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Medical Center of the Americas Master Plan Update

December 2018

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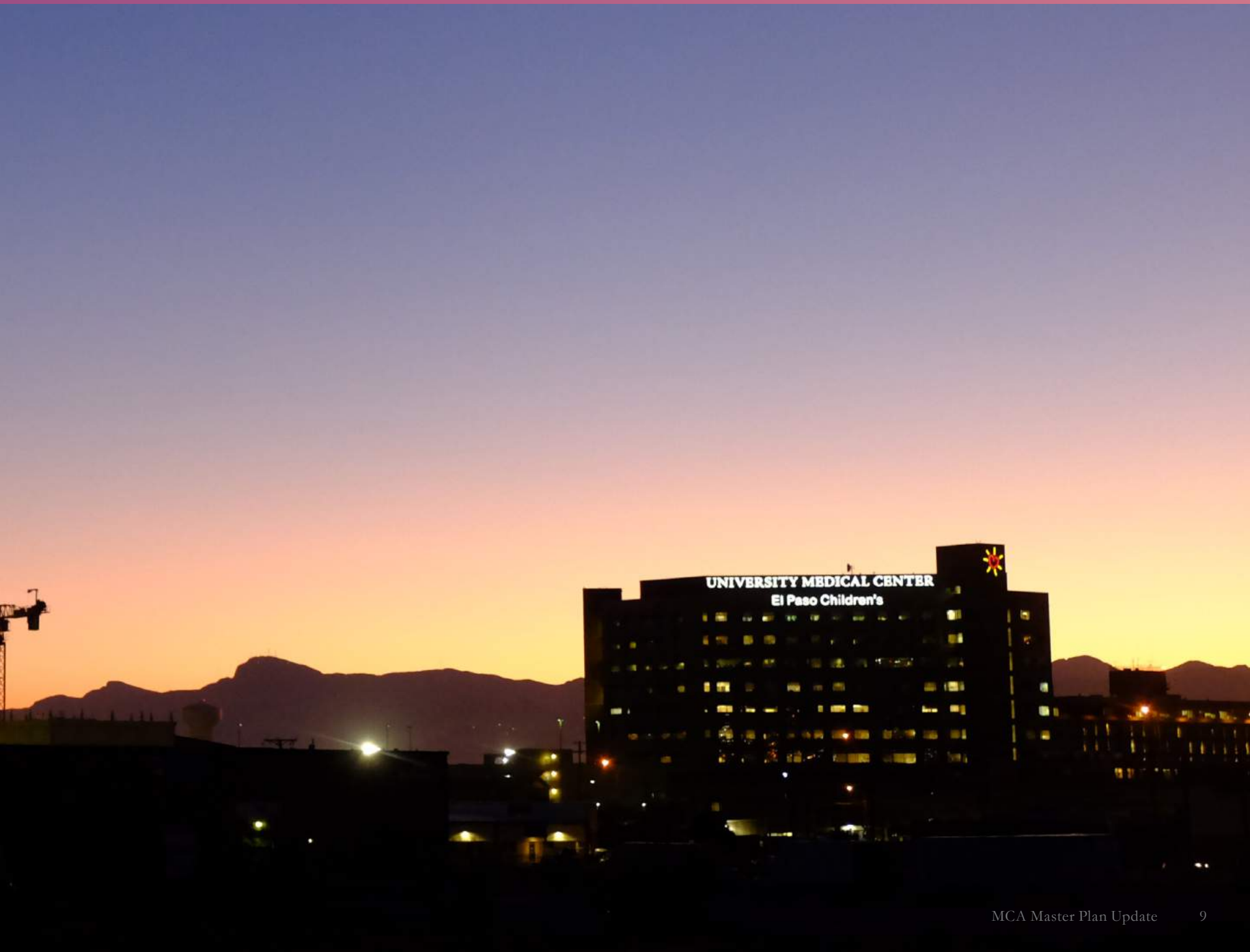
01 Introduction

"The MCA is the keeper of the vision to position the Paso del Norte region as the global leader of health delivery, education and research."


UNIVERSITY MEDICAL CENTER
El Paso Children's

Campus Introduction

"The MCA exists to ensure that the health care needs of the Paso del Norte region are met by facilitating the growth of an entire "life sciences ecosystem"—from delivering health care education and training for our region's workforce to commercializing biomedical research and innovations."

CAMPUS OVERVIEW

The Medical Center of the Americas (MCA) campus is an approximately 440-acre area located in the eastern portion of El Paso, Texas just north of the international border with Mexico. The site is bounded by Interstate 10 to the north, Boone Street to the west, and Paisano Drive to the south and east. The MCA campus has been identified as the ideal location to advance the region's biomedical innovation pipeline, largely due to its existing assets:

- **Texas Tech University Health Sciences Center El Paso (TTUHSC EP)** campus, including the Paul L. Foster School of Medicine, Gayle Greve Hunt School of Nursing, Graduate School of Biomedical Sciences, and upcoming Woody L. Hunt School of Dental Sciences
- **University Medical Center of El Paso (UMC)**
- **El Paso Children's Hospital (Children's)**
- **City of El Paso Public Health Department**
- **El Paso Psychiatric Center**
- **Maxine Silva Magnet High School for Health Professionals / Jefferson High School**
- **MCA Tech Park**, including the Cardwell Collaborative, an approximately 60,000 square foot facility located along the northern boundary of the MCA campus. This LEED Silver building contains wet-labs, dry-labs, office incubator space, a high performance computing room, and meeting and collaboration spaces, in addition to housing MCA and TTUHSC EP offices.

CAMPUS HISTORY

In the last 15 years, the city, state and private industry related to healthcare invested almost $400 million in state-of-the-art education, research and healthcare delivery buildings in the area near the MCA Campus. Major investments have also been made into the programs that will operate in those buildings, not only from the state and local governments, but also from local philanthropists such as Paul L. Foster's $50 million endowment of the medical school and Woody Hunt's $10 million endowment of the Gayle Greve Hunt School of Nursing and $25 million endowment for the upcoming Woody L. Hunt School of Dental Medicine. In addition, significant funding has gone into much needed infrastructure improvements, such as the TXDOT renovation of the Alameda corridor, which runs through the MCA Campus. Yet, much work is necessary to improve the campus's historically neglected infrastructure in order for the campus to appropriately reflect the high caliber of education and occupation occurring there and to give campus users and residents a safe, healthy, and beautiful place to live and work.

The first MCA Campus Master Plan, consisting of 140-acres, was incorporated into the City of El Paso's Comprehensive Plan in October 2008. In June 2011, the City incorporated the expanded MCA Campus Master Plan of 440-acres, all of which was rezoned into the SmartCode, allowing for the type of mixed-use development that is more consistent with an urban academic medical center. The original smaller 140-acre campus nucleus is where the majority of new development is taking place. In May 2013, the MCA commissioned a focused master plan of a 13-acre parcel that it was in the process of purchasing from the City of El Paso, with the intent to develop a biomedical research park, known as the MCA Tech Park. During the spring and summer of 2014, the Texas Department of Transportation (TXDOT) began master planning efforts for transportation within the MCA Campus as a result of the I-10 improvements being planned alongside the MCA Campus. TXDOT realized that the potential employment within the MCA Campus would soon exceed El Paso's downtown employment headcount, resulting in increased traffic and transportation related issues in and around the campus.

Project Location Map

The development of these various campus master plans has been an essential step in coordinating the short- and long-term plans of the multiple campus partners, who each have their own growth strategies and master plans. These campus plans have also served as tools for garnering local, state, and federal support for the growing medical industry in the region.

The master planning effort documented here is the next step in this journey and comes as a result of the campus' initial success. Success which requires immediate attention to infrastructure needs, as the campus becomes a major employment center and economic generator in this area of town.

PROJECT DESCRIPTION

The MCA Foundation (MCAF) and MCA campus partners sought to update the MCA Campus Master Plan due to several changes that have happened in the campus since 2011. First, several anchor tenants have had significant leadership changes, including TTUHSC EP, UMC and Children's, which has led to new ideas related to campus development. Second, significant portions of land in the core of the master plan have changed ownership. Third, several major buildings have been added to the campus and future development plans have become more refined. Finally, the campus use has grown from approximately 3,000 daily campus users (employees, patients, students, etc.) in 2000 to over 9,500 today. As a result, the campus has transformed from a largely residential and light commercial/industrial neighborhood to a dense academic medical campus. Needless to say, as this growth has occurred, the utility and transportation infrastructure needs for the campus have changed significantly. Thus, the MCAF began these efforts to update the MCA Campus Master Plan to account for anticipated future developments and the necessary corresponding utility and traffic infrastructure.

The intent of the Campus Master Plan is to create a framework that assists in coordinating the anchor's distinct development goals while respecting the needs of the nearby community and adjacent neighborhoods. The plan will help to guide effective campus development over the next decade.

PROJECT CHARTER

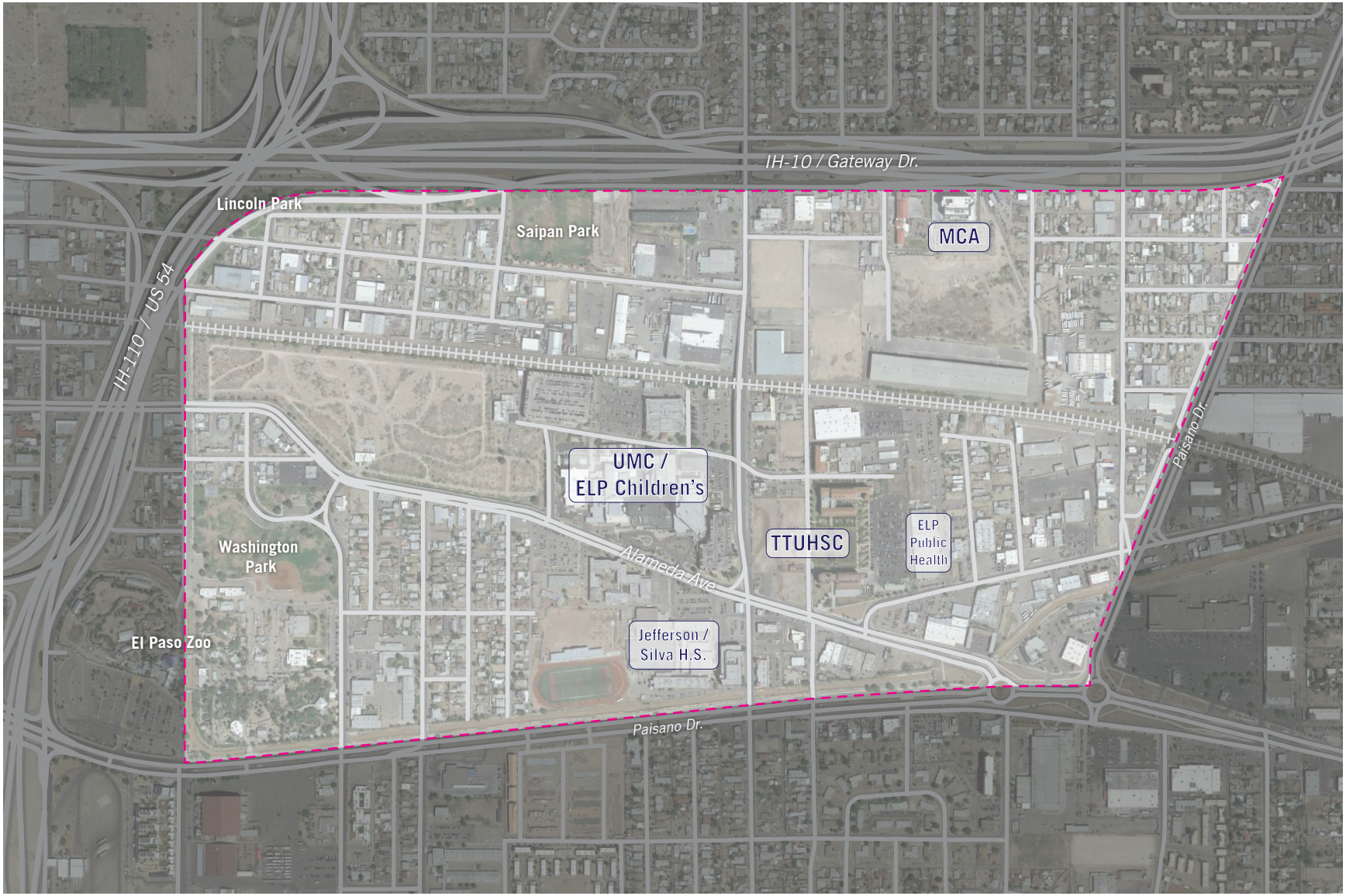
The proposed Campus Master Plan will provide guidance and serve as a foundation to work cohesively among campus partners to grow and develop a multi-institutional and multi-disciplinary campus that attracts and fosters translational biomedical research, innovation and commercialization focused on regional biomedical and economic development needs. It will seek to serve multiple tenants including regional universities, startup and large biomedical enterprises, public and private biomedical labs, and clinical trial network services.

PROJECT OBJECTIVES

By completing this exercise, the MCAF hopes to create a Campus Master Plan that achieves the following objectives:

- Brings all campus partners' goals and objectives to the planning table to create a robust, coordinated and mutually beneficial plan that all partners agree upon and can work together to achieve.
- Details in a comprehensive manner the major transformation of the campus that has occurred and will continue to occur for the use of utility companies, city / state departments of transportation, and other supporting agencies future planning needs.
- Identifies major campus infrastructure needs so that they can be planned and budgeted for by the appropriate parties.
- Provides a framework for the continued development of a state-of-the-art medical and academic research and technology commercialization campus and facilities that will attract leading students, medical professionals and scientists to the region.
- Establishes the MCA campus as an "economic engine" that will grow the region's healthcare biomedical industry, creating high-skill jobs.

Much of the text in this section is adapted from the Request for Proposal for MCA Campus Master Plan Update, August 9, 2017.



MCA Campus Context Map

Project Overview

PROJECT APPROACH

When considering the MCA district from a master planning perspective, the growth and success of the district over time emphasizes the need for highly reliable, functional and efficient utility and transportation infrastructure systems. In addition to infrastructure reliability, there may be a need for significant expansion of capacity to accommodate potential long term growth. The growing need to address these challenges also provides an opportunity to re-engage key district stakeholders in discussions around priority, timing, and alignment. The growth and development throughout the MCA campus is most likely to be driven by the key MCA partners. Understanding shifts in priorities, leadership and the drivers of each stakeholder is critical to the success of this project.

Much has changed since the completion of the MCA Campus Master Plan. Due to the recent successes of the campus, an updated master plan will reflect a more accurate depiction of the success and define what is yet to come.

The needs of the district have shifted and will continue to shift as each new goal is realized. With these shifting needs, it is important to access, strategize and map a course for the future. Through this, the MCA seeks to develop a shared vision for a plan that is achievable, yet adaptable, and one that reflects the success and stature achieved by the Medical Center of the Americas.

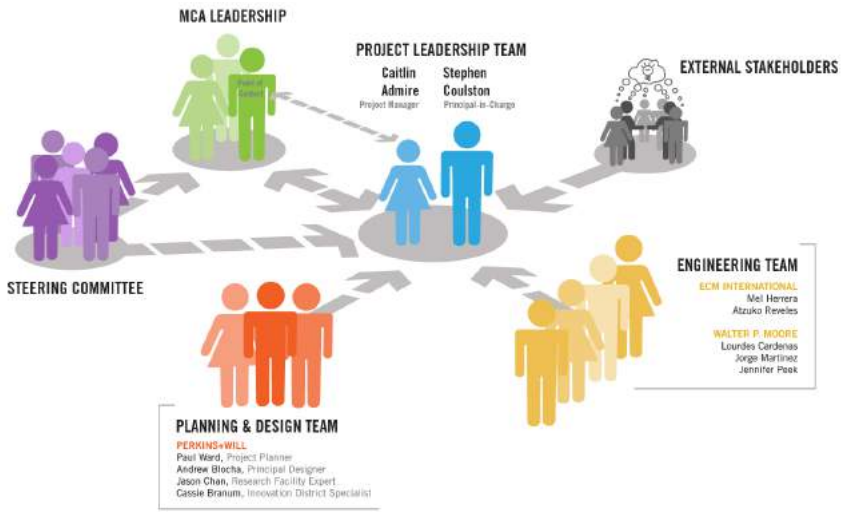
This project is about more than creating a master plan update. It is about reinforcing a vision, establishing priorities, and enhancing district identity. It is about maximizing the utilization of existing resources while fostering a physical environment to support key goals and objectives. It is about stewardship and getting the most from every dollar invested within an environment of limited funding. It is about conceiving innovative approaches to district improvement, ensuring stakeholder access and success, and strengthening the overall reputation of MCA within the state and the nation.

The framework plan created through this process is focused on maintaining the ability to accommodate the widest variety of research and ancillary programs in the future. This is done by maintaining a balance between allowing flexibility and determining the critical elements on which it is necessary to remain inflexible. This approach provides a framework that ensures adherence to the basics of good urban design, to create that vibrant, interactive environment where campus users can be a part of and contribute to a collaborative innovation community, while preserving the ability to respond to market changes and shifting institutional needs. This approach positions the MCA campus to embrace change, improve recruitment and retention, attract funding, and save resources.

PROJECT TEAM

Perkins+Will led the efforts for this project and coordinated the project through an integrated process which involved a diverse group of stakeholders and district anchors. Perkins+Will takes pride in a projects' potential to create positive change. By understanding how the character and texture of a landscape at the human scale influence health, productivity, and the overall quality of daily life of users, they seek to create places that inspire and manifestation of the goals of the district in its physical environment.

Alone, even the best design knowledge is not enough to produce a successful project. The consultant team on this project worked collaboratively to deliver the master plan update, and create a set of implementable near- and long-term projects to realize the vision for the district.



Project Team Organizational Chart

ECM International provided utility infrastructure engineering and cost estimating for the project. With considerable experience throughout the region and prior experience on the MCA campus, ECM has a unique familiarity with and awareness of the area.

Walter P. Moore served as the transportation engineer for the project, helping to identify potential mobility issues and opportunities that consider all users and focuses on all aspects of a user's experience of the district from a transportation perspective.

PROJECT PROCESS

The process involved meeting with a wide number of stakeholders, to understand and develop the vision and mission of the district. The thrust of the project was to convert this vision into a realistic and achievable plan, striking a balance between data and design to create a truly transformative master plan that meets both the near-term and long-term goals of the MCA. To find this balance, the project team established an analysis and design strategy structured around four key phases. Each phase was designed to define and build upon prior phases and, knowing that planning is a process of discovery, allowed the team to nimble and able to adapt to new issues and opportunities that were identified throughout the process.

Phase 1. Information and Data Gathering

The process began by immersing the team and stakeholders into the project and identifying a vision. This included a review of all previously prepared studies and maps of the campus. It is one thing to gather together documents, but another to synthesize it and identify gaps where missing information may be needed to comprehensively understand the site.

Phase 2 Concept Development

The second step in the process involved the exploration of alternatives and the development of a concept that aligned the information gathered in phase one with the opportunities presented by the site and aspirations of the campus entities. The big idea that emerged was configured around creating a network of nodes, connections, and public spaces which support interdisciplinary collaboration between the campus's major institutions and the public sector players intended to become an integral part of the community.

Phase 3: Master Plan Development

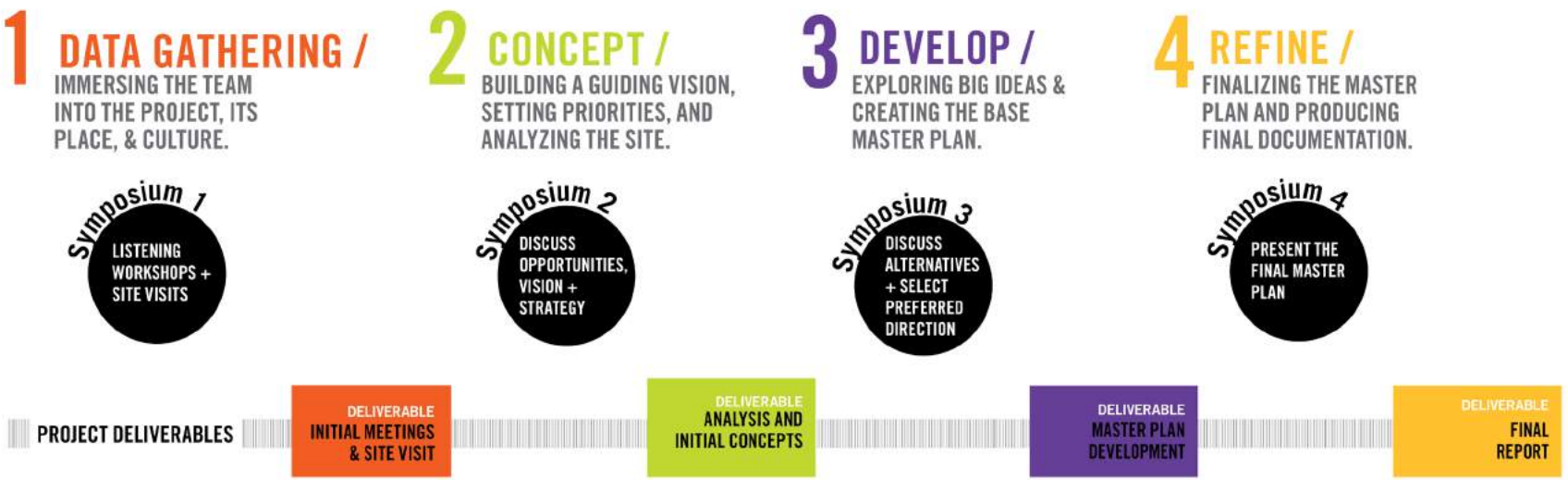
The third phase included refining the plan concept based on the feedback gathered from campus partners to provide the technical and engineering analysis required to create a truly implementable master plan that can be adopted by all parties.

Phase 4: Refinement and Final Presentation

Finally, the team worked closely with MCA representatives and stakeholders to strategize, review, and prepare the preferred plan. Once the preferred plan was established the team prepared final recommendations, produced deliverables, and presented outcomes to the Steering Committee and stakeholders.

Workshops

Workshops were conducted at each phase and provided the team with intensive periods of on-site working and time for engagement with MCA leadership and the considerable number of multidisciplinary stakeholders.

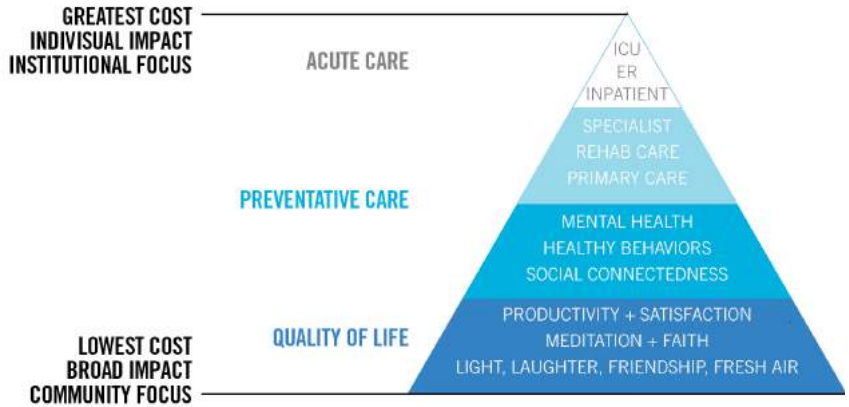


Project Process Flow Chart

Designing for Health

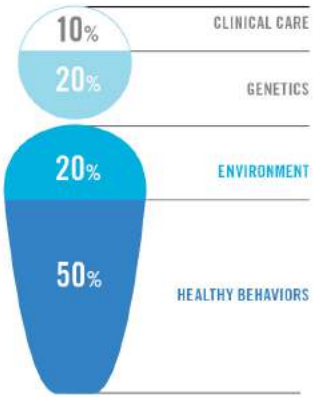
HEALTH VS HEALTHCARE

The definition of health is beginning to be expanded to include overall well-being rather than simply the lack of disease. The idea that health is more a product of how you live than anything else is becoming increasingly the norm. Because of this, players in the healthcare industry are changing to models focused on community-based prevention measures rather than in-hospital treatments. This is not to say that hospitals will become obsolete, but instead will transform from destinations for those requiring treatment and acute care to institutions that promote holistic health outcomes across the entire continuum of care.



THE HEALTHCARE DISTRICT OF THE FUTURE

Unlike hospitals of the past, typified by large, insular buildings surrounded by parking, the healthcare district of the future will be a shared environment that promotes health through education, policy, and support programs, becoming both a place and mechanism to support population health. People will come to these districts because they are places not only for treatment but for working, living, and healing with a focus on lifetime health and wellness. Creating such a place requires strategies focused on promoting physical activity through mobility options and provision of open space, increasing education around and access to healthy food options, and promoting quality of life via healthy workplaces and housing. The built environment is not the singular answer to disease prevention, but it can be a part of the puzzle. Healthcare institutions have the ability and duty to support a culture of health for their employees, visitors, and patients, as well as the residents who live in the communities around them.



Up to 70% of health factors can be influenced by the design of the built environment

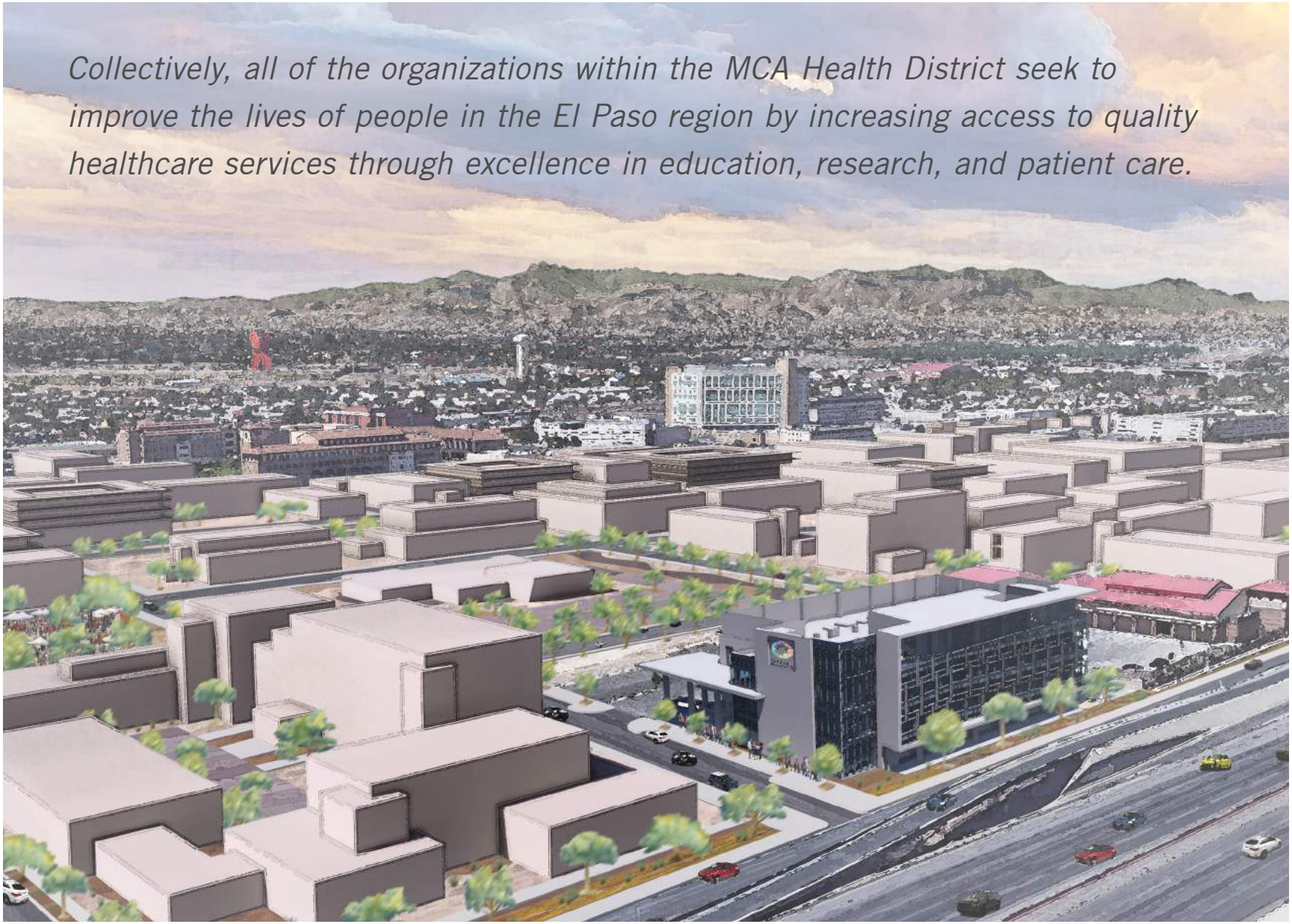
Factors in Healthcare. Source: Bipartisan Policy Center, June 2012.

HEALTHY COMMUNITIES

Chronic diseases that are a result of lifestyle choices (most often related to obesity) are costly to both the healthcare system, businesses, and society as a whole. Behavioral factors such as diet, exercise, and the environmental factors which influence these behaviors, have been found to account for up to 70% of a person's overall health. As major employers and owners or users of land, hospitals, health systems, and their affiliated organizations have the ability to lead the charge when it comes to creating healthier communities that exemplify the benefits of cost-effective prevention measures.

02 Vision + Goals

Institutional Missions



TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER EL PASO

The mission of Texas Tech University Health Sciences Center at El Paso is to **improve the lives of people** in our State and our community by focusing on the **unique health care** needs of **socially and culturally diverse** border populations **through excellence** in integrated **education, research,** and **patient care.**

The mission of the University Medical Center is to enhance the health and wellness of the El Paso **community** by making high-quality, affordable **healthcare** services accessible **to all**. Our tradition of respectful service is enriched by our participation in healthcare-related **education, research,** and **innovation**.

UNIVERSITY MEDICAL CENTER OF EL PASO

El Paso Children's HOSPITAL

The mission of El Paso Children's Hospital is to provide compassionate, coordinated, **family-centered care** for children with a dedicated commitment to excellent patient outcomes, **inclusive** leadership and **innovative** pediatric **research** and **education**.

The MCA Foundation works to improve **access to quality healthcare** in the Paso del Norte region by building a **better healthcare** infrastructure, providing superior healthcare **educational** opportunities and attracting **researchers** and healthcare providers to the region.

MEDICAL CENTER OF THE AMERICAS FOUNDATION

The Veterans Health Administration's mission is to Honor America's Veterans by providing **exceptional health care** that improves their **health and well-being**.

The mission of the City of El Paso Department of Public Health is to provide public health related **research, evaluation, education**, prevention, intervention, and preparedness services.

CITY OF EL PASO DEPARTMENT OF PUBLIC HEALTH

The mission of Maxine Silva Health Magnet School is to provide a progressive and academically rigorous curriculum in a **multicultural** and technologically **advanced** environment for students pursuing a career in **healthcare** professions.

Aligned Interests

All of the major institutions within the district have a mission related to improving the health of people in the region. In order to allow progress towards fulfilling these missions, the existing institutions have a great interest in ensuring that the district itself is a healthy place that can withstand the test of time. This requires the endurance of both the physical infrastructure and economic systems of the place. The district must be able to help itself before it is able to help those around it.

Great place + robust economy = a healthy district that allows for the continuance and enhancement of the missions of the players involved.

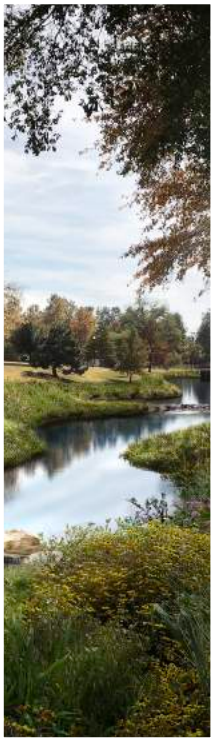
Great places (from an urban design perspective) and robust economies are proven to be inextricably linked. Recommendations within this master plan will focus on designing a great place based on accepted urban design practices, knowing that these will directly inform and influence a robust economy.

Based on conversations with the various stakeholders, there emerged seven major areas of interest around which a majority of the stakeholders could align:

1. **Increased Access** - allowing for visitors, patients, and employees to more easily access the site and its amenities through a variety of mobility options.
2. **Economic Development** - strategic placemaking that promotes the influx of investment, both private and public, to the district.
3. **Upgraded Infrastructure** - the necessary utilities, roadways, and stormwater management that keep the district functioning and can support the types of growth and uses expected for the site.
4. **Increased Visibility** - promoting the MCA and its institutions as a regional leader in healthcare through the creation of a physical place that exemplifies the work being done inside the buildings.
5. **Workforce Development** - ensuring that the residents who live in and around the district benefit from its success and to provide the institutions within the district with a pipeline of qualified talent.
6. **Institutional Growth** - allowing the existing institutions to grow within the district while enhancing their growth through opportunities to collaborate with each other as well as outside players.
7. **Quality of Life** - making the MCA campus a place where employees want to work, making for easier recruitment and retention, along with enhancing the experience of visitors and patients and promoting healthy lifestyles for nearby residents.

GREAT PLACE

INFORM EACH OTHER



INFLUENCE EACH OTHER

INCREASED ACCESS

ECONOMIC DEVELOPMENT

UPGRADED INFRASTRUCTURE

INCREASED VISIBILITY

WORKFORCE DEVELOPMENT

INSTITUTIONAL GROWTH

QUALITY OF LIFE

ROBUST ECONOMY

Design Principles

We know that the physical environment can greatly influence the health of people and why all stakeholders have an inherent interest in making the MCA Campus a healthy place to work, live, and heal. Just like the many factors that contribute to the overall health and wellbeing of a person, there are many factors that contribute to the holistic health of a place.

DESIGN PRINCIPLES

So, how do we define a healthy place for the MCA campus? To assist in this, planning themes or principles, which key back to supporting the aligned interests of all stakeholders, have been developed. Everything that is designed, proposed, or recommend through this master plan should be attributed to one of these. If we are successful in implementing these principles, then we will be well on our way to making the MCA Campus a healthy place.

INDICATORS OF SUCCESS

The next question to ask is how will we be able to identify whether we have been successful in implementing these design principles? For each principle tangible factors or indicators have been outlined to assist in determining if a healthy place has been successfully created. What it all really boils down to is creating places for people.

Principle 1: A place that is accessible and safe.
Supported Interests: Increased Access, Workforce Development

Indicators of Success:

- Increased transit options
- Increased intersection density
- Decreased pedestrian and bicycle accidents

Principle 2: A place that encourages healthy lifestyles.
Supported Interests: Quality of Life

Indicators of Success:

- Increased healthy food options
- Increased access to open space
- Increased sidewalk coverage

Principle 3: A place that is full of activity.
Supported Interests: Economic Development, Increased Visibility

Indicators of Success:

- Increased diversity of land uses
- Increased housing options
- Increased amenities and services

Principle 4: A place that is adaptable.
Supported Interests: Upgraded Infrastructure, Institutional Growth

Indicators of Success:

- Increased infrastructure capacity
- Increased flexibility
- Increased resilience


CARDWELL
COLLABORATIVE
CARDWELL
COLLABORATIVE
Main Entry
Deliveries
5130

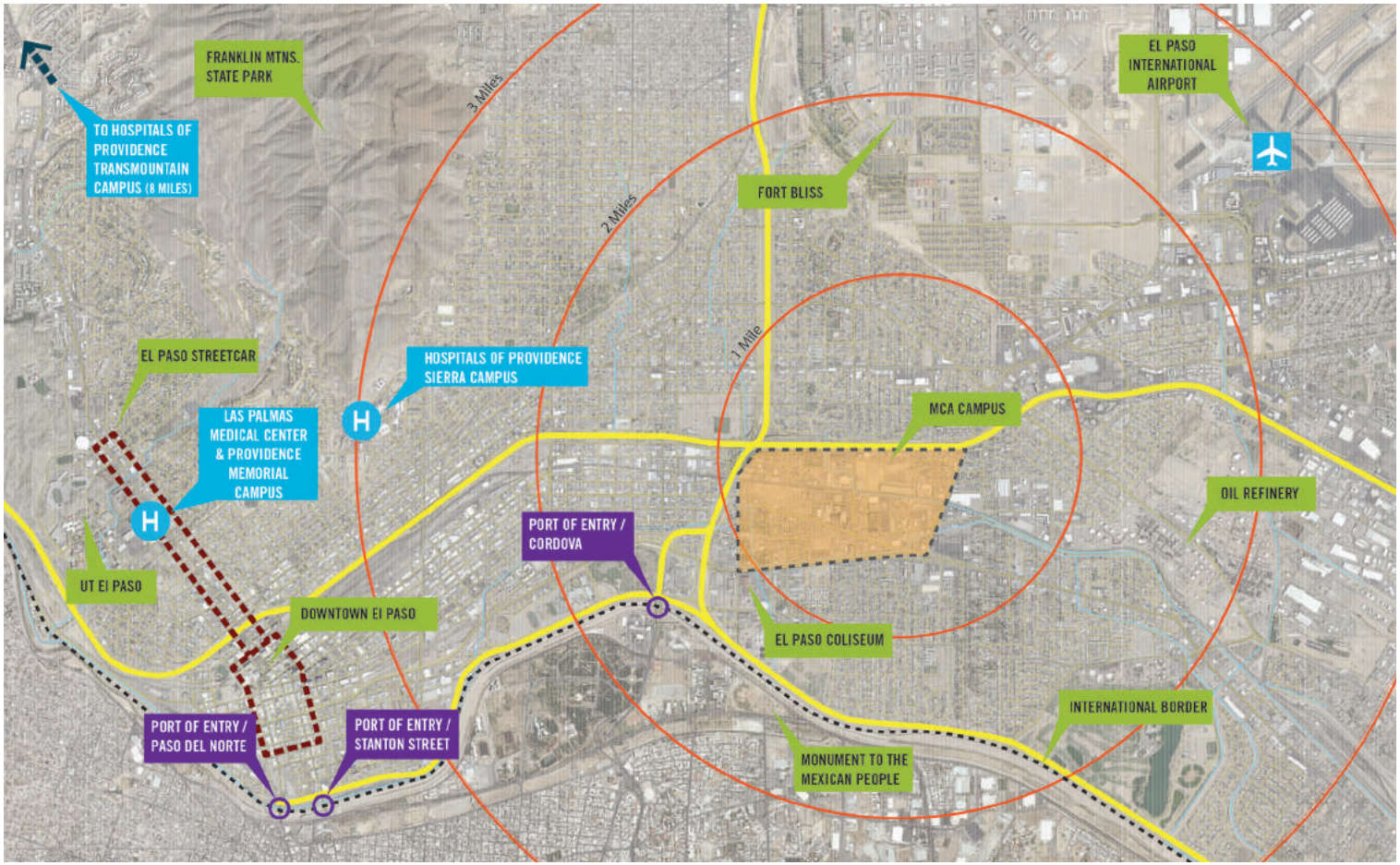
03 Analysis + Observations

Site Context

CITYWIDE SETTING

El Paso

The Medical Center of the Americas is located in east central El Paso, serving the Paso del Norte Region. Roughly 3 miles east of Downtown El Paso, the district is located along major national and international transportation corridors – Interstate 10 which travels east west through the city and Interstate-110 / US-54 which travels north-south through the city and across the Cordova International Port of Entry into Juarez, Mexico. It is in close proximity to the El Paso International Airport and Fort Bliss to the north and northeast.

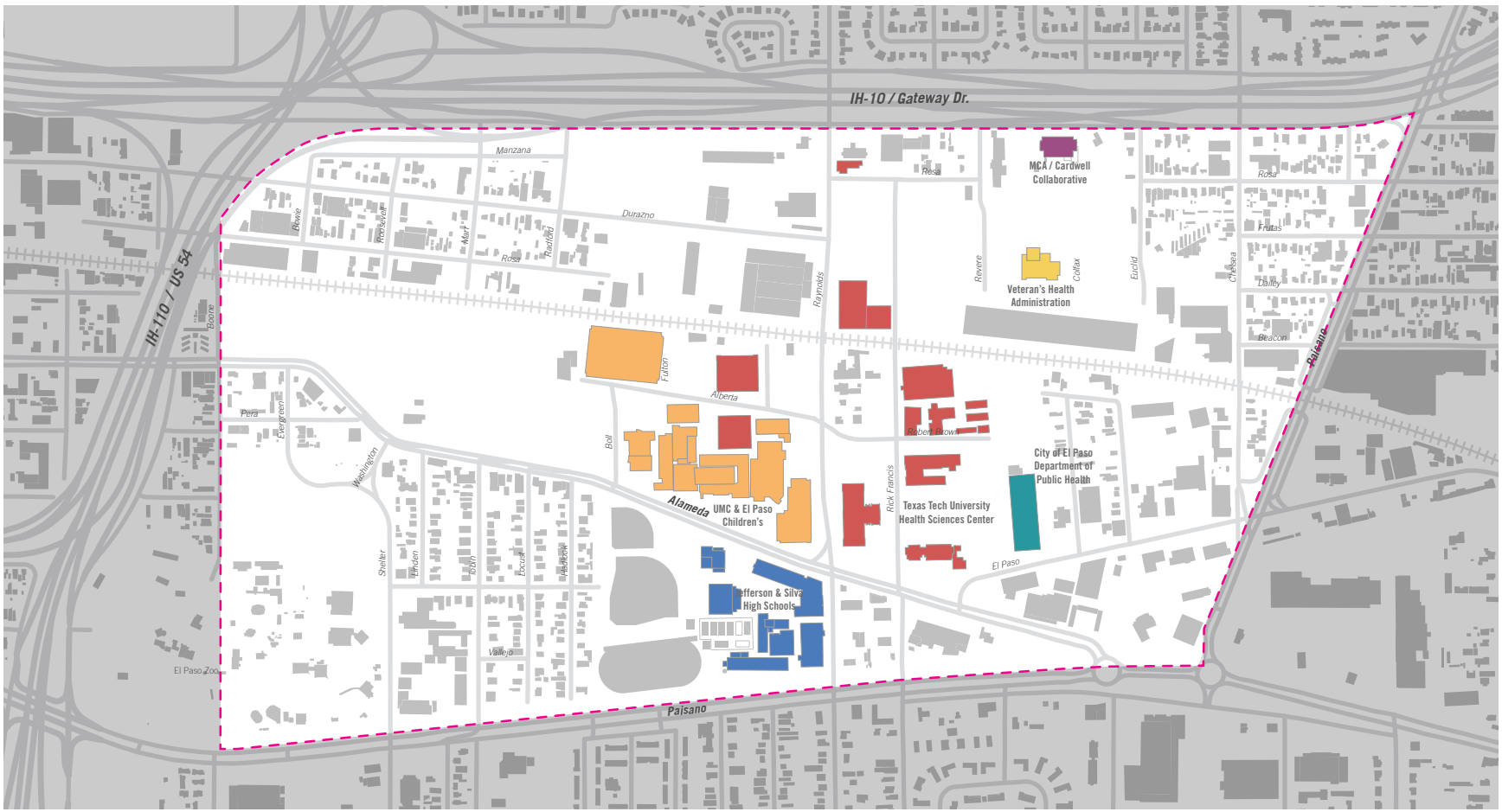


MCA - Citywide Context

SITE CONTEXT

MCA District

The future MCA district is envisioned to be a hub for education, patient care, research, and innovation in pursuit of improving the lives of people in the El Paso region by increasing access to quality healthcare services. The 440 acre medical district is going through a period of physical transition, where areas with an industrial nature are being turned into office, research, and medical facilities. Institutional anchors in the district (Texas Tech University Health Sciences Center, University Medical Center, and MCA Foundation) with plans for expansion are the main owners of land in the district. There's a presence of public ownership within the district as well, with schools and public facilities such as The City of El Paso Public Health Department. The rest of the district mostly consists of private residential and commercial ownership.



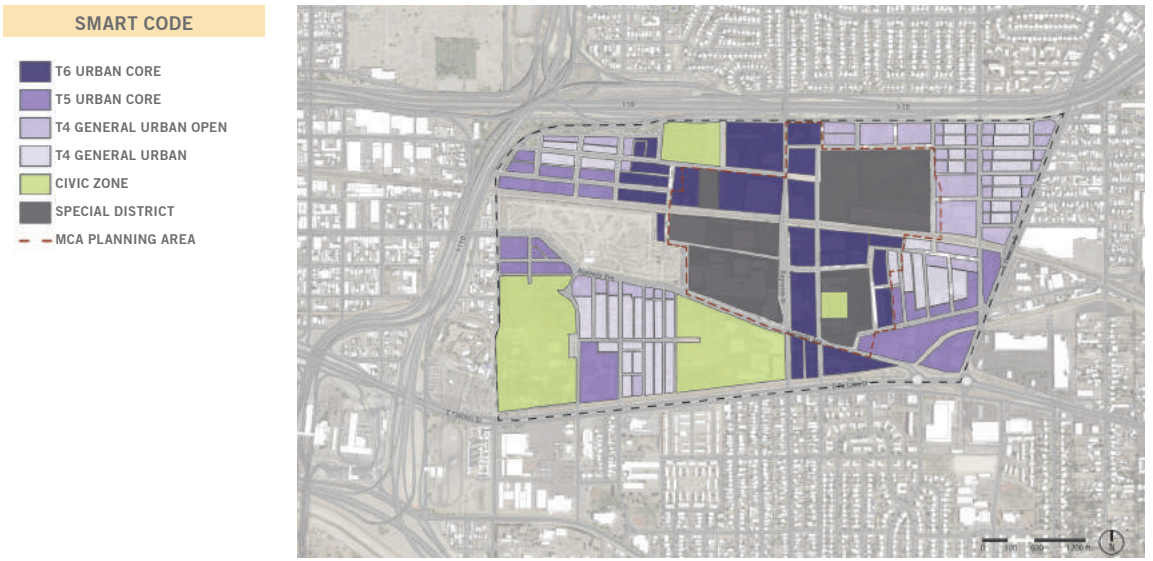
MCA Health Institution Anchors

Planning Analysis

FUTURE LAND USE

Smart Code

The Health District is designated as an Infill RCD (Regional Center Development) area within the City of El Paso Smart Code. Much of he central core of the district (MCA planning boundary) is categorized as special district and T6 Urban Core allowing for more flexible and higher density of development. The Smart Code allows for any Infill RCD on a projected bus rapid transit (BRT) to be re-designated as transit oriented development and permitted the higher density represented by the effective parking allowance.



VEHICULAR NETWORK

District Roadways

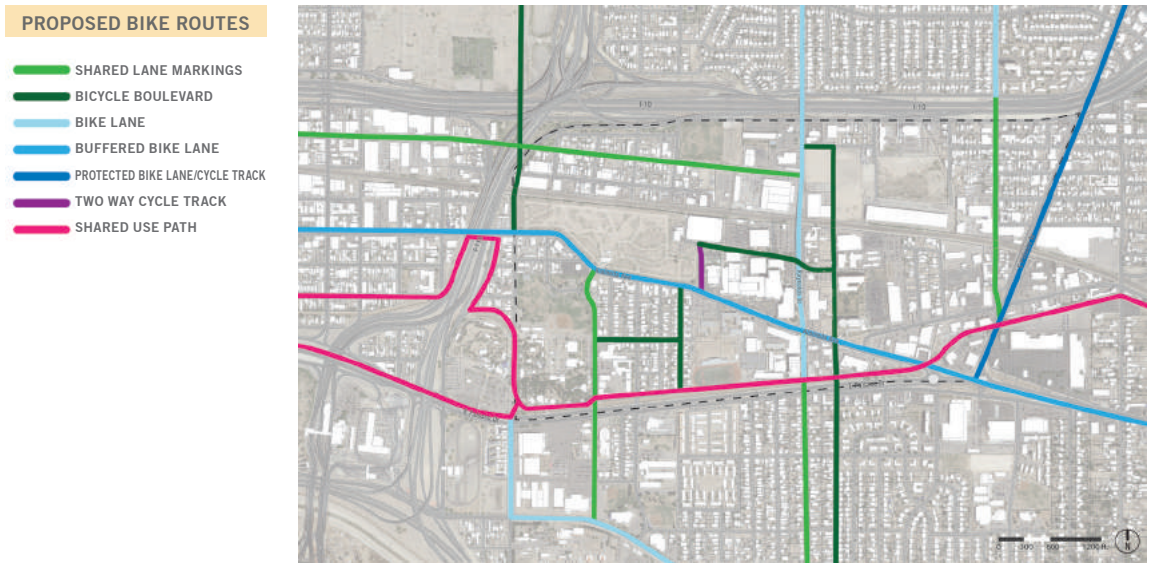
The MCA site at the confluence of many major transportation routes. Regional access routes to the district are provided by I-10 and I-110/ US-54. Main local accessibility to the district is provided through major roads in the area which are Raynolds Street, E Paisano Drive, and Alameda Avenue, all of which are TXDOT rights of way. Internal local roads create the points of access throughout the district, but often have poor connectivity due to existing physical barriers. Disconnection of the network leads to more trips being directed to major roads in the district, causing a higher traffic load on the major connectors.

Source: Medical Center of the Americas Multimodal Access Plan

BICYCLE ROUTES

Proposed Infrastructure

While the City of El Paso Bicycle Plan includes a number of improvements, there is currently very little bicycle infrastructure within the MCA district boundaries. High speed limits on major roads without protected bike lanes and lack of connectivity within the local routes, create an unfriendly transportation network for bicycles. Sharrows have been implemented along Alameda through the district at this time, but buffered bike lanes are planned in the future.



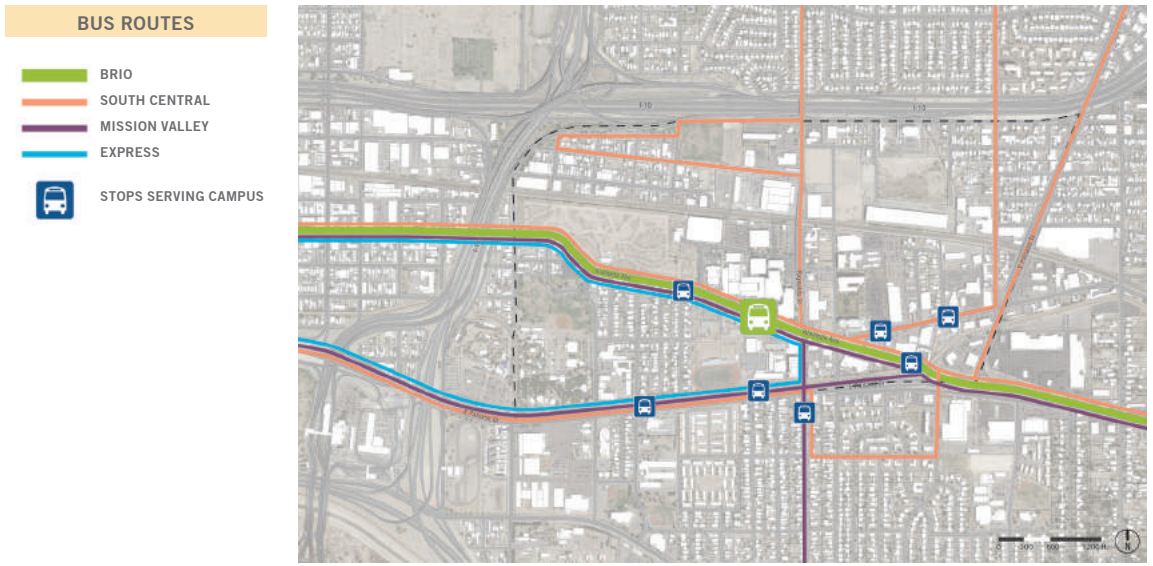
Source: City of El Paso Bike Plan, August 2016

PUBLIC TRANSPORTATION

Bus Routes

MCA campus is served by 10 local bus routes, with multiple options for getting downtown and heading east on Alameda. However, there are few infrequent options for crosstown access. The large number of routes within the district and low frequency of service, creates a hard to understand and unforgiving network for unfamiliar users. The Brio Bus Rapid Transit route will soon be implemented with a stop on Alameda that will improve connectivity with frequent service to the district.

With most routes serving the Alameda corridor, pedestrian connectivity within the district becomes an integral part of planning for better public transportation.



Source: Medical Center of the Americas Multimodal Access Plan

Existing Conditions

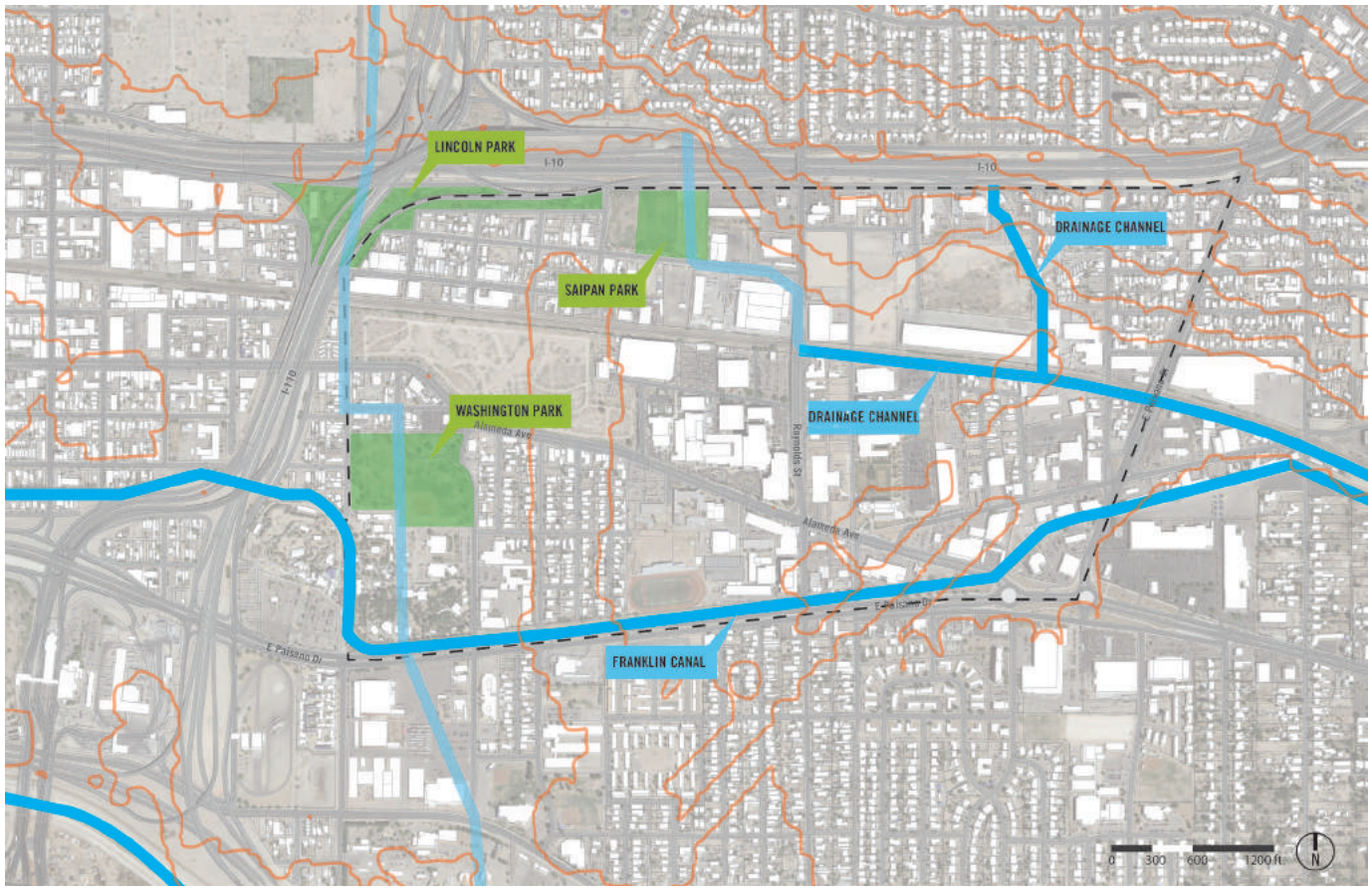
ENVIRONMENTAL ANALYSIS

The site contains a number of challenges related to its environmental conditions. There are significant topographic challenges within the northeast portion of the district which create issues with grade changes and site development constraints. A high amount of impervious cover is present due to large warehouse facilities and attendant parking / loading yards. There is no designate floodplain within the district, but drainage and stormwater issues are prevalent.

A major stormwater management facility has been created at Saipan Park / Pond, which has helped alleviate flooding concerns in the northwest quadrant. The Coors and Brentwood drainage channels have experienced flooding in the past and present opportunities for further mitigation efforts. Further analysis and recommendation for stormwater management can be found in the Utilities Appendix.

ENVIRONMENTAL ELEMENTS

- SURFACE WATERWAYS
- BURIED WATERWAYS
- 10 FOOT CONTOURS
- PARKLAND



Saipan Park, dry conditions

Coors Channel facing MCA / Cardwell Collaborative building

Saipan Park, wet conditions

Connectivity Analysis

SITE SETTING - BARRIERS

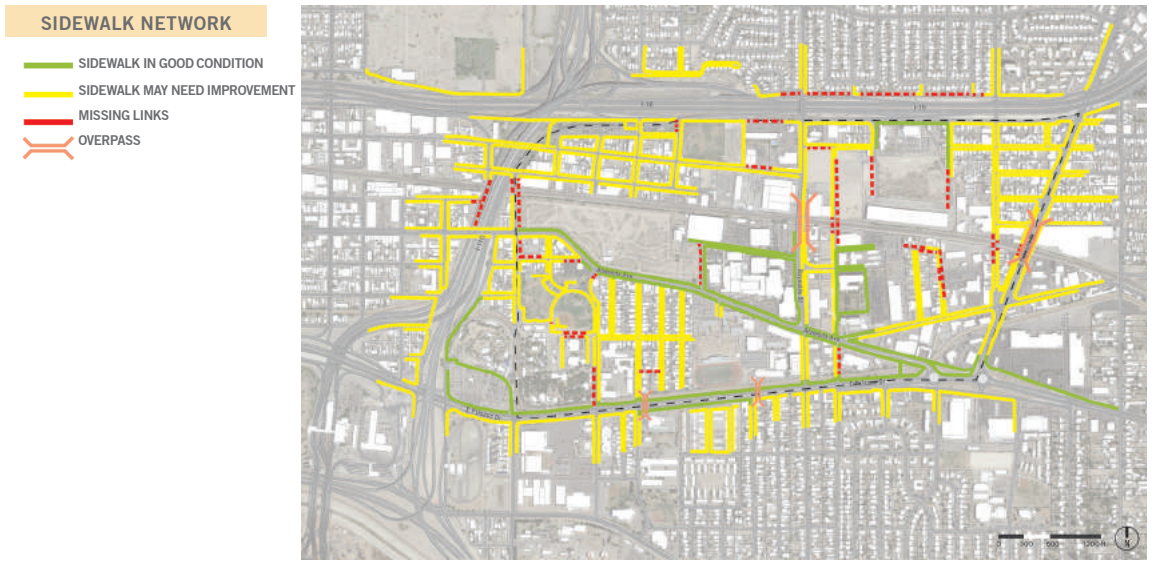
Physical Barriers

There are many physical elements in the district that act as barriers for connectivity. Highways and major roads surrounding the district limit connectivity to adjacent neighborhoods, particularly for pedestrians and cyclists. Surface waterways, the Union Pacific Railroad, elevated overpasses, and large property holdings without through streets create physical barriers within the district that limit both vehicular and pedestrian connectivity.

SITE SETTING - PEDESTRIAN

Sidewalk Network

While sidewalks do exist through many portions of the district, many could be improved as the district redevelops. Where present, sidewalks often lack appropriate widths, have excessive curb cuts, and lack other needed amenities to create a pleasant walking experience. Some areas of pedestrian network within the site lack connection altogether, causing gaps in continuity of the infrastructure.



The Franklin Canal traverses the district om the south edge

The Rayonlds overpass creates an east / west barrier

Interstate highways along the northern and western boundaries disconnect the district from adjacent neighborhoods

Drainage channel bisecting the district along the Union Pacific Railroad

The Union Pacific Railroad bisects the district from east to west

04 Framework Plan

Framework Plan

A GUIDE FOR GROWTH

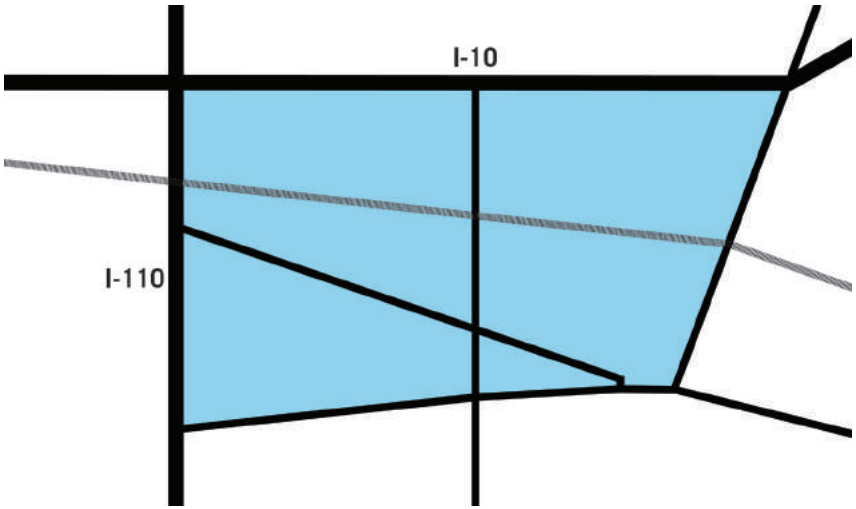
The framework plan presented in this section provides a guide for the long term development of the MCA Health District. The framework proposes new streets, pedestrian and bike facilities, and open spaces that seek to achieve the vision and goals of a healthy district.

This section walks through the design concept or “parti” for the framework plan, and then proceeds to show its component pieces, including street framework, open space framework, proposed street hierarchy, and bicycle & mobility plan. Each of these components is accompanied by a set of best practice recommendations, that provides guidance for future development of each of these elements.

Design Parti

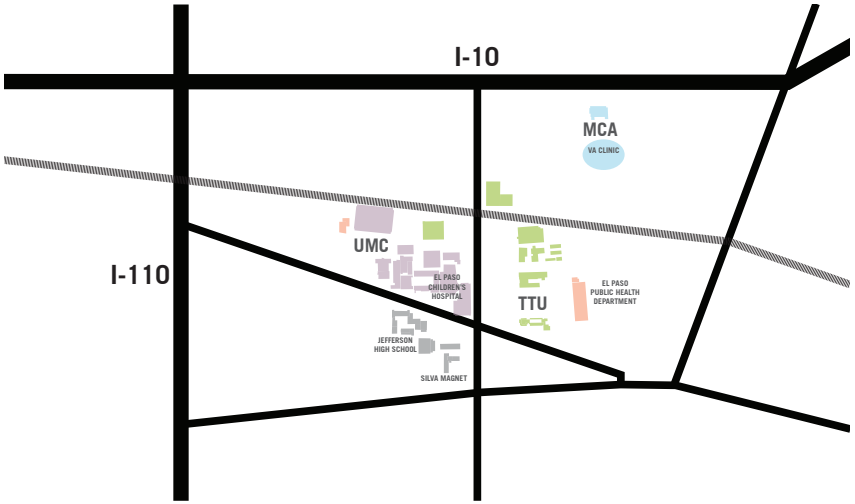
The Big Idea

"Parti" is a design term that varies in literal translation, but is along the lines of "departure point" or "decision point". The following diagrams walk through the thought process behind and build-up of the design parti for the MCA campus, which forms the basic structure for the concept plan. The underlying idea embedded here is one that all district stakeholders can agree on and rally around. Decisions made in regards to campus design should be made with consideration of the intent of the design parti.



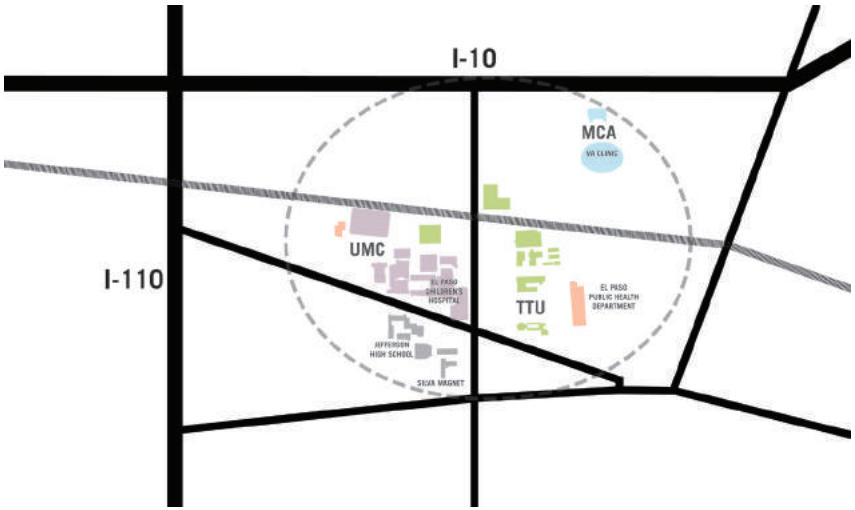
1. A District.

The MCA district has an established boundary, and within this district there are many existing barriers. The barriers created by Raynolds Street and the railroad generally break the area up into four disconnected quadrants. These barriers make it critically important that we create connections wherever possible, and not create further barriers.

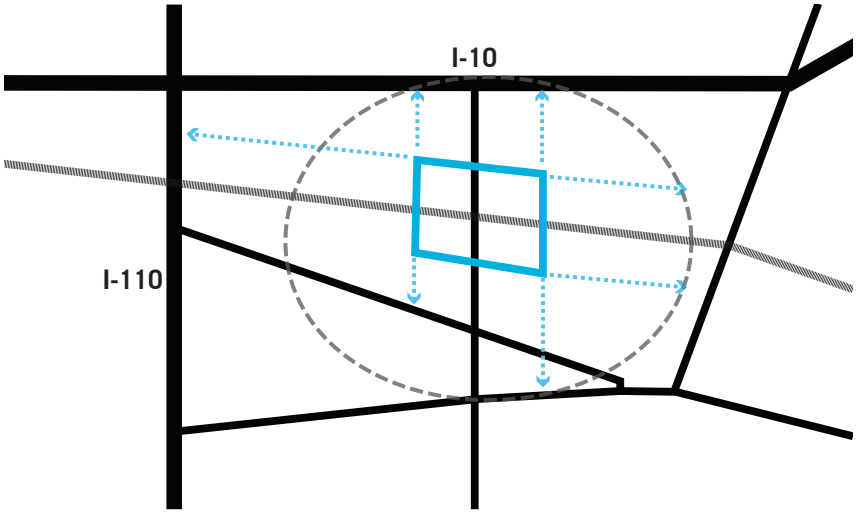


2. A Health District.

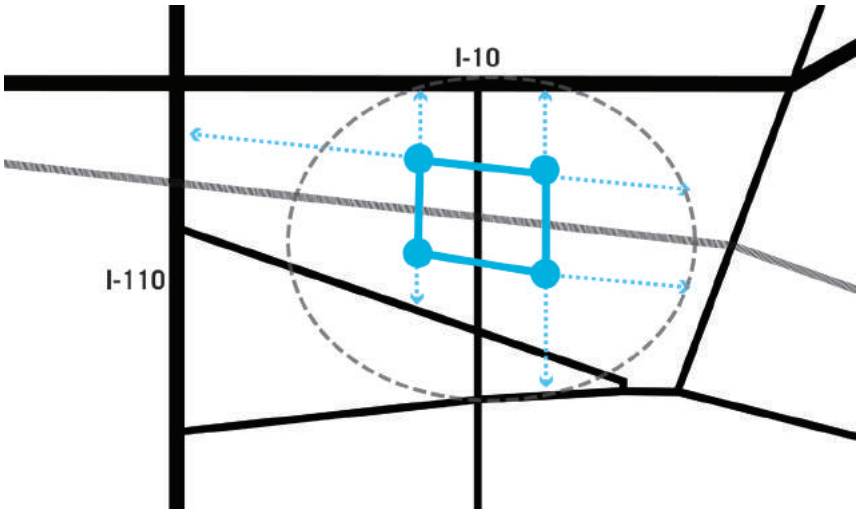
Within the district boundaries, there is an existing grouping of major medical institutions and large related users, generally one in each quadrant. These institutions each has a related mission, lending support to the creation of a health district. These institutions each become a player in that district, based not only on proximity and location, but on related missions and interaction between them.



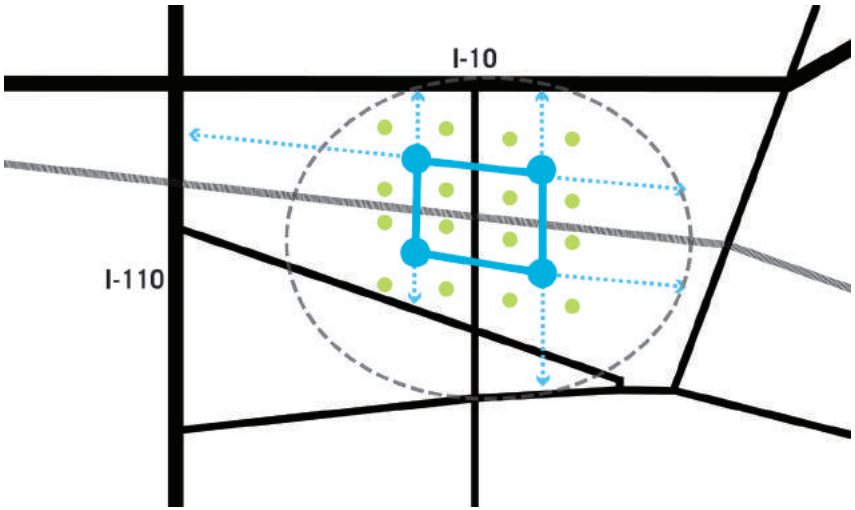
3. A Health District Core.
The major institutions are generally consolidated towards the center of the district, where Raynolds Street crosses the railroads, creating a logical district core. This district core is where a focus for near-term recommendations should be made, allowing the institutions to begin implementing the vision which will then spur private commercial and residential investment to happen organically throughout the rest of the district.



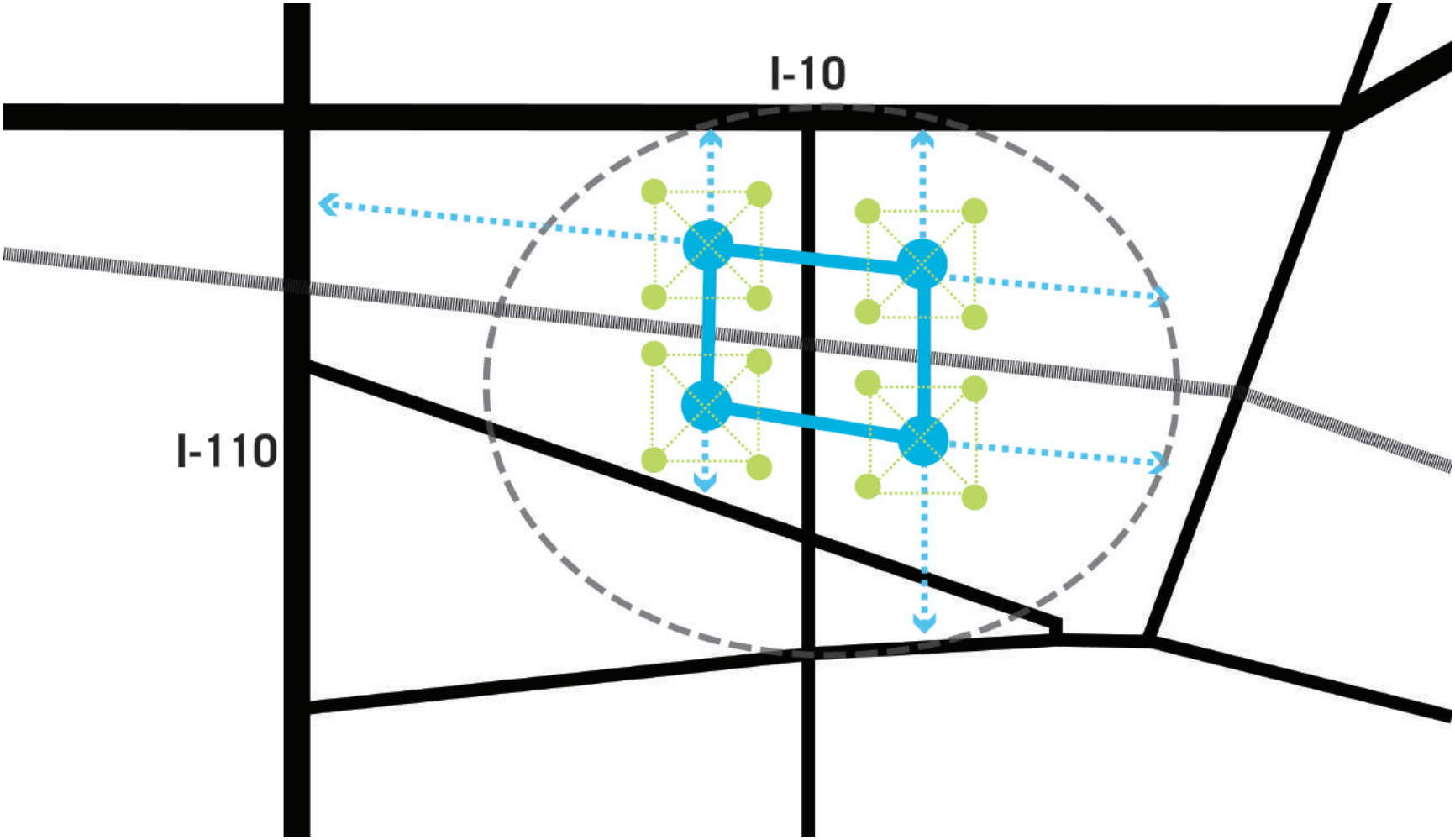
4. A Connected Health District Core.
The location of anchor institutions form a district core, but the physical barriers greatly inhibit connectivity between them. Therefore it is critical to create connections that link each of these quadrants, making the district feel and act like a true campus, which is where the real value lies. These connections should be high-quality streetscapes that promote multi-modal and active transportation options. Careful attention should be paid to where these connections cross major barriers to ensure a safe and enjoyable experience.



5. A Connected Health District Core with Nodes of Activity.
Where the links from each quadrant meet, there should be an active center or node for each quadrant. These nodes should provide interest, activities, and amenities in the form of focused development density with buildings that front the street with active ground floor uses. Uses on the upper floors in these areas could include institutional research, office, educational, office or residential.



6. A Connected Health District Core with Nodes of Activity Supported by Public Spaces.
In addition to nodes of activity, each quadrant should provide public spaces in the form of parks, plazas, etc. These public spaces do not require a huge amount of land, but should be intentional, well designed, and activated by the surrounding uses. The framework plan describes the different scales and designs possible for these spaces.



7. A Connected Health District Core with Nodes of Activity Supported by Public Spaces that Creates a Community Network. The final layer of the design parti is to provide more refined system of linkages, allowing the formation of a community network inclusive of activity nodes, public spaces, and infrastructure. These linkages could be complete streets room for bicycles and pedestrian, or pedestrian only pathways, or a pedestrian bridge over a major barrier. The focus should be on allowing people (not necessarily just cars) to safely and easily move around the campus and create public spaces that users want to inhabit.

Framework Plan

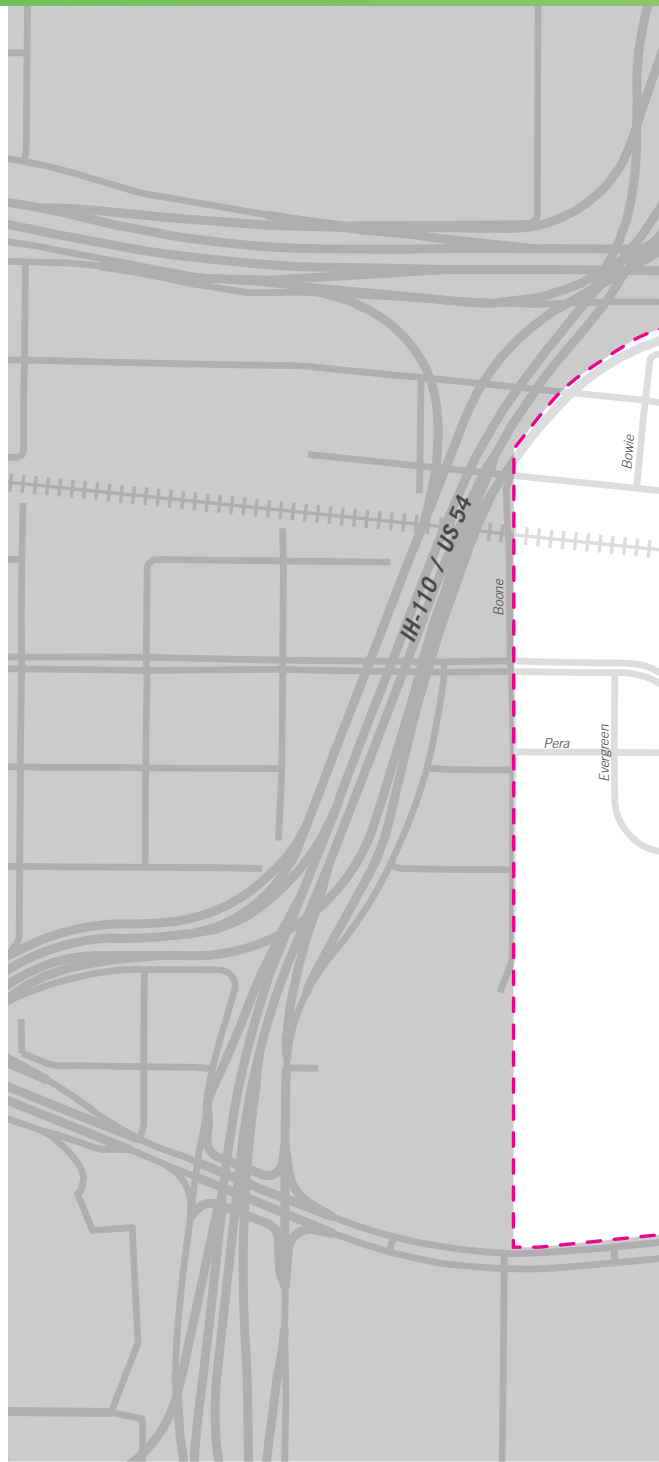
DISTRICT FRAMEWORK

Street Network

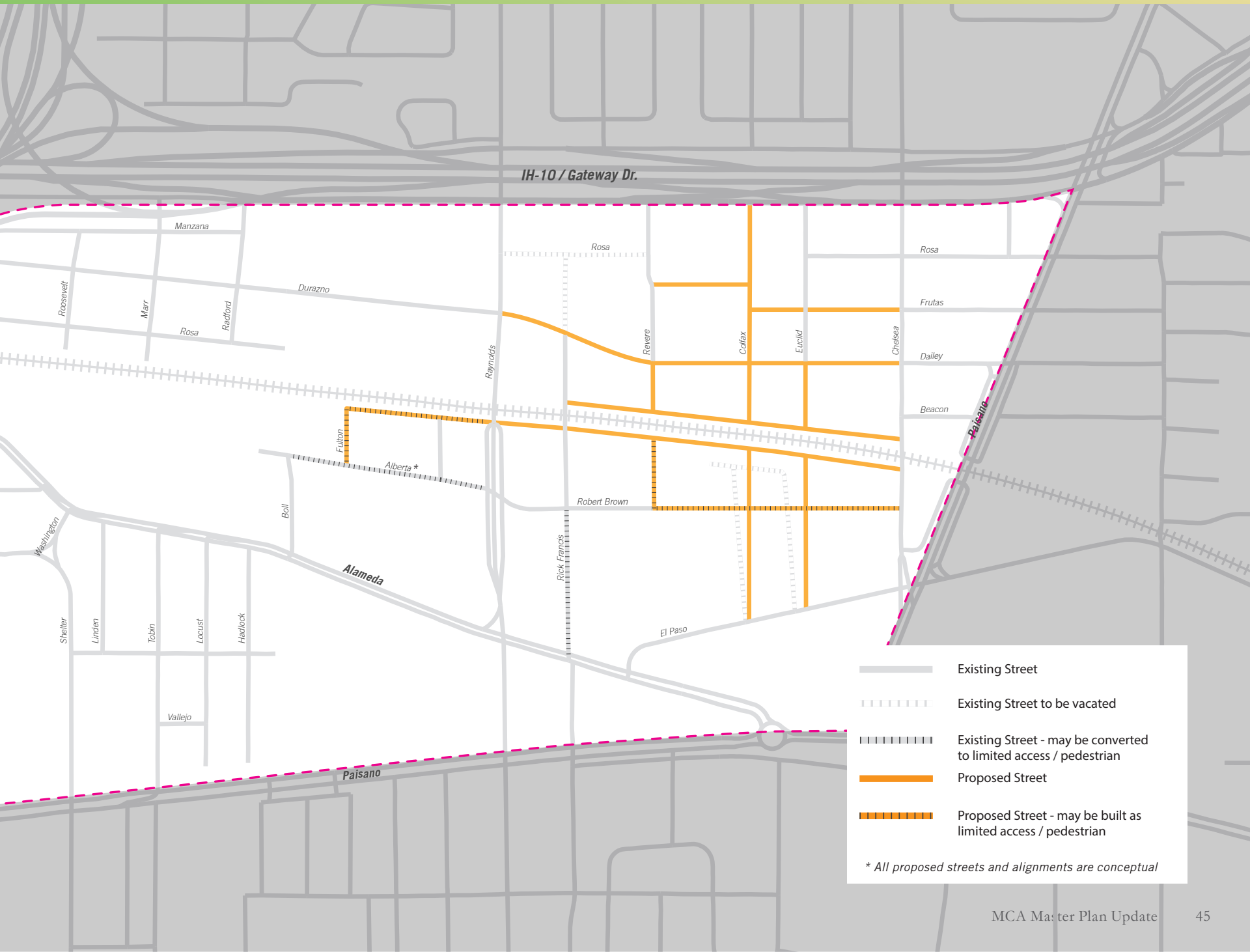
The basis for future development of the MCA is a strong framework of streets that will connect the district. These proposed streets will break down large portions of inaccessible property, creating ways for vehicles, bicycles, and pedestrians to traverse the district safely.

The majority of proposed streets are east of Raynolds; this owes to large portions of the western portion of the district being comprised of existing institutions, parks, cemeteries, etc. that would not lend themselves to the introduction of new rights of way.

It should be noted that some streets shown on the framework plan may be closed to certain types of traffic, and may change along their length. Particularly with regards to the TTUHSC EP and UMC campuses, these institutions have an interest in creating several more pedestrianized streets that may have limited vehicular access. Any street in the framework should be designed to accommodate bicycle and pedestrian traffic, as well as limited vehicular traffic appropriate to the location and institution. As the campuses develop, the needs and plans of each institution will determine how these streets evolve, and what level of vehicular access is appropriate to the context.



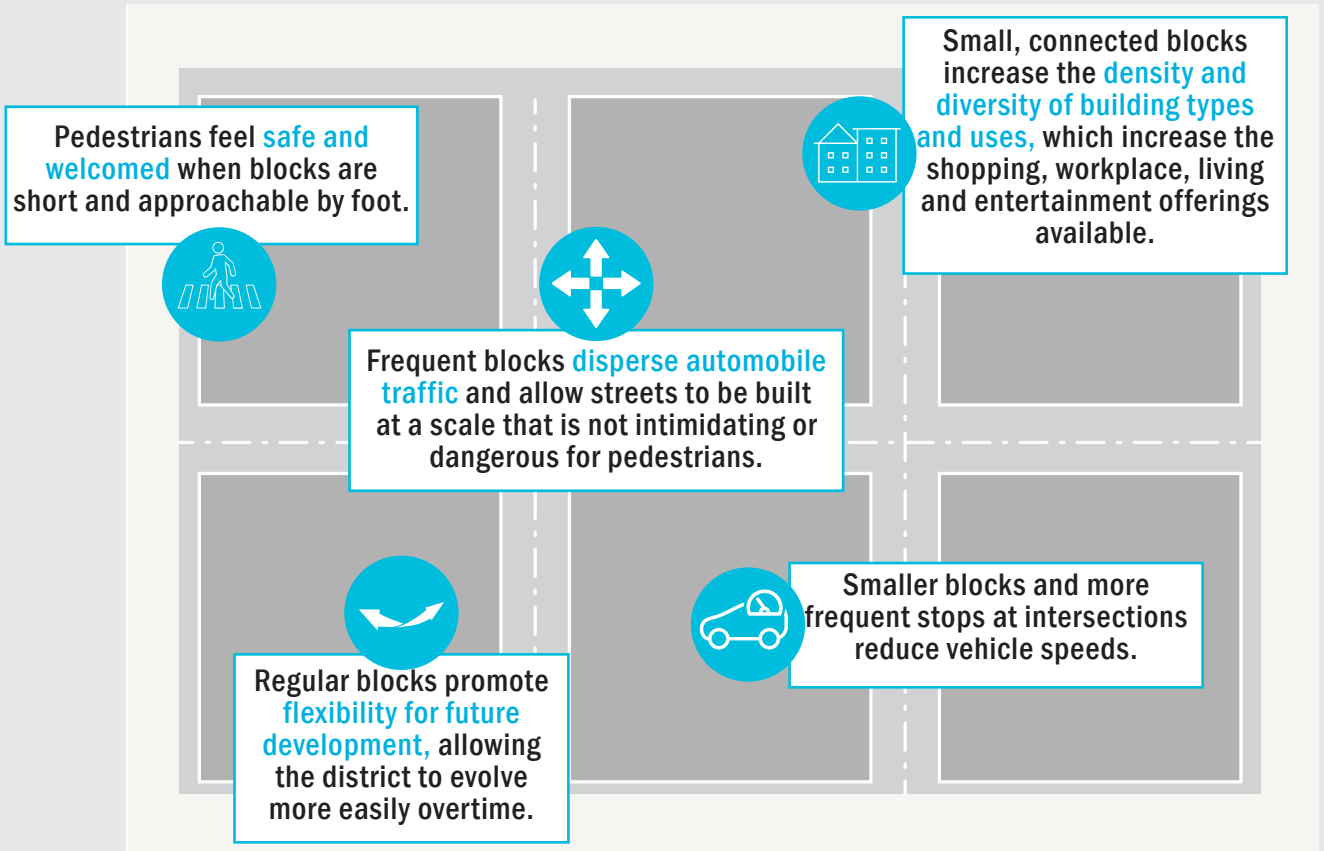
** Alberta ROW is owned by UMC wast of Raynolds*


IH-10 / Gateway Dr.
Manzana
Durazno
Rosa
Roosevelt
Marr
Radford
Rosa
Rosa
Rosa
Frutas
Dailey
Beacon
Reynolds
Revere
Colfax
Euclid
Chelsea
Paisano
Fulton
Alberta *
Robert Brown
Rick Francis
Boll
Washington
Alameda
Shelter
Linden
Tobin
Locust
Hadlock
Vallejo
El Paso
Paisano
Existing Street
Existing Street to be vacated
Existing Street - may be converted to limited access / pedestrian
Proposed Street
Proposed Street - may be built as limited access / pedestrian
* All proposed streets and alignments are conceptual

Best Practices: Block Structure

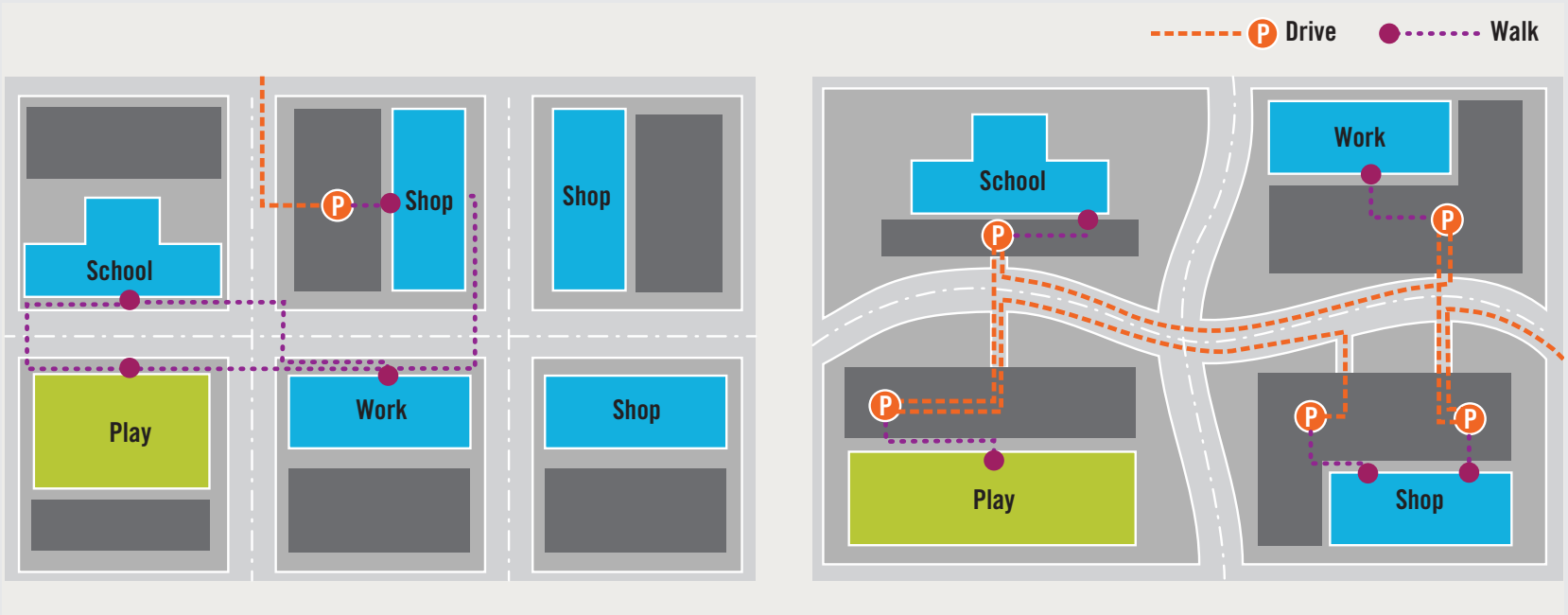
WHAT IS BLOCK STRUCTURE?

Blocks are the developable spaces in between streets or pedestrian paths. Frequent blocks provide more options for pedestrians to get from one place to another. Small blocks also disperse automobile traffic and provide more route options for other modes of transportation. Frequent blocks create more intersections which require automobiles to slow down traffic making it safer for pedestrians. Square blocks provide the most street frontage and the most opportunity to create active, ground floor uses like building entrances and retail activity. A block should be able to accommodate early development of a single-story use with surface parking behind it, as well as more intensive uses, such as above-grade parking structures and multi-story buildings with street-oriented ground floors and high-activity sidewalks. Blocks do not need to be broken up with streets or right-of-way as long as private drives and pedestrian paths are maintained.



***Longer street blocks are unsafe for pedestrians**. Long blocks commonly have crosswalks only at intersections, indirectly encouraging unsafe mid block crossings. **Long blocks also encourage higher vehicle speeds** due to fewer junctions that interrupt travel. More junctions mean more places where cars must stop and pedestrians can cross.*

- CITIES SAFER BY DESIGN, World Resources Institute



CREATING A WALKABLE ENVIRONMENT

There are many factors that go into creating a walkable environment. Block length, intersection frequency, building disposition to the street, pedestrian amenities, shading, ground level activity and many more all contribute.

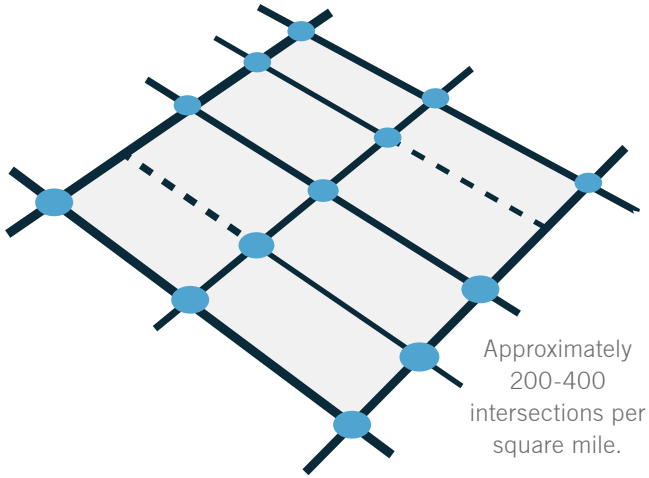
The diagrams above describes two different development scenarios. The one at left shows a block grid system, with short block lengths and buildings that address the street. In this scenario, someone might park their car in the rear of their first destination, and because of the proximity and pedestrian environment created, would be encouraged to walk from destination to destination within the neighborhood.

The diagram above right demonstrates a similar set of uses, with a more suburban development pattern. Buildings are set back far from the street behind parking lots, making users feel farther away from each destination. The irregular grid forces more cars onto wider roads, making it less comfortable and safe for pedestrians to cross from one place to the next, and creating fewer intersections to cross. Users are forced back into their vehicles in order to get from one destination to the next, causing more traffic and intersection delays.

STREET NETWORK AND CONNECTIVITY

A robust and highly connected street network provides many opportunities for route choices and allows for smaller, more pedestrian friendly streets. Connectivity can be measured by intersection density; more intersections per square mile indicate a more highly connected district. As a point of reference, the USGBC LEED Handbook for Neighborhood Development (v4) sets the baseline criteria for consideration as a LEED Neighborhood at 140 intersections per square mile. To earn any points toward certification, an intersection density of 200 per square mile is necessary, while the highest level is > 400 per square mile. At the moment the MCA District has roughly 110 intersections per square mile, while the core area has only 60.

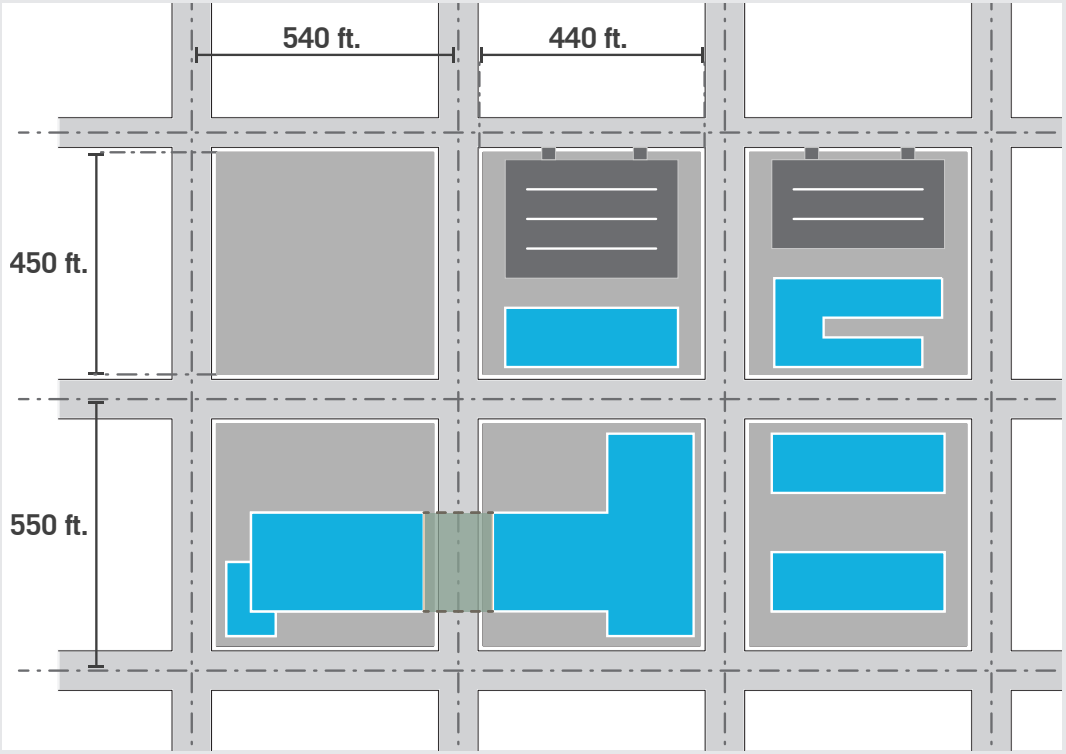
The intersection density in Downtown El Paso is approximately 350 intersections per square mile and allows for a variety of sizes and types of buildings.



Approximately 200-400 intersections per square mile.

INTERSECTION DENSITY - MCA DISTRICT

INTERSECTION DENSITY - CORE AREA

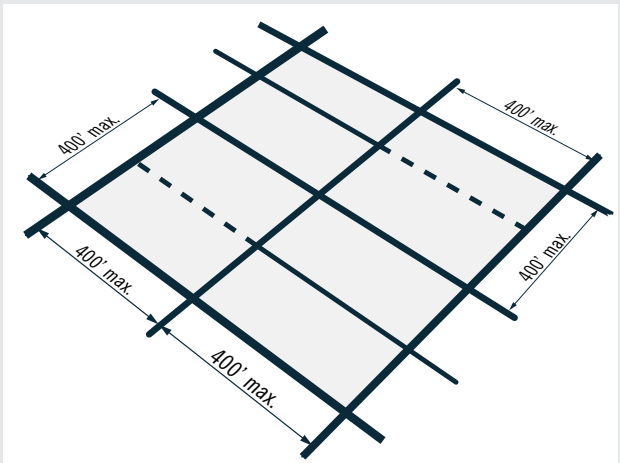


BLOCK SIZE

Shorter blocks allow for a more permeable urban fabric, higher pedestrian activity, and often a more interesting and vibrant streetscape. Block sizes between 400' to 600' provide a good starting target. For reference, Downtown El Paso has a typical block size of less than 300' curb to curb, Manhattan's oblong blocks are typically about 230' by 450-800'.

Existing ROWs, infrastructure, topography, or the needs of a large institution or facility (such as a hospital or university) may not always allow typical block sizes, though it is often possible to design in a way that adheres to this principle while accommodating these needs. If more of the grid structure and block size can be maintained in areas where it is feasible, the impact of the need for larger parcels and existence of obstacles can be minimized.

The block size in downtown El Paso is approximately 300' between intersections. "Intersections" do not always have to mean vehicular streets and can also be created by pedestrian walks and pathways.



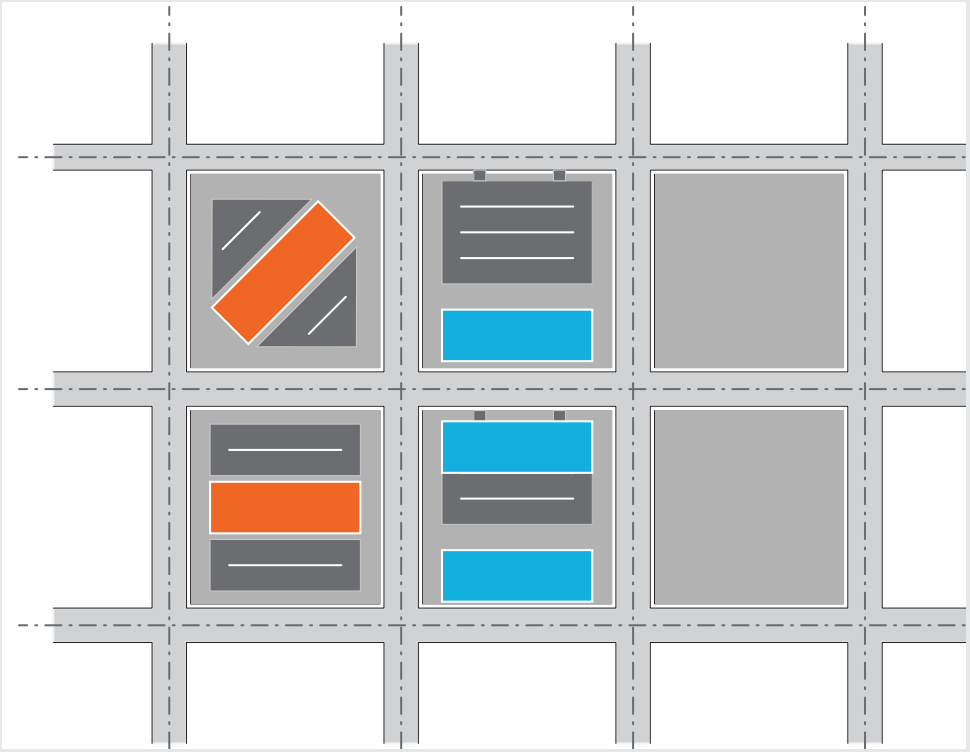
Approximately 400'-600' between connections to adjacent communities.

BUILDING DISPOSITION

Buildings should be designed to frame public space and create the public realm of the street. The El Paso Smart Code zoning has much to say on the topic, and provides guidance on requirements by zoning transect. In addition to the smart code guidance, there are several elements to consider in the implementation of the street framework.

Early phase investments in new or improved streets should be accompanied by development that supports and enhances these improvements. Knowing that it will take many years to complete the street framework shown, new development should seek to enliven these early public space investments to create a sense of place. Buildings that front directly onto the sidewalk create a sense of enclosure at the pedestrian level and generate ground-level uses that encourage pedestrian activity.

Additionally, the efficient placement of permanent structures within a block will have a major impact on the ability to accommodate future development. For example, by placing a building in the center of a block or at an angle, as shown by the orange buildings in the adjacent diagram, the remaining land within the block is severely limited by size and shape. In contrast, placing buildings parallel to the street grid and with small setbacks from the street, as shown by the blue buildings in the diagram to the right, leaves room for future buildings to be built on the remaining land. Being smart about building placement is especially important for places with limited land resources, such as the MCA Campus.



Building Disposition Diagram

Street Improvements

DISTRICT FRAMEWORK

Proposed Streets & Street Improvements

The streets in the MCA Health District are intended to be designed to meet the City of El Paso SmartCode. This means that they should be designed for pedestrian comfort and safety, with buildings that front close to the sidewalk. The SmartCode promotes the idea that building form, rather than land use, can be used to create a better, more walkable urban environment.

The district is already included in the Smart Code zoning. The diagram at right presents a proposed classification for new streets and improvements to existing streets. These classifications either follow street sections presented in the City of El Paso SmartCode or are slight modifications to those sections. The alphabetical prefix corresponds to the ROW type, the first two digits correspond to the overall ROW width, and the final two digits correspond to the width of the street itself.

These sections should be considered "typical," knowing that there will be areas along the length of these ROWs where existing conditions may not allow for implementation in this configuration, or where this configuration may not be possible in early phases of development, particularly in already developed areas. Modified street sections should be coordinated with the City of El Paso so that the SmartCode can be updated to include the sections deemed appropriate for the MCA District.

KEY

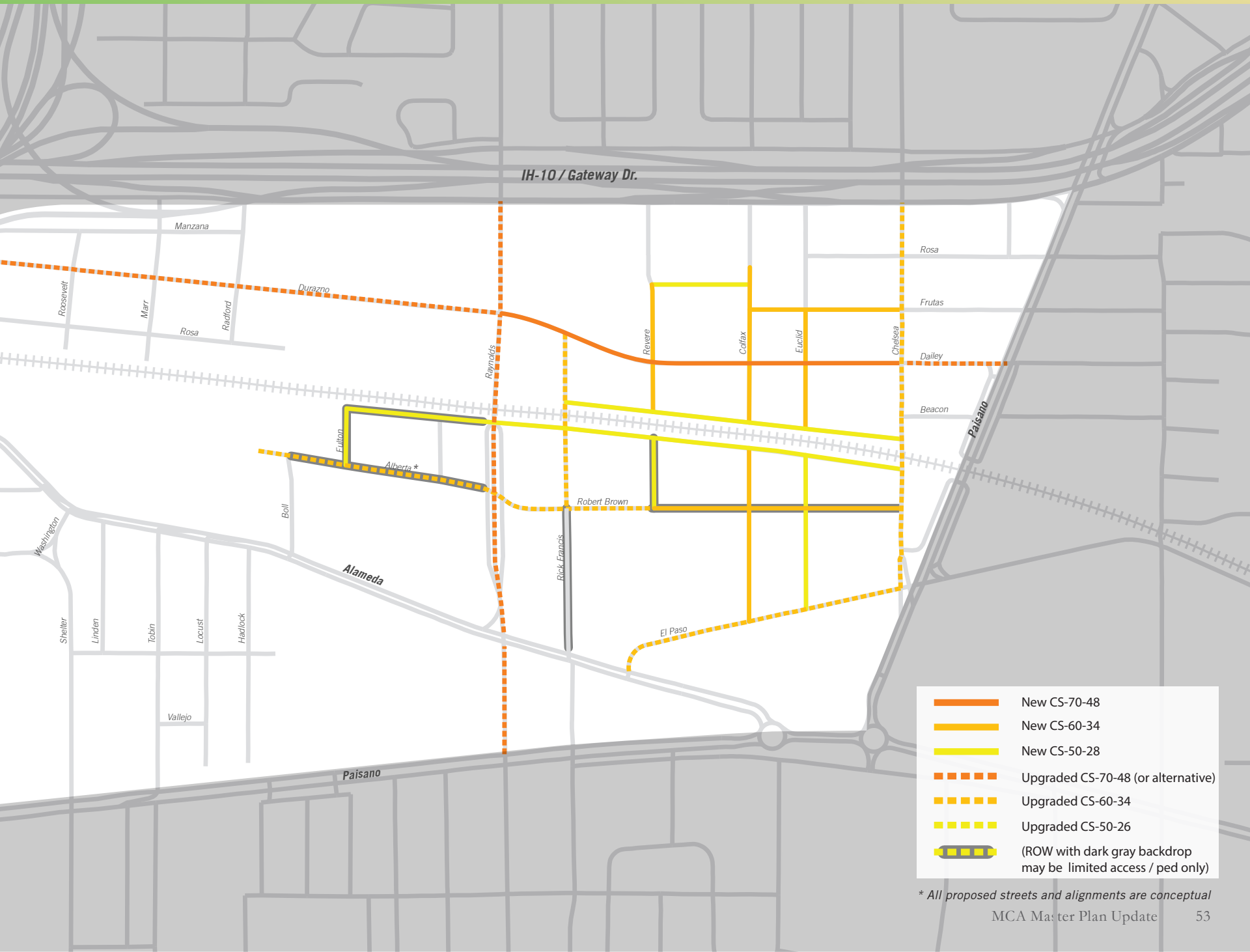
ST-57-20-BL

- Thoroughfare Type
- Right of Way Width
- Pavement Width
- Transportation

THOROUGHFARE TYPES

Highway:	HW
Boulevard:	BV
Avenue:	AV
Commercial Street:	CS
Drive:	DR
Street:	ST
Road:	RD
Rear Alley:	RA
Rear Lane:	RL
Bicycle Trail:	BT
Bicycle Lane:	BL
Bicycle Route:	BR
Path:	PT
Transit Route:	TR

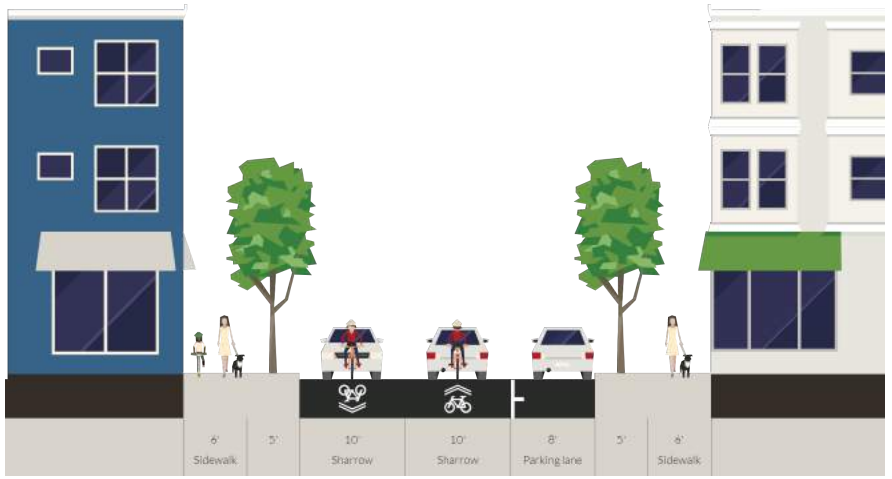
** Alberta ROW is owned by UMC west of Raynolds and is not subject to City of El Paso SmartCode regulation. Future improvements to this street should seek to match this designation to the extent possible.*

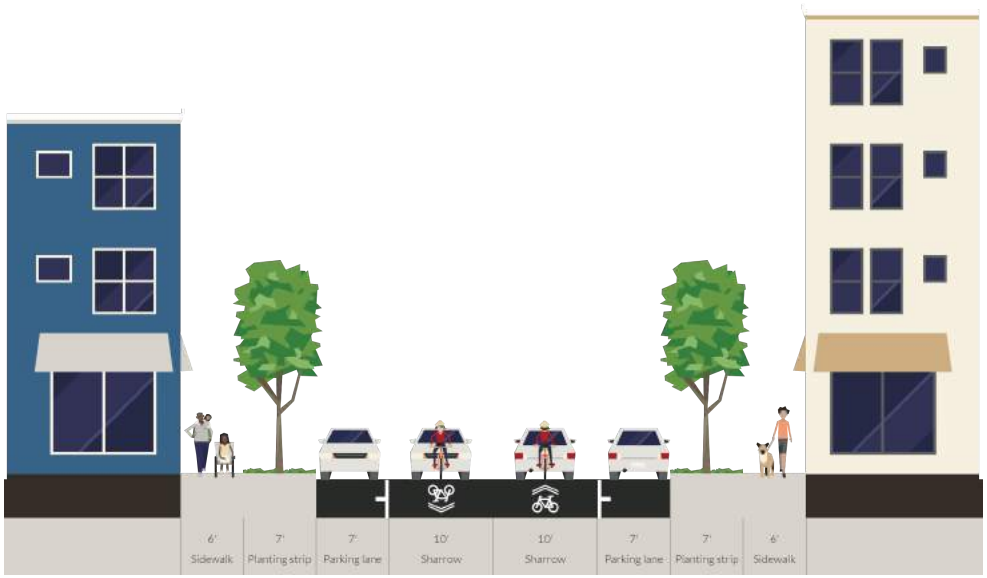


** All proposed streets and alignments are conceptual*

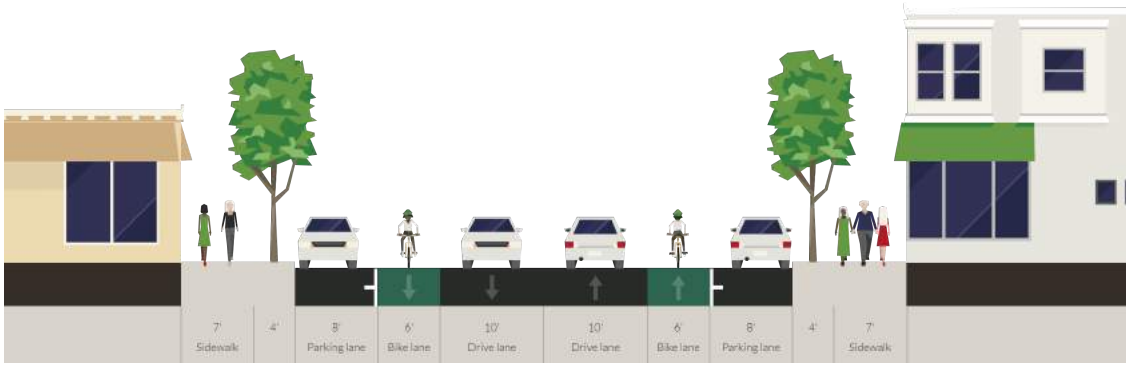
Typical Street Sections

ST-50-28
The narrowest ROW dimension provided in the master plan allows for ample sidewalk and planting areas on both sides of the street, one lane of traffic in either direction with bicycle sharrows, and one lane of parallel parking. Alternately, street trees could be provided in bulb outs that share space with the parallel parking lane.





CS-60-34
The most frequently indicated street section in the master plan, this section provides for ample sidewalk and planting areas on both sides of the street, one lane of traffic in either direction with bicycle sharrows, and parallel parking on both sides of the street

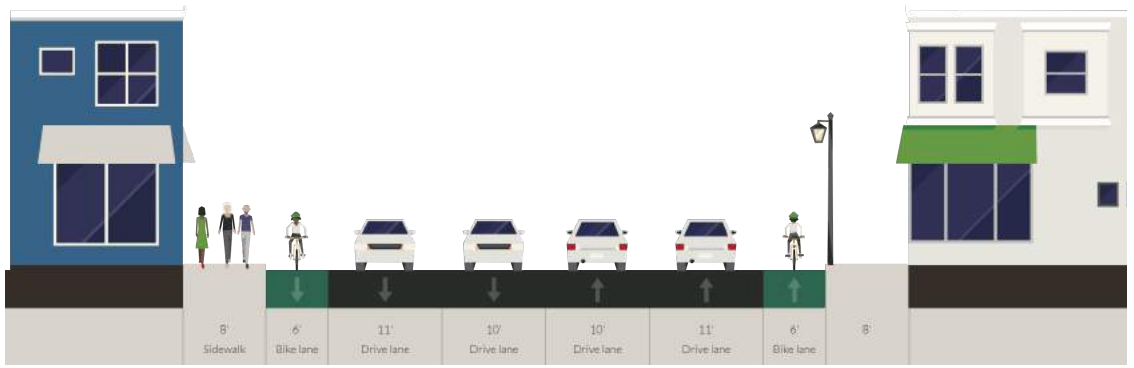


CS-70-48-BL

This street section is shown in several places in the framework plan, including the length of Durazno Street as it passes through the northern portion of the district. The section includes ample sidewalk and planting areas on both sides of the street, one lane of traffic in either direction, bicycle lanes and parallel parking on both sides of the street

CS-70-54-BL (alternative)

This is a modified section of the previous, which is created to reflect an existing condition on Raynolds Street, which may be a difficult street to adjust due to the existing overpass. This section takes the existing roadway and narrows two lanes of traffic to allow for bike lanes, which is critical at one of the only north-south connections over I-10. Rather than separating into small individual spaces, sidewalk and bike lanes could combine in a shared use space on the overpass to create a more comfortable and safe space for these modes.



Best Practices: Street Character

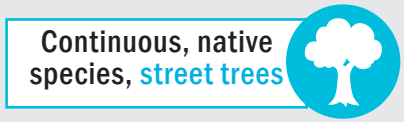
STREET CHARACTER

Streets should be designed to support multi-modal transportation. This includes pedestrians, bikes, transit, and increasingly new mobility solutions like bike share and rideshare. This may include space for bike lanes, bike parking, car share stations, transit stops, etc., but not all streets need dedicated infrastructure for all modes. Safety should be the primary concern how these modes are treated; lower design speeds on smaller streets make it easier to share space, while higher design speeds and larger roads make it more important to designate and separate modes.

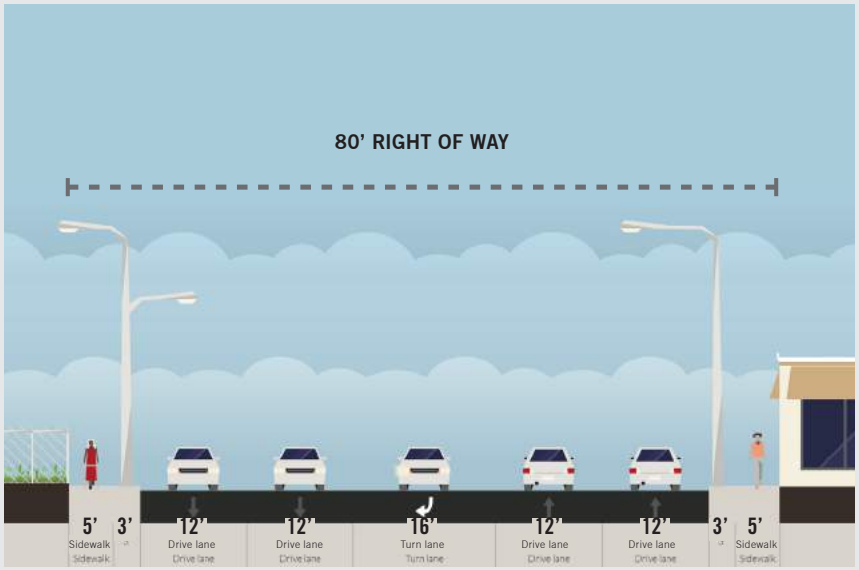
Pedestrian safety should be of utmost priority in street design. In addition to properly sized sidewalks crosswalks at intersections, and appropriate signaling, there are other elements that contribute to pedestrian safety. Narrower lanes create shorter crossing distances, and corner bulb-outs can further reduce this distance where appropriate. Creating on street parking, narrowing lanes, and even reducing building setbacks from the street can help slow vehicle speeds.

In addition to safety, pedestrian comfort and amenities help create great streets. Trees, shade devices, planters, benches and seating, and appropriate lighting all contribute to a welcoming street for the pedestrian.

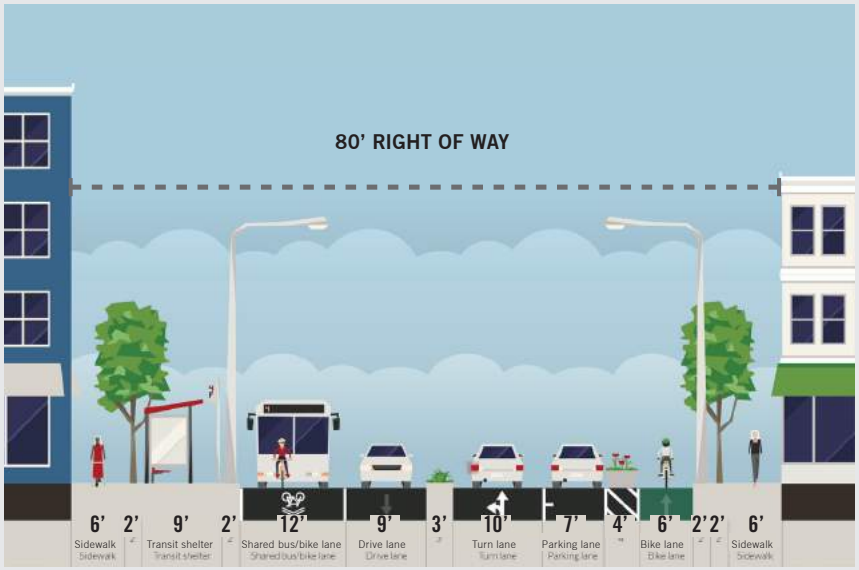
Buildings that have little to no setback from the sidewalk help to enclose space and create the feeling of an "outdoor room" where people feel comfortable. Ground level activity and transparency in these buildings creates more interest for the pedestrian, and opportunity for businesses.



INCOMPLETE STREET



COMPLETE STREET



COMPLETE STREETS ARE...

HEALTHY

Depression, cancer, heart disease, and other conditions dropped by at least **40 percent** among people engaging in moderate exercise such as walking. - *American College of Sports Medicine*

ECONOMICAL

Lancaster, CA gained **$125,000,000** in private investment – plus a 26% increase in sales tax revenue and 800 new jobs – from a $10.6 million Complete Streets investment. - *Smart Growth America*

SUSTAINABLE

Boulder, CO saw a **500,000 pound** reduction of annual CO2 emissions – roughly one-half – once the city implemented a Complete Streets network. - *Smart Growth America*

EFFICIENT

40% of all trips are **two miles or less**. - *U.S. Department of Transportation and Federal Highway Administration National Household Travel Survey, 2009.*

Open Space Network

OPEN SPACE NETWORK

The MCA District is intended to have a variety of open spaces that will promote activity and public life throughout the district. As indicated in Section 3, these spaces are intended to be spread around the district and connected together through a network of "green streets." The diagram on these pages demonstrates this network of existing and proposed open spaces. These spaces are each intended to have different character and programming appropriate to its context and size.

Neighborhood Park

Neighborhood parks are an important part of the district, providing for recreational uses serving existing residents and visitors. These public spaces include amenities like ball fields, playground equipment, picnic tables and pavilions. Existing parks include Lincoln Park, Washington Park, ball fields at Jefferson/Silva High School, and Saipan Park, which serves a dual function as a stormwater management facility

District Park

A district park is meant to be designed to be designed and activated in a way that advances the mission and image of the MCA Health District. This would be more heavily landscaped than a neighborhood park, may contain more dense seating, public art, hardscape and place for events. The MCA Park Pond indicated in the northeast quadrant is imagined as a district park, that would also be designed to hold stormwater during rain events.

TTUHSC EP Quadrangle

The TTUHSC EP quad is a very successfully designed existing public space that should be leveraged to the advantage of the entire MCA district. The quad's formal design creates a great identity for the TTUHSC EP, while interacting well with the surrounding buildings and providing stormwater management during rain events. The western portion shown on the drawing is expected to be framed on the east end by a planned Dental School, while the eastern "wedge" shaped portion would be an area to continue this typology in future phases.

Healing Garden

The area surrounding UMC / Children's currently lacks open space and could benefit from a healing garden. This would give patients, family members, and employees a quiet area to relax, breathe, and heal, outside of the hospital environment. The area to the north of the hospital has existing buildings and parking, but in the long term as this area is redeveloped, a portion could be included for this purpose.

Pocket Park

Many places within the district would benefit from pocket parks - small urban spaces that are often a part of underutilized streetscape or space between buildings that can be activated with street furniture, landscaping, paint, etc. to enliven the public realm.

Green Streets

These streets are meant to be district connectors, acting as great linear public spaces themselves while stitching together the network of open spaces. Building development should front to these streets frame the public space and reinforce their These streets include Durazno, Chelsea, Colfax, Robert Brown/Alberta, Rick Francis, & El Paso.

** Alberta ROW is owned by UMC wast of Raynolds*

** All proposed streets and alignments are conceptual*

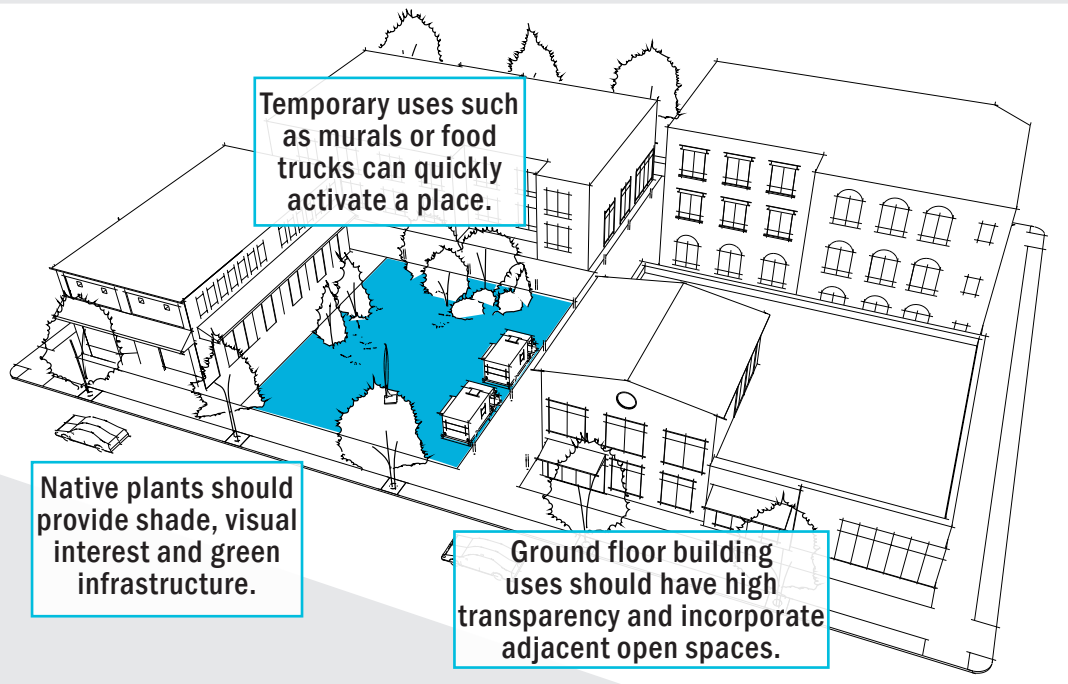
Best Practices: Placemaking

Placemaking

Public spaces come in all shapes and sizes, from large ceremonial lawns to funky pocket parks on busy urban streets. Context is critical in designing the public spaces for the district, and creating the right programming for these spaces can make them come alive. The framework plan indicates a variety of public spaces, each of which should relate to its particular context within the district, and may employ strategies here to make them successful.

Hierarchy

Not every public space needs to be large, or have a big open lawn. In fact, some of the most well-loved public spaces are small pocket parks, may be hardscaped, and simply provide street furniture for somewhere to gather near an active element of the district, such as a café or a heavily used building entry. Having a variety of large and small, landscaped and hardscaped spaces, helps create more opportunity for different activities within the district.



Open Space

UT El Paso - El Paso, Texas

The Rail Yards - Santa Fe, New Mexico

CU Anschutz Cafe - Aurora, Colorado

The Rail Yards - Santa Fe, New Mexico

Art + Temporary Uses

Madrid, Spain

Frisco Square - Frisco, Texas

Farmers Market - El Paso, Texas

Republic Square - Austin, Texas

Klyde Warren Park - Dallas, Texas

Active Uses

The success of open spaces also depends on the uses and design of adjacent properties, and the activity this creates in the space. Buildings with active ground floors, especially food and retail, help encourage vibrant streets and open spaces. Higher transparency on the first level, even in a private office building, can help create a feeling of activity through this visual connection.

Building Design

The relationship of adjacent buildings, including location of entries, parking, walkways, and landscape can influence the success of adjacent spaces by encouraging foot traffic in these areas. Building entries should be located at the street or pedestrian walkway, as opposed to exclusive entries off the parking lot. Design of outdoor seating areas, appropriate shading, signage, and lighting can reinforce the active uses and encourage users to linger.

Art & Temporary Uses

Art other and temporary programming can be used to activate public spaces and create high visibility for the MCA district. This is particularly true in the earlier phases of portions of the development, as more deliberate installations or events might be necessary to create a buzz of activity to begin to develop the culture and sense of place that keeps people coming back. These uses can be as simple as temporary paint or chalk at a district intersection, permanent murals on buildings or infrastructure, or more elaborate light and sculpture installations. Food trucks, outdoor performances, health fairs, and other programmed activities can help reinforce the idea of community in these spaces.

Mobility Recommendations

BICYCLE PLAN

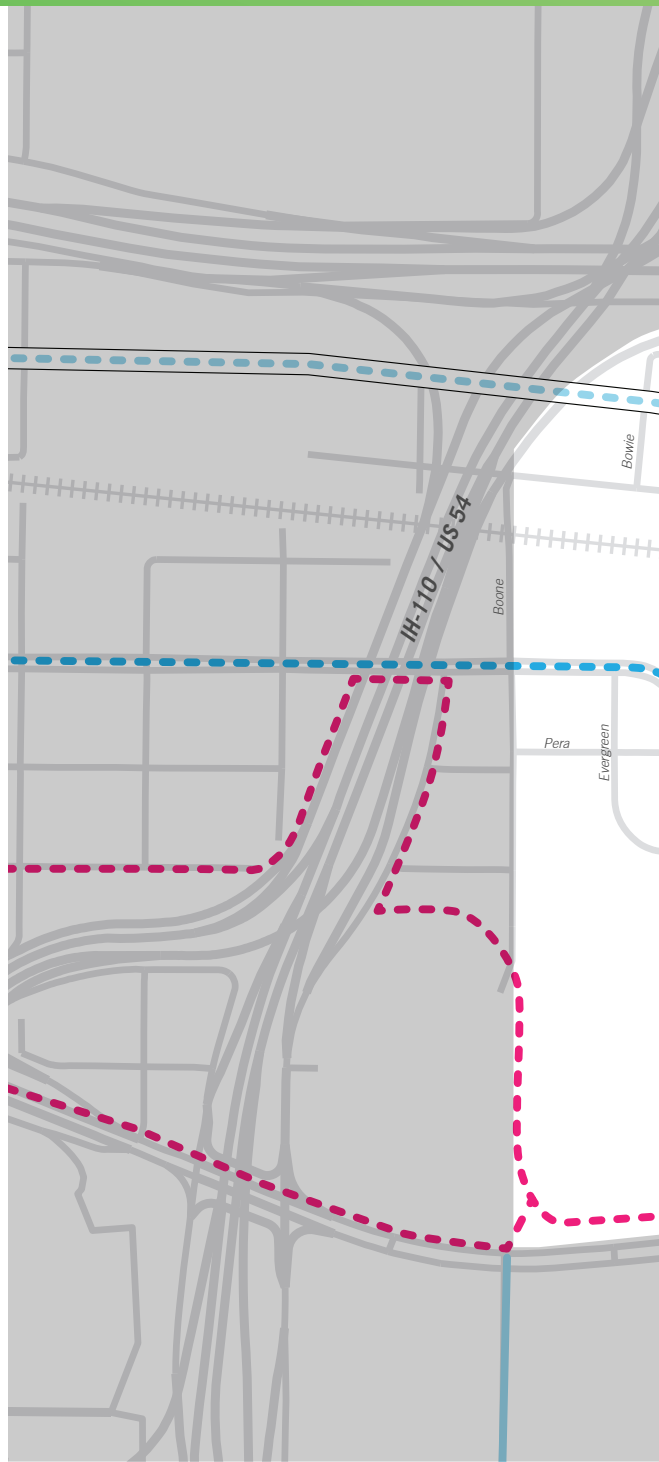
There is currently very little existing bicycle infrastructure with the 440 acres of the MCA Health District. The City of El Paso Bicycle Plan, adopted in 2107, indicates many proposed routes connecting to and through the district, however. In creating the framework plan, many new streets are proposed, all of which should be made safe for bicycles, and some of which will carry specific bicycle infrastructure to support this. The plan on the opposing page shows the connections proposed in the Bicycle Plan, with modifications or additions overlaid according to the legend. In general, the more interior streets are intended to have bicycle friendly design including sharrows or limited vehicle access and speeds, while more arterial through streets and perimeter streets that connect beyond the district are intended to have more dedicated bicycle infrastructure. Description of each of the street treatments can be found in the El Paso Bicycle Plan.

POTENTIAL COUNTY TO COUNTY TRAIL CONNECTION

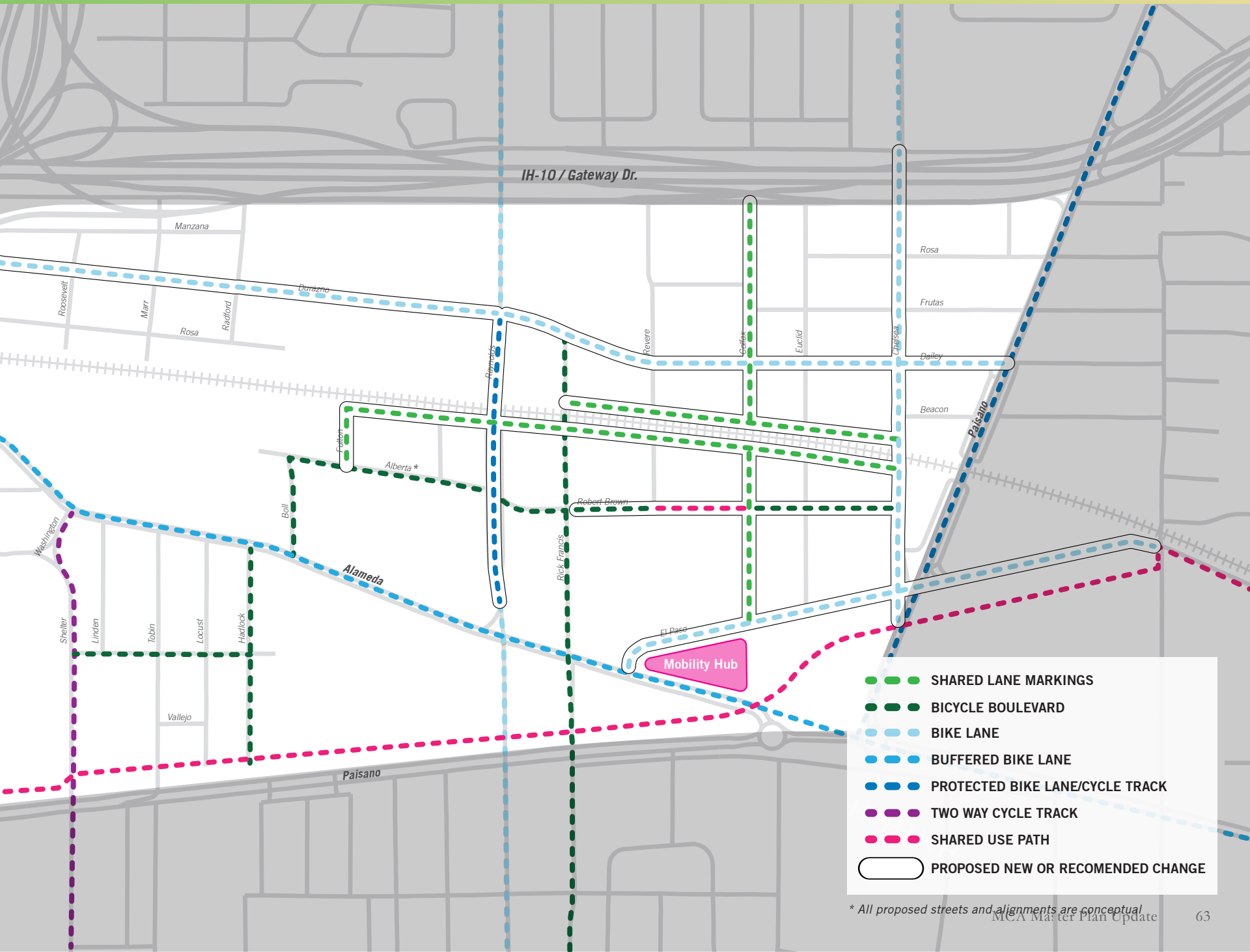
The Paso del Norte Health Foundation is leading an effort to create a county-wide linear trail traversing from northwest to southeast, roughly paralleling the Rio Grande & international border. As the trail passes through the MCA district there will be several opportunities to connect to this regional amenity, allowing trail users to explore the MCA Campus and vice versa. The project is in the planning phase, so the location and configuration is not yet determined exactly, but potential locations are indicated in pink along the Franklin Canal and Paisano Street. Being a major stop on the cross county trail route would be highly beneficial in linking the district to the regional bicycle infrastructure network, even being a potential location for a trail head near the El Paso Zoo / Washington Park or at the proposed mobility hub.

MOBILITY HUB

The MCA Foundation, UMC, Children's and the TTUHSC EP, along with partners at Sun Metro, are pursuing a BUILD grant from the US Department of Transportation that would create a multimodal mobility hub to serve the district. Taking advantage of the planned BRT line on Alameda, the facility would provide a regional transit transfer center for numerous transit routes, connecting employees and patients to MCA jobs and healthcare. The facility would include a 700 space parking garage along, with an estimated cost of $28 million, and could be located near the intersection of El Paso Dr. and Alameda. In the context of the master plan, this facility could become a jumping off point for commuters to access other modes of personal transit such as bicycle share or university shuttles, removing vehicle trips from the interior portions of the MCA campus and allowing for a better pedestrian experience.



** Alberta ROW is owned by UMC wast of Raynolds*



* All proposed streets and alignments are conceptual

Development Potential

DISTRICT WIDE ASSUMPTIONS

Density & Development assumptions

Using the Framework Plan, the planning team created a site capacity study that considered redevelopment of potions of the MCA, many of these in the core area of the district on property owned or planned for acquisition by anchor institutions. The build-out study was conducted for a long-range (50 year) build-out of the district using a massing model with medium density development (3-5 stories average) across most of the blocks designated in pink for redevelopment.

Each quadrant was given an assumption for the amount of development across four broad land use / building type categories: Office / Research, Mixed Use / Residential, Medical, and University. These assumptions are stated acquisition and growth strategies of the major anchor institutions in the district, though cannot represent actual development plans for the blocks in question.

It should be noted that many of the blocks contain existing building, including businesses and residences. It is not the intention of this plan to advocate for displacement of these existing uses, but rather to recognize the growth and acquisition intentions of the institutions which have purchased or may intend to purchase many of the properties in the core area of the district to accommodate future needs.

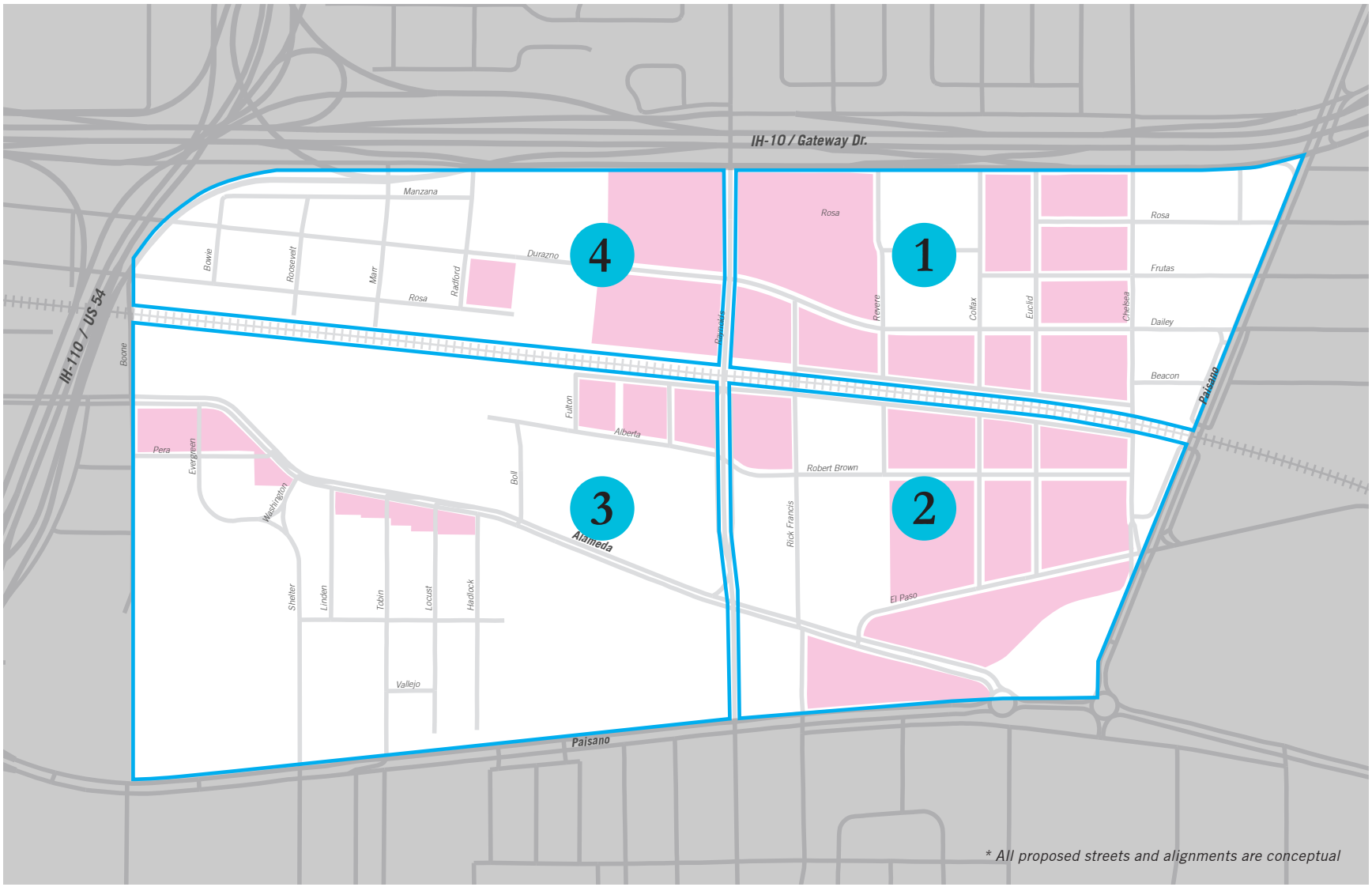
4-Northwest		
Redev. Blocks (Acres)		20.5
Building Footprint (sqft)		298,269
Building GSF		894,807
Office / Research	*20%*	*178,961*
Mixed Use / Residential	*20%*	*178,961*
Medical	*60%*	*536,884*
University	*0%*	-

1-Northeast		
Redev. Blocks (Acres)		31.3
Building Footprint (sqft)		464,153
Building GSF		1,392,459
Office / Research	*40%*	*556,984*
Mixed Use / Residential	*15%*	*208,869*
Medical	*25%*	*348,115*
University	*20%*	*278,492*

3-Southwest		
Redev. Blocks (Acres)		14.1
Building Footprint (sqft)		164,700
Building GSF		425,730
Office / Research		-
Mixed Use / Residential	*50%*	*212,865*
Medical	*50%*	*212,865*
University		-

2-Southeast		
Redev. Blocks (Acres)		42.9
Building Footprint (sqft)		526,101
Building GSF		1,578,303
Office / Research	*10%*	*157,830*
Mixed Use / Residential	*15%*	*236,745*
Medical	*5%*	*78,915*
University	*70%*	*1,104,812*

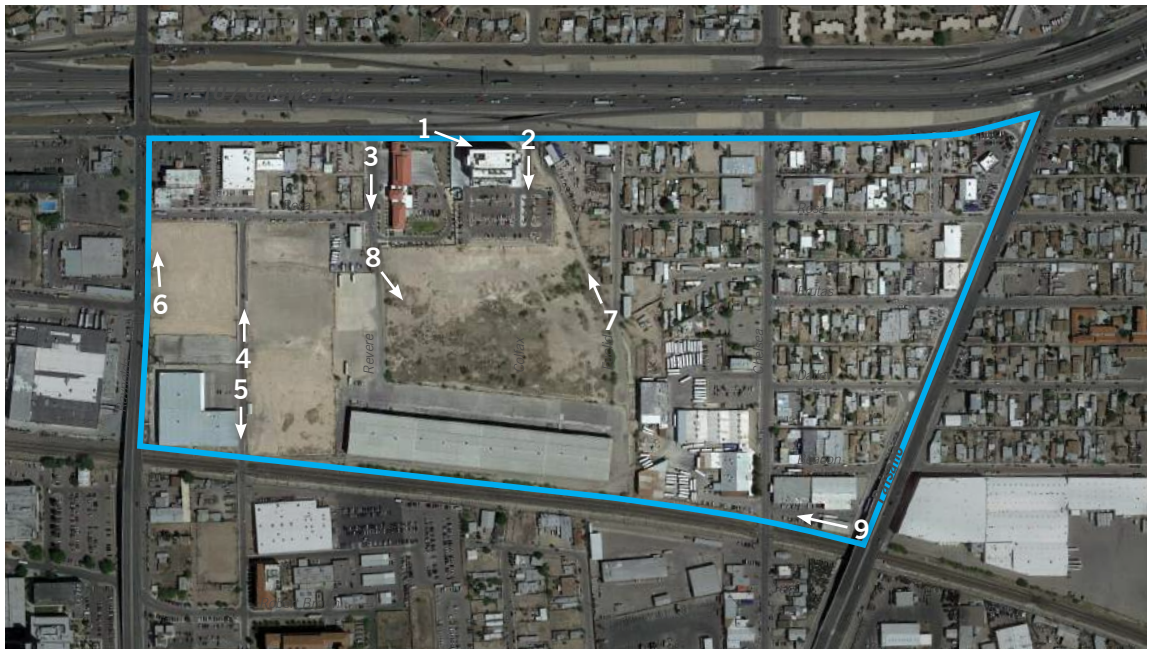
TOTALS		
Redev. Blocks (Acres)		108.7
Building Footprint (sqft)		1,453,223
Building GSF		4,359,669
Office / Research	*21%*	*893,775*
Mixed Use / Residential	*19%*	*837,441*
Medical	*27%*	*1,176,779*
University	*32%*	*1,383,304*



Redevelopment blocks by District Quadrants

05 District Quadrants

1: Northeast Quadrant



1. NORTHEAST QUADRANT

Quadrant Description

The Northeast Quadrant is bounded by Gateway Boulevard/Interstate-10 to the north, Paisano to the east, the Union Pacific Railroad to the south and Raynolds to the west. The main Anchor in the district is the MCA Foundation, which is housed in the Cardwell Collaborative building on Gateway Boulevard East. The MCA owns approximately 13 acres of property on and adjacent to this building, the majority of which is undeveloped.

MCA has entered an agreement with the U.S. Department of Veterans Affairs to build a VA Clinic facility immediately to the south of the Cardwell Collaborative building's parking lot. The parcel for this clinic will occupy approximately 5.6 acres of the MCA property. UMC also owns property on both sides of Rick Francis St. north of the railroad tracks. These properties are presently vacant or undeveloped. TTUHSC EP owns a warehouse building and a small amount of property which it uses for parking.

The San Juan neighborhood is located on the eastern blocks of the Quadrant, with a mix of homes and small businesses, while the Revere Warehouse building has a large footprint bordering on the railroad at the southern border of the site.

The quadrant lacks a true street network and suffers acutely from a lack of east-west connectivity. The only way to traverse the quadrant eastward is by using the Interstate 10 Frontage road, and there is no way traverse the site in a westward direction. Because the quadrant lacks a complete street network, it lacks any pedestrian infrastructure in many areas, and where it does exist it is often substandard, which creates only small enclaves of walkable blocks bounded by impassible streets, vacant land and fenced off railways.

The Coors Channel, a concrete drainage canal which runs at a diagonal from the I-10 near the MCA on a diagonal to the east end of Revere Warehouse presents a problem for the development of the quadrant. The existing canal has backed up in the past and created flooding issues at the south end of the quadrant, and its orientation and exposure prevents full development of blocks that it bisects.

MCA / Cardwell Collaborative building

MCA parking drive / future Colfax Street

Revere Street and New El Paso Fire Station

TTUHSC EP Parking Lot and shuttle shelter along Rick Francis St.

Rick Francis Street and Union Pacific at-grade crossing

View of Northeast Quadrant from Chelsea St. overpass

Coors Channel drainage facing northwest toward MCA / Cardwell Collaborative building

Revere Street facing southeast

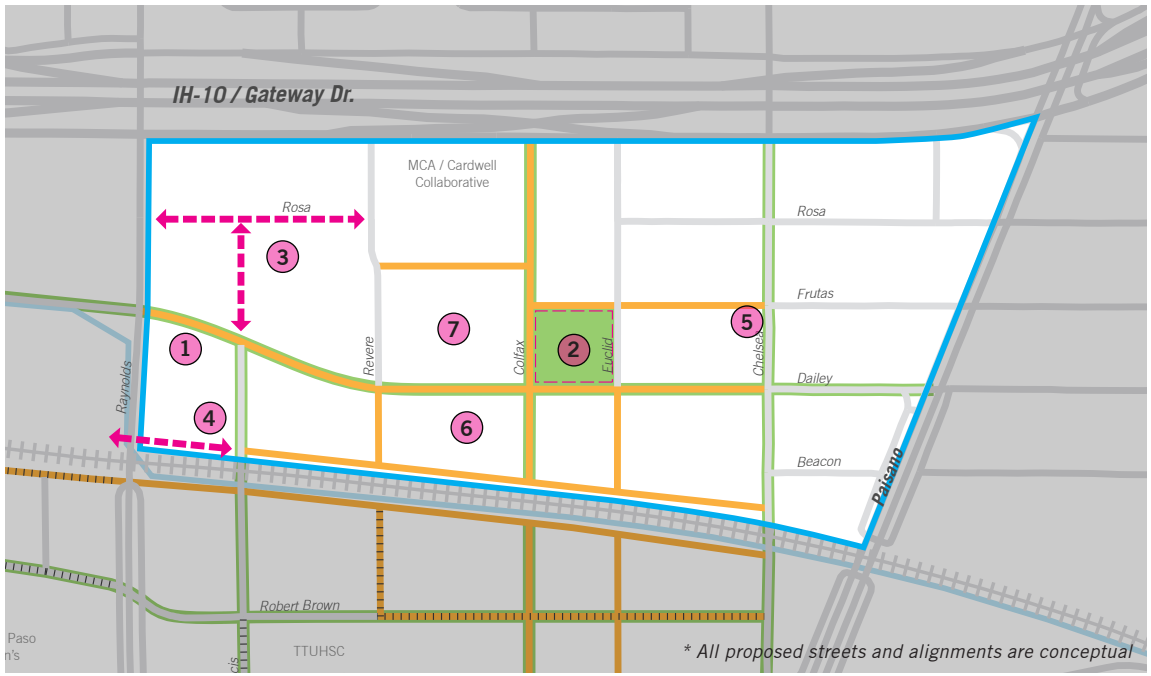
Undeveloped land near the intersection of Durazno and Raynolds

Quadrant Proposals / Alternatives

1. DURAZNO EXTENSION RAYNOLDS TO CHELSEA
The extension of Durazno Street from Raynolds to Chelsea is the most critical improvement in the Northwest Quadrant. It connects 3 north-south streets with railroad crossings and creates the spine for other internal roadway connections within the quadrant. The street is intended as a complete street and that connects beyond the district to the west, tying together new development and green spaces.

2. MCA DISTRICT PARK
The Northwest Quadrant currently lacks any meaningful public open space. This "public square" would remedy this, creating a district amenity full of life, acting as a major gathering point and event space for the development. The park would is envisioned as a space that could serve as a stormwater management facility during rain events, while functioning the majority of the time a public space. Several examples of these dual purpose spaces are included on the opposite page.

3. ALTERNATIVE - ROSA AND RICK FRANCIS STREETS
These streets are both existing at the moment but have been proposed for potential vacation by district stakeholders, pending development plans for the surrounding property. Depending on the ultimate needs of this development, keeping these streets would provide further connectivity to the district, allowing Rick Francis to connect further North and having another access point off of Raynolds.



4. REAR ACCESS ROAD & CONTINUATION UNDER RAYNOLDS OVERPASS (ALTERNATIVE)
The creation of a rear access road along the railroad would provide additional pedestrian, bicycle, and vehicular connectivity access along the southern edge of the quadrant. There is also opportunity to continue this roadway underneath the Raynolds overpass to future development in the Northwest Quadrant. This would depend on the development here, but would increase connectivity across the Raynolds barrier without the need for an intersection. At a minimum, this should be considered for bicycle and pedestrian circulation.

5. CHELSEA STREET IMPROVEMENTS
As the district develops and connectivity builds out, Chelsea Street will gain importance as one of only two at-grade railroad crossings in the entire MCA. Accordingly, this street should receive "complete street" improvements to improve safety and comfort for all users.

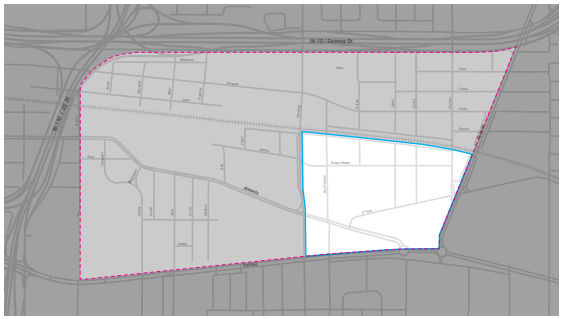
District Park / Stormwater Management
Integrating stormwater management into functional public spaces provides a unique opportunity to derive multiple benefits from our infrastructure and parks. There are many precedents for this type of design, which must be done with specific environmental context, and the programmatic elements desired in a park. Spaces can be formal and manicured or natural and wild, depending on the context and desired use of the park.

MCA Cardwell Collaborative Building

6. BLOCK CONNECTIVITY
The remainder of the district framework is comprised of many small street connections that, taken in total, create a vastly improved grid to support future development. Many existing partial north-south streets are extended fully to the southern extent of the quadrant, while several smaller east-west connectors fill in to create the block structure.

7. VA CLINIC SITE
During the Master Plan process, the MCA secured an agreement with the Veterans Health Administration to construct a clinic on 5.6 acres immediately south of the Cardwell Collaborative Building. This site will add another health-related anchor to the MCA Health District, and further develop the Northwest quadrant.

2: Southeast Quadrant



2. SOUTHEAST QUADRANT

Quadrant Description

The Southeast Quadrant is bounded by the Union Pacific railway to the north, Paisano Drive to the south and east, and Raynolds St. to the west. TTUHSC EP is the primary anchor in this quadrant, and it has expansion plans that would continue its development footprint further east toward Paisano and north of the railway where it also owns property and may acquire more. The new TTUHSC EP Health Sciences Research & Education Building 2 is currently under construction on the block bounded by Raynolds, Rick Francis, Robert Brown, and Alameda.

The City of El Paso Department of Public health building is located next to TTUHSC EP in a large single story building; the Public Health Department is currently seeking new space, and has explored opportunities of locating in Quadrant 1 near the MCA and VA sites, but no plans have been set to date. TTUHSC EP eventually intends to acquire this property and construct a new building to house its Dental School.

Immediately east of the El Paso Department of Public Health is a small pocket of single family homes; many of these homes have been purchased and the structures removed, leaving empty lots or are now integrated into the parking for the Public Health building. With the expansion plans of TTUHSC EP, more of these homes are likely to be purchased as they become available. Finding opportunities for residents to relocate in the neighborhood and preserve their community ties should be a concern as these properties are purchased.

There are other existing warehouses, small businesses, and strip commercial the area south of El Paso Dr. and Alameda. These sites provide opportunity for near and long term redevelopment, which may include a mix of uses that support the core medical, education, and research functions of the district.

TTUHSC EP from intersection of El Paso and Alameda

TTUHSC EP Quadrangle and detention pond

TTUHSC EP Quadrangle pedestrian path

Vacant lot on Colfax St. east of TTUHSC EP

Rick Francis facing north near intersection of Robert Brown

Rick Francis facing north near at grade crossing of Union Pacific Rail

Euclid Street facing north near intersection of El Paso Dr.

Colfax Street facing south near intersection of El Paso Dr.

TTUHSC EP parking lot entry and rear of El Paso Public Health Building

1. RICK FRANCIS STREET IMPROVEMENTS

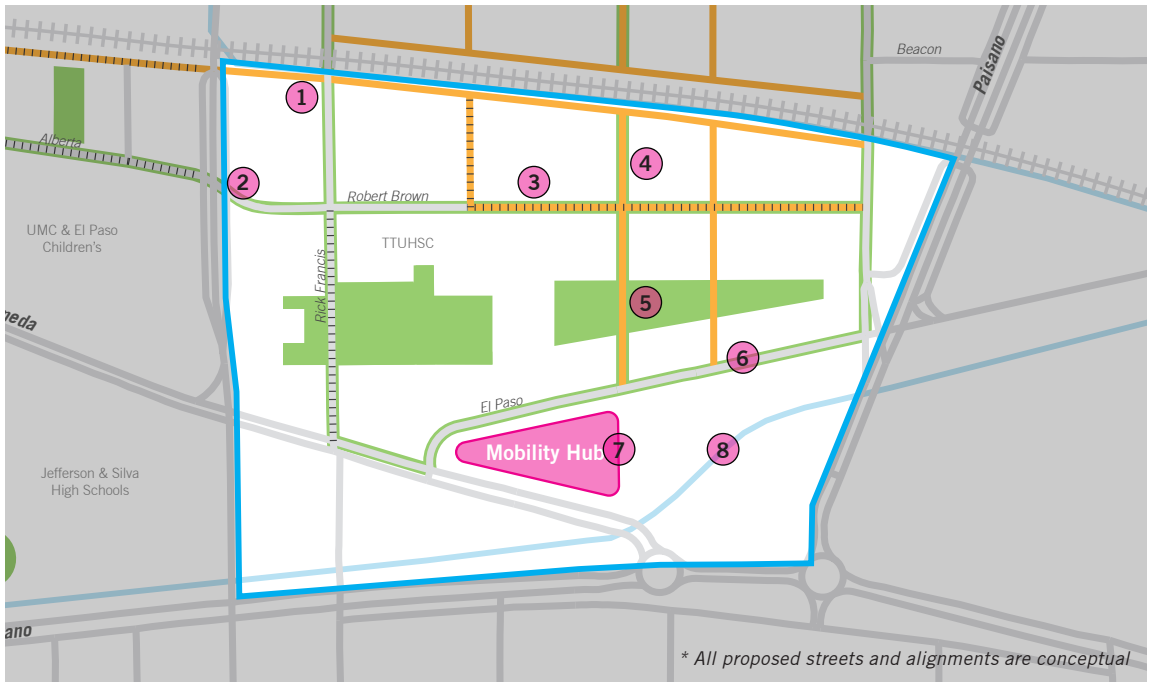
Rick Francis St. is one of only two at-grade crossings in the entire MCA district and is a critical connection between Quadrant 1 and 2. The street has been improved south of Robert Brown, and TTUHSC EP intends to limit vehicle traffic and pedestrianize this portion of the street after the MSB II building is complete. North of Robert Brown, the current ROW lacks appropriate pedestrian areas or has obstructed sidewalks in portions, and needs improvements to become a more complete street.

2. ROBERT BROWN STREET IMPROVEMENTS

Passing underneath Raynolds St., Robert Brown connects major facilities at TTUHSC EP to UMC / Children's. This is one of the only major existing pedestrian corridors within the district; with existing and future construction projects planned in this area, it provides a major opportunity for placemaking and it should be a high priority for reinvestment. The existing portion east of Rick Francis should be improved by removing parking and expanding sidewalks and landscape areas (see rendering on opposite page).

3. ROBERT BROWN STREET EXTENSION

Moving eastward toward Chelsea in the longer term, Robert Brown may continue as a limited access or pedestrian way to create an east-west connection across the quadrant. Alternatively, this could be designed as a low speed, multimodal campus street, allowing for high activity of pedestrian, bicycle, shuttle, and low speed vehicular traffic if necessary.



4. COLFAX & EUCLID REALIGNMENT

This long term project would only occur after many properties to the east are acquired. These streets would align with Colfax and Euclid to the north of the Railroad, which would allow for a future crossing if it becomes possible in the long term

5. TTUHSC EP FUTURE QUAD

Keeping a character similar to the existing quad which adds a great amenity to the district, TTUHSC EP should expand its successful public space to the east of its planned Dental School building.

6. EL PASO STREET IMPROVEMENTS

As TTUHSC EP expands, El Paso Dr. becomes a major opportunity for improvement. In contrast to the more major thoroughfares on the Quadrant 2 borders, El Paso Dr. has more opportunity to be a human-scaled street, with university uses on the north side, and mixed use development and a mobility hub on the south side. Improvements may include bicycle lanes, substantial sidewalks and landscaping, and other complete street elements.

Existing Robert Brown Street and Raynolds St. overpass facing east toward UMC / Children's

Potential future streetscape improvements and placemaking elements on Robert Brown

7. DISTRICT MOBILITY HUB

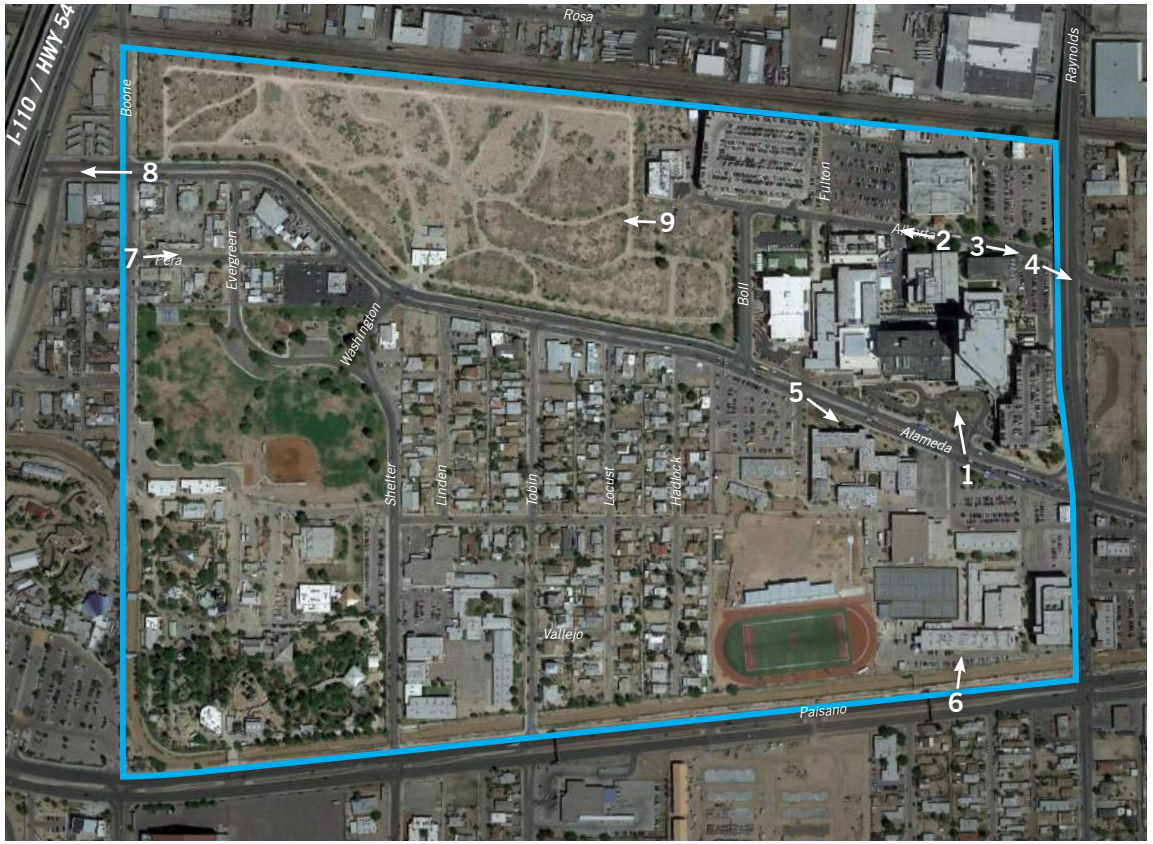
This proposed site for the District Mobility Hub and parking garage (described earlier) capitalizes on the Brio BRT along Alameda and can serve as a district portal, creating a multimodal transit interface and acting as a landmark and gateway from the major thoroughfares of Alameda and Paisano. With the county to county trail proposed to pass just south of this location along the canal, there is an opportunity to allow for the mobility hub to also incorporate a trail head.

8. OPPORTUNITY FOR PRIVATE DEVELOPMENT

Where the county to county trail follows the Franklin Canal through the southeast corner of this quadrant, there is significant potential for private development. There are developable parcels on either side of the canal at this location, which would allow for the trail to widen and create a unique waterfront promenade space. This promenade could connect outside of the district boundaries by continuing through future developments that may happen on the commercial parcels east of Paisano Ave.

The City of Scottsdale, AZ has undertaken an ambitious waterfront redevelopment plan along the Arizona Canal which can serve as an interesting precedent for this area. Connecting to a trail that follows the canal through the city, this area has been transformed into public spaces and pedestrian bridges creating new amenities, which has been supported by successful projects framed around these new public spaces.

3: Southwest Quadrant



3. SOUTHWEST QUADRANT

Quadrant Description

The Southwest Quadrant is bounded by the Union Pacific Railroad to the north, Raynolds to the east, Paisano to the south, and a Boone Street extended on the west (I-110 / US-54 also present a major western barrier, although they do not constitute the district boundary). UMC and El Paso Children's are the major anchors in this district, with substantial facility investments including substantial hospital towers and parking facilities. TTUHSC EP also owns and operates buildings within the UMC / Children's campus on leased land

The Maxine Silva Health Magnet High School, part of the Jefferson High School campus, creates an interesting opportunity for the MCA. High School students receive training in the health professions and have job shadowing opportunities at UMC / Children's. The El Paso Zoo at the southwestern corner of the site is very close to the core district, and is interested in partnerships and programs with the hospital for patients and families to visit.

Similar to all quadrants, the existing physical barriers create significant issues for the district, but the Southwest Quadrant also has many large properties which, despite their importance to the district, limit street connectivity. These include Evergreen Cemetery, UMC / Children's Hospital, Jefferson/Silva High Schools, and the El Paso Zoo.

There are many residential blocks in the heart of this quadrant between the high schools and the zoo, which have good internal connectivity and short, walkable blocks. This neighborhood is expected to remain intact as the area develops. The lots at the northern edges of these blocks along Alameda have older neighborhood scale and strip commercial development, much of which could be ready for redevelopment.

UMC / ELP Children's from Jefferson / Silva High entrances

Alberta St. facing west near TTUHSC EP clinic building

Alberta St. facing east near TTUHSC EP clinic building

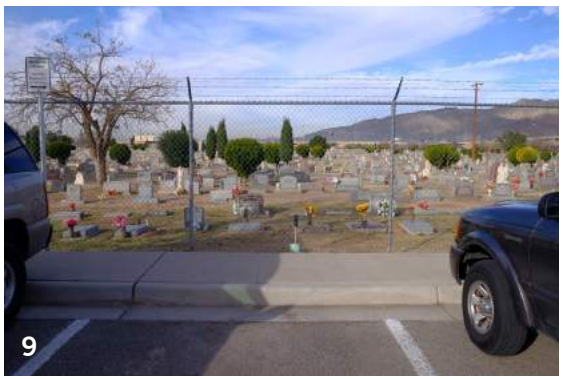
Raynolds overpass on Alberta

Jefferson High School along Alameda

Jefferson High School along Paisano

Neighborhood streets near Washington Park

US-54 / I-110 overpass over Alameda Street facing west toward downtown

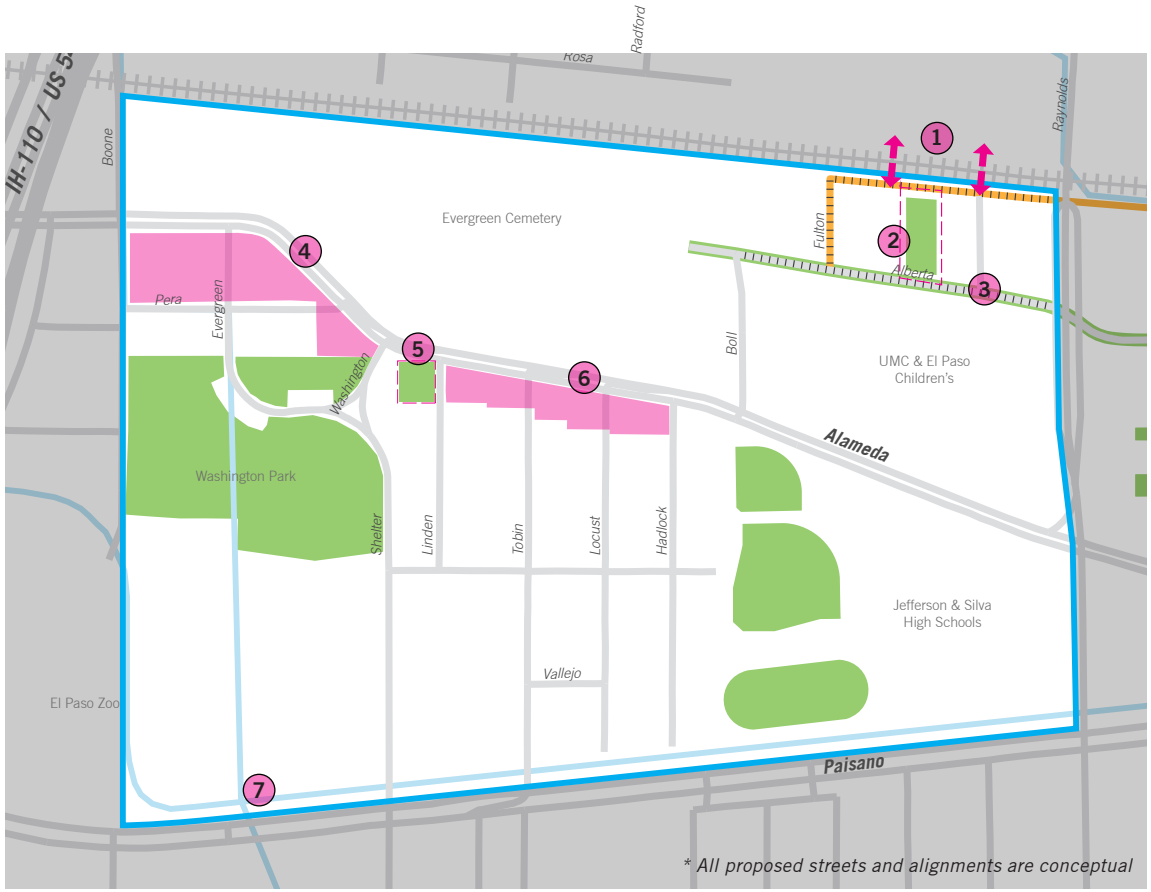


Evergreen Cemetery near Medical Examiner's building.

1. PEDESTRIAN BRIDGE RAILROAD CROSSING
UMC is open to exploring the idea of creating a skyway pedestrian connection across the railroad to future development or parking structures. While not an at-grade crossing, this could be a significant improvement in an area that lacks any north-south connectivity beyond Raynolds Street.

2. UMC & CHILDREN'S HEALING GARDEN
The area near UMC / Children's lacks any inhabitable open space. While no plans yet exist for the redevelopment of the blocks to the rear of the hospital north of Robert Brown, there is a great opportunity to include a small healing garden space in this area for patients and their families to relax, think, and heal.

3. ROBERT BROWN (ALBERTA) STREET IMPROVEMENTS
Similar to what is intended on the east side of Raynolds, Robert Brown is a major pedestrian corridor in need of pedestrian enhancements. UMC owns the ROW on the west side of Raynolds and has discussed creating this as limited access or pedestrian only. There are major servicing, loading, and parking areas along this street, so this will need to be studied carefully.



4. ALAMEDA CORRIDOR
Sun Metro has plans to implement Bus Rapid Transit along Alameda connecting westward to downtown El Paso and eastward to Mission Valley. TxDOT is in the early stages of a corridor study that will help determine corridor improvements including bicycle, pedestrian, and transit options along the length of the corridor. MCA district representatives should be major stakeholders and advocates for improvements to this corridor as it passes through the district.

5. ALAMEDA POCKET PARK
The Alameda corridor could benefit from a small pocket park, integrated into the street and commercial redevelopment. While there is existing parkland nearby, this would provide a different type of space that could be integrated into the streetscape, transit stop, and commercial development.

HEALING GARDENS

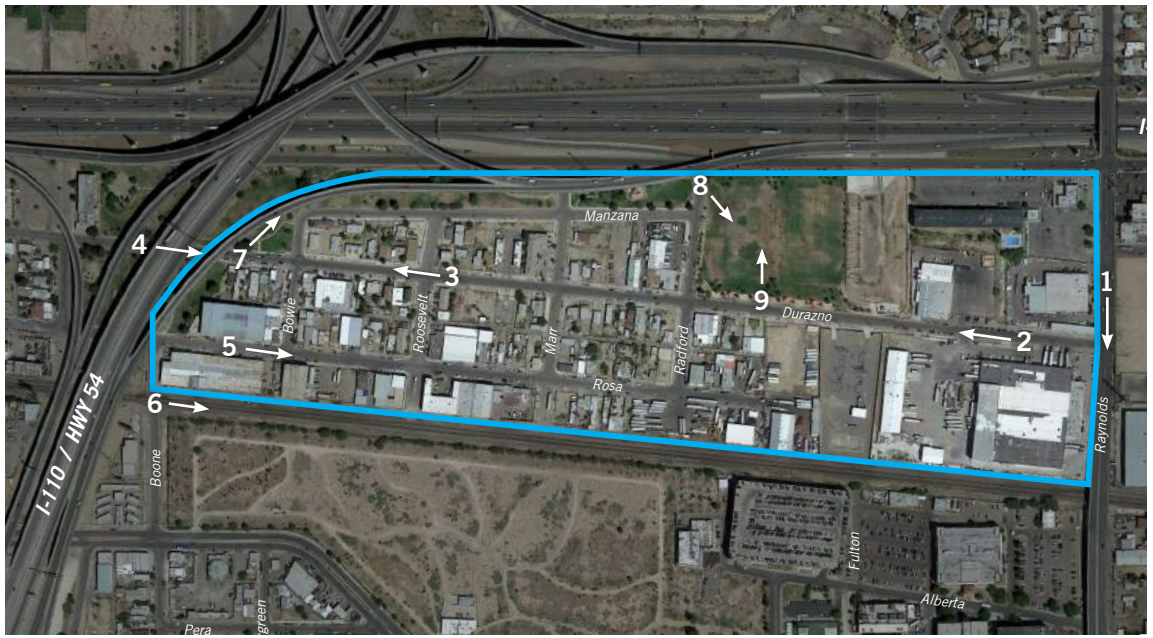
6. ALAMEDA REDEVELOPMENT OPPORTUNITIES

The existing small scale commercial development along Alameda may present a good opportunity for redevelopment. As the district continues to develop and the Alameda corridor is improved with Brio BRT implemented, this street will become more desirable and may support new commercial development.

7. COUNTY TO COUNTY TRAIL CONNECTION

The Paso del Norte Health Foundation is in the planning stages of a trail route that intends to cross El Paso County from northwest to southeast, following near to the US / Mexico border. It is intended as a linear trail, with spurs or loops that connect to nearby areas within El Paso and across the border to Juarez. As it passes through the MCA, the trail is intended to follow the course of the Franklin Canal along the southern edge of the quadrant. Opportunities to connect to this trail through the green space and bicycle network planned within the district framework should be considered as the trail planning moves forward. In particular, the El Paso Zoo should look for opportunities to integrate with this trail as it passes through and adjacent to its property.

4: Northwest Quadrant



4. NORTHWEST QUADRANT

Quadrant Description

The Northwestern Quadrant is bounded by I-10 to the north, I-110 / US-54 to the west, the Union Pacific Railroad to the south, and Raynolds Street to the east. As in other quadrants, these boundaries also create significant barriers and isolate the area from adjacent neighborhoods and facilities.

The quadrant is comprised of a mix of single and multifamily homes, commercial and light industrial uses. At the west end, the Lincoln Park neighborhood is a mix of many of these uses side by side, while the east end toward Raynolds is strictly commercial and light industrial. Durazno Street is the main internal thoroughfare through the district, connecting at Raynolds and passing under the interstate to the west, and there is significant local tractor trailer traffic and idling along this roadway.

There are two significant parks that serve the Northwest Quadrant. Lincoln Park, which abuts and passes under the elevated highway interchange, is a truly unique place that serves as a community hub and cultural center for the region, hosting annual events that draw thousands of people. Many of the structural highway supports are painted with elaborate murals that hold significance to the neighborhood and residents of El Paso, more murals are added each year.

Just beyond the MCA to the west on the other side of the highway is the a community center, a building dating back to 1912, which has been sitting empty since 2006. Lincoln Center served as a school for Mexican and black children at a time when El Paso schools were segregated. Over the years it has served in various capacities, last used by The City of El Paso for its Parks and Recreation Department. Since then, neighborhood residents and advocates for historical and cultural preservation have been working with elected officials and community institutions to restore the building.

Saipan Park also serves the area with two large athletic fields sunken below the level of the street that also function as stormwater management facilities during rain events, and integrate with the larger dedicated stormwater pond on the east side of the park. The City of El Paso purchased flood damaged residential properties and relocated residents to create this dual purpose facility in 2012.

Raynolds St. overpass facing south near Durazno

Trucks idling along Durazno Ave facing west

Durazno Ave. passing under I-110 / US-54 facing east

Durazno Ave. facing west toward I-110 / US-54

Light industrial / warehouse uses along west end of Rosa

The existing Boone St. at-grade crossing will be closed

Lincoln Park murals underneath I-10 / US-54 / I-110

Saipan Park / Pond facing southeast from I-110 overpass

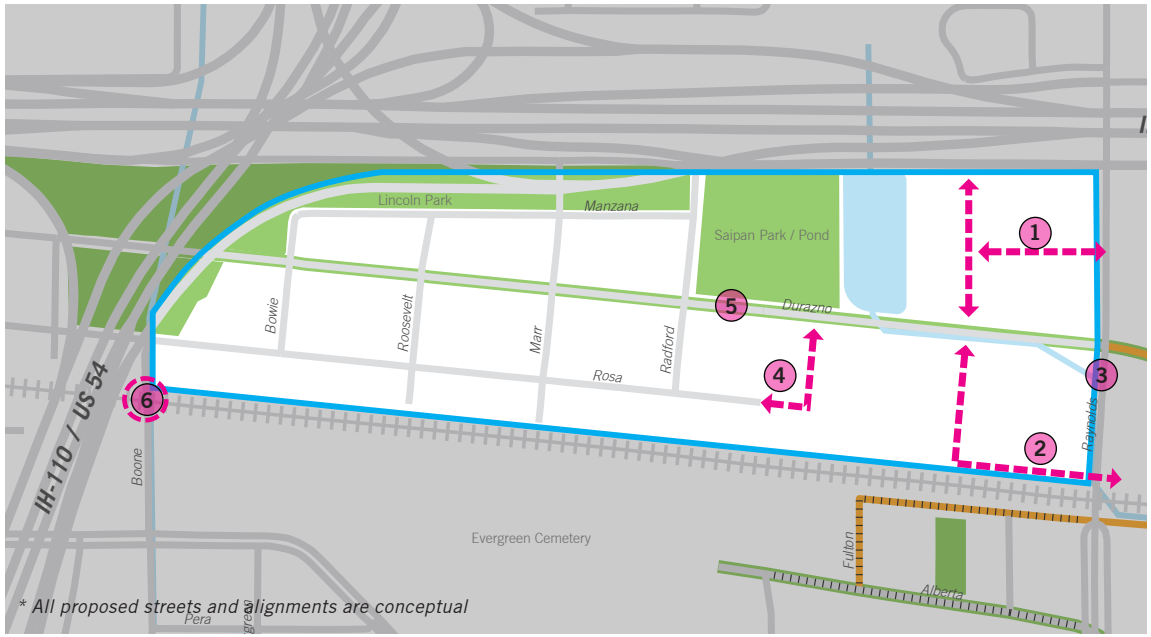
Saipan Park / Pond from sidewalk of Durazno Ave facing north

1. ALTERNATIVE - ROSA EXTENSION & BLOCK CONNECTIVITY

UMC has acquired the Motel 6 property along Gateway Boulevard. This property, along with the adjoining parcels and Saipan Park, creates a very large block. While the layout of any development to this block is uncertain at this point, the option to create connections internal to this block could benefit new development and the district as a whole.

2. ALTERNATIVE - REAR ACCESS ROAD EXTENSION & BLOCK CONNECTIVITY

The property south of Durazno, west of Raynolds, and east of the substation also provides opportunities for future connectivity. This property is currently operating as a warehousing / distribution facility, but in the long term could be redeveloped with a connection from Durazno passing underneath the Raynolds overpass to the Northeast Quadrant.



3. RAYNOLDS AVE IMPROVEMENTS

Raynolds Street is one of the key connectors through and beyond the MCA Health District. In its current state it does not feel safe to pedestrians or bicyclists, and should be improved to better accommodate both modes. This may include widening ROW and adding space for larger sidewalks and landscape north of the intersection at Durazno, and modifying the overpass lane widths or the structure itself to accommodate shared space for non-vehicular modes.

4. ALTERNATIVE - BLOCK CONNECTIVITY

There is opportunity to continue Rosa another half block to the east where it currently dead-ends and connect north to Durazno at the east end of Saipan Park.

Durazno Ave. existing facing west along Saipan Park

Durazno Ave. future complete street including bicycle lanes, street trees and landscaping, parallel parking, improved sidewalks and crosswalks

5. DURAZNO STREET IMPROVEMENTS

Durazno Street is intended as the key east-west connection through the northern quadrants, and as such the existing portion in Quadrant IV should be improved with complete street elements including bicycle facilities, ample sidewalks, street furniture, landscaping and lighting. This street will stitch together Lincoln Park, Saipan Park, and the MCA District Park in Quadrant I.

6. BOONE STREET AT GRADE CROSSING REMOVAL

While not proposed as a part of this master plan, the removal of the Boone Street at grade railroad crossing is important to note on a quadrant and district scale. This will eliminate the only at-grade crossing between the two western quadrants, making other proposed connections even more critical to create.

06 Implementation

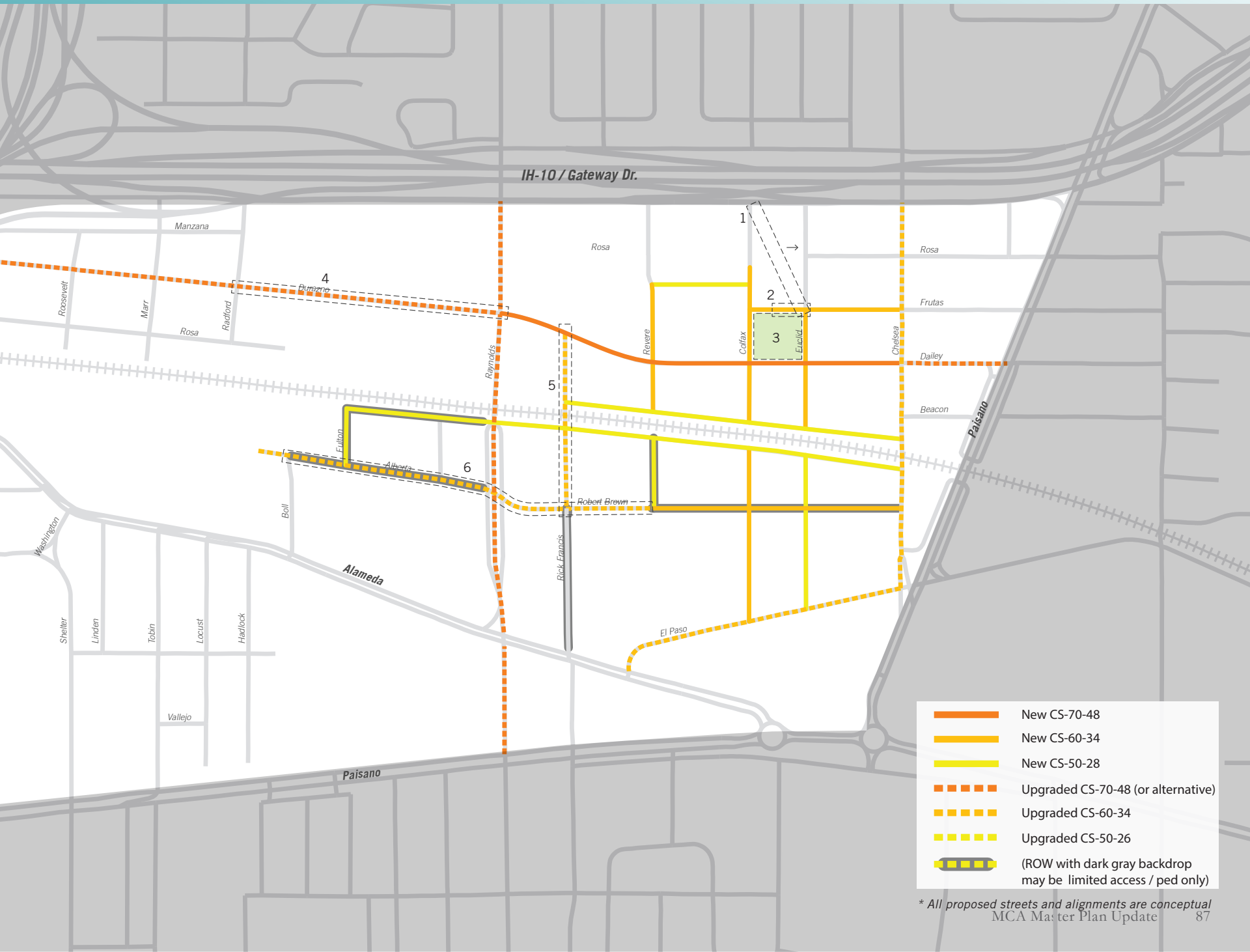
Phasing

NEAR-TERM PROJECTS
All Quadrants

1. Coors Channel Drainage Relocation
2. Frutas Street Extension
3. MCA Pond / Park
4. Durazno Streetscape Improvements
5. Rick Francis Streetscape Improvements**
6. Alberta / Robert Brown Streetscape Improvements
7. Stormwater Improvements Quadrant I
8. Stormwater Improvements Quadrant II
9. Stormwater Improvements Quadrant III
10. Water Improvements: Quadrant I-IV (Rosa Extension)
11. Sewer Improvements: Clardy Fox Lift Station Improvements

**Alberta ROW is owned by UMC west of Raynolds and is not subject to City of El Paso SmartCode regulation. Future improvements to this street should seek to match this designation to the extent possible.*

***The owners acknowledge that the ultimate proposed street widths will be discussed further in coordination with the City of El Paso.*



** All proposed streets and alignments are conceptual*

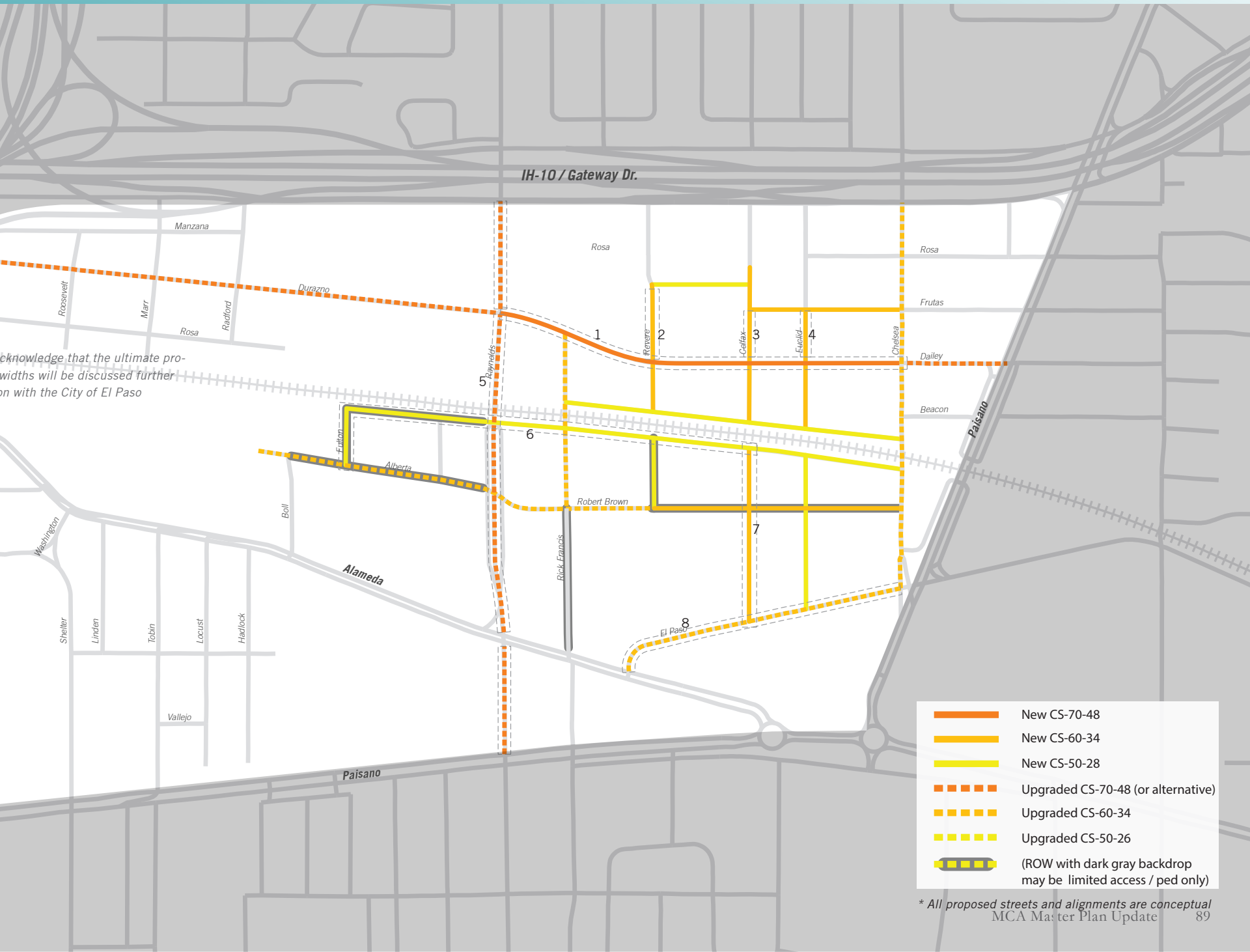
MID-TERM PROJECTS

All Quadrants

1. Durazno Extension - Raynolds to Chelsea**
2. Revere Extension – Rosa to Durazno
3. Colfax extension – Frutas to Durazno
4. Euclid Extension – Frutas to Durazno
5. Raynolds Streetscape Upgrades – Interstate to Paisano
6. Quadrant 2/3 Rear Access Road - Fulton to Colfax
7. New Colfax Street – El Paso Dr. to Loop access road
8. El Paso Dr. Streetscape improvements

**Alberta ROW is owned by UMC west of Raynolds and is not subject to City of El Paso SmartCode regulation. Future improvements to this street should seek to match this designation to the extent possible.*

***The owners acknowledge that the ultimate proposed street widths will be discussed further in coordination with the City of El Paso.*



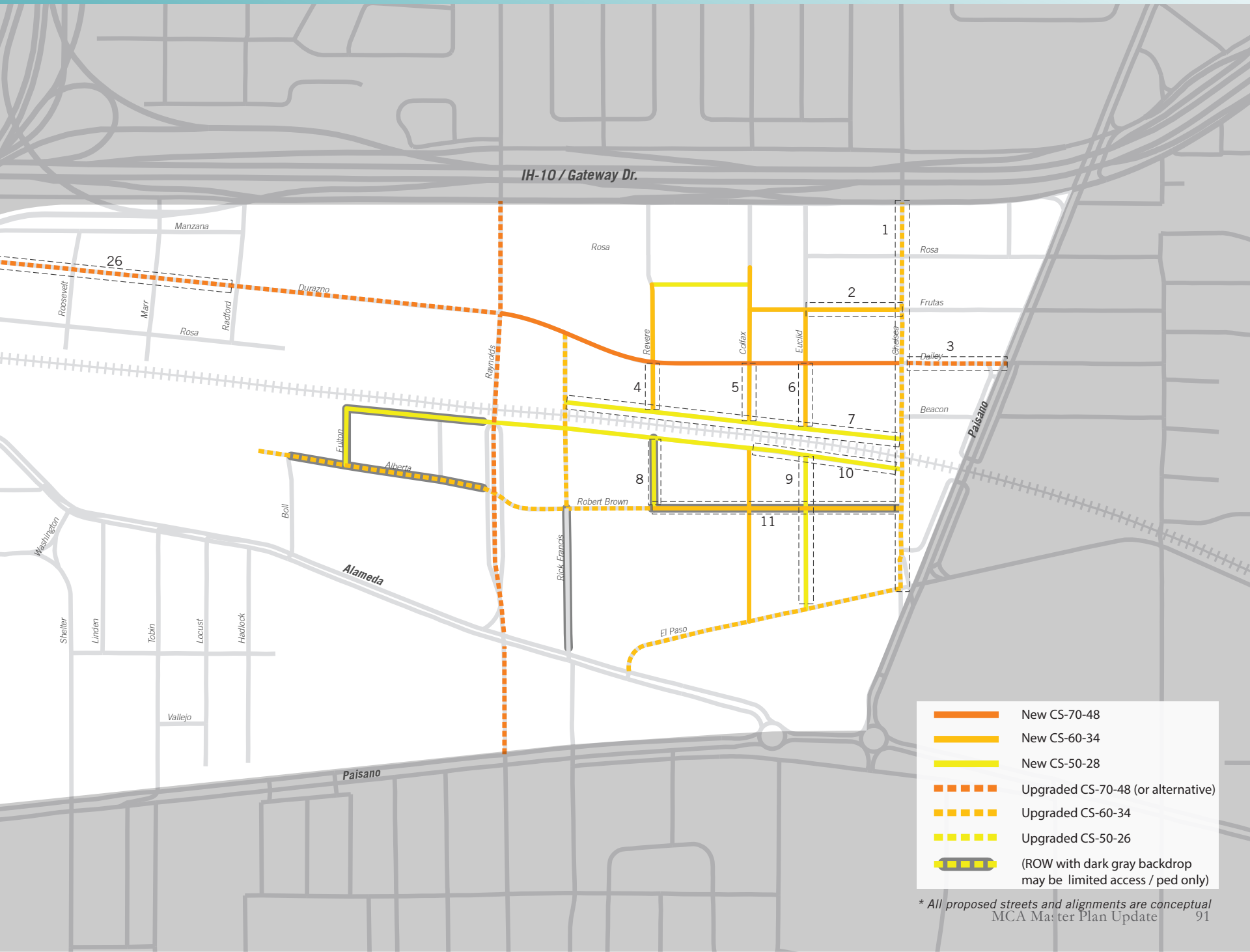
** All proposed streets and alignments are conceptual*

LONG-TERM PROJECTS

All Quadrants

1. Chelsea Street improvements – Interstate to El Paso
2. Frutas Extension – Euclid to Chelsea
3. Dailey Streetscape Improvements – Paisano to Chelsea
4. Revere Extension –Durazno to Access Road
5. Colfax extension – Durazno to Access Road
6. Euclid Extension – Durazno to Access Road
7. Quadrant I Rear Access Road
8. Revere Extension – Robert Brown to Q2 Rear Access Road.
9. New Euclid Street – El Paso Dr. to Loop Access Road.
10. Quadrant II Rear Access Rd. – Colfax to Chelsea
11. Robert Brown – Revere to Chelsea
12. Durazno Street improvements – Saipan Park to Interstate
13. Sanitary Sewer Improvements Quadrant I-II
14. Stormwater Improvements Quadrant IV

** Alberta ROW is owned by UMC west of Raynolds and is not subject to City of El Paso SmartCode regulation. Future improvements to this street should seek to match this designation to the extent possible.*



** All proposed streets and alignments are conceptual*

Cost Estimates

The opinion of probable construction cost was prepared for the recommended utility improvements utilizing ECM's estimating tools. The cost estimates are based on 2018 US dollars and include a 50% contingency. These cost estimates are in the rough order of magnitude which can often be within +/- 50% of actual contractor's bids.

Each of the cost estimate tables correspond to the project phasing presented in the preceding pages. The quantities for each of the recommended improvement projects and associated unit prices were obtained and presented by planning period, and they were based on assumed locations of development and utility corridors. For roadway costs, it was assumed full construction of new streets and as per City of El Paso standards. New roadways include water, wastewater, and stormwater (as broken down in the table), while streetscape upgrades include cost of the roadway only. Adjacent landscaping was included for all streets.

ORDER OF MAGNITUDE OPINION OF PROBABLE COSTS

		QUANTITY	UNIT OF MEASURE	TYPE	ROADWAY NETWORK		WASTEWATER NETWORK		WATER NETWORK		STORMWATER NETWORK	
					UNIT PRICE	COST	UNIT PRICE	COST	UNIT PRICE	COST	UNIT PRICE	COST
	PHASE 1: 5-YEAR SCENARIO											
1	Coors Channel Drainage Relocation	1,200	LF		-	-	-	-	-	-	$ 1,500	$ 1,800,000
2	Frutas Street Extension	200	LF	B	$ 2,500	$ 500,000	$ 550	$ 110,000	$ 600	$ 120,000	-	-
3	MCA Pond / Park	94,750	LF		-	-	-	-	-	-	See Item 7	
4	Durazno Streetscape Improvements	1,500	LF	A	$ 3,000	$ 4,500,000	-	-	-	-	-	-
5	Rick Francis streetscape Improvements	1,000	LF	B	$ 2,500	$ 2,500,000	-	-	-	-	-	-
6	Alberta / Robert Brown Streetscape Improvements	2,200	LF	B	$ 2,500	$ 5,500,000	-	-	-	-	-	-
7	*Stormwater Improvements Quadrant I*	10	AC-FT			-	-	-	-	-	$ 200,000	$ 1,900,000
8	*Stormwater Improvements Quadrant II*	9	AC-FT		-	-	-	-	-	-	$ 200,000	$ 1,780,000
9	*Stormwater Improvements Quadrant III*	12	AC-FT		-	-	-	-	-	-	$ 200,000	$ 2,400,000
10	*Water Improvements Quadrant I-IV (Rosa Extension)*	12,000	LF		-	-	-	-	$ 500	$ 6,000,000	-	
11	*Sewer Improvements Clardy Fox Lift Station Improvements*	1	LS		-	-	$ 4,000,000	$ 4,000,000	-	-	-	-
				Subtotal	***$***	***13,000,000.00***	***$***	***4,110,000.00***	***$***	***6,200,000.00***	***$***	***7,900,000.00***
	PHASE 2: 10-YEAR SCENARIO											
1	Durazno Extension - Raynolds to Chelsea	2,350	LF	A	$ 3,000	$ 7,050,000	$ 550	$ 1,292,500	$ -	$ -	-	-
2	Revere Extension – Rosa to Durazno	450	LF	B	$ 2,500	$ 1,125,000	$ 550	$ 247,500	$ 500	$ 225,000	-	-
3	Colfax extension – Frutas to Durazno	300	LF	B	$ 2,500	$ 750,000	$ 550	$ 165,000	$ 500	$ 150,000	-	-
4	Euclid Extension – Frutas to Durazno	300	LF	B	$ 2,500	$ 750,000	$ 550	$ 165,000	$ 500	$ 150,000	-	-
5	Raynolds Streetscape Upgrades – Interstate to Paisano	3,200	LF	A	$ 3,000	$ 9,600,000	$ 550	$ 1,760,000	$ 500	$ 1,600,000	-	-
6	Quadrant II/III Rear Access Road - Fulton to Colfax	2,300	LF	C	$ 2,000	$ 4,600,000	$ 550	$ 1,265,000	$ 500	$ 1,150,000	-	-
7	New Colfax Street – El Paso Dr. to Loop access road	975	LF	B	$ 2,500	$ 2,437,500	-	-	-	-	-	-
8	El Paso Streetscape Improvements	725	LF	B	$ 2,500	$ 1,812,500	-	-	-	-	-	-
				Subtotal	***$***	***28,200,000***	***$***	***4,900,000***	***$***	***3,300,000***	***$***	***-***
	PHASE 3: 50-YEAR SCENARIO											
1	Chelsea Street Improvements – Interstate to El Paso Dr.	2,200	LF	B	$ 2,500	$ 5,500,000	-	-	-	-	-	-
2	Frutas Extension – Euclid to Chelsea	550	LF	B	$ 2,500	$ 1,375,000	$ 450	$ 247,500	$ 500	$ 275,000	-	-
3	Dailey Streetscape Improvements – Paisano to Chelsea	600	LF	A	$ 3,000	$ 1,800,000	$ -	$ -	$ -	$ -	-	-
4	Revere Extension – Durazno to Access Rd	275	LF	B	$ 2,500	$ 687,500	$ 450	$ 123,750	$ 500	$ 137,500	-	-
5	Colfax extension – Durazno to Access Rd	335	LF	B	$ 2,500	$ 837,500	$ 450	$ 150,750	$ 500	$ 167,500	-	-
6	Euclid Extension – Durazno to Access Rd	375	LF	B	$ 2,500	$ 937,500	$ 450	$ 168,750	$ 500	$ 187,500	-	-
7	Quadrant I Rear Access Road	1,900	LF	C	$ 2,000	$ 3,800,000	$ 450	$ 855,000	$ 500	$ 950,000	-	-
8	Revere Extension – Robert brown to Loop Access Rd.	400	LF	C	$ 2,000	$ 800,000	$ 450	$ 180,000	$ 500	$ 200,000	-	-
9	New Euclid Street – El Paso Dr. to Loop Access Rd.	875	LF	C	$ 2,000	$ 1,750,000	$ 450	$ 393,750	$ 500	$ 437,500		
10	Quadrant II Rear Access Rd. – Colfax to Chelsea	880	LF	C	$ 2,000	$ 1,760,000	$ 450	$ 396,000	$ 500	$ 440,000	-	-
11	Robert Brown – Revere to Chelsea	1,410	LF	B	$ 2,500	$ 3,525,000	$ 450	$ 634,500	$ 500	$ 705,000	-	-
12	Durazno Street improvements – Saipan Park to Interstate	1,850	LF	A	$ 3,000	$ 5,550,000	-	-	-	-	-	-
13	*Sanitary Sewer Improvements Quadrant I-II*	8,000	LF		-	-	$ 500	$ 4,000,000	-	-	-	-
14	*Stormwater Improvements Quadrant IV*	4	AC-FT		-	-	-	-	-	-	$ 300,000	$ 1,200,000
				Subtotal	***$***	***28,400,000***	***$***	***7,200,000***	***$***	***3,500,000***	***$***	***1,200,000***

TOTAL	**$ 69,600,000**	**$ 16,300,000**	**$ 13,000,000**	**$ 9,100,000**

07 Next Steps

Next Steps Recommendations

AWARENESS

People need to understand the important work being done by the MCA and anchor institutions. This includes advances in the biomedical field, their importance to city jobs growth, and contributions to community health. A comprehensive strategy to raise awareness around these elements should be undertaken.

Branding of the "place" should be done in a way that everyone can take pride in the district. The MCA Foundation and MCA District are often conflated, though they are distinct from each other, and the MCA Foundation is only responsible for a portion of the land within the district. The idea to re-brand the district to separate these two elements could be considered, though significant momentum has been created under this existing brand to date.

The MCA as a district struggles the identity of the area. Through the beginning stages of stakeholder engagement a recurring sentiment was heard that private investment and development within the district would be impeded by the apparent stigma of the area.

The MCA should engage a reputable firm to undertake a branding and marketing exercise. Some initial goals of this work may include the creation of collateral for use by MCA as they are out spreading the word about the campus and its envisioned future.

Awareness of the district should further be spread through events on site, which may include different types of fund raisers for related foundations in the area, such as the Paso del Norte Health Foundation of the McKee Foundation.

COORDINATION WITH THE CITY

Close coordination with the City of El Paso will be required in order to ensure coordinated development happens within the district. There should be a designated contact person or "keeper of the plan" both at the MCA campus and at the City. These individuals will act as the points of contact for all things relating to the campus development and should be in constant contact with one another. Any projects that come through a city department for review or approval and that fall within the district boundaries or any project that a campus entity is proposing should be routed through these designated persons to ensure continued integrity of the plan. The MCA should work with the city to identify these people and to empower them to stand up for the vision of the campus.

SHARED INFRASTRUCTURE

In an urban environment there are certain infrastructure elements that inherently benefit each property and entity, both individually and through the promotion of the district as a whole. In an attempt to utilize resources efficiently and ensure the equitable spreading of costs, the following infrastructure systems should be considered being implemented and managed at the district level.

Roads and Utilities

Upgrades to ensure the necessary service and capacity of roadways and utilities will be essential for all players in the district to ensure continued functionality. Publicly accessible roadways and utility mainlines will benefit everyone and no single entity should bear the cost of these projects due to the timing of their development when all properties so obviously benefit.

Mobility

Mobility is a service that needs to be provided at a district level, and not on an individual basis. This includes not only parking, which tends to dominate discussions, but also transit, shuttle services, bicycle, pedestrian, rideshare, and other solutions. Parking and mobility are often treated individually by institution or business, but as the campus becomes a place of collaboration the "turf" of parking and mobility will become increasingly blurred. It may prove beneficial to all parties to have parking and mobility managed for the district as a whole rather than by each entity individually.

Wayfinding

Currently, the campus proves to be confusing and disjointed in its wayfinding and signage. A holistic signage and wayfinding strategy would allow visitors to more easily find their destination (more quickly removing them from their cars and reducing traffic) as well as enhance the brand identity of the district as a single campus. There are ways to design

signage packages for places such as the MCA campus which create coordinated messaging schemes while still allowing for each entity to promote their individual brand.

FUNDING OPTIONS

This section proposes some potential ways that the MCA may consider getting funding for district-wide projects.

Capital Improvements Plans

One of the main benefits of creating a master plan is that it creates agreement on needed roadways and infrastructure upgrades. With the priorities of this master plan in mind, the MCA can push to have needed improvements included on the Capital Improvements Plans of various local entities, including the City of El Paso, El Paso County, TXDOT, Union Pacific Railroad, the Public Services Board, El Paso Metropolitan Planning Organization, etc.

Government and Private Grants

The MCA should continue to pursue grant funding for future needs. This might include, but is not limited to:

- Community Development Block Grants (CDBG) These can often used for something that benefits the entire community.
- U.S. Economic Development Administration (EDA) – public works grants for planning and construction
- U.S. Department of Transportation BUILD grants, such as the one being pursued to help fund the proposed Mobility Hub.
- Federal Railroad Administration (FRA) – to improve railroad crossings, pedestrian crossings in the district.
- Union Pacific Railroad Foundation – provide grants for community good will, workforce development, public safety, MCA typically gets one each year.
- Health and Human Services (HHS)
- U.S. Environmental Protection Agency (EPA) - environmental cleanup and beautification
- Foundations

TIRZ Expansion

There is an active TIRZ (tax increment reinvestment zone) within the MCA district. This designation allows taxes collected from properties within the district to be earmarked for reinvestment in the area. Currently, the TIRZ within this district is only applied to the institutional, governmental, and non-profit (aka tax exempt) properties, meaning that no tax revenue is being generated. It is suggested that the MCA apply for an expansion of the district's TIRZ to include all properties within the district boundaries and potentially to also include those commercial properties adjacent to but not within the district that will benefit from the continued success of the campus. Where the TIRZ is currently voluntary, and non-congruous, it should shift to a mandatory, and congruous boundary that reaches beyond the district boundaries. The TIRZ board could also manage a mobility benefit district that would manage district parking and shuttle.

The TIRZ funds can be used to reinvest in the district to improve streetscape, landscape, parks, wayfinding and signage, lighting, design guidelines, public art, electrical line burial, etc.

Pooled Costs

For identified projects that benefit multiple parties, and are not able to be funded through a CIP or other means, institutions should seek to cooperate and share costs so that parties do not duplicate efforts and incur unnecessary costs individually.

Public Private Partnerships (P3)

Institutions should explore partnerships with private developers to provide desired development within the district including housing, mixed use, and commercial elements that they are not in the business of providing themselves. This might include the development of student housing for the TTUHSC EP in particular, but there are many potential options and structures that could be pursued to expand development of a variety of uses and amenities within the district.

CONTINUE EL PASO'S FOCUS ON RESILIENCE

In 2013, El Paso was recognized by the Rockefeller Foundation as one of the first cities, joining a global cohort, to be a part of the 100 Resilient Cities initiative. Resilience looks at the ability of a city's communities and systems to withstand, recover from, and adapt to inevitable change. These changes are grouped into two categories: acute shocks (single, often unexpected, events that cause rapid change) and chronic stressors (long term stresses that prevent a city from thriving and inhibits its ability to recover from a shock event). Shocks and stressors are looked at via three lenses: social, economic, and environmental. The City of El Paso released its resilient strategies document in early 2018, identifying the following as the most prominent vulnerabilities for the region:

The City of El Paso has, in an effort to shape their own future, looked at these seeming challenges as opportunities to be addressed through their existing strengths. With this approach, they have outlined four pillars or tenants under which their resilience goals are housed:

1. El Paso is a Vibrant Desert City - with a focus on sustainable development, the city will ensure future development is smart and equitable and enhances a city which has been around for 300 years.
2. El Paso has a Thriving Bi-national Economy - strengthen the local economy by leveraging the city's unique asset of being a bi-national metroplex.
3. El Pasoans are Empowered, Healthy, and Engaged - the city government is committed to transparency and community engagement, and the people are ready to set up to the plate and get involved.
4. El Paso has a Collaborative, Reflective, and Globally Connected Government - the city is prepared to utilize their resources to see that resilience strategies are successfully implemented.

In order to see this vision come to fruition, the City of El Paso employs a Chief Resilience Officer who has been engaged in the creation of this master plan and sees the MCA campus as a location that is ripe with opportunity to implement some of the goals outlined in the city's resilience strategy. Close engagement between the MCA and the City's Chief Resilience Officer should continue as additional development comes to the site and specific opportunities to support resilience can be identified.

A - Appendix

Existing & Proposed Utilities

The MCA District is composed of 440 acres bounded by Interstate 10 (I-10) to the north, Paisano Drive to the south, US Highway 54 (US-54) to the west and Paisano Drive to the east. For the purpose of this master plan, the District is subdivided into Quadrants. Quadrant I, the northeast portion of the District, contains approximately 90 acres. It is bounded by the Gateway East to the north, Paisano Drive to the east, the Union Pacific Railroad (UPRR) tracks to the south and Raynolds Street to the west. Quadrant II is located south of Quadrant I with an approximate area of 100 acres. It is bounded by the UPRR tracks to the north, Paisano Drive to the east and south, and Raynolds Street to the west. Quadrant III, the southwest sector of the District, contains approximately 180 acres. It is bounded by the UPRR tracks to the north, Raynolds Street to the east, Paisano Drive to the south and US-54 to the west. Quadrant IV in the northwest has an approximate area of 70 acres. It is bounded by the UPRR tracks to the south, Raynolds Street to the east, the Gateway East to the north and Highway US-54 to the west.

The existing utility infrastructure was reviewed and recommended utility upgrades are provided for each utility category. Ultimately, the proposed utility improvements are based on the District's expected 50-year development area of nearly 268 acres. The development categories include office space, mixed use and residential, medical, and academic buildings. The occupancy area for each category was utilized and obtained a maximum number of expected occupants of approximately 15,000 for all Quadrants. The following sections review and identify the proposed utility improvements required to provide necessary services.

STORMWATER

El Paso Water – Public Service Board (El Paso Water) oversees the stormwater system operations and maintenance. The existing, city-wide, system includes 310 ponds, 39 dams and basins, 74 miles of channels, and 21 pump stations to capture and convey runoff to retention basins and the Rio Grande. The El Paso Water stormwater master plan identifies the District in the Central Region catching basin, and it receives a good portion of its runoff from the Franklin Mountains and the Valley.

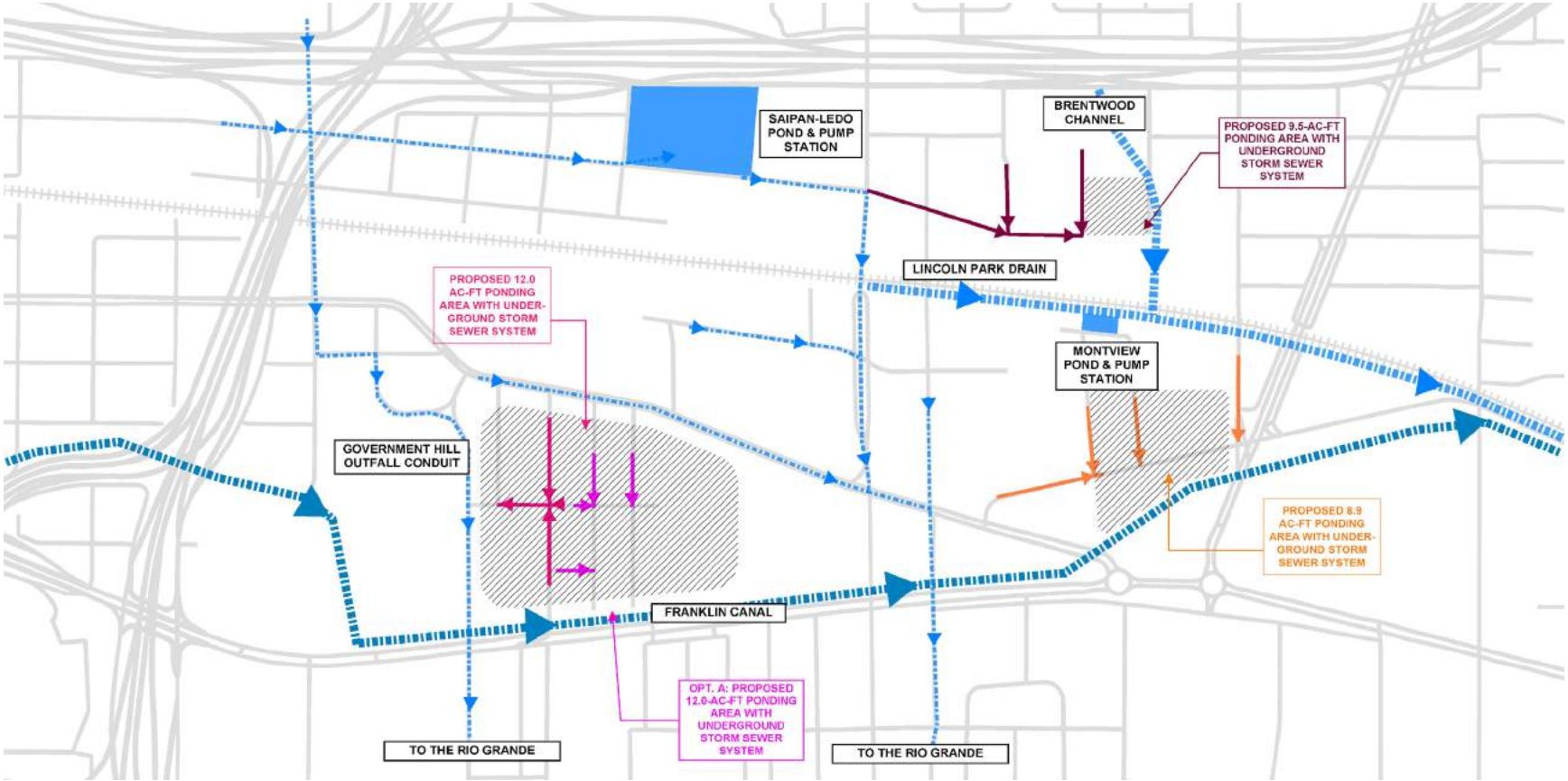
The existing stormwater infrastructure in Quadrant I includes the Brentwood or Coors channel. It is a concrete-lined channel located east of the existing MCA building. The channel runs southeast from Gateway east to the Lincoln Park drain at the intersection of Euclid and the railroad tracks. This channel collects and conveys stormwater runoff principally around the I-10 area to the Lincoln Park Drain. Due to the topography in this quadrant, the runoff generally flows southeast towards the Lincoln Drain.

A key part of the stormwater infrastructure in Quadrants I and II is the Lincoln Drain. It was built to convey stormwater runoff generated in these Quadrants to the southeast towards the Playa Drain, located in the east part of town and outside the limits of the District. It is a trapezoidal concrete-lined channel of varying depths ranging between 5 feet and 10 feet. It extends and runs parallel to and south of the railroad tracks. It starts in the west corner of Quadrants I and II at the intersection of the railroad tracks and Raynolds. The channel receives stormwater runoff at multiple connection points located throughout the channel corridor. Another key infrastructure in these Quadrants include the Montview Stormwater Pond and Pump Station located in the northern portion of Quadrant I and along Montview Court. This pond receives runoff generated from the residential area located north of El Paso Drive and ultimately discharges, via a pump station, into the Lincoln Park Drain. Another key component is the existing 3 feet by 7 feet box culvert coming south from Raynolds Street turns east at Alameda Avenue and then turns south at Concepcion Street. The concrete culvert crosses the Franklin Channel and eventually discharges stormwater runoff generated from Quadrants IV, III and II into the Rio Grande.

There are several underground stormwater pipes in Quadrant III. The 90-inch Government Hill Outfall Conduit captures runoff from the inlet basin located at the intersection of Yandel Drive and Boone Street, north of the I-10. The conduit runs south along Boone Street across I-10 and turns east at Alameda Avenue. The 90-inch conduit continues east and turns south at Evergreen Street (south of the Evergreen Cemetery), discharging ultimately at the Rio Grande.

Quadrant IV has an existing underground stormwater system that captures and conveys stormwater runoff generated within this Quadrant and areas west of the US-54 and north of I-10, into the existing Saipan-Ledo Ponding Area. The existing network is composed of reinforced concrete piping ranging in size from 24 inches, on the upstream end, to a 66 inches conduit on the downstream/discharge point. The Saipan-Ledo Pond is equipped with a pump station that

EXISTING AND PROPOSED STORMWATER SYSTEM



pumps excess stormwater thru a 30-inch pipe located along Durazno Avenue and towards the Lincoln drain. Additionally, an existing 8 feet by 2 feet concrete box culvert captures surface runoff from Durazno Avenue (within the vicinity of the Saipan-Ledo Pond) and runs east and turns south along Raynolds Street.

An existing 3 feet by 7 feet box culvert starts at Durazno Avenue in Quadrant IV and runs south along Raynolds Street, located at the western portion of Quadrant III. It then turns south at Reynolds Street and east at Alameda Avenue. The conduit receives additional street runoff along the way at multiple points from existing drainage intake structures located along Raynolds Street and Alameda Avenue. A 30-inch underground pipe is located along Alameda Avenue and runs east and west direction from Washington Street towards the aforementioned box culvert at Raynolds Street. A second 30-inch underground pipe runs along Alberta Avenue from Boll Street and connects into the existing 3 feet by 7 feet box culvert.

Other

The Franklin canal, owned and operated by El Paso County Water Irrigation District No. 1, is located south of the District and runs parallel to Paisano Drive. It changes direction at the Alameda Avenue and Paisano Drive intersection and continues extending parallel to the El Paso Drive. There is a portion of approximately 900-linear feet that is located within the boundaries of Quadrant I. This canal is utilized for irrigation during the irrigation months, typically March through October.

STORMWATER IMPROVEMENTS

The Chapter 19 of the El Paso Municipal Code provides the minimum general provisions for the management of stormwater runoff associated with new development or redevelopment. The document states that any development shall maintain the pre-development hydrologic in the post-development state as much as possible to mitigate area flooding. This provision is further detailed in the City of El Paso's Drainage Design Manual and Development Standards for Construction.

The most popular, and often the most efficient and cost effective, way to meet the City's stormwater management requirement is by providing onsite ponding within each property lot. City required retention ponds are designed to store stormwater runoff resulting from a 100-year storm and collected within the limits of the property. The pond size is contingent upon the catching area or lot size and thus the design and associated construction costs are estimated once the lot area is known. The cost associated with these improvements are paid by the owner of each specific project. This ponding method is widely utilized throughout town.

Alternatively, another way of meeting the stormwater management requirements is by providing ponding for larger areas such as subdivisions, or Quadrant in this case. It should be noted that this alternative method requires larger ponding areas and timely decisions for the location and construction of the retention ponds. Pond size and location must be selected and built before additional planned development is constructed. This alternative method can have a greater degree of complexity especially when the land is owned by multiple owners with different budgets and planning schedules. The improvements presented herein are for the alternative option of providing stormwater management for larger development areas, Quadrants, acknowledging the limitations and challenges this option may introduce.

The City of El Paso Drainage Design Manual and Development Standards for Construction were utilized to determine the ponding requirements. The retention requirement was analyzed individually for each Quadrant and assuming a single pond per Quadrant. The ponds were sized to retain a potential rain event of 4 inches in three hours over the Quadrant area. Additionally, stormwater conduits and inlets were considered as part of the proposed stormwater system and were strategically located within each Quadrant to effectively catch runoff.

Near Term (5-year) Improvements

The findings presented in this Section arise from the idea of providing a single pond as discussed earlier where stormwater would be stored in the Quadrant it is generated. These improvements consider the total area for each Quadrant and the expected impervious area resulting from the development at the end of the 50-year period. The recommended 5-year improvements are as follows:

Quadrant I has an area of approximately 90 acres and a total development area of nearly 67 acres. The first development of approximately 3.1 acres is planned to occur in the first five years. Thus, a new square pond of 288 feet long and 5 feet deep was determined necessary to retain stormwater runoff. The location for the proposed pond was selected in the southeast corner of this Quadrant.

The existing Coors Channel is located in Quadrant I and extends diagonally east of the MCA building from its north end at Gateway East Boulevard towards southeast to Euclid Street. It is proposed that this channel is modified such that it extends straight south from the intersection of Gateway East and Euclid Street south to allow additional construction at its current location.

Likewise, Quadrant II has an area of approximately 92 acres and a total planned buildout development area of 63 acres. This resulted in a required square ponding site of 279 feet long by 5 feet deep. The location for this pond was selected southeast of the Quadrant, parallel to the Franklin canal. The selected pond area best fitted the existing conditions including topography, street grid system, and available space.

Quadrant III is the largest quadrant with an approximate area of 179 acres and an expected buildout area of 85 acres. This resulted in a required square pond of 324 feet long and 5 feet deep. This is the largest Quadrant with the most diverse development including a large portion of residential area. Thus, two alternative locations were selected within the residential area for the construction of the required pond located between Jefferson High School and the El Paso Zoo. It is acknowledged the complexity to acquire residential area for ponding and it is recommended that other locations within this Quadrant are considered. Additionally, it is recommended that the option of localized onsite ponding is considered for this Quadrant. In summary, the improvement recommendations for the 5-year period include the following:

- Build a new square pond 288 feet long and 5 feet deep in Quadrant I.
- Demolish and replace the existing Coors Channel to extend along Euclid Street.
- Build a new square pond 279 feet long and 5 feet deep in Quadrant II
- Build a new square pond 324 feet long and 5 feet deep in Quadrant III

Long Term (50-year) Improvements

Quadrant IV has an approximate total area of 78 acres and total planned buildout area of 53 acres. This is the only Quadrant with existing ponding owned by the City, the Saipan Pond. It is recommended that for the first 10 planning years, the existing onsite ponding be employed for the 50-year period. It is further recommended that the capacity of the existing Saipan Pond be increased by four feet deep. This improvement also includes inlets and stormwater pipes to convey the runoff to the pond.

In summary, the improvement recommendations for the 50-year period include the following:

Increase the storage capacity of the Saipan Pond 4 feet deeper in Quadrant IV.

Construction cost estimates to complete these recommended improvements were prepared and summarized at the end of this Section. The costs include the improvements recommended in this section and new stormwater piping within each quadrant to convey runoff to the ponding area. Additional details are provided in the cost estimate Section.

WATER

El Paso water owns and operates the infrastructure to provide drinking water to a population of nearly 790,000 people in the El Paso area. Drinking water is obtained from two sources, groundwater from the Hueco and Mesilla Bolsons and surface water from the Rio Grande. The existing infrastructure includes two groundwater treatment plants, Kay Bailey Hutchison Desalination Plant and Upper Valley Treatment Plan, and two surface water treatment plants, Johnathan Rogers Water Treatment Plant and Robertson/Umbenhauer Treatment Plant, for a combined treatment capacity of approximately 264 million gallons per day. Drinking water is delivered to customers utilizing approximately 2,600 miles of pipes, booster pump stations, and approximately 75 storage reservoirs distributed in 7 pressure zones throughout town. El Paso Water has plans of expanding its treatment capacity through direct potable reuse and acquiring water rights for additional water sources outside El Paso as a proactive measure for future demand increases. Additionally, El Paso Water has also successfully implemented a water conservation program which has reduced water consumption from 150 gallons per day in 2003 to 130 gallons per day in 2017.

El Paso Water currently supplies the District with drinking water mainly from the Robertson/Umbenhauer Treatment Plant during the summer months and the northeast wells during the winter months. The water is conveyed to the District through the piping system including distribution pipes of sizes ranging from 6 inches to 12 inches in diameters. The 8-inch and 12-inch pipes in the north area of the District supply water to Quadrants I and IV, respectively. The 8-inch pipe is located near the intersection of Gateway and Euclid Street and the 12-inch pipe is located near the intersection of Gateway East and Radfort Street. Quadrants II and III are supplied through 12-inch and 8-inch pipes located at the intersections of Paisano Avenue and Val Verde Street and Paisano Avenue and Concepcion Street, respectively.

Near Term Improvements

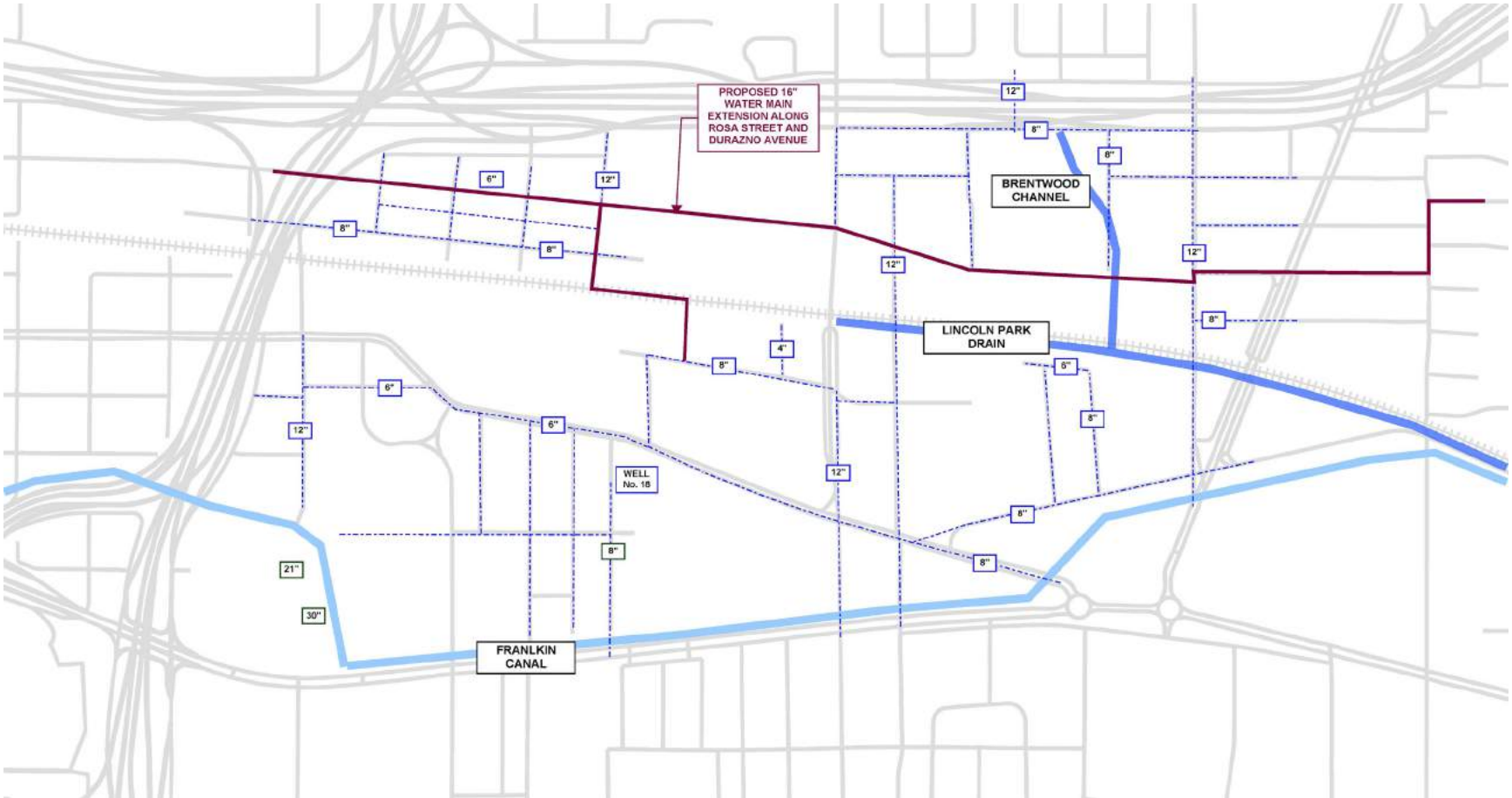
The existing water infrastructure is sufficient to meet the current and 5-year demands. El Paso Water is already planning the expansion of its infrastructure to meet future demands. The predesign of a new 16-inch water transmission pipe called the 16-inch Rosa Street Water Line Extension Project is currently being completed. The size of this proposed pipe was selected to supply additional water demands expected in the 50-year development plan of approximately 15,000 people. The route analysis is currently being completed and will be followed by the detailed design and construction. It is expected for this pipe to be constructed within the next five years.

The ongoing water infrastructure planning described above would supply enough water for the development planned in the next 50 years. Other improvements in this Section include distribution pipes to provide water to the proposed buildings. The El Paso Water Design Standard Manual for Water, Wastewater, and Reclaim Water was utilized to size and select service pipes intended to convey water from the proposed 16-inch Rosa Street Transmission Pipe to the planned development within the District. The proposed water pipes have the general assumptions including the size to be 12-inch of ductile iron pipe material, buried at a depth of 4 feet from existing grade, and that the existing soil is suitable for construction.

El Paso Water has developed various route alignments for the proposed 16-inch Rosa Street pipe for evaluation; however, a final alignment has not been decided to the date of this report. The alignment of Route 10 is one of the proposed routes being considered was utilized to determine additional piping requirements to provide water to the proposed development throughout the District. This Route is approximately 11,000 feet long and passes through Quadrants I and IV. It extends from its east end at the intersection of Frederick Road and Yandell Drive to the west end at the intersection of Durazno Avenue and US-54. The pipe alignment goes through Frutas Avenue and Durazno Avenue.

It is recommended the construction of additional distribution pipes to convey water from the proposed 16-inch pipe to the proposed development. The construction of these pipes follows the phasing of proposed roadway. The following near-term recommendations provide an initial basis for District supply and essential design considerations such as fire route analysis, fire protection, connectivity, and hydraulics need to be completed prior to the detailed design. A 12-inch pipe along Raynolds Street between Robert Brown Avenue and Rosa Street would supply water to Quadrants III and IV. A second 12-inch pipe along Euclid Street between El Paso Drive and Rosa Avenue would supply water to Quadrants I and II. Additional smaller piping would be required to deliver water to individual buildings that would connect to one of the proposed 12-inch pipes.

EXISTING AND PROPOSED WATER SYSTEM



In summary, the recommended improvements for the 5-year period include the following:

- 16-inch Rosa Street Water Line Extension to provide additional water to the District.
- 12-inch pipe along Euclid Street between El Paso Drive and Rosa Avenue to convey water from the proposed 16-inch Rosa Street line to Quadrants I and II.
- 12-inch pipe along Raynolds Street between Robert Brown Avenue and Rosa Street to convey water from the proposed 16-inch Rosa Street line to Quadrants III and IV.

Construction cost estimates to complete these recommended improvements were prepared and summarized at the end of this Section. The costs include the improvements recommended in this section and new water and wastewater pipes along the new roadway extension described in the street section.

SANITARY SEWER (WASTEWATER)

El Paso Water also owns and operates the wastewater infrastructure which treat flows produced in El Paso area. The Haskell R. Street and Roberto R. Bustamante Wastewater Treatment Plants are located in central and southeast parts of town, respectively. These plants treat wastewater to state standards and place treated water into the Rio Grande. Additionally, the John T. Hickerson and Fred Harvey Water Reclamation Plants receive wastewater from the west and northeast parts of town, respectively. Treated effluent from these plants is utilized for irrigation of green areas and also sold to El Paso Electric Company for its Newman plant. The combined treatment capacity from the four plants is approximately 97 million gallons per day. The collection system conveys wastewater flows to these treatment plants utilizing approximately 2,200 miles of pipe and 75 lift stations.

All wastewater generated in the District is conveyed to the Haskell R. Street Wastewater Treatment Plant. The existing collection system include pipes of sizes ranging between 8 inches and 30 inches in diameter utilized. Wastewater conveyance within the District can be described as two independent sub-collection areas separated by the Conception/ Rick Francis Street. Essentially, wastewater flows collected west of Concepcion St. (Quadrants III and IV) are conveyed by gravity to the treatment plant through the 30-inch pipe via the Boone Collector. Flows collected at the east Quadrants (Quadrants I and II) are conveyed through the existing 18-inch pipe via the Clardy Fox Lift Station. From there, flows are conveyed to the treatment plant through a 12-inch pipe.

Another important component of the existing infrastructure in Quadrants I and II, as described above, is the 18-inch collector pipe. This pipe collects most of the wastewater generated in these Quadrants. It starts as a 15-inch pipe at its north end in Quadrant I at the intersection of Chelsea and Gateway Boulevard East. It extends south along Chelsea Street to El Paso Drive and increases to an 18-inch diameter pipe. It then turns southwest along El Paso Drive to Cortez Drive and goes south towards the Clardy Fox Lift Station. The collection points of this pipe include the intersecting 8-inch pipe at Rosa Street, Frutas Street, Beacon Street, Montview Street, and Colfax Street.

Collection system in Quadrants III and IV is mainly composed of a collection network of pipes ranging from 8-inch to 12-inch. A separate 8-inch sewer network collects sewage from the vicinities of the University Medical Center and Jefferson High school and routes it through a 15-inch sewer pipe south and across the Franklin Canal. Wastewater flows in these Quadrants are conveyed to the west through a 30-inch pipe located along Alameda Avenue. This 30-inch pipe receives wastewater from Quadrants III and IV from 8-inch intersecting pipes at Chelsea, Hadlock St., Locust St., Tobin Place, and Linden St. It also receives greater flows from the 18-inch pipe at Boll Place. The 30-inch pipe eventually conveys its flow to the Boone collector at the intersection of Alameda Avenue and Boone Street. It goes to the treatment plant from this point.

Near Term Improvements (5-year)

The El Paso Water Design Standard Manual for Water, Wastewater, and Reclaim Water was utilized to determine the recommended infrastructure. It was determined that a new wastewater gravity pipe is will be required for the 50-year development plan as discussed in the next sections. It is noted that this recommendation was based on available record data and its size and alignment shall be reviewed during the design phase.

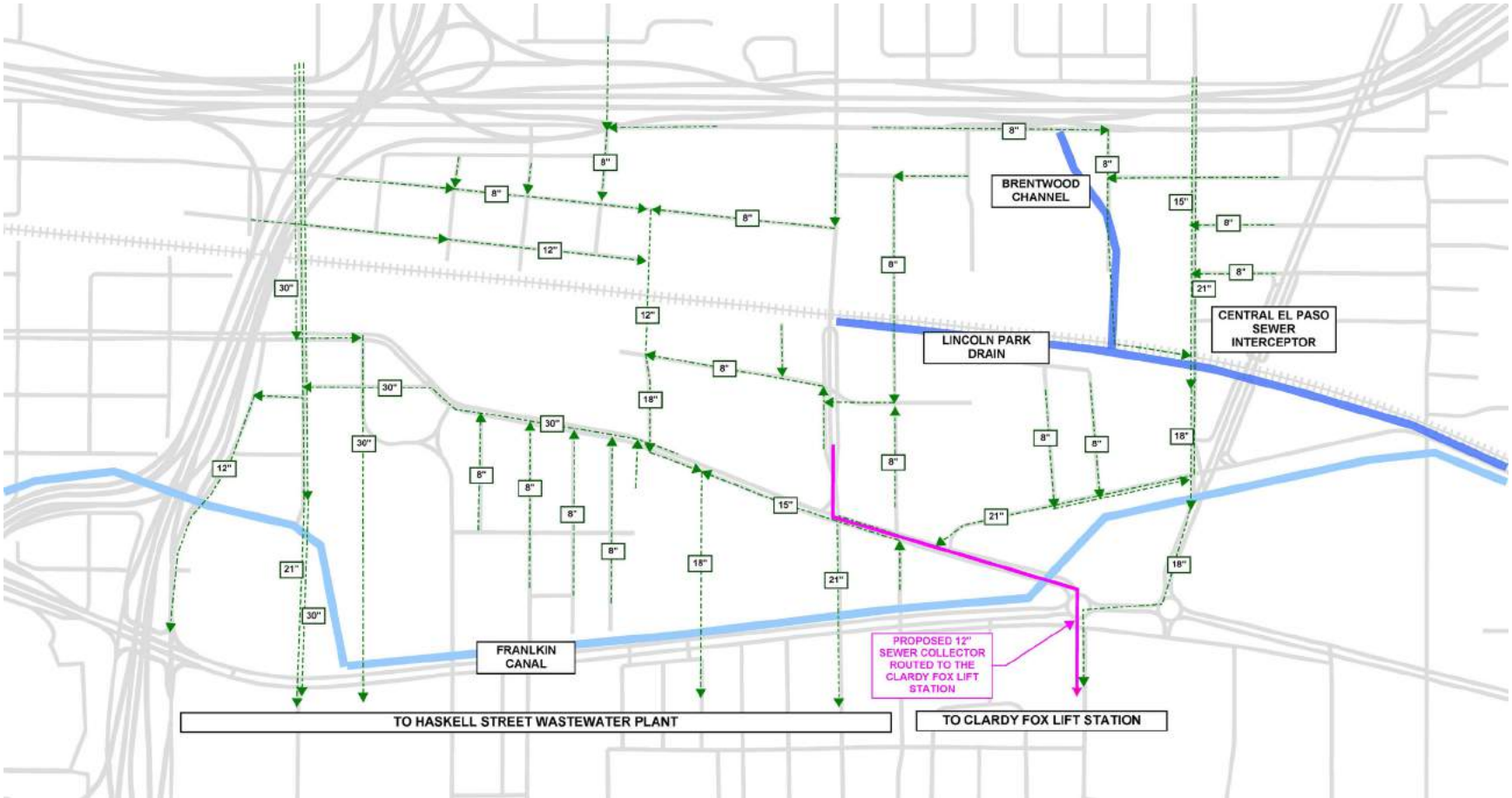
The Clardy Fox Lift Station has an approximate firm capacity of 2,200 gallons per minute (gpm) and a current available capacity of 400 gpm. This capacity was determined to be sufficient to pump flows expected in the next 5 years and possibly 10 years, depending on changes to the planned development. However, El Paso Water already identified the need to increase the pumping capacity to convey the additional flows associated with the full buildout development. The predesign of the expansion is currently ongoing and it is expected to increase pumping capacity by 1,400 gpm. The final design and construction are expected to be completed in the next 5 years.

In summary, the improvement recommendations for the 5-year period include the following:
Increase the pumping capacity of the existing Clardy Fox Lift Station.

Near Term Improvements (10-year)

The existing infrastructure and the improvements described in the 5-year plan provide sufficient capacity to collect and convey expected flows in this planning period. It is projected an occupancy of 3,805 people resulting in flows of 185 gpm. Therefore, no additional wastewater infrastructure is required for this planning period.

EXISTING AND PROPOSED SANITARY SEWER SYSTEM



Long Term Improvements

It was discussed earlier that the existing 18-inch collector pipe conveys wastewater flows produced in Quadrants I and II to the Clardy Fox Lift Station. The increase development expected for the 50-year term would result in an increase occupancy of approximately 15,000 people and an additional wastewater flow of approximately 740 gpm. Thus, it is deemed necessary and recommended to construct a parallel 12-inch collector pipe to convey this additional flow.

In summary, the improvement recommendations for the 50-year period include the following:
Add a 12-inch collector pipe parallel to the existing 18-inch pipe to convey the expected additional flows produced in Quadrants I and II.

Construction cost estimates to complete these recommended improvements were prepared and summarized at the end of this section.

ELECTRICAL SERVICE

Electric Distribution is provided by El Paso Electric Company (EPEC). The existing infrastructure include three small substations on-line providing power to the surrounding area including the District. The Durazno Substation, on Durazno west of Raynolds, the East Substation, located at the intersection of I-54 and Alameda, and the Austin Substation, at the corner of Paisano and Trowbridge, supply 13.8 kV distribution feeders for this area.

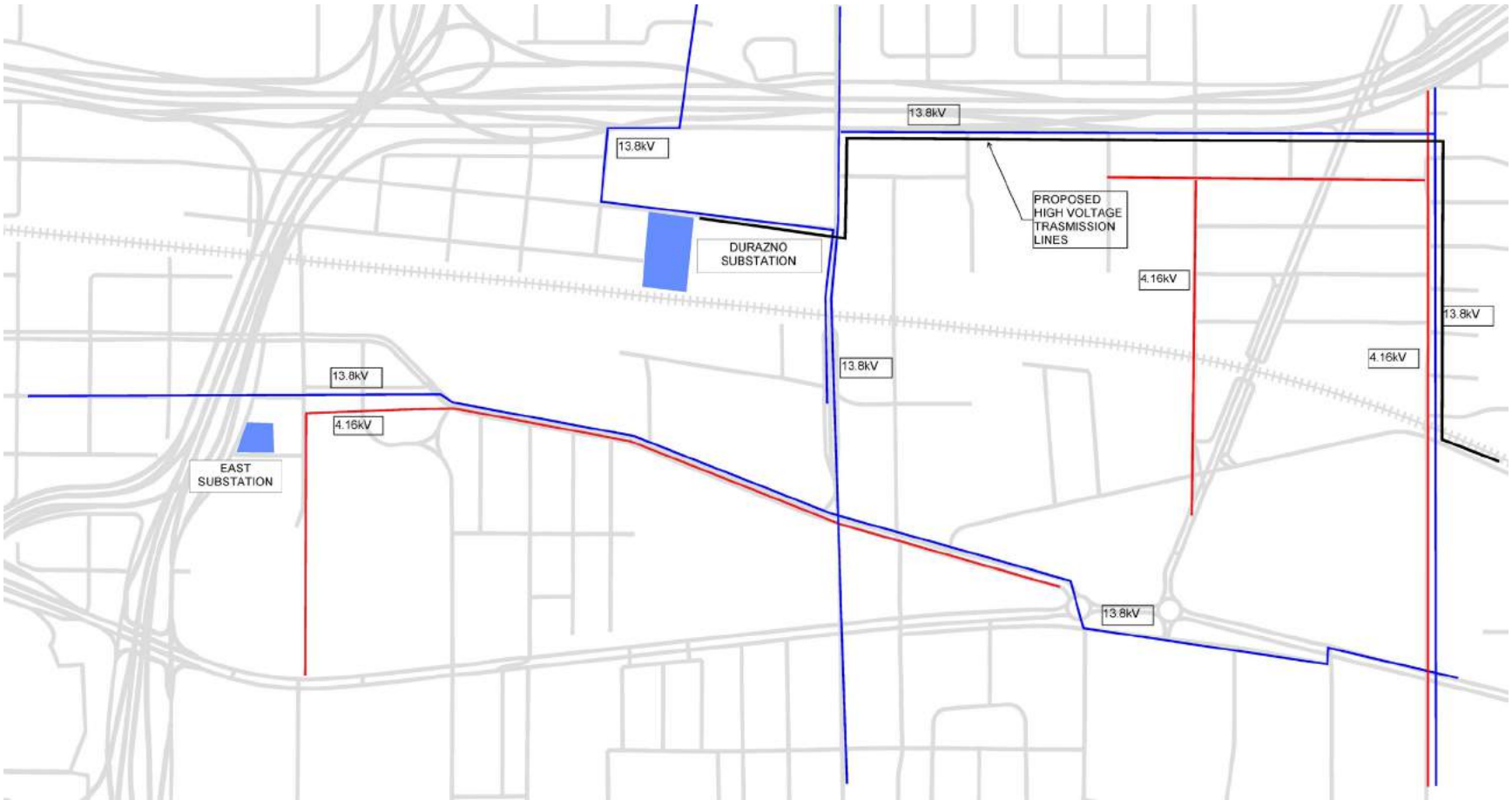
Electricity at the substations described above are distributed within the distributed within the District through 3-phase distribution lines located on Gateway Boulevard East and Raynolds Street. These lines are rated at 13.8 kilovolts (kV) which are located below the high voltage line 115 kV. Also, there is an existing 4kV overhead power line available with additional intermediate poles on the south and east sides of the existing MCA building.

In Quadrant II, presently there is one substation on-line providing power to the surrounding area. The Durazno Substation, on Durazno Avenue just west of Raynolds Street. There are 13.8 kV distribution feeders for this area. EPEC has plans to install addition feeders at the Durazno distribution substations in 2020, which will be utilized to absorb any new or projected loads.

Electrical Distribution Improvements

It is unknown what the future electric power specific demand within the District will be until specific building and load designs or predesigns are completed. EPEC has plans to install additional feeders at the Durazno Substation by 2020, which will be utilized to handle new or projected loads to serve the 5-year, 10-year, and 50-year power demands. Service lines on private property and the cost of the transformer will be at the expense of each project owner.

EXISTING ELECTRICAL SYSTEM



NATURAL GAS DISTRIBUTION

Texas Gas Service (TGS) provides gas service in El Paso area. The gas distribution network is comprised of 2-inch feeder pipes located on Gateway Boulevard East, 4-inch feeders on Raynolds and Glenwood, and a 14-inch high feeder line on Alameda. These pipes are supplied by the 16-inch high pressure transmission pipe on Paisano Avenue. This pipe feeds the District through other small feeders and service pipes described above.

Near Term Improvements

It is unknown what the future demand within the District will be until specific building and load designs have been completed; however, TGS believes that sufficient capacity is available through the 16-inch transmission pipe for the 50-year plan period. TGS can increase the gas supply by providing a larger pipe or pressure increases to absorb any new or projected loads to serve the 5-year, 10-year, and 50-year power demands. Any upgrades to existing pipes or new gas pipes, within the right-of-way or on private property, will be at the expense of the owner of specific projects.

DATA AND COMMUNICATION

The existing AT&T 100 pair copper aerial cable and Time Warner Cable attached to existing electric power poles, located on the south and east sides of the existing MCA building, provide data and communication, respectively, for the District.

Improvements

The existing AT&T and Spectrum Cable should be sufficient to serve any new and projected projects throughout the Quadrants.

EXISTING NATURAL GAS SYSTEM

Transportation

TRAFFIC ANALYSIS

The Medical Center of the Americas (MCA) Strategic Master Plan is a 440 acre study area that encompasses major medical institutions such as the MCA, Texas Tech University Health Science Center (TTUHSC EP), University Medical Center (UMC), and Children's Hospital campus. There are also residential, commercial properties, educational, and recreational areas in the study area. Walter P Moore was engaged to provide the traffic analysis for this master plan to determine the necessary mobility infrastructure needed for existing and future development of medical facilities. This includes review of existing street network, vehicular and pedestrian circulation and parking conditions.

This traffic analysis will include the following:

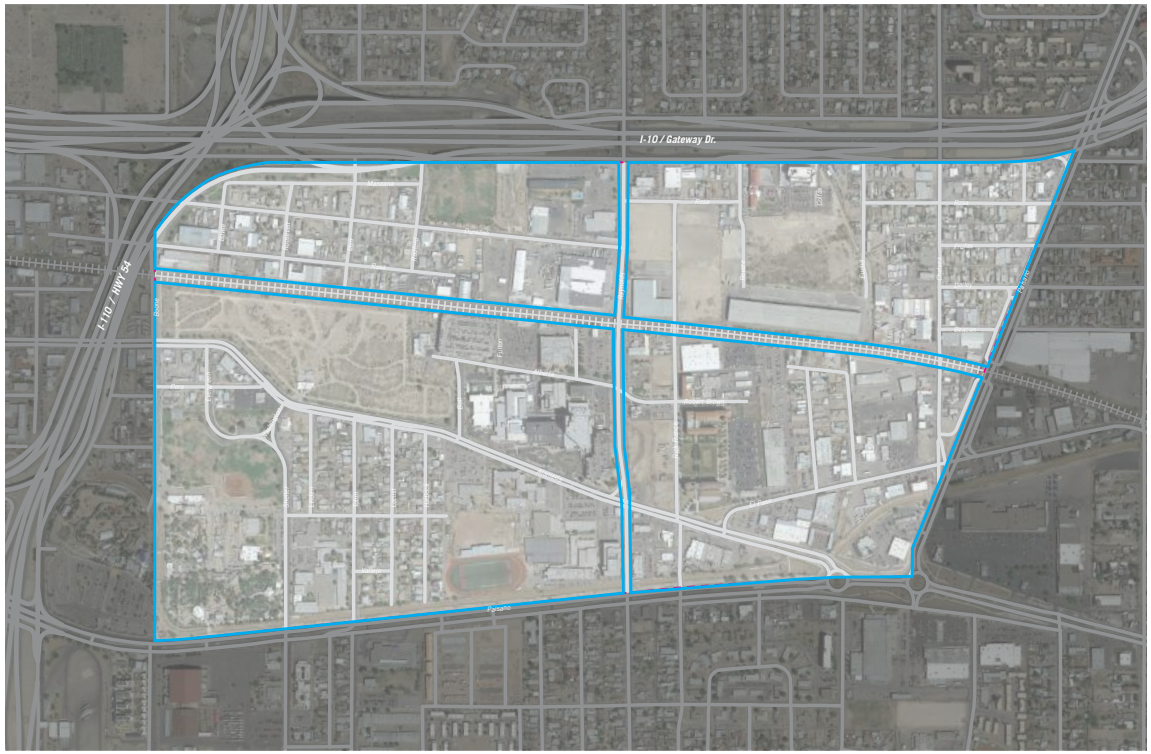
- Review existing and proposed development by MCA, TTUHSC EP, and UMC.
- Consider future and proposed developments
- Develop Trip Generation for proposed developments
- Evaluate on-site roadways and off-site access points to analyze the impact to surrounding transportation infrastructure
- Document transportation improvements and recommendations for the study area intersections and roadway segments.

In general the traffic analysis was guided by the following principles:

- Encourage traffic flow and connectivity
- Create street frontages that promote pedestrian activity
- Create a walkable environment
- Create features that would encourage road-sharing between modes of transportation
- Minimize vehicular conflicts with pedestrians

EXISTING CONDITIONS

The study area is bounded by I-10 to the north, Paisano Dr. and Alameda Ave. to the south, US-54/ I-110 to the west, and Paisano Dr. to the east. Raynolds St. forms a barrier between the east and west areas through an elevated bridge structure over the Union Pacific railroad tracks which forms a barrier between the north and south areas. Figure 1 depicts the study area and the main roads that provide access. The study area is divided in four quadrants utilizing Raynolds St. and the Union Pacific railroad tracks as the quadrant separators. In this report the different quadrants are identified as the northeast, southeast, northwest and southwest quadrants.



STREET SYSTEM

The primary streets in the analysis area are described below:

I-10 is an east-west, major interstate freeway that travels through El Paso and provides four lanes of travel in each direction. Along I-10 westbound, there are two exit ramps (East of Paisano Dr. and East of Raynolds St.) and two entrance ramps (East of Paisano Dr. and East of Chelsea St.) Along I-10 eastbound, there are two exit ramps (East and West of Raynolds St.) and two entrance ramps (East of Raynolds St. and East of Trowbridge Dr.) The posted speed limit is 60 mph.

Gateway East and West are frontage roads parallel to I-10. Gateway West is on the north side of I-10 and Gateway East is on the south side of I-10. Throughout the study area, both Gateway East and Gateway West provide three lanes of travel. The posted speed limit is 45 mph.

Alameda Avenue (SH 20) is an east-west major arterial that travels through the heart of UMC. In the study area the roadway provides two lanes of travel in each direction and a continuous left lane. The posted speed limit is 30 mph with an existing 20 mph when flashing school/hospital zone.

Paisano Drive (US 62) is an east-west major arterial that provides three lanes of travel in each direction. The posted speed limit is 45 mph from West of Val Verde St. to Alameda Ave. and 35 mph from Alameda Ave. to north of Gateway East/West

Raynolds Street is a north-south collector that provides two lanes of travel in each direction. At Alameda Avenue, the roadway includes left turn bays in both directions. In addition, there is a free southbound free right turn lane. There is no posted speed limit on Raynolds Street in the study area. Raynolds Street at its intersection with Alameda Avenue is planned to be widened slightly to provide a larger southbound right turn radius.

Chelsea Street is a north-south at-grade street that crosses the railroad tracks and provides one lane of travel in each direction from north of Gateway East/West to Paisano Dr. There is no posted speed limit on Chelsea St.

Alberta Avenue is an east-west local street that provides one lane of travel in each direction. There is no posted speed limit on Alberta Avenue; however there is a 15 mph hospital zone with flashers. In addition, Alberta Ave. provides access to Texas Tech Medical Center. Meter parking exists on both sides of Alberta between Concepcion and the Raynolds access road.

Boll Street is a north-south local street that provides one lane of travel in each direction. The posted speed limit on Boll Street is 25 mph.

Concepcion Street is a north-south local street that provides one lane of travel in each direction with parallel parking on the west side of the street. The posted speed limit on Concepcion Street is 20 mph with an existing 20 mph, when flashing, school zone. In addition, the street has a railroad crossing located at the north end of TTUHSC EP.

El Paso Drive is an east-west local street that provides one lane of travel in each direction with left turn bays at the entrance/exit driveways of TTUHSC EP and the El Paso Health Department. El Paso Drive serves as the main access to the TTUHSC EP. The posted speed limit on El Paso Drive is 30 mph.

Durazno Avenue is an east-west street providing one lane of travel in each direction. The posted speed limit is 30 mph.

CIRCULATION

The primary entryway to the study area is via I-10, using the Raynolds St., Chelsea St. and Paisano Dr. freeway exits.. Although Raynolds St. is the main connection from I-10 on the north to the TTUHSC EP, Children's Hospital, UMC, and Jefferson High School sites, the grade separation of this roadway forces vehicles to use Alameda Ave. as the main access to their facilities. Due to the design of the roadway, proximity of Jefferson High School, and heavy traffic volumes, vehicles often queue along Raynolds St. and Alameda Ave. Queues can be especially lengthy around the shift changes at UMC and the high school dismissal hours.

Another major entryway to the study area is via Paisano Dr. and Alameda Ave. to the south. Both roads are east-west roads that provide access to the campus. Alameda Ave. carries most of the east-west traffic due to limited connectivity in the study area. Paisano Dr. north of Alameda Ave. becomes a north-south corridor to the east of the study area that provides a secondary north-south relief to the ingress and egress of the study area.

Currently the only north-south at-grade connections in the study area are at Concepcion St., Chelsea St. and Boone St. however, the City is in the process of closing the Boone Street at grade crossing. The Concepcion St. at grade crossing is the only connection to the immediate medical institutions and also connect the northeast quadrant to the southeast quadrant.

The northeast and northwest quadrant's main access points are Gateway Blvd. East, Raynolds St. and Durazno Ave, however, Durazno Ave does not extend through the entire northeast quadrant.

The southeast quadrant can be accessed via Raynolds St., Paisano Dr. and Chelsea St. as the north-south roads. The east-west movements in this quadrant are provided by Alameda Ave., and El Paso Dr. On the other hand, the southwest quadrant can be accessed via Raynolds St. from north and south, and via Alameda Ave. for east and west movements. Most of the internal quadrant access streets within the area are public streets with the exception of Alberta Dr. between Boll St. and Raynolds St. The internal circulator streets are Alberta Ave. and Concepcion St. with limited access from the Raynolds St. one way frontage roads.

PROJECTED TRAFFIC

Traffic projections in the study area are based on the discussed and proposed building program and footprints for all major stakeholders in the area. In addition, the projected conditions take into account a full-build of these programs as well as an increase in residential, commercial and mixed-use developments. Figure 4 illustrates the proposed buildings in a 50 year horizon.

It is important to note that the City of El Paso as well as the Texas Department of Transportation have current on-going projects such as the Re-imagine I-10 and SH 20 Alameda Avenue Corridor Study. These studies are reviewing current needs and future corridor challenges along I-10 and Alameda Avenue. Since these projects are currently in a planning stage, final recommendations were not available therefore could not be included in the future roadway conditions for this study analysis.

TABLE 1: TRIP GENERATION VOLUME

Quadrant	ITE Code	Trip Generation Land Use	Size (sf)	A.M. Peak			P.M. Peak		
				Total	Enter	Exit	Total	Enter	Exit
NE	710	General Office Building	278,491	323	278	45	320	51	269
	760	Research and Development Center	278,492	117	88	29	136	20	116
	814	Variety Store	69,623	221	126	95	476	248	228
	231	Mid-Rise Residential	69,623	26	7	19	31	22	9
	933	Fast Food Restaurant	69,623	1,748	1,049	699	1,973	987	987
	630	Clinic	348,115	1,285	1,002	283	1,142	331	811
	550	University/ College	278,492	304	234	70	326	104	222
NE Quadrant Sub-Total				4024	2784	1240	4404	1763	2641
SE	710	General Office Building	78,915	92	79	13	91	15	76
	760	Research and Development Center	78,916	33	25	8	39	6	33
	814	Variety Store	118,373	376	214	162	810	421	389
	231	Mid-Rise Residential	118,373	44	12	32	53	37	16
	630	Clinic	78,915	291	227	64	259	75	184
	550	University/ College	1,104,812	1,204	927	277	1,293	414	879
SE Quadrant Sub-Total				2040	1485	555	2545	968	1577
SW	814	Variety Store	106,433	338	193	145	728	379	349
	231	Mid-Rise Residential	106,432	40	11	29	48	34	14
	630	Clinic	212,865	785	612	173	698	202	496
SW Quadrant Sub-Total				1163	816	347	1474	615	859
NW	710	General Office Building	89,481	104	89	15	103	16	87
	814	Variety Store	89,481	285	162	123	612	318	294
	814	Variety Store	89,481	285	162	123	612	318	294
	231	Mid-Rise Residential	89,481	34	10	24	40	28	12
	630	Clinic	536,884	1,981	1,545	436	1,761	511	1,250
NW Quadrant Sub-Total				2689	1969	720	3128	1192	1936
SUB-TOTAL ALL QUADRANTS				9,916	7,054	2,862	11,551	4,537	7,014
TOTAL WITH 25% TRIP REDUCTION				***7,437***	***5,290***	***2,147***	***8,663***	***3,402***	***5,261***

TRIP GENERATION

For the proposed development, the number of trips expected to be generated by the planned facilities must be determined. The number of trips generated by the development during an average weekday, and for weekday peak hours, is based on the land use type and building. Standard rates from the Institute of Transportation Engineers (ITE) publication, Trip Generation, 10th edition, were used to determine the amount of traffic generated by the development. The average rates were used to estimate trips generated during the Weekday, AM Peak Hour, and PM Peak Hour in accordance with the City Traffic Impact Study Guidelines. Table 1 shows a summary of the trips generated by the proposed development land uses.

TRIP REDUCTION

The proposed development includes several land uses which generate trips from outside the study area. However, because this development is multi-use, trips among the various land uses can be made on-site and without the use of the major and minor street system analyzed. These on site trips are called internal trips. For example, due to the proximity and variety of land uses in the area it is highly likely that a person working in an office space would not use their vehicle to travel to a restaurant or commercial area within the study area. In this case these trips would be on foot, bike or shared-used paths therefore not generating additional vehicular traffic at the local streets and the major intersections listed in this study.

The reduction accounted for in the study was for 25% of the trips. This reduction is based on the type of mixed-used development, the proximity to existing and proposed Sun Metro Transit routes, and the proposed connectivity by shared-used paths. Transit service presently consists of bus routes on Raynolds and Alameda. In addition, Sun Metro's rapid transit system (BRIO) will have a designated stop near the Alameda Ave. at Raynolds St. intersection. Moreover, Sun Metro is considering a possible new transit terminal to be located east of the intersection of El Paso Dr. at Alameda Ave. Furthermore, a trolley line is under consideration for Alameda, but it is in the early planning stages.

TRIP DISTRIBUTION

After determining the number of trips generated by the proposed development, the trips were distributed among roadways accessing the site using a combination of existing and expected travel patterns. This process involves examining the roadways and the expected travel patterns between the site and other trip ends, based on available routes in the study area. All traffic assignments were made over the most reasonable routes for each direction.

CAPACITY ANALYSIS

Results of the capacity analyses are reported in standard level of service (LOS) format, with the most favorable conditions being designated as LOS A and the poorest conditions indicated by LOS F. Intersection level of service is based on the amount of delay that each vehicle encounters at a given intersection. The level of service criteria for signalized intersections, along with a brief description of the conditions experienced for each level of service grade, can be seen in Table 2. The level of service criteria for unsignalized intersections can be seen in Table 3.

Transportation agencies generally consider operations at or above LOS C to be acceptable. In more dense areas, operations at or above LOS D may also be considered acceptable during peak traffic hours.

TABLE 2: LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level of Service	Stopped Delay (seconds/vehicle)	Description
A	≤ 10	At a single intersection most vehicles do not stop at all. When linked with other signals, vehicles progress through intersections without stopping.
B	> 10 and ≤ 20	At a single intersection some vehicles stop before getting a green signal. When linked with other signals, some cars may have to stop but most progress through the intersection without stopping.
C	> 20 and ≤ 35	At a single intersection, a significant number of vehicles must stop and wait for a green signal. Some vehicles may have to wait through one full signal cycle before being able to move through the intersection.
D	> 35 and ≤ 55	At this level, congestion is noticeable. Many vehicles have to stop while waiting for a green signal. A noticeable number of vehicles have to wait through one full cycle before being able to continue through the intersection.
E	> 55 and ≤ 80	At this level, almost all vehicles have to wait through one or more full signal cycles before moving through the intersection. When linked with other signals, progression is slow.
F	> 80	At this level, the number of vehicles entering the intersection exceeds its capacity. Vehicles have to wait through multiple full signal cycles before moving through the intersection.

TABLE 3: LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Level of Service	Avg. Total Delay (seconds/vehicle)	Description
A	≤ 10	At most, one vehicle is waiting to move through the intersection when the driver reaches the stop sign. Most often, the driver pulls up to the stop sign and is immediately free to proceed through the intersection.
B	> 10 and ≤ 15	When the driver reaches the intersection, one or two vehicles are in front of him. Once those vehicles proceed through the intersection, the driver is able to continue without opposition.
C	> 15 and ≤ 25	At this level, several vehicles may be in front of the driver at a two-way stop-controlled intersection. At an all-way stop-controlled intersection, there may be two or more vehicles at each approach that the driver has to wait for before getting his turn.
D	> 25 and ≤ 35	At this level, there are at least four vehicles in front of the driver and several vehicles at the other approaches. Also, for two-way stop-controlled conditions, the volume of traffic on the uncontrolled street may be high.
E	> 35 and ≤ 50	When the driver reaches the intersection, there are between five and eight vehicles in front of him and many vehicles at the other approaches that must also proceed through the intersection before the driver may continue.
F	> 50	At this level, the driver must wait for eight to ten cars at his approach to move through the intersection along with at least five vehicles at the other approaches. This level can also occur at two-way stop-controlled intersections when the uncontrolled street has such a high volume that no gaps are available in the traffic stream for the vehicles at the cross street to continue.

FIGURE 5: EXISTING LEVEL OF SERVICE (LOS)

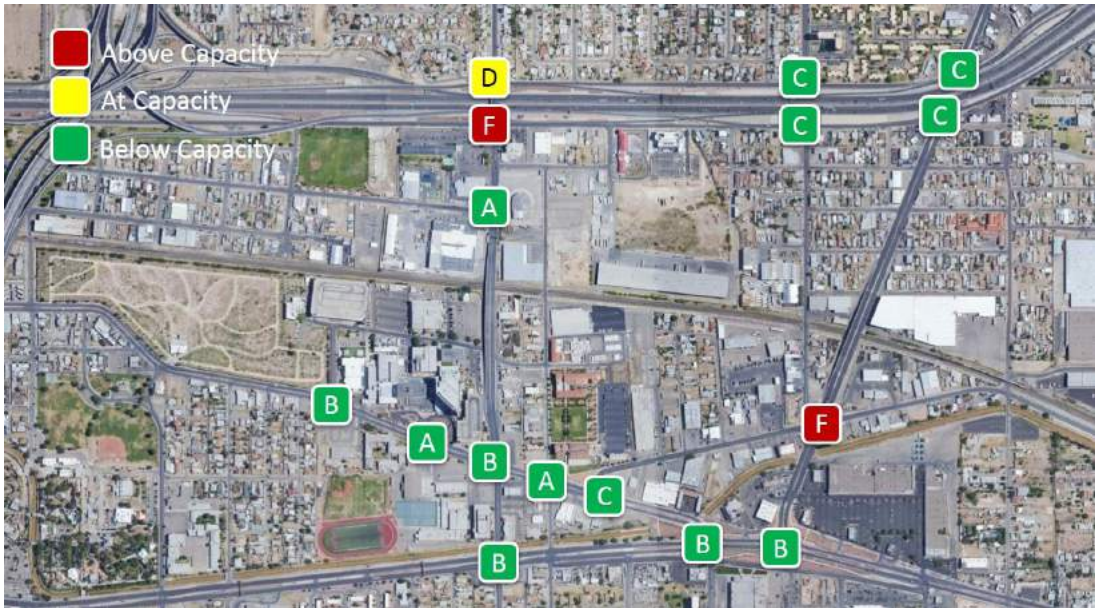
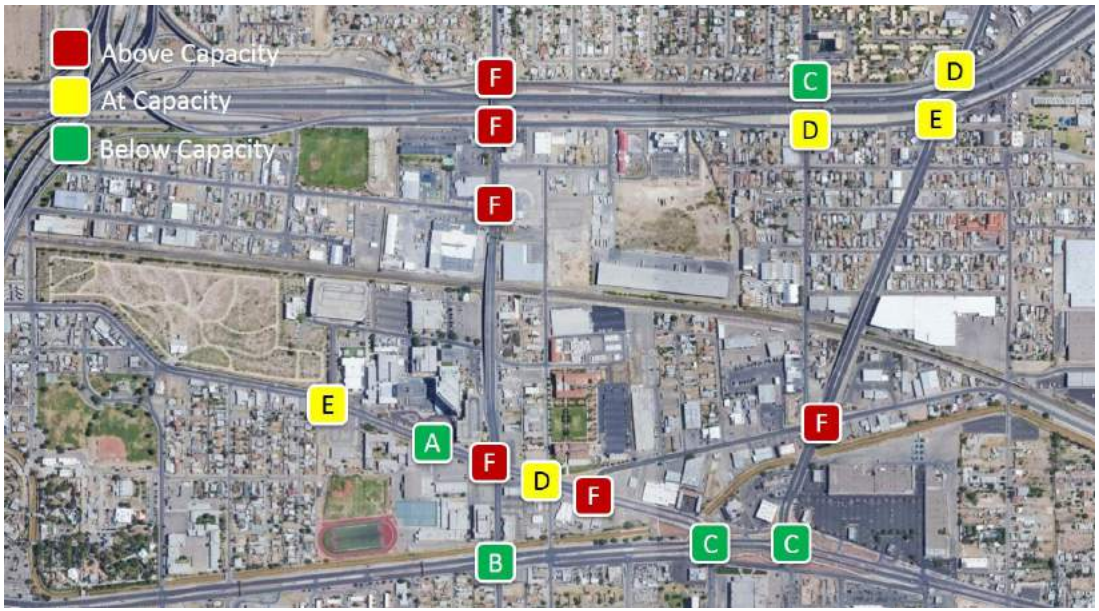


FIGURE 6: FUTURE LOS WITH EXISTING NETWORK

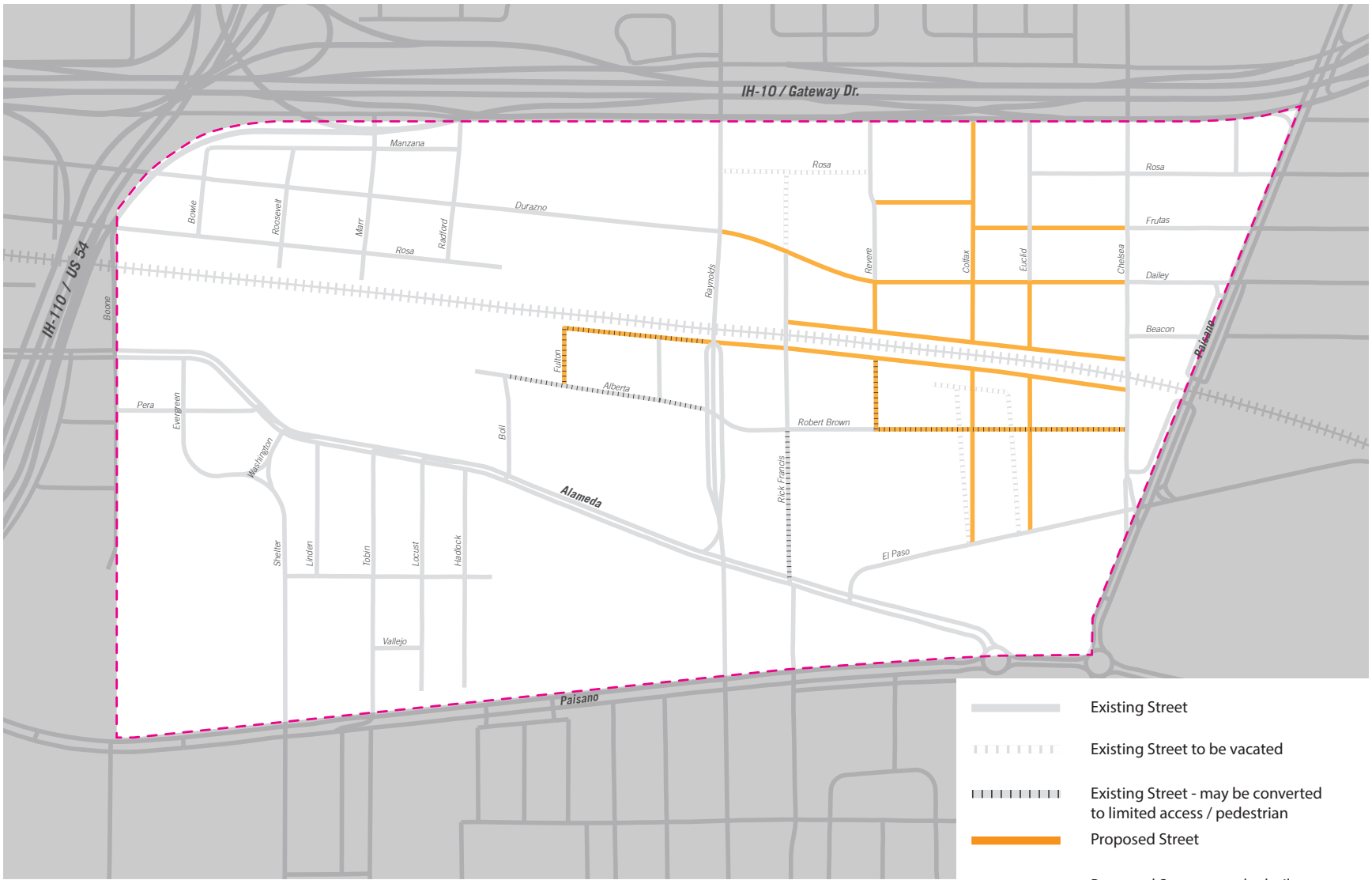


The existing level of service (LOS) operations of the roadway is shown in Figure 5. The level of service taking into account the trips generated in the full-build scenario is shown in Figure 6.

The entrance and exit points to parking facilities and the lack of connectivity between the four quadrants increase the vehicular demand and cause some intersections to operate at-capacity or above capacity with higher delays and adding congestion to the main ingress and egress roadways. The following key intersections were identified in the study area:

- Raynolds Street at Gateway East Blvd (signalized)
- Raynolds Street at Gateway West Blvd (signalized)
- Raynolds Street at Alameda Avenue (signalized)
- Chelsea Street at El Paso Drive/ Paisano Drive (signalized)
- Alameda Avenue at El Paso Drive (signalized)
- Alameda Avenue at Boll Street (signalized)

FIGURE 7: PROPOSED ROADWAYS



As a result of conversations with district stakeholders, a proposed roadway network for the different quadrants is proposed. Existing roadways would need to be extended and new proposed streets would follow smart code regulations to ensure that the different quadrants provide a good grid system making the area more connected and walkable. Parallel parking at these streets will serve as a 'barrier' at the sidewalks. Narrow streets will make incoming traffic reduce their speed and be aware of their surroundings. Figure 7 illustrates the proposed roadway network within the study area.

After including the proposed roadway recommendations, the Level of Service analysis was performed at the study area. Figure 8 illustrates the capacity analysis with the proposed roadway improvements.

It is important to note that only the proposed improvements shown in Figure 8, as well as an assumption of traffic patterns utilizing the roads in an efficient way were considered in the calculations. At the time this report was written, the TXDOT projects were at starting stage and there were no roadways improvements incorporated. It can be assumed that proposed improvements to I-10 would potentially increase capacity at the interchanges.

FIGURE 8: FUTURE LOS WITH PROPOSED ROADWAYS

ROADWAY CONNECTIVITY

The quality of life and economy of a society depend on efficient, comprehensive and coordinated multimodal transport system that provides quick movement of goods and services. Similarly, any proposed land use and building programming among the various institutions in the study area require a good transportation system to provide connectivity between the land uses and its stakeholders. A transportation system involves the flow of people, ideas, materials, goods and services from one location to another, causing the spatial distribution of resources. Initiating road connectivity to reduce traffic problems in the study area would attract minimal cost and reduce man-hours crucial to urban growth and development.

The creation of a walkable, more residential area along the various institutions in the area has been stated as an overarching goal of the master planning efforts. Walkable communities are desirable places to live, work, learn, and play for two reasons. The first is that goods and services that a community resident or employee needs on a regular basis are located within an easy and safe walk. The second reason is that by definition, walkable communities make pedestrian activity possible, thus expanding transportation options and creating a streetscape that better serves a range of users – pedestrians, bicyclists, transit riders, and automobiles. Shared-use paths are a great way to encourage more walking and bicycling. Shared-use paths provide off-road connections that can be used for recreation and commuting. These paths are often found along waterways, abandoned or active railroad and utility rights-of-way, limited access highways, or within parks and open space areas. A path, even if designed primarily as a bike facility, also likely will attract a mix of other users including pedestrians.

In order to achieve connectivity and efficient access, it is recommended that the street configuration within the proposed development follow a grid pattern. This type of connectivity will allow users to have different options to enter/exit the development. The main existing roads that provide access to the study area have been identified as:

- Gateway East/West at Raynolds Street
- Raynolds Street
- Alameda Street
- El Paso Drive
- Paisano Drive
- Chelsea Street

Street grids maximize choice and disperse traffic. Modern road systems minimize choice and concentrate traffic. In an ideal grid system, everyone is within walking distance of one north-south line and one east-west line. So you can get from anywhere to anywhere, with one connection, while following a reasonably direct L-shaped path. A grid system brings many advantages, some of them include:

- Easy navigation
- Flexibility when entering/exiting
- Predictable and regular land lot shapes, easy to build and rebuild
- Easy to add or reduce street length in the existing grid

It's also important to note that urban grids don't have to be rectilinear to be effective, as long as the grid follows a logical and consistent organization, it will provide these same advantages.

Another important element to provide roadway connectivity is signage. Access to the MCA area is currently through the Raynolds exit coming from I-10 East and West There is existing signage that identifies the entrance to the MCA area using Raynolds. In an effort to encourage alternative access to the MCA area, Paisano Dr. is proposed as the I-10 westbound exit route. In accordance with the Texas Manual on Uniform Traffic Control Devices (TMUTCD) several guide signs would need to be included on the existing overhead signs. In addition, within each quadrant wayfinding signs should be clear and have proper indication of building and parking facilities.

NORTHWEST QUADRANT

At this time there are no proposed roads in the northwest quadrant which can become an opportunity for future roadways. The creation of streets should follow a grid system to provide access to and from the frontage road and Durazno Ave. which are currently the only entrance points to this quadrant. In addition, it is important to note that there is no at-grade railroad crossing on the west part of the study area. It is recommended to utilize buildings adjacent to the railroad tracks on both north and southwest quadrants to provide a connection between both areas. Pedestrian bridges between buildings or vehicular connections between parking garages are recommend to provide connectivity.

NORTHEAST QUADRANT

The proposed roadway improvements would allow Durazno Ave. to function as the main street used for east-west circulation in the northern quadrants while Raynolds St., Revere St., Colfax St., and Euclid St. would serve the north-south movements in the quadrant. The extension of Durazno Ave. and the southernmost street up to Chelsea St. would help relieve some of the exiting traffic allowing for vehicles to have an option of accessing I-10 through Chelsea St. and Raynolds St. TXDOT allows for only one lane to enter the Gateway Boulevard which limits the capacity of cars exiting the facility. The proposed roadway would function as a grid system which provides options for entering and exiting traffic.

SOUTHWEST QUADRANT

The proposed roadway in this quadrant would be a ring road just north of Alberta Ave. and adjacent to the railroad tracks. The development of a ring road at both south quadrants would provide east-west connectivity. This loop road would separate vehicular traffic from the main UMC areas.

SOUTHEAST QUADRANT

Similar to the northeast quadrant, the proposed roadways include a north-south extension to Colfax St. and Euclid St. to provide more entrance and exist points for vehicular traffic. The extension of Alberta Ave. would provide a good connection to both southern quadrants as well as a ring road adjacent to the railroad tracks. This loop road would separate vehicular traffic from the main TTUHSC EP and UMC areas. Moreover, in the southeast quadrant, a more pedestrian friendly campus can be achieved by limiting vehicular access on Rick Francis and Robert Brown. This can be achieved by providing the external circulation for vehicles and limiting the vehicular traffic on the internal streets by emphasizing their use as pedestrian corridors.

It is important to note that currently, there are only two at-grade crossings in the study area. They are located on the eastern quadrants on Conception St. and Chelsea St. Both crossings are a key traffic feature in this area and it is important to maintain these crossings, especially Concepcion St. since it provides direct access for current and future development of UMC, MCA and TTUHSC EP. The need for a future crossing should also be considered for both west and east quadrants. This access will provide better circulation within the campus and improve mobility and options for entering and exiting traffic to the MCA site.

The following areas are not addressed at this stage but should be examined in detail as design proceeds: planning pickup/drop-off areas, shuttles, truck docks, loading areas, fire lanes, and setbacks.

CONCLUSIONS AND RECOMMENDATIONS

The expansion of the various institutions as well as the proposed residential and commercial land uses will generate a significant number of trips and will generate conflicts for ingress and egress at the various parking facilities. Without adding additional roadways, it will be very difficult to manage pedestrian and vehicular traffic circulation. For this reason, in order to provide direct access between the different quadrants as identified in this study and to provide circulation within the campus, new roadways should be considered in each quadrant to form a grid system that will help provide traffic flow to and from the site. In addition, the institutions should consider negotiations with the Union Pacific Railroad to include a new north-south roadway connection between the northeast and southeast quadrant. If this cannot be accomplished, it is recommended that parking garage facilities or proposed buildings provide a vehicular and pedestrian bridge over the railroad tracks to provide connectivity between the quadrants.

When determining the most appropriate improvement option, both roadway and intersection improvements were considered. Lane for lane, intersections have lower throughput capacity than the roadways feeding them. This is due to a variety of factors, many of which are related to driver behaviors. Thus the throughput of a corridor is determined by the efficiency of its intersections and not necessarily the number of through lanes along the corridor. Where traffic volumes exceed the capacity of a specific intersection or certain movements at that intersection experience significant delays or excessive queue lengths, a variety of traffic control devices or geometric improvements can be considered to mitigate the performance issue as described below.

- Provide auxiliary lanes. The installation of separate left turn lanes or right turn lanes increase throughput by separating turning traffic from through traffic. However, there must be an equivalent number of receiving lanes to accommodate the planned improvement. In some instances, additional right-of-way is required to implement this strategy, and the subsequent effectiveness would be dependent on the manner of intersection control chosen for the intersection. However, when these intersections are signalized, additional signal timing must be afforded to allow pedestrians to cross the greater width of roadway. Where these widths are significant, the time available for the movement of motor vehicles may have to be reduced and may offset the gains of adding the auxiliary lanes. Auxiliary lanes are recommended at Raynolds St. at the Gateways and Durazno Ave., El Paso Dr. at the extended Colfax St. and Euclid St.

- Use all-way stop control. The limitation of all-way stop control is that all vehicles must stop whether or not other motorists, cyclists or pedestrians are present. Running of stop signs by inattentive or aggressive motorists is a significant safety issue. Instances of motorists demonstrating discourtesy to pedestrians, bicyclists or other motorists who legally have the right-of-way is commonplace. Throughput of vehicular traffic volumes is the lowest of all intersection control options. All-way stop controls are recommended at the intersection of Revere St. at Alberta Ave. in the southeast quadrant.

- Install a traffic signal. Traffic signals do provide a higher level of throughput than all-way stops and can be timed to reflect demands at different times of day or days of week. Running of red lights by inattentive or aggressive motorists is a significant safety issue. Instances of motorists demonstrating discourtesy to pedestrians, bicyclists or other motorists who legally have the right-of-way is commonplace, particularly during right-turn-on-red maneuvers. Vehicular speeds tend to increase in the vicinity of traffic signals; along the roadways adjacent to the intersection higher vehicular speeds occur when through traffic does not have to stop. Given the operational and maintenance resource expenditures associated with a traffic signal and the accompanying liability, the approval of the installation of traffic signals at relatively minor intersections by governing jurisdictions is very limited. Additionally, signal timing and phasing is by practice not optimized for all traffic conditions such as special events or especially heavy flows during inclement weather or the day before a designated holiday. Traffic signals are recommended Durazno Ave. at Raynolds St., Durazno Ave. at Revere St., Durazno Ave. at Colfax St, Durazno Ave. at Euclid St.

- Pedestrian bridges at parking facilities. The Union Pacific Railroad lines are a major stakeholder in the connectivity between the north and southern quadrants of the study area. At-grade crossings would add connectivity but the process may be lengthy and difficult to achieve. However, an alternative would be to design building locations at the edge of the quadrants to allow for a vehicular connection from parking garage to parking garage that may include a pedestrian corridor. This would allow the benefits of connectivity with an easier railroad permission process. This is recommended between the north and southeast quadrant as well as the north and southwest quadrant.

- Signal timing improvements. Traffic signal timing plays a key role in the successful operations of the roadway networks. The City of El Paso and TXDOT should consider monitoring traffic as new development occurs to ensure efficient operations during the different times of day.

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