. The vehicular street network is designed to allow for efficient dispersal of vehicular traffic to and from the site, while minimizing any backups on Mace Boulevard or Country Road 32A. The system also provides a secondary system for truck access so as to limit any impacts to the primary automobile and transit ingress/egress.

The modified grid system of internal streets and roadways is also designed with separated pedestrian and bicycle paths that will eliminate conflicts and provide for safe movements for the vehicles, bicyclists and pedestrians.

**Guidelines:**

The intent of the guidelines are to create and maintain “complete” streets that enable safe, attractive and comfortable access and travel for users of all ages and abilities (including pedestrians, bicyclists, motorists and public transportation users) by reducing and slowing traffic, incorporating pedestrian amenities, and integrating bus transit.

Simultaneously, create and maintain a streetscape system that captures stormwater runoff, filters pollutants, replenishes groundwater supplies, provides habitat for wildlife, and helps the development create a sustainable identity as an environmentally-friendly and sustainable innovation district.

The intent is to create a complete pedestrian circulation system that is safe and comfortable for all users, supports universal access, and increases the overall level of pedestrian connectivity and accessibility throughout the MRIC development.

• The street network on the site should be developed according to the hierarchy, layout and cross sections as described in this chapter and associated figures.
FIG. PROPOSED STREETSCAPE SECTIONS

MAIN STREET/ALHAMBRA EXTENSION

SECONDARY TWO WAY STREET (TYP.)
FIG. STREETSCAPE DESIGN
• Roadways should be built with sidewalks and bike paths separated from the street by planted parkways, as well as bike lanes integrated into the roadway.

• Street trees should be used consistently to provide a comfortable, human scale and enhance a quality of the “urban forest” that reduces energy usage and improves air quality through carefully selected tree and plant palette. See the section on Urban Design and Open Space for appropriate tree types and plant materials.

• Street design will incorporate modified roadway standards such as cross gutters, road crowning, and curb cuts to facilitate low-impact design standards and stormwater management and conveyance.

• Provide clearly marked crosswalks with a minimum width of 10 feet at all controlled intersections and at intersections of secondary streets through the use of special paving materials, colors/patterns, and/or crosswalk signage to heighten visibility and lend identity to the crossing.

• Explore the use of special paving materials, colors, and/or patterns for crosswalks to heighten visibility and lend identity to the area while creating an attractive pedestrian environment.

• Incorporate bulb-outs at intersections and at mid-block pedestrian crossings to improve safety and reduce roadway-crossing distances.
5 BUILDING DESIGN

DESIGN GUIDELINES GOALS AND OBJECTIVES

The proposed buildings that compose the Mace Ranch Innovation Center will be occupied by a variety of tenants and users: research office and laboratories, lab support areas, clinical spaces, offices, lecture and conference spaces, computation laboratories, prototyping and manufacturing, and supportive retail. The organization of the major building elements will usually be related to the modular dimensions of regular building structural bays that are highly flexible to meet changing needs. The space and infrastructure needs of research and innovation tenants can be expected to change often which puts a premium on flexible buildings and layouts, openness, and access to utilities.

The building design guidelines are developed to promote the incremental development of the Project through grouping of buildings around smaller courtyards. These groupings are designed to relate larger open spaces, as well as other smaller groupings of buildings as the project grows. Public lobbies and entrances will allow physical connections through the entire Project.

A desired goal of the MRIC site development is to enable general building sustainability improvements to reduce the use of potable water, control and regulate stormwater runoff and potentially recycle the water on site, improve indoor environmental quality, and generally “future-proof” the buildings.

Manufacturing /Large Format Buildings

In general, due to the complex and technical nature of manufacturing buildings, the general guidelines outlined in this section are encouraged in the design of these buildings to the extent feasible, and so as to not prohibit or impede their functional requirements.

Building Form and Placement

The objective of the placement and form of the buildings is to create a series of related buildings integrated into a clear and legible pattern for the development of the site. It is not intended to be a secluded, independent campus, but one that is integrated and composed of smaller courtyard groupings of buildings. The “Core Area” of the Project is centered around
Building edges to hold to streets and green spaces. Green where is shown.
the Transit Center and the Oval open space. This is where the primary density of building square footage is located.

The guidelines establish build-to street wall lines to create edges and facades that define public space and to ensure that the public spaces, courtyards, lobbies and entries are animated, encourage interaction, and are safe.

- The Plan proposes that buildings be placed in relationship to one another to form smaller grouping of courtyard spaces.
- The research buildings should relate to key streets, courtyards, commons and the other public spaces that have been articulated in the master plan. Their placement should only be within the locations/zones as identified in following Figure x.
- Buildings should not be placed any closer than 50 feet to Mace Boulevard or County Road 32A.
- Buildings should not be placed within the 150 feet of the designated Ag Buffer Zone.
- Buildings are to be set back a minimum of 20 feet of any vehicular street so as to allow adequate bike paths and planting areas.

Manufacturing /Large Format Buildings

Manufacturing, prototyping facilities and other larger format buildings are intended to be placed closer to the periphery of the project and will need to be designed to allow a greater degree of flexibility in their placement given the variety of needs for trucking.

Hotel/Conference Facility

The proposed hotel conference facility is designed for the southwest corner of the site at the intersection of Mace Boulevard and County Road 32A. Proposed in a highly visible corner to the project, the design, massing and placement of this building is very important.

Building Height, Massing & Scale

The various building heights and massing within the development are intended to create visual differentiation, scale, and density around key streets, courtyards and open spaces which will complement and reinforce the grid pattern of the development and result in new, attractive elements as seen from nearby vantage points. See Proposed Massing Variations Fig. x for various options for massing of the proposed buildings.
Max Height Zones

45’ **
55’
75’

Note:
Height allowance do not include parapet or any mechanical penthouse area.

** in an area not to exceed 25% of a buildings overall square footage, maximum height may be exceeded to accommodate specific components of research/manufacturing operations.
FIG. RESEARCH BUILDING MASSING VARIATIONS

Lobby/Entrance
FIG. SPECIFIC BUILDING PLACEMENT

1. Common
2. Parking
3. Plaza
4. Street
• Except as specified herein, all building heights are to be measured in accordance with the proposed maximum heights as identified in Proposed Height Zones Figure x.
• Mechanical penthouses and their associated equipment for all buildings shall not be included in the overall height limits.
• Intake and exhaust stacks, ductwork, mechanical systems, solar panels, flag poles, water storage, pipes, towers, antennas and microwaves will be allowed on top of the penthouses and on roof areas of the proposed buildings.

Building Wall and Facades
These guidelines ensure that the main pedestrian-oriented streets and open spaces are lined with buildings that have sufficient windows and transparency. The facades shall reinforce the urban nature of the Project while responding architecturally to adjacent public open spaces and streets.

Office and technology buildings typically have large floorplates and extensive glazing. Care should be taken to reduce the perception of the building’s bulk and prevent solar exposure from negatively affecting building performance.

Daylight and Solar Access
Buildings should provide occupants with as much daylighting as practicable, while controlling solar exposure. This can be accomplished with light shelves and facade screening elements.

Buildings should reduce use of daytime artificial lighting through design elements, such as bigger wall openings, light shelves, clerestory lighting, skylights, and translucent wall materials.

Buildings should allow for flexibility to regulate the amount of direct sunlight into the interiors. Louvered wall openings or shading devices like bris soleils help control solar gain and check overheating. Bris soleils, which are permanent sun-shading elements, extend from the sun-facing facade of a building, in the form of horizontal or vertical projections depending on sun orientation, to cut out the sun’s direct rays, help protect windows from excessive solar light and heat and reduce glare within.
• Glass on the ground floor must be clear vision glass; no heavily tinted or highly mirrored glass is permitted.

• Buildings fronting on streets and public open spaces are required to have their main entrance on one of those streets.

• Upper Floors: 50-60% of the lineal horizontal dimensions of the façades of each occupied floor are encouraged to be windows or openings.

• For more detail, see Section: Building Performance.

Building Breaks

To create a more attractive and human scale building pattern, office and science technology buildings should articulate the façade to break the building bulk into smaller pieces. Large, repetitive facades are discouraged.

Building breaks are visual breaks in the building plane that provide for additional street edge modulation, variety and visual interest and help avoid long, continuous facades along streets. Building breaks extend through the entire height of the building and act to separate buildings and create open spaces. Building breaks can also take the form of deep recesses that create a perception of distinct building mass and volume.

• Breaking up buildings every 100’ with a major building break in the façade is encouraged. These breaks are important to reduce the mass and scale of buildings.

• Recesses greater than 10 feet deep and 15 feet wide are considered building breaks and are encouraged in the overall massing and design of the buildings.

• Top floors of buildings are encouraged to be set back to allow for rooftop terraces.

• It is encouraged that the rooftop elements such as mechanical penthouses and screen enclosures that characterize these buildings shall be compatible and integrate into the massing and exterior wall design of the rest of the building below in configuration, materials, coloration and surface design.
Lobbies and Entrances

- Lobbies and entrances should be transparent and attractive in design. Multistory lobbies are encouraged and should be articulated in the building facades either through massing changes and two story heights to allow for a sense of spaciousness.

- All buildings lobbies/entrances are encouraged to be interior active spaces. These are important areas for interaction and will be important centers of activity during business hours. Many innovative companies today design their spaces with a focus on these active areas of the buildings. Lobbies and common spaces are one of the areas of greatest focus to provide activity and allow informal chances to meet.

- Lobbies are encouraged to connect through to entrances for the building. This will allow for greater porosity and connections to public spaces and to the other buildings. The proposed buildings have been sited so as to allow for connections to all the various courtyards and plazas through lobbies.

- Other programs such as art displays, kiosks, plant materials etc… should be placed in the lobbies to encourage a more active and communal sense of place.

- Lobbies should be designed to allow for a maximum amount of daylight to penetrate the spaces.

Ground Floor Treatments

- In order to ensure the vitality of activity in the development, the building wall along the ground levels should have a certain amount of transparency through the incorporation of doors and windows.

- Where feasible main building entrances will be on at least two sides of a building, with an adjoining lobby spaces to help animate the major public ways and open spaces.

- Also encouraged at the ground floor are display areas, conference spaces and office where active interior uses would be visible from the sidewalk.

- Ground Floor: At least 50% of the linear horizontal dimensions of the façade are encouraged to be windows or doors. No heavily tinted or mirrored glass is allowed.

- Pedestrian arcades/overhangs/trellis structures could be considered as a ground floor element, particularly around public spaces such as courtyards, plazas and commons,
and should be detailed to be visually attractive and should read as an integrated piece of the building.

**Roofscape**
- Mechanical Screening: Rooftop equipment (all ductwork, exhaust stacks, and elevator penthouses) should be screened or incorporated architecturally within the roof of the building where practicable.
- Photovoltaics are encouraged to extent possible on all rooftops to support the Project’s overall on-site energy production.
- Building roofs, where not occupied with solar/photovoltaic panels or mechanical equipment, should be light colored.

**Supportive Retail**
The project contains a small amount of supportive retail (up to 260,000 SF) including the hotel/conference programs. This use is encouraged on the ground floor of buildings, near major intersections, open spaces, and at transit plaza where larger gatherings of people are expected to be. The Anticipated Building Uses Diagram illustrates areas that supportive retail should be provided. Supportive retail spaces should encourage the following:
- Encourage Storefront Displays: Street level frontage in neighborhood retail areas should be primarily devoted to entrances, shop windows, or other displays.
- Encourage Clear Glass: Clear un-tinted glass should be used to allow maximum visual interaction between sidewalk areas and the interior of buildings.

**Architectural Character and Materials**
The purpose of this section is not to dictate architectural character or architectural style, but rather to provide a conceptual framework for new building design for the MRIC. Innovation Centers develop successfully with a range of architectural expressions that work together to create a collective whole. While side-by-side buildings may not look alike, they can relate to each other through scale, color, materials and texture.
FIG. RESEARCH BUILDING DESIGN PRECEDENTS
FIG. MANUFACTURING BUILDING DESIGN PRECEDENTS
The built form should respond to the local climate and environmental conditions of Davis, Sacramento and the larger Central Valley. Common architectural elements expressed in the architecture include, but are not limited to:

1. Modulation of building facades
2. Establishing common elements such as structural bay or window modulation
3. Colors and material selection

Building Materials
Selecting colors and material options for the Project is a critical step in the creation of a vibrant, cohesive development. One should look to the local vernacular for precedent. Reinterpreting the use of these colors and materials to adjust to modern design or construction technologies is highly encouraged. The use of local materials and methods is encouraged to give the Mace Ranch Innovation Center a distinctly local expression Buildings may use multiple materials to provide façade variety.

Extreme contrasts in materials, colors, shapes and other characteristics that will cause buildings to stand out in excess of their public importance should be avoided. The materials palette for building facades may include a variety of different cladding materials: granite, brick, limestone, other naturally occurring stone or cast stone of high architectural quality. In walls with such materials, punched windows are encouraged and should have a distinct rhythm.

Continuous ribbon windows are discouraged. Glass curtain walls may be used to appropriately distinguish the research/office and laboratory buildings from the manufacturing facilities, as well as provide transparency, lightness on the landscape, and a sense of openness.

These guidelines are intended to outline objectives regarding the use of materials, relative scale, and creation of a human-scaled environment at the pedestrian level. They are not intended to impose a strict limitation on the individual style, form and character of the proposed buildings.

Please see the section on Building Performance for additional information on building materials.
FIG. EXTERIOR BUILDING MATERIAL PRECEDENTS
Encouraged Exterior Materials and Use

- Wall coverings: Stone, brick, stucco, pre-cast concrete, gfrc, engineered wood and metal panels are all appropriate exterior cladding materials.
- Glazing systems: Transparency through use of glass is encouraged at courtyards, entrances, and community spaces.
- Other Materials: Wood, engineered wood, and metal may be used for architectural elements such as sunscreens, trellises, and canopies.

Discouraged exterior materials

- Mirrored glazing
- EIFS (externally insulated finished wall systems)/Dryvit except for mechanical penthouses and other rooftop structures for mechanical equipment.

Maintenance & Durability

- Materials should be selected for their long-term durability in mind.

Recyclable Materials

- Materials that could be reused once the buildings have reached the end of their lifespan reduce the need for further exploitation of natural resources for future developments.
- Apart from how materials could be recovered for future use, the MRIC development should also consider using materials with high-recycled content.

Sunshading

Overhangs should be generously proportioned to protect from solar exposure and rain, and care should be taken to create visually interesting compositions, both horizontally and vertically. Overhangs may be broken or staggered to prevent repetitive and uninteresting facades.
Screens

Screens have a significant place in local building tradition and are encouraged as an attractive means of providing solar shading and/or privacy. Use of wood or metal screens should primarily be used as a façade accent; as such, large areas of these materials are discouraged.

Planters

Vegetation beds are an effective means of stormwater management and create attractive places to live and work. Planters are encouraged at ground level and may be used vertically with balconies as well. Green walls with vine plants or vertical planting beds are also encouraged.

Trellis

Overhang structures that cover outdoor spaces are encouraged to provide important shade. These structures can also be used to support photovoltaic devices to create energy and enhance shade for outdoor spaces.

Building Performance and Sustainable Building Design

The desired goal of the MRIC is to enable general building sustainability improvements to reduce the use of energy and associated carbon emissions, reduce consumption of potable water, to control and regulate stormwater runoff and potentially recycle the water on the site, to improve indoor air quality, and generally “future-proof” the buildings so they can be adaptable to new technologies for reducing water and energy consumption.

The development parcels for this project are proposed to eventually connect to a proposed Neighborhood Energy Utility (NEU) District that will incorporate district heating water and utilize to the extent practicable Purple Pipe non-potable water main for toilet and urinal flushing.

The Building Performance guidelines identify six distinct categories of sustainable design that are appropriate for the unique requirements of the office/R&D/Retail buildings:

1. Building Site Design & Planning
2. High Performance Facades
3. Energy Use & Generation
4. Water Management
5. Materials, Resources and Waste
FIG. EXTERIOR SHADING PRECEDENTS
6. Indoor Air Quality

**Building Site Design & Planning**
Placement and shape of a building can have an enormous effect on a building’s energy performance. Consider orientation, daylighting, heat island effects, stormwater generation, significant vegetation, green corridors and other sustainable building issues.

Orientation affects energy gains and losses as well as the comfort of its users. Heat is absorbed by buildings and paved surfaces and is radiated back, increasing the temperature in urban areas. Consider light colored paving surfaces and shading paved areas with landscaping and/or photovoltaics and solar panels.

**High Performance Facades and Roofs**
- Effective thermal insulation is the most critical design parameter of the building envelope. It reduces the rate of heat losses and gains to and from the outside. Thermal insulation also impacts the surface temperature. All R-values for walls and roofs are to minimally conform to at Title 24/Cal Green Tier 1.

- Solar Shading includes the use of overhangs, blinds, louvers, or anything else that reduces the amount of direct solar gain in the space, reduces both the external and internal surface temperatures of affected windows, floors, walls, and reduces glare in the space.

- External solar shading are encouraged to be designed to shade window areas during mid-July to late August sun angles to coincide with the warmest outdoor ambient air temperatures in Davis.

- Minimum dual-glazed window assemblies with low-e coating are encouraged to be used on all facades.

**Thermal Mass**
Thermal mass refers to materials capable of absorbing, holding, and gradually releasing heat (thermal energy). Thermally massive materials absorb heat and slowly release it when there is a temperature difference. When incorporated into a wall or floor, the mass acts as a heat sink, absorbing the heat and slowing its transfer through the wall or floor.
Buildings are encouraged to use materials high in thermal mass and utilize radiant slab heating and cooling systems.

Energy Use & Generation
The MRIC Project will achieve at least 50% on-site energy generation at full build out. This will be achieved through a variety of means including solar/photovoltaic panels, daylighting strategies, high building performance materials, plug load management and other measures.

The MRIC Ownership Association will perform energy modeling and building energy compliance to standards set forth in this document or regulated by code (Cal Green and/or City of Davis standards-whichever is more restrictive at the time of monitoring).

Individual tenant metering for energy use should be incorporated. Metering displays should be placed in a prominent location to encourage visibility, usage, and improve the effectiveness of occupant operations.

Guidelines include:

- Reduce heating, cooling, and lighting loads through climate-responsive design and conservation practices;

- Employ renewable energy sources such as daylighting, passive solar heating, photovoltaics, and groundwater cooling; All buildings are to be designed to be solar-ready to allow for solar collectors and/or photovoltaic panels.

- Specify efficient HVAC and lighting systems that consider part-load conditions and utility interface requirements.

- Optimize building performance by employing energy modeling programs and optimize system control strategies by using occupancy sensors, CO2 sensors and other air quality alarms.

- Monitor project performance through a policy of commissioning, metering, annual reporting, and periodic re-commissioning.
• Integrate water saving technologies to reduce the energy burden of providing potable water.

• Use energy efficient HVAC equipment and systems that meet at a minimum the Title 24/Cal Green Tier 1 standards.

• Use Energy Star® approved and/or FEMP-designated energy efficient products or products that meet or exceed Department of Energy standards.

• Provide separately controlled plug load time of day automatic shutoff controls for a minimum of 50% of all plugs in the building and individual tenant spaces.

• Evaluate energy recovery systems that pre-heat or pre-cool incoming ventilation air in commercial buildings.

• Investigate the use of integrated generation and delivery systems, such as co-generation, fuel cells, and off-peak thermal storage.

Building Performance and System Control Strategies

• Employ high performance energy modeling programs early in the design process for individual buildings.

• Use sensors to control loads based on occupancy, schedule and/or the availability of natural resources such as daylight or natural ventilation.

• Evaluate the use of modular components such as boilers or chillers to optimize part-load efficiency and maintenance requirements.

• Evaluate the use of Smart Controls that merge building automation systems with information technology (IT) infrastructures.

• Employ an interactive energy management tool that allows you to track and assess energy and water consumption like the Energy Star® Portfolio Manager.

• Employ centralized remote meter reading and management to provide accurate
analysis of energy use and monitor power quality.

- Use metering to confirm building energy and environmental performance through the life of the Project.

- Provide electronic interactive graphic dashboards in prominent locations to educate occupants of their building's energy and water consumption and highlight sustainable building features.

**Water Efficiency and Management**

Buildings and building sites should be designed together with responsible water-use strategies in mind.

Increasing impervious surfaces leads to more stormwater runoff. Runoff control should be designed to mimic natural conditions and protect water quality. Sedimentation caused by erosion may hinder waterway navigation, disrupt aquatic life and reduce the quality of recreational areas. Strategies to minimize impervious surfaces include:

Greywater Harvesting

- Stormwater harvesting is encouraged for reuse in landscape irrigation and/or buildings (fire suppression, toilet and urinal flushing and custodial uses).

- Buildings will be fitted out with purple pipe systems to allow for capture of this reusable water.

*Additional strategies to reduce wastewater include:*

- Low flow plumbing fixtures: dual-flush water closets, ultra-low flush urinals or non-water-using urinals

- Automatic fixtures sensors or metering controls

**Materials, Resources and Waste**

Maximize the use of recycled construction materials and materials with recycled content.
Maximize the use of rapidly renewable materials and materials with high amounts of recycled materials.

Where practicable, use local materials for building construction by taking advantage of local construction techniques.

Design buildings and building sites to minimize strain on local infrastructure. Development projects in areas adjacent to agricultural lands can compromise existing wildlife habitats and exacerbate local and regional erosion. Care should be taken to minimize the impact to the natural environment.

Minimize construction waste and recycle waste material whenever possible. Consider the storage and collection of recyclables during and after building construction.

**Indoor Air Quality**

Establish minimum indoor air quality performance for the comfort and well being of building occupants.

Maximize the use of low-emitting VOC construction materials and reduce the quantity of indoor air contaminants that may be harmful to occupants (adhesives, sealants, paints, carpet, wood products).

Project is encouraged to provide at various streams for waste removal for the development to include regular garbage, recyclable materials and organics.

It is encouraged for the MRIC to provide a central stores facility containing bulk supplies of environmentally-friendly housekeeping supplies in the building.

All building materials should NOT contain any of the following materials or chemicals:

- Asbestos
- Cadmium
- Chlorinated Polyethylene and Chlorosulfonated Polyethylene
- Chlorofluorocarbons (CFCs)
- Chloroprene (Neoprene)
– Formaldehyde (added)
– Halogenated Flame Retardants
– Hydrochlorofluorocarbons (HCFCs)
– Lead (added)
– Mercury
– Petrochemical Fertilizers and Pesticides
– Phthalates
– Polyvinyl Chloride (PVC)
– Wood treatments containing Creosote, Arsenic or Pentachlorophenol

**Signage and Wayfinding**

The intent is to establish an overall signage and wayfinding program that will visually knit the MRIC development together; support and promote the unique brand; enhance the pedestrian environment; and assist employees and visitors in finding their way in and around the area with convenience and ease.

• Signage should feature attractive graphic design and may be fixed above doorways or windows displays.

• Advertising kiosks and signs are encouraged to add a sense of activity in the retail/transit plaza areas.

• Storefront displays, attractive signage, and attractive lighting should be integrated into the overall building design.

• Provide on-site and off-site directional signage to parking areas, major bus stops, train station, Davis Downtown and key community amenities such as public parks, open space areas. Explore opportunities for educational and interpretive signage to highlight important natural features and habitat conservation efforts on the site. In particular, locate this signage along multi-use paths near the specific natural and sustainability features they describe and highlight.
FIG. SIGNAGE AND WAYFINDING
• Place wayfinding and directional signs at a height visible for both pedestrians and drivers. Signs should be placed at approximately eight to 10 feet above ground. Scale signage to be visible both from the roadway and sidewalks.
6. PARKING AND SERVICE LOADING

The proposed parking areas are to visually minimized and serve as areas to promote energy production, utilize landscape for shading, and aid in stormwater management. The parking areas will be designed to include permeable surfaces to address stormwater runoff, shade trees and solar arrays to mitigate the heat island effect often associated with large parking fields.

Depending upon the type of user, buildings may be designed with heavy truck access and loading bays which will occupy a portion of the proposed parking area. Others buildings may include areas specifically designed for outdoor product testing. As a result of user demand-driven build out, over time, parking areas may be converted to parking structures to accommodate full development at the targeted density of the Center. (See Figure xx.)

Parking Lots

The project will be well connected to public transit and the City of Davis’ extensive bicycle network to reduce the dependence on personal automobile use. However, a significant portion of the site will still need to be dedicated to parking. To reduce the impact of parking on the surrounding environment and aesthetics, a number of strategies will be employed.

Surface parking at the Mace Ranch Innovation Center is designed to be aesthetically pleasing, serve to aid in storm water management, and to create energy for the Project. Reflecting the existing agricultural grid, the parking areas are designed to minimize the visual impact of the cars from many views, including Interstate 80 where fields of trees and solar panels will be seen versus large swaths of parked cars.

• Parking space and aisle way dimensions will conform to the City of Davis parking standards.

• All surface lots will incorporate either solar/photovoltaic structures where the cars are parked underneath, or will incorporate trees and bioswales to reduce the heat island effect.

• Electric and NGV stations will be provided in every parking lot area to facilitate the use of the of alternative energy cars. Electric vehicle charging stations powered by 100% solar power will be made available and exceed Cal Green requirements.
FIG. PARKING AREAS
• A portion of the parking spaces will feature the use of permeable paving to reduce runoff and increase groundwater infiltration. Bioswales and rain gardens between the parking spaces will capture and filter runoff, enabling the parking areas to treat storm water.

**Loading/Servicing**

In order to promote a lively urban character, it is essential to minimize the impact of parking garages entrances, service and loading areas on the pedestrian environment; and to provide an efficient and effective servicing environment to fulfill the variety of needs of the Mace Ranch Innovation Center.

• Loading facilities should be located away from major pedestrian routes and intersections where feasible. The size of entrances to loading facilities should be minimized and be designed with visual buffers or screened from public view, where feasible.

• Outdoor trash/recycling receptacles and storage should be screened from public view as practicable.

• Service docks are to be internal to the building envelope, equipped with closable overhead doors. Bays will be dimensioned so that, during use, trucks should not project into the vehicular streets or throughways.

• Service alleys shall be screened from the pedestrian view as much as possible, with building facades and/or site walls with landscaping. Openings shall allow for the minimum vehicular cartway and shall be designed for pedestrian access where appropriate.

• Outdoor trash receptacles shall be screened from public view.

**Lighting**

All lighting for the parking areas shall conform to the City of Davis Ordinance 1966 for Dark Skies. The purpose is to minimize light pollution and allow people to see the sky.
FIG. BUILDING SERVICE AND LOADING

Service and Loading

Service and Loading Area

Mace Ranch Innovation Center Design Guidelines
All outdoor site light fixtures shall be bi-level LED that will reduce the demand for electricity and promote efficiency.

High efficiency fixtures are encouraged to direct light where it is needed and to avoid excessive glare and reduce impacts on the night sky and open space.

Parking lot lights should be no higher necessary to provide efficient lighting and should not exceed 28 feet in height, including the base.
FIG. SITE LIGHTING