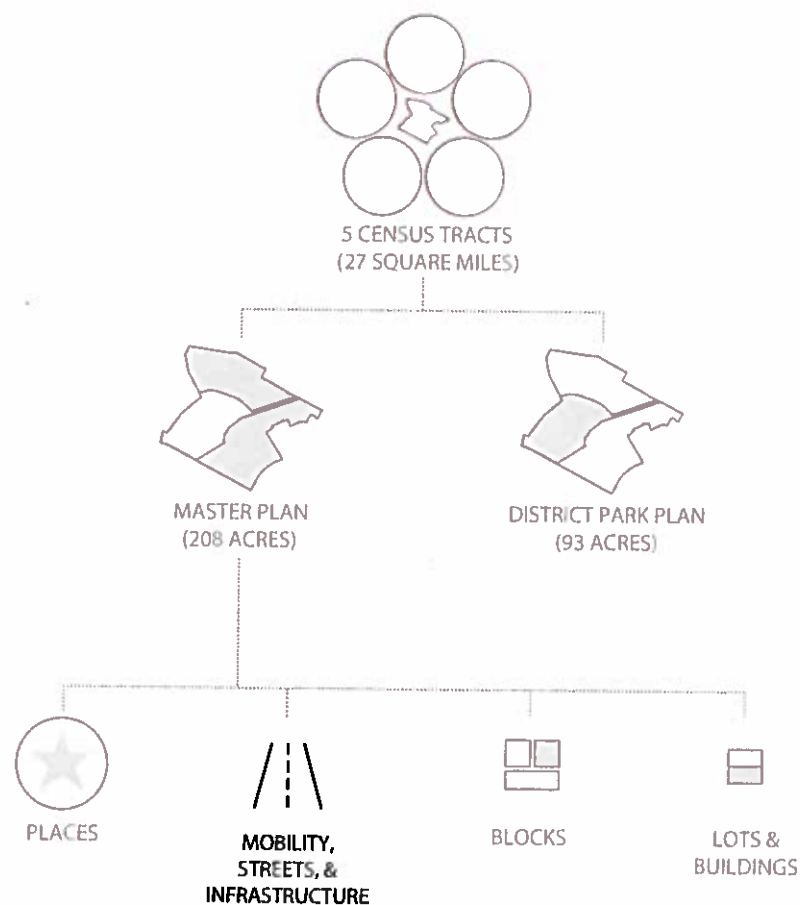


CHAPTER 6

MOBILITY, STREETS, WATER AND INFRASTRUCTURE

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MAXIMIZING VALUE THROUGH STREET DESIGN

● STREETS ARE MADE SAFER BY LOCATING BUILDINGS CLOSE TO THE STREET AND KEEPING LANE WIDTHS MODERATE

● DIMMABLE PUBLIC LIGHTING IMPROVES HEALTH AND SLEEP DURATION AND QUALITY BY CREATING CONTINUOUS DARKNESS

● ON-STREET PARKING CREATES A BUFFER TO PROTECT PEDESTRIANS



● STREET TREES PROVIDE SHADE

● LIGHT COLORED CONCRETE STREETS REDUCE HEAT ISLANDS

● RECLAIMED WATER PROVIDING DRIP IRRIGATION

● COMPLETE STREETS ACCOMMODATE WALKING, BIKING, AND DRIVING

● STREETS ARE MADE MORE WALKABLE BY THE DESIGN ATTENTION GIVEN TO CORNER BUILDINGS

MOBILITY OPTIONS

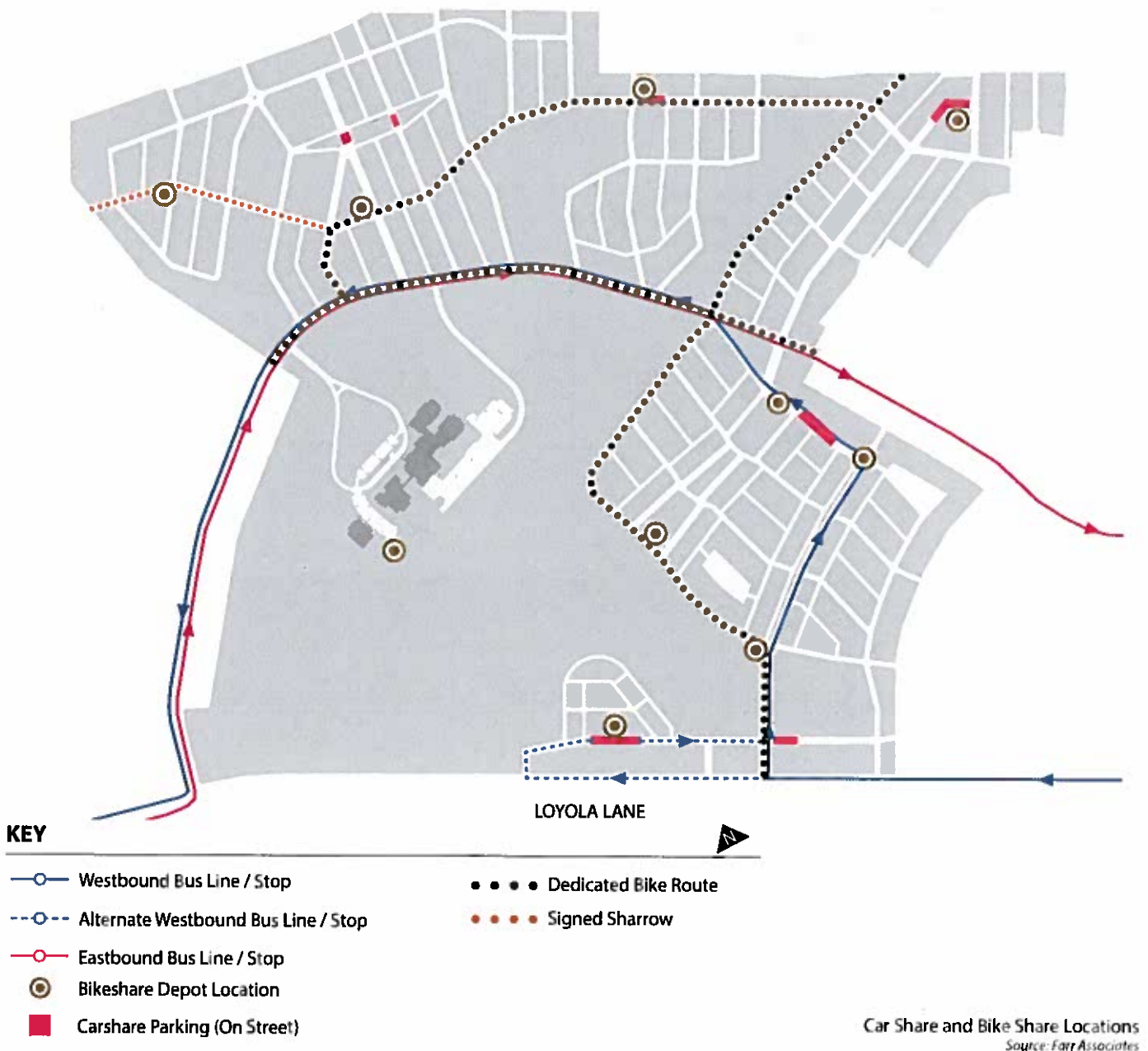
WALKING

Good planning recognizes that before being anything else humans were pedestrians. The Master Plan has been laid out to take advantage of the human capacity to walk. Block size, shading and lighting are features that make the Master Plan pro-walking. The Plan provides a network of paths and streets to provide access to every part of the community. The primary mode of mobility should be considered walking.

TRANSIT

ZERO-COMMUTE JOBS

The most affordable live work arrangement imaginable is the ability to work from home. The internet has made workers more mobile allowing them to work remotely from home. While the City of Austin regulations permit at-home work in any single-family dwelling. The Five Hills plan goes beyond this by introducing Live-Work units in the neighborhood centers; residences that can be



built with storefronts or can be converted to them at any time. Having the freedom to walk to schools and retail, use share bikes and share car and assuming a more robust future transit service, a Five Hills family could live with fewer cars than elsewhere.

FUTURE TRANSIT

Cap Metro currently serves the Colony Park area via bus. The frequency of service is not robust and the routes do not make convenient connections to job centers across the region. With the development of the Master Plan, Cap Metro is anticipated in the future to route its buses through the Five Hills and the greater Colony Park/Lakeside neighborhood and (hopefully) increase bus service.

Another opportunity is for Cap Metro to develop the Green Line commuter rail service and to establish a stop adjacent to Neighborhood 4. The land development plan and zoning are in place to allow a general neighborhood to transform into a TOD.

BIKE SHARE

Bike share programs are growing in popularity around the nation, including Austin's successful B-Cycle program. Bike share programs are a way of allowing persons to "check-out" a bike for a period of time at a low cost. Bike share stations are typically located in a variety of areas (commercial, retail and open spaces) to create a comprehensive network. This provides for people to capitalize on the bike share program to go about a variety of activities: commuting to work, travel to shopping, and for recreational purposes. Bicyclists are able to return the bike to the station at which they picked it up, or to any other bike station located throughout the city. As the density and destinations merit it, B-Cycle should be expanded throughout as proposed to provide bike share to those who work, live, shop in or near the Project Site.

CAR SHARE

Car share is a program gaining popularity in areas with an appropriate level of density combined with the desire to own fewer or no cars. This program has already been implemented in Austin through the Car2Go and ZipCar services. Car sharing allows a user to rent a car for a specific period of time. This can include small trips (such as grocery shopping or running errands), or longer trips for traveling. The cars are typically parked in one location where it is accessible for check out. Cars are typically smaller vehicles with higher gas efficiency. The Master Plan anticipates that in the future, every block will include a car share location.

Car share locations benefit not only the immediate area but also the larger area as part of a comprehensive transportation network that offers choice in how people travel.

If an area has car share parking policy or car share programs implemented, reductions allow for reduced number of parking stalls to be implemented or a waiver to be established to reduce the number of required parking spaces.

TRANSPORTATION FACILITIES

The following facilities are recommended in order to provide choice in the way people travel. By making walking, cycling, and transit more accessible and comfortable, more trips can be accomplished without the use of a car. These facilities should be required, as appropriate, in new development projects.

BIKE STORAGE

Bike storage facilities come in a variety of styles. The standard bike rack is most familiar. However, as using bicycles for other activities and commuting to work are gaining in popularity; other bike storage facilities have become necessary. Examples of this are bike storage rooms at office spaces, and special lockers in residential complexes. These lockers can use a special key or access code to increase security measures.



Example of Bike Storage

Source: Portland State University (<http://www.pdx.edu/bikehub/bike-parking>)

SHOWERS

The installation of shower facilities is an appealing amenity for those individuals commuting to work on bicycles. Shower facilities can be built as separate facilities (as part of a bike share station for instance) or can be used in conjunction with other businesses such as an office complex gym.

BUS SHELTERS

All bus stops shall include shelters for patrons awaiting buses. Additional amenities to be included at all bus stops are lighting, landscaping and trees, signage and route information, trash and recycling receptacles, and water fountains where practical. All amenities shall be handicapped accessible.



Example of Bus Stop Shelter

Source: Farr Associates

SIGNAGE/ANNUNCIATOR

Signage for the area needs to be in compliance with the City of Austin and TxDOT's typical signage design criteria. Special design characteristics can be taken to create a sense of place within the Colony Park development.

Annunciators are devices that verbally announce direction such as when it is time for pedestrians to cross at intersections, or schedules at bus or train stop locations. Annunciators are encouraged for areas with high pedestrian activity.

BUS STOP PAVEMENT DETAILS

Concrete bus stop pavement shall be provided at all proposed bus stop locations. At a minimum, bus stop pavement shall conform to the most current City of Austin standard detail 1000S-7. Where concrete roadway sections are utilized, bus stop locations shall be considered for any adjustments necessary in the pavement design.

ELECTRIC CHARGING STATIONS

Electric charging stations can be used as a way to promote the use of electric cars. Stations can be installed in prime parking locations, so that persons view using an electric car with additional incentives.



Example of an Electric Charging Station & Parking Space

Source: Farr Associates

STREET DESIGN CRITERIA

STREET SPEED

The desired operating speed is influenced by a variety of factors, varying with each corridor. The needs of the modes using the corridor, adjacent land uses, and the context of the corridor in relation to the larger network all have an impact on the recommended speed for a corridor. Typically for collector and local streets, lower operating speeds are preferred. Street design can have a larger influence over motorists travel speeds. These design features may include:

- Limiting/reducing the number of travel lanes;
- Narrow travel lanes that are sized to fit cars;
- Lateral shifts or narrowing, which causes drivers to move out of a straight path);
- Addition of design features such as medians, street trees and other landscaping tools to make the corridor 'feel' narrower;
- Street framing features such as nearby storefronts;
- Speed cushions (humps, tables, platforms);
- Inclusion of on-street parking;
- Smaller curb-return radii to slow turning vehicles.

BLOCK LENGTH

The unimpeded block length has a direct impact on a number of neighborhood livability factors. Shorter block length increases the routing options for pedestrians and bicyclists and can reduce the likelihood of jaywalking. The block length also affects the relationship of speed along a corridor. Unimpeded block length is the distance that drivers may go on a segment without having to slow down, yield or stop. Streets with longer than 600 feet of unimpeded block length typically have 15% of the vehicles exceeding the 85th percentile speed and therefore posted speed limit.

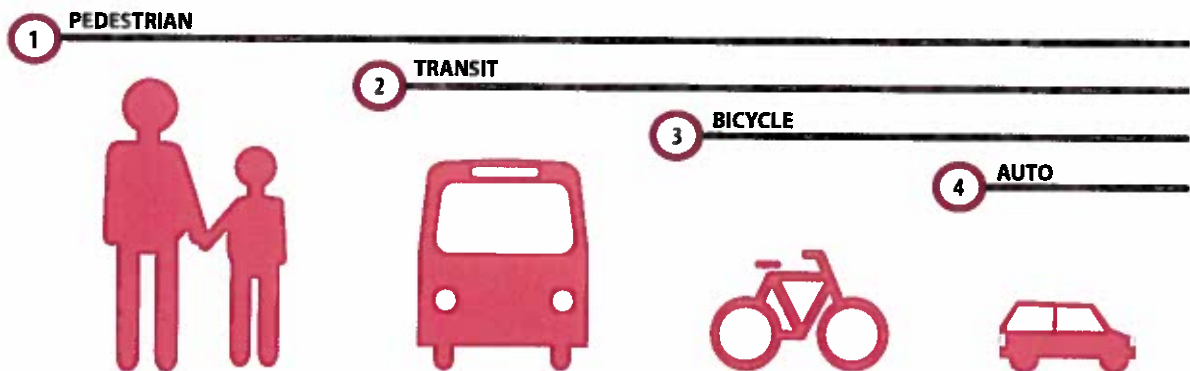
COMPLETE STREETS

Complete Streets is a relatively new term for an idea from decades past. Long before extensive regulations and requirements that favor rapid automobile movement began dictating street design, streets were built and developed to serve the destinations surrounding them. Some of the greatest streets in America still maintain this centuries-old character. Complete Streets are streets designed for everyone – with improved safety of all users and all modes by designing for pedestrians, bicyclists, motorists and transit riders of all ages and abilities.

To help achieve complete streets, the walking public will be given primacy above all other modes of transportation and mobility. Transit will come second in this order, followed by Bicycle then Automobiles (private motor vehicles). This inversion of the dominant, auto-based paradigm will allow the plan's transportation network to grow safely, sustainably and equitably into the 21st Century.

Complete Streets provide the following benefits:

- Provide the option to avoid traffic congestion, and increase the overall capacity of the transportation network;
- Provide incentives for economic revitalization by helping reduce transportation costs and travel time while increasing property values and job growth;
- Provide an opportunity to improve the return on infrastructure investments by integrating sidewalks, bike lanes, transit amenities, and safe crossings into the initial design of a project, which saves the expense of retrofits later;
- Improve the quality of place by creating vibrant and livable centers through increased walking and bicycling;
- Improve the safety for all users by designing for and accommodating all modes – pedestrians, transit users, bicyclists, and automobiles;
- Provide more walking and bicycling opportunities on-street and connected to trails to address increasing chronic diseases caused by physical inactivity. Streets that provide room for bicycling and walking help children get physically active and gain independence;
- Protect Austin's sustainability and environment while incorporating the goals of all City departments.



Model Hierarchy
Source: Farr Associates

STREET SECTIONS

The map on the following page shows the proposed street network. These street types may include bike lanes, on-street parking, landscaping and various other elements. The following pages provide street sections of each street type showing these elements, including typical assignments for underground utilities.

Street Type	Transit	Bike Lane	Parking Lane	Stormwater	Nature	ROW Width	Curb Face-to-Curb Face	Median Curb-to-Curb	Sidewalks	Travel Lanes	Travel Lane Width	Speed (mph)
A: Arcade Street	●	●	●			52'	48'		10'	2	10'	25
B: Mixed-Use Ave. with Parking			●			66'	36'		8'	2	10'	25
C: Mixed-Use Bike Route with Parking	●	●	●			78'	48'		8'	2	10'	25
D: Job Center Ave with Bi-Directional Bike Lane		●	●			70'	40'		8'	2	10'	25
E: Stormwater Conveyance Blvd with Parking	●		●	●		75'	18' / 18'	15'	5'	2	10'	25
F: Mixed-Use Stormwater Conveyance St. with Parking on One Side	●		●	●		61'	28'		8'	2	10'	25
G: Residential Transit St. with Parking	●	●	●			66'	40'		6'	2	10'	20
H: Transit St. with Parking on One Side	●	●	●		●	69'	40'		7' / Trail	2	10'	25
I: Transit St. on Wildlife Crossing Structure	●	●			●	60'	32'		6' / Trail	2	10'	25
J: Nature Street with Bi-Directional Bike Lane		●			●	62'	32'			2	10'	25
K: Nature St. with Parking on One Side			●		●	54'	27'		5' / Trail	2	10'	20
L: Nature Street with Bi-Directional Bike Lane and Parking		●	●	●	●	66'	39'		5' / Trail	2	10'	25
M: Stormwater Treatment Street			●	●		53'	26'		5'	1 (Yield)	12'	20
N: Stormwater Treatment Street with Parking on One Side	●		●	●		55'	28'		5'	2	10'	25
O: Neighborhood Street with Parking			●			50'	26'		5'	1 (Yield)	12'	20
P: One-Way Street with Parking			●			42'	18'		5'	1	10'	20
Q: One-Way Living Street		●		●		35'	35'		5'	1 (Shared)	18'	20
R: Shaded Alley						20'	15'			1	15'	20
Bike/Ped Trail		●			●							

TRANSIT

Streets which include travel lanes that are wide enough to support transit vehicles such as City buses.

BIKE LANE

Streets that include a bicycle lane. The bicycle lane may be a single lane on each side of the street, a bi-directional lane on one side of the street or a shared travel lane with vehicles.

PARKING LANE

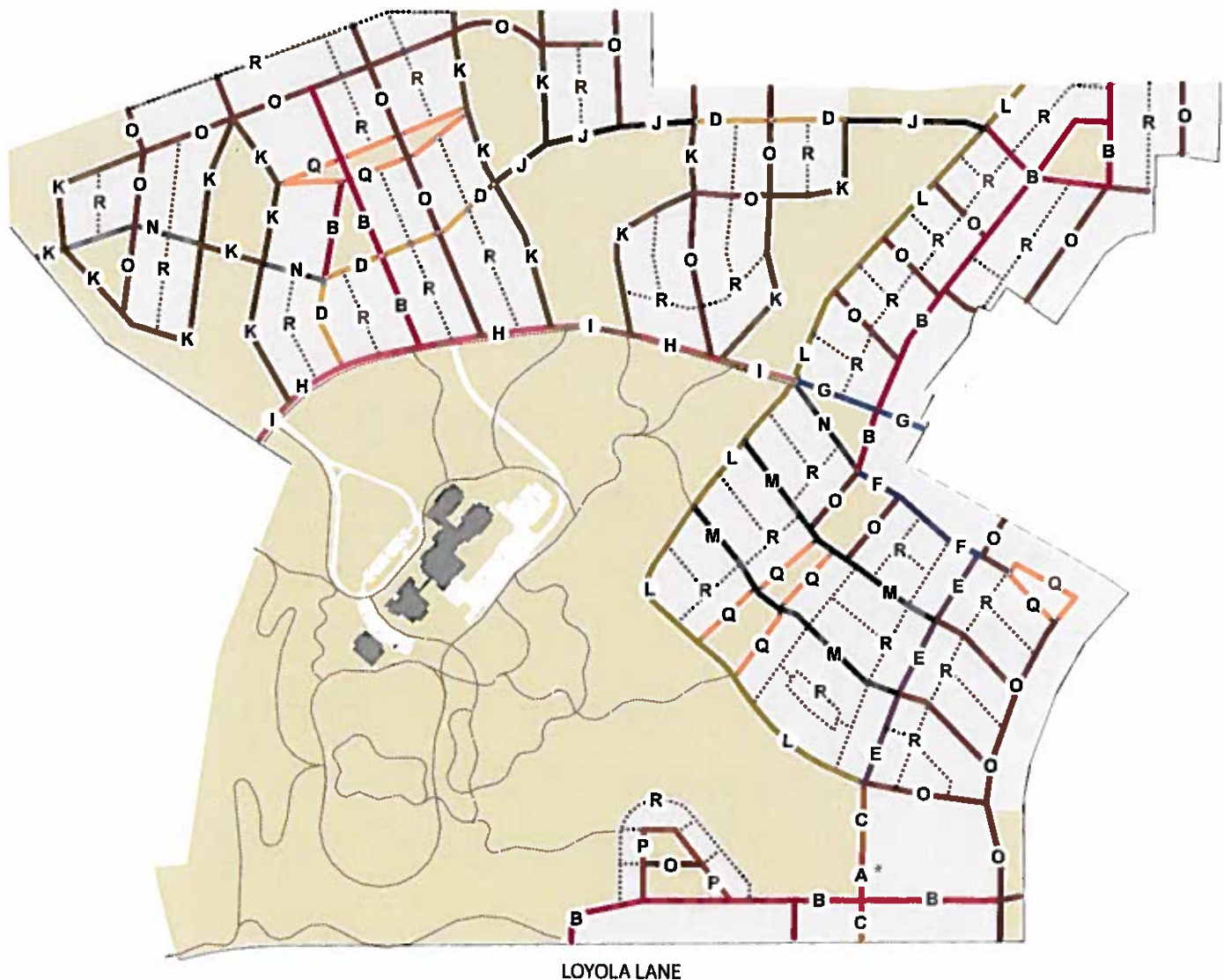
Streets that include a parking lane. This may consist a parking lane on each side of the street or a single lane on one side of the street.

STORMWATER

These streets are dedicated to the conveyance or treatment (water quality rain gardens) of stormwater.

NATURE

Streets that run parallel to open space. This also includes the bicycle and pedestrian trails that run through the District Park.



LOYOLA LANE

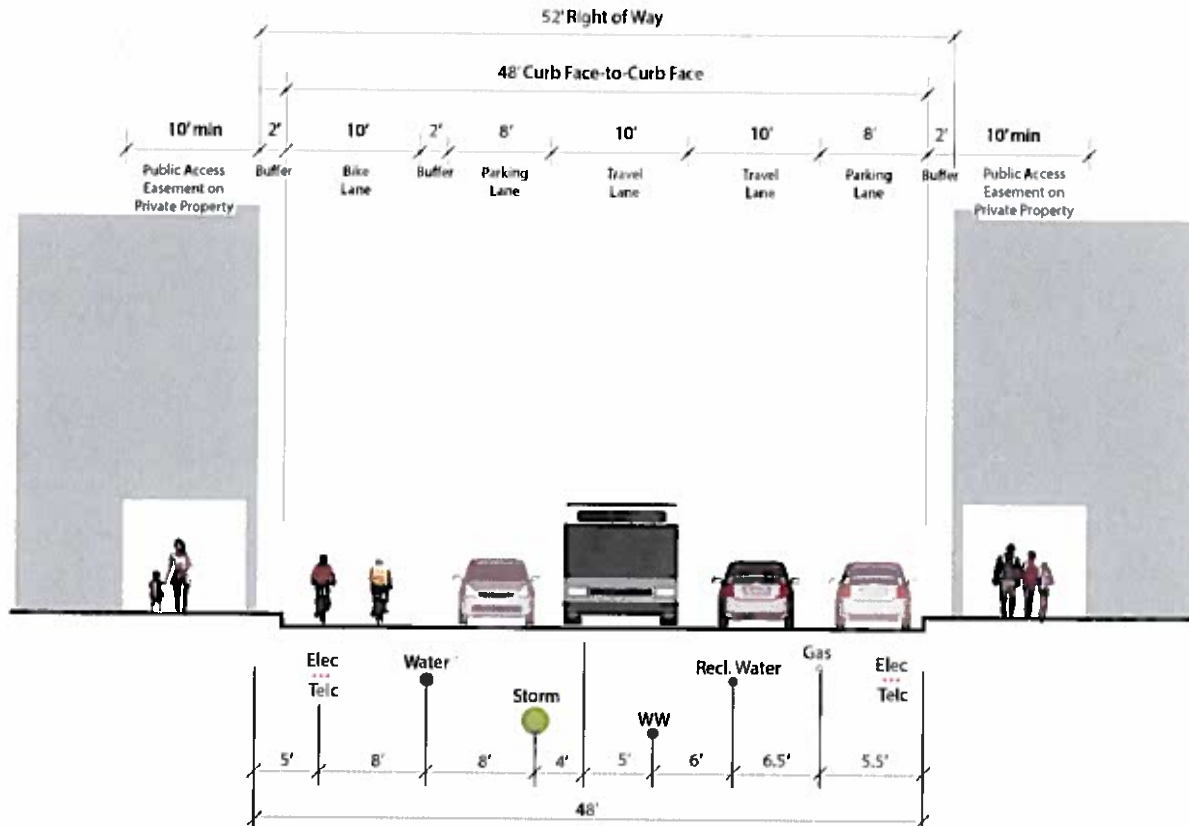
Street Types
Source: Farr Associates

*Street Type A may be substituted with Street Type C.

STREET SECTIONS

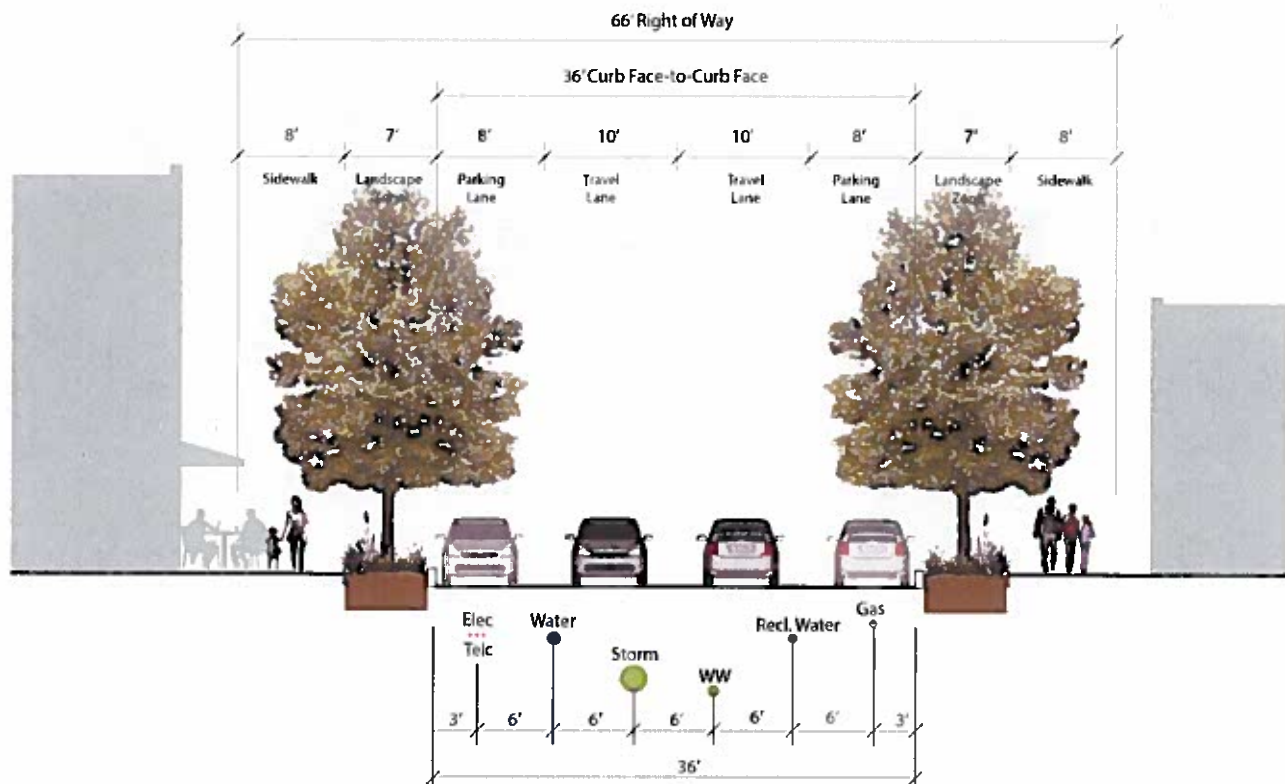
TYPE A: ARCADE STREET *(MAY BE SUBSTITUTED WITH TYPE C)

Arcade Streets provide a covered walkway for pedestrians adjacent to the street with direct access to shops, businesses or other activities. The Arcade Street will be prominently featured in the Loyola Town Center and will be buffered by on-street parking.



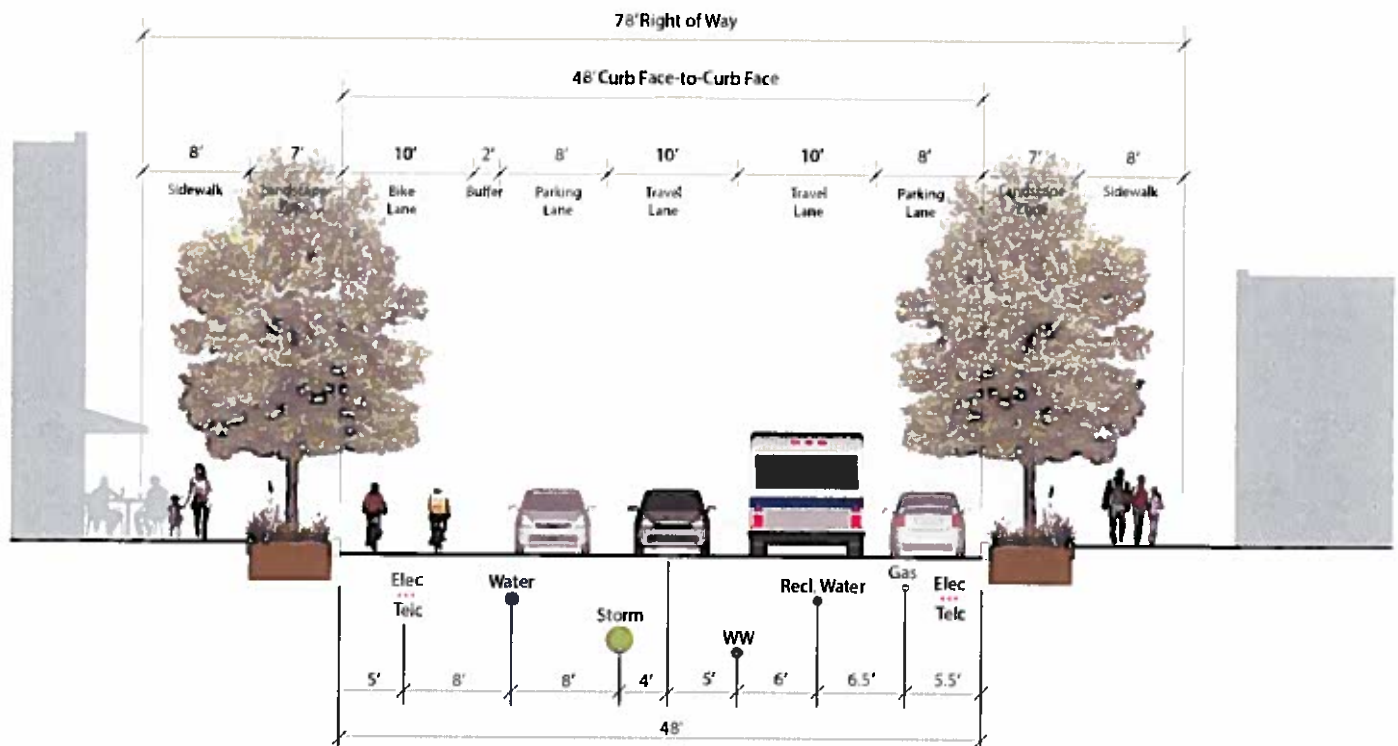
TYPE B: MIXED-USE AVENUE WITH PARKING

Mixed-Use Avenue with Parking provides two-way travel and on-street parking serving a mix of shops, restaurants, offices and residential uses. These streets have wider sidewalks to accommodate higher pedestrian activity adjacent to storefronts and sidewalk cafes. Landscaped zones buffer pedestrians from the travel way.



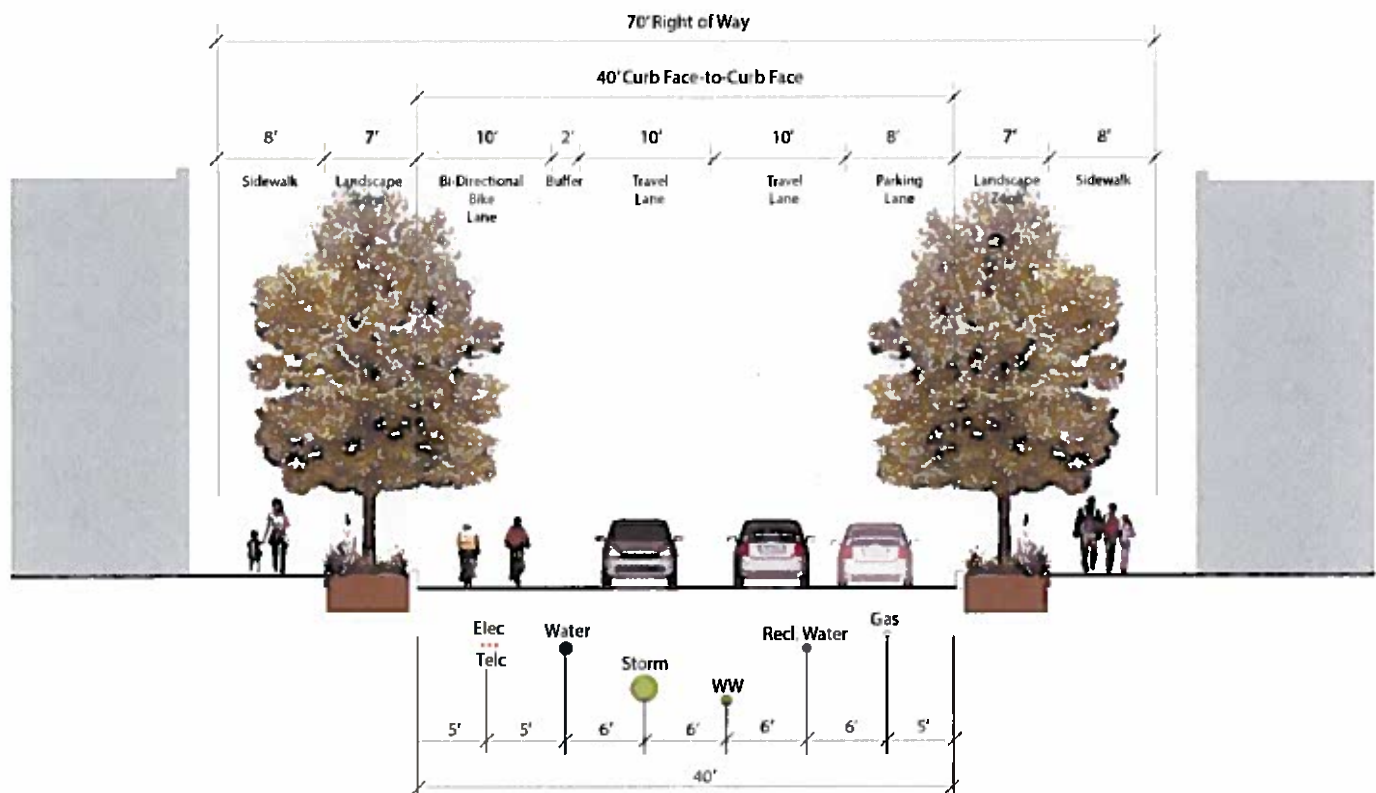
TYPE C: MIXED-USE BIKE ROUTE WITH PARKING

Mixed-Use Bike Route with Parking provides two-way travel and on-street parking serving a mix of shops, restaurants, offices and residential uses. These streets have wider sidewalks to accommodate higher pedestrian activity adjacent to storefronts and sidewalk cafes. Landscaped zones buffer pedestrians from the travel way. These streets also include 10' bi-directional bike lanes on one side with a buffer for increased bicycle safety.



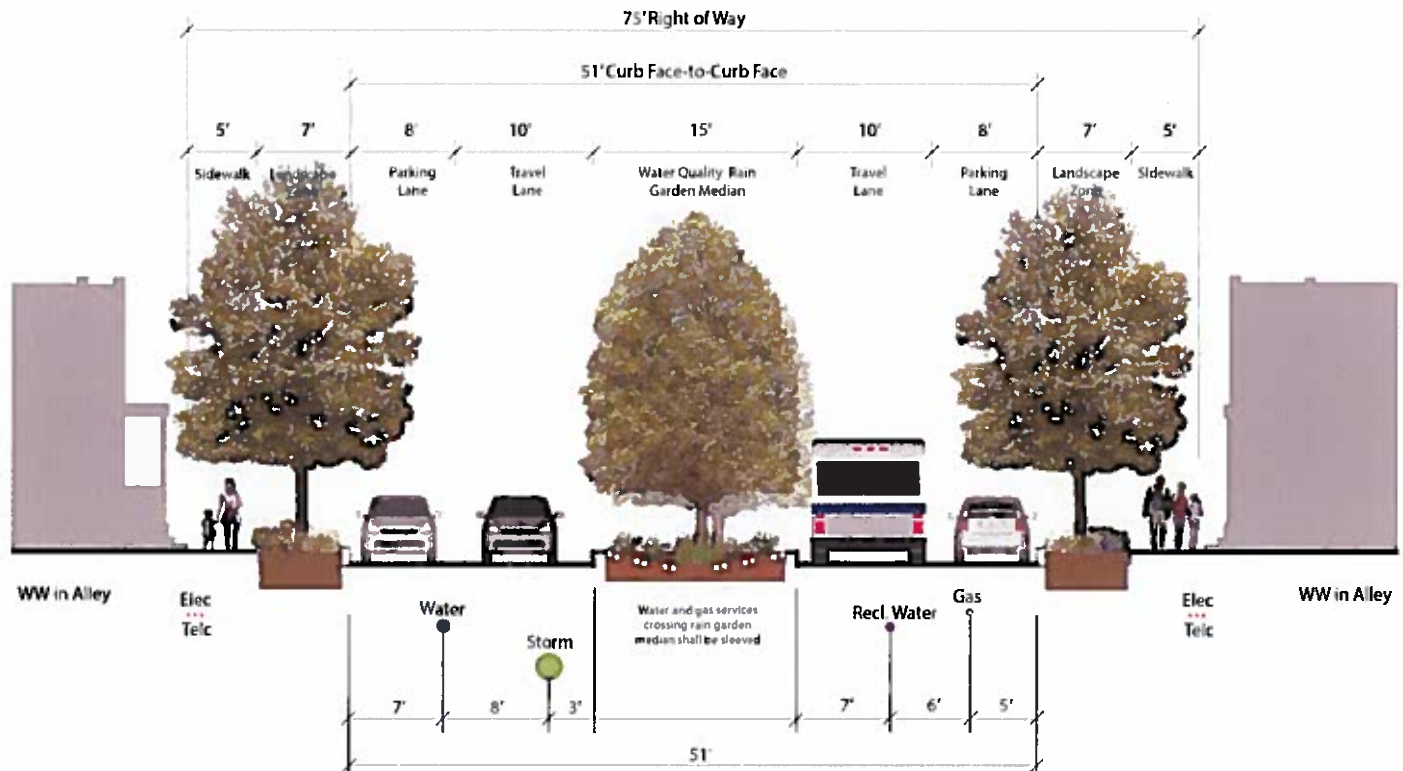
TYPE D: JOB CENTER AVENUE WITH PARKING

The Job Center Avenue is a major corridor through the Transit-Friendly Job Center. As this area is expected to have a high amount of activity, the street lends itself to have wide sidewalks, which allow for flexibility in the use of outdoor space, as well as parking for the surrounding high-density uses. This is also one of the streets along which the primary bike route runs; thus a bi-directional bike lane is positioned on one side of the street.



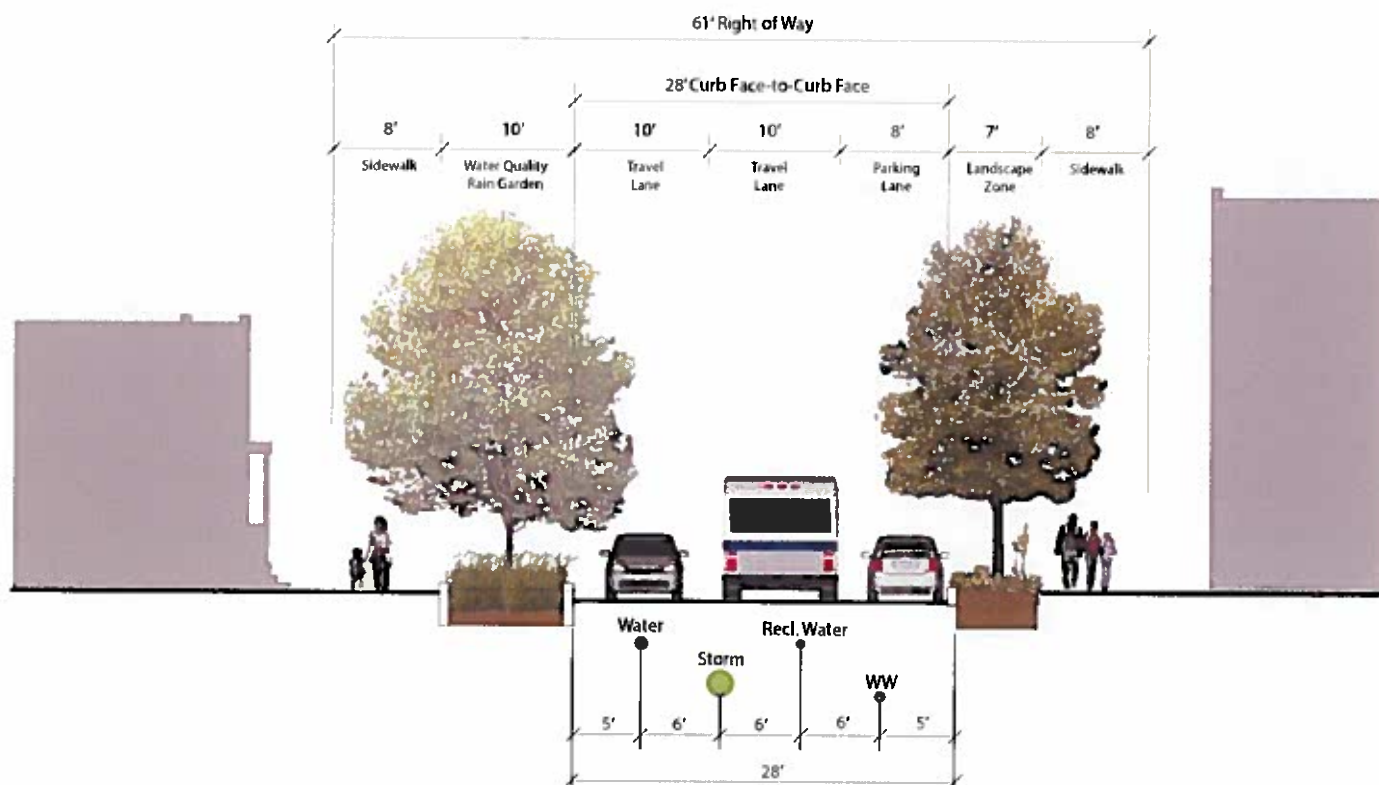
TYPE E: STORMWATER CONVEYANCE BOULEVARD WITH PARKING

Stormwater Conveyance Boulevards are designed to maintain the safety of the corridor's transportation by handling larger amounts of stormwater runoff. A wide bioswale median collects and transports water to open space and retention areas. They are designed to reduce pollutants through infiltration and reduced runoff velocity, while also enhancing the natural appeal of the corridor. The median also presents opportunity for public space with walkways and seating intermitted with landscaping.



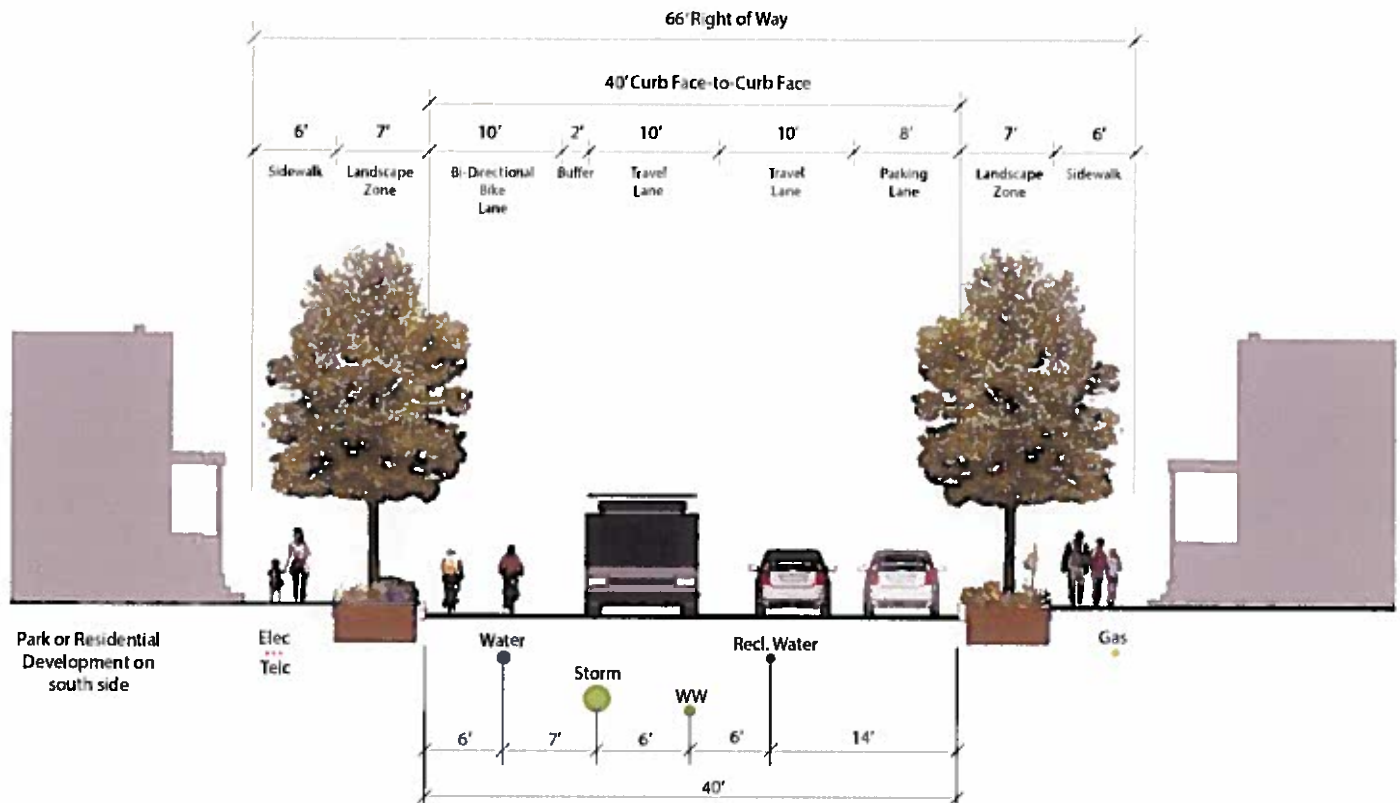
TYPE F: MIXED-USE STORMWATER TREATMENT STREET WITH PARKING ON ONE SIDE

Like the Mixed-Use Avenues, Mixed-Use Stormwater Streets also have wider sidewalks adjacent to a mix of shops, restaurants, offices and residential uses. In addition, a bioswale on one side of the street will collect stormwater runoff as part of the stormwater conveyance network.



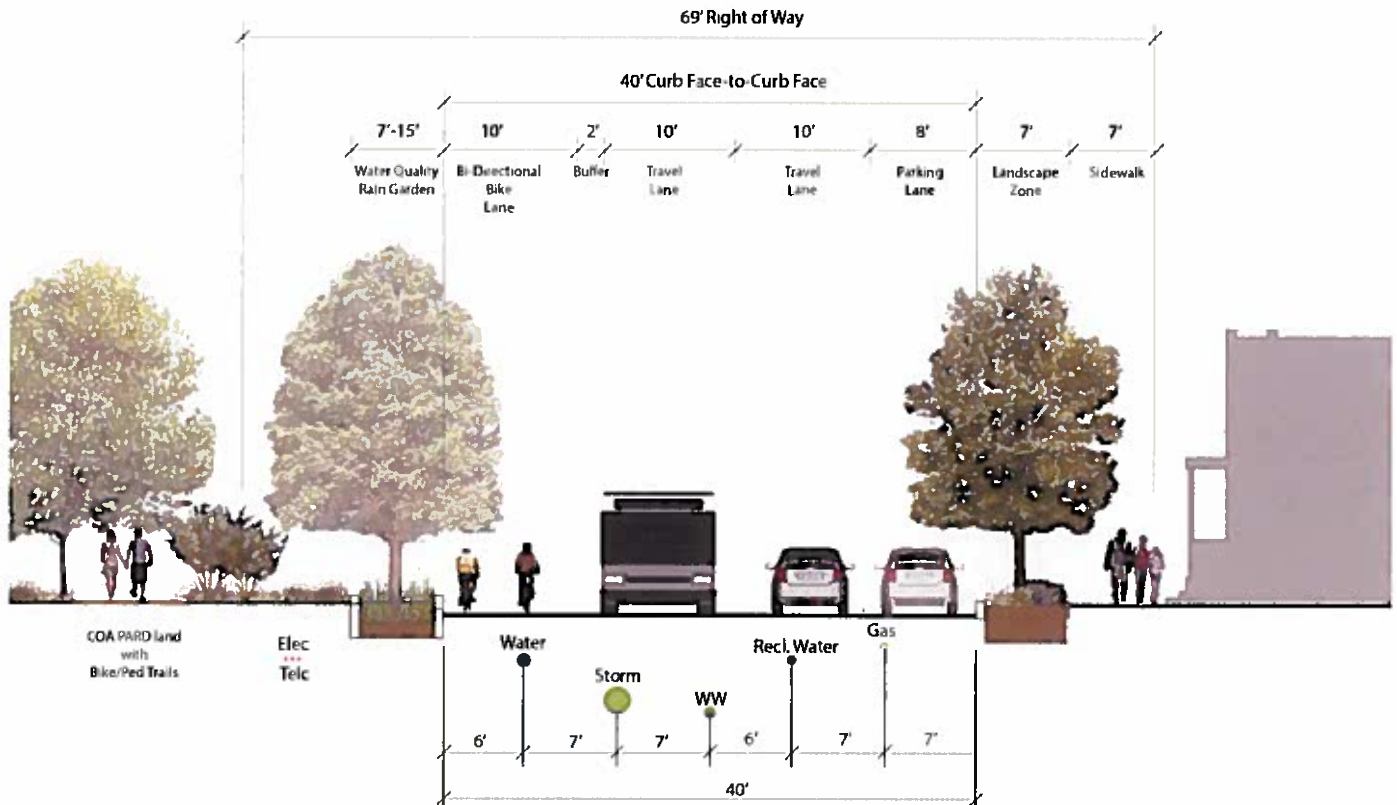
TYPE G: RESIDENTIAL TRANSIT STREET WITH PARKING ON ONE SIDE

The Residential Transit street is the tail end of the bus route within the site. It also provides a bike connection between the project site and the adjacent existing neighborhood. This street is also an extension of Type H and I, except that it has no natural or PARD land on either side of it.



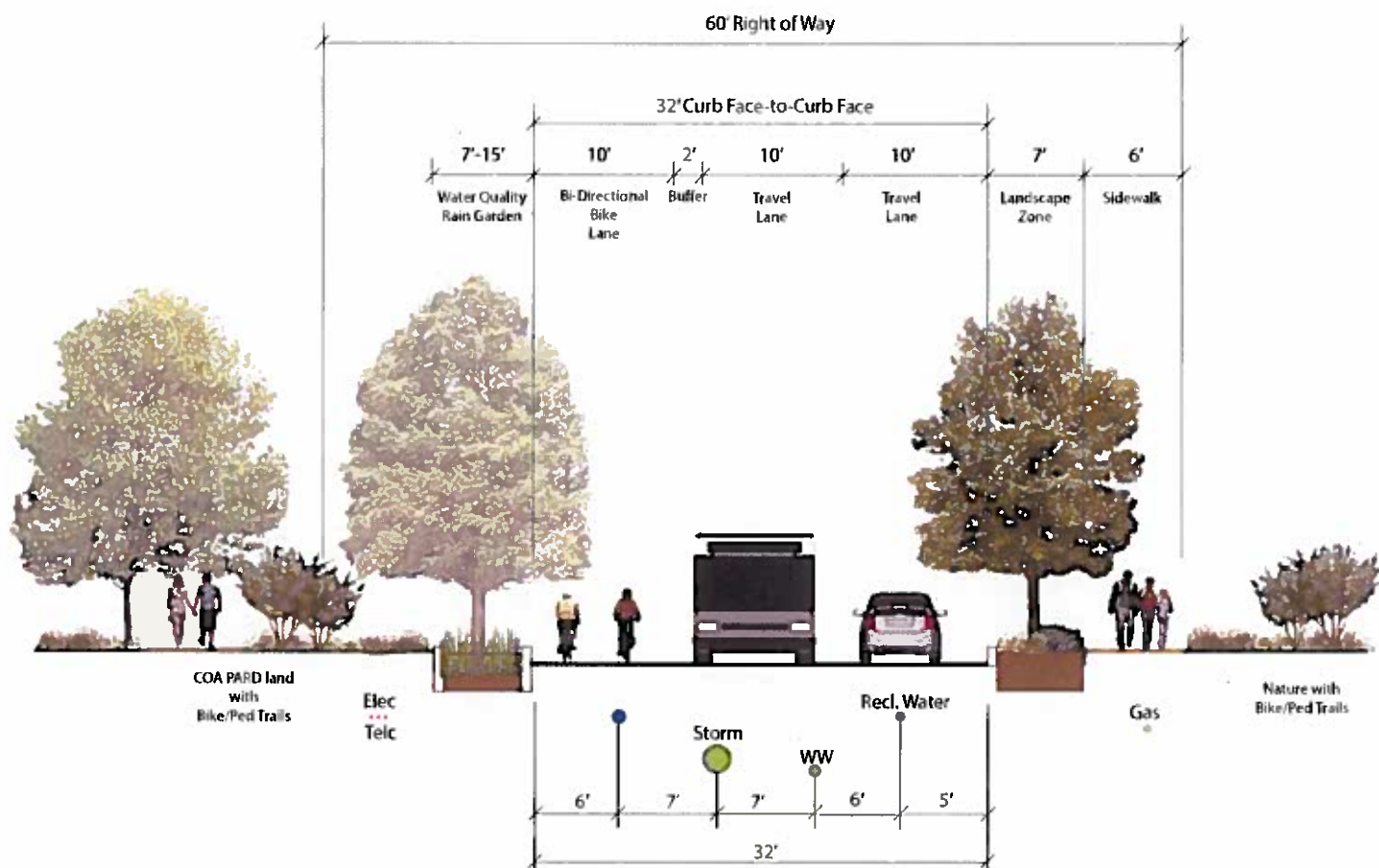
TYPE H: TRANSIT STREET WITH PARKING ON ONE SIDE AND PARK LAND ON SOUTH SIDE

Transit Streets are intended to provide a bus circulation route through the project and connect important neighborhood destinations. This type of street will also likely have pedestrian and bicycle activity. Bike lanes provide a dedicated space for comfortable travel. On the side of the street with on-street parking, the order will go as follows: travel lane, parking lane, bike lane, landscape zone, and sidewalk. A landscaped zone will act as a buffer separating pedestrians from the travel way.



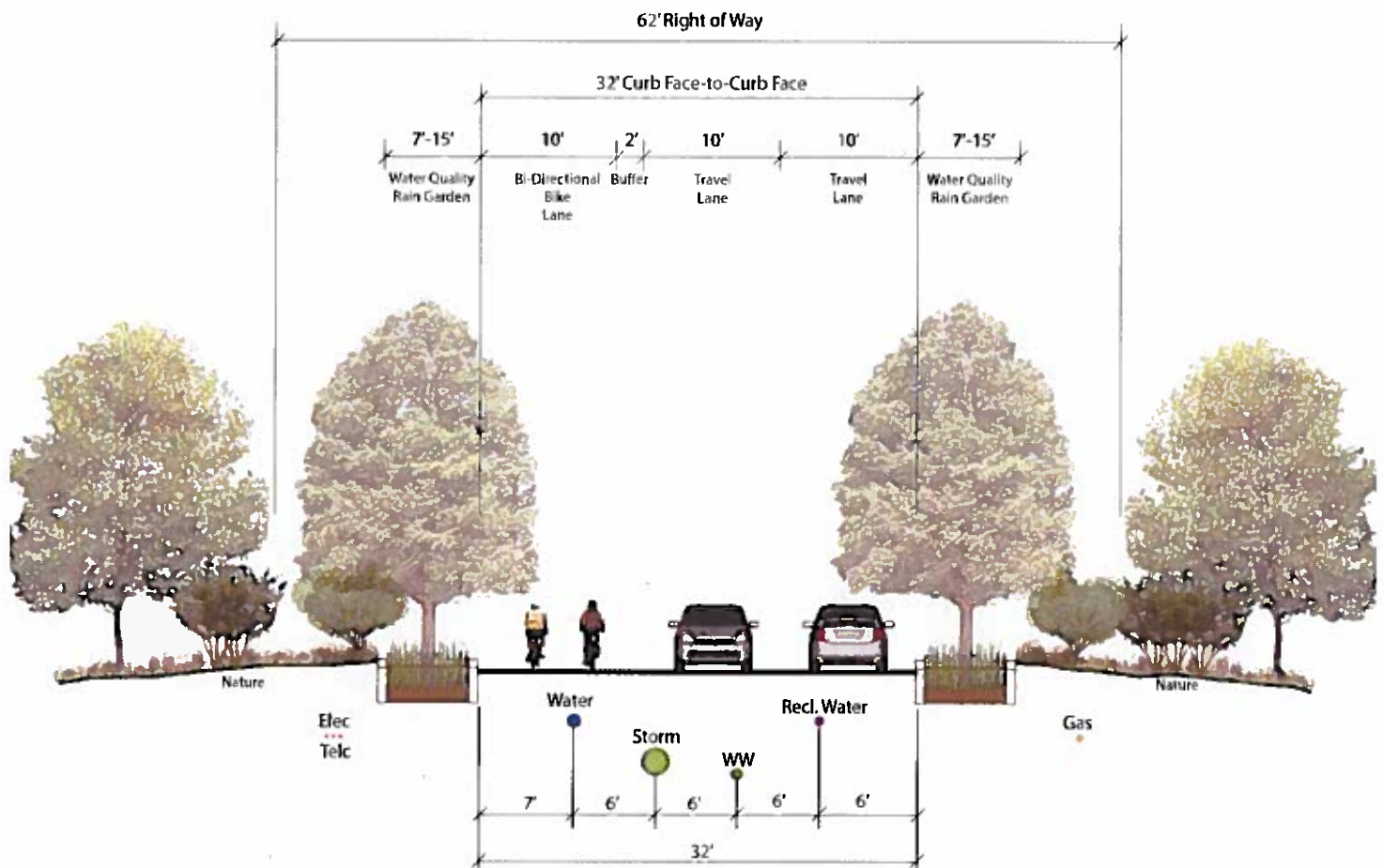
TYPE I: TRANSIT STREET ON WILDLIFE CROSSING STRUCTURE

This is a unique street type as it facilitates wildlife crossing below and provides vehicular, bike, and pedestrian access above. The street is a through street with no parking and no development on either side of it.



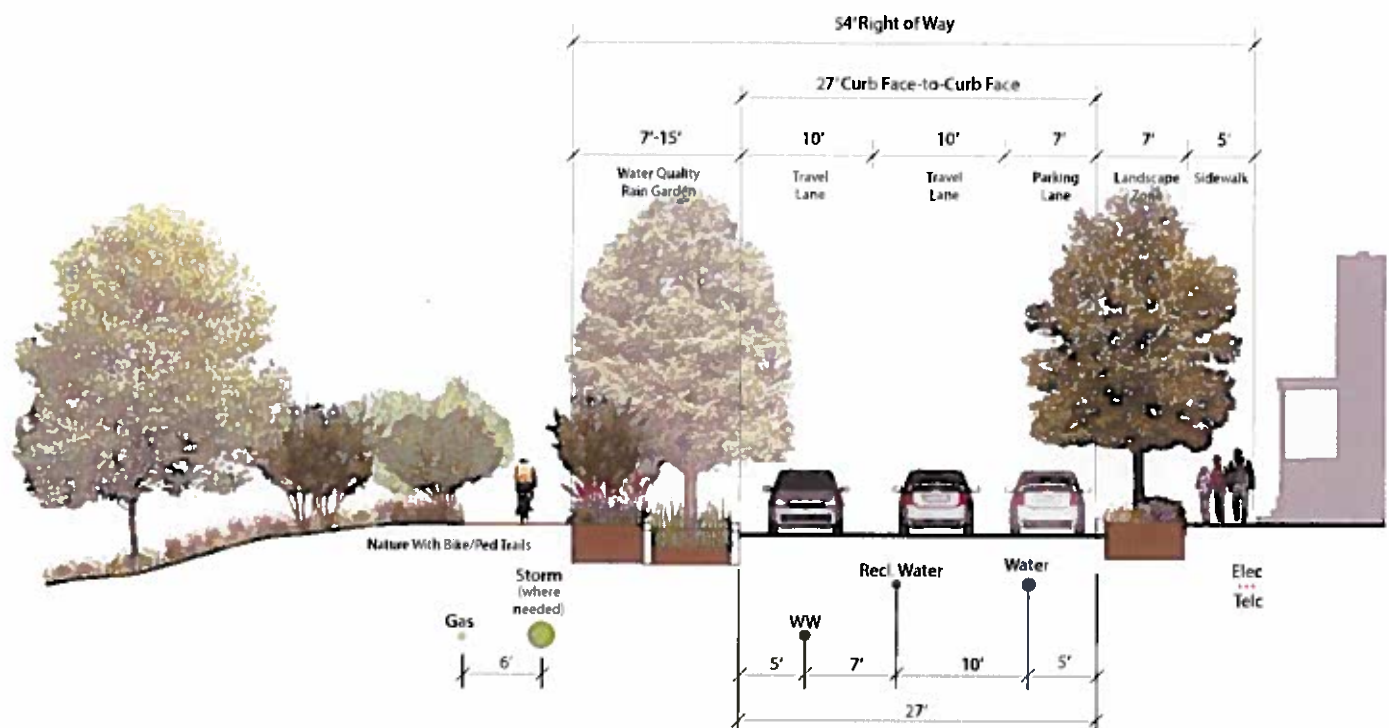
TYPE J: NATURE STREET WITH BI-DIRECTIONAL BIKE ROUTE

These nature streets are through streets that go through the fingers of nature. They provide vehicular and bike access above, while facilitating wildlife crossings below.



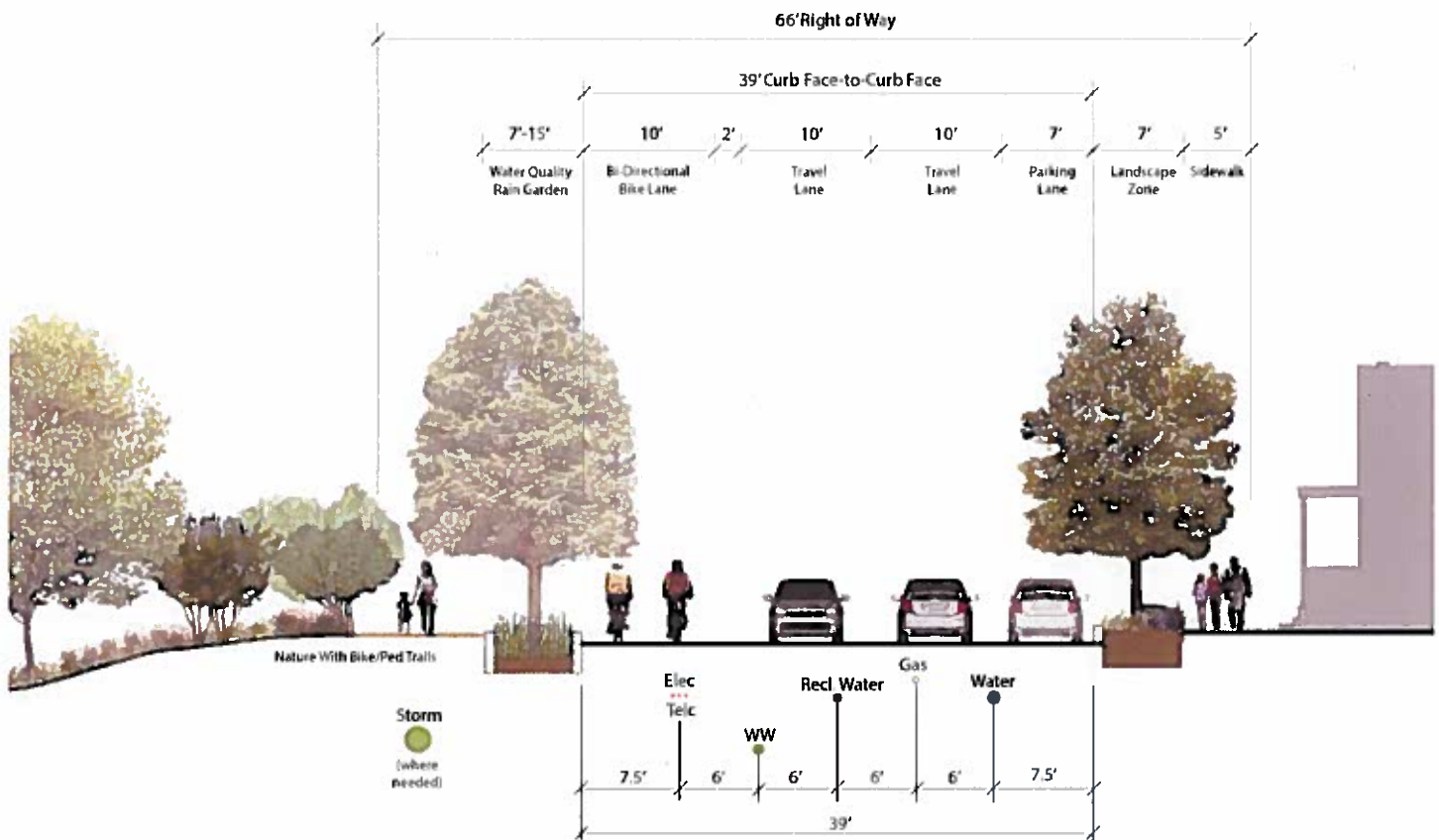
TYPE K: NATURE STREET WITH PARKING ON ONE SIDE

Nature Streets provided two-way travel with parking on one side. This is typical in areas with development requiring on-street parking only on one side, with park or open space on the opposite side.



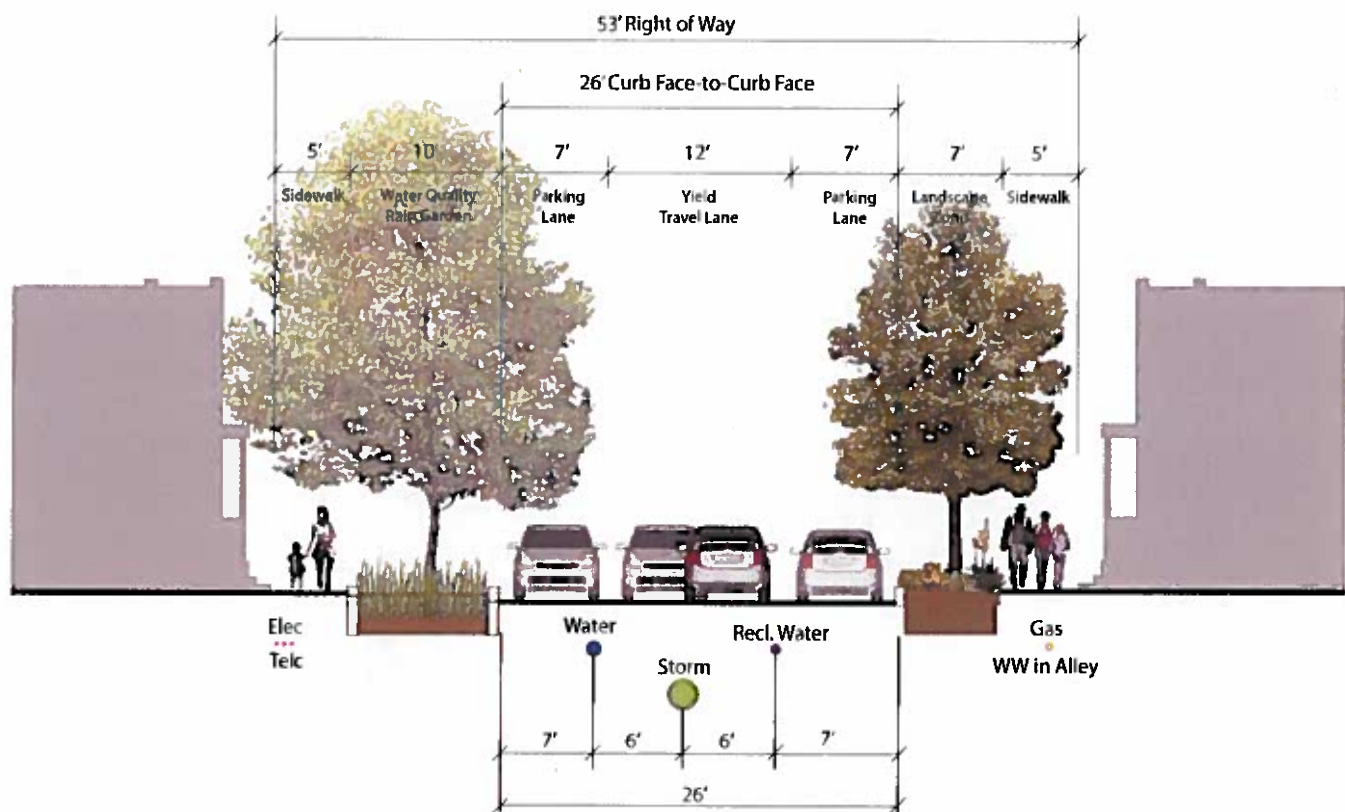
TYPE L: NATURE STREET WITH BI-DIRECTIONAL BIKE ROUTE AND PARKING ON ONE SIDE

These nature streets are one of the most scenic routes within the project site with meandering curves and nature on one side. The street has development on one side with parking along the same side. This is also the street along which the primary bike route runs.



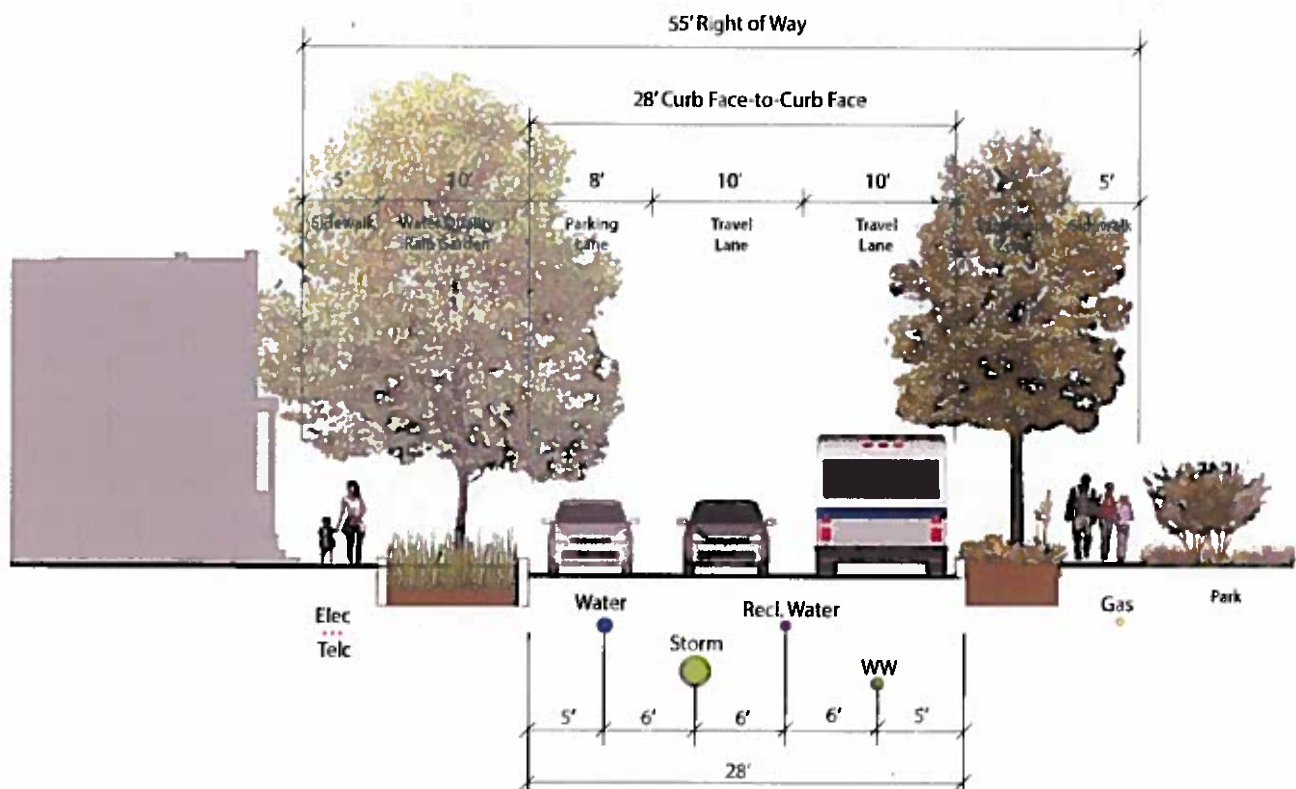
TYPE M: STORMWATER TREATMENT STREET

Stormwater Treatment Streets balance vehicle access with retention of stormwater runoff. A yield travel lane allows safe, slow two-way travel with on-street parking on both sides. The narrow travel lane requires opposing traffic to wait before they can pass, but still provides enough space for emergency vehicle access. This design creates a safer street by encouraging reduced speeds and greater driver attention. Adjacent to the travel way is a bioswale to collect and filter stormwater runoff.



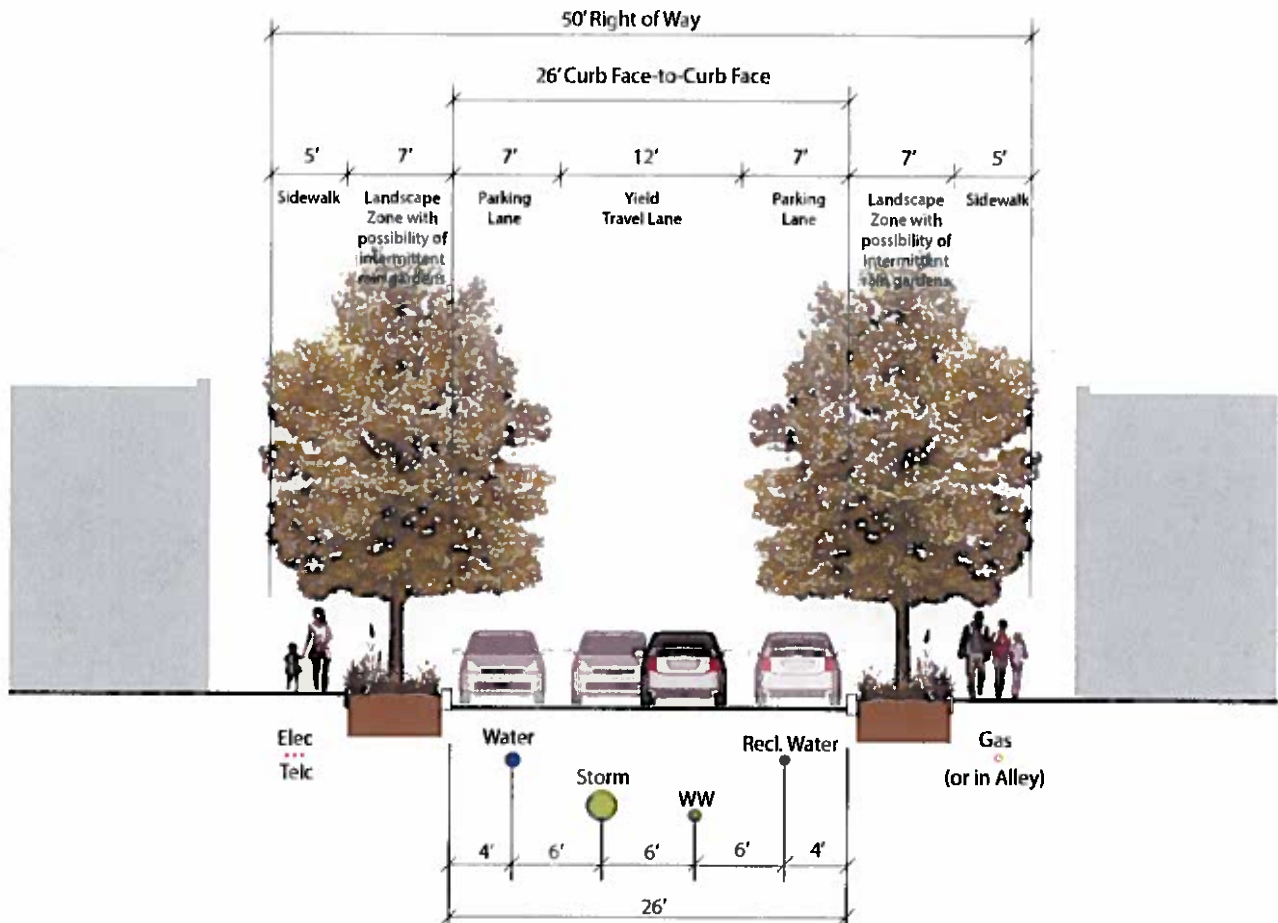
TYPE N: STORMWATER TREATMENT STREET WITH PARKING (ONE SIDE)

Similar to the Stormwater Treatment Street, this street will balance vehicle access with retention of stormwater runoff. Bike lanes will be provided on both sides, as well as a parking lane adjacent to a bioswale. Two travel lanes are provided.



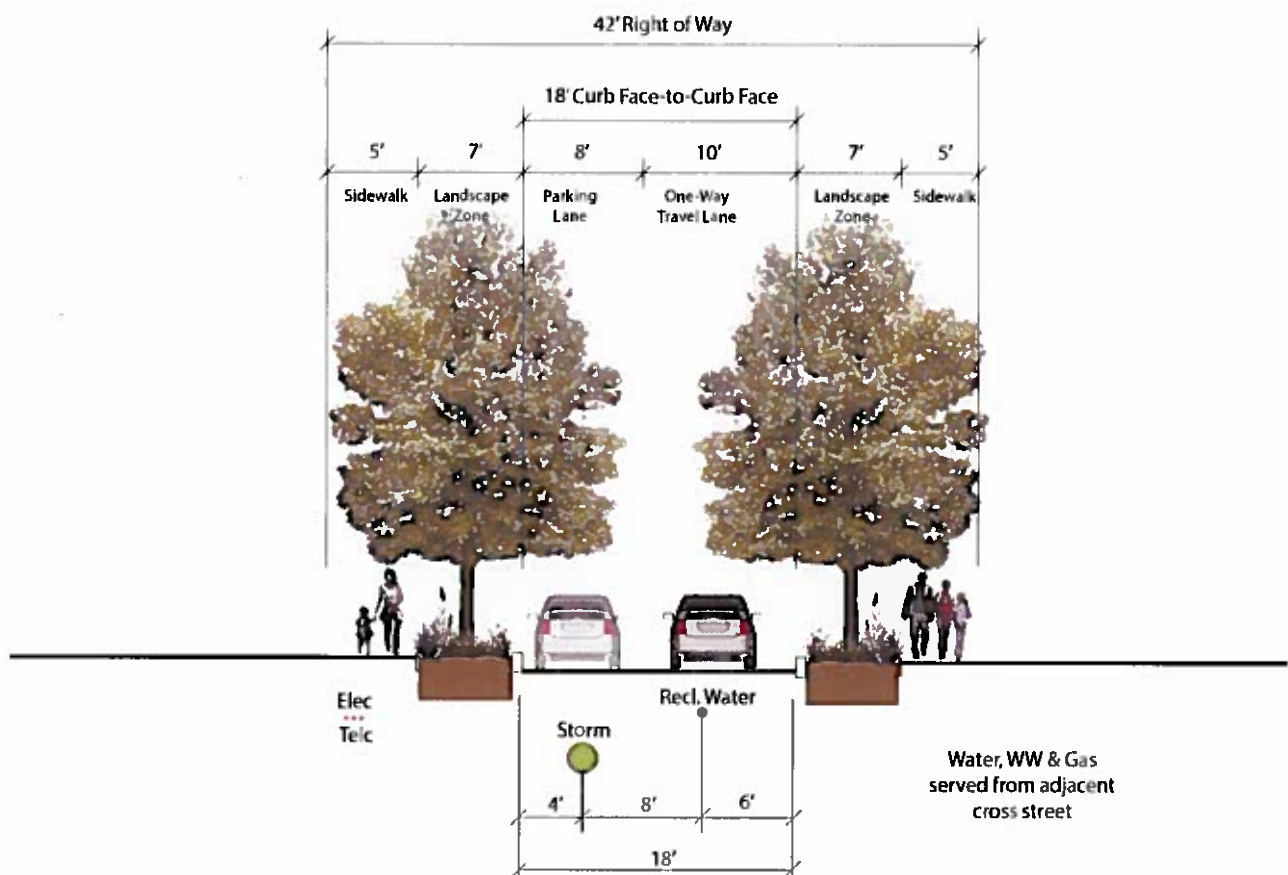
TYPE O: NEIGHBORHOOD STREET WITH PARKING

These streets provide enough space for parking on both sides of the street, with a narrow yield travel lane. This travel lane allows safe, slow two-way travel requiring opposing traffic to wait before they can pass. These streets are appropriate in residential areas with lower traffic volumes and pedestrians of all ages.



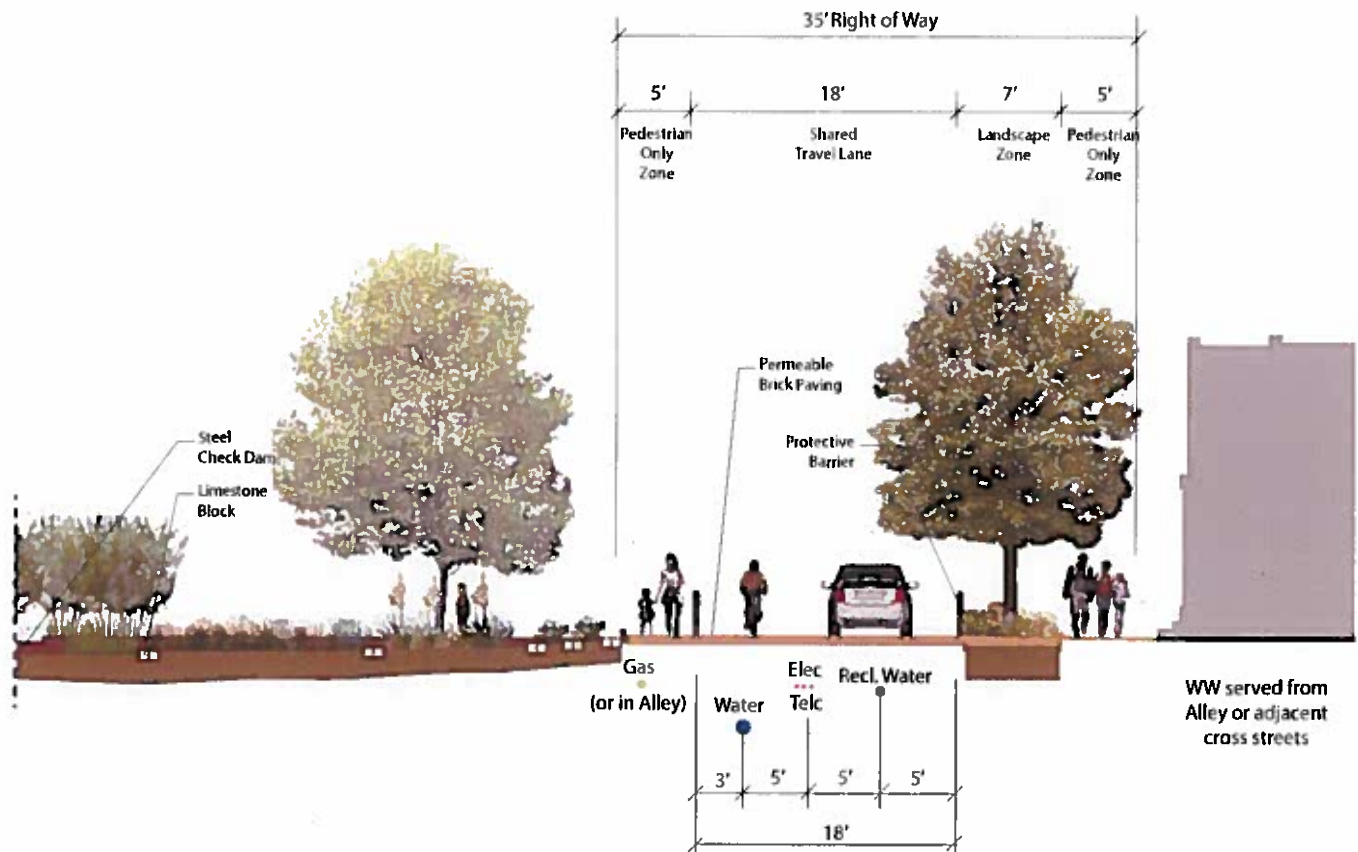
TYPE P: ONE-WAY STREET WITH PARKING

One-way streets with parking are much like One-way Living Streets, with the difference of a dedicated parking lane.



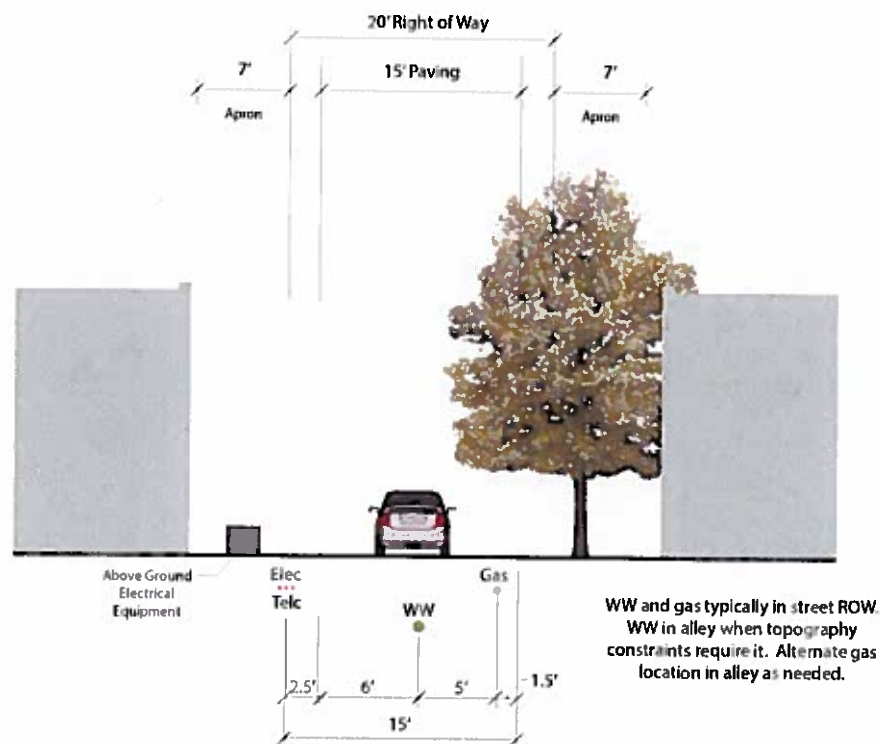
TYPE Q: ONE-WAY LIVING STREET

Living Streets are designed with a shared space approach, where pedestrians and bicyclists have equal travel priority as motor vehicles. A shared travel lane designed with permeable paving will allow use by vehicles but is intended as a space for people to stroll, socialize, and enjoy active transportation. The street is built at the same grade as the sidewalk without curbs, but protective barriers such as bollards, separate pedestrian only zones for those who want to walk outside of the shared travel lane.



TYPE R: SHADED ALLEY

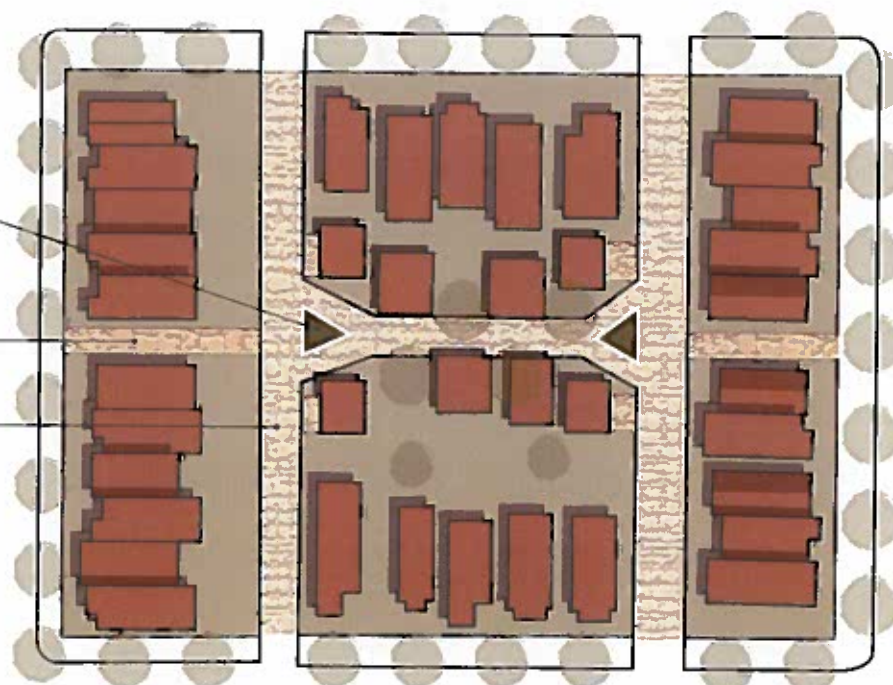
Alleys provide rear vehicular access to residential and commercial buildings. This moves garages and trash collection to the rear of structures – and allows the front of buildings to highlight inviting spaces like porches and uninterrupted sidewalks. Shading is provided with the addition of trees.



Enhanced Intersection with
Landscaped Median

Permeable Walkway

Permeable Paving



Enhanced Alley Configuration
Source: Farr Associates

STREET LANDSCAPING STANDARDS

URBAN TREE CANOPY GUIDELINES

Urban tree canopies are extremely important to our environment and help to provide clean air, healthy soils and reduce heat island effects. The goal of the Urban Tree Canopy guideline is to establish a long range vision to establish, protect and enhance the urban tree canopy within the Colony Park development. The overall goal for Colony Park will be to achieve and 30% canopy coverage over the next 20 years across all land uses with specific goals as follows:

35% coverage for parkland and open space (including school property), 35% coverage for residential neighborhoods and 15% coverage for commercial developments.

The Master Plan calls for a comprehensive canopy of street trees along its non-alley right of ways, estimated to be 50,600 linear feet. At 40-foot spacing (the minimum spacing as determined by LEEDv4-ND (1)), the Master Plan calls for an estimated 2,530 street trees; this would contribute to meeting City of Austin Urban Tree Canopy goals and the American Forests Organization recommendation of 35% coverage for urban residential areas. In addition, the Master Plan calls for additional trees along its alley right of ways, increasing the linear feet of proposed tree canopy.

NEWLY PLANTED TREES

New trees to be planted on the site should be native to Texas, drought tolerant and suited to live in the existing soil types on the site. New trees should also be selected from the specified list of approved trees for the site (reference Chapter 9: Technical Appendix for a list of approved canopy and understory tree species) and should come from a high quality planting stock originating from Central Texas sources or grown in nurseries that simulate the Central Texas growing conditions.

MAINTENANCE AND CARE

All new trees should be properly cared for both during the establishment period and in perpetuity. A long term maintenance specification should be developed and implemented that is specific to this site, its soils and topography.

For more information regarding Austin's Urban Tree Canopy Plans, reference "Austin's Urban Forest Plan: A Masterplan for Public Property" 2013.

LANDSCAPE ZONES: STREET TYPES B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, AND Q

Street landscape zones are incorporated into all street types (except street type A). These planted areas, which run parallel to sidewalks, serve as buffers to separate pedestrians from vehicular and bicycle traffic. Trees are to be planted at regular intervals throughout these zones.

For a list of native and adapted plant species, please refer to Chapter 9: Technical Appendix.

STREET TYPE E: STORMWATER CONVEYANCE BOULEVARD

Stormwater Conveyance Boulevards are designed to be conducive to the inclusion of open channel bioswales for conveyance of stormwater in lieu of enclosed storm drain piping. Cross slope of these streets should be designed such that each side of the street section drains toward the bioswale.



Stormwater Conveyance Boulevard

Source: Retrieved from Urban Design Group photo library

FLows AND DAMS

Channels should be designed to include periodic check dams to reduce flow velocities, provide a detention benefit, and create aesthetic interest in the channel. Outlets from these pooled areas that are created should be sized to slowly discharge to the next pool downstream, creating a base flow of a running stream for a period of time after a rainfall event.

Free flow area must be provided in the channel above the pool levels to accommodate larger stormwater flows without encroaching upon the adjacent roadway or property. Stormwater flows in excess of the full channel capacity may be bypassed by secondary inlet systems within the channel that drain to adjacent storm sewer systems.

The Stormwater Conveyance Boulevard generally runs perpendicular to the contours/slope of the site and carries stormwater along its length. There is a fifteen feet wide Bioswale Median at the center of the street section.



Check Dam

Source: Retrieved from Urban Design Group photo library



Landscaping for Street Type E: Stormwater Conveyance Boulevard

Source: Studio Balcones

BIOSWALE MEDIAN

The Bioswale Median shall be densely vegetated throughout with occasional compositional breaks. For safety reasons, the Bioswale Median shall be easily viewed into and across from the street. No more than fifty percent of the plantings shall be dormant at any given time, and all selected species shall be native and tolerant of both dry and wet weather conditions. The planting mix shall include some woody plants to provide structure but mainly be composed of grasses and perennials.

Limestone block shall be used for side slope stabilization and with as shallow a cross slope as allowed by the required stormwater volume. To slow the water coursing along its length, periodic check dams made of weathering steel shall be inserted. Finally, limestone boulders shall be located at cross streets for casual pedestrian seating.

To minimize washing and erosion, no wood mulch shall be used in the Bioswale Median. Instead, gravel and or river rock shall be selected carefully based upon specific flow rates, slopes, and planting types.

For a list of native and adapted plant species, please refer to Chapter 9: Technical Appendix.

STREET TYPES J, K, AND L: NATURE STREETS

Generally running parallel to the upland contours of the Water Quality Protection Zones, this landscape showcases the contrast between upland / lowland plantings and wild / maintained zones. It is recommended that the existing adjacent vegetation and habitat communities be woven together with circulation systems for bikes, pedestrians at this transition zone.

As a transition zone, large groupings of drought tolerant grasses, shrubs, and understory trees draw out the upland qualities of its natural geophysical location. Locations of planned groupings shall take into account existing vegetation as well as view filters and view corridors.

Along the edges of the bike and pedestrian paths, intensive seeding of native wildflowers and grasses shall provide visual interest as well as habitat and foraging for birds and bees. Canopy trees shall be located along the pedestrian trail to provide shade for hiker/bikers.

The specified desert shrubs (Sotol, Agarita, Yucca) and other prickly plantings should not be planted immediately adjacent to pedestrian traffic areas.

For a list of native and adapted plant species, please refer to Chapter 9: Technical Appendix.

STREET TYPES F, M AND N: STORMWATER TREATMENT STREETS

Stormwater Treatment Streets are designed to be conducive to the inclusion of rain gardens along the low side of the street to treat stormwater runoff from the adjacent street and sidewalks. Cross slope of these streets should be designed such that the entire street section drains toward the rain gardens.



Chris White and Brian Phelps, www.sitephocus.com



Design Sponge (blog)



Rain Dog Designs



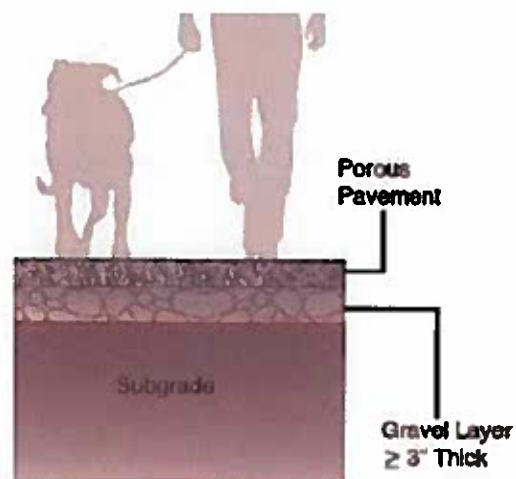
Retrieved from Urban Design Group photo library

Examples of Rain Gardens

BIOFILTRATION

City of Austin guidelines for rain gardens found in the COA Environmental Criteria Manual (ECM) shall be utilized. Because of the very low permeability of the existing site soils, rain gardens will need to be designed utilizing "full filtration" biofiltration beds. Underdrain systems will be tied to adjacent stormwater conveyance swales where possible, or to the storm sewer system.

Biofiltration growing medium depth shall be a minimum of 18" per them ECM. However, the depth should be increased to 24" or 30" where possible to treat the most upstream impervious cover practical. Medium shall meet the performance criteria of the ECM section 1.6.7.C.4. These criteria include specific requirements for amount and type of organic matter and particle size distribution (texture analysis) to ensure a saturated hydraulic conductivity of greater than 2 inches / hour while supporting healthy plant growth. Locally available material marketed as "sandy loam" shall not be allowed.



Porous Pavement for Sidewalk
Source: COA ECM (Fig. 1.6.7.E-1)

DRAINAGE

Where possible, additional drainage area from adjacent lots on the high side of the street may be accounted for in the runoff volume to be treated by the rain gardens. The maximum contributing drainage area to an individual rain garden is 2 acres. Maximum ponding depth in the rain gardens will be 12 inches. Stormwater flows in excess of the design water quality volume of the rain gardens will be bypassed by secondary inlet systems in the street draining to the storm sewer system. The rain garden should be hydraulically offline from the adjacent storm flow, such that when the rain garden is full, additional runoff does not enter the system and instead flows past the inflow opening.

Where capacity does not exist to treat adjacent lots, it is preferable to isolate adjacent lot drainage from entering the street. This may be accomplished by the way the lots drain, or if they drain toward the street, by the use of porous pavement for sidewalks with an underdrain that feeds to a separate conveyance and treatment system.

WATER QUALITY RAIN GARDENS

Stormwater Treatment Streets generally run parallel to the natural contours/slope of the site and are lined with plantings on both sides of the roadway: a landscape zone on the uphill side and a rain garden on the downhill side. The rain garden accepts surface runoff from the roadway that grades to drain toward it with the aim of slowing runoff and increasing localized stormwater infiltration at street plantings.

This rain garden shall primarily be densely planted with tall grasses that exhibit a more erect habit. The aim is to achieve neat and lush appearance, even in drier times.

As the Stormwater Treatment Street rain garden is rather narrow, the detailing for slopes and walls shall be accomplished as efficiently as possible so as to allow as much space as possible to be dedicated to planting. Plate Steel is recommended for paving restraints and curbs whenever possible at edges of the rain garden. Steel grate Bridges shall be employed where intermediary pedestrian walkways are needed to cross from curb to sidewalk.

To minimize washing and erosion, no wood mulch shall be used in the rain garden median. Instead, gravel and or river rock shall be selected carefully based upon specific flow rates, slopes, and planting types.

STREET TYPE Q: ONE-WAY LIVING STREET

The Living Street and Stormwater Park is for celebrating the spectacle of rainfall and to provide space for biofiltration and retention. Overall, the large vegetated area of the Stormwater Park provides for functional biofiltration while particular grading maneuvers, articulated with limestone walls/edging and steel check dams, create clearly constructed routes for water movement that create cascading spillways and small pools of water when a rainfall occurs.

STORMWATER PARK

The Stormwater Park it is an amenity for the neighborhood with spaces for gathering and attractive plantings. It is a habitable space with some areas of lawn and benches to be distributed throughout its length. The planting palette may include some ornamental choices, but the overall character shall feel naturalized rather than garden-like.

As the Stormwater Park generally runs perpendicular to the contours/slope of the site and carries stormwater along its length it shall be densely vegetated throughout with occasional compositional breaks. At large, the character of the planting composition shall feel prairie-like and shall provide habitat for wildlife. No more than fifty percent of the plantings shall be dormant at any given time, and all selected species shall be native and tolerant of both dry and wet weather conditions.

VEGETATION

The planting mix shall include some woody plants to provide structure but mainly be composed of grasses and perennials. For safety reasons, the Stormwater Park shall be easily viewed into and across from the street. Trees shall be spaced generously and carefully located to maintain view sheds towards the downtown Austin skyline.

Limestone block shall be used for side slope stabilization and with as shallow a cross slope as allowed by the required stormwater volume. To slow the water coursing along its length, periodic check dams made of weathering steel shall be inserted. Finally, limestone boulders shall be located at cross streets for casual pedestrian seating.

To minimize washing and erosion, hardwood mulch shall be used selectively, when appropriate. Predominantly, gravel and/or river rock shall be selected carefully based upon specific flow rates, slopes, and planting types.

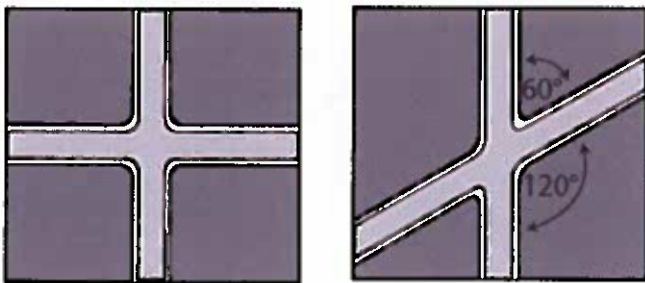
For a list of native and adapted plant species, please refer to Chapter 9: Technical Appendix.

INTERSECTION DESIGN CRITERIA

INTERSECTION CONCEPTS LAYOUT AND ANGLES

FOUR LEG INTERSECTION

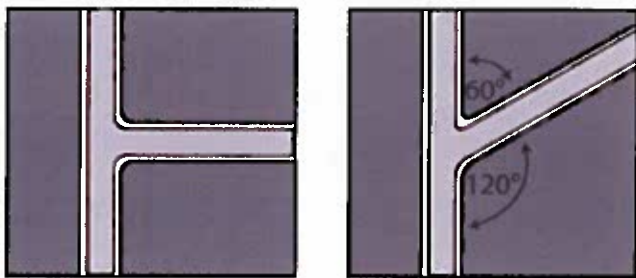
Four-leg intersections can vary from two lightly traveled local roads to a complex intersection of two main roadways. The intersection control can vary from uncontrolled, yield controlled, stop controlled or for intersections with higher volumes, signal controlled. The type of intersection control varies based on traffic speed, traffic volumes, pedestrian crossing volumes and sight distance. For traffic purposes, intersections function best when designed at 90 degree or perpendicular. However in certain areas there may be a desire to allow flexibility in intersection approach angles to allow for unique urban design features. This intersection skew should not be less than 60 degrees, and if it less than 60 degrees, then intersection modifications should be implemented to reduce the skew.



Four Leg Intersection
Source: Kimley-Horn and Associates

THREE LEG INTERSECTION

Many of the design principles found in four-leg intersections apply to three-leg intersections. Intersection control can vary depending on a number of factors and the intersection skew of a T-intersection should not be less than 60 degrees. These intersections can add unique architectural and design elements to the area.



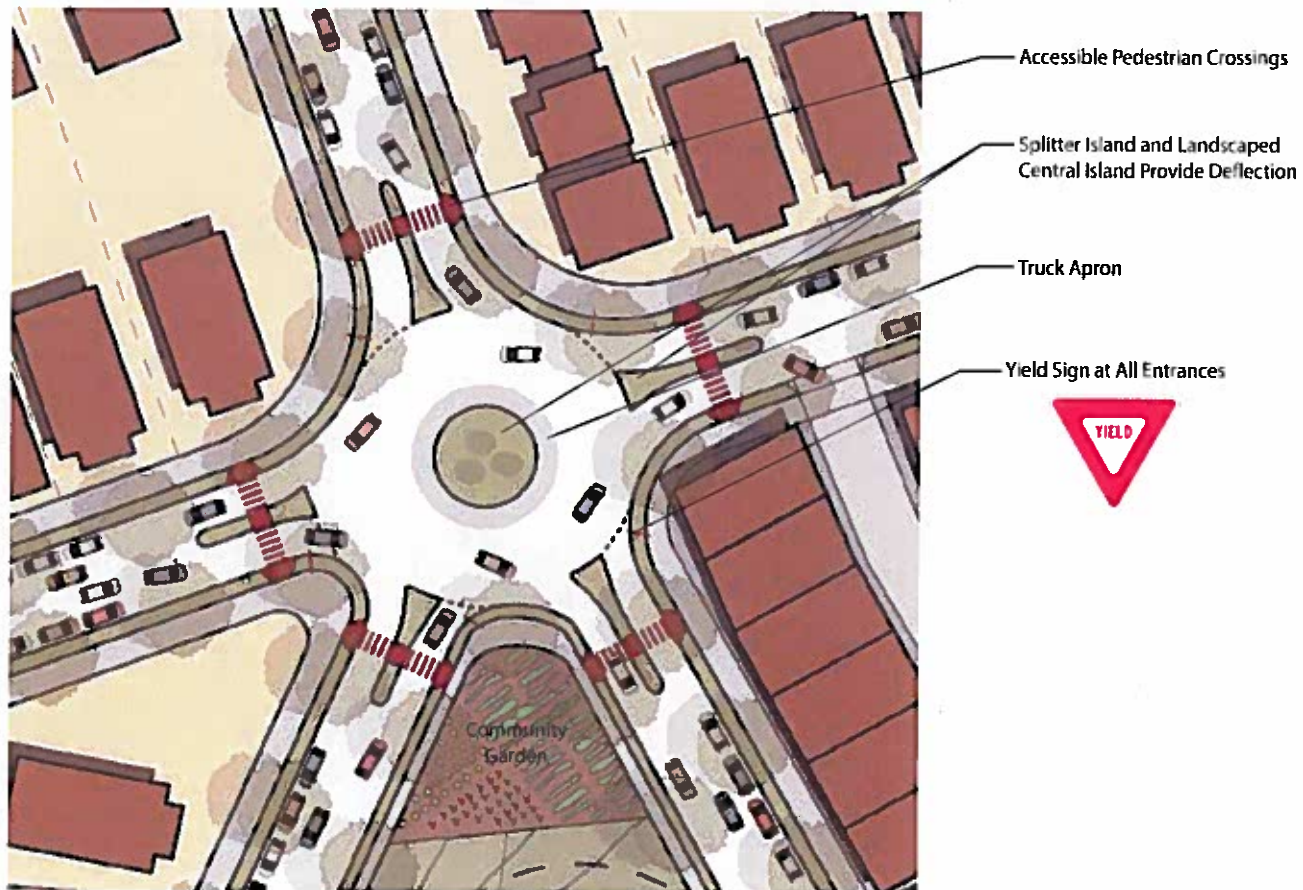
Three Leg Intersection
Source: Kimley-Horn and Associates

MODERN ROUNDABOUT (FROM DESIGNING WALKABLE URBAN THOROUGHFARES: A CONTEXT SENSITIVE APPROACH)

The purpose of a modern roundabout is to increase vehicle capacity at the intersection, slow traffic and reduce the severity of collisions. Given these facts, the use of roundabouts should be analyzed carefully to ensure that they are used properly. General principles and considerations for the design of modern roundabouts include the following:

- Type of design vehicle;
- Use by disabled and visually impaired persons; and
- Effects on pedestrian route directness.

A modern roundabout should be designed to reduce the relative speeds between conflicting traffic streams and the absolute speed of vehicles to improve pedestrian safety. The curved path that vehicles must negotiate slows the traffic. Vehicles entering need to be properly deflected and yield to traffic already in the circulating roadway of the roundabout.



Modern Roundabout
Source: Farr Associates

UTILITIES AND SUSTAINABLE INFRASTRUCTURE

INFRASTRUCTURE

Infrastructure refers to the systems of wires and pipes that convey resources and waste to support human settlements and are divided between wet (i.e., potable water, chilled water, hot water, stormwater, sewer) and dry (i.e., electricity, fiber optic, cable) utilities. Sustainable infrastructure can also be understood as mechanisms by which healthy lifestyles, resource and ecological mindfulness, and innovation can be allowed to flourish. For information in regards to existing utility easements and constraints, refer to Chapter 9: Technical Appendix.

One way to approach the broader goal of net zero energy and water use is to assess how best to achieve it on a development-wide (district) scale with a menu of decentralized generation options coupled with energy and water conserving buildings. This would recognize that, for example, not every building could be energy self-sufficient, that some buildings could generate a surplus and that within an identified boundary sufficient renewable energy could be generated to fulfill demand. A similar approach could be developed to address part or all of the water cycle, from rain water collection to distribution.

UTILITIES

THE RANGE OF UTILITIES

Anticipated utility infrastructure includes domestic water, wastewater, storm drainage, reclaimed water, underground electric, natural gas, and telecommunications. Some existing utilities (water, wastewater, gas) traversing the site will need to be relocated to accommodate the proposed Master Plan layout.

LOCATING UTILITIES

The preferred location for electric and telecom serving lots will be in the alleyway of all streets that have alley-loaded lots. Assignments for electric and telecom main lines in the street right of way are also provided for. Water and wastewater lines will typically run in all street rights of way. Accessory dwelling units will receive water and wastewater service from the front of the lot along with the main house. Topography on some blocks may require that wastewater be located in the alleyway, in which case wastewater for the house and any accessory dwelling units would be served from the alley.

ELECTRICAL UTILITIES

Based on the 2013 Austin Energy Design Criteria Manual, all new construction of AE primary voltage overhead and underground facilities must be installed such that they are 'truck accessible' both for construction and for any later needed maintenance or modification. This normally necessitates that these AE facilities be installed at the front

of the Customer's property or adjacent to a street, road, or other paved surface. Rear lot line construction for new areas will only be permitted where paved alleys or other permanent roadways accessible by AE truck exist.

The Master Plan anticipates an electrical distribution system consisting of underground primary lines and switch boxes located in grassy areas. The switch boxes then serve pad-mounted transformers located in paved alleys within 150 feet of the houses with underground electrical service routed to the houses. The Developer would be responsible for space for AE facilities and equipment, and the installation of the civil work, such as concrete equipment pads, manholes, trenching, and conduits. All Customer-installed civil work for AE facilities must comply with all provisions of the City of Austin Design Criteria, NESC, NEC, AE Design requirements, and any applicable AE specifications, rules, standards, regulations, and conditions.

The next step in beginning the design of the AE distribution system is to submit an Electric Service Planning Application (ESPA) to Austin Energy. AE Design will determine feasibility, cost, and/or other Customer requirements and initiate the design/construction process as required.

RECLAIMED WATER

Reclaimed water piping will be installed in all streets. Commercial, mixed use and multi-family lots will have reclaimed water services stubbed to them, and street landscaping irrigation systems will also be connected to the reclaimed water system. Until such time that a City of Austin reclaimed water main has been extended to the site, the reclaimed water system will be connected to the potable water system with appropriate backflow prevention devices as required and as approved by Austin Water Utility.

Austin Water Utility distributes reclaimed water from its nearby Walnut Creek Treatment Plant. The water is treated to tertiary standards equivalent to 90% of drinking water criteria and is considered suitable for non-potable building and irrigation uses. Allowable uses for this project presently include toilet flushing, cooling tower make-up water, and outdoor irrigation.

The market viability for purple pipe installation in the Project Site is contingent upon installation and maintenance costs. The current rate for reclaimed water is a flat \$1.73 per 1,000 gallons* regardless of quantity used. This represents a minimum 6% savings over low-level consumption rates for residential water and a 70% savings over peak commercial water service rates (peak is defined as water used between July 1st and October 31st). **

* Per Dan Petersen, PE, Austin Water Utility, 11/26/13

** City of Austin Residential & Commercial Water Service <http://www.austintexas.gov/sites/default/files/files/Water/Rates/Approved_Retail_Water_Service_Rates_2013-14.pdf>

IRRIGATION

The proposed Colony Park street tree canopy is estimated to require approximately 60 gallons per tree per month for irrigation(2) ; assuming an averaged peak/off-peak Commercial Water Service Rate (an estimated average unit charge on street tree irrigation water of \$5.65 per 1,000 gallons, billed monthly (3)), the developer would assume an average monthly cost of \$857.67. In contrast, irrigation by reclaimed water (“purple pipe” currently billed at a flat rate of \$1.73 per 1,000 gallons (4)) would represent an estimated total monthly cost of only \$244.97, resulting in an estimated \$7,350 in annual savings. In summer months, the irrigation required to establish street trees can easily triple, at which point the savings coming from using reclaimed water could rise to over \$1,800 monthly.

Using stormwater catchment and detention to offset irrigation costs for right-of-ways and lawns could further reduce the cost and need for reclaimed water service. However, based on current projections, relying solely on captured stormwater for irrigation is insufficient to establish the level of tree canopy called for by this Master Plan based on the calculations above.

At the block level, residential outdoor water use—consisting primarily of watering lawns—is estimated to represent 58% of the total 68.0 gallons/day/capita water use in the Colony Park area(5). Using this estimate, residents use on average 4,326.2 gallons per month on outdoor uses not requiring potable water. According to the City of Austin tiered Residential Water Service Rates, the monthly cost associated with this use is estimated at \$11.57(6); using reclaimed water for these purposes represents a small but proportionately high savings at the resident level, at a monthly estimated cost of \$7.48. It also represents an opportunity to substantially reduce the overall reliance on potable water for the proposed neighborhoods. Reducing outdoor potable water use to zero would cut overall water use by more than half.

Additional lawns, such as xeriscaping, are acceptable. The use of drought- and heat-tolerant species are encouraged. For additional information on such species, refer to Landscaping Standards in this Chapter, as well as the native plant species list in Chapter 9: Technical Appendix.

(1) LEEDv4 for Neighborhood Development NPDc14

(2) Assumes two bubblers per tree, irrigating for 15 minutes two times per week

(3) City of Austin Commercial Water Service <http://www.austintexas.gov/sites/default/files/files/Water/Rates/Approved_Retail_Water_Service_Rates_2013-14.pdf>

(4) Per Dan Petersen, PE, Austin Water Utility, 11/26/13

(5) Austin Energy (assumes average household size of 3.61), Residential End Use of Water, AWWARF, 1999

(6) Conservative estimate based on tiered residential water rates and excluding all indoor water use

COMPOSTING SYSTEMS (CONSISTENT WITH 2040 ZERO WASTE GOAL)

This project has the potential to establish community-based composting facilities to augment or substitute services anticipated to be provided by Austin Resource Recovery as part of the Zero Waste Implementation Plan. Locating a distributed network of composting operations throughout the site would complement the distribution of community gardens and lessen the carbon intensity and associated emissions resulting from transporting compostables to a centralized municipal composting operation. Such a neighborhood scale operation—which could include backyard to neighborhood-wide composting—could also be an opportunity for civic engagement of residents of many ages, including youth service organizations. Community gardens should focus on the collection of vegetable waste for composting and not allow meats and other protein byproducts to ensure proper processing. This approach corresponds with LEED-ND v4 GIB credit that requires on-site composting facilities or a location in a municipality that provides composting collection.

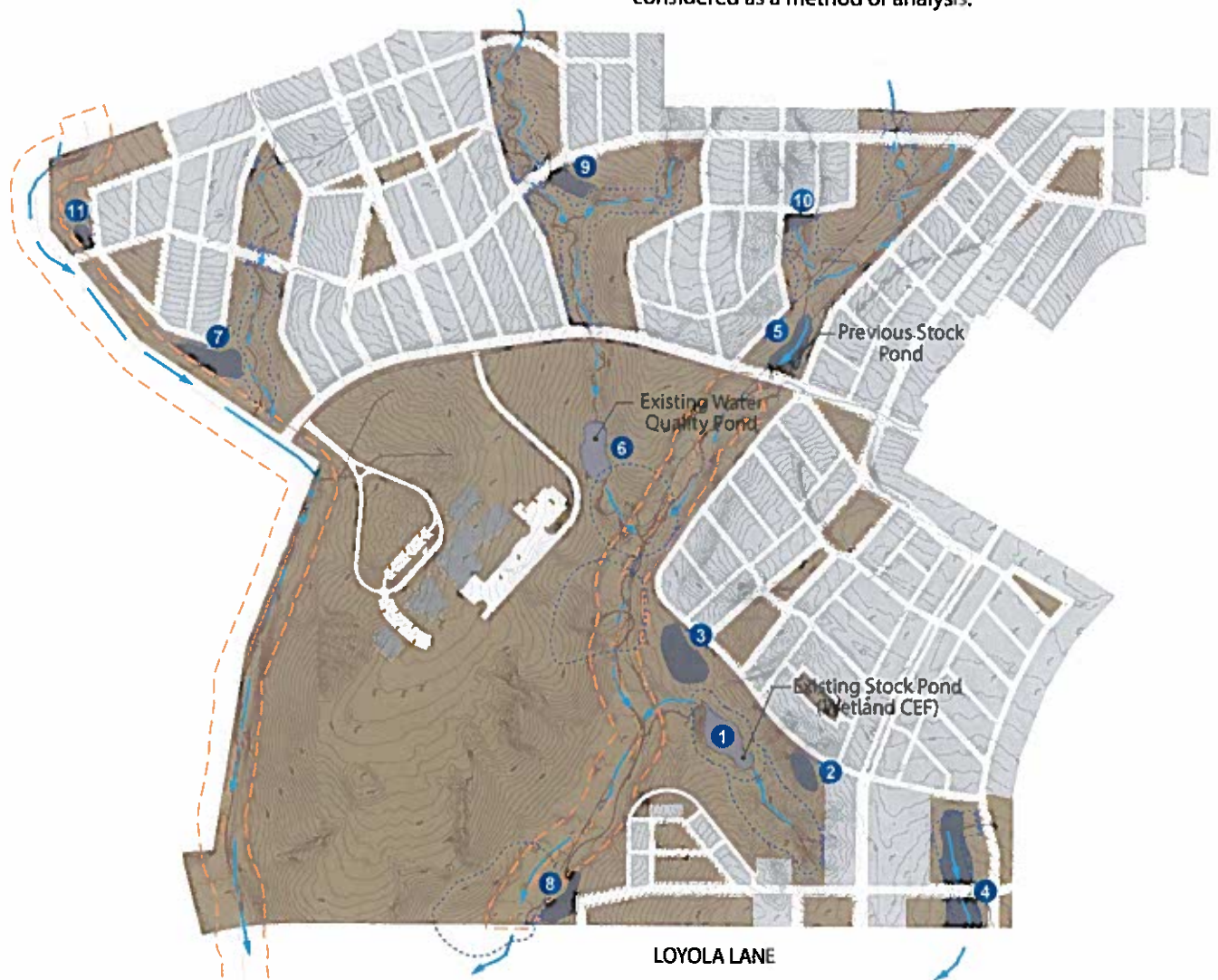
MANAGING STORMWATER

As described in Chapter 3, stormwater management measures will be distributed from smaller, lot level practices, thru targeted block level approaches, and finally to area-wide facilities. Lot level practices are discussed further in Chapter 8 in "Lot Level Stormwater Management Measures". Block level approaches are discussed and shown in Chapter 7 in "Block Scale Stormwater Strategies". Area-wide facilities are discussed further below.

Aesthetics of all ponds should maintain a natural appearance. Chapter 7 "Stormwater Facilities" section provides guidance for the use of natural materials in all stormwater facilities.

POTENTIAL STORMWATER MANAGEMENT POND LOCATIONS

Several locations on the site present themselves as good locations for area-wide stormwater management facilities. These locations are shown on the map below. These ponds supplement the treatment measures at the block and lot level while provide additional storage volume for management of stormwater quantity (detention). Quantification of the treatment and detention effects of these ponds will be made as they are designed. Load-based and volumetric approaches should be considered as a method of analysis.



KEY

- Waterways
- Stormwater Management Pond (Biofiltration/Detention)
- Existing Preserved Wetlands

RESTRICTED NATURAL AREA:

- Critical Water Quality Zone (CWQZ) - 100' Setback
- Critical Environmental Feature (CEF) Setbacks - (Riparian & Wetland Buffers) - Varies 50'-100' (Typical)

Stormwater Management Ponds
Source: Urban Design Group

POND 1 (EXISTING STOCK POND/DESIGNATED WETLAND CEF)

The existing stock pond north of Loyola Lane in the south center of the site captures a large area of Neighborhood Center 1 and the Loyola Town Center. Pond 1 is an existing stock pond which is designated as a wetland CEF. This pond will be kept as is with no disturbance other than any necessary improvements to the berm and overflow outlet. The pond will serve a detention function for mitigating peak stormwater flows.

POND 2

Pond 2 will be constructed upstream of Pond 1 as a biofiltration pond. Treated outflows from Pond 2 will drain to Pond 1 to maintain flows to this CEF.

POND 3

Pond 3 will likewise be designated as a biofiltration pond. To the extent practical as topography allows, outflows from this pond will also be directed to Pond 1.

POND 4

The easternmost south portion of the site drains to an existing culvert crossing Loyola Lane at the southeast corner of the site. The topography of the southeast corner of the site lends itself to creation of a stormwater management pond out of the natural shape of the land. This pond should be designed as a biofiltration pond with detention volume included. CEF setback area has been identified in this area. During permitting review of the pond construction plans, The City of Austin Environmental Resource Management wetland biologist shall determine the revegetation requirements of disturbed areas and shall determine if the pond is designed to minimize disturbance and retain the natural shape and character as much as possible.

POND 5

In the central eastern portion of the site east of where Colony Loop Drive crosses the overhead electric transmission lines is the location of a previously used stock pond. This pond is on-line with the central drainageway thru the site, and presents a prime location for providing detention volume for a stormwater management measure. The area has been extensively cleared and disturbed previously, so modifications can be made to the shape and volume, as well as re-creation of a new outlet structure.

POND 4

Northeast of Overton Elementary School on the 93 acre PARD land is an existing water quality and detention wet pond which was designed and constructed with the school. This pond appears to have been designed accounting for a portion of developed upstream conditions, which includes the central portion of the project site north of the pond. Improvements to the aesthetics of this pond should be considered in conjunction with any required modifications that may be needed to treat upstream areas.

POND 5

Pond 5 is shown along the western boundary line of the tract directly north of Colony Loop Drive. The northwest portion of the site drains to this location. The location of the pond is generally clear and has been previously disturbed. Design of the pond should create a natural and aesthetic shape and utilize natural materials as further described in Chapter 7.

PONDS 8, 9, 10 & 11

Various locations present opportunities for smaller stormwater management ponds. Stormwater runoff from the western portion of Loyola Town Center West can be treated in a small pond located adjacent to Loyola Lane and just off of the main drainageway thru the site, outside of the critical water quality zone. This is shown as Pond 6 on the map. Other small ponds treating portions of Neighborhood Centers 3 and 4 can be located in open areas upstream of the natural drainageways as indicated.

Additional localized stormwater management ponds can be provided at other locations on the site as detailed plans are developed.

BIOFILTRATION PONDS

As the Stormwater Management Ponds diagram shows, biofiltration ponds are conceptually indicated in locations where flows from larger drainage areas are concentrated and have not otherwise been fully treated with other water quality methods. The upper limit of contributing drainage area to a rain garden is approximately 2 acres, so biofiltration ponds are a preferred treatment method for areas larger than this.

City of Austin guidelines for biofiltration ponds found in the COA Environmental Criteria Manual (ECM) shall be utilized. Biofiltration ponds must incorporate a sedimentation chamber in addition to the filtration basin. Because of the very low permeability of the existing site soils, biofiltration beds will require underdrain piping systems below the biofiltration media.

GROWING MEDIUM

Biofiltration growing medium depth shall be a minimum of 18" per them ECM. However, the depth should be increased to 24" or 30" where possible to treat the most upstream impervious cover practical. Medium shall meet the performance criteria of the ECM section 1.6.7.C.4. These criteria include specific requirements for amount and type of organic matter and particle size distribution (texture analysis) to ensure a saturated hydraulic conductivity of greater than 2 inches /

hour while supporting healthy plant growth. Locally available material marketed as "sandy loam" shall not be allowed.

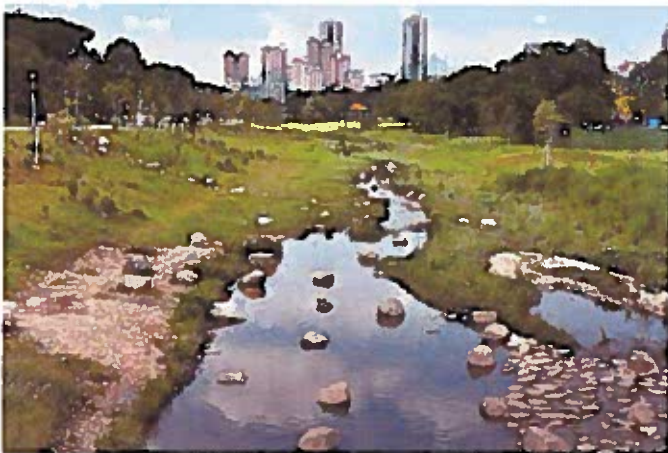
HUMAN DELIGHT

The Biofiltration Ponds shall be lush and "wild" spaces providing cover and food sources for birds/wildlife. When human access is desired, elevated boardwalks shall be constructed to allow for viewing and experiencing of both the pond and the wildlife without causing disturbance to the flow of water or the biodiversity.

VEGETATION

The predominant vegetation type shall be tall grasses that can handle both high and low amounts of water. Pecan Trees shall thrive in this flood-prone area, and shall be planted to be an identifying characteristic of this landscape typology. Pecans shall be planted at approximately thirty feet on center in areas of the pond where the roots shall not conflict with the ponds infrastructure. Edges of the pond shall be planted with more shrubs in order to provide more wildlife cover.

For a list of native plant species, please refer to Chapter 9: Technical Appendix.



Examples of Stormwater Management Ponds (Biofiltration /Detention)
Source: Retrieved from Urban Design Group photo library

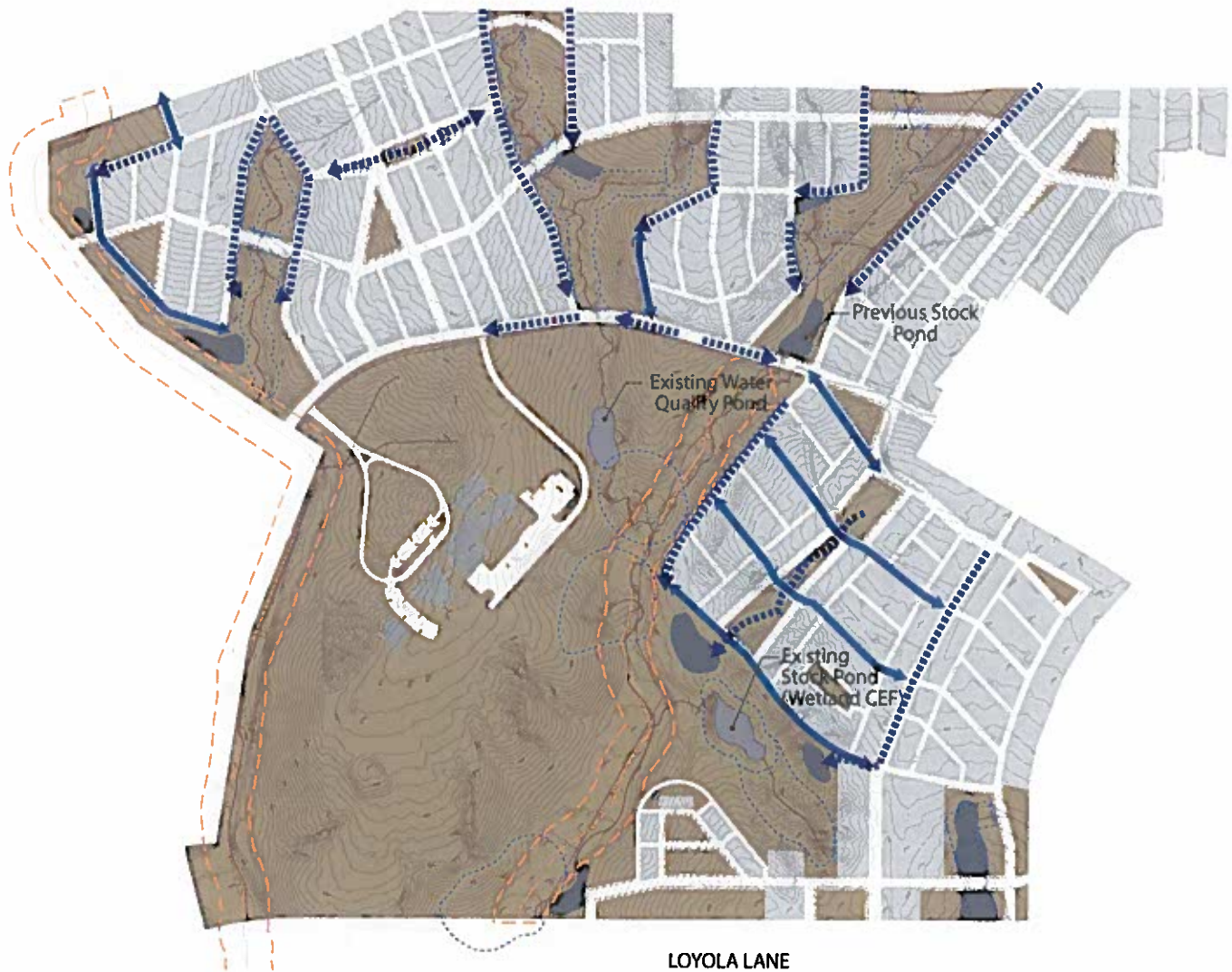
STORMWATER STREETS

CONVEYANCE STREETS

Various streets and open space areas on slopes have been designated as “conveyance” streets. The intent for these streets is to provide open channel bioswale conveyance of stormwater in lieu of traditional enclosed storm sewer systems. (Some streets may require a secondary storm sewer for larger storm flows on a case-by-case basis.) These conveyance channels will be designed to integrate small chained pools to provide a positive detention benefit.

TREATMENT STREETS

Other streets in relatively flat locations have been designated as stormwater treatment streets. These streets will typically have rain gardens located on one side of the street to treat street runoff and some amount of adjacent lot runoff.



KEY

↔ Treatment Street - Water Quality Rain Gardens

➡ Conveyance Street - Bioswale Detention

■ Stormwater Management Pond (Biofiltration/Detention)

■ Existing Preserved Wetlands

RESTRICTED NATURAL AREA:

□ Critical Water Quality Zone (CWQZ) - 100' Setback

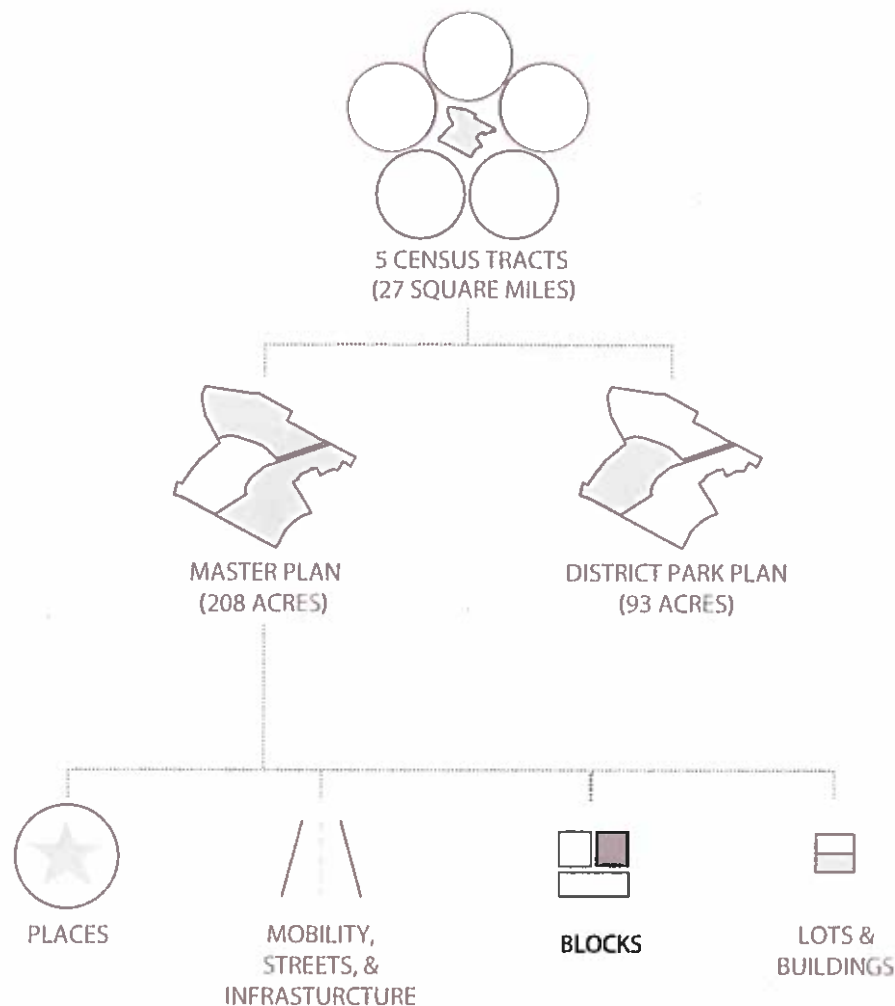
□ Critical Environmental Feature (CEF) Setbacks
- (Riparian & Wetland Buffers) - Varies 50'-100' (Typical)

Proposed Stormwater Conveyance and Treatment Streets
Source: Urban Design Group

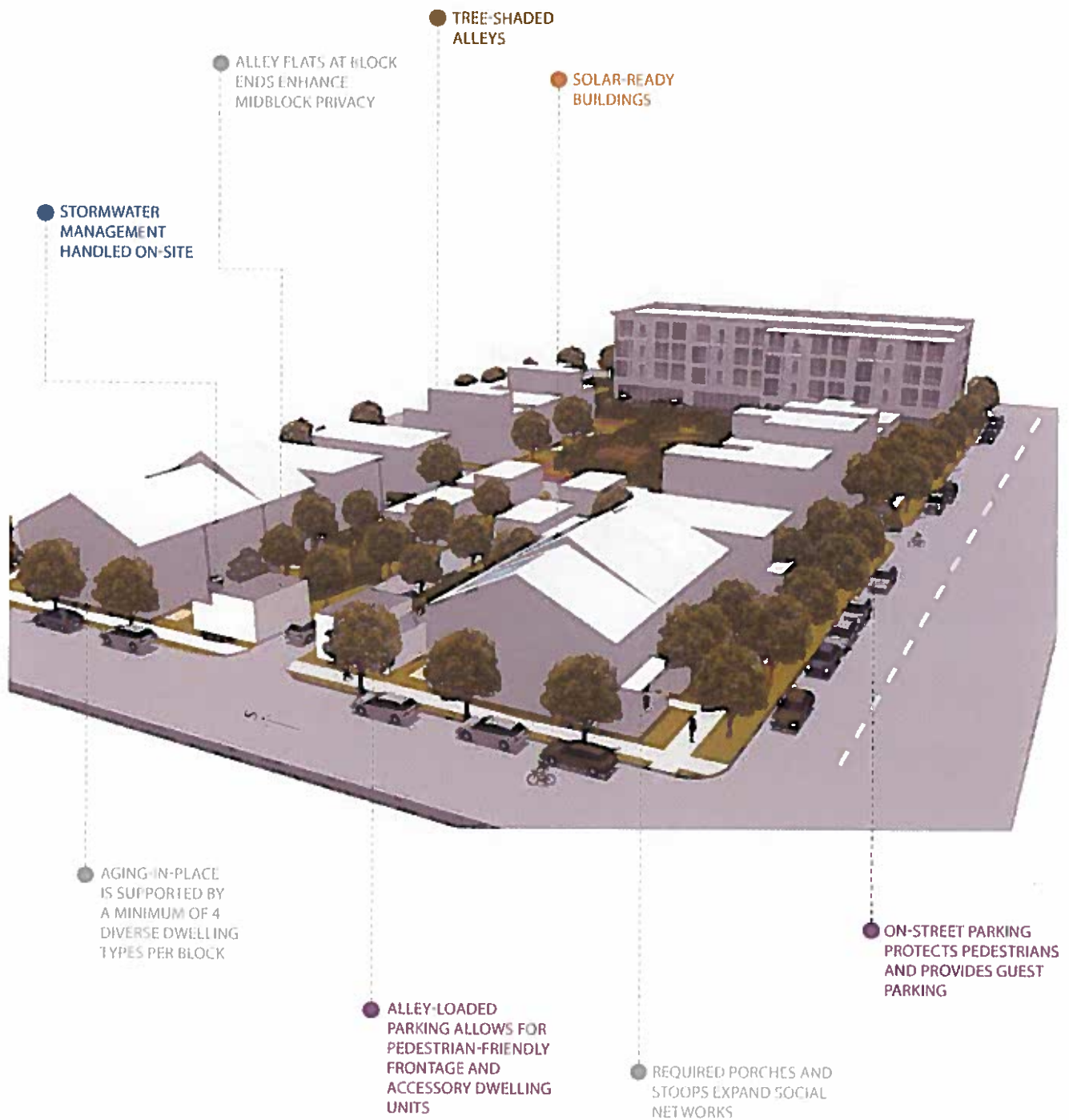
CHAPTER 7

BLOCKS

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MAXIMIZING VALUE THROUGH BLOCK DESIGN



BUILDING ACCESS AND PRIVACY

COA VISITABILITY ORDINANCE

The City of Austin has adopted a visitability ordinance that went into effect on February 10, 2014 requiring visitable entries, routes, and bathrooms in all newly built single and duplex residences. The ordinance stipulates that, "the entrance may be located at the front, rear, or side or in the garage or carport of the dwelling." This provision on the location of the entry grants helpful flexibility on flat or near flat sites.

SLOPES AND VISITABILITY

The CPSCI site is steeply sloping, creating conflicts with visitability. The ordinance states two waiver options for exterior visitability:

1. Lots with 10% or greater slope prior to development; or
2. Properties for which compliance cannot be achieved without the use of switchbacks.

The Master Plan proposes development on land with greater than 10% slopes. The second waiver provision pertaining to setbacks may grant a wide exemption to the ordinance at Colony Park where the typical proposed finished floor level is 24"- 30" above sidewalk and the maximum front yard setback is 15' from the sidewalk. Given these constraints a switchback ramp would be required, exempting the home from compliance. Finally, housing types other than single family and duplex (such as townhomes and accessory units) are exempt from this ordinance.



LOYOLA LANE

KEY

- >10% Slope (Master Plan Area)
- >10% Slope (PARD Area)
- Erosion Areas to be Filled

Approximately 20% of the total Master Plan area has slopes >10% (shown in red). Considering only block area slated for development, approximately 14% block area would be exempt from visitability requirements.

Site Plan Showing Slopes Greater than 10%
Source: Urban Design Group

VISITABILITY & PRIVACY

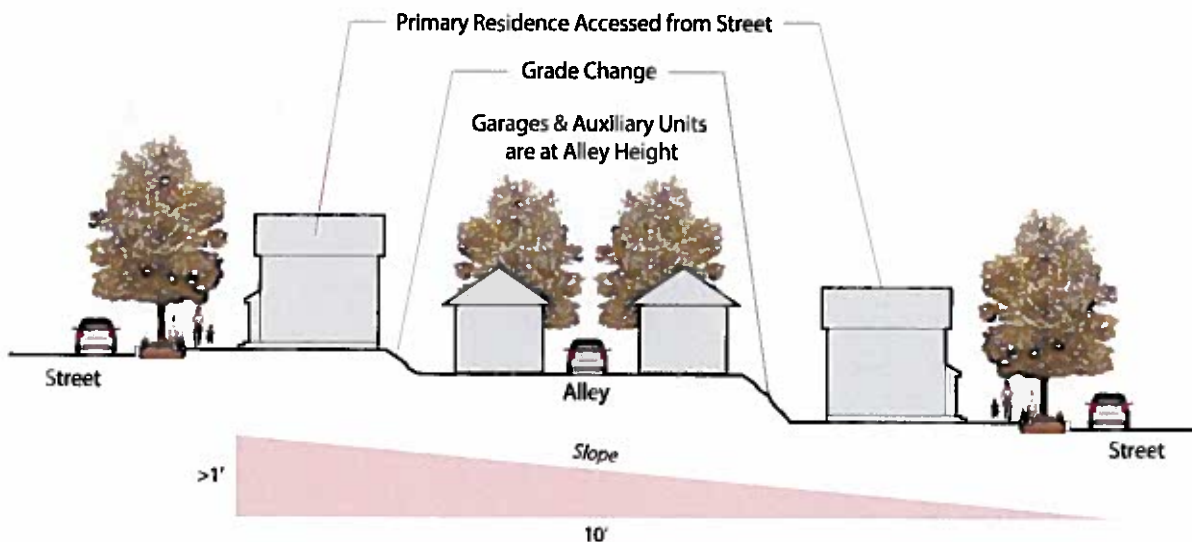
In order to provide privacy in housing with 5' to 15' setbacks from the sidewalk as is planned on the Project Site it is important to elevate the porch floor and first finished floor a minimum of 24" to 30". The visitable entry door and bathroom are relatively easy to attain. However the requirement for a visitable route to the front door can compromise ground floor privacy. The chart below provides design guidance on how high to elevate a porch to achieve privacy.



Porch Floor Height for Privacy
Source: Farr Associates

VISITABILITY ON A SLOPING BLOCK

The City of Austin visitability ordinance exempts Auxiliary Dwelling Units as well as single family homes on sites with a slope greater than 10%. Nonetheless using both street and alley it is possible to provide a visitable route to both a front and rear (ADU) dwelling as shown in the illustration below.



Visitable Paths for Blocks with >10% Cross Slope
Source: Farr Associates

ARCHITECTURAL DESIGN

A large part of what makes a neighborhood walkable is a well-designed public realm including high-quality and varied architecture. The Design Guidelines promote this urban design at the scale of the neighborhood, street, block and building. In order to administer this process it is recommended that the COA/Developer Team engage the services of a "Lead Design Reviewer"

DESIGN BOTH WALLS OF A STREET OR INTERSECTION
The look and feel of public spaces such as streets, parks and plazas are shaped by the architecture of the streetscape that surrounds them. For this reason, the Design Guidelines requires that the streetscape be designed and evaluated all at one time.



DISTINCT ARCHITECTURAL STYLE - GOOD

Source: Farr Associates



DISTINCT ARCHITECTURAL STYLE - BAD

Source: TheShot (www.panoramio.com/photo/71509746)



DIVERSITY OF ARCHITECTURAL STYLES - GOOD

Source: Farr Associates



DIVERSITY OF ARCHITECTURAL STYLES - BAD

Source: Farr Associates



REPETITION - GOOD

Source: InnerLoop Sales



REPETITION - BAD

Source: Farr Associates

In evaluating the design of a streetscape the following strategies are required:

1. Distinct architectural style (one nameable style per building)
2. Diversity of architectural styles (a mix of traditional and modern/green)
3. Some repetition (i.e. a pair of matched homes, 3 – 6 townhomes in a row)

4. A variety of roof types (gable, shed, flat) (one single roof type per building)
5. A variety of building types (detached, duplex, townhome, accessory)
6. A varied palette of façade materials and colors
7. An adequate amount of street trees and landscaping



VARIETY OF ROOF TYPES - GOOD

Source: by Stephanie-Edwards Musa (<https://flic.kr/p/4QutHo>)



VARIETY OF ROOF TYPES - BAD

Source: Gail Delaughter



VARIETY OF BUILDING TYPES - GOOD

Source: Farr Associates



VARIETY OF BUILDING TYPES - BAD

Source: Farr Associates



VARIED FACADE MATERIALS AND COLORS - GOOD

Source: Danielle Johnson



VARIED FACADE MATERIALS AND COLORS - BAD

Source: Karen Ackles

HOUSING DIVERSITY ON EVERY BLOCK

Creating a “compact and connected” community in the spirit of Imagine Austin means including diversity in housing—homes that accommodate people at every life cycle stage. The ability to age in place allows people to maintain lifelong social relationships with friends and neighbors and gives people a sense of well-being. As people age their housing requirements often pass through a predictable cycle of low-cost rental, starter home, move-up home, low maintenance home, an accessible dwelling and finally supportive living. Also in the last few decades the American family has evolved from the “Ozzie and Harriet” model of two parents and two children to many one person households and intergenerational living.

REQUIRED HOUSING DIVERSITY

In order to achieve economies of scale, homebuilders prefer to build less repetitive dwelling types targeted to the perceived large “middle of the market.” This often leaves large minorities of the housing market underserved and in so doing inadvertently prevents aging in place. To overcome this barrier, these guidelines propose to require the developer to build what are often missing housing types on every block throughout the development. These include:

1. An Accessory Dwelling Unit (low cost rental)
2. Efficiency/1 Bedroom Unit – (lone household or small family unit)
3. A 4 to 5 Bedroom Unit (unrelated adults or large or intergenerational family)
4. A Fully Accessible Unit (allowing someone in a wheelchair to live there)



SILENT BLOCKS - QUIET HEATING AND COOLING

Residential air conditioning condensers are conventionally located outdoors next to the homes they serve. In conventional low-density developments this poses no problems however in a compact urban pattern the location of air conditioning equipment causes unforeseen problems. Often located under windows or in the narrow slot between homes the noise and heat generated by AC equipment discourages natural ventilation via open windows and sitting outdoors.

QUIET COOLING

In order to take advantage of the close proximity to nature by promoting open windows and outdoor living these design guidelines recommend that all mechanical equipment meet a quiet performance specification. This can be met three ways:

1. encircling the equipment in a sound deadening enclosure,
2. specifying quiet MEP equipment, or
3. using the earth rather than air as a heat sink through geothermal heating and cooling. The geothermal system has the added advantages of eliminating noise and heat altogether and average annual energy savings of 30% compared to conventional HVAC system.

GEOHERMAL HEAT PUMP SYSTEM

Geothermal (or ground source) heat pump (GHP) systems make use of the ground below the Earth's surface as a source of thermal energy exchange. Ground temperatures starting at about three feet deep and lower are much less variable than ambient air temperatures. Soil or earth at these depths

is warmer than air during the winter months and cooler than air during the summer months. GHP systems save energy and costs because they operate more efficiently than conventional HVAC systems and air source heat pumps. GHP systems are not common in Austin despite increasingly widespread use in other regions. Their use at Colony Park would burnish the Five Hills Brand and improve the quality of life.

EMERGING TECHNOLOGIES

In addition, several emerging technologies for district energy may be viable options for Colony Park, including Fuel Cell technology and Gasification of biomass. District level energy reduction initiatives such as Vehicle2Grid (V2G) may also be included as strategies of distributing peak loads through electric vehicle and grid energy transfer systems.

District management procedures may also be explored as a part of the innovation efforts at Colony Park. A community-scale "Smart Grid" and climate forecasting modeling (i.e., for rainwater trends) have significant potential toward long-term neighborhood resilience. Progressive future building systems may further strengthen the neighborhoods against wind, flood, and wildfire risk, key climatic concerns in the Central Texas area.



Quiet Heating and Cooling Methods
Source: Farr Associates

MAKING UTILITY EQUIPMENT FUNCTIONAL AND ATTRACTIVE

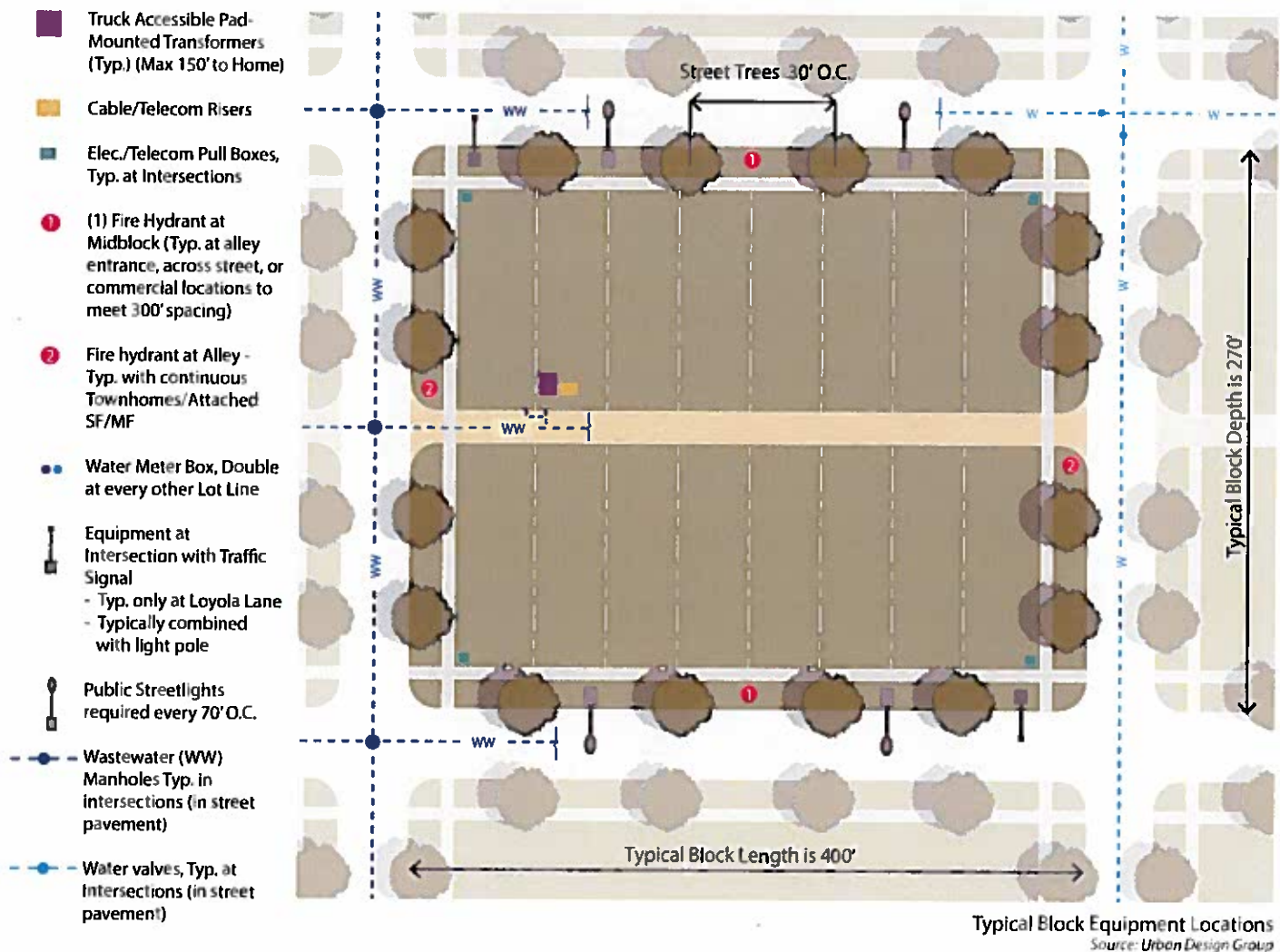
TYPICAL BLOCK EQUIPMENT

Utilities are a necessary and ubiquitous element of streetscape environments, often creating a disorderly visual environment. The location of above ground utilities should be approached with the same attention to design detail as provided in the Design Guidelines for all aspects of the Master Plan. Although City of Austin utility departments have design requirements for each of their utilities these criteria many times were developed at a time when the pedestrian environment did not hold the importance it does today as demonstrated by the goals of this project. As each phase of the project is designed and permitted, intersections that will include signalization will require that the developer and engineers work with the Traffic Signal department to locate required infrastructure below ground when possible and if not possible then boxes should be located on the perimeter of the pedestrian space. This same process should be followed with Austin Energy in the location of vaults and transformers for electrical network.

This work should be done with the Town Architect to ensure a cohesive integration into the streetscape.

Location of fire hydrants will comply with a minimum spacing requirement of 300' in public streets as defined by City of Austin code. In Master Plan street sections with yield travel lanes, the fire hydrants should be placed at closer intervals to allow for breaks in on-street parking which facilitates the function of yielding. Hydrants will be installed on both sides of any divided roadways.

For spacing of public streetlights, Austin Energy (AE) uses 150' on center spacing for standard cobra-head light poles. However, based on block length, streetlights should be located at the corners and one mid-block if using standard AE poles, then 70' on center spacing is typical. The Master Plan encourages the use of custom, decorative poles, at a spacing of 60' to match every-other gap in the tree spacing.





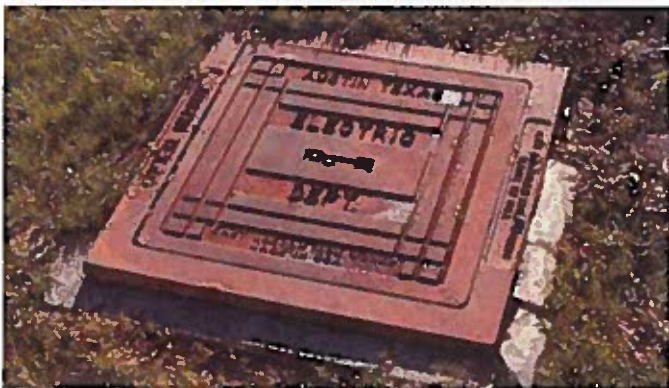
Pad-Mounted Transformer



Water Meter Box



Telecom Box



Electrical Pull Box



Decorative Light Pole



Fire Hydrant

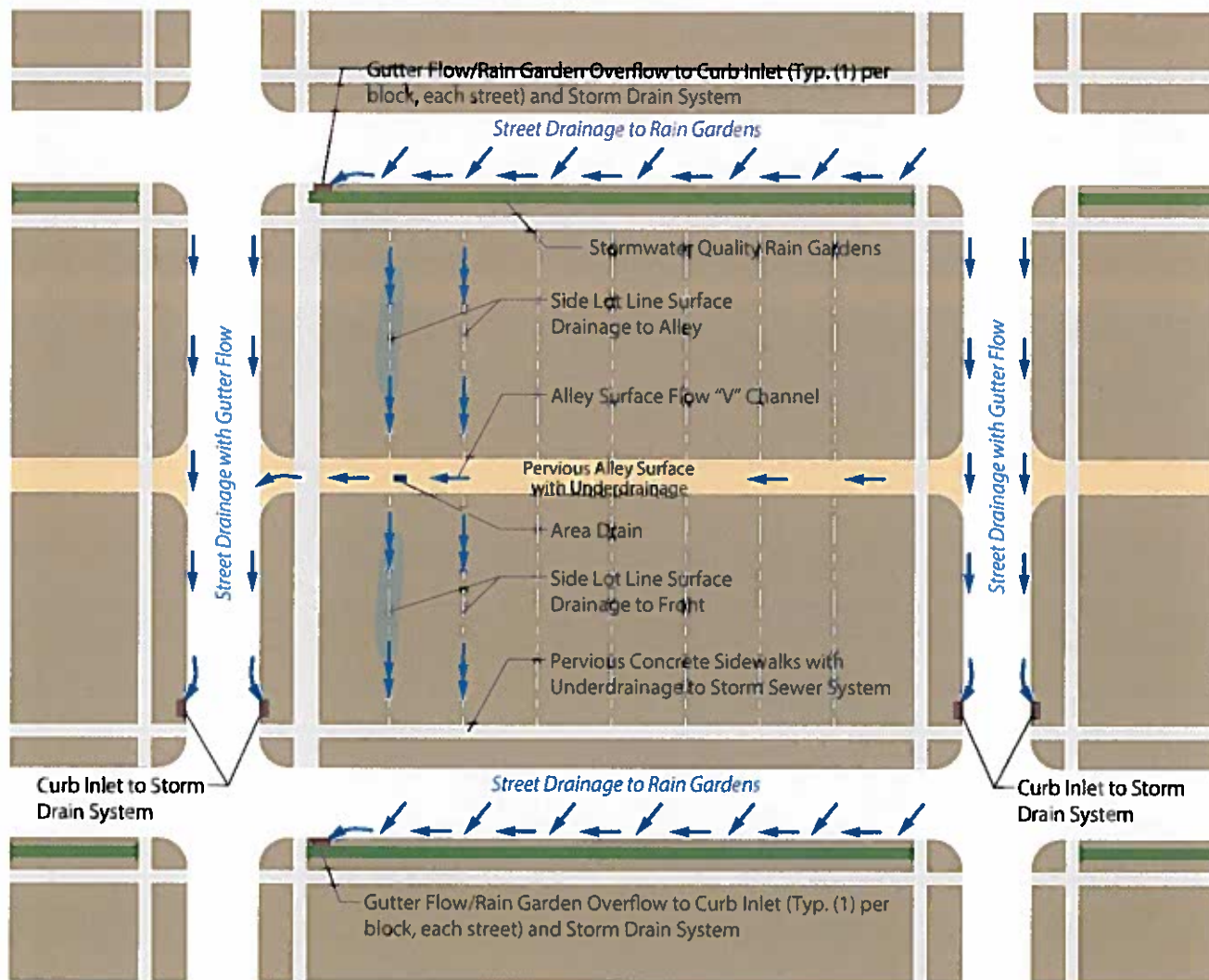


Wastewater Manhole

Examples of Typical Block Equipment
 Source: Retrieved from Urban Design Group photo library

BLOCK SCALE STORMWATER STRATEGIES

For decades the conventional practice for handling rainwater was to collect it, put it in a pipe and convey it away. The CPSCI project starts with the premise that the best place to handle stormwater is to avoid putting it in pipes, retain and recharge it into the soil close to where it lands and filter the water as part of a treatment train.



Typical Block Stormwater Conveyance

Source: Urban Design Group



Rain Garden Along a Block Edge

Source: State College of Pennsylvania (<http://www.statecollegepa.us>)



Typical Curb Drainage Inlet

Source: Retrieved from Urban Design Group photo library

ATTRACTIVE STORMWATER FACILITIES

Stormwater related infrastructure visible from above ground is typically functional in appearance, with little or no consideration given to aesthetic treatments that can enhance their presence. All such infrastructure in the Master Plan shall be designed to be an attractive complement to the surrounding neighborhood. In general, no plain concrete riprap or plain concrete walls shall be used. The use of natural materials and landscaping shall be used to achieve the desired results. Stone finishes shall be a natural palette and shall be used on all storm water structures, including walls, headwalls, wingwalls, check dams, pond splitter structures, and flatwork.

STORM DRAIN OUTFALLS

Storm drain outfalls typically involve some sort of exposed pipe end with a concrete headwall or a sloped end with concrete apron. Storm drain outfalls in Colony Park shall incorporate the use of natural materials to transform these from functional in appearance to pleasing and incorporated into the natural landscape. Examples of this done well are included below.



Examples of Attractive Storm Drain Outfalls
Source: Retrieved from Urban Design Group photo library

STORM CHANNELS AND SWALES

Storm channels and swales are typically trapezoidal and regular in cross-sectional shape. Often times they include concrete flatwork, either for the entire channel or for a low-flow pilot channel in the bottom. Channels and swales in Colony Park shall incorporate natural materials in lieu of flatwork concrete. The use of landscaping and check dam features to create visual interest is encouraged. Where erosion protection is needed, stone, rock or other natural materials shall be used. Flatwork concrete alone shall not be allowed.



Examples of Attractive Storm Channels and Swales
Source: Retrieved from Urban Design Group photo library

WATER QUALITY AND DETENTION POND STRUCTURES

Water quality and detention pond facilities incorporate an engineered outlet structure to pass varying levels of design storm flow rates at different pond elevations. These structures are traditionally functional in appearance and may include some combination of concrete walls, pipes, and concrete flatwork for spillways. These structure types in Colony Park shall be designed to be aesthetically pleasing and blend into the natural backdrop as much as possible. Where possible, these structures can be incorporated into compatible uses in the pond, such as decks, amphitheaters, and other public spaces. Concrete flatwork and plain concrete walls shall not be allowed. Natural materials shall be used to improve the appearance of these structures. Landscaping can further be used as screening and to soften the impact.

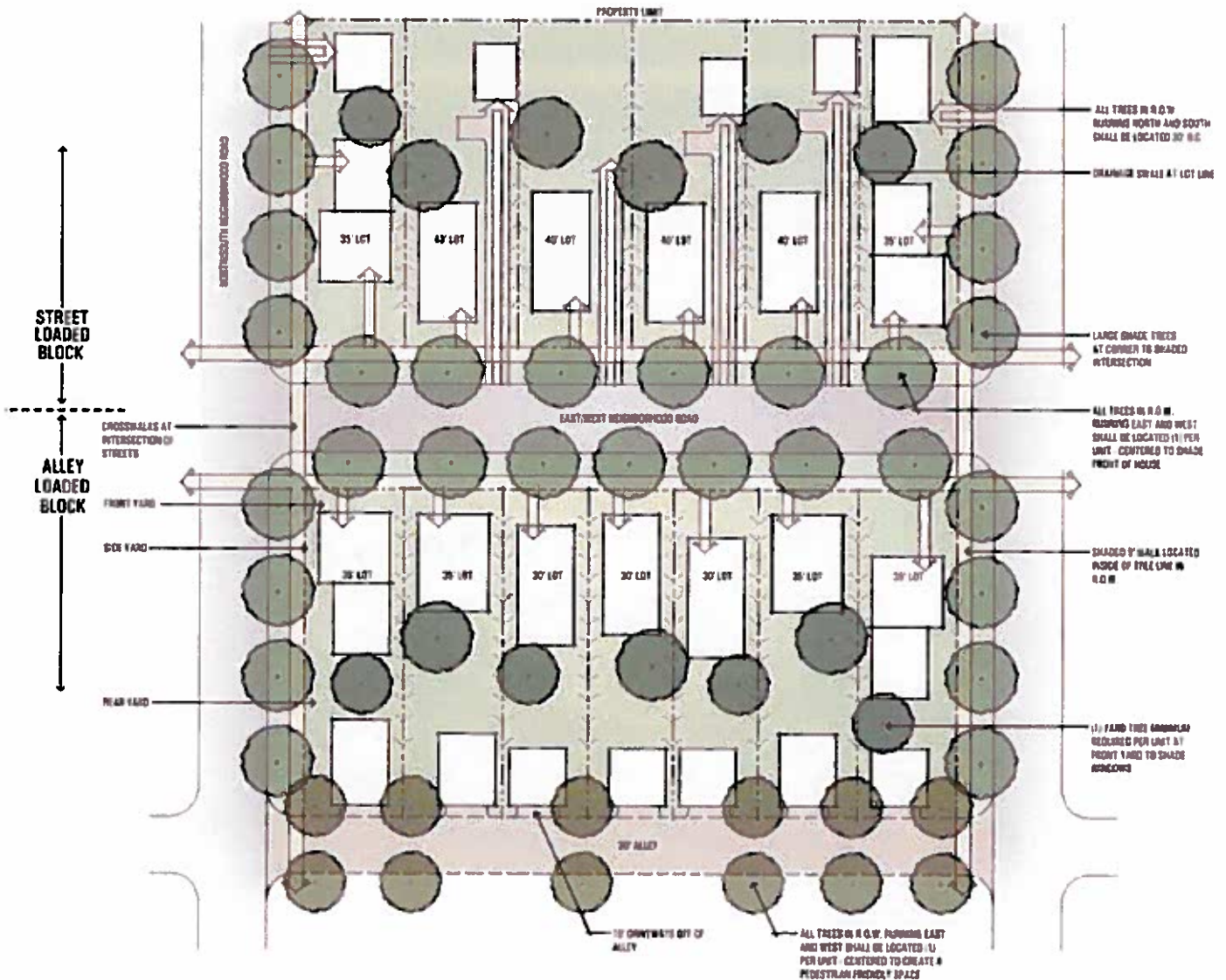


Examples of Water Quality and Detention Pond Structures

Source: Retrieved from Urban Design Group photo library

BLOCK LANDSCAPING

Trees and landscaping are essential design strategies for promoting sustainability and creating beauty and real estate value on each block. Street trees create shaded walking paths and studies demonstrate that street trees can add up to 10% to the value of homes along a given street. These same trees, when placed strategically in front of each house, can shade windows and reduce the demand for air conditioning and energy. Yard and alley trees can provide shade for windows as well as reducing the heat island effect that raise ambient outdoor temperatures.

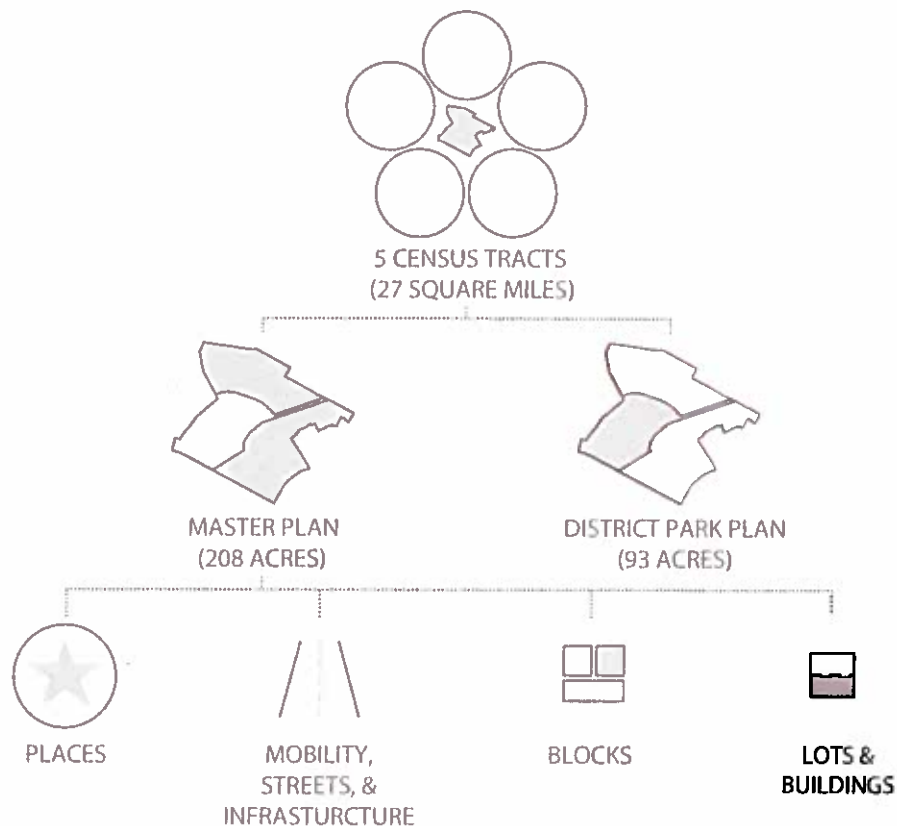


Typical Block Landscaping Standards
Source: T&G

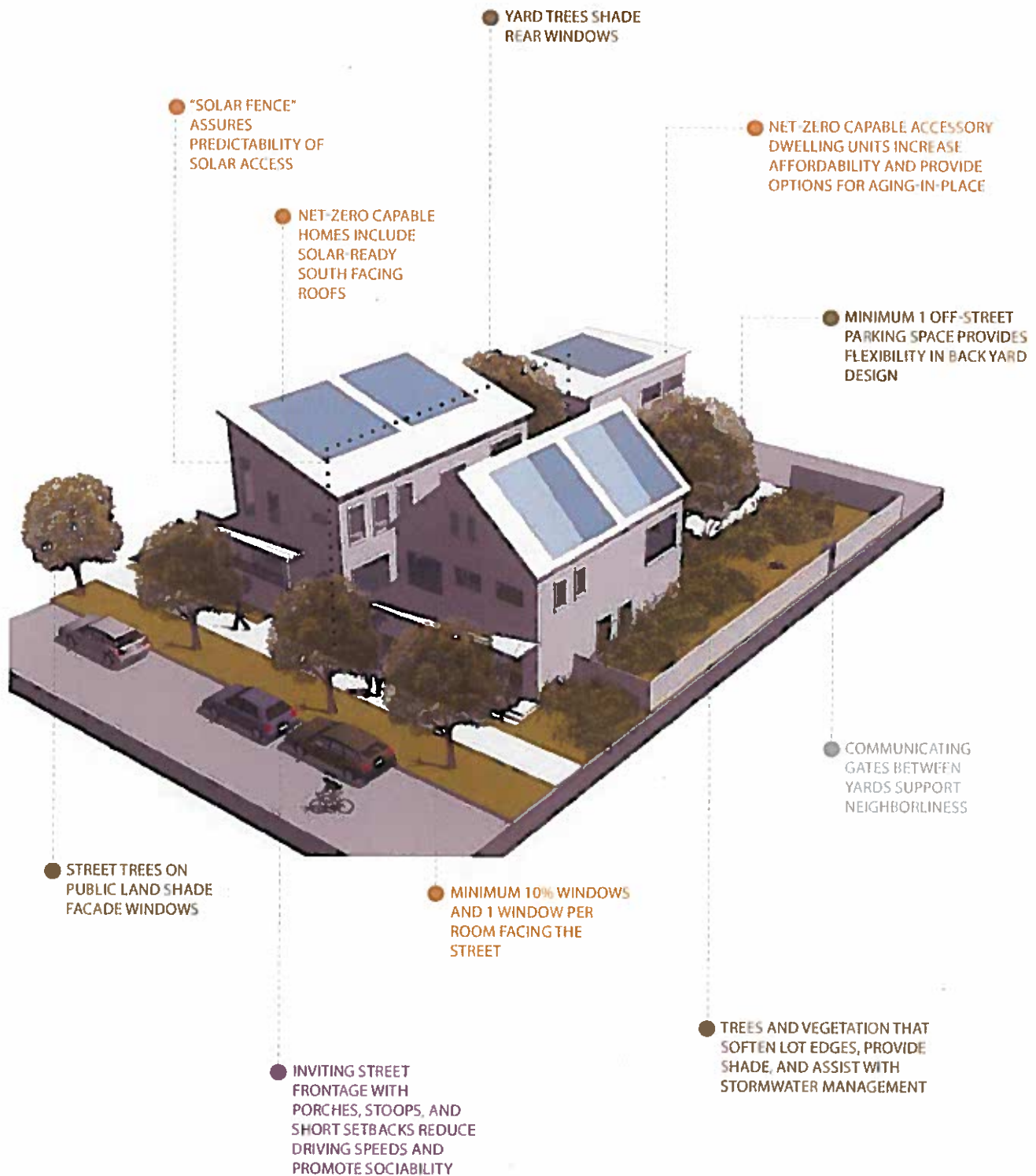
CHAPTER 8

LOTS AND BUILDINGS

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MAXIMIZING VALUE THROUGH LOT AND BUILDING DESIGN













REGULATING PLAN: SCALE AND CHARACTER

MAKING BETTER PLACES AND ADDING VALUE THROUGH DESIGN

The Master Plan has identified lots that require special design attention and approval. These lots have been selected due to their prominence such as framing a major public space, terminating a vista, creating a gateway into the site or between neighborhoods, creating a strong corner, or accomplishing other urban design strategies. These buildings shall employ architectural strategies that enhance their appearance and distinguish them from nearby lots.

KEY

-  Featured Lots
-  Gateway Lots
-  Terminating & Deflected Vistas
-  Minimum Building Height: General Area Designation
-  Minimum Building Height: Corner Lot Designation
-  Minimum Building Height: 2 Stories
-  Minimum Building Height: 3 Stories
-  Minimum Building Height: 4 Stories
-  Colony Park District Park
-  Restricted Natural Area (CWQZ & CEF Setbacks)



FEATURED LOT: A lot that terminates a vista, creates a gateway, or accomplishes another urban design strategy.



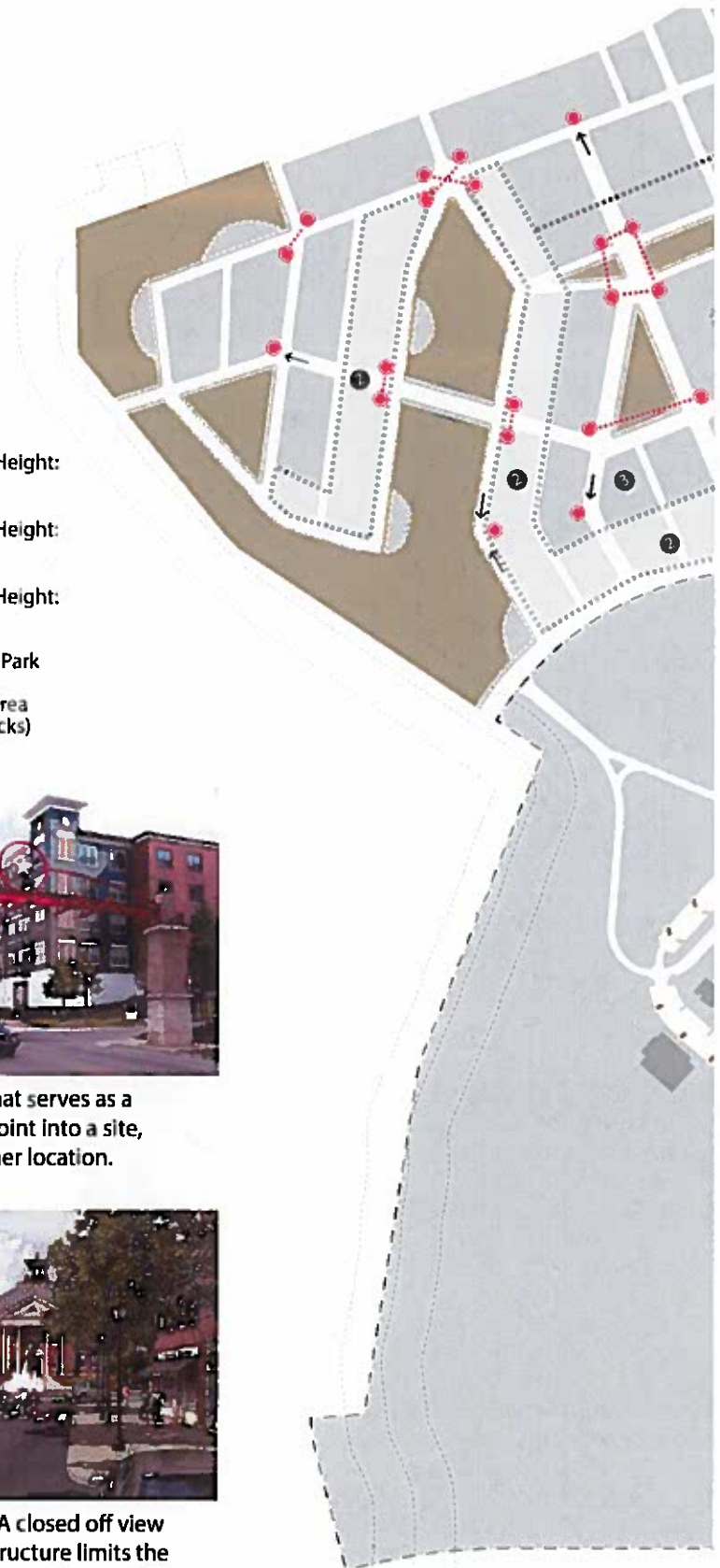
GATEWAY: An area that serves as a recognizable entry point into a site, neighborhood or other location.



DEFLECTED VISTA: An incomplete view where the focal point deflects the view at an angle.



TERMINATED VISTA: A closed off view where an object or structure limits the view serving as an obvious focal point.





LOYOLA LANE

Regulating Plan - Scale and Character
Source: Fair Associates, created May 1, 2014

REGULATING PLAN: BUILDING TYPES

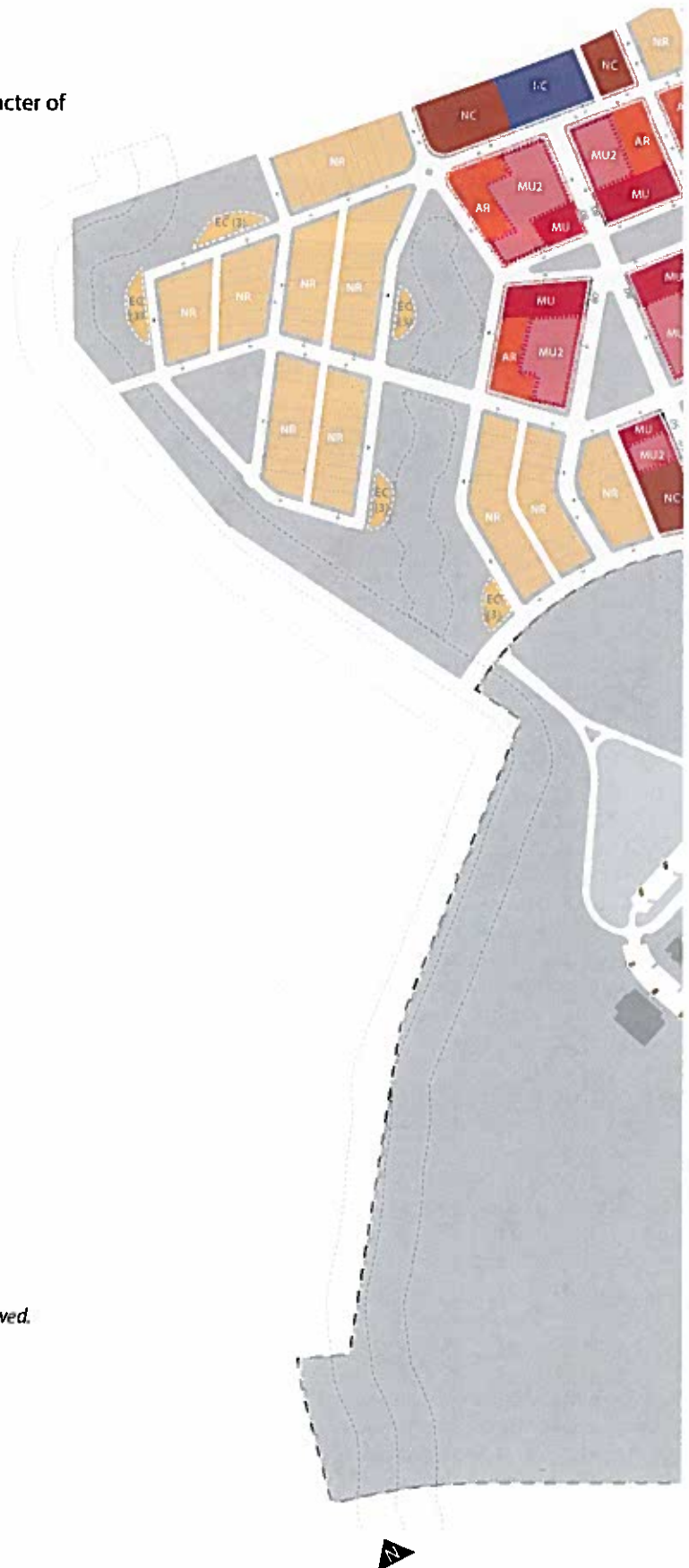
WHAT IS A REGULATING PLAN?

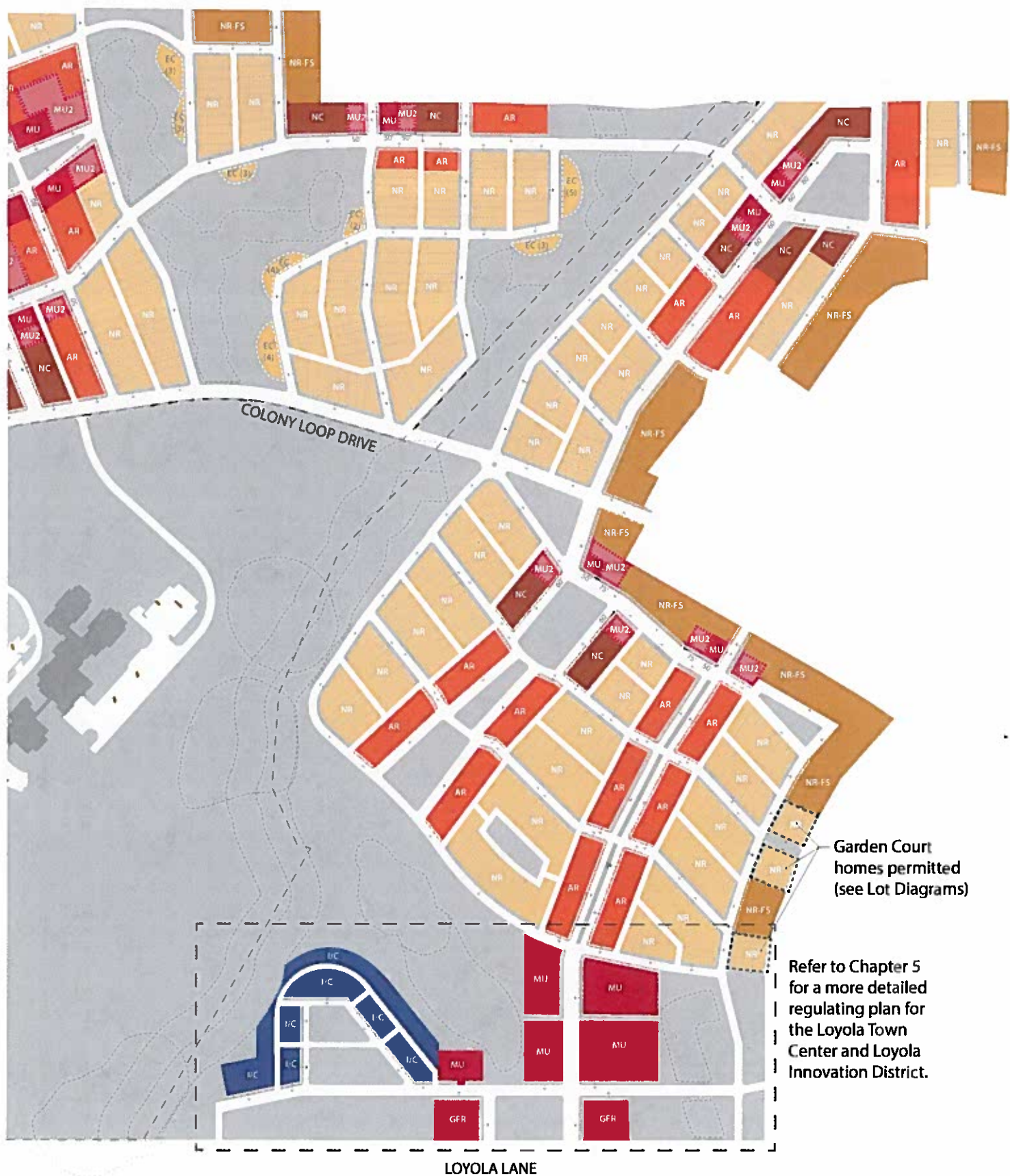
A regulating plan describes the building type, placement and character of buildings that can be built within a master planned development.

- MU** MIXED-USE
- MU2** MIXED-USE 2
- NC** NEIGHBORHOOD CENTER
- AR** ATTACHED RESIDENTIAL
- NR-FS** NEIGHBORHOOD RESIDENTIAL - FRONT SERVED
- NR** NEIGHBORHOOD RESIDENTIAL
- GFR** GROUND FLOOR RETAIL
- I/C** INSTITUTIONAL/CIVIC
- EC** ECO-COTTAGE *
-  COLONY PARK DISTRICT PARK
-  RESTRICTED NATURAL AREA (CWQZ & CEF SETBACKS)

* Numbers shown on map for Eco-Cottage zones are the maximum units allowed.

**Arrows on map indicate direction of frontage areas.



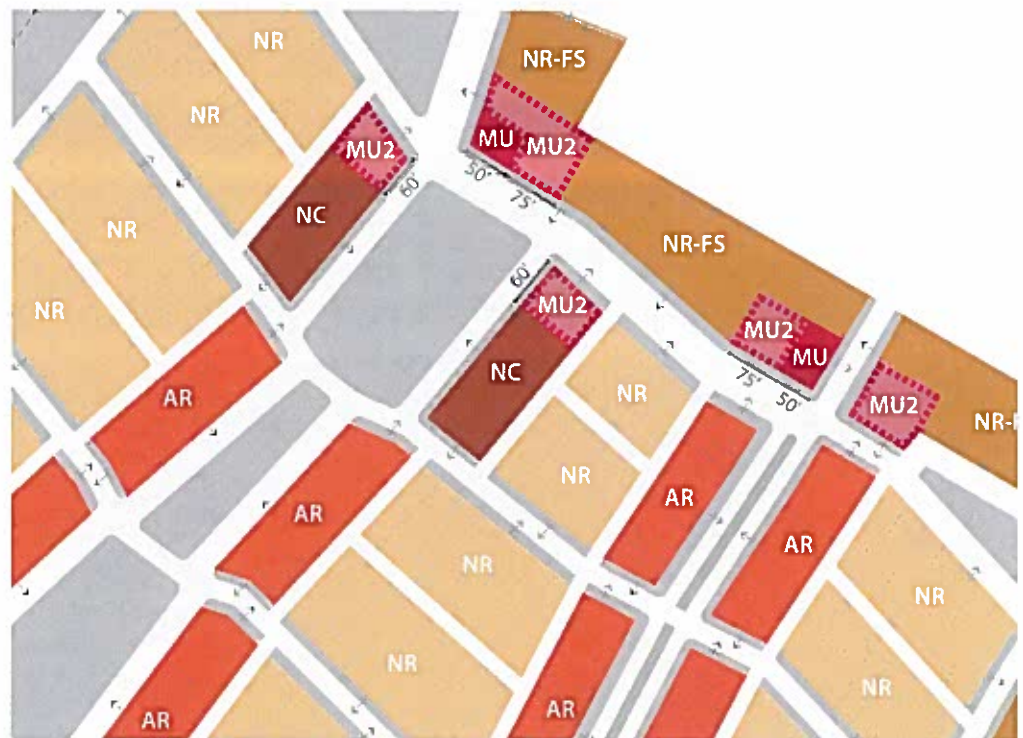


Regulating Plan - Building Types
Source: Farr Associates, created May 1, 2014

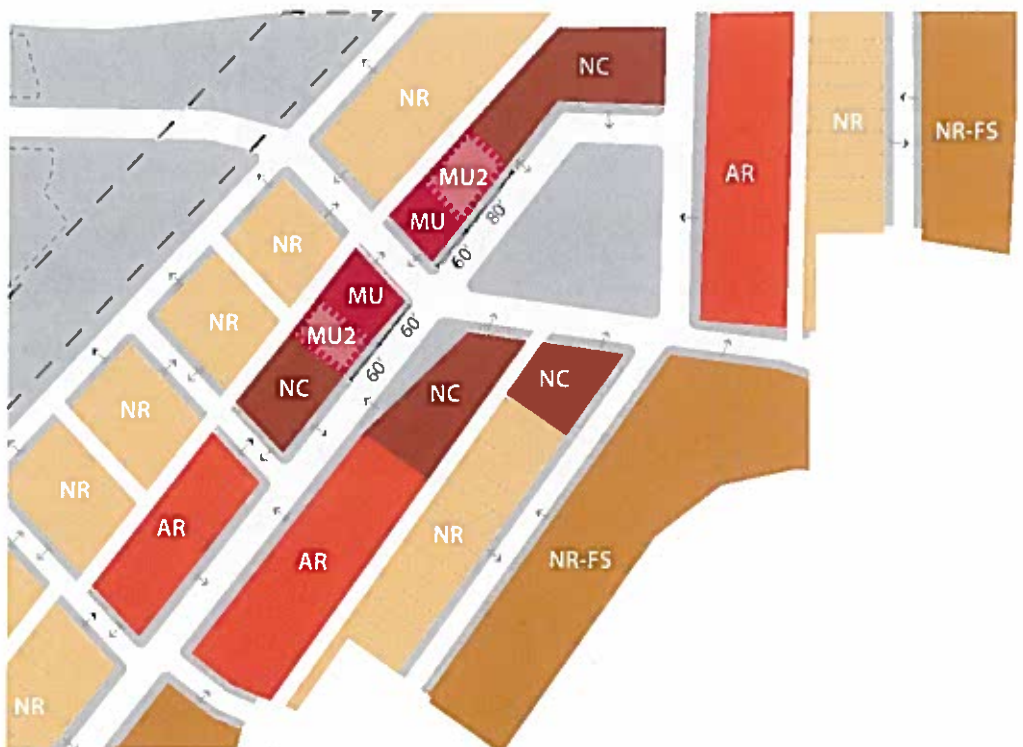
REGULATING PLAN: BUILDING TYPES IN NEIGHBORHOOD CENTERS

NEIGHBORHOOD CENTER 1

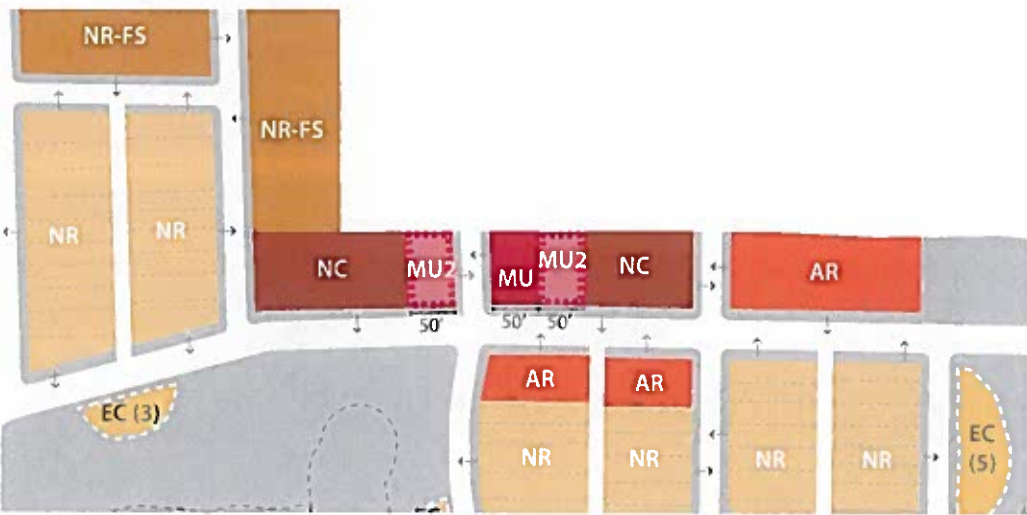
ECO-COTTAGES	EC
NEIGHBORHOOD RESIDENTIAL	NR
NEIGHBORHOOD RESIDENTIAL - FRONT SERVED	NR-FS
ATTACHED RESIDENTIAL	AR
NEIGHBORHOOD CENTER	NC
MIXED-USE 2	MU2
MIXED-USE	MU
INSTITUTIONAL/ CIVIC	I/C
COLONY PARK DISTRICT PARK	— — —
RESTRICTED NATURAL AREA (CWQZ & CEF SETBACKS)	— — —



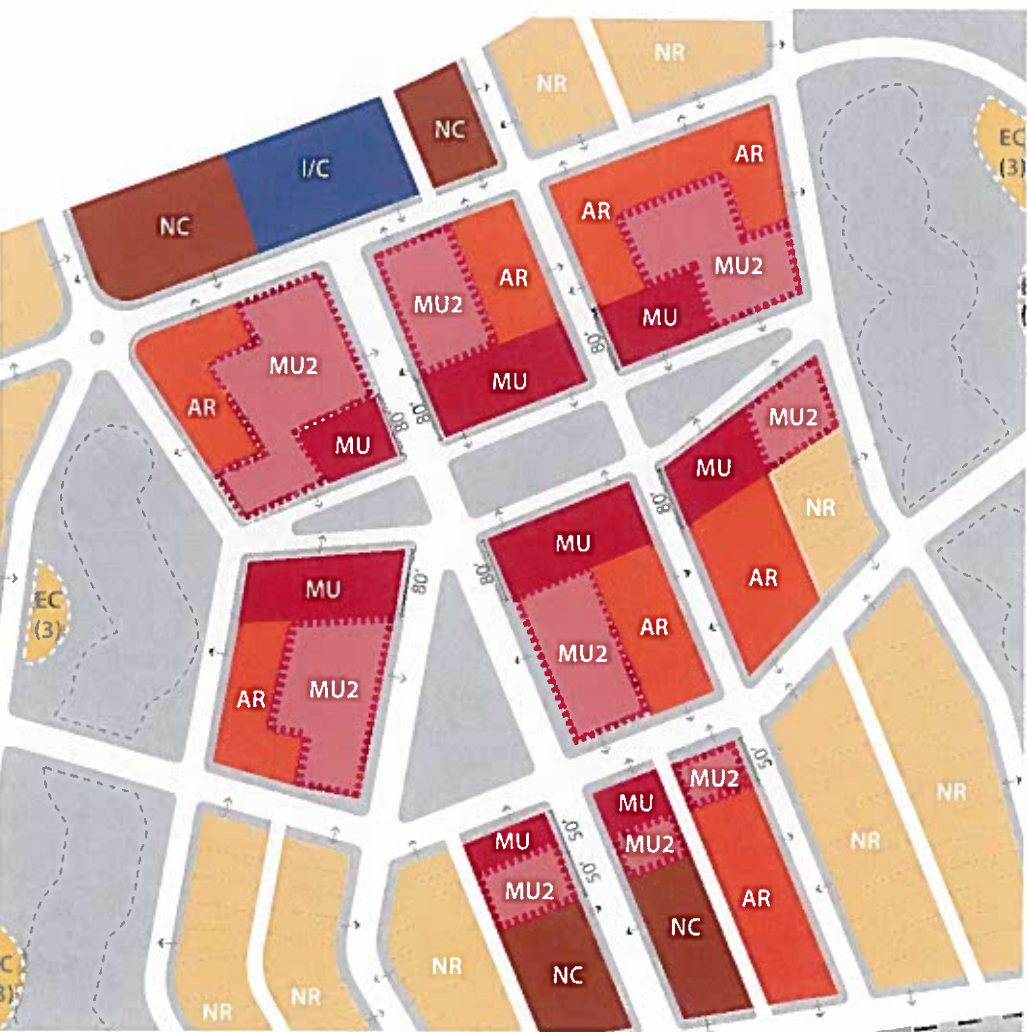
NEIGHBORHOOD CENTER 2










































NEIGHBORHOOD CENTER 3



NEIGHBORHOOD CENTER 4



REGULATING PLAN: BUILDING TYPES PER ZONE

ZONES	BUILDING TYPE	ECO-COTTAGE	SINGLE FAMILY	SINGLE-FAMILY ATTACHED (DUPLX)	MULTI-FAMILY ATTACHED (TOWNHOMES)	STACKED MULTI-FAMILY	COURTYARD	RETAIL	VERTICAL MIXED-USE	INSTITUTIONAL / CIVIC
										
ECO-COTTAGES	EC									
NEIGHBORHOOD RESIDENTIAL - FRONT SERVED	NR-FS									
NEIGHBORHOOD RESIDENTIAL	NR									
ATTACHED RESIDENTIAL	AR									
NEIGHBORHOOD CENTER	NC									
MIXED-USE 2	MU2									
MIXED-USE	MU									
INSTITUTIONAL/ CIVIC	I/C									
GROUND FLOOR RETAIL	GFR									



ALLOWED



LIVE WORK ENABLED
Structure within front facade for future storefront required



SPECIAL USE PERMIT
Requires permission by Design Review Committee



*** CORNER LOT TREATMENT**
Required on corner lots; otherwise not permitted

LOT AND BUILDING TYPE DEFINITIONS

APRON	Area between the Alley Right-of-Way and the rear property line.
CONDITIONED SPACE	Enclosed/Sealed space of the building, does not include porches or stoops.
INTERIOR LOT LINE	A side lot line not abutting a street. Includes lot lines that abut public easements.
FRONT YARD	Portion of lot with the short side facing the primary street.
MIDBLOCK EASEMENT	A path that runs down the middle of a block from the frontage street to another street or an alley. These easements provide public access through the block and create a visual and physical break between a block of townhomes.
SIDE YARD	Portion of lot with the long side facing the secondary street
TYPICAL SETBACK	Minimum setbacks that are to be implemented in general conditions
ZERO LOT LINE CONDITION	Setbacks that abut the property line and require no minimum setback.

BUILDING TYPES OVERVIEW

BUILDING TYPE*	SETBACKS				PARKING		HEIGHTS		
	Front Yard Min/Max**	Corner Lot Side Yard Min/Max	Minimum Side Yard Min/Max	Minimum Rear Yard Setback	Primary Dwelling Min/Max	Location	Minimum Overall Height***	Maximum Overall Height	All Stories Min/Max
SINGLE FAMILY DETACHED	10'/15'	5'/10'	3'	45'	1 / 2	Rear Yard	See Regulating Plans (Page 154)	3 Stories - 45' to Top of Ridge	9'/14'
SINGLE FAMILY ATTACHED (DUPLEX)	10'/15'	5'/10'	3'	45'	1 / 2	Rear Yard	See Regulating Plans (Page 154)	3 Stories - 45' to Top of Ridge	9'/14'
MULTI-FAMILY ATTACHED (TOWNHOMES)	5'/15'	5'/15'	5'	45'	1 / 2	Rear Yard	2 Stories	3 Stories - 45' to Top of Ridge	9'/14'
STACKED MULTIFAMILY	10'/15'	10'/15'	5'	10'	Min 0.5 / Max 1;; provide unbundled parking	Rear	2 Stories	5 Stories	9'/14'
COURTYARD	10'/15' (excluding courtyard)	10'/15'	5'	10'	Min 0.5 / Max 1;; provide unbundled parking	Rear	2 Stories	5 Stories	9'/14'
MIXED USE	0'/5'	0'/5'	5'	10'	See Parking Req's; provide unbundled parking	Rear	2 Stories	5 Stories	9'/14'
RETAIL	0'/5'	0'/5'	5'	10'	See Parking Req's	Rear	2 Stories	5 Stories	9'/14'
INSTITUTIONAL / CIVIC	0'/5'	0'/5'	5'	10'	See Parking Req's	Rear	2 Stories	5 Stories	9'/14'
ECO-COTTAGE	5'/10'	N/A	3'	10'/15'	N/A	On-Street	1 Story	1 Story	9'/14'

*These standards refer to the primary building on a lot. For information in regards to accessory dwelling units where permitted, refer to the individual building type tables

**To conditioned space

***Minimum 3-story construction required on gateway lots identified on Regulating Plan (page 154). Maximum 2-story construction on lots within 50' of project perimeter.

BUILDINGS TYPES STANDARDS

As the Regulating Plan shows, there are various types of buildings that are allowed in the Master Plan. The following pages provide requirements and standards for each buildings type. Graphics typically represent one example of a building that could be developed utilizing the standards for that building type. Graphics are provided to illustrate general intent. In all cases, tables and text supercede graphic representations.

GENERAL LOT RESTRICTIONS

Visually undesirable components on and around residences should be carefully considered during the design phase of residential structures and be placed so that they do not distract from the design intent. The following requirements are applicable to all building types and spaces.

DOWNSPOUTS

Downspouts should not be placed on the front of structures whenever possible. Inside corners and at least 4 feet from the face of structures should guide the placement as well as placing as many as possible on the sides as opposed to the front and rear faces. Downspouts shall discharge to pervious, planting areas and shall not be discharged directly onto impervious surfaces such as sidewalks and driveways.



Downspout Location (behind building) - Good
Source: <http://www.leafguard.com>



Downspout Location (front of building)- Bad
Source: <http://ourfinehouse.wordpress.com>

EXHAUST VENTS

- Exhaust vents on roofs should always be pushed to the rear of the structure whenever possible and be placed so that they do not interfere with the planned placement of photovoltaic and solar thermal panels.
- Through the wall exhaust vents should always be placed as out of sight, hearing, and smell as possible, which means they too should follow the design and placement guidelines noted for the condensers and compressors.

CONDENSERS AND COMPRESSORS

Condensers and compressors should always be placed on the hidden sides of structures a considerable distance from the front in order to minimize visibility from the street and sidewalks, with consideration given to hiding them with shrubbery that does not preclude access. The units should be placed as far away from windows as possible.

UTILITY METERS

- Gas and electric meters should follow the same design guidelines and locations as noted above regarding condensers and compressors.
- Transformers and underground meters should be placed in the city easement as close to the property line as possible, and framed by shrubbery so as to hide the elements while not precluding access.

FIRE RESISTIVE SETBACKS

Buildings cannot be closer than 10 feet or they must be fire protected.

Walls less than 5 feet from the property line:

- must have a 1-hr rating
- are limited to 25% of the area for wall openings

Walls less than 3 feet from the property line:

- must have a 1-hr rating
- may not have any wall openings

Roof overhangs less than 5 feet from the property line:

- must have a 1-hr rating
- cannot project closer than 2 feet from property line
- Exception: A garage roof overhang located within 2 feet of property line may have a 4" projection

BUILDING ENTRIES

All level building entries should be weather protected with a roof that deflects rain away from level entries.

VISITABILITY

Visible designs on all sites except those with major slope issues. For more information regarding visibility, please refer to the Building Access and Privacy section in Chapter 7: Blocks.

PORCH AND SETBACK REQUIREMENTS

Porches are required on the front of all single family homes and meet the following requirements:

- Minimum Porch Depth: 8'
- Minimum Porch Width: 10'
- They can be located within the building setback unless they are under a second floor portion of the home. In that case, the porch needs to be outside of the building setback. The second floor may not overhang beyond the porch.
- Porches shall be a minimum of 12" (2 steps) above the grade of the sidewalk and have railings and some form of balusters or screening defining the area as a porch.
- During the design phase, consideration should be given to the possibility of adding a legal ramp from the sidewalk to the side of the front porch for those confined to wheel-chairs.
- Provide additional setback space if providing the opportunity for a front porch enclosure for incremental housing.



Good Examples of Porches

Source: <http://www.moreland.com>; <http://muellersilentmarket.com>

PROHIBITED BUILDING MATERIALS

The following materials are not permitted on the visible exterior of any primary, accessory or other support structures:

1. Vinyl siding
2. Aluminum siding
3. Plywood
4. Pressure-treated wood.
5. Split timber or rough hewn wood

CORNER LOT ENCLOSURES

Each corner building must contribute to the public realm in three ways:

1. Accentuate the intersection with an architectural feature such as corner windows, a tower, a wrap-around porch or other suitable accents.
2. The principal building or buildings must be long enough to provide privacy to the back yards.
3. Corner lots must have an accessory dwelling unit; must be built at the same time.



Corner Building
Source: Farr Associates

ECO-COTTAGE



Eco-Cottage
Source: Casabella Architects

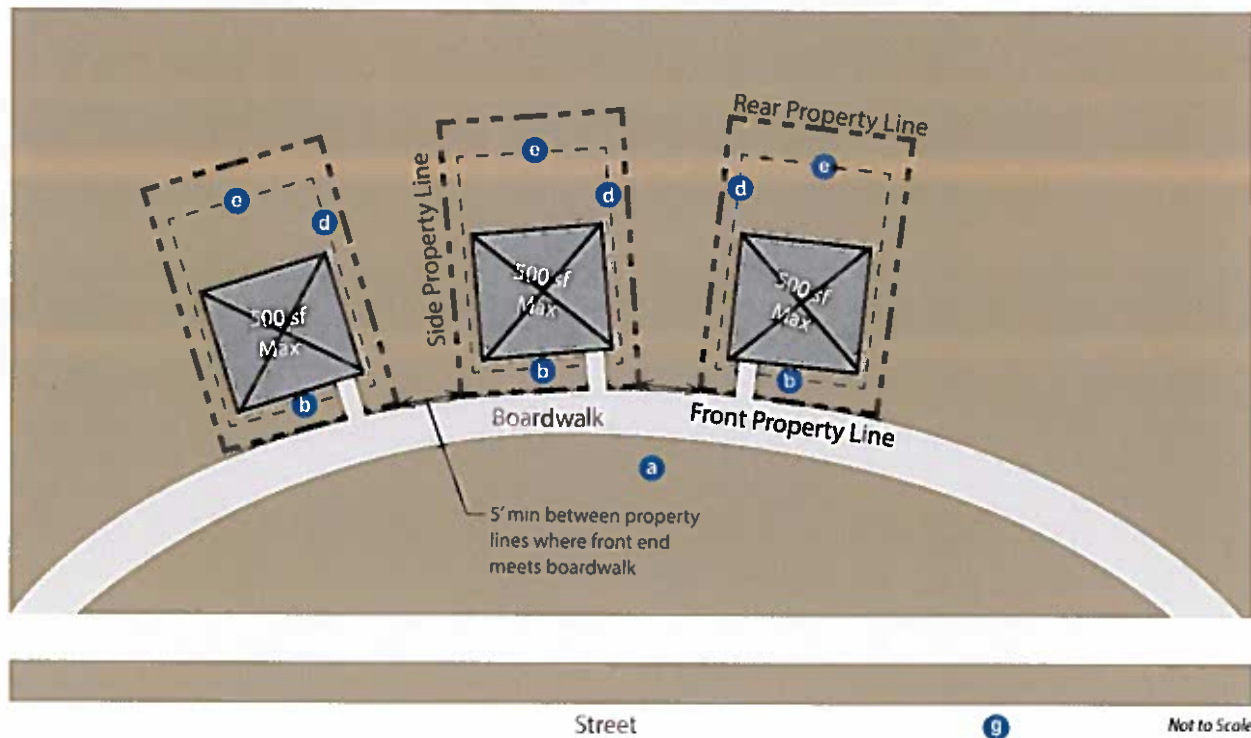
REQUIREMENTS - PRIMARY BUILDING

BUILDING SITING	
a Lot Width Max	26'
Front Property Line Coverage Min.	N/A
b Front Setback Min/Max*	5'/10'
c Corner Lot Side Yard Setback Min/Max	N/A
d Minimum Side Yard Setback	3'
e Minimum Rear Yard Setback Min/Max	10'/15'
f Minimum Apron from Alley	N/A
Maximum Impervious Coverage	N/A
Parking Amount Primary Dwelling Min/Max	N/A
g Parking Location	On-Street
Vehicular Access	N/A
HEIGHT	
Minimum Overall Height **	1 Story
Maximum Overall Height	1 Story
All Stories: Minimum Height Maximum Height	9' 14'
USES	
All Stories***	Residential/Office/Retail
STREET FACADE REQUIREMENTS	
Minimum Transparency Facing	10% (of facade area at each story)
Principal Entrance Location per Unit	front, corner, or corner side facade from Boardwalk
Required Number of Street Entrances	1
ROOF TYPE REQUIREMENTS	
Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM	
Accessory Dwelling Unit	Not Permitted
Waste, Recycling, and Composting Receptacle	Stored rear yard; placed on street for collection.
Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection barrel.
Patios and Paths	Boardwalk minimum width: 6'

*To conditioned space

**Minimum 3-story construction required on gateway lots identified on Regulating Plan (page 156). Maximum 2-story construction on lots within 50' of project perimeter.

*** Refer to Regulating Plan (Page 158)



KEY

- BUILDING FOOTPRINT
- PROPERTY LINE
- MAXIMUM BUILDABLE AREA

SINGLE-FAMILY DETACHED: ALLEY SERVED

20'-35' Wide Lots



Single Family Detached - Rear Loaded
Source: Casabella Architects

REQUIREMENTS - PRIMARY BUILDING

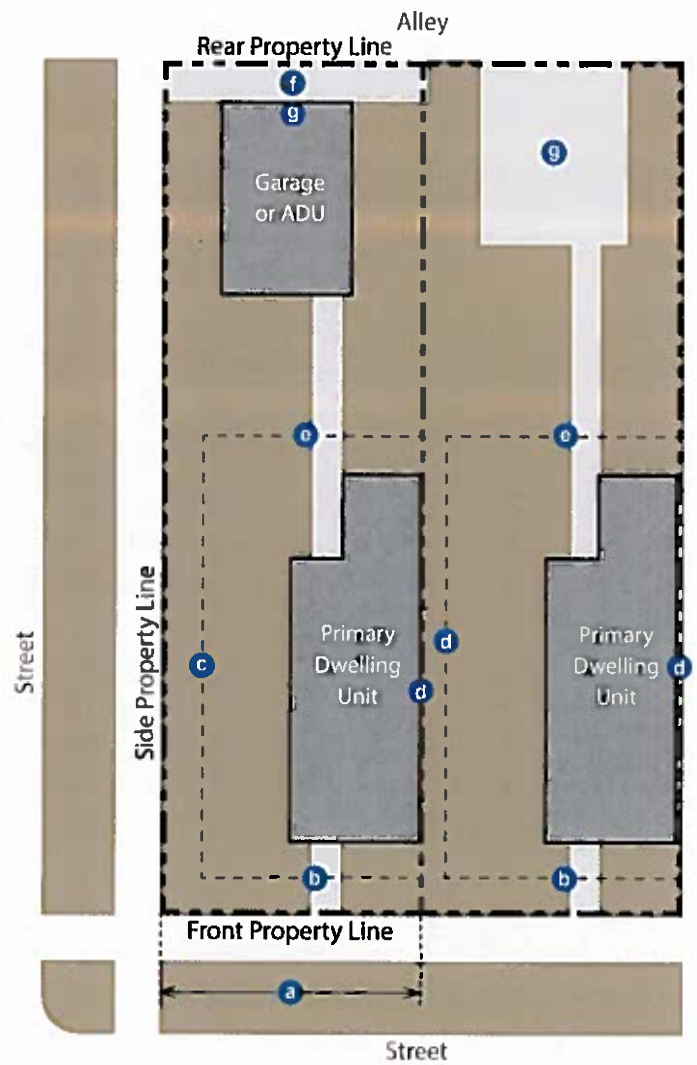
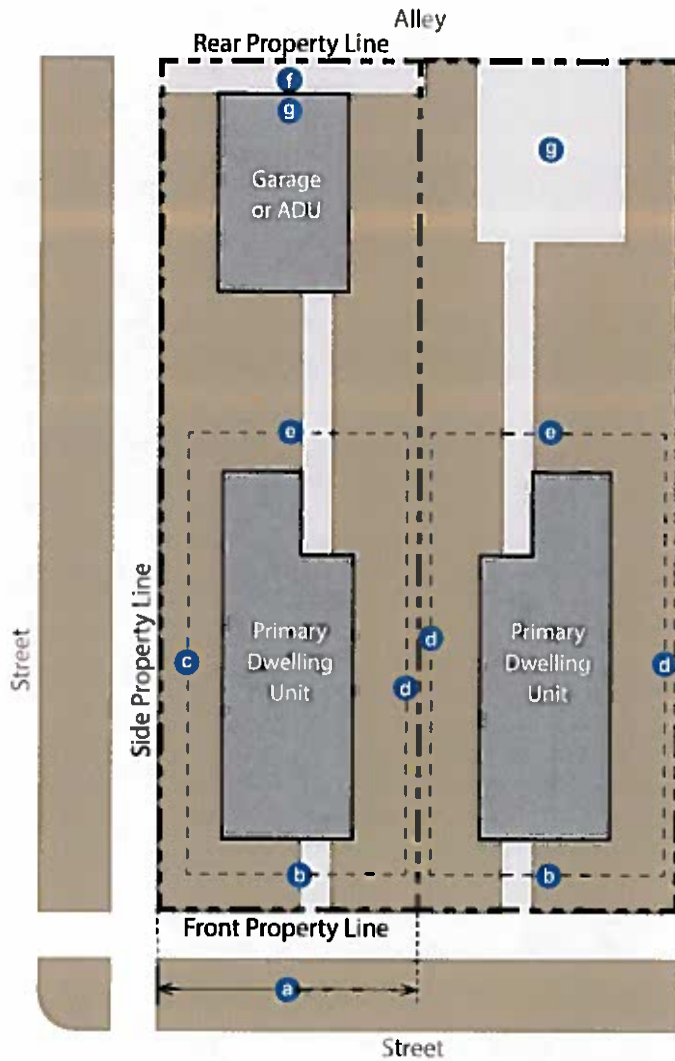
BUILDING SITING	
a Lot Width Min/Max	20'/35'
Front Property Line Coverage Min.	N/A
b Front Setback Min/Max*	10'/15'
c Corner Lot Side Yard Setback Min/Max	5'/10'
d Minimum Side Yard Setback Zero Side Yard Condition	3' 0'
e Minimum Rear Yard Setback	45'
f Minimum Apron from Alley	7'
Maximum Impervious Coverage	65%
Parking Amount Primary Dwelling Min/Max Accessory Dwelling Min/Max	Min 1 / Max 2 Min 0 / Max 1
g Parking Location	Rear Yard
Vehicular Access	Alley
HEIGHT	
Minimum Overall Height **	See Regulating Plans (Page 154)
Maximum Overall Height	3 Stories - 45' to Top of Ridge
All Stories: Minimum Height Maximum Height	9' 14'
USES	
All Stories***	Residential or Live/Work
STREET FACADE REQUIREMENTS	
Minimum Transparency Facing	10% (of facade area at each story)
Principal Entrance Location per Unit	front, corner, or corner side facade
Required Number of Street Entrances	1
ROOF TYPE REQUIREMENTS	
Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM	
Accessory Dwelling Unit	Permitted
Waste and Recycling Receptacle	Stored in garage; placed on alley apron for collection.
Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection barrel.
Patios and Paths	See Landscape Req's
Groundcover / Tree Cover	See Landscape Req's
Fencing Location / Material / Height	See Landscape Req's

REQUIREMENTS - ACCESSORY DWELLING UNIT




BUILDING SITING	
a Lot Width Min/Max	N/A
Front Property Line Coverage Min.	N/A
b Front Setback Min/Max*	N/A
c Corner Lot Side Yard Setback Min/Max	5'/10'
d Minimum Side Yard Setback Zero Side Yard Condition	3' 0'
e Minimum Rear Yard Setback	N/A
f Minimum Apron from Alley	7'
Maximum Impervious Coverage	N/A
Parking Amount Primary Dwelling Min/Max Accessory Dwelling Min/Max	Min 1 / Max 2 Min 0 / Max 1
g Parking Location	Rear Yard
Vehicular Access	Alley
HEIGHT	
Minimum Overall Height	N/A
Maximum Overall Height	2 Stories - Garage and Dwelling - 30' to Top of Ridge
All Stories: Minimum Height Maximum Height	9' 14'
USES	
All Stories***	Residential Permitted
STREET FACADE REQUIREMENTS	
Minimum Transparency Facing	10% (of facade area at each story)
Principal Entrance Location per Unit	front, corner, or corner side facade
Required Number of Street Entrances	1
ROOF TYPE REQUIREMENTS	
Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM	
Accessory Dwelling Unit	Permitted
Waste, Recycling, and Composting Receptacle	Stored in garage; placed on alley apron for collection.
Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection barrel.
Patios and Paths	See Landscape Req's
Groundcover / Tree Cover	See Landscape Req's
Fencing Location / Material / Height	See Landscape Req's

TYPICAL SETBACK BLOCK

ZERO LOT LINE BLOCK

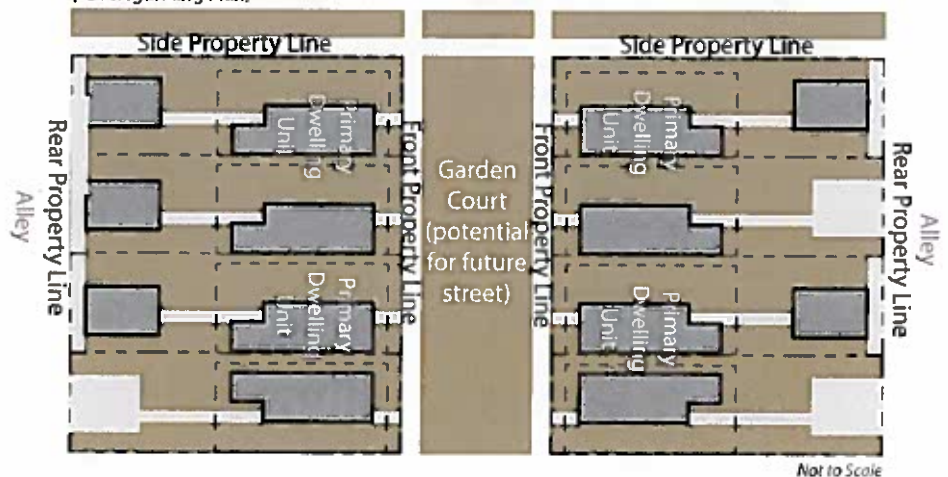


KEY

-  BUILDING FOOTPRINT
-  PROPERTY LINE
-  MAXIMUM BUILDABLE AREA

GARDEN COURT HOMES

Permitted in areas where street connections are pending (see Regulating Plan)



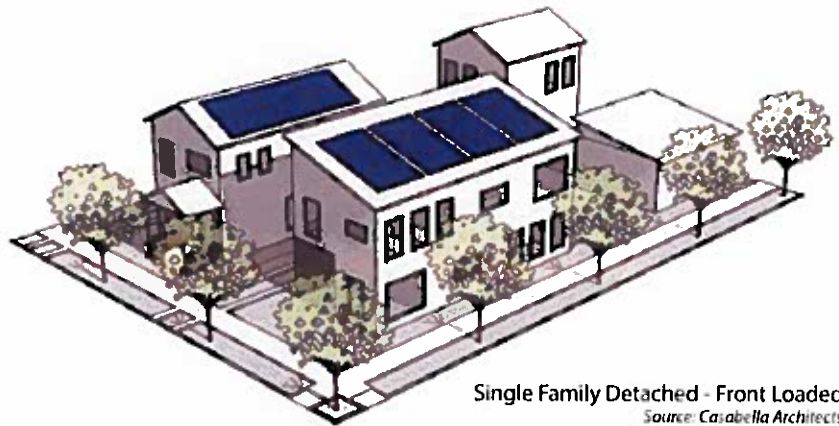
*To conditioned space

**Minimum 3-story construction required on gateway lots identified on Regulating Plan (page 156). Maximum 2-story construction on lots within 50' of project perimeter.

*** Refer to Regulating Plan (Page 158)

SINGLE-FAMILY DETACHED: FRONT / SIDE SERVED

35'-40' Wide Lots



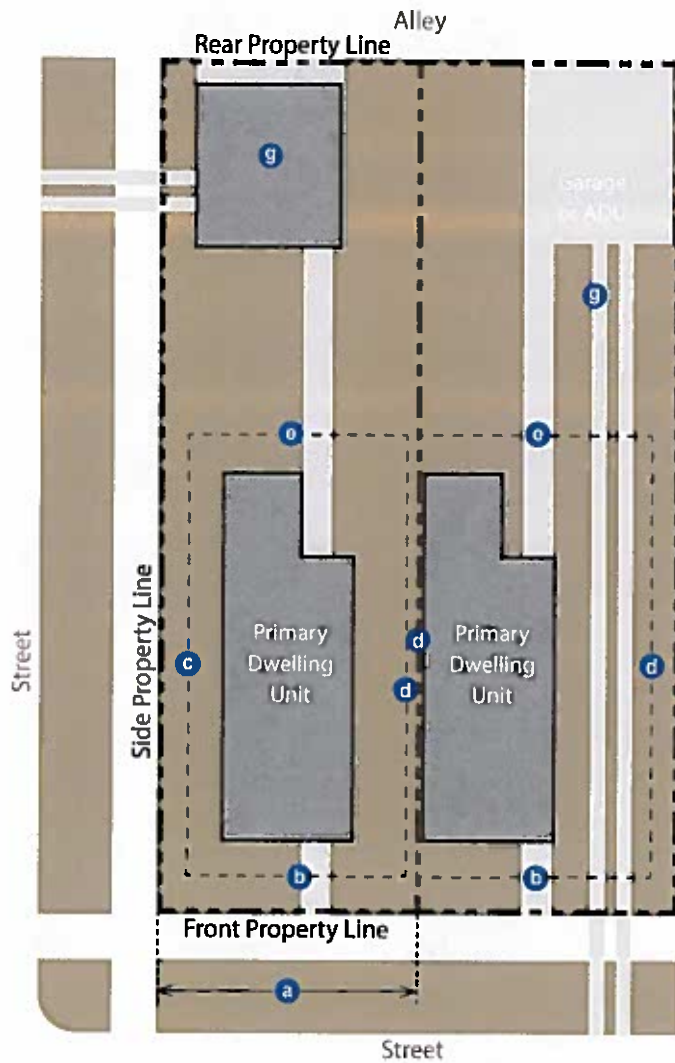
Single Family Detached - Front Loaded
Source: Casabella Architects

REQUIREMENTS - PRIMARY BUILDING



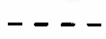
BUILDING SITING	
a Lot Width Min/Max	35'/40'
Front Property Line Coverage Min.	N/A
b Front Setback Min/Max*	10'/15'
c Corner Lot Side Yard Setback Min/Max	5'/10'
d Minimum Side Yard Setback Zero Side Yard Condition	3' 0'
e Minimum Rear Yard Setback	45'
f Minimum Apron from Alley	7'
Maximum Impervious Coverage	65%
Parking Amount Primary Dwelling Min/Max Accessory Dwelling Min/Max	Min 1 / Max 2 Min 0 / Max 1
g Parking Location	Rear Yard
Vehicular Access	From alley; if no alley exists, 1 driveway per street frontage
HEIGHT	
Minimum Overall Height **	See Regulating Plans (Page 154)
Maximum Overall Height	3 Stories - 45'to Top of Ridge
All Stories: Minimum Height Maximum Height	9' 14'
USES	
All Stories***	Residential
STREET FACADE REQUIREMENTS	
Minimum Transparency Facing	10% (of facade area at each story)
Principal Entrance Location per Unit	front, corner, or corner side facade
Required Number of Street Entrances	1
ROOF TYPE REQUIREMENTS	
Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM	
Accessory Dwelling Unit	Permitted
Waste and Recycling Receptacle	Stored in garage; placed on alley apron for collection.
Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection barrel.
Patios and Paths	See Landscape Req's
Groundcover / Tree Cover	See Landscape Req's
Fencing Location / Material / Height	See Landscape Req's

REQUIREMENTS - ACCESSORY DWELLING UNIT

BUILDING SITING	
a Lot Width Min/Max	N/A
Front Property Line Coverage Min.	N/A
b Front Setback Min/Max*	N/A
c Corner Lot Side Yard Setback Min/Max	5'/10'
d Minimum Side Yard Setback Zero Side Yard Condition	3' 0'
e Minimum Rear Yard Setback	N/A
f Minimum Apron from Alley	7'
Maximum Impervious Coverage	N/A
Parking Amount Primary Dwelling Min/Max Accessory Dwelling Min/Max	Min 1 / Max 2 Min 0 / Max 1
g Parking Location	Rear Yard
Vehicular Access	From alley; if no alley exists, 1 driveway per street frontage
HEIGHT	
Minimum Overall Height	N/A
Maximum Overall Height	2 Stories - Garage and Dwelling - 30' to Top of Ridge
All Stories: Minimum Height Maximum Height	9' 14'
USES	
All Stories***	Residential Permitted
STREET FACADE REQUIREMENTS	
Minimum Transparency Facing	10% (of facade area at each story)
Principal Entrance Location per Unit	front, corner, or corner side facade
Required Number of Street Entrances	1
ROOF TYPE REQUIREMENTS	
Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM	
Accessory Dwelling Unit	Permitted
Waste, Recycling, and Composting Receptacle	Stored in garage; placed on alley apron for collection.
Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection barrel.
Patios and Paths	See Landscape Req's
Groundcover / Tree Cover	See Landscape Req's
Fencing Location / Material / Height	See Landscape Req's



KEY

-  BUILDING FOOTPRINT
-  PROPERTY LINE
-  MAXIMUM BUILDABLE AREA

*To conditioned space

**Minimum 3-story construction required on gateway lots identified on Regulating Plan (page 156). Maximum 2-story construction on lots within 50' of project perimeter.

*** Refer to Regulating Plan (Page 158)

SINGLE-FAMILY ATTACHED (DUPLEX)

35'-50' Wide Lots



Single Family Attached
Source: Casabella Architects

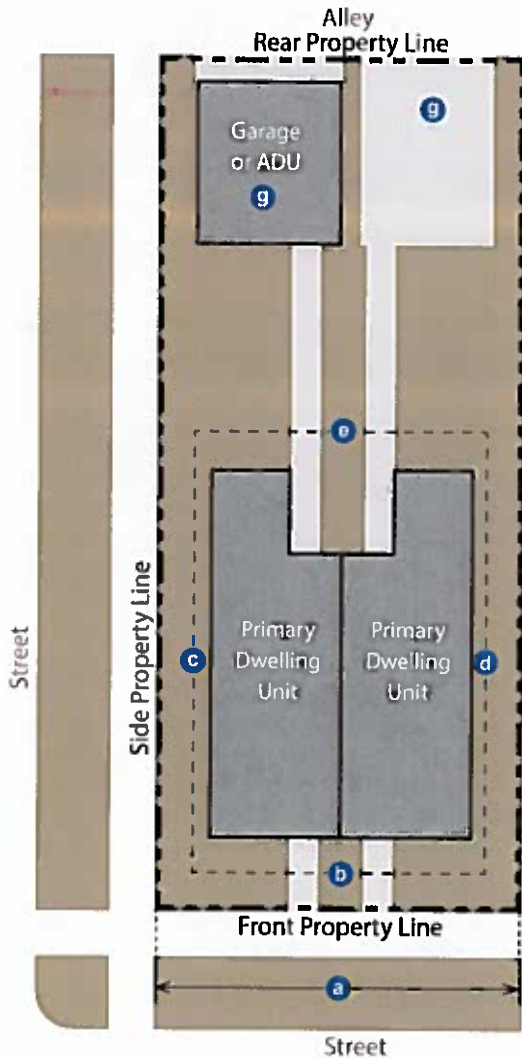
REQUIREMENTS - PRIMARY BUILDING

BUILDING SITING	
a Lot Width Min/Max	35'/50'
Front Property Line Coverage Min.	N/A
b Front Setback Min/Max*	10'/15'
c Corner Lot Side Yard Setback Min/Max	5'/10'
d Minimum Side Yard Setback Zero Side Yard Condition	3' 0'
e Minimum Rear Yard Setback	45'
f Minimum Apron from Alley	7'
Maximum Impervious Coverage	65%
Parking Amount Primary Dwelling Min/Max Accessory Dwelling Min/Max	Min 1 / Max 2 Min 0 / Max 1
g Parking Location	Rear Yard
Vehicular Access	From alley; if no alley exists, 1 driveway per street frontage
HEIGHT	
Minimum Overall Height **	See Regulating Plans (Page 154)
Maximum Overall Height	3 Stories - 45' to Top of Ridge
All Stories: Minimum Height Maximum Height	9' 14'
USES	
All Stories***	Residential or Live/Work
STREET FACADE REQUIREMENTS	
Minimum Transparency Facing	10% (of facade area at each story)
Principal Entrance Location per Unit	front, corner, or corner side facade
Required Number of Street Entrances	1
ROOF TYPE REQUIREMENTS	
Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM	
Accessory Dwelling Unit	Permitted
Waste and Recycling Receptacle	Stored in garage; placed on alley apron for collection.
Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection barrel.
Patios and Paths	See Landscape Req's
Groundcover / Tree Cover	See Landscape Req's
Fencing Location / Material / Height	See Landscape Req's

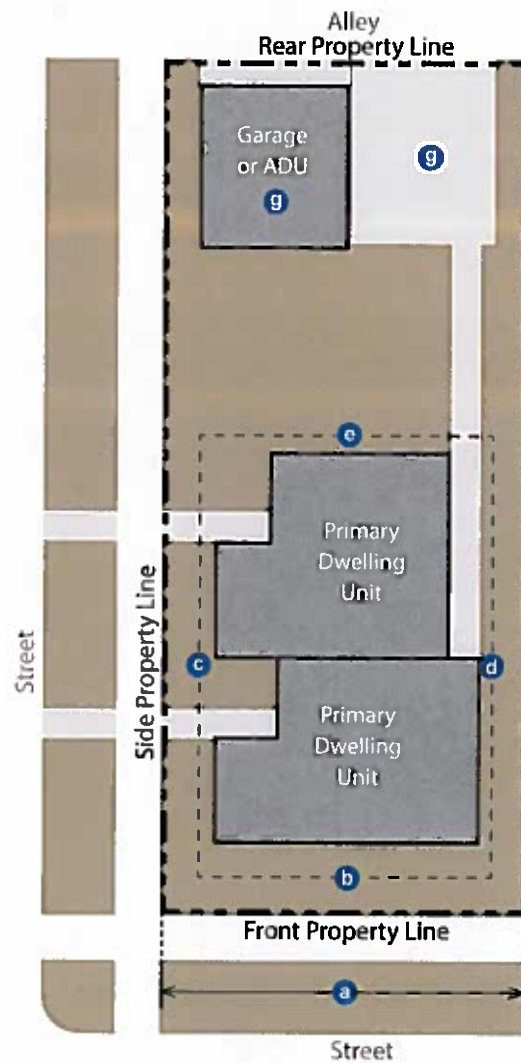
REQUIREMENTS - ACCESSORY DWELLING UNIT

BUILDING SITING	
a Lot Width Min/Max	N/A
Front Property Line Coverage Min.	N/A
b Front Setback Min/Max*	N/A
c Corner Lot Side Yard Setback Min/Max	5'/10'
d Minimum Side Yard Setback Zero Side Yard Condition	3' 0'
e Minimum Rear Yard Setback	45'
f Minimum Apron from Alley	7'
Maximum Impervious Coverage	N/A
Parking Amount Primary Dwelling Min/Max Accessory Dwelling Min/Max	Min 1 / Max 2 Min 0 / Max 1
g Parking Location	Rear Yard
Vehicular Access	From alley; if no alley exists, 1 driveway per street frontage
HEIGHT	
Minimum Overall Height	N/A
Maximum Overall Height	2 Stories - Garage and Dwelling - 30' to Top of Ridge
All Stories: Minimum Height Maximum Height	9' 14'
USES	
All Stories***	Residential Permitted
STREET FACADE REQUIREMENTS	
Minimum Transparency Facing	10% (of facade area at each story)
Principal Entrance Location per Unit	front, corner, or corner side facade
Required Number of Street Entrances	1
ROOF TYPE REQUIREMENTS	
Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM	
Accessory Dwelling Unit	Permitted
Waste, Recycling, and Composting Receptacle	Stored in garage; placed on alley apron for collection.
Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection barrel.
Patios and Paths	See Landscape Req's
Groundcover / Tree Cover	See Landscape Req's
Fencing Location / Material / Height	See Landscape Req's




FRONT-FACING UNITS



SIDE-FACING UNITS



KEY

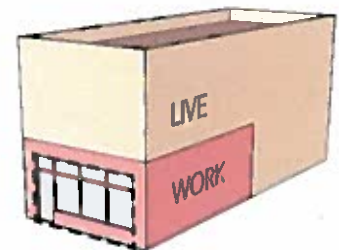
-  BUILDING FOOTPRINT
-  PROPERTY LINE
-  MAXIMUM BUILDABLE AREA

LIVE/WORK ENABLED

Structure within front facade for future storefront required

LIVE/WORK PERMITTED

Storefront structure not required, but Live/Work permitted in an "Attached Residential Zone" when abutting a "Neighborhood Center zone" (see Regulating Plan: Building Types Per Zone).



*To conditioned space

**Minimum 3-story construction required on gateway lots identified on Regulating Plan (page 156). Maximum 2-story construction on lots within 50' of project perimeter.

*** Refer to Regulating Plan (Page 158)

MULTI-FAMILY ATTACHED (TOWNHOMES)

16'-28' Wide Lots



Multi-family Attached (Townhomes)

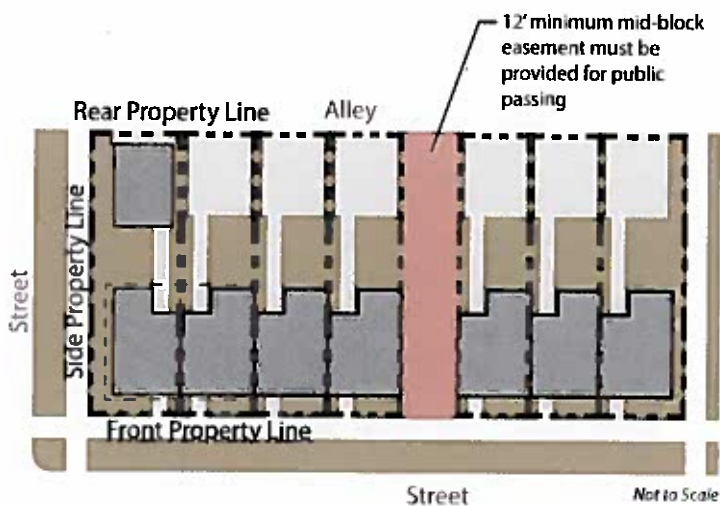
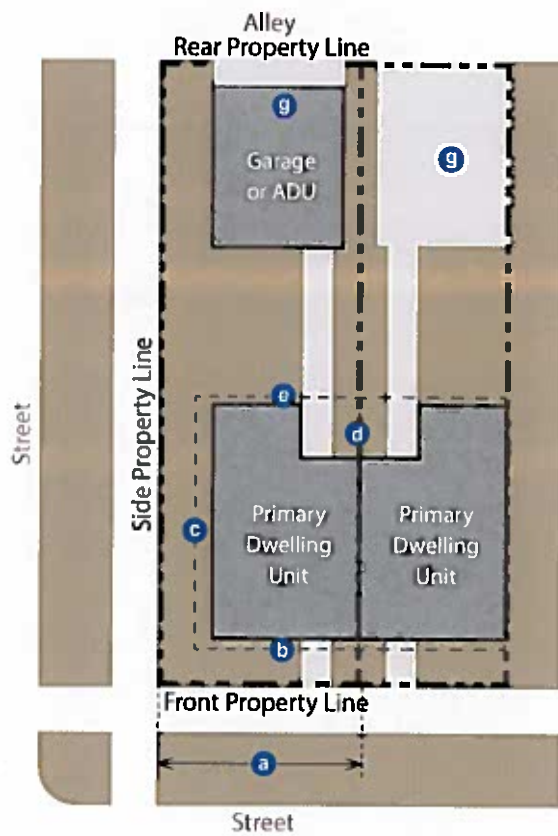
Source: Casabella Architects

REQUIREMENTS - PRIMARY BUILDING



BUILDING SITING	
a Lot Width Min/Max	16'/28'
Front Property Line Coverage Min.	N/A
b Front Setback Min/Max*	5'/15'
c Corner Lot Side Yard Setback Min/Max	5'/15'
d Minimum Side Yard Setback Zero Side Yard Condition	5' 0'
e Minimum Rear Yard Setback	45'
f Minimum Apron from Alley	4'
Maximum Impervious Coverage	65%
Parking Amount Primary Dwelling Min/Max Accessory Dwelling Min/Max	Mln 1 / Max 2 Min 0 / Max 1
g Parking Location	Rear Yard
Vehicular Access	From alley; if no alley exists, 1 driveway per street frontage
HEIGHT	
Minimum Overall Height **	2 Stories
Maximum Overall Height	3 Stories - 45' to Top of Ridge
All Stories: Minimum Height Maximum Height	9' 14'
USES	
All Stories***	Residential or Live/Work
STREET FACADE REQUIREMENTS	
Minimum Transparency Facing	10% (of facade area at each story)
Principal Entrance Location per Unit	front, corner, or corner side facade
Required Number of Street Entrances	1
ROOF TYPE REQUIREMENTS	
Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM	
Accessory Dwelling Unit	Permitted on lots deeper than 85'
Waste and Recycling Receptacle	Stored in garage; placed on alley apron for collection.
Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection cistern.
Patios and Paths	See Landscape Req's
Groundcover / Tree Cover	See Landscape Req's
Fencing Location / Material / Height	See Landscape Req's

REQUIREMENTS - ACCESSORY DWELLING UNIT Permitted on lots deeper than 85'

BUILDING SITING	
a Lot Width Min/Max	N/A
Front Property Line Coverage Min.	N/A
b Front Setback Min/Max*	N/A
c Corner Lot Side Yard Setback Min/Max	5'/15'
d Minimum Side Yard Setback Zero Side Yard Condition	5' 3'
e Minimum Rear Yard Setback	N/A
f Minimum Apron from Alley	7'
Maximum Impervious Coverage	N/A
Parking Amount Primary Dwelling Min/Max Accessory Dwelling Min/Max	Mln 1 / Max 2 Min 0 / Max 1
g Parking Location	Rear Yard
Vehicular Access	From alley; if no alley exists, 1 driveway per street frontage
HEIGHT	
Minimum Overall Height	N/A
Maximum Overall Height	2 Stories - Garage and Dwelling - 30' to Top of Ridge
All Stories: Minimum Height Maximum Height	9' 14'
USES	
All Stories***	Residential Permitted
STREET FACADE REQUIREMENTS	
Minimum Transparency Facing	10% (of facade area at each story)
Principal Entrance Location per Unit	front, corner, or corner side facade
Required Number of Street Entrances	1
ROOF TYPE REQUIREMENTS	
Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM	
Accessory Dwelling Unit	Permitted on lots deeper than 85'
Waste, Recycling, and Composting Receptacle	Stored in garage; placed on alley apron for collection.
Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection cistern.
Patios and Paths	See Landscape Req's
Groundcover / Tree Cover	See Landscape Req's
Fencing Location / Material / Height	See Landscape Req's



KEY

-  BUILDING FOOTPRINT
-  PROPERTY LINE
-  MAXIMUM BUILDABLE AREA

*To conditioned space

**Minimum 3-story construction required on gateway lots identified on Regulating Plan (page 156). Maximum 2-story construction on lots within 50' of project perimeter.

*** Refer to Regulating Plan (Page 158)

LIVE/WORK ENABLED

Structure with front facade for future storefront required

LIVE/WORK PERMITTED

Storefront structure not required, but Live/Work permitted in an "Attached Residential Zone" when abutting or directly across from a "Neighborhood Center zone" (see Regulating Plan).



STACKED MULTIFAMILY



Residential Multifamily
Source: Casabella Architects

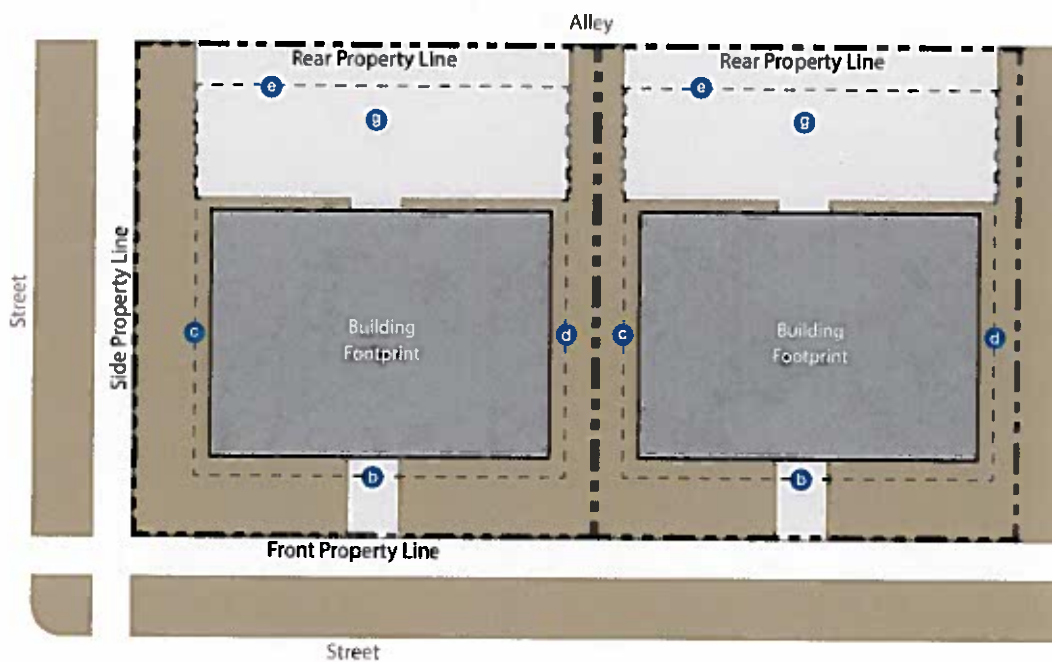
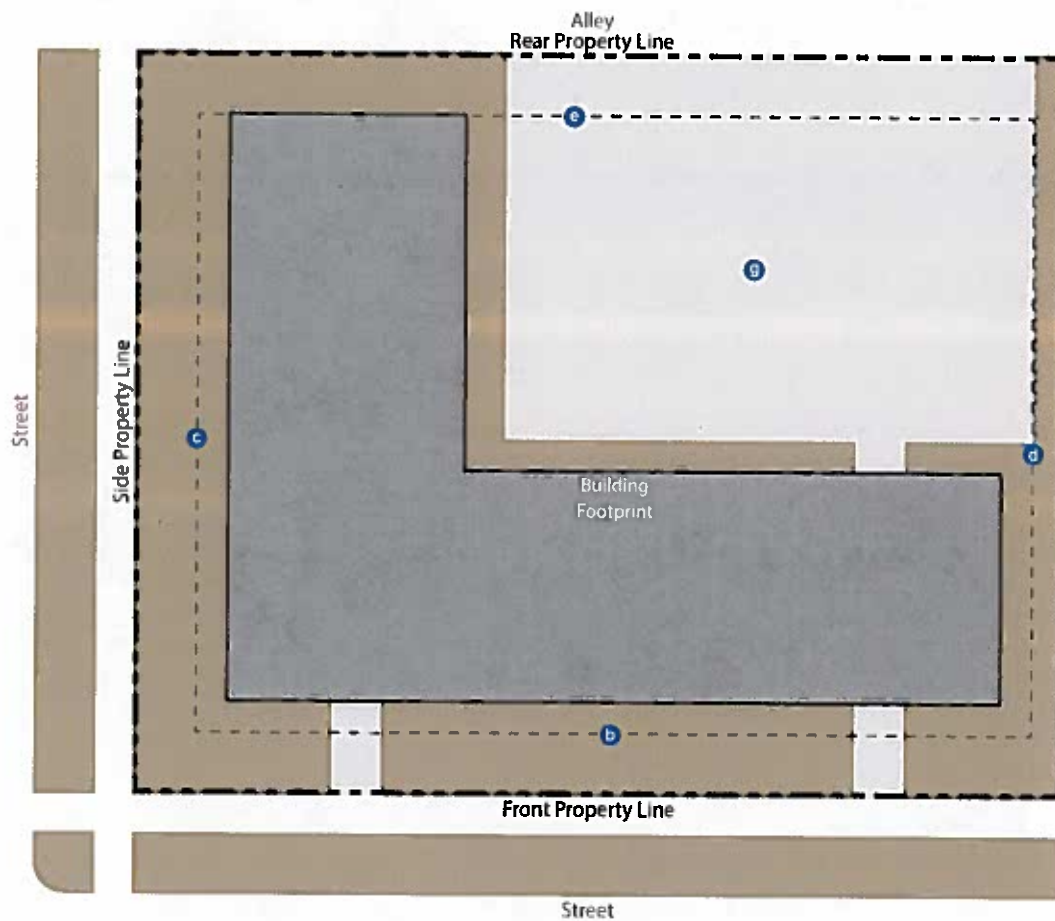
REQUIREMENTS - PRIMARY BUILDING

BUILDING SITING	
a Lot Width Min/Max	N/A
Front Property Line Coverage Min.	75%
b Front Setback Min/Max*	10'/15'
c Corner Lot Side Yard Setback Min/Max	10'/15'
d Typical Side Yard Setback	5'
Zero Side Yard Condition	0'
e Minimum Rear Setback	10'
f Minimum Apron from Alley	7'
Maximum Impervious Coverage	90%
Parking Amount	Min 0.5 / Max 1;; provide unbundled parking
Primary Dwelling Min/Max	
g Parking Location	Rear
Vehicular Access	From alley; if no alley exists, 1 driveway per street frontage
HEIGHT	
Minimum Overall Height **	2 Stories
Maximum Overall Height	5 Stories
All Stories: Minimum Height	9'
Maximum Height	14'
USES	
All Stories***	Residential
STREET FACADE REQUIREMENTS	
Minimum Transparency Facing	10% (of facade area at each story)
Principal Entrance Location per Unit	front, corner, or corner side facade
Required Number of Street Entrances	1 every 75'
ROOF TYPE REQUIREMENTS	
Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM	
Accessory Dwelling Unit	Not Permitted
Waste, Recycling, and Composting Receptacle	Placed in alley
Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection cistern.



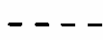
*To conditioned space

**Minimum 3-story construction required on gateway lots identified on Regulating Plan (page 156). Maximum 2-story construction on lots within 50' of project perimeter.

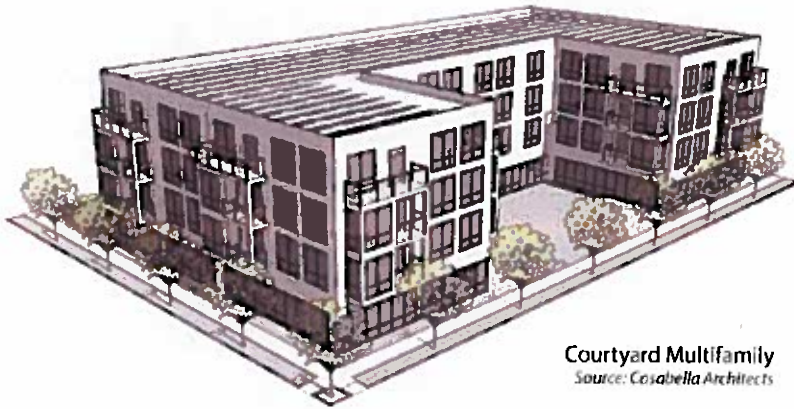
*** Refer to Regulating Plan (Page 158)



KEY

-  **BUILDING FOOTPRINT**
-  **PROPERTY LINE**
-  **MAXIMUM BUILDABLE AREA**

COURTYARD



Courtyard Multifamily
Source: Cosabella Architects

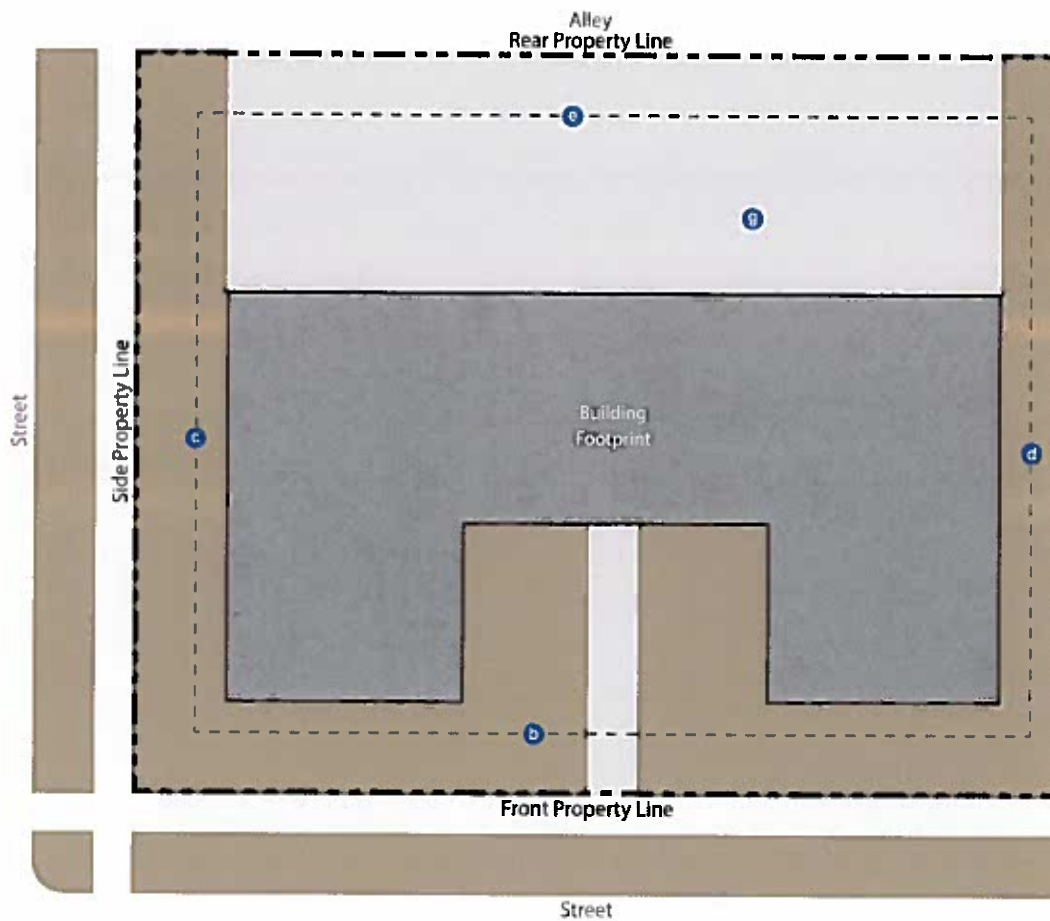
REQUIREMENTS - PRIMARY BUILDING

BUILDING SITING	
a Lot Width Min/Max	N/A
Front Property Line Coverage Min.	75%
b Front Setback Min/Max*	10'/15' (excluding courtyard)
c Corner Lot Side Yard Setback Min/Max	10'/15'
d Typical Side Yard Setback	5'
Zero Side Yard Condition	0'
e Minimum Rear Setback	10'
f Minimum Apron from Alley	7'
Maximum Impervious Coverage	90%
Parking Amount	Min 0.5 / Max 1; ; provide unbundled parking
Primary Dwelling Min/Max	
g Parking Location	Rear
Vehicular Access	From alley
HEIGHT	
Minimum Overall Height **	2 Stories
Maximum Overall Height	5 Stories
All Stories: Minimum Height	9'
Maximum Height	14'
USES	
All Stories***	Residential
STREET FACADE REQUIREMENTS	
Minimum Transparency Facing	10% (of facade area at each story)
Principal Entrance Location per Unit	front, corner, or corner side facade
Required Number of Street Entrances	1 every 75'
ROOF TYPE REQUIREMENTS	
Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM	
Accessory Dwelling Unit	Not Permitted
Waste, Recycling, and Composting Receptacle	Placed in alley
Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection cistern.




*To conditioned space

**Minimum 3-story construction required on gateway lots identified on Regulating Plan (page 156). Maximum 2-story construction on lots within 50' of project perimeter.

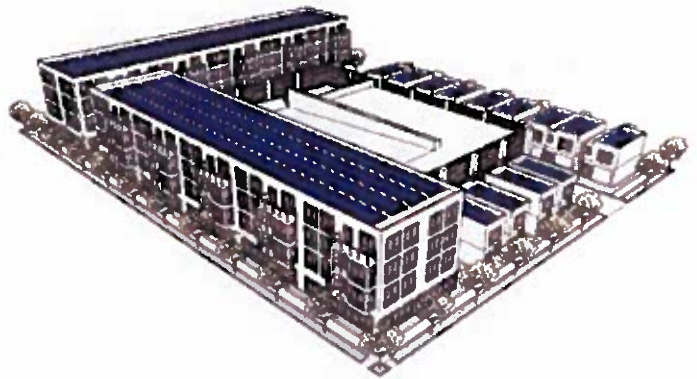
*** Refer to Regulating Plan (Page 158)



KEY

-  BUILDING FOOTPRINT
-  PROPERTY LINE
-  MAXIMUM BUILDABLE AREA

VERTICAL MIXED USE



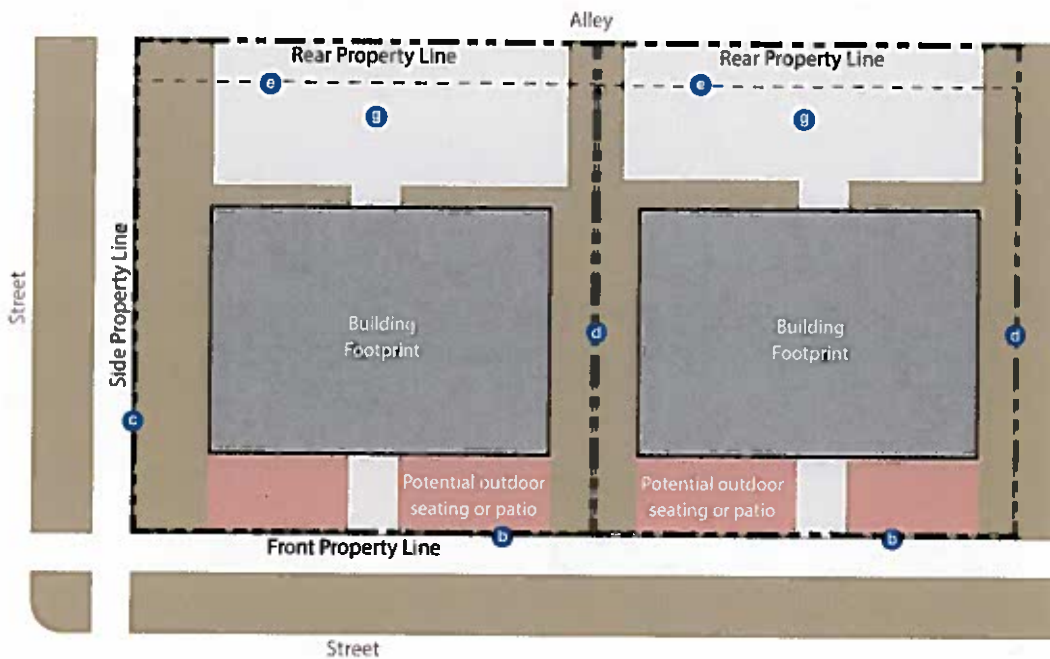
Mixed Use
Source: Casabella Architects

BUILDING SITING		
a	Lot Width Min/Max	N/A
	Front Property Line Coverage Min.	85%
b	Front Setback Min/Max*	0'/5'
c	Corner Lot Side Yard Setback Min/Max	0'/5'
d	Typical Side Yard Setback	5'
	Zero Side Yard Condition	0'
e	Minimum Rear Setback	10'
f	Minimum Apron from Alley	7'
	Maximum Impervious Coverage	95%
	Parking Amount	See Parking Req's; provide unbundled parking
	Primary Dwelling Min/Max	
g	Parking Location	Rear
	Vehicular Access	From alley; if no alley exists, 1 driveway per street frontage
HEIGHT		
	Minimum Overall Height **	2 Stories
	Maximum Overall Height	5 Stories
	All Stories: Minimum Height	9'
	Maximum Height	14'
USES		
	First Floor***	Retail/ Office
	Upper Stories***	Residential/Office
STREET FACADE REQUIREMENTS		
	Minimum Transparency Facing	10% (of facade area at each story)
	Principal Entrance Location per Unit	front, corner, or corner side facade
	Required Number of Street Entrances	1 every 75'
ROOF TYPE REQUIREMENTS		
	Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM		
	Accessory Dwelling Unit	Not Permitted
	Waste, Recycling, and Composting Receptacle	Placed in alley
	Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection barrel.




*To conditioned space

**Minimum 3-story construction required on gateway lots identified on Regulating Plan (page 156). Maximum 2-story construction on lots within 50' of project perimeter.

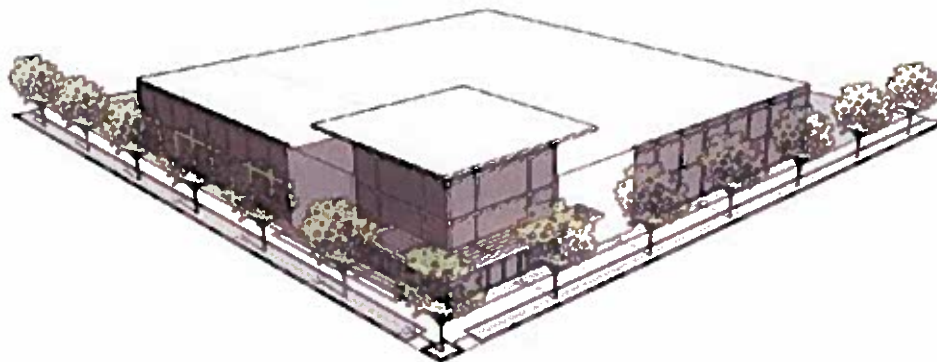
*** Refer to Regulating Plan (Page 158)



KEY

-  **BUILDING FOOTPRINT**
-  **PROPERTY LINE**
-  **MAXIMUM BUILDABLE AREA**

RETAIL



Retail / Office Building
Source: Casabella Architects

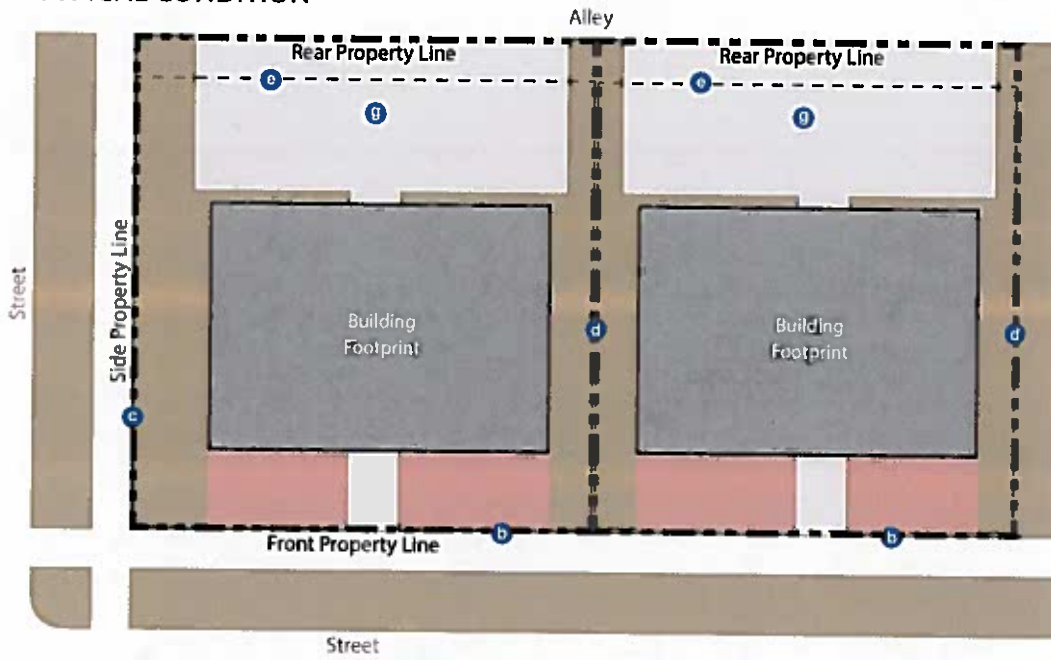
BUILDING SITING	
a Lot Width Min/Max	N/A
b Front Property Line Coverage Min.	85%
c Front Setback Min/Max*	0'/5'
d Corner Lot Side Yard Setback Min/Max	0'/5'
e Typical Side Yard Setback	5'
f Zero Side Yard Condition	0'
Minimum Rear Setback	10'
Minimum Apron from Alley	7'
Maximum Impervious Coverage	95%
Parking Amount	
Primary Dwelling Min/Max	See Parking Req's
g Parking Location	Rear
Vehicular Access	From alley; if no alley exists, 1 driveway per street frontage
HEIGHT	
Minimum Overall Height **	2 Stories
Maximum Overall Height	5 Stories
All Stories: Minimum Height	9'
Maximum Height	14'
USES	
First Floor***	Retail/ Office
Upper Stories***	Residential/Office
STREET FACADE REQUIREMENTS	
Minimum Transparency Facing	10% (of facade area at each story)
Principal Entrance Location per Unit	front, corner, or corner side facade
Required Number of Street Entrances	1 every 75' Loyola Lane frontage - see Loyola Town Center Regulating Plan (page
ROOF TYPE REQUIREMENTS	
Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM	
Accessory Dwelling Unit	Not Permitted
Waste, Recycling, and Composting Receptacle	Placed in alley
Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection barrel.

*To conditioned space

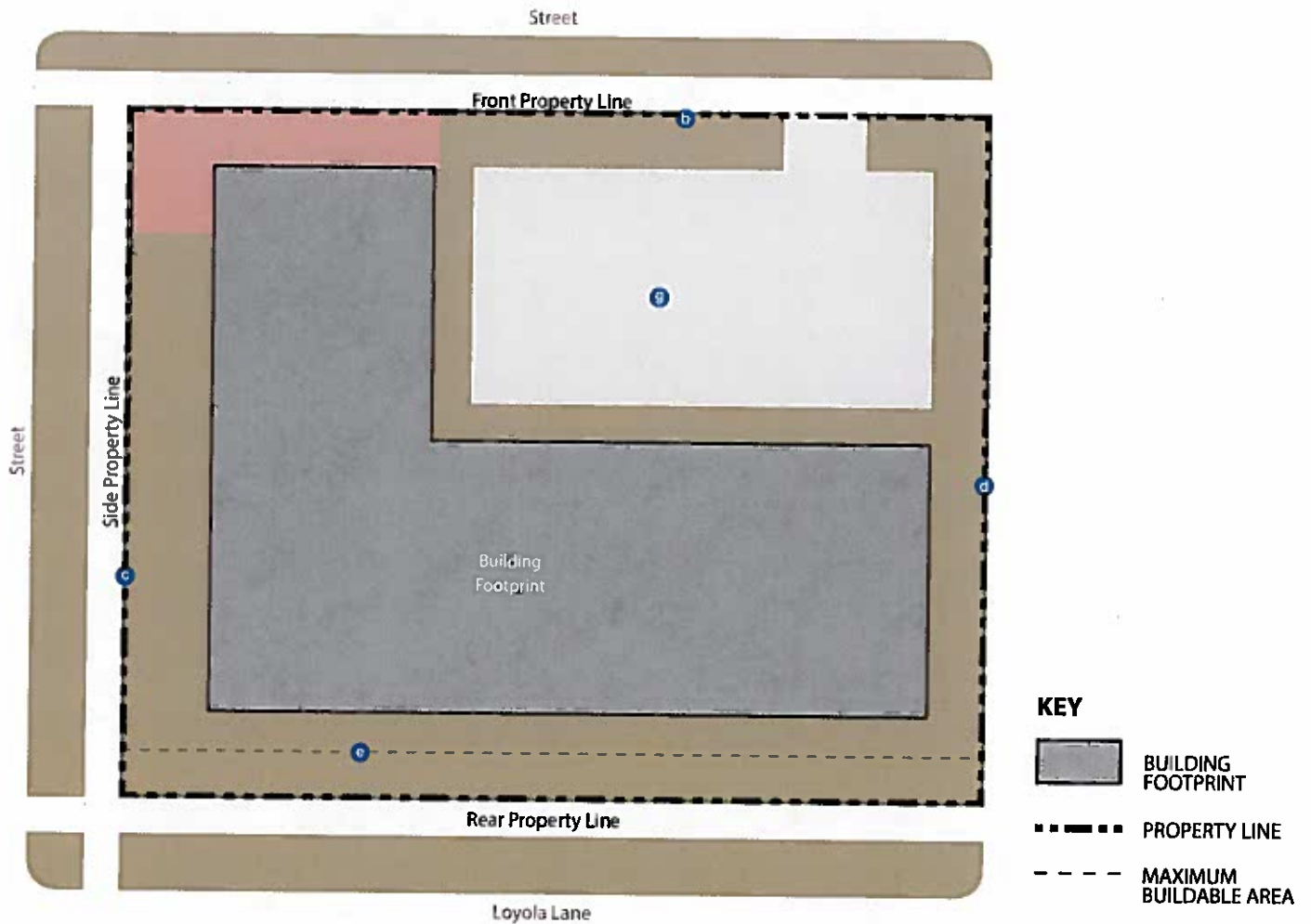
**Minimum 3-story construction required on gateway lots identified on Regulating Plan (page 156). Maximum 2-story construction on lots within 50' of project perimeter.

*** Refer to Regulating Plan (Page 158)

TYPICAL CONDITION



LOYOLA LANE FRONTAGE CONDITION



INSTITUTIONAL / CIVIC



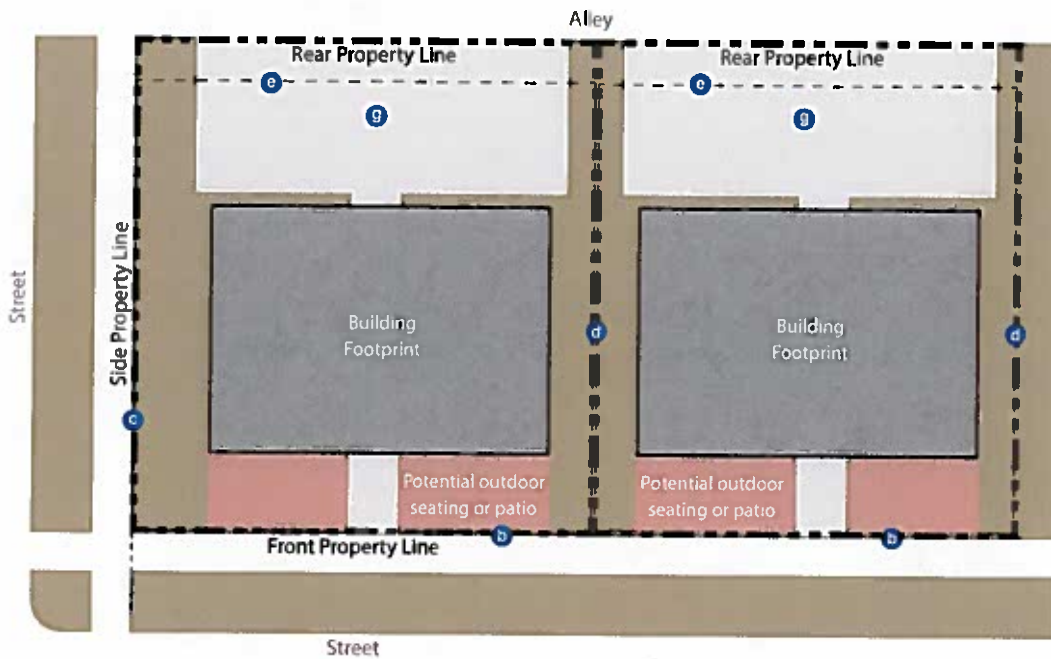
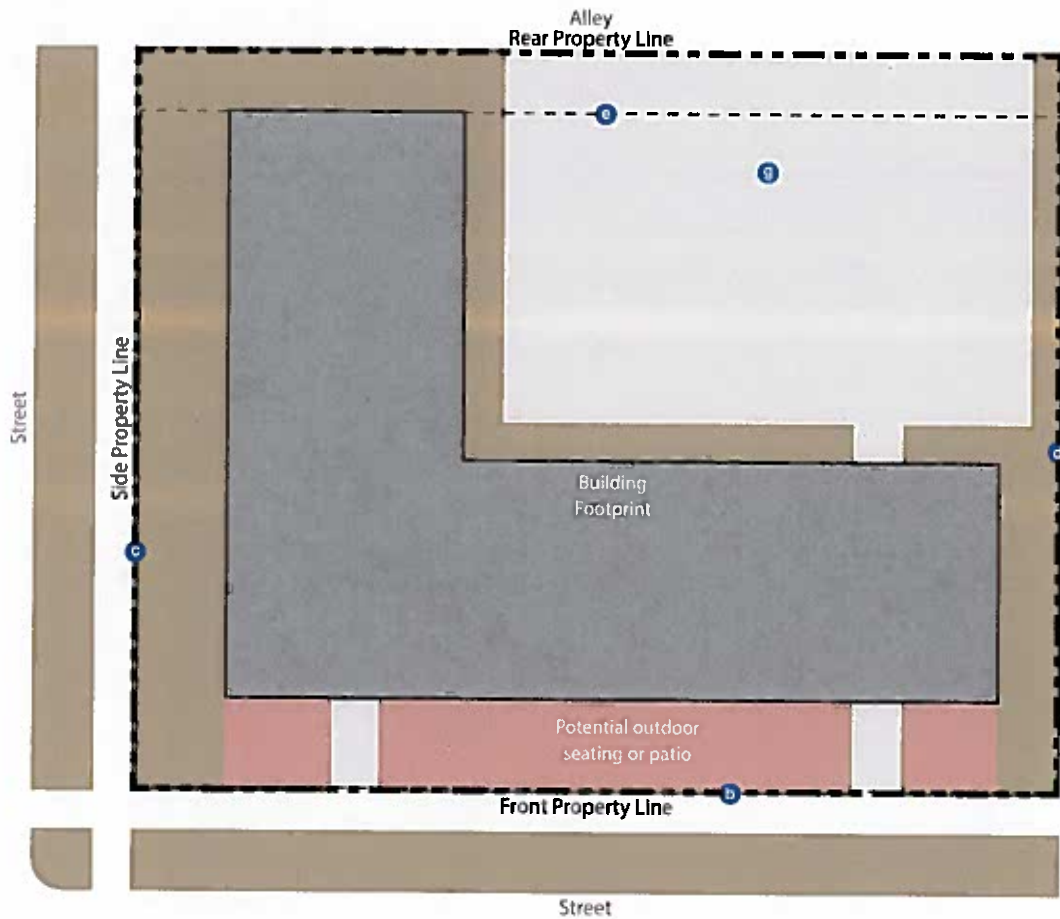
Institutional / Civic
Source: Casabella Architects

BUILDING SITING	
a Lot Width Min/Max	N/A
Front Property Line Coverage Min.	85%
b Front Setback Min/Max*	0'/5'
c Corner Lot Side Yard Setback Min/Max	0'/5'
d Typical Side Yard Setback Zero Side Yard Condition	5' 0'
e Minimum Rear Setback	10'
f Minimum Apron from Alley	7'
Maximum Impervious Coverage	95%
Parking Amount Primary Dwelling Min/Max	See Parking Req's
g Parking Location	Rear
Vehicular Access	From alley; if no alley exists, 1 driveway per street frontage
HEIGHT	
Minimum Overall Height **	2 Stories
Maximum Overall Height	5 Stories
All Stories: Minimum Height Maximum Height	9' 14'
USES	
First Floor***	Retail/ Office
Upper Stories***	Office
STREET FACADE REQUIREMENTS	
Minimum Transparency Facing	10% (of facade area at each story)
Principal Entrance Location per Unit	front, corner, or corner side facade
Required Number of Street Entrances	1 every 75'
ROOF TYPE REQUIREMENTS	
Permitted Roof Types	parapet, pitched, flat, shed
LOT PLAN PROGRAM	
Accessory Dwelling Unit	Not Permitted
Waste, Recycling, and Composting Receptacle	Placed in alley
Stormwater Storage	Roof drain downspouts prohibited from discharging to impervious surfaces. Must discharge to landscaping, or rainwater collection barrel.

*To conditioned space

**Minimum 3-story construction required on gateway lots identified on Regulating Plan (page 156). Maximum 2-story construction on lots within 50' of project perimeter.

*** Refer to Regulating Plan (Page 158)

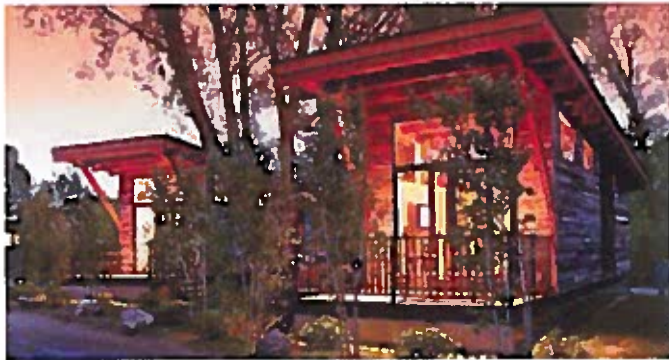


KEY

- BUILDING FOOTPRINT
- PROPERTY LINE
- MAXIMUM BUILDABLE AREA

ECO-COTTAGES

In the Master Plan, there are open areas adjacent to the green fingers of land that are well vegetated and transport storm water to points below. These areas are ripe for the construction of eco-cottages that are placed in what appears to be a relatively random pattern and perform the function of housing and, perhaps, small studios or businesses. These sustainably designed cottages will be about 500 square feet in size with a welcoming porch and can accommodate a single person or a couple as a small home or, as noted above, a small shop such as a coffee house with seating in or out. Parking for these rental units will be on the adjacent street and be accessed by an accessible route through the woods and the units will be connected to other sections of the neighborhood by means of a bridge/boardwalk through the green fingers of Colony Park. The properties will be developed as a condominium regime with the property being owned by the developer. The designs could and should range from contemporary bungalows to traditional cottages comfortably sited in the woods. This unique and affordable housing option can and will be yet another example of how welcoming and progressive Colony Park will be.



Source: Tuck Fauntelroy (www.motherearthliving.com)



Source: <http://www.lanayrls.com>



Source: <http://www.nationwide-homes.com>



Source: <http://www.nationwide-homes.com>



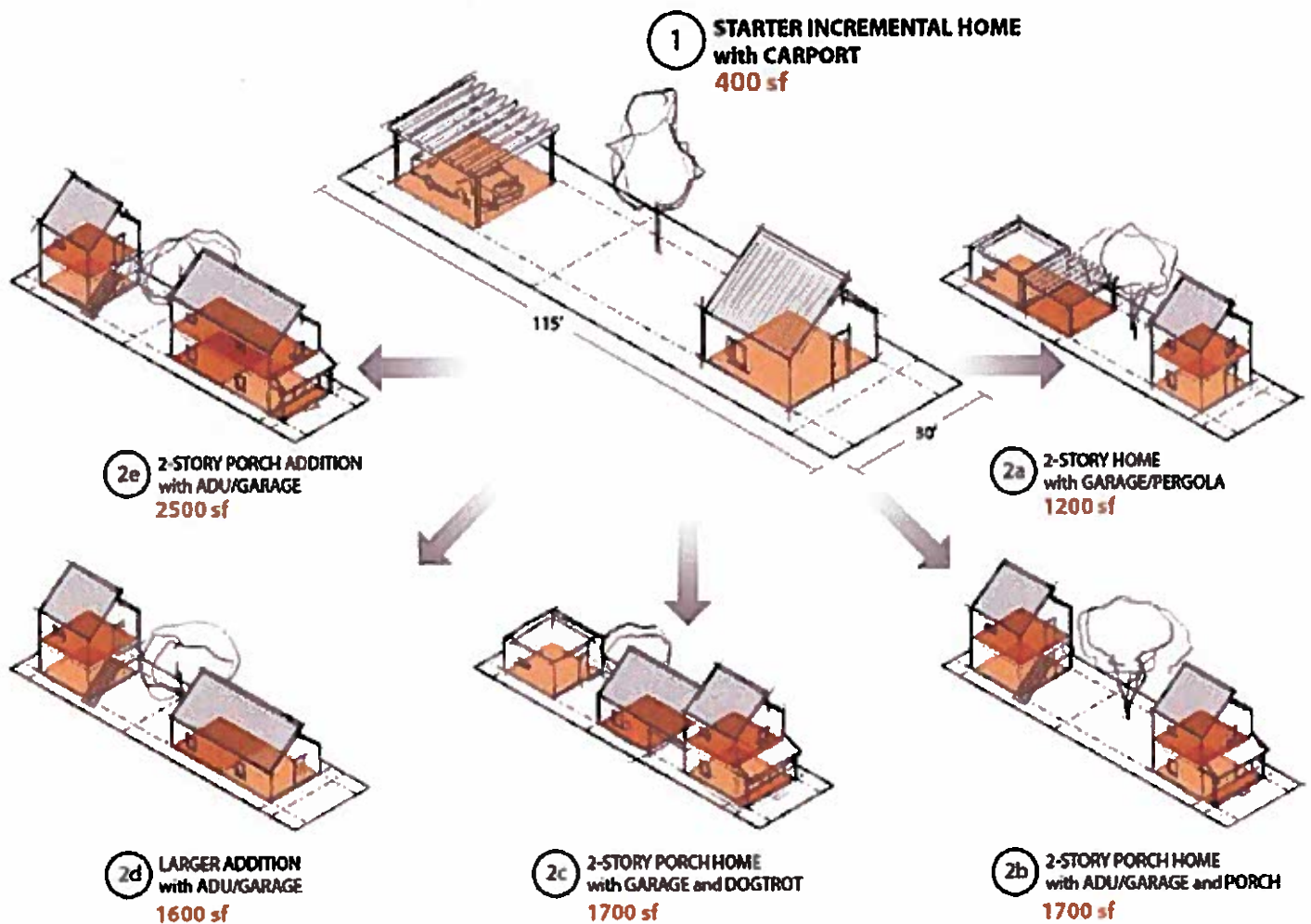
Eco-Cottages
Source: Farr Associates

INCREMENTAL HOUSING

Recognizing the evolving needs of people as they age-in-place, and in efforts to increasing affordability, incremental housing is supported through the Plan. Incremental housing simply allows for a family to start with a small home and add to it over time. Families are able to add square footage as their income allows and supports increases in family sizes.

The methods that can be utilized in growing homes are:

- Front Porch Enclosure
- Side Yard Addition
- Rear Yard Addition
- Upper Story Addition
- Accessory Dwelling Unit Addition



Incremental Housing Additions
Source: Center for Maximum Potential Building Systems

OFF-STREET PARKING

RECOMMENDED OFF-STREET PARKING RATIOS

Cars need to be parked somewhere. The Master Plan envisions new development that accommodates cars while eliminating the need to use cars for internal and short trips. In addition the Master Plan aspires to create safe, low-speed streets, a key strategy of which is on street car parking. For this reason the Master Plan seeks to minimize off-street parking. Inset lots are corner lots that do not have a driveway connection to the alley. These lots do not have an off-street parking requirement.

Building Type	Minimum Off Street	Maximum Off Street	Notes
Single Family, Duplex, Townhome	1.0/Dwelling	2.0/Dwelling	Minimums do not apply to inset lots.
Accessory Dwelling	0/Dwelling	1.0/Dwelling	Minimums do not apply to inset lots.
Multifamily Attached (Stacked and Side)	0.5/Dwelling	1.0/Dwelling	May be further reduced with nearby share car
Mixed Use	Retail: 0 Residential: 0.5	Retail: 1/1000 sf Residential: 1.0	
Town Center/Innovation District/ TOD Mixed use	Retail: 0 Residential: 0.5 Office: 1/1000 sf	Retail: 1/1000 sf Residential: 1.0 Office: 3/1000 sf	May be further reduced with shared parking

Parking Ratios per Building Type
Source: Farr Associates

The City is encouraged to instigate a pilot district where parking is not required, e.g. near the TOD. The City would work with the developer who is interested in constructing car-free residences. Additional requirements will apply when vehicular parking is not required such as expanded bicycle parking (visitor and covered), designated bicycle repair, cargo bicycle rental, showers, etc

SHARED PARKING

Shared parking is a way of reducing the amount of space dedicated to parking lots. The concept behind shared parking is that adjacent uses do not require parking 24 hours a day and opportunities are sought to share parking lots for uses that have different peak demands. Sharing a parking area with another use can help to reduce the number of lots designated as parking, and open those areas up potentially for more development.

An example of this concept would be a church and a restaurant located adjacent to one another. The church needs parking primarily on Sunday, but due to its hours of operations it is typically not as busy during the weekdays. Alternatively, the restaurant will not have many customers on Sunday, but will have them during lunch and/or dinner hours during weekdays and weekend evenings. Sharing their parking will conserve the amount of paved parking surfaces surrounding the buildings and provide opportunities for them to use the space in another way.

UNBUNDLED PARKING

Unbundled parking is a different way of thinking about the cost and use of parking. “Bundled” parking is common—for example, when a person rents an apartment, parking is typically included even if they don’t want it or use it. Unbundling the parking from the apartment provides benefits to both the tenant and the developer or owner by building, and charging for only the parking that is truly needed.

Unbundling parking can be done in a variety of ways:

- When a residential complex or office space is purchased or leased, parking can be bought or rented separately;
- Renters not using a parking space can be offered a discounted rate on their rent;
- Parking costs can be listed as a separate line item in lease agreements to show tenants the cost and enable them to negotiate reductions.

SIGNAGE STANDARDS

The Master Plan seeks to enhance the economy and aesthetic appeal of the Plan through the reasonable, orderly, safe, and effective display of signage. Below are the signage standards and requirements. The standards and requirements herein are recommendations. Once selected, the Master Developer should set the final signage standards.

GENERAL COMPLIANCE

Compliance with the regulations outlined shall be attained under the following situations.

1. **Newly Constructed or Reconstructed Signage.** All new signs and structural improvements to existing signs.
2. **Change in Use for Single Business Signage.** For signage serving one business, whenever the existing Use is changed to a new use resulting in a change in signage, including rewording.
3. **Multiple-Business Signage.** For signage serving multiple businesses, whenever 50% or more of the existing uses are changed to new uses resulting in a change in signage, including rewording.
4. **Damage or Destruction.** When a sign has been damaged or destroyed by fire, collapse, explosion or other cause and the cost of restoration is greater than 50% of the replacement value at the time of the destruction or damage, the replacement sign shall comply with the standards in this article.

SIGN LOCATION

Unless otherwise specified, signs shall only be located within the boundaries of the lot and not in the right-of-way or on public property.

1. Certain Sign types may extend beyond a property line into the right-of-way or public property with permission from the City and in accordance with the regulations outlined in this section.
2. No sign shall be attached to a utility pole, tree, standpipe, gutter, or drain.
3. Signs shall be erected so as to permit free ingress to or egress from any door, window, the roof, or any other exit-way required by the building code or by fire department regulations.
4. No Sign shall be erected or maintained in such a manner as to obstruct free and clear vision of, interfere with, or be confused with any authorized traffic sign, signal, or device.

Zone (Refer to Regulating Plan)	Sign Type							
	Ped-Scale Pole-Mounted	Pole Mounted	Project	Wall	Awning	Canopy- Mounted	Window	Monument
Neighborhood Residential (NR)	●							
Neighborhood Residential - Front Served (NR-FS)	●							
Medium Density Residential (MDR)	●							
High Density Residential (HDR)	●		●	●	●		●	●
Live / Work Enabled (LWE)	●		●	●	●		●	●
Mixed-Use (MU)	●	●	●	●	●	●	●	●
Mixed-Use Permitted MUP)	●	●	●	●	●	●	●	●
Ground Floor Retail (GFR)	●	●	●	●	●	●	●	●
Institutional / Civic (I/C)	●	●	●	●	●	●	●	●
Eco-Cottages (EC)	●							
All Open Space	●							●

Permitted Sign Types per Zone
Source: Farr Associates

ILLUMINATION

All signs shall be illuminated according to the following provisions unless otherwise stated.

1. Signs shall be illuminated only by steady, stationary light sources directed solely at the Sign or internal to it.
2. Individual letters or logos may be internally illuminated as permitted per each sign type; no other portion of the sign shall be internally illuminated, unless otherwise stated.
3. When an external artificial light source is used to illuminate a Sign, the lamp (or bulb) shall be located, shielded, and directed so as to not be visible from any public street or private residence.
 - (a) No receptacle or device housing a permitted light source which is attached to the sign itself shall extend more than 18 inches from the face of the Sign.
 - (b) If ground lighting is used to illuminate a sign, the receptacle or device should not extend more than 12 inches above ground and must be fully screened and housed.
4. The illumination of any sign, resulting from any internal or external artificial light source, shall not exceed 250 nits at the Sign face during the day and 125 nits at the Sign face after sunset, with no light trespass onto adjacent property.
 - (a) Signs located within the following districts are exempt from this standard: Medium-Density Residential (MDR), High-Density Residential (HDR), Live/Work Enabled (LWE), Mixed-Use (MU), Mixed-Use Permitted (MUP), Ground Floor Retail (GFR) and Institutional/Civic (I/C).

COMPUTATION

The following standards generally apply to computing the area of signs by type and by building lot. Refer to the Sign Types on the following pages for more information.

1. Exempt and temporary signs are not included in the maximum signage area calculations, unless otherwise specified.
2. Height for freestanding signs is measured from the average grade at the front property line to the top of the sign, sign cabinet, or cap, whichever is highest.
3. For the purposes of determining area, lot width or frontage is measured along the front property line.
 - (a) If the lot is a corner lot, the width shall be measured along the front yard.
 - (b) Building frontage is the width of the front facade of a building.

OPEN SPACE STANDARDS

As mentioned in Chapter 5: Places, signage in open space areas should serve wayfinding and connectivity purposes. Signage should also complement the surrounding landscaping and natural features. Signs should be similar in height and constructed of harmonious materials to blend in with the landscape.



Educational Signage for Open Space
Source: TBG



Educational Signage for Open Space
Source: TBG



Trail Distance Marker
Source: TBG

SIGN TYPES

The following pages include various sign types that are recommended to be used throughout the development.

PED-SCALE POLE-MOUNTED SIGN

A Ped-Scale Pole-Mounted Sign is freestanding and may be mounted on one or two poles. Three configurations are permitted. Refer to Figure 8.1.

1. A sign mounted onto a double set of poles.
2. A sign mounted on a single pole.
3. A sign hanging from a single pole.

Height	8' maximum height for sign mounted or hanging on a single pole; 5' for sign mounted on double set of poles; Each pole shall have a maximum diameter of 3 inches
Area	8 sq ft maximum area per sign face
Location	Front or Corner Yards
Quantity	1 per lot
Materials	Solid wood, metal & masonry; Plastic & synthetics permitted on Sign face



Examples of Ped-Scale Pole-Mounted Signs

Source: Farr Associates

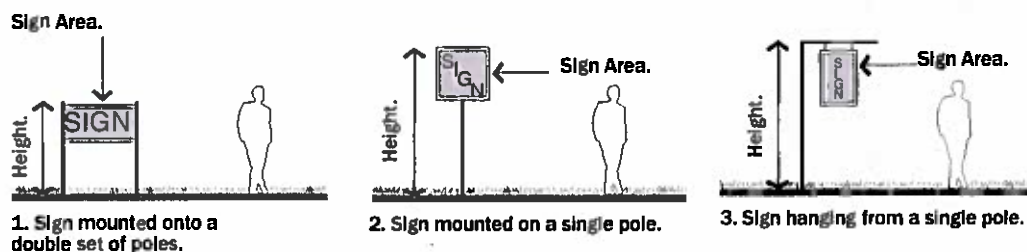


Figure 8.1. Three Types of Ped-Scale Pole-Mounted Signs.

POLE-MOUNTED SIGN

A Pole-Mounted Sign is freestanding with a one or two-faced Sign panel. Three configurations are permitted. Refer to Figure 8.2.

1. A sign mounted onto a double set of poles.
2. A sign mounted on a single pole.
3. A sign hanging from a single pole.

Height	18' maximum height; 6' minimum clearance from bottom of Sign to ground; Each pole shall have a maximum diameter of 6 inches
Area	40 sq ft maximum area per opposite Sign faces; one Sign per pole is permitted
Location	Front or Corner Yards
Quantity	1 per lot
Materials	Solid wood, metal & masonry; Plastic & synthetics permitted on Sign face



Examples of Pole-Mounted Signs

Source: Farr Associates

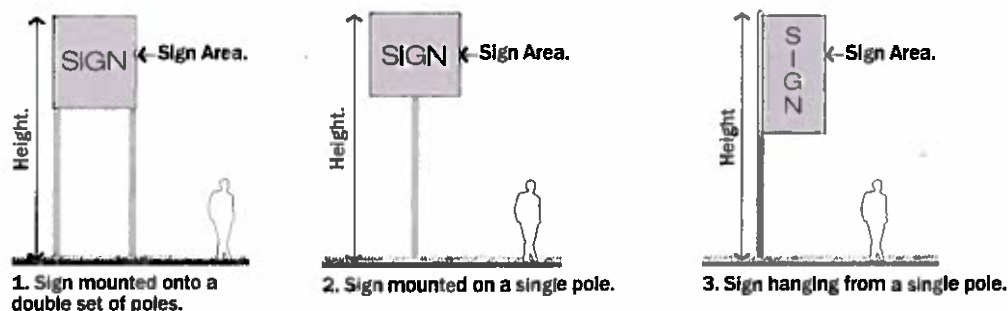
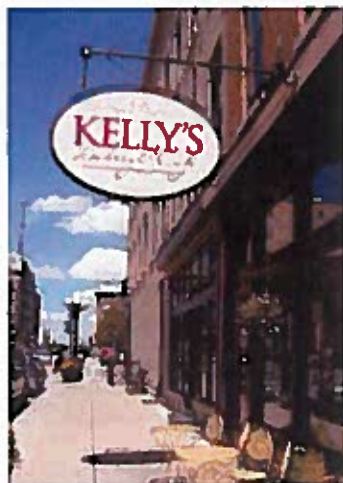


Figure 8.2. Three Types of Pole-Mounted Signs.

PROJECTING SIGN

A Projecting Sign is attached to and projects from a building face or hangs from a support structure attached to the building face. Sign faces are typically perpendicular to the building face, but may be at an angle greater than 45 degrees from the facade. The sign may be vertically or horizontally oriented. Refer to Figure 8.3.

Height	8' maximum sign length, 8' minimum clearance to walk required
Area	No maximum area for sign type
Location	Permitted on all facades; Sign and structural supports shall not extend above the eave or parapet
Quantity	1 per tenant per public ROW frontage; 1 per tenant per side or rear facade on a parking lot
Materials	Solid wood, metal, masonry & neon glass; Plastic & synthetics permitted only as separate alphanumeric characters or logos



Examples of Projecting Signs

Source: Farr Associates

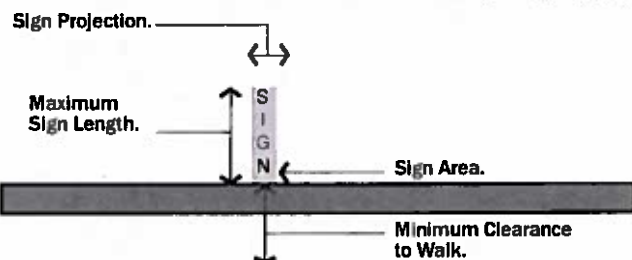


Figure 8.3. Projecting Sign.

WALL SIGN

Wall Signs, also known as flat or band signs, are mounted directly to the building face to which the sign is parallel. Refer to Figures 8.4A and 8.4B. Area is calculated by drawing the smallest possible square or rectangle around the largest letters and/or elements, as is illustrated in Figure 8.4B.

Height	2' maximum letter or element height
Area	No maximum area for sign type
Location	Permitted on all facades
Quantity	1 per tenant per public ROW frontage; 1 per tenant per side or rear facade on a parking lot
Materials	Solid wood, metal, masonry & neon glass; Plastic & synthetics permitted only as separate alphanumeric characters or logos



Examples of Wall Signs

Source: Farr Associates

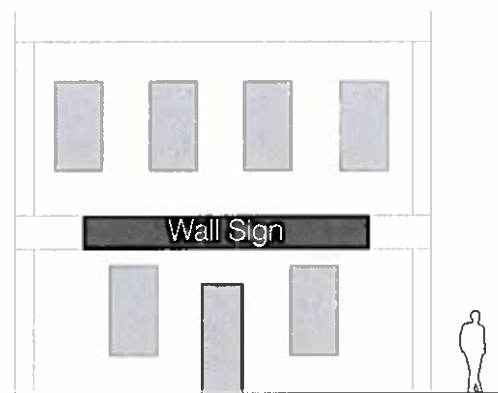


Figure 8.4A. Wall Sign.



Figure 8.4B. Measuring Wall Signs.

AWNING SIGN

A sign that is mounted, painted, or otherwise applied on or attached to an awning or canopy. Refer to Figures 8.5A and 8.5B. The area of an Awning Sign is calculated by drawing the smallest possible square or rectangle around the largest letters and/or elements of the sign portion of the awning.

Height	8' minimum clearance to walk required
Area	Up to 50% of the awning may be used for Signage
Location	Permitted on all facades
Quantity	1 per tenant per street frontage; 1 per tenant per side or rear facade on a parking lot
Materials	Cloth, canvas, metal, or wood; All supports shall be made of metal or wood

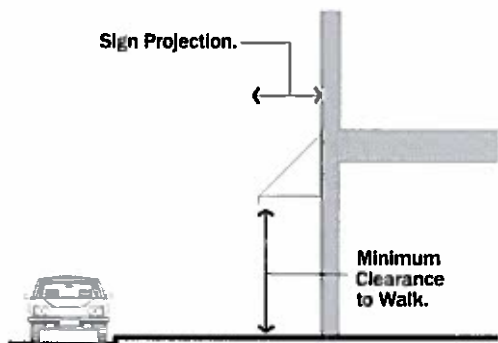
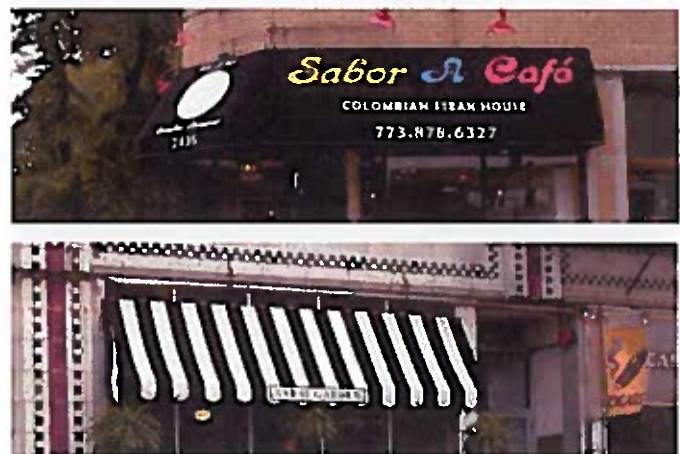


Figure 8.5A. Awning Sign.



Examples of Awning Signs
Source: Farr Associates



Figure 8.5B. Measuring Awning Signs.

CANOPY-MOUNTED SIGN

A sign with individual alphanumeric characters and/or logos that is mounted on top of a permanent canopy. Refer to Figures 8.6A and 8.6B. The area of a Canopy-Mounted Sign is calculated by drawing the smallest possible square or rectangle around the largest letters and/or elements of the sign portion of the Canopy-Mounted Sign.

Height	2' maximum letter or element height; Cannot project more than 2' above roof line of canopy
Area	No maximum area for sign type
Location	Permitted on all facades; not intended for the principal roof of the building
Quantity	1 per tenant per public ROW frontage; 1 per tenant per side or rear facade on a parking lot
Materials	Solid wood, metal, & neon glass; Plastic & synthetics permitted only as separate alphanumeric characters or logos

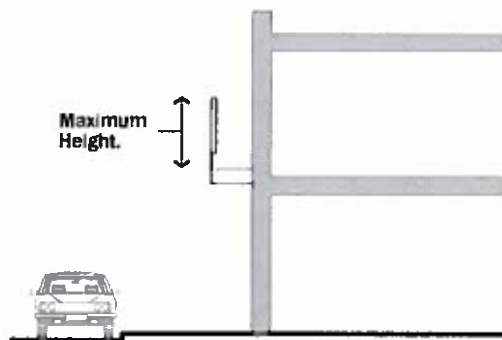


Figure 8.6A. Canopy-Mounted Signs.



Examples of Canopy-Mounted Signs
Source: Farr Associates

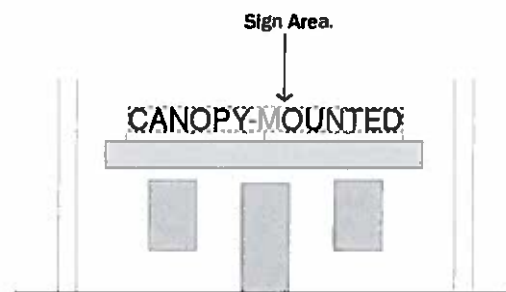


Figure 8.6B. Measuring Canopy-Mounted Signs.

WINDOW SIGN

A Window Sign is posted, painted, placed, or affixed in or on a window exposed for public view or is a sign hung inside the building facing the window for public view. Refer to Figure 8.7. A series of windows that are separated by frames or supporting material of less than six inches in width shall be considered a single window for the purposes of computation. To measure sign area percentage, divide the total sign area by the total window area.

Height	No maximum height for sign type
Area	Up to 30% of a set of continuous windows may be covered with signage; No more than 50% of any one window panel may be covered with signage
Location	Permitted on all facades
Quantity	No maximum quantity, based on window Sign area for ground story; 1 per tenant per floor for upper stories
Materials	Drawn, painted, or affixed on the glass; Wood, metal, neon glass, plastic, or other similar materials also permitted

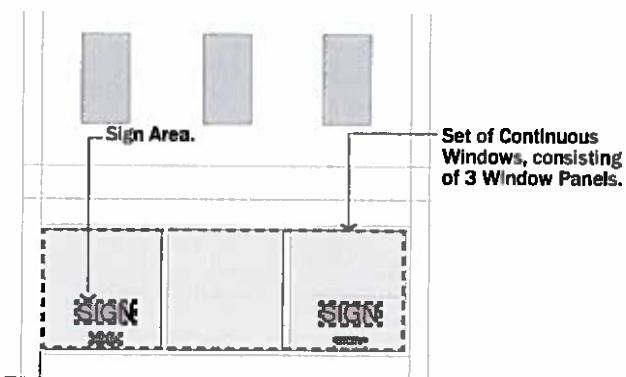


Figure 8.7. Measuring Window Signs.



Examples of Window Signs
Source: Farr Associates

MONUMENT SIGN

A Monument Sign is freestanding; it is located in a front or side yard of a lot. Refer to Figure 8.8. The area of a two-sided Monument Sign is equal to the area of one Sign face. Height shall include the sign face, base, cabinet, and ornamental cap. Multiple tenant buildings on a lot with a width of greater than 300 feet may have up to two Monument Signs on one frontage at least 150 feet apart.

Height	Maximum height 6'
Area	Maximum 70 sq ft per Sign face
Location	Front or Corner Yards
Quantity	1 per public ROW frontage
Materials	Solid wood, metal & masonry; Plastic & synthetics permitted on Sign face

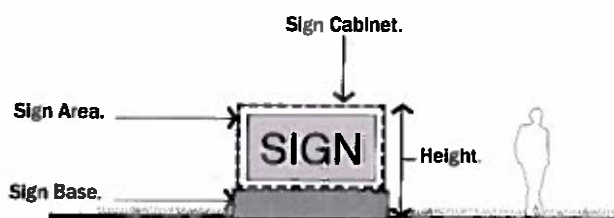


Figure 8.8. Monument Signs.



Examples of Monument Signs
Source: Farr Associates

GREEN BUILDING PRACTICES

GREEN BUILDING OVERVIEW

The Colony Park Planned Unit Development (PUD) requires compliance with the Tier 1 requirement of Austin Energy Green Building (AEGB) two-star rating for all buildings in the development, using AEGB's single- and multi-family residential and commercial rating systems. In addition, the U.S. Green Building Council's LEED for Neighborhood Development (LEED-ND) offers a rating system to guide and measure sustainable urbanism practices at the neighborhood scale. The Master Plan has potential to meet all LEED-ND v4 prerequisites, and to earn sufficient points to achieve a "Certified" certification level or higher. Other USGBC rating systems, including LEED for New Construction, LEED for Homes, LEED for Retail, etc., guide and provide third-party certification to various types of building over the life of the development, and can be pursued in addition to the AEGB ratings. These metric tools will be used to align the CPSCI Master Plan goals and objectives with specific strategies, and to verify compliance.

ENERGY INTENSITY

*** RECOMMENDED ENERGY INTENSITY: 5.5 – 6.0 kWh/square foot/year

The recommended Energy Intensity for new homes developed according to the Master Plan is in the range of 5.5 – 6.0 kilowatt-hours per square foot annually. This range is an estimate of the local energy code anticipated to be in effect when the first building permits for housing at Colony Park are issued, based on the current trajectory established by recent local energy code amendments. Energy Intensity may be calculated by estimating the annual energy consumption of the home in kilowatt-hours with an energy model that uses an hour-by-hour simulation, and dividing this total annual energy consumption by the square footage of the total conditioned space.

WHAT IS ENERGY MODELING?

Energy modeling is a method for estimating the annual energy consumption of a building with computer software that uses a mathematical model to calculate energy use based on the climate (local weather data), building orientation, design, envelope, equipment, appliances, and occupancy, among other factors. Use of energy modeling to estimate energy consumption allows design decisions to be based on the expected performance of the building rather than prescribing certain values, such as insulation values, window size, or roofing material. Since this guide is performance based, rather than prescriptive, all of the recommended values and strategies may vary in order to achieve the recommended Energy Intensity. However, minimum code and Austin Energy Green Building requirements must still be met.

The total annual energy consumption includes all energy uses in the entire house, including HVAC, lighting, appliances, and miscellaneous loads. Solar electric systems are not to be included in the model to estimate the annual energy consumption of the home, although the model may include a solar thermal system. An Energy Intensity range is provided, since smaller homes (< 1,000 sf) will likely trend toward the 6.0 kWh/sf value, while larger homes (> 1,000 sf) may trend toward the 5.5 kWh/sf value.

The following guidelines are provided to achieve the required Energy Intensity for each home. Please see Table 8.1 for a summary.

ORIENTATION (SUN AND WIND)

If orientation guidelines are not met, compensating community solar opportunities must be provided.

- The long axis of the house should run east-west such that the larger facades face north and south.
- Orient the home such that a line perpendicular to the E-W axis falls within an arc ranging from 10 degrees east of south to 30 degrees west of south.
- Place operable windows on opposite sides of the house with openings between such that southeasterly prevailing breezes may provide cross ventilation from one side of the house to the other.

WINDOWS

- The window to floor area ratio should be in the 25 – 30% range.
- South facing windows should be shaded by an overhang or awning that adequately shades the window during the cooling season. This means that the shadow cast by the shading device, whether overhang or awning, should fall on the window sill at noon on the Spring Equinox (March 21).
- Any overhead glazing, such as clerestories and light monitors should be included in the above window to floor ratio guideline.
- Windows should have a U-Factor of 0.30 or less and Solar Heat Gain Coefficient (SHGC) of 0.23 or less

INSULATION

- Walls: Cavity R-value = R19 + Sheathing R-Value = R3
 - This may be achieved with 2x6 construction and filling the wall cavity with either open cell spray foam or blown-in insulation, such as cellulose or fiberglass in addition to structural insulated sheathing on the exterior. Must be formaldehyde-free.
- Perimeter: Provide edge Insulation of R-4 or equal to a depth of 18 inches for slab on grade foundations.
 - This may be achieved with extruded polystyrene rigid insulation.
- Floor: Insulate raised floors (over unconditioned space) to R30 or better. (For more information in regards to foundation design, please refer to Chapter 9: Technical Appendix.)

MECHANICAL EQUIPMENT

- Provide a heat pump: 21 SEER and HSPF = 10

HOT WATER

- Recommend a heat pump water heater or solar thermal system with electric or gas back-up.

LIGHTING

- All lamps installed in all lighting fixtures should be high efficacy and ENERGY STAR rated. LED is preferred.

APPLIANCES

- All appliances should be ENERGY STAR rated. (Note that ENERGY STAR will extend rating to clothes dryers by 2016)

NET ZERO ENERGY CAPABLE HOUSING

CPSCI ZERO ENERGY CAPABLE HOMES DESIGN GUIDELINES COMPARISON TO AEGBP 2-STAR			
	AEGBP 2 - Star (SF 2013 Version)	RATIONALE	CPSCI Zero Energy Capable Homes Design Guidelines
Orientation	Include in Manual J calcs	Proper Orientation with Shading Minimizes Solar Gain	10 deg east of South to 30 deg west of South
Insulation	Same R-Value as Current Code + ENERGY STAR Grade 1 Installation + No Added Urea Formaldehyde	Keep the Same	ENERGY STAR Grade 1 Installation + No Added Urea Formaldehyde
Walls	R15 or R13 + 2	Better Wall and Either Better Floor Insulation or Slab Insulation Saves Energy	R19 + 3
Floor Insulation (pier and beam foundation)	R13		R30
Perimeter Insulation (slab on grade foundations)	n/a		R4
Roof	R38		No additional req.
Windows (U-factor/SHGC)	0.40/0.25	Lower U-Factor Saves Energy	0.30/0.23
Mechanical System	15 SEER/ 8.2 HSPF	Heating & Cooling Use The Most Energy	21 SEER/ 10 HSPF
Hot Water Heater	0.93 Efficiency + Timer for Electric Water Heater	Heat Pump Efficiency is 2.2 and Solar is 1.2	Heat Pump or Solar Thermal Hot Water Systems
Lighting	90% High Efficacy* Lamps	Incandescent Lamps Do Not Qualify as High Efficacy*	100% High Efficacy* Lamps
Appliances	> 4 ENERGY STAR Includ- ing Appliances, Ventilation Fans, Light Fixtures, Ceiling Fans	ENERGY STAR Refriger- ators, Dishwashers, and Clothes-washers Save Energy	All ENERGY STAR Appliances

* High Efficacy is defined as 60 lumens/W for lamps over 40W;
50 lumens/W for lamps over 15W to 40W; 40 lumens/W for lamps 15W or less.

Table 8.1. Zero Energy Guidelines Comparison
Source: Austin Community Design and Development Center, created May 1, 2014

RENEWABLE ENERGY DESIGN

The following guidelines are for all single-family homes whether or not on-site renewable energy systems are installed at initial construction. Although on-site renewable energy systems may not be installed on all homes at initial construction, each home should be designed as follows for future renewable energy installations.

- Each home should have 30 – 35% of unshaded south facing roof area as a percentage of floor area with a recommended maximum roof pitch between 3/12 and 9/12
- Any roof penetrations from below, including plumbing vents for kitchen and bathrooms need to be coordinated with expected future the solar panel installation, such that the 30 – 35% of unshaded south facing roof area does not have any penetrations. It is recommended that all roof vents, plumbing vents, and other essential roof surface penetrations be located on north sloping roofs.
- Please see Table 8.2 below for a sample PV system sizing calculation. A typical solar thermal panel is 26.5 sf and typically two are needed for each dwelling unit.
- Metal roofs shall be standing seam with a profile that is compatible with solar electric array mounting clamps in order to avoid unnecessary penetrations.
- Roof structures shall be designed to support an additional 5 lb/sf of additional weight.
- Provide a solar ready electrical system as follows (see solar ready diagrams):
 - Provide at least 6 linear feet of exterior wall space in a readily accessible location for a DC disconnect, inverter, AC disconnect and, PV meter and AC disconnect to be mounted.
 - Provide a minimum 1" diameter electrical conduit from the main electric panel location to the attic near the unshaded south facing roof area described above.
 - Provide a main electrical panel with the proper panel and main disconnect ratings, as well as a slot for a photovoltaic back-fed circuit breaker.

SAMPLE HOUSE SIZE (SF): 1,000

ENERGY INTENSITY (KWH/SF): 6

ANNUAL ENERGY CONSUMPTION KWH: 6,000 (FROM ENERGY MODEL)

SAMPLE PV ARRAY SIZING TABLE**			
	PV Panel A*	PV Panel B*	PV Panel C*
Rated Watts/Panel	265	310	330
Estimated Annual kWh/Panel^	361	422	449
PV Panel Size (sf)	17.62	20.89	17.55
# PV Panels to Meet Load	17	14	13
Area of PV Panels to Meet Load	293	297	235
Area of PV Panels as a % of Floor Area	29%	30%	23%

•
Panel A: Jinko Solar 265
Panel B: Jinko Solar 310
Panel C: Sunpower 330

^ from PV Watts (<http://rredc.nrel.gov/solar/calculators/pvwatts/version1/US/Texas/Austin.html>)

** This table assumes that hot water is provided by a heat pump water heater powered by photovoltaic (PV) panels. If a solar thermal system with electric back-up is used for hot water, then solar thermal panels will be required and the amount of roof area required for all solar panels will be more than then percentages shown in this table. Thus the rule of thumb is that the unshaded roof area required for all solar panels is 30 - 35% of the floor area.

Table 8.2. Sample PV Sizing

Source: Austin Community Design and Development Center, created May 1, 2014



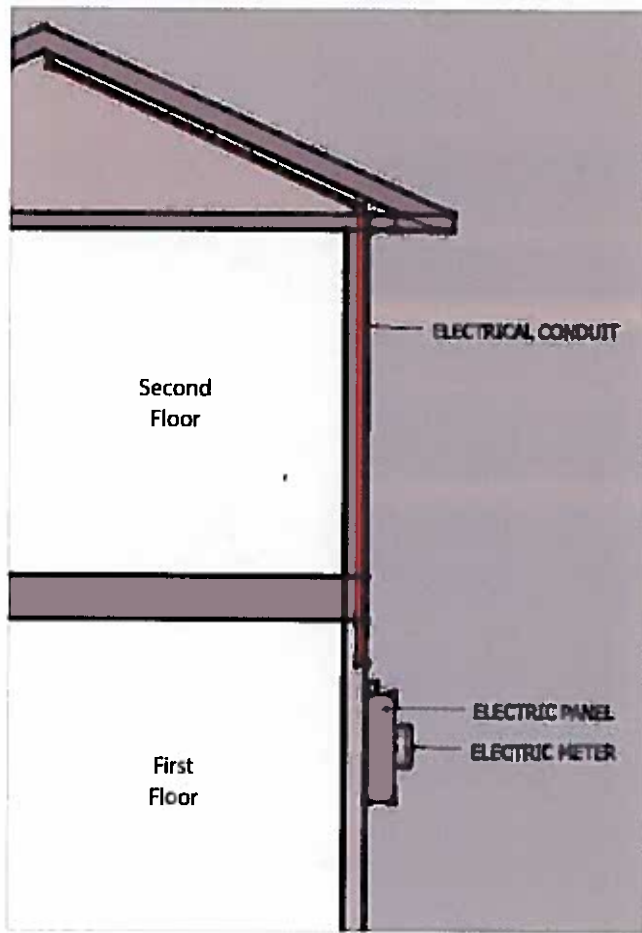
Solar PV Hardware

Source: Austin Community Design and Development Center

SOLAR PV HARDWARE

The PV hardware requires approximately six feet of space along an exterior wall that includes the main electric panel and the utility meter. In the image to the left, the pictured components (from left to right) are the following:

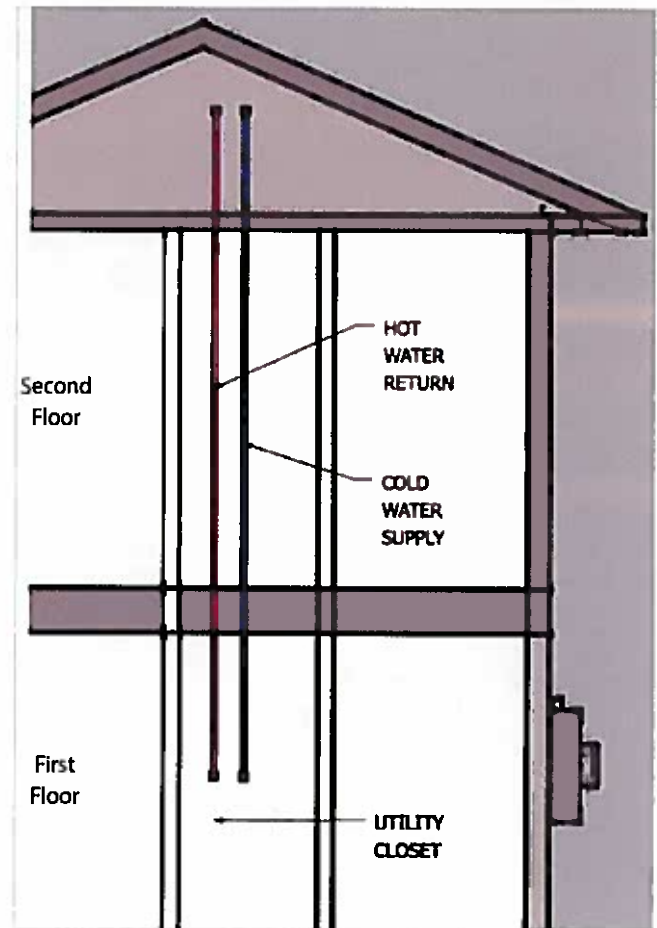
- Disconnect switch between the rooftop PV panels and the inverter
- Solar DC to household AC inverter
- Disconnect switch between the inverter and solar meter to isolate the inverter for replacement
- Solar electric meter
- Main electric panel
- Utility electric meter



Solar Ready Electrical Conduit
Source: Austin Community Design and Development Center

SOLAR READY ELECTRIC (GRID-TIED PHOTOVOLTAIC)
Install 1" diameter electrical conduit (orange pipe above) from the ridge of the south roof down to the exterior wall where the main electrical panel and utility meter will be located. If the attic is accessible, then it is not necessary that the conduit penetrate the roof until the solar PV panels are installed.

SOLAR READY THERMAL (WATER HEATING)
Install 3/4" diameter cold water supply (blue) pipe and hot water return (red) pipe from the ridge of the south roof down to a closet or utility room where the heat exchanger and solar thermal storage tank (may also be the back-up water heater) will be installed. There must initially be an accessible pathway from the collectors to the tank area so as to allow two 3/4" insulated pipes to be sloped downward at least 1/4" per foot the entire pipe run. The recommended closet size is 3'x 4' and a height of 7'6". It should have one 110V receptacle next to the tank for the water pump. If the attic is accessible, then it is not necessary that the pipes penetrate the roof until the solar thermal panels are installed.



Solar Ready Water Heating
Source: Austin Community Design and Development Center

WATER USE REDUCTION

Reduced water use not only saves water; it also lowers water bills. The Project is subject to City of Austin residential water rates structured to incentivize conservation, with lower rates per 1000 gallons associated with lower overall monthly water consumption. The most recent approved rates, effective 11/1/13, introduced a fifth pricing tier to further incentivize conservation.

Conservation and collection measures can be easily introduced both to existing neighborhood residences and in future residential and commercial construction. The Master Plan calls for the installation of water-conserving plumbing fixtures in all new construction to meet or exceed to Code-approved maximums (refer to Table 8.3).

Fixture	Flow Rate
Toilet	1.28 gpf
Urinals	0.5 gpf
Shower	2.5 gpm
Faucets	0.5 gpf

Table 8.3. Code Required Fixtures and Flow Rates
Source: Uniform Plumbing Code with Austin Amendments, effective October 1, 2010

The Master Plan calls for the allowance of rainwater collection at a parcel scale. When designing rainwater catchment systems, the major variables are catchment area (i.e., roof), rainfall, and storage volume (i.e., cistern). Systems will ideally be designed such that there is sufficient storage capacity to ensure there is always water in the cistern to supply water during extended periods without rain. For rainwater collection systems that do not contribute to stormwater management calculations, there is no limit on the length of time the rainwater can remain in the cistern. When rainwater harvesting systems contribute to stormwater management calculations, the water is required to be released within 72-hours of capture.

LEED RATING SYSTEMS

The Master Plan has included an assessment of LEED for Neighborhood Development (LEED-ND) v4 prerequisites to ensure that the project aligns well with its goals and metrics. If the project pursues LEED-ND certification, it is expected to qualify for a "Certified" level of certification or higher. Large-scale LEED-ND projects such as Colony Park face challenges, particularly in contexts where surrounding development is primarily single-use in nature and for which there are multiple construction phases over many years; regardless, the project is well positioned to reach a level of certification under LEED-ND. To address this, the Green Building Certification Institute (GBCI) has published guidance materials for large projects (320 acres and above). In addition, because of the anticipated phasing of construction over the course of the project build-out, it may be preferred to assign LEED-ND project boundaries according to the phases of construction instead of the entire development. This would result in several discrete LEED-ND projects that would be easier to manage than the entire development site. It would also enable early phase development to contribute to connectivity and diverse uses and opening up additional opportunities for builders to use targeted LEED rating systems such as LEED for Homes.

A single LEED-certified building is a prerequisite of LEED-ND v4; LEED-ND offers additional points for tiered levels of LEED-certified buildings within the LEED-ND boundary. This represents an opportunity for green building practices to advance LEED certification under both the building and neighborhood scales.

Please see Table 8.5 for a comparison of the Master Plan to the LEED-ND v4 prerequisites.

AUSTIN ENERGY GREEN BUILDING

SINGLE FAMILY

The Austin Energy Green Building (AEGB) Single Family Rating is made up of a series of Basic Requirements required for all rated projects and seven additional categories containing measures that can be achieved to attain points for a higher rating. All Basic Requirements must be fulfilled for a home to qualify for a Rating. Compliance with all Basic Requirements

achieves a score for a 1-Star Rating (without any additional points needed from the other categories). The seven additional compliance categories are the following:

- Education
- Site
- Energy
- Water
- Materials and Resources
- Indoor Environmental Quality
- Innovation

Points are earned for implementing green measures in the above categories. No negative points are assigned for failing to implement a given measure. It is not possible for all of the recommended green building measures to be implemented in a given house. In fact, many are mutually exclusive. A minimum number of points are required for each star level beyond 1-Star and specific measures, called Special Requirements, are required for each star level, as well.

For all new single family residences in the project, a minimum rating of 2 Stars must be achieved in the AEGB Single Family Program.

MULTIFAMILY AND COMMERCIAL

Similar to single family developments, multifamily and commercial developments must fulfill the basic requirements to be AEGB rated (please see Table 8.4 for AEGB Star Level ratings for all three development types). Also in similarity, multifamily and commercial developments are judged in similar compliance categories as single family developments, with the addition of Team for multifamily and Integrated Design for commercial developments.

The Multifamily Rating is applicable to residential and mixed-use developments six stories or less in height. Residential and mixed-use developments higher than six stories shall use the Commercial Rating. If there is more than one building in a development, each building must meet AEGB requirements.

Star Level	Single Family	Multifamily	Commercial
1	Basic Reqs	Basic Reqs	Basic Reqs
2	25-49 Points + all 2 Star Reqs.	29-42 Points	35-44 Points
3	50-74 Points + all 3 Star Reqs.	43-51 Points	45-54 Points
4	75-99 Points + all 4 Star Reqs.	52-66 Points	55-74 Points
5	100-Higher Points + all 5 Star Reqs.	67+ Points	75+ Points

Table 8.4 Austin Energy Green Building Star Level Ratings
Source: Austin Energy

PREREQUISITE	REQUIREMENTS	MASTER PLAN
Smart Location and Linkage		
SLLp1: Smart Location	Project must demonstrate at least 25% of its perimeter bordering previously developed parcels (Infill Site) or qualify as a Site Served by Transit	As Project evolves, it will be important to determine the qualifications of its neighboring parcels to assess the means by which to achieve this prerequisite
SLLp2: Imperiled Species & Ecological Communities Conservation	Conservation Plan or its equivalent required if affected species or ecological communities are found on Project site	Project has the potential to meet requirements
SLLp3: Wetland & Water Body Conservation	Project must maintain a minimum 50' buffer from identified riparian areas and wetlands	Master Plan maintains a minimum 100' buffer from all riparian areas and wetlands
SLLp4: Agricultural Land Conservation	Project must not sit on agricultural preservation district or farmland	Master Plan does not include agricultural preservation district or farmland
SLLp5: Floodplain Avoidance	Project may not be located within Flood Hazard Area	Plan does not call for any development within Flood Hazard Areas
Neighborhood Pattern and Design		
NPDp1: Walkable Streets	Project must contain at least 15% of street frontage which demonstrates a minimum street-width-to-building-height ratio of 1:1.5 and have sidewalks or their equivalent on both sides at least 90% of Project streets	Project has the potential to meet requirements
NPDp2: Compact Development	Project must meet residential and non-residential density requirements: ≥ 12 D.U./ac Residential (Transit) ≥ 7 D.U./ac Residential ≥ 0.8 FAR Non-Residential (Transit) ≥ 0.5 FAR Non-Residential	Project has the potential to meet requirements
NPDp3: Connected and Open Community	Project must include a minimum of 140 internal intersections per square mile and at least one through-street at Project boundary every 800 feet, excluding physical obstacles	Project has the potential to meet requirements
Green Infrastructure and Buildings		
GIBp1: Green Infrastructure & Building	At least one building in project must be certified through LEED rating system	At least one building in project would be certified through the LEED rating system (AEGB does not apply to credit)
GIBp2: Minimum Building Energy Performance	At least 90% of total building floor area must demonstrate a 5% minimum energy performance improvement from baseline	Project has the potential to meet requirements
GIBp3: Indoor Water Use Reduction	New buildings must demonstrate a minimum average of 20% water use reduction from baseline	This is a requirement of AEGB 2-Star Rating and will be required for Master Plan
GIBp4: Construction Activity Pollution Program	Plan would require the creation and implementation of an erosion and sedimentation control plan for all new construction activities, incorporating best management practices	Project has the potential to meet requirements

Table 8.5 LEED for Neighborhood Development v4 Prerequisites
Source: Center for Maximum Potential Building Systems

PARCEL SOLAR ACCESS

SOLAR ACCESS AREAS

Blocks within the Master Plan have been oriented to maximize solar gain. Developers should subdivide blocks so that lots are able to take advantage of solar access. Areas may have homogeneous lots sizes and orientations. If so, then solar access guidelines may be established for each solar access area or block. In the case of areas or blocks with various lot sizes and orientations, the worst-case scenario of solar access shall be used as a solar access guideline. The worst-case scenario is a one-story residence with a shallow pitched gable roof, with minimum north and south setbacks (e.g., 3 feet), on the narrowest lot allowed in the neighborhood or zoning district (e.g., 25 feet).

SINGLE FAMILY RESIDENTIAL SOLAR FENCE

A hypothetical solar fence shall exist for each single family residential lot. Each solar fence completely encloses the lot in question and its foundation is contiguous with the lot lines. The bottom elevation of the fence shall be the average finish grade elevation of the residence for which solar access is being protected. The fence is opaque and lacks any thickness.

SOLAR ACCESS SITING

For purposes of insuring the potential for utilization of solar energy and complying with the Zero Energy Capable Home (ZECH) amendments to the city of Austin energy code, all new single family residences shall have a roof that meets the following criteria:

- is flat or has a south facing surface,
- if sloping, then is oriented within ten degrees east of and thirty degrees west of south, and is structurally capable of supporting at least one-third the floor area of the conditioned space of the residence in solar energy electric generation equipment.

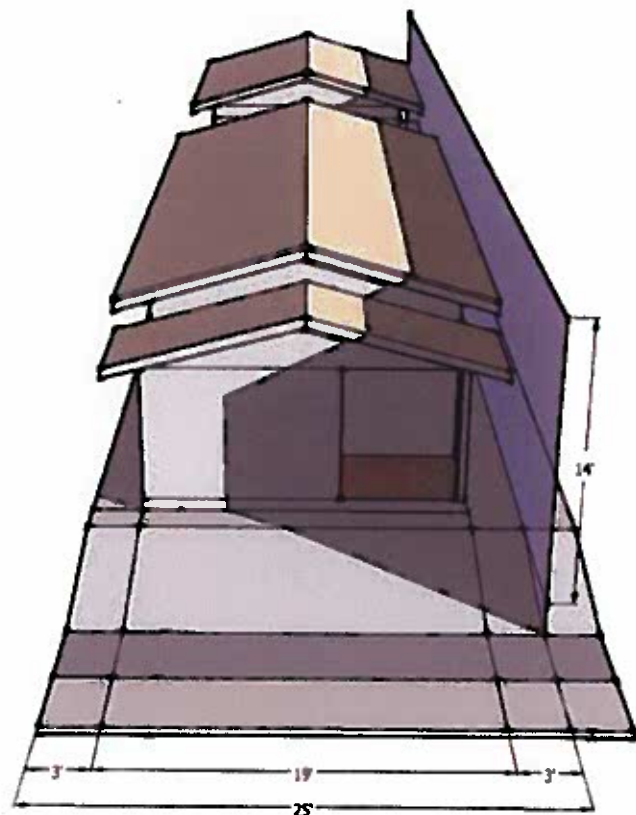
ZERO OR NEGLIGIBLE SLOPES

THREE (3) FOOT SETBACK - 25 FT. WIDE LOT

The worst-case scenario shall apply to all single family lots that have a south setback of three (3) feet. In areas where the worst-case scenario is the governing condition, then no object or structure shall be constructed on any other SF residential lot that would shade a protected SF lot to a greater degree than the lot would be shaded by a solar fence fourteen (14) feet in height, between two hours before (10:00am) and two hours after (2:00pm) local solar noon (12:00) on the winter solstice (usually Dec. 21).

Protecting an unshaded south facing roof surface equal to one third of the conditioned floor area was the criterion used to determine the height of the solar fence. This much area provides enough south facing surface to install a solar PV array capable of meeting 100% of the average annual energy use of the residence.

SOLAR FENCE / 3 FOOT SETBACK	
Lot Width	25 feet
Setbacks	3 feet
Residence	One Story with Alley Access Garage
Roof Style	3/12 Pitch Gable
Solar Roof	33% of Conditioned Floor area
Site	Zero or Negligible Slope
SOLAR FENCE	14 Feet (blue pane in diagram)



Solar Fence: 3 Foot Setback
2:00pm, December 21, 30 Deg. N

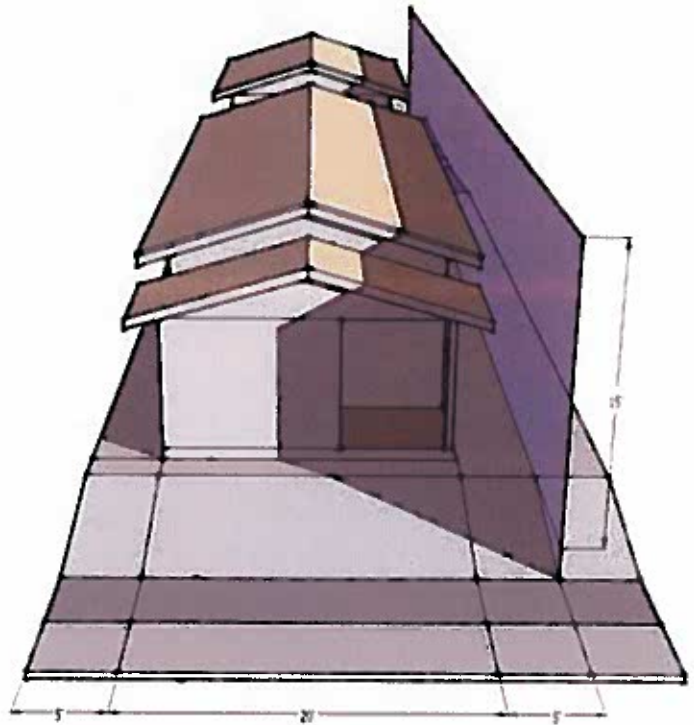
Source: Austin Community Design and Development Center

FIVE (5) FOOT SETBACK - 30 FT. WIDE LOT

In areas where a south setback of three (3) does not occur, then a south setback of five (5) feet shall be the governing condition. In these areas, no object or structure shall be constructed on any other SF residential lot that would shade a protected SF lot to a greater degree than the lot would be shaded by a solar fence fifteen (15) feet in height, between two hours before (10:00am) and two hours after (2:00pm) local solar noon (12:00) on the winter solstice (usually Dec. 21).

Similar to the three foot setback condition above, protecting an unshaded south facing roof surface equal to one third of the conditioned floor area was the criterion used to determine the height of the solar fence. As with the three foot setback, this much area provides enough south facing surface to install a solar PV array capable of meeting 100% of the average annual energy use of the residence.

SOLAR FENCE / 5 FOOT SETBACK	
Lot Width	30 feet
Setbacks	5 feet
Residence	One Story with Alley Access Garage
Roof Style	3/12 Pitch Gable
Solar Roof	33% of Conditioned Floor area
Site	Zero or Negligible Slope
SOLAR FENCE	15 Feet (blue pane in diagram)



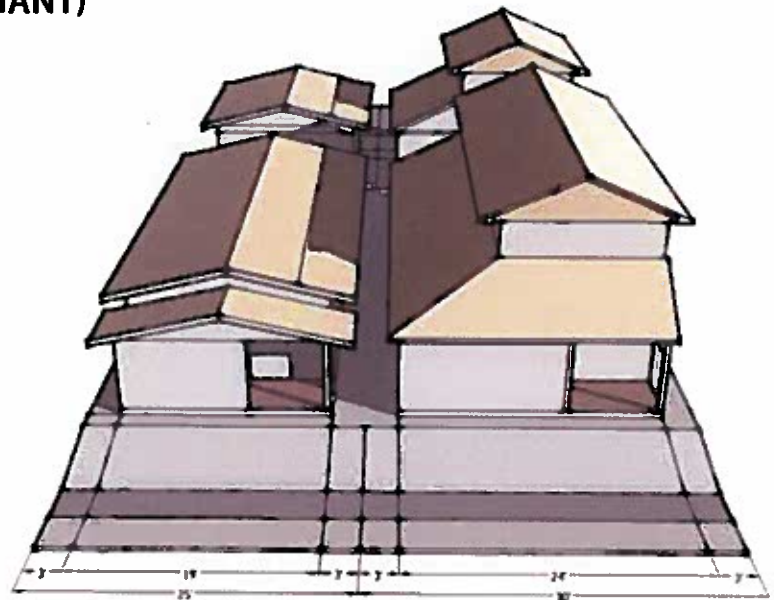
Solar Fence: 5 Foot Setback
2:00pm, December 21, 30 Deg. N
Source: Austin Community Design and Development Center

ZERO OR NEGLIGIBLE SLOPES (COMPLIANT)

THREE (3) FOOT SETBACK - 30 FT. WIDE LOT

The adjacent neighbor to the south is built on the setback line 3 feet south of the north property line on a lot width of 30 feet. The residence has been designed with a partial second story. The peak of the two-story roof does not cast a shadow over the solar fence. The south roof of the one story residence to the north has adequate solar access. The neighboring two-story residence complies with the solar fence guideline.

SOLAR FENCE / 3 FOOT SETBACK / COMPLIANCE (30 FT. WIDE LOT)	
Lot Width	25 feet
Setbacks	3 feet
Residence	One Story with Alley Access Garage
Roof Style	3/12 Pitch Gable
Site	Zero or Negligible Slope
Neighbor	Partial Two Stories with Alley Access Garage on 30 ft. Wide Lot
Roof Style	6/12 Pitch Gable

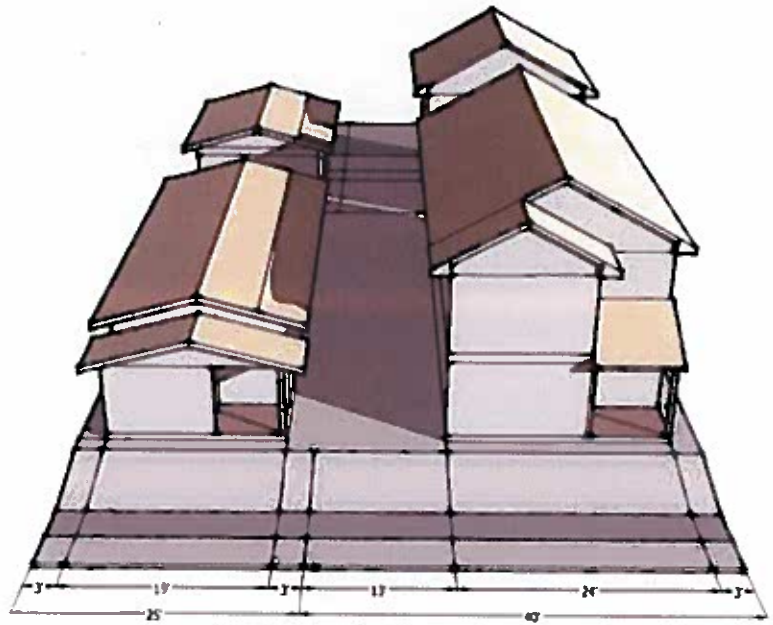


Solar Fence: 3 Foot Setback , Compliance (30 ft. Wide Lot)
2:00pm, December 21, 30 Deg. N
Source: Austin Community Design and Development Center

THREE (3) FOOT SETBACK - 40 FT. WIDE LOT

The adjacent neighbor to the south is built 13 feet south of the north property line on a lot width of 40 feet. The lot width has been increased by 10 feet. The peak of the two-story roof does not cast a shadow over the solar fence. The south roof of the one story residence to the north has adequate solar access. The neighboring two-story residence complies with the solar fence guideline.

SOLAR FENCE / 3 FOOT SETBACK / COMPLIANCE (40 FT. WIDE LOT)	
Lot Width	25 feet
Setbacks	3 feet
Residence	One Story with Alley Access Garage
Roof Style	3/12 Pitch Gable
Site	Zero or Negligible Slope
Neighbor	Two Stories with Alley Access Garage on 40 ft. Wide Lot
Roof Style	6/12 Pitch Gable



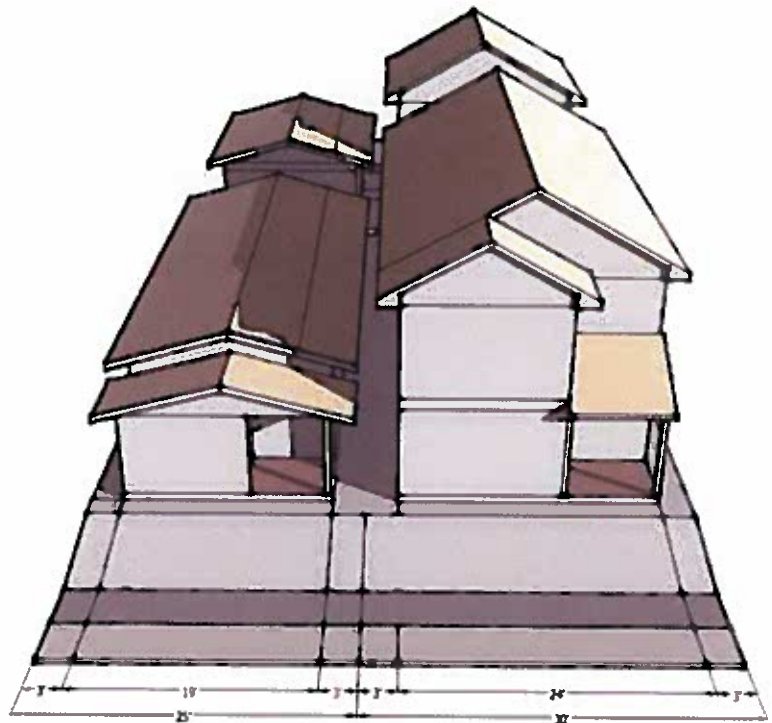
Solar Fence: 3 Foot Setback , Compliance (40 ft. Wide Lot)
2:00pm, December 21, 30 Deg. N
Source: Austin Community Design and Development Center

ZERO OR NEGLIGIBLE SLOPE (NON- COMPLIANT)

THREE (3) FOOT SETBACK

The adjacent neighbor to the south is built on the north property line 3 ft. setback. The peak of its roof casts a shadow over the solar fence and completely shades the south roof of the one story residence to the north. The design of the neighboring two-story residence does not comply with the solar fence guideline.

SOLAR FENCE / 3 FOOT SETBACK / NON-COMPLIANCE	
Lot Width	25 feet
Setbacks	3 feet
Residence	One Story with Alley Access Garage
Roof Style	3/12 Pitch Gable
Site	Zero or Negligible Slope
Neighbor	Two Stories with Alley Access Garage on 30 ft. Wide Lot
Roof Style	6/12 Pitch Gable



Solar Fence: 3 Foot Setback , Non-Compliance
2:00pm, December 21, 30 Deg. N
Source: Austin Community Design and Development Center

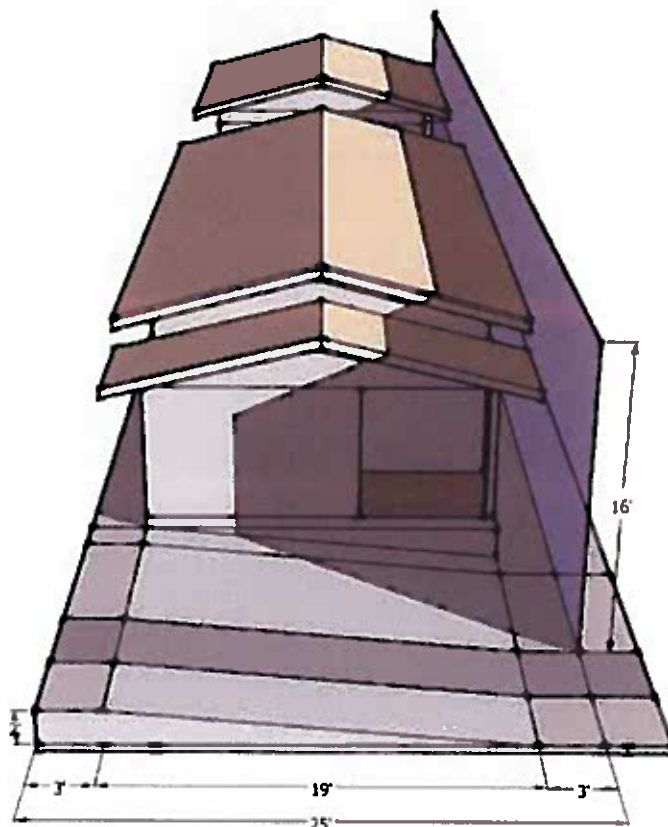
SLOPING SITES

THREE (3) FOOT SETBACK - SLOPING SITE

On south sloping sites, extend the solar fence downward to finish grade. In this example, finish grade drops 2 feet to the south across the width of the lot and the solar fence is extended downward 2 feet to finish grade. The height of the solar fence above finish grade is 16 feet.

On north sloping sites, the height of the solar fence shall be the same as sites with zero or negligible slope.

SOLAR FENCE / 3 FOOT SETBACK / SLOPING SITE	
Lot Width	25 feet
Setbacks	3 feet
Residence	One Story with Alley Access Garage
Roof Style	3/12 Pitch Gable
Solar Roof	33% of Conditioned Floor area
Site	Slope 10% (2') South
SOLAR FENCE	16 Feet (blue pane in diagram)



Solar Fence: 3 Foot Setback, Sloping Site
2:00pm, December 21, 30 Deg. N

Source: Austin Community Design and Development Center

GENERAL GUIDELINES FOR SLOPING SITES

Sloping Sites:

Maintain the same height of the top edge of the solar fence on the south property line relative to the south roof of the dwelling as indicated for flat sites.

South Sloping Sites:

Extend the bottom of the solar fence *downward* to finish grade at the south property line. The revised height of the solar fence above grade will be 14 feet (the height for flat sites) *plus* the change in elevation from the finish floor level of the dwelling to the south property line. For example, if the site *drops* 2 feet below floor level from north to south across the site, then the solar fence on the south property line is lowered 2 feet and the new height of the fence above grade is 16 feet.

North Sloping Sites:

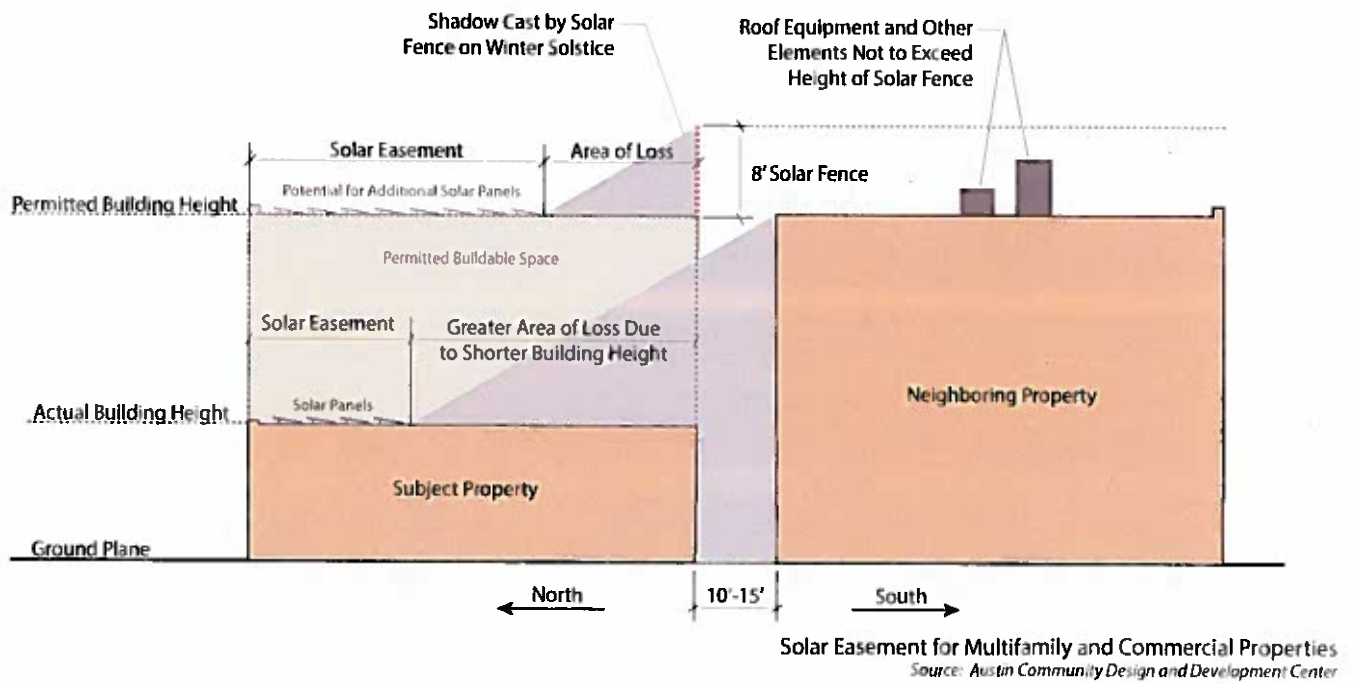
Raise the bottom of the solar fence *upward* to finish grade at the south property line. The revised height of the solar fence above grade will be 14 feet (the height for flat sites) *minus* the change in elevation from the finish floor level of the dwelling to the south property line. For example, if the site *rises* 2 feet above floor level from north to south across the site, then the solar fence on the south property line is raised 2 feet and the new height of the fence above grade is 12 feet.

These guidelines apply to a one story dwelling. This is the worst case condition. For a two story dwelling there is no solar access problem when there is a one or two story dwelling located to the south. The same guideline would apply if there is a three story dwelling to the south. For a block with all two story dwellings, the solar fence guideline is not necessary.

SOLAR ACCESS FOR MULTIFAMILY AND COMMERCIAL PROPERTIES

All multifamily and other commercial properties are entitled to a Solar Easement defined as follows: a right, expressed in a written instrument for the purpose of assuring adequate access to direct sunlight for solar energy systems. A solar easement is often expressed in a deed or other written instrument on behalf of a property owner.

The Solar Easement extends from the northern edge of the subject property to a shadow cast by an 8' tall solar fence located on the southern edge of the property at the roof plane at the permitted height of the building at noon on the Winter Solstice.



RECYCLING AND COMPOSTING

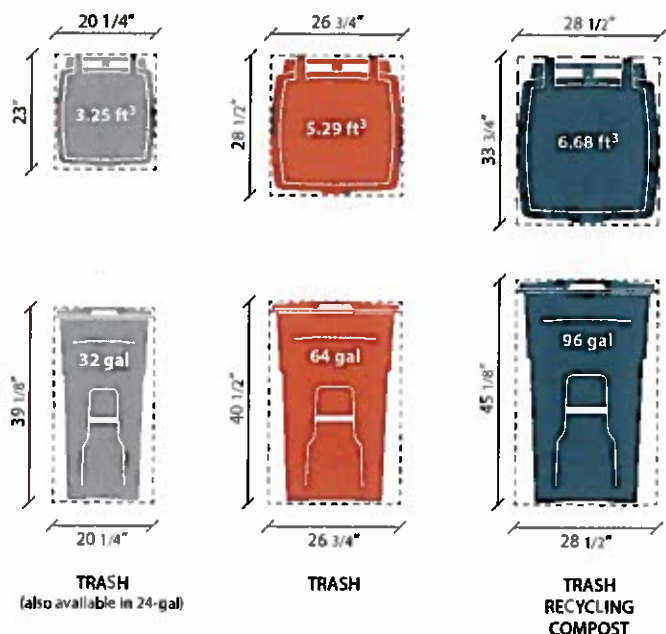
Each building in the Master Plan is designed to have adequate outdoor or garage space allocated for the collection of commingled recyclables, yard trimmings and compostables, in addition to landfill trash. For buildings serviced by Austin Resource Recovery (ARR), including single-family homes, duplexes, triplexes and some small businesses, collection consists of weekly collection of yard trimmings and semi-weekly collection of commingled recyclables in a 96-gallon container. Collection of compostables is currently in pilot phase using a 96-gallon container; this program has the potential to extend to city-wide service. Space allocated for backyard composting is recommended in advance of city-wide service.

Based on this configuration of separation and service provision, each single-family lot should allocate approximately 7.5 square feet per container (assuming one for commingled recyclables, one for compostables and lawn debris, and one for landfill trash), or a total of 22.5 square feet. (Note that the 'pay-as-you-throw' landfill trash rate structure provides for a range of container sizes—24-gallon, 32-gallon, 64-gallon, 96-gallon—with higher monthly fees for larger containers. The 22.5 square foot is a conservative estimate, assuming the 96-gallon size. A smaller footprint would be possible for households that choose a smaller landfill trash container. Currently, 67% of households in the 78724 zip code use the 64-gallon container.*) The containers should have a direct accessible pathway to curbside or alley for collection.

*Per Aurora Pizano, Austin Resource Recovery, 12/11/13

Although policy decisions regarding ARR lie outside of the purview of this Master Plan, the team has identified some measures that, if enacted, would ease the spatial restrictions of bin

sizes and numbers on homeowners and in alley right-of-ways on pick-up days. These include offering multiple sizes of bins for recycling and composting, particularly for Accessory Dwelling Units or other small-family residences, and allowing shared recycling, compost, and trash bins for single-family residences and Accessory Dwelling Units. As ARR continues to develop its composting collection routines in accordance with the Zero Waste Plan, it will be critical that recycling and compost pickup occur on alternating weeks to allow for sufficient bin space throughout alley right-of-ways.



Trash, Recycling and Composting Bins
Source: Center for Maximum Potential Building Systems

LOT LEVEL STORMWATER CONTROL MEASURES

DISCONNECTED ROOF RUNOFF

Roof systems shall have gutters to collect stormwater roof runoff. Gutter downspouts shall not drain directly to impervious surfaces such as sidewalks and driveways. Instead, downspouts should be directed towards pervious areas, such as planters or landscaped areas, or to rainwater collection systems. Overflow from rainwater collection systems should likewise be directed to pervious areas. Homeowners should be provided with educational materials on the requirements for and benefits of disconnected roof drains.



Downspout Disconnection Stormwater Planter
Source: U.S. Environmental Protection Agency (EPA)

RAINWATER HARVESTING

Residential lot owners should be encouraged to implement rainwater harvesting for roof drainage runoff. Austin Water Utility currently offers rebate programs for installing a residential rainwater harvesting system. Developers should consider installing rain barrels and roof downspouts at the time houses are constructed. Information about rebate and other installation programs should be provided to area residents and homeowners.



Rain Barrel
Source: Retrieved from Urban Design Group photo library

SOIL AMENDMENT

Re-vegetation of developed lots and other disturbed areas presents a prime opportunity for improvement of existing low-permeability site soils. A soils management plan should be developed with input from a county agricultural extension agent. The plan should focus on decompaction techniques and addition of soil microorganisms and organic matter. Improvements permeability of the amended soil should be tested and documented to assist in quantitative analysis of the stormwater runoff reduction benefits.

PERVIOUS PAVEMENT

In conjunction with improved permeability soils, pervious concrete or permeable pavers for sidewalks, walkways and driveways should be incorporated into construction on all lots.



Pervious Concrete
Source: Wikipedia (JJ Harrison)

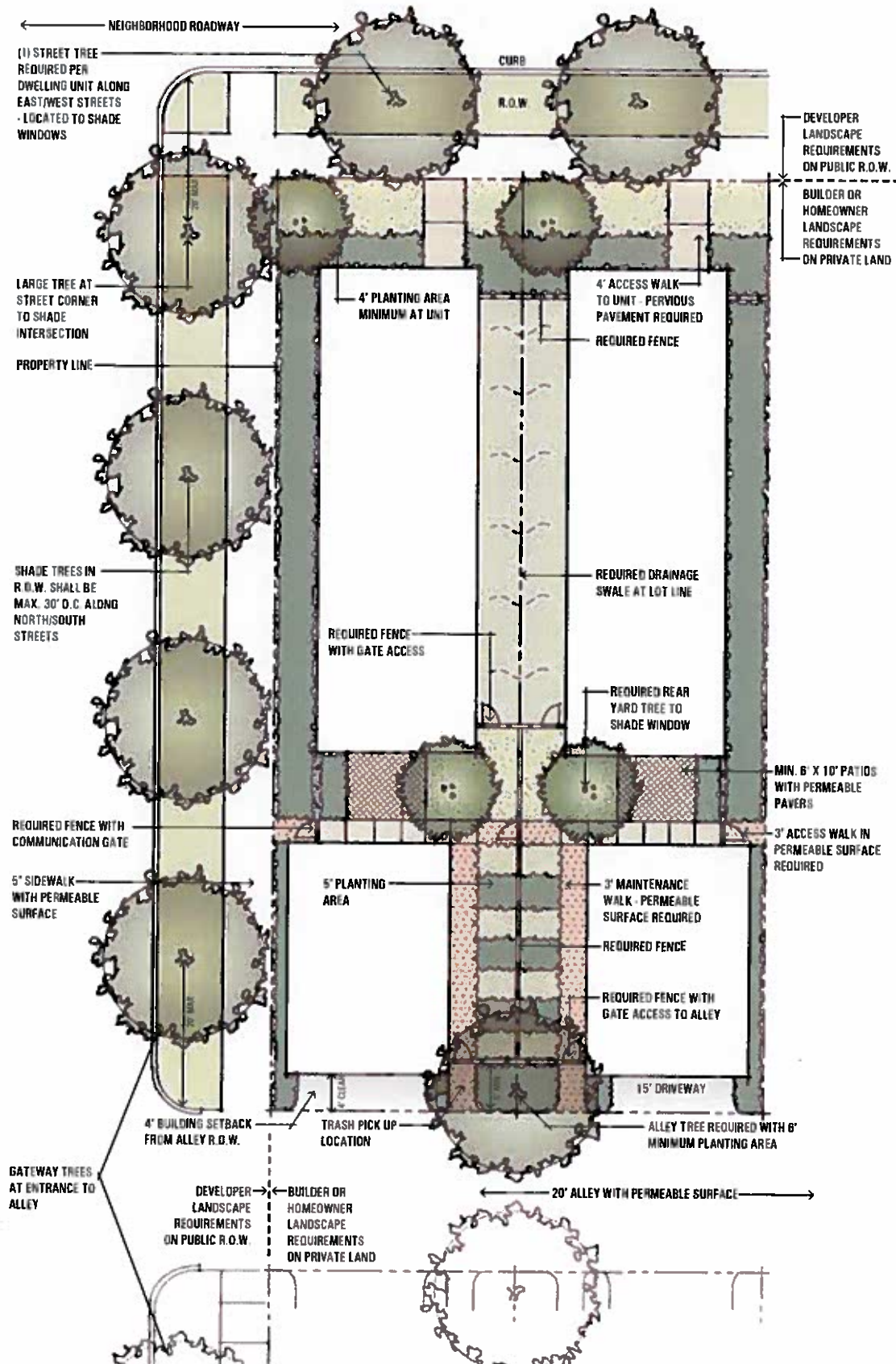


Permeable Pavers
Source: County of Santa Barbara, Water Resources Division

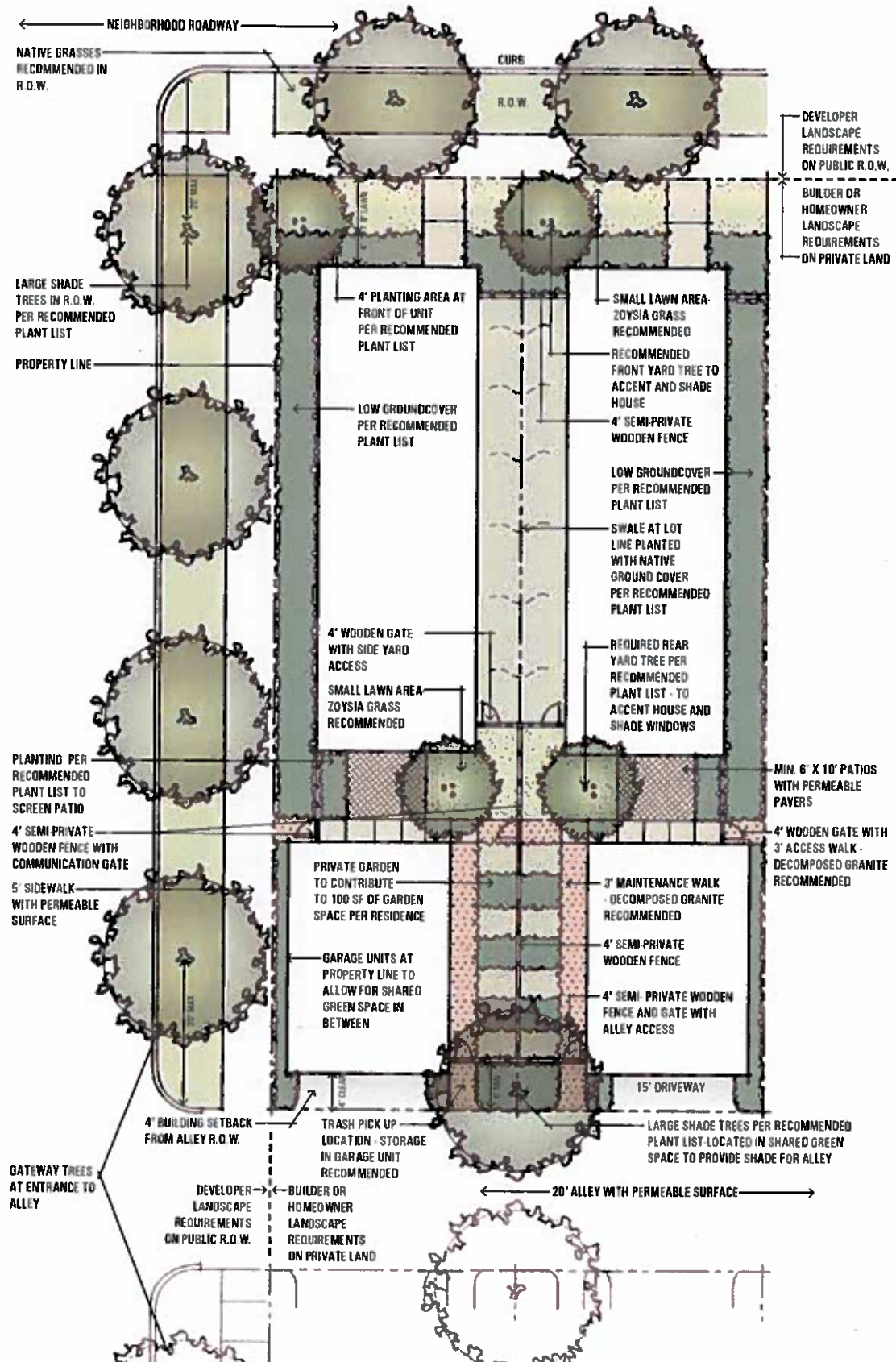
INTEGRATED PEST MANAGEMENT PLAN

A community-wide Integrated Pest Management (IPM) Plan shall be developed. The plan shall include a public education component. Multiple methods should be employed for distributing the IPM plan and for providing assistance to about understanding and follow the guidelines of the plan.

LOT LANDSCAPING REQUIREMENTS & RECOMMENDATIONS



Landscaping Requirements
Source: TBG



Landscaping Recommendations
Source: TBG

CHAPTER 9

TECHNICAL APPENDIX

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Native and Adapted Plant Species	216
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EXISTING UTILITY EASEMENTS AND CONSTRAINTS

UTILITY EASEMENTS

Several existing utility easements traverse and bisect the Project Site. These are shown on the included utility easement map and described below.

WILMINGTON DRIVE – WATER AND NATURAL GAS LINES

An existing 8 inch water line and a natural gas line run north-south along the eastern portion of the site from Loyola Lane to the intersection of Wilmington Drive and Colony Loop Drive. These utilities appear to have been installed in the anticipated alignment of what was intended to have been Wilmington Drive street right of way on a previous plan for the Project Site. This right of way was never dedicated. The water line is now associated with a 15' Public Utility Easement (Vol 4729, Pg 1637). There does not appear to be an easement for the natural gas line. Austin Water Utility has indicated this line may need to be replaced based on age, and will be relocated within the proposed street right of way. The natural gas line will need to be relocated to the new street right of way.

COLONY LOOP DRIVE – WATER LINE

A 12 inch water line exists along the alignment of Colony Loop Drive where the street has currently not been constructed. There does not appear to be an easement for this line, but it follows the alignment of the Colony Park PUD 1.194 acre and 3.334 acre tracts that were the previously intended right of way for the connection of Colony Loop Drive. Austin Water Utility has indicated this line needs to be replaced based on age and pipe material, and will be relocated within the proposed street right of way.

COLONY LOOP DRIVE – WASTEWATER LINE

A 12" wastewater line exists along the Colony Loop Drive alignment to the west of the overhead electric transmission lines. This line is associated with a 20' Wastewater Easement (Vol 13035, Pg 457). The line turns to the north and extends to the north property line of the Project Site. Portions or all of the line will need to be rerouted to new street right of way when this area of the Master Plan is developed, and the associated easement abandoned.

Another 12" wastewater line exists along the Colony Loop Drive alignment to the east of the overhead electric transmission lines. This line is associated with a 15' Public Utility Easement (4729, Pg 1637). This line turns south and generally follows the central drainageway south to the southern boundary line at Loyola Lane. This line may need to be relocated within the proposed street right of way.

DRAINAGE EASEMENT, SOUTHEAST CORNER

A drainage easement (Vol 12691, Pg 1191) exists in the southeast corner of the Project Site. The easement is titled "Open Drainage Ditch or Enclosed Storm Sewer" and generally comprises the easternmost natural drainageway and its connection to the existing storm drain culvert crossing Loyola Lane. A water quality pond consistent with the use of this easement is planned in this location. Upon development of this pond, this easement can be adjusted in location and name as necessary.

OVERHEAD ELECTRIC TRANSMISSION LINES

Overhead electric transmission lines operated by Austin Energy run north-south, bisecting the Project Site to the east and west. These lines are contained in a City of Austin 100' Pipeline and Electric Line Easement (Vol 3654, Pg 193). This easement is the same land as the City of Austin PARD-owned 9.93 acre tract that bisects the Project Site and the adjacent parkland. While the easement includes "pipelines" as a use, there is no indication that any pipelines are present within the easement. Overhead electric transmission lines and towers are generally centered within the easement. Street and trail crossings and other uses that do not interfere with the intended use of the easement are typically allowed as they are not specifically excluded in the easement document.

NOTE: Not Permitted - Structures and buildings are not be allowed within the easement.

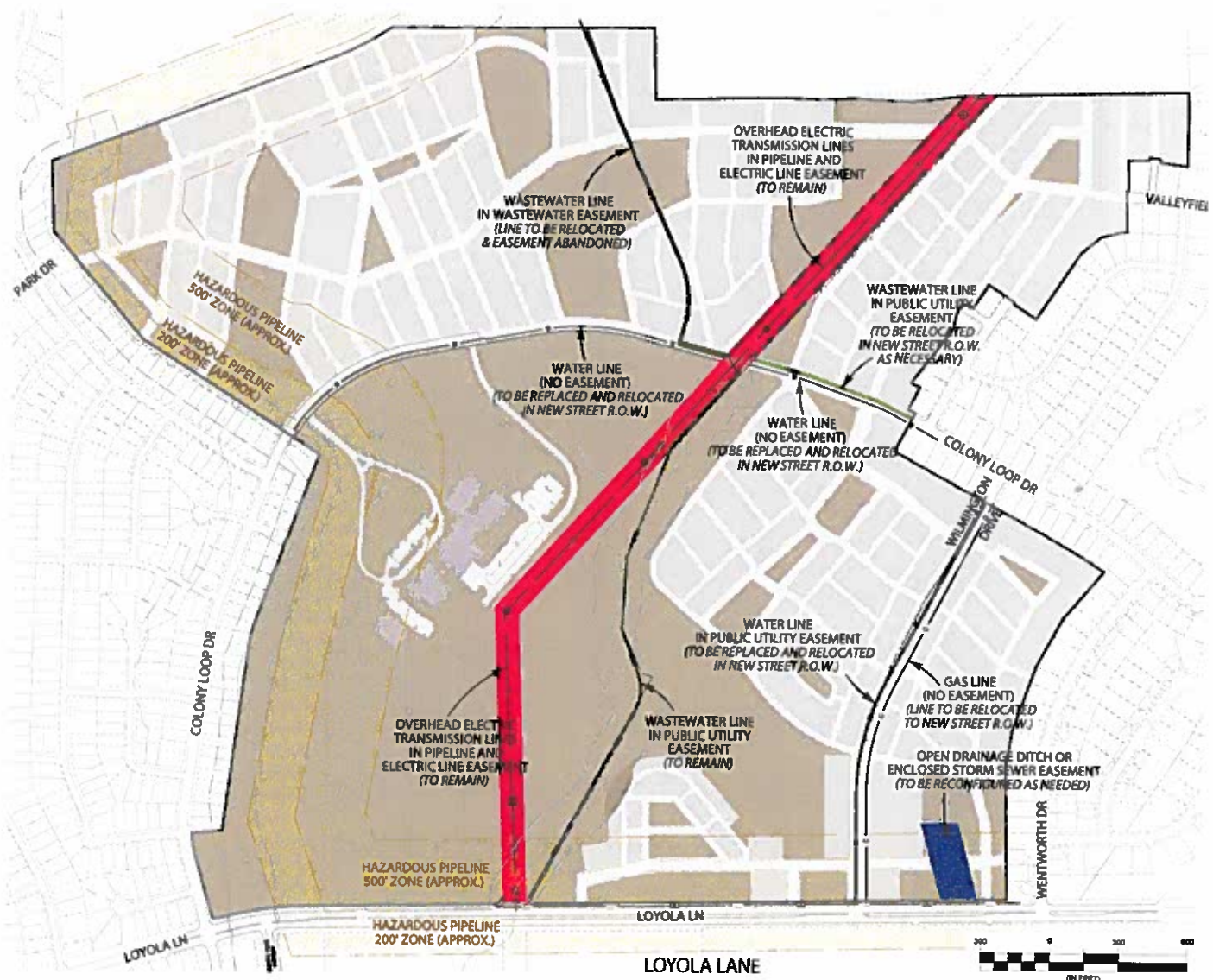
HAZARDOUS PIPELINE RESTRICTIONS

A petroleum products pipeline operated by Koch Pipeline Company, L.P. runs parallel to the southern boundary line of the Project Site (located south of Loyola Lane) and the western boundary line of the Project Site. City of Austin Code section 25-2-516 regulates development in the vicinity of hazardous pipelines. Refer to the City of Austin Code and Fire Criteria Manual, and applicable building codes for complete information.

Per COA Code section 25-2-516, all new buildings within 200' of hazardous pipelines must meet certain requirements listed in section 25-2-516(B), including providing certain maximum time periods for occupant evacuation, and incorporation of a system for early detection and notification of pipeline leak or a fire associated with the pipeline, comply with standards for construction near a pipeline contained in the COA Fire Criteria Manual.

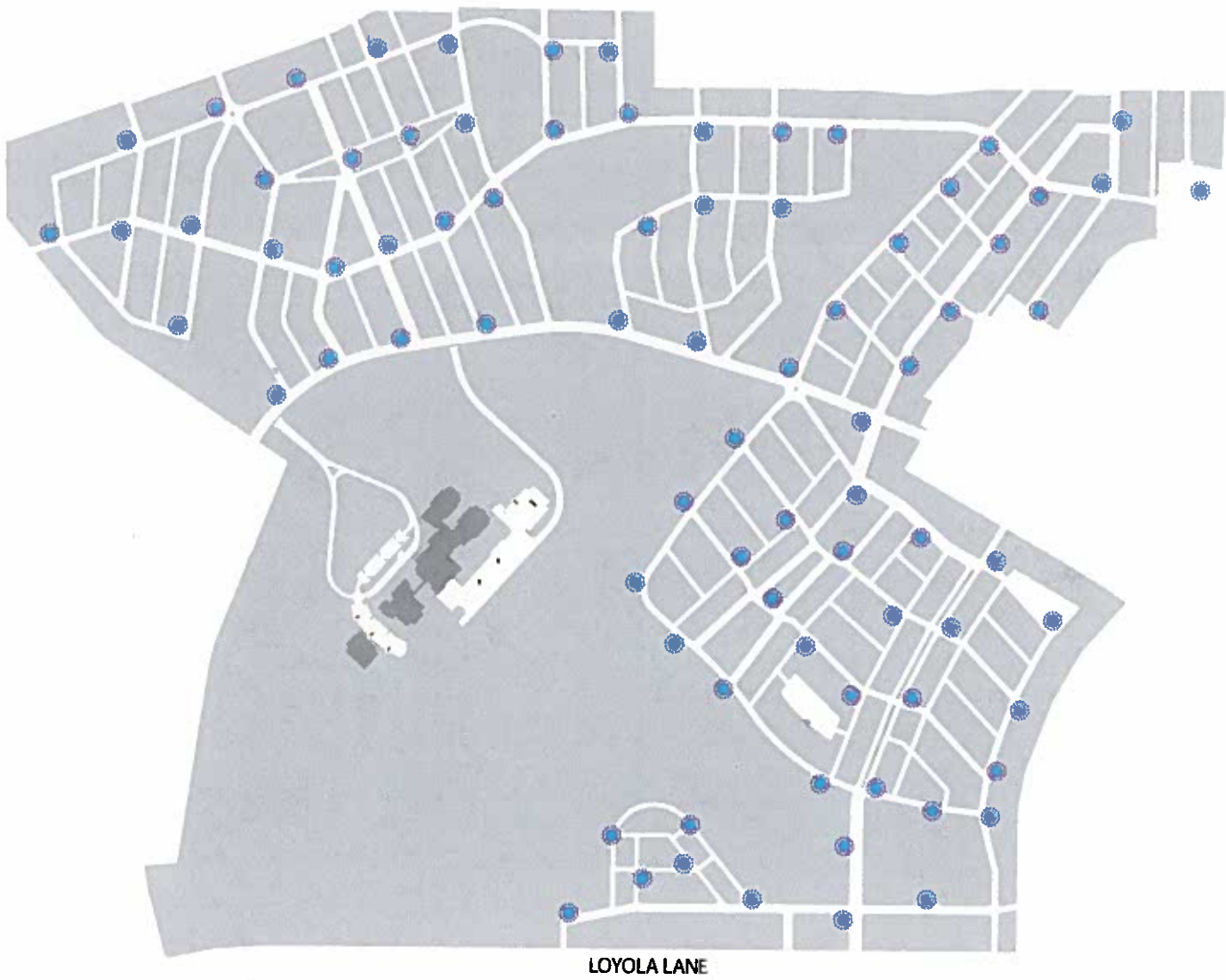
NOTE: Not Permitted - Per COA Code section 25-2-516, uses requiring evacuation assistance are prohibited within 200' of the pipeline. These prohibited uses include congregate living, convalescent services, detention facilities, day care services, hospital, medical offices, primary and secondary educational facilities, and retirement housing.

In general (other than for uses requiring evacuation assistance) there are no other restrictions outside of the 200' zone. Uses requiring evacuation assistance that are located between 200' and 500' of a hazardous pipeline are prohibited unless the structure has a performance-based design that provides an adequate time period for occupant evacuation in the event of a pipeline leak or a fire associated with the pipeline and the structure incorporates a system for early detection & notification of pipeline leak or a fire associated with the pipeline.



Existing Utility Easements and Constraints
Source: Urban Design Group, created May 1, 2014

GENERAL FIRE HYDRANT LOCATIONS



KEY

 Typical Fire Hydrant Location

General Fire Hydrant Locations
Source: Urban Design Group, created May 1, 2014

FOUNDATION DESIGN CONSIDERATIONS

INNOVATIVE STRUCTURAL TECHNIQUES

The Project Site is characterized by expansive soils that may be well-suited to innovative structural techniques. Buildings, particularly small structures, may benefit from low impact helix earth anchors or pin foundation footings. A structural cistern foundation is another option, particularly for sloping sites where cut and fill is needed, which can serve the dual function of securing the building and maximizing site area potential for water collection storage.

The following describes the structural systems required for the construction of residential development proposed in the Master Plan. This information provides a general opinion of the structural impact of the neighborhood development described above. It is not intended as an exhaustive and complete analysis of the structural systems.

I. APPLICABLE CODES

- A. 2012 International Building Code
- B. Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-10
- C. Structural Steel: AISC Steel Construction Manual, Fourteenth Edition
- D. Structural Concrete: ACI 318-11
- E. Structural Masonry: 2011 MSJC, ACI 530-11/ASCE 5-11/TMS 402-11
- F. Structural Wood: NDS 2012, ANSI/AF&PA SDPWS-2008

II. GEOTECHNICAL REPORT – NOT AVAILABLE

- A. For the purposes of this narrative it is assumed that the existing soils exhibit moderate to high shrink-swell properties with plasticity indexes at or above 20. This should result in a remove and replacement of the existing soils with compacted or moisture conditioned fill to a depth of 4'-0" to 6'-0" and a maximum potential for vertical rise (PVR) of 1".
- B. For the purposes of this narrative, a soil-supported concrete foundation design and a pier & beam foundation design were only considered. A suspended concrete foundation system with void forms and drilled piers was not considered, even though this system is the most structurally superior, due to the very high cost.

III. SOIL-SUPPORTED CONCRETE FOUNDATION DESIGN OPTION

- A. Soil Supported Post-Tensioned Slab: 4" to 5" thick concrete slab supported by select compacted fill. Stressing on tendons shall be 33 kips and shall have an approximate spacing of 4'-0" each way.
- B. Soil Supported Conventionally Reinforced Slab: Some areas shall require a convention reinforcement consisting of a 4" to 5" thick concrete slab supported by select compacted fill and reinforced with #4 @ 16" o.c.
- C. Grade Beams:
 - 1. Post-Tensioned Design: All perimeter and interior grade beams shall be approximately 14" wide and 27" deep with two (2) tendons.
 - 2. Conventionally Reinforced Design: All perimeter and interior grade beams shall be approximately 14" wide and 27" deep and reinforced with (2) #6 top & bottom with #3 stirrups @ 24" o.c.

IV. PIER & BEAM FOUNDATION DESIGN OPTION

- A. Concrete Piers with Spot Footings: 12" to 18" diameter concrete piers reinforced with (4) #5 vertical and #3 circular ties at 12" on center and 2'-0" to 3'-0" square by 1'-0" deep concrete footings reinforced with #5 at 12" on center, top and bottom, each way. Bottom of footing to be located 2'-6" to 3'-0" below existing grade.
- B. Foundation Flooring Framing: Multi-ply standard lumber or laminated veneer lumber (LVL) beams supporting standard lumber joists.
- C. Foundation Floor Decking: ¾" or 1-1/8" plywood decking depending on joist spacing.

V. FRAMING DESIGN

- A. Roof Framing: Wood pre-engineered roof trusses to be designed by the wood truss manufacturer
- B. Roof Decking: ½" plywood or OSB sheathing
- C. Floor Framing: Wood pre-engineered roof trusses to be designed by the wood truss manufacturer or standard lumber joists
- D. Floor Decking: ¾" or 1-1/8" plywood decking depending on joist spacing
- E. Wall Framing: Load bearing and non-loading bearing wood stud walls consisting of 2x6 studs and/or 2x4 studs. All studs shall be Southern Pine No. 2.
- F. Lateral System: Exterior 15/32" APA graded plywood sheathing with interior shear walls consisting of plywood and/or gypsum board. All exterior and interior shear walls may require the utilization of hold-down anchor attachments.
- G. For long beam spans, the use of laminated veneer lumber (LVL) and/or steel beams may be required.

NATIVE AND ADAPTED PLANT SPECIES

NATURAL AREAS

Plantings shall include, but are not limited to the following native and adapted species:

Type of Planting	Common Name	Latin Name
Canopy Trees*	Mexican Sycamore	<i>Platanus mexicana</i>
	Chinquapin Oak	<i>Quercus muhlenbergii</i>
	Shumard Oak	<i>Quercus shumardi</i>
	American Elm	<i>Ulmus americana</i>
	Cedar Elm	<i>Ulmus crassifolia</i>
Understory Trees & Shrubs**	Huisache	<i>Acacia farnesiana</i>
	Anacacho Orchid	<i>Bauhinia lunarioides</i>
	Texas Persimmon	<i>Diospyros texana</i>
	Mexican Plum	<i>Prunus mexicana</i>
	Evergreen Sumac	<i>Rhus virens</i>
	Flame-leaf Sumac	<i>Rhus lanceolata</i>
	Mexican Buckeye	<i>Ungnadia speciosa</i>

BIOFILTRATION PONDS

Plantings shall include, but are not limited to the following native and adapted species:

Type of Planting	Common Name	Latin Name
Canopy Trees*	Bald Cypress	<i>Taxodium distichum</i>
	Montezuma Bald Cypress	<i>Taxodium mucronatum</i>
Forbs	Yarrow	<i>Achillea millefolium</i>
	Blue Mistflower	<i>Conoclinium coelestinum</i>
	Maximillian Sunflower	<i>Helianthus maximiliani</i>
	Texas Star Hibiscus	<i>Hibiscus coccineus</i>
	Beebalm	<i>Monarda citriodora</i>
	Sunflower	<i>Helianthus annuus</i>
Shrubs	Yaupon Holly	<i>Ilex vomitoria</i>
	Evergreen Sumac	<i>Rhus virens</i>
	Texas Sedge	<i>Carex texensis</i>
	Aromatic Sumac	<i>Rhus aromatic</i>
Grasses***	Bushy Bluestem	<i>Andropogon glomeratus</i>
	Switchgrass	<i>Panicum virgatum</i>
	Indian Grass	<i>Sorghastrum nutans</i>
	Composite Dropseed	<i>Sporobolus compositus var. compositus</i>
	Inland Sea Oats	<i>Chasmanthium latifolium</i>
	Side Oats Grama	<i>Bouteloua curtipendula</i>
	Cherokee Sedge	<i>Carex cherokeensis</i>

TERRACED ORCHARD ABOVE BIOFILTRATION POND

Plantings shall include, but are not limited to the following native and adapted species:

Type of Planting	Common Name	Latin Name
Fruit Trees	Texas Persimmon	<i>Diospyros texana</i>
	Fig	<i>Ficus carica</i>
	Peach	<i>Prunus persica</i>
	Texas Pecan	<i>Carya illinoensis</i>
	Plum	<i>Prunus salicina</i>

ALL STREET TYPOLOGIES (LANDSCAPED ZONES)

Plantings shall include, but are not limited to the following native and adapted species:

Type of Planting	Common Name	Latin Name
Street Trees	American Elm	<i>Ulmus Americana</i>
	Bur Oak	<i>Quercus macrocarpa</i>
	Cedar Elm	<i>Ulmus crassifolia</i>
	Chinquapin Oak	<i>Quercus muhlenbergii</i>
	Lacey Oak	<i>Quercus laceyi</i>
	Texas Live Oak	<i>Quercus fusiformis</i>
	Monterey Oak	<i>Quercus polymorpha</i>
	Shumard Oak	<i>Quercus shumardi</i>
	Pecan	<i>Carya illinoensis</i>
	Black Walnut	<i>Juglans nigra</i>
	Big Tooth Maple	<i>Acer gradidentatum</i>
	Texas Ash	<i>Fraxinus albicans</i>
	Honey Mesquite	<i>Prosopis glandulosa</i>
	Texas Red Oak	<i>Quercus texana</i>
Streetyard Grasses	Inland Sea Oats	<i>Chasmanthium latifolium</i>
	Deer Muhly	<i>Muhlenbergia rigens</i>
	Switchgrass	<i>Panicum virgatum</i>
	Little Bluestem	<i>Schizachyrium scoparium</i>
	Pine Muhly	<i>Muhlenbergia dubia</i>
Streetyard Shrubs	Desert Sotol	<i>Dasyllirion wheeler</i>
Streetyard Forbs	Twistleaf Yucca	<i>Yucca rupicola</i>
	Creeping Germander	<i>Teucrium cossonii</i>
	Santolina	<i>Santolina chamaecyparissus</i>
	Wooly Stemodia	<i>Stemodia lanata</i>

STREET TYPES F, M & N: STORMWATER TREATMENT STREETS

Plantings shall include, but are not limited to the following native and adapted species:

Type of Planting	Common Name	Latin Name
Biofiltration Grasses***	Little Bluestem	<i>Schizachyrium scoparium</i>

For more plantings, refer to grasses noted in Biofiltration Ponds list.

STREET TYPE E: STORMWATER CONVEYANCE BOULEVARD

Plantings shall include, but are not limited to the following native and adapted species:

Type of Planting	Common Name	Latin Name
Canopy Trees*	Mexican Sycamore	<i>Platanus mexicana</i>
	Chinquapin Oak	<i>Quercus muhlenbergii</i>
	Shumard Oak	<i>Quercus shumardi</i>
	Cedar Elm	<i>Ulmus crassifolia</i>
Understory Trees & Shrubs**	Possumhaw	<i>Ilex decidua</i>
	Yaupon Holly	<i>Ilex vomitoria</i>
Grasses & Forbs In Areas with Low Infiltration	Bushy Bluestem	<i>Andropogon glomeratus</i>
	Mexican Butterfly Weed (Tropical Milkweed)	<i>Asclepias curassavica</i>
	Inland Sea Oats	<i>Chasmanthium latifolium</i>
	Texas Star Hibiscus	<i>Hibiscus coccineus</i>
	Deer Muhly	<i>Muhlenbergia rigens</i>
	Switchgrass	<i>Panicum virgatum</i>
	Brazos (Gulf Coast) Penstemon	<i>Penstemon tenuis</i>
Grasses & Shrubs in Areas with High Infiltration	Little Bluestem	<i>Schizachyrium scoparium</i>
	Seep Muhly	<i>Muhlenbergia reverchonii</i>
	Pine Muhly	<i>Muhlenbergia dubia</i>
	Little Bluestem	<i>Schizachyrium scoparium</i>
	Twistleaf Yucca	<i>Yucca rupicola</i>

STREET TYPE J, K & L: NATURE STREETS

Plantings shall include, but are not limited to the following native and adapted species:

Type of Planting	Common Name	Latin Name
Understory Trees & Shrubs**	Hulsache	<i>Acacia farnesiana</i>
	Anacacho Orchid	<i>Bauhinia lunarioides</i>
	Texas Ash	<i>Fraxinus albicans</i>
	Mexican Plum	<i>Prunus mexicana</i>
	Mexican Buckeye	<i>Ungnadia speciosa</i>
Shrubs	Sotol	<i>Dasyllirion</i>
	Agarita	<i>Mahonia trifoliolata</i>
	Texas Lantana	<i>Lantana urticoides</i>
	Spineless Prickly Pear	<i>Opuntia ellisiana</i>
	Twistleaf Yucca	<i>Yucca rupicola</i>
Grasses for Park Space	Sideoats Grama	<i>Bouteloua curtipendula</i>
	Seep Muhly	<i>Muhlenbergia reverchonii</i>
	Pine Muhly	<i>Muhlenbergia dubia</i>
	Purple Muhly	<i>Muhlenbergia rigida</i>
	Big Muhly	<i>Muhlenbergia lindheimeri</i>

STREET TYPE Q: ONE-WAY LIVING STREET

Plantings shall include, but are not limited to the following native and adapted species:

Type of Planting	Common Name	Latin Name
Canopy Trees*	Chinquapin Oak	<i>Quercus muhlenbergii</i>
	Shumard Oak	<i>Quercus shumardi</i>
	Bur Oak	<i>Quercus macrocarpa</i>
	American Elm	<i>Ulmus americana</i>
	Cedar Elm	<i>Ulmus crassifolia</i>
Understory Trees & Shrubs**	Huisache	<i>Acacia farnesiana</i>
	Anacacho Orchid	<i>Bauhinia lunarioides</i>
	Mexican Plum	<i>Prunus mexicana</i>
	Mexican Buckeye	<i>Unquadia speciosa</i>
Grasses for Rain Garden***	Bushy Bluestem	<i>Andropogon glomeratus</i>
	Inland Sea Oats	<i>Chasmanthium latifolium</i>
	Texas Star Hibiscus	<i>Hibiscus coccineus</i>
	Switchgrass	<i>Panicum virgatum</i>
	Brazos (Gulf Coast) Penstemon	<i>Penstemon tenuis</i>
	Little Bluestem	<i>Schizachyrium scoparium</i>
Grasses for Park Space	Flame Acanthus	<i>Anisacanthus quadrifidus var. wrightii</i>
	Seep Muhly	<i>Muhlenbergia reverchonii</i>
	Pine Muhly	<i>Muhlenbergia dubia</i>
	Purple Muhly	<i>Muhlenbergia rigida</i>
	Big Muhly	<i>Muhlenbergia lindheimeri</i>
	Rock Rose	<i>Pavonia lasiopetala</i>
	Mexican Bush Sage	<i>Salvia leucantha</i>
	Little Bluestem	<i>Schizachyrium scoparium</i>
	Zexmenia	<i>Wedelia texana</i>

* Canopy trees listed may also apply to other areas throughout the development where canopy trees will exist.

** Understory trees and shrubs listed may also apply to other areas throughout the development where such plantings will exist.

*** Such grasses may also apply to other street types where rain gardens are included.

COMMUNITY SOLAR FOR LOYOLA TOWN CENTER & INNOVATION DISTRICT

PBI BUSINESS MODEL –

AE COMMERCIAL CUSTOMERS

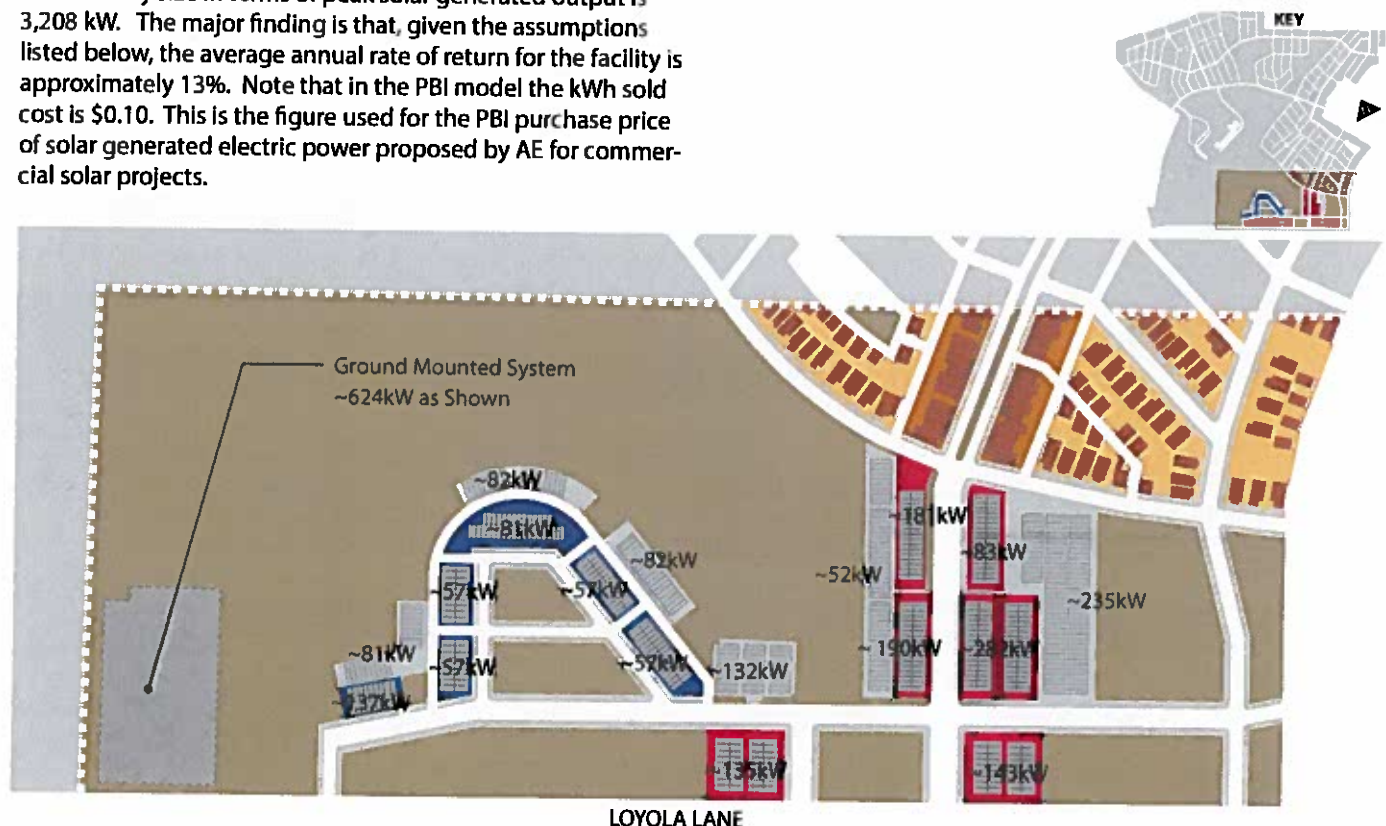
A community size solar PV array may also be sized for a particular group of buildings and the solar generated electric power can be connected to a solar electric meter on one or more of the buildings. Under a Performance Based Incentive (PBI) agreement, rather than provide an upfront rebate on the installation of a solar PV system, AE pays for each kilowatt-hour of solar electricity produced over a 10-year period. For commercial solar PV installations, the property owners pay all the up-front costs for the solar equipment. AE then credits the commercial customer ten (10) cents for every kilowatt-hour produced by the solar system for up to ten (10) years.

ROOFTOP AND PARKING LOT PV LAYOUT

Using the current Master Plan of Colony Park, engineering staff from a solar contractor company conducted an investigation into the feasibility of designing and constructing a solar facility for the proposed commercial and institutional buildings located in the Town Center and Innovation District on Loyola Lane. The total gross floor area of all buildings is 424,000 sq. ft. PV arrays were placed on all building rooftops and as shade structures above all adjacent parking lots. The total area of all PV arrays is approximately 225,000 square feet (about 5 acres). The PV array size in terms of peak solar generated output is 3,208 kW. The major finding is that, given the assumptions listed below, the average annual rate of return for the facility is approximately 13%. Note that in the PBI model the kWh sold cost is \$0.10. This is the figure used for the PBI purchase price of solar generated electric power proposed by AE for commercial solar projects.

- Initial installed cost: \$ 7,327,000 (\$2.30 per watt)
- Federal tax credits: \$ 2,198,000 (30%)
- Net initial cost: \$ 5,129,000
- Annual PV production: 4,491,000 kWh
- PBI from AE per kWh: \$ 0.10/kWh
- Annual PBI from AE: \$ 449,100
- Total PBI from AE for 10 yrs: \$ 4,491,000
- PBI minus net cost: \$ 1,134,000
- Assumptions
 - o PBI rate: \$ 0.10/kWh
 - o Accelerated depreciation: \$ 2,180,000
 - o Annual O&M: \$ 38,500
 - o O&M inflation rate: 2%
- Net present value: \$ 3,572,200
- 25 year average annual rate of return: 13%
- Payback: 6 years

As a point of reference, 4,430,000 kWh per year can provide all heating, cooling, lighting and electric power for all the buildings proposed in the new Town Center and Innovation District. Therefore, the total area of all PV arrays shown is adequate to provide 100% of the electric power needs of all the building proposed for the Town Center and Innovation District.



Rooftop and Parking Lot Solar PV Arrays in the Loyola Town Center and Innovation District
Source: Meridian Solar, created May 1, 2014

