APPENDIX Q
MRTP Development Code

MAUI RESEARCH AND TECHNOLOGY PARK

DEVELOPMENT CODE

November 20, 2012

INTRODUCTION

The idea for the Maui Research and Technology Park originated in the 1980's with local private and public sector leaders intent on diversifying Maui's economy through investment in high technology. The economy was too heavily dependent on tourism and agriculture, and a Research & Technology Park was envisioned as a tool to help create the "third leg of the stool", adding different kinds of jobs and making the overall economy less vulnerable and more robust through diversity. Since that time, the Island's agricultural sector has been contracting, and the tourist economy has shown its volatility with changes in the broader economy. The goal of economic diversification remains more important now than ever.

The Park's first building opened in the early 1990's, and to date approximately 180,000 square feet of Class A office, laboratory, and data center space has been developed. An estimated $100-$150 million a year in revenue flows through the Park's businesses and projects. The Park and all its current buildings and associated infrastructure represent an estimated $60 Million investment. Approximately 400 people work in the Maui Research & Technology Park at over 20 companies in a variety of sectors, including optics, directed energy, data fusion, space surveillance/situational awareness, software development, and professional services.

However, even with these achievements, the breadth and depth of employment opportunities is significantly less than what more modern and progressively planned parks are capable of delivering. At their best, technology parks act not only as a magnet for already established businesses, but also embrace and accelerate businesses start-ups by nurturing local talent and ideas.

The current Maui Research & Technology Park is too inflexible to fully respond to the needs of an increasingly diverse high technology industry. The Park's current 2-acre minimum lot size makes it cost prohibitive for many small businesses to enter the Park. And, at the other end of the spectrum, fully entitled lots of sufficient size are not readily available for large campus type users. If such a user was to desire a lot in the Park, years of costly entitlement processing would be required before the campus could be developed.

Exacerbating the current condition is the Park's zoning ordinance which prohibits mixed use development. This prohibition has made the Park isolated from the types of goods, services and amenities that a high technology workforce desires. Current employees of the Park are required to drive to and from work and since few daytime amenities exist, the Park is entirely automobile dependent.

In the time since the creation of the Maui Research and Technology Park, the understanding of innovation clusters and the needs of knowledge workers and businesses has increased. Technology businesses thrive in areas of diversity and activity. A diversity of businesses and workers and availability of many startup spaces enhance the chance for success of individual businesses as well as the cluster as a whole.

This Plan utilizes the principles of New Urbanism and Smart Growth to transform the current, single-use large lot research and technology campus into an integrated and vibrant mixed-use community focused around a regional knowledge industry employment base. This transformation will have positive effects on the environment, on individual health and well being, and on the long-term economic viability and adaptability of the Park.

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CONTENTS

1 - BACKGROUND

Organization of this Book

This document sets forth the details and implementation strategy of an updated vision for the Maui Research & Technology Park. This chapter discusses the Park's background and context. Chapter 2 explains the genesis of the Park's challenges in achieving its economic development goals and overarching strategies to help the park achieve those goals. Chapter 3 discusses a broad set of design principles which encompass the current state of the art in urban design and planning.

Based on the approach and principles from chapters 2 & 3, Chapter 4 shows the proposed updated master plan for the park. The plan is a vision for one possible way for the Park to develop. Finally, chapters 5, 6 and 7 create a set of regulations to guide the Park's development based on the preceding chapters' principles and vision. These chapters comprise the project's form-based code.

Form-Based Codes

Form-based codes regulate the built environment in order to create better places. The standard zoning and its concentration on land use has proven unable to create high quality places. By creating large areas of uniform land use, leaving the urban structure and public realm unregulated, zoning has allowed the growth of formless, dysfunctional places that often fail to achieve even the goals for which the zoning was created.

Form-based codes are an attempt to remedy this problem. By concentrating on the elements of physical form while allowing more flexibility in land use, they work to weave buildings, streets, and neighborhoods together into beautiful, functional, and adaptable places.

Form-based codes can be organized in a variety of ways. This code regulates multiple elements, from the design and location of public spaces to the creation of a set of building typologies. Because of the necessity of keeping a high degree of flexibility for the employment uses, the

See "Form-Based Codes: A Guide for Planners, Urban Designers, Municipalities, and Developers" by Parolek, Parolek, and Crawford for an in-depth discussion of form-based codes.

Controlling Plan

The major layout for the plan, including the location of various land use zones

Land Use Matrix

The land uses assigned to each land use zone

Building Types

The specific rules for building types

General Rules at the Neighborhood and Building Scales

The overall set of rules which give the plan a uniform quality of development

portion of the code which deals with the larger employment areas regulates by concentration on the public street frontages.

Form-Based Code Elements

Form-based codes have a variety of elements. There is no fixed list, but the most common elements are the regulating plan, standards for public space and infrastructure, standards for private development, and administration procedures.

A regulating plan shows how elements fit together on the site, including streets, parks and other public spaces, and private properties. The regulating plan may be more or less detailed, in some cases showing every street or in others showing larger blocks of development. The regulating plan is the element of the code which is most specific to an individual site, since it shows the overall vision for the project. The regulating plan for the Maui Research & Technology Park is in Chapter 5 of this document.

The standards for public space and infrastructure and the standards for private development set basic requirements for how the public and private realm are constructed. These code elements should work together to create a public and private sphere that achieves the overall goals of the project, including economic development, aesthetic goals, and quality of life goals. Subjects which may be included in these sections are block and subdivision rules, building types, architecture, green building, and landscape. Public space and infrastructure regulations are included in chapter 5 of this document, “Neighborhood Scale.” Private development standards are included in chapter 6, “Building Scale.”

Administration procedures are included in form-based codes to ensure that the elements of the code are implemented as envisioned. The administration for this code is shown in chapter 7, “Implementation.”

Site Description

Island of Maui

The Maui Research and Technology Park (MRTP) is located in the South Maui town of Kihei, mauka (east) of the intersection of Pi'ilani Highway and Lipoa Parkway (called Lipoa Street makai of Pi'ilani Highway). Kihei is one of many small towns on Maui, and is developed in a linear form along South Kihei Road, which runs north and south parallel to the ocean shore. The newer Pi'ilani Highway lies mauka of most of the town's development, and is a high speed facility with a limited number of intersections. The island's primary airport is in Kahului, about 30 minutes away by car.

Kihei has a variety of development, including many mid-range hotels and condominium developments, single family homes and some low density multifamily. Much of Kihei's retail is small in scale and lies along South Kihei Road, but several large shopping centers exist as

MRTP lies mauka of Kihei, beyond Pi'ilani Highway

Azeka Shopping Center in Kehei

Maui coastline

well, including Azeka Shopping Center near the intersection of South Kihei Road and Lipoa Street. Pi'ilani Shopping Center is one block north of Lipoa Street and just makai of Pi'ilani Highway, very near the Technology Park, and includes a large Safeway grocery store. A large new shopping center called Downtown Kihei is planned near Pi'ilani Shopping Center, and a large outlet mall and shopping center is planned for an area north of the Park, also Mauka of Pi'ilani Highway.

Divided from the rest of Kihei by the high speed four-lane Pi'ilani Highway, the Technology Park is physically and visually isolated. A golf course lies between the Park and the highway, leaving the park with no highway frontage. The one road access, Lipoa Parkway, is currently two lanes with a very wide right of way which will easily accommodate four lanes. There are no through roads in the park, leaving the Park's overall road network to function as a cul de sac. The Park is surrounded by undevel-

A Park tenant

Local Context

The Park has open setbacks and lush landscaping

Park Plaza building

oped land on the north, east and south sides.

Existing development in the park is on five parcels. Buildings are one and two stories, and all development (as required by existing design guidelines) sits behind deep setbacks, usually filled with one or more rows of parked cars. Roads and intersections are large, with large turn radii. Most roads have sidewalks, and much of the landscaping is lush and beautiful.

Some Park buildings have little local architectural influence

Hedges screen unattractive parking lots from the street

Parking lots line most streets

MRTP Context Map

Opportunities & Constraints

Maui's Valley Landscape

Retention Basin and Spillway

Views to West Maui

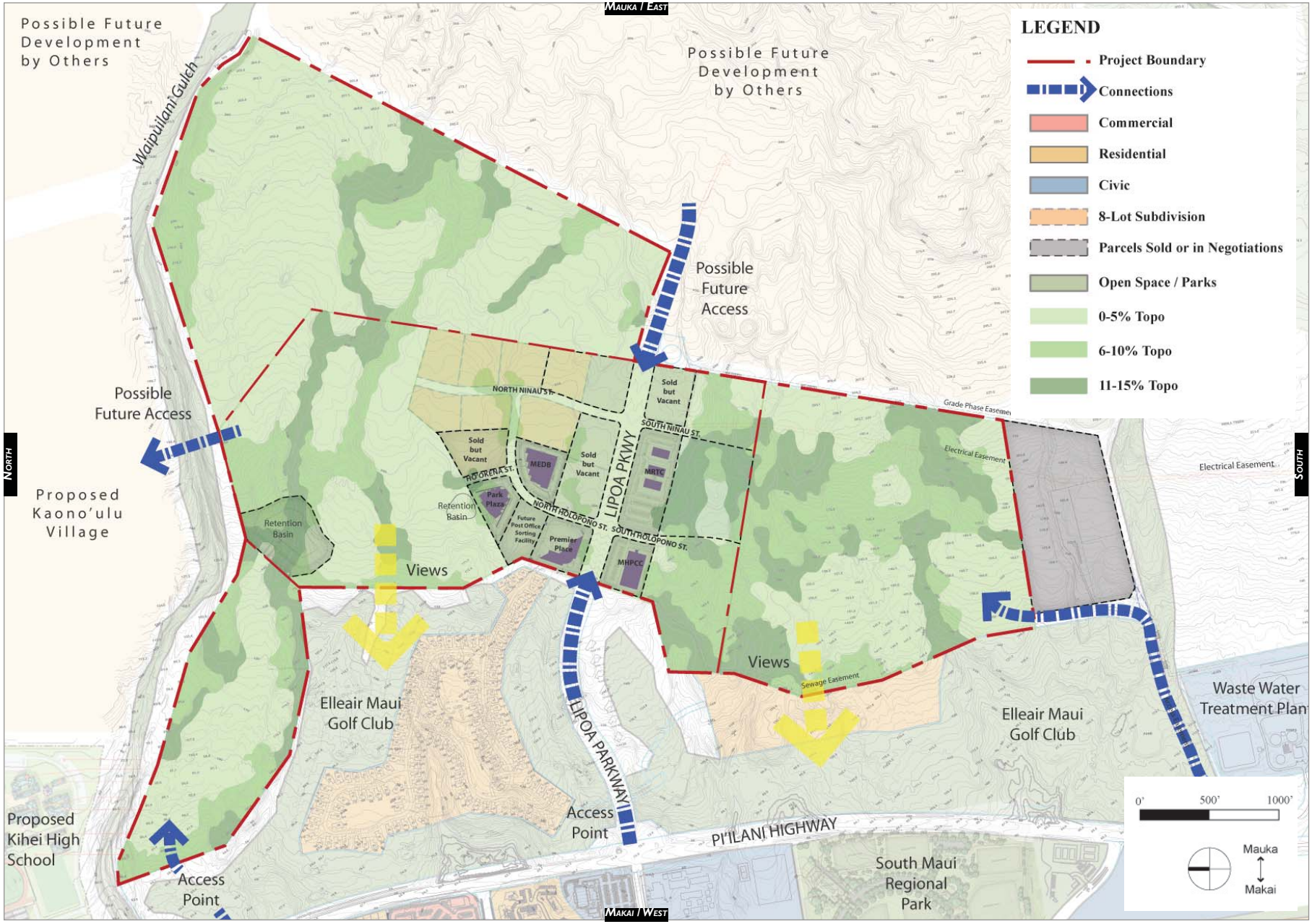
The most interesting opportunity on this site is the presence of an existing employment base. The creation of mixed use and walkable areas is of the highest importance, as will be discussed in chapters 2 and 3. Unlike most greenfield sites, however, the Park already contains the most difficult element to obtain for creation of walkable mixed use - employment. This site presents a unique opportunity on Maui for the creation of a true mixed use center.

As for topography, the site generally falls to the west toward the ocean. The slope is typically gradual, with some areas of steeper terrain including several small gulley systems. A large gulley lies just outside the site's northern boundary. Just under the shallow soils of the site is a very hard rock called blue rock, which makes excavation expensive.

The most spectacular views from the site are makai. They encompass the ocean, west Maui, and neighboring islands. Many parts of the site also overlook the adjacent golf course. Views mauka are also good, toward Haleakala.

Access and visibility for the site are extremely limited. Hidden by topography and the golf course, the site is most visible on Pi'ilani Highway by its entry sign at Lipoa Parkway. Possible future access points from Pi'ilani Highway at Waipuilani Road in the north and Welakahao Road in the south will help this situation some. However, the lack of visibility and through traffic, as well as the presence of large amounts of nearby retail, would make it unlikely that significant retail development in the Park would be successful.

A development of executive golf course homes is currently under way in the golf course makai of the Park. The housing north of Lipoa Parkway is partially complete, and another area south of the Parkway and adjacent to the Park is also planned. Haleakala Ranch has proposed



Opportunities and Constraints Map

development on Ranch property on the north and mauka sides of the Park. The timeline for this development is unknown, but would likely happen over many years. This adjacent development will help to make the Park less isolated, would help to support employment and retail uses in the Park, and would necessitate the creation of connections to the Park.

Retention basin and mountain view

Waipuilani Gulch

Elleair Maui Gulf Course

2 - CHALLENGE & APPROACH

Challenge

The Maui Research and Technology Park's mission of job creation and diversification of the island's economy remains one of vital importance. In light of the current worldwide economy's condition and its effect on tourism, as well as the reduction in agriculture on Maui, having a viable economic "third leg of the stool" is more important than ever. For this reason, the Park's slow development calls for a change in tactics.

The Park retains many advantages, not the least of which is the high amenity value of life on Maui. But a variety of factors have impeded hoped-for growth. Among these factors are the physical and visual isolation of the park, offshore perception of Maui as destination for leisure - not business, a lack of flexibility created by restrictive zoning and design guidelines, a lack of some of the public amenities valued by knowledge workers, and the lack of flexible, cheap space for use by entrepreneurs for growing businesses.

Aerial of Maui Research and Technology Park

Approach

While there are limits to what urban design can do, such as changing the offshore perception of Maui, this plan aims to create a Park that is fertile ground for the growth of new jobs on Maui. This plan addresses the challenges posed by the park with a variety of strategies. These can be broadly grouped into two categories – creating a place and diversifying the offering.

Creating a Place

Recent years have been productive ones in the understanding of businesses, cities, and economic development. In the early part of the 20th century, Modernist thinking sought to isolate people and businesses, creating strictly separated zones of employment, work, shopping and recreation. This may have had some validity in the days of belching steel mills and other heavy industry, but even when these ideas originated their power to divide and destroy healthy communities was clear.

These patterns of separation of uses continue largely today. They have lead to single use subdivisions, big box retail strung along highways and part of no neighborhood, and isolated business parks. It was from this branch of thinking that the Maui Research and Technology Park grew. Now, however, most places of employment do not create the noise, smell, or pollution which would require them to be isolated from housing and other uses. Instead, the separation of land uses by long distances has forced people to drive for the vast majority of trips. Ironically, the thing most people now dislike about commercial development is the very traffic that this separation of uses has created.

On the other hand, years of research into the growth of businesses in Silicon Valley and other tech centers have shown the value of a mixture of uses and activities. For businesses and cities alike, the healthiest situations arise where there is a mixture of elements. In cities, this allows easy interactions and transportation between home, work, play and education, with a corresponding rise in the option of getting around by foot or bicycle

Lahaina streetscape

Maui single family housing

Office and retail mixed-use building, Stapleton, Denver, Colorado

and a reduction in carbon emissions and in consumption of natural areas and agricultural land for sprawling development. Not surprisingly, businesses also thrive in these mixed environments, especially young businesses which depend on the business connections made available by diverse environments and the labor pool which comes with these areas. The younger, highly-educated, highly-motivated knowledge workers which make up this labor pool are drawn to these diverse and interesting environments on their own, and become a kind of natural resource that in turn attracts and creates business. Publications like the Wall Street Journal have written on this trend, noting that in Silicon Valley, "demand for downtown office space is being driven by start-ups wanting better access to public transportation and to be in walking distance to restaurants."[1]

This understanding has also been recognized in prominent economic development publications like the 2008 report by the Association of University Research Parks, "The Power of Place." Among that reports recommendations was to:

> *Build Sustainable Communities of Innovation: Incentives for sustainable 'smart growth' development should be central to establishing American Innovation Zones. The U.S. Department of Housing should explore best practices nationally to encourage density and mixed-use development in American Innovation Zones in urban areas, which will encourage researchers and entrepreneurs to live where they work, and reduce sprawl.* [2]

Creating a "place", a location which people are drawn to, involves a combination of factors. Among others, these factors include diversification of land uses and creation of an attractive and welcoming public realm. A satisfying and interesting place contains a variety of users and activities, and is friendly to people on foot. In order to create a place, this plan proposes the diversification of land uses within the park. The addition of housing, retail, civic, and open spaces to the Park will add amenity for business attraction and retention. While the plan does not contemplate addition of a large amount of retail, local serving retail such as coffee shops, restaurants, dry cleaners, and business services will be amenities for employees of the park. Civic uses such as a school or a library, if they can be attracted to the park, also serve as amenities. Residential development, especially development with a wide variety of unit types targeted toward

Urban format office, Daybreak, UT

[1] *Wall Street Journal, "Start-Ups Are Drawn to Pulse of Downtown," November 4, 2010.*

[2] *The report "The Power of Place: A National Strategy for Building America's Communities of Innovation," October 2008, by the Association of University Research Parks, can be found online at http://data.memberclicks.com/site/aurp/The_Power_of_Place.pdf*

workers in the park, would also be an amenity, helping businesses in the park attract and retain qualified workers and reducing the barrier of the high cost of housing on the island.

Put together, the combination of existing businesses and employees in the Park, new businesses which will be created and attracted, housing, retail, open space, and civic elements will create a true neighborhood in place of the isolated, single use Park that exists today. The combination of elements will create synergies beyond what all of these land uses would add up to as separated pods, and this added energy will drive development of employment at the Park.

Diversifying the Offering

The current condition of the Park is one of quiet and uniformity. Buildings of similar scale and massing sit quietly behind beautiful landscaping in rigid isolation. Some businesses see this type of environment as ideal, regardless of the environmental or social consequences. This current strategy is most suited to attracting mid-size businesses which have been in existence for some time. However, the Park's existing one-size-fits-all strategy is destined to miss out on many opportunities to achieve the ultimate goal of the Park, which is diversification of Maui's economy with high skilled, high paying jobs.

Jane Jacobs, one of the most influential urban theorists of the 20th century, understood the power of diversity for both the health of a place and for its power to generate new economic development. In her seminal book, "The Death and Life of Great American Cities," she noted that in order to create opportunities for innovation, cities must provide a variety of spaces. She said, "Old ideas can sometimes use new buildings. New ideas must use old buildings." [3] This was an argument against the blank and lifeless uniformity of single use zoning and urban monocultures.

Of course, the Park is new and lacks old buildings. The

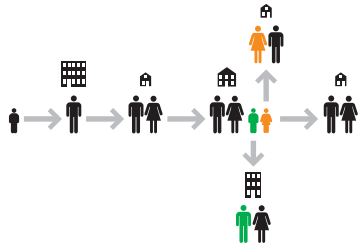
Inspiration for flex typology from local built form

Wailuku commercial building

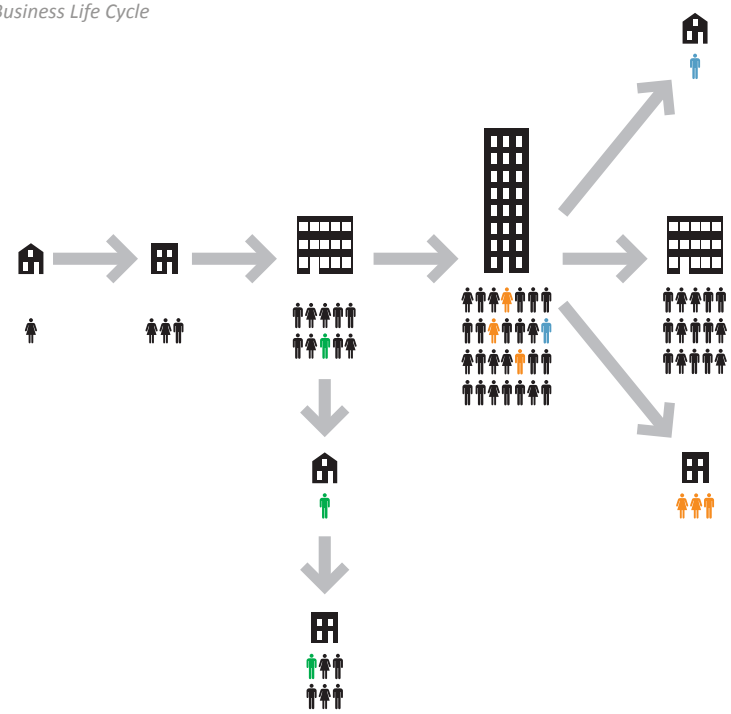
Informal space as incubator - the birth places of Hewlett-Packard, Apple and Google.

[3] *"The Death and Life of Great American Cities," 1961, by Jane Jacobs.*

Family Life Cycle



Business Life Cycle



Businesses move through stages of life, just as families do. At top, a person goes from childhood to young adulthood to marriage to children, and finally to an empty nest. At each stage of life, the individual's desired housing type changes, from apartment to small house to larger house and then again to a small house. Similar stages apply to businesses, from inception to growth in various stages. As time goes by, people leave even successful businesses to found new businesses, starting the process again. Unfortunately, with its uniform buildings, the Park at present can only accommodate mid-size and large businesses and does not help to incubate new businesses for Maui.

same result can be achieved, however, by creating a wide variety of spaces, especially small, inexpensive, flexible spaces which will allow entrepreneurs to begin and grow businesses. The plan proposes a great diversification in the Park's offering of spaces for business. One strategy to achieve this will be the revision of the Park's guidelines. The revised guidelines protect essential aspects of the park but loosen many of the onerous restrictions on business development in the park. For example, large minimum lot sizes and deep setback requirements promote a certain aesthetic vision that unfortunately serves to exclude many possible park tenants, such as those who do not need or want a large building or parcel of land. A more open set of regulations can still serve to create an attractive setting, while allowing businesses to create facilities that respond more closely to their own needs.

Another diversification strategy is the master plan's variety in parcel sizes. This element of the physical plan will allow the Park to maximize job creation by being opportunistic, seizing every chance at business attraction. While still providing parcels at current sizes of approxi-

Single use development

Auto-centric development

mately two acres, the plan subdivides some into smaller parcels for smaller users. At the same time, the plan maintains space for a large, "campus"-scale user should the opportunity arise to accommodate one in the Park.

Unlike some other places which serve as fertile ground for innovation, the Park does not possess a varied stock of old and new buildings of varied conditions and sizes. The key idea in this is that new businesses often do not need or want large, new spaces, and in an area with a variety of spaces, entrepreneurs can occupy space of the size and quality that suit their business's life stage. To accommodate this need, the plan proposes the use of innovative flex space. Used before in other places as a seed space, notably in the Second Street Studios in Santa Fe, New Mexico, flex space provides cheap, flexible space for entrepreneurial efforts. Even while keeping such space affordable, quality architecture can make flex buildings attractive parts of an area.

And finally, the plan proposes casting a wider net to attract the high skill, high paying jobs so vital to Maui's economy. While the goal of attracting "high technology" workers is a good one, other quality jobs broadly falling in the category of "knowledge industries." The Park's mission of economic development will be facilitated by the flexibility to attract many different knowledge businesses. The addition of new employees will aid in creation of a critical mass in the park, benefitting the effort to make the Maui Research and Technology Park into a place, moving beyond its current state as an isolated, single use zone.

Staffordshire Technology Park, Staffordshire, United Kingdom

Urban format office, Daybreak, Salt Lake City, Utah

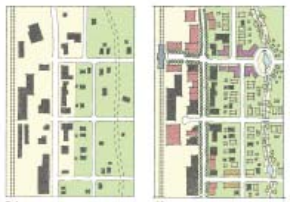
Supportive Efforts

While physical design of the built environment is vital, other supportive efforts will be essential to the health of the Park. These include continued efforts to attract businesses and coordinate between existing businesses in the park. Collaboration with the Maui Economic Development Board, County of Maui, and the State and Federal Government on efforts to attract, retain and expand businesses in the park will be of key importance - a concerted and joint approach is a must. These entities are very supportive of economic diversification, and the Park has always been recognized as an appropriate location for jobs developed as result of joint economic development efforts.

Locating civic facilities and amenities in the Park will accelerate and enhance efforts to grow into the hoped for regional employment center for knowledge and technology workers. Examples of value added projects that would enhance the Park would include additional public or private university projects, or establishments of new university campuses, public or private K-12 schools - including charter schools, community-based organizations such as a YMCA or youth center, and the re-emergence of business incubation efforts.

Google Campus, Mountain View, California

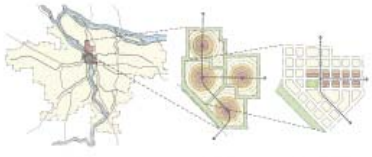
3 - DESIGN PRINCIPLES



Conservation and Restoration

Diversity and Balance

Human and Pedestrian Scale



Connections and Interdependence

Principles of Urban Design

The understanding of the importance of Urban Design and Planning has changed greatly in the last twenty years. Far from being concerned simply with aesthetic issues, well-designed places function far more efficiently than poorly-designed ones do. They have positive effects on the environment, on individual health and well-being, and on long-term economic viability and adaptability. Well-designed places are also better and more enjoyable places for people to live and work, which has made good design an important element in efforts to create economic development.

The motivation for the founding of the Maui Research and Technology Park remains as important as ever. Continuing job creation and economic development are essential for the well-being of Maui. This has become even more apparent with the recent economic downturn and the continuing decline of agriculture on the island.

Fortunately, the latest understanding of urban design for quality economic development, especially in fields of high technology, is also urban design which achieves environmental and other goals. Places which attract and create new high technology businesses are those which facilitate the exchange of ideas and make it easier for people to become entrepreneurs, and are able to deliver a high quality of life. By providing a variety of public and private spaces and a quality public environment, these places give people and businesses the flexibility and freedom to experiment, to take chances, and to make connections. These types of places are fertile ground for growth and entrepreneurship.

For these reasons, it is essential to use new models of development for the Park. New development must address many concerns simultaneously, incorporating the latest understanding of multiple issues. While good design involves an infinite number of elements, we have grouped the major concerns of urban design into four categories for purposes of discussion: conservation & restoration of the environment, economic and social diversity & balance, human & pedestrian scale in the public and private realms, and connections & interdependence between the neighborhood, town and region.

Because it is also important that the plan fit the needs and desires of Kihei residents, the details of these principles also incorporate elements of other local guidelines, such as the Kihei Community Association General Open Space and Design Guidelines. The KCA Guidelines are concerned with community quality and livability, with major areas of concern being:

- Open space drainage ways and flood control
- Wetlands and low lying drainage areas
- Neighborhood connectivity and pocket parks
- Shoreline property
- Beach access/impact
- Pedestrian and community safety and de-emphasis of the automobile
- Roundabouts and street design guidelines
- Affordable housing
- Schools, parks and roads
- Commercial and high density developments
- Green Building Guidelines

The design principles and plan which follow address nearly all of these concerns and are in near-total agreement with the KCA Guidelines.

Conservation & Restoration

Before After

Cities represent a fragile balance between our human needs and the capacity of our ecosystems. As we continue to gain deeper understanding of the repercussions of our human activity on the world's environment, the city is increasingly understood as an important place to adopt to a more sustainable lifestyle.

The design of the Maui Research & Technology Park will have an effect on the environment both locally and globally. Design which respects existing topography and other natural features not only is less damaging to construct, but preserves natural systems and the area's cultural and geographic memory.

On the other hand, design which minimizes unnecessary automobile travel has effects on the environment world-wide. The world is facing an environmental crisis of profound economic and social dimensions. Brought about largely by carbon emissions into the atmosphere, climate change is already affecting the human and natural environment and promises to create immense problems in the coming years and decades. Such problems may be particularly pronounced in island communities like Hawaii.

As is now understood, one of the major causes for carbon emissions over the last fifty years has been the way we build our cities. A purposeful emphasis on the creation of cities for automobiles at the expense of pedestrians, bicycles, and transit has increased automobile usage and the associated carbon emissions. At the same time, this style of development has increased land consumption, thereby reducing forest cover and increasing problems with stormwater runoff and pesticide use wherever it has been implemented.

Choices made now will have immense effects on the future of carbon emissions. Creating the Park in an efficient, livable, and environmentally-friendly way will ensure reduced emissions. Using an outmoded, autocentric development model will do the opposite, and the effects will be solidified in the built environment for years to come.

The Maui Research & Technology Park should add to the sustainability of Maui. It will be environmentally responsible by reducing resource waste, demanding less of the environment, and accommodating growth to support the island economy. It will address an ongoing challenge of economic development by attracting new growth in proximity to housing and regional transit.

By incorporating strategies on the neighborhood and building level, the design of the Maui Research & Technology Park can affect not only its site and surroundings, but the health of the planet as a whole.

Diversity & Balance

Mixed Use and Clustering

Mixing of uses and clustering of destinations is a way to reduce distances and make walking and bicycling more convenient. Maui already has development of middle density, but it often lacks clustering with other uses which leaves it seeming unfocused. Bringing the densest development together, ideally around a transit node, shortens trips and makes them more convenient. Having more residents or workers within 1/4 mile of a transit node makes it more likely that those persons will chose to use transit when they go elsewhere in the island, also.

Mixed Use

Mixed use is the mixing of various activities and land uses within a small area. Vertical mixed use means that a single building has several uses within. Horizontal mixed use means that multiple uses and activities are clustered near each other. Both of these types achieve the goal of making trips shorter and more convenient and raising the possibility that people will choose to use walking, bicycling or transit for their trips.

Mixing of uses at the neighborhood scale, within the 1/4 mile walking radius, allows people to reach daily destinations easily by foot. Large areas with single uses such as housing or employment force everyone to travel long distances to get around. Having retail and civic uses within areas of residential and employment uses makes it easy for people to do quick errands during their daily activities. Having recreational spaces nearby allows people to reach them more easily, creating situations where people can incorporate healthful activity into their daily lives. Having appropriate uses and activities near homes allows children as well as older people who can no longer drive a car to have increased independence.

Diversity of Housing

There will never be a single perfect housing type. Housing types must be as diverse as the needs of the people who inhabit them and accommodate changing demographic and consumer preferences. Even a single individual's housing needs change over his or her lifetime. A young person living in a small apartment may want a house after marrying, then a larger house after having children. Once these children grow up and leave home, the empty-nester couple may again choose a smaller home or apartment. Neighborhoods with a diversity of housing can accommodate these changes without forcing someone to move a long way or even to another community. A collection of townhomes, single family dwellings, and low apartment buildings can achieve a diversity appropriate for a growing and changing population.

Jobs Housing Balance

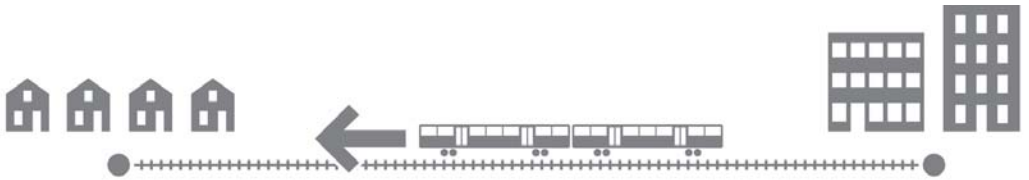
Another important reason for a mix of uses on the district scale is to create jobs housing balance. This means that an area would have a similar amount of jobs within it as it has workers living in it. This not only shortens many commute trips and therefore makes it more likely that people can travel to their jobs by walking or bicycling, but it also makes transit and automobile travel more efficient. By using transportation lines (roads or

bus lines) in both directions in a similar amount, peaking is reduced and a line of the same size can accommodate more travelers. (see diagrams)

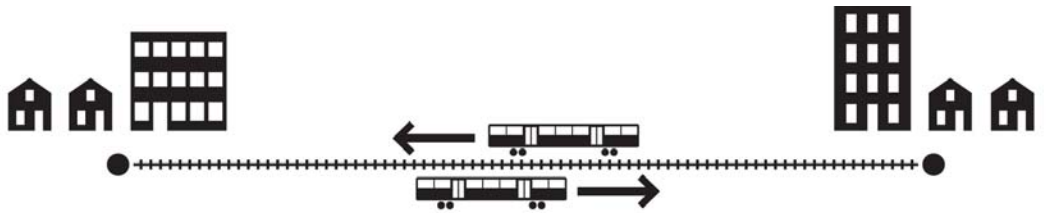
Balanced Flows

As a jobs center, it is unlikely that the Park would achieve a complete jobs housing balance. However, adding at least some housing will improve the situation, improving transportation efficiency as well as adding 24-hour activity to the Park. Having people in an area during more hours of the day makes an area safer and helps local serving businesses like restaurants survive, since they have customers in both the daytime hours and the evening hours. This will make the Park a more livable and economically viable area.

Unbalanced Morning Commute - going to work

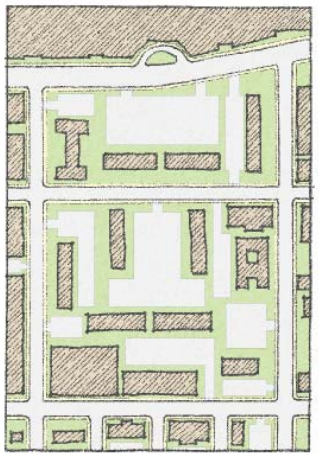


Unbalanced Evening Commute - returning home



Balanced Commute - moderate flows in both directions

Human & Pedestrian Scale



Auto - Scale

Pedestrian - Scale

Creating a place of human scale would leave it in stark contrast to the auto-centric development which has been common over many years and continues all over the world. Human and pedestrian scale recognizes the needs of people for safety, convenience and pleasure in the public realm. By creating places designed for humans, we give people the flexibility to order their lives in ways other than around the automobile.

Mixed Use and Proximity

Human and pedestrian scale includes many aspects of a place. Among the most important factors is a diversity of land use, as discussed in the preceding pages. A mix of uses in close proximity allows people to satisfy needs within an area which can be easily traveled by walking or bicycling. To achieve this result, the development must also be of sufficient density to contain these uses in a small area. Of course, each person differs in the distance which they are willing or able to walk, and factors such as the current weather affect this as well. However, a good rule of thumb is that destinations should be with about five minutes' walk, which is a distance of about 1/4 mile.

Walkable Streets

Another critical factor in human and pedestrian scale is walkable streets. An environment that encourages walking is imperative to the creation of a vibrant community. By walking for transportation we receive a variety of benefits – we reduce the need for the automobile, we provide foot traffic to local businesses, we interact with our neighbors, and we improve our physical health. In fact, a Washington State study found that residents of a pedestrian friendly neighborhood weigh, on average, seven pounds less than residents of a sprawling suburb[1]. In addition, walkable neighborhoods need less infrastructure for cars, thus sparing land for more enjoyable spaces such as parks and promenades.

To be walkable, streets must be well designed. Sidewalks are a must, but the design of the road network and of the streets themselves are key.

Street Networks

Auto-oriented street networks are designed in a very similar way all over the world. Beginning on local streets (often cul de sacs), every journey moves then to collector roads, then arterials, and often then onto a highway. Because of the fear of through traffic and a disregard for pedestrians, road networks are typically designed to force this pattern for every trip, lengthening each trip and congesting all of the arterials. This congestion then creates calls for road widening and the resulting huge roads make walking or bicycling even more difficult and dangerous.

Connector Roads

Rather than this typical street hierarchy of cul-de-sacs, locals, collectors and arterials, the Plan builds a network of interconnected local streets and connector roads. By ensuring multiple connections and routes, connector roads avoid the difficult problem of unlivable, high traffic collectors which are too busy and too noisy to accommodate residential development. Connector roads

[1] *Smart Growth America, http://blog.smartgrowthameri-*

typically occur every quarter mile and serve to disperse traffic widely.

Local Roads

Local roads are intended primarily for local access, but are also a vital part of the road network. They only rarely end in cul-de-sacs in the plan. Speed and through traffic are controlled by narrow road widths and curved alignments, while connections on both ends preserve emergency access and add route choice for daily users. Parking is provided along the road, further slowing traffic and providing for more activity on the street as people access their cars.

Street Design

The Evolution of Street Design

The weight of years of experience and research is chipping away at the entrenched practice of creating wide, autocentric roads in disconnected, discontinuous networks. Promoted for years as the safest and most efficient way to build road systems, it has now been proven that this type of system is just the opposite. Wide roads, contrary to providing an added cushion for error by drivers, instead provoke drivers to speeding and carelessness. The result is more crashes and more severe crashes. Pedestrian and bicycle injuries and deaths are multiplied by large, fast, busy roads, and because few people who have other options choose to walk or bicycle, even more traffic is created.

In contrast, the streets in this Plan are designed with a pedestrian-friendly environment as the first priority. Comfortable, walkable and bikeable streets knit neighborhoods and districts together, adding to a sense of community and facilitating transit use. Each sidewalk needs the shelter of trees, the presence of building entries and porches rather than parking lots, and a buffer of parking to protect the pedestrian corridor from moving traffic.

In all cases streets must be designed to slow traffic, as high speeds are entirely unnecessary within the site. High speed traffic creates a much higher level of noise, disturbing workers and residents. Preserving livability on the area's road network will require reasonable speeds to be maintained. More importantly, high automobile speeds create much greater danger for pedestrians as well as automobiles, making accidents more likely and multiplying the force of a crash many times. A pedestrian struck by a car at 20 miles per hour has a less than 10 percent chance of death. At 30 miles per hour, this chance rises to almost 50 percent. And at 40 miles per hour, fatalities are nearly 90 percent [2]. Speed on all roads in the Park should be limited to 25 miles per hour or less. At these speeds, a driver can still easily reach any Park location in minutes or less.

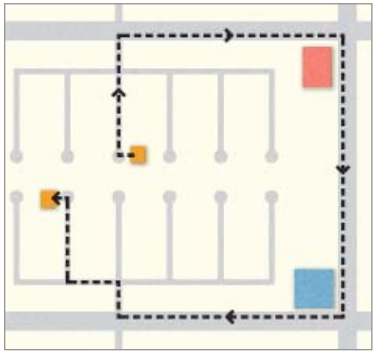
Traffic Calming

Traffic calming is the practice of bringing vehicular speeds and behavior into conformity with the needs of non-drivers. The streets in the Park have been designed to be calmed through their basic design to be more human in scale and character. By sizing the streets correctly and highlighting character elements that emphasize the streets' quality as much as their quantity, the Park's neighborhoods will be naturally safer for all users, including employees, residents, and their children.

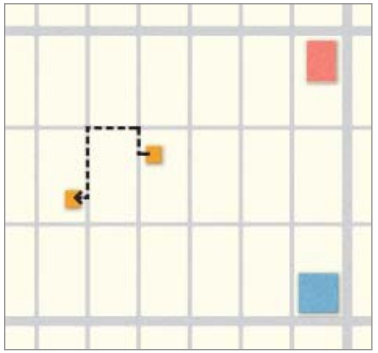
However, where extra care is needed or desired, additional calming methods can be used to ensure a safe and efficient street. Although they vary in application, the basic theory behind these techniques is to present a driver with physical and psychological cues which prompt more careful driving behaviors or choice of travel route. By using signage in concert with uncommon movements, a street's design can encourage safer speeds, reduce volume, or invite more careful navigation. Many times, one or a combination of measures can accomplish all of these goals simultaneously.

There are three major categories whereby a street's design can affect driving behavior, as described below: signage and graphics, deflection (vertical and horizontal), and narrowing.

[2] *http://www.walkinginfo.org/pedsafe/crashstats.cfm*



Heirarchical road networks require long trips on large roads.



Connected road networks allow direct routing and small-scale roadways.

Vertical and horizontal deflections slow traffic

Simple markings can make streets and pathways safer for all users

For further information on traffic calming methods, see "U.S. Traffic Calming Manual", published by APA Planners Press and the American Society of Civil Engineers in 2009, written by Reid Ewing and Steven Brown.

Signage and Graphics

Signage and graphics are the most common traffic calming measures. Not only are they the least costly and usually the least disruptive to implement, they also benefit from a history of use and are therefore familiar to the public and to regulating municipalities. Common types of signage/graphics include:

- Striping
- Bicycle Lanes
- Crosswalks
- Stop Signs
- Child-Related Signage
- Speed Reduction
- Signal Progression
- Pedestrian and Bicycle Signals

Deflection (vertical and horizontal)

Deflections in the travel path require the driver to slow in order to maintain control or to avoid unpleasant forces on themselves or their automobile. Deflections come in vertical and horizontal varieties, and can be gently, or harshly persuasive in form. Common types of a deflection are:

- Speed Humps/Speed Bumps
- Pedestrian Tables/Speed Tables
- Raised Crosswalks
- Raised Intersections
- Chicanes/Slaloms
- Forced Turns
- Street Closures (full or half)
- Median Islands
- Full Roundabouts (full or mini)
- Traffic Circles

Narrowing

When physical elements of the streetscape are drawn in toward the travel lane, the driver feels that the travel lane narrows as well. This perception, real or imaginary, prompts lower speed and more careful observation of the road ahead. Common types of narrowing include:

- Bumpouts/Curb Extensions
- Bus Bulbs
- Pinch Points/Chokers
- Neckdowns
- Narrow Streets
- Narrow Planting
- Streetside Parking

Narrow Streets

One of the primary methods of traffic calming, the use of narrow streets has many advantages, not all of which are immediately obvious. As mentioned above, wide roads are not safer roads. Studies have indicated that for local roads, crash frequency and injury rise with street width. The safest local roads are the narrowest. In addition to safety, narrow roads consume less land, produce less stormwater runoff, and are less expensive to construct and maintain.

Fire Response

One major hurdle to implementation of narrow streets is fire access. The International Fire Code sets a standard of 20 feet clear driving space for fire access. This allows two fire trucks to pass each other while getting to a fire, and allows plenty of space for firefighters to set up their equipment at a fire. This 20 foot standard would forbid roads with narrow lanes such as local roads with

12 or 14 feet of driving area (queueing streets) and two-lane roads with medians and less than 20 feet between parked cars and the median. For these narrow roads, approval of fire authorities is necessary.

Fire access is a critical life-safety issue. However, automobile and pedestrian safety is also a life-safety issue, and an increasing number of fire officials are recognizing this in their approval of alternative road configurations. Alternative street sections have already been proposed on Maui Island, including those in the Pulelehua project such as the “Street” and “Avenue” sections.

On roads with less than 20 feet of clear driving space, fire access can be maintained and even improved compared to a standard road network with a number of strategies:

- Alley access – Alleys provide a critical second means of access for fighting fires and are alternate routes for fire trucks.
- Network connectivity – Having room for fire trucks to pass each other becomes less important with good road connectivity. A connected network of streets allows fire trucks to access a fire from multiple directions.
- Center block staging area – Limiting parking in short sections mid-block, within hose distance of buildings in the middle of the block, can create a valuable staging area for firefighting equipment.
- Entry neck downs – Neck downs limit parking near intersections. In situations where two narrow roads meet, parking too near the corner can reduce turn radii so much that fire trucks cannot enter the street. Neck downs preserve fire access.
- Mountable curbs at corners and roundabouts – Mountable curbs serve to retain access for larger vehicles like fire trucks and freight trucks, while keeping corners tight and thereby limiting vehicular speeds.
- Limited block lengths – Blocks of limited lengths (less

Store fronts benefit from street parking as it activates the sidewalks

Effective streets prioritize spaces for pedestrian

Narrow streets slow down traffic enough to create safe environments for pedestrian circulation

than 300 feet), such as the short ends of typical city blocks, allow fires to be fought from the adjacent intersections even if the street itself is blocked.

- Sprinklers in buildings – Requiring sprinklers in all buildings can reduce fire risk and increase acceptable response time such that a reduction in fire truck speed may be allowed. This strategy was used in Baldwin Park in Orlando, Florida, to achieve local street widths as small as 21 feet across, with street parking.

These strategies, alone and in combination, can keep people and property safe from fires while improving road safety and livability.

Street parking creates a buffer between moving traffic and sidewalk

Parallel parking supplies functional parking for all uses

Street Parking

On-street parking acts as a traffic calming device and protects pedestrians from moving vehicles. While this buffer is not typically needed for physical protection, it serves as a valuable psychological division between the automobile realm and the pedestrian realm. In addition to this function, street parking helps to activate the street with people coming and going, and makes street-facing store and business entries work. Parallel parking is preferred to diagonal parking, as it keeps street widths to a minimum and because, diagonal parking can cause serious conflicts with bicycles since it impedes drivers' ability to see bicyclists while backing.

Intersection Design

Another critical factor for walkable streets is the design of intersections. Intersection design affects the safe and comfortable flow of travel for all modes, including walking and bicycling. Intersections are particularly important to the overall safety of a road network since a high proportion of accidents occur there. A variety of strategies can be used to make intersections safer and more functional for all users while maintaining critical functionality.

Actual Curb Radius and Effective Turning Radius

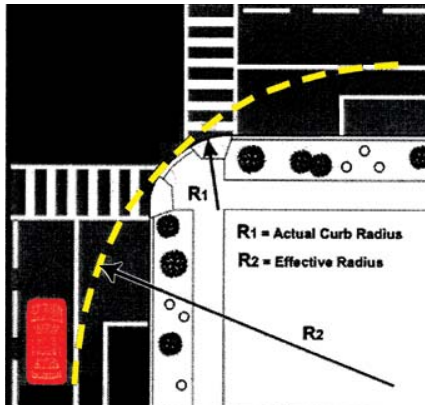
An important factor for intersection safety is the speed of turning vehicles. Smaller curb radii and the associated tighter turns by vehicles at corners can allow normal use by automobiles, while at the same time slowing turning movements and thereby increasing safety.

The effective turning radius (ETR) of a corner refers to the path of travel of the inside wheel of a turning vehicle (see figure at left). This is usually unmarked on the street and is not visible as part of the street assembly. The ETR of an intersection should not be confused with the actual curb radius which is likely to be significantly smaller.

Recognizing the difference between ETR and the actual curb radii is important because overlarge actual curb radiuses serve to make intersection crossing distances longer without enhancing the intersection's performance for automobiles. In fact, large curb radii can actually encourage drivers to take turns at unsafe speeds, endangering themselves, other drivers, and any pedestrians or bicyclists also using the intersection.

Curb extensions

Narrow widths make intersections safer for pedestrians by limiting crossing distances. Intentionally narrowing roads at intersections with curb extensions achieves



AASHTO Comparison of Actual Curb Radius (R1) to Effective Turning Radius (R2)

shorter distances and helps to slow automobile traffic. Curb extensions are allowed and encouraged at all intersections. It is also appropriate to consider curb extension areas as opportunities to achieve other goals of the plan.

In denser and more urban areas, curb extensions are well-suited for bus stops and other pedestrian seating areas. Special care should be taken to understand traffic flow and its implications on safety and signalization when bus stops are located near intersections and within the moving lane.

Curb extensions can also be paired with bicycle storage facilities which provide a safe and visible area for bicycles to be stored on the more active streets. Placing bike facilities in the curb extensions also means that pedestrian walkways and sidewalks in the immediate area are not partially blocked by parked bicycles. Placing bicycles in this prominent area also has the potential to add to the creation of a cycle-minded community where bicycles are not only a priority, but are also aesthetically part of the streetscape.

In lower intensity areas, curb extensions may be well-used as stormwater detention and filtration areas. "Flush" volumes of rainfall can carry unhealthy amounts of surface pollutants when the water runs over the street surface and along the street-side gutter. These pollutants are often carried along hard infrastructure for long distances, and potentially into sensitive waterbodies such as streams and ponds, and eventually the ocean. By catching surface contaminants in street-side swales and retention areas, contaminants can be filtered naturally by plants while the clean water is left to infiltrate into the ground. Using curb extensions to build these retention areas means that contaminants are less detrimental to downstream environments, and stormwater infrastructure has less of a chance of being overwhelmed by large volumes of stormwater runoff when large rain events occur.

Bicycle and Pedestrian Facilities

Walking and bicycling are important transportation modes. They promote health, reduce traffic congestion, reduce the need for large parking lots, and are often enjoyable recreational activities which will serve as amenities for employees, residents, and visitors to the Park.

Pedestrian Network

The need for pedestrian facilities (sidewalks, safe crossings) is a given. Regardless of whether sidewalks are provided, people will at times walk along roadways, and forcing people to walk in traffic is dangerous and unnecessary. The Plan instead encourages people to walk by providing safe, pleasant sidewalks and pedestrian paths connecting all locations.

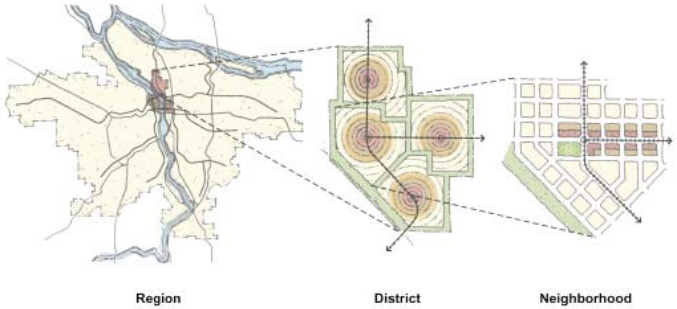
Bicycle System

As for bicycles, they need to travel wherever automobiles travel. Bicycles have many of the health and environmental advantages of walking, and their higher speed allows longer travel distances. This will be especially important in the Park due to its current location outside the main area of development in Kihei.

In contrast to the typical 1/4 mile travel distance limit for pedestrians, their higher speed allows bicyclists to commonly travel much further, between one and 2.5 miles.

Traffic circles slow traffic without causing delays and can beautify the streetscape

Connections & Interdependence



Thinking of individual elements of the urban environment as distinct and unrelated has been a hallmark of Modernist thought and has led to regions which are socially, economically and environmentally disconnected. Contemporary thought searches for a deeper understanding of the relationships between all elements of the built environment. Elements such as the environmental and economic connections and interrelationship of the park to the rest of the county are important considerations, as discussed above. A more direct and very important connection to consider here is transportation.

Intermodalism

Much transportation planning as it is currently practiced is in fact only automobile transportation planning. Given the increasingly-apparent health and environmental benefits of non-automotive modes like walking, bicycling and transit, this emphasis on the automobile is unfortunate. A robust, equitable, environmentally sound transportation system accommodates multiple transportation modes. A variety of strategies can be used to achieve this, from provision of adequate pedestrian and bicycling facilities to implementation of transportation demand management strategies such as parking cash-out, where those who do not use “free” parking receive a cash payment instead.

Connectivity

Connectivity is closely related to intermodalism and is an important tool. Well-connected street networks better accommodate multiple modes. Direct routes are especially important for pedestrians, since the rate of trips made by walking is highly sensitive to distance. Connected streets also affects trip lengths for automobiles, reducing vehicle miles traveled while providing alternate routes in case of road blockages or repairs. And consideration of connectivity between modes, such as good sidewalk connections to transit stations, improves the efficiency and effectiveness of the entire system.

The Fallacy of Free Parking

The issue of parking is one of the most contentious in planning and urban design. For many years, government authorities have required with minimum parking standards that plentiful parking be made available for every type of land use. The reasoning behind this was that if a business or residence did not provide sufficient parking, people would be forced to park their cars on the street, inconveniencing their neighbors. While generally not requiring that parking be free, regulations have required that parking be provided at such high levels that there

Multi-Modal street, Ottawa

has been typically no point in charging for it, and people have become used to the idea of plentiful, free parking wherever they go.

However, free parking is not really free. There are many costs to providing parking, from land costs to construction costs to ongoing maintenance and security. With the current system, however, the costs of parking are bundled into the cost of everything else, and so parking seems free to drivers.

Free, plentiful parking leads to increased driving. When a normal good is underpriced, it will be overconsumed. This applies to parking – because a portion of the journey is subsidized, people's decisions are influenced toward driving and away from other modes or carpooling. In addition, the requirement for large amounts of parking means that destinations are spread further apart by large parking lots. Since parking often takes up more than half of a developed parcel, the amount of destinations within reach in the critical pedestrian quarter mile is often cut by more than half. And few people enjoy walking to destinations through the seas of parking in which buildings often float.

Reduced Parking Minimums

For these reasons, this plan proposes reductions of mandated parking provision in the Park. Businesses will undoubtedly choose to provide parking, but making their own decisions about the amount of parking will provide one more element of flexibility to businesses seeking to locate in the Park. A business which desires to promote walking, bicycling or transit use, or even to run a commute shuttle service for its employees, may choose to provide less parking.

If street parking becomes scarce, which is to say, if drivers are forced to circle looking for spaces, then metering can be introduced and the price raised to a level where supply equals demand. The resulting income could be devoted to improvements within the park such as sidewalk and street maintenance and improvements, open space maintenance, or transportation demand management measures such as transit passes. Moving automobile parking toward a market-based system will help to incorporate market efficiencies and reduce the overconsumption motivated by underpricing.

See "The High Cost of Free Parking" by Donald Shoup for an in-depth discussion of the costs and complications of abundant and underpriced parking.

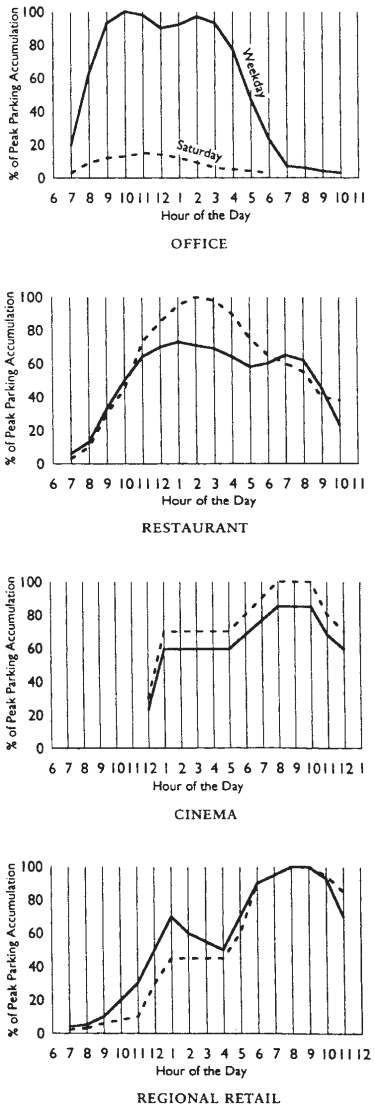
Shared Parking

While parking lots are necessary parts of the transportation system, they are expensive to build and maintain and they spread development out, making places less walkable. There are many benefits to only building the amount of parking that is needed. While each parking space has a financial and environmental cost, additional usage of that space has little additional cost. Thus, for a given amount of parking needed, it is much better to utilize one space for longer periods than have two spaces each occupied for only a portion of the day.

By recognizing that peak demand occurs at different times for different land uses, shared parking facilities help minimize the need for parking lots and garages. For example, office parking lots are typically full during the day Monday to Friday, but nearly empty at other

For more information about shared parking, see Shared Parking (Urban Land Institute, 2005) and Shared Parking Planning Guidelines (Institute of Transportation Engineers, 1995).

Multiple parking facilities can share one parking surface



Parking Demand Diagrams

times. Retail parking has a different pattern, reaching maximum usage on the weekend. Mixed use, retail, office, civic buildings, and multi-family developments may share off-street parking spaces. This approach works well anywhere, as long as walking distances to the parking area are reasonable.

Commercial users in the Park are encouraged to use shared parking. The Urban Land Institute's (ULI's) Shared Parking Standards, or an equivalent, are good ways to calculate the total number of shared parking spaces. To determine parking demand if spaces are shared, parking demands for the two or more uses are added for each hour of the day - for weekdays, Saturdays and any other days with significant variation in parking patterns - to see which hour produces the highest parking demand.

The following steps can be used to determine the minimum number of spaces needed for mixed-use areas:

1. Start with the maximum parking needed for each user which will be using the shared parking arrangement.
2. Determine the parking demand for each user for key times. The ULI uses weekdays and Saturdays at 10 AM, 1 PM, 5 PM, 8 PM and 10 PM.
3. Determine the total parking demand for these key times by summing the demand of the various land uses for each key time.
4. Determine the minimum shared parking space requirement by noting the largest of the aggregate parking demand figures.

Example Shared Parking Calculation

The following example illustrates how to determine the parking demand from joint use shared parking for a mixed-use area containing a 10,000 square foot restaurant and 200,000 square feet of office space:

Assume that the restaurant user estimates a maximum need for 10 spaces per 1,000 square feet of restaurant space and the office user estimates a maximum need for 3 spaces per 1,000 square feet of office space. A 10,000 square foot restaurant and a 200,000 square foot office building thus require 100 and 600 spaces, respectively, or 700 total.

Land Use	Single Use Peak Hour Demand (spaces)	Percentage of Demand for Key Times*									
		Weekdays					Saturdays				
		10 AM	1 PM	5 PM	8 PM	10 PM	10 AM	1 PM	5 PM	8 PM	10 PM
Retail	3/1,000 sf	50	75	75	65	25	50	100	90	65	35
Office	3/1,000 sf	100	90	50	5	5	15	15	5	0	0
Restaurant	10/1,000 sf	20	70	70	100	95	5	45	60	100	95
Cinema	1/3 seats	0	60	60	85	85	0	70	70	100	100
Hotel	1/room	45	30	60	90	100	40	30	60	90	100
Health Club	5/1,000 sf	10	80	100	30	10	60	80	60	30	10
Residential	1.3 - 2/unit (see req's)	85	80	85	95	100	70	65	75	95	100

** From the Urban Land Institute's* Shared Parking Standards, *1983.*

An example of a shared parking demand spreadsheet

To determine parking demand if spaces are shared, parking demands for the two uses are added for peak times on weekdays and Saturdays, to see which hour produces the highest parking demand. In this case, the highest total demand is at 10 am on a weekday, when the the office parking usage is estimated to be 100%, but the restaurant will be using only 20% of peak usage. The total is parking needed is thus 620 spaces, 80 fewer spaces than would be needed with separate parking lots. Even larger reductions in demand are possible with uses that have greater differences in their demand curves, such as office and cinema.

Conclusion

Development-as-usual has proven detrimental to our environment and our health. Maui needs development that is efficient, harmonious with the natural environment, and capable of meeting human needs.

Changing the current standard practice of development will take many years and the efforts of many people. The built environment changes slowly, so for a long time areas with better development patterns will be small pockets in large areas with less to offer. But for places scaled to people, small areas are enough - the walk to the grocery, to work, or to the park will happen at short distances, so even small pockets of quality can function better than they would have as autocentric sprawl.

And it is important to begin now. The Maui Research & Technology Park has the opportunity to showcase an array of cutting edge sustainable design strategies. Workers and residents will enjoy a diversity of housing, transit connectivity, and quality economic development from this community for years to come.

Wide traveling lanes promote higher vehicular speeds

Car-Centered intersections like this one at Lipoa Parkway and Pi'ilani Highway discourage pedestrian activity, leaving the park somewhat cut off from the rest of Kihei.

4 - MASTER PLAN

Concept Diagram

Maui shoreline

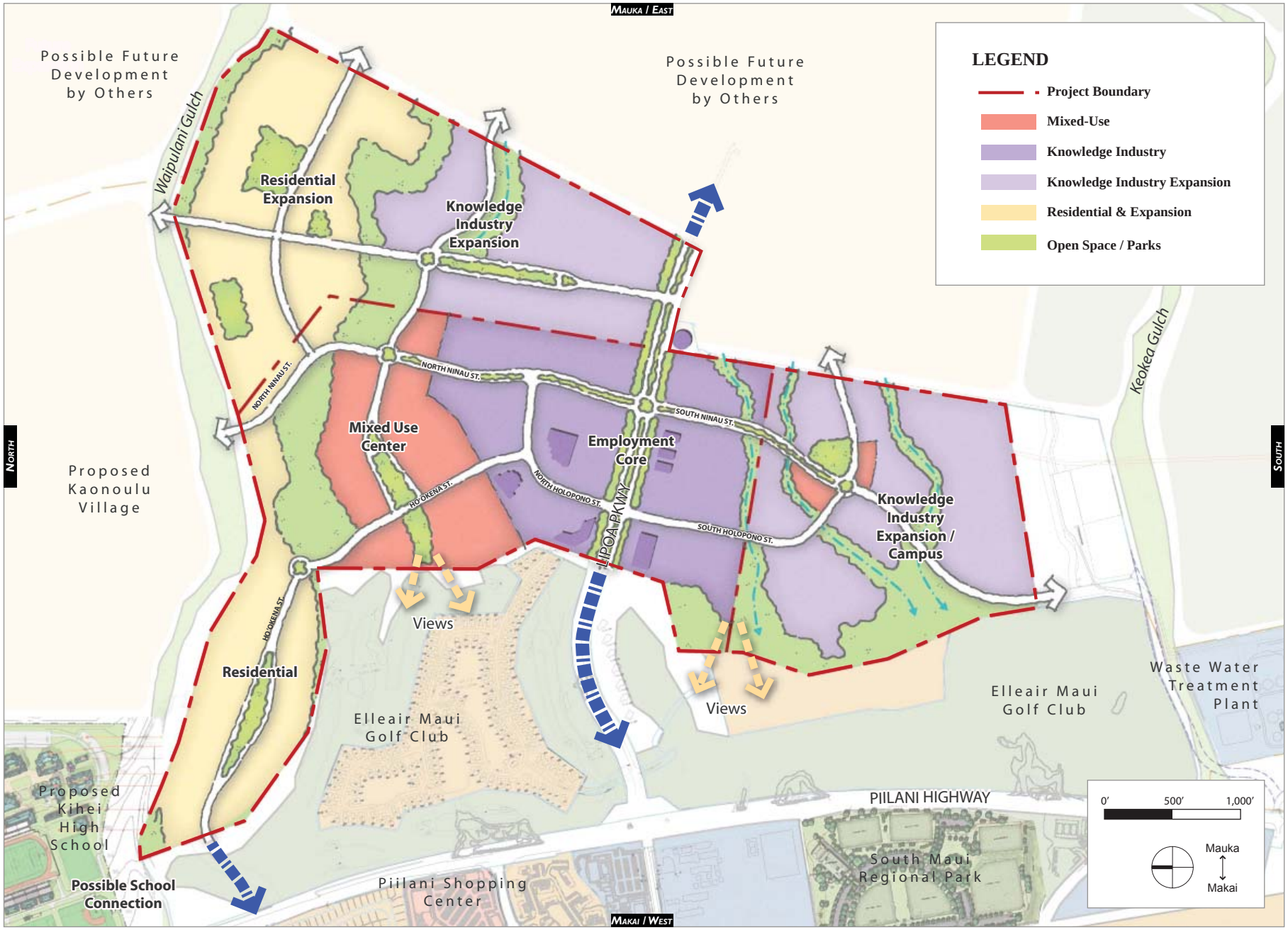
The Concept Diagram shows the overall vision for the future of the Maui Research and Technology Park. The Park's existing buildings are within the Employment Core area. This area will remain exclusively in employment uses, though incidental supportive retail uses will be allowed. Major new employment zones south of Lipoa Parkway (the Knowledge Industry Expansion/ Campus area) and mauka the employment core (the Knowledge Industry Expansion area) provide large new areas for employment expansion and diversification. The new Mixed Use Center is a flexible area to contain space for incubating new businesses as well as supportive retail, civic uses, open space, and residential uses. New residential zones mauka and makai of the Center provide additional housing in a variety of formats which will appeal to park business owners and employees.

The Park has been envisioned with pedestrian connectivity as a first priority. A green corridor, running north to south along Ninau Street, links the center of the site. This corridor links the Park's two mixed use areas. Ideally, transit stops in these locations will also connect park workers and residents to the larger region. With a majority of businesses and homes within a 5-minute walk of the centers, many daily needs will be within a short and comfortable walk.

Park Plaza Building in MRTP

Wailuku commercial building

Maui single family housing



Concept Diagram

Conceptual Development Program and Illustrative Plan

The plan at right shows an illustrative vision of how the Park might develop, based on the Concept Diagram on the preceding page. The numbers below show the development resulting from the Illustrative Plan.

In the Plan, new employment buildings line the streets and parking is placed at the rear. The scale of development is broken down in many areas to provide a greater variety of buildings and parcels.

The Village Center contains a diversity of uses and building types. In the southern employment area, a small center provides a focus for employment expansion. Parks and an open space system unify the Park and provide an important focus of leisure and activity. Throughout the mixed use and residential areas, a robust local road network provides flexibility in routing and raises walkability with greater route directness.

Note 1. The total Maui Research & Technology Park land area is 410.937 acres. The 401 acre total on this page does not include land areas for Lipoa Parkway makai of the Park and the portion of Ninau Street south of the Park boundary (which is shown in the plan on the opposite page). Both of these areas are roadways and do not contain development.

Note 2: Net Developable Land is land in excess of roads, utilities, open space requirements, etc.

A Employment Core

	Acres		
Net Developable Land	63.7	74.1%	
Parks & Open Space	9.3	10.8%	
Road Rights-of-Way	13.0	15.2%	
Total Land Area	86.0	100.0%	
Employment BUA (New)	716,000	Square Feet	
Employment BUA (Total)	896,000	Square Feet	
Dwelling Units	0		

B Knowledge Industry Expansion / Campus

	Acres		Park Acres Required
Net Developable Land	54.6	62.0%	
Parks & Open Space	25.9	29.4%	0.24
Road Rights-of-Way	7.6	8.6%	
Total Land Area	88.2	100.0%	
Non-Residential BUA (New)	611,082	Square Feet	
Dwelling Units	21		

C Village Center

	Acres		Park Acres Required
Net Developable Land	34.1	58.5%	
Parks & Open Space	10.4	17.9%	4.59
Road Rights-of-Way	13.8	23.7%	
Total Land Area	58.3	100.0%	
Non-Residential BUA (New)	269,200	Square Feet	
Dwelling Units	400		

D Makai Residential

	Acres		Park Acres Required
Net Developable Land	21.0	53.9%	
Parks & Open Space	7.0	17.8%	4.02
Road Rights-of-Way	11.0	28.2%	
Total Land Area	39.0	100.0%	
Non-Residential BUA (New)	0	Square Feet	
Dwelling Units	350		

E Option Land

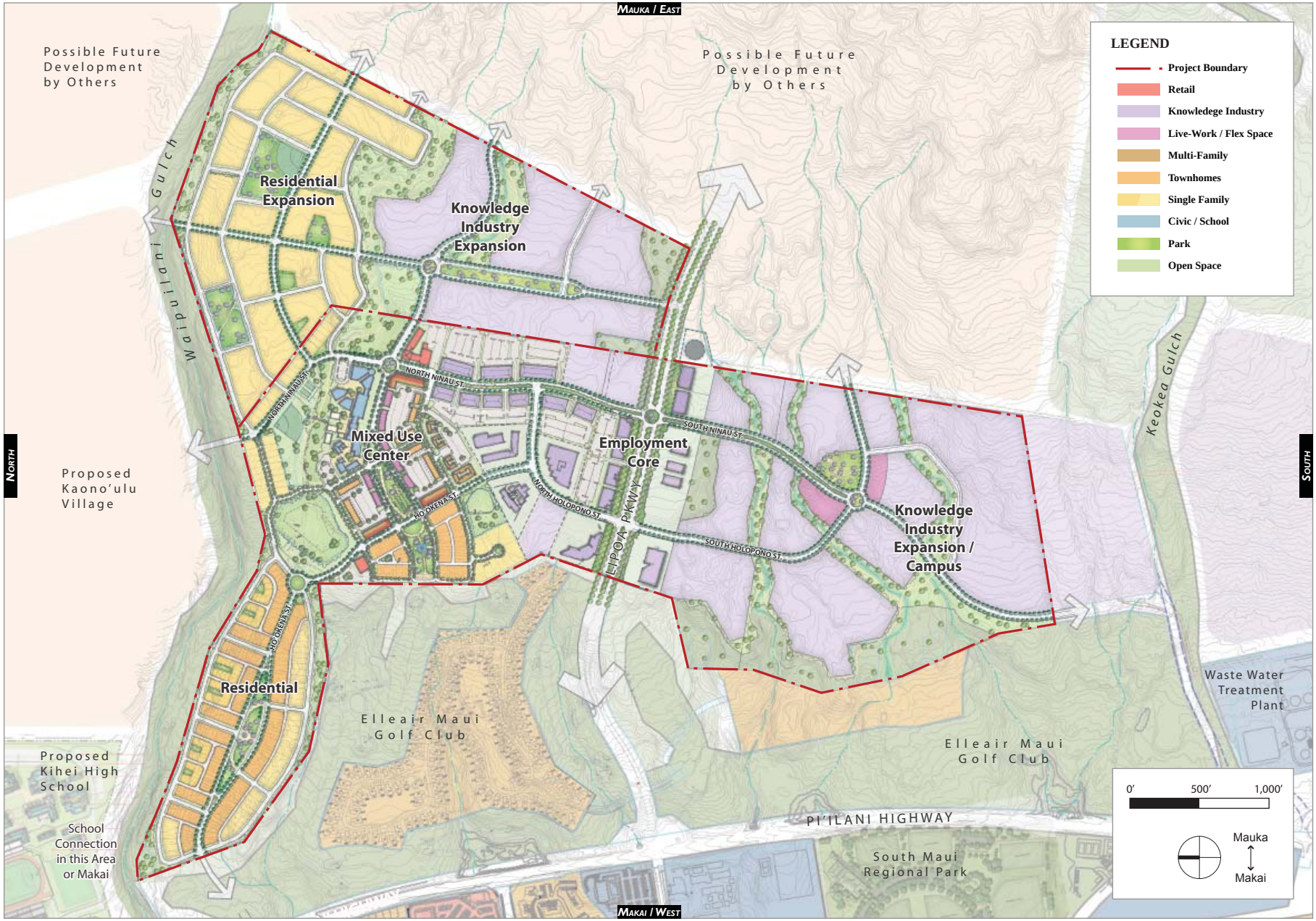
	Acres		Park Acres Required
Net Developable Land - Employment	34.6	27.9%	
Net Developable Land - Residential	34.5	27.8%	
Net Developable Land - Total	*69.1*	*55.8%*	
Residential Parks & Open Space	6.3	5.1%	5.50
Other Parks & Open Space	24.4	19.7%	
Road Rights-of-Way	24.0	19.4%	
Total Land Area	123.8	100.0%	
Non-Residential BUA (New)	403,718	Square Feet	
Dwelling Units	479		

F Retention Pond

	Acres
Open Space	5.5
Road Rights-of-Way	0.3
Total Land Area	5.8

SITE TOTALS

	Acres	
Net Developable Land	242.5	60.5%
Parks & Open Space	88.7	22.1%
Road Rights-of-Way	69.8	17.4%
Total Land Area	**401.0**	**100.0%**
Non-Residential BUA (New)	2,000,000	Square Feet
Non-Residential BUA (Total)	2,180,000	Square Feet
Dwelling Units	**1,250**	



Illustrative Plan

Open Space Network & Parks

Open space trails

Armory Park in Lahaina

Community gardens could be welcome elements of the Park's open spaces

Waipuilani Gulch

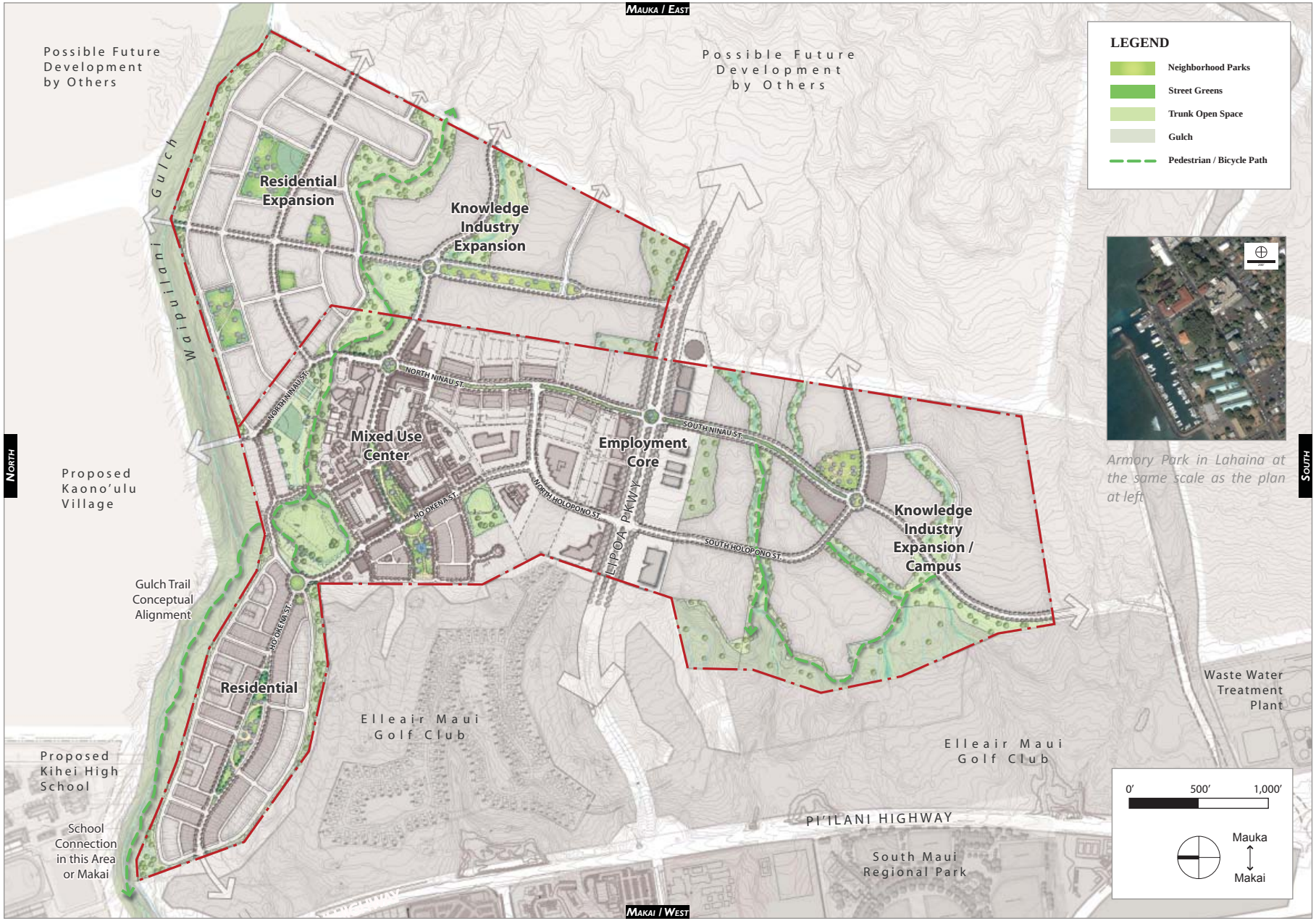
Open space is essential to a healthy community. Successfully designed, it transcends the traditional aesthetic role of an attractive landscape to accommodate ecological factors, infrastructure systems and many social needs. Ecological factors to be addressed include wildlife movement, habitat enhancement, water conservation, storm water capture and treatment, microclimate control to minimize heat island effects, and stream corridor protection. Open space serves as both landscape and infrastructure through the use of constructed facilities to capture, control and clean storm water and the provision of transportation corridors for trails and pathways. Open space also provides for the social needs of the community by providing spaces for recreation, relaxation and social interaction. In the end, multi-layered landscapes become expressions of cultural values and gather meaning and value to the entire community over time and through shared experience.

The Park will provide multiple types of open spaces and parks. The spaces take inspiration from some of the Park and Island's existing landscape and parks.

Linear open space along Lipoa Parkway

Existing gulches (outside the Park boundary) provide valuable connections mauka/makai, and could form the trunk routes of a trail network connecting to the rest of Kihei. Neighborhood parks serve as community focal points and places for exercise, sports, relaxation, activities like community gardening, and celebration. Trunk open spaces contain some of the site's more dramatic terrain, allowing the plan to respect the existing topography while creating another set of linkages throughout the site.

Finally, street greens continue the Park's beautiful landscape treatments and serve to link the park together. On Lipoa Parkway, continuation of the existing 60 foot setback rule creates a wide greensward lined with lush landscaping. This treatment is a reference to the Park's existing aim for park-like atmosphere and a way to take full advantage of the beautiful mature trees along the Parkway. The north-south connector greenway (North and South Ninau Street) connects the site laterally, linking the mixed-use center with the employment area center while linking together other open spaces as well.



Armory Park in Lahaina at the same scale as the plan at left

Open Space Plan

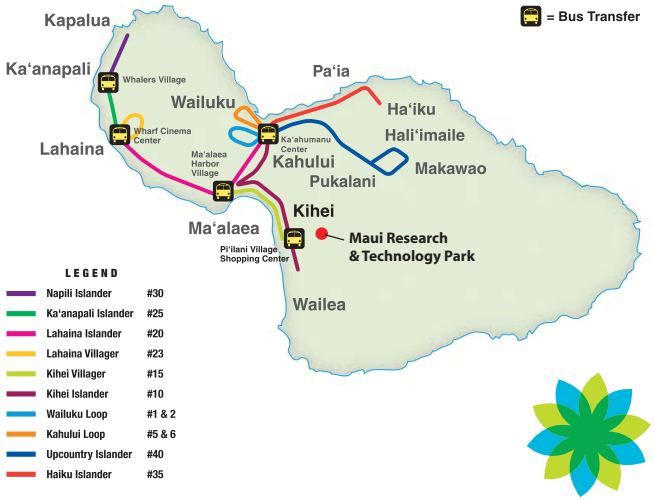
Transit Plan

Given the low general density of the site and its position at the edge of the developed area, high quality transit will be difficult to achieve. However, at least a basic level of service should be provided to serve transit dependent persons and those who chose not to drive. As the site gains employment and population, transit service will become more viable as well as more essential.

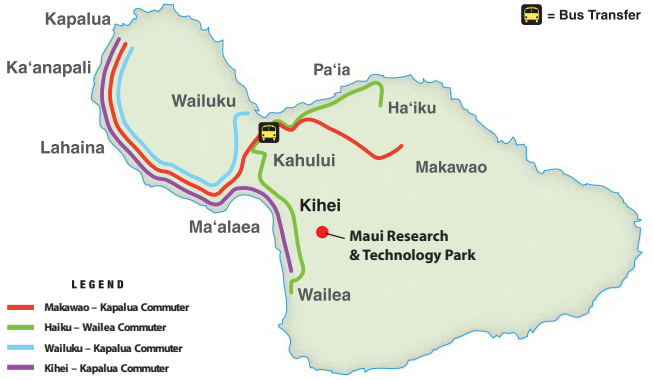
Phase one transit service could run either as an extension of existing transit service from the Pi'ilani Shopping Center area or as a dedicated jitney serving the park. Making a loop within the first phase development area, this line would link central Kihei to the development, providing easy access up the hill across Pi'ilani Highway. The major transit stop would be the intersection of north Ninau and the mauka extension of the village green, though other stops could be provided along the route depending on development patterns.

Contingent on the form of surrounding development and future road network changes, phase two transit service could run north and south along Ninau Street, connecting the site to nearby development and the island as a whole. The Park's frequent street connections with proposed nearby development will provide flexibility for future transit routing. The primary southern transit stop is located at the mixed use district and the park, a point which puts the entire southern portion of the site within an easy walking distance.

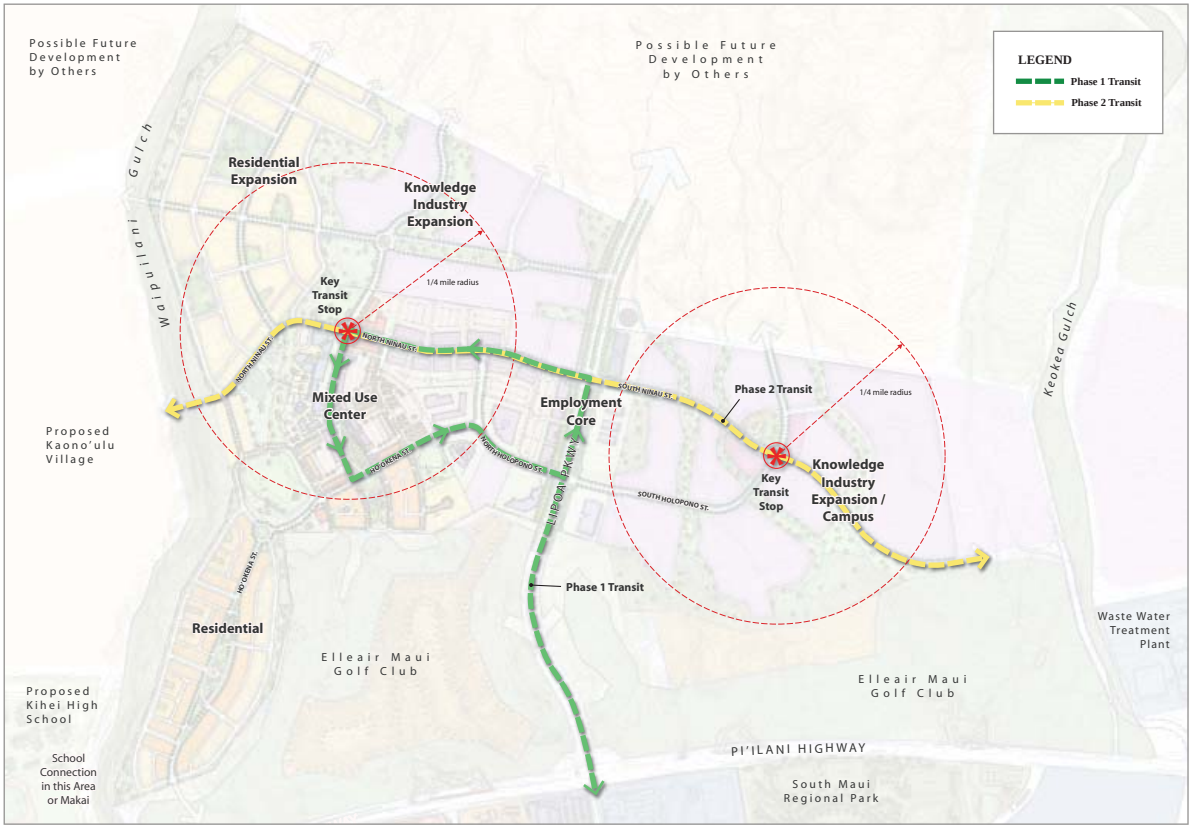
Maui Bus vehicle (source: Wikipedia)



Public Bus Service on Maui (source: Maui County)



Commuter Bus Service on Maui (source: Maui County)



Public Transit Phasing Diagram

Transit networks can be a supportive part of a diverse, multi-modal transportation system on Maui.

Phase one jitney services can operate from relatively small and fuel-efficient vehicles, which can be privately owned and easily maintained.

Bicycle & Pedestrian Connections

This roadway in Kahului near a major shopping destination has a small sidewalk on one side and only this dangerous shoulder for walking on the other.

Pedestrian routes are often unconsidered, discontinuous, and unsafe, like this one at the intersection of Lipoa Parkway and Pi'ilani Highway.

This fire lane could be a valuable pedestrian path to the Park.

The plan creates a unified bicycle and pedestrian system within the Park and connections to its existing and future surroundings. Unfortunately, bicycle and pedestrian connectivity is often ignored in the current auto-centric transportation engineering system. This has the effect of creating discontinuous networks, unsafe conditions, and unpleasant environments for users. These factors naturally reduce the number of people bicycling and walking, further marginalizing these beneficial transportation modes.

Because of the Park's relatively long walking distance from Kihei makai, walking will be important inside the park but bicycling will assume additional importance for accessing the Park. The roads into the Park from Pi'ilani Highway will have bicycle paths, making the journey uphill as safe and easy as possible. Connectivity in the Park is provided both with bicycle lanes and with mixed flow riding. Streets within the Park are intended to be small in scale and low in speed, which will make it safe to use bicycles in traffic.

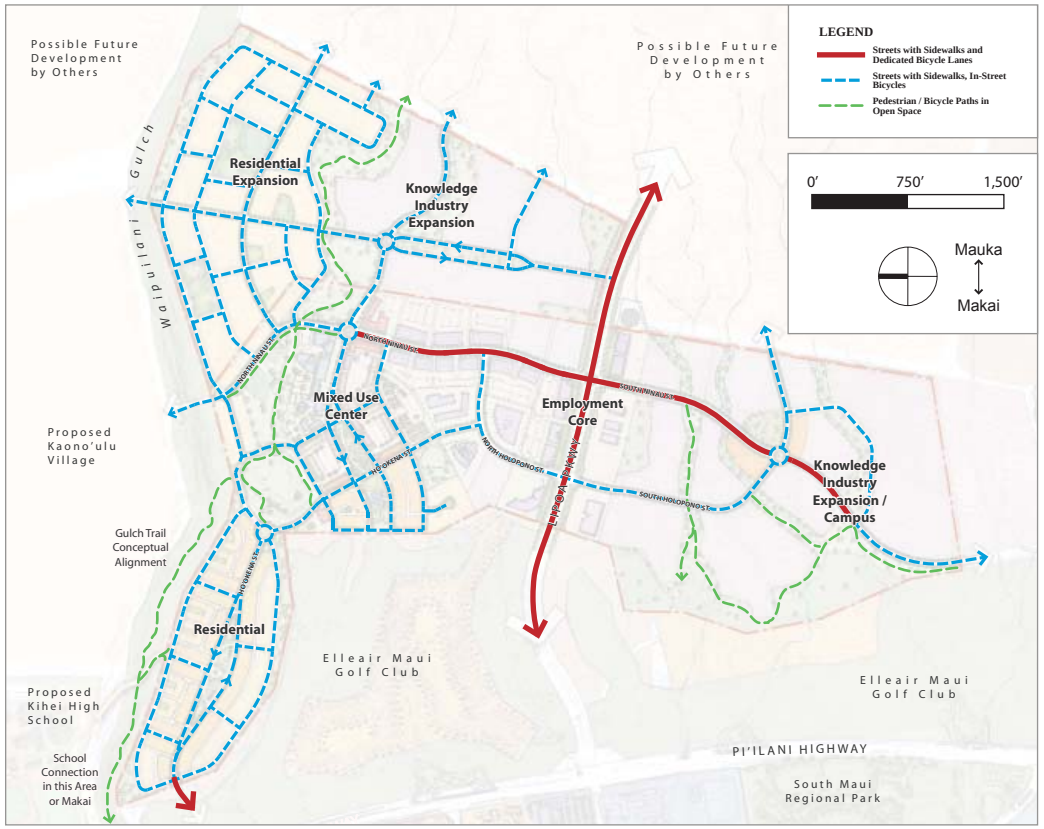
An additional opportunity for access is presented by the Pi'ilani Highway overpass over the Waipuilani Gulch. This wide connection (see photo at top right), while also an important stormwater drainageway, could make an excellent connection for pedestrians and bicyclists from the rest of Kihei to the Park and the new high school planned nearby. Concerns over safety from storm events and the consequent water in the gulch can be overcome, as seen in other similar cases throughout the world. This connection would connect the Park to the North/South Greenway along Liloa Drive as well as possibly to other bicycle facilities like the bicycle lanes on South Kihei Road.

Other pedestrian and bicycle connections can be made opportunistically, where feasible. For instance, the fire lane to the new housing development makai of the Park could be used as a pedestrian access for residents of that development to reach the Park's village center.

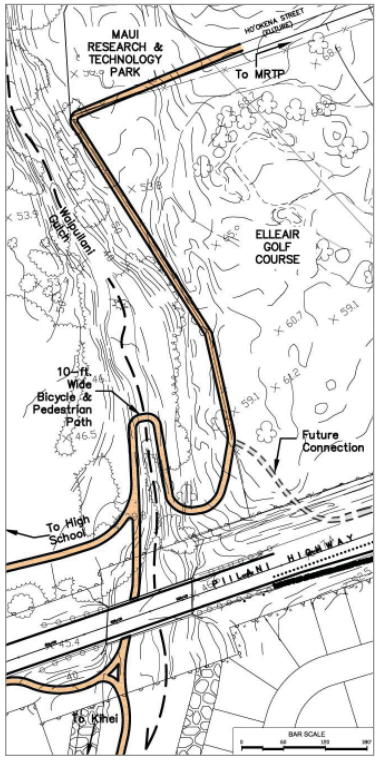
The Waipuilani Gulch crosses under Pi'ilani Highway with this underpass. This could make an ideal location for a high quality pedestrian and bicycle connection from to the Park and the new High School from makai.

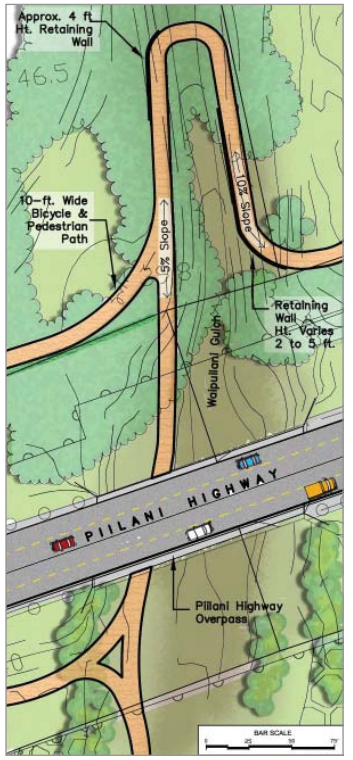
Trail under an underpass in Livermore, California

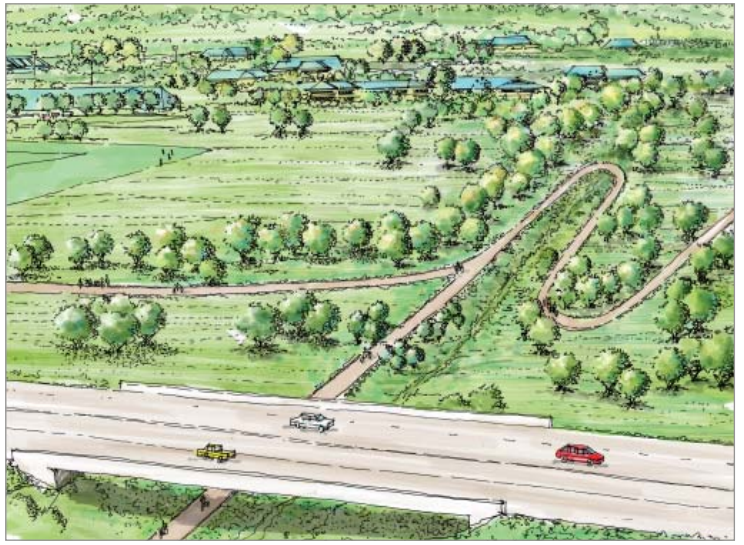
Bicycle / Pedestrian trail in a drainage way, Denver, Colorado



Pedestrian and Bicycle Connections Plan







The three drawings at right show a concept for a connection to the Park in the Waipuilani Gulch. The top left drawing shows the trail connecting from the Park, makai into and across the gulch, and then to the proposed high school to the north and across the highway into the rest of Kihei to the west. The top right drawing shows the detailed treatment, including how the trail might handle the topography getting into the gulch. At bottom is a rendering of how this trail would work. At the top of the drawing is the high school, and at the bottom is Pi'ilani Highway. Such a trail could be a safe and effective connection between important locations. It would require the coordination between and cooperation of variety of public and private entities.

Mixed-Use Center Illustrative Plan

The Mixed-Use Center Illustrative Plan adds additional detail to the concept for the center. The final commercial and residential development in the Center will depend on market conditions. However, this plan illustrates one possible development scenario which meets the goals of the Plan. The Center is highly connected to the rest of the Park. Two connections into the center from the south are on Ninau and Ho'okena streets. From makai, Ho'okena Street enters the Center from Pi'ilani Highway via the Makai Residential property. Several roads also go into the possible expansion land mauka.

A ribbon of trunk open space connects across the site mauka/makai, adding park uses to retention areas and using portions of the open space for school playgrounds. A public park follows a small area of topography from Ninau Street toward the golf course over the course of several blocks.

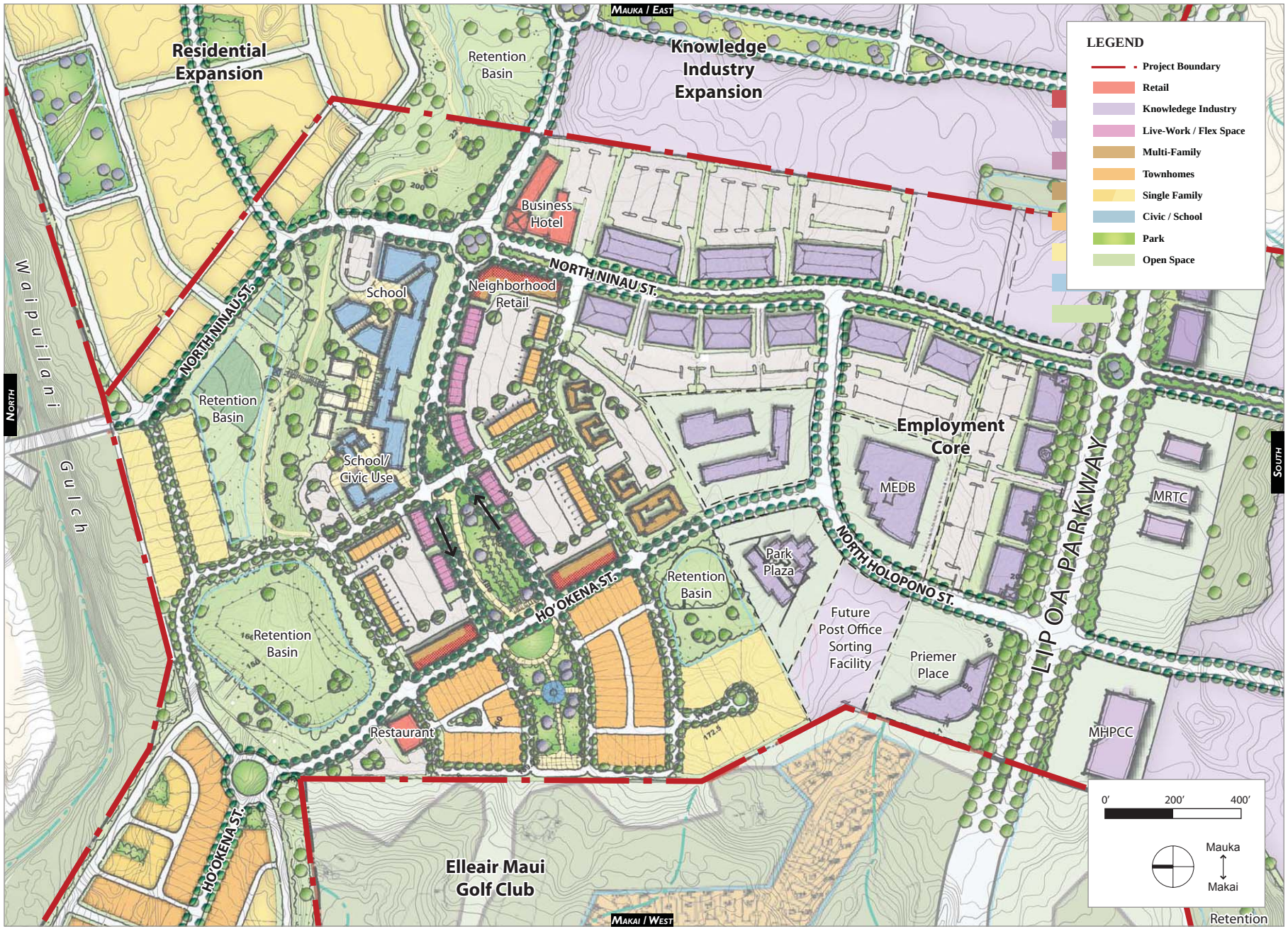
Two schools occupy a site along both the trunk open space spine and the public park blocks. Other uses line the park, providing a mix of activity and 24-hour usage of the park. These uses are small retail spaces, flex space buildings, multifamily buildings with ground floor retail, and townhomes. Townhomes and mixed-use multifamily line Ho'okena Street, creating a small main street. This will be the early heart of the area's retail uses, providing local-serving uses like cafes and business services. A mauka node at the intersection of the park and Ninau Street will provide retail space later on, as the site develops further, including a possible space for a business hotel with small conference facilities to serve the Park's employers.

The residential area makai along Ho'okena Street on the way to Pi'ilani Highway has high amenity value, with views of the golf course to the south and Waipuilani gulch to the north. Houses also line a large local park in the center of the area, with traffic on Ho'okena Street traveling around the edges. A connection to the planned high school on the north side of the gulley allows students who live in the area to reach the school by foot without going onto busy Pi'ilani Highway, and will make programmatic connections between the school and businesses in the park easier.

Single family housing

Mixed-Use building in Lahaina

Local retail in Lahaina



Mixed-Use Village Center Illustrative Plan

Housing Variety

The plan assigns overall densities to the various areas in the Park. Within those areas, it is expected that there will be a wide variety of housing types. Housing variety not only allows development to respond to the changing conditions of the market, it will also make the Park a more vibrant area by supplying housing to a wide variety of people. A diverse housing market will also make the Park more economically vibrant by appealing to a broader portion of the housing market.

As the table below shows, overall densities can be derived with a variety of unit mixes. In the Makai Residential example, an overall density of 14 units per acre for developable land (not including parks, roads, utilities and other non-developable land) is reached with all fee-simple housing in option 1. Most of the homes are townhomes and small lot detached houses. This mix would serve more young families and first-time home buyers. Other options include both a higher percentage of land with compact development, in multifamily and 3 & 4-plex buildings, and more low density units of various types. This type of mix would create a market for singles and couples to get into the neighborhood, and at the same time provide move-up housing for more established families.

The Residential Expansion Land example provides similar variety of housing type mixes in the three options. In all options for both parcels, the overall density remains very similar to the target density. This allows the overall impact of the development on things such as roadways and infrastructure to remain similar in the various options.

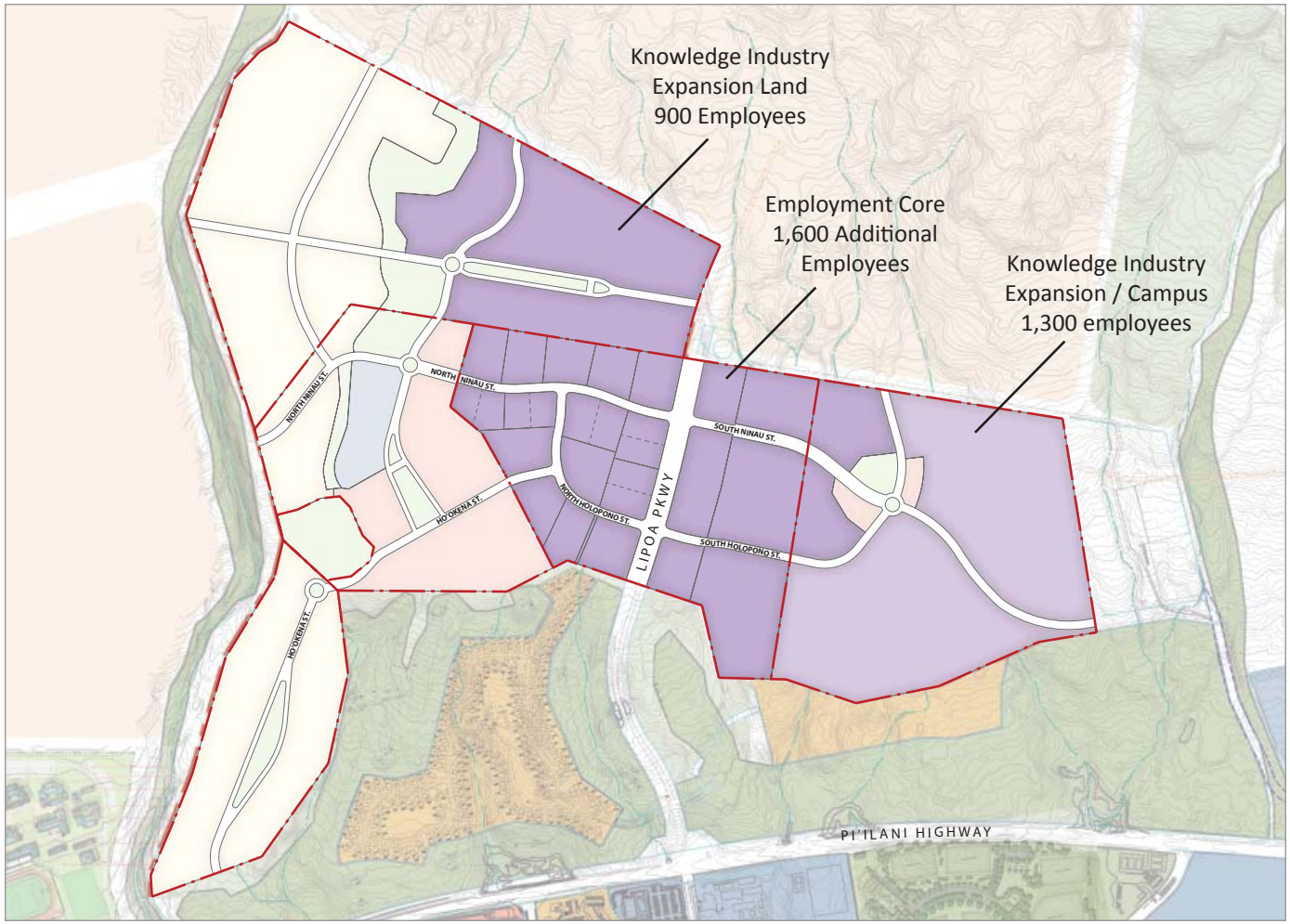
LAND MIX		TARGET AVERAGE NET BLOCK DENSITY	PERCENTAGE OF LAND AREA						RESULTING DENSITY
PARCEL			MULTIFAMILY	3-PLEX & 4-PLEX	TOWNHOME	GREEN COURT SINGLE FAMILY	SMALL LOT SINGLE FAMILY	LARGE LOT SINGLE FAMILY	
		UNITS/ACRE	*30 UNITS / ACRE*	*45 UNITS / ACRE*	*20 UNITS/ACRE*	*12 UNITS/ACRE*	*9 UNITS/ACRE*	*6 UNITS/ACRE*	*UNITS/ACRE*
D	MAKAI RESIDENTIAL	14.0							
	OPTION A		0%	0%	50%	0%	40%	10%	14.2
	OPTION B		10%	0%	30%	15%	15%	30%	14.0
	OPTION C		0%	20%	0%	0%	20%	60%	14.4
E	RESIDENTIAL EXPANSION LAND	15.0							
	OPTION A		20%	0%	25%	0%	30%	25%	15.2
	OPTION B		10%	10%	15%	20%	0%	45%	15.6
	OPTION C		40%	0%	0%	0%	0%	60%	15.6

Similar overall densities can be achieved with a variety of housing land mix options.
Note: the densities listed here for each type are assumptions for the purposes of exploring options. These are net block densities and do not there correspond completely to the densities listed in the building types section of this Code.

Employment Capacity

The purpose of the Maui Research and Technology Park is to provide job diversity for the Island of Maui. While the diversification of the uses in the Park is a part of the economic development strategy of this plan and is a way to help the Park to both attract and generate jobs, it is also important to confirm that the Park retains enough space for job creation.

The graphic below shows the areas of the park which are maintained as strictly employment areas. While other areas such as the mixed use center will provide some jobs, the core employment areas are those in purple on the map. As the graphic makes clear, the plan retains a very large capacity for jobs in these areas of the park.



Employment capacity of the employment-focussed areas of the park

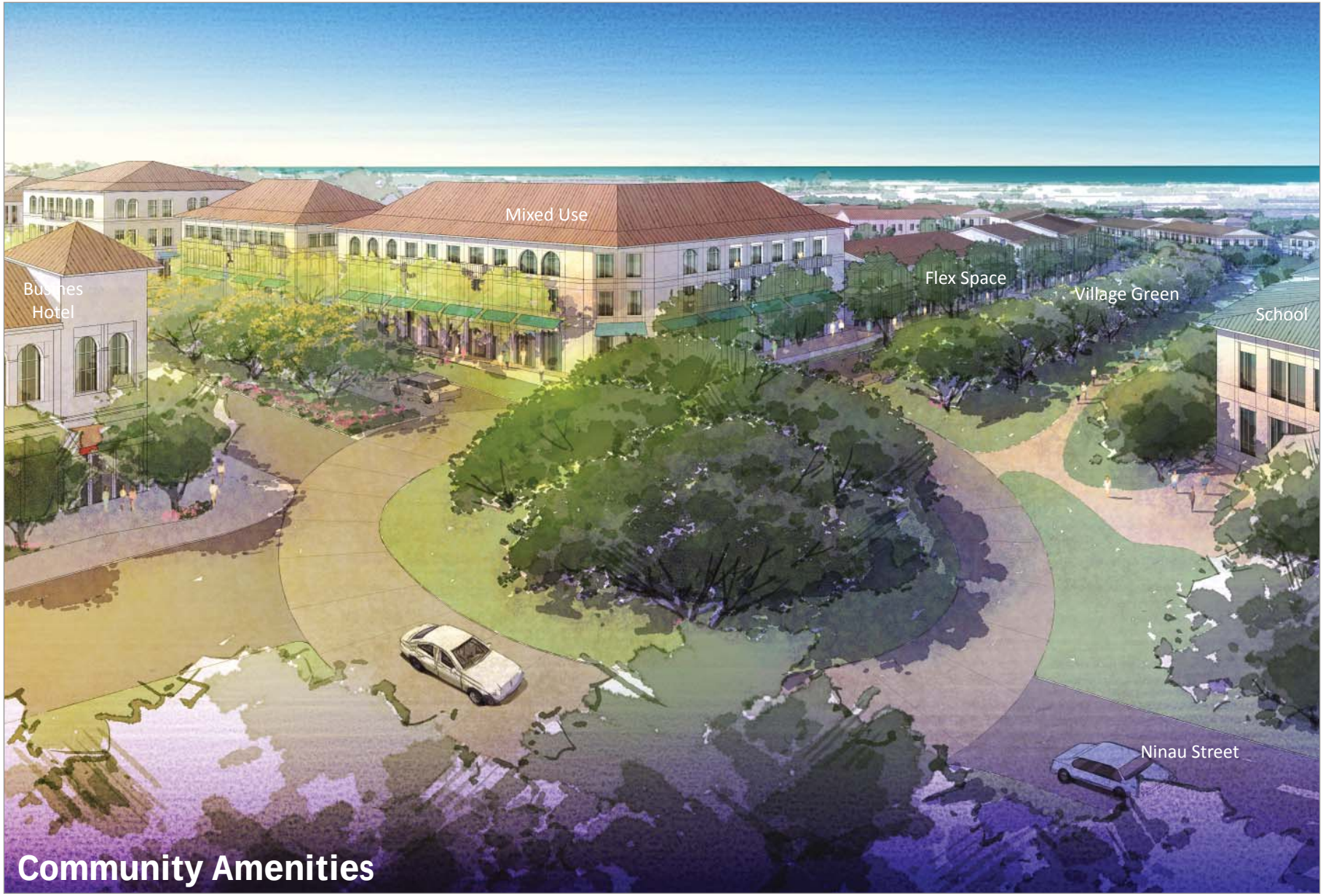
The employment numbers as shown are calculated based on the capacity for new construction (square feet) in the Park combined with the average number of employees per square foot of area in existing buildings in the park. Because the number of employees per square foot could vary in future businesses, and is somewhat higher in the current market study of the Park's future development, the number of employees in the areas shown in the graphic at left could be even higher.

Concept Renderings

The drawings on the following pages illustrate the various areas and elements of the Park. These renderings are meant to be visualizations of the urban design concepts. However, detailed design of the park and the Park's buildings will happen over time, so these should not be taken as literal depictions of planned development.

Village Center


Townhomes
Flex Space
Village Green
Village Green



Community Amenities

Economic Development and Urbanism

Employment Campus

Residential Area


Southern
Employment Zone
Kihei
Employment
Core
Employment
Expansion Land
Village Center

Aerial View

5 - FORM BASED CODE

NEIGHBORHOOD SCALE

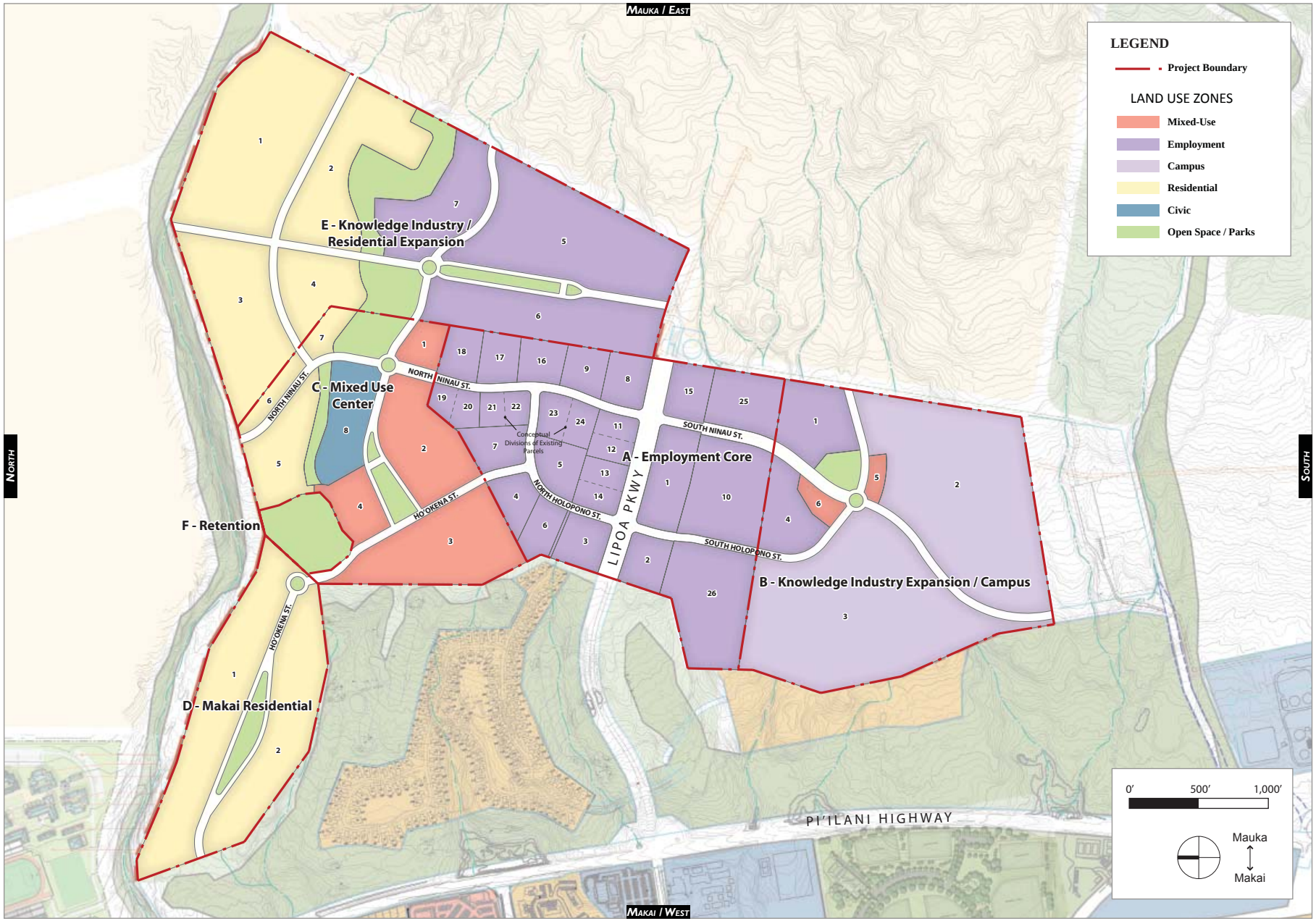
Controlling Plan

This portion of the form-based code regulates the larger structure of the plan and the Park's relationship to its context. The Controlling Plan and Controlling Plan Matrix establish the layout of the Park's land uses and the building types allowed within the uses. The Development Capacity spreadsheet sets out maximum and minimum development numbers. Following this are multiple sections conveying rules which establish neighborhood-scale characteristics of the Park such as circulation and connectivity.

The Controlling Plan establishes the overall development district for each block in order to focus growth in the appropriate locations while still encouraging a diverse building set within each neighborhood. A maximum unit count is established per block by multiplying average density times the block area, but within each block a range of building types and densities can be used. The allowable building types are established in the Controlling Plan Matrix. Leaving the selection of building type at the discretion of future builders greatly increases the flexibility of the master plan.

Sold Parcels

There are several parcels within the Park which have already been sold and are not under the control of Park ownership. The Park owners intend that these parcels will be developed in accordance with this Development Code. However, because these parcels were sold with the existing zoning in force, the owners of these sold parcels may choose to develop their parcels under either the previous zoning rules or the rules of this Development Code.



Controlling Plan

Land Use

The land uses in the Park were tightly limited by the original zoning designation. Besides the goal of improving the urban design of the Park, this plan also seeks to broaden the range of uses allowed. The following table lists the land use areas in the park and associated uses permitted within. Since the intent of the Park's development is to create economic development for Maui, in any case where the inclusion of a proposed activity or use in one of the given permitted categories is in question, the benefit of the doubt should go toward including the activity in the Park.

This plan is written with the intent to make the park more flexible and able to adapt to changing needs and market conditions. While the intent is to build the Park as shown in the plan, it may be necessary to make minor changes to respond to future conditions. For this reason, the land use categories for some portions of the Park may be changed at the will of the Park owner, as follows:

- Civic land may be changed to Mixed-Use
- Residential land may be changed to Employment
- Employment parcel B-4 may be changed to Mixed-Use

Land Use Categories

The plan categories uses based upon function, product or physical characteristics. Characteristics include the type and amount of activity, the type of customers or residents, how goods or services are sold or delivered, likely impact on surrounding properties, and site conditions.

It would be impossible to list every possible use which may be proposed for the park. In the event that a use is not listed or classification is otherwise required, the Park shall classify the use as appropriate into the use most similar, based on the charactistics listed above.

Accessory Uses

A non-residential use or structure shall be considered an Accessory Use or Accessory Structure if it meets the following criteria:

A. The use or structure serves (though not necessarily exclusively) the primary use and its inhabitants or employees or principal structure.

B. The use is subordinate in area, extent, or purpose to the primary use.

C. The use is located on the same lot as the primary use.

D. The use is included in calculation of maximum built up area.

(see Chapter 6 for a discussion of ohana / residential accessory units)

Permitted Accessory Uses

Following are permitted accessory uses and accessory structures:

A. Home Businesses.

B. Storage structures not exceeding 10 percent of the maximum lot coverage and maintaining compatibility of scale, materials and design with the principal structure.

C. Solar panels and similar features, awnings, canopies, carports, and other amenities attached or directly related to the primary structure.

D. Recycling storage and enclosures.

E. Temporary uses associated with construction sites.

PERMITTED USES BY ZONE		LAND USE ZONES					
		MIXED-USE	EMPLOYMENT	CAMPUS	RESIDENTIAL	CIVIC	OPEN SPACE / PARKS
PERMITTED USES	EMPLOYMENT						
	OFFICE	●	●	●			
	RESEARCH AND DEVELOPMENT	●	●	●			
	LIGHT INDUSTRIAL / STORAGE		●	●			
	COMMERCIAL / RETAIL						
	BUSINESS HOTEL	●	●	●			
	RETAIL, GENERAL SALES (MAXIMUM STORE SIZE 10,000 SQUARE FEET)	●	●	●	●		
	EATING & DRINKING ESTABLISHMENT	●	●	●	●		
	GROCERY STORE / MARKET (MAXIMUM STORE SIZE 20,000 SQUARE FEET)	●	●	●	●		
	PERSONAL SERVICES	●					
	RESIDENTIAL						
	RENTAL APARTMENT	●			●		
	CONDOMINIUM	●			●		
	FEE SIMPLE DWELLINGS (OHANA ALLOWED)	●			●		
	AFFORDABLE HOUSING	●			●		
	LIVE / WORK MIXED USE	●	●	●	●		
	SENIOR HOUSING	●			●		
	INSTITUTIONAL / CIVIC						
	PLACE OF WORSHIP	●			●	●	
	HOSPITAL	●	●	●		●	
	SCHOOL	●	●	●	●	●	
	MEDICAL OFFICE, CLINICS	●	●	●		●	
	LIBRARY / COMMUNITY CENTER	●			●	●	
	RECREATIONAL FACILITY	●	●	●	●	●	
	DAYCARE / NURSERY	●	●	●	●	●	
	GOVERNMENT SERVICES	●	●	●		●	
	POST OFFICE	●	●	●		●	
	POLICE / FIRE STATION	●	●	●		●	
	SHARED / PUBLIC PARKING STRUCTURE	●	●	●		●	

● PERMITTED

Note: Permitted Use categories are intentionally broad in order to provide unity and flexibility. Uses not specifically listed fall under the most similar use category. Development compatibility is ensured via form controls.

Land Use Matrix

Prohibited Accessory Uses

The following accessory uses are prohibited:

A. Open storage of vehicles except for resident vehicles.

B. Open storage of any kind (i.e. materials, supplies or equipment).

C. Outdoor display for sale of items such as automobiles, furniture, appliances or other large-scale materials.

Home Occupation / Home Businesses

The desire for the Park to become a place of innovation and economic development leads to the encouragement of home businesses in the Park's residential areas. Thus, any dwelling unit in the Park could be considered "live/work", regardless of the physical characteristics of the dwelling unit itself. However, the Park should also be a good place to live, and certain business activities may disrupt the viability of residential areas if left unregulated. Therefore, the following conditions apply to home businesses in the Park.

"Home Occupation" means an enterprise or activity conducted by the occupant of the dwelling unit wherein the enterprise or activity takes place and which involves either the growing, processing, or manufacturing of product or the provision of services for consideration and profit provided;

4. That no more than two employees, other than residents of the dwelling unit, shall be employed by the home occupation;

5. That no more than 40% of the floor area of the dwelling unit shall be used by the home occupation;

6. That group instruction classes or group sales meeting shall not include more than four persons, excluding employees of the home occupation;

7. That signs to advertise the home occupation shall be no larger than four square feet and shall be attached to the dwelling unit;

8. That no goods, chattel, materials, supplies, or items of any kind shall be delivered either to or from the premises of the dwelling unit used for a home occupation other than by a vehicle owned by the residents of the dwelling unit and limited to cars, jeeps, vans with a maximum capacity of nine passengers, and four-wheel drives and trucks with a maximum load capacity of three-quart tons, except for the delivery of furniture or large equipment;

9. That any storage of goods samples, materials, or objects used in connection with the home occupation shall be stored within the dwelling unit and shall receive the approval of all appropriate governmental agencies; and

10. That the following occupations shall not be construed to be a home occupation and therefore shall not be permitted;

    a. Harboring, training, or raising dogs, cats, birds, horses, or other animals, and

    b. Automobile and/or body fender repairing.

Accessory Use Development Standards

The following standards shall apply to all accessory structures:

A. The combination of all structures on a property, including the primary structure and all accessory structures, shall not exceed any requirements established in this chapter for the given parcel.

B. No accessory structure shall be constructed upon a property prior to completion of the primary structure.

Temporary Uses

Permitted Temporary Uses

Unless otherwise prohibited by this code, the following temporary uses and structures may be permitted provided that they do not adversely affect surrounding properties nor disrupt the normal activity associated with permitted uses:

A. Contractor's office, construction equipment sheds and lay down areas, haul roads, access roads, borrow/fill sites and other construction related uses.

B. A real estate office.

Duration of Temporary Use

A temporary use may be granted for a maximum time duration determined by the Park owner. An extension of time for continuance of a temporary use may be granted by the Park owner upon request and review.

Within 30 days following expiration of the granted time duration, the parcel shall be cleared of all debris and all temporary structures. A guarantee or signed contract with a disposal firm may be required as part of approval of any Temporary Use Permit.

Temporary Use Development Standards

The following standards shall apply to all temporary uses and structures, unless otherwise noted:

A. Temporary sanitary facilities must be approved by the Park owner.

B. Temporary uses shall meet reasonable landscaping, fencing and sign standards as approved by the Park owner.

C. Parking for the temporary use may be required by the Park owner, including a stabilized drive to the parking area.

D. Temporary uses must provide appropriate mitigation methods approved by the Park owner to minimize noise, storm water runoff, construction dust and pollution.

Storage of Materials and Equipment

No construction materials, supplies, tools, or equipment, including trucks and other vehicles shall at any time be placed or stored in any area within the Park other than the given parcel without approval of the Park owner. Storage shall occur inside a closed, temporary building, or behind a visual barrier or fence of such design and construction to screen the storage area from public view. Such temporary structures, fences and visual barriers shall require approval by the Park owner and shall not extend over the designated boundary.

Building Types and Land Use

The building types as detailed in Chapter 5 encompass many of the typologies which will be needed for the park. As shown in the Building Type by Zone table below, these can be sorted into appropriate areas of land use, based on the permitted uses in each zone.

Not all possible building types have been detailed. Some, such as the proposed business hotel, are already known and a part of the plan proposal. Others, such as industrial uses, may be placed in the Park if the opportunity arises. And even other building types will undoubtedly be necessary as the park developes more fully. However, these building types are meant to guide the development of the Park, and the principles which guide them, as well as the more general principles detailed throughout Chapter 5, should guide the design of any building types not detailed here.

Civic Buildings

The plan encourages the location of civic buildings in the Park. The addition of civic uses will help to make the Park a true mixed-use neighborhood. Possible civic uses include public or private schools, a YMCA facility, a community center, or trade schools, among other uses.

Like other building types which are not specifically noted, civic buildings in the park could take any number of forms but should contribute to the quality of the Park's public spaces like any other building. Thus, these buildings must comply with the rules in this code, such as their relationship to the street, or vehicle access and storage.

BUILDING TYPE BY ZONE	BUILDING TYPE												
	OFFICE / RESEARCH & DEVELOPMENT	OFFICE OVER RETAIL	RETAIL	FLEX SPACE	RESIDENTIAL OVER RETAIL	MULTI-FAMILY	4-PLEX	3-PLEX	TOWNHOMES	GREEN COURT	SINGLE FAMILY SMALL LOT	SINGLE FAMILY LARGE LOT	CIVIC / PUBLIC
MIXED-USE	●	●	●	●	●	●	●	●	●		●	●	●
EMPLOYMENT	●	●	●	●									●
CAMPUS	●	●	●	●									●
RESIDENTIAL			●	●	●	●	●	●	●	●	●	●	●
CIVIC													●

Controlling Plan Matrix

● PERMITTED

Controlling Plan Rules

Substituting Employment

In all parcels employment uses can be substituted for residential or retail uses. In such case, the maximum FAR for the parcel will be 0.65, net of any publicly accessible roads or parks created on the site.

Subdivision

The site has been divided into a number of larger blocks for the purposes of assigning development capacities. It is not intended that most of these blocks would remain at current sizes, however. Whether developed directly by the Maui Research and Technology Park or sold and developed by others, most of these blocks should be further broken down into more human-scaled blocks and parcels.

The appropriate block size varies by land use. The maximum block sizes for developed land are:

- Residential – 5 acres
- Retail or mixed residential and commercial – 5 acres
- Office – 8 acres
- Industrial – 8 acres
- Campus – 35 acres

These maximums may be exceeded on a case by case basis where conditions such as topography or lack of adjacent road connections make a smaller block impossible or impractical. These instances must be approved by the Park.

There are no minimum block sizes.

Street Connectivity

The connectivity of the street network is highly important. All roads created in subdivided parcels should connect to other roadways at both ends. This rule may only be broken with permission of Park management, and must be justified based on specific problems such as difficult terrain or land boundaries, and must have no other reasonable solution which would allow the road to maintain connectivity.

Required Retail Frontage

There is no certainty of the amount of retail which will be able to survive within the Park. The Park's current level of development, as well as its relative isolation from major through roadways, make extensive retail development unlikely. However, as the park adds additional employees and residents, it may be feasible for neighborhood-supporting retail to exist. This retail would be part of the supportive amenities for the Park's economic development and business attraction.

In order to support the plan's creation of neighborhood nodes at the northern and southern ends of the North South Greenway, two parcels in the plan have required retail frontage. This is not to say that retail may not locate in other permitted places in the Park as well, but that these two locations are particularly important. As the locations of the primary transit stops as well, these sites should have active, public uses. Therefore, retail is required along the fronts of the two parcels as shown.

Road and Open Space Locations

At present, the plan remains conceptual to some degree. Much work remains to be done, such as engineering of the final road alignments. For this reason, the locations of the roads and open spaces as shown in the plan are flexible and may be changed with the creation of the final designs as long as the overall network of roads and open spaces remains. Open space amounts can vary in this process as necessary, to -20% of current amounts.

Park areas as shown will be augmented with active park space as required for residential zones.

Development Capacity

Note: The total Maui Research & Technology Park land area is 410.937 acres. The 401 acre total on this page does not include land areas for Lipoa Parkway makai of the Park and the portion of Ninau Street south of the Park boundary (which is shown in the controlling plan on page 59). Both of these areas are roadways and do not contain development.

Parcel	Use Type	Acres
A	**Employment Core**	**86.0**
	Developed Parcels	*15.8*
6	Employment	*2.2*
7	Employment	*2.9*
8	Employment	*2.7*
9	Employment	*2.3*
10	Employment	*9.2*
11	Employment	*1.2*
12	Employment	*1.2*
13	Employment	*1.4*
14	Employment	*1.4*
15	Employment	*2.8*
16	Employment	*2.3*
17	Employment	*2.3*
18	Employment	*2.3*
19	Employment	*0.9*
20	Employment	*1.2*
21	Employment	*1.0*
22	Employment	*1.0*
23	Employment	*1.6*
24	Employment	*1.5*
25	Employment	*4.9*
26	Employment	*10.7*
	Trunk Open Space	*0.2*
	Trunk Roads	*13.0*

Parcel	Use Type	Acres
B	**Knowledge Industry Expansion / Campus**	**88.2**
1	Employment	*6.1*
2	Employment / Campus	*32.3*
3	Employment / Campus	*34.9*
4	Employment	*4.8*
5	Mixed Use / Flex	*0.9*
6	Mixed Use / Flex	*1.3*
	Trunk Open Space	*1.8*
	Trunk Roads	*6.0*
C	**Village Center**	**58.3**
1	Mixed Use	*2.1*
2	Mixed Use	*9.5*
3	Mixed Use	*13.1*
4	Mixed Use	*3.7*
5	Residential Mixed	*7.0*
6	Residential Mixed	*1.8*
7	Residential Mixed	*1.7*
8	Civic	*6.2*
	Trunk Open Space	*6.3*
	Trunk Roads	*6.8*

Parcel	Use Type	Acres
D	**Makai Residential**	**39.0**
1	Residential Mixed	*18.8*
2	Residential Mixed	*14.5*
	Trunk Open Space	*2.3*
	Trunk Roads	*3.4*
E	**Option Land**	**123.8**
1	Residential Mixed	*24.2*
2	Residential Mixed	*13.3*
3	Residential Mixed	*14.6*
4	Residential Mixed	*6.4*
5	Employment	*21.2*
6	Employment	*12.9*
7	Employment	*9.3*
	Trunk Open Space	*12.3*
	Trunk Roads	*9.7*
F	**Retention**	**5.8**
	Trunk Open Space	*5.5*
	Trunk Roads	*0.3*

	Phase 1	*Phase 2*	*Total*
SITE SUMMARY	**189.0**	**212.0**	**401.0**
	Areas A,C,D	*Areas B, E*	
Employment	*72.7*	*121.5*	*194.2*
Mixed Use	*28.4*	*2.3*	*30.7*
Civic	*6.2*	*0.0*	*6.2*
Residential Mixed	*43.8*	*58.5*	*102.3*
Trunk Open Space	*14.3*	*14.1*	*28.3*
Trunk Roads	*23.6*	*15.7*	*39.3*
Maximum New Non-Residential BUA *(square feet)*	**985,200**	**1,014,800**	**2,000,000**
Maximum Residential Units	**750**	**500**	**1,250**

Development Caps

Maximum New Non-Residential Built Up Area	**2,000,000 square feet**
Maximum Total Retail BUA*	**100,000 square feet**
Maximum Combined Retail & Eating & Drink Establishments BUA Per Area for A, B, D & E	**12,000 square feet**
Maximum Dwelling Units	**1,250 dwelling units**

* retail cap does not include Hotels, Eating & Drinking Establishments, and home-based businesses

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Circulation & Connectivity

The transportation network in the Maui Research and Technology Park will be essential to creating a high quality working and living environment. This code regulates essential elements of the transportation network with that goal in mind.

Bicycle & Pedestrian Facilities

For parcels bordering open space, pedestrian and bicycle access shall be provided to the open space for persons employed or living on the parcel. Access for customers and guests to the open space is encouraged.

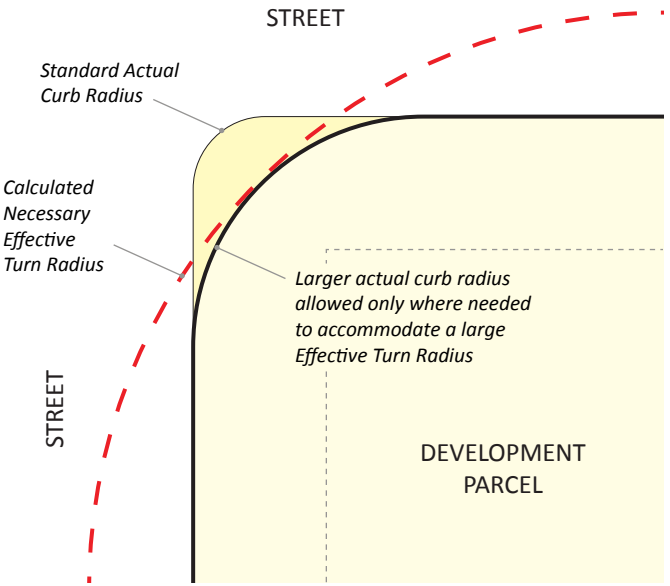
All non-residential and multi-family residential parcels shall promote the option of commuting by bicycle by providing the following:

- One bicycle space for every 20 car spaces. Bicycle racks shall be located within 40 feet of the primary building entrance in an area easily visible from inside the building. 10% of the required bike spaces shall be in the form of covered, secure bike storage. This can be accommodated inside the building or with covered bike storage outdoors.
- Employee shower facilities and changing rooms that are convenient and accessible shall be provided for commercial buildings larger than 50,000 square feet.

Intersection Curb Radii

As discussed in Chapter 3, there is a critical difference between the actual curb radius and the effective turn radius of an intersection. The aim of this Code is to keep the actual curb radius as small as possible (thereby reducing pedestrian crossing distances and keeping vehicle turning speeds low). At the same time, it is necessary to safely accommodate vehicle turning movements. Both goals can be addressed by calculating curb radii in the Park based on the effective turn radius, not the actual curb radius.

The maximum standard actual curb radius in the Park shall be 10 feet. This radius may only be increased where necessary to keep the curb from overlapping the required effective curb radius. Though it is permissible to allow material changes in the street surface which overlap the effective turn radius, in all cases the effective turn radius shall be free and clear of obstacles such as vertical curbs, curb ramps, or parked cars. It is also permissible to set minimum effective turn radii which require large vehicles to cross into the opposite side of the street to complete a turn when the frequency of turns of these vehicles will be low.



Curb Geometry Diagram

Traffic Calming

Traffic calming measures as discussed in Chapter 3 are encouraged in the park where necessary to manage traffic and to keep automobile speeds at safe levels. Ideally, the Park's network of small-scale streets, short blocks, and human-scale intersections will make traffic calming largely unnecessary. However, as the Park develops and traffic patterns become clear, addition of traffic calming may be required.

Calming measures which are allowed are:

- Speed Hump/Speed Bump
- Pedestrian Table/Speed Table
- Raised Crosswalk
- Raised Intersection
- Chicane/Slalom
- Forced Turn
- Median Island
- Full Roundabout (full or mini)
- Traffic Circle
- Bump-Out/Curb Extension
- Bus Bulb
- Pinch Point/Choker
- Neckdown
- Narrow Planting

Narrow streets and streetside parking are other traffic calming measures which are built into the project's proposed street sections, which follow.

Other measures may be used with approval from the County.

Parking

As discussed in Chapter 3, the requirement for every parcel to provide on-site parking warps the free market, creates additional driving and its related congestion and pollution, and subsidizes driving at the expense of pedestrians, bicyclists and transit users.

However, the system of requiring the provision of parking for various land uses has been used for many decades and is at this time fully entrenched. There is concern that removing all parking requirements in the Park could jeopardize the approval of the plan as well as create unease among possible employers in the park and the lenders who would serve them.

For these reasons, the plan does not remove all parking requirements. Instead, the amount of parking required is reduced. The new, lower requirements for each use are detailed in the revised section of the County Code which concerns the Park.

In addition, the Code allows on-street parking spaces and off-site parking (such as joint lots) to be counted against the parking requirements of a parcel. Joint use parking, also called shared parking, is also allowed. These strategies will help to strike the right balance between flexibility, sustainability and the adherence to contemporary norms.

Street Network

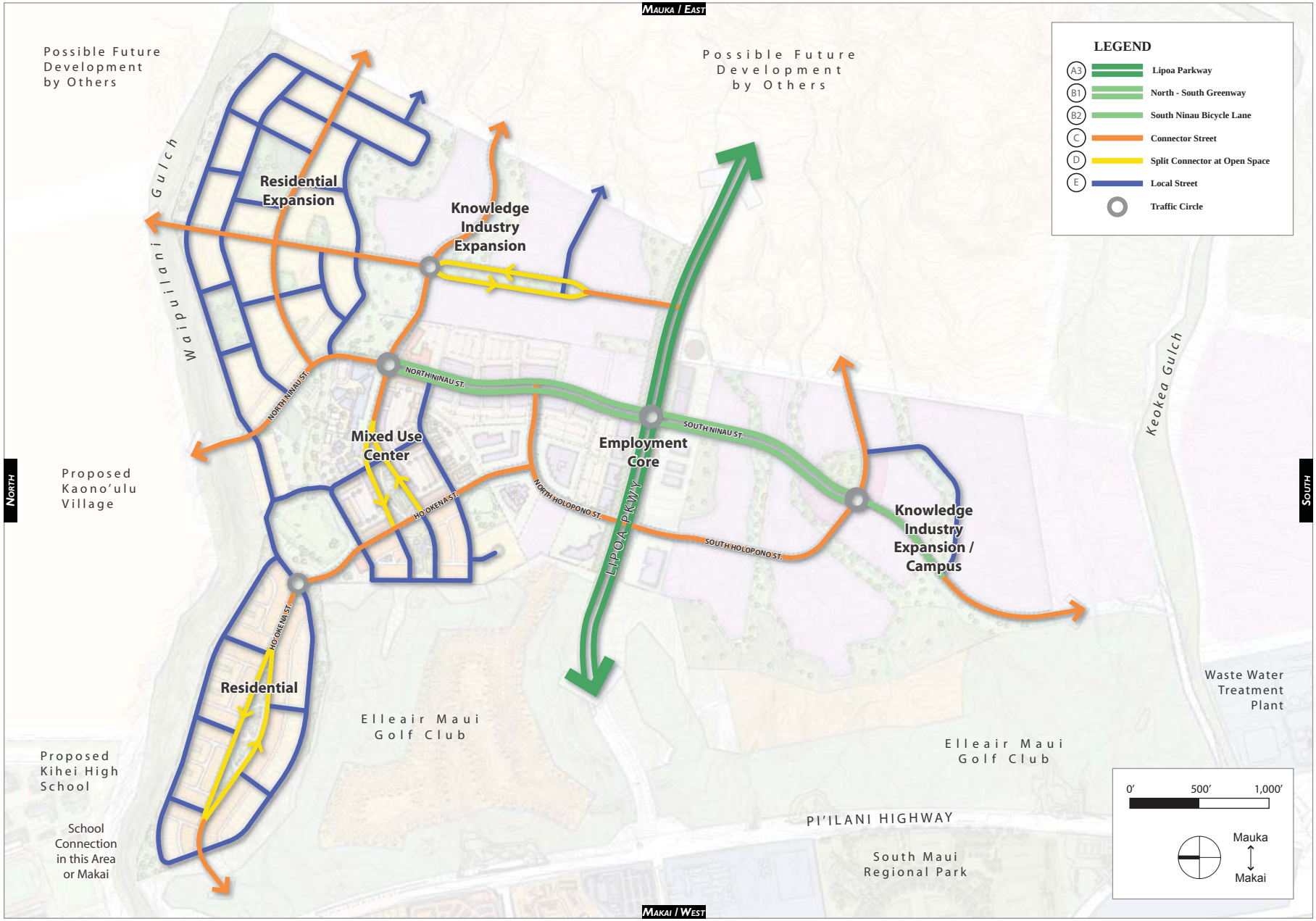
Well-designed streets and their associated sidewalks and pathways function as the primary social space of a community. They offer the opportunity for al fresco dining, dog walking, chance encounters, or conversations with neighbors working in their yards or sitting on their porches. In order for these things to occur, streets must be specifically designed to foster pedestrian comfort. The width and number of vehicle travel lanes should be minimized to encourage pedestrian crossings. Street tree plantings and street furnishings should be scaled appropriately to the pedestrian and should reflect their natural and cultural environments. When properly designed, streets are an integral part of a community and create a vitality that sustains the social interaction of its citizens.

The street sections which follow incorporate the various principles and concepts of good street and network design. The sections include a palette of configurations for use throughout the Park. Specific street sections may be chosen for specific locations at a later date, based on more detailed calculations of traffic volume and network issues.

Stormwater retention or detention in street facilities such as in bulb-outs, curb extensions, or tree lawns can reduce total site runoff and the need for large retention/detention ponds or areas. In addition, this strategy adds additional green space to the street and can reduce the amount of pulluted runoff. In order to encourage this practice, creation of stormwater retention/detention in street facilities in the Park will receive full credit to be applied to overall site requirements, reducing the amount of downstream retention/detention required.

An good example of on-street stormwater retention is the Green Street Program in Portland, Oregon, described at http://www.portlandonline.com/BES/index.cfm?c=44407.

Sustainable stormwater management in Portland, Oregon



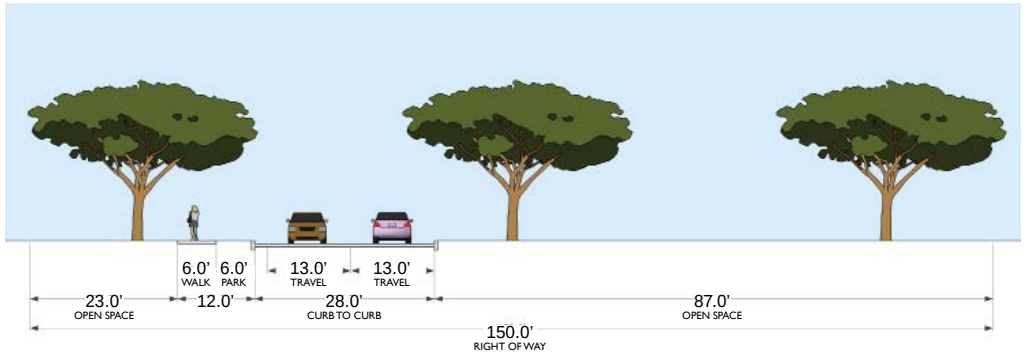
Circulation Plan

Street Sections

The existing condition on Lipoa Parkway is one of large trees and extensive planting. This plan retains that pattern by creating a mandatory 60 foot setback from the Lipoa Parkway right of way. This setback requirement overrides other setback figures in this book, but applies only to Lipoa Parkway. Setbacks along side streets, even along parcels which front on Lipoa Parkway, remain as noted elsewhere.

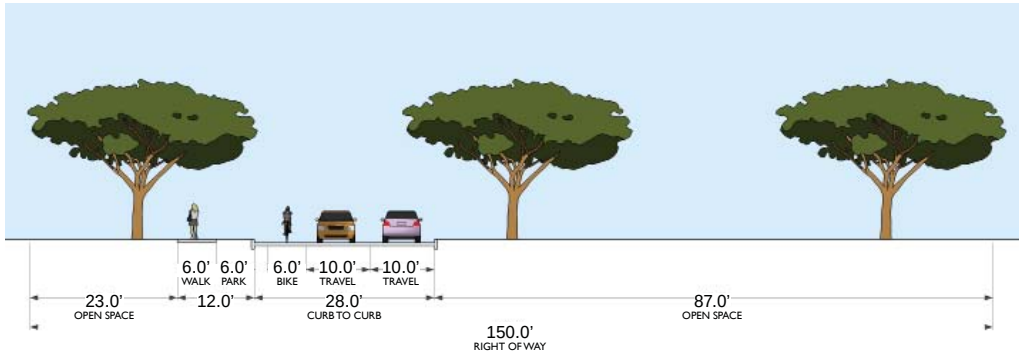
A1

LIPOA PARKWAY (Existing)



A2

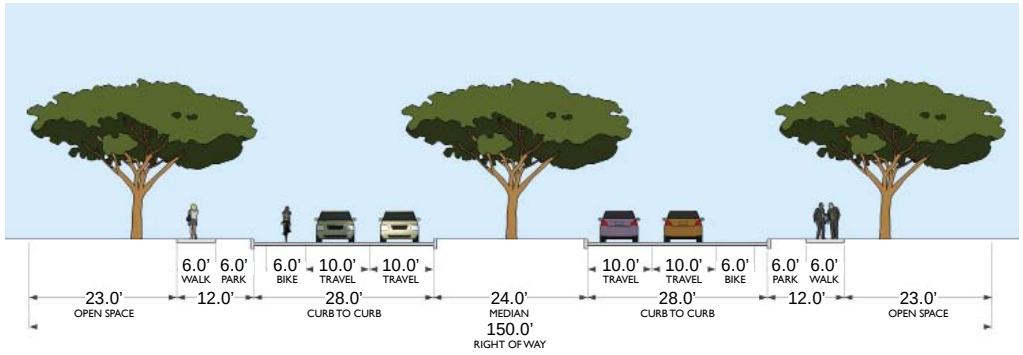
LIPOA PARKWAY (Interim)

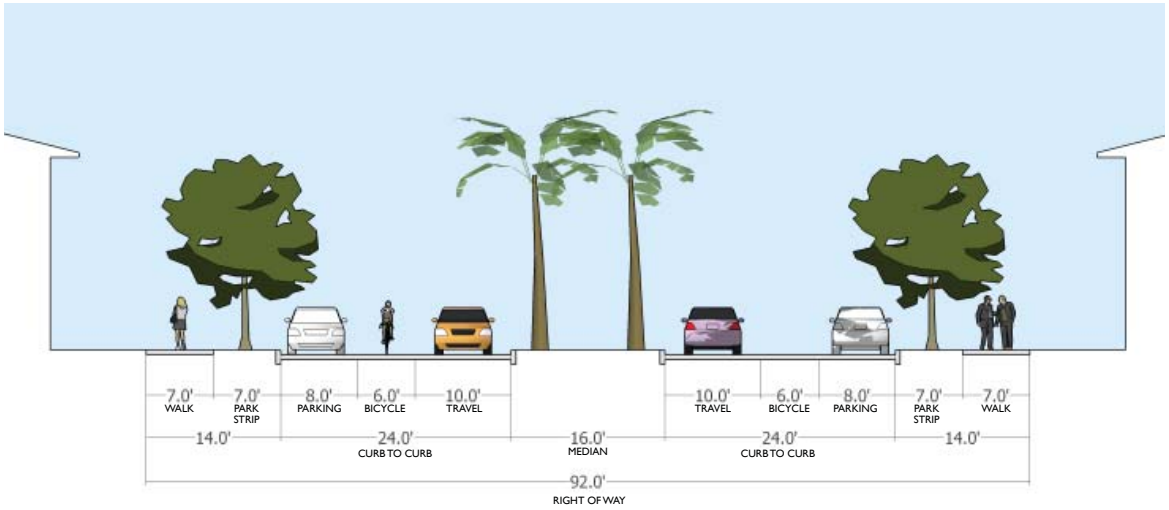


A3

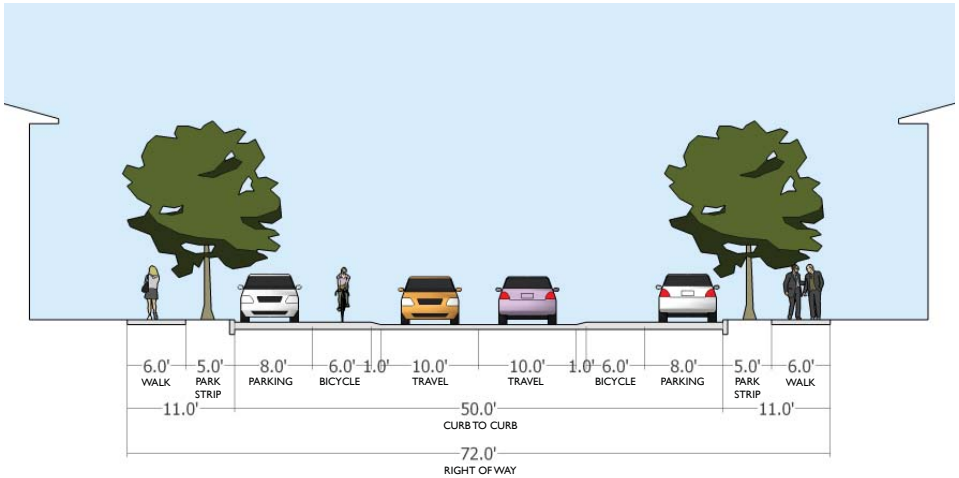
LIPOA PARKWAY (Final)

0' 15' 30'





B1
NORTH - SOUTH GREENWAY

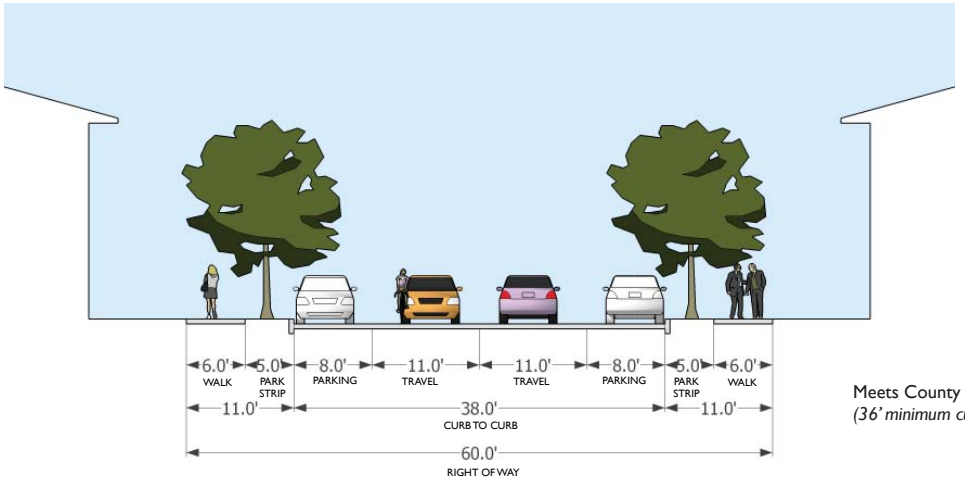


The South Ninau Bicycle Lane is intended to be a raised bicycle lane. This configuration raises the bicycle lane and adjacent parking lane above the level of the driving lanes. A small transition area allows bicycles and cars to safely go from the driving lanes into the bicycle and parking lanes. This configuration helps to protect bicyclists and keeps the main surface of the roadway much narrower than with the use of regular at-grade bicycle lanes, reducing the the careless driving behavior that can result from excess road width.

B2
SOUTH NINAU BICYCLE LANE

C

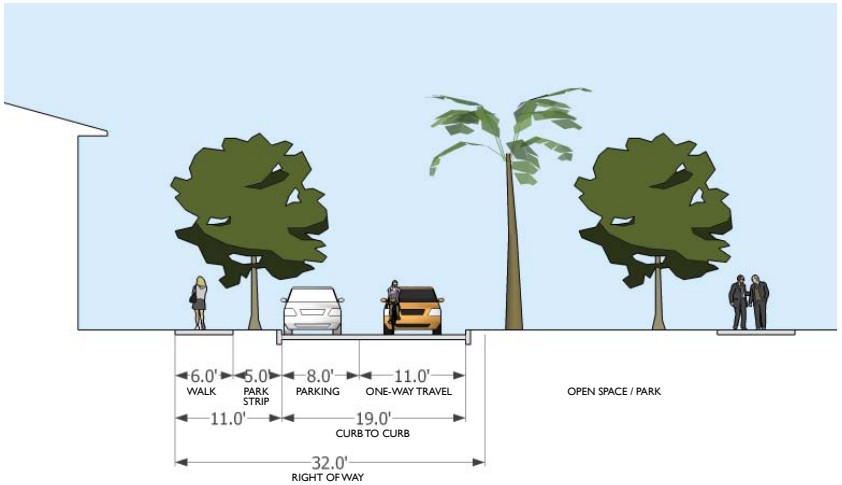
CONNECTOR STREET



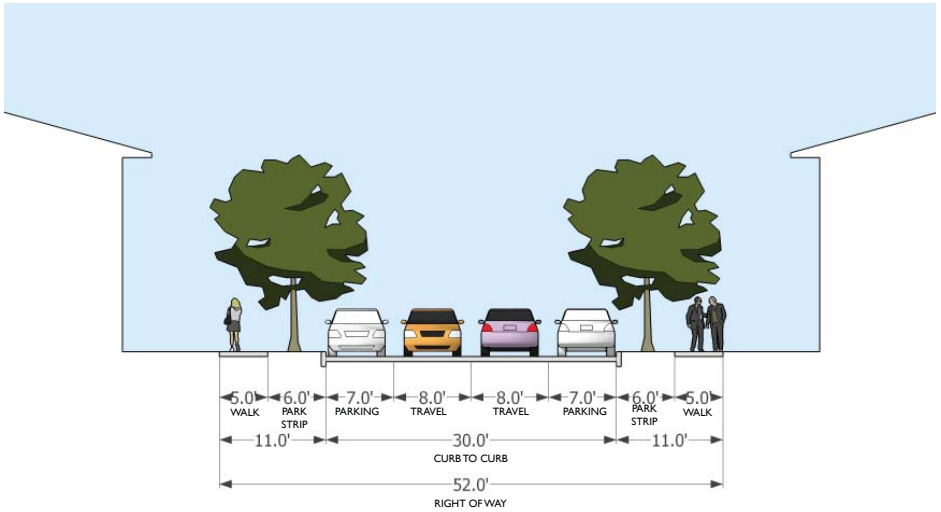
Meets County Standard
(36' minimum curb to curb)

D

SPLIT CONNECTOR AT OPEN SPACE (One-Way)

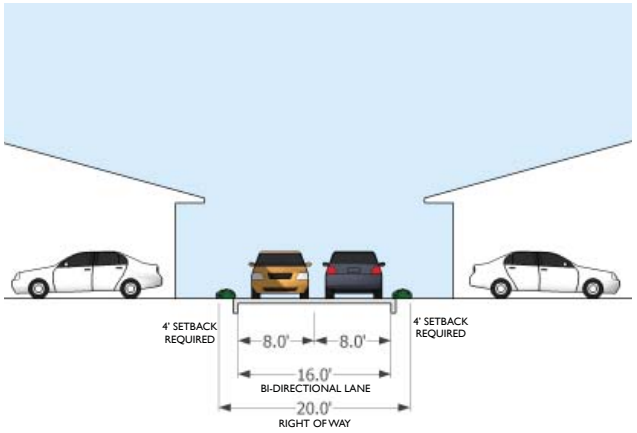


0’ 10’ 20’



E

LOCAL STREET



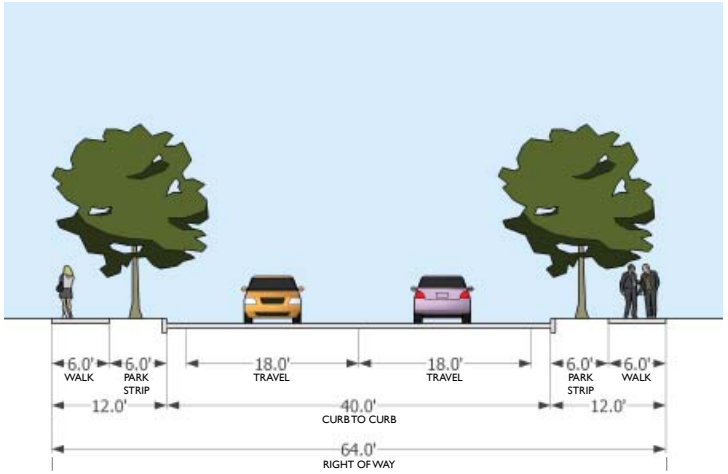
F

ALLEY (two-way)

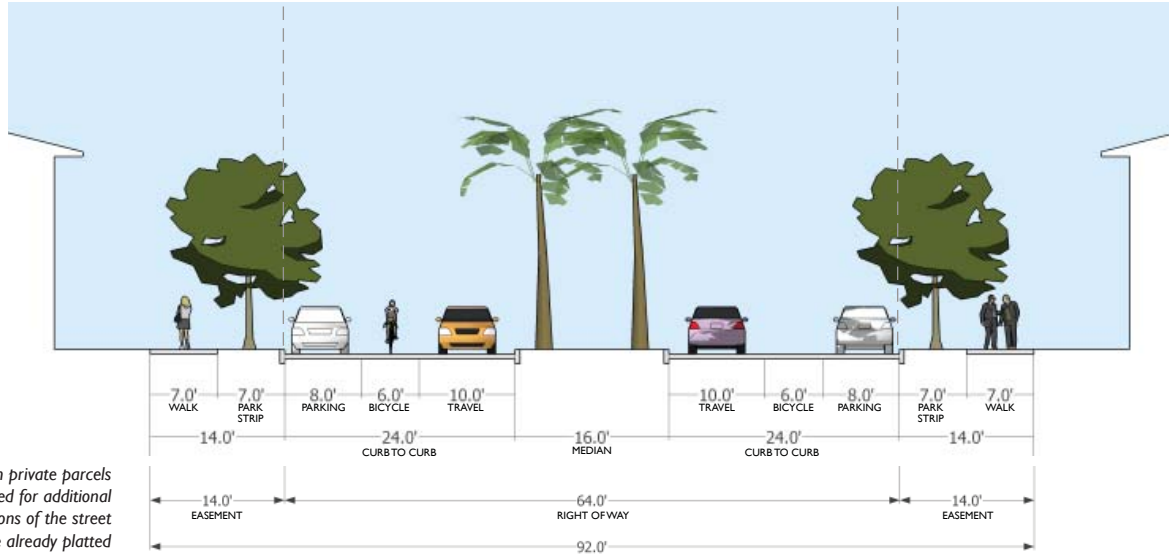
0’ 10’ 20’

G1
NINAU STREET (Existing)

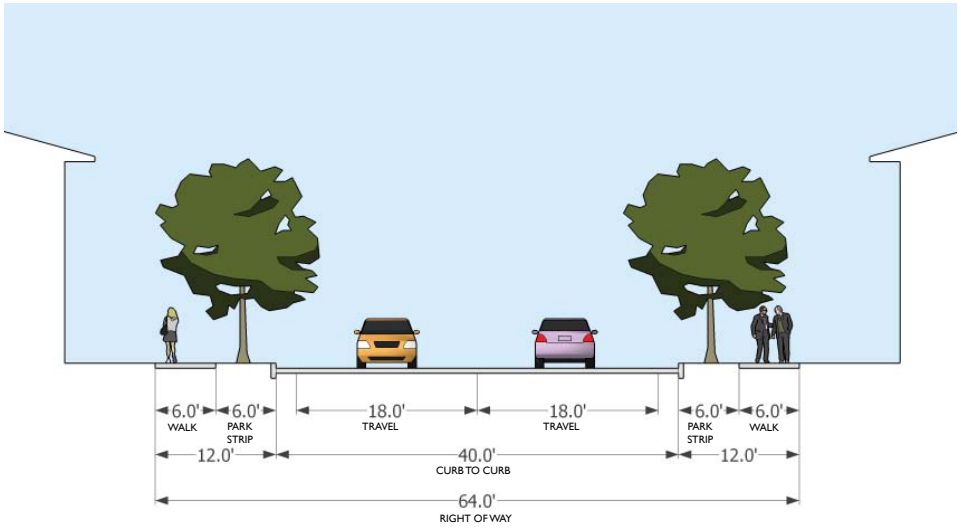
In order to unify the treatment of Ninau Street between the northern and southern portions of the Park, the plan continues the North - South Greenway concept in the existing parcels along Ninau Street by creating easements along which public walkways and open space are located as shown at bottom. For parcels previously purchased, creation of this easement is at the discretion of the owner. Rebuilding of Ninau Street to the configuration shown would happen at the discretion of the Maui Research and Technology Park.



G2
NINAU STREET (Final, North - South Greenway Format)

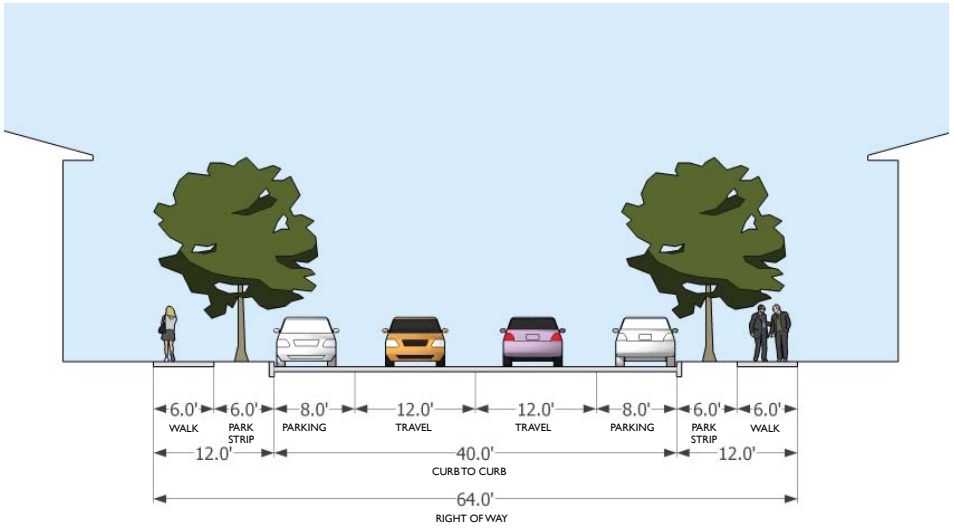


Easements on private parcels are proposed for additional area in sections of the street which are already platted



H1

HOLOPONO & HO'OKENA STREET (Existing)



H2

HOLOPONO & HO'OKENA STREET (Final)

0' 10' 20'

6 - FORM BASED CODE

BUILDING SCALE

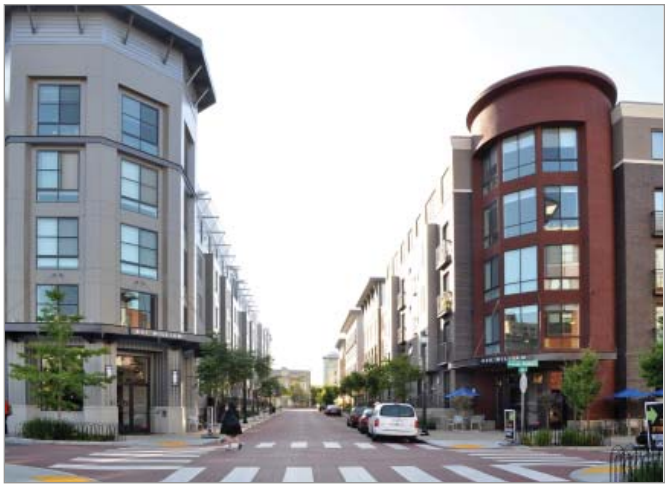
BUILDING SCALE DESIGN GOALS

Building design, including the location of buildings, parking and entries, greatly affects a community's social ties, the public realm and the pedestrian experience. Placing buildings close to sidewalks defines a more human-scale street and provides pedestrian interest. Building facades that surround a street or public space create an "outdoor room" – the type of space that has always defined memorable urban places. Entries give pedestrians direct access from buildings to sidewalks, reinforcing the notion that the street is designed for people as well as cars. Parking areas located in block interiors, not at sidewalk edges, further reinforce pedestrian primacy. And the tradition of alleyways sets a simple precedent of site configurations that honor the street and the pedestrian by placing buildings and pedestrians before cars.

Urban design and architecture also establish human scale, foster community, and encourage the use of outdoor spaces. Architectural massing and detailing provide visual interest and a variety of environments for the person on foot or bike. At the same time, they establish the character, durability, and quality of a place. Window locations and treatments reinforce human scale and also ensure that "eyes on the street" will provide casual surveillance. Variation from building to building relieves the monotony of large or repetitious environments. Finally, clearly articulated entries add architectural punctuation to the street. Together, appropriate architectural treatments create a community with a distinct identity that does not facelessly blend into other areas.

This portion of the form-based code regulates the parcel and building scale characteristics of the Park. The Building Typologies and Summary Matrix explain the various buildings which are allowed. Following the building typologies, various sections discuss the relationships of buildings to their context, vehicular access and storage, architectural characteristics, and other important building concepts.

BUILDING TYPOLOGIES



Building typologies are used in this plan to set parameters for development on the private parcels. The typologies which follow show a wide variety of building types, including many different land uses. All of these types have in common the treatment of the public space as a valued and important realm. Rather than allowing buildings to be hidden behind parking lots or large garages, the intent is to present a human face to the street. Such buildings create a more lively and vital common space, and make an area safer with “eyes on the street.” All buildings will have prominent entrances to the street, allowing easy access from street side parking and for pedestrians, bicyclists and transit users.

These typologies are generalized massing diagrams. Final architecture should be culturally and climatically appropriate to Maui, and should fulfill the intent of these guidelines to create a high quality public realm.

Case Studies

Building typologies originate from an understanding of existing buildings as well as an aim to improve the design of future buildings. Given the Park's focus on technology employment, one of the most important building types to understand is office.

The studies on the opposite page show existing office buildings within the Park. The site sizes are large, conforming with the minimum two acre requirement. This requirement makes it uneconomical to build smaller buildings in the Park, eliminating some possible tenants from consideration.

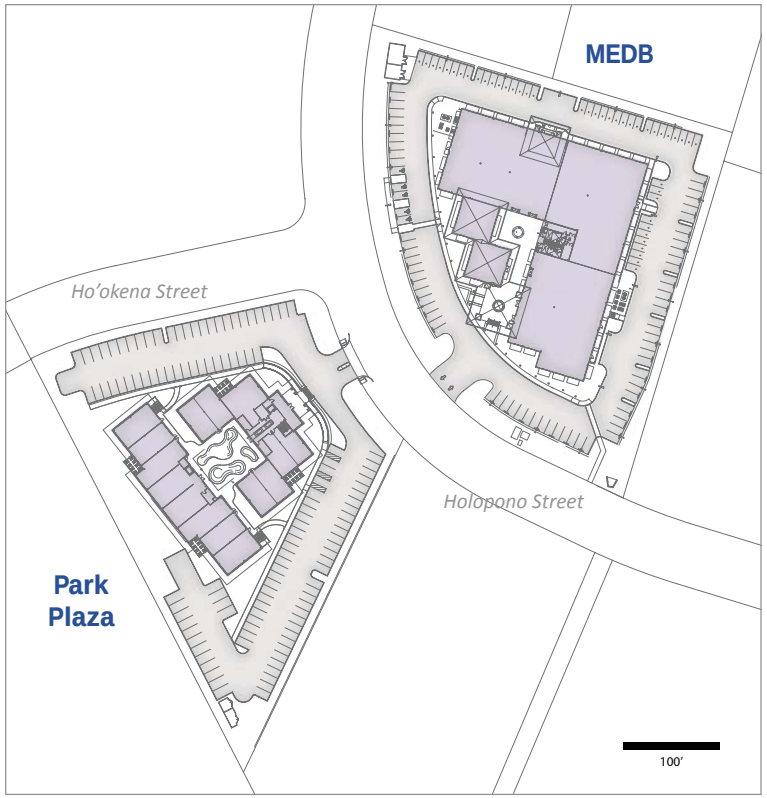
Each building is surrounded by parking. This is a function of the need for parking combined with the Park's current minimum setback requirements. As a result of the setbacks, the building is pushed to the center of each parcel. The only room available for parking is then the site's perimeter. This leaves each building "floating in a sea of parking," making the entrance reachable only through the parking lot.

The densities of the buildings are floor area ratios of 0.27 and 0.36. The floor area ratio, the ratio of a building's built floor area to the area of the parcel on which it sits, is a common measure of built density. These buildings are at typical densities for buildings of this type which have surface parking. Large parking lots consume much of the land area of the site, naturally limiting the possibility for larger buildings.

Parking is provided on these sites at around 3.5 parking spaces for every 1,000 square feet of building area. This ratio is common for office buildings where most people will arrive by automobile. Where other travel options such as walking, bicycling, carpooling, or transit are available, buildings often have much lower parking ratios.

Alternative building arrangements are possible, and becoming increasingly common. Smaller lot sizes make building a possibility for users who do not need large amounts of space. Reduced or eliminated setbacks allow buildings to come close to the public realm, framing the street with a human scale, town-like atmosphere. Reduced or eliminated parking requirements help remove the subsidy which free parking provides for driving, and creates long-term flexibility in the built environment for response the actual need for parking rather than fixed

Office buildings with street-facing entries and retail on the ground floor



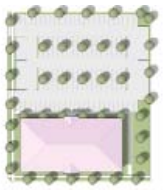
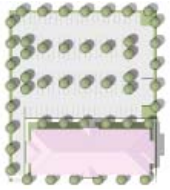
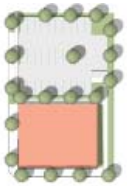
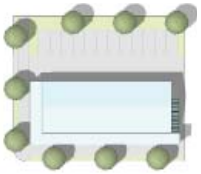
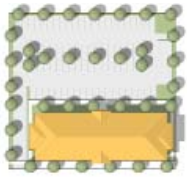
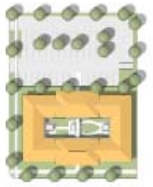
Park Plaza	
Building	37,000 square feet on 2 floors
Site	2.34 acres
Density	FAR 0.36
Parking	121 parking spaces (3.3 per 1,000 square feet)

MEDB	
Building	33,500 square feet on 1 floor
Site	2.80 acres
Density	FAR 0.27
Parking	118 parking spaces (3.5 per 1,000 square feet)

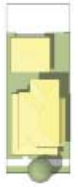
Park Plaza building

MEDB building

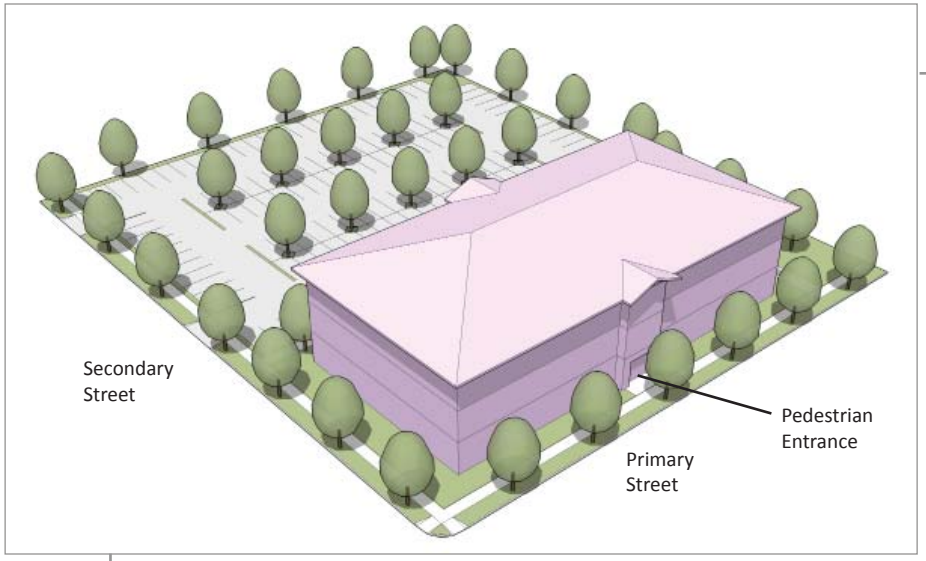
Building Typologies Summary Matrix

BUILDING TYPE	OFFICE / RESEARCH and DEVELOPMENT	OFFICE over RETAIL	RETAIL	FLEX SPACE	CIVIC	RESIDENTIAL over RETAIL	MULTI-FAMILY
	 Primary Street	 Primary Street	 Primary Street	 Primary Street	Not Illustrated	 Primary Street	 Primary Street
OVERALL							
Lot Size (examples shown above)	75,000 sf	70,000 sf	23,400 sf	12,000 sf	Not shown	49,400 sf	38,250 sf
Lot Area (minimum square feet)	6,000	6,000	2,400	1,800	5,000	6,000	4,500
FAR (net) (min./max)	0.3 - 0.65	0.5 - 0.65	0.3 - 0.4	0.5 - 0.8	N/A	N/A	N/A
Unit Size (min./max.)	N/A	N/A	N/A	1,000 sf - 2000 sf	N/A	400 sf - 1000 sf	400 sf - 1,000 sf
Stories / Building Height (maximum)	4 / 50 feet	4 / 50 feet	2 / 40 feet	2 / 40 feet	4 / 50 feet	4 / 50 feet	3 / 40 feet
Density (net units/ac) (min./max.)	N/A	N/A	N/A	15 - 20	N/A	18 - 30	28 - 40
Parking Access	Alley or side drive or secondary street	Alley or side drive or secondary street	Alley or side drive or secondary street	Alley or secondary street	Alley or side drive or secondary street	Alley or side drive or secondary street	Alley or side drive or secondary street
SETBACKS							
Setbacks (min./max. feet) - Front, Back, Side	0-15, 5 (min), 0 (min)	0-15, 5 (min), 0 (min)	0-10, 5 (min), 0 (min)	0-10, 5 (min), 0 (min.)	5-15, 5 (min), 0 (min)	0-10, 5 (min), 0 (min)	5-15, 5 (min), 5 (min)
Length of Primary Frontage Occupied (minimum)	60%	60%	70%	80%	50%	70%	70%

Notes:
sf = square feet
‘ and ft = feet
N/A = not applicable

BUILDING TYPE	FOUR-PLEX	TRI-PLEX	TOWNHOME	SINGLE FAMILY/DUPLEX GREEN COURT	SINGLE FAMILY SMALL LOT	SINGLE FAMILY LARGE LOT
	 Primary Street	 Primary Street	 Primary Street	 Primary Street	 Primary Street	 Primary Street
OVERALL						
Example Lot Sizes (common sizes)	40' x 75' (3,000 sf) 50' x 85' (4,250 sf)	30' x 75' (2,250 sf) 35' x 90' (3,150 sf)	20' x 55' (1,100 sf) 24' x 100' (2,400 sf)	55' x 30' (1,650 sf) 70' x 50' (3,500 sf)	50' x 70' (3,500 sf) 45' x 100' (4,500 sf)	55' x 90' (4,950 sf) 70' x 100' (7,000 sf)
Lot Size (min./max. square feet)	3,000 (min)	2,200 (min)	1,100 (min)	1,650 (min)	3,600 - 4,800	4,801 - 7,250
FAR (net) (min./max)	N/A	N/A	N/A	N/A	N/A	N/A
Unit Size (min./max.)	500 sf - 1,100 sf	500 sf - 1,100 sf	900 sf - 1,400 sf	800 sf - 1,400 sf	1,200 sf - 1,800 sf	1,400 sf - 2,000 sf
Stories / Building Height (maximum)	3 / 40 feet	3 / 40 feet	3 / 40 feet	2 / 30 feet	2 / 30 feet	2 / 30 feet
Density (net units/ac) (min./max.)	40 - 60	40 - 60	18 - 40	12 - 26	9 - 12	6 - 10
Parking Access	Alley or secondary street (side of unit)	Alley or secondary street (side of unit)	Alley or secondary street (side of unit)	Alley	Alley or secondary street (side of unit)	Alley or side drive or secondary street (side of unit)
SETBACKS						
Setbacks (min./max. feet) - Front, Back, Side	5-12, 5 (min), 5 (min)	5-12, 5 (min), 5 (min)	5-11, 5 (min), 0 (min.)	5-10, 5 (min), 5 (min)	5-10, 5 (min), 0 (min.)	5-15, 6 (min), 6 (min)
Length of Primary Frontage Occupied (minimum)	70%	70%	70%	60%	60%	40%

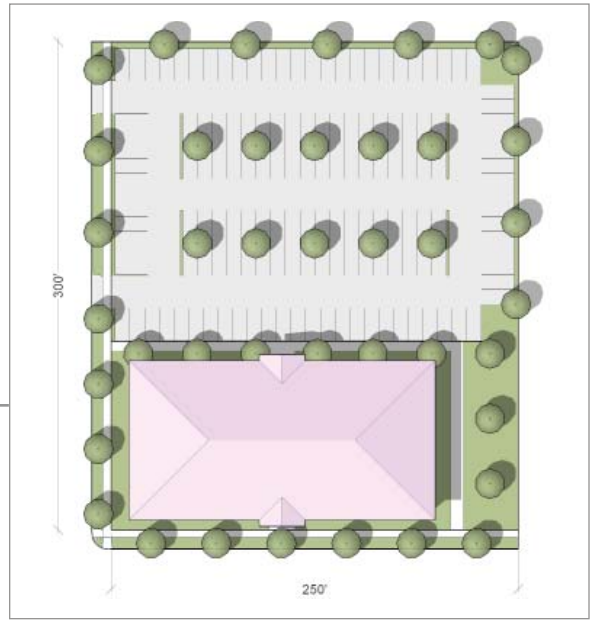
Commercial



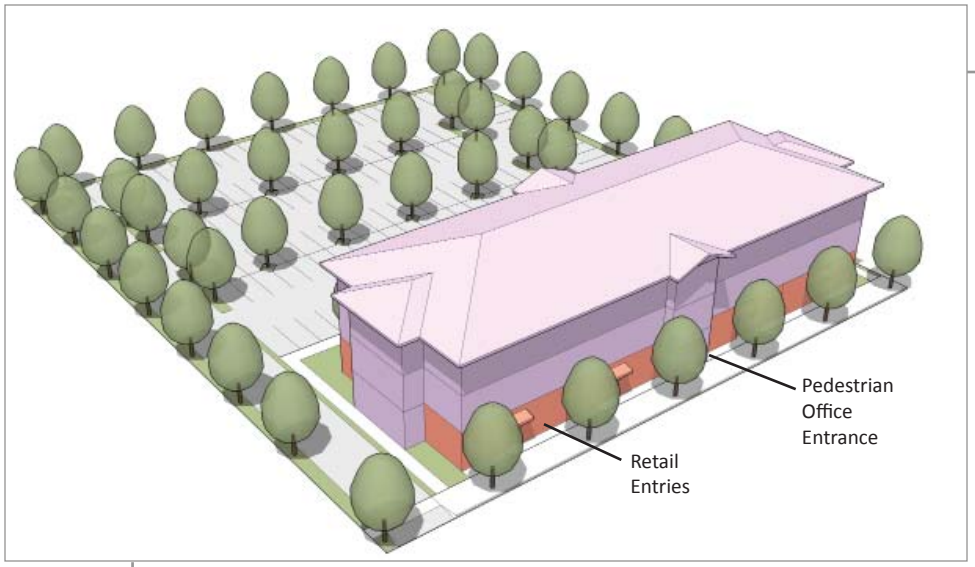
Typical Condition

Office / Research & Development

Proposed Height (max.)	3 stories
Total FAR (net)	0.3 - 0.65
Parking Access	Alley or side drive or secondary street



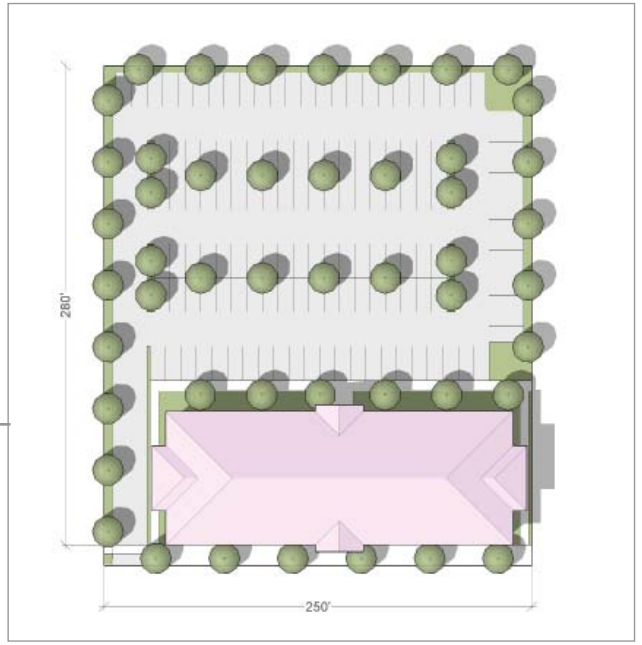
Typical Condition



Typical Condition

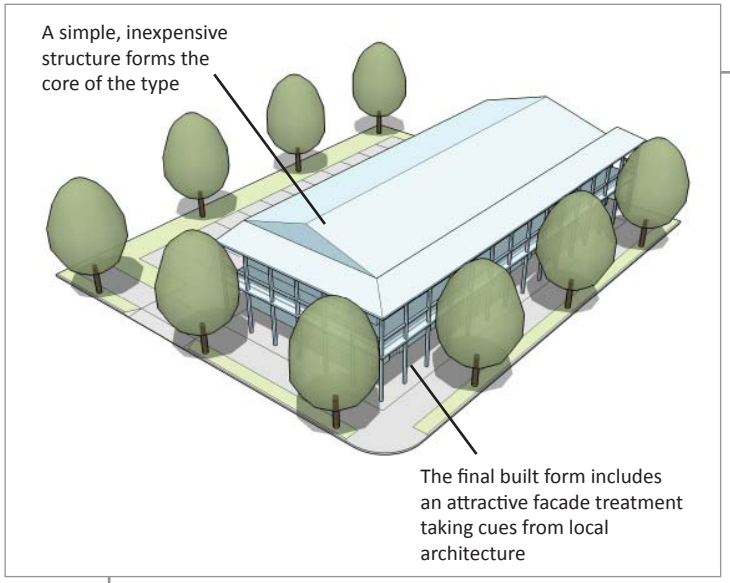
Office Over Retail

Proposed Height (max.)	3 stories
Total FAR (net)	0.5 - 0.65
Parking Access	Alley or side drive or secondary street



Typical Condition

Flex Space

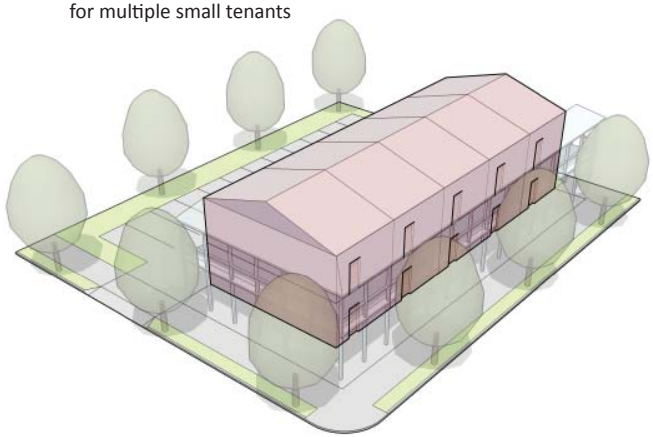


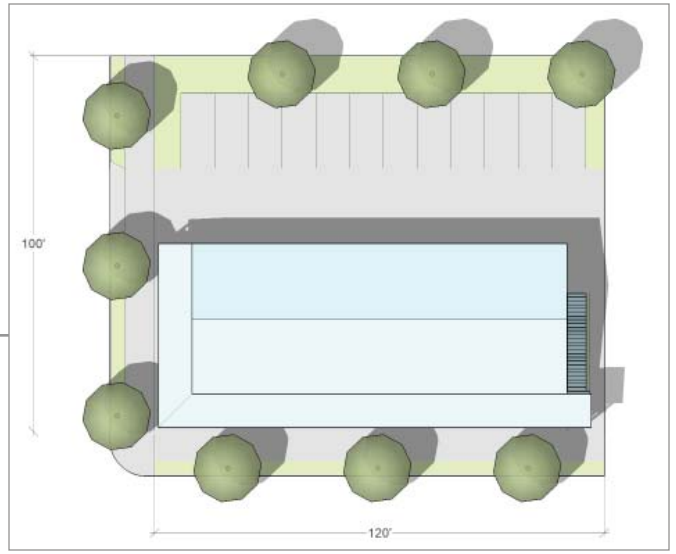
Typical Condition

Flex Space

Proposed Height (max.)	2 stories
Total FAR (net)	0.5 - 0.8
Parking Access	Alley or secondary street

The core building is simple in structure and easy to subdivide for multiple small tenants





Typical Condition

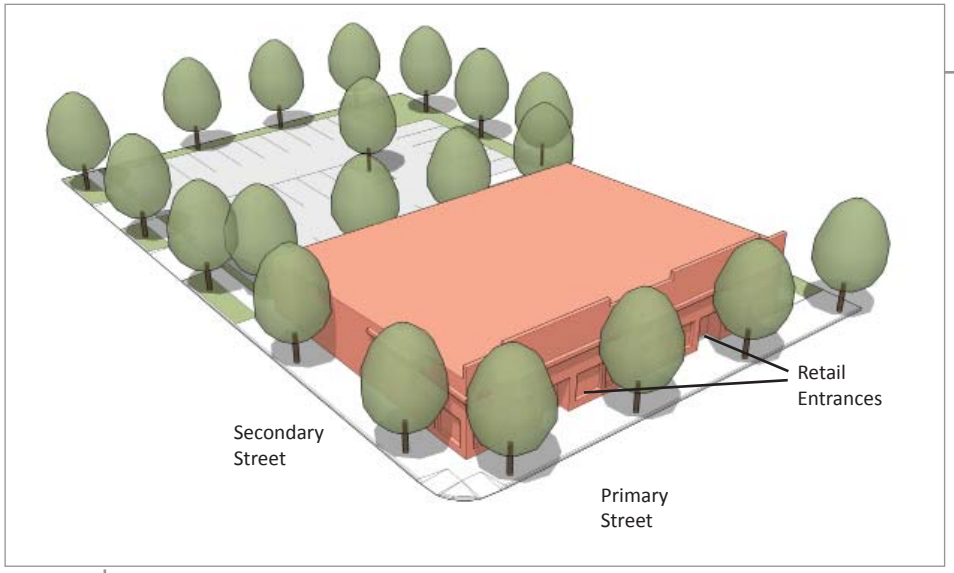
Local architecture as inspiration

Live / Work projects

Second Street Studios in Santa Fe

The flex space or live / work typology facilitates the creation of small business by providing inexpensive space. In some cases, the unit is more like a standard townhome, with some ground floor space which is suitable for in-home business. The type proposed for the Park is more similar to Second Street Studios in Santa Fe, New Mexico. This project provided inexpensive space which users could finish on their own or leave unfinished. It attracted a variety of small businesses, artisans and artists. A similar product in the Park would serve as a technology incubator and add life and variety to the mixed-use center.

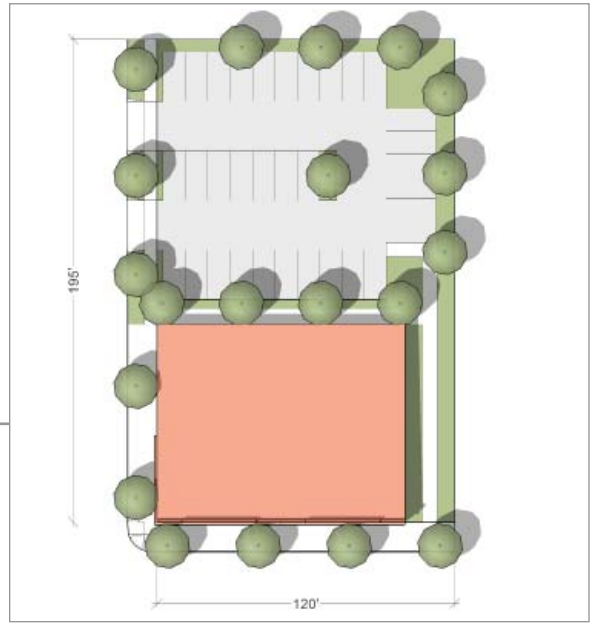
Retail



Typical Condition

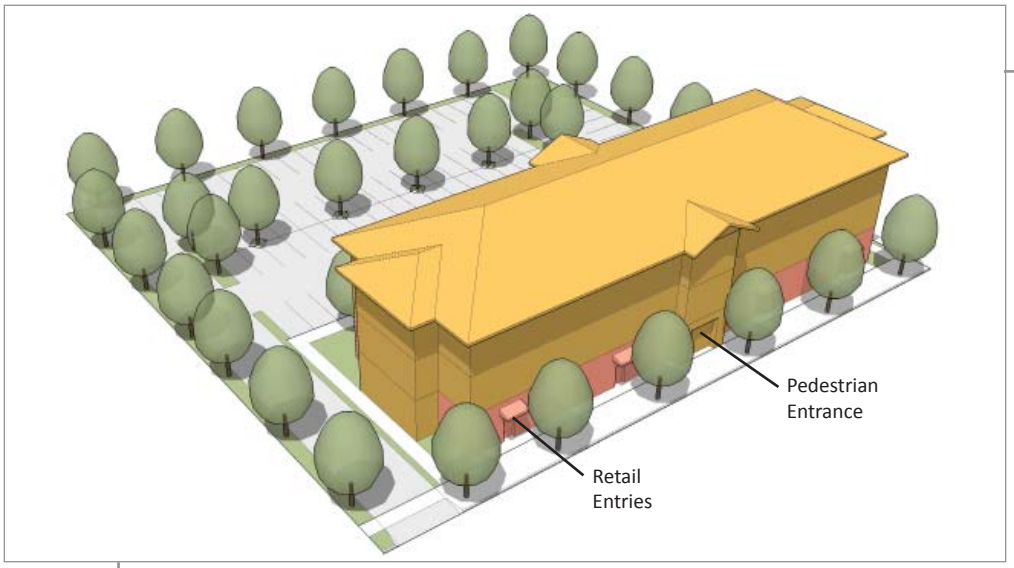
Retail

Proposed Height (max.)	2 stories
FAR (net)	0.3 - 0.4
Parking Access	Alley or side drive or secondary street



Typical Condition

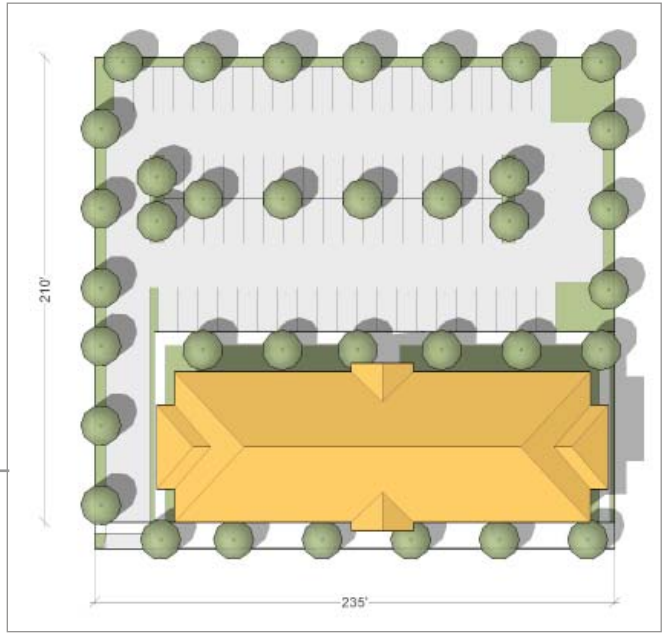
Mixed Use



Typical Condition

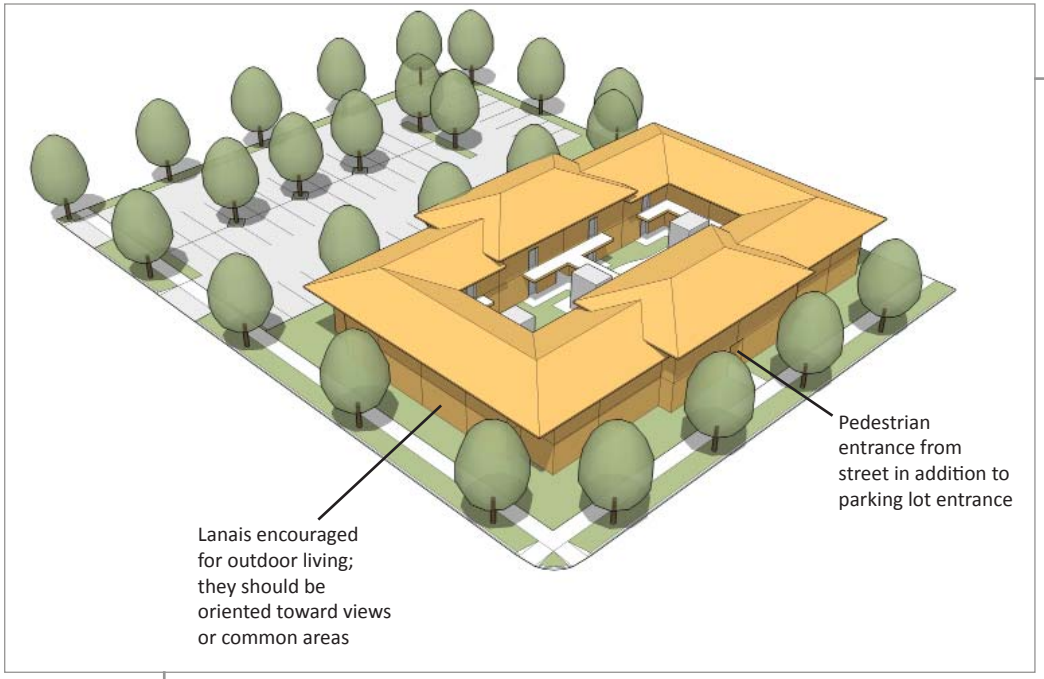
Residential Over Retail

Proposed Height (max.)	3 stories
Density (min.-max.)	18 du/ac - 30 du/ac
Parking Access	Alley or side drive or secondary street



Typical Condition

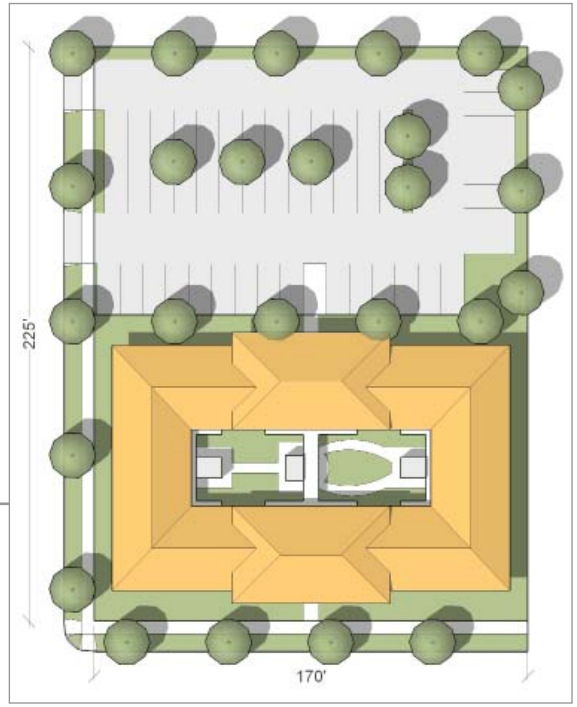
Residential



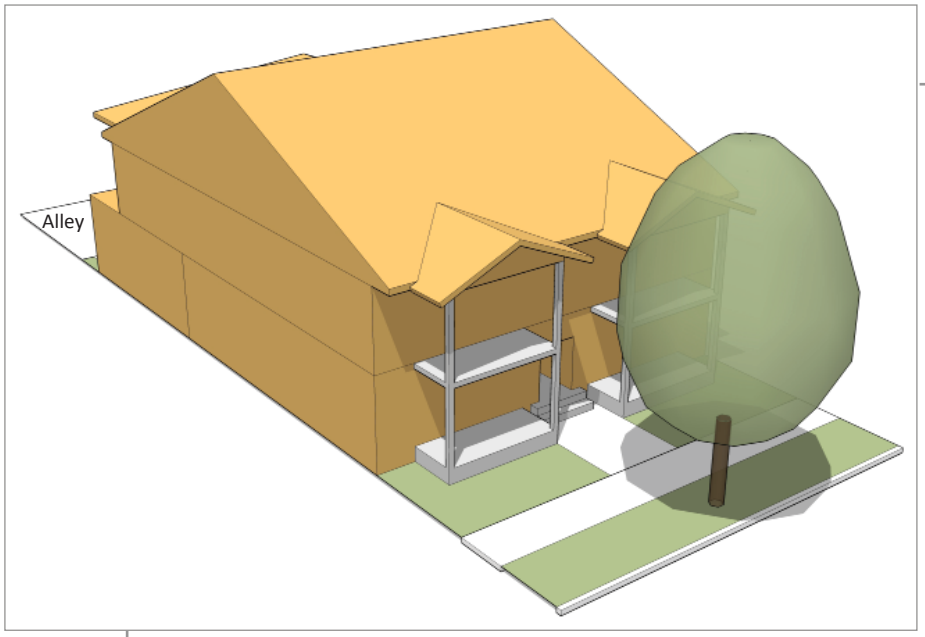
Typical Condition

Multifamily

Proposed Height (max.)	3 stories
Density (min.-max.)	28 du/ac - 40 du/ac
Parking Access	Alley or side drive or secondary street



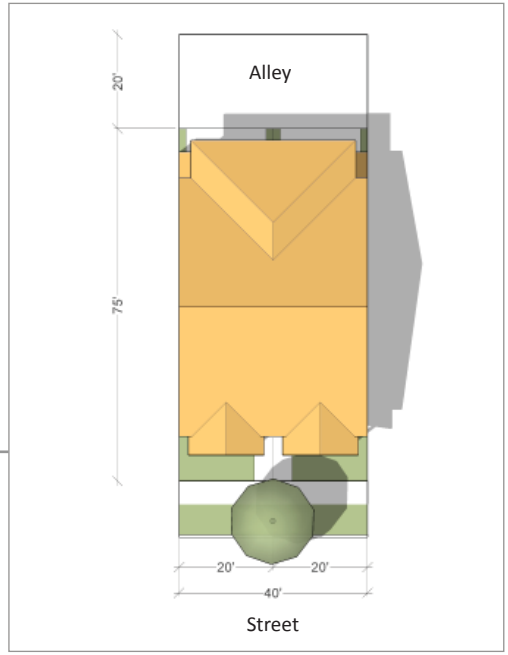
Typical Condition



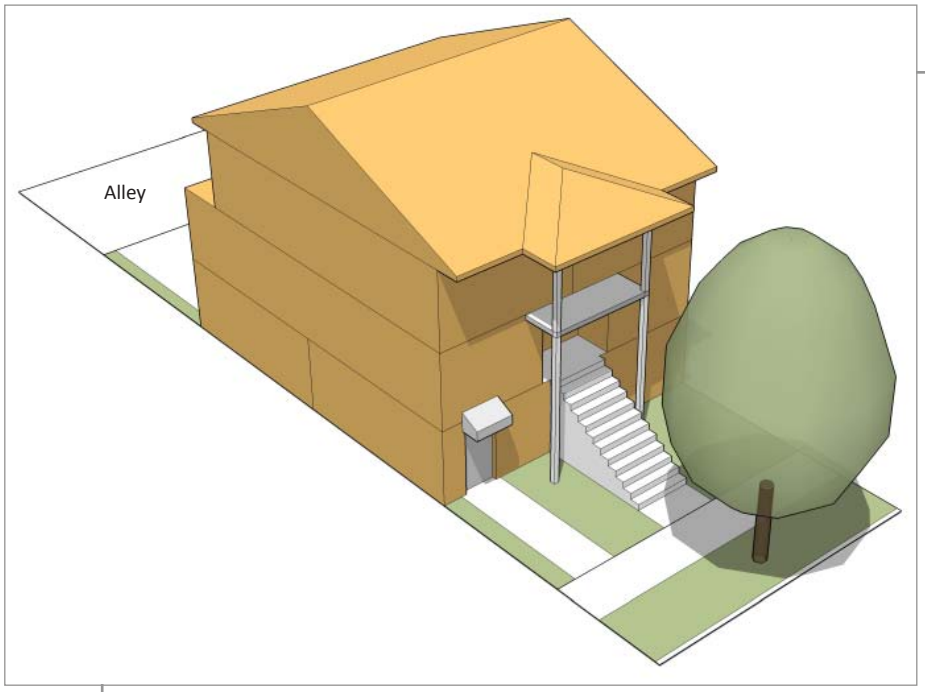
Typical Condition

Four-Plex

Proposed Height (max.)	3 stories
Density (min.-max.)	40 du/ac - 60 du/ac
Parking Access	Alley or secondary street (side of unit)



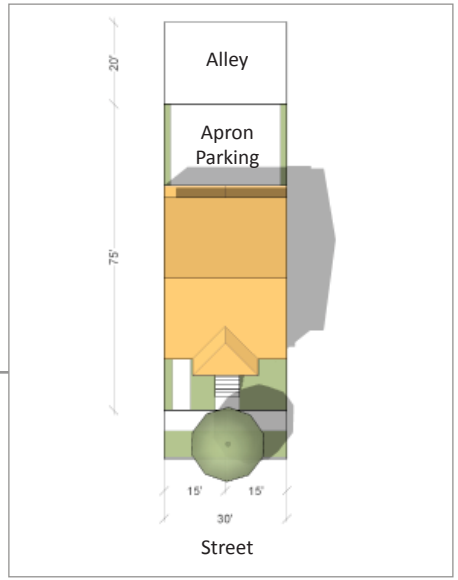
Typical Condition



Typical Condition

Tri-Plex

Proposed Height (max.)	3 stories
Density (min.-max.)	40 du/ac - 60 du/ac
Parking Access	Alley or secondary street (side of unit)



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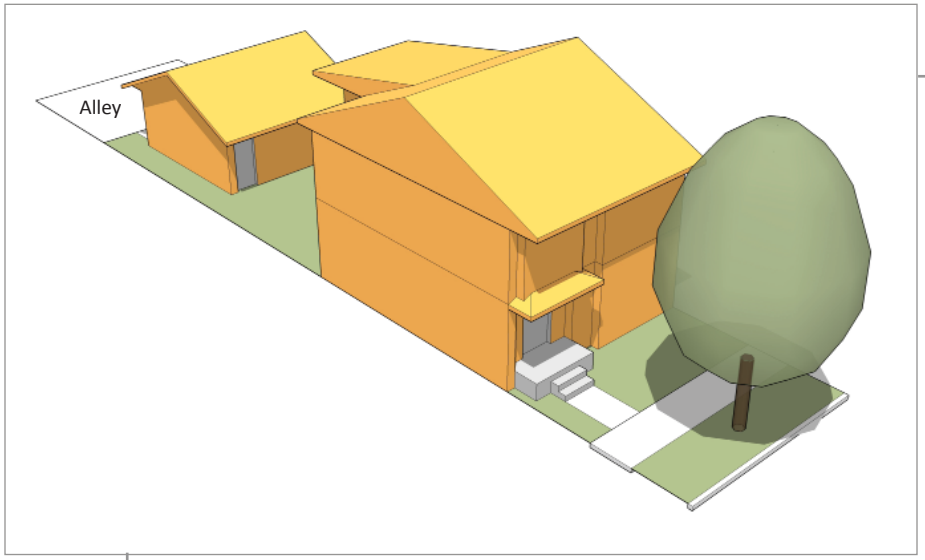
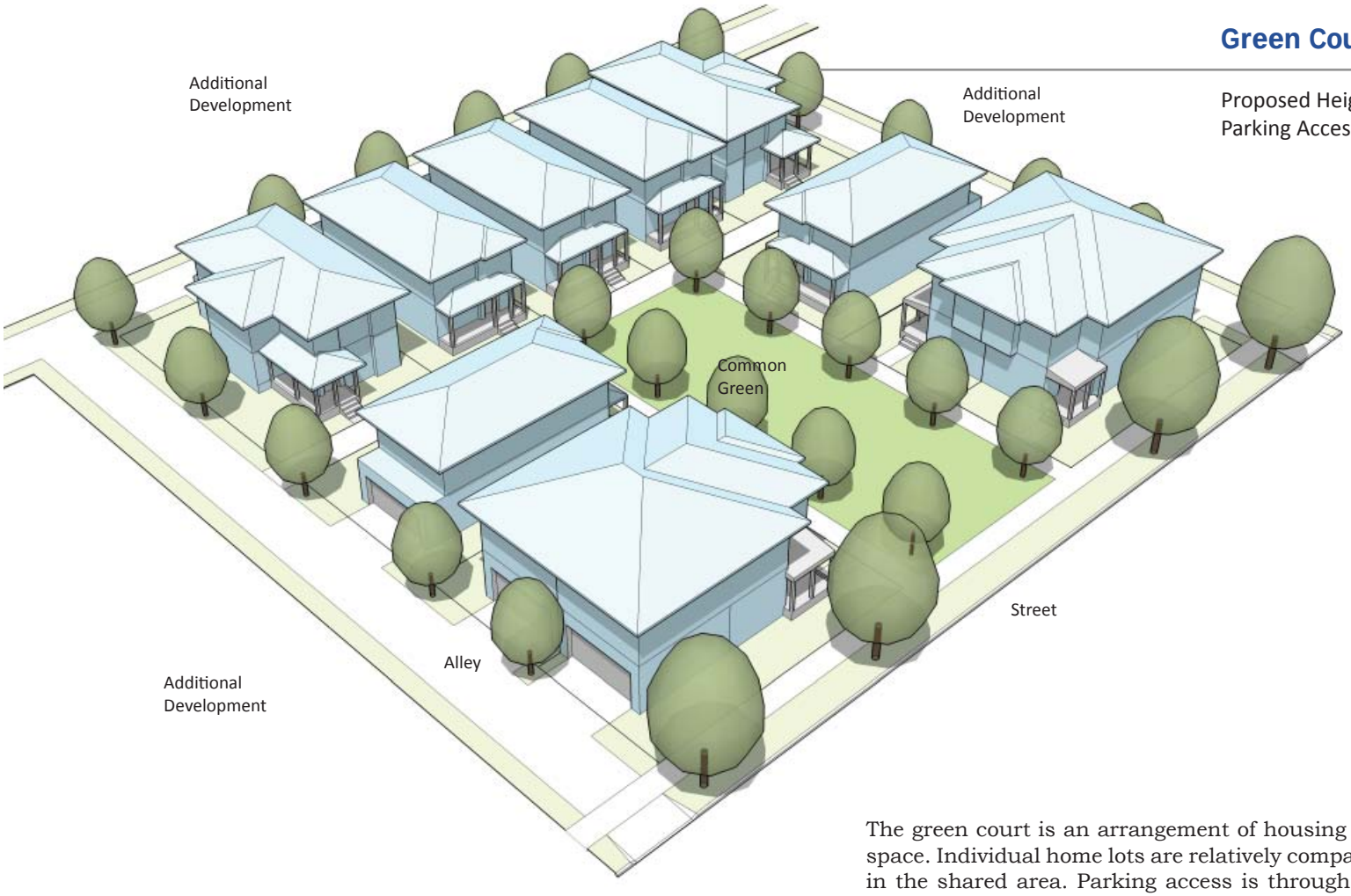


Typical Condition

Townhome

Proposed Height (max.)	3 stories
Density (min.-max.)	18 du/ac - 40 du/ac
Parking Access	Alley or secondary street (side of unit)

Typical Condition



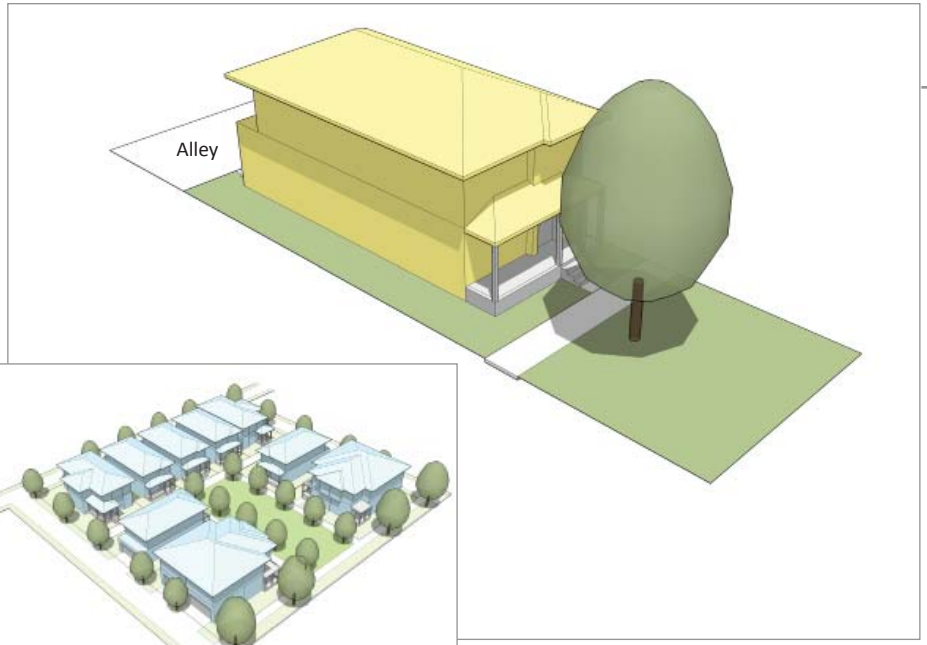
Green Court Typology

Proposed Height	2 stories
Parking Access	Alley

The green court is an arrangement of housing around a central green space. Individual home lots are relatively compact, with most open area in the shared area. Parking access is through alleys, leaving a large, quiet, and protected pedestrian zone. This typology has proven popular in many places and appeals to a wide range of people, from families with children to older people and professionals looking to minimize time spent on yard maintenance.

Single Family / Duplex - Green Court

Proposed Height	2 stories
Density (min.-max.)	12 du/ac - 26 du/ac
Parking Access	Alley



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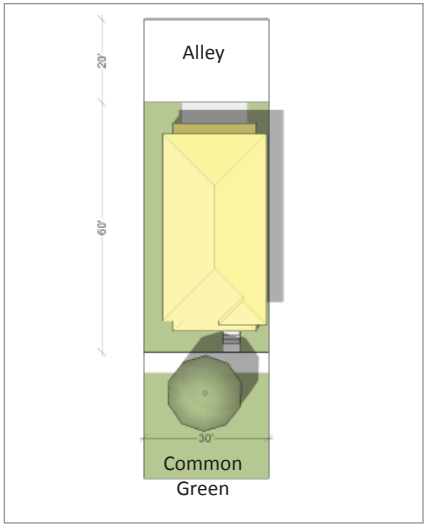

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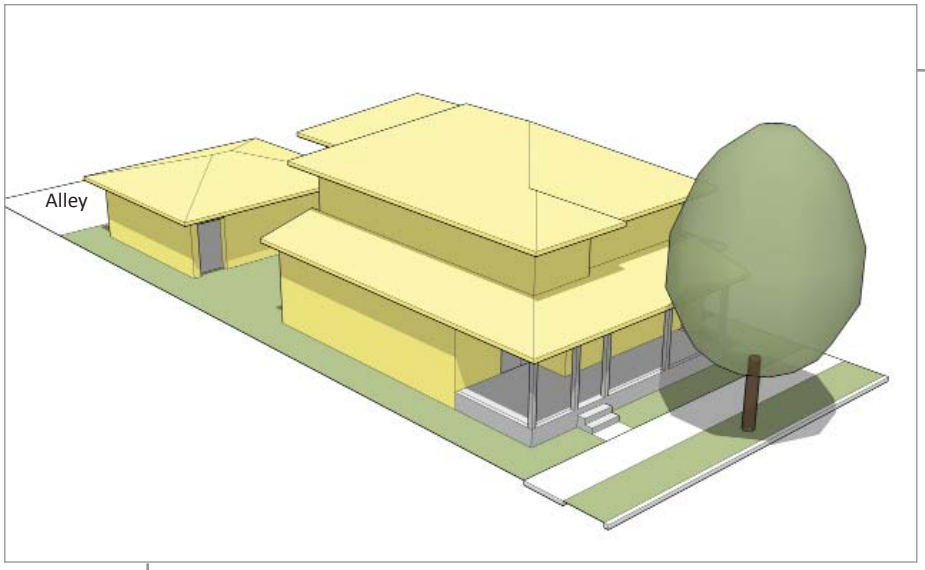
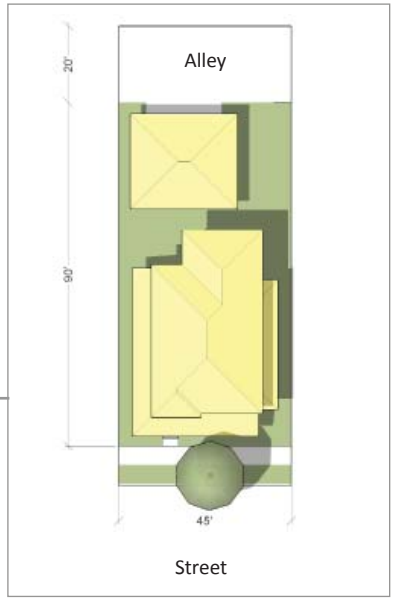


Typical Condition

Single Family - Small Lot

Proposed Height	2 stories
Density (min.-max.)	9 du/ac - 12 du/ac
Parking Access	Alley or secondary street (side of unit)



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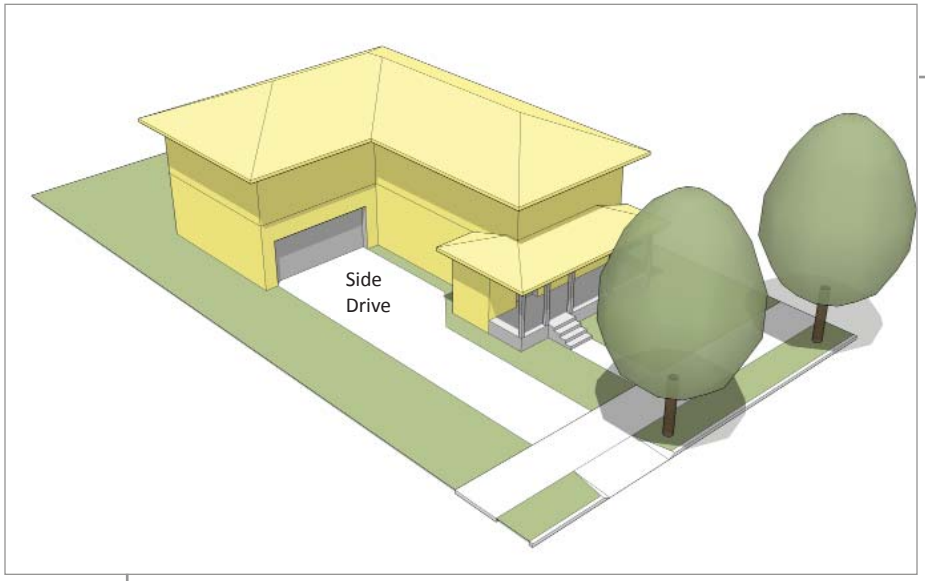
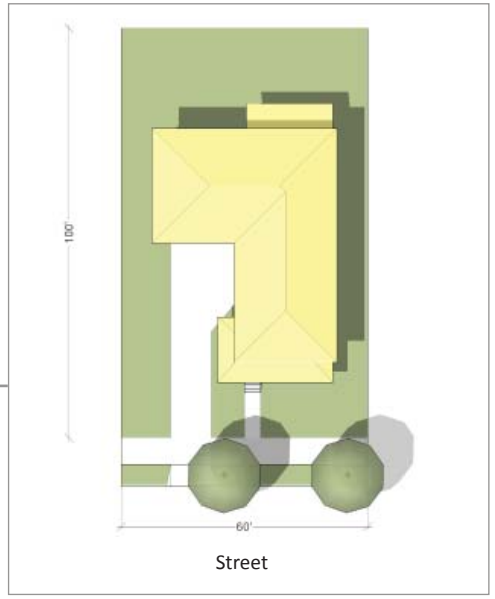


Typical Condition

Single Family - Large Lot

Proposed Height	2 stories
Density (min.-max.)	6 du/ac - 10 du/ac
Parking Access	Alley or side drive or secondary street (side of unit)



Typical Condition

RELATIONSHIPS BETWEEN BUILDING AND STREETS

Employment Building

Primary residential facades face the street

The spatial character of MRTP's streets should provide a sense of intimacy, community, security, safety, and pedestrian activity. The location of buildings and landscape design in relation to the streets and sidewalks create this spatial character. This section sets up rules for how buildings treat the public realm.

Retail buildings fronting Ali'i Drive

Building Orientation

Employment Areas

The relatively large blocks of office and campus uses and the need for truck loading access for industrial uses make achieving good urban design particularly difficult in employment areas. For this reason, the regulation of each building's relationship to the public street is critical. Having a building sited in the middle of its parcel, "floating in a sea of parking", divorces it from its context, making it difficult to access for pedestrians, bicyclists and transit users, and reduces the quality of the public realm.

Goals

To create a pleasant, safe, vital, and interesting work environment which will have a distincet character and will attract and nurture innovation.

To establish a system of building locations that reinforce the urban space, create a pedestrian oriented streetscape, define space and allow for straight forward orientation and convenient access for all modes of transportation

To reinforce the character and quality of public streets through building locations and configurations that provide orientation and access toward the street.

To set standards of quality that will ensure long term value and maintainability of properties

Standards

The major organizing principle of the public realm in the employment areas of the Park is the road network. Because of the uncertainty about the eventual users of the park, the plan has created a variety of parcel sizes and reduces restrictions on factors such as setbacks and parking ratios. Within that variety, most types of employment users can easily adapt their facility design to support the unified treatment of the public realm. However, certain users such as truck-dependent light industrial facilities and some arrangements such as large employment campuses will not be able to fully adapt their

design to these principles.

Accordingly, employment parcels are regulated by their frontages on specific streets. As defined in the Controlling Plan, the matrix below lists the trunk road network in the Park. These roads form the Park's primary network of public spaces, as well as its transportation network.

Employment uses are grouped into four categories here for urban design treatment. These categories are meant to sort the potential uses by their need for customer and truck access, and the need for larger parcels.

A. No Truck Access - common employment-centered uses such as office and research and development. Primary access is by employees, though guest and customer access will be necessary as well.

B. Public-Serving Commercial - uses requiring frequent customer access such as is needed for retail or restaurants.

C. Employment Campus - employment-centered uses such as office, or uses requiring more customer access such as hospitals, but which require large parcels.

D. Heavy Truck Access - uses requiring heavy truck access such as warehousing or light manufacturing.

These groups are allowed or restricted on the various streets in order to ensure a quality public realm on primary streets. The hierarchy creates streets that have a more urban character with buildings lining the streets, and allows industrial and truck intensive activities on minor streets where buildings may be set back from the street. Please also refer to this list for guidance in any instance where there is a question about which road is the "primary" roadway and which is the "secondary". The roads here are listed in order, so that a road with a lower number is always considered the primary road and the higher number road is the secondary road.

All projects will be required to incorporate the following requirements for site design:

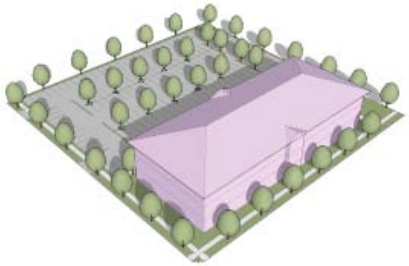
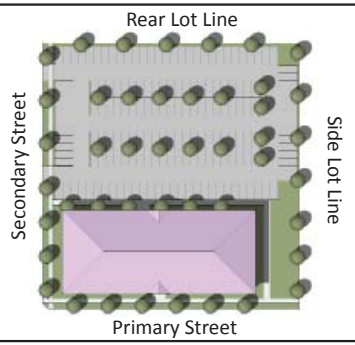
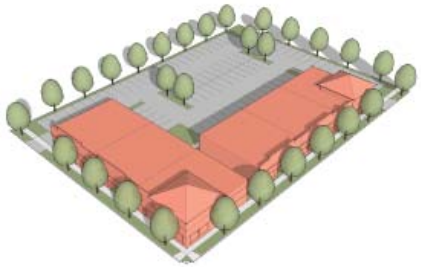
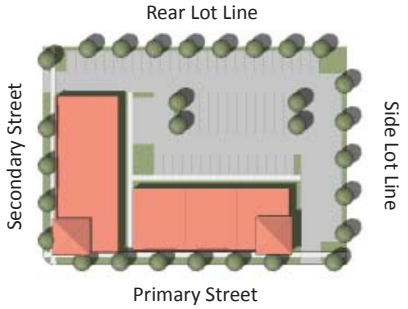
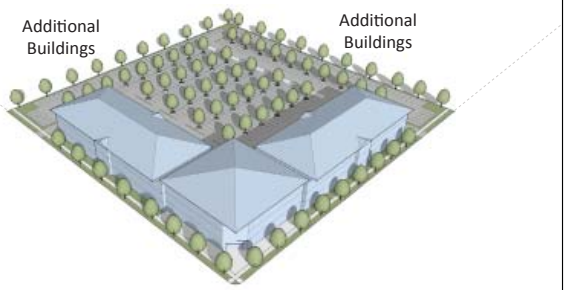
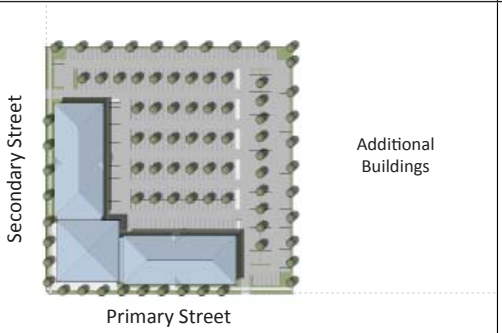
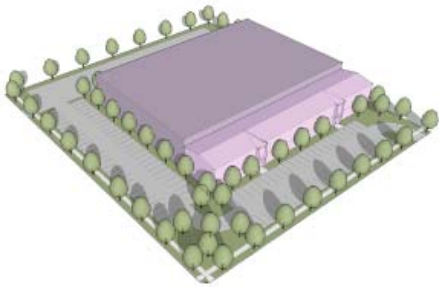
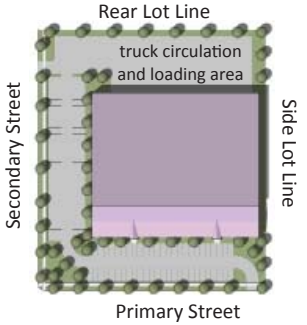
- Buildings shall be located as close to the street as possible, after setback and/or build to zone requirements have been fulfilled
- Office buildings shall be oriented towards and adjacent to the primary street
- For industrial buildings, a maximum of one bay of parking (one drive aisle parked on both sides) is allowed between buildings and primary streets
- No building shall be oriented on a lot in such a way so as to treat the primary street frontages as a rear or side lot line
- For lots located at the intersections of major streets, buildings shall define corners through location and design. Buildings shall be located within the maximum setback in all directions within 70' of major intersections
- Buildings shall address the street with primary entrances, glazing, and signage
- Loading and service areas shall not be located facing the street and shall be screened where visible from the street.
- Drive-up and drive-thru facilities, where permitted, shall be located on the rear of buildings, not visible from the primary street.

Employment Configuration Allowed based on Street Adjacency

● PERMITTED

ALLOWED EMPLOYMENT CONFIGURATIONS (SEE NEXT PAGE FOR DETAILS)

ADJACENT STREET		A - No Truck Access (Office)	B - Public-Serving Commercial (Retail)	C - Employment Campus	D - Heavy Truck Access (Industrial)
1	Lipoa Parkway	●			
2	North - South Greenway (central Ninau Street)	●	●		
3	Ninau Street	●	●	●	
4	Ho'okena Street	●	●		
5	Holopono Street	●	●	●	
6	Road 1	●	●		
7	Road 2	●	●		
8	Road 3	●	●		
9	Road 4	●	●	●	
10	"Local" roads, not a part of the trunk road network	●	●	●	●

	PERSPECTIVE	PLAN	NOTES
A - No Truck Access			• Buildings shall be oriented towards the primary street • At intersections of public streets, buildings shall define corners through location and design • Parking areas shall be located behind buildings • At least 80% of the parcel length along the primary street must have a building within the minimum and maximum setback distance
B - Public-Serving Commercial			• Retail facades shall be oriented toward a street, not toward a parking lot • For a parcel at an intersection, at least the 30 feet of the building closest to the intersection along both streets must be an active retail frontage • Parking areas shall be located behind buildings • At least 70% of the parcel length along the primary street must have a building within the minimum and maximum setback distance
C - Employment Campus			• Buildings shall be sited along street edge where the parcel meets a public roadway. At least 50% of the parcel length along the public street must have a building within the minimum and maximum setback distance • At intersections of public streets, buildings shall define corners through location and design • Parking areas shall be subdivided into smaller sub-areas and pedestrian paths shall be provided in parking lots
D - Heavy Truck Access			• A maximum of one bay of parking between the street and building is permitted • Buildings shall be oriented towards the primary street • Truck circulation and parking areas shall be located behind buildings, not visible from the public right of way

Walkable mixed-uses with close proximity to the street

Mixed-Use and Residential Areas

Successful mixed-use areas are fronted on pedestrian-oriented streets. Spaces at the street level should be reserved for retail use when feasible. This will attract pedestrians and keep the spaces surrounding the buildings and along roadways active. In mixed-use areas sidewalks should extend to storefronts and be broad enough for sidewalk cafes and displays from retail stores. Storefronts should be attractive and provide views into shops. Street trees should provide shade for pedestrians. Additional vegetation should provide color. Benches, bike racks and other elements of street furniture should be provided to optimize pedestrian comfort.

The spatial character of the residential areas will vary based on density. Near the mixed-use areas where multi-family housing is concentrated, the buildings will be taller and closer to the roadway giving more definition to the street. In these areas, uniform setbacks are generally encouraged to maintain continuity and strong definition of the streetscape. Lower density residential areas will have greater setbacks and be defined less by the buildings and more by the street trees and porches. In all residential areas, inclusion of usable lanais and front porches is encouraged to populate the streets and promote a sense of community.

Goals

To enhance the pedestrian comfort and safety, and encourage activity by placing buildings, entries, and garages appropriately.

The character and energy in an urban area has everything to do with the surrounding buildings' placement on their parcels. Consistency in lot size, building proximity, form, setback, amount of frontage, height, transparency, detail, and landscaping coverage are the most common (but usually, unconscious) elements of the urban fabric which make a neighborhood recognizable and give it its "feel". All urban spaces are characterized by some variation on the above elements.

In traditional neighborhoods, buildings front the street and garages and parking are placed to the rear or side of a parcel. Buildings with short setbacks from the sidewalk allow employees, customers, and neighbors to interact on a frequent basis, and more "eyes on the street" help create safer and more active streetscapes. Moving garages and driveways to the rear of the parcel puts emphasis on the front entry, both physically and philosophically. Without front-facing parking lots or garages, buildings can have more windows looking onto the street; more attractive, compact, and straightforward floor plans; centrally located entries with less interior space dedicated to circulation; simplified construction; more corner rooms to allow for balanced lighting and cross ventilation; and more landscaping options allowing for more natural and complementary design.

Standards

- Buildings shall be oriented parallel or nearly parallel to adjacent streets (minor architectural features such as towers, kiosks, and accessory structures may vary from this orientation).
- Primary facades shall face the most active adjacent street.
- On the interior of large sites, mid-block buildings should face pedestrian spaces, such as plazas and/or

Retail Street with Outdoor Dining

Higher Density Residential Street

greenways, where possible.

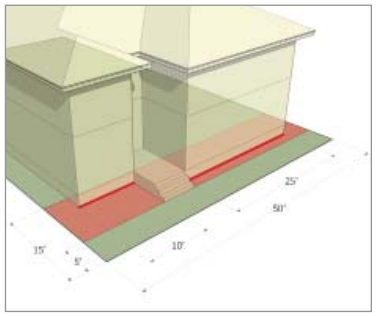
- Setbacks shall be shallow to bring buildings and activity closer to the street. Setback requirements are detailed in the Building Typologies Summary Matrix.
- Parking lots, garages, and driveways shall be placed in the rear, or to the side, of buildings.

Lower Density Residential Street where driveways and garages have too much emphasis but do not overwhelm the street

Setbacks

Efficient and welcoming front setback

Some setbacks provide for variety of public spaces



This building occupies 70% of the frontage, with 35' of the facade between the maximum and minimum setbacks.

Requiring buildings to have a certain percentage of street frontage near minimum setback lines prevents sidewalks lined with parking lots or large landscaped areas which often lack visual interest, activity or definition.

Building placement that reinforces the public area through proximity, detail, transparency and entries are especially important for uses typical in employment and mixed-use centers, such as multifamily, mixed-use and commercial buildings. Hence, required street frontage percentages are higher for these uses.

The standards for building placement complement parking location standards, which generally call for parking behind or recessed on the side, rather than in front of buildings.

Recessed garages and alleys place the garage face behind the primary facade of the building, reinforcing the entry as the "face" of the home instead of the blank stare of the garage door. For homes, side-drive configurations place garages towards the rear of the lot, accessed by driveways from the street. This arrangement places the garage apron to the rear where it can be integrated into the yard as a play area.

Goal

To encourage a well-defined, active streetscape by placing buildings, entries and garages appropriately and to allow for more private outdoor space to the rear of buildings.

Standards

- Basic setback standards are shown in the Building Typologies Summary Matrix.
- Setback standards vary according to building type.
- Street-facing residential garage facades must be at least 20 feet behind the building's primary facade.

Retail requires minimal setbacks for accessibility

Setbacks required for stoops or different landscaping

Principle Entries

Principal entries should be dominant and recognizable features. Entries should not be set off to the side of a building or obscured by other elements, which can create an uninviting character for the streetscape. The design standards call for entries that are clearly visible and directly accessible from the sidewalk.

For business and live/work buildings, entries should be well marked, attractive, and inviting to pedestrians. Entries clearly visible and directly accessible from the street are required in residential buildings. This ensures that buildings orient to the street rather than to parking areas, encouraging social activity and security on the street while providing easy access for residents and guests to buildings.

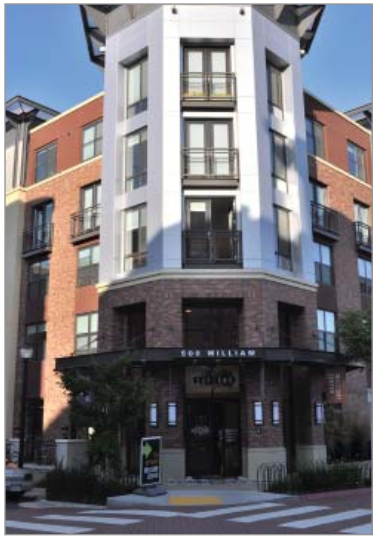
The placement of parking in the rear of a building shall not draw the entry from the street, but rather may necessitate a connective walkway from rear to front of the building, or a second (rear) entry.

Goal

To identify and give architectural importance to the primary entrance of each building in a way that clearly addresses the street.

Standards

- Building massing shall highlight the location of building entries
- Primary pedestrian entries shall be clearly expressed
- The principal entrance shall be oriented towards the primary street. The general order of primacy is set in the Street Heirarchy and Employment Uses table.
- Where multiple entries may be required for multifamily and commercial building types, the primary entrance shall be located on the street frontage, not a parking area or garage. If some entrances are closed at certain times, the primary entrance at least must remain open, regardless of which other entries are closed.
- Corner lots are encouraged to have primary entries at or near the corner. This includes buildings on corners where a street and a plaza or greenway intersect.
- Where direct access from the sidewalk for a particular building is not possible, larger multi-family parcels are encouraged to provide internal walkways which physically and visually connect the building's primary entrance to the public sidewalk.
- Secondary entries may provide access from parking lots.
- Multifamily buildings should have individual unit entries to all ground floor, street-side units.



Corner buildings shall have primary entry at or near major corner

Retail or Employment buildings often require multiple entries

Building Frontage and Character

Inviting and active frontages

Entries enliven the street and encourage pedestrian interaction

Street-side building facades are responsible for contributing toward the character of the neighborhood and are often where employees, customers, residents, and their neighbors interact. Building elements which support this interaction and are within close proximity to the public realm are preferred. Semi-public building elements include lanai, entries, common rooms, and operable and partially transparent facades which allow "eyes on the street". Building design elements which create an interesting and appealing facade also adds to the quality of the streetscape.

Non-compatible elements include garages, fences, blank walls, and large setbacks which typically shield or remove the building from the street creating a less inviting neighborhood character, and making the public realm feel more isolated to the pedestrian.

Goal

To enhance and encourage an active pedestrian environment on the street by placing buildings, entries, and garages appropriately on the parcel.

Standards

Residential windows and lanai engage with the public realm

- All buildings should have fenestration on street-facing facades and avoid blank walls.
- Lanai and covered entries are encouraged on the street-facing facade and may intrude into the required setback up to the right of way line.
- For ground-level walls of retail structures facing public streets, at least 50 percent of the wall area between 2 and 10 feet above grade must be constructed of glass with a visible transmittance rating of 0.6 or higher.
- A variety of architectural treatments and human-scale details shall be used. See the Architectural Guidelines for examples.
- For all building types, facades may not exceed 30 feet without being divided or articulated.
- Rear or side building facades which are visible from public rights-of-way shall be sufficiently articulated to provide visual interest.

Open Space Frontage

Parks and open spaces provide amenity for all park users

Parks and open space corridors will be developed as part of the Park's overall infrastructure as well as within various sub-areas of the Park. These areas will be important public spaces and should be treated as such.

Goal

To make public open spaces safe and inviting amenities by making them part of a high-quality urban setting.

Standards

- Provide at least one pedestrian connection from the parcel to the open space
- No opaque fencing or walls over 4 feet tall are allowed adjacent to the open space
- Building facades facing open space shall receive equivalent treatment as the building's primary street facade
- Service areas shall be visually screened from open space
- Buildings shall front onto open space wherever possible unless required to front onto a public street

Semi-private open space in a green court

RELATIONSHIPS OF BUILDINGS TO NEIGHBORS

The Park will contain many buildings of various types. In order for them to fit into a harmonious whole, it is necessary to consider the relationships between these various buildings and land uses. Individual buildings can on their own be beautiful or ugly, functional or dysfunctional. In the same way, the sum of all the Park's buildings can have the same characteristics. This is a quality often lost, except as it comes to simpler ideas such as harmonious color palettes or small details like mail boxes. This section creates guidelines for how buildings in the Park should relate to each other to create a more beautiful and functional district.

Lot Coverage

High lot coverage in urban environment

Lot coverage refers to the portion of a lot covered by the building on that lot. Lot coverage limitations are sometimes used as a way to attempt to ensure the presence of "light and air" on a parcel. However, the resulting open space is typically covered by parking in the case of commercial development, and in any parcel if the area is left as green space it may be fractured and formless, rendering it unusable other than as visual relief. However, if required open areas are reduced or eliminated on individual parcels, there would still be "light and air" in any case due to the requirements of the individual buildings for fenestration, ventilation and daylighting. This reduction in excessive open space requirements then reduces the size of parcel necessary to build a given amount of development (a single family home, for instance), which then frees up land for usable public open spaces and parks.

High Lot Coverage encourages a more coherent urban fabric and keeps buildings at the property line

In any case, limits on density in the current plan (by dwelling units per acre and by floor area ratio) are derived from wider concerns over such issues as infrastructure, traffic, and development capacity. These limits area not so high that there will be concern over provision of open area on individual parcels.

Parcel Dimensions

Neighborhood structure supported with lot size standards

The intent of the diversification of the land use mix at the Park is to support the Park's mission of economic development. For this reason, the parcel dimensions of both commercial and residential parcels have been considered.

For employment parcels the current lower parcel size limit of 2 acres places unnecessary limits on the economic development potential of the Park. In order to maximize economic development potential, the Park must be able to accommodate the widest range of possible users. Current understanding of the high technology industry shows that many future successful companies rely on small start-up spaces. Then, as they grow, these companies require successively larger facilities. The Park must be able to provide a place for businesses at any stage, from inception to maturity.

For residential parcels, maximum sizes have been limited. The goal of adding residential uses to the park is to provide a more balanced environment for the creation of economic development. One part of this is the provision of housing types and prices which fit the spectrum of workers in the area. While it will not be feasible to limit residence to people employed in the park, creation of housing which is appropriate in size to park workers will provide the option for them to reside in the Park if they choose. Homes on larger lots run the risk of attracting persons seeking second homes or others who would not support the Park's mission.

Goal

To ensure that parcel sizes support the Park's economic development strategy.

Standards

Lot size standards vary according to building type.

Lot size standards are noted in the Building Typologies Summary Matrix table.

Uniformity of Lot sizes and lot coverage depend on individual building prototypes

Building Height

Residential buildings can meet massing standards, but vary in design

Building height limits can have a variety of purposes. Among these are the protection of important views, the protection of sunlight falling onto adjacent parcels or onto public streets or parks, the limitation of development intensity, and aesthetic goals of consistency among various buildings. Because of the relatively low intensity of development which can be accommodated in the Park, as regulated by floor area ratio and dwelling units per acre, these issues are of less concern. However, even within the overall and parcel limits on intensity, spot densities within the Park could allow development height to block views or block sunlight unless regulated.

Because of the contrary goal of avoiding monotony in building massing and height, the height limits have been set so that a building could reach the limit on floor area or dwelling unit density by using a variety of configurations of height. For instance, a builder could create a house of a given floor area with one large floor and one smaller second floor, with two mid-size floors, or even with two smaller floors and a small third floor. This variety within limits will help to create interesting variation in the buildings in the park without sacrificing views, sunlight, or aesthetics.

Office and retail buildings can meet massing standards, but vary in design

Goals

To protect views, access to sunlight, and the aesthetic character of the park without creating monotony.

Standards

Basements are unlikely in the Park. However, due to grading on sloping areas of the park, some below-grade space may be created in some buildings. Such space is not counted in the number of floors when the floor above it is less than 3 feet above grade at the uphill side of the building.

In order to preserve variety in the built environment and flexibility for architects, floor to floor heights for residential or commercial space are not regulated.

Building height standards are noted in the Building Typologies Summary Matrix table.

Building Plan Variety

The large scale of modern development often leads to the repetition of a building design multiple times in close proximity with minimal variation. This can lead to monotonous streets filled with buildings lacking individual character and identity. More seriously, this sameness can also create large areas with no variation of available built spaces, creating a social and economic monoculture. Such areas, like monocultures in nature, are most vulnerable to changes, since they have no diversity to offer users. A monocultural employment area cannot serve a variety of businesses and is vulnerable to changes in the economy. A monocultural residential area relies on one economic group, and often one social group, removing the possibility of a diverse population and forcing people to move out of the area should their housing needs change.

Therefore, a mix of building types, varied floor plans and even diverse architectural treatments are desirable in both commercial and residential areas. Variation in floor plan or roof configurations may be limited by budget or design intentions, but some differentiation can and should be achieved by shifts in form, massing and materials.

Goal

To create variety and a unique character for the Park by avoiding the simple repetition of identical buildings.

Standards

Each block face of 6 or more parcels in commercial and residential areas, regardless of how many builders participate on that block, must contain at least three different building plans with varying architectural treatments. Other than in campus developments, no more than two buildings of the same plan and architectural treatment can be placed on the same block face without prior approval. It is desirable to separate plan and treatments of similar character. In addition to architectural treatments, color variation should be used to provide additional variety to each street.

Ohana (accessory) Units

Rear alley with garage access and accessory units

Ohana or accessory residential units are a positive way to provide affordable rental housing for singles and empty nesters as well as to provide supplementary income for homeowners. Ohana units may be part of the primary dwelling unit or may be attached to or above a garage on single family lots.

Goal

To best integrate minor structures and to allow affordable rental housing into the neighborhood.

Standards

Ohana units are encouraged and are allowed on all single family detached lots in the Park.

Ohana units must be no more than 600 square feet in size.

VEHICLE ACCESS & STORAGE

Automobiles have had a remarkable impact on the urban environment. Since their introduction, they have changed the way people move around, creating a freedom of movement which is hard to imagine doing without today, but must have been a revelation for early users.

Nowhere have cars been more thoroughly integrated into everyday life than in the United States. Through the interaction of a variety of factors, some meant to encourage automobile use, some meant to improve driving safety, and some meant to reduced what was believed to be unhealthy levels of density in cities, automobiles have reshaped cities all over the country.

Accommodating the presence of automobiles has become the single most important factor in urban design. For many years, designers strove to remake the city to fit the automobile at the expense of all other concerns. Recently, however, people have rediscovered the importance of the city in its own right, and have begun to seek ways to strike a balance between automobile users, pedestrians, bicyclists, residents, workers, and all other residents and visitors.

This section is meant to create rules and guidelines to control the impact of automobiles on the Park. They are intended to make the Park safe and accessible for automobile users as well.

Driveways & Curbcuts

Unaligned curb-cuts and minimal street parking opportunities

Controlling the number and size of curb cuts and driveways promotes safer, more efficient, and more attractive streetscapes. In retail areas especially, high volume and frequent driveways fracture the pedestrian environment and create dangerous conditions. In residential areas, curb cuts encourage people leaving their driveways to back across the sidewalk, endangering pedestrians, bicyclists, and any children playing in the drives or on the sidewalk.

Goal

To reduce interruptions to sidewalks and building facades, and to minimize redundant access points which can claim valuable frontage from businesses and pedestrians.

Standards

In parcels with alley access, curb cuts on other parcel edges are not allowed.

To reduce total curb cuts, curb cuts and driveways should be shared between multiple projects or buildings where feasible.

Driveways for access to corner parcels must occur on the secondary street, or on the alley if one is available.

Driveways shall be perpendicular to the street to the extent possible.

The width of a commercial or multifamily driveway crossing a sidewalk shall not exceed 18 feet.

The width of a single family residential driveway crossing a sidewalk shall not exceed 10 feet.

In no case will the level or slope of the sidewalk be altered to accommodate ramping where a driveway crosses a sidewalk. Any change in elevation must be accommodated in the vehicular way, outside of the sidewalk.

Parking Lots

Well-lighted lots with clearly marked paths and planting

Pleasing and functional parking and landscaping design

The visual and physical impact of a parking lot can be improved through appropriate siting, design, and landscaping. Additionally, good parking planning can help minimize the environmental effects of a parking lot's large expanses of pavement such as "heat islands" and increased storm runoff. Poor parking lot design can isolate people and buildings in the urban environment, and can drain vitality from the urban form by disassociating uses from one another with an uncomfortable expanse of asphalt. Good parking lot design brings a sense of human scale and character to an otherwise auto-dominated development feature.

Goal

To create parking lots that are pleasant, convenient, and as unobtrusive as possible to the street.

Standards

Parking or automobile circulation shall not be located between a primary street and building for all uses except industrial uses with loading dock.

Large truck parking areas shall not be located along a primary street.

Landscaped setbacks that provide view screening of a minimum 10-foot-width shall be provided wherever a surface or structured parking lot abuts a street. This may include the use of landscape material, land forms, rockeries, etc.

Surface runoff in parking lots shall be directed to landscaped water harvesting areas.

Landscape islands shall be installed at the ends of all on-grade parking bays.

Service and emergency service lanes shall be designed as part of the site circulation and shall not be dedicated lanes that add impervious surface

Carports are allowed only if materials are closely related to building architecture and by Park approval

Parking lots shall be subdivided by pedestrian paths or landscape areas into zones so that no single zone shall have greater than 100 parking spaces.

Good parking design is comfortable for cars and pedestrians

Pervious parking surface for stormwater infiltration

Pedestrian Connections

There shall be pedestrian paths from the parking lot to proximate building entrances, open spaces, and streets through parking areas in the form of walkways between parking zones. Paths double as a means to break parking lots into parking zones. The minimum clear width of these paths shall be 6 feet

Pedestrian crossings shall be provided where concentrated pedestrian traffic is expected to cross vehicular zones. The crossing path shall be a contrasting color and/or material, such as brick or colored patterned concrete. Crossings shall be a minimum of 6' wide

Heat Island Effect

All lots should attempt to mitigate "heat island" effect through one of the following or equivalent:

- Parking area must achieve 25% or more net permeability (pervious or porous) of the automobile parking and driving surface.
- Vegetative shading of at least 30% of non-roof impervious surfaces within five years from completion of construction.
- A landscaped stall, 160 square feet or larger, shall be integrated into the parking layout at a minimum of every five auto stalls.
- A planting bed (minimum 5 feet wide) shall be provided for the entire length of each parking bay, including shade trees spaced at 60' intervals or less.

Parking lot solar installations may be used in place of shading requirements based on the amount of shade provided. Such solar installations would not be subject to lot setback requirements.

Structured Parking

Parking structure providing additional uses

Structures can blend in by using retail as a ground floor use

Structured parking provides the highest density of parking spaces per unit of land. However, parking structures often contrast poorly with their surroundings. The following standards are geared toward making parking structures more visually appealing as well as architecturally compatible with adjacent developments.

Goal

To allow the use of parking structures while minimizing their negative visual or physical aspects.

Standards

Parking structures may not be used to fulfill frontage requirements along streets.

Parking structures shall be designed to obscure the view of all parked cars and internal light sources from adjacent public right of way or open space for the full height of the structure.

Parking structures shall be compatible in massing, scale, style, and materials with the buildings they support or surround.

Parking structure facade openings that face any public right of way or open space shall be vertically and horizontally aligned and the floors fronting on such facades shall be level.

Landscape material, such as vines or planters, should be incorporated to soften the edges of parking structures.

Residential Garages

The location of large residential garages at the front of homes has the effect of blocking the home off from the street, isolating the residents from the public space and from their neighbors and creating a "garagescape." Garages placed beside or behind homes allow gracious front pedestrian entries and the creation of a pleasant streetscape.

Goal

To make garages accessible and functional while minimizing their deadening impact on the streetscape.

Standards

As noted in the Setbacks section, street facing residential garage facades must be at least 20 feet behind the building's primary facade.

On residential corner lots, a curb cut for a street facing garage must be on the secondary street, with street primacy as defined in the Street Hierarchy and Employment Uses table, even if that means that the curb cut is on the curb in front of the "front" facade of the home.

Tandem garage parking is allowed in all cases.

Multi-functional parking and access areas

Loading, Service & Utility Areas

Loading, service and utility areas, while necessary, should be located in a way so as not to disrupt the public streetscape.

Goals

To maintain the quality of the public realm by keeping non-contributing elements screened from view.

Standards

Service and storage areas, including loading docks, trash compactors and storage yards, shall be located away from pedestrian areas and out of sight of the public right-of-way and where possible, open space areas. Where visible from the street, these areas shall be screened from streets and open space by walls matching the adjacent buildings in materials, detailing and color.

Walls, matching the adjacent buildings in materials detailing and color, shall be used to screen docks, loading areas, electrical equipment, and trash collection areas.

Trash compactors shall be contained within walled enclosures with opaque gates.

Ground mounted utilities shall be screened from streets and open space.

ARCHITECTURAL GUIDELINES

Commercial, mixed-use and residential buildings within the Maui Research and Technology Park will have architectural characteristics which are culturally and environmentally appropriate to Maui's traditional buildings and the project's climate. The Park should have a variety of architecture and this Code does not impose a specific architectural style. Rather, inspiration should be taken from pedestrian-scaled areas in the island's historical towns such as Wailuku, Lahaina, and Paia. The intention is for the architecture at the Park to reflect but not duplicate this architectural tradition. Each project should bring architectural creativity that honors local architecture yet is unique in this village setting.

Despite the allowance for eclectic architecture, however, each building must maintain the high quality urban character of the Park. Buildings in the park can accommodate a mix of building types and architectural styles while still creating a cohesive sense of place. Buildings should be in scale and character with pedestrian-oriented activities. Materials, especially for portions of buildings near the pedestrian realm, should use materials of quality, durability, and scale appropriate to pedestrian activity and contact. The following guidelines are intended to ensure a high quality public realm while still allowing for architectural freedom and diversity.

Stores in Holualoa Town

Building Mass & Proportion

Multifamily building types

Example of scale for street level retail

Buildings within the Park shall be characterized by a pedestrian emphasis in their scale, level of detail, and variety of materials. Buildings designed to be seen by passengers in automobiles rely on large, blocky shapes and little detailing because viewers will have no time to see subtle treatments. Buildings in the Park should be designed to be seen at the speed of someone walking.

Monolithic forms should be avoided and the addition of scale-giving elements should be used to reduce the apparent scale of larger buildings. Building masses, especially larger commercial, mixed-use and multifamily buildings, should be articulated and organized with a variety of composite forms. While the physical scale of buildings will vary with building size, "user scale" should be consistently intimate.

Example of scale for street level retail

While individual buildings are encouraged to differ significantly in form, color, and material, all buildings should emphasize common elements, such as consistent horizontal trim lines, roof forms, and awning heights. The design of elements such as awning locations and roof heights will be determined based upon the usage and requirements of each building type. Mixed-use buildings, multi-family and single-family buildings will be differentiated through the variation of these elements.

For larger multi-level buildings, emphasis should be placed on distinguishing three-part massing with distinctive base, body, and roof forms. The care of the building base design should be apparent, including the use of awnings, arcades, canopied entry ways, courtyards, and transparent panes of glass at the building base. Covered pedestrian walkways should be provided whenever possible to create an inviting place for people.

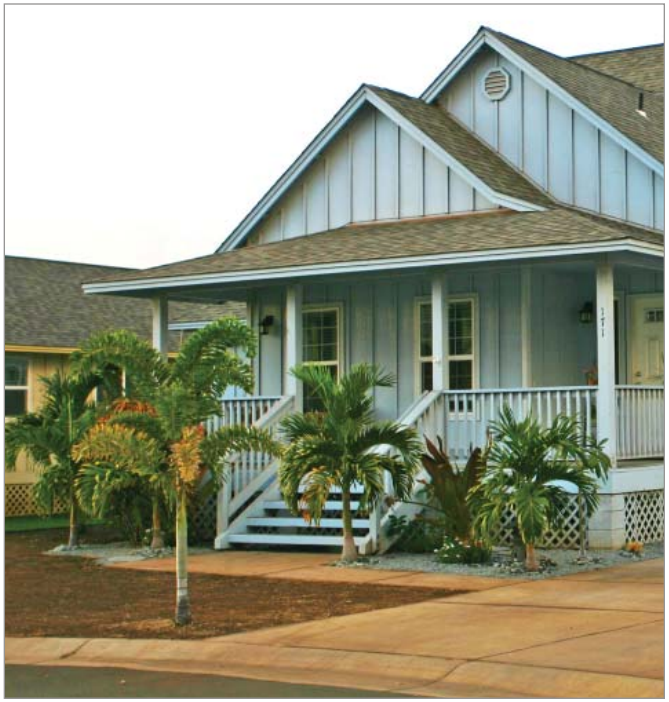
Facade Articulation

Example of appropriate articulation for a mixed-use building

Changing from an auto-centric to a pedestrian-oriented streetscape makes facade details and articulation more important. Instead of being viewed at high speed from behind a windshield, buildings in the Park should be of the high quality suitable to be viewed by pedestrians, at slow speed and close proximity.

Facades should meld the architectural characteristics of Maui's historic buildings with modern woods and sustainable design strategies. Facades should also reflect the life of the users and residents. Blank, expressionless facades are discouraged. Lively, animated facades are encouraged.

Project designers are encouraged to use a wide array of details, patterns, textures, and decorations to enhance the facades of their buildings, but must always keep in mind that buildings should not alienate themselves from the development as a whole.



Example of using entry lanais and balconies for bringing scale to large buildings

Architectural details, such as balconies, pop-outs and window planters are encouraged. Integration of decorative bands will help to break down scale of larger buildings, as monolithic forms should be avoided. Details such as wood rafter ends, supporting members, columns, hand rails, ventilation grills, capitals and cornices provide a textural quality and charm.

Parking structures must have visually interesting facades, preferably similar to retail or office buildings. The parking structure facades should be of comparable detail and quality to adjoining buildings.

Different building prototypes shall have appropriate facade articulation to allow for a variety of architectural characters

Roofs

Parapet False-Fronts in Local Downtowns

Hipped and Gabled Roof in Wailuku

Examples with roof forms (above) and Flat Roof with Parapet Wall (below)

Roofs should be reflective of traditional forms. They should generally be articulated rather than monolithic so as to provide richer roofscapes. A variety of roof shapes, forms, and sizes are encouraged in the Park.

Roof Forms

Roof forms of large buildings should be broken into smaller forms. Where possible, variations in roof profile and parapets shall be used to emphasize entries and create interest on building facades. Gable and hip roof forms on residences should be used in combination for articulation when feasible. Varied roof forms should also be used to provide variation along the streetscape when similar units are adjacent.

Roofs with false-front parapet walls have been historically used in commercial building in local towns and are appropriate for use on commercial and mixed-use buildings. Mansard roofs are appropriate especially on large multi-family, mixed-use and commercial buildings to reduce the height of roofs. The mansard roofs also provide flat roof areas for solar panels that can be screened by the roof.

The design of the roof form and other related elements such as roof material, color, trim and lighting should be an integral part of the architecture. Rooftop equipment shall be screened from view of public streets and open space by architecturally integrated screening elements.

Trellis Shading Lanai at Entry

Combination of Gable and Hip Roof Forms

Use of Multiple Roof Materials, Exposed Eaves and Rafter Tails

Example of pitched roof in single family building type

Dormers

It is typical for dormers to function as vents and skylights in order to give light, air and appropriate height to attic spaces. Dormers are encouraged as functional and visual assets.

Eaves

Overhangs should be used on primary buildings. The eaves on the roofs of secondary buildings such as garages may be clipped. The use of broad eaves is encouraged where feasible. The expression of rafters is encouraged; however, exterior soffits are allowed.

Roof Pitches

Roofs in the Park may have single or double pitches at a minimum slope of 4:12 for the primary slope.

Roof Materials

Visible roof materials may include asphalt shingles, wood shingles or shakes, corrugated, standing or split seam metal or terracotta. Single sheet roofing systems are allowed in flat portions of mansard roofs.

Exterior Finishes

Variety of materials, textures and treatments used modernly

Traditional use of building form, with adapted or modern materials

Variety of colors and finishes break-down the scale of buildings

Exterior Wall Design

To reduce scale, exterior wall surfaces should be broken down by the use of different materials and treatments. Wall treatments such as changes in material, color, texture, and plane or parapet height shall be used to provide variety and break up large uninterrupted surfaces.

The use of horizontal or vertical wood siding, ship-lap, vertical board and batten siding or wood shingles is appropriate for the aesthetic of the Park. Plaster is also allowed. However, it should not be the dominant finish but instead used in contrast with other materials.

Fenestration including windows and doors shall be incorporated into facades facing public streets. At least 25% of the total building facade length facing a public street shall be fenestrated. Where spaces which do not allow fenestration occur at these locations, other forms of articulation which provide visual variety shall be incorporated at a minimum interval of 40'.

Variety of materials, textures and treatments used traditionally

Ground-level retail in mixed-use building may be predominately store-front glass systems. Upper residential floors of mixed-use buildings should be clad with more traditional residential materials. Wall treatments for larger single family residences and multifamily buildings should be broken down where ground level walls might have a stucco-like character and upper levels may be typically more board and batten and wood-like. Within groupings of homes, a variety of wall materials, textures and treatments should be used to provide variety.

Wood shingles and trims with plaster base and stone wall

Wood Siding

The use of wood or wood-like siding systems including horizontal or vertical siding, ship-lap, and board-and batten is encouraged. It is also encouraged that a variety of wood siding not only be used throughout a project but also within individual structures.

Broad Corners & Base Trims

It is encouraged that broad corner and base trims be used to complement the trims around doors, windows, soffits, wainscots or any combination thereof. The prominence of wood trims integrated on exterior walls, such as headers at the top of the wall transitioning to the soffit is also encouraged. Trims should be painted in a manner that accents their forms.

Wood Shingle

Wood shingle should be used as a common wall material. The use of several shingle types within the same project or even the same structure is encouraged. Shingle may be used in combination with horizontal or vertical wood siding or plaster. Shingles must be painted. They might be expressed in a variety of shapes such as fish scale and irregular forms.

Stone/Rock

The use of local stone, rock, and synthetic stone consistent with the look of local stone is encouraged. Stone and rock may be used especially for base, porch and exterior walls and gardens. Rock should be used as an accent and not as the predominant exterior wall material. When synthetic stone is used it should mimic stone that exists in existing structures on the Island.

Plaster

Plaster or plaster-like exterior wall systems may be used in a manner subordinate to, and supportive of, other material systems. Large plaster surfaces will not be allowed. Plaster walls should be trimmed with wood when supportive of wood exterior wall systems.

Use of wood pannels and high glass windows in office buildings

Entries & Balconies

Stoop up to second level with entrance to street level unit tucked to the side.

Entries

Commercial and residential entries should have distinctive forms resulting from their shapes, headers, details, building materials, structural details and unique doorways. Entries must face the public way, the street or entry court. Entries shall be treated with some form of sheltering element, such as canopies, portals or arcades, to protect people while entering. Canopies and awnings shall be of a durable material, integrated in material and color with the primary building architecture.

Balconies

Balconies should be provided in residences where feasible. Balconies provide a form of expression in elevations and well designed railings are decorative elements.

Lanais & Stoops

Stoop used for front entry to a local home

Lanais are a uniquely Hawaiian architectural form. Along with stoops - covered entryways that are either recessed into or protrude from facades - they should feature prominently in the residential areas of the Park. Not only can their design give a sense of individuality and variety to similar home plans, but they serve an important function as intermediate spaces between the public and private realms. Entry lanais are a place of receiving guests and meeting neighbors.

The steps and railings of lanais and stoops provide a physical separation and a psychological sense of protection, creating a comfortable place from which to view and interact in the street scene. As bridges between the inside and outside, they also provide shelter from the elements, offering a dry place to look for keys on rainy days, or a shaded place to sit on warm days. Residences should have lanai spaces off of the kitchen or family room fronting private yards when possible. Lanais should be large enough for outdoor sitting and dining.

Standards

All street-facing ground floor units in multifamily buildings shall have individual entries to the street. It is encouraged that ground floor units that do not face a street have individual entries to a walkway or court.

In general, all single-family homes shall have an entry lanai where possible.

Homes without lanais shall have stoops.

Homes on corner lots shall have lanais (wrap-around lanais are encouraged).

To differentiate home plans, lanais and stoops should vary in size, roof pitch, materials, and style.

Where possible, lanais should be elevated from grade to provide a physical transition between public, semipublic, and private zones.

Usable, street-facing lanai

Front entry lanai for sitting with balcony above

Trellis entrances for Mixed-Use buildings

Stoop entrance for Multi-family building

Doors

Example of retail doors

Example of residential entry doors

Entry doors should be attractive and inviting. All exterior doors should be paneled and glazed to the extent practicable, especially for entry doors to residences and commercial spaces.

Glazing on entry doors should utilize small light panes. Screened doors may be used for through ventilation especially on residences.

Doors should be painted colors that contrast with adjacent wall surfaces of the homes or buildings. Trims around doors should be broad and painted to contrast with adjacent wall surface.

Example of retail doors

High glass doors with metal frames in Mixed-Use building

Windows

Residential windows facing the street

Example of local storefronts using double-hung windows

Trims highlighted with a bright white

Windows are to be traditional in shape and form. Double hung, casement and awning windows may be used, but jalousie windows are discouraged.

Broad “picture windows” are discouraged. Multiple windows should be used instead of large picture windows in areas such as living rooms where large penetrations are desirable.

Window shutters, eyebrows, sunshades and screens are encouraged. Detail elements, frames and exterior screens for windows must be appropriately colored.

Windows shall be shaded by some form of architectural treatment as appropriate based on their relative solar orientation. Shading on southeast to west facing facades is the highest priority. This can be accomplished with either added shading elements, deep overhangs, or recessing windows into thickened exterior walls.

In retail buildings, glazing within a facade which adjoins a public street, pedestrian walk or bikeway shall be clear, untinted glass.

Mirrored glass is not permitted.

Window shading with projections, screenshades or awnings

Decorative Elements & Details

Decorative Braces and Window Shades

Decorative elements and details which give projects individual character and human scale should be incorporated into the buildings. These details may range from exposed timber, trims, rafter tails, braces, or structural systems, to vents, exterior lights and sconces.

Decorative grills, patterns, trims, and other elements which reflect cultural or naturalistic patterns of the island are encouraged. Patterned grills in walls and roof vents are encouraged. Exterior hand railing that goes beyond vertical pickets is encouraged.

Variations in Railing Design

High glass windows for lighting in Office building

Color

Red tile roof in Wailuku (above) and green metal roof on a home (below)

Earth Tones with Vivid Use of Color on Sunshades and Shutters (above) and Vivid reds and greens used in local towns (below)

Good combination of materials and colors for more attractive facades

Color palettes shall promote variety even within same building groups.

Wall Colors

A variety of color is encouraged within the range of earth tones while more vivid colors can be used in the mixed-use center. Traditionally, the vivid colors used in town centers ranged from deep brown, mustard and red to various greens and tans. An attractive, strong composition of compatible colors is encouraged.

Trims and Accent Colors

Typically, color is used to highlight and differentiate the trim from the building. The combination of several colors on individual facades is encouraged with the minimum requirement being that the exterior wall and trims be differentiated.

Roof Colors

Roofs are often colored if they are made of metal. Roof materials and colors shall complement the colors and materials of the structure to which they are attached. In general, roof colors should be earth tones in the medium range. Accent colors may be used.

Fences and Freestanding Walls

The design and materials for walls and fences shall be coordinated with the design and materials of the principal buildings in terms of color, quality, scale and detail.

Where visible where visible from the public right of way, prohibited materials are Portland gray, plain face CMU; fluted CMU; and chain link fencing and concertina wire, except for certain security reasons and with approval by the Park.

The location of any walls or fences exceeding four feet in height closer to a public street than the maximum setback must be approved by the Park. Such walls or fences shall provide variety and articulation at intervals not exceeding 50 feet through either changes in plane or an expression of structure such as a post, column, or pilaster.

Walls and buffering vegetation create pleasing separations between spaces

Traditional lava rock wall with subtle design elements and plantings

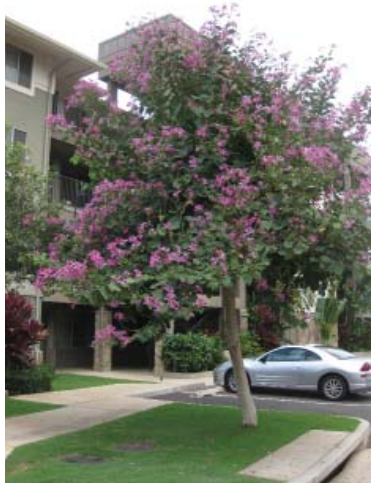
LANDSCAPE GUIDELINES

In addition to the landscaping requirements set forth in County of Maui Code, 19.36A 'Off-Street Parking and Loading' and the Maui County Planting Plan, the following guidelines are presented with the intention of enhancing the daily experience of the MRTP residents, workers and visitors. These guidelines contribute to a well-planned street tree planting scheme and can be the visual thread that unifies a development, while providing visual appeal, comfort and identity. Landscape planting and irrigation plans shall be prepared for all development at the MRTP, except single-family developments.

Pink tecoma trees along Market Street, Wailuku

Kihei is primarily hot and dry. A well-shaded area offers welcome relief. Monkey pod tree (background) and Plumeria tree (foreground)

Shower trees providing shade along Vevau Street, Kahului



Hong Kong orchid tree providing shade

A large monkey pod tree providing shade

General Guidelines

• Landscaping shall be used to enhance the natural site, compliment the built environment, encourage pedestrian circulation, and provide visual variety, color and shade.

• Parking lots shall be landscaped with shade canopy trees and screened from view from adjacent street frontages and neighboring properties with the use of hedges and fences or walls in compliance with Maui County Code 19.36A.

• Native (endemic and indigenous) and Polynesian-introduced plants shall be used to the greatest extent possible.

• Maintain mountain and ocean views.

• Use fewer species of plants, but more of one species to maintain a strong composition. Repetition can be used to create unity.

• Plant material should be matched to appropriate micro-climates and rainfall rates in the Kihei region. Rainfall ranges from ½-inch to 5-inches annually, but can vary, locally, depending on leeward or windward aspects.

• Use plant screening material to block visually unappealing sites such as trash enclosures, transformers and loading areas. Comply with Maui Electric Company recommendations when planting near electrical equipment.

• Do not plant invasive species (as determined by Hawaii Invasive Species Council).

• Irrigation is required for all newly installed plant material.

• This use of drought-tolerant plants and drip-irrigation is encouraged.

• All irrigation must comply with the State Department of Health Regulations for the use of R-1 water.

Joannis Palm with golden duranta shrubs, Kahului

Tree Guidelines

• Consider growth rate, color, time of flower & fruit, fragrance, leaf litter, wind resistance, form, size and shade when selecting trees.

• Transplant rather than eliminate mature trees where feasible. Mature trees are generally greater than 6-inch trunk diameter.

• Shade trees should be used where pedestrians gather or frequently walk

• Tall (columnar or palm) species can be used to frame views.

• Tall (columnar or palm) species can be used where overhead space is limited

• New trees shall be a minimum of 15-gallon size & min. 2" caliper.

• All trees near hard surfaces shall be planted with root barriers at a minimum 2-foot depth.

• Trees within 30-feet of power lines should not be higher than 30-feet tall at maturity.

• Do not plant trees with nuts or fruit that could fall and create tripping hazards near sidewalks or in parking lots.

• Parking lot trees should have a mature canopy spread of min. 20-ft. and preferably 35-ft.

• Plant fruit trees sparingly as rotting fruit can become a maintenance issue.

• Do not plant trees in such a way that will contact buildings or block signs.

• Do not plant trees on top of underground utilities.

• Do not plant trees with aggressive roots near underground utilities or hard surfaces.

• Select trees near intersections that can be pruned so as to not obstruct safe travel and sight lines.

• Do not plant large trees near walls.

• Do not plant trees where roots can invade and damage nearby properties.

• To provide shade and minimize the effects of solar radiation in parking areas, 1 canopy shade tree of minimum 2" caliper size and 6'-0" planted height shall be required for every 5 parking stalls (or portion thereof). Shade trees shall be evenly distributed. Refer to the Maui County Code Chapter 19.36A "Off-street Parking and Loading".

• Vertical form trees shall be planted along the front yard perimeter of parking structures to reduce the visual impact of blank walls and parked vehicles. A tree shall be planted for every 20-feet of linear building length.

• Street trees should be planted no closer than the following horizontal distances:

5 ft. from storm drain

8 ft. from water main or lateral or meter

10 ft. from fire hydrant

15 ft. from utility pole

Coconut palms with seashore paspalum turf grass at Kai Makani, Kihei

Flower of the Jatropha tree

Macarthur palms provide screening

Recommended Tree Species

20 ft. from electrical transformer

The following are recommendations for trees in the MRTP.

Large Trees

1. COCONUT PALM – Cocos nucifera "Green"
2. GOLD TREE – Tabebuia donnell-smithii
3. KAMANI - Calophyllum inophyllum
4. KUKUI - Aleurites moluccana
5. MONKEY POD - Samanea saman
6. NARRA – Pterocarpus indicus
7. ROYAL POINCIANA - Delonix regia
8. RAINBOW SHOWER - Cassia fistula x javanica
9. ROYAL PALM - Roystonea regia

Medium Trees

10. BLACK PALM - Normanbya normanbyi
11. HALA – Pandanus tectorius
12. HAWAIIAN KOU – Cordia subcordata
13. HELIOTROPE - Tournefortia argentea
14. FERN TREE - Filicium decipiens
15. FIJI FAN PALM - Pritchardia pacifica OR thurstonii
16. JOANNIS PALM - Veitchia joaniss
17. LOULU PALM – Pritchardia affinis
18. MILO - Thespesia populnea
19. ORCHID TREE - Bauhinia x blakiana
20. 'OHI'A LEHUA - Metrosideros polymorpha
21. PINK TECOMA - Tabebuia heterophylla
22. QUEEN PALM – Cocos plumose

Small Trees

23. ALAHE'E - Psydrax odorata (form.Canthium odoratum)
24. GEIGER TREE – Cordia sebestena
25. JATROPHA – Jatropha integerrima
26. MACARTHUR PALM - Ptychosperma macarthurii
27. MANILA PALM - Veitchia merrillii
28. 'OHE MAKAI - Reynoldsia sandwicensis
29. PLUMERIA - Plumeria obtuse 'Singapore'
30. WAUKE – Paper Mulberry - Broussonetia papyifera

Purple lantana groundcover - 3 months after planting from 4-inch pots

Shrubs and Groundcover Guidelines

- Do not plant shrubs over 3-ft. high in view corridors.
- All shrub plantings shall comply with the Maui County Code 12.20 “Hedges at Intersections”.
- Do not plant shrubs or groundcover with thorns near walkways (unless the intent is to create a barrier planting).
- Do not plant shrubs or groundcover with poisonous fruit if accessible to pedestrians.

Natal plum has thorns, placement should be well-considered

The native hala tree growing with beach naupaka shrubs

Queen Emma lily with ice plant groundcover throughout

Recommended Shrub and Groundcover Species

The following are recommendations for shrubs & ground-cover in the MRTP.

Shrubs

1. AKIA – Wikstroemia uva-ursi
2. BEACH VITEX - Vitex rotundifolia
3. BIRD-OF-PARADISE - Strelitzia reginae
4. BOUGAINVILLEA – Bougainvillea spp.
5. CROTON - Codiaeum variegatum
6. GOLDEN DURANTA - Duranta repens 'goldii'
7. HIBISCUS - Hibiscus waimeae
8. HO'AWA - Pittosporum hosmeri
9. INDIAN HAWTHORN – Rhaphiolepis indica
10. KULU'I - Nototrichium sandwicensis
11. NAUPAKA – Scaevola taccada
12. NATAL PLUM - Carrissa macrocarpa
13. PIKAKE – Jasmine Sambac
14. SPIDER LILY OR QUEEN EMMA LILY - Crinum augustum
15. RED GINGER – Alpinia purpurata
16. RED / GREEN TI – Cordyline fruiticosa
17. ULEI – Osteomeles anthyllidifolia

Groundcover

18. ALLAMANDA – Allamanda cathartica "Dwarf"
19. ILIMA PAPA - Sida fallax
20. ICE PLANT – Sesuvium spp.
21. LANTANA – Lantana montevidensis
22. LAUAE FERN – Phymatosorus grossus "Dwarf"
23. MAIAPILO – Capparis sandwichiana
24. NEHE – Lipochaeta integrifolia "Dwarf"
25. RHOEO – Tradescantia spathecea "Dwarf"
26. UKI UKI - Dianella sandwicensis
27. KUPUKUPU - Nephrolepis exaltata

Turf Grass

28. SALT-TOLERANT : SEASHORE PASPALUM - Paspalum vaginatum
29. SHADE-TOLERANT : St. AUGUSTINE - Steno taphrum secundatum
30. HIGH TRAFFIC : ZOYSIA 'EL TORO' - Steno taphrum secundatum

Rhoeo groundcover with a spider lily plant

UNIVERSAL DESIGN

Universal Design is making environments accessible to as many people as possible, regardless of physical ability. Accessibility is typically required of commercial buildings. For residential buildings, Universal Design is advisable even where not required because it enhances the ability of seniors and the disabled to live independently. Incorporating Universal Design strategies into homes also makes good business sense by expanding the market to a broader range of potential home buyers. It also promotes sustainability by enabling residents to more easily adapt their homes throughout their lifetimes as their needs change with aging, illness, or injury.

Residential visitability is a characteristic of Universal Design that allows for the main level of any home to be accessible to visitors with limited mobility. The three most elementary features necessary for basic access, listed below, are strongly recommended:

A "zero-step" entrance should be provided to each home. It can be located anywhere but should be placed on a route that has no steps, steep slopes, or abrupt level changes from the driveway, sidewalk, or point of arrival. "Zero step" means that the there is a maximum of ¾ inch of level change at the threshold and that the threshold is beveled.

Main floor interior passage doors, including bathroom doors, should have a minimum of 32 inches of clear passage space.

A half-bath, and preferably a full bath, should be provided on the main floor.

In addition, all dwelling units shall comply with the following standards:

Where accessible units are provided, ensure the compatibility of ramps, landings and railings with the architectural design.

"Zero step" front lanai allow universal access to a house or business

GREEN BUILDING STANDARDS

Designing for building-scale bicycle facilities helps promote greener modes of travel

Solar technology can replace conventional energy sources in sun-rich Hawaii

Employing green building standards to regulate new construction is an excellent way to guarantee a level of environmental integrity. By using creative strategies in architecture, engineering and urbanism, green buildings reduce the overall impact of the built environment on human health and the natural environment. While a number of green building certification systems exist today, all yield benefits in their own regard.

In addition to controlling a building's geometry, size, materials and architecture, green standards stress the importance of an appropriate site for construction, proper building orientation on that site, connectivity to transit, and the efficiency of all building systems. Strategies such as climate-responsive design, passive solar, low-flow water fixtures and double glazed windows assure that the building will significantly reduce its demand on the environment over its lifespan. The benefits are noted not only in a green building's reduced consumption, yet also in the health of all who use it.

Among the benefits of a green building is its capacity to:

- Reduce energy consumption and building operating costs
- Reduce waste streams
- Improve water and air quality
- Improve worker productivity
- Enhance comfort and health
- Enhance and protect biodiversity and ecosystems
- Minimize strain on local infrastructure

Buildings within the park are encouraged to pursue LEED certification.

Green Roofs

Consistent with its vision for environmentally-conscious growth, the Park allows the use of green roofs. Buildings using a green roof are relieved of the requirements for roof pitch. Among the benefits provided by a green roof are its capacity to improve environmental integrity, regulate building temperatures, reduce interior noise levels and provide additional open space for public enjoyment.

The choice of vegetation used on rooftops will take into consideration issues of irrigation, maintenance, and weight. The right rooftop materials will allow for maximum water harvesting. A proper plant palette will allow for a playful and colorful aesthetic as well as provide an improved air quality and microclimate. It can also encourage a diverse habitat where birds, butterflies and other insects are attracted.

The plant and soil matter of a green roof create thermal insulation that provides for a more comfortable atmosphere within the building. The natural processes of plant and soil matter absorb sunlight in warmer weather, reducing the heat island effect.

As compared to a roof with conventional construction, green roofs also offer a noticeable level of sound reduction. Reducing noise pollution is particularly important in areas with heavy noise pollution, such as alongside highways, railways or beneath aircraft flights. The Park does not suffer from high levels of noise pollution, but green roofs may serve to reduce any spillover sound from Pi'ilani Highway.

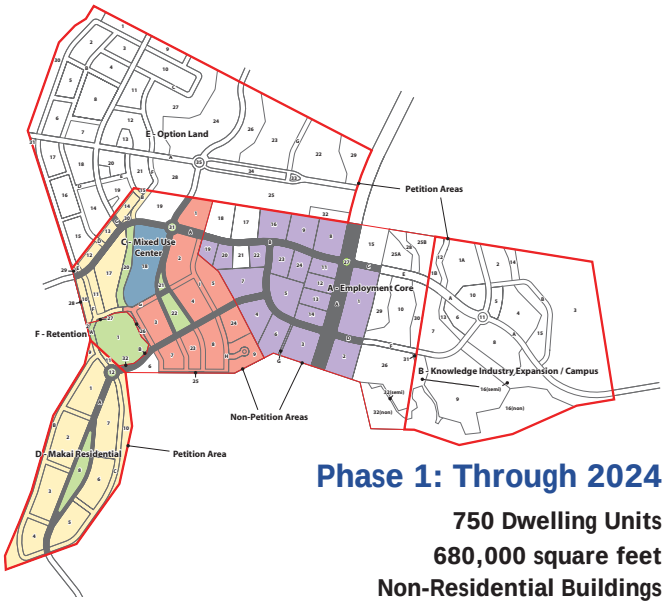
Green roofs have the capacity to give ordinary buildings extraordinary open spaces and create new habitats. Their elevated position accommodates unique vistas and provides a more enjoyable rooftop aesthetic for surrounding buildings.

7 - IMPLEMENTATION

Phasing Concept

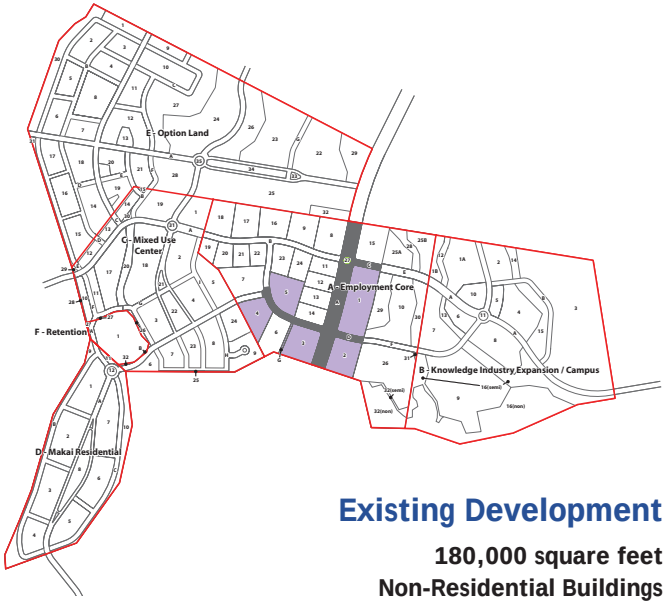
Phasing for the plan stresses flexibility. Given the uncertainty in economic development in general and in the volatile field of high technology in particular, the current phasing plan may change greatly. The amount of time it will take to update the existing Park regulations may also cause the schedule to change. The graphics here illustrate the current concept for development of the park, showing existing development, phase / increment 1, and phase / increment 2. These phases work with the Park's current understanding of the demand for residential and non-residential space on Maui. These plans are by nature an approximation, a good faith guess about the Park's development.

In any case, infrastructure within the Park and associated infrastructure improvements outside the Park will be coordinated with the pace of development. A more detailed consideration of these issues can be found in the Park's Incremental Plan.



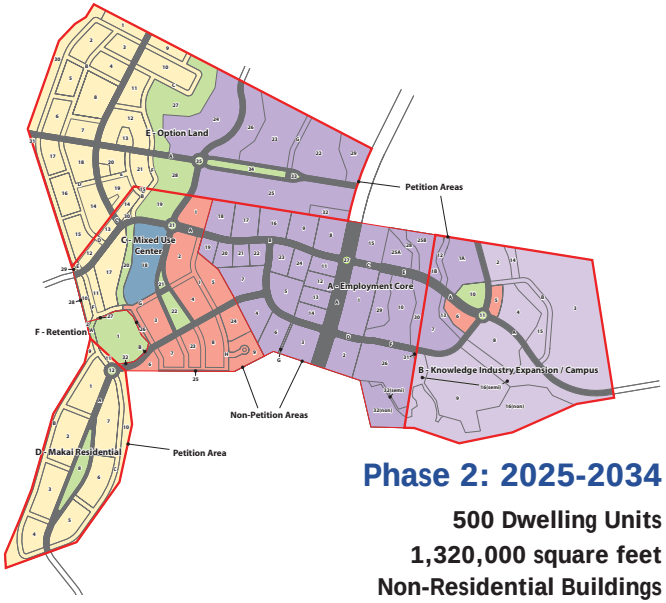
Phase 1: Through 2024

750 Dwelling Units
680,000 square feet
Non-Residential Buildings



Existing Development

180,000 square feet
Non-Residential Buildings



Phase 2: 2025-2034

500 Dwelling Units
1,320,000 square feet
Non-Residential Buildings

Project Design Review Process

Purpose

The purpose of this design review process is to ensure that all development projects at the Maui Research and Technology Park conform to and implement the design concepts and themes set forth in this Development Code and thus contribute to the overall environmental quality desired for the community.

Applicability

Any construction, installation or alteration upon any lot, building, or other type of structure, or change to surface drainage, may be undertaken only after review and approval in accordance with these procedures.

Nothing herein removes or otherwise affects the responsibility of each project applicant and designer for satisfying all applicable laws, codes and ordinances, and for obtaining all permits and approvals required by law.

Participants

Maui R&T Partners, LLC (the "Park owner"), and on future delegation by the Park owner, the Maui R&T Park Owners Association, retains design review of projects for all developments within the Park.

In order to assist in the review of projects and interpretation of the provisions of the Development Code, the Park owner will establish a Design Review Board (DRB). The DRB will be comprised of but not limited to professionals in the fields of architecture, planning, sustainability, landscape architecture and engineering.

General Review Standards

In reviewing plans and specifications, the DRB and the Park owner will be concerned with site planning, the overall design concept, and the details of the design. General concerns will include whether the proposed project:

- Contributes to the implementation of the major themes, planning concepts, architectural typologies and other key design elements set forth in the Development Code.
- Is compatible and in harmony with existing and approved structures and other improvements in the area in terms of exterior design, quality and type of materials and workmanship, and relationship to topography and ground elevation.
- In all other respects including landscape design constitutes a suitable and adequate development of the Park.
- Furthers resource conservation through energy efficiency, water conservation, recycling and other environmentally sensible practices.

Plans found to be inconsistent with Development Code concepts or themes shall be rejected. Major variations from the standards and guidelines contained in this document shall also be rejected. Determinations of consistency, and of whether a project constitutes a "suitable and adequate" development, shall be at the sole discretion of the Park owner.

Minor and Major Projects

Separate processes are established for the review of "Minor Projects" and "Major Projects." Examples of minor projects include the addition of small structures, changing a building's color, the adding of awnings at ground level, or replacing plant material. The determination of which process is to be applied to each project rests solely with the Park owner.

Review Procedures: Minor Projects

Upon notice of proposed action, the Park owner will determine whether the project will qualify for minor project processing. If so qualified, the Park owner will consult

Note: This section explains the process of design review internal to the Park. The revised Maui County Code section which discusses the Park explains the separate, expedited County approval process for construction projects in the Park.

the chairperson and/or appointed members of the DRB. The entire DRB need not be convened.

The Park owner and consulted DRB members will review the project at its various stages, generally through correspondence. Phases of the review will generally be as follows:

Pre-Schematic Design Submittal

At the initiation of the project, a verbal and graphic submission should be made which outlines the intent of the action, describes its major characteristics, and briefly assess its impacts on any existing or approved site improvements and adjacent properties.

Schematic Design Submittal

Upon approval at the Conceptual Phase, appropriate drawings should be submitted for review. Emphasis should be given to relationships (setbacks, colors, materials, etc.) to adjacent properties and existing buildings on them, and to connections beyond the project site.

Preliminary Design Submittal

Upon approval of the Schematic Design Phase, drawings further developed which confirm the major characteristics of the project, its relationship to adjoining facilities and the materials and methods of constructions should be submitted for approval.

Final Design Submittal

Should approval be given at the Preliminary Design Phase, final drawings and other documents should be submitted for approval.

Review Procedures: Major Projects

For actions which are determined to be major projects, the review process below will be followed.

Pre-Schematic Design Meeting

This meeting is to include the following participants: the project architect, representatives of the Park owner, and a representative of the DRB.

The purpose of the meetings is to introduce the users and the project designers to the design and environmental goals of the Development Code, and to provide a context for further work and reviews. The applicability to the project of the design framework established in the Development Code will be discussed. Information regarding infrastructure and linking elements such as pedestrian ways, bikeways, roadways, and landscaping which require specific interfacing, will be clarified. Information regarding the character of the area and adjacent buildings will also be exchanged.

Schematic Design Meeting

This meeting is to include the following participants: representative(s) of the applicant, the project architect, representatives of the Park owner, and the DRB.

At least seven days prior to the meeting, the applicant is to submit half-sized schematic plans for the proposed improvements to the Park owner (number of copies to be determined by the Park owner). The schematic plans should include sufficient information to show how the proposed design satisfies the parameters established at the Pre-Schematic Design Meeting and the development standards and specific provisions of the Development Code.

The DRB review will include the following:

a. Site plan considerations including traffic flow, pedestrian linkages, parking, service, etc. The site plan should show linkages and relationships to adjacent areas.

b. Overall building massing considering view planes, heights, setbacks, etc. All major sections and elevations should be indicated.

c. Building characteristics including architectural style, volumetric forms, building materials, colors, etc. Provision of perspective drawings and/or models is en-

couraged.

d. Landscape plans showing concept, general planting characteristics, rock and water work, etc.

e. Basic environmental effects (i.e., sunlight and shade exposure, wind velocity, drainage), especially on adjacent buildings.

f. Energy and water conservation methods utilized in the project.

g. Provisions for recycling and use of recycled material.

Whenever possible, the application review will be completed and recommendations and requirements arising from the review and meeting will be forwarded by the Park owner to the applicant within thirty (30) days of the meeting. Other meetings in the schematic stage may be necessary if the design is not initially approved. The Park owner may extend its initial review period to review plans for large projects or projects which it deems to require more intensive study.

Design Development Meeting

This meeting is to include the following participants: the applicant, the project architect, any other appropriate consultants, representatives of the Park owner, and the DRB. At least seven days prior to the meeting, the applicant is to submit appropriate sets of half-sized design development plans and outline specifications and a cover letter addressing issues identified in the Schematic Design Meeting to the Park owner (number of copies to be determined by the Park owner).

The information to be provided on the preliminary design plans, and the concerns to be addressed in the DRB review, will include the following:

a. Review of site plan drawings at a scale of 1" = 40' or larger. Such plans shall, at a minimum, include the following information: all building locations and size, dwelling types and unit counts, number of stories, roof overhangs and setbacks; locations of roads and walks; location and size of parking areas and/or parking structures, and a description of basic parking needs for the project including the ratio of compact to full size stalls; location and size of loading areas; locations, size and intended use of any recreational facilities, courtyards, water features, etc. Ground elevations with existing and finished grades, drainage, earthwork, utility lines, etc. should be indicated. Special attention should be given to relationships to adjacent properties. Also, energy conservation methods should be identified.

b. Review of floor plan drawings at a scale of at least 1/8" = 1' for all building types. Special attention will be directed at public spaces such as entry lobbies, courtyards, restaurants, stores, etc.

c. Review of elevation drawings. Inclusion of perspective drawings and a model is encouraged. Special attention will be given to roof forms and materials, balcony and arcade treatments, elevator penthouses, mechanical stacks, trellises, etc. Proposed colors for the project will be considered.

d. Review of sections of the buildings and site. Attention will be given to any major changes in ground elevations in regard to their impacts on drainage, views and adjacent properties.

e. Review of landscape drawings. These drawings should show the location of all vegetation, plant species, size of specified plants, walks, landscape lighting, signs, paved areas, water features, rock work, etc.

f. Review of development timetable and phasing plans. The timing of construction and the location, size and sequence of the various phases should be indicated. Attention will be paid to the impacts of the project's construction schedule on existing and other planned developments in the surrounding area.

The Design Development review will be completed within thirty (30) days, and a report forwarded by the Park owner to the applicant containing the recommendations and

requirements arising from the review and meeting. The Park owner may extend its review period to review plans for large projects or projects which it deems to require more intensive study.

Approval will depend on the extent to which the proposed design satisfies the objectives, standards and criteria established in previous reviews, as well as those identified in these Development Code. Other meetings in the preliminary design stage may be held if the design is not initially approved. In no case should the applicant proceed with construction documents prior to Design Development approval.

Final Design Review

The DRB or a design professional retained by the Park owner will check construction documents for compliance to Design Development review comments. The appropriate number of sets of half-sized construction drawings and specifications should be submitted to the Park owner. Approval of the documents or a report listing required modifications will be forwarded by the Park owner to the applicant within thirty (30) days of their receipt. The Park owner may extend its review period to review plans for large projects or projects which are deemed to require more intensive study.

Construction documents approval by the Design Advisory Board and the Park owner does not constitute authorization to proceed with the project. Compliance with applicable codes, laws, ordinances, and government agency conditions of approval is the responsibility of the applicant and the project architect.

Construction Review and Approval

Duration of Final Approval

Any approval provided shall be effective for a period of 12 months, and shall be deemed revoked if the approved construction, reconstruction, refinishing, alteration, or other work approved thereby has not begun within the 12-month period. The Park owner may upon request extend the 12-month approval period.

If approval lapses hereunder, the owner or lessee shall be required to re-submit the final plans and specifications for approval. The DRB and the Park owner shall not be bound by any previous decision in reviewing such plans and specifications, but shall either approve or disapprove the same in writing within thirty (30) days after such resubmission.

As-built Plans

Upon completion of construction, a complete set of as-built plans and specifications for infrastructure improvements will be provided to the Park owner.

Variances

The Park owner, in consultation with the DRB, may in its sole discretion approve variances from this Development Code, if they are found to be minor in nature and consistent with the goals for the Maui Research and Technology Park, and if they meet high development standards. Variances found to be substantially inconsistent with the provisions of this document will not be approved through this procedure.

Applications to amend the Development Code and criteria in order to address substantive inconsistencies may be submitted for consideration, provided they are based on a clearly demonstrated hardship or practical difficulty.

Fees

Professional fees and the expenses incurred by the DRB members in reviewing and approving plans will be paid by the applicant at each stage of the review.

8 - REFERENCE

Glossary

This section contains many general terms used within this document and in urban design more broadly. These are intended for general information. For detailed treatment of specific terms along with requirements (Accessory Unit, for example), see the text of this code as well as the section of the Maui County Code which discusses the Parl.

Accessory Unit - a separate dwelling unit that contains its own kitchen and bath facilities and is located on the same lot as a principal building.

Average Net Density – the number of dwelling units per acre within a block's extents. Streets, parks and large public open spaces are excluded from the calculation, while semi-private spaces such as courtyards, alleyways, and paseos are included.

Block – an area of land bounded by public roads or a project edge on all sides.

Chapter 19.33 "Kihei Research and Technology Park District" - the portion of the Maui County zoning code which regulates the Park. This section established regulations on things like land uses, setbacks, and lot coverage.

Commercial – office, research & development, retail, industrial, or other non-residential use.

Commercial buildings - buildings of non-residential use, including office, industrial, retail among other uses.

Community Plan - A community plan "provides specific recommendations to address the goals, objectives, and policies contained in the General Plan." "Implementation of the goals, objectives and policies contained in the Community Plan is defined through specific implementing actions, also set forth in each community plan. Implementing actions as well as broader policy recommendations are effectuated through various processes, including zoning, the capital improvements program, and the County budgeting process." (source: Kihei-Makena Community Plan, 1998)

Entry – the entrance of a commercial building or residence. This can be in the form of a portico, porch, lanai or stoop.

Floor Area Ratio (FAR) – the ratio of building floor area (including all buildings on site) to the land area of the associated parcel.

Form-Based Code - a method of regulating development which concentrates on the elements of physical form while allowing more flexibility in land use, as compared to standard zoning.

Frontage – the front facade of a structure along the primary street right of way.

Height – the number of stories of a building, measured from the highest (uphill) point of the building. Used sometimes instead of an absolute vertical measurement, regulating by the number of stories allows height variation based on differing floor to floor dimensions, even among buildings of the same building type, creating a more interesting and attractive landscape.

Lot Area – the total extent of surface, measured in a horizontal plane, within the parcel lines of a lot.

Lot Coverage - the total portion of the lot which is covered by building (also sometimes called Building Coverage). This includes the area located between and including the foundation walls of all structures on a lot, including garages and carports, but not including open exterior portals, porches, pergolas, lanais, covered entries, or trellis structures located within 3 feet of adjacent grade.

Makai - the direction toward the ocean shore.

Mauka - the direction away from the ocean, generally uphill and toward the mountain top.

Orientation of a Building - The direction of primary facade, primary entry or entries, and longest edge of the building.

Outbuilding - a separate structure on a residential parcel that may contain a garage, workshop, or accessory unit.

Parapet - an upward extension of an exterior wall that creates a low wall around the edge of a flat or nearly flat roof.

Parcels - individual parcels of land. Regulations on parcels (e.g. bicycle parking requirements) apply only if a parcel contains development.

The Park - the Maui Research and Technology Park.

Parking – vehicle parking for vehicles used to transport people (automobiles, small trucks, etc.).

Paseo - an exterior pedestrian passage, typically between 10 and 40 feet in width, that provides access to and frontage for buildings.

Principal Building - the main structure located on an individual parcel.

Privacy Wall or Fence - a wall between 5 and 6 feet high and constructed of solid opaque materials to create visual privacy.

Public Right of Way - Any of the roads in the Park's controlling plan, regardless of whether these roads are technically "public" or remain under the ownership of the Park.

Screen Wall - a wall or fence that provides screening of a service facility, such as a trash container, transformer, or parking area, from public view along a street or alley.

Setback – a line, parallel with and measured from the corresponding property line, which defines either the minimum or maximum distance from the property line in which the facade of a building may be constructed.

- When a setback is indicated as a minimum, the exterior building wall must be placed at or behind that line.
- When both a minimum and maximum are given, the exterior building wall may be placed anywhere in between the lines.
- When a setback is indicated as required, the building wall must be placed at that line.
- Eaves or roof overhangs are allowed within all required setbacks.
- When a separate side street setback is not indicated for a side street, the setback shall be the same as the side setback.
- When a separate side setback is not indicated for a garage, the garage shall have the same side setback as the principal building.

Side Drive - a residential or commercial driveway located along the side of the parcel and intended to provide access from the street to a garage or parking lot on the parcel.

Tandem Garage - a garage with parking spaces configured one behind the other and a single garage door for access.