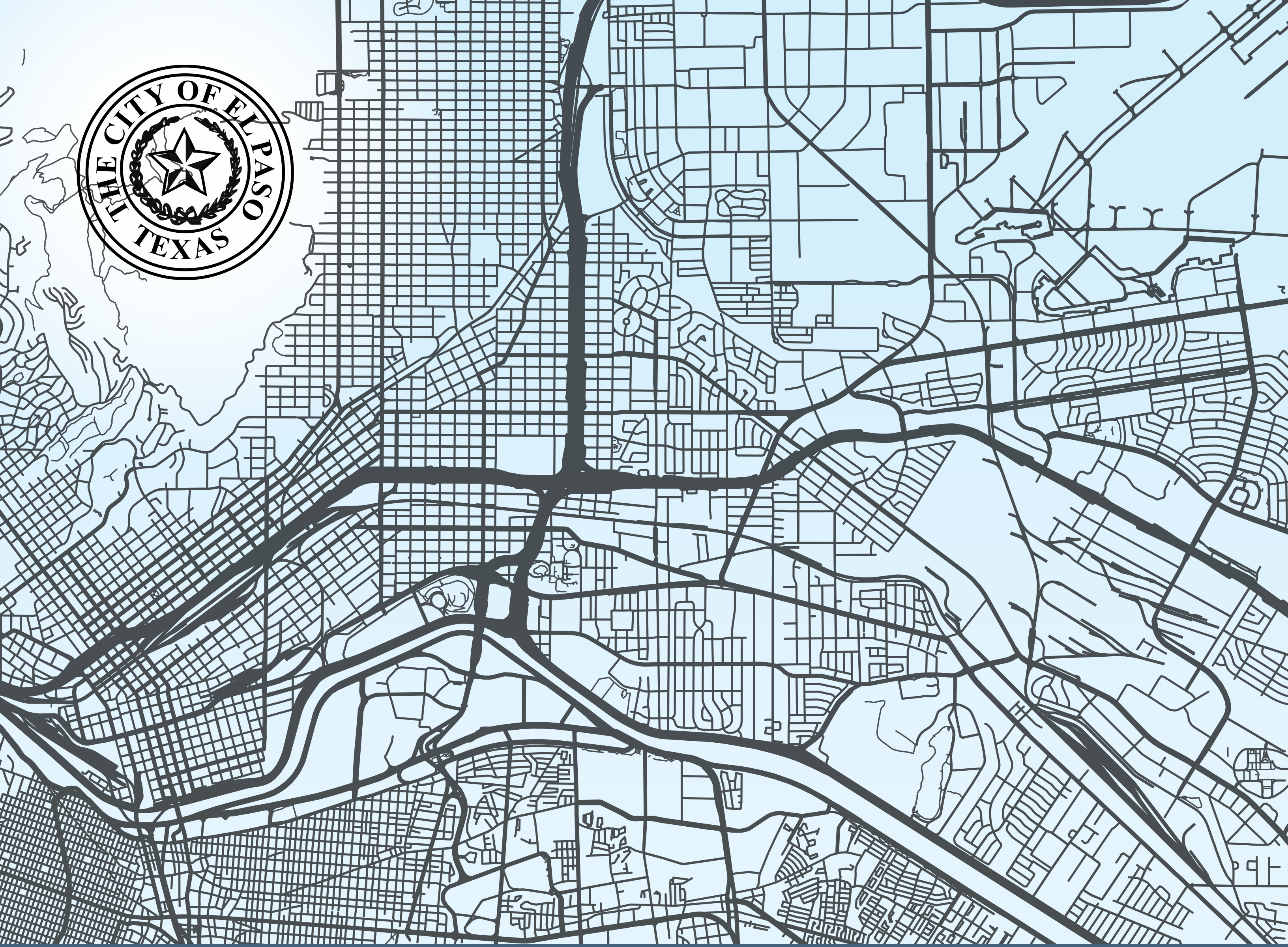

2022

CITY OF EL PASO

Street Design Manual

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Chapter 1

How to Use This Document

1.1 INTRODUCTION

The City of El Paso (COEP) Street Design Manual is structured in twelve chapters aimed at planning and producing context-sensitive, functional and sustainable streets for everyone. It should be noted that the information in this document is not intended to supersede or conflict with the specific standards and requirements from the City of El Paso's subdivision regulations and other development regulations documents, but rather provide all information in a single document so that the same approach used in City- and public agency-led street designs may be combined with the private development process.

A brief overview of the content of each chapter is presented below:

Chapter 1: How to Use this Document
This chapter outlines the step-by-step process for both private and public projects. The process diagrams provide information regarding the goals of each step, and directs the reader to specific sections of this document for more information on each step.

Chapter 2: Design Principles and Community Context
This chapter presents a broad discussion of the purpose of the document and its scope, a brief description of the various existing policy documents used as a reference, and outlines the philosophy of the Complete Streets Approach that forms the base of this document's standards and guidelines.

Chapter 3: The El Paso Street Design Toolbox
This chapter presents the core guiding principles and details for street design, including street design zones, bicycle facility types, and Smart Mobility notes.

Chapter 4: Thoroughfare and Street Standards
This chapter provides revised functional classifications and definitions of streets and thoroughfares, accompanied by design criteria and cross-sections for each type. Chapter 4 is intended to consolidate street standards from various planning and regulatory documents of the City of El Paso (e.g., Plan El Paso, Major Thoroughfare Plan, Title 19).

Chapter 5: Design Exceptions and Modifications
The roadway cross-sections in the preceding chapter are intended as templates only; the heart of context-sensitive street design is the ability to customize execution to fit local conditions. This chapter describes acceptable modifications to the idealized cross-sections based on local context, available right-of-way, street type and other factors.

Chapter 6: Access and Connectivity
This Chapter discusses the guidelines and minimum requirements to be used for access points from the El Paso roadway network into properties adjoining such thoroughfares and streets.

Chapter 7: Street Lighting
This Chapter provides high-level guidance regarding the goals and standards of roadway and thoroughfare lighting, including Dark Sky requirements. It directs the creation of an Illumination Plan, and discusses easements and funding.

Chapters 8-9: Reserved/Interim
This document is intended as a living document, to be updated to reflect evolving local context, and to integrate future additional policy efforts. At this time, Chapters 8 - 9 are reserved for future expansion of the document, and are designated for the following topics:

- Chapter 8: Traffic Calming
- Chapter 9: Design Standards for Construction

Chapters 10: Definitions
This chapter provides explanation of the terminology and acronyms used throughout the document.

1.2 STREET DESIGN PROCESS

This document's approach highlights the need for context-sensitive design strategies to best capture the role of each street within the broader transportation network. However, it also takes into consideration the existing limitations and challenges which arise from space constraints on existing or future streets. For this reason, the manual is designed to allow flexibility, especially when travel modes or street users other than automobiles have a special need or priority.

Designing streets should follow the process outlined in subsections 1.2.1 and 1.2.2. Although the document is intended to be used in redesigns of existing streets as well as designs of new streets, new streets are obviously less constrained (in space as well as in the current community expectations), and will likely involve fewer tradeoffs or compromises described through this Chapter.

1.2.1 DESIGN PROCESS: SITE PLANS AND SUBDIVISIONS

The following procedures shall apply for all site plan and subdivisions of land in accordance with Title 19, Subdivisions and Title 20, Zoning.

1

REVIEW FUNCTIONAL CLASSIFICATION AND CONTEXT

- **See Chapter 2.5**
- Street defined based on relationship of Area Type and Functional Classification
- These are combined to form a composite street type (e.g., compact urban major arterial)

2

REVIEW STREET DESIGN TOOLBOX

- **See Chapter 3**
- Street design elements and dimensions will be dependent on the project's goals/scope, street type, modal priorities and constraints.

3

ESTABLISH ROADWAY NETWORK

- **See Chapter 6.1**
- Set number of neighborhood access points
- Determine spacing of arterials, collectors, locals
- Determine length of blocks
- Identify bicycle and pedestrian infrastructure

APPLY THOROUGHFARE AND STREET STANDARDS

- **See Chapter 4**
- Input from previous steps used to create possible cross sections for the identified street
- A standard detail may be used or altered to meet specific conditions

4

REQUEST DESIGN EXCEPTIONS AND/OR MODIFICATIONS AS NEEDED

- **See Chapter 5**
- Exceptions and modifications based on neighborhood context, available right-of-way and trade-off analysis

5

FINALIZE CONSTRUCTION DESIGN DETAILS

- **See Chapter 10 - Design Standards for Construction (DSC)**
- Provide roadway classification on preliminary plat, final plat and subdivision improvement plans for each roadway

6

1.2.2 DESIGN PROCESS: PUBLIC PROJECTS

The following procedures apply for all projects undertaken by the City for the improvement of existing streets and the construction of new streets.

1

ESTABLISH INITIAL PROJECT GOALS / REFERENCING ADOPTED PLANS

- **See Chapter 2.3**
- Align with Plan El Paso-designated Area Type, COEP Major Thoroughfare Plan (MTP), and COEP approved plans and policies (also see sections 2.3, 2.4)
- Define scope for project; consider street as well as existing and future adjacent land uses

2

CREATE ENGAGEMENT PLAN

- Stakeholder & public participation throughout project. User COEP departments must be included as stakeholders. State/regional stakeholders must also be included (e.g., Municipal Planning Organization, Texas Department of Transportation, El Paso County).
- Engagement Plan outlines activities that will be used for each step in the Design Process and project

3

REFINE PROJECT GOALS AND SCOPE

- Goals refined from initial goals from Step 1
- Public and stakeholder input used to refine goals and scope of the project, incorporating local knowledge

4

IDENTIFY FUNCTIONAL CLASSIFICATION AND CONTEXT

- **See Chapter 2.5**
- Street defined based on relationship of Area Type and Functional Classification
- These are combined to form a composite street type (e.g., compact urban major arterial)

5

IDENTIFY MODAL PRIORITIES

- Modal priorities (e.g., walking, cycling, transit, driving, and delivering goods/services are identified; generally walking and cycling should be prioritized based on Plan El Paso goals
- Where required, emergency access must be accommodated regardless of the modal priorities of a corridor

6

EVALUATE DESIGN OPTIONS

- **See Chapter 3**
- Street design elements and dimensions will be dependent on the project's goals/scope, street type, modal priorities

7

MAKE TRADE-OFFS

- **See Chapter 4**
- Prioritize competing demands for street space with limited right-of-way
- City Manager or designee will approve trade-offs
- Considerations include modal priority, network considerations and evaluation of street design elements as compared to goals and values established in previous steps

8

CONFIRM RECOMMENDED DESIGN

- Modal priorities (e.g., walking, cycling, transit, driving, and delivering goods/services are identified; generally walking and cycling should be prioritized based on Plan El Paso goals
- Where required, emergency access must be accommodated regardless of the modal priorities of a corridor

9

FINALIZE CONSTRUCTION DESIGN DETAILS

- **See El Paso Design Standards for Construction (DSC)**

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2

Design Principles and Community Context

Chapter 2

Design Principles and Community Context

2.1 WHY FOCUS ON STREET DESIGN?

Public streets are the most prevalent public space in our cities. They should also be the most equitable, right? Citizens pay taxes toward the construction, maintenance and improvement of public streets, but historically, streets have been designed almost exclusively for motor vehicles. This imbalance in favor of automobiles has created inequities for other user groups; fortunately, street design is evolving to provide more attention to the usage, interests, and safety of other modes, like walking and cycling. It is also becoming more flexible and context sensitive. City streets are high cost infrastructure investments. They should be designed and built to accommodate all users equitably while also considering existing and future land use and community context. The City of El Paso is setting the stage to be a leader in treating streets as high-quality public spaces, not just a way to get from here to there.

2.2 PURPOSE OF THE DOCUMENT

The El Paso Street Design Manual is a specialized document aimed at providing appropriate requirements and guiding standards on the planning, design and construction of safe, adequate and sustainable streets and thoroughfares for every user. This Street Design Manual consolidates the various design standards from Titles 19, 20 and 21 as well as the Design Standards for Construction Manual (DSC). It constitutes a single point of reference through which the City unites best practices in design guidance and technical knowledge with the purpose of creating efficient streets that can also be great public spaces for the City. It is intended to encourage a broader and context-based approach to street design that seeks to include the different users' needs with a focus on safety, comfort, efficiency, and sustainability. The Street Design Manual presents the different design components, minimum standards and guidance necessary to prepare construction documents for the City of El Paso, which also include the prior classifications of streets and their zones presented in the proposed Major Thoroughfare Plan Update (MTP) of 2019.

This manual also presents the Geometric Design Standards to be applied to the various street types, which includes design criteria for pavement structures. Geometric Design Standards are set in place to ensure the construction of safe, comfortable and efficient streets and thoroughfares that provide appropriate conditions for the transit of all of its users (pedestrian, motor vehicle, and bicycle traffic). By incorporating context-specific design, these standards enhance the public realm and allow for flexibility in case of future changes. The need for retrofitting existing streets is also addressed.

The El Paso Street Design Manual is created as a living document acknowledging that future changes in best practices and their specific applications need to allow for regular updates.

2.3 LOCAL PLANS/DOCUMENTS

The policy documents used and referenced for the creation of the El Paso Street Design Manual are listed below:

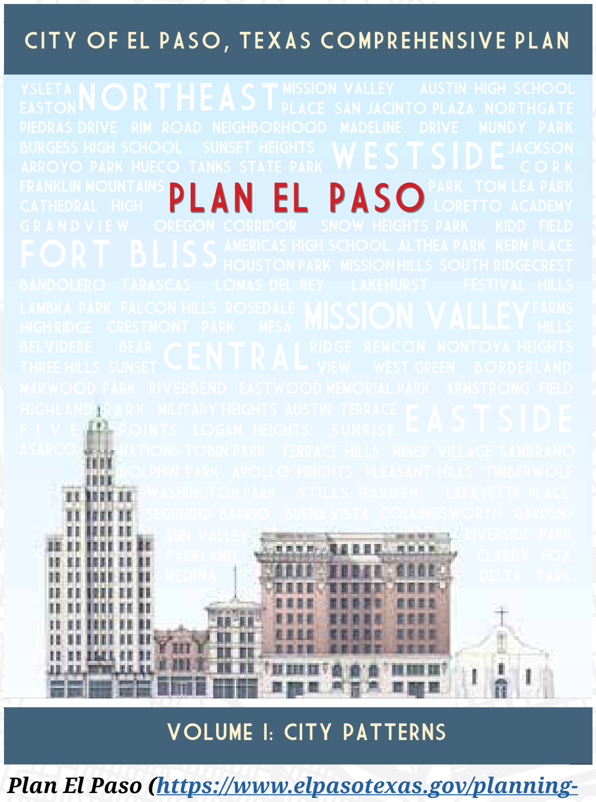
2.3.1 PLAN EL PASO & MAJOR THOROUGHFARE PLAN 2013

The 1999 Plan for El Paso included a thoroughfare plan in its Map Atlas, labeled as "Proposed Thoroughfare System." The map was modified 30 times between 1999 and 2012 through comprehensive plan amendments. The current version has been maintained as a computer-based map on the City's Geographic Information System (GIS). The then-current MTP map was readopted into Plan El Paso in March 2012. This draft update was effective on an interim basis until the Thoroughfare Plan was finalized and adopted in 2013.

This draft plan introduced a context-sensitive approach to street design decision-making—setting thoroughfare street designs according to a set of land use area types (compact urban, drivable suburban, and rural). It recognized the different needs of particular streets as they travel through various contexts of the city—especially related to sidewalks and the use of streetside space behind curbs.

2.3.2 EL PASO EASTSIDE MASTER PLAN & EL PASO THOROUGHFARE PLAN 2019 UPDATE

The Eastside Master Plan identifies existing deficiencies in City services and infrastructure in this fast growing desert city. The Eastside Growth Management Plan addresses the absence of sufficient public amenities in the areas of parks, libraries, public safety services, senior centers, recreation centers and pools. Overall connectivity between neighborhoods and services through multi-modal pathways is addressed in the companion thoroughfare plan recommendations. The 2019 Major Thoroughfare Plan Update keeps the original system of combining land use context with street design parameters, but it harmonizes a series of different classification types into a single system.



Plan El Paso (https://www.elpasotexas.gov/planning-and-inspections/plan-el-paso/)

2.3.3 EL PASO BICYCLE PLAN 2016

The bike plan adopted in 2016 gave the City of El Paso a road map to create a comprehensive network of cycling infrastructure over a ten year horizon. Preferred routes were identified as part of an interconnected network. The plan also includes construction guidance for new facility types such as bicycle boulevards, bike lanes, buffered bike lanes, and one-way or two-way cycle tracks. At the time of adoption, the city had approximately 140 miles of bike facilities with an additional 900-1,100 miles planned for the future.

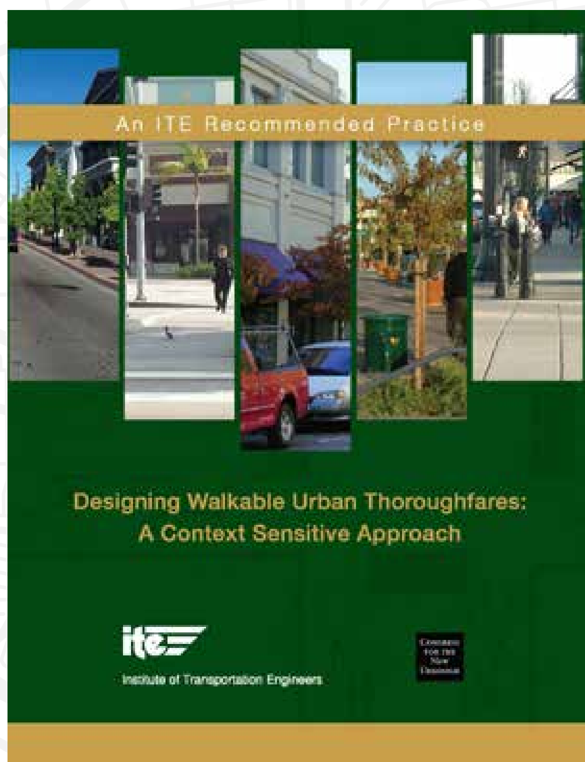
City of El Paso Bike Plan

2.3.4 CNU/ITE MANUAL: DESIGNING WALKABLE URBAN THOROUGHFARES 2017

The City of El Paso officially adopted the CNU/ITE guidebook as part of its Complete Streets policy. The manual illustrates the creation of walkable mixed use streets by utilizing best practices in both design and implementation.

2.3.5 NACTO URBAN STREET DESIGN GUIDE AND BIKEWAY DESIGN GUIDE

The City of El Paso officially passed a resolution in 2014 adopting several guides published by the National Association of City Transportation Officials (NACTO) including the "Urban Street Design Guide," the "Transit Street Design Guide," the "Urban Street Stormwater Guide" and the "Urban Bikeway Design Guide" as the official design guidelines for capital improvement projects and other city funded street and roadway improvement projects within the City of El Paso.



ITE/CNU Designing Walkable Urban Thoroughfares

2.3.6 FEDERAL, STATE AND NATIONAL PUBLICATIONS

This document is also informed by the following publications on best practices:

- MUTCD (Manual on Traffic Control Devices for Streets & Highways)
- TXMUTCD (Texas Manual on Uniform Traffic Control Devices)
- FHWA (U.S. Dept. of Transportation)
- AASHTO (American Association of State Highway and Transportation Officials)
- NCHRP (National Cooperative Highway Research Program)

2.4 THE COMPLETE STREETS APPROACH

Streets in the City of El Paso have traditionally been designed following the principles of roadway functional classification, a concept developed to guide street and road design around primary functions of roads in a larger system. This was developed as a way of standardizing the expansion of America's highway network during a time of rapid growth in automobile use, and has generally worked well to serve vehicular movement. However, when the needs of other modes of travel are considered--especially in the limited space of cities and towns--it quickly becomes apparent that a more nuanced approach is needed.

In March, 2012, the City adopted a document called "Complete Streets Policy Plan El Paso" with the specific goal of "becoming the least car-dependent city in the Southwest through meaningful travel options and land-use patterns that support walkability, livability, and sustainability." Several challenges arise when designing a street as a multi-modal facility including competing demands and limited space. This manual seeks to address these challenges by presenting a context-sensitive design philosophy that steers away from vehicle-focused roadway standards and provides a new direction for the planning, design, and construction of quality streets for all users.

This street design guidance in this document is intended to modernize the City's transportation system over time to balance safety, comfort, and efficient movement for all users. To achieve this, certain trade-offs and evaluations will need to be made, depending on context and priorities. Some streets prioritize certain modes over others, based on their primary use, function, and surrounding land uses. A more detailed explanation of how to assess these prioritizations is presented in Table 4.1 (Design Guidance Criteria for Typical Sections: by Functional Classification and Area Type) presented in Chapter 3 El Paso Street Design Toolbox, of this manual.

2.5 FUNCTIONAL CLASSIFICATION AND COMMUNITY CONTEXT

Conventional transportation engineering has broadly adopted the Federal Highway Administration's functional classification system defining the role of a roadway within the broader transportation network. Over time, this system has become closely tied to design standards and policies, used by many state and even local transportation agencies, that emphasize elements such as design speeds, lane widths, and the spacing of intersections and access points to adjoining land. However, on its own the Functional Classification system does not consider community context, adjacent land uses, or--notably-- the needs of non-motoring users of a road.

In this case, El Paso's current transportation network (implemented post-World War II) utilizes a three-type thoroughfare classification, as defined in A Policy on the

Table 2.1 - Comparison of Functional Classifications and Application of Area Types

	2020 Street Design Manual	TXDOT Roadway Inventory	Capital Improvement Plan	El Paso Smart Code	2013 Thoroughfare Plan Update
	Expressway	Interstate	No Equivalent Classification	Highway	Expressway
		Other Freeway & Expressway			
Plan El Paso Area Types Compact Urban | Drivable Suburban Rural| Open Space	**Major Arterial**	Other Principal Arterial	Major Arterial	No Equivalent Classification	Principal Arterial
	Minor Arterial	Minor Arterial	Minor Arterial	Boulevard	Minor Arterial
	Collector	Major Collector	Non-Residential Collector	Avenue	Collector
		Minor Collector	Multi-Family and Commercial/ Industrial Collector		
			Residential Collector		
	Local	Local	No Equivalent Classification	Road	Local
				Street	
				Drive	
				Commercial Street	

Geometric Design of Highways and Streets (“Green Book” by AASHTO, 2011): (a) Arterial Streets; (b) Collector Streets; and (c) Local Streets. These three main distinct categories classify thoroughfares and streets based on movement/direction, distribution/collection, and access. Given the adoption of Plan El Paso, which orients the city toward a more walkable, bikable and transit focused evolution, the use of the CNU-ITE design manual and NACTO design guides to provide flexibility in street design are appropriate.

However, more recent practices in street and thoroughfare design have embraced a more holistic approach that emphasizes support for other modes of transportation. Further, considerations toward scale, traffic volume, service areas, and creating important and strategically located access points from certain types of roadways have proven to be beneficial for the majority of users and the surrounding communities they serve. As Plan El Paso defined a community vision for a high-quality built environment and a balanced transportation system, the conventional functional classification system is not adequate as a de facto design policy to address the more complex and nuanced transportation needs for El Paso’s streets and roads.

In response, the El Paso Street Design Manual presents a revised version of the Functional Classification System that brings together the objectives of Plan El Paso with a context-sensitive approach towards Street and Thoroughfare Design. This manual offers a measured balance between the Functional Classification System requirements with considerations for context-appropriate street type. Section 3.1 expands on the design and planning guidelines that reflect such a balance.

Based on this approach, the manual presents a more detailed breakdown of the broader three-type thoroughfare classifications typically considered within the Functional Classification System, based on previous uses and applications presented in the MTP. A more detailed description of each of the Street Types used in this manual is offered in the sub-sections that follow.

2.5.1 MAJOR ARTERIALS

Major Arterials facilitate trips between one point of the city to another by linking lower classification streets to Freeways. Designed for long trips, high traffic volumes and speeds, they are located in areas where major centers of activity attract greater numbers of traffic connections. They should carry a high percentage of travel while efficiently making use of space needed for total system mileage.

Major Arterials are laid out to create a network of interconnected roadways that, through the use of strategies such as Geometric Design and traffic control measures, enhance efficient movement of motorists. Further, this street type addresses safety considerations by setting access restrictions to adjoining properties while protecting the through traffic carrying capacity of a roadway.

2.5.2 MINOR ARTERIALS

Supplementing a Major Arterials network, Minor Arterials interconnect to serve the flow of traffic within a smaller geographic area of influence and to provide continuous paths to intermediate destinations. Trips made on Minor Arterials tend to be moderate in length although still carrying significant through traffic, and sometimes, act as alternate routes. Because of their characteristics, Minor Arterials are in the position to effectively ensure greater land access to adjoining properties. Ultimately, this street type represents a key element to adequately provide route and spacing continuity within the Major Arterials Network.

2.5.3 COLLECTOR STREETS

Providing continuous paths to arterial roadway networks, Collector Streets allow for connections between local neighborhood streets and the Major and Minor Arterials System needed to allow users to reach their ultimate destinations. They are intended to collect traffic from local streets and channel it into the wider arterial system of the city, while allowing for greater land access due to their medium traffic volumes and speeds. Collector Streets are critical to the effective operation of their communities and provide unique access quality to the wider circulation needs of the transportation roadways network.

2.5.4 LOCAL STREETS

Supporting access to all destinations not on the Arterials/Collector network, Local Streets traditionally manage neighborhood-level transportation needs. They serve a smaller scale of traffic volumes and constitute the lowest level of mobility within the system. The main role of Local Streets is to allow for direct access to adjoining land and properties, possible through the increased safety aspect of establishing lower speeds, while also linking its traffic to Arterial and Collector roadways.

This Street Design Manual continues to expand on these categories in Sections 4.2-4.8 providing illustrated and detailed cross section information for each street type. Although many roads do not fully match the descriptions and definitions presented here, a road should be categorized according to the type that it most closely matches. Additionally, this approach is aimed at offering future design flexibility as the variety of physical and social conditions in a city environment continue to change and evolve.

While the conventional functional classification system and its balance of regional and local mobility is still a fundamental foundation for this Street Design Manual's street types, the Manual outlines additional considerations to reflect the variety of physical and social contexts that each type will traverse.

2.5.5 PLAN EL PASO: COMPACT URBAN

Plan El Paso designates the Compact Urban area type as a place where multi-modal transportation and street network design become a priority. In this case, character and function are emphasized over traffic capacity, and the main focus becomes to get "people moving" through the provision of smaller blocks and pedestrian-scale amenities. Compact Urban represents an area type that had been previously part of the Drivable Suburban designation.

In the Compact Urban area type, there is an established grid of streets, and because motor-vehicle users have choices, guidelines are not needed to restrict access to adjoining land along certain arterial roadways to maintain an efficient traffic flow. Plan El Paso has designated three main neighborhood types as Compact Urban, based on the layout of the Future Land Use Map (See page 1.30 of Plan El Paso):

A. **Existing Walkable Neighborhoods**. These types of existing neighborhoods tend to allow for a greater number and quality of pedestrian-oriented facilities, typically arising from El Paso's original development pattern laid out in eras when walking and/or taking transit were the norm. Because of their physical characteristics, these areas are well-suited for continued evolution through a mix of land uses and transportation options. As laid out in the Future Land Use Map, these types of neighborhoods have been designated as G-1 "Downtown" and G-2 "Traditional Neighborhood".

B. **Planned Walkable Communities.** These types of areas correspond to large tracts of developable land owned by the City of El Paso that are being master planned for potential urban expansion using Smart Growth principles. Planned Walkable Communities are envisioned to be served with pedestrian-oriented streets that allow for safe and comfortable walking paths/sidewalks. As presented in the Future Land Use Map, land for Planned Walkable Communities corresponds to areas designated as O-7 "Urban Expansion", with one tract adjoining the El Paso International Airport, and two others located on opposite sides of the Franklin Mountains.

C. **Future Redevelopment and Infill Neighborhoods.** These areas correspond to land near Rapid Transit System (RTS) stops and Sun Metro transfer stations with a strong potential for infill development and redevelopment (See page 4.34 of Plan El Paso).

2.5.6 PLAN EL PASO: DRIVABLE SUBURBAN

Characterized by maintaining a predominately motor-vehicle oriented development pattern, Drivable Suburban areas in El Paso represent an often-continuous network of arterials along with a fewer numbers of collectors. In these areas, the network provides alternate travel paths for motor vehicles to alleviate some of the traffic congestion that occurs during peak hours. Physical features of thoroughfares in Drivable Suburban areas include sidewalks and, when feasible, separated, protected or buffered bike lanes.

2.5.7 PLAN EL PASO: RURAL AND OPEN SPACE

As defined in the Federal-Aid Highway Law, Rural Areas comprise everything outside the boundaries of Urban Areas (designated as such by the Census Bureau). These two classifications of areas (Urban and Rural) present fundamentally different characteristics, however Federal Guidelines allow for the adjustment of this boundary for transportation purposes.

Although the Urban/Rural distinction is a key component of thoroughfare design, designations based on the Census Bureau remain quite broad and group vastly diverse types of land development that do not differentiate among the physical contexts of those areas. To improve on the conventional Urban/Rural distinction, Plan El Paso bases its designations on desired conditions projected for the future. These enhancements include:

- The Rural Area boundary is based on Plan El Paso's Future Land Use Map, instead of the U.S. Census.
- Urban Areas are subdivided as described earlier.
- The Open Space Area represents a newly conceived type to group lands that will not be developed.

2.5.8 CONFORMING TO THE MAJOR THOROUGHFARE PLAN

The City's adopted thoroughfare plan shall be used to determine the minimum type of roadway, the general location of the roadway, and the areas that the roadway is intended to connect to as part of the platting process. For streets that are not shown on the city's thoroughfare plan, such as local residential streets, the arrangement of such streets within a subdivision shall:

A. Conform to any plan for the neighborhood approved or adopted by the city to meet a particular situation where topographical or other conditions make continuance or conformity to existing streets impractical;

B. Provide for future access, such as by stubbing streets for future extension, to adjacent vacant or commercial areas which will likely not have incompatible land uses; and

C. Not conflict in any way with existing or proposed driveway openings (including those on the other side of an existing or planned median-divided arterial, in which case new streets shall align with such driveway openings such that median openings can be shared).

2.5.9 CONFORMANCE WITH THE COMPREHENSIVE PLAN

Streets, contexts and the layout of streets shall be consistent with the adopted comprehensive plan and its relevant contexts, and specifically the current Major Thoroughfare Plan.

2.5.10 TXDOT ROADWAYS

Roadways owned by TXDOT shall be subject to TXDOT standards and regulations.

The El Paso Street Design Toolbox

3

Chapter 3

The El Paso Street Design Toolbox

3.1 THE DESIGN TOOLBOX KIT OF PARTS

This section pertains to the design of new streets and/or the re-design of existing streets. It summarizes essential characteristics of the updated roadway classification system, establishing basic principles based on the street cross-sections previously presented in the Major Thoroughfare Plan (MTP). Guidance is generally defined 'from centerline to edge' with regard to a typical cross-section layout. Specific design criteria are presented in detail in Tables 3.1 and 4.1, and rely on the following basic principles (which should be understood as minimum standards when defined as such):

A. **Lane Widths**. May range from 9 to 18 feet depending on their intended use, per the DSC. However, where certain conditions call for lanes to accommodate high-capacity transit, wider dimensions need to be considered. Therefore, cross-sections presented will typically propose 10-foot widths for inner lanes, and 11-foot widths for outer lanes, parking adjacent, or rural area lanes. Also see, NACTO guidance.

Context sensitive lane widths that discourage speeding

Arterial sidewalks suitable for multiple uses

Planting strips that provide separation from moving cars and encourage shade tree vitality

B. **Bicycle Facilities**. Refer to the El Paso Bike Plan and NACTO standards for proposed bicycle network and facilities. A 3-foot wide buffer from the travelway is recommended for buffered bike lanes or cycle tracks.

C. **Planting Zone**. A minimum of 5 feet width shall be used for Planting Zones, including planter parkways, strips, or tree wells.

D. **Arterial Pedestrian Zone**. A minimum of 12-foot widths should be used for the Pedestrian Zone along Arterial roadways to allow for space that may need to be re-purposed or substituted for other uses, such as sidepaths.

E. **Collector Sidewalks**. A minimum of 6-foot widths for sidewalks along Collector roadways will be used.

3.2 STREET DESIGN ZONES

Street Zones represent an important aspect of Street Design that regulate and outline the distinct uses contained within the right-of-way. In El Paso, although not all streets will contain all zones, they are still one of the most extensively used civic spaces in the community. For this, the broader purpose of this section is to provide the appropriate and context-sensitive design criteria to be used in Street and Thoroughfare creation.

The Street Zones illustrated and defined below include guidelines to design portions of the street containing components such as vehicle travel lanes and sectors allocated to other uses such as pedestrian areas or the placement of public utilities*.

* Utilities may be found in all street zones and are subject to local utility requirements, per City of El Paso Code and technical criteria manuals. For mobility purposes, utility location is preferred in the pedestrian zone.

Typically, a street is comprised of six different zones, each one with specific functions and unique design considerations that also interact in several ways. Also see, NACTO guidelines.

3.2.1 FRONTAGE ZONE

The Frontage Zone comprises the frontage area immediately adjacent to the building face, wall, or fence that marks the property line. Elements such as stoops, bay windows, planters, water fountains, or ground level commercial amenities could be used in the Frontage Zone to enhance the street environment provided that pedestrian and Americans with Disabilities Act (ADA) accessibility are maintained.

3.2.2 PEDESTRIAN THROUGH ZONE

The Pedestrian Through Zone comprises the portion of the street that primarily accommodates pedestrian access. Uses generally include walking, business, and social activities, and they could extend from the face of the building or property edge to the face of the curb. The portion of the Pedestrian Through Zone specifically reserved for pedestrian travel is the Sidewalk Clear Zone.

Sidewalk design considerations need to meet the ADA Accessibility Guidelines (ADAAG). To accomplish this, sidewalks should be well-lit, free of any physical obstructions for pedestrian movement, and should use consistent materials from block to block along the street. Other considerations critical for accessibility and safety include surface design, dimensions, and slopes.

STREET DESIGN ZONES

Frontage Zone	Pedestrian Through Zone	Street Furniture/ Buffer Zone	Curbside Zone	Travelway Zone	Median Zone
Typical Uses					
Cafe seating, temporary signage, plazas, landscaping, benches, building lighting, stoops, awnings	Pedestrian access, ADA access	Trees, Lighting, Wayfinding, Signage, Waste & Recycling, Bike racks, Vending, Seating, Landscape, Transit stops, Stormwater mgmt.	On-street parking, Transit Stops, Active Mobility Facilities, Loading Zones, Curb Extensions, Stormwater Management, Flexible Uses (e.g. parklets), Mobile Food Vending	General Purpose Travel Lanes, Active Mobility Lanes, Transit Lanes, Shared Lanes	Trees, Landscaping, Stormwater Management, Signage, Lighting, Parking, Public Art, Refuge Islands

Figure 3.1: Street design zones

Throughout this document, the minimum Sidewalk Clear Zone is established at 5 ft wide in all areas and 6 ft wide when within ½ mile of a transit facility. The placement of utility poles, signal boxes, street furniture, and vegetation should not encroach into the Sidewalk Clear Zone.

3.2.3 STREET FURNISHINGS/BUFFER ZONE

The Street Furnishings/Buffer Zone comprises the area between the curb and the Pedestrian Through Zone, placed there to provide physical distance and protection from moving vehicle traffic. It provides space for the placement and organization of street lights, street trees and landscaping, transit stops (to include bus stops/shelters), street furniture, bicycle racks, newspaper boxes, signage, parking meters, as well as above and below ground utilities.

As the point of transfer between pedestrians and the various transportation vehicles (transit, bicycle and private automobiles), the Street Furnishings/Buffer Zone provides the area needed to create space between the curb and the various vertical elements on the streets. When adjacent curbside parking is present, this area allows for proper clearance to allow car doors to open and motor vehicle drivers to access the sidewalk. It also includes space for driveway aprons to ramp down from the sidewalk grade to the street, needed to maintain a level sidewalk.

In the case of Stormwater Management considerations, features such as rain gardens or bioswales could be placed here to collect rainwater and reduce impervious surface area.

3.2.4 CURBSIDE ZONE

Accessory elements included in public curbsides reflect the wide variety of uses possible for the city's streets. Some examples include curb extensions, sidewalk extensions, waste and recycling removal, bicycle parking, temporary installations, storm drains, and/or parklets with public seating. The placement and organization of these elements need to pay careful attention to paths of movement and required sight lines.

The flexible use of the Curbside Zone serves to enhance the overall pedestrian experience and vibrancy of the street while maintaining safety and making efficient, equitable use of streets. Elements like curb bump-outs and curb extensions, serve to calm traffic and enhance pedestrian safety by visually and physically narrowing the street, extending the sidewalk, reducing pedestrian crossing distance, and increasing pedestrian visibility.

The Curbside Zone also accommodates parking areas adjacent to the curb where it is permissible within the public right-of-way for drivers to leave their vehicles. Parking areas designated as on-street parking serve multiple functions such as increasing street activity, meeting the parking needs of adjacent land uses, protecting pedestrians from moving traffic, and making pedestrian crossing safer through traffic calming.

On-street parking in the Curbside Zone may be parallel, perpendicular, angled, or back-in diagonal; and when appropriate, is beneficial to most street types and contexts. Additionally, it can be designated or managed to provide curbside access for persons with disabilities, in which case it should be located near major destinations such as commercial areas and civic buildings.

Parking in the Curbside Zone can also provide some congestion relief in high traffic areas, by converting to a travel lane during peak hours. This is achieved through management by allowing parking throughout the day, except during peak morning and evening hours. Alternative uses allowed in the Curbside Zone, such as bike corrals, can encourage other modes of mobility while reducing vehicle emissions and fuel consumption. Parking in the Curbside Zone is notably not an essential component of all streets, as it may not be appropriate or necessary in certain contexts.

3.2.5 TRAVELWAY ZONE

The Travelway Zone is the portion of the street reserved for vehicular travel of all varieties, including transit, bicycle and other motorized vehicles. Consideration of speed and width are important when designing Travelways in various contexts.

For example, increased lane widths can encourage higher travel speeds, which may not be appropriate in pedestrian-oriented and compact contexts. Lower speeds are favorable for accommodating curbside parking maneuvers and responding to restricted sight distances encountered in compact urban places. Travelways should not be used for loading or parking. Typically, the acceptable lane width on Travelways varies depending on the street type, the context and the average daily traffic.

3.2.6 MEDIAN ZONE

Medians are a preferred means of access management, with space to allow turn lanes. They provide opportunities for stormwater management, green infrastructure, public art and landscaping. Medians can also accommodate pedestrian refuge islands to enhance pedestrian crossing safety. Occasionally, in pedestrian-oriented contexts and on streets with low travel speeds, medians can also provide curbside parking and seating areas. They can be depressed as a drainage swale to accommodate drainage and stormwater management.

3.3 DESIGN CRITERIA FOR THOROUGHFARE ZONES

Tables 3.1 and 3.2 on the following pages identify design criteria for Major and Minor Arterials, Collectors, Locals, and Alleys. Adjustments to number of lanes will be made based on a Traffic Impact Assessment (TIA).

Table 3.1 Additional Design Criteria for Thoroughfare Corridors

	Major Arterial	Minor Arterial
TYPICAL THOROUGHFARE CHARACTERISTICS		
Network Function	Straight paths to distant destinations; connects to freeways	Continuous paths to intermediate destinations; alternate routes for longer trips
Direct Route	Yes	Yes, but may include minor deflections
Network Spacing Guidance	Should be spaced generally 1 mile apart outside of Compact Urban areas, where historical growth patterns may mean these are closer together.	Midway between principal arterials, although exact spacing (such as directly at the midpoint) may be determined by particular network characteristics
Driveway and Access Spacing	Curb cuts should be discouraged by land development regulations, no more than one driveway per 660 feet in urban conditions and 1320 feet in suburban and rural conditions	Curb cuts should be replaced by cross-parcel access requirements in land development regulations; no more than one driveway per 500 feet or one per block face, whichever is less
DESIGN CRITERIA FOR NEW & RECONFIGURED THOROUGHFARES		
Number of Travel Lanes and Base ROW Width		
Compact Urban	4 lanes under 35,000 ADT[3]; 6 lanes over 35,000 ADT[3] Base 110 ft ROW; constraints may reduce this	4 lanes under 35,000 ADT[3]; 6 lanes over 35,000 ADT[3] Base 92 ft ROW; constraints may reduce this
Drivable Suburban	4 lanes / 92 ft ROW under 30,000 ADT[3] 6 lanes / 112 ft ROW at or over 30,000 ADT[3]	2 lanes / 70 ft ROW under 18,000 ADT[3] 4 lanes / 90 ft ROW at or over 18,000 ADT[3]
Rural	4 lanes / 108 ft ROW at or over 15,000 ADT[3]	2 lanes / 80 ft ROW
Bicycle Facilities [1] (preferred design to be used on El Paso Bike Plan-designated thoroughfares)		
Compact Urban	Refer to El Paso Bike Plan "Recommended Bikeway Network" for preferred facility type	
Drivable Suburban		
Rural		
Mid-Block Crossings [4]		
Compact Urban	Allowed on blocks longer than 800 feet	Allowed on blocks longer than 600 feet
Drivable Suburban	Allowed between signalized intersections more than 1000 feet apart	Allowed between signalized intersections more than 1000 feet apart
Rural	Not allowed except at special locations (recreational areas, etc.)	Not allowed except at special locations (recreational areas, etc.)
On-street Parking (for curbside not designated for bus stops, loading, and other specialized uses)		
Compact Urban	In commercial districts	Commercial districts
Drivable Suburban	No	No
Rural	No	No
Maximum Curb Radius (without curb extensions)		
Compact Urban	15 feet	15 feet
Drivable Suburban	25 feet	25 feet
Rural	25 feet	25 feet
Recommended Street Tree Spacing		
Compact Urban	30 feet on center	30 feet on center
Drivable Suburban	30 feet on center	30 feet on center
Rural	35 feet on center	35 feet on center

Note 1 - Bike facilities shall not be limited, instead they shall conform to the El Paso Bike Plan and NACTO Design Guides.
Note 2 - Adjustments to number of travel lanes will be made based on a Traffic Impact Assessment (TIA).
Note 3 - Adapted from Florida DOT's Generalized Level of Service Tables.
Note 4 - The City Traffic Engineer will have final approval authority over mid block crossings.

	Collector	Local
TYPICAL THOROUGHFARE CHARACTERISTICS		
Network Function	Continuous paths to arterial network; allows local trips to avoid the arterial network	Provides access to all parcels not on the arterial / collector network
Direct Route	Yes, but may include deflections & minor jogs	Not critical; but are highly interconnected in Compact Urban areas
Network Spacing Guidance	A minimum of one collector should be placed between two arterials whether minor or major; should generally not exceed one-half mile	As needed to provide access to all parcels
Driveway and Access Spacing	Depending on area type and specific land use context, driveways may be required frequently but should be discouraged through subdivision design features such as alleys and side-street entrances	Frequent spacing, though land development regulations should allow no more than one driveway per land parcel and should favor local streets over higher classifications
DESIGN CRITERIA FOR NEW & RECONFIGURED THOROUGHFARES		
Number of Travel Lanes and Base ROW Width		
Compact Urban	2 lanes / 74 ft ROW	2 lanes / 62 ft ROW in non-residential land use areas 2 lanes / 60 ft ROW in residential land use areas
Drivable Suburban	2 lanes / 71 ft ROW in non-residential land use areas 2 lanes / 58 ft ROW in residential land use areas	2 lanes / 60 ft ROW in non-residential land use areas 2 lanes / 48 ft ROW in residential land use areas
Rural	2 lanes / 70 ft ROW	2 lanes / 60 ft ROW
Bicycle Facilities (preferred design to be used on El Paso Bike Plan-designated thoroughfares)		
Compact Urban	Refer to El Paso Bike Plan "Recommended Bikeway Network" for preferred facility type	
Drivable Suburban		
Rural		
Mid-Block Crossings		
Compact Urban	Allowed on blocks longer than 800 feet	Allowed on blocks longer than 500 feet
Drivable Suburban	Allowed when distance between protected pedestrian crossings is more than 1000 feet	Allowed when distance between traffic control devices that would stop vehicles for a pedestrian crossing is more than 800 feet
Rural	Not allowed except at special locations (recreational areas, etc.)	Not allowed
On-street Parking (for curbside not designated for bus stops, loading, and other specialized uses)		
Compact Urban	Required in commercial districts	Allowed but not required
Drivable Suburban	Required in commercial districts	Allowed but not required
Rural	No	No
Maximum Curb Radius (without curb extensions)		
Compact Urban	15 feet	15 feet
Drivable Suburban	20 feet	15 feet
Rural	20 feet	15 feet
Recommended Street Tree Spacing		
Compact Urban	30 feet on center	30 feet on center
Drivable Suburban	30 feet on center	30 feet on center
Rural	35 feet on center	30 feet on center

3.4 GENERAL BICYCLE FACILITY TYPES

The NACTO Urban Bikeway Design Guide and El Paso Bike Plan recommends a variety of facility types to be applied to various street types. The specific bicycle facility types are illustrated below.

BICYCLE FACILITY CONTEXTUAL GUIDANCE

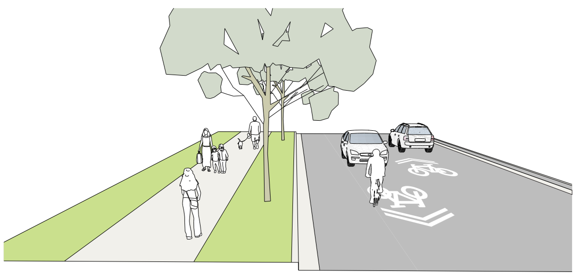
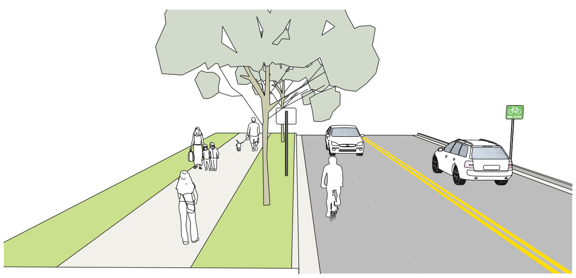
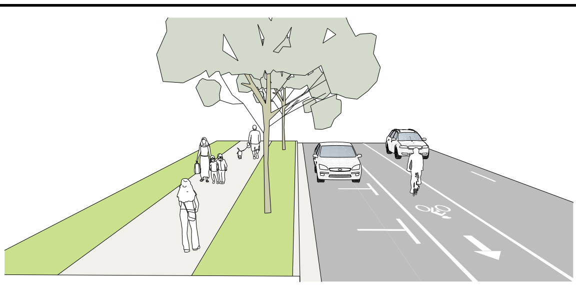
Typical Arrangement of the Facility	Facility Type	Street Class	Speed, Volume & Separation	Additional Factors
	**Bicycle Boulevard** Comfortable and attractive bicycling environment without utilizing physical separation; Includes traffic calming.	**Local**	**Volume** 0-2k, 2k-3k **Speed** 15-20, 20-25 **Separation** ●○○○	Emergency Route
	**Bike Route** A travel lane shared by bicyclists and motorists, indicated by signage.	**Local**	**Volume** 0-2k, 2k-8k, 8k-10k **Speed** 15-25, 25-30 **Separation** ●○○○	Higher Traffic Volumes, Space for Traffic Calming, Space for Bike Lanes, Critical Network Link
	**Bike Lane** Exclusive space for bicyclists through the use of pavement markings and signage.	**Collector**	**Volume** 3k-4k, 4k-15k, 15k-20k **Speed** 15-20, 20-30, 30-40 **Separation** ●●○○	High Turnover Parking, Front-in Diagonal Parking, Insufficient Road Space, High Traffic Volumes, Multiple Travel Lanes

Figure 3.2: Bicycle facility contextual guidance

Separation from Travelway

●○○○ Minimal
●●○○ Moderate
●●●○ Good
●●●● High

	min.	desired	max.	
Volume				Average Annual Daily Traffic (1,000 veh/day or 100 veh/peak hr)
Speed				Posted Travel Speed (mph)

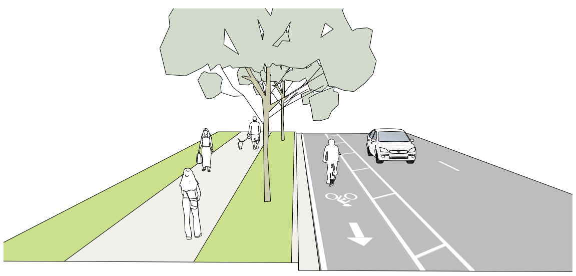
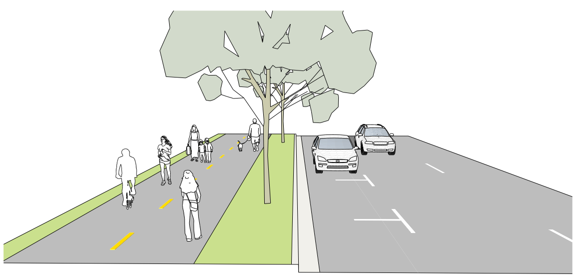
BICYCLE FACILITY CONTEXTUAL GUIDANCE				
Typical Arrangement of the Facility	**Facility Type**	**Street Class**	**Speed, Volume & Separation**	**Additional Factors**
	**Buffered Bike Lane** Traditional bike lane separated from vehicle travel lanes or parking lanes by an adjacent buffer area.	**Minor Arterial**	**Volume** 3k-4k, 4k-25k, 25k-30k **Speed** 20-25, 25-40, 40-45 **Separation**	Insufficient Road Space, Illegal Parking/Loading, Sidewalk Riding, Space for Cycle Track
	**Cycle Track** Physically separated bikeway. Could be one or two way and physically protected.	**Minor Arterial**	**Volume** 3k-9k, 9k-25k, 25k-32k **Speed** 25-30, 30-50, 50-55 **Separation**	Frequent Driveways, Frequent Intersections, Park or linear corridor with space for shared use path
	**Shared Use Path** Completely separated from roadway, typically shared with pedestrians.	**Major Arterial**	**Volume** 3k-6k, 6k-32k **Speed** 35-45, 45-60, 60+ **Separation**	Frequent Driveways, Frequent Intersections, High Pedestrian Volume

Figure 3.2: Bicycle facility contextual guidance (continued)

(Sources: El Paso Bike Plan, 2016. FHWA. Separated Bike Lane Planning and Design Guide. 2015. AASHTO. Guide for the Development of Bicycle Facilities. 2012. FHWA. Manual on Uniform Traffic Control Devices. 2009. NACTO. Urban Bikeway Design Guide. 2012. NCHRP Report 766: Recommended Bicycle Lane Widths for Various Roadway Characteristics. 2014)

3.5 MID-BLOCK CROSSWALKS

Table 3.3 Recommended Practice for Midblock Crossings

GENERAL
The decision to locate a midblock crosswalk will be based on numerous factors. Generally, however, consider providing a marked midblock crossing when protected intersection crossings are spaced greater than 400 feet so that crosswalks are located no greater than 200 to 300 feet apart in areas where a relatively high demand of foot traffic is existing or anticipated, and meet the criteria below.
Midblock crossings may be considered when there is significant pedestrian demand to cross a street between intersections, such as connecting to major generators or transit stops.
Midblock crosswalks should be located at least 100 feet from the nearest side street or driveway so that drivers turning onto the major street have a chance to notice pedestrians and properly yield to pedestrians who are crossing the street.
CRITERIA
Streets with an average daily traffic volume (ADT) of 12,000 vehicles per day or less
Multilane streets carrying less than 15,000 ADT if a raised pedestrian refuge island or median is provided
Operating speeds less than 40 mph
A minimum pedestrian crossing volume of 25 pedestrians per hour for at least four hours of a typical day.
Adequate sight distance is available for pedestrians and motorists.
RECOMMENDATIONS
Conform to Public Rights-of-Way Accessibility Guidelines (PROWAG) for the disabled and visually impaired. Conform to COEP TAS, TDLR, ADA rules.
Unsignalized midblock crosswalks should not be provided on streets where traffic volumes do not have gaps in the traffic stream long enough for a pedestrian to walk to the other side or to a median refuge. At locations with inadequate gaps that also meet Manual on Uniform Traffic Control Devices (MUTCD) signalization warrants, consider a signalized midblock crossing.
Consider a signalized midblock crosswalk (including locator tone and audio pedestrian signal output as well as visual pedestrian countdown signal heads) where pedestrians must wait more than an average of 60 seconds for an appropriate gap in the traffic stream. When average wait times exceed 60 seconds, pedestrians tend to become impatient and cross during inadequate gaps in traffic. If this initial threshold is met, check pedestrian signal warrants in the MUTCD.
Provide overhead safety lighting on the approach sides of both ends of midblock crosswalks.
Provide wheelchair ramps or at-grade channels at midblock crosswalks with curbs and medians.
Provide raised median pedestrian refuge at midblock crossings where the total crossing width is greater than 60 feet, and on any unsignalized multi-lane thoroughfare crossing.
Use high-visibility (ladder-style) crosswalk markings to increase visibility longitudinally.
Provide advance stop or yield lines to reduce multiple-threat crashes.
Provide advance crosswalk warning signs for vehicle traffic.
Provide curb extensions at midblock crosswalks with illumination and signing to increase pedestrian and driver visibility. "Z" crossing configurations should be used for midblock crossings with medians wherever possible (see Figure 2.5). Provide an at-grade channel in median at a 45-degree angle toward advancing traffic to encourage pedestrians to look for oncoming traffic.
OTHER CONSIDERATIONS
A strategy to calm traffic speeds in advance of and at a midblock crossing is to raise the pavement to meet the sidewalk elevation by use of gentle ramps (see Figure 2.6). Consider use of overhead flashing beacons.

Sources:
Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, ITE/CNU, 2017
Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations, FHWA, 2005
Manual on Uniform Traffic Control Devices, FHWA, 2014 Edition
Guide for the Planning, Design and Operation of Pedestrian Facilities, AASHTO, 2004
Guide for the Development of Bicycle Facilities, AASHTO, 2012

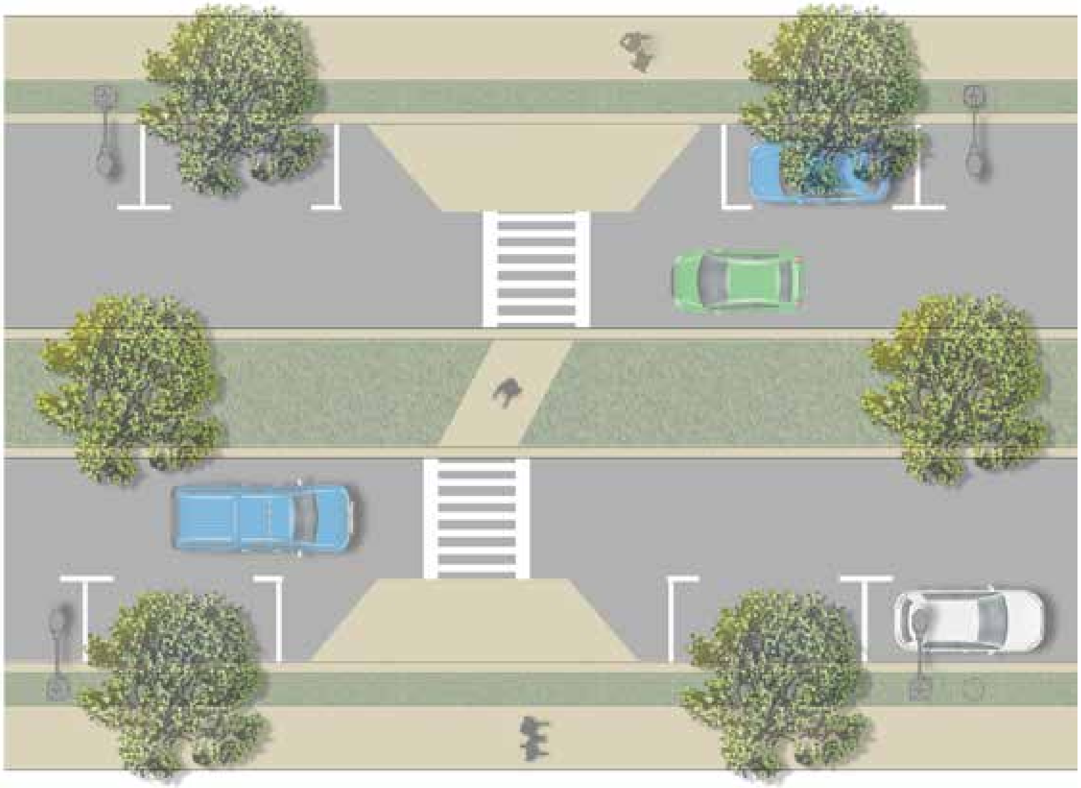


Figure 3.3 - Midblock crossings with a "Z" configuration force pedestrians crossing the median or raised pedestrian refuge island to look toward oncoming traffic. Avoid street trees that interfere with visibility. Source: Stantec, ITE

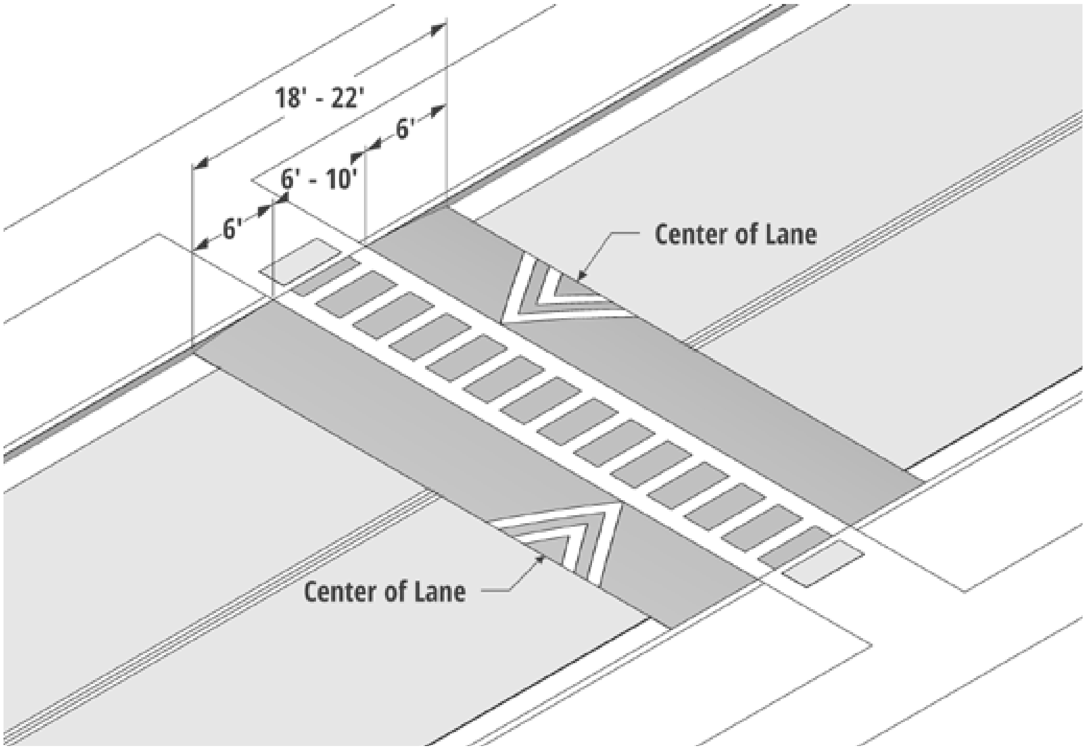


Figure 3.4 - The raised roadway crosswalk concept combines midblock crosswalks with traffic calming devices. Source: Stantec, ITE

3.6 ARID CLIMATE DESIGN CONSIDERATIONS

El Paso is a southwestern city characterized for its low-humidity hot summers and its cool dry winters. During the summer months (July to September), the city experiences most of its heavy rainfall—averaging about 9.7 inches per year—and thunderstorms, some severe enough to produce flash flooding. These natural climate considerations form part of a context-sensitive design strategy aimed at creating comfortable urban environments year-round. In the case of El Paso, the need to design streets for this specific climate is apparent.

Considerations for El Paso's climate should be integral to the design process for both public and private projects*. Some street design characteristics to consider are as follows:

1. Provide relief from hot temperatures in the pedestrian environment with design elements such as street trees, umbrella-covered tables, and cooling mist systems.
2. Require building facades to implement generous awnings for shading of the sidewalk area.
3. Must include water harvesting design treatments as per NACTO standards latest editions
4. Utilize textured hardscape elements to enliven and bring color to the streetscape.
5. Apply stormwater management strategies to handle flash flooding through a continuous shared soil system for street trees that absorbs and filters intense rainfalls efficiently and enhances street tree health. See Urban Street Stormwater Guide, NACTO, 2017 for additional guidance.
6. Flexible use of the street can allow opportunities to provide shade and seating areas to enhance comfort for pedestrians.
7. NACTO Transit Street Design Guide

* Applicable to Downtown and Compact Urban Areas

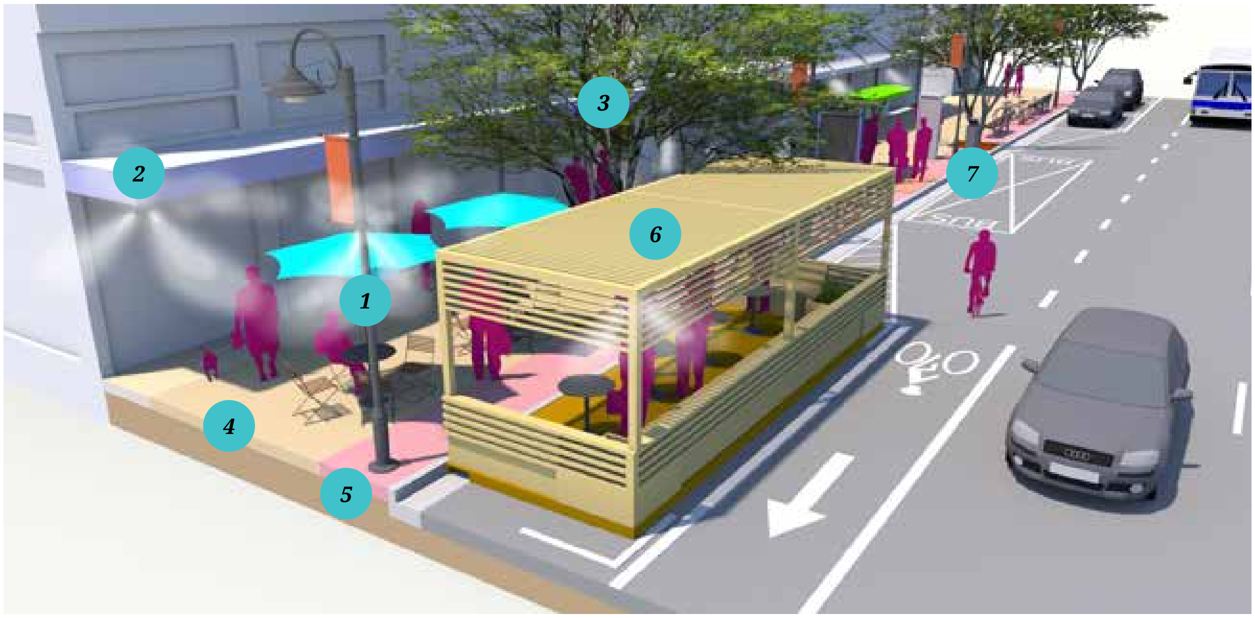


Figure 3.5: Illustration depicting design considerations for El Paso's arid climate

3.7 SMART MOBILITY

3.7.1 SMART MOBILITY

Smart mobility is a rapidly growing broader transportation focus that can transform communities. It includes more commonly known mobility technologies like autonomous and electric vehicles. More specifically, Smart mobility can be divided into five categories, accessible, automated, connected, electric, and shared (A2CES) systems. Communities—including El Paso—can take advantage of these rapidly evolving technologies to enhance the community's resiliency, equity, environmental sustainability, and economy.

3.7.2 ACCESSIBILITY

Accessibility refers to a mobility system's effectiveness in serving people of different abilities including disabled persons, senior citizens, children, or even parents with strollers. Accessibility features can be built into all manner of vehicle systems and services from mobile applications to on-board human-machine interfaces to wheelchair ramps. The principles of accessibility seek to promote equity, flexibility, simplicity, and ease of use.

3.7.3 AUTOMATED

Automated vehicles are those that operate independently of the world around them and do not need a driver. Such vehicles depend on a sophisticated set of sensors and computing to construct a digital map of the world around them in real time and move accordingly. Trials and pilots of automated vehicles have been occurring around the world for a number of years with millions of miles of successfully logged trips.

3.7.4 CONNECTED

Vehicles can now be connected to a wide variety of things, other vehicles, surrounding infrastructure and many other potential devices. This connectivity is made possible through a series of devices like sensors, servers and 5G networks, which increasingly allows for mobility and service enhancements. Connections provide additional information to the vehicle such as the location of potential accidents ahead, ride hailing by a passenger, and location/availability of parking spaces or charging stations. At it's most basic level, today's mapping applications on smart phones are examples of how information is communicated through a connected system that pools information from other drivers to improve the experience for everyone.

3.7.5 ELECTRIC

The electric car has long been a technology that transportation planners have embraced as a means to reduce the negative impacts of air and noise pollution produced by the internal combustion engine. Recently, electric vehicles have become more desirable as advances in battery storage have drastically increased the vehicle's travel range. Still, the availability and location of charging stations remains a limiting factor in the widespread use of electric vehicles.

3.7.6 SHARED

Shared mobility has historically taken the form of public transit – buses and trains. The great recession gave rise to a sharing economy that leveraged the power of social networking and mapping to rent out and "share" a variety of assets including available car seats (e.g., Uber/Lyft). The sharing network has extended to other mobility services including shared bicycles and electric scooters. Manufacturers and service providers are taking this concept further and have been developing new shared vehicle technologies known as micro-transit or automated shuttles to provide short distance connectivity – typically less than 3 miles in length – in business districts, office and college campuses, and in high tourist areas.

Smart mobility has great potential to positively transform communities and enhance the efficiency, safety and equity of community mobility. But, like all technologies, the success will depend on the core principles with which it is applied. These rapidly emerging mobility technologies deserve consideration as El Paso and it's street network grow and streets are planned, designed and redesigned over time.

Figure 3.6: Conceptual rendering of a connected intersection where the vehicles, can communicate with the infrastructure as well as with other devices in the area

4

Thoroughfare and Street Standards

Chapter 4

Thoroughfare and Street Standards

4.1 APPLICABILITY

This Chapter of the El Paso Street Design Manual presents, in coordination with partner agencies, an updated set of typical cross-sections based on requirements and considerations contained in the Major Thoroughfare Plan (MTP), the revised Functional Classifications of Streets, and the new area types of Plan El Paso. The proposed set of cross-sections presents a new way of approaching thoroughfares in El Paso, and is aimed at creating a single reference resource for street design, planning, and construction. These sections also take into account other things happening around the city such as capital projects, development-related infrastructure, and right-of-way contributions—all key elements to the continuous urban and economic growth of the City of El Paso.

4.2 SUMMARY TABLE OF TYPICAL SECTIONS

This chapter contains descriptions of priorities and spatial preferences and minimums for roadway type. Table 4.1 on the next pages provides a high level of summary of this information, followed by more detailed information and sections for each type.

Table 4.1 Design Guidance Criteria for Typical Sections: by Functional Classification and Area Type

		Major Arterial (92-112 ft typ. ROW) Detailed design guidance begins on Page 38						**Minor Arterial (70-92 ft typ. ROW)** Detailed design guidance begins on Page 46					
		Travelway			Parking Zone	Accessory/ Amenity Zones	Pedestrian Zone	Travelway			Parking Zone	Accessory/ Amenity Zones	Pedestrian Zone
		Typical Lanes/ Widths[5]	Medians/ Access	EPBP Bike Facilities Focus	On-Street Parking	Streetscape Focus[1]	Min. Sidewalk Width[2]	Typical Lanes/ Widths	Medians/ Access	EPBP Bike Facilities Focus	On-Street Parking Priority	Streetscape Focus	Min. Sidewalk Width
Compact Urban	G-1	4-6 lanes, 10-11 ft	N/A	CT/ BBL/BL	Allowed	Planter/ Hardscape	8 ft	4-6 lanes, 10-11 ft	N/A	CT/BBL/ BL	Allowed	Planter/ Hardscape	8 ft
Compact Urban	G-2	4-6 lanes, 10-11 ft	Medians	CT/ BBL/BL	Allowed	Planter/ Hardscape	8 ft	4-6 lanes, 10-11 ft	Medians	CT/BBL/ BL	Allowed	Planter/ Hardscape	8 ft
Compact Urban	O-7	4-6 lanes, 10-11 ft	Medians	CT/ BBL/BL	Cond	Planter/ Hardscape	8 ft	4-6 lanes, 10-11 ft	Medians	CT/BBL/ BL	Cond	Planter/ Hardscape	8 ft
Drivable Suburban	G-3	4-6 lanes, 10-12 ft	Medians or TWLTL	SUP/ BBL/BL	Cond	Planter Strip	12 ft SUP, 6 ft SW	2-4 lanes, 10-11 ft	Medians or TWLTL	SUP/ BBL/BL	Cond	Planter Strip	6 ft
Drivable Suburban	G-4	4-6 lanes, 10-12 ft	Medians or TWLTL	SUP/ BBL/BL	Cond	Planter Strip	12 ft SUP, 6 ft SW	2-4 lanes, 10-11 ft	Medians or TWLTL	SUP/ BBL/BL	Cond	Planter Strip	6 ft
Drivable Suburban	G-5[3]	4-6 lanes, 10-12 ft	Medians	SUP/ BBL/BL	Cond	Planter Strip	6 ft	2-4 lanes, 10-12 ft	Medians or TWLTL	SUP/ BBL/BL	Cond	Planter Strip	6 ft
Drivable Suburban	G-7	4-6 lanes, 11-12 ft	Medians or TWLTL	SUP/ BBL/BL	Cond	Sidewalk	6 ft	2-4 lanes, 10-12 ft	Medians or TWLTL	SUP/ BBL/BL	Allowed	Sidewalk	6 ft
Drivable Suburban	G-8[3]	4-6 lanes, 11-12 ft	Medians	SUP/ BBL/BL	Cond	Sidewalk	6 ft	2-4 lanes, 10-12 ft	Medians or TWLTL	SUP/ BBL/BL	Cond	Sidewalk	6 ft
Drivable Suburban	G-9[3]	4-6 lanes, 11-12 ft	Medians	SUP/ BBL/BL	Cond	Sidewalk	6 ft	2-4 lanes, 10-12 ft	Medians or TWLTL	SUP/ BBL/BL	Cond	Sidewalk	6 ft
Rural	G-6	2-4 lanes, 11-12 ft	Medians	SUP/ BL	Not Allowed	Sidewalk	5 ft	2-4 lanes, 11-12 ft	N/A	SUP/BL	Not Allowed	Sidewalk	6 ft
Rural	O-3	2-4 lanes, 12 ft	Medians	BL/BB	Not Allowed	None	N/A	2-4 lanes, 12 ft	N/A	SUP/BL	Not Allowed	None	5 ft
Rural	O-4	2-4 lanes, 12 ft	Medians	BL/BB	Not Allowed	None	N/A	2-4 lanes, 12 ft	N/A	SUP/BL	Not Allowed	None	5 ft
Rural	O-5	2-4 lanes, 12 ft	Medians	BL/BB	Not Allowed	None	N/A	2-4 lanes, 12 ft	N/A	SUP/BL	Not Allowed	None	5 ft
Rural	O-6	2 lanes, 11-12 ft	Medians	BL/BB	Not Allowed	None	N/A	2 lanes, 11-12 ft	N/A	SUP/BL	Not Allowed	None	5 ft

EXPLANATION OF PARKING TERMS

Allowed[4] On-street parking is permitted on this thoroughfare type in the area type. Specific guidance in Chapter 9 provides detail on how it can be accommodated, especially in constrained rights-of-way

Conditional (Cond) On-street parking may be permitted subject to additional criteria.

Not Allowed On-street parking is not allowed.

Not Applicable (NA)

Note 1: In areas where 8 ft is the min. sidewalk width, 6 ft may be accepted in constrained areas as approved by the City Manager or designee. Pedestrian Clear Zone, not inclusive of Planter Strip.

Note 2: A minimum of 12-foot widths should be used for the Pedestrian Zone along Arterial roadways to allow for space that may need to be re-purposed or substituted for other uses, such as shared use paths.

Note 3: Areas of the County designated as G-5, G-8 and G-9 are not within the COEP's regulatory jurisdiction at the time of writing.

Note 4: On-street parking near a bus stop and adjacent to a transit lane will need to comply with existing Sun Metro standards.

Note 5: Adjustments to number of lanes will be made based on a Traffic Impact Assessment (TIA).

		Collector (58-88 ft typ. ROW) Detailed design guidance begins on Page 52						Local (48-62 ft typ. ROW) Detailed design guidance begins on Page 60					
		Travelway			Parking Zone	Accessory/ Amenity Zones	Pedestrian Zone	Travelway			Parking Zone	Accessory/ Amenity Zones	Pedestrian Zone
		Typical Lanes/ Widths	Medians/ Access	EPBP Bike Facilities Focus	On-Street Parking	Streetscape Focus	Min. Sidewalk Width	Typical Lanes/ Widths	Medians/ Access	EPBP Bike Facilities Focus	On-Street Parking	Streetscape Focus	Min. Sidewalk Width
Compact Urban	G-1	2-4 lanes, 10-11 ft	N/A	CT/BBL/ BL	Allowed	Planter/ Hardscape	8 ft	2 lanes, 10-11 ft	N/A	BL/BB	Allowed	Planter/ Hardscape	6 ft
	G-2	2-4 lanes, 10-11 ft	Medians or TWLTL	CT/BBL/ BL	Allowed	Planter/ Hardscape	8 ft	2 lanes, 10-11 ft	Turn lanes	BL/BB	Allowed	Planter/ Hardscape	6 ft
	O-7	2-4 lanes, 10-11 ft	Medians or TWLTL	CT/BBL/ BL	Allowed	Planter/ Hardscape	8 ft	2 lanes, 10-11 ft	Turn lanes	BL/BB	Allowed	Planter/ Hardscape	6 ft
Drivable Suburban	G-3	2-4 lanes, 10-11 ft	Medians or TWLTL	CT/BBL/ BL	Allowed	Planter Strip	6 ft	2 lanes, 10-11 ft	N/A	BL/BB	Allowed	Planter Strip	5 ft
	G-4	2-4 lanes, 10-11 ft	Medians or TWLTL	CT/BBL/ BL	Allowed	Planter Strip	6 ft	2 lanes, 10-11 ft	N/A	BL/BB	Allowed	Planter Strip	5 ft
	G-5	2-4 lanes, 10-11 ft	Medians or TWLTL	SUP/BL	Allowed	Planter Strip	6 ft	2 lanes, 10-11 ft	N/A	BL/BB	Allowed	Planter Strip	5 ft
	G-7	2-4 lanes, 10-11 ft	Medians or TWLTL	SUP/BL	Allowed	Planter Strip	6 ft	2 lanes, 10-11 ft	N/A	BL/BB	Allowed	Sidewalk	5 ft
	G-8	2-4 lanes, 11-12 ft	Medians or TWLTL	SUP/BL	Cond	Sidewalk	6 ft	2 lanes, 10-11 ft	N/A	BL/BB	Cond	Sidewalk	5 ft
	G-9	2-4 lanes, 12 ft	Medians or TWLTL	SUP/BL	Cond	Sidewalk	6 ft	2 lanes, 10-11 ft	N/A	BL/BB	Not Allowed	Sidewalk	5 ft
Rural	G-6	2 lanes, 11-12 ft	N/A	BL, SB	Not Allowed	SUP or Sidewalk	6 ft	2 lanes, 10-11 ft	N/A	N/A	Allowed	SUP or Sidewalk	5 ft
	O-3, O-4, O-5, O-6	2 lanes, 11-12 ft	N/A	SB	Not Allowed	None	N/A	2 lanes, 10-11 ft	N/A	N/A	Not Allowed	None	5 ft
								Alley (20-28 ft typ. ROW) Detailed design guidance begins on Page 68					
All Area Types								1-2 lanes, 12-14 ft	N/A	N/A	Not Allowed	None	None

EXPLANATION OF BICYCLE FACILITY TERMS (core designations from the El Paso Bike Plan)

CT Cycle Track

BBL Buffered Bike Lane (may also be designed as "protected bike lane" with physical barriers in the buffer area)

BL Bike Lane

SB Shoulder Bikeway

SUP Shared Use Path: Minimum 10-foot, two-way shared bicycle and pedestrian facility separated from main traveled way

BB Bicycle Boulevard

SSR Signed Shared Roadway

MSSR Marked and Signed Shared Roadway

EXPLANATION OF OTHER TERMS

TWLTL Two-way Left Turn Lane

4.3 MAJOR ARTERIALS

4.3.1 MAJOR ARTERIAL - COMPACT URBAN

The Compact Urban sections should have the slowest design speed (compared to the suburban and rural sections) to provide a better balance between pedestrians, vehicles, and bicyclists in walkable urban areas. Four travel lanes are provided in the basic section, with an option to add two additional lanes if warranted by traffic demand. Medians may be allowed based on local access and driveway patterns, and interior travel lanes are narrowed to 10 feet. Any bicycle facilities recommended in the El Paso Bike Plan shall be pursued, although in constrained rights-of-way design trade-offs approved by the City Manager or designee may allow for reduced facility dimensions. These streets will require flexibility in designing for the arterial function, as they are located in land use contexts not compatible with high-speed travel.

Although vehicle lanes (and their widths) remain high-priority design factors, they should not come at the expense of pedestrian safety or other concerns central to downtowns and traditional neighborhoods.

BASIC DESIGN FACTORS

MAJOR ARTERIAL COMPACT URBAN AREA TYPE

BASE ROW: 110 FEET

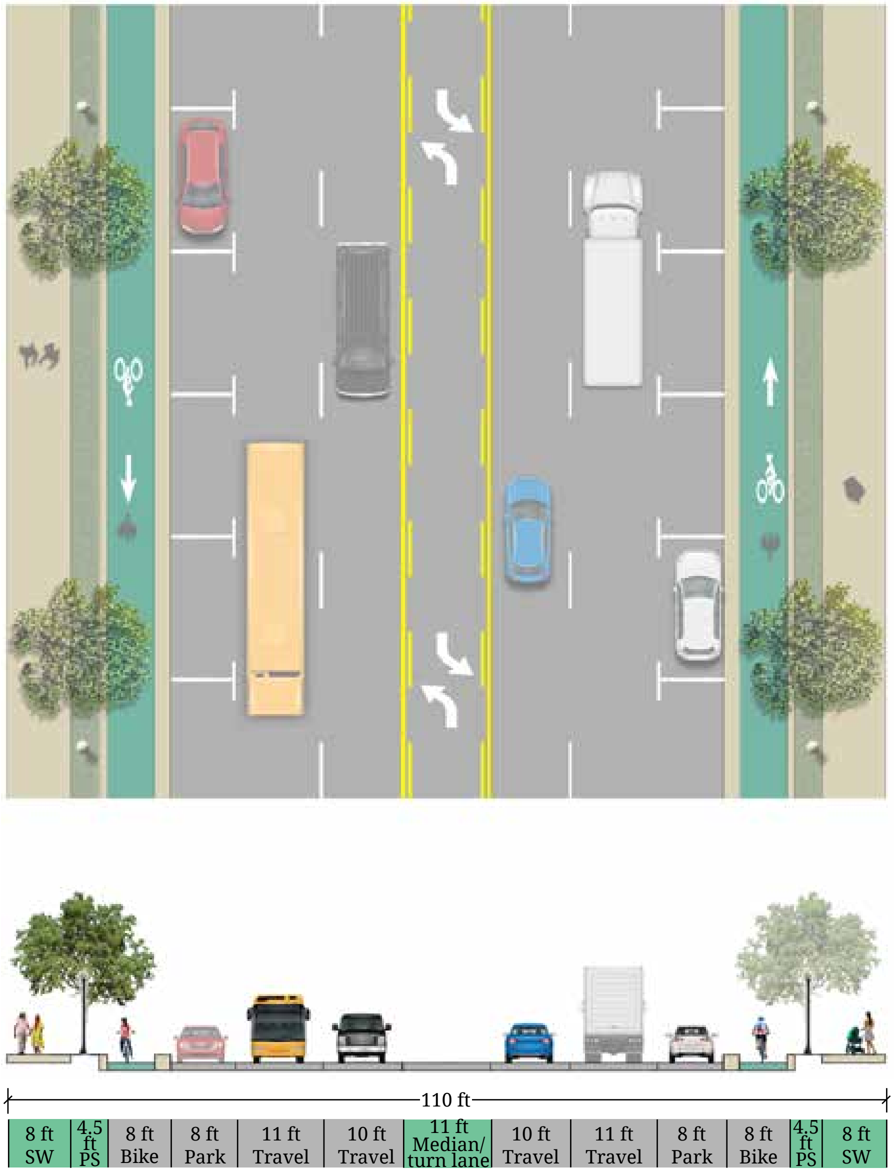
Thoroughfare Cross-Section Design Factors and Priorities						
	Typical Lanes/ Widths	Medians/Access	On-Street Parking	Streetscape Elements	El Paso Bike Plan Bike Facilities	Min. Sidewalk Width
G-1 Downtown	4-6 lanes depending on volumes and bicycle facilities or parking needs. 10 ft inner lanes and 11 ft outer lanes (for transit vehicles)	Medians (except in G-1) preferred. Curb cuts should be restricted.	Allowed, should be retained when possible. Other lower-class roadway types may be more suitable	Planter strip, which may be substituted for hardscape treatment. The separation from sidewalk to travel lanes is important for pedestrian safety in these areas	Cycle Track or Buffered Bike Lane should always be used on designated routes. Constrained areas, buffer may be reduced or eliminated	8 ft
G-2 Traditional Neighborhood						8 ft
O-6 Potential Annexation & O-7 Urban Expansion	2-4 lanes, 10 ft-11 ft lanes	Medians	Depends on context. May be used in commercial areas		When planning for new routes, plan space for protected facilities	8 ft

The above design factors and priorities may be applied in O-6 Potential Annexation as necessary with future annexations.

Other Thoroughfare Design Factors	
Traffic Volume Threshold for Added Lanes	35,000 vehicles per day existing or projected volume (based on major development) to expand from four to six lanes
Mid-Block Crossings [1] and Other Pedestrian Enhancements	Mid-block crossings should not be needed along major arterials with a regular block spacing typical of (or desired for) Compact Urban area types. They may be allowed when block lengths (or the spacing between otherwise protected pedestrian crossings) exceeds 800 feet.
Curbside Management Concerns	On-street parking is generally allowed, though should be used with care, especially on any six-lane arterials or cases of right-of-way constraint. Curbside freight loading/unloading and rideshare/taxi pickup and drop-off should not be designated.
Transit Vehicle Design and Needs	Transit routes may designate stops in curbside lanes. Generally, 62 feet and 95 feet of curbside length should be reserved at stops for standard transit bus and Brio transit bus vehicle needs respectively.

Note 1: Mid-block crossings shall be determined by engineering studies/judgment not just define spacing, provided sources and defined regular block spacing.

MAJOR ARTERIAL COMPACT URBAN AREA TYPE
110 FT TOTAL ROW



Medians (except in G-1) are preferred means of access management, with space to allow turn lanes.

Travel lanes are the main priority of arterials, though in Compact Urban area types 10 ft inner lanes may be used. 11 ft outer lanes should be designated on priority transit corridors. **Inside travel lane dimensions exclude gutter, which is included in median dimensions.**

Parking is critical to include in commercial areas. For trade-offs, the number of lanes may be reconsidered, as major arterials in Compact Urban areas should not be carrying the bulk of regional traffic volumes.

Bicycle facilities shall be provided when designated in the El Paso Bike Plan, with protected facilities preferred. Dimensions are inclusive of gutter.

Planter strips or hardscape areas allow street trees and critical separation of pedestrians and moving traffic in Compact Urban area types, especially when parking or bike facilities are not included.

Wider sidewalks are desirable, but in trade-offs and constrained situations, 6 ft minimum is critical to preserve in Compact Urban area types.

4.3.2 MAJOR ARTERIAL - DRIVABLE SUBURBAN

The Drivable Suburban section is similar to the existing permitted section. Four travel lanes are provided in the basic section, with an option to add two additional lanes if warranted by traffic demand. The vehicular lanes are 10 or 11 ft in width, and medians are a preferred approach to access management.

Because bicycle facilities as recommended in the El Paso Bike Plan are not as crucial to Compact Urban Major Arterials, they should be given a higher priority in Drivable Suburban area types as they may be critically important routes for completing a bicycle network.

BASIC DESIGN FACTORS

MAJOR ARTERIAL DRIVABLE SUBURBAN AREA TYPE

BASE ROW: 112 FEET (6 LANE) / 92 FEET (4 LANE)

Thoroughfare Cross-Section Design Factors and Priorities

	Typical Lanes/Widths	Medians/ Access	On-Street Parking	Streetscape Elements	El Paso Bike Plan Bike Facilities	Min. Sidewalk Width
G-3 Post-War	4-6 lanes depending on volumes, 10 ft-12 ft lanes. 10 ft lanes typ. for inner lanes; 12 ft lanes (incl. gutter) typ. for outer lanes on priority transit corridors and truck routes	Medians preferred; TWLTL may be used	Conditional depends on land use context. This is preferred for commercial locations with smaller parcel patterns	Planter strips, which may be substituted with hardscape materials for special treatments such as bus stops	BBL, BL or SUP are appropriate to use, though in these area types any designated corridors should emphasize pedestrian and cyclist safety	12 ft SUP, 6 ft SW
G-4 Suburban						12 ft SUP, 6 ft SW
G-5 Independent City	4-6 lanes, 10 ft-12 ft	Medians		Planter strip ideal to provide	SUP/BBL/BL	6 ft
G-7 Industrial	4-6 lanes, 11 ft-12 ft	Medians or TWLTL	Low priority; may not be feasible due to other design factors	Sidewalks critical to preserve, other streetscape may be lesser priority	SUP/BBL/BL	6 ft
G-8 Fort Bliss Mixed Use	4-6 lanes, 11 ft-12 ft	Medians	Conditional, depending on land use context	Sidewalk	SUP/BBL/BL	6 ft
G-9 Fort Bliss Military	4-6 lanes, 11 ft-12 ft	Medians		Sidewalk	SUP/BBL/BL	6 ft

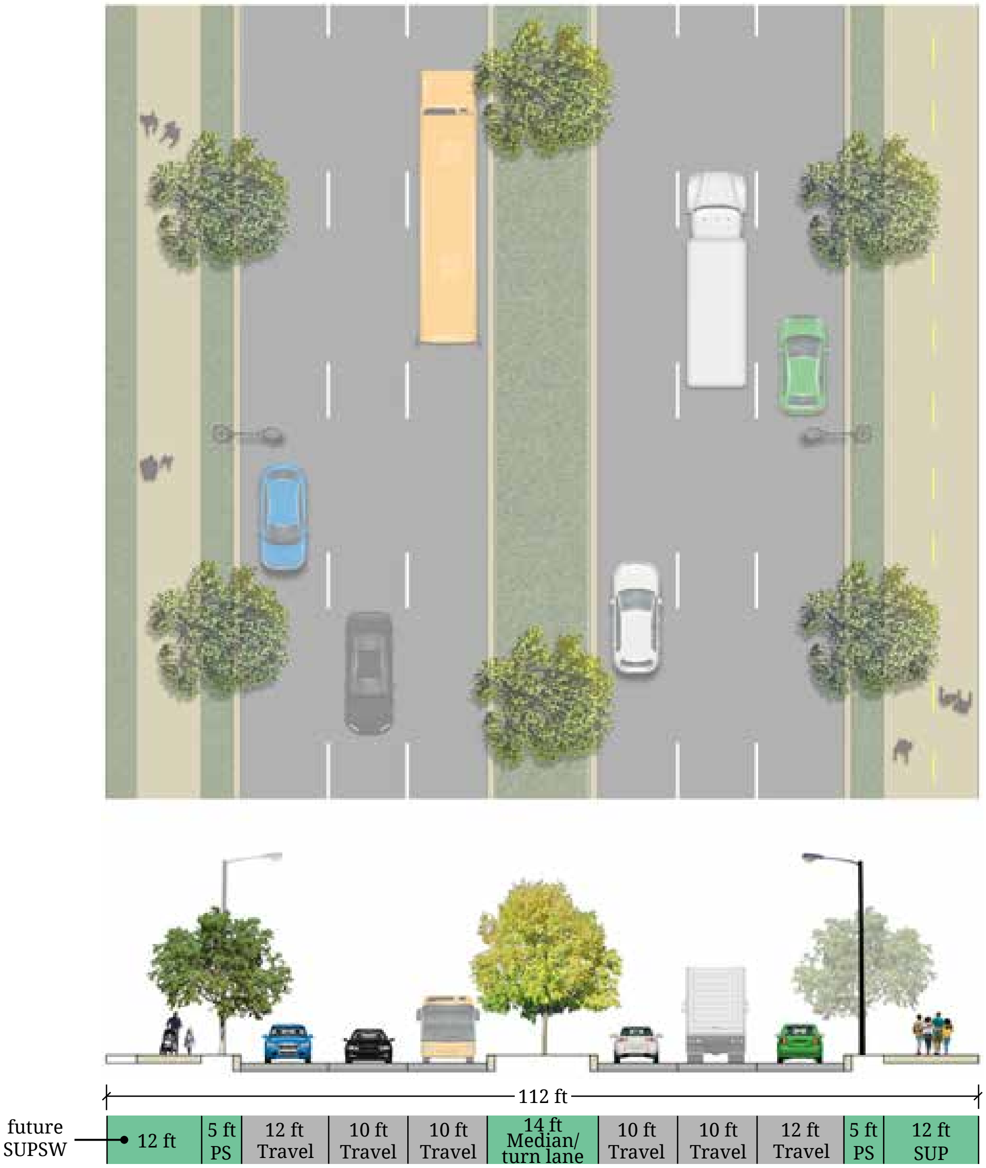
The above design factors and priorities may be applied in O-6 Potential Annexation as necessary with future annexations.

Other Thoroughfare Design Factors

Traffic Volume Threshold for Added Lanes	30,000 vehicles per day existing or projected volume (based on major development) to expand from four to six lanes, due to a greater amount of expected mid-block turn activity.
Mid-Block Crossings [1] and Other Pedestrian Enhancements	Mid-block crossings are allowed between signalized intersections more than 1,000 feet apart.
Curbside Management Concerns	On-street parking should be focused on commercial or multi-family areas only. Freight and passenger pickup/drop-off should not be designated.
Transit Vehicle Design and Needs	Transit routes may designate stops in curbside lanes. Generally, 62 feet and 95 feet of curbside length should be reserved at stops for standard transit bus and Brio transit bus vehicle needs respectively.

Note 1: Mid-block crossings shall be determined by engineering studies/judgment not just define spacing, provided sources and defined regular block spacing.

MAJOR ARTERIAL DRIVABLE SUBURBAN AREA TYPE
112 FT TOTAL ROW



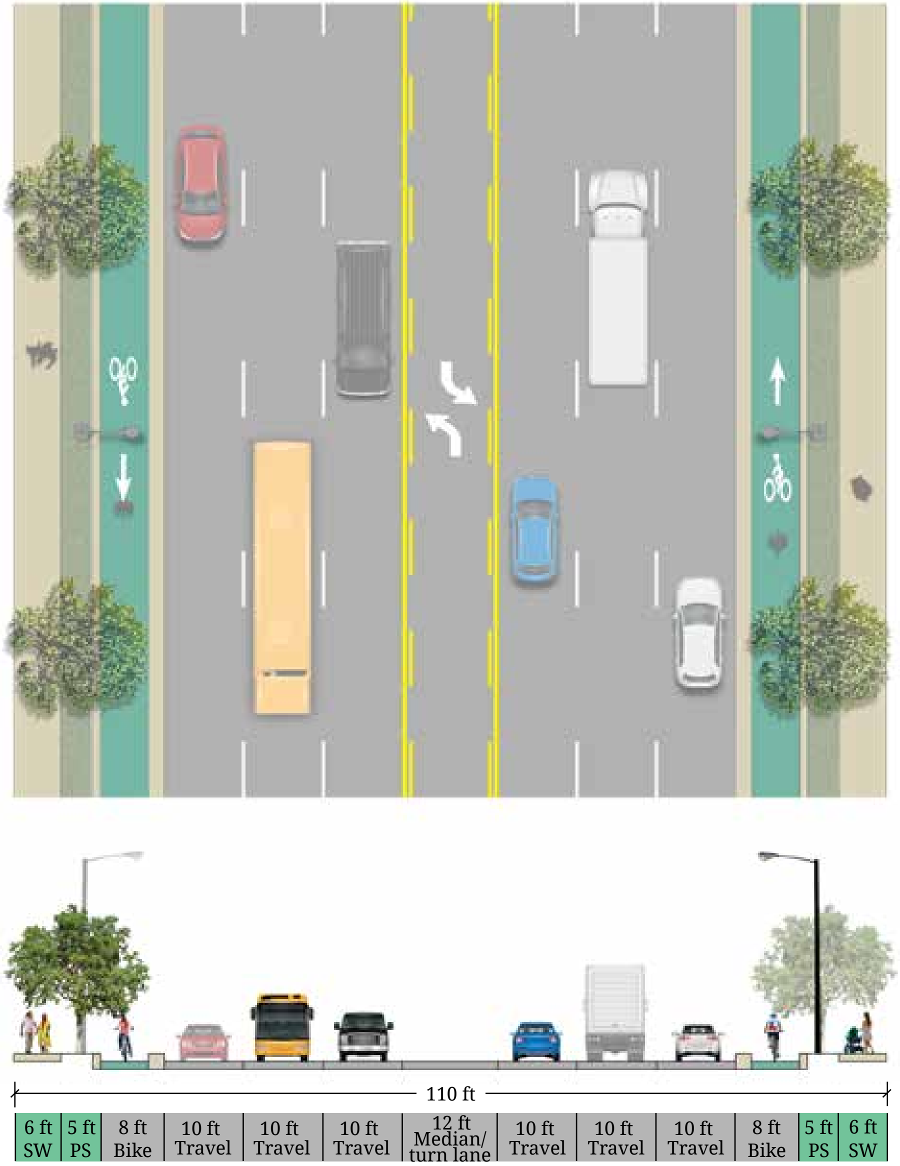
Median widths may be reduced to 11 ft in constrained conditions.

When existing or projected traffic volumes warrant added lanes, strive to keep overall lane widths tailored to context conditions of Compact Urban area types, designing for travel speeds appropriate to these areas. Outside travel lane dimensions are inclusive of the gutter.

Planter strips or hardscape areas are all the more critical in roadways wider than four lanes, as constrained conditions may mean that parking or bicycle facilities are not added.

12 ft should be maintained on corridors planned for a shared use path (SUP) in the El Paso Bike Plan and/or to allow for future shared use path implementation. If no SUP is planned, wider sidewalks are desirable, but in trade-offs and constrained situations, 6 ft minimum is critical to preserve in Drivable Suburban Area Types.

MAJOR ARTERIAL DRIVABLE SUBURBAN AREA TYPE
110 FT TOTAL ROW



Medians are a preferred means of access management, with space to allow turn lanes. Two-way left turn lanes may be used in existing conditions with frequent driveway spacing or where access management is difficult to implement.

Number of travel lanes should be determined by traffic volumes (or projected volumes from new major developments).

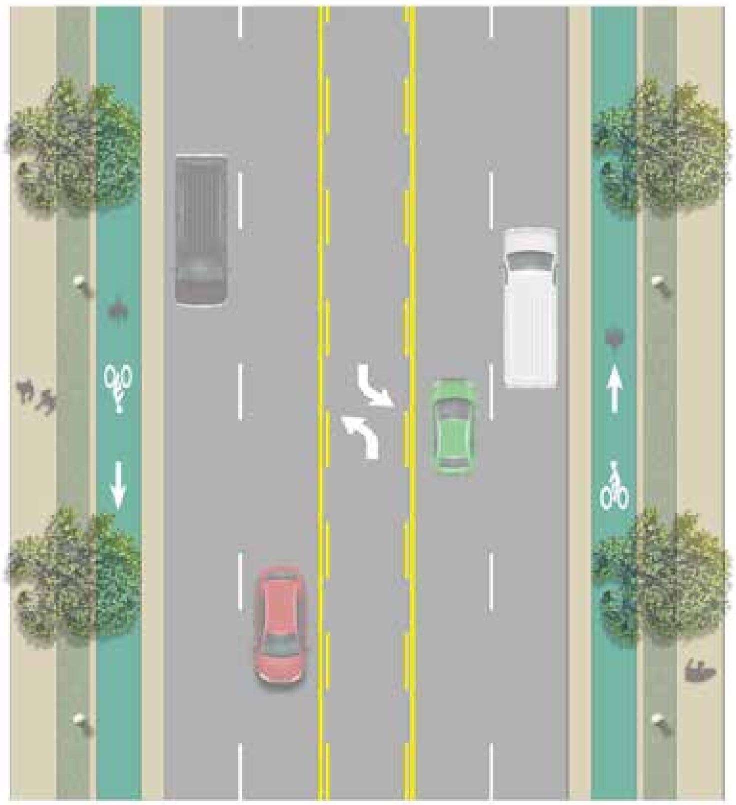
Bicycle facilities should be included when designated in the El Paso Bike Plan, with protected facilities preferred. Bike lane dimensions are inclusive of the gutter, but the gutter is not considered a ridable surface.

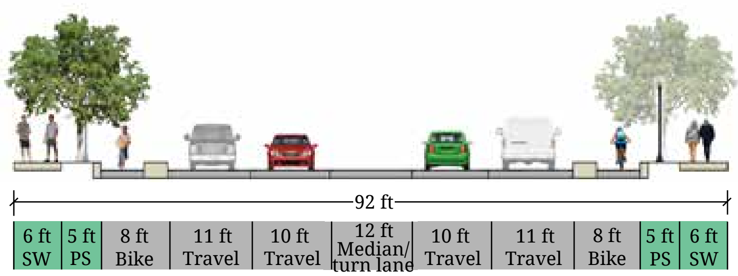
Planter strips or hardscape areas allow street trees and critical separation of pedestrians and moving traffic.

Wider sidewalks are desirable, but in trade-offs and constrained situations, 6 ft minimum is critical to preserve in Drivable Suburban area types.

MAJOR ARTERIAL DRIVABLE SUBURBAN AREA TYPE

92 FT TOTAL ROW





Wider sidewalks are desirable, but in trade-offs and constrained situations, 6 ft minimum is critical to preserve in Drivable Suburban area types.

Medians are a preferred means of access management, with space to allow turn lanes. Two-way left turn lanes may be used in existing conditions with frequent driveway spacing or where access management is difficult to implement.

Number of travel lanes should be determined by traffic volumes (or projected volumes from new major developments. 11 ft outer lanes are preferred on major transit and truck route corridors.

Bicycle facilities should be included when designated in the El Paso Bike Plan, with protected facilities preferred. This may be substituted for on-street parking in space constrained areas and in industrial land use contexts where curbside parking is a low priority. Bike lane dimensions are inclusive of the gutter.

Planter strips or hardscape areas allow street trees and critical separation of pedestrians and moving traffic in Drivable Suburban area types, especially when parking or bike facilities are not included.

4.3.3 MAJOR ARTERIAL - RURAL

The Rural section provides two lanes, with an option to add two additional lanes if warranted by traffic demand. A wide swale provides separation between pedestrians, bicyclists, equestrians, and moving vehicles. Trees in swales are typically clustered organically.

BASIC DESIGN FACTORS

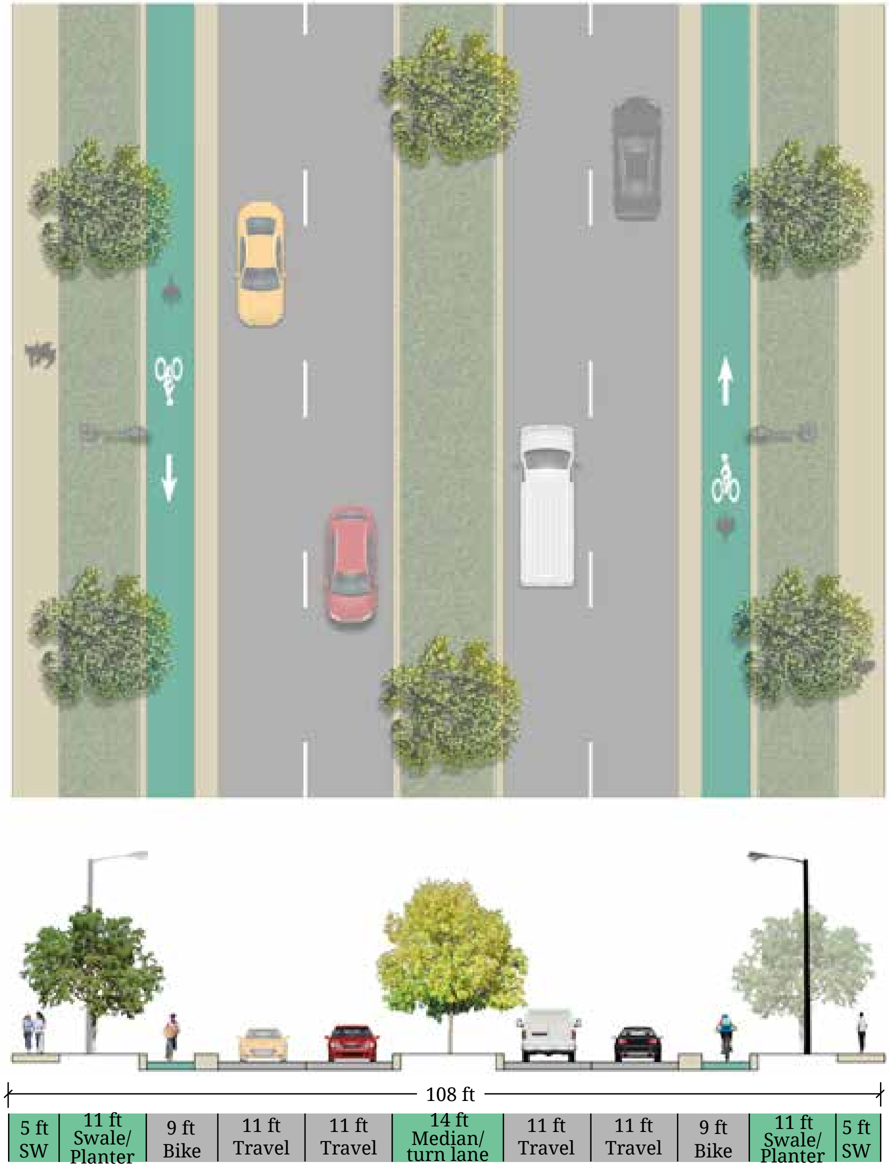
MAJOR ARTERIAL RURAL AREA TYPE

BASE ROW: 108 FEET

Thoroughfare Cross-Section Design Factors and Priorities

	Typical Lanes/Widths	Medians/ Access	On-Street Parking	Streetscape Elements	El Paso Bike Plan Bike Facilities	Min. Sidewalk Width
G-6 Rural Settlement	2-4 lanes, depending on traffic volumes. 11 ft lanes preferred, though 12 ft lanes may be used for particular needs such as truck routes	Medians	Not allowed	Sidewalk is critical, though separation from roadway is also desirable	Shared use path or Bike Lane, depending on overall driveway spacing and access patterns	5 ft sidewalk is critical to preserve in these areas
O-3 Agriculture	2-4 lanes, 12 ft lane widths	Medians	Not allowed	None	Shared use path or Shoulder Bikeway	Not applicable
O-4 Military Reserve	2-4 lanes, 12 ft lane widths	Medians	Not allowed	None	Bike Lanes or Bicycle Boulevard.	Not applicable
O-5 Remote	2-4 lanes, 12 ft lane widths	Medians	Not allowed	None	Bike Lanes or Bicycle Boulevard.	Not applicable
O-6 Potential Annexation	2-4 lanes, 12 ft lane widths	Medians	Not allowed	None	Bike Lanes or Bicycle Boulevard.	Not applicable

MAJOR ARTERIAL RURAL AREA TYPE
108 FT TOTAL ROW



Medians should be standard in rural sections, as access management principles should apply to new development.

Number of travel lanes should be determined by traffic volumes (or projected volumes from new major developments). 110 ft section shown here is a four-lane section. **Inside travel lane dimensions exclude gutter, which is included in median dimensions.**

Bicycle facilities should be included when designated in the El Paso Bike Plan, with protected facilities preferred. Bicycle lane dimensions include the gutter, but the gutter is not considered a ridable surface.

ROW accommodates swale drainage until future curb and gutter is constructed.

5 ft sidewalk is a high priority in Rural Settlement areas only; it is not required in other Plan El Paso area designations.

4.4 MINOR ARTERIALS

4.4.1 MINOR ARTERIAL - COMPACT URBAN

In the Compact Urban context, the denser street network allows minor arterials to have only two travel lanes. Vehicular lanes are reduced to 10 ft in width and sharrow markings are provided to slow the vehicular design speeds and provide a better balance between all modes of travel (vehicle, pedestrian, and bike). On-street parking produces further traffic calming, and provides a buffer between pedestrians and moving vehicles. The street gutter pan should be located within the prescribed parking lane dimension.

Parallel parking should be allowed up to within 25 ft of the curb radius return at intersections. Where left turn lanes are needed, additional parking may be eliminated closest to intersections to provide needed width. Curb extensions at intersections are not recommended, as these can interfere with turning movements of emergency service and similar-sized vehicles.

Note: One travel lane each direction should be increased to 11 ft in width on transit streets.

BASIC DESIGN FACTORS

MINOR ARTERIAL COMPACT URBAN AREA TYPE

BASE ROW: 92 FEET

Thoroughfare Cross-Section Design Factors and Priorities

	Typical Lanes/ Widths	Medians/Access	On-Street Parking	Streetscape Elements	El Paso Bike Plan Bike Facilities	Min. Sidewalk Width
G-1 Downtown	4-6 lanes depending on volumes. 10 ft inner lanes and 11 ft outer lanes (for transit vehicles)	Medians (except G-1) preferred. Curb cuts should be restricted.	On-street parking is highly important in commercial land use contexts	Planter strip, which may be substituted for hardscape treatment. The separation from sidewalk to travel lanes is important for pedestrian safety in these areas	CT or BBL should always be used on designated routes. In right-of-way constraints, buffer may be reduced or eliminated	8 ft minimum critical
G-2 Traditional Neighborhood						8 ft
O-7 Urban Expansion	4-6 lanes, 10 ft-11 ft lanes		Conditional		When planning for new routes, plan space for protected facilities	8 ft

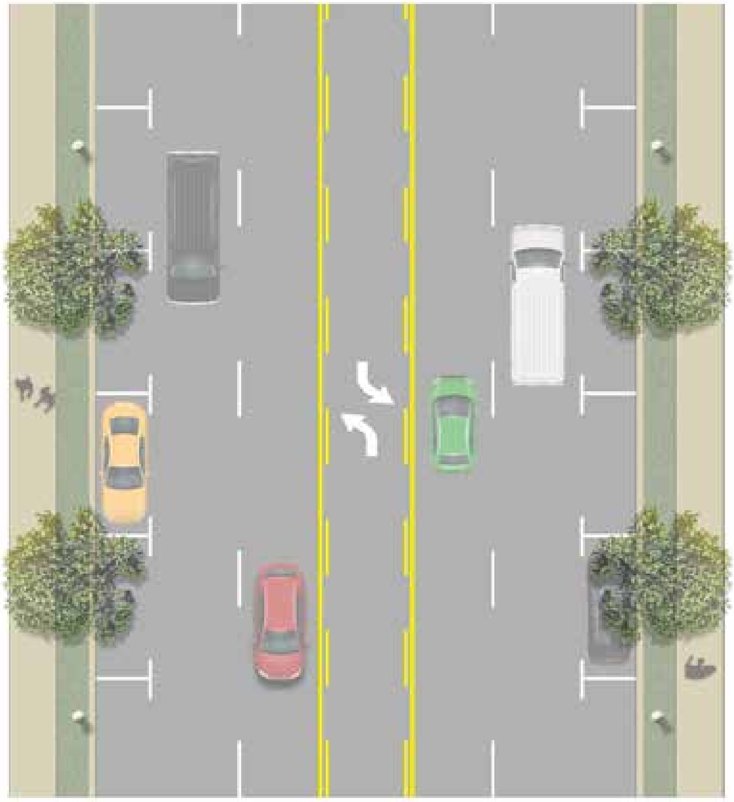
The above design factors and priorities may be applied in O-6 Potential Annexation as necessary with future annexations.

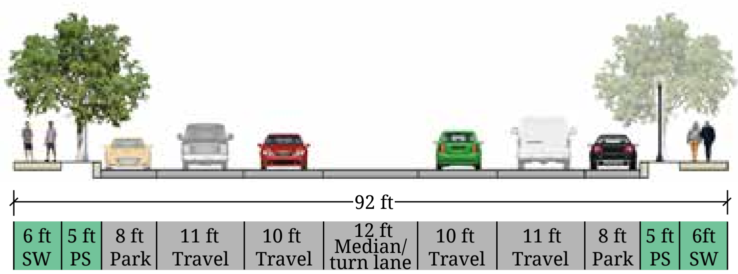
Other Thoroughfare Design Factors

Traffic Volume Threshold for Added Lanes	35,000 vehicles per day existing or projected volume (based on major development) to expand from four to six lanes.
Mid-Block Crossings [1] and Other Pedestrian Enhancements	Mid-block crossings may be allowed when block lengths (or the spacing between otherwise protected pedestrian crossings) exceeds 600 feet.
Curbside Management Concerns	On-street parking should be focused on commercial or multi-family areas only. Freight and passenger pickup/drop-off may be designated.
Transit Vehicle Design and Needs	Transit routes may designate stops in curbside lanes. Generally, 62 feet and 95 feet of curbside length should be reserved at stops for standard transit bus and Brio transit bus vehicle needs respectively.

Note 1: Mid-block crossings shall be determined by engineering studies/judgment not just define spacing, provided sources and defined regular block spacing.

MINOR ARTERIAL COMPACT URBAN AREA TYPE
92 FT TOTAL ROW





Wider sidewalks are desirable, but in trade-offs and constrained situations, 6ft minimum is critical to preserve in Drivable Suburban area types.

Medians (except in G-1) are a preferred means of access management, with space to allow turn lanes. Two-way left turn lanes may be used in existing conditions with frequent driveway spacing or where access management is difficult to implement.

Number of travel lanes should be determined by traffic volumes (or projected volumes from new major developments. 11ft outer lanes are preferred on major transit and truck route corridors.

Bicycle facilities should be included when designated in the El Paso Bike Plan, with protected facilities preferred. This may be substituted for on-street parking in space constrained areas and in industrial land use contexts where curbside parking is a low priority. Parking and bike lane dimensions are inclusive of the gutter.

Planter strips or hardscape areas allow street trees and critical separation of pedestrians and moving traffic in Drivable Suburban area types, especially when parking or bike facilities are not included.

4.4.2 MINOR ARTERIAL - DRIVABLE SUBURBAN

The Suburban section is the most similar to the existing permitted minor arterial section. Two travel lanes are provided in the basic section, with an option to add two additional lanes if warranted by traffic demand. The vehicular lanes are 11 ft width in this auto-dominant environment. The pedestrian realm is widened to enhance walking and biking opportunities. The tree-lined parkway provides separation between pedestrians, bicyclists, and moving vehicles.

BASIC DESIGN FACTORS

MINOR ARTERIAL DRIVABLE SUBURBAN AREA TYPE

BASE ROW: 90 FEET (4 LANE) / 70 FEET (2 LANE)

Thoroughfare Cross-Section Design Factors and Priorities

	Typical Lanes/Widths	Medians/ Access	On-Street Parking	Streetscape Elements	El Paso Bike Plan Bike Facilities	Min. Sidewalk Width
G-3 Post-War	2-4 lanes depending on volumes, 10-11 ft lanes. 10 ft lanes typ. for inner lanes; 11 ft lanes typ. for outer lanes on priority transit corridors and truck routes	Medians are preferred, though two-way left turn lanes may be used	Conditional depends on land use context. This is preferred for commercial locations with smaller parcel patterns	Planter strips, which may be substituted with hardscape materials for special treatments such as bus stops	BBL, BL, or a SUP appropriate, though in these area types any designated corridors should emphasize pedestrian and cyclist safety	6 ft
G-4 Suburban						6 ft
G-5 Independent City	2-4 lanes, 10 ft-12 ft	Medians	Conditional	Planter strip	SUP/BBL/BL	6 ft
G-7 Industrial	2-4 lanes, 10 ft-12 ft	Medians or TWLTL	Low priority; may not be feasible due to other design factors	Sidewalks critical to preserve, though other streetscape is a lesser priority	SUP/BBL/BL	6 ft
G-8 Fort Bliss Mixed Use	2-4 lanes, 10 ft-12 ft	Medians	Conditional	Sidewalk	SUP/BBL/BL	6 ft
G-9 Fort Bliss Military	2-4 lanes, 10 ft-12 ft	Medians	Conditional	Sidewalk	SUP/BBL/BL	6 ft

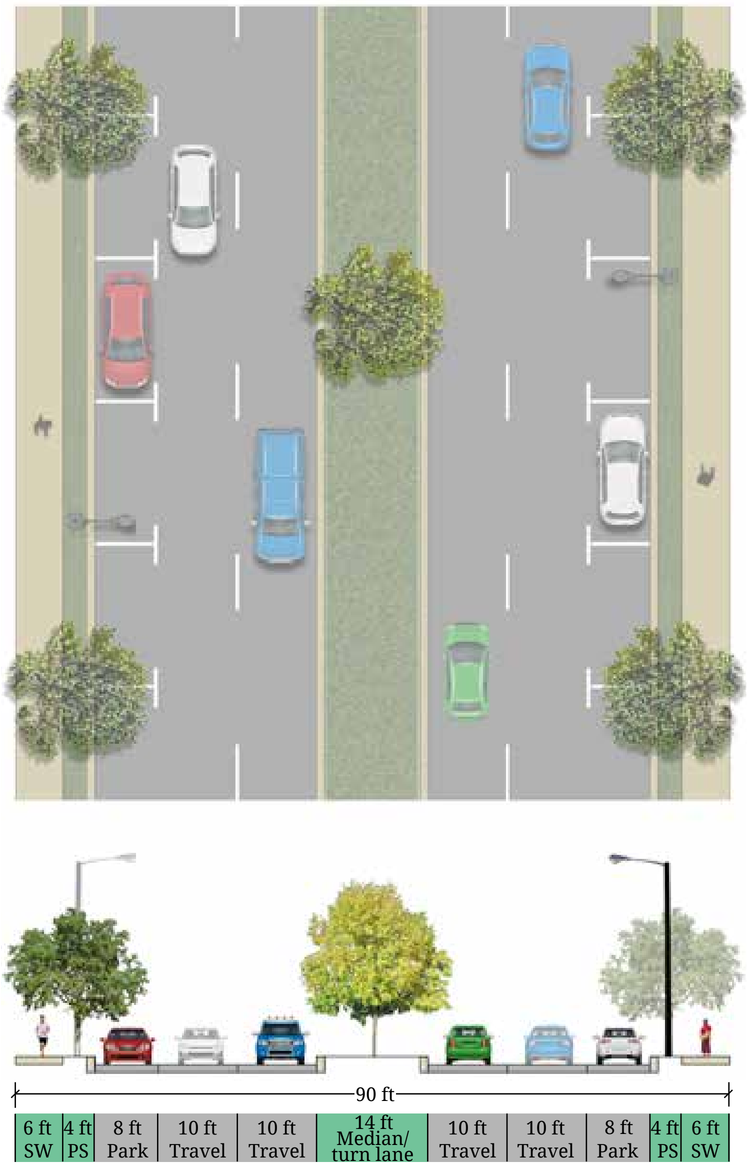
The above design factors and priorities may be applied in O-6 Potential Annexation as necessary with future annexations.

Other Thoroughfare Design Factors

Traffic Volume Threshold for Added Lanes	18,000 vehicles per day existing or projected volume (based on major development) to expand from two to four lanes.
Mid-Block Crossings [1] and Other Pedestrian Enhancements	Mid-block crossings may be allowed when block lengths (or the spacing between otherwise protected pedestrian crossings) exceeds 1,000 feet.
Curbside Management Concerns	On-street parking should be focused on commercial or multi-family areas only. Freight and passenger pickup/drop-off should not be designated.
Transit Vehicle Design and Needs	Transit routes may designate stops in curbside lanes. Generally, 62 feet and 95 feet of curbside length should be reserved at stops for standard transit bus and Brio transit bus vehicle needs respectively.

Note 1: Mid-block crossings shall be determined by engineering studies/judgment not just define spacing, provided sources and defined regular block spacing.

MINOR ARTERIAL DRIVABLE SUBURBAN AREA TYPE
90 FT TOTAL ROW



Medians are preferred means of access management, with space to allow turn lanes.

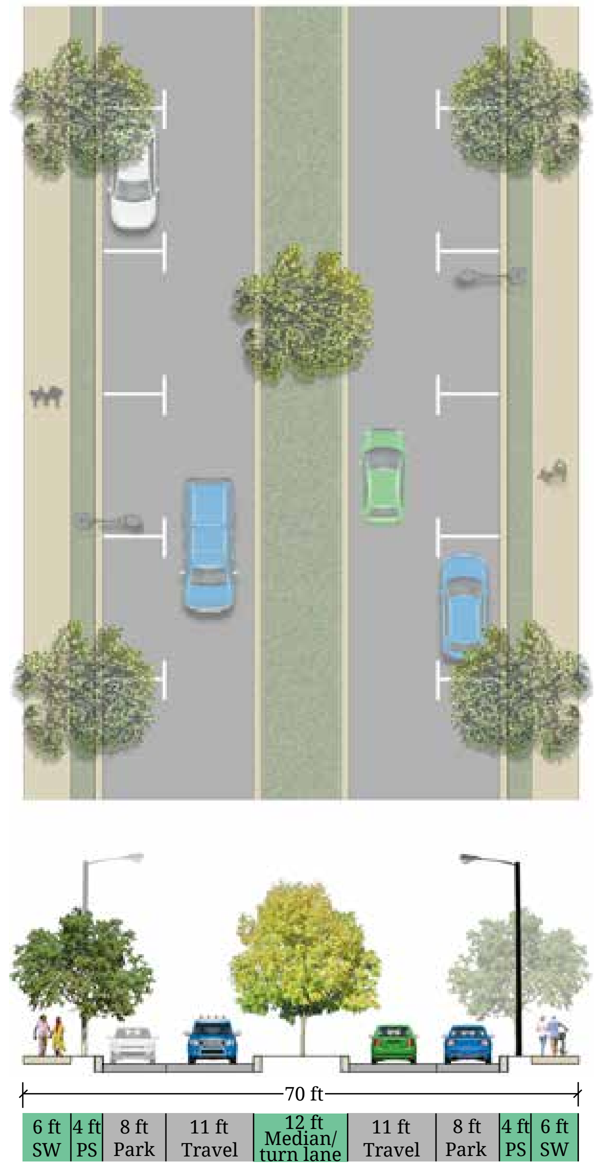
Travel lanes are the main priority of arterials, though in Drivable Suburban area types 10 ft inner lanes may be used. 11 ft outer lanes should be designated on priority transit corridors. **Inside travel lane dimensions exclude gutter, which is included in median dimensions.**

Bicycle facilities should be included when designated in the El Paso Bike Plan, with protected facilities preferred. This may be substituted for on-street parking, though in space constraints these are less of a priority than ensuring the arterial function of the street and pedestrian safety.

Planter strips or hardscape areas allow street trees and critical separation of pedestrians and moving traffic in Compact Urban area types, especially when parking or bike facilities are not included.

Wider sidewalks are desirable, but in trade-offs and constrained situations, 6 ft minimum is critical to preserve in Drivable Suburban area types.

MINOR ARTERIAL DRIVABLE SUBURBAN AREA TYPE
70 FT TOTAL ROW



Medians preferred, with space to allow turn lanes.

Travel lanes are the main priority of arterials, though in Drivable Suburban are types 10 ft inner lanes may be used. 11 ft outer lanes should be designated on priority transit corridors. **Inside travel lane dimensions exclude gutter, which is included in median dimensions.**

Bicycle facilities should be included when designated in the El Paso Bike Plan, with protected facilities preferred. This may be substituted for on-street parking with no bike plan designation.

Wider sidewalks are desirable, but in trade-offs and constrained situations, 6 ft minimum is critical to preserve in Drivable Suburban area types.

4.4.3 MINOR ARTERIAL - RURAL

The Rural section provides two lanes, with an option to add two additional lanes if warranted by traffic demand. A wide swale provides separation between pedestrians, bicyclists, equestrians, and moving vehicles. Trees in swales are typically clustered organically.

BASIC DESIGN FACTORS

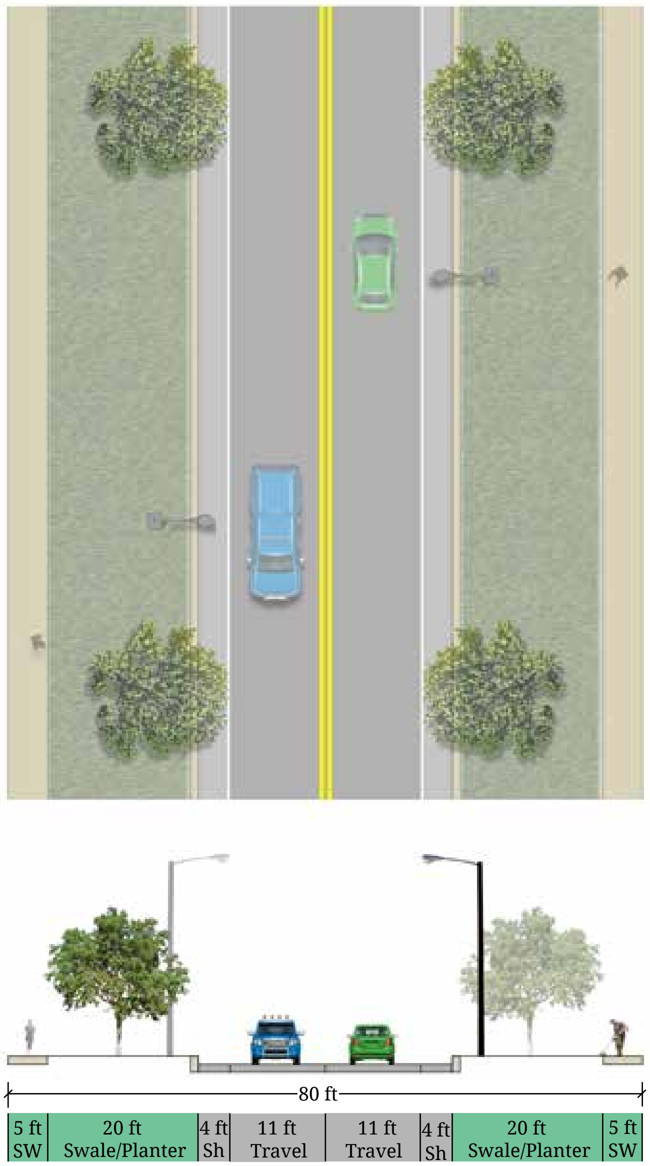
MINOR ARTERIAL RURAL AREA TYPE

BASE ROW: 80 FEET

Thoroughfare Cross-Section Design Factors and Priorities

	Typical Lanes/Widths	Medians/ Access	On-Street Parking	Streetscape Elements	El Paso Bike Plan Bike Facilities	Min. Sidewalk Width
G-6 Rural Settlement	2-4 lanes, depending on traffic volumes. 11 ft lanes preferred, though 12 ft lanes may be used for particular needs such as truck routes	Medians	Not allowed	Sidewalk	Shared use path or Bike Lane, depending on overall driveway spacing and access patterns	5 ft sidewalk is critical to preserve in these areas
O-3 Agriculture	2-4 lanes, 12 ft lane widths	Medians	Not allowed	None	Shared use path or Bike Lanes	Not applicable
O-4 Military Reserve	2-4 lanes, 12 ft lane widths	Medians	Not allowed	None	Shared use path or Bike Lanes	Not applicable
O-5 Remote	2-4 lanes, 12 ft lane widths	Medians	Not allowed	None	Shared use path or Bike Lanes	Not applicable
O-6 Potential Annexation	2-4 lanes, 11-12 ft lane widths	Medians	Not allowed	None	Shared use path or Bike Lanes	Not applicable

MINOR ARTERIAL RURAL AREA TYPE
80 FT TOTAL ROW



Number of travel lanes should be determined by traffic volumes (or projected volumes from new major development). 80 ft ROW accommodates a 4-lane section should expansion be warranted.

If designated in bike plan, shoulders should be substituted for bike facilities, or space in swale dedicated to off-street/off-road facilities (such as sidepaths).

ROW accommodates swale drainage until future curb and gutter is constructed.

5 ft Sidewalk is a high priority in Rural Settlement areas only; it is not required in other Plan El Paso area designations.

4.5 COLLECTORS

4.5.1 COLLECTOR - COMPACT URBAN

In the Compact Urban context, Collectors may generally have narrower lanes, although these may still function as preferred routes for transit and should consider that when designing streets. Medians remain a preferred means of access management, as they are with arterials, though these may be substituted with turn lanes as needed, including two-way left turn lanes on longer blocks.

BASIC DESIGN FACTORS

COLLECTOR COMPACT URBAN AREA TYPE

BASE ROW: 74 FEET

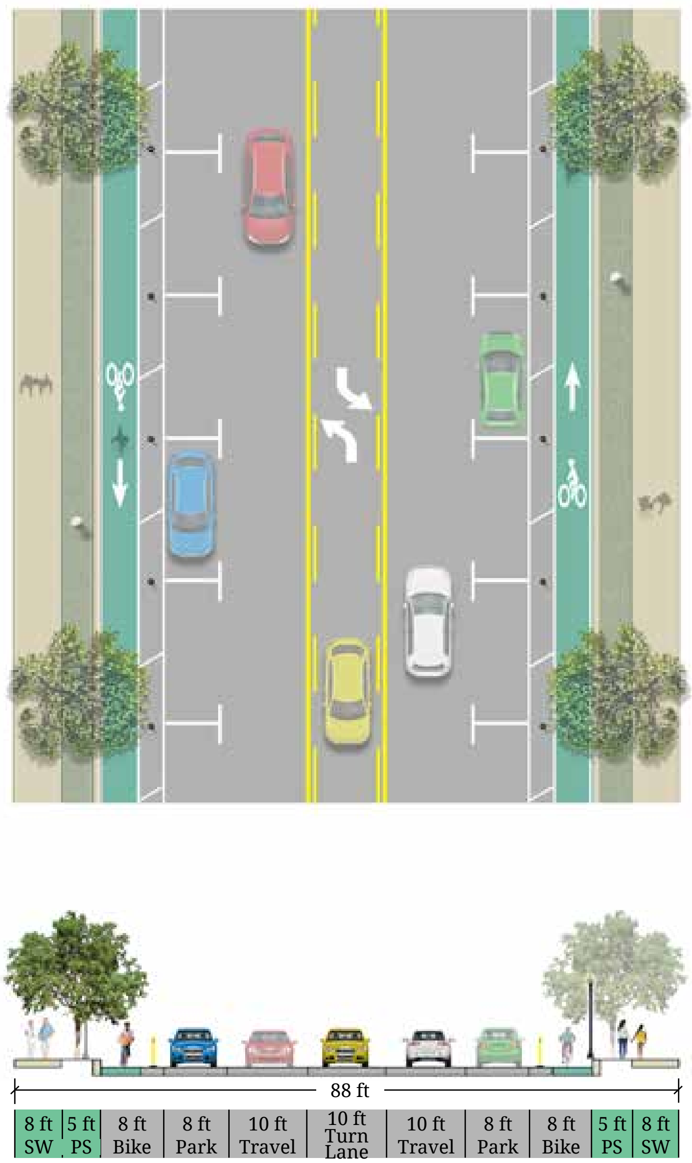
<table>
<tr><th colspan="7">Thoroughfare Cross-Section Design Factors and Priorities</th></tr>
<tr><th></th><th>Typical Lanes/ Widths</th><th>Medians/Access</th><th>On-Street Parking</th><th>Streetscape Elements</th><th>El Paso Bike Plan Bike Facilities</th><th>Min. Sidewalk Width</th></tr>
<tr><th>G-1 Downtown</th><td rowspan="2">2-4 lanes depending on volumes. 10 ft inner lanes and 11 ft outer lanes (for transit vehicles)</td><td rowspan="3">Medians preferred for driving roadways. Two-way left turn lanes may be provided in areas with frequent existing driveways</td><td rowspan="2">Allowed</td><td rowspan="3">Planter strip, which may be substituted for hardscape treatment. The separation from sidewalk to travel lanes is important for pedestrian safety in these areas</td><td rowspan="2">Cycle Track or Buffered Bike Lane should always be used on designated routes. In right-of-way constraints, buffer may be reduced or eliminated</td><td>8 ft minimum is critical to meet</td></tr>
<tr><th>G-2 Traditional Neighborhood</th><td>8 ft</td></tr>
<tr><th>& O-7 Urban Expansion</th><td>2-4 lanes, 10 ft-11 ft lanes</td><td>Allowed</td><td>When planning for new routes, plan space for protected facilities</td><td>8 ft</td></tr>
</table>

The above design factors and priorities may be applied in O-6 Potential Annexation as necessary with future annexations.

Other Thoroughfare Design Factors	
Traffic Volume Threshold for Added Lanes	18,000 vehicles per day existing or projected volume (based on major development) to expand from four to six lanes.
Mid-Block Crossings [1] and Other Pedestrian Enhancements	Mid-block crossings may be allowed when block lengths (or the spacing between otherwise protected pedestrian crossings) exceeds 800 feet.
Curbside Management Concerns	On-street parking should be focused on commercial or multi-family areas, though is generally allowed. Freight and passenger loading areas may be designated.
Transit Vehicle Design and Needs	Transit routes may designate stops in curbside lanes. Generally, 62 feet and 95 feet of curbside length should be reserved at stops for standard transit bus and Brio transit bus vehicle needs respectively.

Note 1: Mid-block crossings shall be determined by engineering studies/judgment not just define spacing, provided sources and defined regular block spacing.

COLLECTOR COMPACT URBAN AREA TYPE
88 FT TOTAL ROW



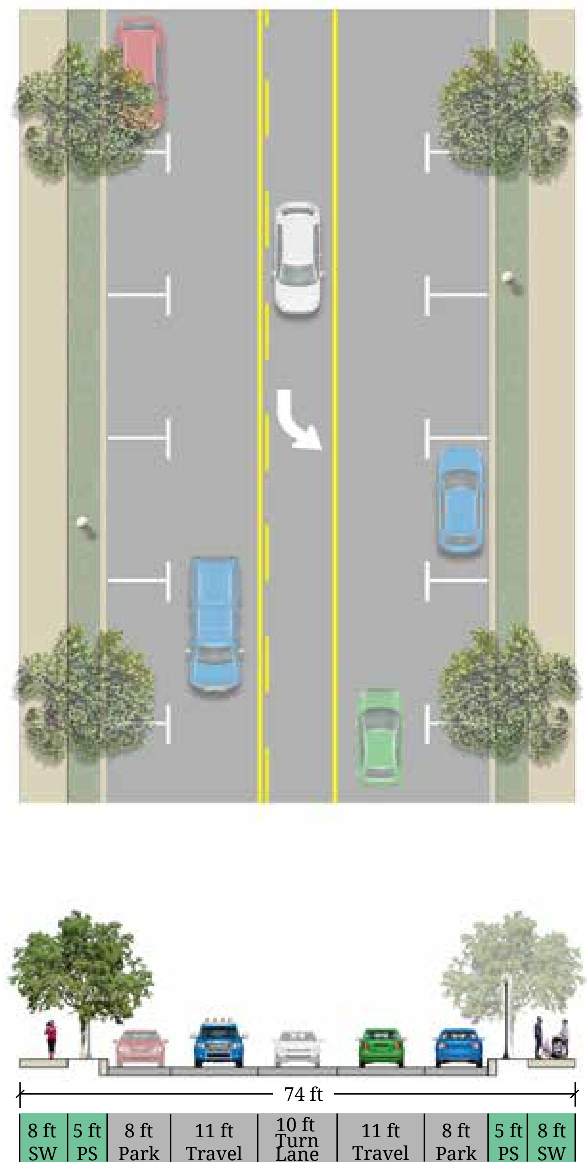
Turn lanes at intersections or along streets as needed.

Travel lanes are the main priority of arterials, though in Compact Urban area types 10 ft inner lanes may be used. 11 ft outer lanes should be designated on priority transit corridors.

Bicycle facilities should be included when designated in the El Paso Bike Plan, with protected facilities preferred. This may be substituted for on-street parking with no bike plan designated, or as space allows with other needs, both may be used. Bike lane dimensions include the gutter, but the gutter is not considered a ridable surface..

Wider sidewalks are desirable, but in trade-offs and constrained situations, 8 ft minimum is critical to preserve in Compact Urban area types.

COLLECTOR COMPACT URBAN AREA TYPE
74 FT TOTAL ROW



Turn lanes at intersections or along street as needed.

Travel lanes are the main priority of arterials, though in Compact Urban area types 10 ft inner lanes may be used. 11 ft outer lanes should be designated on priority transit corridors.

Parking lane dimensions include the gutter. Depending on priorities, context and available right-of-way, bicycle facilities may be included in the Curbside Zone. Where designated in the El Paso Bike Plan, bicycle facilities should be included, with protected facilities preferred.

Wider sidewalks are desirable, but in trade-offs and constrained situations, 8 ft minimum is critical to preserve in Compact Urban area types.

4.5.2 COLLECTOR - DRIVABLE SUBURBAN

The Suburban section is the most similar to the existing permitted sections. The vehicular lanes are 11 feet wide in this auto-dominant environment. The pedestrian realm is widened to enhance walking and biking opportunities. The tree-lined parkway provides separation between pedestrians, bicyclists, and moving vehicles.

<u>Note:</u> Travel lanes may be increased to 12-14 feet in width in industrial zones.

BASIC DESIGN FACTORS

COLLECTOR DRIVABLE SUBURBAN AREA TYPE

BASE ROW: 71 FEET (NON-RESIDENTIAL) / 58 FEET (RESIDENTIAL) / 62 FEET (INDUSTRIAL)

<table>
<tr><th colspan="7">Thoroughfare Cross-Section Design Factors and Priorities</th></tr>
<tr><th></th><th>Typical Lanes/Widths</th><th>Medians/ Access</th><th>On-Street Parking</th><th>Streetscape Elements</th><th>El Paso Bike Plan Bike Facilities</th><th>Min. Sidewalk Width</th></tr>
<tr><td>G-3 Post-War</td><td rowspan="2">2-4 lanes depending on volumes, 10-11 foot lanes. 11 foot lanes typ. in areas with transit, on-street parking or where bicycle facilities are designated. Protected facilities do not fit in constrained right-of-way</td><td rowspan="2">Medians or TWLTL with two travel lanes</td><td rowspan="2">Allowed, and preferred in commercial and residential areas without on-site parking or driveway access</td><td rowspan="2">Planter strips, which may be substituted with hardscape materials for special treatments such as bus stops</td><td rowspan="2">El Paso Bike Plan designations should be followed as collectors are a key network component to balance safety with connectivity of routes. Protected facilities preferred, but bicycle lanes may be used.</td><td>5 ft</td></tr>
<tr><td>G-4 Suburban</td><td>5 ft</td></tr>
<tr><td>G-5 Independent City</td><td>2-4 lanes, depending on traffic volumes. 10-11 foot lane widths may be used</td><td>Medians or TWLTL</td><td>Allowed</td><td>Planter strip</td><td>Bike Lanes or Sidepaths</td><td>5 ft</td></tr>
<tr><td>G-7 Industrial</td><td>2-4 lanes, depending on traffic volumes. 10-11 foot lane widths may be used</td><td>Medians or TWLTL</td><td>Allowed</td><td>Sidewalks critical to preserve; other streetscape is a lesser priority</td><td>Bike Lanes or Sidepaths</td><td>5 ft</td></tr>
<tr><td>G-8 Fort Bliss Mixed Use</td><td rowspan="2">2-4 lanes, depending on traffic volumes. 10-11 foot lane widths may be used</td><td>Medians or TWLTL</td><td>Conditional, based on land use context</td><td>Sidewalk</td><td>Bike Lanes or Sidepaths</td><td>5 ft</td></tr>
<tr><td>G-9 Fort Bliss Military</td><td>Medians or TWLTL</td><td>Not allowed</td><td>Sidewalk</td><td>Bike Lanes or Sidepaths</td><td>5 ft</td></tr>
</table>

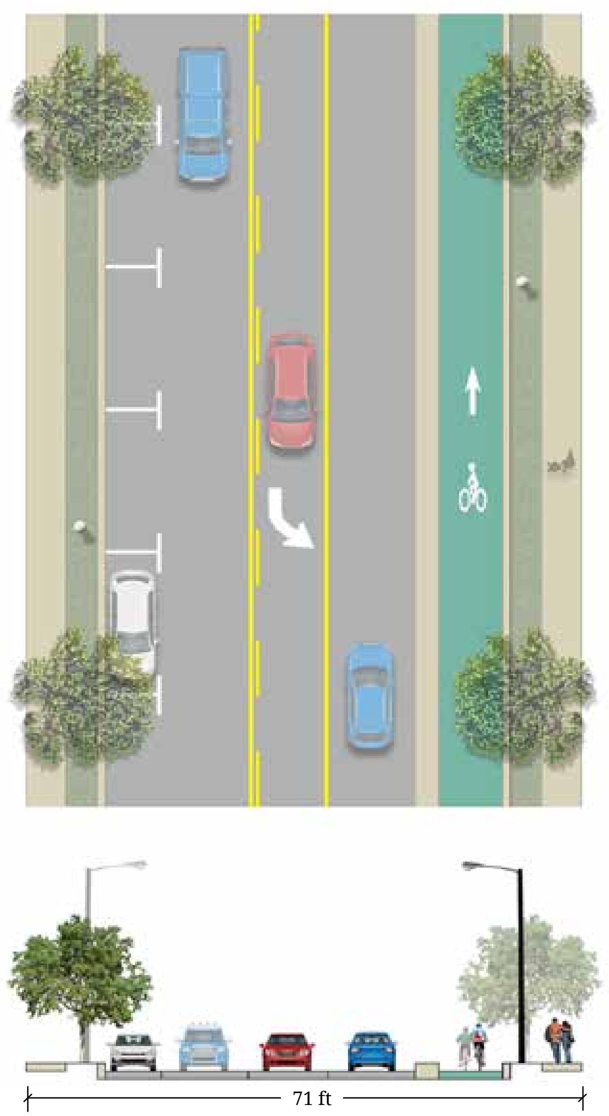
The above design factors and priorities may be applied in O-6 Potential Annexation as necessary with future annexations.

Other Thoroughfare Design Factors	
Traffic Volume Threshold for Added Lanes	Two lanes for volumes less than or equal to 18,000 vehicles per day; Four lanes for volumes greater than 18,000 vehicles per day; Collectors in Drivable Suburban area types should not need to be expanded beyond four lanes.
Mid-Block Crossings[1] and Other Pedestrian Enhancements	Mid-block crossings may be allowed when block lengths (or the spacing between otherwise protected pedestrian crossings) exceeds 1,000 feet.
Curbside Management Concerns	On-street parking should be focused on commercial or multi-family areas, though is generally allowed. Freight and passenger loading may happen freely without a need for designated areas.
Transit Vehicle Design and Needs	Transit routes may designate stops in curbside lanes. Generally, 62 feet and 95 feet of curbside length should be reserved at stops for standard transit bus and Brio transit bus vehicle needs respectively.

Note 1: Mid-block crossings shall be determined by engineering studies/judgment not just define spacing, provided sources and defined regular block spacing.

NON-RESIDENTIAL COLLECTOR DRIVABLE SUBURBAN AREA TYPE

71 FT TOTAL ROW



5 ft SW	5 ft PS	8 ft Park	11 ft Travel	10 ft Turn Lane	11 ft Travel	11 ft Bike	5 ft PS	5 ft SW

Bike lane dimensions include the gutter. One way cycle track shown.

Turn lanes at intersections or along street as needed.

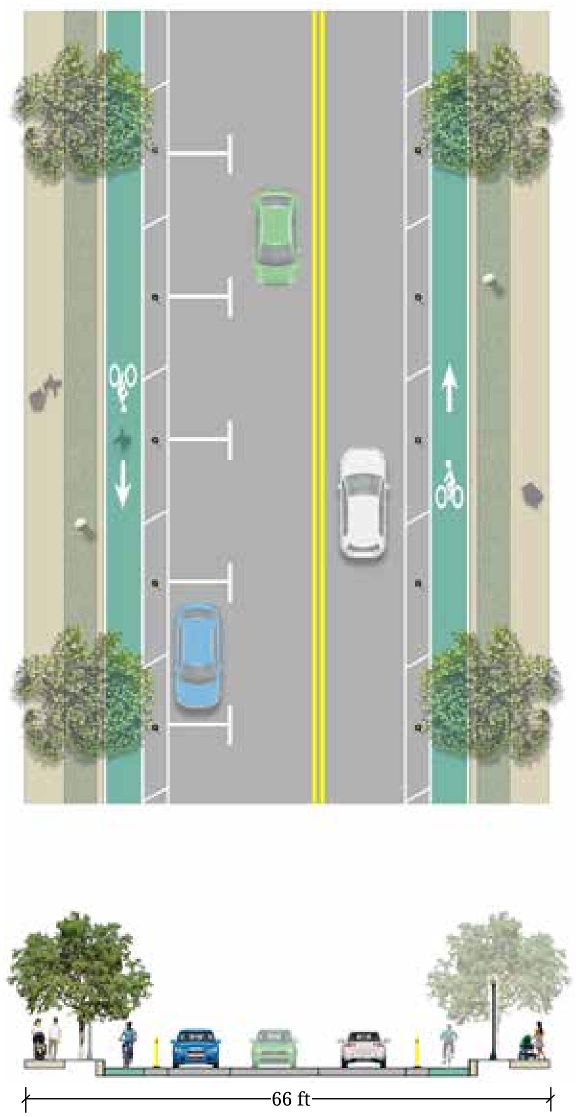
11 foot travel lanes recommended adjacent to narrow on-street parking spaces; may reduce to 10 foot in constrained conditions.

Parking lane dimensions include the gutter. Bicycle facilities should be included when designated in the El Paso Bike Plan, with protected facilities preferred. As shown in this cross-section illustration, both parking and bikes are accommodated on separate sides of the street using a two-way cycle track.

Wider sidewalks are preferred, but in trade-offs and constrained situations, 5 foot minimum is critical to preserve in Drivable Suburban area types.

RESIDENTIAL COLLECTOR DRIVABLE SUBURBAN AREA TYPE

66 FT TOTAL ROW



5 ft SW	5 ft PS	8 ft Bike	8 ft Park	11 ft Travel	11 ft Travel	8 ft Bike	5 ft PS	5 ft SW

Bike lane dimensions include the gutter.

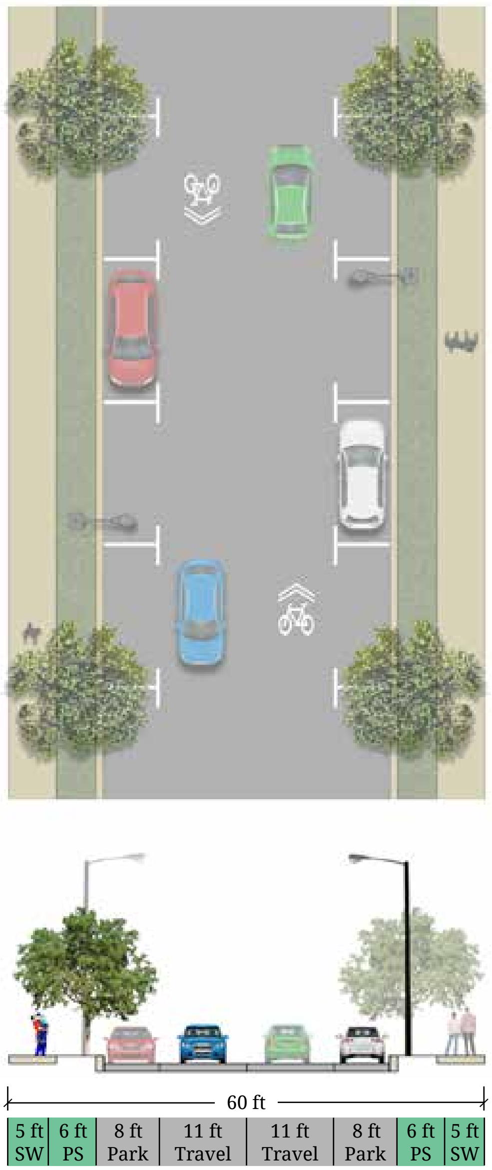
11 foot travel lanes recommended adjacent to narrow on-street parking spaces; may reduce to 10 foot in constrained conditions.

On-street parking may be important in neighborhood contexts where properties directly access arterials. This should be balanced with land development regulations and the permission of driveway curb cuts to ensure adequate curbside for allowing on-street parking. Parking lane dimensions include the gutter.

Streets with lower speeds and volumes, bike lanes or bicycle boulevards may be used as recommended in the El Paso Bike Plan.

Wider sidewalks are preferred, but in trade-offs and constrained situations, 5 foot minimum is critical to preserve in Drivable Suburban area types.

RESIDENTIAL COLLECTOR DRIVABLE SUBURBAN AREA TYPE
60 FT TOTAL ROW

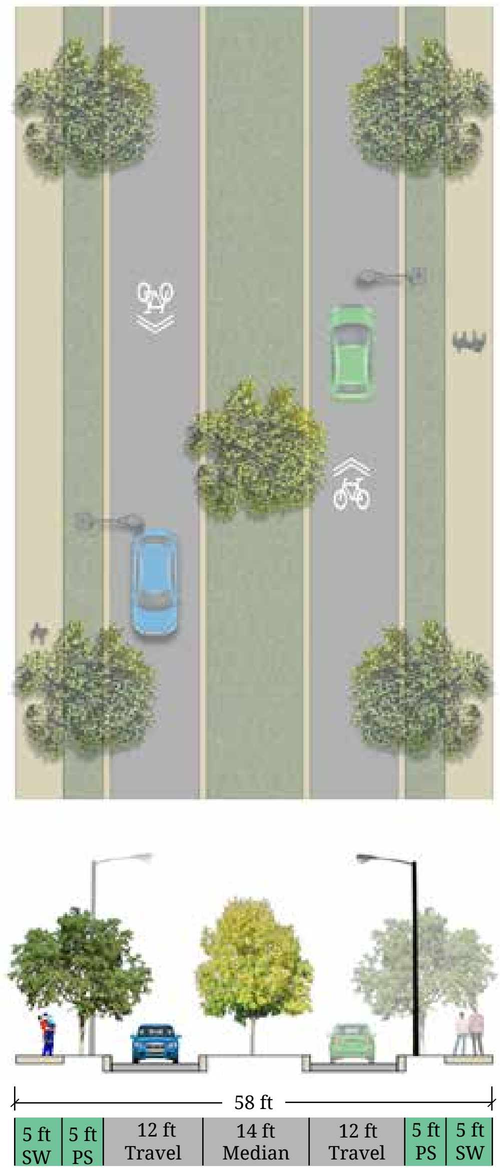


Travel lane widths may be reduced though care should be taken adjacent to parking and other auxiliary uses such that they protrude from their design dimensions.

On-street parking is an important component of commercial land use contexts, though less of a priority in Drivable Suburban area types than in Compact Urban areas types. It may be substituted for bicycle facilities as recommended in the El Paso Bike Plan. Parking lane dimension includes the gutter.

Wider sidewalks are desirable, but in trade-offs and constrained situations, 5 ft minimum is critical to preserve in non-residential areas of Drivable Suburban area types.

RESIDENTIAL COLLECTOR DRIVABLE SUBURBAN AREA TYPE
58 FT TOTAL ROW



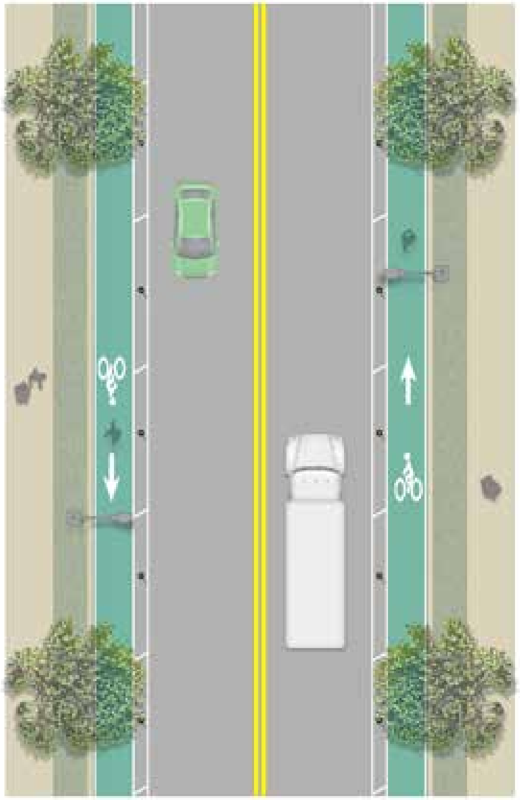
Medians are preferred means of access management, with space to allow turn lanes. Dimensions include gutter on both sides.

Travel lane dimensions include outside gutter; median gutters are included in median dimensions.

Wider sidewalks are desirable, but in trade-offs and constrained situations, 5 ft minimum is critical to preserve in non-residential areas of Drivable Suburban area types.

INDUSTRIAL COLLECTOR DRIVABLE SUBURBAN AREA TYPE

62 FT TOTAL ROW



62 ft

5 ft SW	5 ft PS	7 ft Bike	14 ft Travel	14ft Travel	7 ft Bike	5 ft PS	5 ft SW

Bike lane dimensions include the gutter.

14 foot travel lanes accommodate industrial vehicles and prevent damage to buffer areas adjacent to bike lanes/cycle tracks or vehicular trespass into unprotected bike lanes.

Bike facilities should be used to complete the bike network as recommended in the El Paso Bike Plan.

Wider sidewalks are preferred, but in trade-offs and constrained situations, 5 ft minimum is critical to preserve in Drivable Suburban area types.

4.5.3 COLLECTOR - RURAL

The vehicular lanes are 11-12 feet wide in this auto-dominant rural environment. Paved shoulders are 6 feet wide to accommodate bicycle mobility as necessary per the El Paso Bike Plan. The pedestrian realm is available in two configurations: one 12 ft shared use path on one side of the street accommodating all pedestrian movement and other appropriate modes, or; 6 ft sidewalks on either side of the street. On-street bicycle facilities are accommodated by either shoulder bikeways or bike lanes. Streets are curbless and stormwater is managed by drainage swales.

BASIC DESIGN FACTORS

COLLECTOR RURAL AREA TYPE

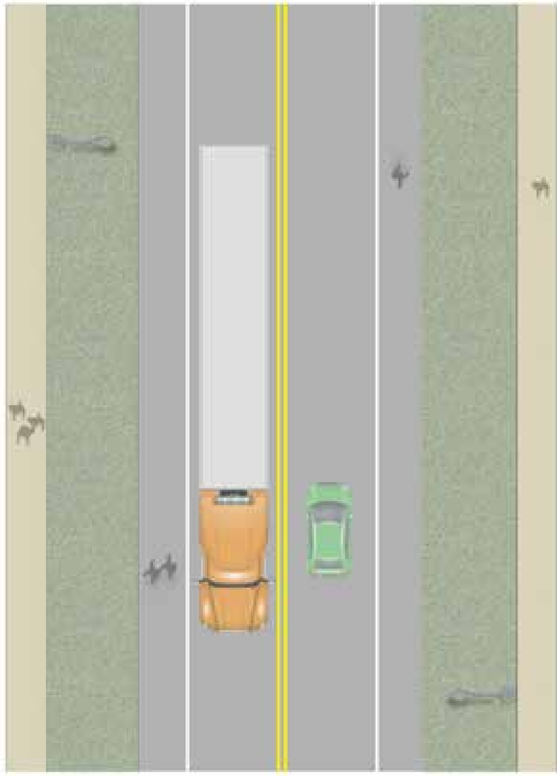
BASE ROW: 70 FEET

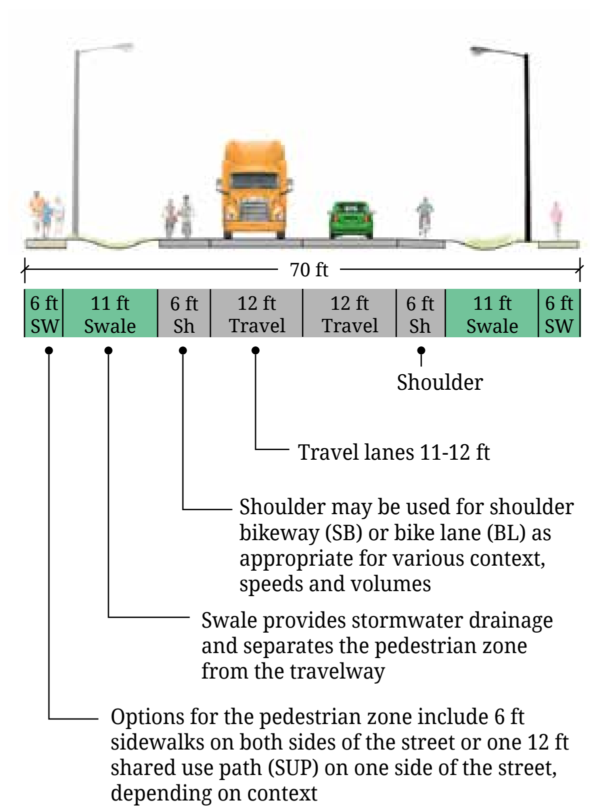
Thoroughfare Cross-Section Design Factors and Priorities

	Typical Lanes/Widths	Medians/ Access	On-Street Parking	Streetscape Elements	El Paso Bike Plan Bike Facilities	Min. Sidewalk Width
G-6, Rural Settlement	2 lanes, 11-12 ft	N/A	Not Allowed	SUP or Sidewalk	BL, SB	6 ft
Open Space Sectors 0-3, 0-4, 0-5, 0-6	2 lanes, 11-12 ft	N/A	Not Allowed	None	SB	N/A

The above design factors and priorities may be applied in O-6 Potential Annexation as necessary with future annexations.

COLLECTOR RURAL AREA TYPE
70 FT TOTAL ROW





4.6 LOCAL STREETS

4.6.1 LOCAL - COMPACT URBAN

In the Compact Urban context, vehicular lanes are reduced to ten feet in width and sharrow markings are provided to slow the vehicular design speeds and provide a better balance between all modes of travel (vehicle, pedestrian, and bike). Nine foot wide travel lanes may be permitted within blocks 400 feet long or less and on streets without on-street parking so long as a 20 foot cleared travelway is maintained for fire access.

On-street parking produces further traffic calming, and provides a buffer between pedestrians and moving vehicles. The street gutter pan should be located within the prescribed parking lane dimension. Parallel parking should be allowed up to within 25 ft of the curb radius return at intersections. Where left turn lanes are needed, additional parking may be eliminated closest to intersections to provide needed width.

BASIC DESIGN FACTORS

LOCAL COMPACT URBAN AREA TYPE

BASE ROW: 62 FEET (NON-RESIDENTIAL) / 60 FEET (RESIDENTIAL)

Thoroughfare Cross-Section Design Factors and Priorities

	Typical Lanes/ Widths	Medians/Access	On-Street Parking	Streetscape Elements	El Paso Bike Plan Bike Facilities	Min. Sidewalk Width
G-1 Downtown	2 lanes; 10 or 11 feet depending on land use context. Commercial and mixed-use streets may use 11 ft lane widths	Medians and other dividers not applicable, though land development regulations should limit curb cuts	Allowed. Parking is important in commercial land use contexts and should be prioritized	Planter strip, which may be substituted for hardscape treatment. The separation from sidewalk to travel lanes is important for pedestrian safety in these areas	Bicycle lane or bicycle boulevard	6 ft minimum is critical to meet.
G-2 Traditional Neighborhood						6 ft
O-7 Urban Expansion	2-4 lanes, 10-11 ft lanes		Allowed			6 ft

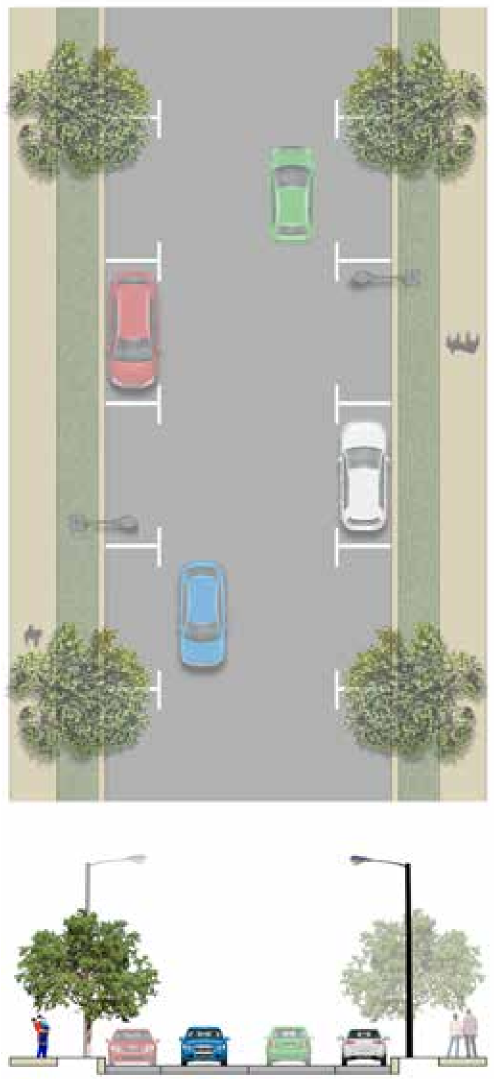
The above design factors and priorities may be applied in O-6 Potential Annexation as necessary with future annexations.

Other Thoroughfare Design Factors

Mid-Block Crossings [1] and Other Pedestrian Enhancements	Mid-block crossings may be allowed when block lengths (or the spacing between otherwise protected pedestrian crossings) exceeds 500 feet.
Curbside Management Concerns	On-street parking allowed, and freight and passenger loading areas may be designated. In areas where on-street parking is not regulated, freight and passenger loading may occur freely.
Transit Vehicle Design and Needs	Transit routes are less likely to follow local streets, but in the event of the preferred transit alignment that would utilize particular local streets, adequate curbside areas should be provided for passenger waiting and loading. Generally, 62 feet and 95 feet of curbside length should be reserved at stops for standard transit bus and Brio transit bus vehicle needs respectively.

Note 1: Mid-block crossings shall be determined by engineering studies/judgment not just define spacing, provided sources and defined regular block spacing.

NON-RESIDENTIAL LOCAL COMPACT URBAN AREA TYPE
62 FT TOTAL ROW



62 ft

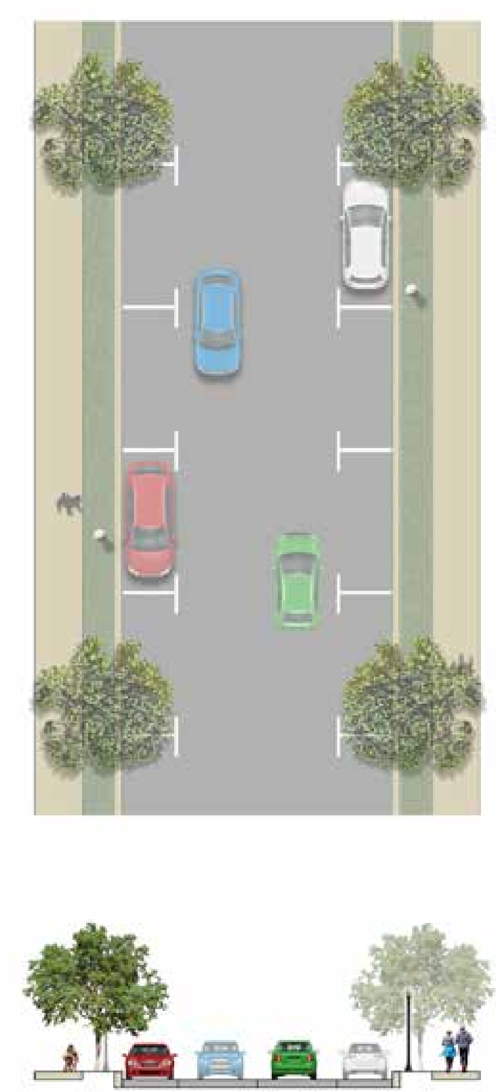
6 ft SW	6 ft PS	8 ft Park	11 ft Travel	11 ft Travel	8 ft Park	6 ft PS	6 ft SW

Travel lane widths may be reduced though care should be taken adjacent to parking and other auxiliary uses that may operate such that they protrude from their design dimensions.

On-street parking is a critical component of commercial land uses contexts, especially on local streets. This should be regarded as a general curbside auxiliary use in these areas, which can also support freight deliveries, passenger pickup and drop-off, and other uses such as dockless bicycle stations. Parking lane dimension includes the gutter. Bike lanes may replace parking lanes depending on priority.

Wider sidewalks are desirable, but in trade-offs and constrained situations, 6 ft minimum is critical to preserve in non-residential areas of Compact Urban area types.

RESIDENTIAL LOCAL COMPACT URBAN AREA TYPE
60 FT TOTAL ROW



60 ft

6 ft SW	5 ft PS	8 ft Park	11 ft Travel	11 ft Travel	8 ft Park	5 ft PS	6 ft SW

Travel lane widths may be reduced to 9 feet depending on context, though care should be taken adjacent to parking and other auxiliary uses that may operate such that they protrude from their design dimensions.

Residential areas of Compact Urban area types tend to rely on street parking more than in suburban neighborhoods and it is important to keep this as a part of designs. However, in constrained conditions, it may be limited to a single side, or drive lanes narrowed as per current DSC street sections. Parking lane dimension includes gutter. Bike lanes may replace parking lanes depending on priority.

Wider sidewalks are desirable, but in trade-offs and constrained situations, 6 ft minimum is critical to preserve in non-residential areas of Compact Urban area types.

4.6.2 LOCAL - DRIVABLE SUBURBAN

The Suburban section is the most similar to the existing permitted sections. Bicyclists and vehicles may share the travel lanes in the local street setting.

BASIC DESIGN FACTORS

LOCAL DRIVEABLE SUBURBAN AREA TYPE

BASE ROW: 60 FEET (NON-RESIDENTIAL)/ 48 FEET (RESIDENTIAL)

The tree-lined parkway provides separation between pedestrians, bicyclists, and moving vehicles.

Note: Travel lanes may be increased to 12 ft width in industrial zones.

<table>
<tr><th colspan="7">Thoroughfare Cross-Section Design Factors and Priorities</th></tr>
<tr><th></th><th>Typical Lanes/Widths</th><th>Medians/ Access</th><th>On-Street Parking Priority</th><th>Streetscape Elements</th><th>El Paso Bike Plan Bike Facilities</th><th>Min. Sidewalk Width</th></tr>
<tr><th>G-3 Post-War</th><td rowspan="2">2 lanes; 9 to 11 feet depending on land use context. Commercial and mixed-use streets may use 11 ft lane widths</td><td>Not Applicable</td><td rowspan="2">Allowed, and preferred in commercial and residential areas without on-site parking or driveway access</td><td rowspan="4">Planter strip, which may be substituted with hardscape materials for special treatments such as bus stops</td><td rowspan="2">El Paso Bike Plan designations shall be followed, though bicycle lanes or bicycle boulevards area appropriate if other design factors control speeds</td><td>5 ft</td></tr>
<tr><th>G-4 Suburban</th><td>Not Applicable</td><td>5 ft</td></tr>
<tr><th>G-5 Independent City</th><td>2 lanes; 9 to 11 feet depending on land use context. Commercial and mixed-use streets may use 11 ft lane widths</td><td>Not Applicable</td><td>Allowed</td><td>Bike Lanes or Bicycle Boulevard</td><td>5 ft</td></tr>
<tr><th>G-7 Industrial</th><td>2 lanes. May use lane widths of up to 14 ft</td><td>Not Applicable</td><td>Allowed</td><td>Bike Lanes or Bicycle Boulevard</td><td>5 ft</td></tr>
<tr><th>G-8 Fort Bliss Mixed Use</th><td rowspan="2">2-4 lanes, depending on traffic volumes. 9 to 11 ft lane widths may be used</td><td>Not Applicable</td><td>Conditional, based on land use context</td><td>Sidewalk</td><td>Bike Lanes or Bicycle Boulevard</td><td>5 ft</td></tr>
<tr><th>G-9 Fort Bliss Military</th><td>Not Applicable</td><td>Not Allowed</td><td>Sidewalk</td><td>Bike Lanes or Bicycle Boulevard</td><td>5 ft</td></tr>
</table>

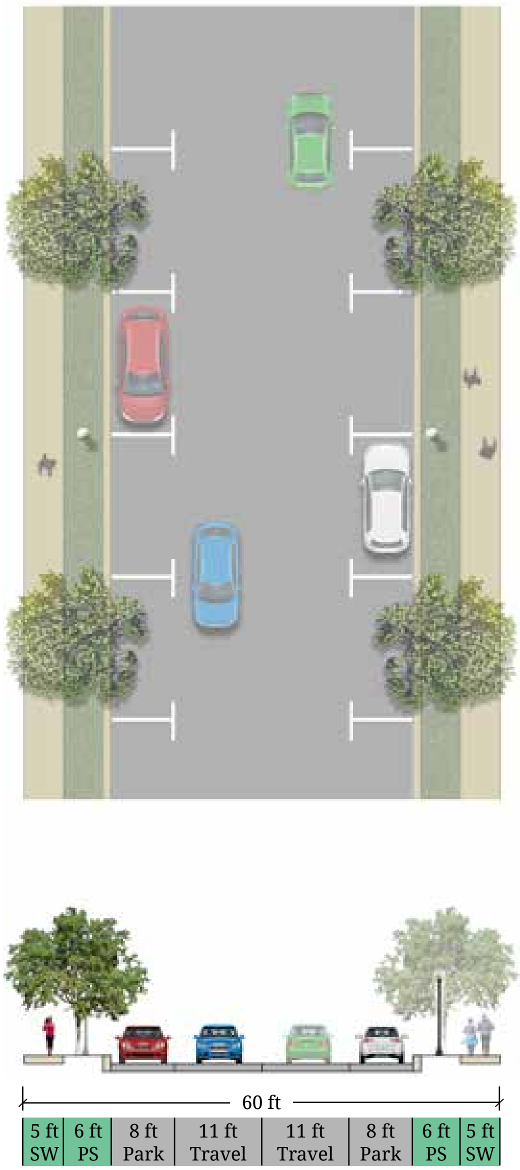
The above design factors and priorities may be applied in O-6 Potential Annexation as necessary with future annexations.

Other Thoroughfare Design Factors	
Mid-Block Crossings [1]	Mid-block crossings may be allowed when block lengths (or the spacing between otherwise protected pedestrian crossings) exceeds 500 feet.
Curbside Management Concerns	On-street parking allowed, and freight and passenger loading areas may be designated. In areas where on-street parking is not regulated freight and passenger loading may occur freely.
Transit Vehicle Design and Needs	Transit routes are less likely to follow local streets, but in the event of preferred transit alignments that would utilize particular local streets, adequate curbside areas should be provided for passenger waiting and loading. Generally, 62 feet and 95 feet of curbside length should be reserved at stops for standard transit bus and Brio transit bus vehicle needs respectively.

Note 1: Mid-block crossings shall be determined by engineering studies/judgment not just define spacing, provided sources and defined regular block spacing.

NON-RESIDENTIAL LOCAL DRIVABLE SUBURBAN AREA TYPE

60 FT TOTAL ROW



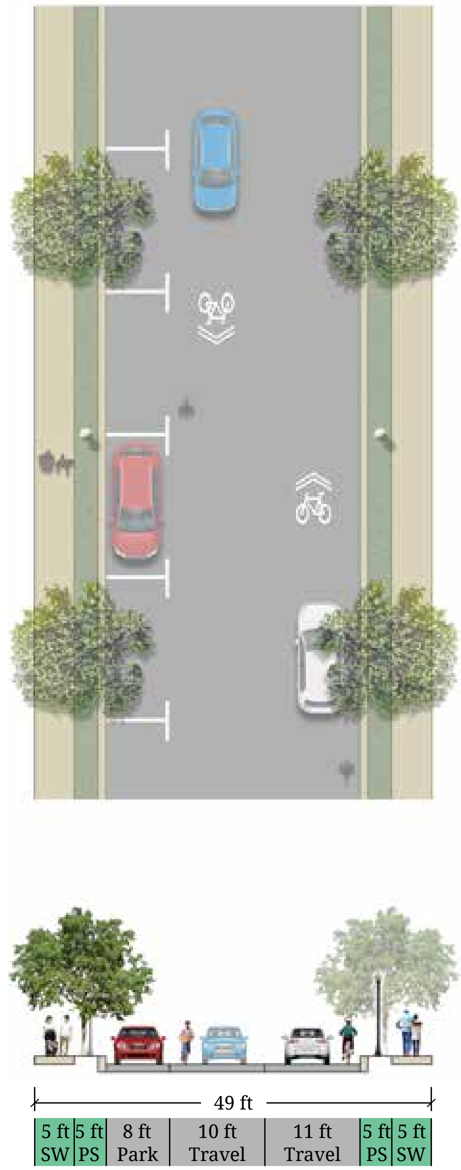
Travel lane widths may be reduced though care should be taken adjacent to parking and other auxiliary uses that may operate such that they protrude from their design dimensions.

On-street parking is an important component of commercial land use contexts, though less of a priority in Drivable Suburban area types than in Compact Urban areas types. It may be substituted for bicycle facilities as recommended in the El Paso Bike Plan. Parking lane dimension includes the gutter.

Wider sidewalks are desirable, but in trade-offs and constrained situations, 5 ft minimum is critical to preserve in non-residential areas of Drivable Suburban area types.

RESIDENTIAL LOCAL DRIVABLE SUBURBAN AREA TYPE

49 FT TOTAL ROW



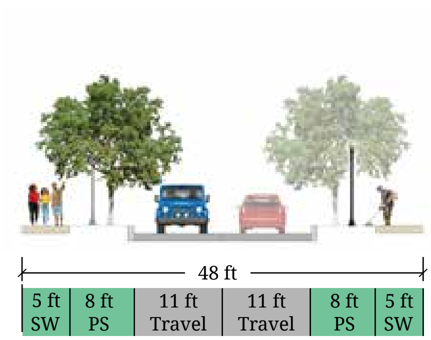
Travel lane widths should generally remain narrow to control speeds on these streets, though treatments such as bicycle boulevards may use wider lanes to allow flexibility for cyclists navigating on-street parking and allowing vehicles to pass cyclists safely. Travel lane dimension includes the gutter. Lane widths may be reduced to 9 feet depending on context.

On-street parking is allowed in Drivable Suburban area types but may be less likely to serve a critical need based on land use patterns and driveways. Parking lane dimension includes the gutter.

Wider sidewalks are desirable, but in trade-offs and constrained situations, 5 ft minimum is critical to preserve in non-residential areas of Drivable Suburban area types.

RESIDENTIAL LOCAL DRIVABLE SUBURBAN AREA TYPE - NO PARKING

48 FT TOTAL ROW



Travel lane widths should remain narrow along neighborhood streets to encourage slow moving traffic. Travel lane dimension includes the gutter. Lane widths may be reduced to 9 feet, depending on context.

A more generous 8 foot planting strip may be more appropriate in Drivable Suburban area types. 6 foot is minimum for health of trees.

Minimum sidewalk width is 5 feet

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4.6.3 LOCAL - RURAL

The vehicular lanes are 10-11 feet wide in this auto-dominant rural environment. The pedestrian realm is available in two configurations: one 10 ft shared use path on one side of the street accommodating all pedestrian movement and other appropriate modes, or; 5 foot sidewalks on either side of the street. Streets are curbless and stormwater is managed by drainage swales.

BASIC DESIGN FACTORS

LOCAL RURAL AREA TYPE

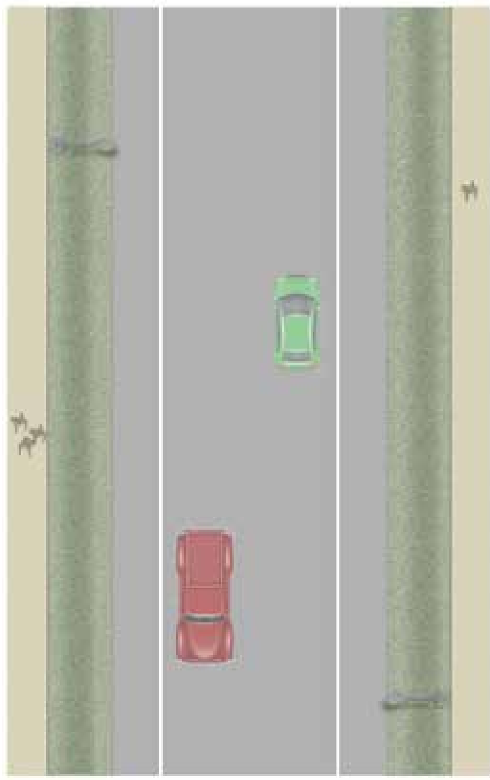
BASE ROW: 60 FEET

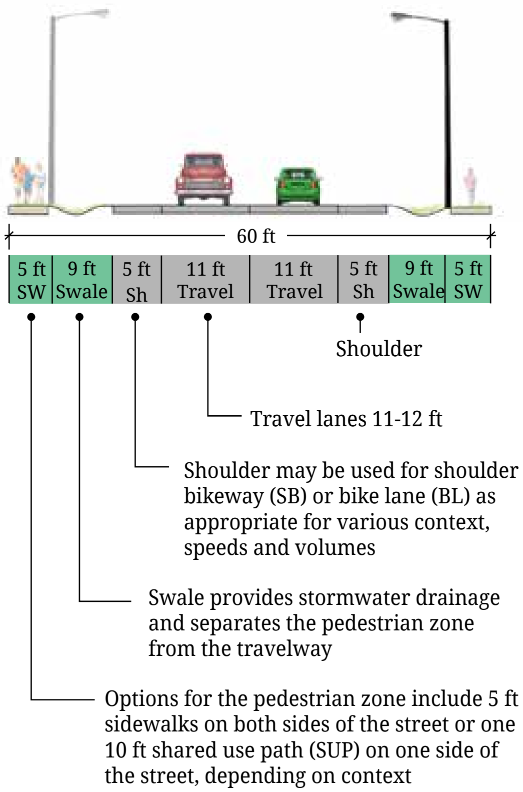
Thoroughfare Cross-Section Design Factors and Priorities

	Typical Lanes/Widths	Medians/ Access	On-Street Parking	Streetscape Elements	El Paso Bike Plan Bike Facilities	Min. Sidewalk Width
G-6, Rural Settlement	2 lanes, 10-11 ft	N/A	Allowed	SUP or Sidewalk	N/A	5 ft
Open Space Sectors 0-3, 0-4, 0-5, 0-6	2 lanes, 10-11 ft	N/A	Not Allowed	None	N/A	N/A

The above design factors and priorities may be applied in O-6 Potential Annexation as necessary with future annexations.

LOCAL RURAL AREA TYPE
60 FT TOTAL ROW





4.7 BICYCLE FACILITIES

4.7.1 BICYCLE FACILITIES - GENERALLY

Bicycle facilities are required in accordance with the adopted City of El Paso Bike Plan. The design standards presented herein follow the technical and dimensional standards of the NACTO Urban Bikeway Design Guide.

The type of facilities required are specified in the El Paso Bike Plan Appendix B: Bike Network Atlas. For develoments and thoroughfares not specified in the adopted bike plan facilities shall be provided in accordance with the contextual guidance in Chapter 3 of this manual.

4.7.2 DEDICATION REQUIRED

Additional right-of-way dedication shall be made to accommodate required bicycle facilities. The additional width is calculated from the design requirements in this section and added to the typical right-of-way widths for all thoroughfare classifications when required.

4.7.3 CONTINUITY OF EXISTING FACILITIES

For new developments, bicycle facilities on thoroughfares adjacent to existing developments shall maintain continuity of the existing adjacent facilities. Deviation from these standards is permitted if connection to an existing bicycle facility is proposed and the new bicycle facility meets or exceeds the design standard of the existing facility.

4.7.4 BICYCLE BOULEVARDS

Bicycle boulevards streets with low motorized traffic volumes and speeds, designated and designed to give bicycle and pedestrian travel priority. Bicycle boulevards use signs, pavement markings, and traffic-calming measures to discourage through trips by motor vehicles, while accommodating local access. These facilities provide people of all ages and abilities with comfortable and attractive places to walk and ride a bicycle. Intersection crossing treatments (particularly at arterial crossings) are used to create safer, more comfortable, and convenient bicycle- and pedestrian-optimized streets. People riding bicycles should feel comfortable bicycling two abreast or “conversation riding” while traveling on a neighborhood greenway.

FIGURE 4.7.4 BICYCLE BOULEVARD DESIGN STANDARDS ILLUSTRATED

Figure 4.7.4 illustrates some of the required design standards for Bicycle Boulevards. The numbered call-outs on the image correspond to the required design standards of section 4.7.4 of this document.

Bicycle Boulevards shall meet the following design standards:

1. Bicycle wayfinding signage and pavement markings shall be included on bicycle boulevards. Pavement markings and identification/wayfinding signs provide a strong visual identity for the street and designate the corridor as a bicycle route.
2. Where the bicycle boulevard turns or jogs onto another street, signs and/or markings shall be provided to indicate how users can remain on the route.
3. Center line stripes (if present) shall be removed or not repainted, except for short sections on intersection approaches that have a stop line or traffic circle. Drivers have an easier time passing bicyclists on roads that do not have centerline stripes. If vehicles cannot easily pass each other using the full width of the street, it is likely that there is too much traffic for the street to be a successful bicycle boulevard.
4. Pavement markings shall be large enough to be visible to all road users; 112 inches by 40 inches (the standard size of a shared lane marking) is the minimum recommended size.
5. Decision and turn signs shall include destinations with arrows and distance and/or bicycling times. Bicycling time should assume a typical speed of 10 mph.
6. Advanced crossing warning signs such as MUTCD sign W11-1 (bicycle crossing; may be supplemented with AHEAD plaque) should be placed on intersecting streets with more than 5,000 vpd. A non-standard sign using the coloration and style of other bicycle boulevard signs may be used with an arrow showing bi-directional cross traffic.
7. On narrow local streets where it can be difficult for cars traveling in opposite directions to pass, pavement markings shall be applied in closer intervals near the center of the travel lane, as determined by the City Traffic Engineer.
8. Signs may differ from those outlined in the MUTCD to highlight or brand the bicycle boulevard network. If used, signs

Image credit: NACTO (National Association of City Transportation Officials), nacto@nacto.org shall be consistent in content, design, and intent; colors reserved by the MUTCD Section 1A.12 for regulatory and warning road signs (red, yellow, orange, etc.) are not recommended. Green, blue and purple are commonly used.

9. Confirmation signs may include destinations and distance and/or bicycling times.

10. To minimize sign clutter, a bicycle symbol may be placed on a standard street name sign, along with distinctive coloration.

11. Either shared lane markings or non-standard markings may be used along bicycle boulevards.

12. On particularly narrow streets (approximately 25 feet wide with parking), shared lane marking stencils may be placed either in the center of the lane facing each other, or with the bicycle marking in the center of the roadway and two sets of chevrons offset 1 foot in each direction or travel.

13. For wayfinding purposes, the orientation of the chevron marking at offset intersections may be adjusted to direct bicyclists along discontinuous routes. Alternately, an arrow may be used with the chevrons to indicate the direction of the turn.

14. On-street parking spaces may be delineated with paint or other materials to clearly indicate where a vehicle should be parked and to discourage motorists from parking their vehicles too far into the adjacent travel lane.

4.7.5 BIKE ROUTE - SIGNED & MARKED AND SIGNED SHARED

On shared streets, bicyclists and motor vehicles use the same roadway space. Signed shared roadways use guide signs and warning signs to provide wayfinding information to people riding bicycles and to alert people driving motor vehicles to be aware and respectful of other road users. Signed shared roadways are often installed on streets that have considerable constraints prohibiting a more substantial bikeway type, but are essential for addressing a gap in the bikeway network or serving as the final leg of a bicycle route on a low-volume, lowspeed roadway. The shared lane marking is a pavement marking with a variety of uses to support a complete bikeway network; it is not a facility type and should not be considered a substitute for bike lanes, cycle tracks, or other separation treatments where these types of facilities are otherwise warranted or space permits.

A marked and signed shared roadway builds on the basic signed shared roadway described above by incorporating shared lane markings (sharrows). Sharrows are road markings used to indicate a shared lane environment for bicycles and automobiles. Sharrows remind drivers of bicycle traffic on the street and recommend proper bicyclist positioning within the travel lane.

Bike routes shall meet the following design standards:

1. The Shared Lane Marking in use within the United States is the bike-and-chevron “sharrow,” illustrated in MUTCD figure 9C-9.

2. Shared Lane Markings shall not be used on shoulders, in designated bicycle lanes, or to designate bicycle detection at signalized intersections. (MUTCD 9C.07 03)

3. Frequent, visible placement of markings is essential. The number of markings along a street should correspond to the difficulty bicyclists experience taking the proper travel path or position. SLMs used to bridge discontinuous bicycle facilities or along busier streets should be placed more frequently (50 to 100 feet) than along low traffic bicycle routes (up to 250 feet or more). SLMs used along low volume routes can be staggered by direction to provide markings closer together.

4. Lateral placement is critical to encourage riders to avoid the "door zone" and to encourage safe passing behavior. MUTCD guidance recommends minimum placement when a parking lane is present at 11 feet from the curb face.

5. If on-street vehicle parking is not present, SLMs should be placed far enough from the curb to direct bicyclists away from gutters, seams, and other obstacles. On streets with posted 25 mph speeds or slower, preferred placement is in the center of the travel lane to minimize wear and encourage bicyclists to occupy the full travel lane. MUTCD guidance recommends minimum placement with no parking at 4 feet from the curb face.

6. On streets with posted 25 mph speeds or slower, preferred placement is in the center of the travel lane to minimize wear and encourage bicyclists to occupy the full travel lane.

7. On streets with posted 35 mph speeds or faster and motor vehicle volumes higher than 3,000 vpd shared lane markings are not a preferred treatment. On these streets other bikeway types are preferred. For wayfinding purposes the orientation of the chevron marking may be adjusted to direct bicyclists along discontinuous routes.

8. Color may be used to enhance the visibility of the shared lane marking and to further encourage desired lane positioning.

9. Dotted line markings may accompany the shared lane marking to further encourage desired lane positioning.

4.7.6 CONVENTIONAL BIKE LANES

Bicycle lanes designate an exclusive space for bicyclists with pavement markings and signage. The bicycle lane is located adjacent to motor vehicle travel lanes and bicyclists ride in the same direction as motor vehicle traffic. Bicycle lanes are typically on the right side of the street (on a two-way street), between the adjacent travel lane and curb, road edge or parking lane.

Conventional Bike Lanes shall meet the following design standards:

1. The desirable dimensions should be used unless other street elements (e.g., travel lanes, medians, median offsets) have been reduced to their minimum dimensions.

2. The desireable bike lane width adjacent to a curbface is 6 feet. The minimum ridable surface adjacent to a street edge or longitudinal joint is 3 feet.

3. When placed adjacent to a parking lane, the desired reach from the curb face to the edge of the bike lane (including the parking lane, bike lane, and optional buffer between them) is 14.5 feet; the absolute minimum reach is 12 feet. A bike lane next to a parking lane shall be at

least 5 feet wide, unless there is a marked buffer between them. Wherever possible, minimize parking lane width in favor of increased bike lane width.

4. The minimum bike lane width adjacent to a guardrail or other physical barrier is 2 feet wider than otherwise in order to provide a minimum shy distance from the barrier.

5. Bicycle lane word and/or symbol and arrow markings (MUTCD Figure 9C-3)

Image credit: NACTO (National Association of City Transportation Officials)

FIGURE 4.7.6 CONVENTIONAL BIKE LANE DESIGN STANDARDS ILLUSTRATED

Figure 4.7.6 illustrates some of the required design standards for conventional bike lanes. The numbered call-outs on the image correspond to the required design standards of section 4.7.6 of this document.

shall be used to define the bike lane and designate that portion of the street for preferential use by bicyclists.

6. Bike lane word, symbol, and/or arrow markings (MUTCD Figure 9C-3) shall be placed outside of the motor vehicle tread path at intersections, driveways, and merging areas in order to minimize wear from the motor vehicle path.

7. A solid 6” white lane line marking shall be used to separate motor vehicle travel lanes from the bike lane.

8. A through bike lane shall not be positioned to the right of a right turn only lane or to the left of a left turn only lane (MUTCD 9C.04). A bike lane may be positioned to the right of a right turn only lane if split-phase signal timing is used.

9. When placed adjacent to parking, a solid white line marking of 4 inch width shall be used between the parking lane and the bike lane to minimize encroachment of parked cars into the bike lane.

10. Gutter seams, drainage inlets, and utility covers should be flush with the ground and oriented to prevent conflicts with bicycle tires.

11. If sufficient space exists, separation should be provided between bike lane striping and parking boundary markings to reduce door zone conflicts. Providing a wide parking lane may offer similar benefits.

12. If sufficient space exists and increased separation from motor vehicle travel is desired, a travel side buffer should be used.

13. Lane striping should be dashed through high traffic merging areas.

4.7.7 BUFFERED BIKE LANES

Buffered bicycle lanes are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. A buffered bicycle lane could potentially be converted to a cycle track.

Buffered Bike Lanes shall meet the following design standards:

1. Bicycle lane word and/or symbol and arrow markings (MUTCD Figure 9C-3) shall be used to define the bike lane and designate that portion of the street for preferential use by bicyclists.

2. The buffer shall be marked with 2 solid white lines. White lines on both edges of the buffer space indicate lanes where crossing is discouraged, though not prohibited. For clarity, consider dashing the buffer boundary where cars are expected to cross at driveways.

3. Buffers shall be at least 18 inches wide and located on both the travel side and parking side of the bike lane. The buffer area shall have interior diagonal cross hatching or chevron markings if 3 feet in width or wider.

4. If used, interior diagonal cross hatching should consist of 4” lines angled at 30 to 45 degrees and striped at intervals of 10 to 40 feet. Increased striping frequency may increase motorist compliance.

5. The combined width of the buffer(s) and bike lane should be considered “bike lane width” with respect to guidance given in other documents that don’t recognize the existence of buffers. Where buffers

FIGURE 4.7.7 BUFFERED BIKE LANE DESIGN STANDARDS ILLUSTRATED

Figure 4.7.7 illustrates some of the required design standards for buffered bike lanes. The numbered call-outs on the image correspond to the required design standards of section 4.7.7 of this document.

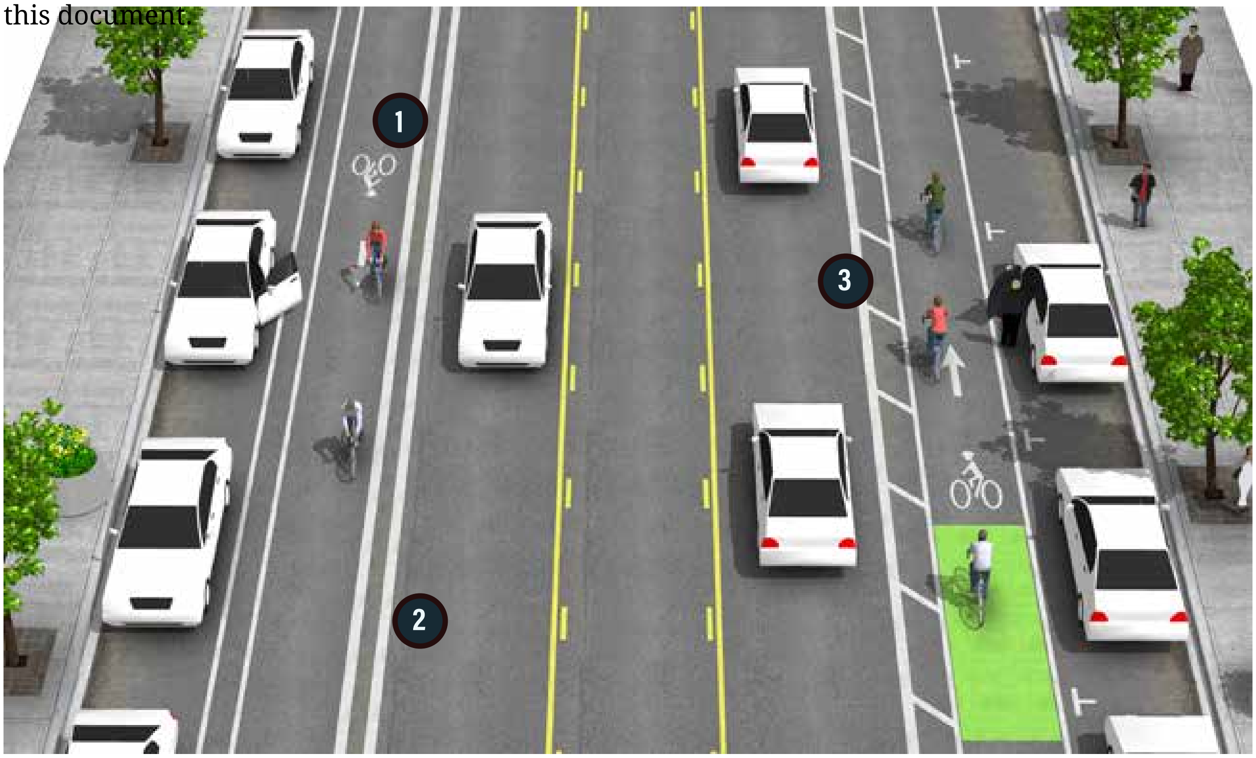


Image credit: NACTO (National Association of City Transportation Officials)

are used, bike lanes can be narrower because the shy distance function is assumed by the buffer. For example, a 3 foot buffer and 4 foot bike lane next to a curb can be considered a 7 foot bike lane. For travel side buffered lanes next to on street parking, a 5 foot minimum width is recommended to encourage bicyclists to ride outside of the door zone.

6. The desired bicycle travel area width is 7 feet when parking is permitted, the City Traffic Engineer may approve a narrower bicycle travel area width when insufficient right-of-way exists.

7. On intersection approaches with right turn only lanes, the bike lane shall be transitioned to a through bike lane to the left of the right turn only lane, or a combined bike lane/turn lane should be used if available road space does not permit a dedicated bike lane.

8. On intersection approaches with no dedicated right turn only lane the buffer markings should transition to a conventional dashed line. Consider the use of a bike box at these locations.

9. Like a conventional bike lane, a wide (6 inch) solid white line may be used to mark the edge adjacent to a motor vehicle travel lane. For a parking side buffer, parking T's or a solid line are acceptable to mark between a parking lane and the buffer.

10. For travel lane buffer configurations, separation may also be required, at the discretion of the city traffic engineer,

between bike lane striping and the parking boundary to reduce door zone conflicts. This creates a type of parking-side buffer.

11. Color shall be used at the beginning of each block to discourage motorists from entering the buffered lane.

4.7.8 CYCLE TRACKS

Of all on-street bicycle facilities, protected bike lanes, also referred to as cycle tracks, offer the most protection and separation from adjacent motor vehicle traffic. Protected bike lanes are physically separated from motor vehicle traffic and typically provide bicycle travel in the same direction as motor vehicle traffic. They may be at street level, or distinct from the sidewalk, as a raised cycle track. In situations where on-street parking is allowed, protected bike lanes are located adjacent to the curb and sidewalk, with on-street parking repositioned to buffer people on bicycles from moving vehicles.

A two-way cycle track is an on-street bicycle facility that allows bicycle movement in both directions on one side of the street. A two-way cycle track may be configured as a street level cycle track with a parking lane or other barrier or as a raised cycle track to provide vertical separation from the adjacent motor vehicle lane. Two-way cycle tracks must provide clear and understandable bicycle movements at intersections and driveways.

Cycle tracks shall meet the following design standards:

1. Bicycle lane word, symbol, and/or arrow markings (MUTCD Figure 9C-3) shall be placed at the beginning of a cycle track and at periodic intervals along the facility to define the bike lane direction and designate that portion of the street for preferential use by bicyclists.

2. If configured on a one-way street, a “ONE WAY” sign (MUTCD R6-1, R6-2) with “EXCEPT BIKES” plaque shall be posted along the facility and at intersecting streets, alleys, and driveways informing motorists to expect two-way traffic.

3. A “DO NOT ENTER” sign (MUTCD R5-1)

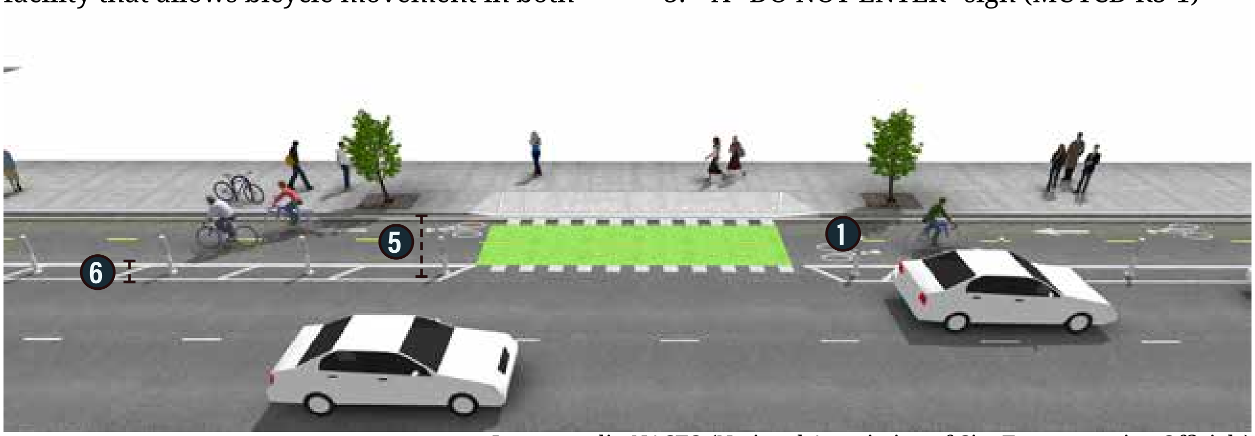


Image credit: NACTO (National Association of City Transportation Officials)

FIGURE 4.7.8 CYCLE TRACK DESIGN STANDARDS ILLUSTRATED

Figure 4.7.8 illustrates some of the required design standards for cycle tracks. The numbered call-outs on the image correspond to the required design standards of section 4.7.8 of this document.

with “EXCEPT BIKES” plaque shall be posted along the facility to only permit use by bicycles.

4. Intersection traffic controls along the street (e.g., stop signs and traffic signals) shall also be installed and oriented toward bicyclists traveling in the contra-flow direction.
5. The desirable two-way cycle track width is 12 feet. Minimum width in constrained locations is 8 feet.
6. When protected by a parking lane, 3 feet is the desired width for a parking buffer to allow for passenger loading and to prevent dooring collisions.
7. In the absence of a raised median or curb, the desired with of the painted buffer is 3 feet. The buffer space shall include bollards, armadillos, planters, signs or other forms of physical protection as approved by the city’s traffic engineer.
8. A dashed yellow line shall be used to separate two-way bicycle traffic and to help distinguish the cycle track from any adjacent pedestrian area.
9. If the cycle track is parking protected, parking shall be prohibited near the intersection to improve visibility. The desirable no-parking area is 30 feet from each side of the crossing.
10. For motor vehicles attempting to cross the cycle track from the side street or driveway, street and sidewalk furnishings and/or other features shall accommodate a sight triangle of 20 feet to the cycle track from minor street crossings, and 10 feet from driveway crossing.
11. Color, yield lines, and “Yield to Bikes” signage shall be used to identify the conflict area and make it clear that the cycle track has priority over entering and exiting traffic.
12. Tubular markers or armadillos/concrete

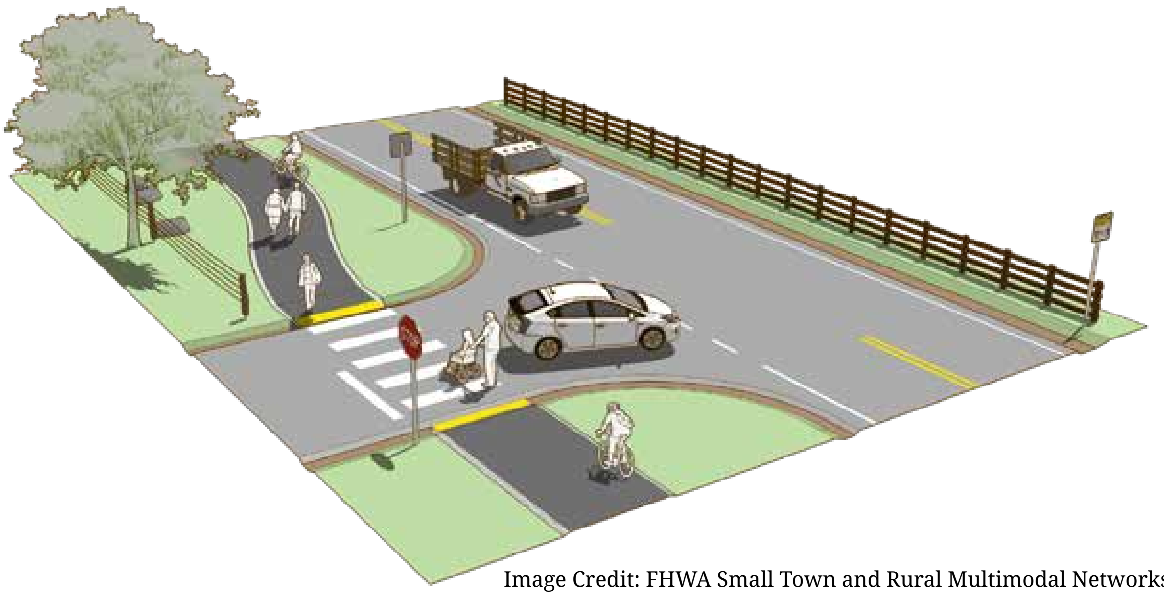


Image Credit: FHWA Small Town and Rural Multimodal Networks

FIGURE 4.7.9 SHARED USE PATH DESIGN STANDARDS ILLUSTRATED

Figure 4.7.9 illustrates some of the required design standards for shared use paths. The numbered call-outs on the image correspond to the required design standards of section 4.7.9 of this document.

buttons shall be used to protect the cycle track from the adjacent travel lane. The color of the tubular markers shall be the same color as the pavement marking they supplement.

4.7.9 SHARED USE PATHS

A shared-use path, also called a multi-use trail, or hike and bike path allows for two-way, off-street bicycle use and may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles. Because of their separation from motor vehicle traffic, shared-use paths appeal to the widest variety of user types, from families with children to adult recreational riders to everyday commuters. When these linear shared-use paths lead to popular destinations or connect to the on-street bikeway network, their utility expands greatly, offering a comfortable, low-stress bicycling environment for people to use for everyday trips.

Shared Use Paths shall meet the following design standards:

1. The desired paved width of a shared use path is 10 feet, the minimum width is 8 feet. The desired dimensions shall be used unless other street elements (e.g., travel lanes, medians, median offsets) have been reduced to their minimum dimensions at the discretion of the city traffic engineer.
2. Shared use paths shall be seperated from the roadway by a minimum 5 feet planted buffer or as otherwise required in Chapter 4 of this document. Seperation of less than 5 feet is permitted when a physical barrier is proposed.
3. Due to the fact that nearly all shared use paths are used by pedestrians, they fall under the accessibility requirements of the Americans with Disabilities Act (ADA). Refer to the U.S. Access Board website (www.access-board.gov) for up-to-date information regarding the accessibility provisions for shared use paths and other pedestrian facilities covered by the Americans with Disabilities Act and the Architectural Barriers Act.
4. In addition to the standards herein, designers shall justify proposed shared use paths with guidance from the AASHTO Guide for the Development of Bicycle Facilities, 4th Edition, 2012.

4.7.10 INTERSECTION TREATMENTS

For bicyclists traveling in a conventional bike lane the approach to an intersection with vehicular turn lanes can present a significant challenge. For this reason it is vital that bicyclists are provided with an opportunity to correctly position themselves to avoid conflicts with turning vehicles. This treatment specifically covers the application of a through bicycle lane at the intersection.

Through bicycle lanes at intersections shall meet the following standards:

1. The desired width of a dotted bike transition lane and through bike lane is 6 feet with a minimum width of 4 feet.
2. Bicycle lane word and/or symbol and arrow markings (MUTCD Figure 9C-3) shall be used to define the bike lane and designate that portion of the street for preferential use by bicyclists.
3. The through bike lane shall be placed to the left of the right-turn only lane.
4. Dotted lines signifying the merge area shall begin a minimum of 50 feet before the intersection (MUTCD). Dotted lines should begin 100 feet before the intersection if along a high speed/volume

roadway.

5. Dotted lane line transition areas to through bike lanes shall not be used on streets with double right turn lanes. Double right turn lanes are extremely difficult for bicyclists to negotiate. Shared lane markings may be used in the center of the inside turn lane to designate the preferred path of through bicycle travel.
6. Accompanying signage shall include R3-7R "Right Lane Must Turn Right" and R4-4 "Begin Right Turn Yield to Bikes" (MUTCD).
7. Dotted white lines should be 6 inches wide and 2 feet long with a 2- to 6-foot gap between dashes (MUTCD).
8. Through bike lanes should be provided at any intersection approach where a right turn only auxiliary lane is created (also known as a right turn add lane). It is desirable for bicyclists to travel straight through the merging area to reinforce right-of-way.
9. Dotted lane line transition areas to through bike lanes should not be provided at any intersection approach where a through travel lane transitions into a right turn only lane (also known as a right turn drop or trap lane). In such instances designers shall utilize an exclusive bicycle signal phase with the bike lane remaining to the right, or not delineating the merging area connecting to the through bicycle lane. Shared lane markings may be used to provide additional guidance.
10. At intersections with high right turning vehicle volumes, high bicyclist volumes, or along priority bicycle corridors, treatments beyond dotted white lines such as coloring and increased signing should be provided.
11. Terminating the bike lane in advance of the intersection is not acceptable.
12. For intersections that lack the physical width to install a bicycle pocket, a combined bike/turn lane should be used.
13. Vehicle turn lane width shall not be reduced to less than 9 feet.
14. Bicycle warning signs or a "Share the Road" sign shall be used in advance of the merge/transition area.

A combined bike lane/turn lane places a suggested bike lane within the inside portion of a dedicated motor vehicle turn lane. Shared lane markings or conventional bicycle stencils with a dashed line can delineate the space for bicyclists and motorists within the shared lane or indicate the intended path for through bicyclists. This treatment includes signage advising motorists and bicyclists of proper positioning within the lane.

When configured on a cycle track corridor, the combined lane is commonly called a mixing zone, and is intended to minimize conflicts with turning vehicles at intersections as an alternative to an exclusive bike signal phase.

Combined bicycle lane turn lanes shall meet the following standards:

1. Shared lane markings shall be used to clarify bicyclist positioning within the combined lane. A dotted 4 inch line and bicycle lane marking shall be used to clarify bicyclist positioning within the combined lane without excluding cars from the suggested bicycle area.
2. Within the combined lane, the bicycle area width shall be 4 feet minimum.
3. Width of combined lane shall be 9 feet minimum, 13 feet maximum. A full bicycle through lane can be accommodated if the vehicle right turn

only lane can be made 14 feet or wider.

Further intersection treatments consistent with NACTO guidance may be required at the discretion of the city traffic engineer.

4.8 ALLEYS

4.8.1 ALLEYS - ALL AREA TYPES

Alleys are assets in certain zoning districts and they can supplement the overall street network by providing rear access to various land uses. By providing rear access to a development, curb cuts and driveways along the frontage conditions can be minimized and pedestrian safety can be enhanced. Alleys provide necessary circulation and can accommodate services like utilities, trash pick-up and stormwater drainage.

4.8.2 ALLEYS REQUIRED

The dedication of alleys shall be optional in all subdivisions, except where alleys must be dedicated as direct continuations or extensions of alleys existing in adjacent subdivisions or as otherwise indicated in this chapter. Such continuations shall be extended in the same alignment as evident from adjacent lots in the existing subdivision, except where an existing alley is less than sixteen feet wide. In that case, additional land shall be dedicated so as to form an alley at least sixteen feet wide.

For new development, alleys shall be required for all residential lots fronting major or minor arterials. Where off-street access is desired, alleys shall be provided.

4.8.3 EXISTING SUBDIVISIONS WITH ALLEYS

Where lots are subdivided or resubdivided adjacent to or within subdivisions already having alleys, the alley must be improved only to the same extent as may be evident from the existing alley. Where lots are subdivided as continuations of existing subdivisions already having alleys, alleys in the new subdivision shall be improved only to the same standards as those existing alleys, all the way to the first street intersection. Thereafter, if alleys are required or desired, they should conform to standards for alley dedication and improvement set forth in subsection 4.8.4 below.

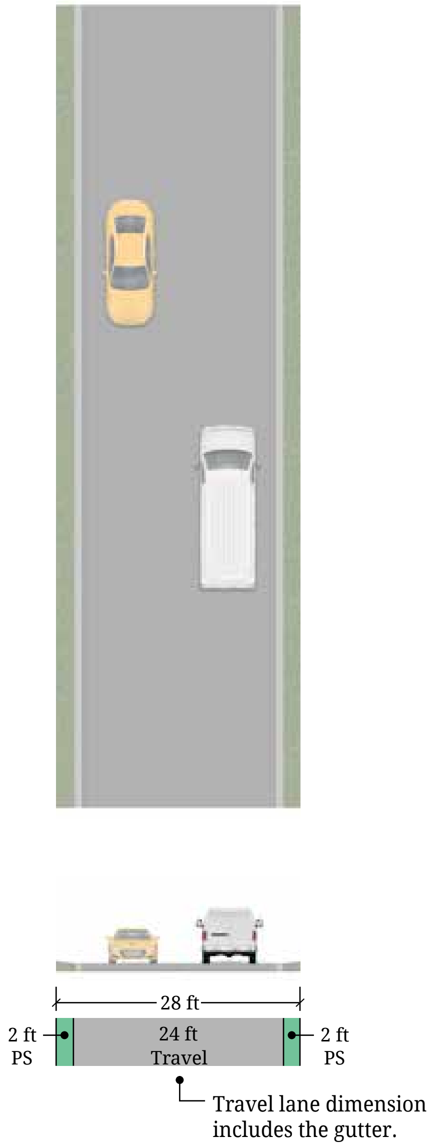
4.8.4 ALLEY GENERAL REQUIREMENTS

1. Alleys shall be as nearly parallel to the street frontage as reasonably possible.
2. Alley intersections with streets shall be as close to right angles (ninety degrees) as practical.
3. Where two alleys intersect or turn at an angle, a corner clip of not less than ten feet from the normal intersection of the property line shall be provided along each property line.
4. If alleys are not straight within each block or do not connect on a straight

Alley Design Factors

	Alley in Commercial and Multifamily Districts (including townhomes and patio homes)	Alleys in Residential Districts
Minimum ROW Width	28 feet	20 feet
Minimum Paved Width	24 feet	12 feet

COMMERCIAL/MULTIFAMILY ALLEY
28 FT TOTAL ROW



RESIDENTIAL ALLEY
20 FT TOTAL ROW

course with alleys on adjoining blocks, an easement shall be provided for the placement of guy wires on lot division lines necessary to support overhead utility poles set on curving or deviating alley rights-of-way.

5. Alleys should not be platted to intersect any arterial streets.
6. Dead-end alleys shall not be permitted unless a permanent or temporary turnaround is provided. The following standards shall apply:

    a. In subdivisions subject to Sub-section 4.8.3 above, turnarounds shall be provided with a minimum radius of thirty-five feet;

    b. In all other subdivisions, turnarounds shall be provided with a minimum radius of thirty-two feet;

    c. In instances where dead-end alleys will clearly be permanent, turnarounds shall be surfaced in accordance with the cross-sections on the preceding page, as applicable;

    d. In instances were dead-end alleys are of a temporary nature, turnarounds shall be improved with a minimum six-inch-base of crushed limestone.

7. Layout and arrangement of alleys shall be designed to avoid the creation of short cuts for traffic and to discourage use by traffic other than that generated by activity within property abutting the alley.
8. Cross intersections of alleys shall not be permitted.
9. Alleys forming the boundary of a subdivision, and adjacent to unplatted property, shall be dedicated and improved the same as if situated in the interior of a subdivision.

4.9 SIDEWALKS

4.9.1 PURPOSE

Sidewalks are required as a part of subdivision plat approval as outlined within this manual and in the City Code Title 13, Chapter 04 to help the City of El Paso achieve the following:

1. Promote the mobility, health, safety, and welfare of residents, property owners, and visitors to the City of El Paso and to implement objectives and strategies of the El Paso Comprehensive Plan;
2. Improve the safety of walking by providing separation from motorized transportation and improving travel surfaces for pedestrians;
3. Improve public welfare by providing an alternate means of access to transportation and social interaction, especially for children, other citizens without personal vehicles, or those with disabilities;
4. Facilitate walking as a means of physical activity recognized as an important provider of health benefits;
5. Establish minimum criteria for the development of sidewalks as a part of the pedestrian element of the transportation system within the city and its extraterritorial jurisdiction (ETJ).

4.9.2 APPLICABILITY

These requirements shall apply to all development within the city and its ETJ.

4.9.3 EXCEPTIONS

The City Plan Commission may approve an exception to the requirement for sidewalks on individual streets or within subdivisions:

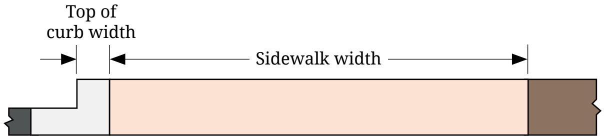


Figure 4.1: Sidewalk width (Cross section view)

1. In existing single-family residential neighborhoods where sidewalks are not present and have not historically been provided or comply;
2. On local streets within an approved subdivision where all the lots provide a minimum one-half acre lot area and the adjoining properties have no sidewalks;
3. On mountain residential and divided mountain residential streets within an approved mountain development subdivision;
4. On local streets within an approved planned unit development where pedestrian access is provided within the approved subdivision through an alternative sidewalk design not installed within the street right-of-way; provided, however, that an easement may be required by the City Manager or designee to provide for the installation of traffic signage and signalization, utility services, neighborhood delivery and collection box units, or other similar facilities;
5. On local streets within an approved subdivision which meet all of the following criteria as determined by the City Plan Commission:

    a. A characteristic of the neighborhood is that no sidewalks have been required to date,

b. The subdivision adjoins or lies within a neighborhood in which buildings or structures have been constructed on at least fifty percent of the lots within the neighborhood, and

c. The type of subdivision and intensity of land use is compatible with the character of the neighborhood;

6. On streets within neighborhoods that meet the criteria in Title 20 (Zoning) for infill development, where a street construction project, whether local, state or federal, has been awarded and the project includes construction of the sidewalks; and
7. In areas with severe topography or other natural constraints that will constrain proper implementation of this title.

4.9.4 GENERAL REQUIREMENTS

A. **Standards Not Otherwise Specified**. Where facility standards and requirements are not otherwise specified within this manual, the design of pedestrian facilities shall follow the City's Ordinance Title 13.04, the DSC, and other city Sidewalk Design Standards and applicable state and federal laws and regulations.

B. **Maintenance**. All sidewalks, sidewalk amenities, and landscaping in the right-of-way shall be maintained by the adjoining property owner unless otherwise specifically provided for by public policy.

C. **Location and Width of Sidewalks**. Unless noted otherwise:

1. Sidewalks shall have a minimum clear path width of five feet on local streets in all zoning districts primarily intended for single-family residential development when located adjacent to the property line. Sidewalks are preferred abutting the property line, not directly adjacent to the curb. Sidewalks located next to the curb along local streets shall be a minimum five feet in width. Sidewalks along arterials shall have a minimum width of five feet. The top of curb width shall not be included in the sidewalk width;
2. Sidewalks shall have a minimum clear path width of five feet in all other locations;
3. Sidewalks in areas determined to be high pedestrian traffic areas or pedestrian-oriented developments by the CPC may be required to be wider than the minimum widths listed herein by the CPC;
4. Sidewalks shall be located in existing areas to match the width and location of existing walks of the block in which they are located. Vacant blocks shall comply with the sidewalk requirements of this title;
5. Sidewalks shall not be located next to the curb on collectors or arterial streets except when an exception is approved by the CPC or designee at the time of subdivision plat approval. Such exception shall be due to actual physical or topographic constraints. Sidewalks on TXDOT facilities shall be as approved by TXDOT;
6. Sidewalks may be required to improve connectivity between subdivisions, to schools, parks, bus stops and retail areas by the CPC at the time of plat approval;
7. The CPC may approve alternative sidewalk design and locations at the time of plat approval including

meandering or curvilinear sidewalks provided such design and location meets the intent of this title.

D. **Timing of Improvements**. The timing of sidewalk construction shall be as required by this manual and Chapter 13.04 of the City Ordinance, unless a developer agreement between the property owner and the city provides for alternative timing for construction or security has been provided in accordance with this title.

E. **Internal Pedestrian Circulation**. In addition to sidewalks within the right-of-way, internal pedestrian circulation shall be provided in new development or redevelopment serving any nonresidential and at any governmental facility, school, church, or other place of public assembly. Sidewalks shall be installed to connect all buildings to one another and to parking areas and to connect the development to the public street system. All such sidewalks in the city's right-of-way shall be protected from encroachment by parked vehicles.

F. **Curb Ramps**. Curb ramps shall be provided within a street right-of-way wherever an accessible route for pedestrians (sidewalk or pedestrian way) is required. The design and construction of curb ramps shall be in accordance with the DSC and shall comply with the Texas Accessibility Standards. DSC standards must be modified to increase the number of options, place of installation and at signalized intersections. ADA TXDOT standards must be considered for state and local streets

G. **Compliance with DSC**. Sidewalks shall be constructed in compliance with the standards in the City of El Paso DSC and Chapter 13.04 of the City Code.

4.9.5 SIDEWALK REQUIREMENTS FOR NEW STREETS

A. **Sides of the street**. Sidewalks shall be required on both sides of all new streets except in accordance with Chapter 13.04 of the City Code.

B. **Timing of Improvements**. Sidewalks, landscape and curb ramps shall be provided by the developer at the time of road construction on all new freeway frontage roads unless disallowed by TXDOT, arterial streets, or collector streets, except on individual lots fronting on or siding up to such street. The developer may choose to provide security in accordance with this chapter and to delegate the requirement to construct such sidewalks, landscape and curb ramps

A safe and predictable sidewalk system is an essential public infrastructure investment

to the purchaser of a lot or the purchaser's builder as a part of the building permit for a period of three years from the date of acceptance of the adjacent street. However, at the end of the three-year time period, the developer shall make arrangements to complete the missing sidewalks, landscape and curb ramps or in lieu of such arrangements, the city may utilize the security to complete the sidewalks, landscape and curb ramps. As sidewalks, landscape and curb ramps are completed during the three year period, the developer may request the partial release of security for the completed portions in accordance with this title.

C. **Financial Guarantee**. A developer of a new subdivision may contribute the projected cost of the sidewalk construction into an escrow fund or through other form of financial guarantee to delay the time of construction of the sidewalk according to procedures within this manual and Chapter 13.04 of the City Ordinance.

4.9.6 SIDEWALK REQUIREMENTS FOR EXISTING STREETS

A. **Sides of the Street**. Sidewalks shall be required on both sides of existing collector streets, arterial streets, and the external sides of the frontage roads of freeways.

B. **Location**. Sidewalks shall be required along block faces of existing local streets where redevelopment is occurring in any of the following categories or combinations of categories:

1. The central business district designated by the El Paso comprehensive plan;
2. Designated pedestrian routes in a neighborhood plan, corridor plan, or other small area plan adopted by the City of El Paso;
3. Locations that would connect existing or otherwise required sidewalks by closing gaps of less than two hundred and fifty feet;
4. Locations in which an adjacent property has a public sidewalk along the same block face;
5. Street frontages in all developments except the following:
    a. Developments intended primarily for single-family residential purposes and where sidewalks are not present,
    b. Along local and collector streets in developments intended primarily for warehousing, manufacturing, and industrial uses,
    c. Developments intended to preserve agricultural activities and open space.

C. **Required with Street Improvement**. Any land development or subdivision that triggers a requirement for any street improvements along an existing collector street, arterial street, or freeway frontage road shall include sidewalk improvements. The sidewalks shall be provided concurrently by the developer with other street improvements except as otherwise provided in this manual and Chapter 13.04 of the City's Ordinance

D. **Site Plan**. No new or amended site plan shall be approved for development on any property in a location wherein sidewalks are required unless applicable provisions for required sidewalks are included in the site plan.

E. **Permits**. A certificate of occupancy, or any other type of final approval for a residential development that does not require a certificate of occupancy, may not be issued until required sidewalks are installed or brought up to applicable standards when there is development activity requiring:

1. A permit for new construction of a structure other than an accessory structure,
2. A permit for a major addition to a structure other than an accessory structure, or
3. A permit for major alterations or repairs to a structure other than an accessory structure.

F. **Removal Requires Replacement**. An existing sidewalk may not be removed unless a replacement sidewalk is constructed to standards current at the time of removal.

4.10 CURBS AND GUTTERS

Curbs and gutters shall be installed according to the provisions of this chapter and to the DSC. Combination curb and gutter improvements shall be provided to mark the edge of pavement and carry off surface water, as set forth below:

4.10.1 BESIDE FREEWAYS

The subdivider shall be required to install curbs along the outside lanes in rights-of-way designated for freeways, as per the TXDOT approval or construction plans.

4.10.2 BESIDE ARTERIAL AND COLLECTOR STREETS

The subdivider shall install curbs on both sides of all arterial and collector streets within the subdivision, and on one side of all such streets at the subdivision boundary.

4.10.3 BESIDE LOCAL STREETS

The subdivider shall install curbs on both sides of all local streets within the subdivision and at subdivision boundaries, except for existing boundary streets, in which case curb and gutter installation shall be required on the subdivision side only.

4.10.4 AT STREET INTERSECTIONS

The minimum curb radii at street intersections shall be as prescribed in the DSC and shall maintain proper stopping sight distance as determined by the latest edition of AASHTO's "A policy on Geometric Design of Highways and Streets."

4.11 GENERAL DESIGN STANDARDS

4.11.1 DSC STANDARDS TO BE MET

In addition to the requirements of the City of El Paso Design Standards for Construction (DSC), the requirements of the street standards in this section shall be met.

All streets and thoroughfares shall be constructed and paved to city standards and within rights-of-way as required by the thoroughfare plan and this article, and in accordance with the DSC and other city standards, as may be from time to time amended or adopted. Traffic signal design shall be as per TMUTCD latest edition. Construction and/or dedication of facilities that exceed the standards herein is discouraged unless the excess facilities serve a functional purpose that aligns with the standards herein.

4.11.2 INTERSECTION IMPROVEMENTS AND TRAFFIC CONTROL DEVICES

Intersections shall be designed and improved in accordance with the DSC and MUTCD. Any additional improvements and/or traffic control devices shall be required only as a result of the findings of a traffic impact analysis when required per the City Code of Ordinances.

4.11.3 OFF-SITE IMPROVEMENTS

Where traffic impact analysis demonstrates the need for the facilities or upon the affirmative recommendation of the City Manager or designee, the property owner shall make their proportional share of improvements to off-site collector and arterial streets and intersections necessary to mitigate traffic impacts generated by the development or in conjunction with related developments including but not limited to vehicular, bicycle and pedestrian improvements. The city may participate in the costs of additional/oversize improvements with the property owner as set out herein, and subject to the city's cost participation policies on additional/oversized improvements.

4.11.4 STREET NAMES AND ADDRESSES

Street Names

A. **Requirement.** New streets in a subdivision shall be named in a way that will provide continuity of street names and prevent conflict or confusion with existing street names in the city, in the city's extraterritorial jurisdiction or in a neighboring jurisdiction, subject to the approval of the City Manager, or designee for subdivisions located within the corporate limits, or by the county engineer within the extraterritorial jurisdiction. Subdivisions submitted as a preliminary plat shall indicate proposed street names for streets within the subdivision. The City Manager, or designee or county engineer may review, coordinate with the fire department and 911 and accept, in accordance with these standards, any street name that is proposed. The City Manager, or designee or county engineer, when requested by the subdivider, may originate street name(s) as needed. Approved street names shall be shown on the final plat of the subdivision.

B. **Standards.** Preliminary street names shall be shown on the preliminary plat and final street names shall be approved with the final plat and shown on the recorded plat. Street names shall not conflict with or duplicate any existing street name within the City or County of El Paso. Conflict may be based on the following:

1. Close pronunciation to another street name;
2. Street name is too difficult to pronounce;
3. Street names with undesirable meanings or connotations; and
4. Street names with language translation problems.
5. New streets which are extensions of, or obviously in alignment with, existing streets shall bear the name of the existing street.
6. Cul-de-sac streets having six or more lots fronting on them, or that have more than one hundred fifty feet or more in length measured from the center line of the intersecting street to the center of the turnaround, shall have street names assigned to them. All other cul-de-sac, inlets, turning heels or eyebrows shall carry the street name, suffix and house numbering sequence of the main street.

7. Street names shall be in accordance with the DSC.

8. Street names shall not begin with initials.

9. Street names shall contain suffixes according to the standards listed in Table 4.2 and below except that streets within the extraterritorial jurisdiction shall be provided a street name suffix of “road” except where otherwise approved by the county engineer: (i) Boulevards built in accordance with ordinance may be designated as “Boulevard” regardless of orientation; (ii) Frontage roads within a freeway right-of-way shall be assigned the suffix of “Gateway.”

10. Streets with curves, doglegs or offsets up to ninety degrees with fewer than six lots fronting on them and no intersecting streets shall maintain the same name and addressing as the street at each end.

11. Renaming of existing streets shall also be in accordance with this chapter and all other applicable city ordinances.

Street Addresses

A. **Requirement**. Street addresses shall be assigned, after consulting with the fire department and 911 reviews, by the city for subdivisions located within the corporate limits, or by the county engineer if within the extraterritorial jurisdiction, as part of the preliminary plat submittal. Street addresses shall be shown on the final recorded plat of the subdivision, including residential, commercial and industrial lot addresses.

Table 4.2 Street Names

General Direction of Street	Street Length 1,000ft or More	Street Length Less than 1,000ft
North and south	Street	Place
East and west	Avenue	Court
Diagonal	Drive	Way
Curving	Drive	Lane or Circle

Blocks to be divided into lots in the future by replatting shall show the address range on the recorded plat.

B. **Standards**.

1. Addresses on the north side of streets which are subdivided in a generally east-west direction shall have odd numbers assigned.
2. Addresses on the south side of the street shall have even numbers assigned.
3. Addresses on the west side of the street which are subdivided in a generally north-south direction shall have odd numbers assigned.
4. Addresses on the east side of the street shall have even numbers assigned.
5. Addresses shall be assigned numerically in intervals of four, except where otherwise approved by the planning official or county engineer.
6. Cul-de-sac having less than six lots fronting on them, or less than one hundred fifty feet in length measured from the centerline of the intersecting street to the center of the turnaround,

shall be assigned the same house numbering sequence as the main street.

7. A property not requiring a subdivision shall have frontage on a dedicated public or private street before an official street address may be assigned to it.

8. Assignment of addresses to corner lots within single-family residential subdivisions shall be determined by the location of the main entrance to the building; except that assignment of addresses to lots with nonresidential uses and having more than one street frontage shall be determined by the location of the main entrance to the building, unless otherwise requested by the property owner and approved by the director.

9. Addresses shall not be assigned to landlocked or illegally subdivided properties.

10. As adjacent territory is annexed into the city, the existing street names and addresses in the newly annexed areas shall be reviewed by the director and modified as necessary to eliminate duplication of street names already existing within the city, and to ensure that all addresses follow the numbering sequence existing in the city.

4.11.5 STREET RIGHT-OF-WAY DEDICATION

The property owner shall provide all rights-of-way required for existing or future streets, and for all required street improvements, including perimeter streets and approach roads, as shown in the thoroughfare plan and as required by the Design Standards for Construction (DSC) or by other valid development plans approved by the city, subject to the rough proportionality provisions of this design manual. There shall be sufficient right-of-way such that sidewalks and related pedestrian activity is not impeded by the location of utilities, including solid waste pick-up, fire hydrants, and utility poles. If such right-of-way is not sufficient, then the developer and/or the respective utility shall be responsible for obtaining additional easements or right-of-way.

4.11.6 TRANSITIONS OF RIGHT-OF-WAY WIDTH

Wherever the right-of-way width of a residential, local, collector or arterial street must transition to a greater or lesser width, the transition shall not occur within an intersection but within the street right-of-way so that the right-of-way shall be the same on both sides of the street intersection. The minimum taper length of the right-of-way transition taper shall be 100 feet.

4.11.7 EXTENSIONS OF EXISTING STREETS

New streets which extend existing streets shall bear the names of the existing streets, and shall be dedicated at equal or greater right-of-way widths than the existing streets for an appropriate transition length, if applicable, unless a lesser street is justified by a TIA.

4.11.8 INTERSECTIONS

Street intersections shall be situated at an angle of ninety degrees, plus or minus fifteen degrees except where the intersection utilizes knuckles, turning heels or eyebrows in accordance with the DSC. Such intersections shall maintain proper intersection visibility as determined by the latest edition of AASHTO's

“A policy on Geometric Design of Highways and Streets.” The major access driveway to large multifamily, commercial and industrial developments shall also meet the requirements of this chapter.

4.11.9 STREET OFFSETS

A. **Minimum Offset Distances**. No combination of two streets intersecting a third shall have their centerlines offset any less than the distance specified in Table 6.1 unless a traffic impact analysis recommends a greater distance to preserve safe and efficient traffic operations. The City Manager or designee may grant an exception where infill, topographic or other physical features render the required offset unnecessary or impractical.

B. **Configuration Shall Reduce Minimal Offsets**. Intersecting streets onto an existing or future divided roadway must be configured in accordance with Section 6.2, such that the centerline offset will accommodate the appropriate median opening and left-turn lanes (with required transition and stacking distances) on each divided roadway, and shall be aligned with any existing or proposed streets or driveways on the opposite side of the divided roadway (in order to share the median opening). Median openings and offsets should be analyzed in the traffic impact analysis, and a determination made if developments sharing a median opening may cause additional traffic conflicts, where an exception to sharing a median opening may be made.

4.11.10 HALF-STREETS

Construction of half-streets shall be prohibited, except when essential to the reasonable development of the subdivision in conforming with the other requirements of this code and the thoroughfare plan, and where the CPC makes a determination at the time of preliminary plat approval that

Table 4.3 Minimum Offset Distances

Types of Streets Intersecting at Offset [1]	Types of Street Intersected	Minimum Offset Distances [2,3]	
		Intersection Type A	Intersection Type B
Local/Local	Local	125 ft	125 ft
Local/Local	Collector	125 ft	125 ft
Local/Local	Arterial [4]	125 ft	300 ft
Local/ Collector	Collector	125 ft	300 ft
Local/ Collector	Arterial	125 ft	300 ft
Local/Arterial w/o median or median break	Arterial	200 ft	400 ft
Collector/ Collector	Collector	250 ft	400 ft
Collector/ Collector	Arterial	300 ft	400 ft
Collector/ Arterial	Arterial	300 ft	400 ft

Note 1: For the purposes of this table freeways shall be considered as arterial streets with no median breaks unless an interchange is provided.
Note 2: Measured from closest property line to closest property line, as shown in the DSC. If one intersection is signalized, the minimum spacing to the next unsignalized intersection shall be 600' or as dictated by TIA.
Note 3: Existing and future signalized intersections shall be at least 2,650 feet apart in order to match the desired spacing in the thoroughfare plan and shall be required to have left turn storage in both directions. The City Manager or designee may approve a reduction to the required signal spacing to meet a specific need. The city traffic engineer may also require lining up of intersections for future or existing signalization or median breaks, as required in Sub-Section 3.8.2. Signal spacing in central business districts may be reduced upon approval of the traffic engineering division. Signals shall be spaced at least 2,650 feet or more from frontage roads.
Note 4: Local streets intersecting with an arterial with no median break shall not be required to be offset.

there is no immediate benefit to be gained by constructing the full street section since no access from the street will be needed by the subdivision in question. The CPC may also find that it would be more practical, or cost effective, to delay construction of the other half or some portion thereof of a street until when the adjoining property is developed.

4.11.11 PRIVATE STREETS

A. **Permitted Only as Local Street**. Private streets shall require approval as an exception at the time of preliminary plat approval by the City Plan Commission in accordance with this title. No streets or thoroughfares shown on the adopted thoroughfare plan may be a nonpublic street. Construction and development of private streets shall meet the standards for right-of-way width and improvement as set forth in this chapter as applied to public streets.

B. **Classification**. At the time a private street is proposed, it shall be classified as either a local or sub-collector street, as described herein and made to conform in all respects with right-of-way paving, curb and gutter, construction, and design requirements as applicable to a public street.

C. **Subdivision Boundary Streets**. New subdivision boundary streets shall not be private.

D. **Private Streets, General**. In order to be considered for an exception to allow the construction of private streets, the developer shall meet the requirements set out in this section.

    1. **Construction.** All private streets shall be designed, constructed, and maintained to meet city standards. The construction and improvement plans shall be reviewed by the city in the same manner as construction and improvement plans for public infrastructure. The city shall not participate in any portion of the cost of constructing a private street.

    2. **Inspection During Construction.** All private streets shall be subject to inspections by city staff in the same manner, at the same intervals, as public streets, including the payment of applicable inspection fees. A construction schedule shall be submitted with the construction and improvement plans in order to assist in scheduling the inspections. Failure to pass an inspection and meet city construction standards shall require re-inspection, and re-construction, as necessary. No certificates of occupancy shall be released for structures along a private street until all inspections shall have been completed satisfactorily.

    3. **Traffic Control Devices.** All private traffic control devices and regulatory signs shall conform to the “Texas Manual of Uniform Traffic Control Devices”, as amended, and to city standards.

    4. **Restricted Access.** The subdivision homeowners association shall clearly mark entrances to all private streets with a sign, in accordance with the DSC, placed in a prominent and visible location, indicating that the streets within the subdivision are private, and not maintained nor regularly patrolled by the city. All restricted access entrances shall be manned twenty-four (24) hours every day, or they shall provide a reliable, alternative means of ensuring access into the subdivision by the City, by

emergency service providers, and by other utility or public service providers, such as postal carriers and utility companies, with appropriate identification. The method used to ensure city and emergency access into the subdivision shall be approved by the city's fire department and by any other applicable emergency service providers during the final platting process. Gates on private streets shall provide a traffic queue analysis and provide adequate on-street storage in advance of the gate. If the homeowners association fails to maintain reliable access as required by city codes, the city may enter the private street subdivision and remove any gate or device which is a barrier to access, and bill the expense to the association. If the bill is not paid, the city may file a lien for the expense against any property owned by the association.

5. **Waiver of Services.** Certain city services may not be provided for private street subdivisions, including but not limited to street maintenance, routine law enforcement patrols, enforcement of traffic and parking regulations, preparation of accident reports, and payment of costs for street lighting. A note as to waiver of services may be required on the face of the plat.

6. **Street Lighting.** Street lighting as required by this title shall be entirely at the expense of the developer and subsequent property owners. Decorative poles or alternative spacing may be approved by the City Manager or designee, following a recommendation by the CPC, who shall make such recommendation based on the lighting type, the lumens necessary to effectuate safe traffic and pedestrian travel, and a finding that the proposed lighting plan provides as well or better for the health, safety and welfare of the future residents of the private street subdivisions.

7. **Maintenance.** The developer shall provide for the establishment of a homeowners or property owners association, in covenants, conditions, and restrictions (CCRs), to assume the obligation of perpetual maintenance of private streets and other improvements held privately, including a mandatory assessment for such private streets and improvements to be placed on all property owners within the subdivision, allowance for city staff to inspect the streets to assure they are being maintained to city standards, hold harmless provisions as required in subsection 9, and providing for notice to the city attorney and City Manager of any amendments to these relevant sections. The city shall be a necessary party for the amendment of any portions of the CCRs dealing with these requirements. The proposed CCRs shall be submitted for review by the city attorney at the time of filing the preliminary plat. The city attorney shall review the CCRs to ensure that the requirements of this section are met, and shall submit recommended changes to the developer, who shall incorporate such changes. Absence of city attorney approval of the CCRs shall require the denial of the exception for private streets.

8. **Petition to Convert to Public Streets.** A property owners association may petition the city to accept private

streets and any associated property as public streets and right-of-way upon written notice to all association members, and the favorable vote of a majority of the membership, or as required in the CCRs. A dedication instrument shall also be submitted, and shall be reviewed and the final form approved by the city attorney prior to submission of this request to city council. The city shall not be required to accept any private streets for public dedication and maintenance. The staff shall review the request and make a recommendation to CPC, who shall forward a recommendation to city council. City council shall make their decision based on the public health, safety and welfare considerations of the streets. As a condition of accepting the dedication and maintenance of private streets, the city may impose a requirement for repairs and improvements at private expense prior to acceptance, enter into an agreement for an assessment or pro-rata sharing of costs for repairs or improvements prior to acceptance, or other legal or equitable options to ensure that the streets being accepted are not a liability to the city. The city shall be the sole judge of the nature and extent of repairs or improvements needed. The city may also require, at the sole expense of the association's or property owner's expense, the removal of any guard houses, access control devices, landscaping or other amenities located within the streets or common areas prior to city acceptance.

9. **Hold Harmless.** The property

Table 4.4 Width for Cul-de-sac Streets and Turnarounds for Certain Activities

Activity Served	Paving Width [1]	Right-of-Way Width	Additional Requirements
Cul-de-sac Streets			
Less than 12 dwellings	32 ft	52 ft	300 ft maximum length
1-25 dwellings	36 ft	56 ft	600 ft maximum length-Single-family, duplex only [2]
Nonresidential Zoning Districts (except as otherwise specified)	36 ft	54 ft	300 ft maximum length
Heavy Commercial District and Industrial Districts	40 ft	62 ft	300 ft maximum length
Cul-de-sac Turnarounds			
Residential and Nonresidential Zoning Districts (except as otherwise specified)	90 ft diameter	110 ft diameter or 100 ft with 10 ft utility and sidewalk easement [3]	Shall be a minimum of 10 ft of ROW or ROW/Easement Combination behind curb [4]
Heavy Commercial District and Industrial Districts	100 ft diameter	120 ft diameter	N/A

Note 1: Measured from the front of adjoining curbs.
Note 2: Cul-de-sacs (dead end streets) serving triplex, quadruplex and higher density multifamily uses shall be discouraged. Exceptions may be granted by the CPC where no alternative exists and meeting the Heavy Commercial Standard or in infill development situations.
Note 3: 7 foot to provide room for fire hydrants and other utilities, streetlights and traffic/no parking signs, and still meet ADA compliance.
Note 4: or in accordance with the DSC.

owners association, as owner of the private streets and appurtenances, shall release, indemnify, defend and hold harmless the city, any other governmental entity, and any public utility entity for damages to the private streets that may be occasioned by the reasonable use of the private streets by same, and for damages and injury (including death) arising from the condition of the private streets, out of any use of access gates or cross arms, or out of any use of the subdivision by the city or governmental or utility entity.

4.11.12 CUL-DE-SAC STREETS

Cul-de-sac streets are discouraged for use in subdivision design. Except where projecting into adjacent unsubdivided areas, any street having only one vehicular access to another street shall be terminated by a permanent turnaround. Standards for both the turnaround and its street approach are set forth within this section. Exceptions to these standards shall be discouraged due to firefighting and solid waste collection requirements. Any turnaround, either temporary or permanent, that does not meet these requirements shall be permanently signed for no parking or marked as a fire lane in accordance with the DSC.

A. **Width for Cul-de-sac Streets for Certain Activities**. That portion of any street extending from an intersection to a turnaround shall be improved and rights-of-way platted with the minimal dimensions provided in Table 4.3.

B. **Turnaround for Cul-de-sac Streets for Certain Activities**. The turnaround portion of any cul-de-sac shall be improved, and rights-of-way platted, as prescribed in Table 4.3.

4.11.13 STREET STUBS/FUTURE CONNECTIONS

Except when recommended by the City Manager or designee, no public dead-end streets will be approved unless they are provided to connect with existing streets (including stubbed-out streets) or future platted streets on adjacent land.

A. **Lots on Future Connections**. No more than one lot (per side) can front onto the street stub/future connection unless a temporary turnaround bulb (with the appropriate temporary street easement) is provided at the end.

B. **Maximum length and turnaround**. A street stub/future connection shall not exceed the maximum allowed length of a normal cul-de-sac, and the temporary turnaround bulb must be constructed like a cul-de-sac, as provided in Section 4.11.12 above.

C. **Temporary Street stubs**. A note shall be placed on the final plat clearly labeling any temporary street stubs (if any) that will at some point be extended into the adjacent property. Any required temporary turnaround easements shall be shown on the final plat along with their appropriate recording information, if they are off-site or established by separate instrument.

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Design Exceptions and Modifications

5

Chapter 5

Design Exceptions and Modifications

5.1 APPLICABILITY AND VESTED

The City Plan Commission may grant exceptions to these requirements in cases where the proposed subdivision is constrained by topographic features of at least 20% grade, existing single family neighborhood development, or other impassable features, as determined by the City Manager or designee.

5.2 GUIDANCE ON FLEXIBILITY IN STREET DESIGN

This Street Design Manual emphasizes the concept of tradeoffs and priorities in street design to ensure that the general intent of a design can be met even if right-of-way constraints or other limiting context factors might not make all preferred parts of a design possible. These tradeoffs should occur explicitly throughout the process and be guided by design values that actively respond to their context. Generally, trade-off considerations include modal priority, determination of appropriate street design elements, and evaluations on the level of impact that regular weather conditions will have on normal street and thoroughfare operations.

GENERAL PRIORITIES FOR DECISION-MAKING

- Connect to existing bicycle facilities on the corridor or adjacent corridors and/or provide bicycle connections proposed in the El Paso Bike Plan
- Widen and/or connect sidewalks to those existing on the corridor or adjacent corridors where possible
- Provide additional amenities were possible (e.g., landscaping, lighting)

Additionally, to ensure consistency along a corridor, network level operations should also be considered. Trade-offs are typically required in constrained situations and should be made strategically to avoid any unintended adverse impacts on adjacent streets when determining how to fit multiple modes into a roadway.

There are many combinations of factors related to the design of a street including, but not limited to; constraints on the right-of-way, particular access needs, accommodating space for parking, streetscaping, as well as other additional curbside uses. The El Paso Street Design Manual focuses on providing a general set of Cross-Sections that include more detail on the decision factors that would finalize a design for a certain corridor. This becomes especially important for achieving certain designs on existing street while ensuring an overall consistency in the Functional Classification as they transition into newer areas of the City.

Depending on existing amenities, existing context, project type, and priority these trade-off considerations could include the following[1]:

- Removal or reduction of medians
- Inclusion of streetscape elements (such as planter strips, hardscape, or sidewalks)
- Removal of the parking lane on one or both sides of the street to make space for the inclusion of dedicated lanes for other modes of transportation (such as bicycle lanes)
- Removal or reduction of the Amenity Zone (in exceptional circumstances)
- A "Road Diet," or the removal or reduction of motor vehicle lanes

Where constraints prevent the accommodation of a certain mode on a street that is recommended within the Design Criteria values, the broader network should be reviewed. In some instances, such modes may be accommodated on a parallel street, for example.

Since the El Paso Street Design Manual is intended to be used as a guide for the implementation of a broad range of thoroughfares—including both existing constrained rights-of-way and new rights-of-way dedicated with development—it is important to understand how trade-off considerations should be made. To explain the process through which trade-offs and design decisions should be made, Table 3.2 summarizes general guidelines according to each functional classification and street type.

Section 3.1 (and specifically Tables 3.1 and 4.1) provides an overall summary of recommended guidance for each combination of functional classification and area types. More specific trade-off priority level details are included on each cross-section diagram, presented in Sections 4.2-4.8, with the aim of providing direction on where trade-offs need to be made for certain conditions.

5.3 DESIGN PRIORITIZATION FOR MODIFICATION OF TYPICAL SECTIONS

Table 5.1 below, identifies allowable modifications to typical sections based on roadway type, location and sector. Adjustments to number of travel lanes will be made based on a TIA.

Note 1: Existing landscaping and or illumination shall be taken into consideration before removal.

Table 5.1 General Design Flexibility Guidance for Thoroughfare Corridors

			Major Arterial	Minor Arterial	Collector	Local
KIT-OF-PARTS APPROACH TO THE CROSS SECTIONS						
Compact Urban	**G-1, G-2, O-7**	**Basic Cross Section**[1]	4-6 lanes without median, with parking, sidewalk, and parkway with trees	Two lanes without median or four lanes with median, with parking, sidewalk, and parkway with trees	Two lanes without median, with parking, sidewalk, and parkway with trees	Two lanes, with curb, parking, sidewalk, and parkway with trees
		Is it designated in the Bike Plan?	Volumes of 6,000 vehicles per day (VPD) or greater and posted speed of 25 MPH or greater, consider cycle track or shared use path Volumes less than 6,000 vehicles per day (VPD) and posted speed of less than 25 MPH, consider buffered bike lanes, bike lanes or bicycle boulevard		Add Cycle Track, buffered bike lanes, bike lanes or bike boulevards	Add bike lanes or a bike boulevard treatment
		Special context factors?	Substitute parkway/ tree well with hardscape		Substitute parkway/ tree well with decorative features	
Drivable Suburban	**G-3, G-4, G-5, G-7, G-8, G-9**	**Basic Cross Section**[1]	Four lanes with median, with sidewalks and parkway with trees	Two lanes without median or four lanes with median, with sidewalks and parkway with trees	Two lanes without median, with sidewalk and parkway with trees	Two lanes, with curb, sidewalk, and wider parkway with trees
		Is it designated in the Bike Plan?	Volumes of 6,000 vehicles per day (VPD) or greater and posted speed of 25 MPH or greater, consider cycle track or shared use path Volumes less than 6,000 vehicles per day (VPD) and posted speed of less than 25 MPH, consider buffered bike lanes, bike lanes or bicycle boulevard			
		Special context factors?	Add median (continuous or at major intersections only)			
Rural	**G-6, O-3, O-4, O-5, O-6**	**Basic Cross Section**[1]	Two lanes without median or 4 lanes with median, with shared use path and equestrian trail and swales	Two lanes without median, with shared use path and equestrian trail and swales		Two lanes without curbs, with equestrian trail (optional) and swales
		Is it designated in the Bike Plan?	Buffered bike lanes or shared use path			
		Special context factors?	In Rural Settlement area types, add sidewalks			

Note 1: Adjustments to number of travel lanes will be made based on a TIA.

Plan El Paso Future Land Use Base Sectors

GROWTH SECTORS	OPEN SPACE SECTORS
G-1 Downtown	O-1 Preserve
G-2 Traditional N'hood	O-2 Natural
G-3 Post-War	O-3 Agriculture
G-4 Suburban	O-4 Military Reserve
G-5 Independent City	O-5 Remote
G-6 Rural Settlement	O-6 Potential Annexation
G-7 Industrial	O-7 Urban Expansion
G-8 Fort Bliss Mixed Use	
G-9 For Bliss Military	

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Access and Connectivity

6

Chapter 6

Access and Connectivity

6.1 ROADWAY NETWORK CONNECTIVITY

6.1.1 APPROACH ROADS AND ACCESS

All subdivisions with a single point of access must have no roadway, or link, that exceeds three hundred feet or sixty dwelling units from the access point or an average daily traffic (ADT) of greater than one thousand two hundred. All other subdivisions must have at least two points of vehicular access, and must be connected with improved roadways to the city's improved thoroughfare and street system by two or more approach roads of the dimensions and standards hereinafter set forth. An access road that is divided with twenty feet in each direction to the intersection of two streets shall be considered two means of access.

A. Requirements for dedication of right-of-way and improvement of approach roads, signalization, median breaks, additional lanes and other traffic mitigation or safety improvements may be increased depending upon the size or density of the proposed development, or if the need is demonstrated by traffic impact analysis (TIA).

B. An exception for a subdivision may be allowed by the City Plan Commission

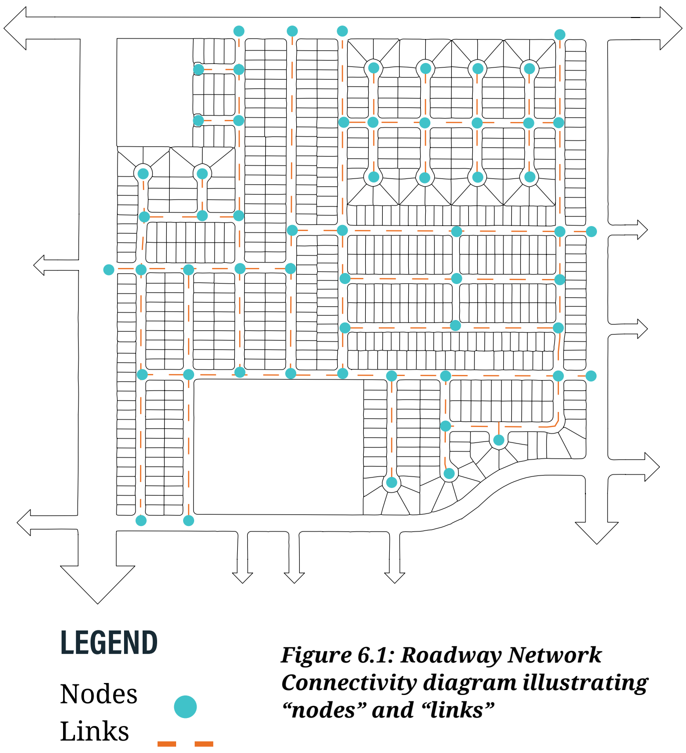


Figure 6.1: Roadway Network Connectivity diagram illustrating "nodes" and "links"

(CPC) provided a second emergency access that is controlled in a manner acceptable to the fire marshal shall be provided.

C. Each nonresidential lot shall have a minimum frontage on a dedicated public street as required by the applicable zoning, unless other provisions have been authorized through a commercial unit development with cross access easements to the property. The City Plan Commission may approve alternative solutions provided the intent of providing adequate emergency access for public safety vehicles is met.

D. Adequate lighting of access points shall be coordinated with the Streets and Maintenance Department and provided by the subdivider.

6.1.2 STREET SPACING GUIDELINES

The basic form of the thoroughfare system is shaped by the spacing and alignment of arterial thoroughfares. The system of arterials should be continuous and networked in a general rectilinear form. In urban areas, arterial spacing may need to be one-half mile or less. In denser urban centers and core areas, arterials may need to be spaced at one-quarter mile or less.

In more conventional suburban areas that are intended to remain so, arterial spacing of up to one mile may suffice if facilities of up to six lanes are acceptable to the community. The arterial thoroughfares should be supplemented by thoroughfares spaced at most one-half-mile apart. Such areas typically are interspersed with areas of mixed-use and walkable activity, such as commercial districts and activity centers. These centers require more frequent and connected networks of local streets.

Closer spacing of thoroughfares (one-quarter mile for collectors) may be needed depending on pedestrian activity levels, desired block patterns and continuity. Natural features, preserved lands, or active agriculture may break up the pattern.

Local streets should be configured in a fine-grained, multimodal network internal to the neighborhood, with many connections to the system of thoroughfares. Where streets cannot be fully networked, they should be supplemented by pedestrian and/ or bike-pedestrian facilities to provide the desired connectivity.

Pedestrian facilities should be spaced so block lengths in less dense areas (suburban or general urban) do not exceed 600 feet (preferably 200 to 400 feet) and relatively direct routes are available. In the densest urban areas (urban centers and urban cores), block length should not exceed 400 feet (preferably 200 to 300 feet) to support higher densities and pedestrian activity.

All proposed developments must have a connectivity index of 1.4 or greater. The connectivity index shall be calculated by dividing the total number of links (streets including stub-out streets) by the total number of nodes (intersections, culs-de-sac, no-outlets, dead-ends).

The city plan commission may grant exceptions to these requirements only upon a finding that the development is constrained by topographic features, existing development or other impassible features. The grant of the exception requires the affirmative vote of at least three fourths of all members of the city plan commission.

6.1.3 LENGTH OF A BLOCK OR STREET SEGMENT

The maximum length of any block or street segment (including a looped street) shall be one thousand six hundred feet along arterial streets, except that where lots are designed under Sub-section 6.2.5, blocks may not exceed eight hundred feet. Block faces shall not exceed one thousand feet along other streets and the full perimeter of a block shall not exceed two thousand four hundred feet except when Section 5.2 specifies otherwise or where topographic features or parcels of one-half acre or larger would justify an exception from this requirement. Cul-de-sac streets shall adhere to Sub-Section 6.1.4 or other requirements herein. Measurements shall be as measured along the centerline of the street from the centerline or center point of one intersection to the centerline or center point of the next intersection. For the purposes of measurement, either a full four-way intersection or a "T" three-way intersection shall be considered an intersection. Traffic calming may be provided by the developer or may be required in accordance with the adopted Neighborhood Traffic Management Policy and in accordance with the DSC by the City Manager or designee.

The length of a block or street segment may exceed the maximum length stated above under the following conditions:

1. Blocks containing retention or detention ponds, and
2. Blocks containing parks.

6.1.4 MAXIMUM LENGTH OF A CUL-DE-SAC STREET

A. Cul-de-sacs should be discouraged in subdivision design.

B. No cul-de-sac served by one access point in any single-family, multiple-family, industrial, or commercial subdivision shall exceed six hundred feet in length or the length as shown in Table 4.3, whichever is less.

C. No cul-de-sac in any single-family subdivision district shall be designed to serve more than twenty-five single-family dwelling units, unless an exception is granted by the CPC to the maximum length, in which case the maximum number of dwelling units shall be increased in the same percentage as the maximum length has been increased.

D. For purposes of this paragraph, cul-de-sac length shall be measured along the centerline of the cul-de-sac from a point beginning at the intersection of the cul-de-sac street with the centerline of the street from which it extends to the center of the turnaround at the end of such cul-de-sac. (Also see Sub-section 4.11.12 for cul-de-sac requirements.) For the purposes of measurement, either a full four-way intersection or a "T" three-way intersection shall be considered an intersection.

E. An exception may be granted by the City Plan Commission to develop a parcel:

    1. With topographic problems;
    2. With Arroyos or environmental areas requiring protection surrounding such parcel;
    3. That is effectively landlocked with no other alternative than a cul-de-sac exceeding six hundred feet;
    4. Is in a proposed subdivision that has such a unique configuration that the only way to serve the area in question is with a cul-de-sac exceeding six hundred feet. Such exception shall not be granted if the length of the cul-de-sac can be reduced by connection to an adjacent and/or parallel street. The desire to gain additional lots from the cul-de-sac exception by itself is not

reason enough to grant such exception to the maximum length;

5. Additional modifications may be required by the City Plan Commission upon recommendation by the fire marshal's office including intermediate turnarounds (eyebrows) to accommodate emergency vehicles being provided at a maximum distance of six hundred feet;

6. Building construction within the area of the cul-de-sac beyond the six hundred feet distance shall be fire sprinklered and a note shall be added to the recording plat and the subdivision improvement plans indicating that buildings are required to be sprinklered within the subdivision, and which lot numbers have such requirement.

6.2 DRIVEWAYS AND ACCESS MANAGEMENT

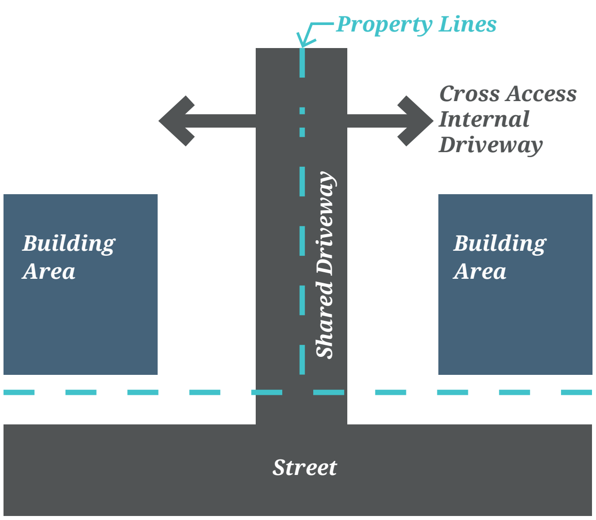


Figure 6.2 Shared Access Driveway & Cross Access Internal Driveway

6.2.1 DRIVEWAY APPROACHES AND RELATED REQUIREMENTS

Driveway approaches, curbs, gutters, pavements and appurtenances on public property and other facilities to provide access to abutting properties in the city and ETJ in connection with platting or building construction shall be constructed, provided, altered or repaired in accordance with the City of El Paso Design Standards for Construction (DSC) and as prescribed by the standards outlined within this title.

6.2.2 ACCESS MANAGEMENT

Roadway access management standards and requirements related to TXDOT roadways and city roadways shall be in accordance with this ordinance, the DSC, all other city and TXDOT regulations, and as determined by the traffic impact analysis.

6.2.3 SHARED DRIVEWAYS AND CROSS-ACCESS DRIVES

A. **Type II Driveway Approaches and Shared Driveways**. Shared access driveways in relation to Type II driveways are encouraged and may be required by the City Manager, or designee in order to ensure public safety access by providing mutual/common access to a median opening, to minimize the number of driveway cuts on streets, thereby maintaining street mobility, and to facilitate traffic flow between adjacent lots. (See Figure 6.2)

   1. Arterial Street. A shared mutual access easement(s) for a driveway(s) may be required between adjacent lots fronting on an arterial street, as designated on the thoroughfare plan (as the street exists or is planned to be improved in the future).

2. Location and Dimension. The location and dimensions of such easement(s) shall be determined by the City Manager or designee.
3. Easement on Plats. Such easements shall be noted on the preliminary plat and final plat with the language specified as part of the city's application requirements.

B. **Type II Driveway Approaches and Cross Access Internal Driveways**. Cross access easements for internal driveways are encouraged and may be required as part of the preliminary and final plat approval by the City Manager, or designee in order to minimize the number of driveway cuts on streets, thereby maintaining street mobility, and to facilitate traffic flow between adjacent lots.

1. **May Be Required.** A cross access easement(s) for an internal driveway(s) may be required between adjacent lots. Such easement shall be required between adjacent properties within the same plat, phases of plats or ownership when the following conditions exist:
   a. On arterial frontages between adjacent parking lots;
   b. Between lots when one or more do not have direct access to the thoroughfare;
   c. When accessing shared driveways;
   d. On arterial lots in close proximity to intersections where individual lot driveways to not align with median breaks, thereby giving each lot access to a median break.

C. **Location and Dimension**. The location and dimensions of such easement(s) shall be determined by the City Manager or designee.

D. **Easement on Plats**. Such easements shall be noted on the preliminary plat and final plat with the language specified as part of the city's application requirements.

6.2.4 MEDIAN OPENINGS

Common access to median openings from driveways should be discouraged due to increase of potential conflict points and collisions.

6.2.5 LOTS ACCESSING ARTERIAL STREETS

Where a subdivision abuts or contains an existing or proposed arterial street, the City Manager, or designee may require that single-family lots shall not directly access an existing or proposed arterial and no residential lot frontage, other than the side of the lot with no access, shall be allowed on arterial streets, except where the proposed subdivision meets one or more of the following criteria:

A. **Adjoining Property Frontage**. Where residential lot frontage is provided from an arterial street on an adjoining property, and the City Plan Commission determines that a public benefit would result from permitting the proposed development to be similarly designed.

B. **Physical Limitations**. Where the only street frontage which may be provided to the residential lots is from an arterial street due to the shape, topography or other physical condition of the property.

C. **Design Requirements**. Where residential lot frontage is proposed on an arterial street, the block face and lot(s) facing the arterial shall meet the following requirements:

a. Lots shall be accessed from an alley at the rear of the property.

b. Lots shall not have driveway access to the arterial.

c. The development shall provide street trees placed at thirty feet on center along the entire block face where lots face the arterial.

d. The arterial shall provide for on street parking.

e. The sidewalk width along the entire face of the block with lots facing the arterial shall be a minimum of six feet.

f. The parkway along the entire face of the block with lots facing the arterial shall be a minimum of thirteen feet.

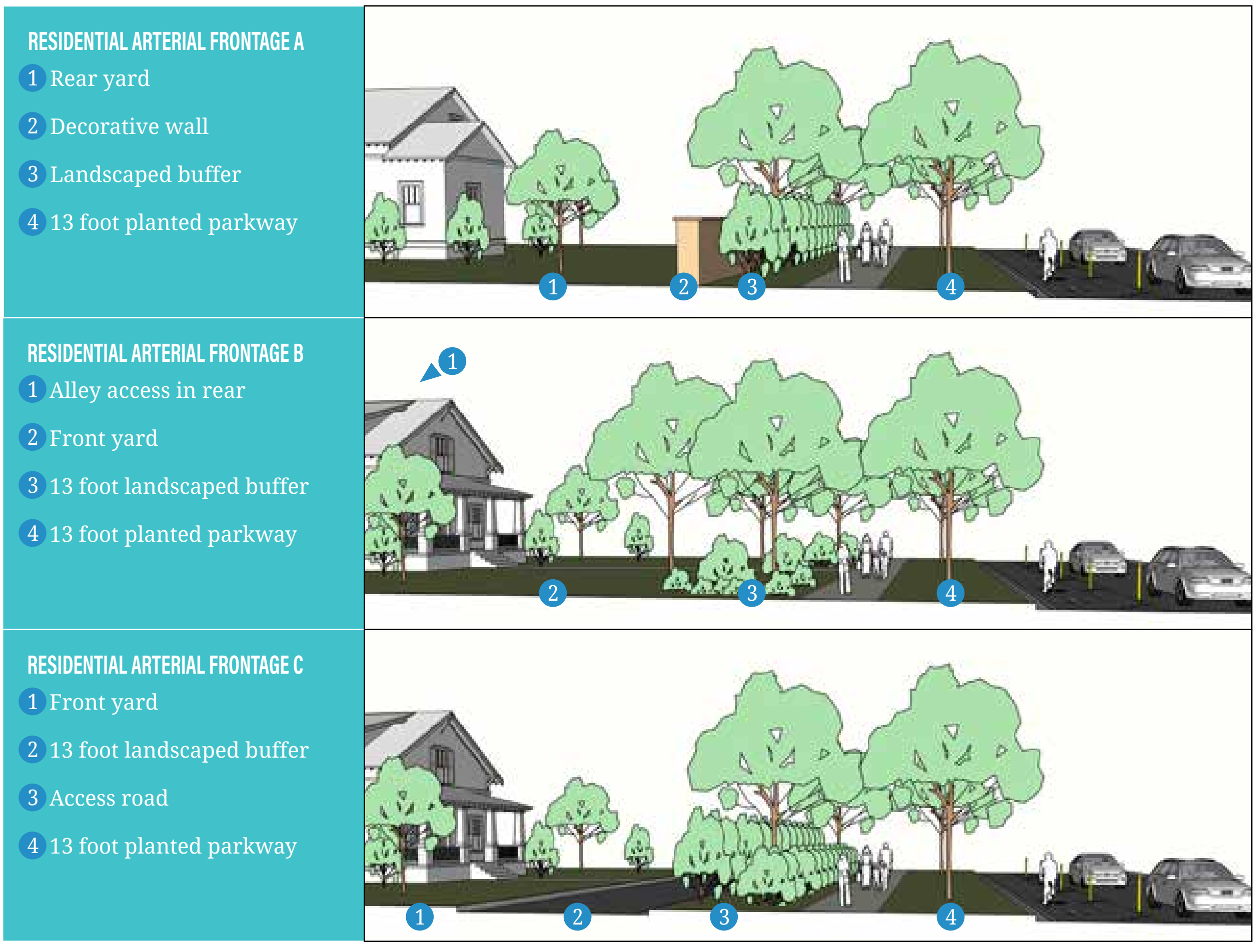


Figure 6.3 Design Visualizations for lots fronting an arterial roadway. Decorative walls will comply with Title 20 - Zoning and are shown to illustrate recommended treatments for residential lots fronting arterial roadways.

Street Lighting

7

Chapter 7

Street Lighting

7.1 PURPOSE AND APPLICABILITY

The subdivider shall furnish and install streetlights along all public and private streets, whether within the corporate limits or within the extraterritorial jurisdiction. Such streetlights shall comply with the requirements of this title, the City of El Paso lighting ordinance found in Title 18, the City's Building and Construction Standards and with the requirements of the DSC. The standards shall apply in determining the number of streetlights required, and are based on approved standards of the American National Standards Institute and the Illuminating Engineering Society of North America, a copy of which is maintained by the city.

7.2 CONTEXTUAL STREET LIGHTING

Lighting can and should vary between various contexts. Lighting of rural roadways may be desired, but the need is much less than in Compact Urban areas. Lighting of rural areas is not well justified except in certain areas including intersections, railroad grade crossings, bridges and tunnels, sharp curves and where roadside interferences are present.

Compact Urban and Drivable Suburban roadway lighting is necessary to enhance safety. General fixed-source roadway lighting is mounted on a support pole at least 30 feet above the roadway surface. Pedestrian-scale lighting is fixed-source lighting mounted at a lower height than other roadway lighting, generally only 15 feet above grade. It is essential for illuminating sidewalks, crosswalks, bike lanes and other multi-modal facilities. Pedestrian-scale lighting should be used in any contexts where relatively high volumes of pedestrian activity are anticipated such as transit stops, educational and medical institutions and mixed use or commercial areas.

7.2.1 LIGHTING PLANNING & DESIGN

All projects that involves a roadway is to be evaluated for lighting requirements. This includes:

1. Land development, including new roadways
2. Upgrades to existing roadways with geometric modifications
3. Upgrades to existing roadways without geometric modifications
4. Retrofits to an existing roadway lighting system

The design of a roadway lighting system

needs to take into consideration various factors including:

- Safety – the primary objective of roadway lighting is to enhance road user safety by providing road users with improved nighttime visibility of roadway conditions and potential hazards.

  Light poles, transformers and cabinets present potential hazards to errant vehicles. Therefore, take careful consideration of installation locations. In addition, location is crucial for maintenance crews to be able to conduct activities in a safe, economical and effective manner.

  Evaluate Clear zones. The clear zone is the preferred location for installing elements associated with the lighting system whenever it is possible. The width of the clear zone is dependent on the traffic speed, traffic volumes, road geometry, and alignment. For more information regarding clear zones, refer to the AASHTO Roadside Design Guide.

- Cost – A proposed design shall include Estimates for Capital costs, Operating costs and Life Cycle costs. Operating cost calculations should include maintenance and energy costs.

- Optimization of Lighting – In general, design a roadway section requiring lighting to use the least amount of lighting infrastructure possible to provide the recommended amount of light for roadway user safety. Evaluate photometric reports of various products and select luminaires with optics most suitable for a given application. Optimize the design and use the fewest number of luminaires and poles, reducing both capital and life cycle costs.

  The use of few poles also improves the roadway aesthetics, reduces visual clutter, and enhances safety by reducing the possibility of collisions with poles by errant vehicles.

- Aesthetics – Roadway aesthetics are most heavily influenced by the pole height and layout. In areas with high pedestrian volumes such as downtown and entertainment districts, the use of shorter poles, for a more pedestrian – scale appearance, is recommended.

- Environmental Consideration – some street locations pose special environmental concerns related directly to lighting. Designers should consider how to mitigate the negative effects of roadway lighting when designing for these special situations. This includes:

  1. Vehicle-wildlife conflict areas. Give consideration to light areas past the roadway edge. This will assist roadway users in identifying wildlife entering the roadway or adjacent areas and may aid road users in avoiding collisions with animals. The use of approved taller poles with a longer setback form the roadway will facilitate a wider lighted area.

  2. Obtrusive light impacts – Design the lighting system so it minimizes obtrusive light impacts particularly in urban areas and address dark sky compliance, light trespass, sky glow, and offsite glare.

- Site conditions – The lighting designer should work with the landscape designer to find the best locations for trees and bushes with respect to the luminaires.

In all cases, the lighting should take precedence over the installation and maintenance of trees and bushes.

- Collision data and investigations – The designer should use this information to improve lighting to recommended levels within areas that have a history of collisions involving vehicles and pedestrians.

7.2.2 LIGHTING DESIGN PROCESS

Visual Task. Designers should completely understand the visual task in a given setting. The designer often thinks only in terms of the driving task. Take into account seeing pedestrians, dropping off passengers, viewing elements within the streetscape, reading signs, and other driving tasks related to urban areas. Other users include pedestrians and bicyclists, which also require adequate lighting for their tasks.

Design Considerations:

1. Impact of headlights. Generally, roads designed for speeds of 30mph or less do not require additional illumination, vehicle headlights are sufficient.
2. “Because it is dark” is not a reason for installing street lighting. Carefully evaluate the reason and purpose the requirement for installing street lighting
3. Location Considerations:
    - Pole locations should be compatible with driveway entrances, property lines and windows of residential dwellings and be aware how pole location affects the adjacent properties not just the site.
    - Pole locations should be coordinated with physical obstructions such as trees, distribution transformers, utility enclosures and other utility infrastructure. Avoid installing street lighting on El Paso Electric poles as much as possible.
    - Installation of Street lighting fixtures on poles/structures not owned by the City of El Paso is not permitted. The only exceptions are poles owned by El Paso Electric, and only if there are no other options available for installing a fixture. The El Paso Electric Co. and Streets and Maintenance Department must approve this installation prior to design approval.
    - No portion of the street lighting system shall be installed on private property.
    - Always check clearance to overhead power lines.
    - Coordinate with The El Paso Electric Co. at the pre-design phase to determine service availability and location of power drops.
    - Additional lighting may be needed for streets near playgrounds, green spaces, or school zones.
4. Equipment considerations
    - Dark sky compliance now asks for fixtures with light spectrum Color Coordinated Temperature (CCT) of 3000K or less. Color rendering Index (CRI) of fixtures should be no less than 70%
    - In keeping with environmental concerns the up-light rating in B-U-G rating system shall be zero (0).
    - Decorative street lights are not considered street lighting. Decorative lighting is designed for improving

aesthetics and not roadway safety.

5. Safety and security - lighting may not ensure security, but the presence of lighting may provide a sense of security.
6. Other recommended considerations
   - All streets shall be illuminated as per their classification as determined by the proper warrants. See table below.
   - The B-U-G rating for a particular street's luminaires, shall not serve to compromise the design criteria as determined by the street design classification and pedestrian classification.
   - Environmental Lighting Zones shall have no influence in the selection of the proper street classification.
   - No off-road lighting shall be considered in determining a street classification, nor shall any off-road lighting contribution be used to achieve the minimum lighting requirements of a classification.
   - Street lighting design shall be restricted as much as possible to the roadway area. However, it may be desirable to extend the lighting to adjacent areas such as sidewalks.
   - Off-road lighting installations shall take into consideration any adjacent streets so as not to create any safety issues for drivers.
   - Metal street light poles place within streets with a posted speed limit greater than 30mph require a breakaway device.
   - Luminaire and pole Location should be such as not to obstruct sidewalks or to provide enough clearance for placement of a sidewalk where none exists.

7.2.3 PRE DESIGN

The designer is expected to evaluate and understand the roadway geometrics and utility locations both overhead and underground prior to beginning the design.

The design must be coordinated and integrated with all civil design elements.

The designer is expected to be familiar with the City of El Paso light ordinances and National Electric Code requirements.

The designer is expected to investigate the site conditions. This includes proper assessment of the condition of existing equipment. Google maps investigations are not proper site condition investigations.

Lighting systems near railroad tracks have specific track-clearance requirements which are covered at the end of this chapter. Coordination with the proper railroad authority may be necessary and any approvals by them secured during this phase of the design.

Coordination with El Paso Electric Company is required at this stage to determine power service requirements, location of power drops and if any transformers or equipment needs to installing or ordering. In addition, any conflicts with distribution and transmission lines and clearance distances owned by The El Paso Electric Company are to be cleared by them.

Environmental issues of concern are offsite glare, light trespass, and sky glow. Also, be aware of community concerns.

Take into consideration maintenance and operations into the design. Materials used should be corrosion resistant and durable. It is critical that luminaires be safely accessible with minimal disruption to traffic. Consult with the Streets and Maintenance Department's Street Lights section during this phase.

Poles can be a potential hazard to errant motor vehicles. Clear zones and pole placement issues should be known and addressed.

Historical traffic data. Consult with the Streets and Maintenance Traffic section for historical information regarding hazardous locations and problematic locations with recorded collision statistics. Problematic areas should be identified and solutions discussed.

Historical Districts. Consult with the City of El Paso Historical district for any limitations or restrictions to the design of the lighting system.

7.3 STANDARDS

The classifications in Table 7.1, Table 7.2 and Table 7.3 shall be used for purposes of this chapter.

7.3.1 HIGHWAY LIGHTING VS. STREET LIGHTING

The intent of this chapter is to provide guidance in planning and designing street lighting. To assist with this a definition for both highway lighting and street lighting are given.

Highway lighting refers to lighting that is provided for freeways, expressways, limited access roadways, and roads on which pedestrians, cyclists, and parked vehicles are generally not present. The primary purpose of highway lighting are to help the motorist remain on the highway and help with the detection of obstacles within and beyond the range of the vehicle's headlights.

Street lighting refers to lighting that is provided for major (arterial), collector, and local roads, where pedestrians and cyclists are generally present during hours of darkness. The primary purpose of street lighting are to help the motorist identify obstacles, provide adequate visibility of pedestrians and cyclists, and assist in visual search tasks, both on and adjacent to the street.

7.3.2 RESIDENTIAL STREET LIGHTING

Designers should always maintain the recommended light levels for residential streets as for any other roadway. General objectives that can be achieved in a residential street lighting installation include:

1. pedestrian and driver safety
2. crime reduction
3. comfortable use of residential neighborhood streets after dark
4. obtrusive light control
5. minimized power usage
6. community and neighborhood ambience

Location Consideration

1. Pole locations should be compatible with driveway entrances, property lines, and windows of residential dwellings.
2. Pole locations should be coordinated with physical obstructions such as trees, distribution transformers, utility enclosures and other utility infrastructure. Minimize the number

TABLE 7.1 - CLASSIFICATIONS AND DEFINITIONS FOR ILLUMINATION DESIGN (MAY DIFFER IN OTHER DOCUMENTS, ZONING CODES, BUILDING CODES, AND AGENCIES)

STREET CLASSIFICATION	DESCRIPTION
Major Street	Principal network for through-traffic flow. Connect areas of principal traffic generation and important rural roadways entering and leaving the city. Primary and secondary arterials and thoroughfares.
Collector Street	Road servicing traffic between major and local streets. Used mainly for traffic movements within residential, commercial and industrial areas. Used for truck or bus movements.
Local Street	Direct access to residential, commercial, industrial or other abutting property.
Alley	A narrow public way within a block, generally used for vehicular access to the rear of an abutting property.
Isolated Traffic Area	Where an increased potential exists for collisions between vehicle, between vehicles and pedestrians, and/or between vehicles and fixed objects. Examples include intersections, crosswalks, and merge areas.
Median	Portion of a divided roadway physically separating the traveled ways for traffic in opposite directions

TABLE 7.2 - PEDESTRIAN ACTIVITY CLASSIFICATIONS FOR LIGHTING DESIGN

PEDESTRIAN ACTIVITY AREAS	DESCRIPTION	DESIGN CONSIDERATION
High	Commercial areas with high nighttime pedestrian activity.	The use of both horizontal and vertical illuminances is recommended for design
Medium	Community facilities such as libraries and recreation centers.	Pedestrian safety and providing guidance to primary travel ways are key elements in the design.
Low	Direct access to residential, commercial, industrial or other abutting property.	Allow both driver and pedestrian to visually orient in the environment, detect obstacles, identify other pedestrians, read street signs and recognize landmarks.

TABLE 7.3 - PAVEMENT CLASSIFICATIONS FOR LIGHTING DESIGN

Pavements can be grouped into a limited number of standard road surfaces (Class) having specific reflectance (Q_O) characteristics. Calculations where pavement luminance or Small Target Visibility (STV) are used, reflectance values may be taken from Table

CLASS	Q_0	DESCRIPTION	MODE OF REFLECTANCE
R1	0.10	Portland cement concrete road surface Asphalt road surface with a minimum of 12% aggregate composed of artificial brightener (e.g. Synopal) aggregates. (E.g. labradorite, quartzite)	Mostly Diffuse
R2	0.07	Asphalt road surface with an aggregate composed of a minimum 60% gravel (size >1 cm) Asphalt road surface with with 10 to 15 percent artificial brightener in aggregate mix. (Atypical for North America)	Mixed (diffuse and specular)
R3	0.07	Asphalt road surface (regular and carpet seal) with dark aggregates (e.g. trap rock, blast furnace slag); rough texture after some months of use. (typical highway)	Slightly Specular
R4	0.08	Asphalt road surface with very smooth texture	Mostly Specular

of poles to pole clutter and improve aesthetics.

3. Luminaire orientation on curves shall be oriented at 90 degrees perpendicular to the tangent of the curve. Street light poles placed on the outside of a curve and center medians have a greater tendency of being struck by a vehicle. Consider this as to the placement of the street light. From an errant vehicle perspective, it is preferred that the luminaire and pole be placed on the inside curve rather than the outside curve and on the parkway (left and right sides of the road) instead of the center medians.

4. All luminaires for street lighting shall be full cut off and dark sky compliant. Up lighting rating (U) shall be zero (0).

5. Keep light trespass to a maximum of 0.05fc at the property line in residential areas and 0.1fc in commercial districts whenever possible. This restriction however, should not compromise the minimum requirements for safely illuminating for a roadway.

6. Fixtures with a B-U-G ratings of no more than 1-0-2 shall be used in residential street lighting.

7. BUG ratings - Residential streetlights with design speed of 30mph or less and low pedestrian traffic. should have an Up Light (U) rating of 0 and a Glare (G) rating no greater than 2. The BUG rating however, shall not compromise the design criteria as determined by the street design classification and Pedestrian classification.

8. Keep back lighting to a minimum to allow illumination of the sidewalk but close the 0.5 fc at the property line.

9. Arterial lighting should meet the requirements of the street Design Classification and Pedestrian Classification.

10. Environmental Lighting Zones shall have no influence in the selection of the proper Street Classification.

11. Place streetlights perpendicular to the street. At intersections, the light shall illuminate as shown in Fig. 7.1. Place streetlights beginning of a cul-de-sac or heel.

12. Place streetlights as close to between property lines as shown in Fig 7.1 below.

13. For street lighting, the recommended

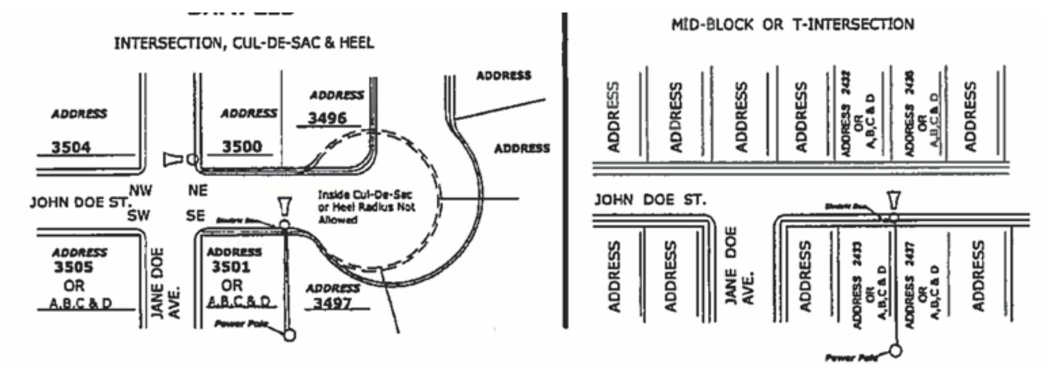


FIGURE 7.1 LIGHTING REQUIREMENTS FOR RESIDENTIAL STREET LIGHTING

TABLE 7.4 - ILLUMINATION REQUIREMENTS

Street Classification	Pedestrian Activity Classification*	Average Luminance L_{avg} (cd/m^2)	Average Uniformity Ratio L_{avg}/L_{min}	Maximum Uniformity Ratio L_{max}/L_{min}	Maximum Veiling Luminance Ratio $L_{v,max}/L_{avg}$
Major	High	1.2	3.0	5.0	0.3
	Medium	0.9	3.0	5.0	0.3
	Low	0.6	3.5	6.0	0.3
Collector	High	0.8	3.0	5.0	0.4
	Medium	0.6	3.5	6.0	0.4
	Low	0.4	4.0	8.0	0.4
Local	High	0.6	6.0	10.0	0.4
	Medium	0.5	6.0	10.0	0.4
	Low	0.3	6.0	10.0	0.4

Table Notes:

* Pedestrian Activity Classifications are defined in Section 11.3.3.

L_{avg}: Maintained average pavement luminance

L_{min}: Minimum pavement luminance

$L_{v,max}$: Maximum veiling luminance

method of calculation is luminance. For cul-de-sacs the recommended method of calculation is illuminance. For minimum luminance requirements use table 7-4

7.3.4 INTERSECTIONS, ROUNDABOUTS AND CROSSWALKS

The following definitions shall be used for purposes of this chapter:

1. Intersection – The general area where two or more roadways cross at the same level. Also called a grade intersection
2. Isolated intersection – a lighted area in which two or more non-continuously lighted roadways join ror cross at the same level.
3. Crosswalk – any portion of a roadway at an intersection or eslwhere distnclty indicated as a pedestrian crossing by lines on the survace, which may be supplemented by contrasting pavement texture, style, or color.
4. Intersection Classifications: Each intersecting street or roadway may be classified as one for the following based on the average daily traffic (ADT):
    i. Major (M) roadway: Over 3,500 vehicles ADT,
    ii. Collector (C) roadway: 1,500 to 3,500 vehicles ADT
    iii. Local (L) roadway: 100 to 1,500 vehicles ADT

Note: these street classifications apply only to Table 7.5 for determining intersection lighting levels.

5. Full Intersection Lighting – Used for continuous lighting situations. If an intersecting roadway is illuminated above the recommended value, then the intersection illuminance value should be proportionately increased. The corresponding uniformity ratio should meet the highest roadway classification.
6. Light poles should be positioned in advance of the crosswalk to improve visibility in the crosswalk by providing improved vertical illuminance and positive contrast.
7. Partial Intersection Lighting (Isolated Intersections) – a lighting system that is put in place to provide lighting at points of potential conflict. Not continuous lighting.
8. Delineation (beacon) lighting – Lighting that marks an intersection location for approaching traffic, lights vehicles on a cross street, or lights a median crossing.

TABLE 7.5 - ILLUMINANCE CRITERIA FOR FULL INTERSECTION LIGHTING (lux/fc)

Illuminance for Intersections				
Functional Classification	Pedestrian Activity Level Classification			E_{avg}/E_{min}
	High	Medium	Low	
Major/Major	34/3.2	26/2.4	18/1.7	3.0
Major/Collector	29/2.7	22/2.0	15/1.4	3.0
Major/Local	26/2.4	20/1.9	13/1.2	3.0
Collector/Collector	24/2.2	18/1.7	12/1.1	4.0
Collector/Local	21/2.0	16/1.5	10/0.9	4.0
Local/Local	18/1.7	14/1.3	8/0.7	6.0

TABLE 7.6 - ILLUMINANCE CRITERIA FOR PARTIAL (ISOLATED) INTERSECTION LIGHTING (lux/fc)

Road Classification	Pavement Classification			Uniformity Ratio
	R1 lux/fc	R2 & R3 lux/fc	R4 lux/fc	E_{avg}/E_{min}
Major	6/0.6	9/0.8	8/0.7	3.0
Collector	4/0.4	6/0.6	5/0.5	4.0
Local	3/0.3	4/0.4	4/0.4	6.0

Design Considerations

Design considerations are typical for all roadway-related lighting designs.

1. Safety – Consider the placement of poles, transformer, cabinets and establish clear zones as described in AASHTO documents. Evaluate possible glare situations.
2. Site Conditions – Investigate site conditions to establish the context in which the lighting design will be completed. Take into account land use, traffic and pedestrian activity levels, intersection and roadway geometry and classification and potential hazards.

Design Criteria

Establish the design criteria prior to staring the lighting design:

- Light levels and uniformity requirements
- Pavement classifications
- Full, partial, or delineation lighting
- Local policies and ordinances

Design Elements

Consider variable design elements such as pole placement, light source type, fixture height, arm length, offsets, wattage, light output and distribution. Luminaire wattage and mounting heights may need to vary from those on the approach roads to meet the required levels of illumination and uniformity ratios for the intersection.

Intersections

Lighting design parameters for grade intersections depend on whether continuous or non-continuous lighting exists. In areas with continuous lighting, design with full intersection lighting. For non-continuous lighting areas design as Partial intersection lighting (Isolated Intersections).

Tables 7.5 and 7.6 are the minimum recommended values for Full Intersection Lighting.

Figures 7.2 and 7.3 illustrate the conflict areas that should be illuminated. Use for both Full & Partial Intersection Lighting.

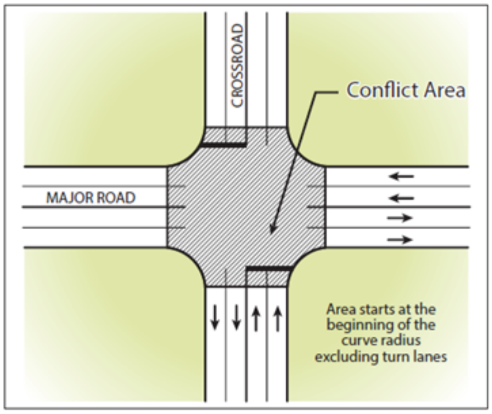


FIGURE 7.2 CONFLICT AREA, FOUR-WAY INTERSECTION

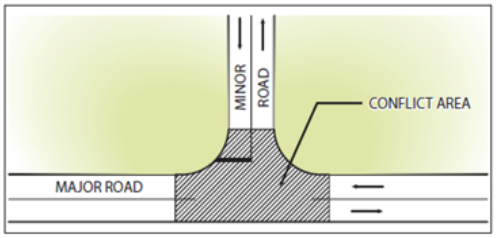


FIGURE 7.3 CONFLICT AREA, T-INTERSECTION

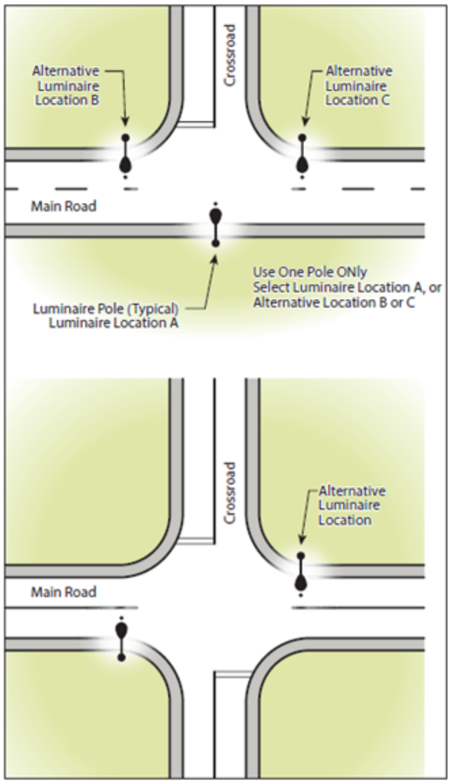


FIGURE 7.4 TYICAL POLE LAYOUTS FOR DELINEATION LIGHTING

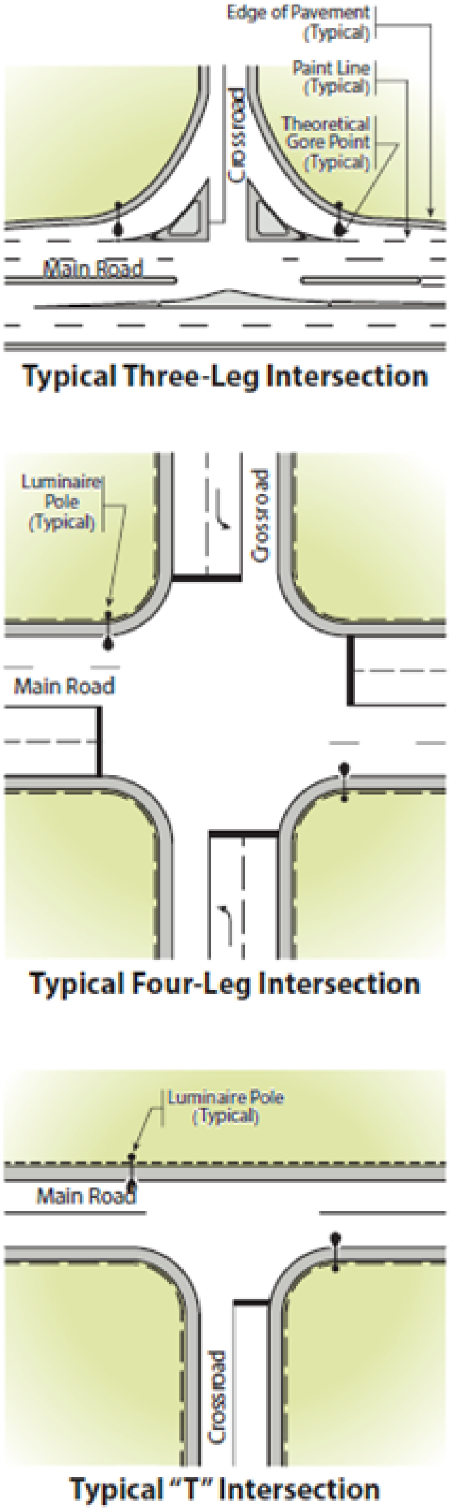


FIGURE 7.5 TYICAL POLE PLACEMENT FOR PARTIAL INTERSECTION LIGHTING

Intersection Delineation (Beacon Lighting) shall consist of a single luminaire installed simply for marking the presence of an intersection. Low light output luminaries and low mounting heights should be used in order to reduce glare.

For roads with four or fewer lanes, it is recommended that a single HID luminaire source of 150W or less (LED equivalent) mounted on 30ft. height or lower.

For roads with more than four lanes, it is recommended a 250W or less HID luminaire source or LED equivalent) mounted on a 30 to 45 ft. pole. Luminaires should be oriented toward the road with the highest traffic volume.

Roundabouts

The lighting of roundabouts serves two primary purposes

1. It makes the roundabout visible from a distance, improving the roundabout's perception to approaching users.
2. It makes key conflict areas more visible, thus improving user' perception of the layout of the intersection and their perception of one another as they use the roundabout.

The lighting should mark a break in the linear path of the approaching roads by emphasizing the circular aspect of the roundabout and thus improve the users understanding of its operation and their task ahead.

Light Recommendations for Roundabouts

Use a combination of horizontal and vertical illuminance (when crosswalks are present) to determine proper lighting levels. Refer to Table 7.7 for minimum illumination requirements and uniformity ratios.

Crosswalks at Intersections

A minimum vertical illuminance level of 20 lx measured at 5 ft. from the road surface is recommended to allow drivers to detect pedestrians in midblock crosswalks at adequate stopping distances under rural conditions. Higher levels might be required if glare from opposing vehicles is a possibility or when the crosswalk is located in areas with high ambient light levels or at a lighted intersection. For areas with a medium

TABLE 7.7 - MINIMUM PAVEMENT ILLUMINANCE FOR ROUNDABOUTS BASED ON PEDESTRIAN ACTIVITY CLASSIFICATION.

Illuminance for Roundabouts (lux/fc)				
Functional Classification	Pedestrian Activity Classification			E_{avg}/E_{min}
	High	Medium	Low	
Major/Major	34/3.2	26/2.4	18/1.7	3:1
Major/Collector	29/2.7	22/2.0	15/1.4	3:1
Major/Local	26/2.4	20/1.9	13/1.2	3:1
Collector/Collector	24/2.2	18/1.7	12/1.1	4:1
Collector/Local	21/2.0	16/1.5	10/0.9	4:1
Local/Local	18/1.7	14/1.3	8/0.7	6:1

pedestrian conflict, the minimum should be 30 lx. 40 lx for high pedestrian conflict locations.

Figure 7.6 shows the proper placement for lighting at crosswalks.

FIGURE 7.6 CROSSWALK POLE PLACEMENT

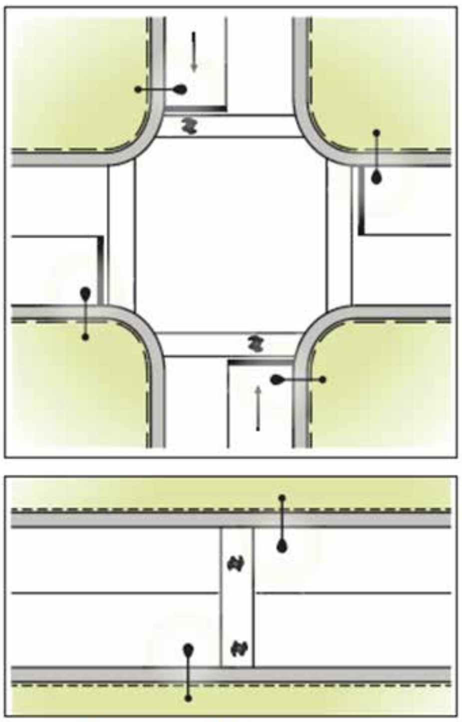
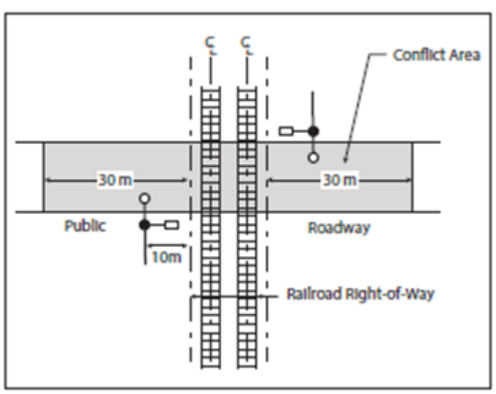


FIGURE 7.6 CROSSWALK POLE PLACEMENT



At-Grade Railway Crossings

Design Considerations

The intent of railroad grade crossing lighting is to light the conflict area of the crossing. The conflict area is defined as the complete road cross section, including the shoulders, to a distance of 30 meters in front of the crossing in both directions.

Design Issues

Coordinate all designs with the proper railroad authority at all stages of the design. The electric company should also be involved at this stage.

Consider clear zones and the use of breakaway systems at railroad crossings.

Lighting Recommendations

Maintain an average of at least 10 lux on the vertical plane of the train cars for each track, the plane of measurement to be located along the centerline of each track for each roadway approach. Use Luminaires with low intensity at high angles to minimize glare.

Lighting Calculations

Use Horizontal illuminance calculations for the approach road as for partial intersection lighting. Use vertical illuminance for the train cars with the light meter pointing in the direction of the approaching road user. Glare calculations are not required.

7.3.5 MINIMUM LIGHTING REQUIREMENTS

Streetlights shall be installed in accordance with the requirements of this chapter and the DSC by the developer:

C. At all intersections as close to the corner as possible;

D. At the beginning of turnarounds of cul-de-sac exceeding three hundred feet in length, unless located by the City Manager or designee at different intervals or at corners to provide better coverage. In no case, however, shall the number of lights provided by the developer exceed the number in subsection (6) below;

E. Shall have no greater distance than three hundred feet between them within or abutting the subdivision, unless located by the City Manager or designee at different intervals or at corners to provide better coverage. In no case, however, shall the number of lights provided by the developer exceed the number in subsection (6) below;

F. "Dark sky" compliant streetlights shall be installed in accordance with the DSC;

G. Streetlights shall be placed at approximately equal intervals between intersections and shall be subject to the approval of the City Manager or designee;

H. The number of streetlights that are the responsibility of the developer shall be calculated as the total linear footage between street intersections divided by the required spacing of three hundred feet for local and collector streets and as required by the illumination plan for arterial streets. Fractions of streetlights shall be rounded to the next whole number when the fractional amount is equal to or exceeds 0.50. Fractional amounts less than 0.50 shall not require an additional streetlight.

7.4 EASEMENTS

Where required, electrical service easements for overhead or underground electrical services shall be provided as a part of the subdivision approval. The service connections and streetlight poles shall be installed by the subdivider.

7.5 EXCEPTIONS

Exceptions or reductions to the streetlight spacing requirements for local streets in residentially zoned exclusive single family neighborhoods may be authorized by the City Plan Commission at the request of the developer at the time of plat approval:

A. Where streetlights are not present or have reduced coverage and have not historically complied;

B. On local streets within an approved subdivision where all the lots have a minimum one-half acre lot area and the adjoining properties have reduced streetlighting;

C. On mountain residential and divided mountain residential streets within an approved mountain development subdivision; or

D. Streetlighting shall be provided at all intersections regardless of other exceptions or reductions that may be granted.

7.6 EXPENSES PRIOR TO ACCEPTANCE

The subdivider shall be responsible for the maintenance and associated cost of electrical energy of the streetlights until such lights are accepted by the city or the City of El Paso shall accept the streetlights for maintenance and electrical energy costs at the time it accepts the streets and other public improvements within the subdivision for maintenance.

7.7 ILLUMINATION PLAN

An illumination plan for all streets within the subdivision, as part of the requirements of this chapter, shall be filed, together with the subdivision improvement plans, and based on approved standards of the American National Standards Institute and the Illuminating Engineering Society of North America, a copy of which is maintained by the city. The plan shall show the proposed location of the streetlights. The illumination plan shall be subject to the approval of the city engineer or other designee of the City Manager within the corporate limits, and of the county engineer within the extraterritorial jurisdiction.

At minimum, the street illumination plan shall include:

1. A plan-view drawing showing all proposed, existing and future road geometrics (curbs and gutters, sidewalks, crosswalks) and utilities. Overlay pole locations, conduit and wiring, and the service location on the plan. Include legend and notes specific to the design.
2. Pole elevation drawings, including pole and foundation details. If standard drawings are available, a reference to the standards may mitigate the need to detail these items.
3. Schematic and/or one-line diagram of service, lighting controls, and branch lighting circuits. If standard drawings are available, a reference to the standards may mitigate the need to detail these items.
4. Drawings signed and sealed by a Professional Engineer licensed in the State of Texas.
5. Photometric drawings, although not part of a plan set, will be required for review during the design process. Show light levels as contours for easy of reading. Do not terminate the contours at the property lines. Include table(s) showing the recommended lighting values and the design values. (ex. Avg. fc and uniformity ratios).
6. Superimpose the Traffic plan on the street light plan. Show crosswalks, traffic intersections, midpoint crosswalks, signs etc. If there is landscaping involved, a separate landscape plan superimposed on the street light plan showing the size and shape of mature trees shall be included to determine any conflicts with illumination and street light fixtures.
7. Provide cost estimates for the project with the final drawings.

7.8 AS-BUILT ILLUMINATION PLAN

Prior to the acceptance of the streetlights for maintenance by the city or county, an amended illumination plan showing the final location of the streetlights installed by the subdivider shall be submitted to the city engineer or other designee of the City Manager or county engineer.

7.9 CUSTOM LIGHTING

A. The subdivider may elect to provide custom lighting in lieu of the required standard streetlighting, subject to the approval of such lighting by the City Manager or designee. Custom lighting shall be furnished and installed to meet the approved standards of Title 18, the City's Building and Construction

Standards.

B. Where custom lighting is approved within the street right-of-way, the city or county shall be liable for the costs of electrical energy of the custom lighting provided that the following conditions are met:

    1. A separate rate can be charged to the city by the electric utility for the custom lighting proposed; and

    2. The total rate charged to the city is equal to or less than the rate for electrical energy for standard streetlighting in the same configuration.

C. If a subdivider elects to provide and install custom lighting, a public improvement district (or other such private entity) shall be created which will be perpetually liable for all costs associated with the maintenance of the lighting fixtures. Where the city is not liable for the costs of electrical energy from the custom lighting as provided in this subsection, the public improvement district shall also be liable for the electrical energy costs of the custom lighting.

D. An agreement between the city and the public improvement district shall be required which makes adequate provision to indemnify and hold the city harmless from any claims which may arise from the custom lighting, whether within or outside of the public right-of-way. The agreement shall provide that the city may require that any or all of the installed custom lights be removed, at the public improvement district expense, when a finding is made by the city council or county commissioners' court based on a recommendation of the city engineer or other designee of the City Manager or county engineer that the custom lighting creates a nuisance or is unsafe. Upon such a finding, standard streetlighting pursuant to this chapter shall be required to be furnished and installed to replace the custom lighting.

E. The city shall reserve the right to review and approve all such provisions of the agreement. The agreement shall accompany the subdivision improvement plan submission. Restrictive covenants which include the provisions for continuous lighting and perpetual maintenance of the custom streetlights shall be recorded by the subdivider concurrently with the subdivision.

F. Where custom lighting is provided, the subdivider or public improvement district shall notify the electric utility before any work is commenced at any streetlight location.

G. Custom streetlighting placed within the public right-of-way shall meet the lumen level required in the DSC and provide roadway coverage meeting or exceeding that provided by standard streetlighting. Lighting outside the right-of-way shall meet the lumen level and coverage requirements of the DSC.

8

Traffic Calming

Chapter 8

Traffic Calming & Vision Zero

8.1 TRAFFIC CALMING

Traffic calming should be consider in street design, especially in resident areas, near parks and other public facilities. Traffic calming standards are detailed the DSC.

Traffic Calming must be considered by a developer where the roadway facility exceeds the street length standards and treatments from traffic calming devices described in the amended NTMP.

8.2 VISION ZERO (RESERVED)

Chapter reserved for future information.

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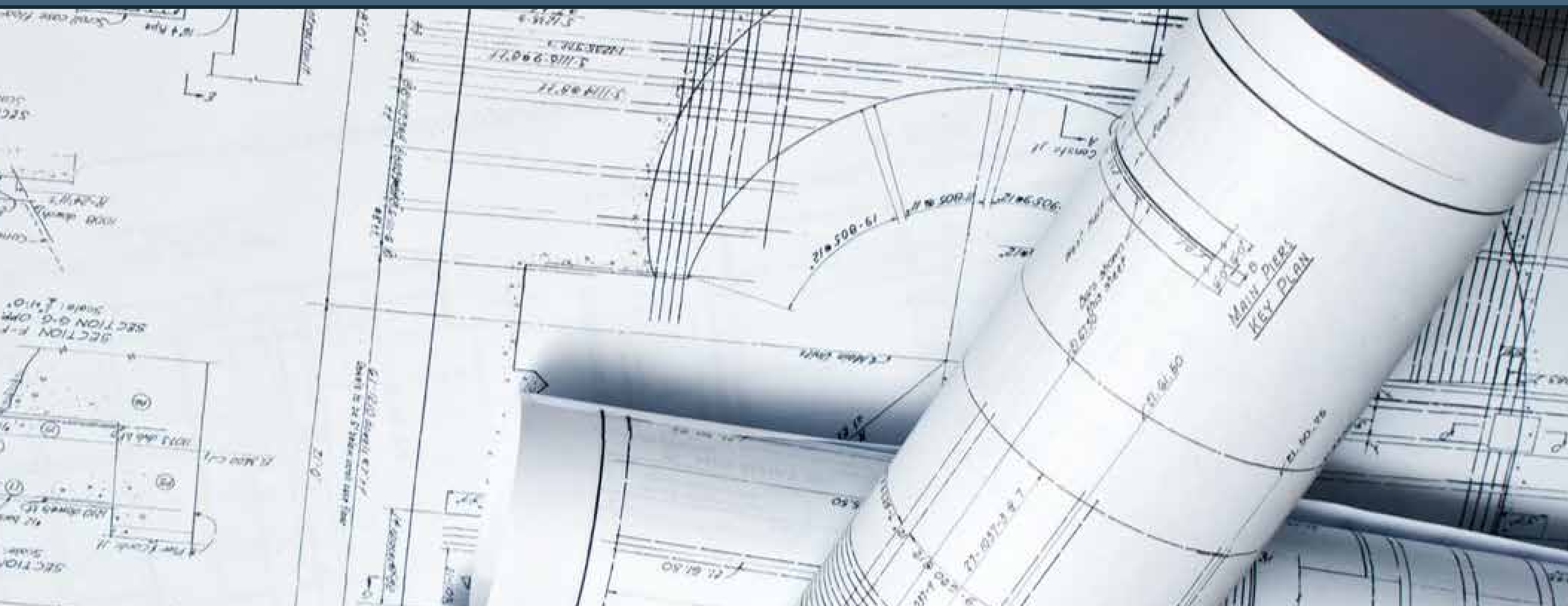
9

Design Standards for Construction



Chapter 9

Design Standards for Construction

9.1

Chapter reserved for future information. Interim design standards that reflect the requirements of this manual are provided in appendix A.

Definitions

10

Chapter 10

Definitions

“Avenue (AV)” means a Thoroughfare of high vehicular capacity and low to moderate speed, acting as a short distance connector between urban centers, and usually equipped with a landscaped median.

“Bicycle Boulevard (BB)” means a street with low motorized traffic volumes and speeds, designated and designed to give bicycle travel priority. Bicycle Boulevards use signs, pavement markings, and speed and volume management measures to discourage through trips by motor vehicles and create safe, convenient bicycle crossings of busy arterial streets. (Source: NACTO)

“Bicycle lane (BL)” means a dedicated lane for cycling within a moderate-speed vehicular Thoroughfare, demarcated by striping.

“Bicycle route (BR)” means a Thoroughfare suitable for the shared use of bicycles and automobiles moving at low speeds.

“Bicycle trail (BT)” means a bicycle way running independently of a vehicular Thoroughfare.

“Boulevard (BV)” means a Thoroughfare designed for high vehicular capacity and moderate speed, traversing an urbanized area. Boulevards are usually equipped with slip roads buffering sidewalks and buildings.

“Buffered Bicycle Lane” means conventional bicycle lanes paired with a designated buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. (Source: NACTO)

“Curb” means the edge of the vehicular pavement that may be raised or flush to a swale. It usually incorporates the drainage system.

“Design speed” means the velocity at which a Thoroughfare tends to be driven without the constraints of signage or enforcement. There are four ranges of speed: very low: (below 20 MPH); low: (20 to 25 MPH); moderate: (25t o 35 MPH); high: (above thirty-five MPH). Lane width is determined by desired design speed.

“Drive” means a Thoroughfare along the boundary between an urbanized and a natural condition, usually along a waterfront, park or promontory. One side has the urban character of a Thoroughfare, with sidewalk and building, while the other has the qualities of a road or parkway, with naturalistic planting and rural details.

“Road (RD)” means a local, rural and suburban Thoroughfare of low-to-moderate vehicular speed and capacity. This type is allocated to the more rural Transect Zones (T1-T3).

"Effective turning radius" means the measurement of the inside turning radius taking parked cars into account.

"Highway" means a rural and suburban Thoroughfare of high vehicular speed and capacity. This type is allocated to the more rural Transect Zones (T-1, T-2, and T-3).

"One-Way protected cycle track" means bikeways that are at street level and use a variety of methods for physical protection from passing traffic.

"Passage (PS)" means a pedestrian connector, open or roofed, that passes between buildings to provide shortcuts through long blocks and connect rear parking areas to Frontages.

"Path (PT)" means a pedestrian way traversing a park or rural area, with landscape matching the contiguous Open Space, ideally connecting directly with the urban sidewalk network.

"Protected bicycle lane" (See "One-way protected cycle track")

"Raised median" means a raised barrier in the center of the roadway separating opposing lanes of traffic, through which a crosswalk passes.

"Raised pedestrian refuge island" (See "Raised median")

"Rear alley (RA)" means a vehicular way located to the rear of lots providing access to service areas, parking, and outbuildings and containing utility easements.

"Rear lane (RL)" means a vehicular way located to the rear of lots providing access to service areas, parking, and outbuildings and containing utility easements.

"Shared use path" means a minimum 10-foot wide, two-way shared bicycle and pedestrian facility separated from the main traveled way

"Sidepath" (See "Shared use path")

"Slip road" means an outer vehicular lane or lanes of a Thoroughfare, designed for slow speeds while inner lanes carry higher speed traffic, and separated from them by a planted median.

Street (ST): a local urban Thoroughfare of low speed and capacity.

"Special district (SD)" means an area that, by its intrinsic function, disposition, or configuration, cannot or should not conform to one or more of the normative community types or Transect Zones specified by the SmartCode.

Thoroughfare at an intersection, measured at the inside edge of the vehicular tracking. The smaller the turning radius, the smaller the pedestrian crossing distance and the more slowly the vehicle is forced to make the turn.

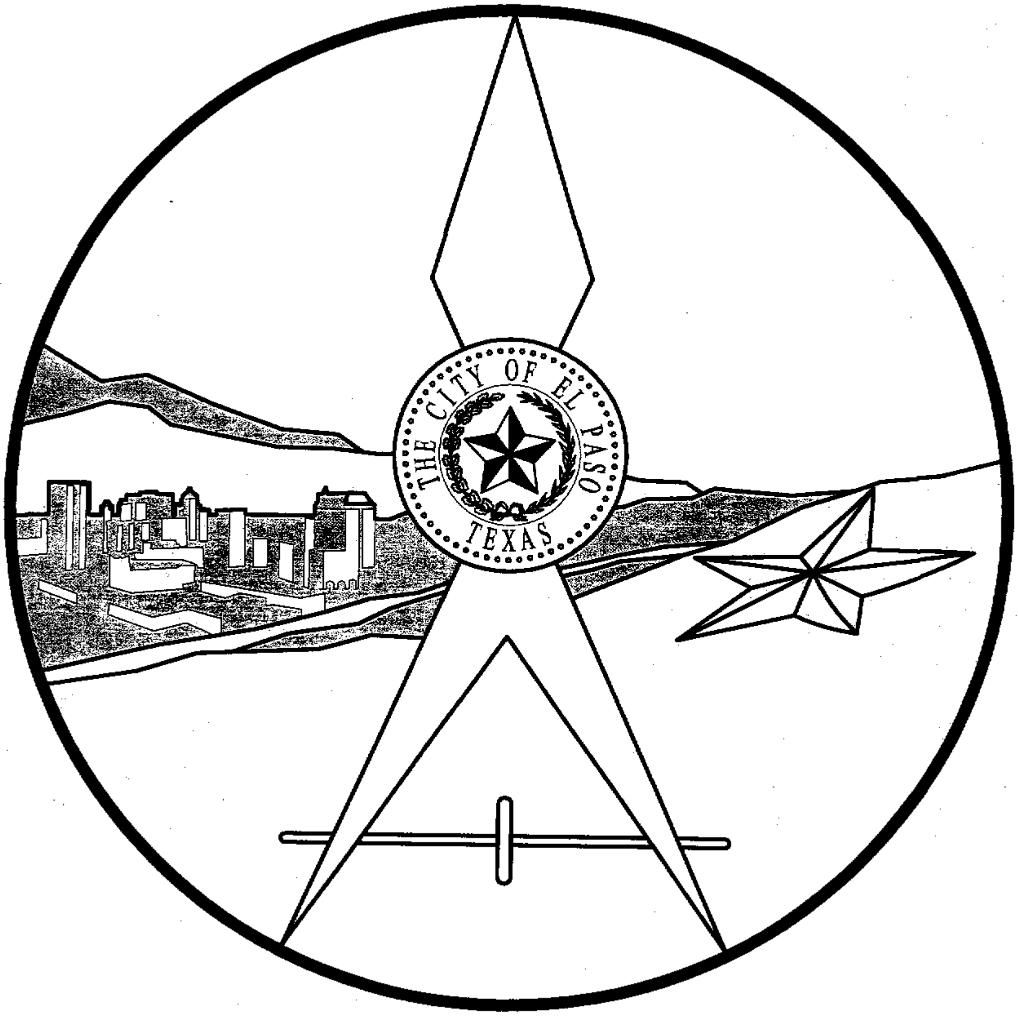
"Turning radius" means the curved edge of a Thoroughfare at an intersection, measured at the inside edge of the vehicular tracking. The smaller the turning radius, the smaller the pedestrian crossing distance and the more slowly the vehicle is forced to make the turn.

"Yield street" means characterizing a Thoroughfare that has two-way traffic but only one effective travel lane because of parted cars, necessitating slow movement and driver negotiation.

Appendix A - Interim DSC

Appendix A

Interim Design Standards for Construction



TITLE 19 - SUBDIVISION ORDINANCE

DESIGN STANDARDS FOR CONSTRUCTION

JUNE 3, 2008

DESIGN STANDARDS FOR CONSTRUCTION

SECTION 1

SECTION 1

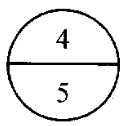
SUBDIVISION IMPROVEMENT PLAN PREPARATION GUIDELINES

BACK TO SECTION INDEX PAGE

PLAN STANDARDS

A. LETTERS AND NUMBERS SHALL BE VERTICAL OR SLANTED CAPITAL. THE MINIMUM SIZE SHALL BE 1/16-INCH - GUIDELINES ARE REQUIRED FOR FREEHAND.

B. REFERENCE CROSS-SECTION SYMBOLS SHALL BE AS SHOWN



1. TOP NUMBER: SECTIONAL DETAIL NUMBER
2. BOTTOM NUMBER: SHEET DETAIL NUMBER

BACK TO TITLE INDEX PAGE

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PLAN STANDARDS 1-1

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

TITLE SHEET

A. LOCATION PLANS - SCALE ONE (1) INCH = SIX HUNDRED (600) FEET

B. TITLE SHALL COMPLY WITH THE CITY'S ENGINEERING DEPARTMENT'S STANDARD TITLE SHEET

C. VICINITY MAP - N. T. S.

D. INDEX OF DRAWINGS

1. TITLE SHEET
2. FINAL APPROVED PLAT FOR REFERENCE ONLY (IF APPLICABLE)
3. GRADING PLAN
4. DRAINAGE PLAN
5. STREET PLAN & PROFILES
6. CROSS-SECTIONS
7. DETAILS
8. ILLUMINATION PLAN; INCLUDING STREET SIGNAGE & NDCBU LOCATIONS
9. LANDSCAPE & IRRIGATION PLAN
10. STORMWATER POLLUTION PREVENTION PLANS AND ASSOCIATED SPECIFICATIONS

E. DESIGN FIRM NAME

BACK TO TITLE INDEX PAGE

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

TITLE SHEET 1-2

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

GRADING PLAN

A. NORTH ARROW UP OR LEFT TO RIGHT, A SCALE OF ONE (1) INCH = ONE HUNDRED (100) FEET

B. GRADING PLAN SHALL BE REFERENCED TO THE PRELIMINARY PLAT VERTICAL CONTROL. VERTICAL CONTROL TO NORTH AMERICAN VERTICAL DATUM (NAVD) 1988.

C. BOUNDARIES OF SUBDIVISION OR SITE

D. CONTOUR LINES OF THE PROPOSED SUBDIVISION, AND TWO HUNDRED (200) FEET OUTSIDE AND ABUTTING THE SUBDIVISION UNLESS THE AREA IS MODIFIED BY THE CITY ENGINEER, HAVING THE FOLLOWING INTERVALS:

1. ONE FOOT (1') CONTOUR INTERVALS FOR GROUND SLOPES BETWEEN LEVEL AND THREE (3) PERCENT;
2. TWO FOOT (2') CONTOUR INTERVALS FOR GROUND SLOPES MORE THAN THREE (3) PERCENT AND UP TO AND INCLUSIVE OF ELEVEN (11) PERCENT;
3. FIVE FOOT (5') COUNTOUR INTERVALS FOR GROUND SLOPES OVER ELEVEN (11) PERCENT;
4. DASHED LINES FOR EXISTING CONTOUR LINES;
5. SOLID (BOLD) LINES FOR PROPOSED CONTOUR LINES; AND
6. INDEX CONTOURS AT FIVE (5) FEET INTERVALS.

E. LOCATE ALL EXISTING STRUCTURES WITHIN AND ONE HUNDRED (100) FEET OUTSIDE OF THE SUBDIVISION UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.

F. TYPICAL GRADING PLAN FOR LOT SHALL SHOW DIRECTION OF RUNOFF OR ON-SITE PONDING.

G. FINISHED FLOOR AND FINISHED GROUND ELEVATION FOR ALL LOTS.

GO TO PAGE 2 OF 2

BACK TO TITLE INDEX PAGE

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

GRADING PLAN

1-3A

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

H. TOP OF CURB, HEADER CURB AND DRIVEWAY ELEVATIONS.

I. SLOPE STABILIZATION PLAN, WHERE REQUIRED BY CITY ENGINEER.

J. EROSION CONTROL PLAN

K. CONCENTRATED STORM RUNOFF OVER UNPROTECTED AREAS, INCLUDING SLOPES SHALL NOT BE PERMITTED

L. CROSS SECTIONS AS REQUESTED BY CITY ENGINEER

M. REQUIRED RETAINING WALLS (LOCATION ONLY, UNLESS TO BE BUILT BY SUBDIVIDER)

DESIGN OF RETAINING WALLS FOUR (4) FEET OR HIGHER SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER

N. PLANS SHALL SHOW FLOOD ZONE AREAS AS PER CURRENT FLOOD INSURANCE RATE MAPS (FIRM) OR LETTER OF MAP REVISION (IF APPLICABLE), REFERENCE PANEL NUMBER AND DATE

O. FINISHED FLOOR ELEVATIONS SHALL COMPLY WITH DRIVEWAY ORDINANCE AND/OR FEMA REGULATIONS.

BACK TO TITLE INDEX PAGE

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

GRADING PLAN

1-3B

Approved By R. A. SHUBBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

DRAINAGE PLAN

(REFER TO DRAINAGE DESIGN MANUAL FOR DRAINAGE CRITERIA, DESIGN METHODS AND METHODOLOGIES)

A. SCALE ONE (1) INCH = ONE HUNDRED (100) FEET - NORTH ARROW

B. DRAINAGE PLANS SHALL CONFORM TO THE APPROVED MASTER DRAINAGE PLAN, IF APPLICABLE

C. SHOW BOUNDARIES OF SUBDIVISION AND CONTRIBUTING DRAINAGE AREAS

D. IDENTIFY LIMITS OF CONTRIBUTING WATERSHED AREAS WITHIN SUBDIVISION AND OUTSIDE THE SUBDIVISION

E. CALCULATION TABLE TO INCLUDE TIMES OF CONCENTRATION (Tc), INTENSITIES (I), COEFFICIENT VALUES (C) AND EXPECTED RUNOFFS OF ALL WATERSHED AREAS - EXPECTED RUNOFF QUANTITIES, CARRYING CAPACITIES, AND RUNOFF VELOCITIES FOR DRAINAGE STRUCTURES SHALL BE SHOWN ON PLANS FOR 25, 50 AND 100 YEAR EVENTS.

F. SHOW LOCATION AND SIZES OF ALL PROPOSED AND EXISTING DROP INLETS, PIPES, CULVERTS, CHANNELS, BASINS, AND OTHER DRAINAGE STRUCTURES

G. SHOW EXISTING AND PROPOSED DRAINAGE FLOW PATTERNS

H. SHOW HIGH AND LOW POINTS OF STREET WITH FLOW PATTERNS

BACK TO TITLE INDEX PAGE

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

DRAINAGE PLAN

1-4A

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

DRAINAGE PLAN
(continued)

I. STORAGE FACILITIES (DAMS, PONDS, ETC.) INDICATING:

1. MAXIMUM CAPACITY
2. EXPECTED RUNOFF
3. BOTTOM ELEVATION
4. HIGH WATER SURFACE
5. FREE BOARD
6. SPILLWAY AND OUTLET STRUCTURE
   (A) MAXIMUM CAPACITY
   (B) DESIGN OUTFLOWS
7. SEDIMENT AND EMERGENCY VOLUMES
8. APPROVAL FROM TEXAS WATER BOARD AND U.S. ARMY CORPS OF ENGINEERS FOR DAMS, WHEN APPLICABLE
9. SOIL TESTS TO DETERMINE SPECIAL STABILIZED SLOPES
10. PERCOLATION RATE TESTS TO BE PERFORMED AT PROPOSED POND INVERT (RETENTION BASINS ONLY). TO BE PERFORMED WHEN THE WATER TABLE (ELEVATION) IS AT IT'S HIGHEST.
11. EXISTING WATER TABLE ELEVATION DURING OFF-PEAK PERIOD AND HIGH WATER TABLE ELEVATION, IF APPLICABLE.

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TITLE 19 - SUBDIVISION ORDINANCE
ENGINEERING DEPARTMENT
DESIGN STANDARDS FOR CONSTRUCTION

DRAINAGE PLAN
1-4B

Approved By R. A. SHUBERT Date JUNE 03, 2008
Checked By H. M. E. Drawn By QEC / J. R.

DRAINAGE PLAN
(continued)

J. ON LOTS WITH ON-SITE PONDING THE FOLLOWING INFORMATION SHALL BE SUBMITTED

1. PRELIMINARY SOILS TEST. FINAL PERCOLATION RATE TEST, SOILS TESTS, AND WATER TABLE ELEVATION INFORMATION TO BE SUBMITTED PRIOR TO STREET ACCEPTANCE AND/OR BUILDING PERMITS. PERCOLATION TESTS TO BE PERFORMED AT THE INVERT WHERE STORMWATER WILL BE RETAINED AND WHEN THE WATER TABLE IS AT ITS HIGHEST.

2. TYPICAL LOT CROSS SECTION DETAIL SHOWING ON-SITE PONDING STORAGE CAPACITY

3. PERMANENT ELEVATION MARKER DETAIL (REFER TO PLATE 2-7)

4. DRAINAGE COMPUTATIONS BASED ON 100-YEAR STORM

5. MINIMUM OF 2.0% CROSS SLOPE ON STREET

6. LOTS AND/OR MEDIANS SHALL ALSO ACCOMMODATE ALL STREET RUNOFF

7. FIFTY (50) PERCENT OF THE RESIDENTIAL LOT AREA SHALL REMAIN WITHOUT STRUCTURES OR OTHER IMPERMEABLE SURFACES

8. ADDITIONAL EMERGENCY AND SILT/DEBRIS CAPACITY NOT REQUIRED FOR RESIDENTIAL ON-SITE PONDING LOTS

K. STREET DESIGN REQUIREMENTS

1. GENERAL STANDARDS

(A) MAXIMUM STANDARD CURB HEIGHT - 6 INCHES UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER

(B) CROWN ON STREET TO BE FROM ZERO (0) TO THREE (3) PERCENT SLOPE

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	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QBC / I. R.

DRAINAGE PLAN
(continued)

(C) INVERT STREET CROSS SECTION ALLOWED WITH APPROVAL BY CITY ENGINEER

(D) NO PONDING (UNDRAINED LOW POINTS) TO BE ALLOWED ON STREETS TO PREVENT PAVEMENT DETERIORATION

2. STANDARDS FOR 25-YEAR STORM

(A) MAXIMUM FLOW DEPTH IN ANY STREET: FIVE (5) INCHES OR CURB HEIGHT, WHICHEVER IS LESS

(B) MINOR ARTERIALS; ONE HALF (1/2) OF ONE (1) LANE WIDTH TO REMAIN FREE OF WATER IN EACH DIRECTION

(C) MAJOR ARTERIALS AND SUPER ARTERIALS; ONE (1) FULL LANE WIDTH ON EACH SIDE OF RAISED MEDIAN TO REMAIN FREE OF WATER

(D) AT ROAD BENDS AND INTERSECTIONS, MAXIMUM FLOW DEPTH IN STREETS TO BE FIVE (5) INCHES

(E) PRODUCT NUMBER (DEPTH X AVERAGE VELOCITY) TO BE A MAXIMUM OF 6.5 FT ^{2}/S UNLESS APPROVED BY THE CITY ENGINEER

(F) ANY HYDRAULIC JUMPS (EG. SAG VERTICAL CURVES OR CHANGES IN SLOPE) TO BE CONTAINED WITHIN CURB HEIGHTS WITH APPROPRIATE FREE BOARD

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DRAINAGE PLAN

1-4D

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Date JUNE 03, 2008	Drawn By QEC / J. R.

DRAINAGE PLAN
(continued)

(G) THE HYDRAULIC GRADE LINE FOR THE DRAINAGE STRUCTURE(S) DISCHARGING INTO A 100-YEAR RETENTION OR DETENTION BASIN SHALL BE BASED ON THE 100-YEAR WATER SURFACE ELEVATION (WSEL) WHICH EXCLUDES THE SILT/DEBRIS AND 25% EMERGENCY CAPACITY VOLUMES AND:

(i.) THE 25-YEAR WSEL SHALL NOT EXCEED THE TOP OF CURB ELEVATION

(ii.) IF THE 100-YEAR WSEL EXCEEDS THE TOP OF CURB ELEVATION, THE ENGINEER SHALL ALSO CONSIDER THE EFFECT ON MANHOLES.

3. STANDARDS FOR 100-YEAR STORM

(A) PRODUCT NUMBER (DEPTH X AVERAGE VELOCITY) TO BE A MAXIMUM OF 8 FT^2/S UNLESS APPROVED BY THE CITY ENGINEER

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THE CITY OF EL PASO TEXAS

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DESIGN STANDARDS FOR CONSTRUCTION

DRAINAGE PLAN

1-4E

Approved By R. A. SHUBERT
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DRAINAGE COMPUTATION TABLES

DETENTION OR RETENTION BASINS							
BASIN NO.	REQUIRED CAPACITY (AC.FT)	AVAILABLE CAPACITY (AC.FT)	PEAK INFLOW (CFS)	OUTLET TOWER FLOW (CFS)	HIGH WATER SURFACE ELEVATION (FT)	BOTTOM ELEVATION	FREE BOARD (FT)

WATERSHED AREAS					
DRAINAGE AREA NO.	DRAINAGE AREA (AC)	DESIGN STORM INTENSITY	TIME OF CONCENTRATION	RUNOFF COEFF. (C)	Q (CFS)

DROP INLETS			
DROP INLET NO	REQ. FLOW CAPACITY Q REQ (CFS)	AVAIL. FLOW CAPACITY Q AVAIL.(CFS)	FLOW BYPASS

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DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

DRAINAGE COMPUTATION TABLES 1-5

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Date JUNE 03, 2008 Drawn By QEC / J. R.

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STREET PLAN AND PROFILE

A. PLAN

1. STREET NAMES
2. VERTICAL CONTROL TO NORTH AMERICAN VERTICAL DATUM (NAVD) 1988 AND SHOWN ON EVERY SHEET
3. SCALE ONE (1) INCH = THIRTY (30) FEET MAXIMUM HORIZONTAL VERTICAL SCALE OF ONE (1) INCH = FIVE 95) FEET FOR SLOPES OF ZERO (0) PERCENT TO THREE (3) PERCENT AND ONE (1) INCH = TEN (10) FEET FOR SLOPES GREATER THAN THREE (3) PERCENT
4. EXISTING STRUCTURES AND TOPOGRAPHIC FEATURES
5. SURVEY CONTROL LINE
6. RIGHT-OF-WAY LINES, CURB LINES AND CENTERLINES
7. RIGHT-OF-WAY AND ROADWAY WIDTHS
8. CURB RETURN DATA
9. CENTERLINES AND CURB DATA
10. STATIONING ALONG CENTERLINE
11. STATION AT SPECIAL POINTS (PC, PT, PRC, CB, RET, CL INTERSECTIONS, LC, ETC.)
12. TOP OF CURB ELEVATION AT SPECIAL POINTS (PC, PT, PRC, CB, RET)
13. PROPOSED AND EXISTING DRAINAGE STRUCTURES
14. DIRECTION OF FLOW AND HIGH AND LOW POINTS
15. FIFTY (50) FOOT (MINIMUM) TRANSITIONS FROM CROWN - FLAT - INVERT
16. LIMITS OF CONSTRUCTION
17. LOCATION OF GUARDRAIL AND DEAD END SIGNS
18. MATCH STATIONS FOR FOLLOWING PAGE
19. SHOW ALL EXISTING STRUCTURES AND IMPROVEMENTS ONE HUNDRED (100) FEET PAST THE LIMITS OF CONSTRUCTION UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER
20. SIDEWALK LOCATIONS

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

STREET PLAN & PROFILE

1-6A

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

STREET PLAN AND PROFILE
(continued)

B. PROFILE

1. EXISTING AND PROPOSED PROFILES AT CURB LINES
2. PROPOSED PERCENT GRADE FOR ALL PROFILES
3. MINIMUM OF FIVE TENTHS (0.5) PERCENT GRADE AND A MAXIMUM OF ELEVEN (11) PERCENT GRADE; EXCEPT THAT UP TO FIFTEEN (15) PERCENT GRADE IN THE MOUNTAIN DEVELOPMENT AREA MAY BE PERMITTED WITH APPROVAL OF FIRE DEPARTMENT AND CITY ENGINEER
4. VERTICAL CURVE INFORMATION. THE ENTIRE LENGTH OF VERTICAL CURVE SHALL BE SHOWN ON SAME SHEET
5. EXISTING AND PROPOSED ELEVATIONS AT EVERY FIFTY (50) FEET AND SPECIAL STATIONS
6. STREET PROFILE SHALL EXTEND ONE HUNDRED (100) FEET BEYOND LIMITS OF CONSTRUCTION UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER
7. EXISTING AND PROPOSED DRAINAGE STRUCTURES AS THEY RELATE TO PROFILES
8. PROPOSED STREET PROFILE SHALL MATCH EXISTING STREET PROFILE FOR A SMOOTH TRANSITION
9. OPPOSITE CURB ELEVATIONS SHALL MATCH AT EACH STATION, EXCEPT IN A SUPERELEVATED ROADWAY OR AS APPROVED BY CITY ENGINEER
10. STREET CROWN SHALL NOT EXCEED THREE (3) PERCENT

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Approved By R. A. SHUBERT	Checked By H. M. E.
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STORM SEWER PLAN AND PROFILE

A. STORM SEWER PLAN

1. PROPOSED RIGHT-OF-WAY LINE AND WIDTHS
2. LIMITS OF CONSTRUCTION AND MATCH-LINE STATIONING
3. NORTH ARROW AND SCALE
4. NAME OF STREET
5. SURVEY CONTROL LINE
6. STORM SEWER ALIGNMENT TIED TO SURVEY CONTROL LINE
7. BEARINGS (DIRECTION AND HORIZONTAL CURVE DATA)
8. STATIONING
9. SIZE, TYPE, AND CLASSIFICATION OF PIPE
10. MANHOLES - JUNCTION BOXES (CAST-IN-PLACE OR PRE-CAST)

    (A) STATIONING AND A MAXIMUM OF FIVE HUNDRED (500) FEET ON CENTER - MANHOLE REQUIRED AT CHANGE OF DIRECTION

    (B) TOP OF COVER ELEVATION

    (C) INVERT ELEVATION

    (D) TYPE, SIZE, AND NUMBER OF MANHOLE

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STORM SEWER PLAN & PROFILE

1-7A

Approved By R. A. SHUBERT Date JUNE 03, 2008 | Checked By H. M. E. Drawn By QEC / J. R.

STORM SEWER PLAN AND PROFILE
(continued)

11. DROP INLETS

    (A) STATIONING

    (B) TOP OF GRATE AND TOP OF CURB/NOSE AT GRATE ELEVATION

    (C) INVERT ELEVATION

    (D) TYPE, NUMBER OF GRATES, AND DROP INLET NUMBER (TWO (2) GRATE MINIMUM)

    (E) STORMWATER DISCHARGE - EXPECTED AND CAPACITY

12. DROP INLET PIPE (LATERALS)

    (A) SIZE AND TYPE OF PIPE

    (B) TYPE OF CONNECTOR

    (C) STORMWATER DISCHARGE - EXPECTED, CAPACITY, AND VELOCITY(IES)

13. SHOW EXISTING DRAINAGE STRUCTURES IN DASHED LINE AND INDICATE SIZE AND TYPE OF STRUCTURE

B. STORM SEWER PROFILE

1. STATIONING ALONG CENTERLINE OF STREET AT EVERY 100 FEET
2. TYPE AND SIZE OF EXISTING DRAINAGE STRUCTURES
3. EXISTING GROUND PROFILE AND PROPOSED TOP OF PAVEMENT
4. PROPOSED STORM SEWER PROFILE WITH PERCENT SLOPE
5. TYPE AND SIZE OF PIPE
6. HYDRAULIC GRADIENT LINE PROFILE WITH ELEVATION SHOWN AT EVERY MANHOLE AND/OR DROP INLETS

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STORM SEWER PLAN AND PROFILE
(continued)

7. MANHOLE

   (A) SIZE, TYPE, AND MANHOLE NUMBER

   (B) TOP INVERT ELEVATION

   (C) CENTERLINE STATIONING

   (D) INVERT OF CONNECTOR LATERAL - SIZE AND TYPE OF PIPE

8. DROP INLETS

   (A) TYPE, NUMBER OF GRATES AND DROP INLET NUMBER (TWO (2) GRATE MINIMUM)

   (B) TOP OF GRATE AND INVERT ELEVATIONS

   (C) CENTERLINE STATIONING

   (D) STORMWATER DISCHARGE - EXPECTED AND CAPACITY

9. CONNECTOR PIPES (INLETS LATERALS)

   (A) TYPE AND SIZE OF PIPE

   (B) INVERT AT MAIN STORM SEWER

   (C) CENTERLINE STATIONING

   (D) STORMWATER DISCHARGE - EXPECTED, CAPACITY, AND VELOCITY(IES)

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1-7C

Approved By R. A. SHUBERT | Checked By H. M. E.
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STORM SEWER PLAN AND PROFILE
(continued)

10. EXISTING SANITARY SEWER

    (A) SANITARY SEWER LINE

        (i.) PROFILE OF SANITARY SEWER

        (ii.) TOP MANHOLE AND INVERT ELEVATIONS

        (iii.) TYPE AND SIZE OF PIPE

        (iv.) PERCENT GRADE

        (v.) DETAIL INFORMATION OF SANITARY SEWER CONFLICTS

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DETAIL SHEET

WHERE APPLICABLE, THE FOLLOWING SHALL BE PROVIDED:

A. DROP INLET(S)

B. MANHOLE(S) AND JUNCTION BOX(ES)

C. SURVEY MONUMENTS

D. STORM SEWER TRENCH CROSS-SECTION

E. PIPE CONCRETE COLLAR(S)

F. ROCKWALL FENCING

G. GUARD RAIL(S), BARRICADE(S), AND SIGNAGE

H. BOX CULVERTS

I. RETAINING WALL(S) (LOCATION ONLY, UNLESS TO BE BUILT BY SUBDIVIDER)

J. FOOTING(S)

K. CHANNEL CONCRETE LINING(S) - CROSS SECTIONS

L. SPILLWAYS

M. SEWER PIPE(S) - THRUST BLOCK(S)

N. SEEPAGE LINE(S) DETAILS

O. STORM SEWER OUTLET STRUCTURE(S)

P. BASIN(S) PLAN AND CROSS SECTIONS

Q. CONFLICTS WITH EXISTING IRRIGATION FACILITIES OR UTILITIES

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1-8

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CONSTRUCTION PHASING PLAN

WHERE APPLICABLE:

A. SHOW ENTIRE LIMITS OF PROJECT

B. INDICATE LIMITS OF INDIVIDUAL CONSTRUCTION PHASE BY STATIONS

C. TEMPORARY DRAINAGE PHASING PLAN

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CONSTRUCTION
PHASING PLAN

1-9

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SECTION 2

SECTION 2

DRAINAGE AND DRAINAGE STRUCTURES

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SECTION 2

DRAINAGE AND DRAINAGE STRUCTURES
(continued)

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Approved By R. A. SHUBERT | Checked By H. M. E.
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RETENTION BASIN DESIGN

DEFINITION: A MANMADE OR NATURAL RESERVOIR, EITHER PUBLIC OR PRIVATE, DESIGNED TO COMPLETELY RETAIN A SPECIFIED AMOUNT OF STORM WATER RUNOFF WITHOUT GRAVITY RELEASE.

DESIGN CRITERIA: THE DESIGN STORM FOR RETENTION BASINS IS 4" OF RAINFALL IN THREE HOURS OVER AN AREA OF 200 ACRES OR LESS (FOR AREAS OVER 200 ACRES SEE 2-9)

TOTAL RUNOFF FORMULA: QT = ARC/12

QT = TOTAL RUNOFF IN ACRE-FEET

A = 100% OF CONTRIBUTING WATERSHED AREA IN ACRES

R = RAINFALL IN INCHES

C = RUNOFF FACTOR INCHES (SEE NO. 2-10)

STORAGE CAPACITY: A RETENTION BASIN MUST HAVE STORAGE CAPACITY AS FOLLOWS:

1. 100% OF THE DESIGN STORM

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DESIGN STANDARDS FOR CONSTRUCTION

RETENTION BASIN DESIGN
2-1

Approved By R. A. SHUBERT	Checked By H. M. E.
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RETENTION BASIN DESIGN REQUIREMENTS

1. SIDE SLOPES SHALL NOT EXCEED FOLLOWING MAXIMUMS, UNLESS SATISFACTORY GEOTECHNICAL REPORT IS SUBMITTED:

   A. IN COHESIVE SOIL: THREE HORIZONTAL TO ONE VERTICAL (3:1)
   B. IN NON-COHESIVE SOIL: THREE HORIZONTAL TO ONE VERTICAL (3:1)

   NOTE: SOILS HAVING A PLASTICITY INDEX (PI) OF 8 OR ABOVE ARE CONSIDERED COHESIVE.

2. AN EROSION CONTROL PLAN IS REQUIRED FOR NON-COHESIVE SOILS.

3. RETENTION BASINS WITH SIDE SLOPES GREATER THAN 12% SHALL BE ENCLOSED WITH A SIX (6) FOOT HIGH CHAINLINK FENCE, EXCEPT THAT THE CHAINLINK FENCE MAY BE SUBSTITUTED WITH MASONRY OR ROCKWALL, WROUGHT IRON FENCING OR A COMBINATION THEREOF. THE HEIGHT SHALL BE MEASURED FROM THE GROUND INSIDE OR OUTSIDE THE WALL WHICHEVER IS THE HIGHER

4. BORING TESTS SHALL BE TO A DEPTH OF FIVE (5) FEET BELOW THE PROPOSED BASIN INVERT. THE BOTTOM OF THE BASIN SHALL BE A MINIMUM OF 24 INCHES ABOVE THE HIGH WATER TABLE. PERCOLATION TESTS IN THE VALLEY AREAS, SHALL BE PERFORMED ACCORDING TO ASTM-5126 DURING PEAK IRRIGATION SEASON BETWEEN AUGUST AND SEPTEMBER. STORM WATER, WITHIN THE BASIN, SHALL PERCOLATE WITHIN 72 HOURS. A GEOTECHNICAL INVESTIGATION, PERFORMED BY A LICENSED PROFESSIONAL GEOTECHNICAL ENGINEER, SHALL BE SUBMITTED PRIOR TO FINAL APPROVAL OF THE DEVELOPMENT PLANS. THE REPORT SHALL CONTAIN, AT A MINIMUM, SUBSURFACE SOIL PROFILE(S) AND PERCOLATION TEST RESULTS.

5. PROVIDE ONE (1), 18 FT MINIMUM WIDE DOUBLE GATE, ACCESSIBLE FROM PUBLIC RIGHT-OF-WAY AND ALIGNED WITH THE ACCESS RAMP. THE GATE SHALL BE CHAINLINK FENCE, EXCEPT THAT THE GATE SHALL BE WROUGHT IRON WHERE A MASONRY OR ROCKWALL IS SUBSTITUTED FOR A CHAINLINK FENCE.

6. PROVIDE AN ACCESS RAMP MEETING THE FOLLOWING CRITERIA:

   MAXIMUM SLOPE: 15%
   MINIMUM WIDTH: 15 FT
   RAMP MATERIAL: MINIMUM PI OF 8, WITH NO LOOSE MATERIAL
   COMPACTION: MINIMUM 90% PER ASTM D-1557

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DESIGN STANDARDS FOR CONSTRUCTION

RETENTION BASIN DESIGN REQ.
2-2A

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RETENTION BASIN DESIGN REQUIREMENTS
(continued)

7. RETENTION BASINS WITH DEPTHS OF 10 FEET OR MORE SHALL HAVE MAINTENANCE ROADS WITH A MINIMUM WIDTH OF 15 FEET. RETENTION BASINS WITH DEPTHS OF LESS THAN 10 FEET SHALL HAVE A FIVE (5) FOOT BENCH TERRACE ADJACENT TO THE PROPERTY LINE.

8. THE DESIGN WATER DEPTH IN RETENTION BASINS SHALL NOT EXCEED TWENTY (20) FEET, EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER WHEN BENCHING, SHALLOWER SLOPES OR OTHER MEASURES ARE PROVIDED.

9. THE ALLOWABLE CLEARANCE AT THE BOTTOM OF THE BASIN SHALL BE 25 FEET IN DIAMETER, MINIMUM.

10. IF AN ACCESS ROAD IS REQUIRED, A MINIMUM WIDTH OF TWENTY (20) FEET FOR THE ACCESS ROAD SHALL BE PROVIDED FROM THE STREET R.O.W. TO THE TOP OF THE BASIN.

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RETENTION BASIN DESIGN REQ. 2-2B

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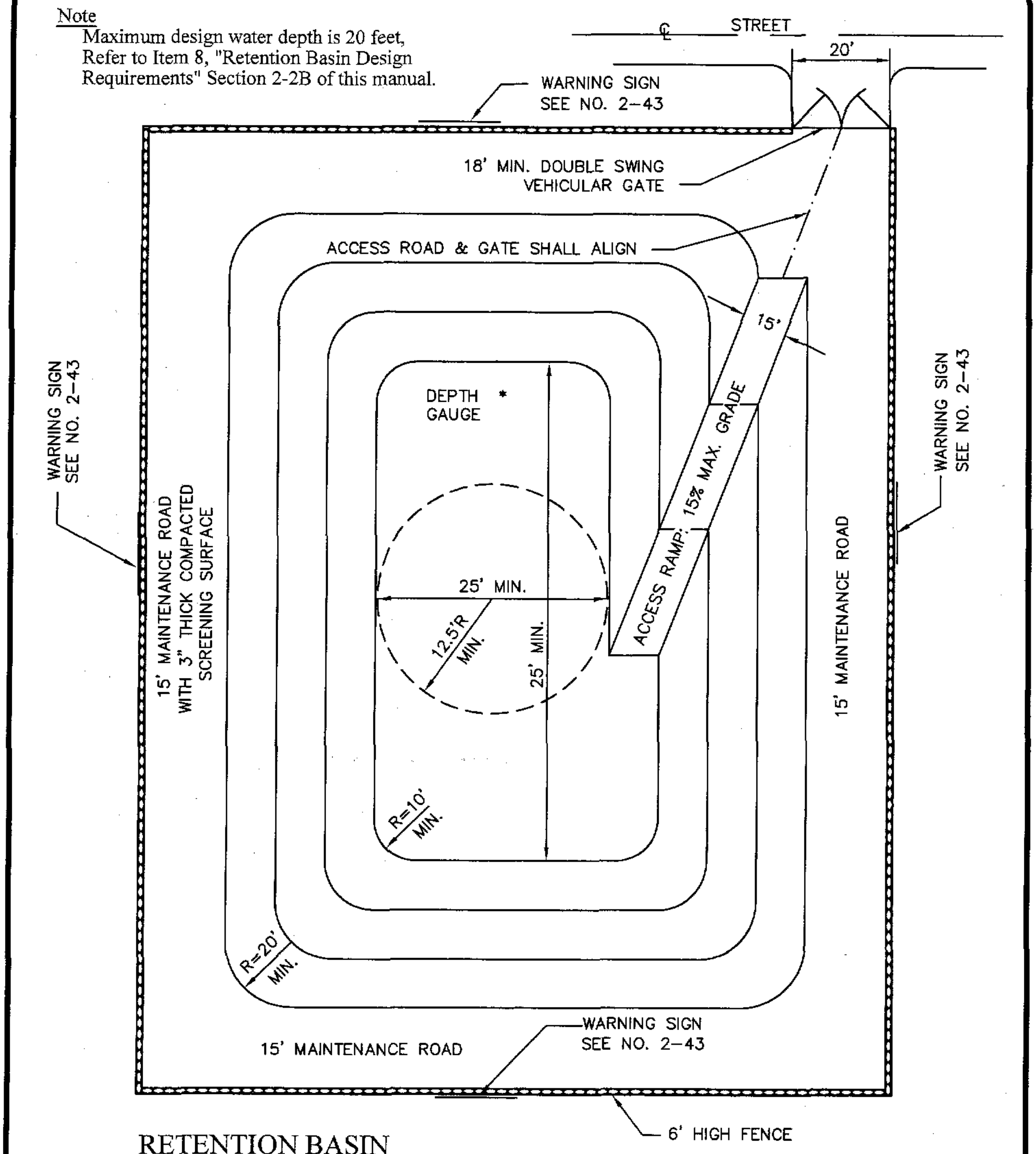

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

RETENTION BASIN DESIGN (DRAWING) 2-3

Approved By R. A. SHUBERT	Checked By H. M. E.
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DETENTION BASIN DESIGN

DEFINITION: A DETENTION BASIN IS A MANMADE OR NATURAL RESERVOIR, EITHER PUBLIC OR PRIVATE, DESIGNED TO RESTRICT THE FLOW OF STORMWATER TO A PRESCRIBED MAXIMUM RATE THROUGH A CONTROLLED RELEASE BY GRAVITY, AND TO CONCURRENTLY DETAIN THE EXCESS WATERS THAT ACCUMULATE BEHIND THE CONTROL STRUCTURE.

DESIGN CRITERIA: THE DESIGN STORM WILL BE A 4" RAINFALL IN THREE (3) HOURS OVER AN AREA OF 200 ACRES OR LESS. (FOR AREAS LARGER THAN 200 ACRES, SEE NO. 2-9, EXAMPLE INCLUDED).

TOTAL RUNOFF FORMULA: $QT = ARC/12$

- QT = TOTAL RUNOFF IN ACRE-FEET
- A = 100% OF CONTRIBUTING WATERSHED AREA IN ACRES
- R = RAINFALL IN INCHES
- C = RUNOFF FACTOR (SEE CoEP "DRAINAGE DESIGN MANUAL")

THE DETENTION BASIN WILL BE DESIGNED UTILIZING GOOD ENGINEERING PRACTICES AND ACCEPTED METHODS (HEC-1) WHEREBY 100% OF THE RUNOFF VOLUME IS TO BE PROPERLY MANAGED THROUGH THE USE OF CHANNELS AND BASINS.

A GEOTECHNICAL INVESTIGATION, PERFORMED BY A LICENSED PROFESSIONAL GEOTECHNICAL ENGINEER, SHALL BE SUBMITTED PRIOR TO FINAL APPROVAL OF DEVELOPMENT PLANS. THE REPORT SHALL CONTAIN, AT A MINIMUM, SUBSURFACE SOIL PROFILE(S) AND PERCOLATION TEST RESULTS.

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THE CITY OF EL PASO TEXAS

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DESIGN STANDARDS FOR CONSTRUCTION

DETENTION BASIN DESIGN

2-4

Approved By R. A. SHUBERT
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Drawn By QEC / J. R.

DETENTION BASIN DESIGN REQUIREMENTS

1. EARTH LEVEE DESIGN: THE DESIGN OF EARTH LEVEES SHALL BE IN ACCORDANCE WITH BOTH ACCEPTED ENGINEERING PRACTICE AND FEMA (FEDERAL EMERGENCY MANAGEMENT AGENCY) GUIDELINES AND SHALL INCLUDE A SEEPAGE ANALYSIS.

2. SPILLWAY: AN EMERGENCY CONCRETE SPILLWAY SHALL BE PROVIDED WITH A CAPACITY EQUAL TO THE PEAK DISCHARGE OF THE DESIGN STORM. (SEE 2-6,2-9,2-10,2-11) DEPTH OF FLOW OVER THE CREST OF THE SPILLWAY SHALL BE NO MORE THAN ONE (1) FOOT.

3. SIDE SLOPES SHALL NOT EXCEED FOLLOWING MAXIMUMS, UNLESS OTHERWISE RECOMMENDED BY A LICENSED PROFESSIONAL GEOTECHNICAL ENGINEER:

   A. IN COHESIVE SOIL, THREE (3) HORIZONTAL TO ONE (1) VERTICAL (3:1).
   B. IN NON-COHESIVE SOIL, THREE (3) HORIZONTAL TO ONE (1) VERTICAL (3:1).

4. PROVIDE AN ACCESS RAMP MEETING THE FOLLOWING CRITERIA:

   MAXIMUM SLOPE: 15%
   MINIMUM WIDTH: 15 FT
   RAMP MATERIAL: MINIMUM PI OF 8, WITH NO LOOSE MATERIAL
   COMPACTION: MINIMUM 90% PER ASTM D-1557

5. FOR MAINTENANCE PURPOSES, ONE (1) 18-FOOT WIDE DOUBLE SWING GATE ACCESSIBLE FROM PUBLIC RIGHT-OF-WAY SHALL BE PROVIDED.

6. DETENTION BASINS WITH DEPTHS OF 10 FEET OR MORE SHALL HAVE MAINTENANCE ROADS WITH A MINIMUM WIDTH OF 15 FEET AND A MAXIMUM SLOPE OF 15%. DETENTION BASINS WITH DEPTHS OF LESS THAN 10 FEET SHALL HAVE A FIVE (5) FOOT BENCH TERRACE ADJACENT TO THE PROPERTY LINE.

7. DETENTION BASINS SHALL BE ENCLOSED WITH A 6-FOOT CHAINLINK FENCE, EXCEPT THAT THE CHAINLINK FENCE MAY BE SUBSTITUTED WITH MASONRY OR ROCK WALL, WROUGHT IRON FENCING OR A COMBINATION THEREOF. THE HEIGHT SHALL BE MEASURED FROM THE GROUND INSIDE OR OUTSIDE THE WALL, WHICHEVER IS THE HIGHER.

8. THE DESIGN WATER DEPTH IN DETENTION BASINS SHALL NOT EXCEED TWENTY (20) FEET, EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER WHEN BENCHING, SHALLOWER SLOPES OR OTHER MEASURES ARE PROVIDED.

9. THE MINIMUM ALLOWABLE CLEARANCE AT THE BOTTOM OF BASIN SHALL BE 25 FEET IN DIAMETER.

10. THE OUTLET SHALL EMPTY THE BASIN WITHIN 72 HOURS FROM THE END OF DESIGN INTENSITY STORM.

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THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

DETENTION BASIN DESIGN REQ.
2-5

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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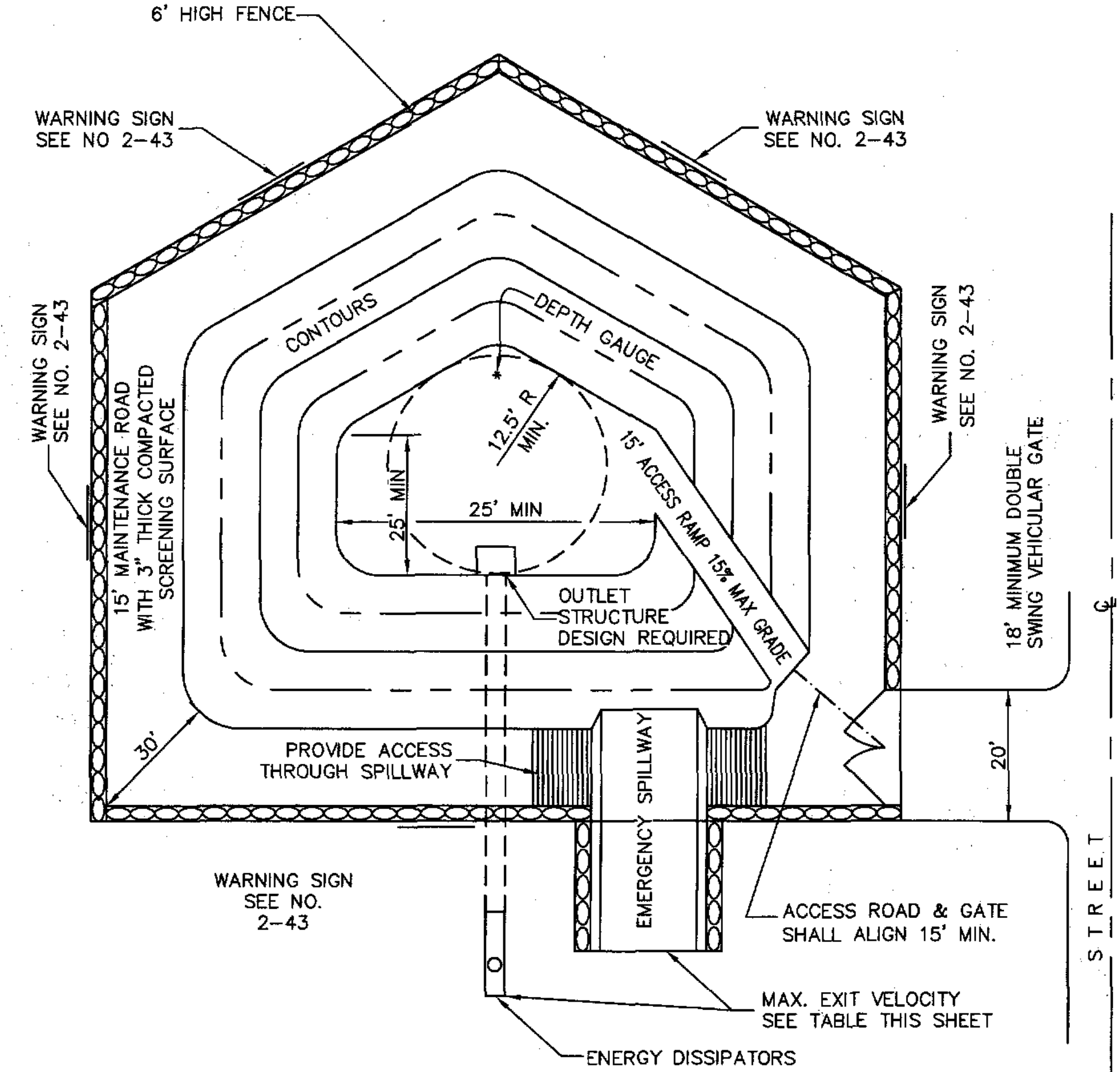
Note
Maximum design water depth is 20 feet, Refer to Item 9, "Detention Basin Design Requirements" Section 2-5 of this manual.



DETENTION BASIN

MAX. VELOCITY @ DISCHARGE POINTS
5 fps FOR UNPROTECTED GROUND
8 fps FOR OTHER GROUND COVER MATERIALS

THE CITY OF EL PASO TEXAS

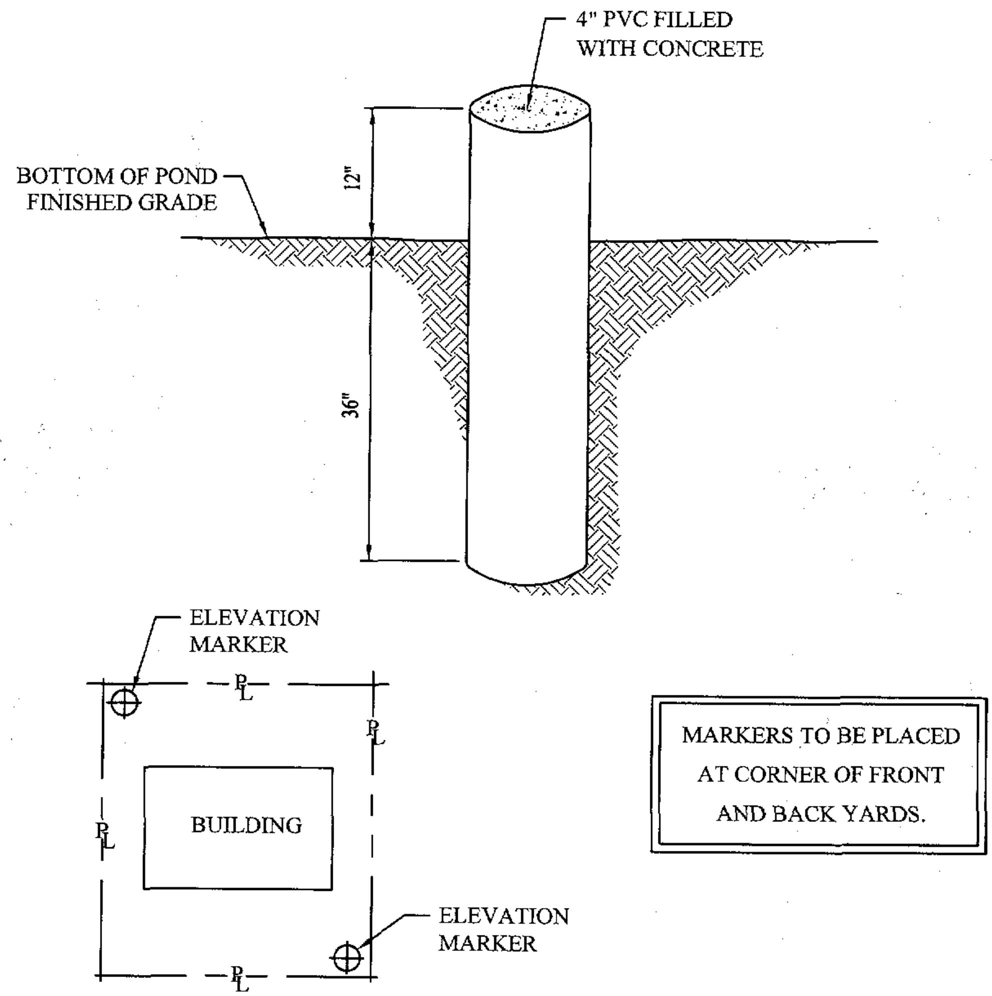
TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

DETENTION BASIN DESIGN (DRAWING) 2-6

Approved By R. A. SHUBERT Date JUNE 03, 2008
Checked By H. M. E. Drawn By QEC / J. R.



PERMANENT ELEVATION MARKER
FOR ON SITE PONDING N.T.S.

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TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PERMANENT ELEVATION MARKER FOR ON-SITE PONDING

2-7

Approved By R. A. SHUBERT	Checked By H. M. E.
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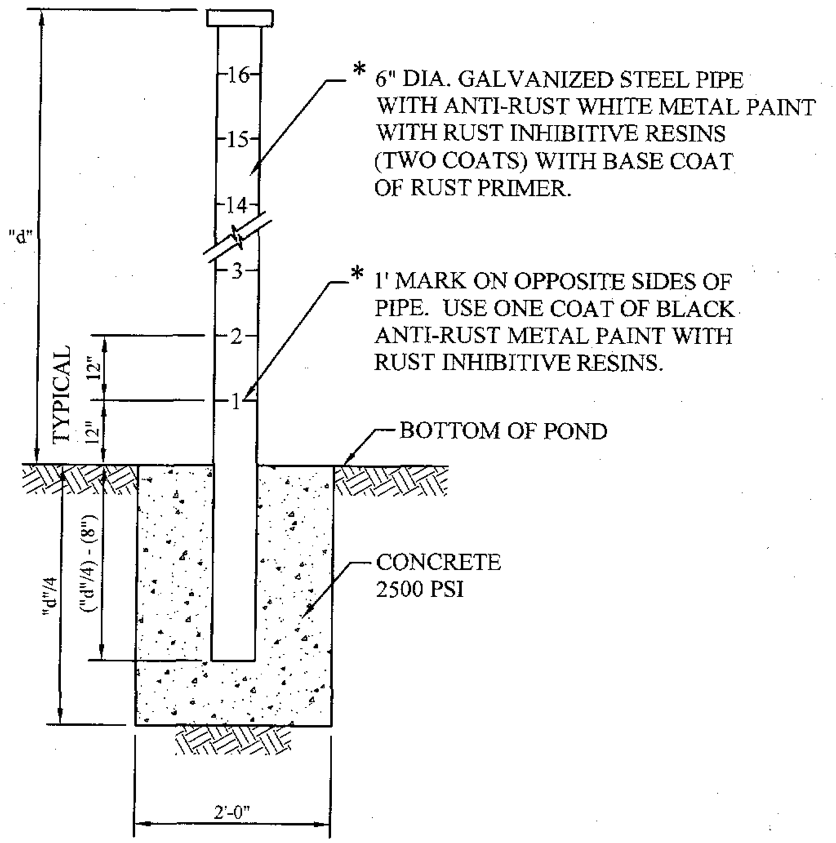
NOTE
ALTERNATES WILL BE ALLOWED WITH THE PRIOR REVIEW AND APPROVAL OF THE CITY ENGINEER.



POND DEPTH GAUGE

SCALE: 1/2"=1'-0"

* NOTES:
1.CONSULT WITH PAINT MANUFACTURER FOR PRODUCTS THAT CAN SUSTAIN LONG PERIODS OF MOISTURE.
2."d" = depth

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	POND DEPTH GAUGE 2-8
		Approved By R. A. SHUBERT Date JUNE 03, 2008
		Checked By H. M. E. Drawn By QEC / J. R.

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TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	BLANK 2-9
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THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

BLANK
2-10

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THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

BLANK
2-11

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THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	BLANK 2-13
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	BLANK 2-14
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ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

BLANK
2-15

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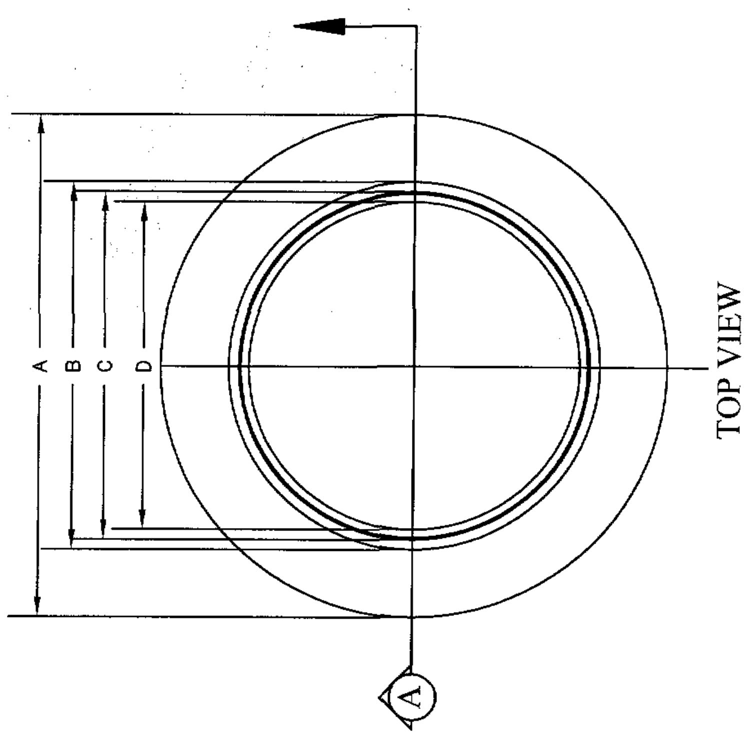
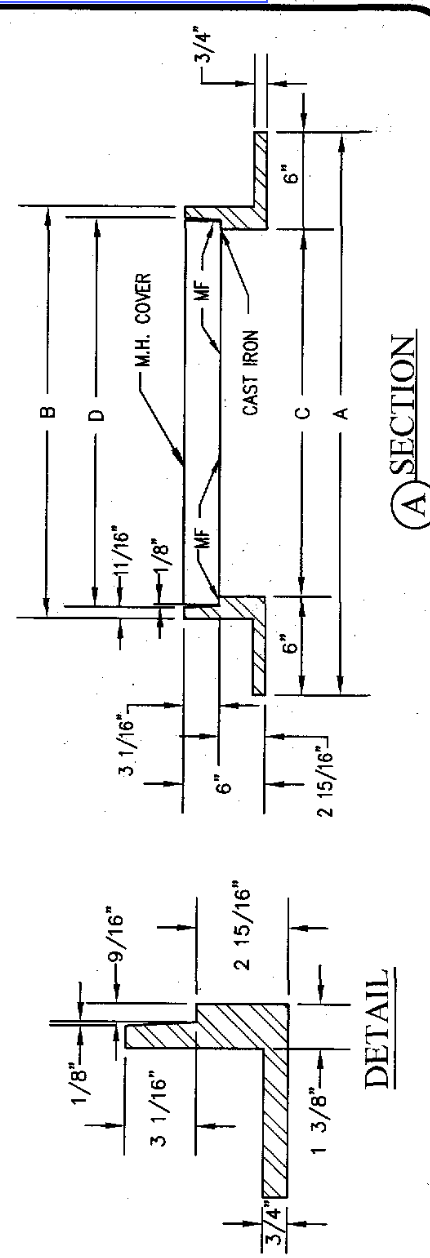
NOTE:
1. MATCHING SURFACES MARKED "MF" TO BE MACHINE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
2. CASTING TO BE SMOOTH AND VOID OF AIR HOLES.

MANHOLE RING	48" MANHOLE	72" MANHOLE
WEIGHT	165 LBS.	225 LBS.
A	2'-10 1/2"	3'-6"
B	2'-1 1/4"	2'-8 3/4"
C	1'-10 1/2"	2'-6"
D	1'-11 7/8"	2'-7 3/8"



TOP VIEW



A SECTION

DETAIL

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

MANHOLE RING
2-16

Approved By R. A. SHUBERT Date JUNE 03, 2008
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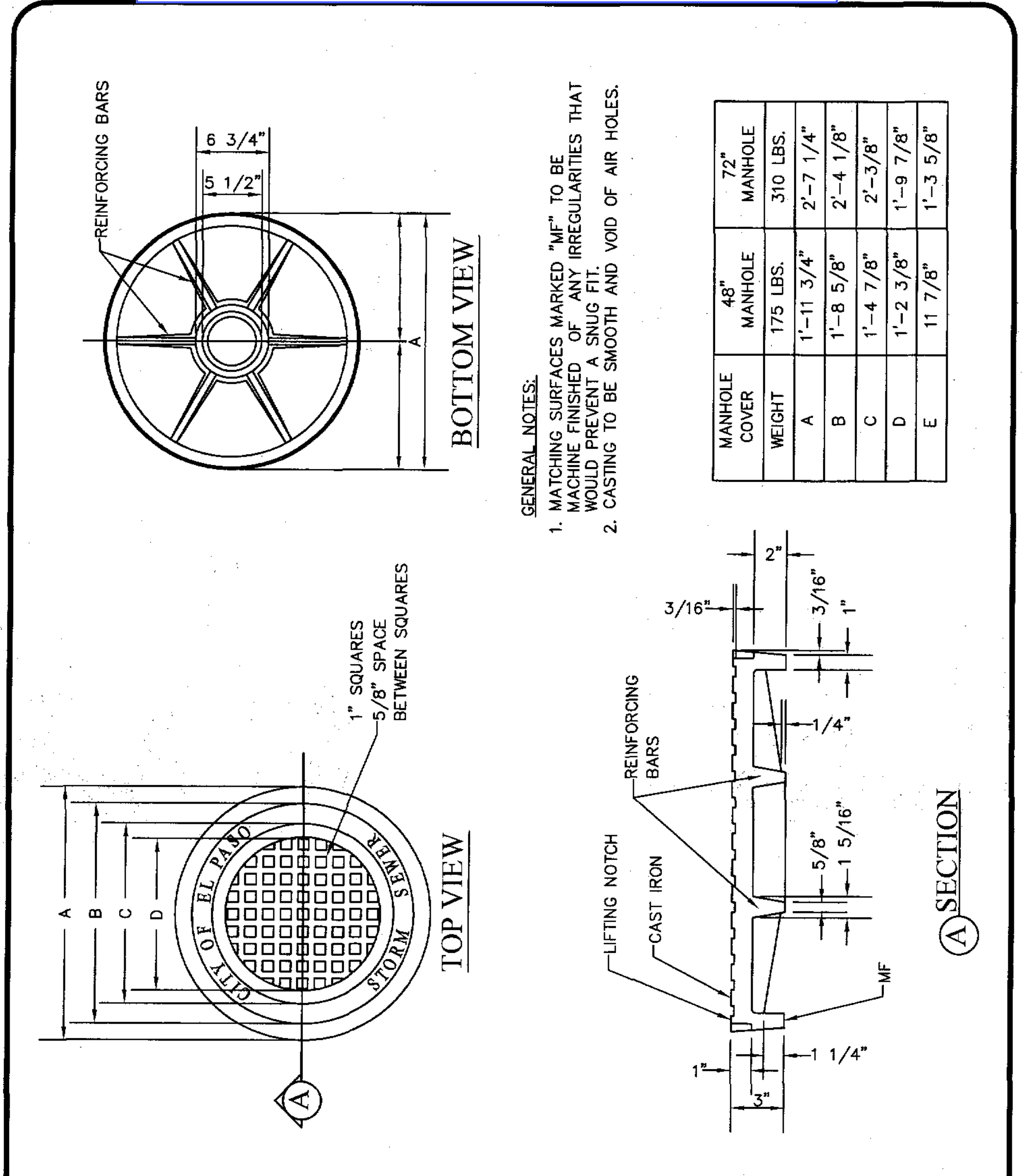

GENERAL NOTES:

1. MATCHING SURFACES MARKED "MF" TO BE MACHINE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
2. CASTING TO BE SMOOTH AND VOID OF AIR HOLES.

MANHOLE COVER	48" MANHOLE	72" MANHOLE
WEIGHT	175 LBS.	310 LBS.
A	1'-11 3/4"	2'-7 1/4"
B	1'-8 5/8"	2'-4 1/8"
C	1'-4 7/8"	2'-3/8"
D	1'-2 3/8"	1'-9 7/8"
E	11 7/8"	1'-3 5/8"

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

MANHOLE COVER
2-17

Approved By R. A. SHUBERT
Date JUNE 03, 2008
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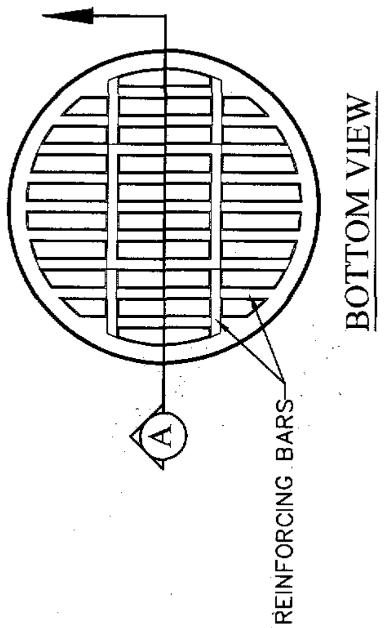
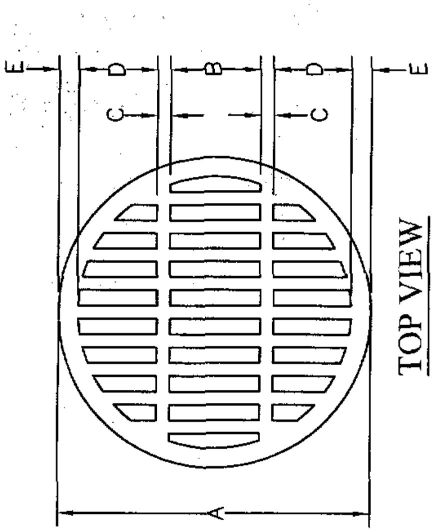


BOTTOM VIEW

GENERAL NOTES:

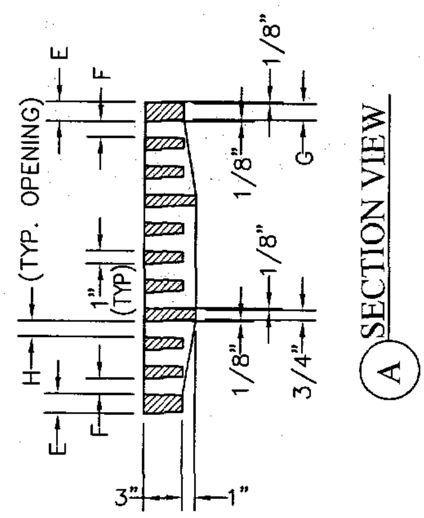
1. MATCHING SURFACES MARKED "MF" TO BE MACHINE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
2. CASTING TO BE SMOOTH AND VOID OF AIR HOLES.

MANHOLE COVER	48" MANHOLE	72" MANHOLE
WEIGHT	175 LBS.	310 LBS.
A	1'-11 3/4"	2'-7 1/4"
B	6 1/2"	9"
C	1"	1 1/2"
D	6"	8"
E	1 5/8"	1 5/8"
F	1 1/4"	1"
G	1 3/8"	1 3/8"
H	1"	1"



TOP VIEW

NOTE:
THIS MANHOLE COVER FITS IN A STANDARD MANHOLE RING (SEE 2-16)



A SECTION VIEW

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

GRATED MANHOLE COVER
2-18

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
Drawn By OEC / J. R.

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CONCRETE APRON FOR CIRCULAR PENETRATIONS IN ASPHALT PAVEMENTS

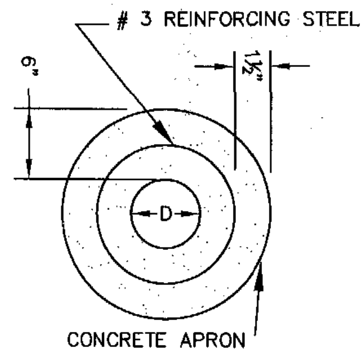
"D" DIAMETER OF PENETRATION (INCHES)	"A" CONCRETE HORIZONTAL DIMENSION FROM PENETRATION (INCHES)	NUMBER OF NO. 3 REINFORCING STEEL BARS (INCHES)	"B" MINIMUM CLEARANCE FROM EDGE OF CONCRETE APRON TO CENTER OF NEAREST REBAR (INCHES)	"C" MINIMUM CLEARANCE FROM PENETRATION EDGE TO CENTER OF NEAREST REBAR (INCHES)
0 TO 6.01	6	1	1½	1½
6.01 TO 18.01	8	2	1½	1½
18.01 AND OVER	12	3	1½	1½

CONSTRUCTION NOTES:

1. ANY DISTURBED SUBGRADE UNDER THE CONCRETE APRON SHALL BE COMPACTED TO 95% DENSITY ± 3% OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D-1557.
2. ANY DISTURBED COARSE UNDER THE CONCRETE APRON SHALL BE COMPACTED TO 100% DENSITY ± 2% OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D-1557.
3. PROVIDE A MINIMUM OF 1 1/2" OF CONCRETE COVER FOR ALL REINFORCEMENT STEEL.
4. REINFORCING SHALL MEET ASTM C-478 AND TRAFFIC LOADING (HS-20).
5. NO. 3 REINFORCING STEEL HOOPS SHALL BE SPACED EQUALLY.

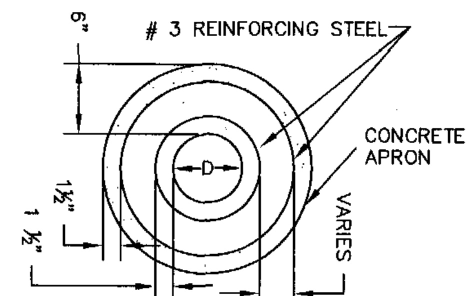
GENERAL NOTES:

1. THE PENETRATION APRON SHOULD BE CAST IN-PLACE CONCRETE. (MINIMUM 28 DAY COMPRESSIVE STRENGTH 4000 PSI. HIGH EARLY CONCRETE IS REQUIRED)
2. TOPS OF PENETRATION APRON SHALL BE FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE UNLESS OTHERWISE SPECIFIED BY THE CITY ENGINEER.



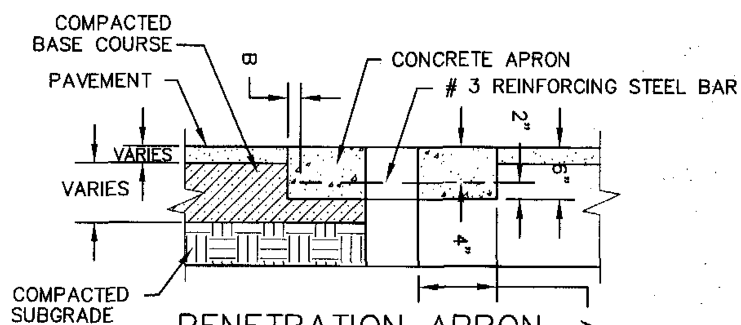
PENETRATION APRON

PLAN VIEW – SINGLE REBAR



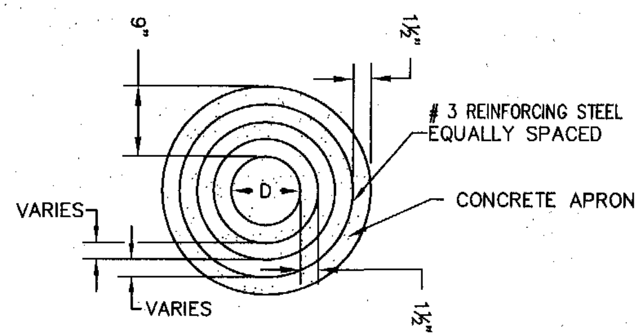
PENETRATION APRON

PLAN VIEW – 2 REBAR



PENETRATION APRON

SECTION VIEW



PENETRATION APRON

PLAN VIEW – THREE REBAR

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PENETRATION APRON

2-19

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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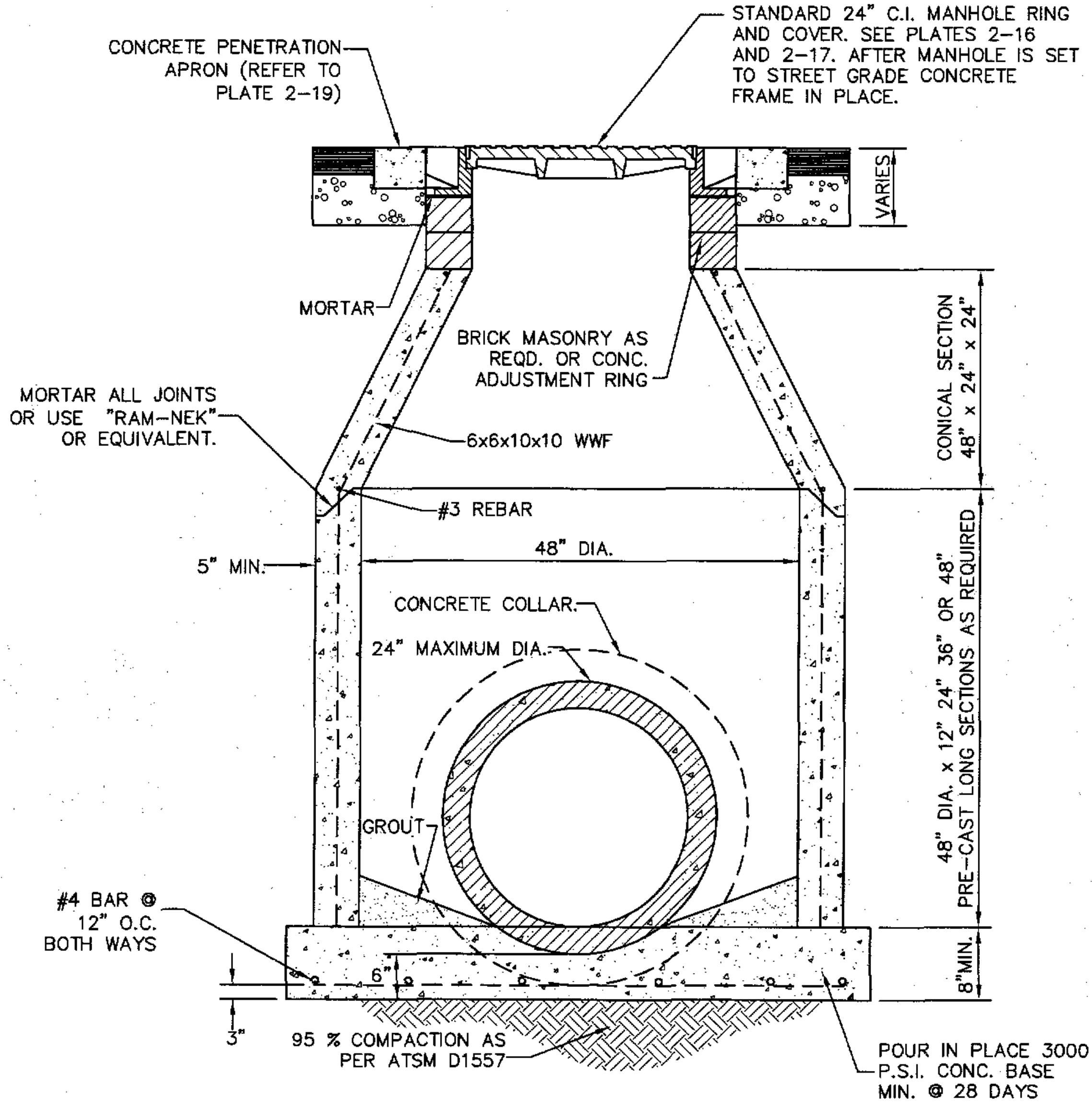

48" DIAMETER STANDARD MANHOLE

NTS

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	48" DIAMETER STANDARD CONICAL MANHOLE 2-20 Approved By R. A. SHUBERT — Checked By H. M. E. Date JUNE 03, 2008 — Drawn By QBC / J. R.

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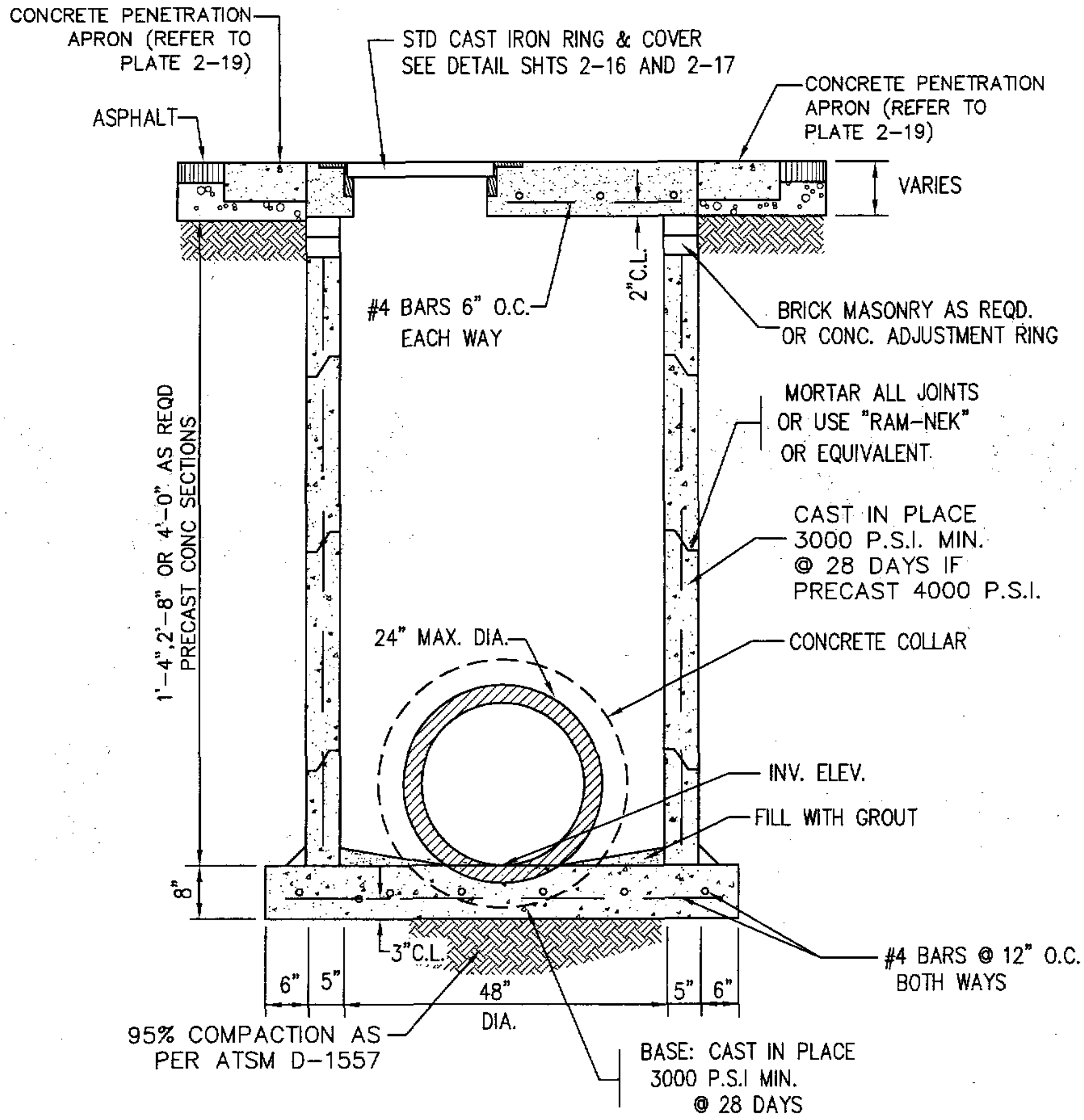

48" DIAMETER PRECAST MANHOLE SECTIONS

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	48" DIAMTER PRECAST MANHOLES 2-21 Approved By R. A. SHUBERT Date JUNE 03, 2008 Checked By H. M. E. Drawn By QEC / J. R.

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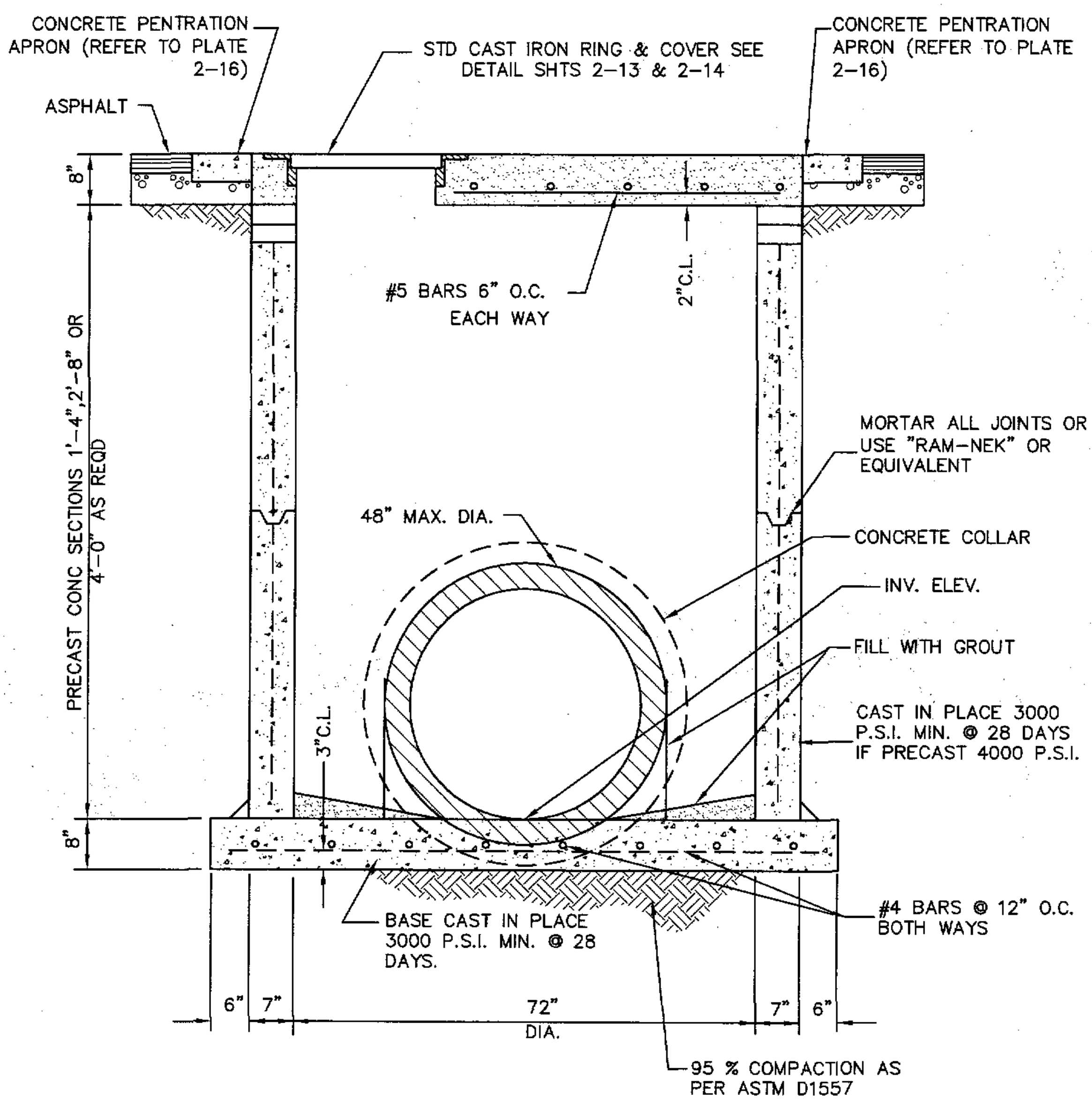

72" DIAMETER PRECAST MANHOLE SECTIONS

NTS

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

72" DIAMETER PRECAST MANHOLES
2-22

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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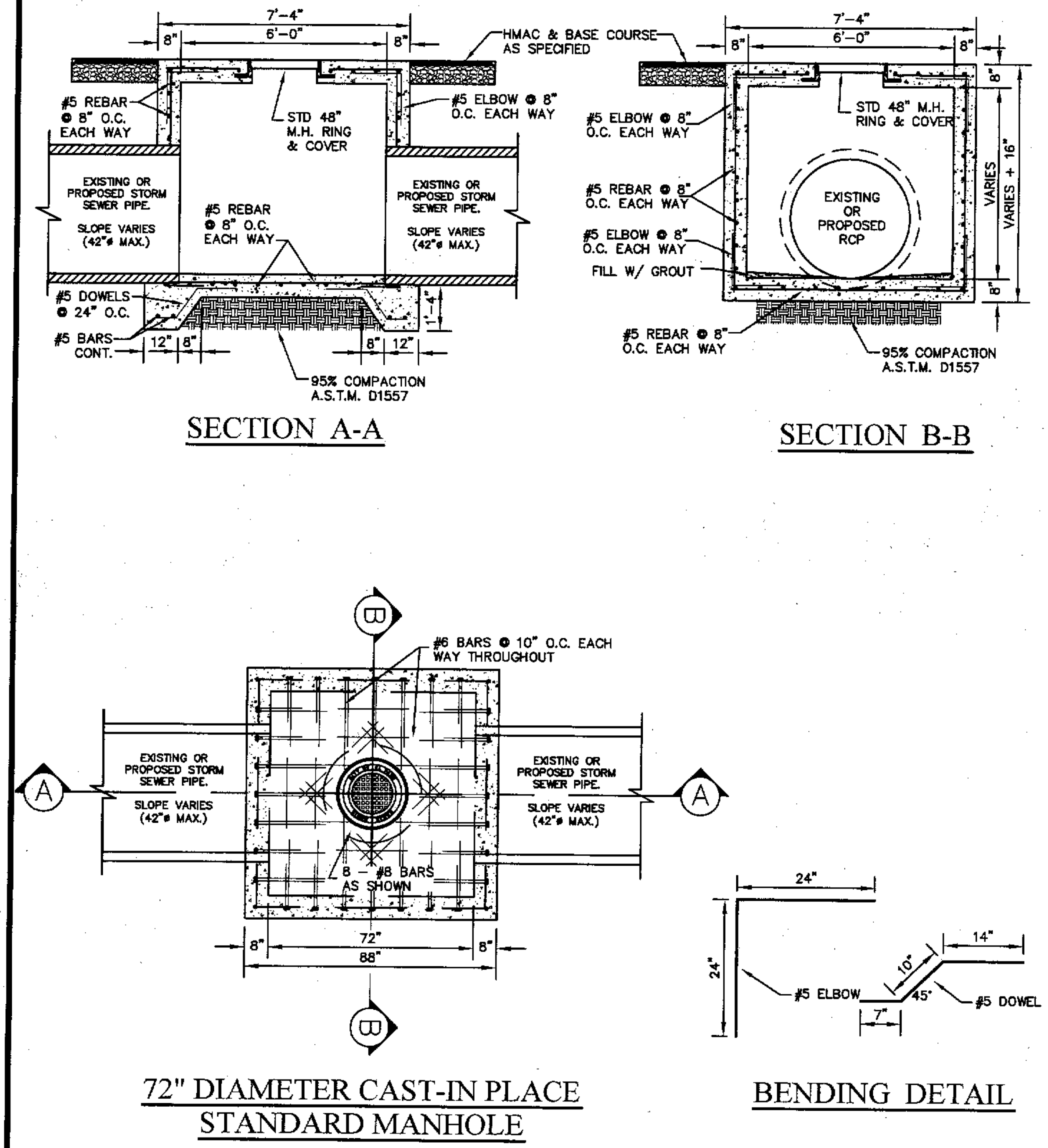


TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

72" DIAMETER CAST-IN-PLACE MANHOLE 2-23

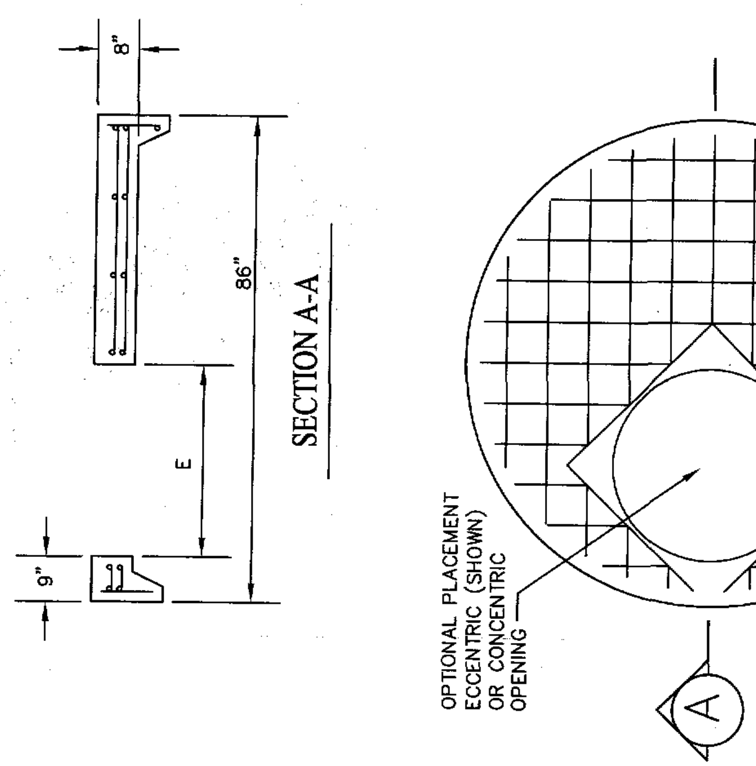
Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

GENERAL NOTES:

1. ALL JOINTS TO BE TONGUE AND GROOVE AND SEALED WITH RAM-NEK OR EQUAL.
2. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.

CONSTRUCTION KEY NOTES:

A. 4000 P.S.I. CONCRETE 28 DAYS.
B. KEYLOCK ADDS 8" TO VERTICAL HEIGHT.
C. RING & COVER OR SPECIAL LIDS TO MEET REQUIREMENTS. MAY BE CAST IN PLACE.
D. REINFORCING SHALL MEET A.S.T.M. C478-87 AND TRAFFIC LOADING (HS-20).
E. SIZE TO ACCOMMODATE TYPE 72" DIAMETER MANHOLE RING.



MANHOLE COVER FOR TYPE 72" MANHOLE

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TITLE 19 - SUBDIVISION ORDINANCE

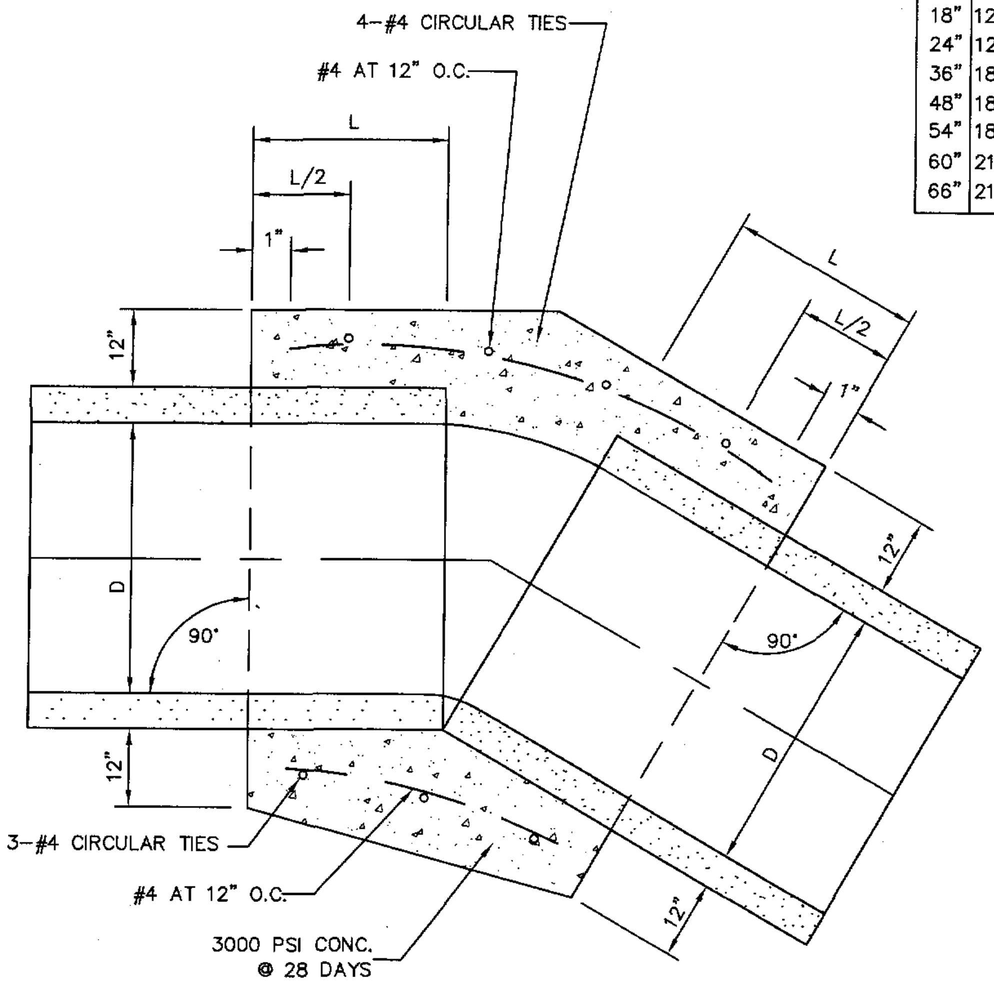
ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

CONCRETE MANHOLE COVER FOR TYPE 72" MANHOLE
2-24

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

D	L
12"	12"
18"	12"
24"	12"
36"	18"
48"	18"
54"	18"
60"	21"
66"	21"



CONCRETE PIPE COLLAR

1. A CONCRETE COLLAR IS REQUIRED WHERE PIPES CHANGE IN HORIZONTAL OR VERTICAL ALIGNMENT.
2. FOR PIPES 24" OR LESS IN DIAMETER REINFORCE WITH W.W.M.

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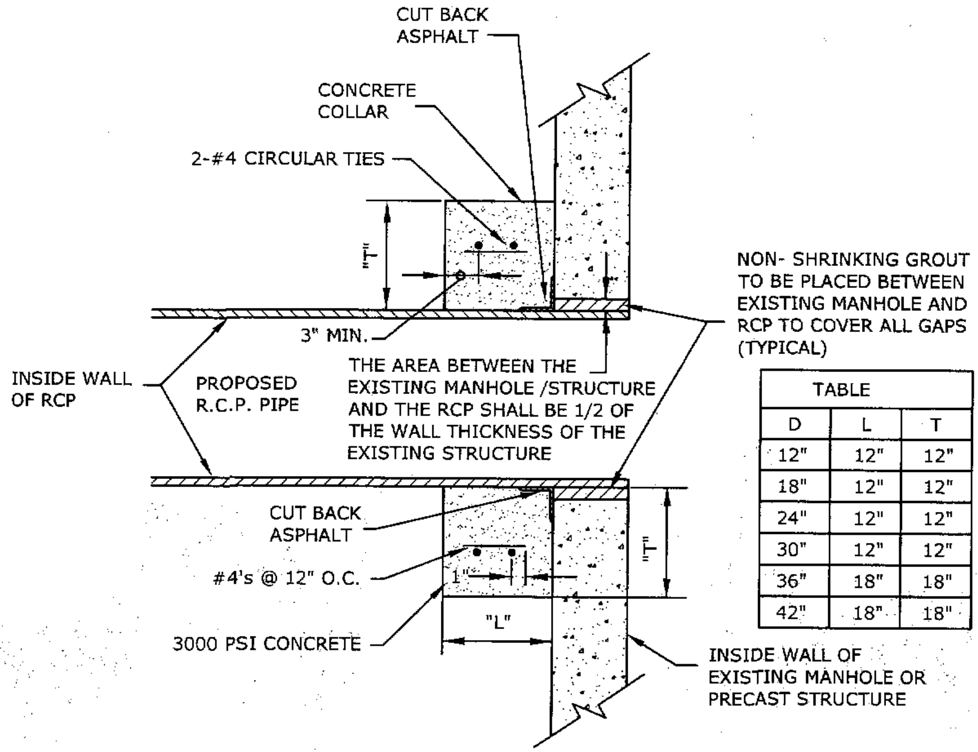
TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

CONCRETE PIPE COLLAR
2-25

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.



TABLE

D	L	T
12"	12"	12"
18"	12"	12"
24"	12"	12"
30"	12"	12"
36"	18"	18"
42"	18"	18"

CONNECTION AT PRECAST JUNCTION BOXES OR EXISTING MANHOLES

SCALE: N.T.S.

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THE CITY OF EL PASO TEXAS

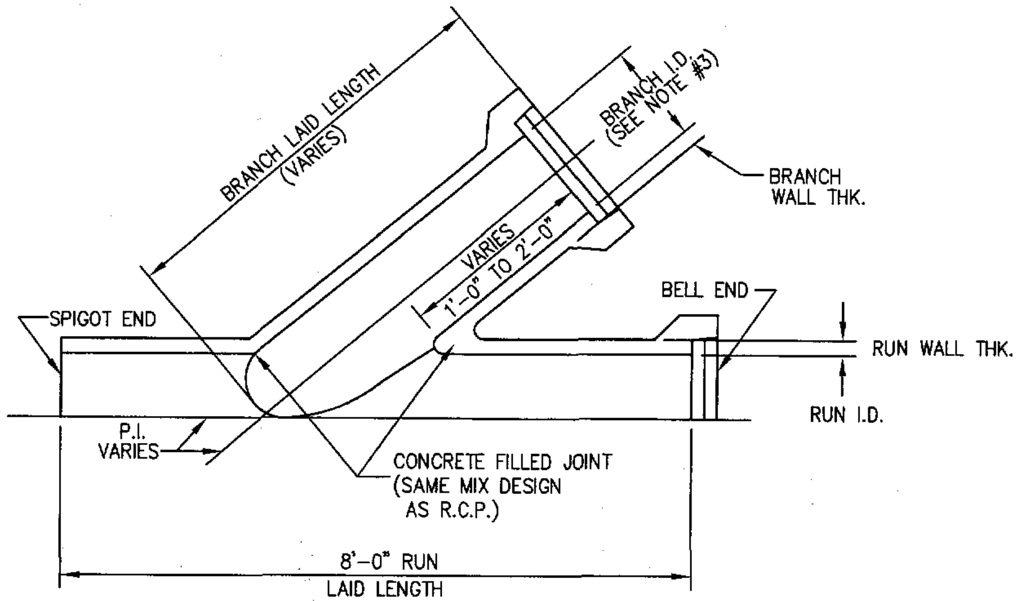
TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

CONNECTION AT PRECAST JUNCTION BOXES OR EXISTING MANHOLES
2-26

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
Drawn By QEC / J. R.



REINFORCED CONCRETE PIPE – WYE 18" THRU 96" DIA.

PLAN VIEW SECTION

N.T.S.

NOTES:

1) THIS DRAWING IS NOT INTENDED TO SHOW REINFORCEMENT DESIGN EITHER AS TO PLACEMENT OR STEEL AREA. ACTUAL PROJECT SPECIFIACTIONS WILL GOVERN.

2) STEEL AREA IN WYE CONNECTION EXCEEDS THAT REQUIRED IN ADJACENT PIPE.

3) FOR 18" DIA. TO 30" DIA. MAINLINE R.C.P. THE DIA. OF THE WYE NEEDS TO BE 6" SMALLER THAN THE MAINLINE DIA. FOR 36" DIA. TO 96" DIA. MAINLINE R.C.P. THE DIA. OF THE WYE NEEDS TO BE 12" SMALLER THAN THE MAINLINE DIA.

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TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PRE-FABRICATED REINFORCED CONCRETE PIPE WYE
2-27

Approved By R. A. SHUBERT | Checked By H. M. E.
Date JUNE 03, 2008 | Drawn By QBC / J. R.

STANDARD MANHOLE SPECIFICATIONS

1. THE PRECAST MANHOLE RISER AND CONICAL SECTIONS SHALL CONFORM TO ASTM SPECIFICATIONS C-478.
2. THE PRECAST CONCRETE SHALL ATTAIN A MINIMUM ALLOWABLE COMPRESSIVE STRENGTH OF 4000 PSI @ 28 DAYS.
3. THE CONCRETE BASE SHALL ATTAIN A MINIMUM ALLOWABLE COMPRESSIVE STRENGTH OF 3000 PSI @ 28 DAYS.
4. MASONRY SHALL BE COMMON BRICK WITH ASTM TYPE 'S' MORTAR ATTAINING A MINIMUM COMPRESSIVE STRENGTH OF 1800 P.S.I. AT 28 DAYS.
5. INCLUDE DETAIL FOR CONNECTION AT PRECAST JUNCTION BOXES OR EXISTING MANHOLES (IF APPLICABLE) , REFER TO PLATE 2-26.
6. MANHOLE COVER SHALL BE SET FLUSH WITH FINISHED PAVEMENT.
7. SUBGRADE FOR MANHOLES SHALL BE COMPACTED TO A MINIMUM OF 95% IN ACCORDANCE WITH ASTM D1557.

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THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

STANDARD MANHOLE SPECIFICATIONS
2-28

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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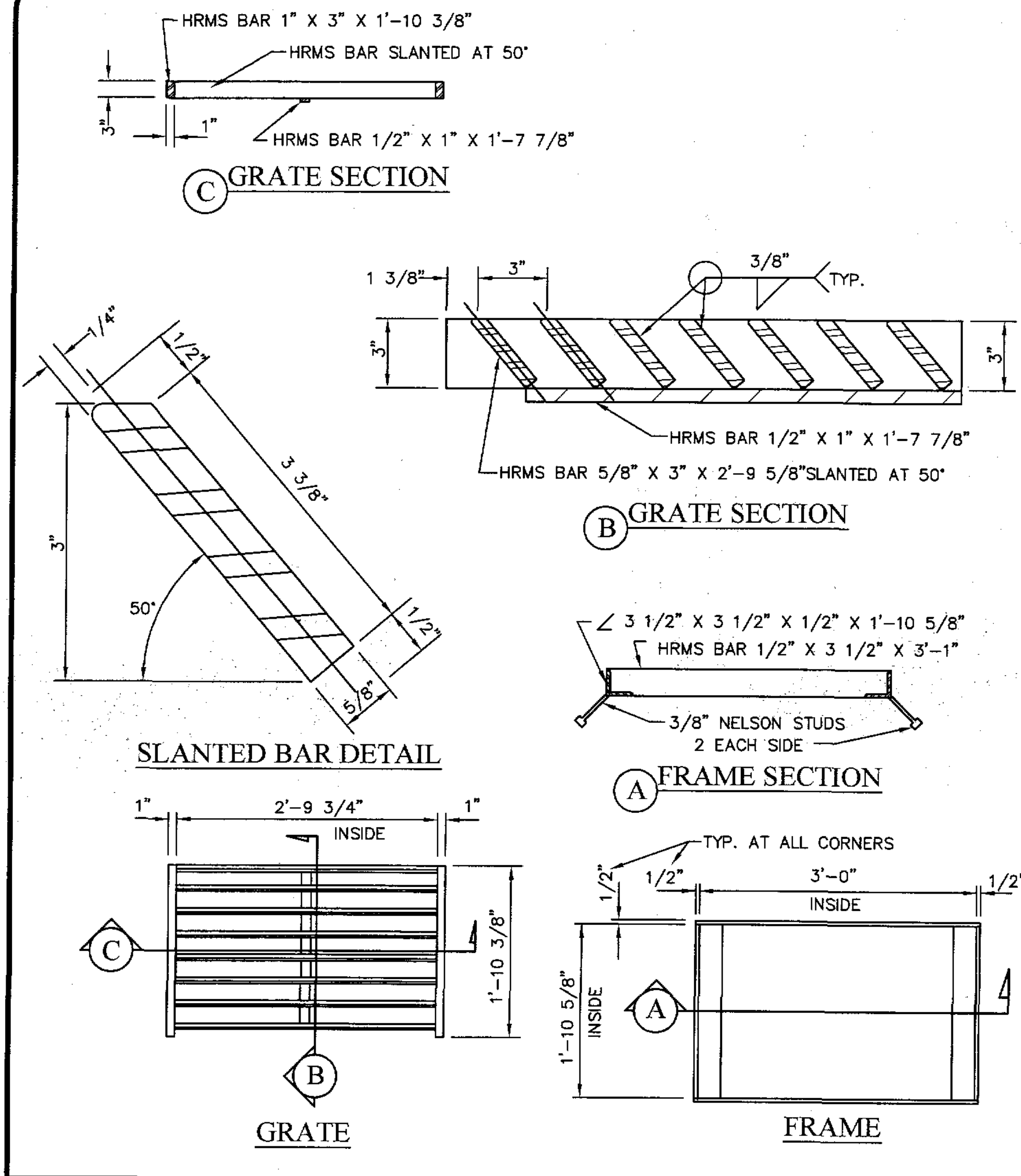

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

GRATE AND FRAME FOR DROP INLET 2-29

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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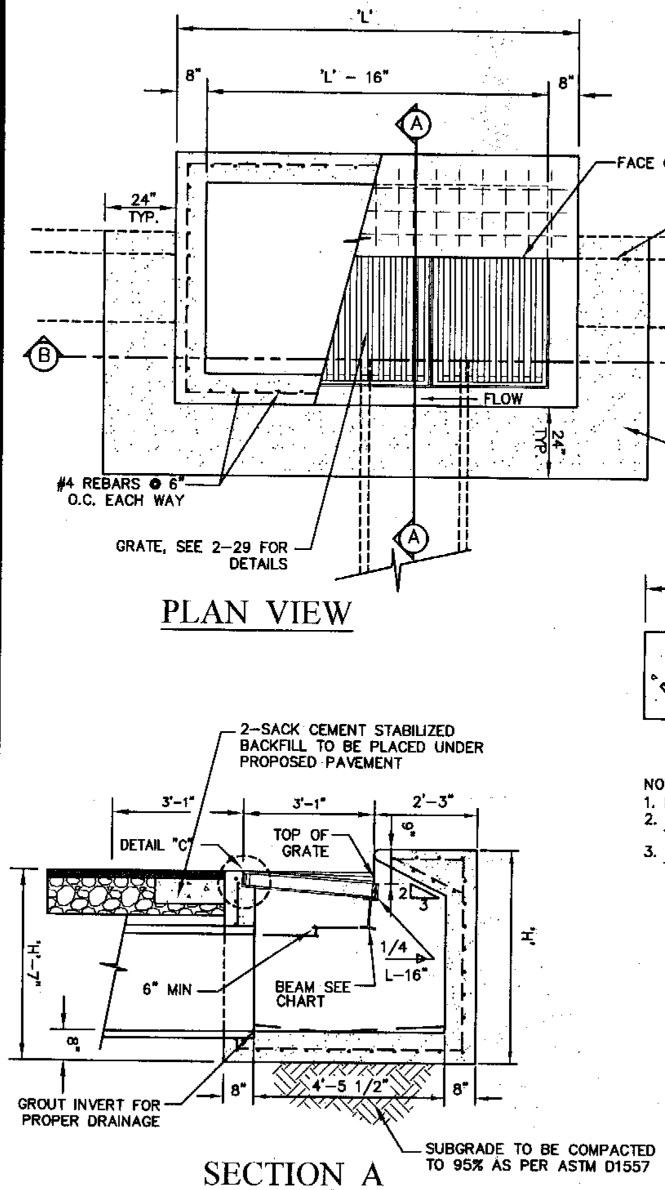
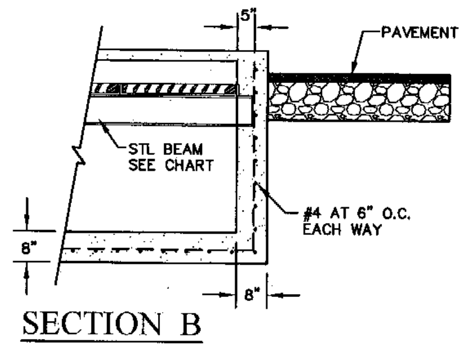
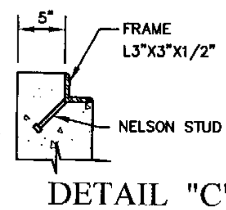
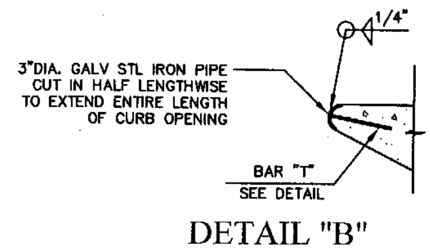
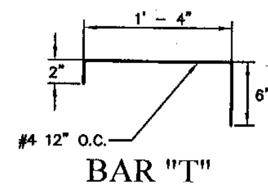










NOTES
1. H = 20' MAXIMUM
2. CONCRETE TO BE 3000 psi MIN CORE TEST @ 28 DAYS.
3. GRATE TO BE PERPENDICULAR TO TRAFFIC.

NO. OF GRATES	'L'	BEAM	
		LENGTH	MINIMUM SIZES
2	5'-1 1/8"	4'-7 1/8"	W6X12, S6X12.5, MC6X15.1
3	7'-0 1/4"	6'-5 1/8"	W8X15, S7X15.3, MC7X17.6
4	8'-9 7/8"	8'-3 7/8"	W9X18, S8X18.4, MC10X21.9
5	10'-8"	10'-2"	W12X16, S8X21, MC10X21.9
6	12'-6 5/8"	12'-0 5/8"	W12X19, S8X23, MC10X25

TITLE 19 - SUBDIVISION ORDINANCE

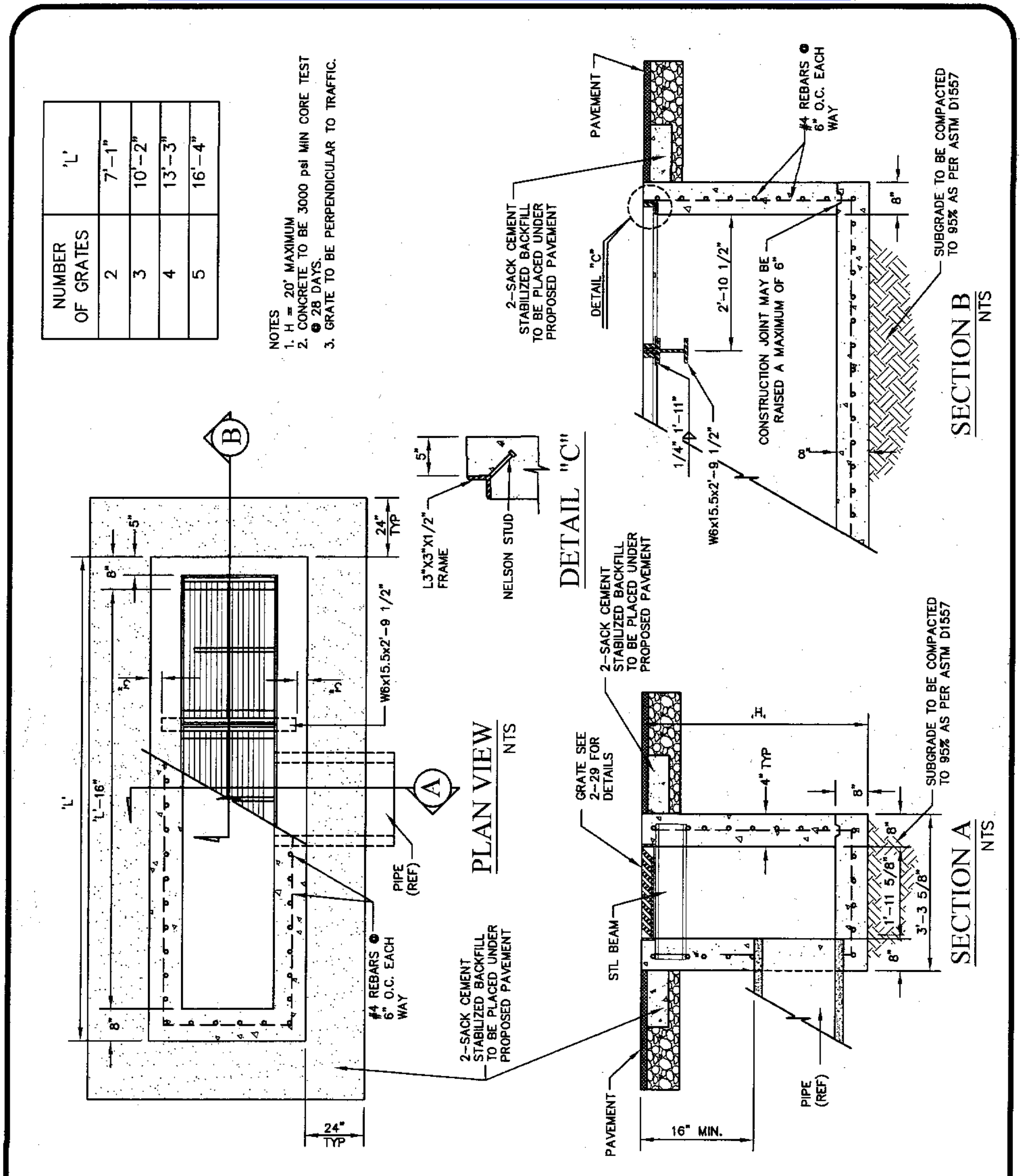
ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

DROP INLET
TYPE I
2-30

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
Drawn By QEC / J. R.

BACK TO TITLE INDEX PAGE



TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

DROP INLET
TYPE II
2-31

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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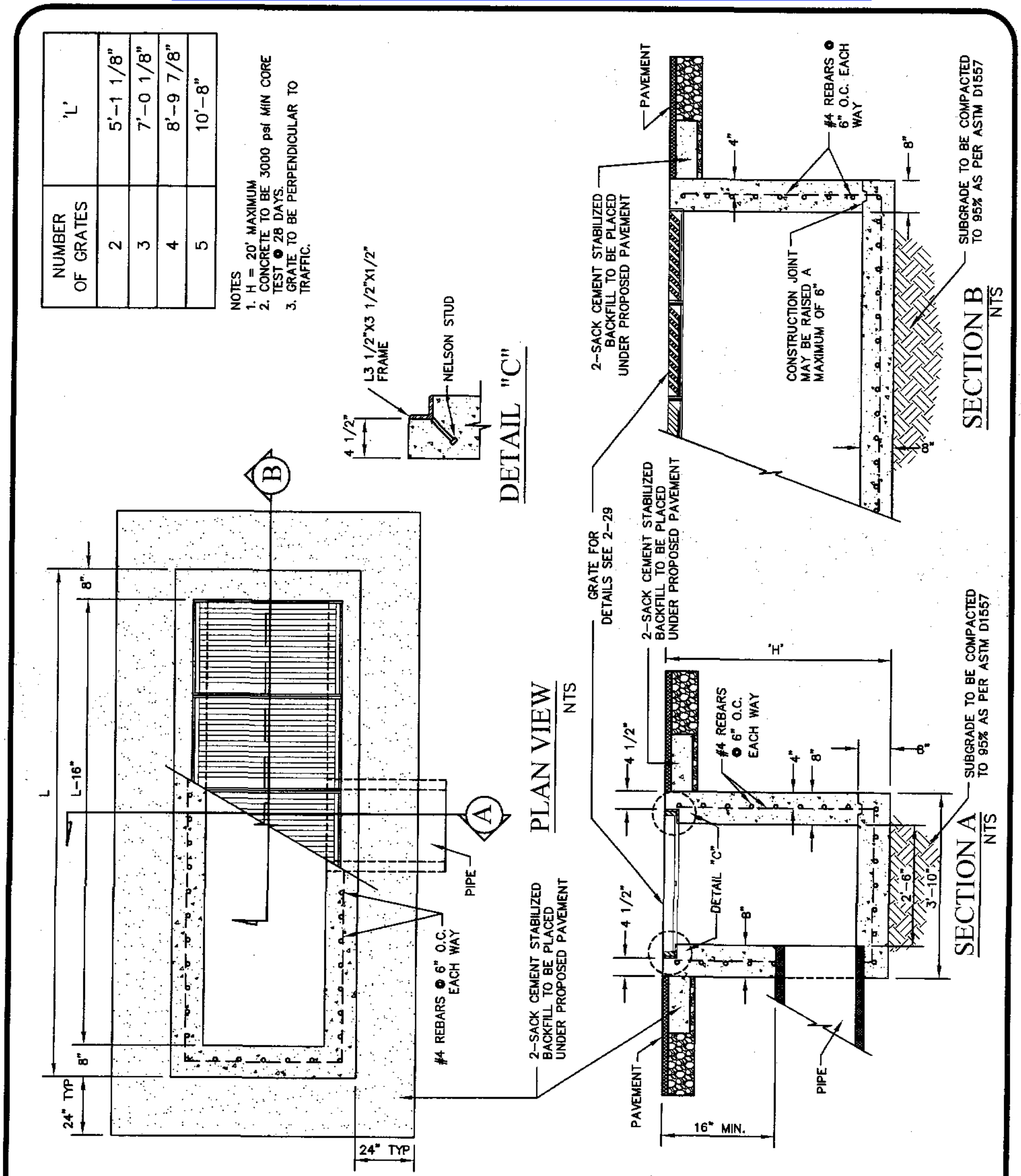

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

DROP INLET TYPE III
2-32

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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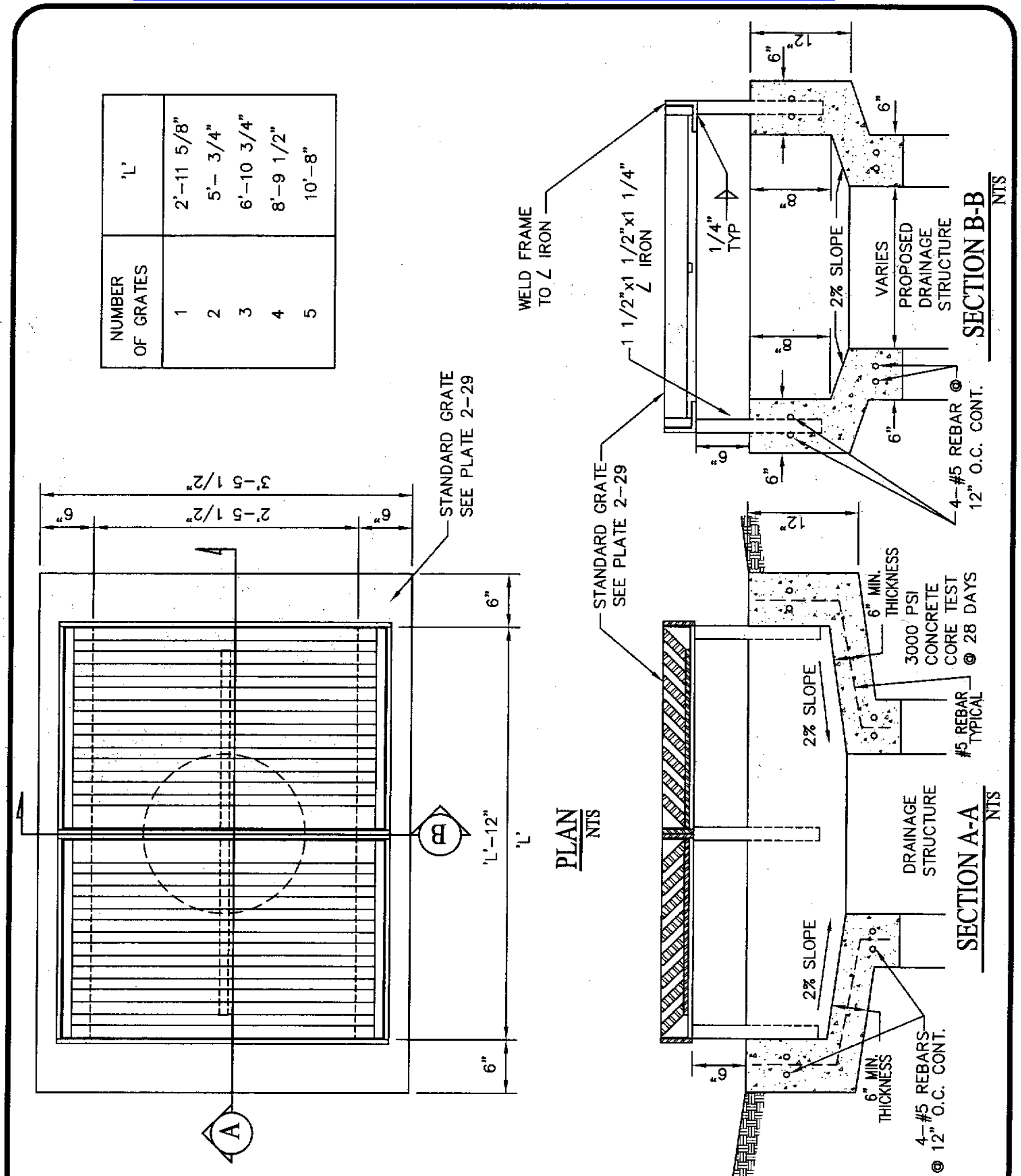

NUMBER OF GRATES	'L'
1	2'-11 5/8"
2	5'- 3/4"
3	6'-10 3/4"
4	8'-9 1/2"
5	10'-8"

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

OFF- STREET STORM INLET DETAIL
2-33

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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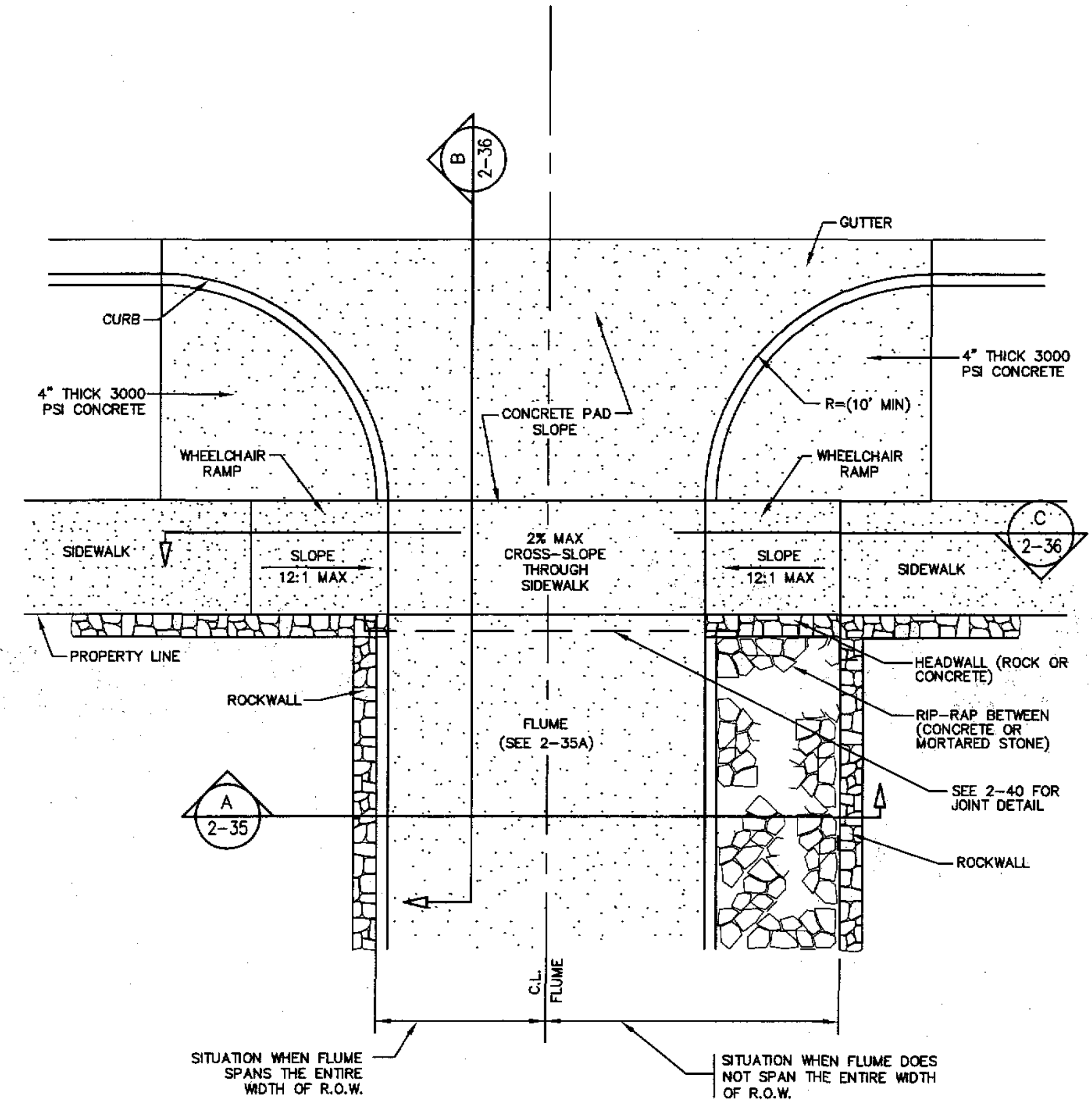

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

FLUME DESIGN
2-34

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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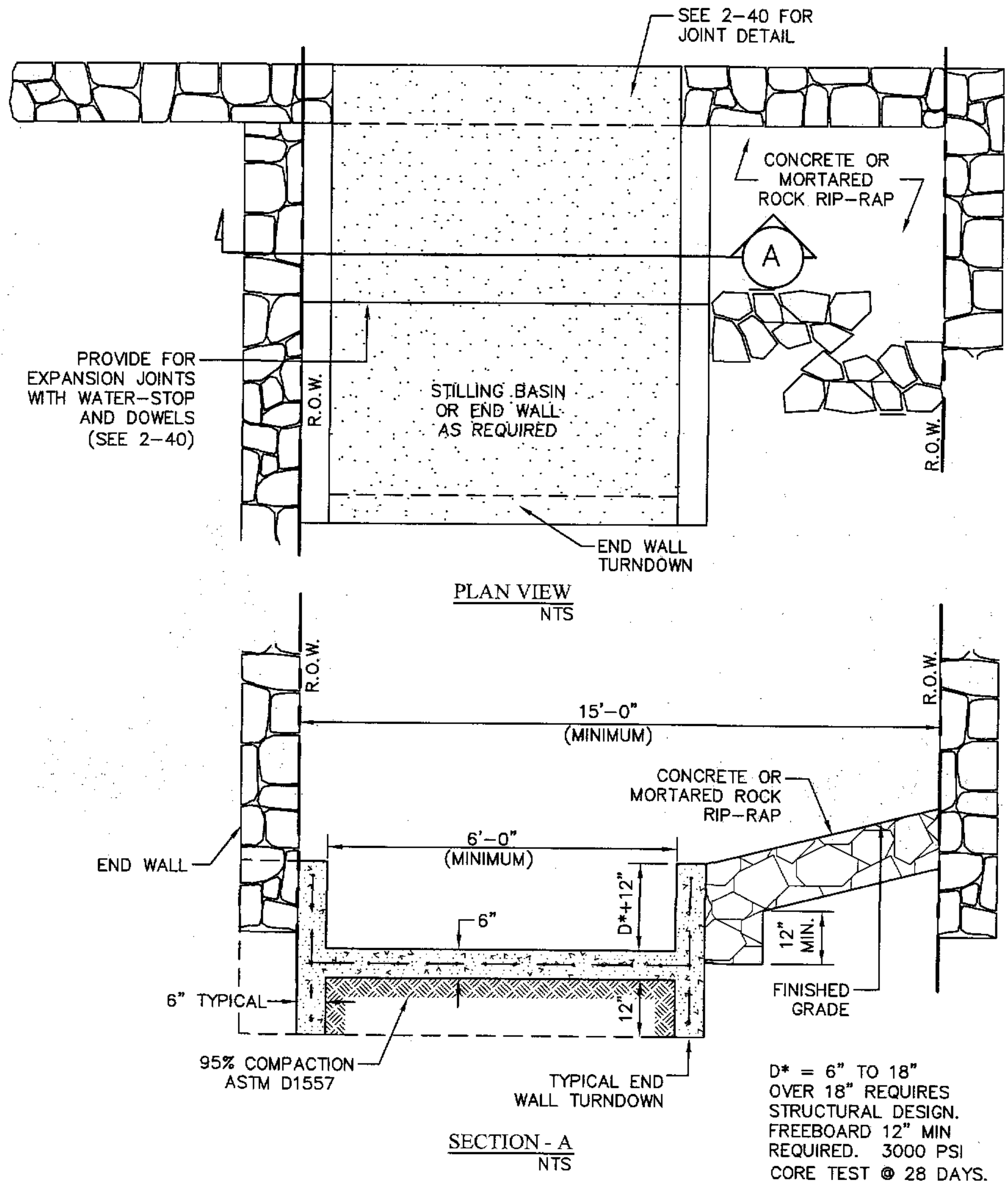


TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

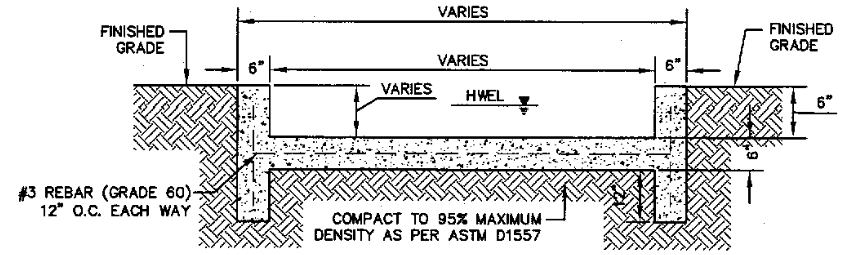
THE CITY OF EL PASO TEXAS

CONCRETE FLUME WITHIN DRAINAGE R.O.W.
2-35A

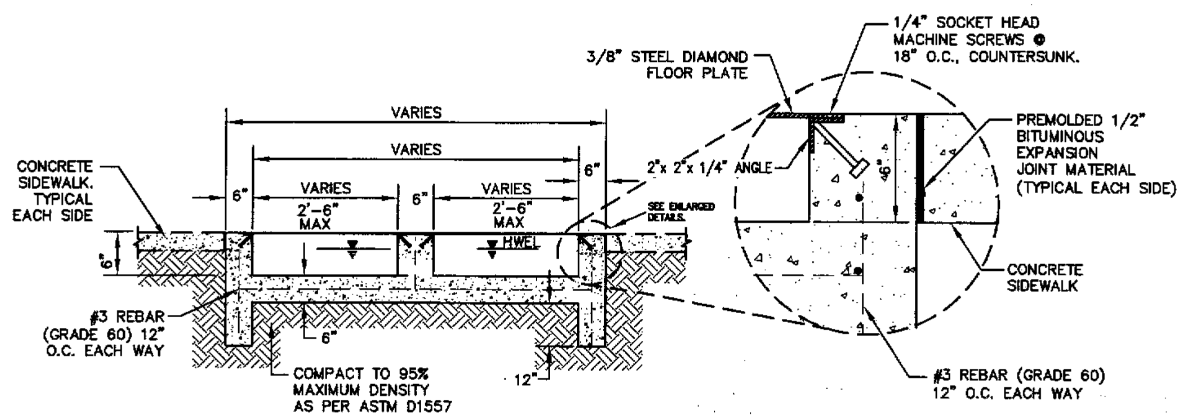
Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

BACK TO TITLE INDEX PAGE

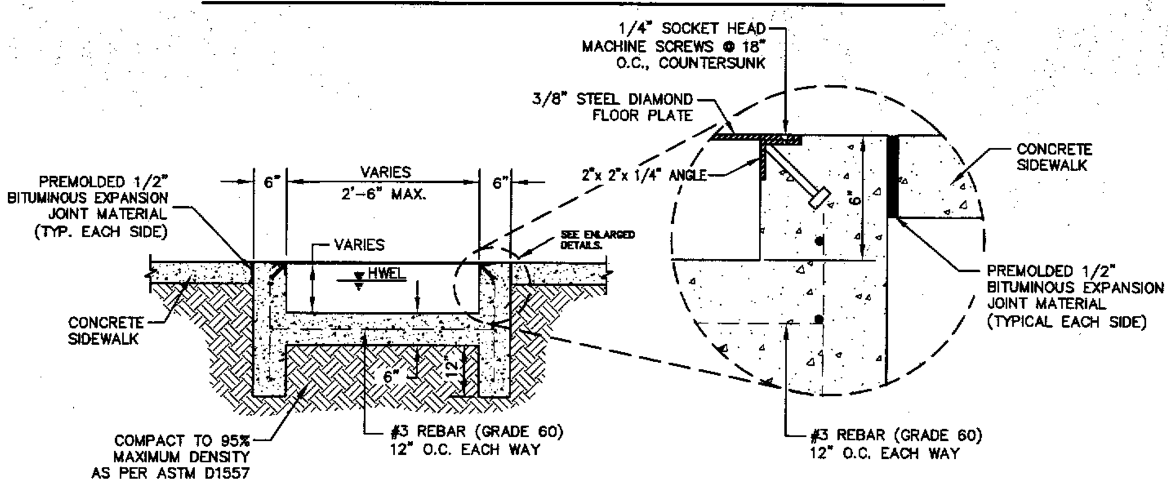
NOTES:
1. ALL CONCRETE SHALL BE 3000 PSI COMPRESSIVE STRENGTH @ 28 DAYS.
2. STEEL DIAMOND FLOOR PLATE TO HAVE A MINIMUM OF TWO COATS OF RED OXIDE PRIMER.
3. PLATE COLOR AS SPECIFIED.



CONCRETE FLUME SECTION WITHOUT PLATE



MULTIPLE CONCRETE FLUMES WITH STEEL PLATE COVER



CONCRETE FLUME WITH STEEL PLATE COVER

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

TYPICAL CONCRETE DRAINAGE FLUMES

2-35B

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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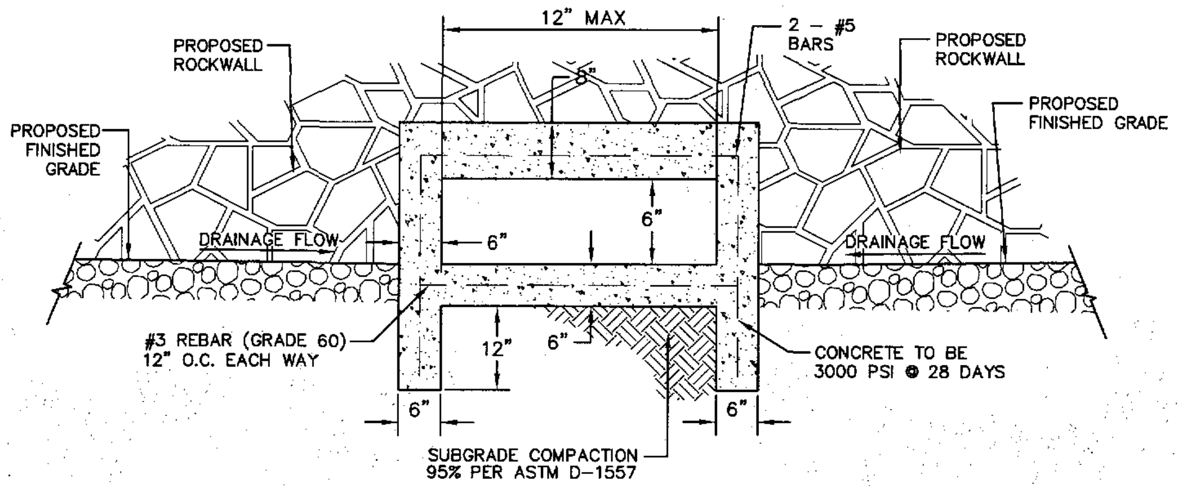

NOTE: FOR OPENINGS WIDER THAN 12", DESIGN ENGINEER SHALL SUBMIT STRUCTURAL DESIGN CALCULATIONS TO BE SUBMITTED AND APPROVED BY THE CITY ENGINEER. WIDER OPENINGS SHALL INCLUDE INTERMEDIATE VERTICAL CONCRETE SUPPORTS AND SAFETY PIPE/GRATING WHERE APPROPRIATE.

SMALL WALL OPENING FOR DRAINAGE

SCALE: NTS

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

SMALL WALL OPENING FOR DRAINAGE

2-35C

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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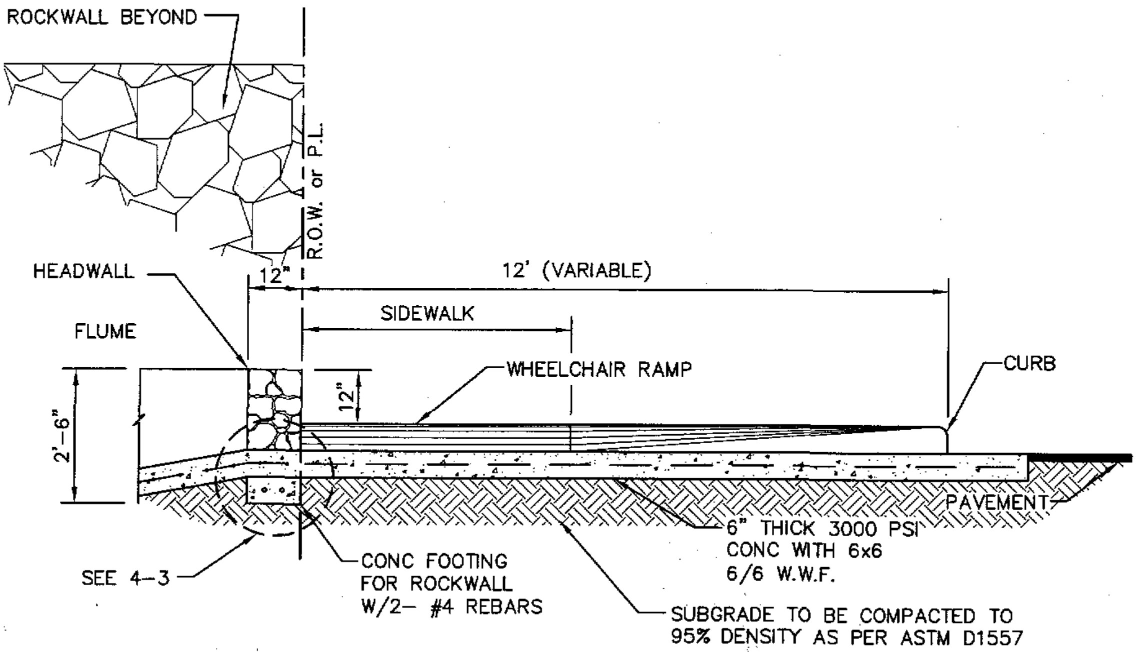
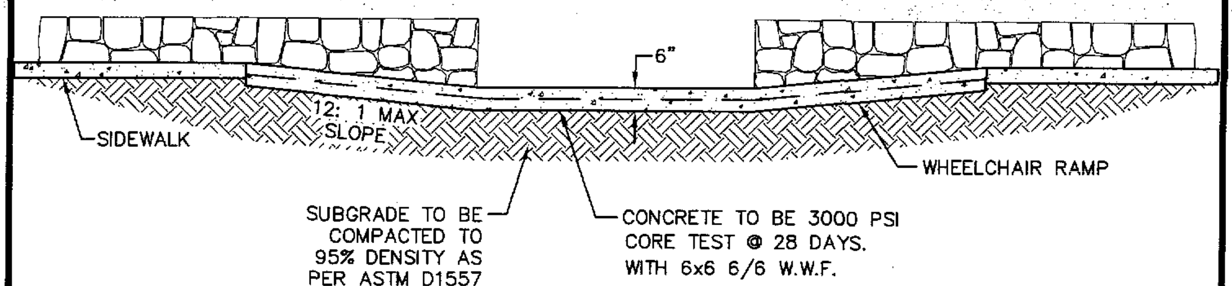


SECTION - B

NTS



SECTION - C

NTS

TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	FLUME DESIGN SECTION 2-36
Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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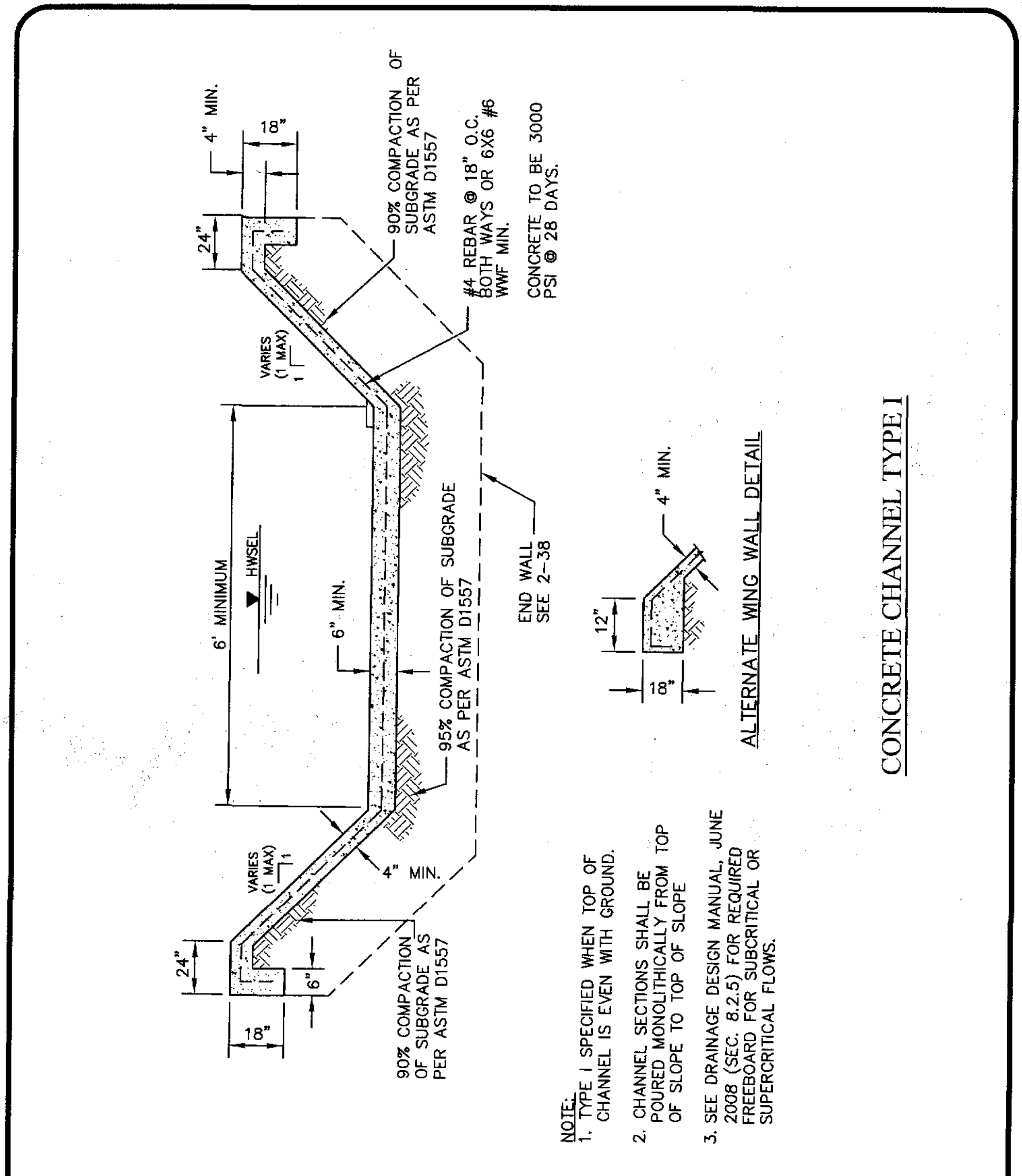

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

CONCRETE CHANNEL TYPE I

2-37

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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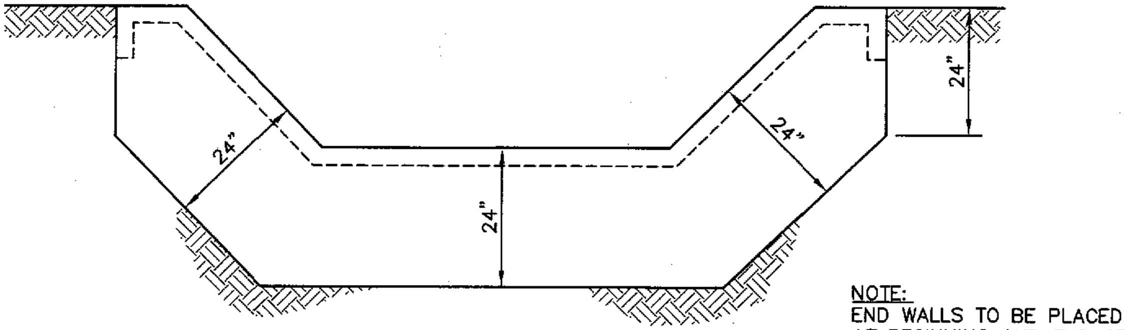
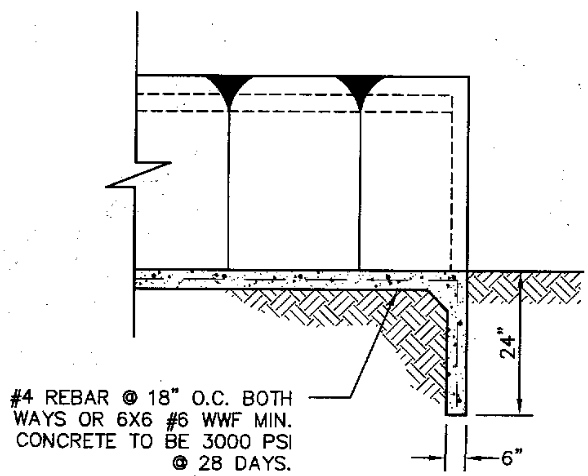


END WALL
ELEVATION



END WALL
SECTIONAL VIEW

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

CONCRETE CHANNEL
TYPE I
END WALL DETAIL
2-38

Approved By R. A. SHUBERT
Date JUNE 03, 2008
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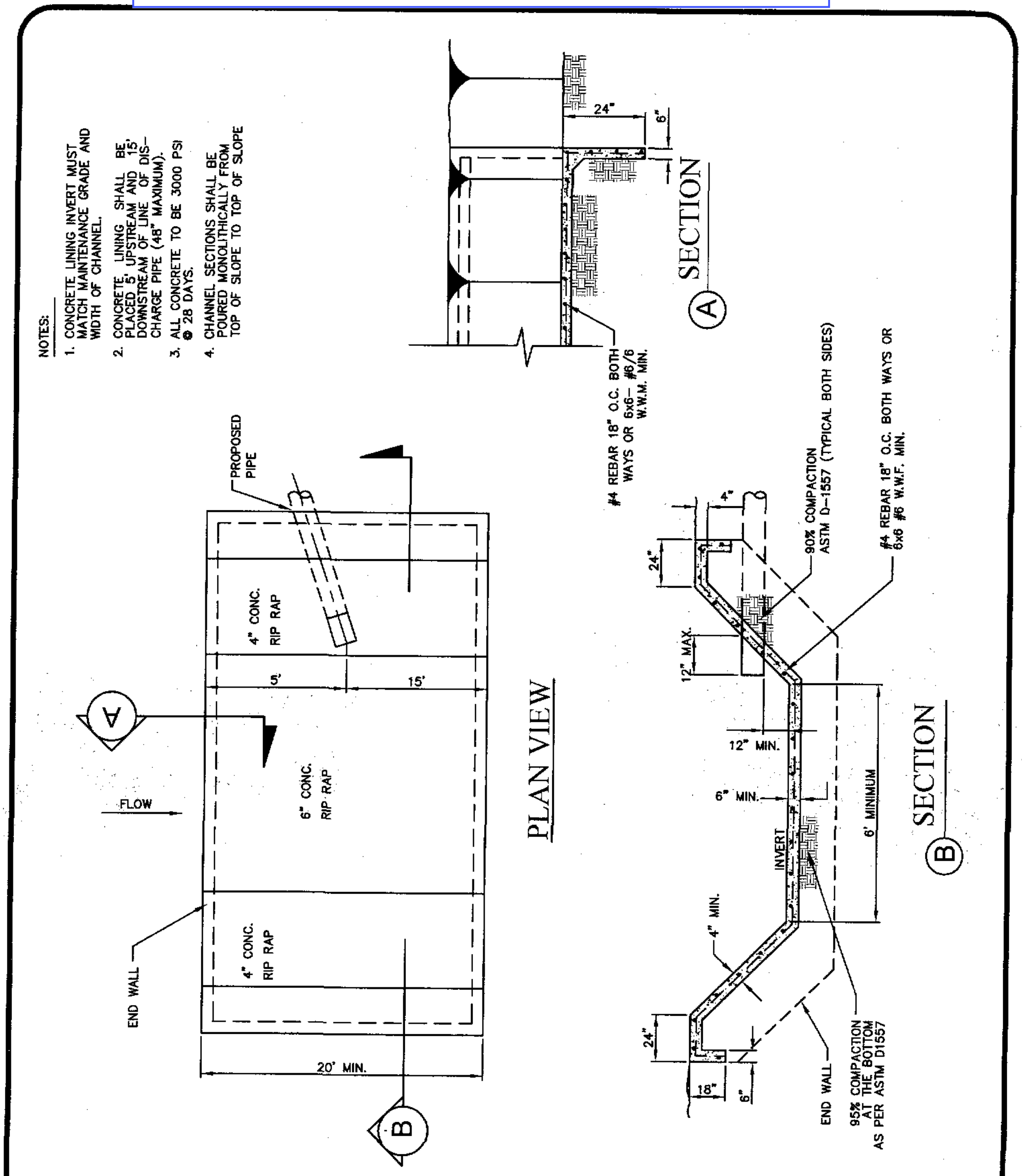

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

CHANNEL LINING AT PIPE DISCHARGE

2-39

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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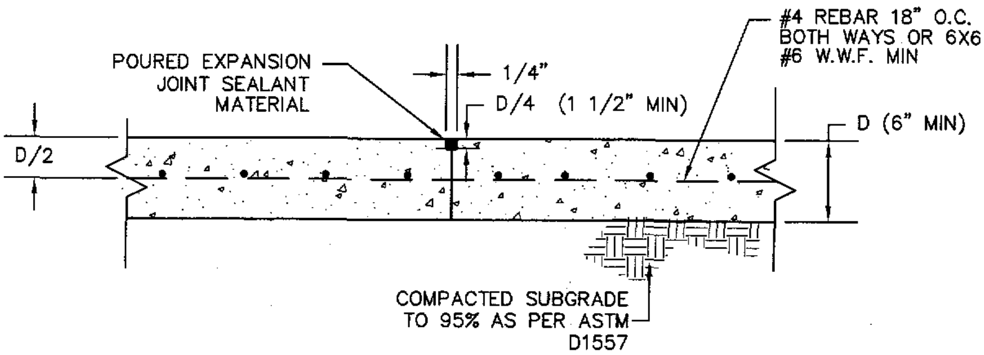
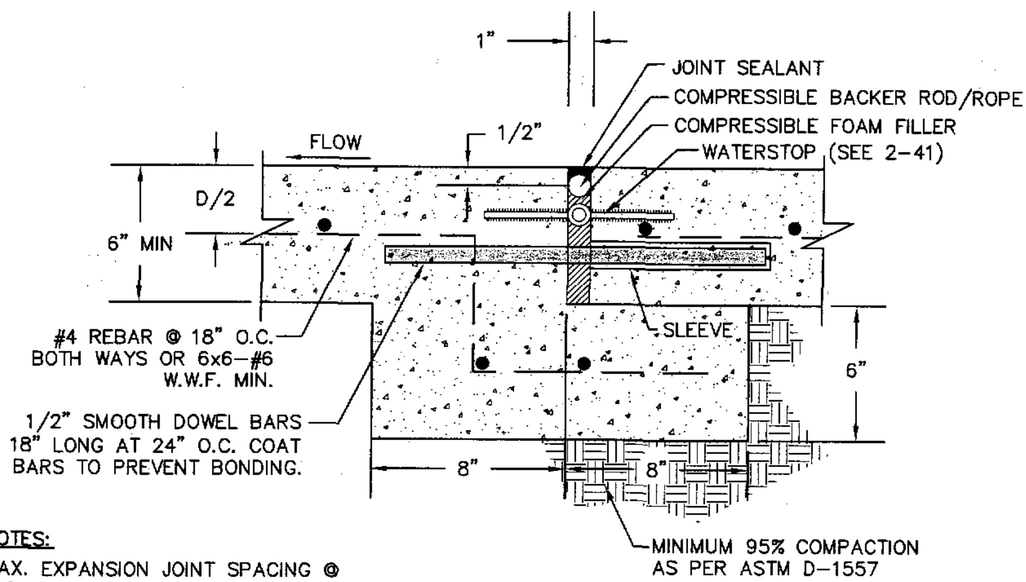


CONTRACTION JOINT AT 25' O.C.



NOTES:
MAX. EXPANSION JOINT SPACING @ 100 FEET O.C. ALONG C.L. OF CHANNEL.

EXPANSION JOINT

TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	CONCRETE JOINTS 2-40
Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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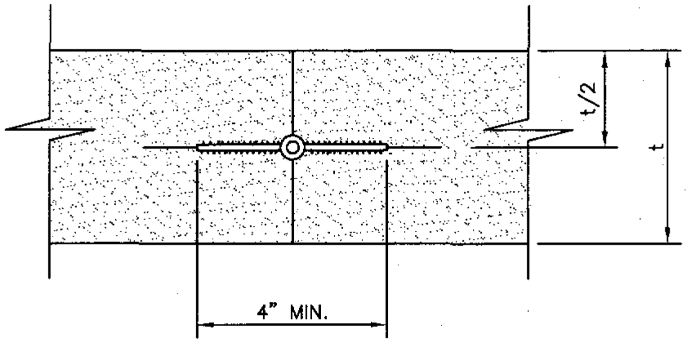

WATERSTOP DETAIL

NOTE:
WATERSTOP SHALL BE GREENSTREAK PVC MATERIAL, SPECIFICATIONS GRADE, 6" X 1/8" AND SERRATED WITH CENTERBULB OR APPROVED SUBSTITUTION BY CITY ENGINEER.

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

WATERSTOP DETAIL

2-41

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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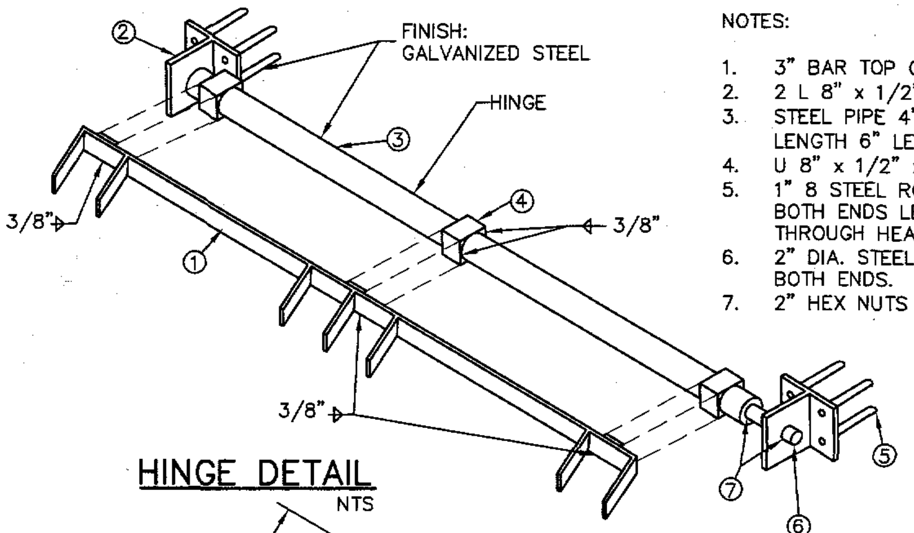
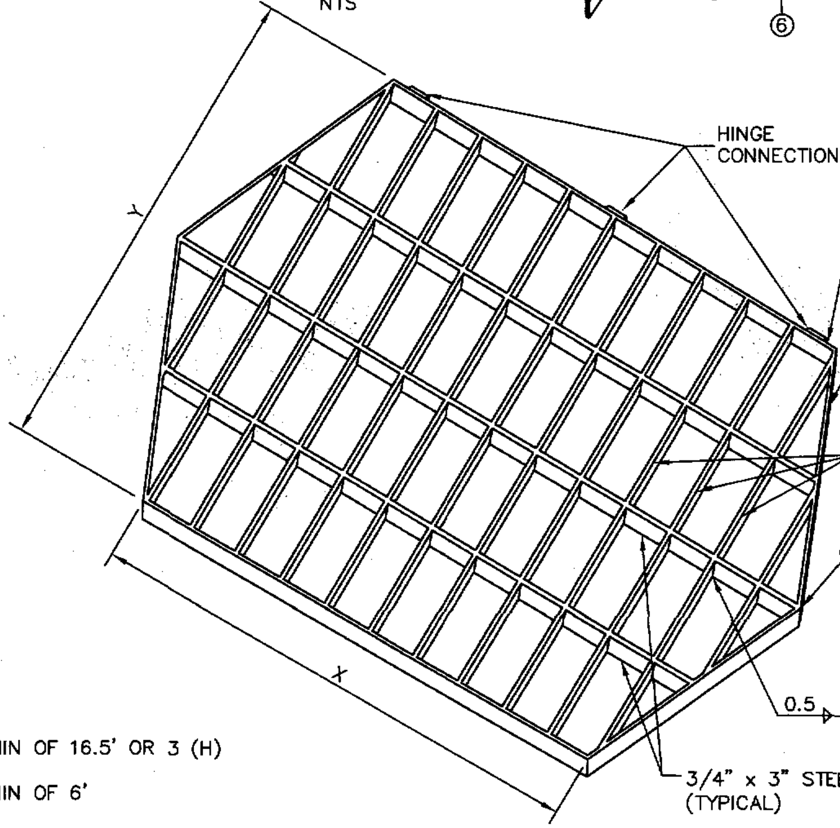


HINGE DETAIL

NTS

NOTES:

1. 3" BAR TOP OF RACK.
2. 2 L 8" x 1/2" x5"
3. STEEL PIPE 4" O.D. 2-1/2" I.D. LENGTH 6" LESS THEN ROD
4. U 8" x 1/2" x 5" x 3"
5. 1" 8 STEEL RODS THREADED BOTH ENDS LENGTH TO EXTEND THROUGH HEADWALL.
6. 2" DIA. STEEL ROD THREAD BOTH ENDS.
7. 2" HEX NUTS AND WASHERS.



Y=MIN OF 16.5' OR 3 (H)

X=MIN OF 6'

DEBRIS TRAP DETAIL

NTS

TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	DEBRIS TRAP/SAFETY GRATE 2-42	
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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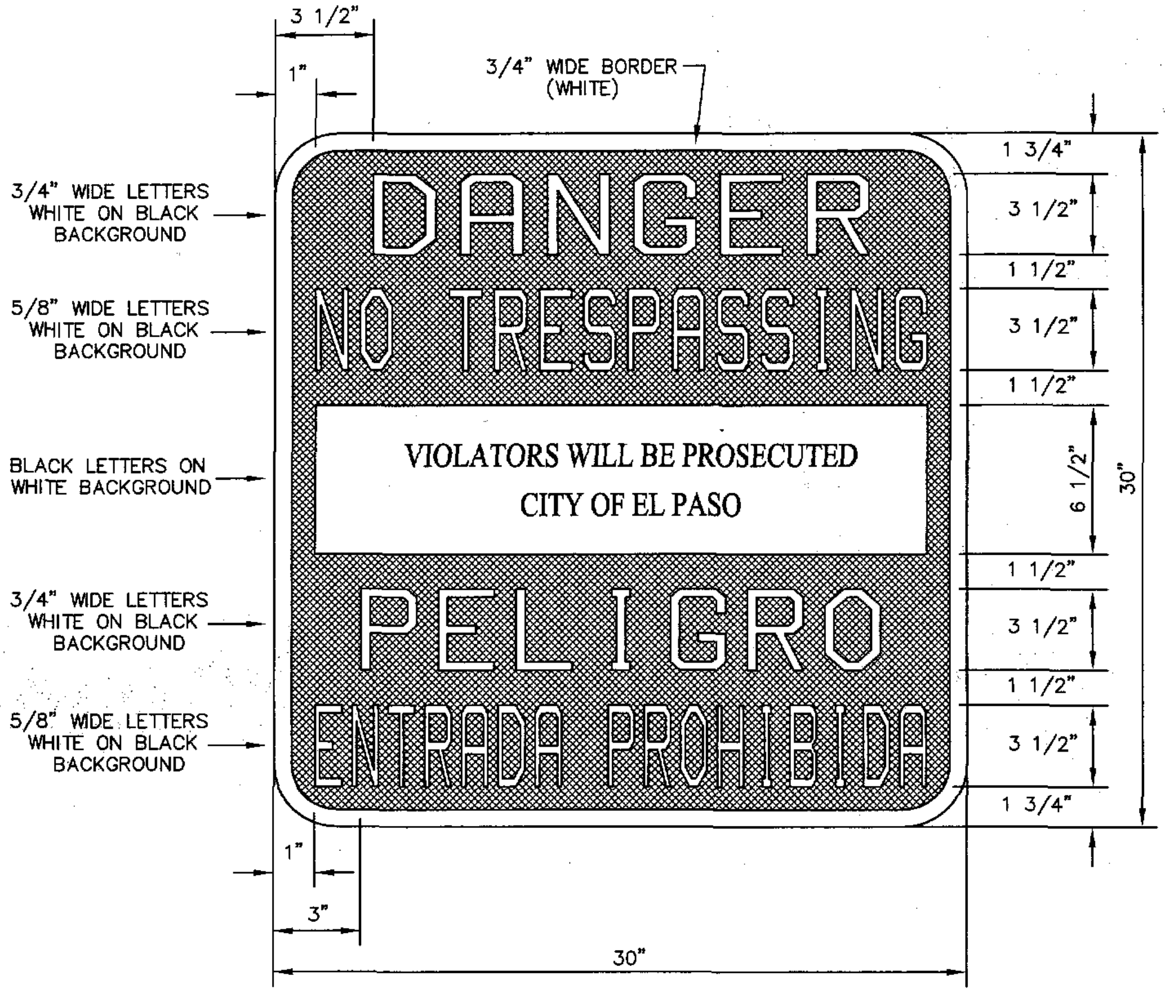

NO TRESPASSING WARNING SIGN

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	NO TRESPASSING WARNING SIGN 2-43
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / I. R.

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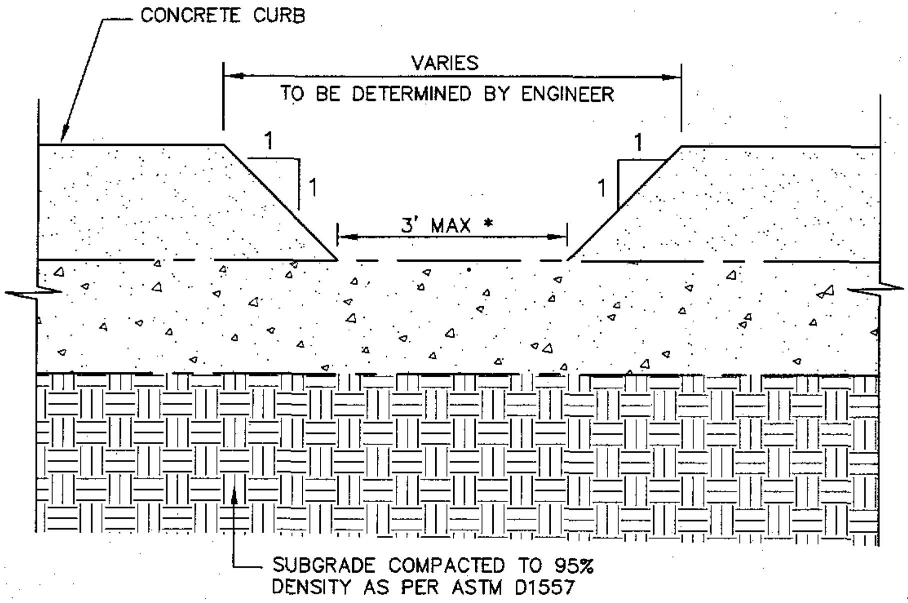

CURB OPENING FOR DRAINAGE

SCALE: N.T.S.

* NOTE: 3' MAX UNLESS APPROVAL IS GRANTED BY THE CITY ENGINEER FOR A LARGER OPENING. IF PERMISSION IS GRANTED FOR A WIDER OPENING PROTECTIVE MEASURES SUCH AS PIPE BOLLARDS OR GUARDRAIL SHALL BE USED.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	CURB OPENING FOR DRAINAGE 2-44
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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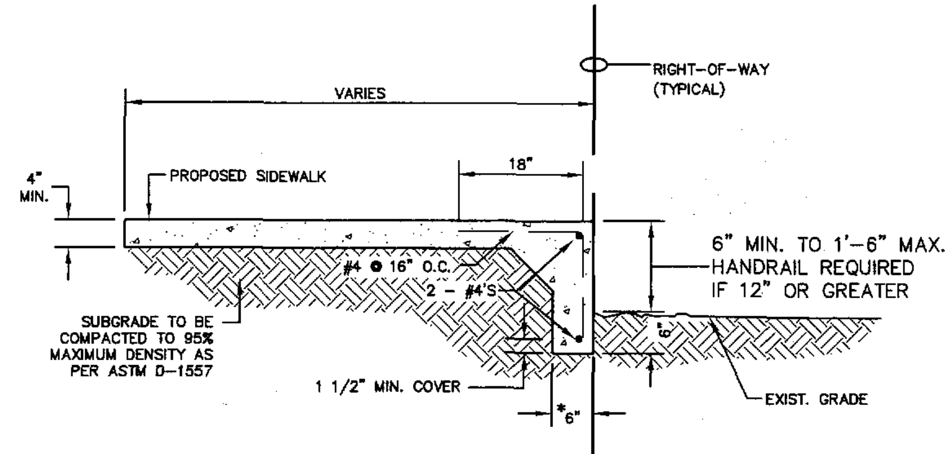
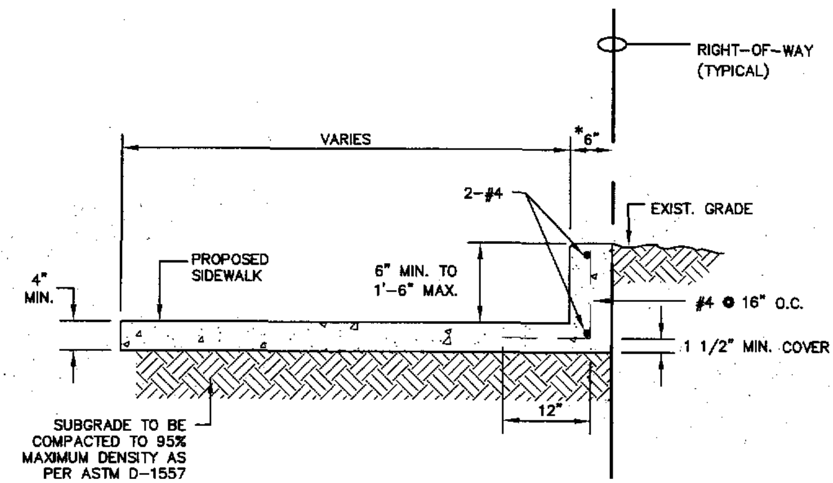


CONDITION "A"



CONDITION "B"

*NOTE: THICKNESS SHALL BE 8" FOR SECTIONS WITH HANDRAIL.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

MODIFIED SIDEWALK DETAILS "A" & "B"

2-45

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

SECTION 3

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SECTION 3

STREETS

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

SECTION 3
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SECTION 3

STREETS
(continued)

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

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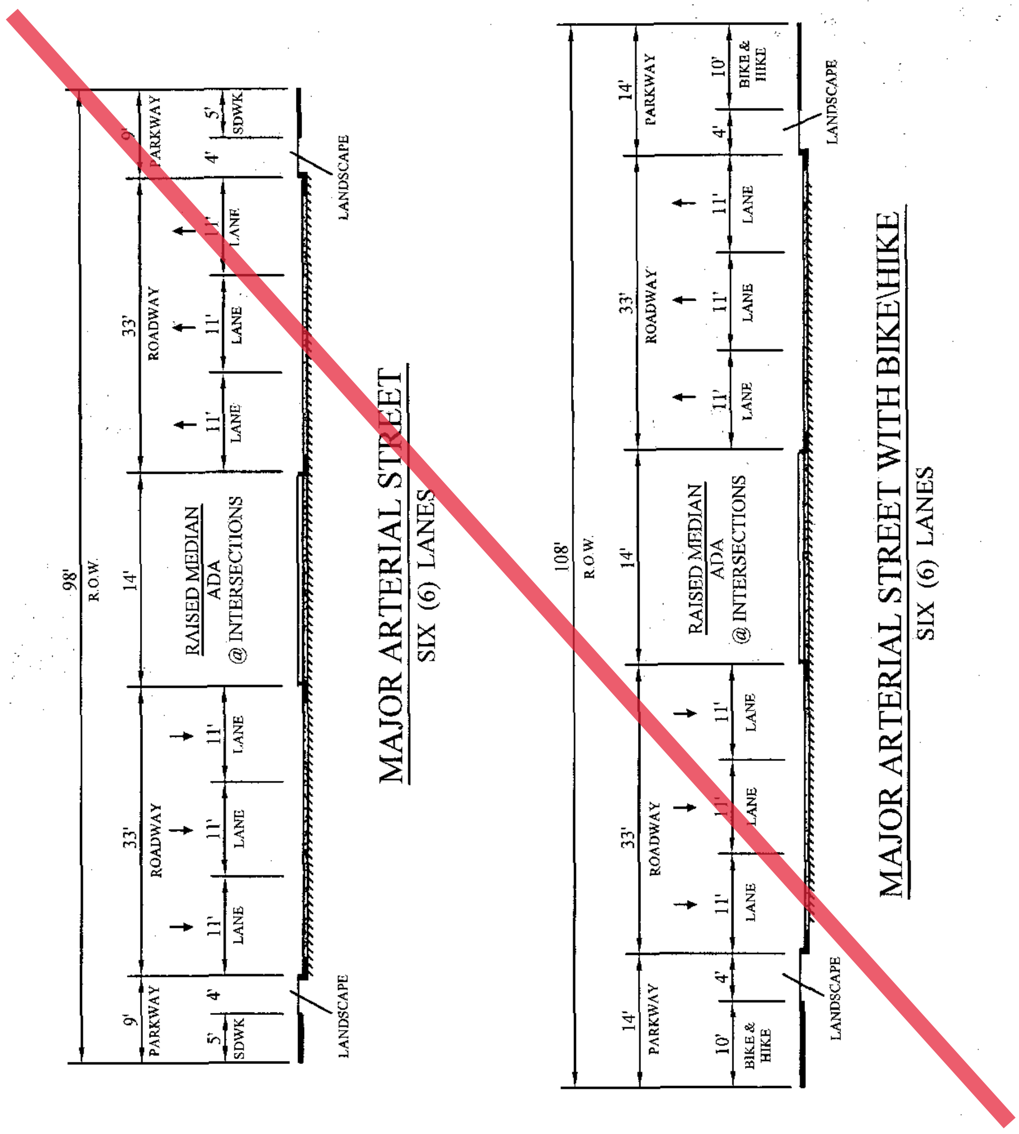

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

STREET CROSS-SECTIONS

3-1

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By OBC / J. R.

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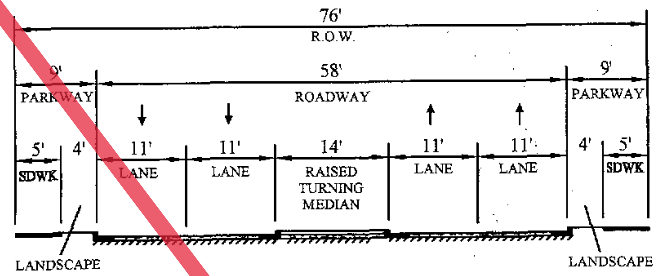
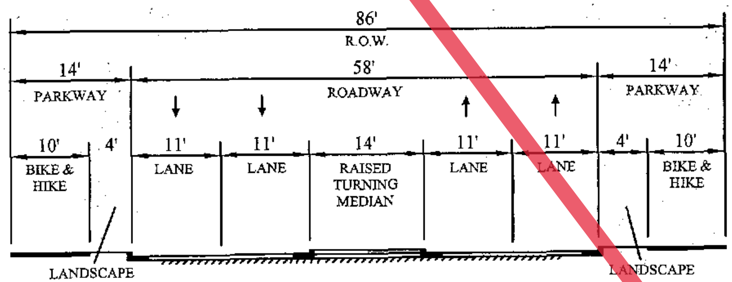


MINOR ARTERIAL STREET

FOUR (4) LANES



MINOR ARTERIAL STREET WITH BIKE\HIKE

FOUR (4) LANES

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	STREET CROSS-SECTIONS 3-2
		Approved By R. A. SHUBERT — Checked By H. M. E. Date JUNE 03, 2008 — Drawn By QEC / J. R.

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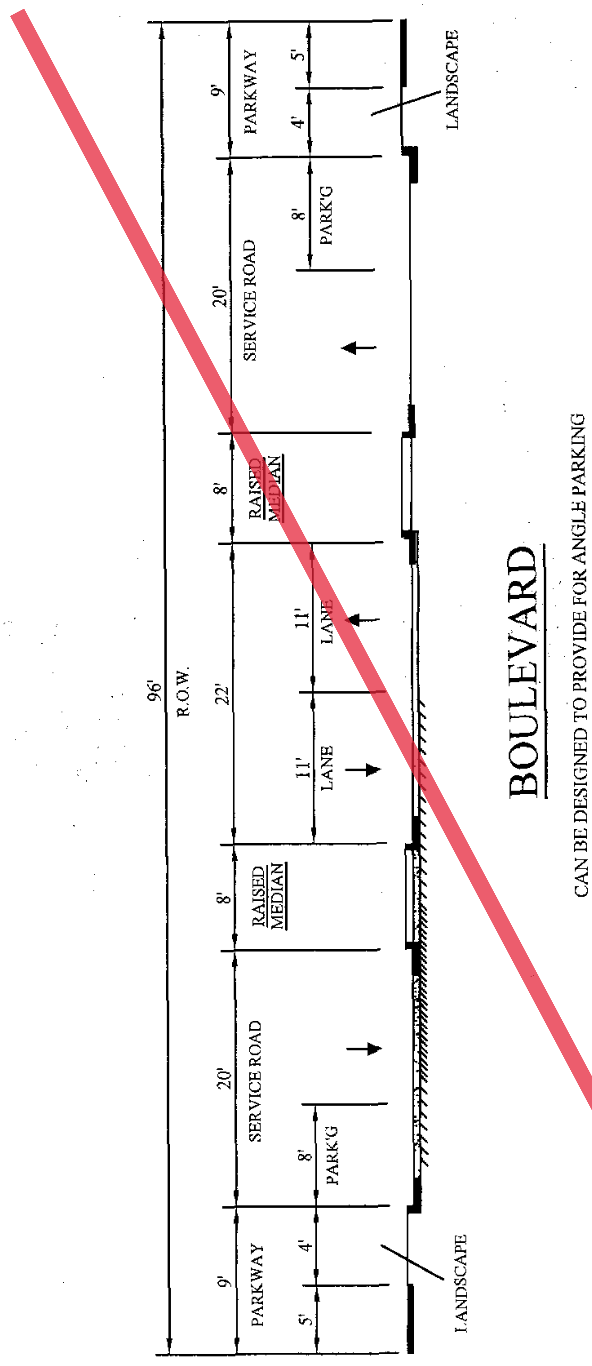

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

STREET CROSS- SECTIONS

3-3

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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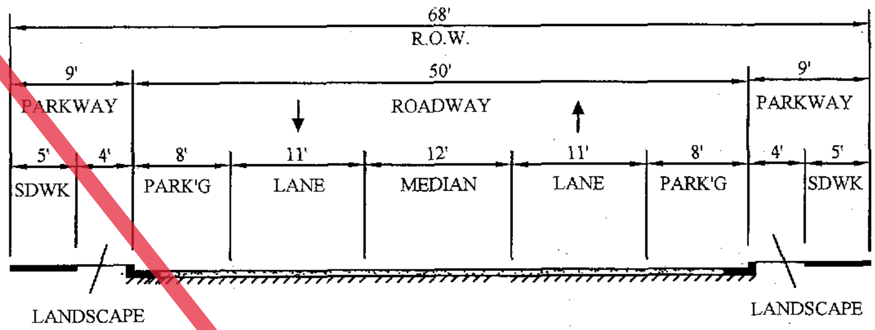
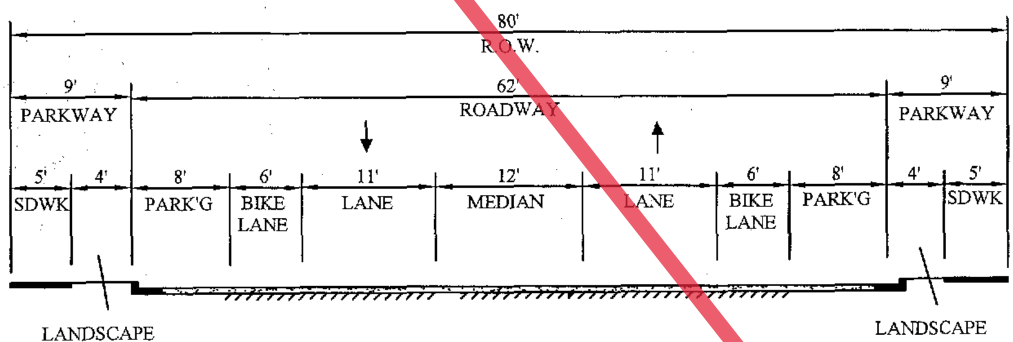


NON-RESIDENTIAL COLLECTOR

CAN BE DESIGNED TO PROVIDE FOR ANGLE PARKING
MEDIAN MAY BE RAISED



NON-RESIDENTIAL COLLECTOR WITH BIKE LANES

CAN BE DESIGNED TO PROVIDE FOR ANGLE PARKING
MEDIAN MAY BE RAISED

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

STREET CROSS-SECTIONS

3-4

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
Drawn By QEC / J. R.

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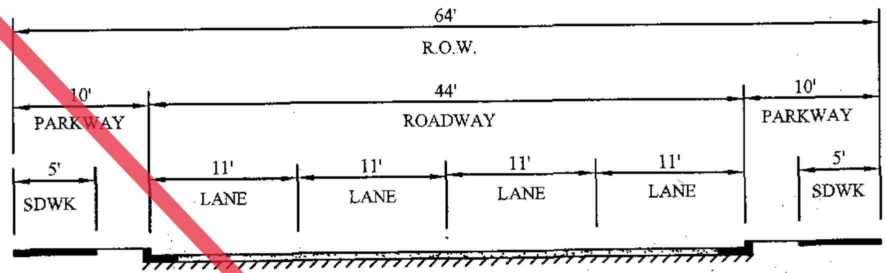
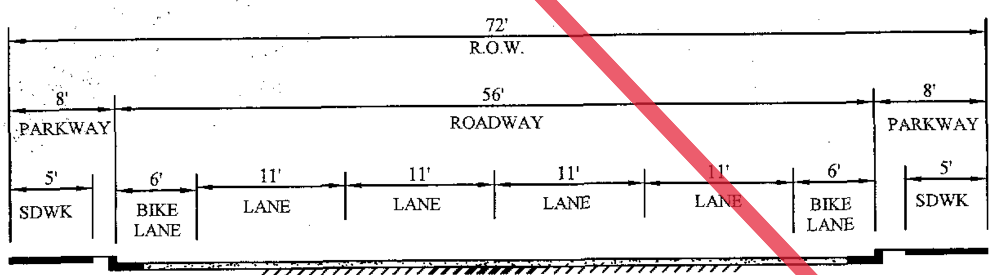


NON-RESIDENTIAL 4 LANE COLLECTOR



NON-RESIDENTIAL 4 LANE COLLECTOR
WITH BIKE LANES

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

STREET CROSS-SECTIONS

3-5

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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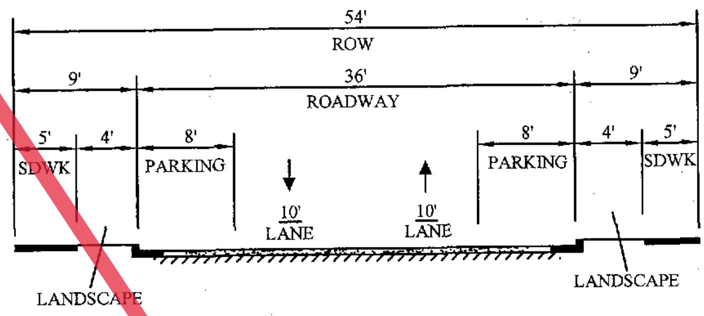
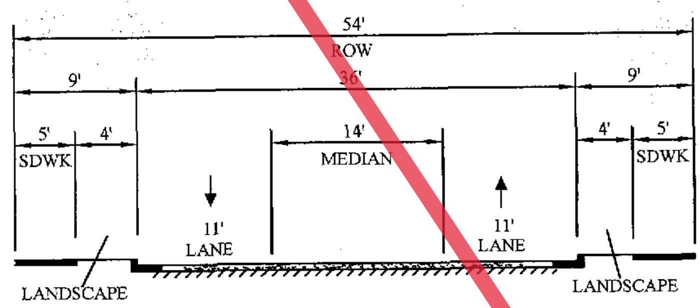


RESIDENTIAL COLLECTOR

CAN BE DESIGNED TO PROVIDE FOR ANGLE PARKING



RESIDENTIAL COLLECTOR STREET SECTION

TWO (2) LANES

CAN BE DESIGNED TO PROVIDE FOR ANGLE PARKING

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

STREET CROSS-SECTIONS

3-6

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By OEC / J. R.

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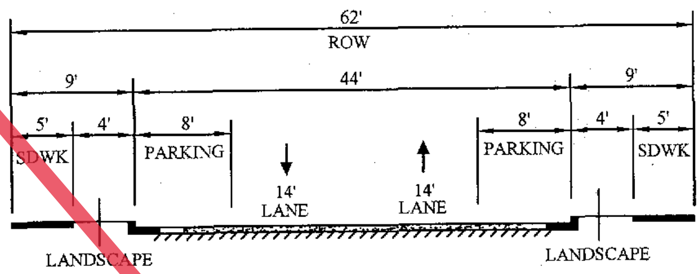
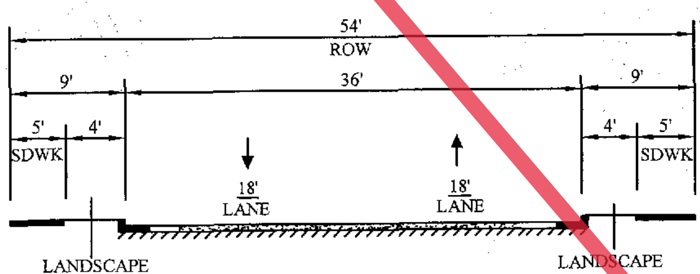


MULTI-FAMILY & COMMERCIAL/INDUSTRIAL LOCAL STREET 1

CAN BE DESIGNED TO PROVIDE FOR ANGLE PARKING



MULTI-FAMILY & COMMERCIAL/INDUSTRIAL LOCAL STREET 2

CAN BE DESIGNED TO PROVIDE FOR ANGLE PARKING

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

STREET CROSS-SECTIONS

3-7

Approved By R. A. SHUBERT
Date JUNE 03, 2008

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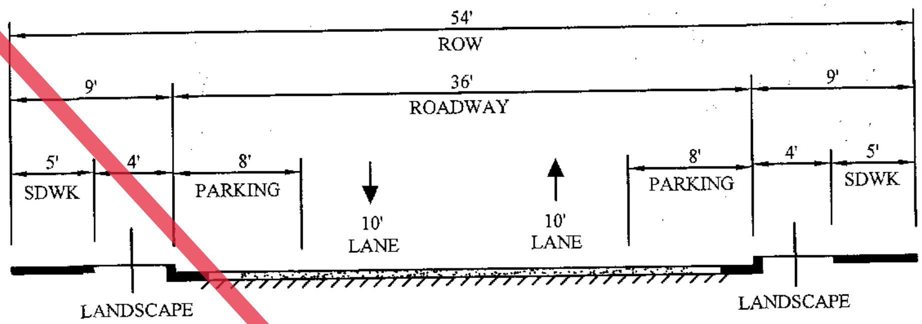
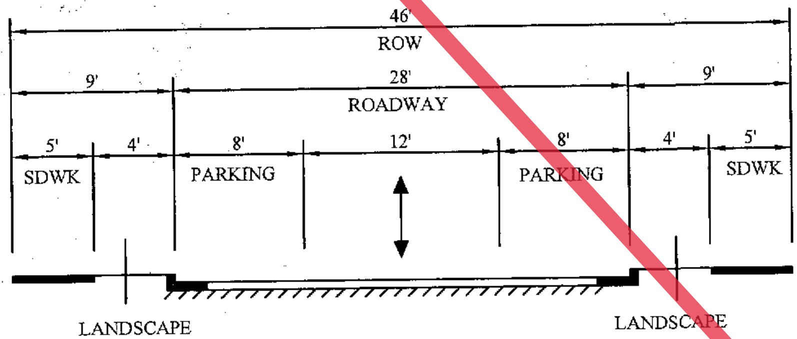


36' LOCAL RESIDENTIAL 1

NOTE: CROSS SECTIONS ARE MINIMUM, STANDARD REQUIREMENTS



28' LOCAL RESIDENTIAL 2

NOTE: CROSS SECTIONS ARE MINIMUM, STANDARD REQUIREMENTS

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	STREET CROSS -SECTIONS 3-8
		Approved By R. A. SHUBERT Date JUNE 03, 2008
		Checked By H. M. E. Drawn By QEC / J. R.

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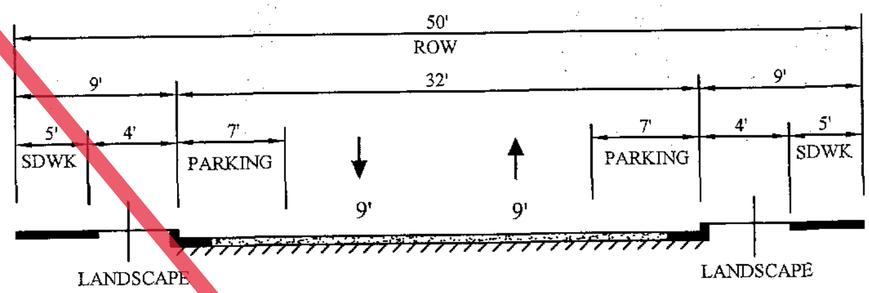
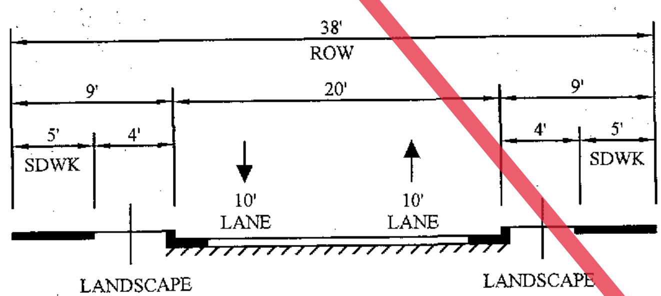


32' LOCAL RESIDENTIAL 3

NOTE: CROSS SECTIONS ARE MINIMUM, STANDARD REQUIREMENTS



20' RESIDENTIAL LANE
NO PARKING

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

STREET CROSS-SECTIONS

3-9

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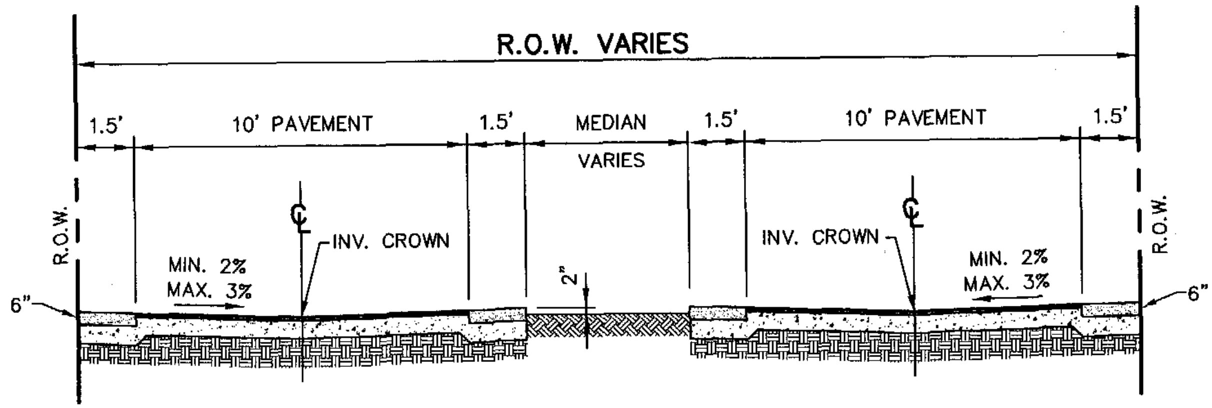

DIVIDED MOUNTAIN RESIDENTIAL STREET

NOTES:

1. WITHIN A DIVIDED RESIDENTIAL STREET, THE MEDIAN MAY BE DESIGNED TO PERMIT A SWALE FOR DRAINAGE PURPOSES.
2. HEADER CURBING AS A MINIMUM SHALL BE REQUIRED, HOWEVER, STANDARD CURBING SHALL BE ALLOWED.
3. STREET CROSS-SECTION TO BE INVERTED CROWN.
4. GRADES IN EXCESS OF 11% MUST BE APPROVED BY THE CITY ENGINEER AND FIRE DEPARTMENT, BUT IN NO CASE SHALL GRADES EXCEED 15%.
5. GRADES AT INTERSECTION IN EXCESS OF 3% SHALL HAVE THE APPROVAL OF THE CITY ENGINEER.
6. MINIMUM MEDIAN WIDTH – FOUR (4') FEET.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

LOCAL STREETS

3-10

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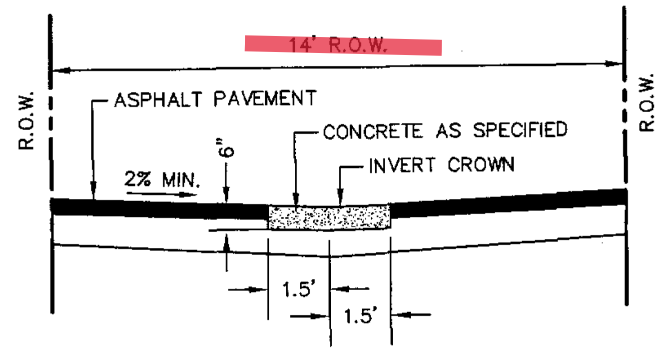
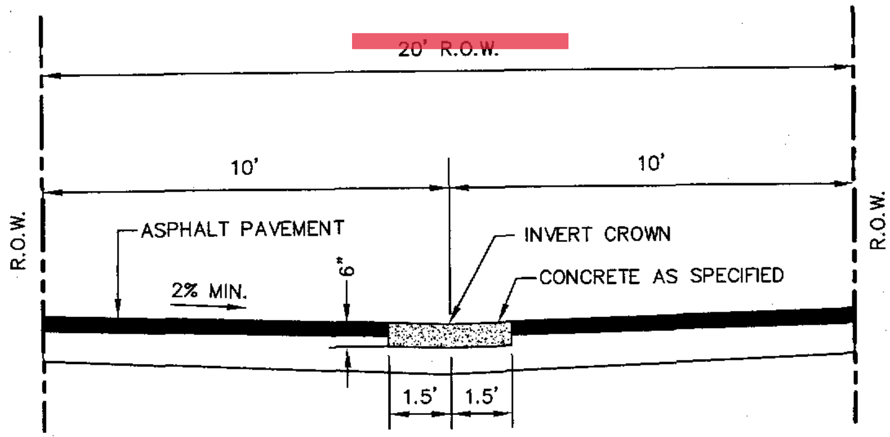


ALLEY
ONE (1) WAY LANE



ALLEY
TWO (2) LANES

NOTES:

1. ONE (1)–THREE FOOT CONCRETE VALLEY GUTTER LOCATED AT THE CENTERLINE OF THE RIGHT–OF–WAY WHEN THE LONGITUDINAL SLOPE OF THE ALLEY IS LESS THAN ONE (1) PERCENT, AND DRAINAGE IS TO BE CARRIED WITHIN THE ALLEY.
2. NO CONCRETE VALLEY GUTTER REQUIRED WHEN LONGITUDINAL SLOPE OF THE ALLEY IS EQUAL OR GREATER THAN ONE (1) PERCENT.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

ALLEY CROSS-SECTIONS AND DETAILS

3-11

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Date JUNE 03, 2008	Drawn By QEC / J. R.

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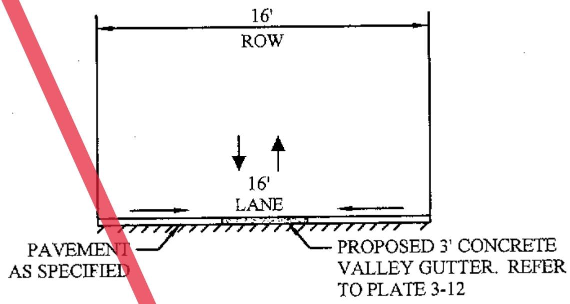
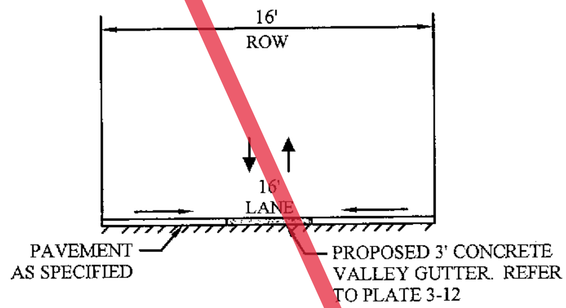
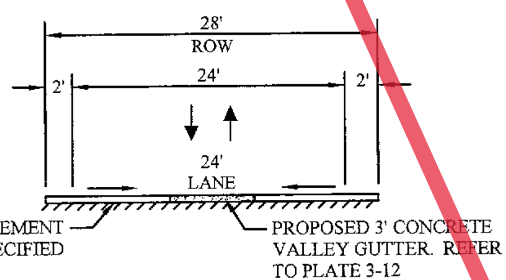


16' ALLEY NO PARKING



16' ALLEY
SINGLE FAMILY RESIDENTIAL



28' ALLEY
COMMERCIAL/INDUSTRIAL/MULTI-FAMILY

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	ALLEY CROSS-SECTIONS 3-11A
		Approved By R. A. SHUBERT Date JUNE 03, 2008
		Checked By H. M. E. Drawn By QEC / J. R.

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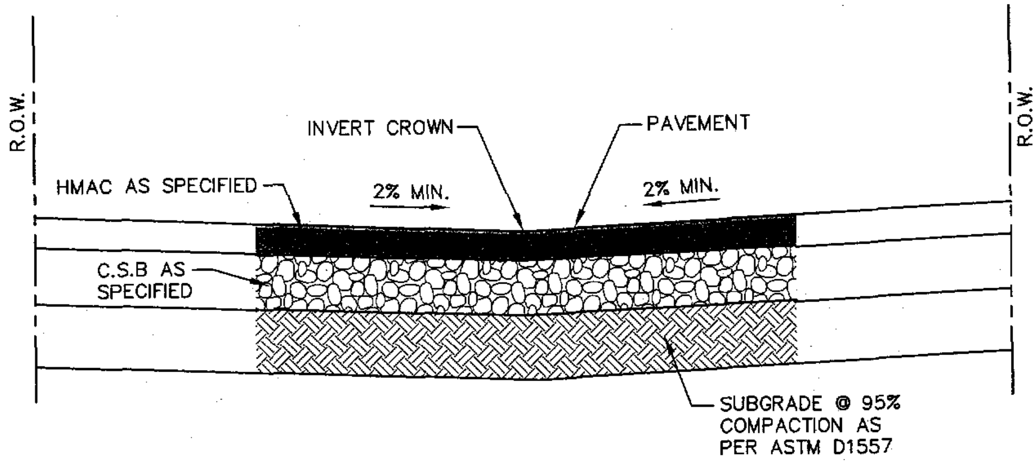
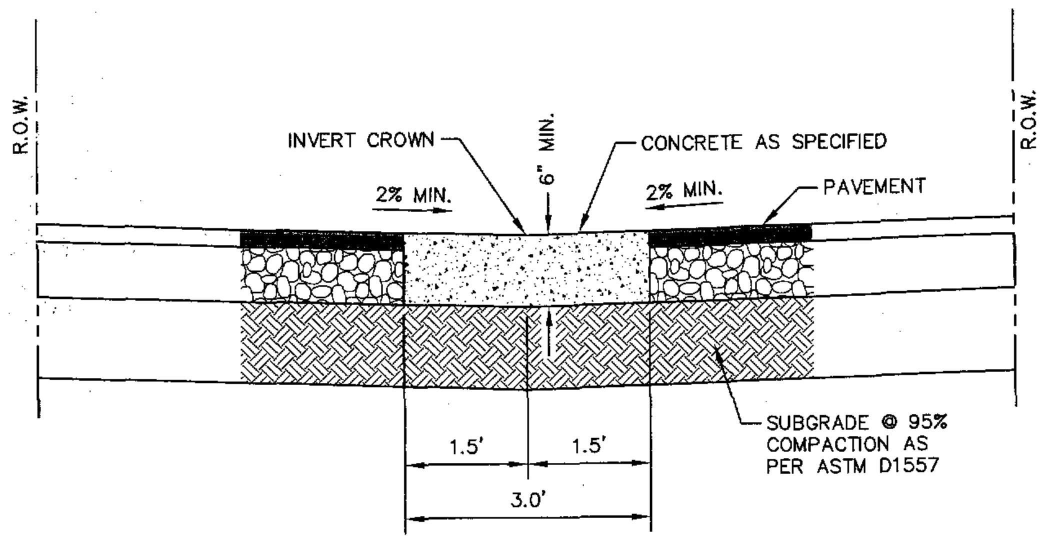


ALLEY PAVEMENT



VALLEY GUTTER

NOTES:

COMPRESSIVE STRENGTH OF CONCRETE SHALL BE F_C= 3000 P.S.I. MINIMUM

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

ALLEY DETAILS

3-12

Approved By R. A. SHUBERT	Checked By H. M. E.
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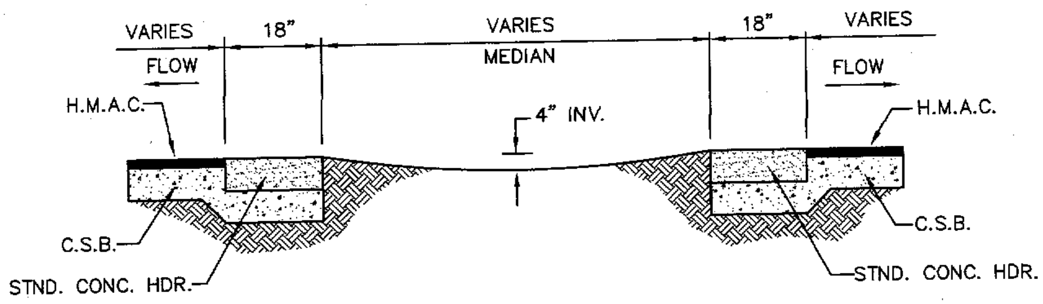
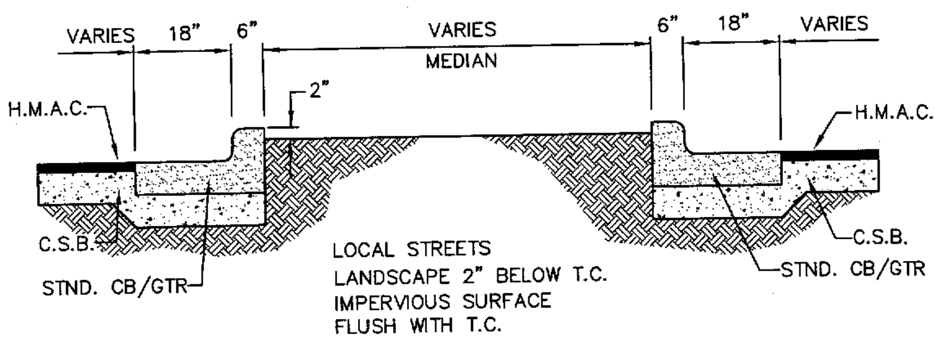


FLUSH MEDIAN WITH HEADER DESIGN



RAISED MEDIAN DESIGN

NOTE:
THE MEDIAN MAY BE DESIGNED TO PERMIT A SWALE FOR DRAINAGE PURPOSES.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	FLUSH MEDIAN W/HEADER & RAISED MEDIAN DESIGN 3-13
		Approved By R. A. SHUBERT / Date JUNE 03, 2008
		Checked By H. M. E. / Drawn By QEC / J. R.

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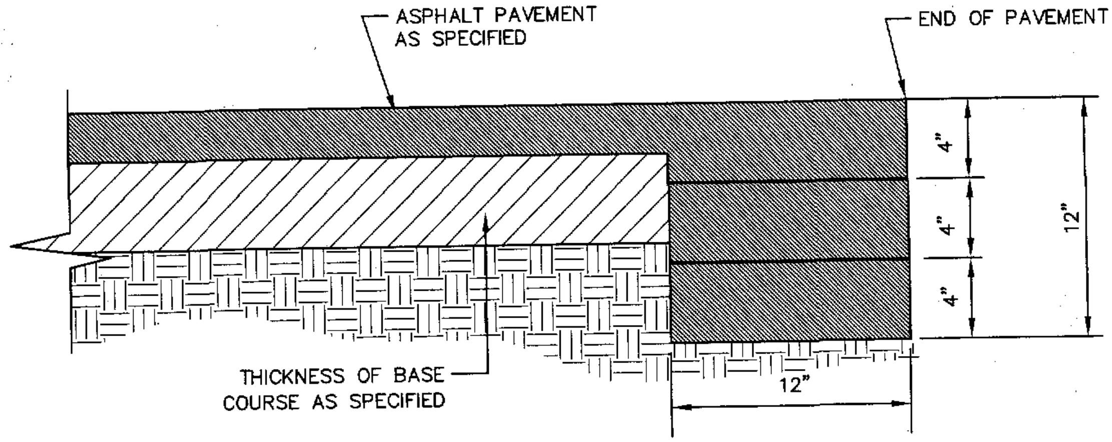

TERMINUS OF STREET

NOTE:

TERMINUS MUST BE CONSTRUCTED IN 4" LIFTS. FINAL LIFT MUST BE PLACED WITH FINAL PAVEMENT COURSE. COMPACTION REQUIREMENTS SHALL BE 98% MINIMUM AS PER ASTM D1557 OR AS RECOMMENDED BY THE PROJECT GEOTECHNICAL ENGINEER.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

TERMINUS OF STREET

3-14

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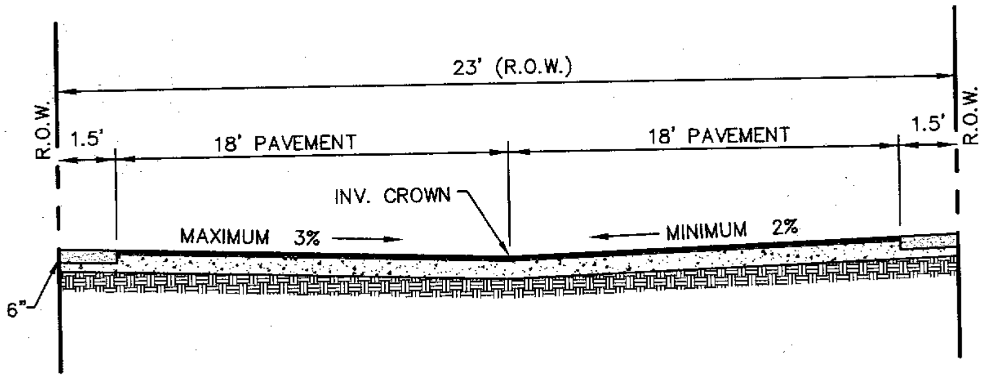

MOUNTAIN RESIDENTIAL STREET

TWO (2) LANES ONLY ON (M.D.A.)

1. 18" x 6" HEADER CURB.
2. MINIMUM 23 FOOT RIGHT-OF-WAY.
3. STREET CROSS-SECTION TO BE INVERTED CROWN. (REFER TO NOTE No. 7).
4. GRADES IN EXCESS OF 11% MUST BE APPROVED BY THE CITY ENGINEER AND FIRE DEPARTMENT, BUT IN NO CASE SHALL GRADES EXCEED 18%.
5. GRADES AT INTERSECTIONS IN EXCESS OF 3% SHALL HAVE THE APPROVAL OF THE CITY ENGINEER.
6. HEADER CURBING AS A MINIMUM SHALL BE REQUIRED, HOWEVER, STANDARD CURBING SHALL BE PERMITTED.
7. A CROWNED SECTION CAN BE USED IN LIEU OF AN INVERTED CROWN WITH THE APPROVAL OF THE CITY ENGINEER.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

MOUNTAIN RESIDENTIAL STREET 3-15

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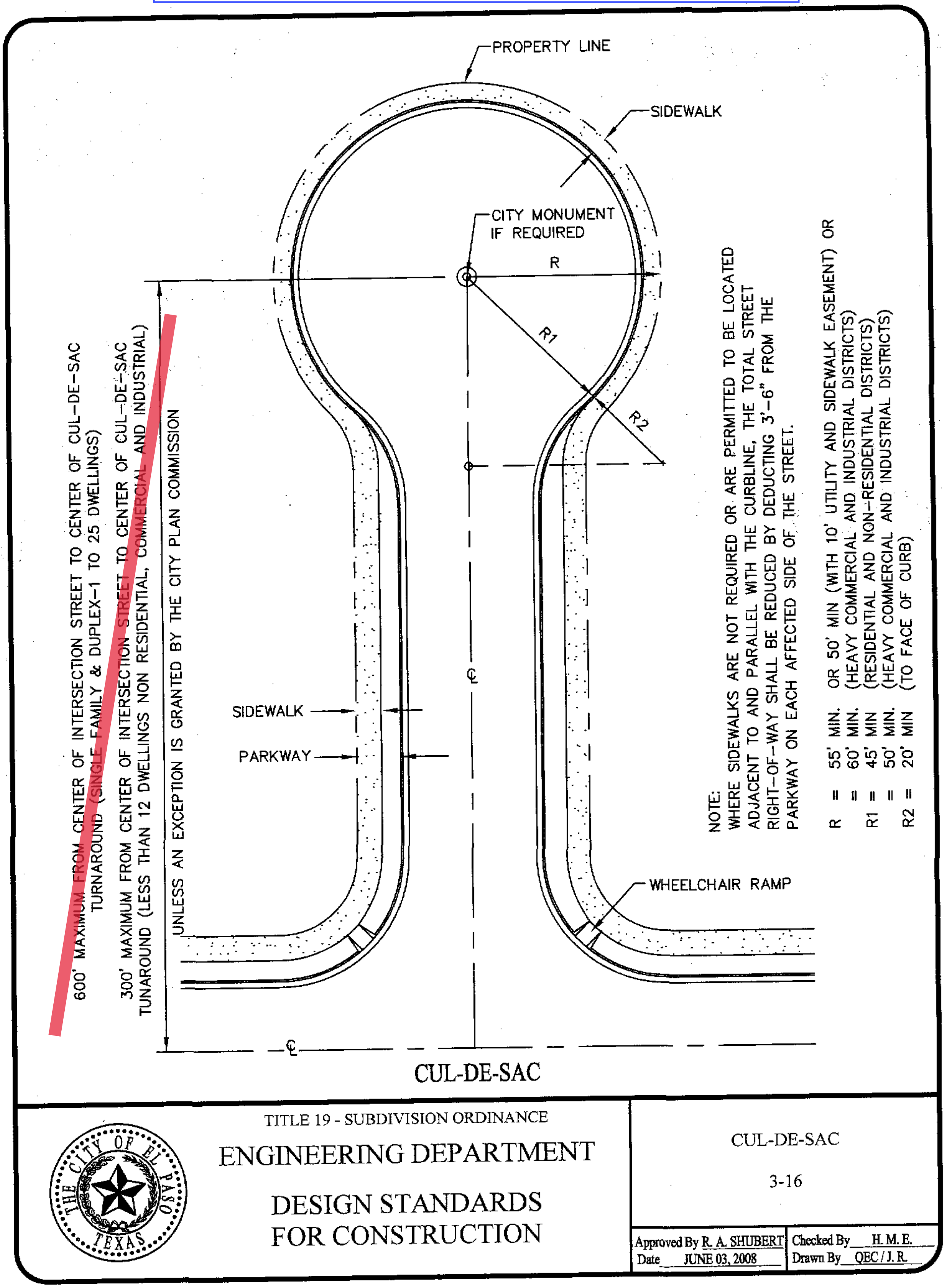

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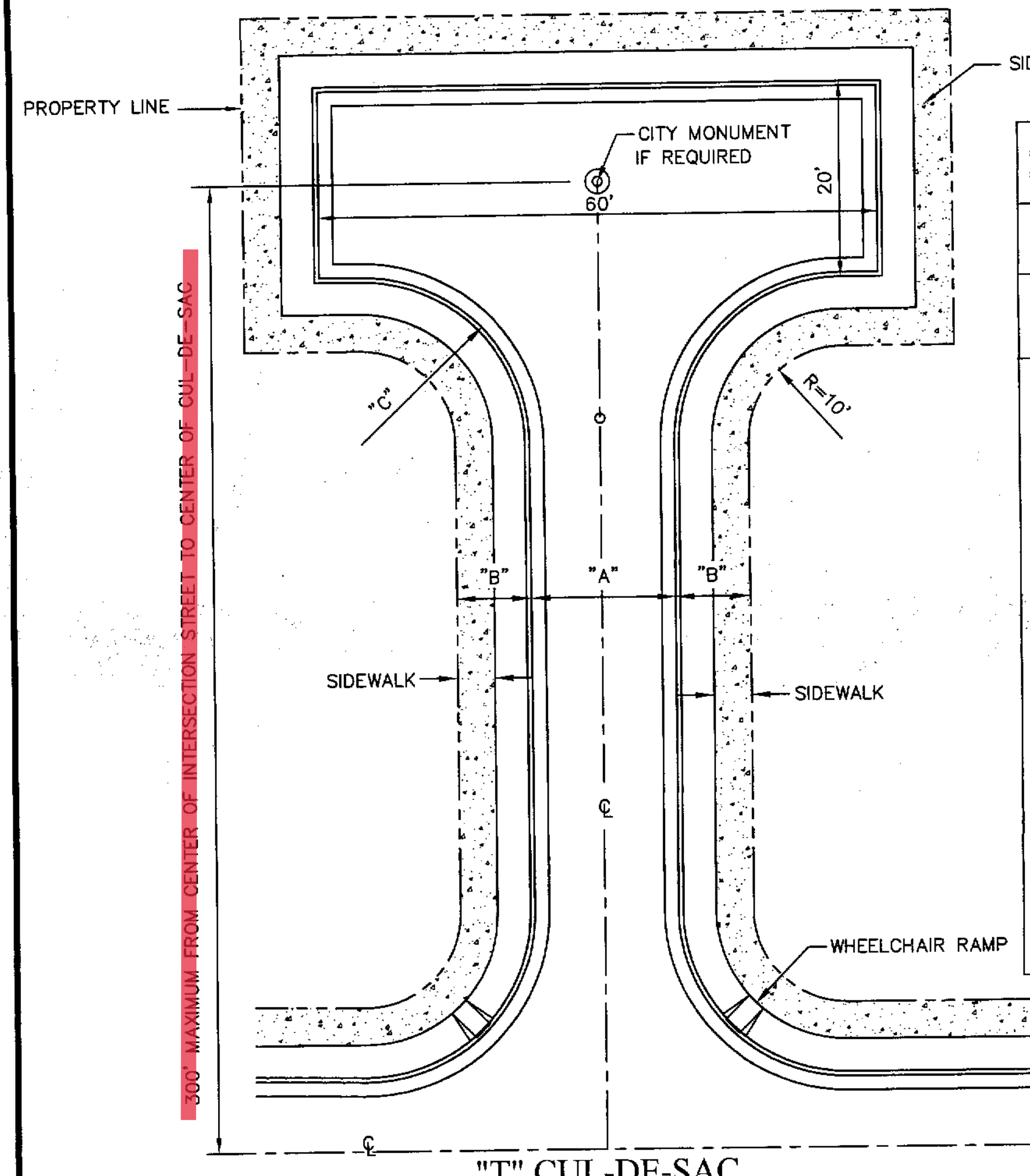
NOTE:
WHERE SIDEWALKS ARE NOT REQUIRED OR ARE PERMITTED TO BE LOCATED ADJACENT TO AND PARALLEL WITH THE CURBLINE, THE TOTAL STREET RIGHT-OF-WAY SHALL BE REDUCED BY DEDUCTING 3'-6" FROM THE PARKWAY ON EACH AFFECTED SIDE OF THE STREET.



ROADWAY CLASSIFICATIONS	"A"	"B"	"C"
MINOR RESIDENTIAL ACCESS /MOUNTAIN RESIDENTIAL	20 FT.	8'	18'
MAJOR RESIDENTIAL ACCESS	28 FT.	8'	18'

"T" CUL-DE-SAC

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

"T" CUL-DE-SAC

3-17

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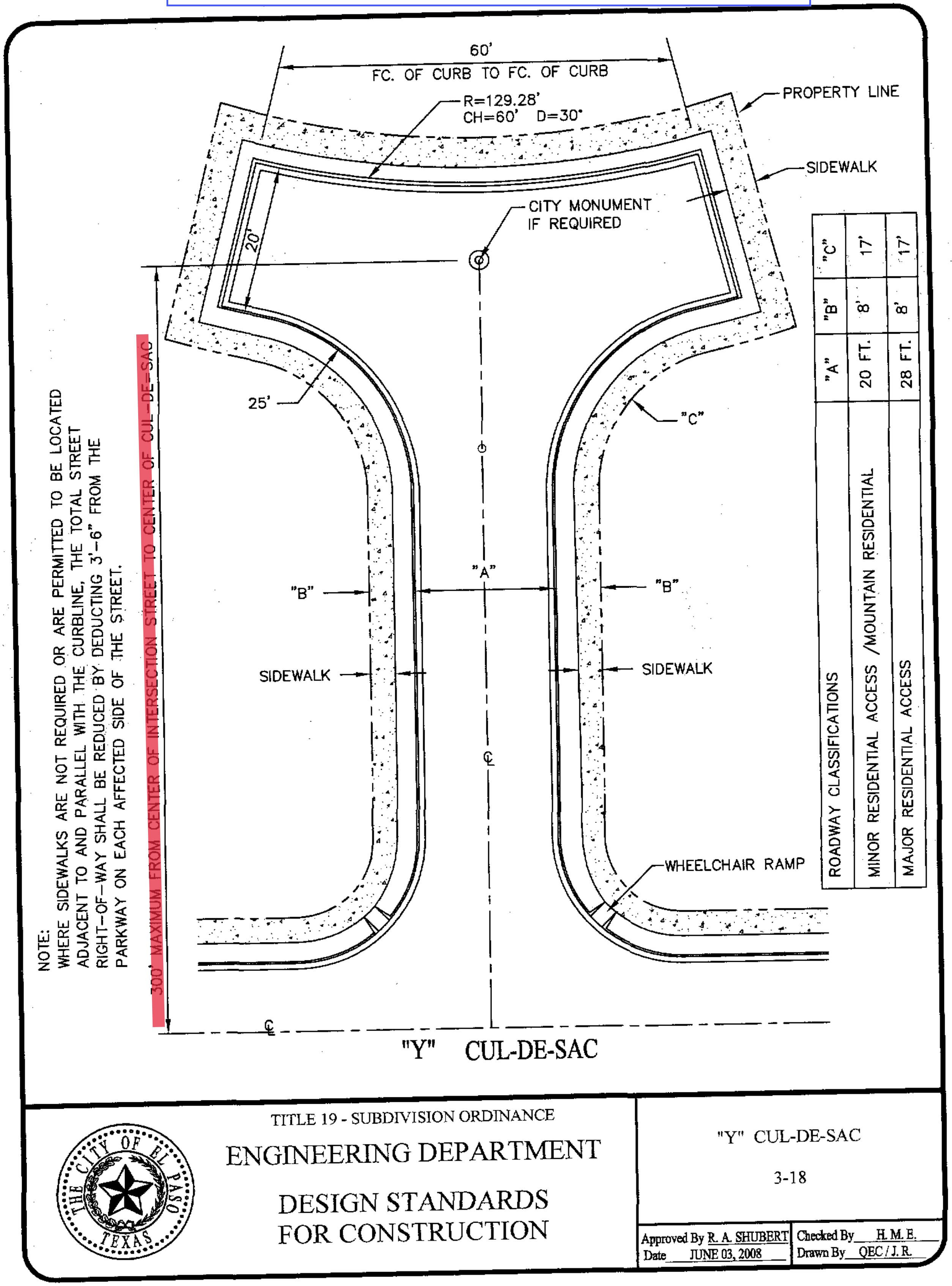

ROADWAY CLASSIFICATIONS	"A"	"B"	"C"
MINOR RESIDENTIAL ACCESS /MOUNTAIN RESIDENTIAL	20 FT.	8'	17'
MAJOR RESIDENTIAL ACCESS	28 FT.	8'	17'

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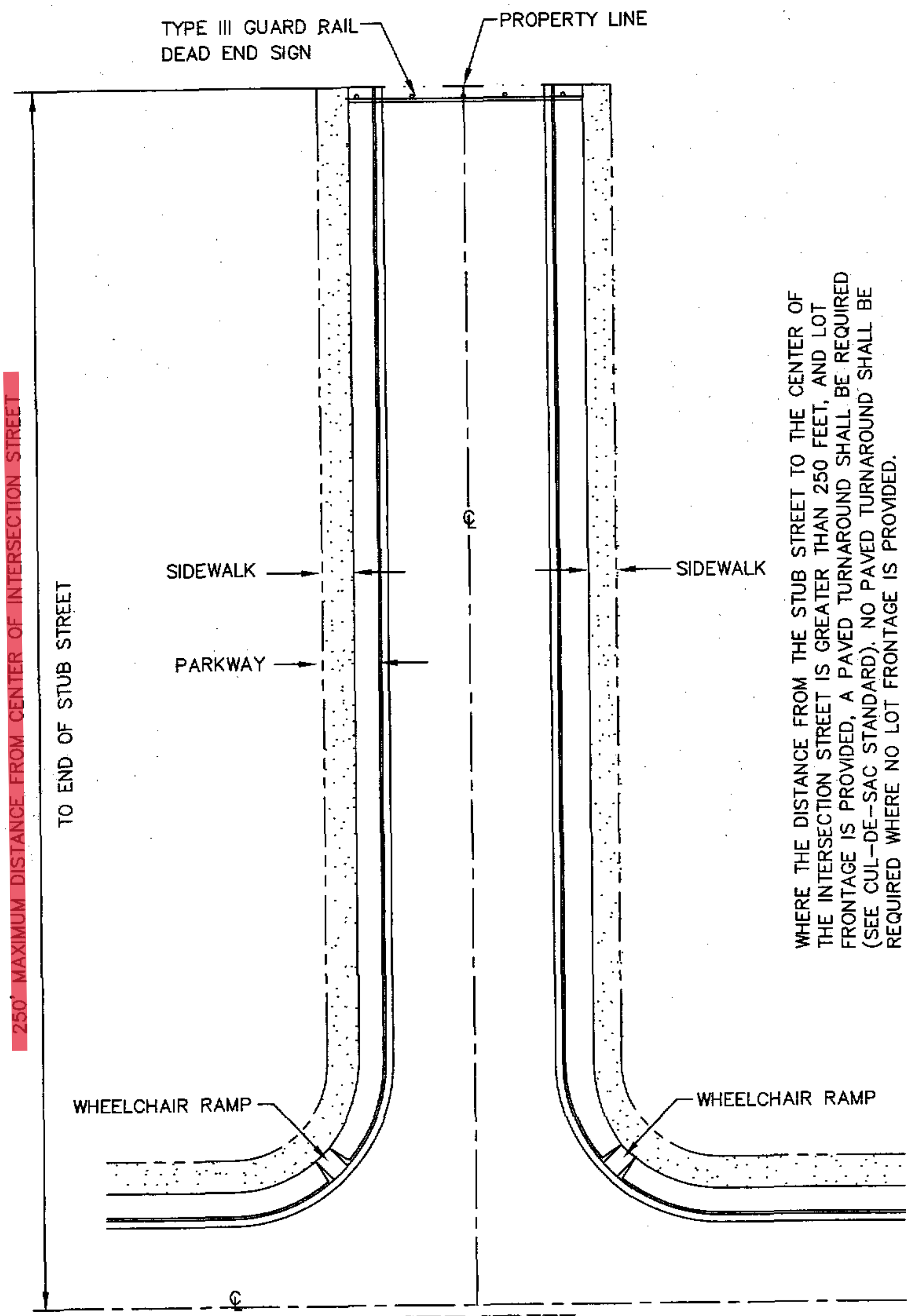

STUB STREET

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	STUB STREET 3-19
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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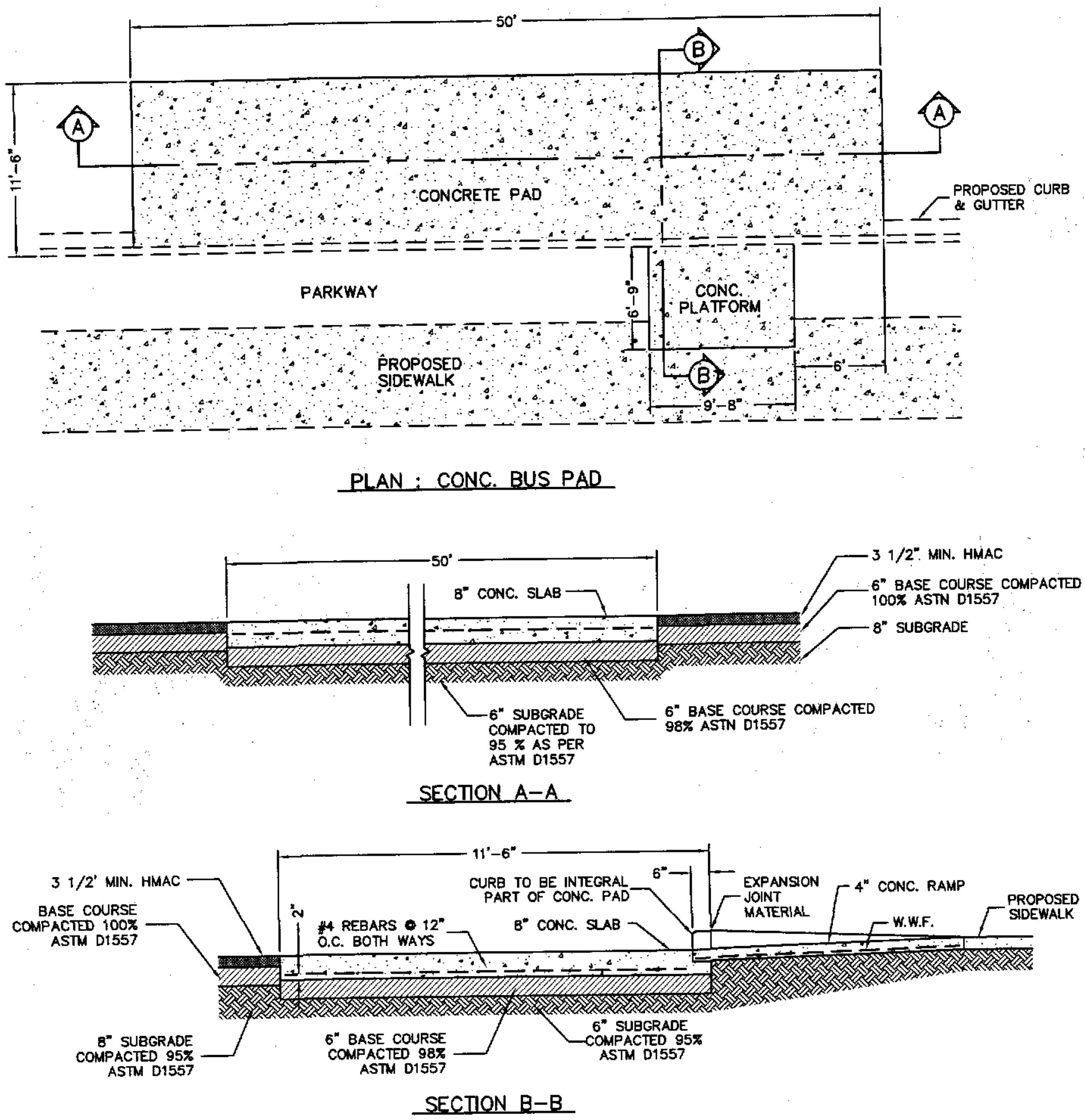

NOTE

WHERE NEW BUS STOP PADS ARE CONSTRUCTED AT BUS STOPS, BAY OR OTHER AREAS WHERE A LIFT OR RAMP IS TO BE DEPLOYED, THEY SHALL HAVE A FIRM, STABLE SURFACE; A MIN. CLEAR LENGTH OF 96 INCHES (MEASURED FROM THE CURB OR VEHICLE ROADWAY EDGE) AND A MIN. CLEAR WIDTH OF 60 INCHES (MEASURED PARALLEL TO THE VEHICLE ROADWAY) TO THE MAXIMUM EXTENT ALLOWED BY LEGAL OR SITE CONSTRAINTS; AND SHALL BE CONNECTED TO STREETS, SIDEWALK OR PEDESTRIAN PATHS BY AN ACCESSIBLE ROUTE COMPLYING WITH TAS. THE SLOPE OF THE PAD PARALLEL TO THE ROADWAY SHALL, TO THE EXTENT PRACTICABLE, BE THE SAME AS THE ROADWAY. FOR WATER DRAINAGE A MAXIMUM SLOPE OF 1:50 (2%) PERPENDICULAR TO THE ROADWAY IS ALLOWED.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	CONCRETE BUS PAD (PROPOSED PAVEMENT) 3-20	
		Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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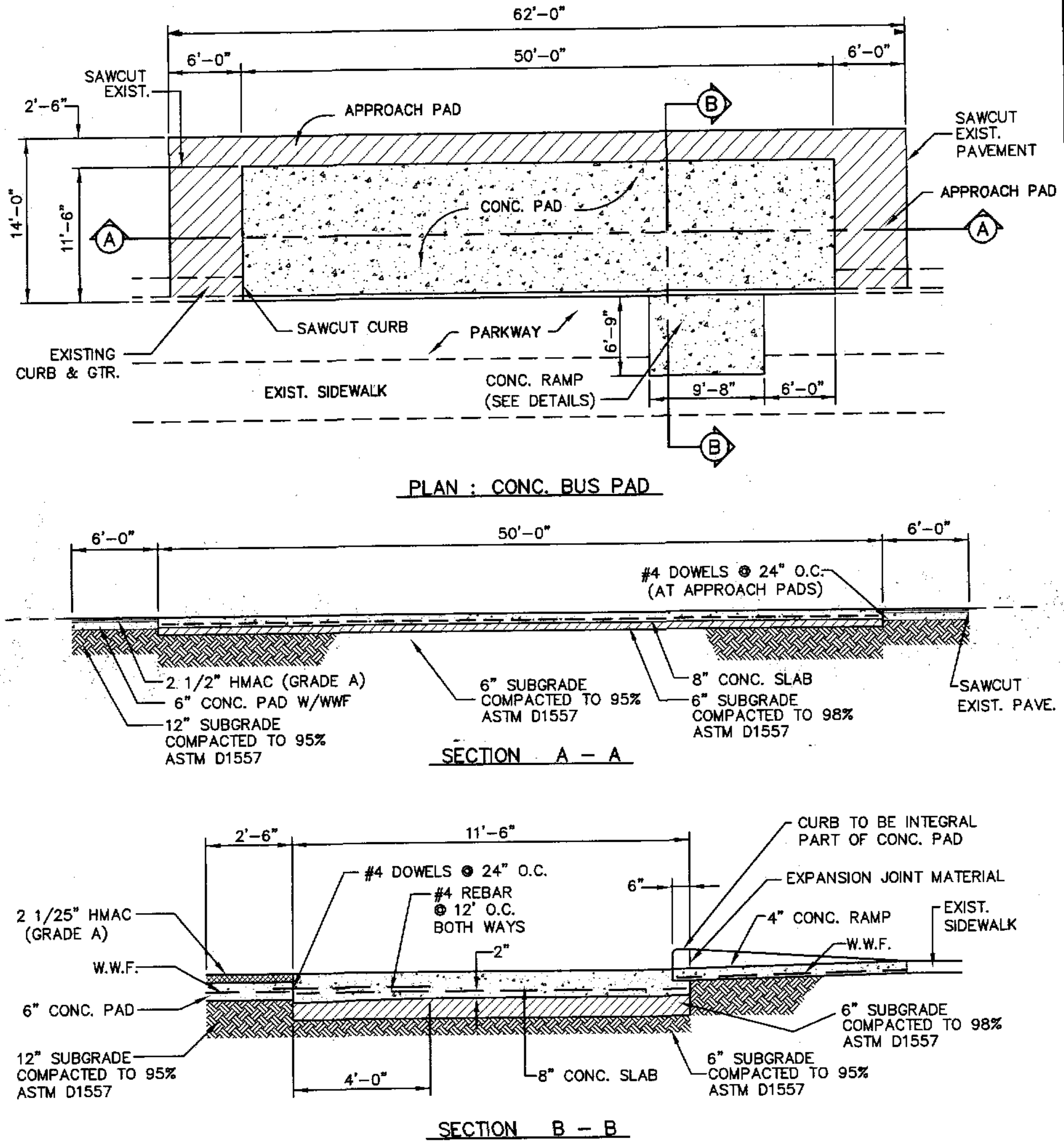

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

CONCRETE BUS PAD (EXISTING PAVEMENT)

3-21

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By OEC / J. R.

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PAVEMENT THICKNESS DESIGN PROCEDURE

THE FOLLOWING PROCEDURES WILL BE USED FOR ALL CITY OF EL PASO STREET PAVING PROJECTS, INCLUDING THOSE CONTRACTED BY THE CITY AND THOSE CONTRACTED BY THE DEVELOPER WITHIN A DISTANCE OF 5 MILES OUTSIDE THE CITY LIMITS. THE SOIL STUDY ANALYSIS REPORT FOR ALL PROJECTS SHALL INCLUDE THE FOLLOWING:

1. ESTABLISH CLASSIFICATION OF SUBGRADE SOILS.

   A. DRILL SOIL BORINGS WITH STANDARD PENETRATION TESTS (SURFACE AND 2-1/2 FOOT INTERVALS) TO 6.5 FT BELOW PAVING SUBGRADE AT LOCATIONS DETEMINED BY THE CITY ENGINEER OR AT INTERVALS NOT TO EXCEED 800 FT. WITH A MINIMUM OF 2 SOIL BORINGS PER PROJECT.

   B. OBSERVE AND LOG SAMPLES TO IDENTIFY SOILS IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

   C. OBSERVE AND REPORT FREE GROUNDWATER CONDITIONS.

2. ESTABLISH INDEX PROPERTIES OF SUBGRADE.

   A. MAKE TESTS TO DETERMINE ATTERBERG LIMITS AND PERCENT OF SOIL PASSING 200-MESH SIEVE FOR EACH MAJOR SOIL TYPE.

   B. DETERMINE GRAIN SIZE CURVES FOR COARSE GRAINED SOILS BY SIEVE ANALYSIS.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PAVEMENT THICKNESS DESIGN PROCEDURE 3-22A

Approved By R. A. SHUBERT Date JUNE 03, 2008 | Checked By H. M. E. Drawn By QEC / J. R.

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PAVEMENT THICKNESS DESIGN PROCEDURE
(continued)

3. ESTABLISH IN-PLACE CONDITIONS AND STRENGTH OF SUBGRADE.

   A. DETERMINE MOISTURE CONTENTS AND UNIT DRY WEIGHTS OF UNDISTURBED AND/OR RELATIVELY UNDISTURBED SAMPLES OF SOILS.

   B. DETERMINE STRENGTH OF COHESIVE SOILS BY UNCONFINED COMPRESSION TESTS ON SELECTED UNDISTURBED SHELBY TUBE SAMPLES.

4. OBTAIN STRENGTH OF SUBGRADE SOILS.

   A. USE THE CALIFORNIA BEARING RATION (CBR). CBR VALUES SHALL BE OBTAINED BY TEST METHODS OUTLINED IN EITHER ASHTO T193 OR ASTM D1883.

5. DETERMINE THICKNESS OF BASE MATERIALS AND PAVEMENT IN ACCORDANCE WITH AASHTO INTERIM GUIDE FOR DESIGN OF PAVEMENT STRUCTURES 1972, CHAPTER III, REVISED 1981; PUBLISHED BY: AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 444 N. CAPITAL STREET, N.W. SUITE 225, WASHINGTON, D.C. 20001.

   A. THE NECESSARY DESIGN DATA FOR HOT MIXED ASPHALTIC CONCRETE PAVEMENTS MUST BE OBTAINED AND USED AS FOLLOWS:

      1. TERMINAL SERVICEABILITY INDEX (PT) MUST BE 2.0.

      2. EQUIVALENT 18-KIP SINGLE-AXLE LOADS (EAL) MUST BE OBTAINED FROM TABLE 1, STREET DESIGN CRITERIA, DESIGN STANDARD SHEET NO. 3-25. THE DEPARTMENT OF ENGINEERING SHALL DETERMINE APPLICABLE STREET CLASSIFICATION.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PAVEMENT THICKNESS DESIGN PROCEDURE
3-22B

Approved By R. A. SHUBERT Date JUNE 03, 2008
Checked By H. M. E. Drawn By QEC / J. R.

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PAVEMENT THICKNESS DESIGN PROCEDURE
(continued)

3. SOIL SUPPORT VALUE (S) MUST BE DETERMINED FROM FIGURE 1 ATTACHED. SOIL STRENGTH VALUES MUST BE AS OBTAINED FROM CBR TESTS.
4. REGIONAL FACTOR (R) MUST BE 0.5.
5. STRUCTURAL NUMBER (SN) MUST BE DETERMINED FROM THE NOMOGRAPH, FIGURE 2. ATTACHED.
6. LAYER COEFFICIENT (A_1, A_2, A_3) MUST BE ESTABLISHED FROM TABLE 2. (ATTACHED).
7. USE THE FOLLOWING EQUATION TO DETERMINE THE MOST EFFICIENT PAVEMENT STRUCTURE.

$$SN = A_1 D_1 + A_2 D_2 + A_3 D_3$$

WHERE D_1 = THICKNESS OF SURFACE COURSE
D_2 = THICKNESS OF BASE COURSE
D_3 = THICKNESS OF SUBBASE COURSE

TITLE 19 - SUBDIVISION ORDINANCE
ENGINEERING DEPARTMENT
DESIGN STANDARDS FOR CONSTRUCTION

PAVEMENT THICKNESS DESIGN PROCEDURE
3-22C

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PAVEMENT THICKNESS DESIGN PROCEDURE
(continued)

DEFINITIONS:

CALIFORNIA BEARING RATION (CBR) - THIS IS A MEASURE OF THE STRENGTH OF A SOIL AS DETERMINED BY FORCING A 3 SQUARE INCH PLUNGER INTO A CYLINDER OF THE SOIL. CBR VALUES MAY RANGE FROM 1-100.

TERMINAL SERVICEABILITY INDEX (PT) - THE SERVICEABILITY OF A PAVEMENT IS DEFINED AS THE ABILITY TO SERVE HIGH-SPEED, HIGH VOLUME AUTOMOBILE AND TRUCK TRAFFIC AND IS MEASURED BY USE OF AN INDEX. THE PT IS THE LOWEST INDEX THAT WILL BE TOLERATED BEFORE RESURFACING OR RECONSTRUCTION BECOMES NECESSARY. FOR EL PASO, THE PT MUST BE 2.0.

EQUIVALENT 18-KIP SINGLE AXLE LOADS (EAL) - TO ASSESS TRAFFIC LOADS, THE VARYING AXLE LOADS OF DIFFERENT VEHICLES ARE CONVERTED TO A COMMON UNIT. IN THIS PROCEDURE THE 18 KIP SINGLE AXLE LOAD IS USED.

SOIL SUPPORT VALUE (S) - AN INDEX NUMBER WHICH EXPRESSES THE ABILITY OF A SOIL OR AGGREGATE MIXTURE TO SUPPORT TRAFFIC LOADS THROUGH A FLEXIBLE PAVEMENT STRUCTURE.

REGIONAL FACTOR (R) - A NUMERICAL FACTOR THAT IS USED TO ADJUST THE STRUCTURAL NUMBER FOR CLIMATIC AND ENVIRONMENTAL CONDITIONS. FOR EL PASO, THE (R) MUST BE 0.5.

STRUCTURAL NUMBER (SN) - AN INDEX NUMBER DERIVED FROM AN ANALYSIS OF TRAFFIC, SUBGRADE SOIL CONDITIONS, AND REGIONAL FACTOR WHICH MAY BE CONVERTED TO THICKNESS OF FLEXIBLE PAVEMENT LAYERS THROUGH THE USE OF SUITABLE LAYER COEFFICIENTS RELATED TO THE TYPE OF MATERIAL BEING USED IN EACH LAYER OF THE PAVEMENT STRUCTURE.

LAYER COEFFICIENTS - A NUMBER WHICH RELATES SN AND THICKNESS .

A_1 REPRESENTS THE SURFACE COURSE.
A_2 REPRESENTS THE BASE COURSE.
A_3 REPRESENTS THE SUBBASE COURSE.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PAVEMENT THICKNESS DESIGN PROCEDURE 3-23

Approved By R. A. SHUBERT Date JUNE 03, 2008 | Checked By H. M. E. Drawn By QEC / J. R.

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PAVEMENT THICKNESS DESIGN PROCEDURE
(continued)

EXAMPLE:

DESIGN A PAVEMENT STRUCTURE FOR A 36' ROADWAY WITH CBR = 12, 85% COMPACTED SUBGRADE, ASTM D1557.

A. $P_t = 2.0$

B. CITY ENGINEER DETERMINES THIS STREET IS A RESIDENTIAL COLLECTOR ACCORDING TO TABLE 1. THEREFORE, EAL=269,000

C. FROM FIGURE 1, WITH CBR = 12 , S = 6.35

D. R = 0.5

E. FROM FIGURE 2, SN = 1.70

F. FROM TABLE 2 , $a_1 = 0.44$, $a_2 = 0.14$, $a_3 = 0.11$

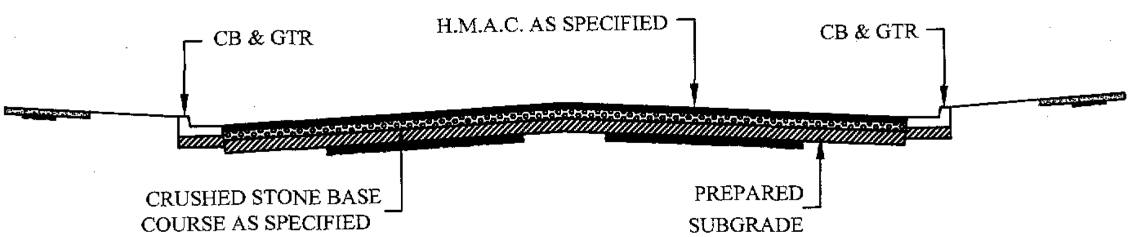
G. USE $D_1 = 2"$, $D_3 = 6$ IN EQU -1 AND SOLVE FOR D_2

$$1.70 = (0.44)(2) + (0.14) D_2 + (0.11)(6)$$

$$D_2 = 1.14"$$

EXAMPLE:

MINIMUM "D" FOR RESIDENTIAL SUBCOLLECTOR ACCESS STREET IS 4 1/2". THIS PAVEMENT STRUCTURE WOULD CONSIST OF 2" H.M.A.C., 4 1/2" C.S.B. AND 6" COMPACTED SUB-BASE



TYPICAL ROAD SECTION

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PAVEMENT THICKNESS DESIGN PROCEDURE 3-24

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PAVEMENT THICKNESS DESIGN CHART

STREET CLASSIFICATION	AVERAGE DAILY TRAFFIC	ROADWAY WIDTH (FT.)	ROW WIDTH (FT.)	MINIMUM PAVEMENT THICKNESS (IN.) ** HMAC
E.A.L.	CSB (20 YRS)			SUBGRADE
ALLEY	200 45,000	14 OR 20	14 OR 20	1-1/2 4-1/2 6
TWENTY FOOT (20') RESIDENTIAL LANE - NO PARKING	200 45,000	20	40	1-1/2 6 8
THIRTY-TWO FOOT (32') RESIDENTIAL LANE - NO PARKING	500 45,000	32	50	1-1/2 6 8
THIRTY-SIX FOOT (36') RESIDENTIAL 1 LANE	3,000 269,000	36	56	1-1/2 6 8
TWENTY-EIGHT FOOT (28') RESIDENTIAL 2 LANE	3,000 269,000	28	46	1-1/2 6 8
RESIDENTIAL COLLECTOR - WITH PARKING	3,000 269,000	36	54	1-1/2 6 8
RESIDENTIAL COLLECTOR WITH MEDIAN	3,000 269,000	36	54	1-1/2 6 8
MOUNTAIN RESIDENTIAL	500 * 45,000	20	23	1-1/2 4-1/2 6
DIVIDED MOUNTAIN RESIDENTIAL	500 * 45,000	20	VARIES	1-1/2 4-1/2 6
MULTI-FAMILY/ COMMERCIAL/ INDUSTRIAL LOCAL STREET 1	6,000 * 630,000	44	64	2 8 10

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PAVEMENT THICKNESS DESIGN CHART
3-25

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PAVEMENT THICKNESS DESIGN CHART
(continued)

STREET CLASSIFICATION	AVERAGE DAILY TRAFFIC E.A.L. (20 YRS)	ROADWAY WIDTH (FT.)	ROW WIDTH (FT.)	MINIMUM PAVEMENT THICKNESS (IN.) ** HMAC CSB SUBGRADE
MULTI-FAMILY/ COMMERCIAL/ INDUSTRIAL LOCAL STREET 2	6,000 * 630,000	36	56	2 8 10
NON-RESIDENTIAL COLLECTOR	6,000 * 630,000	50	70	2 8 10
NON-RESIDENTIAL COLLECTOR WITH BIKE LANES	6,000 * 630,000	62	82	2-1/2 8 10
BOULEVARD	14,000 * 1,300,000	44	120	2-1/2 10 12
MINOR ARTERIAL	14,000 * 1,500,000	58	78	2-1/2 8 10
MINOR ARTERIAL W/BIKE LANES	14,000 * 1,500,000	58	88	2-1/2 8 10
MAJOR ARTERIAL	26,000 * 3,100,000	66	110	2-1/2 10 12
MAJOR ARTERIAL W/BIKE LANES	26,000 * 3,100,000	66	120	2-1/2 10 12

* ADT FOR PURPOSES OF ESTIMATING AXLE LOADS ONLY

** IF THE RESULTS FOR "CBR" VALUES ARE HIGHER THAN THE MINIMUM PAVEMENT THICKNESS, THE HIGHER VALUES SHALL BE USED.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PAVEMENT THICKNESS DESIGN CHART

3-26

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
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PAVEMENT THICKNESS DESIGN PROCEDURE

STREET CLASSIFICATION	AVER. DAILY TRAFFIC E. A. L. (20 YRS.)	ROADWAY WIDTH (FT.)	R. O. W. WIDTH (FT.)	MINIMUM PAVEMENT THICKNESS (IN.) ** HMAC CSB SUBGRADE
COLLECTOR ARTERIAL**	7,000* 1,800,000	90	98	2 1/2 8 10
MINOR ARTERIAL**	14,000* 2,200,000	98	120	2 1/2 10 12
MAJOR ARTERIAL**	28,000* 4,600,000	98	136	2 1/2 10 12
COLLECTOR ARTERIAL** W/ BIKE LANES	7,000* 1,800,000	98	136	2 1/2 8 10
MINOR ARTERIAL** W/ BIKE LANES	14,000* 2,200,00	98	136	2 1/2 10 12
MAJOR ARTERIAL** W/ BIKE LANES	28,000* 4,600,000	98	136	2 1/2 10 12

*ADT FOR PURPOSES OF ESTIMATING AXLE LOADS ONLY.

**MINIMUM PAVEMENT THICKNESS FOR ARTERIAL STREETS, WITHIN HEAVY COMMERCIAL AND INDUSTRIAL DEVELOPMENTS (PROPERTIES ZONED C-4, M-1, M-2, M-3 AND P.I.) SHALL BE SUBJECT TO THE APPROVAL OF THE CITY ENGINEER.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PAVEMENT THICKNESS DESIGN CHART (HEAVY)
3-27

Approved By R. A. SHUBERT Date JUNE 03, 2008
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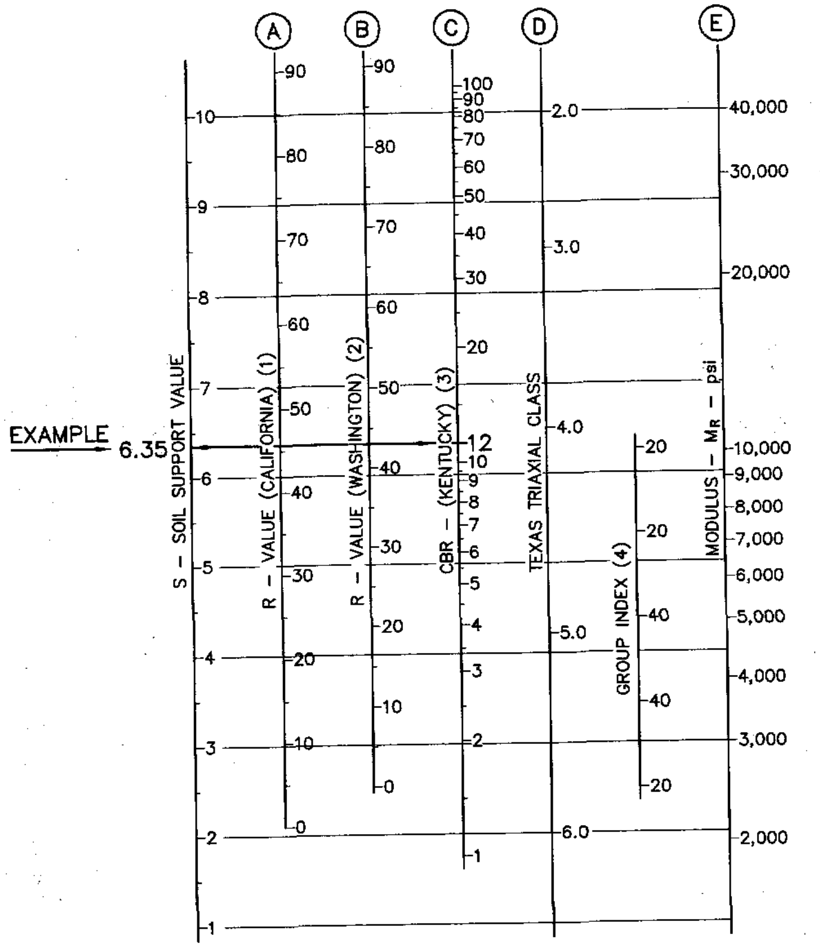

PAVEMENT THICKNESS

(1) THE CORRELATION IS WITH THE DESIGN CURVES USED BY CALIFORNIA; AASHO DESIGNATIONS T–173–60, AND EXUDATION PRESSURE IS 240 psi. SE HVEEM, F.M., AND CARMANY, R.M., "THE FACTORS UNDERLYING THE RATIONAL DESIGN OF PAVEMENTS." PROC. HRB, VOL. 28 (1948) PP. 10–136.
(2) THE CORRELATION IS WITH THE DESIGN CURVES USED BY WASHINGTON DEPT. OF HIGHWAYS; EXUDATION PRESSURE IS 300 psi. SEE "FLEXIBLE PAVEMENT DESIGN CORRELATION STUDY." HRB BULL. 133 (1956).
(3) THE CORRELATION IS WITH THE CBR DESIGN CURVES BY KENTUCKY. SEE DRAKE, W.B., AND HAVENS, J.H., "RE–EVALUATION OF KENTUCKY FLEXIBLE PAVEMENT DESIGN CRITERION." HRB BULL. 233 (1959) PP. 33–56. THE FOLLOWING CONDITIONS APPLY TO THE LABORATORY–MODIFIED CBR: SPECIMEN IS TO BE MOLDED AT OR NEAR THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY AASHTO T–99; DYNAMIC COMPACTION IS TO BE USED WITH A HAMMER WEIGHT OF 10 LB. DROPPED FROM A HEIGHT OF 18 IN.; SPECIMEN IS TO BE COMPACTED IN FIVE EQUAL LAYERS WITH EACH LAYER RECEIVING 10 BLOWS; SPECIMEN IS TO BE SOAKED FOR 4 DAYS.
(4) THIS SCALE HAS BEEN DEVELOPED BY COMPARISON BETWEEN THE CALIFORNIA R–VALUE AND THE GROUP INDEX DETERMINED BY THE PROCEDURE IN PROC. HRB VOL. 25 (1945) PP. 376–392.

FIGURE I

TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	PAVEMENT THICKNESS DESIGN 3-28
	Approved By R. A. SHUBERT — Date JUNE 03, 2008 — Checked By H. M. E. — Drawn By OEC / J. R.

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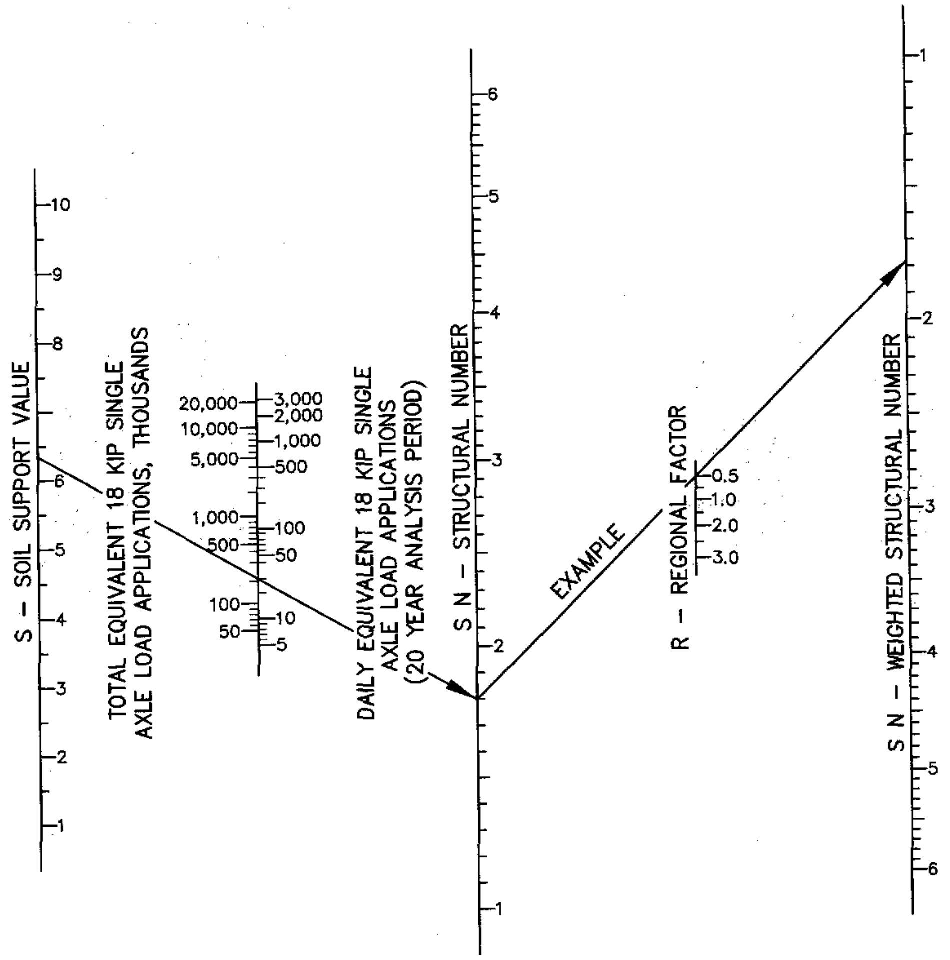

STRUCTURAL NUMBER FOR Pt = 20
FIGURE 2

TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	PAVEMENT THICKNESS DESIGN 3-29A	
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

THE CITY OF EL PASO TEXAS

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PAVEMENT COMPONENT	COEFFICIENT (3)	
SURFACE COURSE		
ROADMIX (LOW STABILITY)	0.20	
PLANTMIX (HIGH STABILITY)	0.44 *	← EXAMPLE
SAND ASPHALT	0.40	
BASE COURSE		
SANDY GRAVEL	0.07 * 2	← EXAMPLE
CRUSHED STONE	0.14	
CEMENT-TREATED (NO SOIL - CEMENT)		
COMPRESSIVE STRENGTH @ 7 DAYS		
650 PSI OR MORE (4.48 MPA)	0.23 2	
400 TO 650 PSI (2.76 TO 4.48 MPA)	0.20	
400 PSI OR LESS (2.76 MPA)	0.15	
BITUMINOUS - TREATED		
COARSE - GRADED	0.34 2	
SAND ASPHALT	0.30	
LIME - TREATED	0.15 - 0.30	
SUBBASE COURSE		
SANDY GRAVEL	0.11 *	← EXAMPLE
SAND OR SANDY-CLAY	0.15 - 0.10	

LAYER COEFFICIENTS
TABLE 2

TITLE 19 - SUBDIVISION ORDINANCE
ENGINEERING DEPARTMENT
DESIGN STANDARDS FOR CONSTRUCTION

PAVEMENT THICKNESS DESIGN
3-29B

Approved By R. A. SHUBERT Date JUNE 03, 2008
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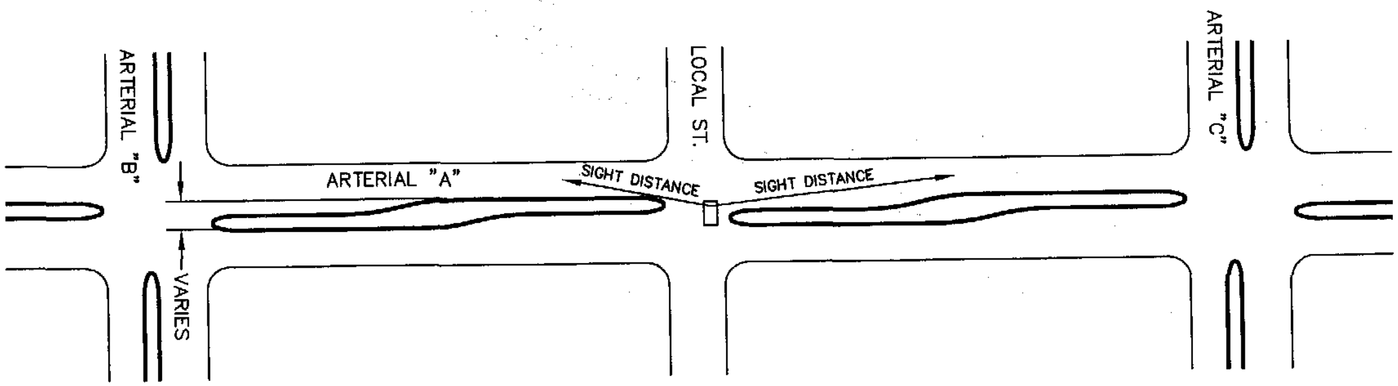

MEDIAN OPENING SIGHT DISTANCE

(2-STOP CROSSING)

NOTE:

MINIMUM SIGHT DISTANCE REQUIRED AT MEDIAN OPENINGS WHERE THE CROSSROAD IS CONTROLLED BY STOP SIGNS SHALL BE AS SHOWN BELOW; OTHER APPLICATIONS SHALL COMPLY WITH AASHTO REQUIREMENTS.

MEDIAN GREATER THAN OR EQUAL TO 20 FEET (2-STOP CROSSING)

ARTERIAL DESIGN SPEED	30 MPH	35 MPH	40 MPH	45 MPH	50 MPH
2 LANES (20'–24')	390	455	520	585	650
3 LANES (32'–36')	435	505	580	650	725
4 LANES (40'–48')	450	525	600	675	750

VERTICAL SIGHT DISTANCE SHALL BE MEASURED FROM A DRIVER'S EYE LEVEL (3.5 FEET) TO THE TOP OF AN ONCOMING CAR (4.5 FEET).

NO MEDIAN OPENING SHALL BE LOCATED WHERE THE GRADE BETWEEN THE LANES ON OPPOSITE SIDES OF THE MEDIAN EXCEEDS 11%.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

MEDIAN OPENING SIGHT DISTANCE (2-STOP CROSSING) 3-30

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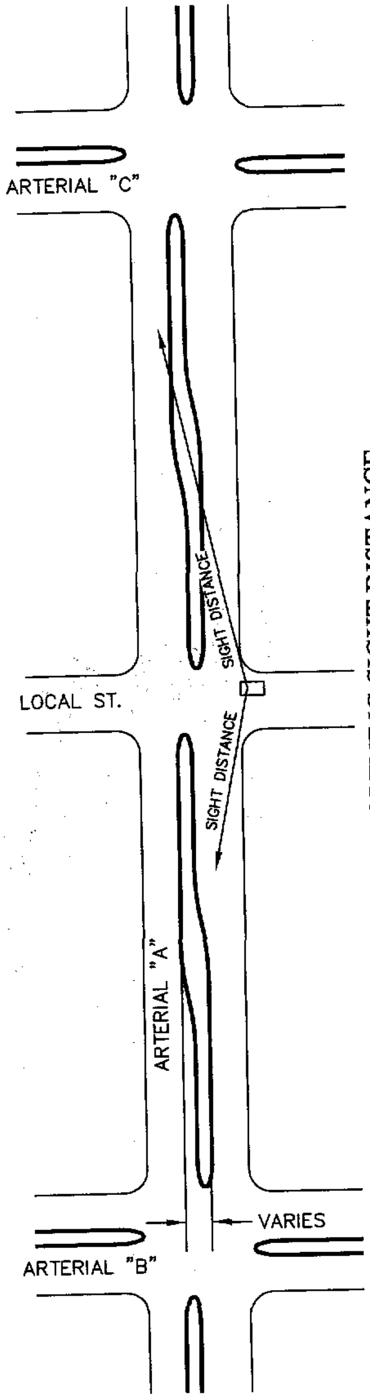

MEDIAN OPENING SIGHT DISTANCE

(1-STOP CROSSING)

NOTE:

MINIMUM SIGHT DISTANCE REQUIRED AT MEDIAN OPENINGS WHERE THE CROSSROAD IS CONTROLLED BY STOP SIGNS SHALL BE AS SHOWN BELOW; OTHER APPLICATIONS SHALL COMPLY WITH AASHTO REQUIREMENTS.

MEDIAN LESS THAN 20 FEET (1-STOP CROSSING)

ARTERIAL DESIGN SPEED	30 MPH	35 MPH	40 MPH	45 MPH	50 MPH
4 LANES (40'-48')	485	565	645	730	810
6 LANES (64'-72')	530	620	705	795	880

VERTICAL SIGHT DISTANCE SHALL BE MEASURED FROM A DRIVER'S EYE LEVEL (3.5 FEET) TO THE TOP OF AN ONCOMING CAR (4.5 FEET).

NO MEDIAN OPENING SHALL BE LOCATED WHERE THE GRADE BETWEEN THE LANES ON OPPOSITE SIDES OF THE MEDIAN EXCEEDS 11%. OTHER APPLICATIONS FOR SIGHT DISTANCE DESIGN SHALL BE PERMITTED, PROVIDED THEY MEET AASHTO GUIDELINES.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

MEDIAN OPENING SIGHT DISTANCE (1-STOP CROSSING)
3-31

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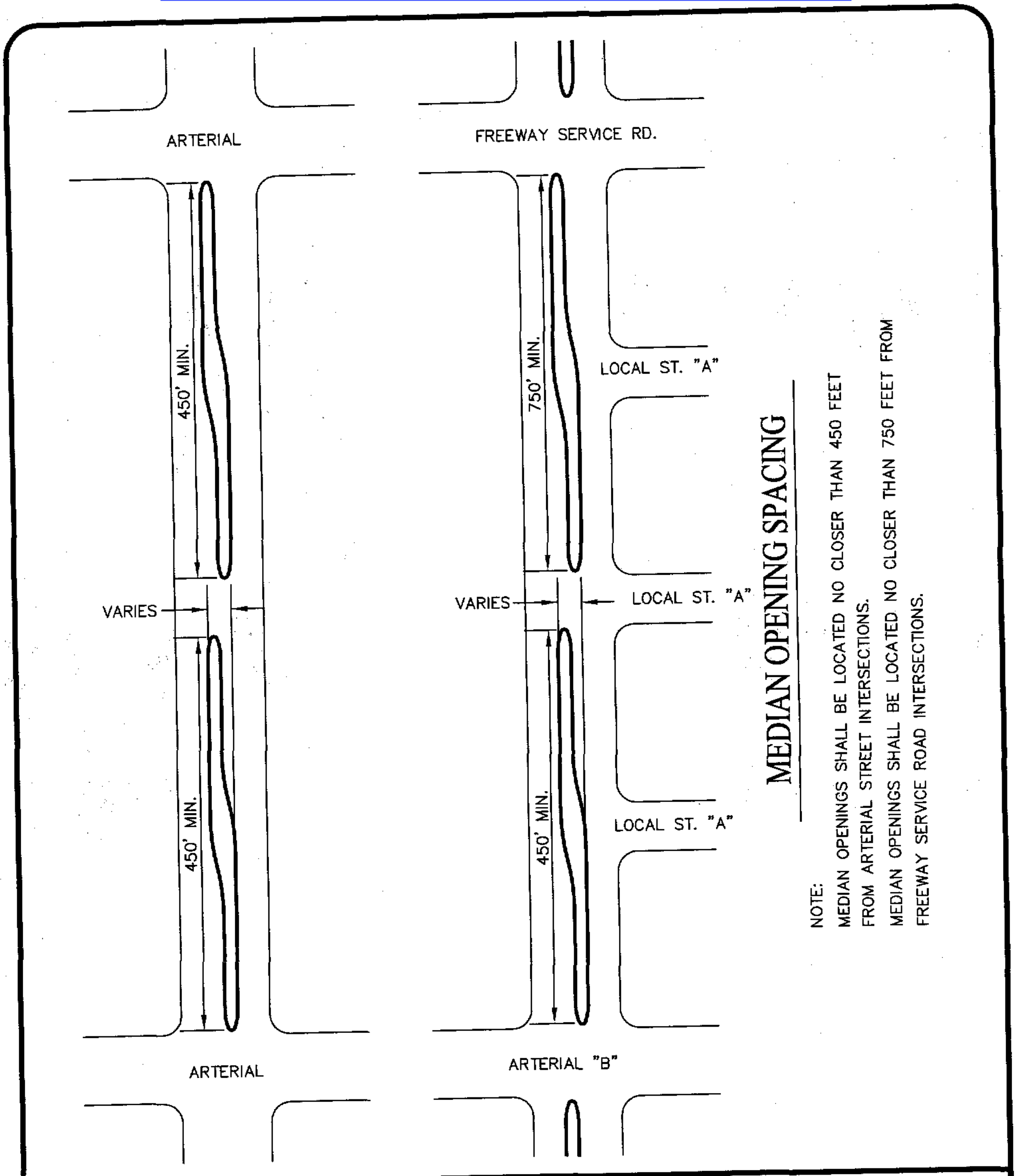

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

MEDIAN OPENING SPACING
3-32

Approved By R. A. SHUBERT	Checked By H. M. E.
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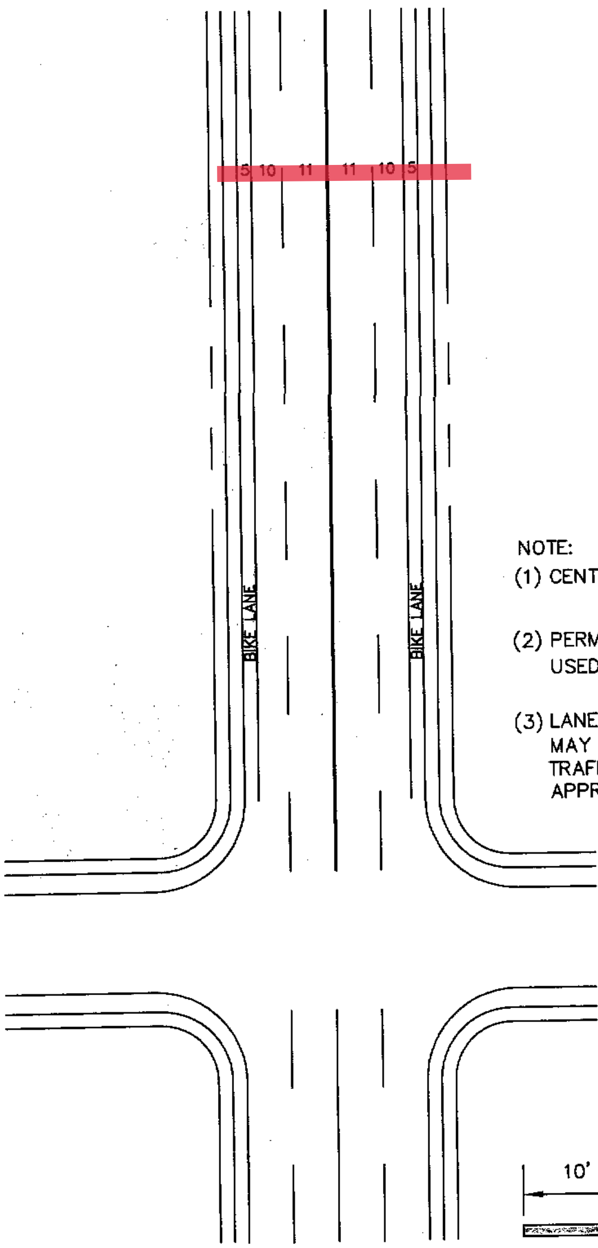
CENTERLINE STRIPING WITH BIKE LANES



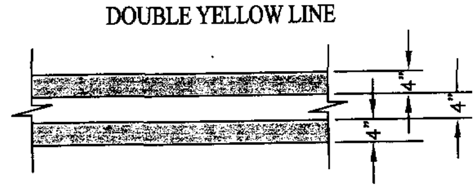
NOTE:

(1) CENTER LINE STRIPING FOR COLLECTOR ARTERIAL.

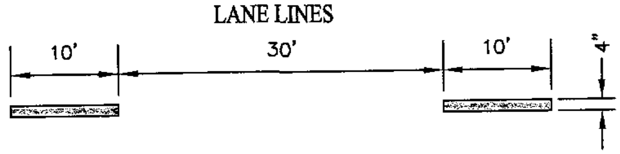
(2) PERMANENT PAVEMENT MARKING MATERIALS TO BE USED AS PER CITY SPECIFICATIONS.

(3) LANE MARKINGS TO BE FURNISHED AND INSTALLED MAY INCLUDE PERMANENT THERMO-PLASTIC MARKINGS, TRAFFIC BUTTONS OR OTHER STRIPING MATERIALS APPROVED BY THE CITY ENGINEER.

DOUBLE YELLOW LINE



LANE LINES



TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

CENTERLINE STRIPING WITH BIKE LANES 3-33

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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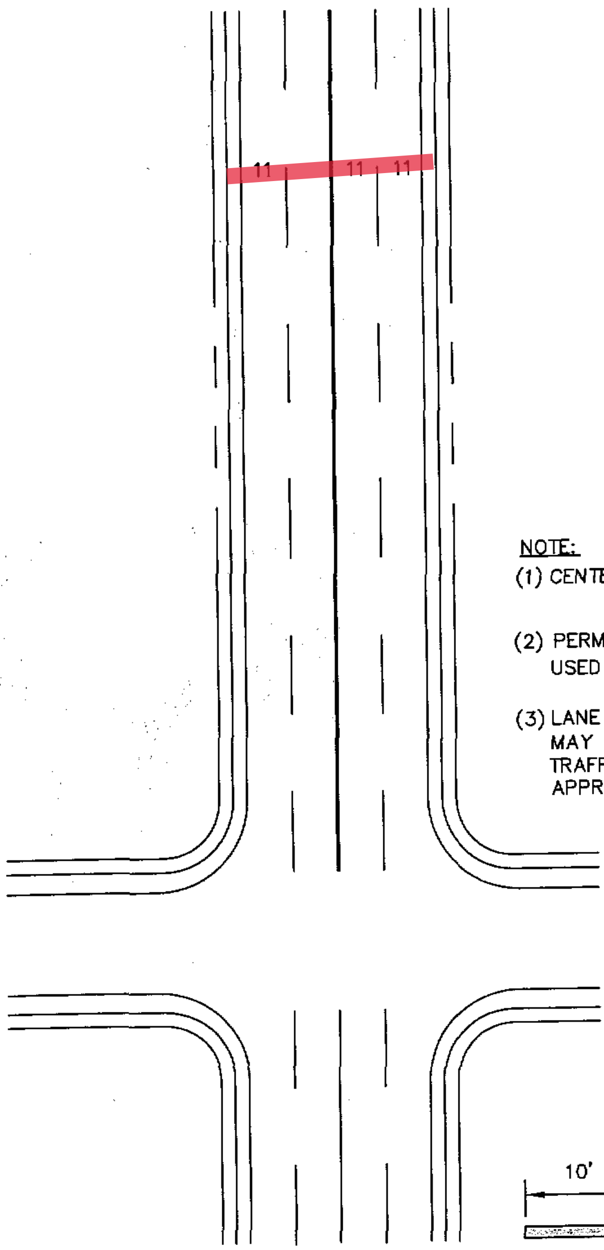
CENTERLINE STRIPING WITHOUT BIKE LANES



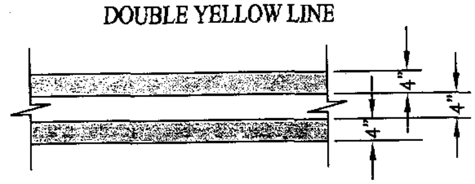
NOTE:

(1) CENTER LINE STRIPING FOR COLLECTOR ARTERIAL.

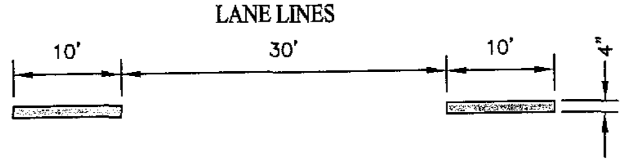
(2) PERMANENT PAVEMENT MARKING MATERIALS TO BE USED AS PER CITY SPECIFICATIONS.

(3) LANE MARKINGS TO BE FURNISHED AND INSTALLED MAY INCLUDE PERMANENT THERMO-PLASTIC MARKINGS, TRAFFIC BUTTONS OR OTHER STRIPING MATERIALS APPROVED BY THE CITY ENGINEER.

DOUBLE YELLOW LINE



LANE LINES



TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

CENTERLINE STRIPING WITHOUT BIKE LANES 3-34

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Date JUNE 03, 2008	Drawn By QEC / J. R.

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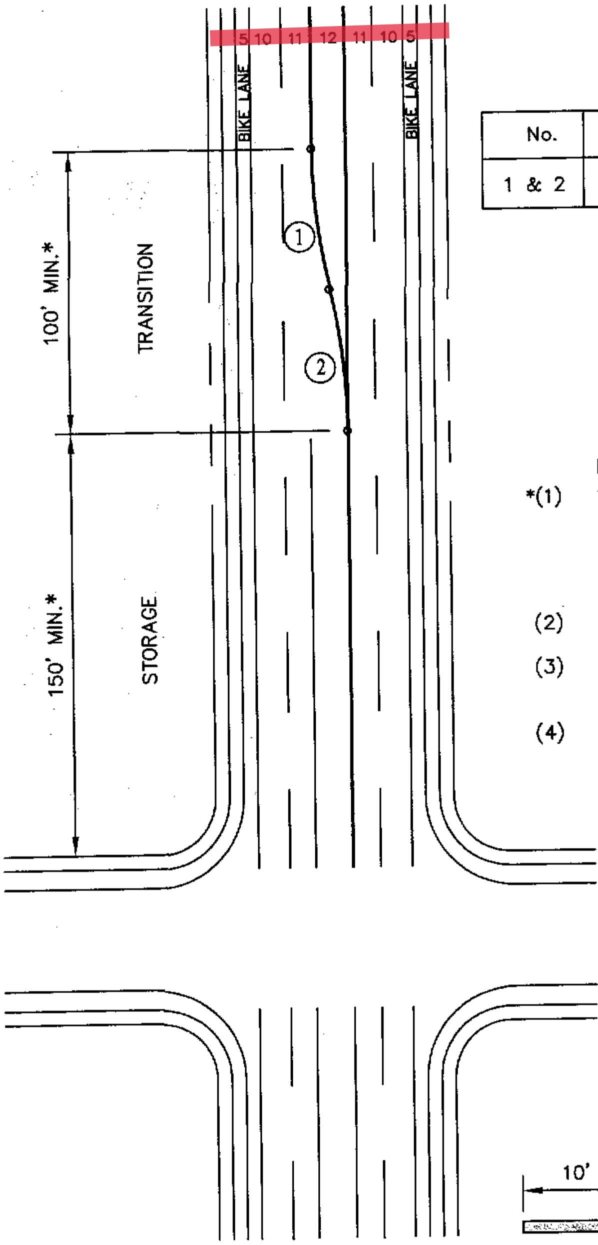
MEDIAN STRIPING WITH BIKE LANES



TYPICAL CURVE DATA

No.	Δ	R	L	T	CH
1 & 2	13°41'08"	211.34'	50.48'	25.36'	50.36'

$$T = R \tan \frac{\Delta}{2}$$

$$C = 2R \sin \frac{\Delta}{2} = 2T \cos \frac{\Delta}{2}$$

$$L = \frac{\Delta R \pi}{2}$$

NOTE:

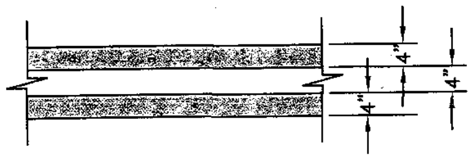
*(1) LENGTH OF R, STORAGE, AND TRANSITION TO BE INCREASED BASED UPON TRAFFIC DENSITY, ROAD DESIGN, SPEED, AND PRESENCE OR ABSENCE OF TRAFFIC SIGNALS.

(2) MEDIAN STRIPING FOR MINOR ARTERIAL.

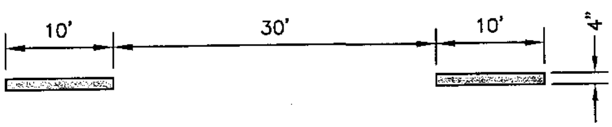
(3) PERMANENT PAVEMENT MARKING MATERIALS TO BE USED AS PER CITY SPECIFICATIONS.

(4) LANE MARKINGS TO BE FURNISHED AND INSTALLED MAY INCLUDE PERMANENT THERMO-PLASTIC MARKINGS, TRAFFIC BUTTONS OR OTHER STRIPING MATERIALS APPROVED BY THE CITY ENGINEER.

DOUBLE YELLOW LINE



LANE LINES



TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

MEDIAN STRIPING WITH BIKE LANES

3-35

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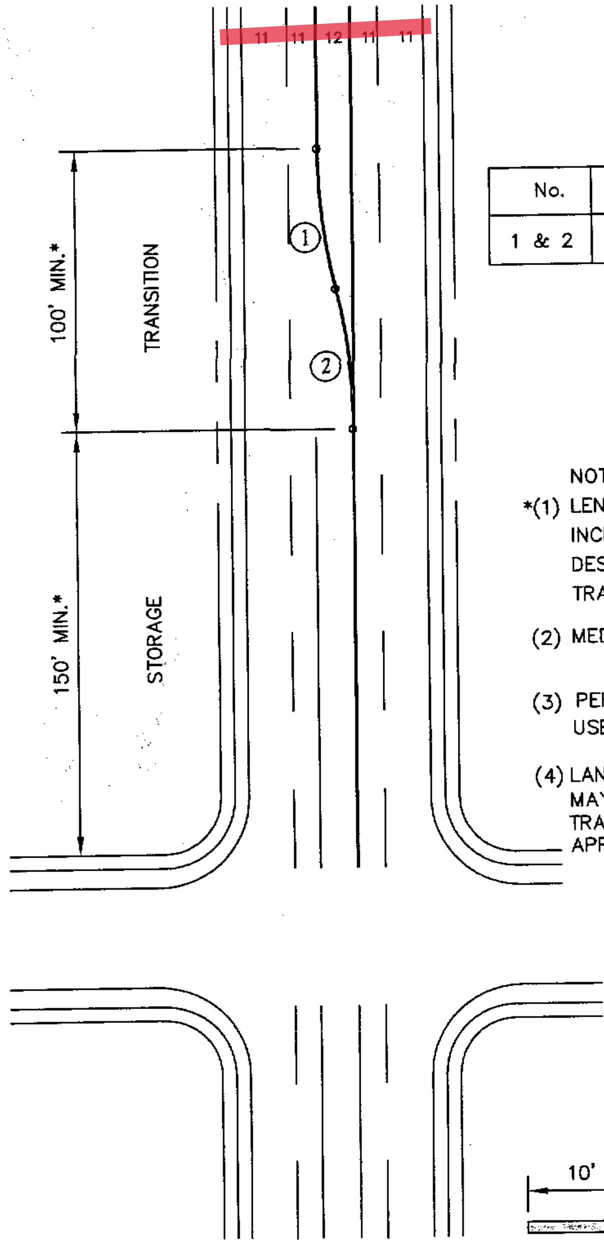
MEDIAN STRIPING WITHOUT BIKE LANES



TYPICAL CURVE DATA

No.	Δ	R	L	T	CH
1 & 2	13°41'08"	211.34'	50.48'	25.36'	50.36'

$$T = R \tan \frac{\Delta}{2}$$

$$C = 2R \sin \frac{\Delta}{2} = 2T \cos \frac{\Delta}{2}$$

$$L = \frac{\Delta R \pi}{2}$$

NOTE:

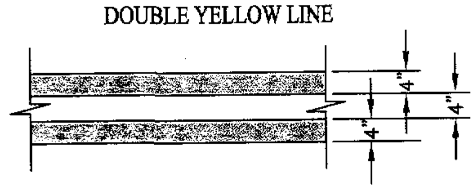
*(1) LENGTH OF R, STORAGE, AND TRANSITION TO BE INCREASED BASED UPON TRAFFIC DENSITY, ROAD DESIGN, SPEED, AND PRESENCE OR ABSENCE OF TRAFFIC SIGNALS.

(2) MEDIAN STRIPING FOR MINOR ARTERIAL.

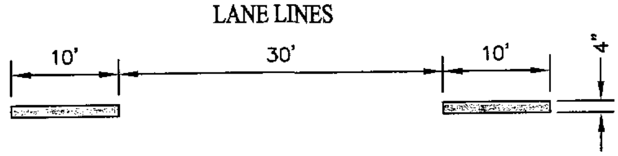
(3) PERMANENT PAVEMENT MARKING MATERIALS TO BE USED AS PER CITY SPECIFICATIONS.

(4) LANE MARKINGS TO BE FURNISHED AND INSTALLED MAY INCLUDE PERMANENT THERMO-PLASTIC MARKINGS, TRAFFIC BUTTONS OR OTHER STRIPING MATERIALS APPROVED BY THE CITY ENGINEER.

DOUBLE YELLOW LINE



LANE LINES



TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

MEDIAN STRIPING WITHOUT BIKE LANES

3-36

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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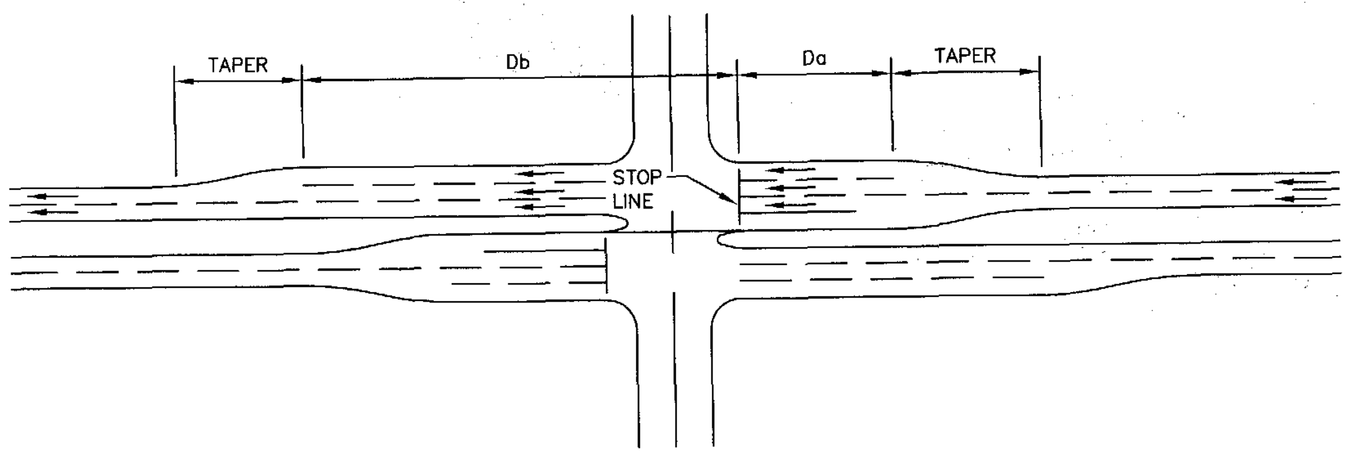

LENGTH OF WIDENING BEYOND INTERSECTION

LENGTH REQUIRED FOR ACCELERATION		
DESIGN SPEED (MPH)	Db (FEET)	TAPER (FEET)
40	200	200
45	375	225
50	525	250

LENGTH OF WIDENING IN ADVANCE OF INTERSECTION

LENGTH REQUIRED FOR DECELERATION		
DESIGN SPEED (MPH)	Da (FEET)	TAPER (FEET)
40	150	175
45	175	200
50	200	225

LENGTH REQUIREMENTS FOR ACCELERATION AND DECELERATION TURNING LANE

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

ACCELERATION AND DECELERATION LANES

3-37

Approved By R. A. SHUBERT
Date JUNE 03, 2008
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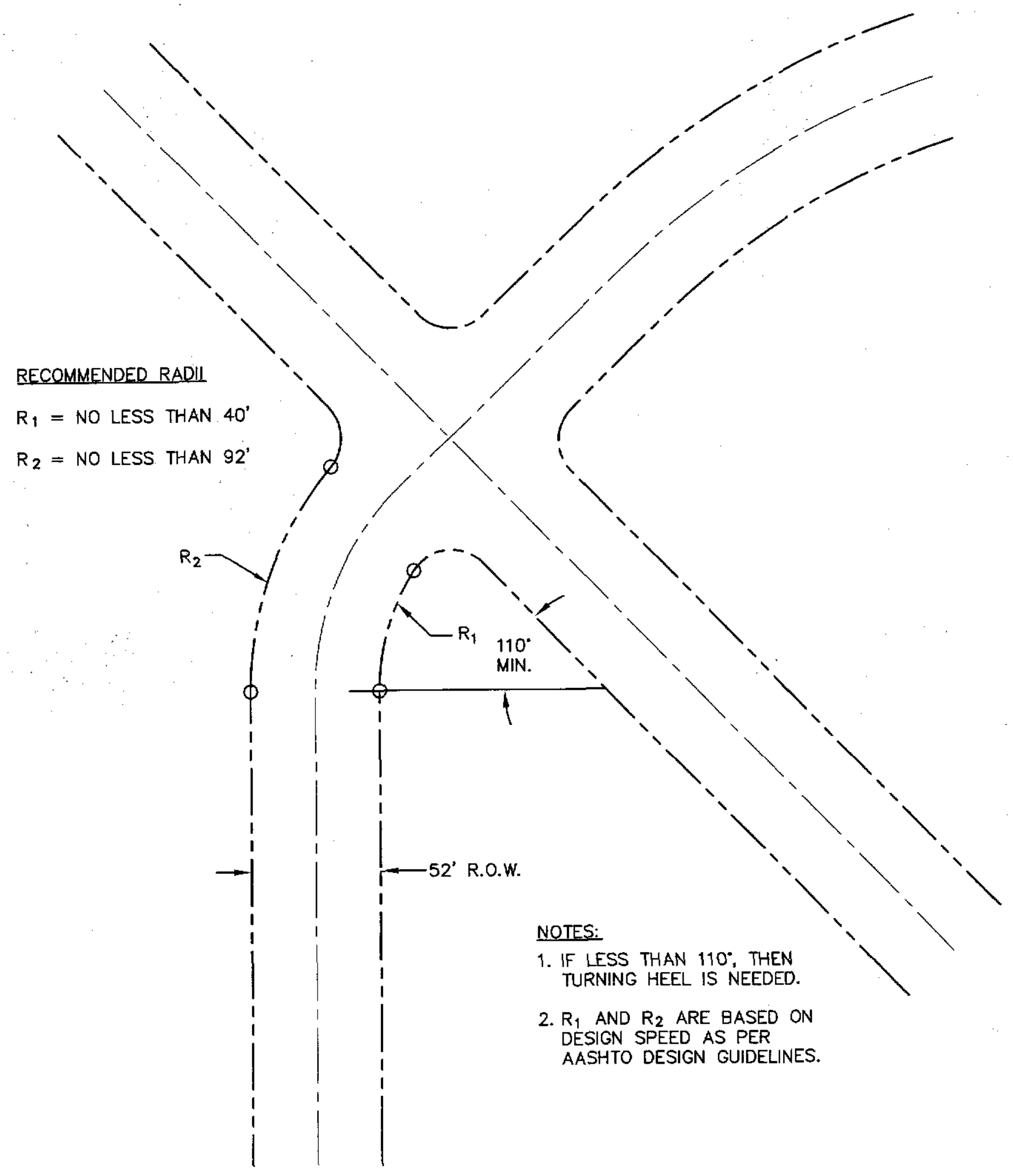

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

MINIMUM RADII AT INTERSECTION APPROACH

3-38

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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INTERSECTION DESIGN

1. STREETS SHALL BE LAID OUT SO AS TO INTERSECT AS NEARLY AS POSSIBLE AT RIGHT ANGLES. NO INTERSECTION SHALL BE LESS THAN AN INCLUDED ANGLE OF SEVENTY DEGREES AND NO MORE THAN ONE HUNDRED TEN DEGREES.

2. THE RIGHT-OF-WAY LINE AT STREET INTERSECTIONS SHALL HAVE A MINIMUM RADIUS OF TWENTY (20) FEET.

3. WHERE PARALLEL STREETS INTERSECT ANOTHER STREET, THE CENTERLINE OF THOSE STREETS SHALL BE OFFSET A MINIMUM OF ONE HUNDRED TWENTY (120) FEET. THIS OFFSET SHALL NOT APPLY TO MINOR ARTERIAL STREETS INTERSECTING A HIGHER ORDER ARTERIAL, IF A RAISED MEDIAN IS PROVIDED AND NO MEDIAN OPENING IS ALIGNED WITH OR RAISED BETWEEN THE OFFSET STREETS. FUTURE MEDIAN OPENINGS SHALL NOT BE PERMITTED WHERE TWO (2) MINOR ARTERIAL STREETS OFFSET AND INTERSECT A MAJOR ARTERIAL STREET AT A DISTANCE OF LESS THAN ONE HUNDRED TWENTY(120) FEET; PROVIDED, HOWEVER MEDIAN OPENINGS MAY BE ALLOWED FOR ONEWAY TRAFFIC CIRCULATION SUBJECT TO THE APPROVAL OF THE DIRECTOR OF TRAFFIC AND TRANSPORTATION DEPT.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

INTERSECTION DESIGN REQUIREMENTS 3-39

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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GEOMETRIC DESIGN OF ROADWAYS

DESIGN SPEED (m.p.h.)	HORIZONTAL ALIGNMENT MINIMUM CURVE RADIUS (ft)	VERTICAL ALIGNMENT RATE OF VERTICAL CURVATURE (K–VALUE)		INTERSECTION SIGHT DISTANCE MINIMUM SIGHT DISTANCE (ft)
		CREST	SAG	
15	180	20	30	125
25	(INFORMATION TO BE INCORPORATED AT A LATER DATE)			
30	300	30	40	325
35	475	50	50	400
40	675	80	70	500
45	1,100	120	90	500
50	1,400	160	110	600

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

GEOMETRIC DESIGN OF ROADWAY

3-40

Approved By R. A. SHUBERT
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Checked By H. M. E.
Drawn By QEC / J. R.

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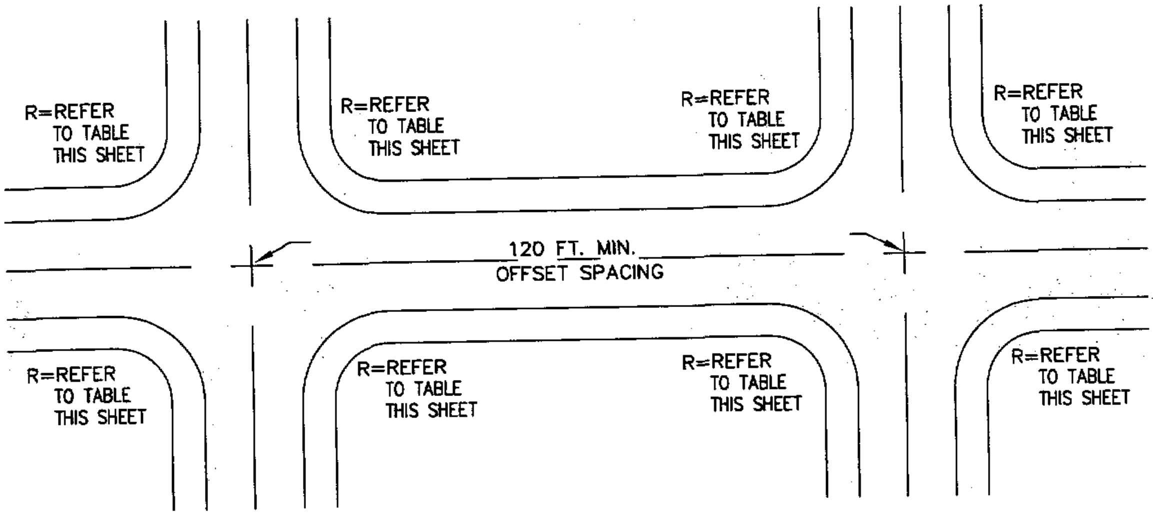

INTERSECTION DESIGN

ROADWAY CLASSIFICATION	DESIGN SPEED
ALLEY	15
(INFORMATION TO BE INCORPORATED AT A LATER DATE)	25
MINOR RESIDENTIAL ACCESS	30
MAJOR RESIDENTIAL ACCESS	30
RESIDENTIAL SUBCOLLECTOR	30
DIVIDED RESIDENTIAL	30
MOUNTAIN RESIDENTIAL & DIVIDED MOUNTAIN RESIDENTIAL:	
< 200 ADT	20
≥ 200 ADT	25
STUB STREET	25
COLLECTOR ARTERIAL	35
MINOR ARTERIAL	40
MAJOR ARTERIAL	45
SUPER ARTERIAL	50

Minimum Curvature of Curbs at Street Intersections	
Intersection	Curb Turn Radius
Local with: Local, Subcollector, or Collector	25'
Local with: Arterial or Freeway	25'
Subcollector with: Subcollector, or Collector	20'
Subcollector with: Arterial or Freeway	25'
Collector with: Collector	25'
Collector with: Arterial or Freeway	30'
Arterial with: Arterial or Freeway	40'

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

INTERSECTION DESIGN

3-41

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
Drawn By QEC / J. R.

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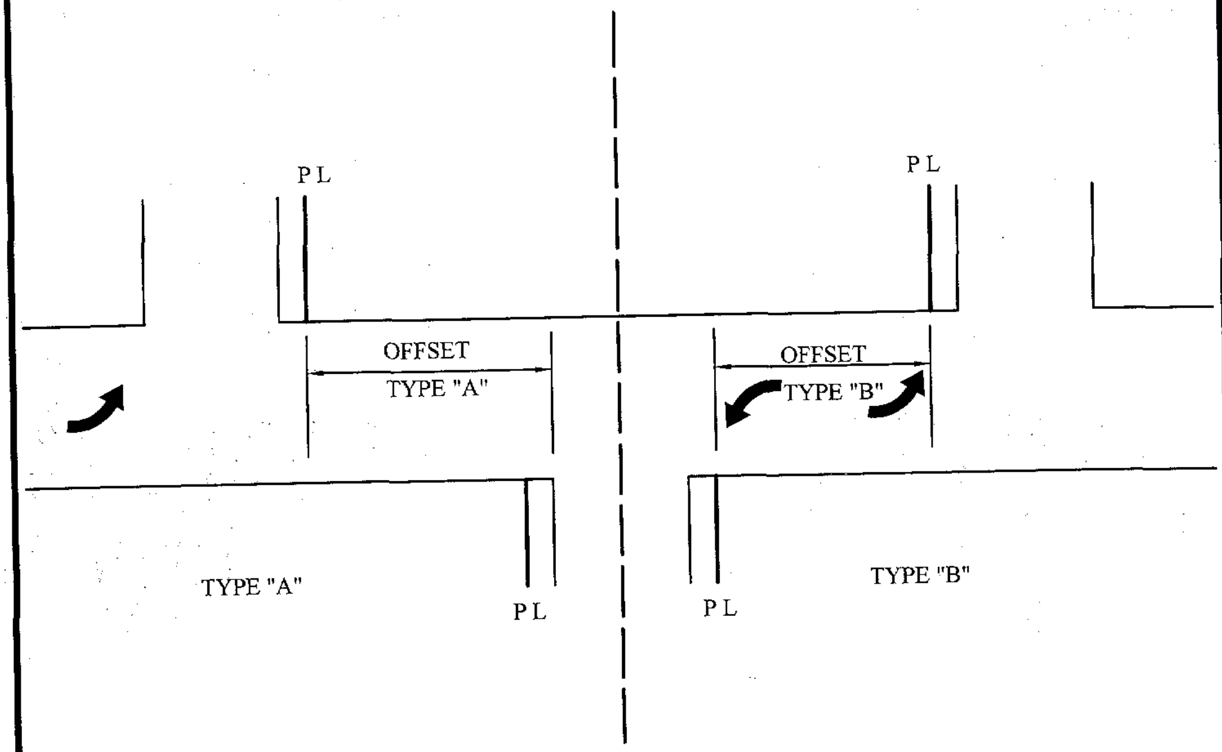

INTERSECTION OFFSET

NOTE:
REFER TO SECTION 19.15.12 - STREET OFFSETS, TABLE 19.15-4 OF THE SUBDIVISION ORDINANCE FOR MINIMUM OFF-SET DISTANCES

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

INTERSECTION OFFSET

3-41A

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Date JUNE 03, 2008
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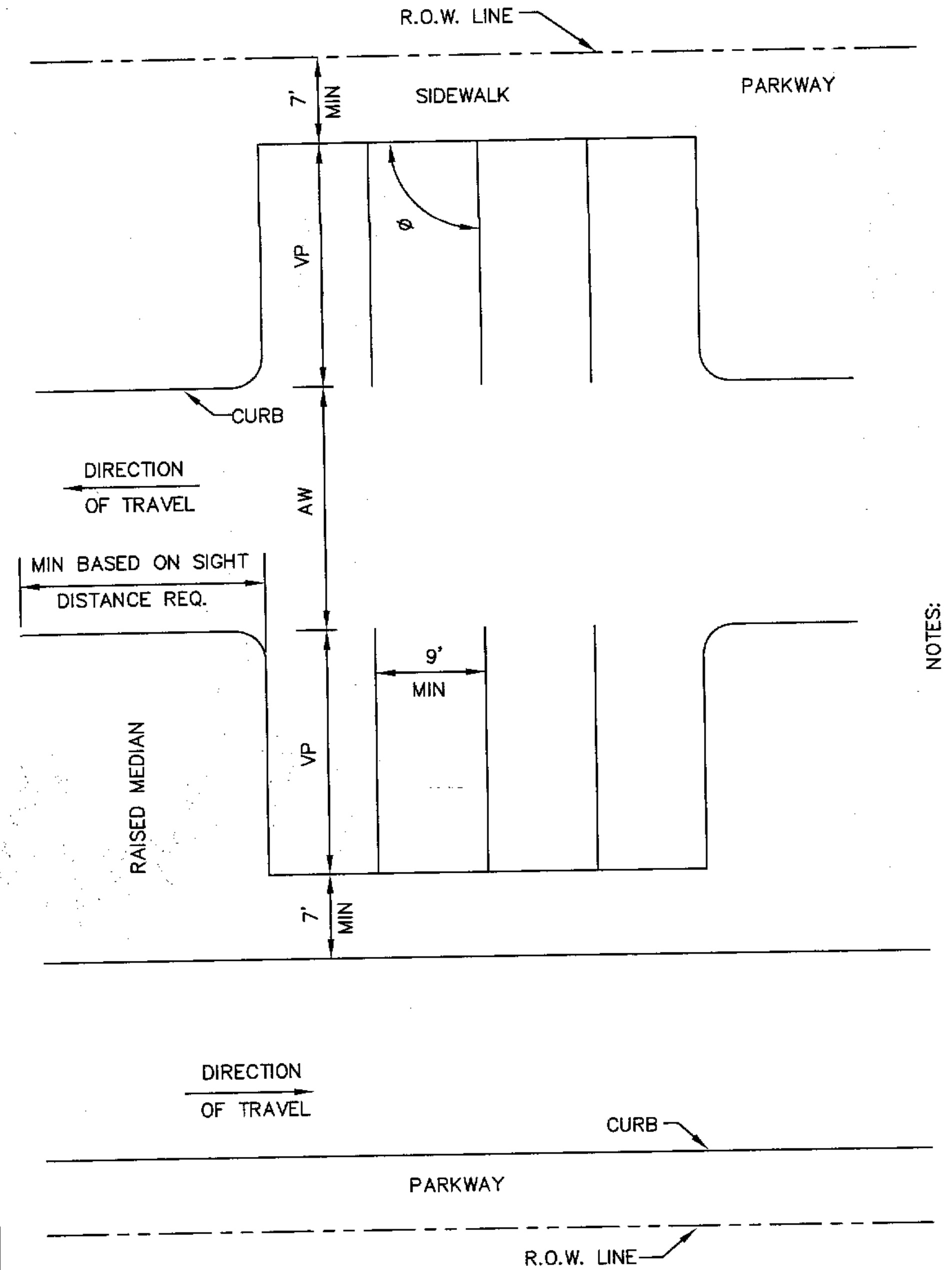

NOTES:
1) FOR TWO-WAY CIRCULATION ON A STREET, ROADWAY SHALL BE A MINIMUM OF 2 x AW WIDTH.
2) CLUSTER PARKING ON PARKWAY OR MEDIAN SHALL MEET MINIMUM SIGHT DISTANCE REQUIREMENTS OF INTERSECTIONS.
3) OTHER APPLICATIONS FOR CLUSTER PARKING SHALL BE PERMITTED UPON THE APPROVAL OF THE CITY ENGINEER BASED ON AASHTO GUIDELINES.

ANGLE ø	VEHICLE PROJECTION VP	AISLE WIDTH AW
45°	18'-0"	13'-0"
60°	19'-6"	16'-0"
75°	19'-9"	20'-0"
90°	20'-0"	20'-0"

CLUSTER PARKING

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

CLUSTER PARKING

3-42

Approved By R. A. SHUBERT | Checked By H. M. E.
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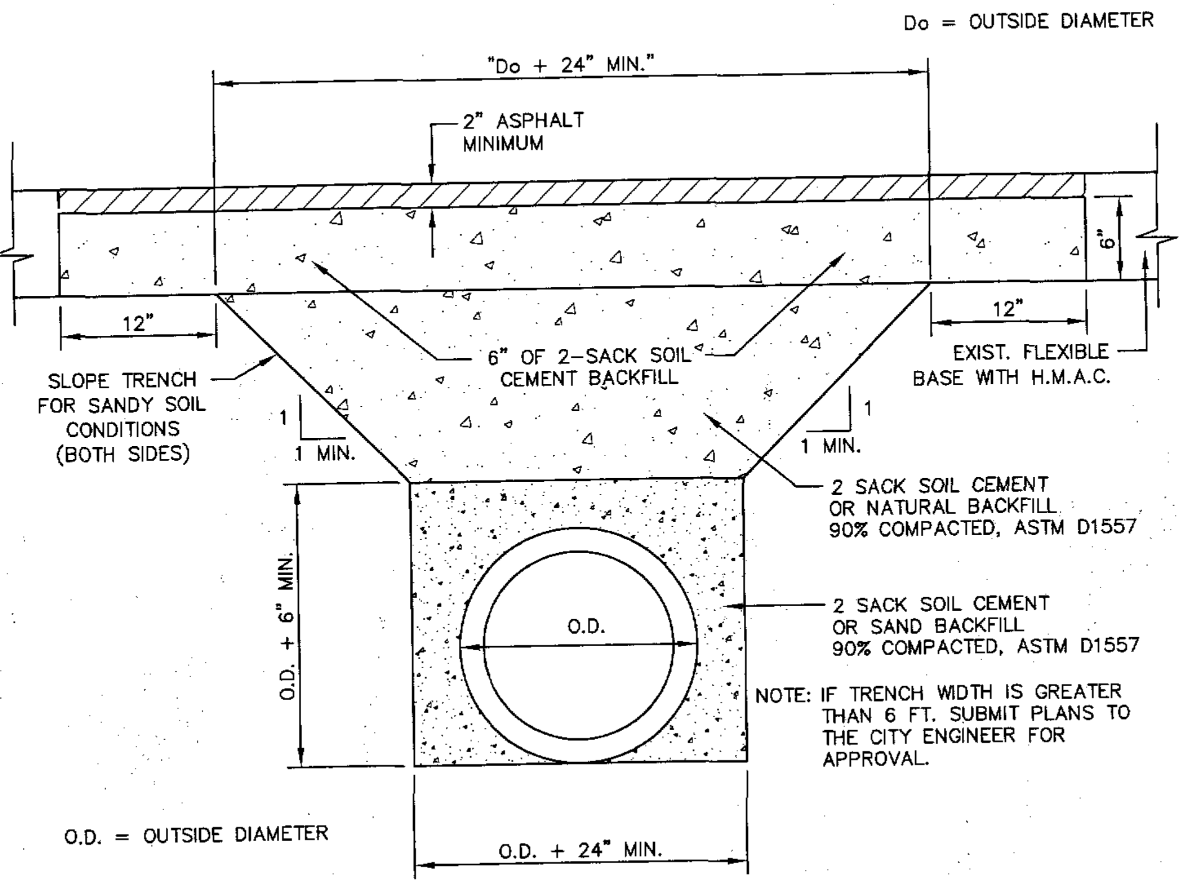
TRENCH BACKFILL & PAVEMENT REPLACEMENT



TYPICAL SECTION FLEXIBLE BASE WITH H.M.A.C. SURFACE

A. ALL ASPHALT CUTS MUST BE SAW CUT.

B. TWO SACK SOIL CEMENT MIX MUST BE 2 SACKS OF CEMENT PER ONE CUBIC YARD OF SOIL.

C. PLACE BACKFILL MATERIAL IN 8" MAX. LIFTS AND COMPACT AS SPECIFIED.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	STREET PAVING CUT 3-43
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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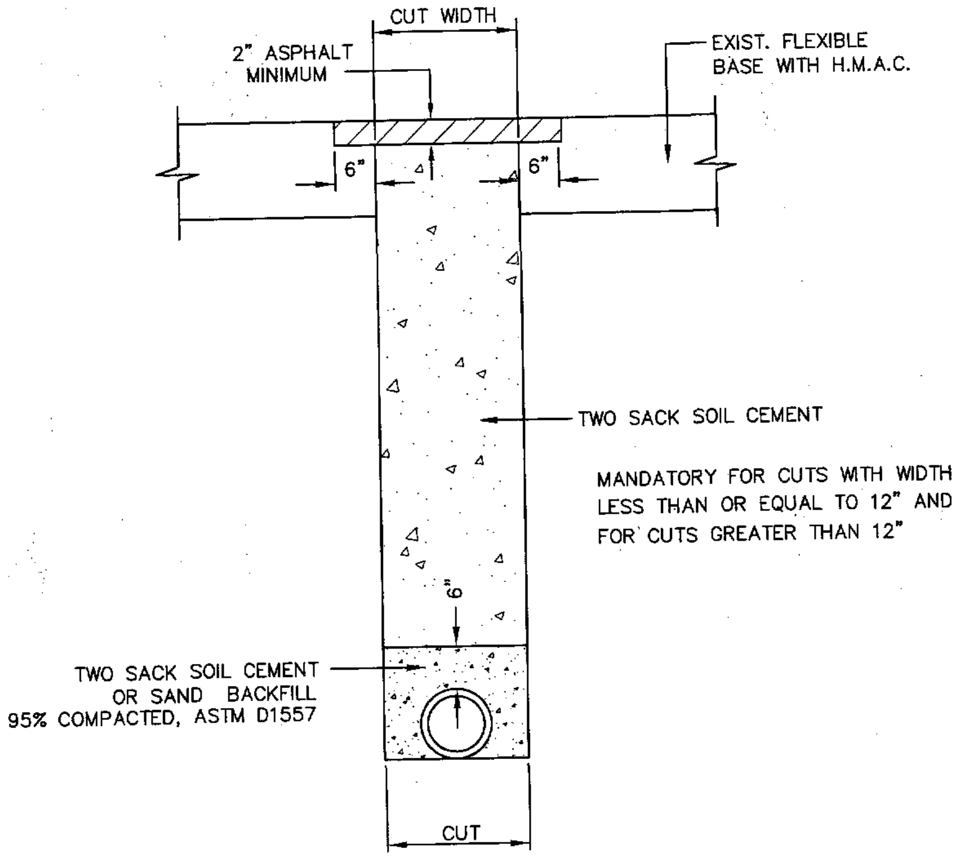
CONDUIT TRENCHING



TYPICAL SECTION FLEXIBLE BASE WITH H.M.A.C. SURFACE

1. ALL ASPHALT CUTS MUST BE SAW CUT.
2. TWO SACK SOIL CEMENT MIX MUST BE 2 SACK OF CEMENT PER ONE CUBIC YARD OF SOIL.

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

STREET PAVING CUT (CONDUIT) 3-44

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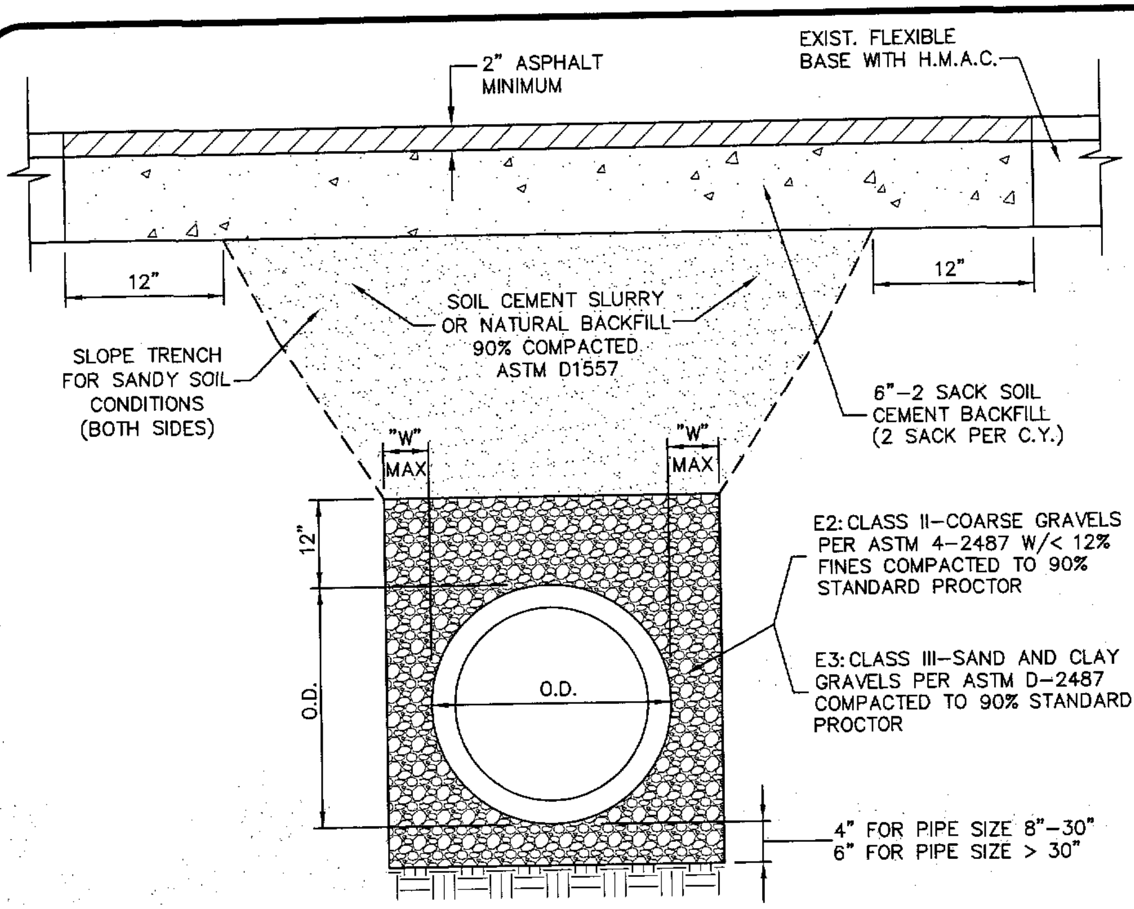

GENERAL NOTES

1. NATURAL MATERIAL MAY BE USED PROVIDED IT MEETS THE SPECIFICATONS FOR CLASS II OR III MATERIALS.
2. EMBEDMENT CONDITIONS SHOWN FOR DRY TRENCH.

CONSTRUCTION KEY NOTES

A. PLACE EMBEDMENT MATERIAL IN 8" MAX. LIFTS AND COMPACT AS SPECIFIED.
B. TRENCH DIMENSION "W" AS FOLLOWS

PIPE DIAMETER	"W"
LESS THAN 24'	9"
24' THRU 48"	12"
GREATER THAN 48"	O.D./4

STREET PAVING CUT FOR FLEXIBLE PIPE

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

STREET PAVING CUT FOR FLEXIBLE PIPE

3-45

Approved By R. A. SHUBERT	Checked By H. M. E.
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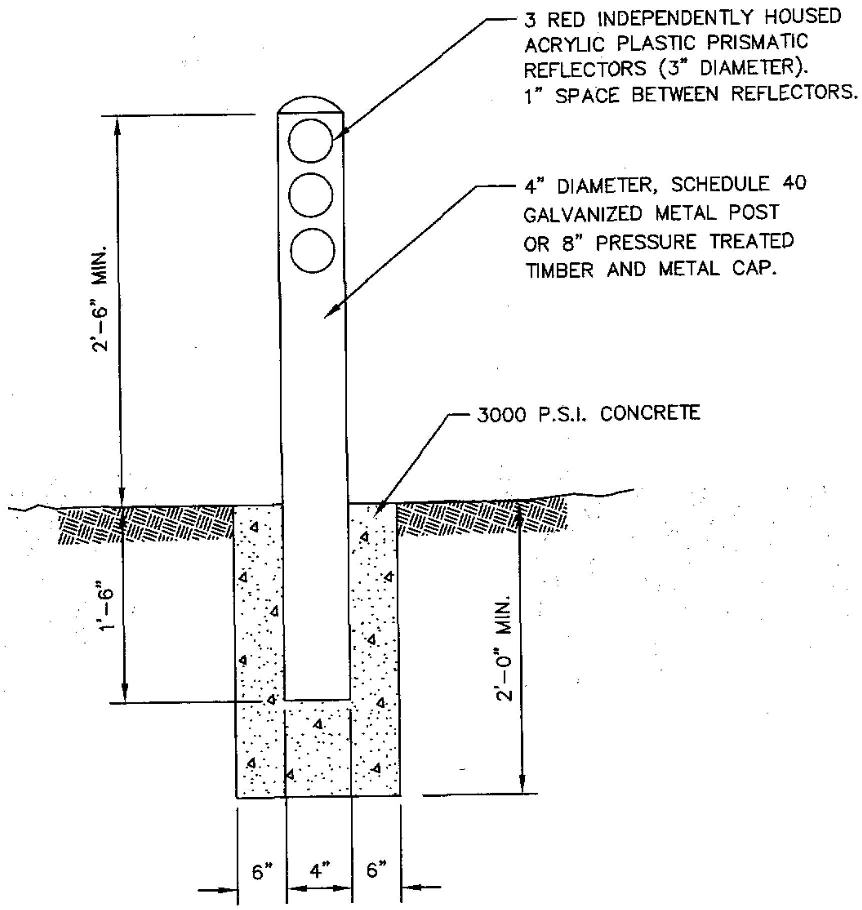

METAL GUARD POST DETAIL

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	GUARD POST DETAIL 3-46 Approved By R. A. SHUBERT Date JUNE 03, 2008 Checked By H. M. E. Drawn By QEC / J. R.

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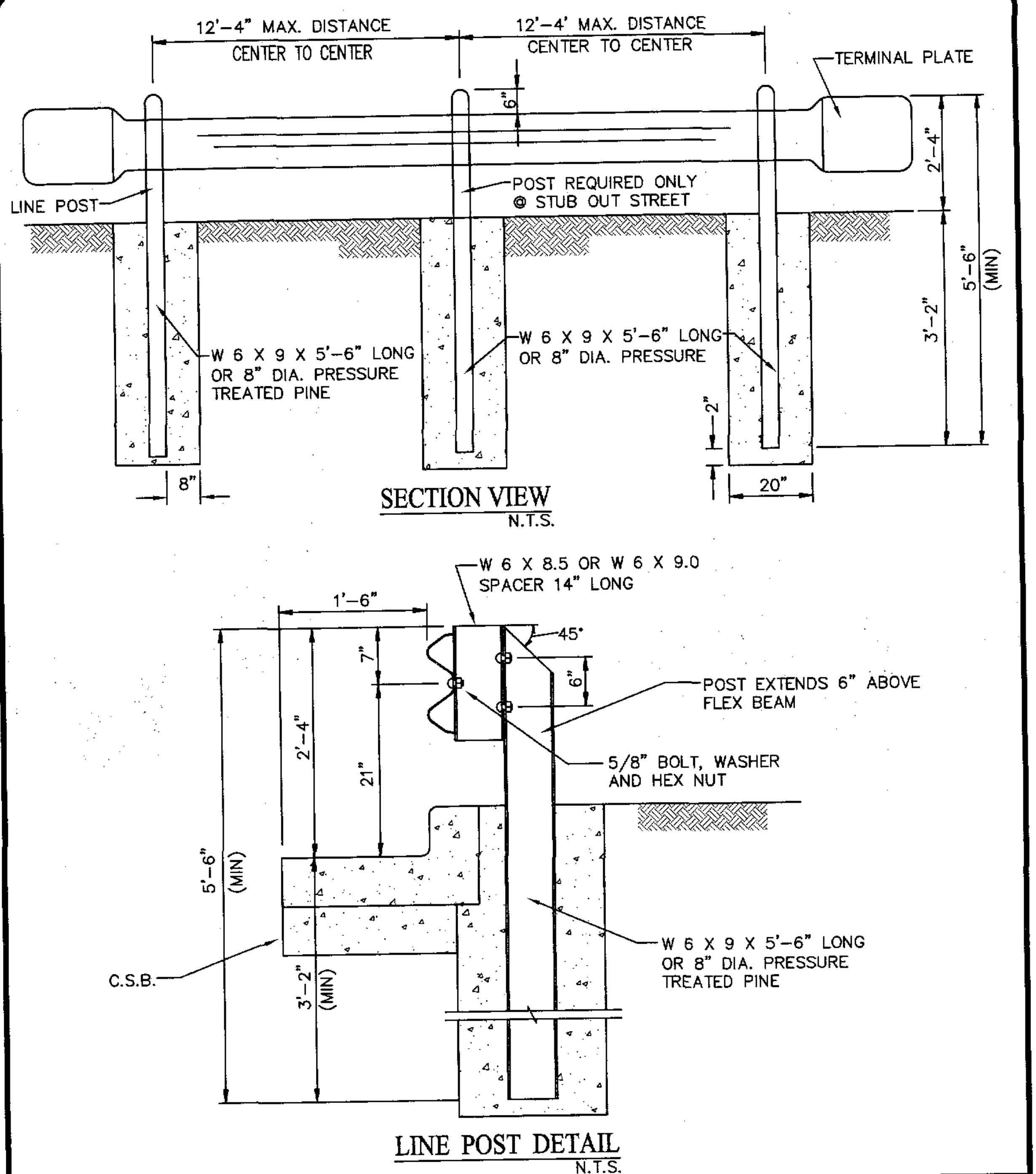

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

GUARD RAIL

3-47

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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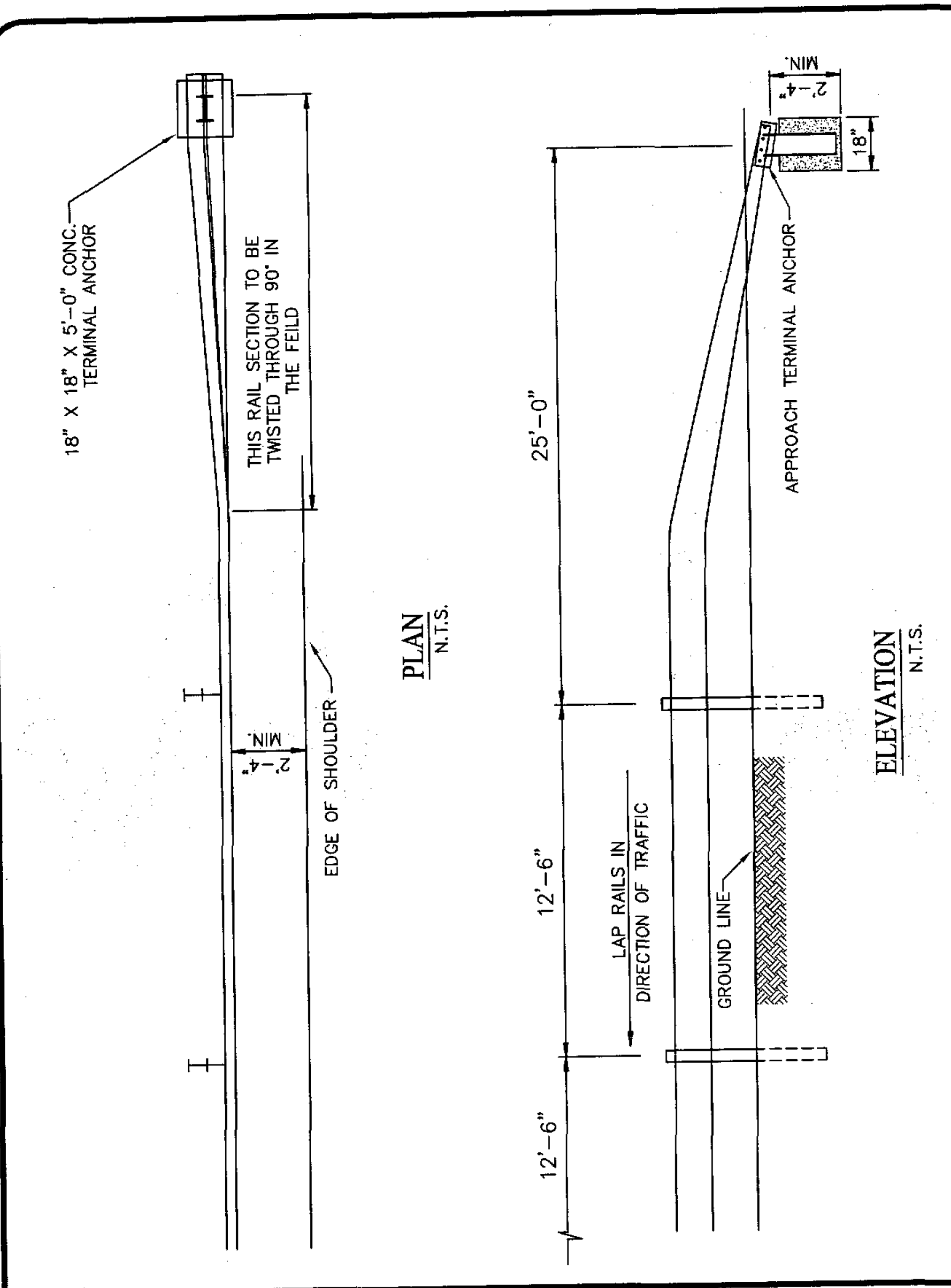

NOTE:
1. ALL STEEL FITTINGS SHALL BE GALVANIZED.
2. SEE NO. 3-44 FOR LINE POST DETAIL.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

TERMINUS METAL BEAM GUARD FENCE

3-48

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
Drawn By QEC / J. R.

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PROPOSED CITY MONUMENT LOCATIONS

A. MONUMENTS SHALL BE INSTALLED SO THAT ALL FRONT PROPERTY CORNERS OF ALL LOTS IN THE SUBDIVISION ARE WITHIN LINE OF SIGHT OF A MONUMENT, OR WITHIN SIGHT OF THE LINE BETWEEN TWO ADJACENT MONUMENTS

B. EACH MONUMENT SHALL BE WITHIN LINE OF SIGHT OF ANOTHER MONUMENT

C. MONUMENTS SHALL BE NO FARTHER THAN 2000 FEET APART

D. AT LEAST ONE (1) MONUMENT SHALL BE PLACED ON EACH HORIZONTAL CURVE (PI) OF THE TANGENTS LEADING INTO THE CURVE FALLS OUTSIDE THE CURB LINE

E. NO FEWER THAN TWO MONUMENTS SHALL BE PLACED IN ONE (1) STREET SUBDIVISIONS.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PROPOSED CITY MONUMENTS LOCATIONS 3-49

Approved By R. A. SHUBERT Checked By H. M. E.
Date JUNE 03, 2008 Drawn By QEC / J. R.

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PLANE SURVEYS AND GEODETIC CONTROL SUBMISSION REQUIREMENTS ON ALL ENGINEERING AND GIS MAP DRAWINGS

SCOPE:

THESE SUBMISSION REQUIREMENTS APPLY TO ALL WORK DONE IN THE CITY AND COUNTY OF EL PASO. IT IS PUT FORTH TO FACILITATE PERSONNEL TO ACCESS AND UPDATE MAP INFORMATION MORE EFFICIENTLY.

ALL FIELD WORK WHICH REQUIRES A SURVEY SHALL BE REQUIRED TO ABIDE TO THE FOLLOWING:

- BENCHMARK(S) ARE TO BE TIED TO THE PUBLISHED CITY OF EL PASO'S GEODETIC CONTROL POINTS, AND REFERENCED TO THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE (TXC SPCS), FIPS 4203. HORIZONTAL DATA WILL BE REFERENCED TO NAD83, AND ELEVATIONS TO NAVD88.
- DETAILED CAD DRAWINGS ILLUSTRATING THE SPATIAL LAYOUT OF THE OVERHEAD (PORTION OF A PARCEL MAP AND/OR UTILITY INFRASTRUCTURE) SHALL HAVE ALL BENCHMARKS REFERENCED TO THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE (TXC SPCS), FIPS 4203. HORIZONTAL DATA WILL BE REFERENCED TO NAD83, AND ELEVATIONS TO NAVD88. THIS WILL ALLOW THE ELECTRONIC DRAWING(S) TO CONFORM AND OVERLAY TO ALL EXISTING ENGINEERING COMPUTER AIDED DESIGNS, GIS LAYERS AND IMAGERY.

DELIVERY

1. A DIGITAL COPY(S) OF THE COMPUTER AIDED DESIGN DRAWING REFERENCED TO THE TEXAS STATE PLANE COORDINATE SYSTEM , CENTRAL ZONE, FIPS 4203, NAD83, AND ELEVATIONS TO NAVD88; ELEVATIONS WILL BE NOTED (ANNOTATED) NEXT TO THE BENCHMARK(S) IN BOTH NAVD88 AND GROUND/SURFACE COORDINATES.
2. A HARD COPY.
3. A REPORT ON THE ELEVATIONS OF SURVEYED BENCHMARKS IN GROUND COORDINATES AND REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988

AN ADDITIONAL REPORT IS REQUIRED WHEN A NEW BENCHMARK IS TIED INTO THE SURVEY. THE REPORT WILL INCLUDE THE SURVEYED COORDINATES AND THE TIED COORDINATES AS THEY READ FROM THE CITY OF EL PASO'S GEODETIC CONTROL SYSTEM.

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PLANE SURVEYS AND GEODETIC CONTROL

3-50

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
Drawn By QEC / J. R.

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SURVEYS AND MONUMENTS

TEXAS COORDINATE SYSTEM MONUMENTATION: SUBDIVISION PLATS INTRODUCED TO THE CITY OF EL PASO SHALL BE TIED TO TEXAS STATE PLANE COORDINATE SYSTEM CONTROL ZONE, IN CONFORMANCE WITH THE REQUIREMENTS OF DIVISION X, CHAPTER X, SECTION XXX ET SEQ. OF THE PUBLIC RESOURCES CODE OF THE STATE OF TEXAS, UNLESS WAIVED IN WRITING BY THE CITY ENGINEER. COORDINATES AND BEARINGS MAY BE BASED UPON TEXAS CENTRAL STATE PLANE COORDINATE SYSTEM AND SHALL BE BASED UPON THE HORIZONTAL DATUM OF 1983 AND VERTICAL DATUM OF 1988. ALL TIES SHALL BE IDENTIFIED WITH GRID BEARINGS AND GROUND LEVEL DISTANCES, AND THE FOLLOWING NOTE SHALL APPEAR ON ALL SHEETS OF THE MAP UPON WHICH ANY PARCEL IS SHOWN:

TEXAS STATE PLANE COORDINATE SYSTEM: COORDINATES AND BEARINGS SHOWN HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, FIPS 4203, US SURVEY FEET (NAD 83, NAVD 88) AND TIED TO THE CITY OF EL PASO'S GEODETIC CONTROL POINT SURVEY. DISTANCES SHOWN ARE GROUND LEVEL DISTANCE. TO OBTAIN GRID DISTANCE, MULTIPLY GROUND LEVEL DISTANCE BY (COMBINATION FACTOR). THE NORTH ARROW SHALL INDICATE GRAPHICALLY THE DIVERGENCE BETWEEN GEODETIC NORTH AND GRID NORTH, AND THE THETA (0) ANGLE SHALL BE SHOWN NOTING AT WHICH MONUMENT SAID ANGLE WAS COMPUTED. THE ONLY COORDINATES APPEARING ON THE FINAL MAP SHALL BE FOR THE PRIMARY GEODETIC CONTROL STATIONS.

BOUNDARY MONUMENTS: MONUMENTS SHALL BE SET OR REFERENCED ON THE EXTERIOR BOUNDARY OF THE SUBDIVISION AT ALL CORNERS, ANGLE POINTS, BEGINNING AND ENDS OF CURVES AND AT INTERMEDIATE POINTS NOT TO EXCEED 1,000 FEET APART. THE LOCATION OF INACCESSIBLE POINTS SHALL BE ESTABLISHED BY TIES TO THE CITY OF EL PASO'S GEODETIC CONTROL POINT SURVEY AND SHALL BE NOTED ON THE FINAL MAP OR PARCEL MAP. IF ANY OR ALL OF THE BOUNDARY MONUMENTS ARE TO BE SET AFTER FILING OF THE FINAL MAP OR PARCEL MAP WITH THE COUNTY RECORDER, THE SURVEYOR MAKING THE SURVEY SHALL FURNISH EVIDENCE ACCEPTABLE TO THE CITY ENGINEER TO SUBSTANTIATE HIS REASONS FOR DEFERRING THE SETTING OF SUCH MONUMENTS UNTIL AFTER FILING OF SUCH MAP WITH THE COUNTY RECORDER.

INTERIOR MONUMENTS: MONUMENTS SHALL BE SET AT ALL BLOCK, LOT OR PARCEL CORNERS AND ANGLE POINTS AND AT THE BEGINNINGS AND ENDS OF CURVES AND WITHIN STREET RIGHTS-OF-WAY. IF THE INTERIOR MONUMENTS ARE NOT SET WITHIN THE PERIOD OF TIME SPECIFIED ON THE SURVEYOR'S CERTIFICATE, THE CITY ENGINEER SHALL BY WRITTEN NOTICE FORTHWITH DIRECT THE SURVEYOR OF RECORD TO SET SUCH MONUMENTS WITHIN SIXTY (60) DAYS OF NOTICE, AND FURNISH SUCH FIELD NOTES AS WERE AGREED TO BE SET AND FURNISHED ON SAID CERTIFICATE. IF THE SURVEYOR FAILS TO COMPLY WITH SAID DIRECTIVE AFTER 60 DAYS, THE CITY ENGINEER SHALL WITHOUT FURTHER NOTICE SUBMIT A WRITTEN COMPLAINT AND REQUEST FOR DISCIPLINARY ACTION AGAINST SAID SURVEYOR TO THE TEXAS BOARD OF PROFESSIONAL LAND SURVEYING.

MONUMENT TYPE: ALL BOUNDARY MONUMENTS AND MONUMENTS SET WITHIN EXISTING AND PROPOSED CITY RIGHTS-OF-WAY SHALL BE STANDARD CITY MONUMENTS AND SHALL BE SET TO THE DEPTH AND IN THE MANNER PRESCRIBED IN THE SUBDIVISION STANDARDS.

MONUMENT IDENTIFICATION MARKS: ALL MONUMENTS SET AS REQUIRED HEREIN SHALL BE PERMANENTLY AND VISIBLY MARKED OR TAGGED WITH THE REGISTRATION OR LICENSE NUMBER OF THE SURVEYOR WHO SIGNS THE SURVEYOR'S CERTIFICATE AND UNDER WHOSE SUPERVISION THE SURVEY WAS MADE.

REPLACEMENT OF DESTROYED MONUMENTS: ANY MONUMENT SET AS REQUIRED HEREIN WHICH IS DISTURBED OR DESTROYED BEFORE ACCEPTANCE OF ALL IMPROVEMENTS BY THE CITY SHALL BE REPLACED BY THE SUBDIVIDER'S SURVEYOR AND NEW MONUMENT CERTIFICATION SHALL BE SUBMITTED.

SURVEY DATA AND INFORMATION TO BE SHOWN ON FINAL MAP OR PARCEL MAP: THE FOLLOWING SURVEY DATA AND INFORMATION SHALL BE SHOWN ON EACH FINAL MAP OR PARCEL MAP BASED UPON A FIELD SURVEY: 1) STAKES, MONUMENTS OR OTHER EVIDENCE FOUND ON THE GROUND TOGETHER WITH THEIR PRECISE POSITIONS TO DETERMINE THE BOUNDARIES OF THE SUBDIVISION; AND 2) CORNERS OF ALL ADJOINING PROPERTIES IDENTIFIED BY LOT AND BLOCK NUMBERS, SUBDIVISION NAMES, NUMBERS AND PAGE OF RECORD OR BY SECTION, TOWNSHIP AND RANGE OR OTHER PROPER DESIGNATION.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

SURVEYS AND MONUMENTS

3-51

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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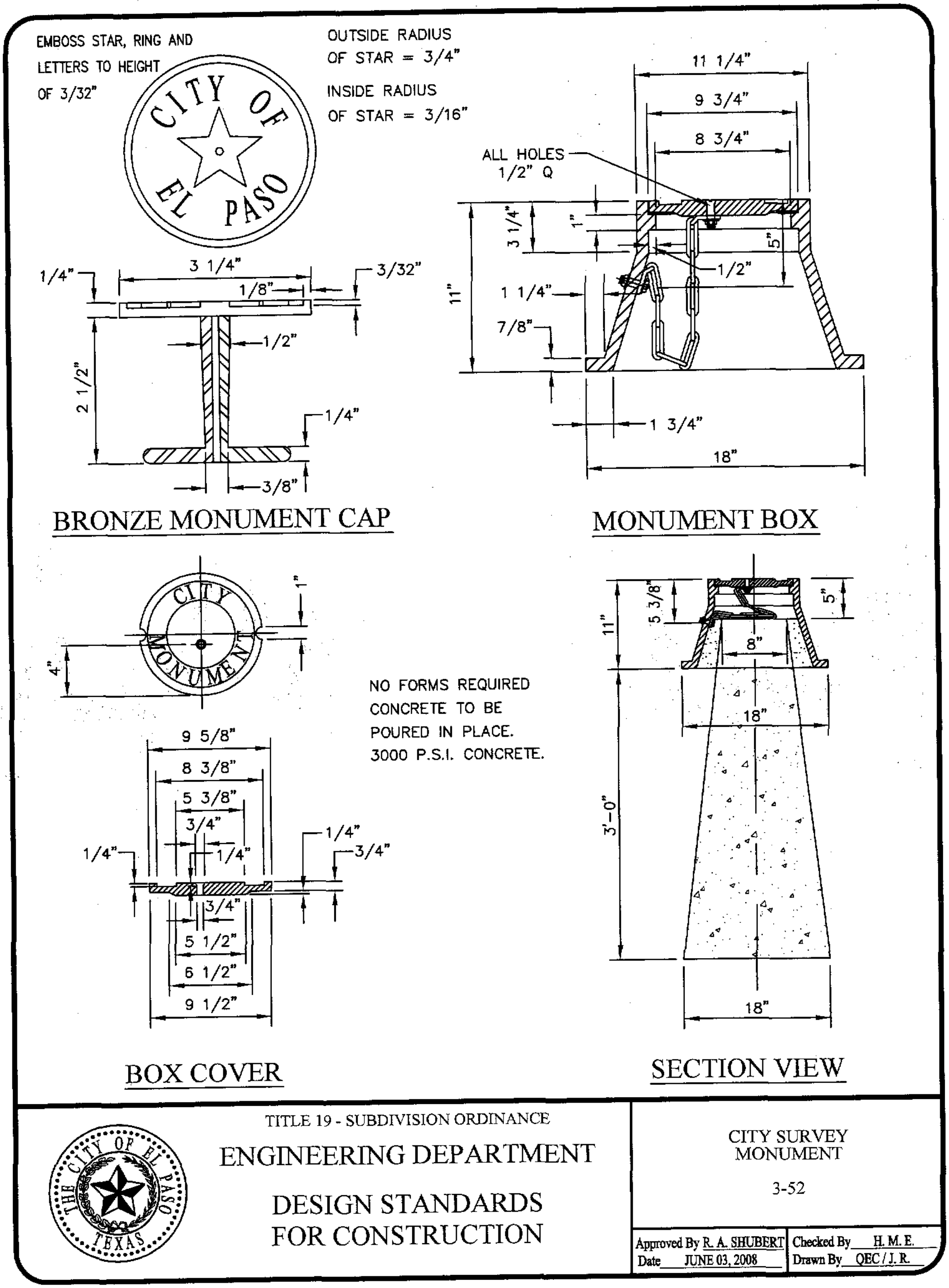

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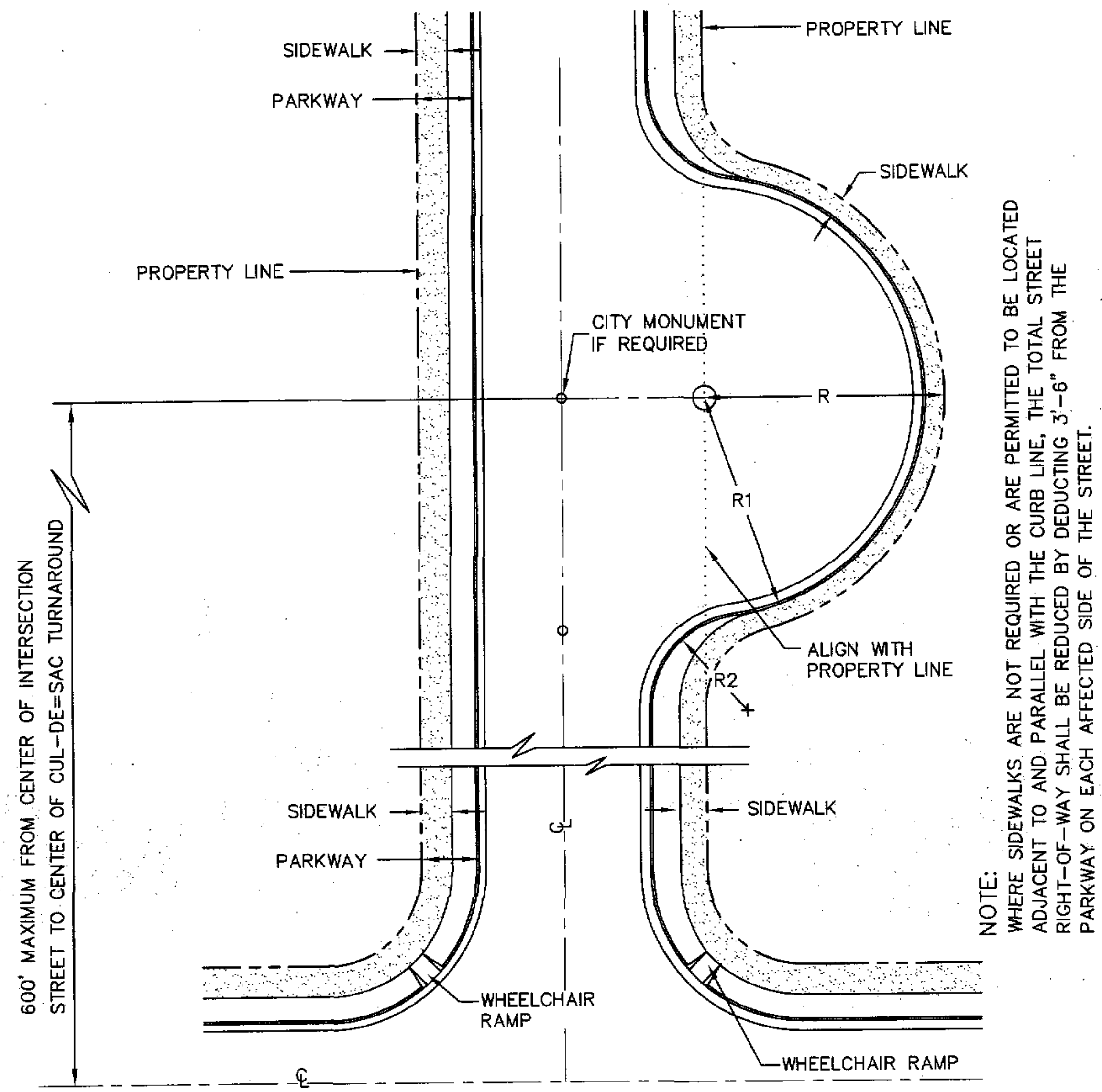

	R	R1	R2
32' LOCAL	58'	54'	20'
RESIDENTIAL COLLECTOR = (36' RDWY.)	50'	46'	20'
MINOR\DIVIDED\MOUNTAIN RESIDENTIAL = (20' RDWY.)	66'	62'	20'
* DIVIDED MOUNTAIN RESIDENTIAL = (10' RDWY.)	–	–	–

* SINGLE EYEBROW CUL-DE-SAC SHALL NOT BE PERMITTED

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

SINGLE EYEBROW
CUL-DE-SAC

3-53

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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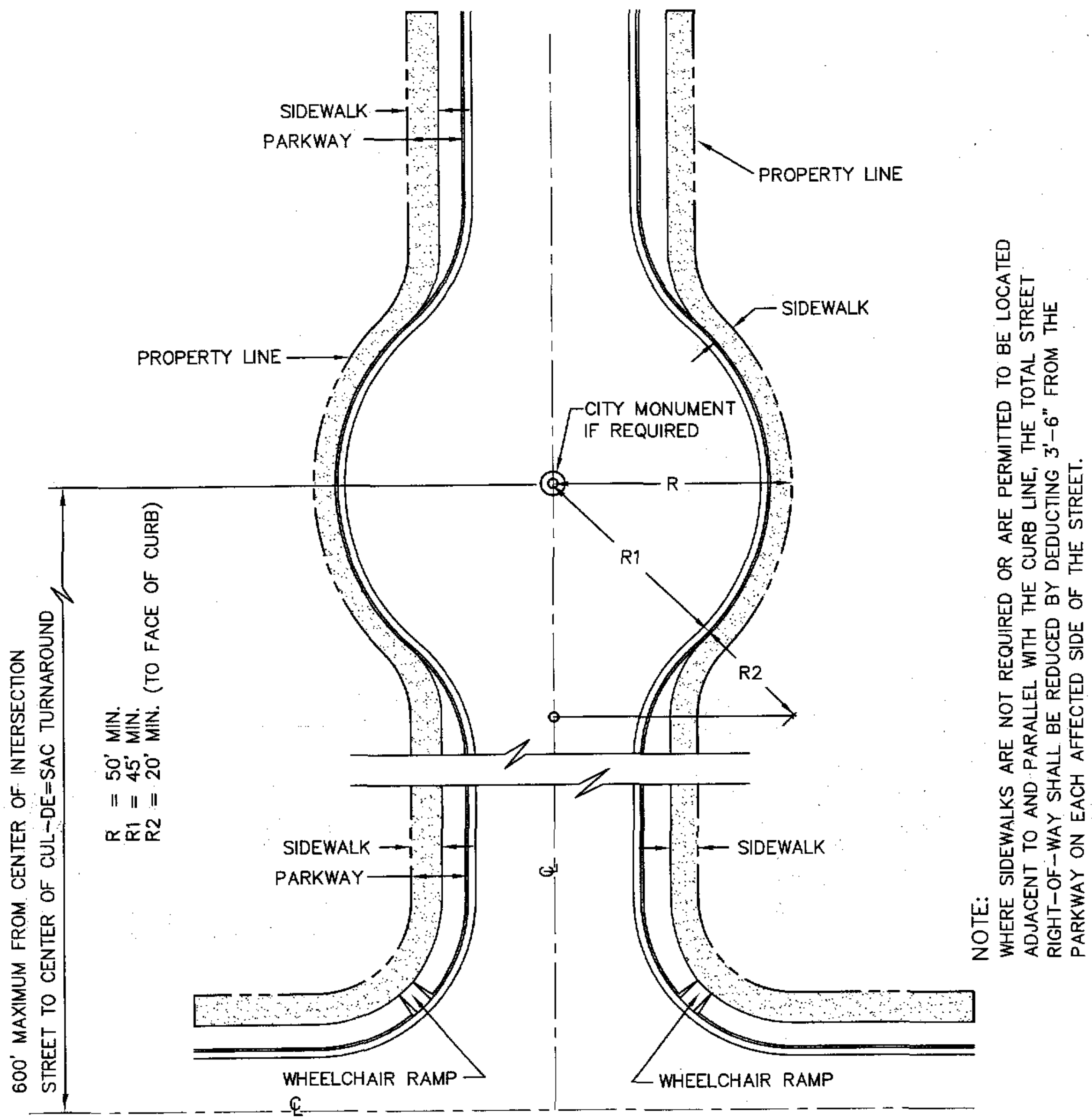

DIVIDED MOUNTAIN RESIDENTIAL DUAL EYEBROW CUL-DE-SAC'S MAY BE PERMITTED SUBJECT TO THE APPROVAL OF THE CITY ENGINEER.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

DUAL EYEBROW CUL-DE-SAC

3-54

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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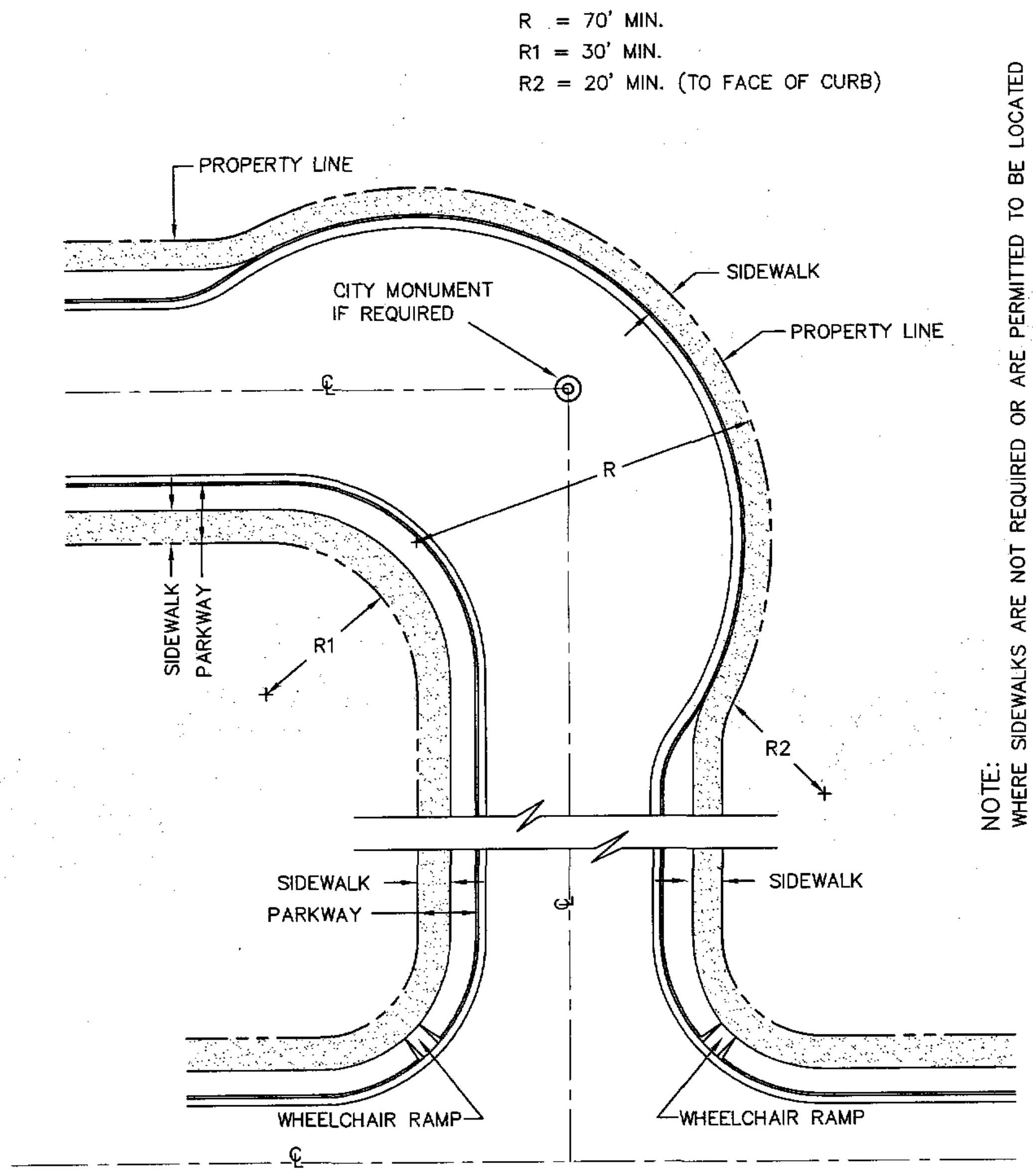

NOTE:
WHERE SIDEWALKS ARE NOT REQUIRED OR ARE PERMITTED TO BE LOCATED ADJACENT TO AND PARALLEL WITH THE CURB LINE, THE TOTAL STREET RIGHT-OF-WAY SHALL BE REDUCED BY DEDUCTING 3'-6" FROM THE PARKWAY ON EACH AFFECTED SIDE OF THE STREET.

TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	TURNING HEEL CURVE 3-55	
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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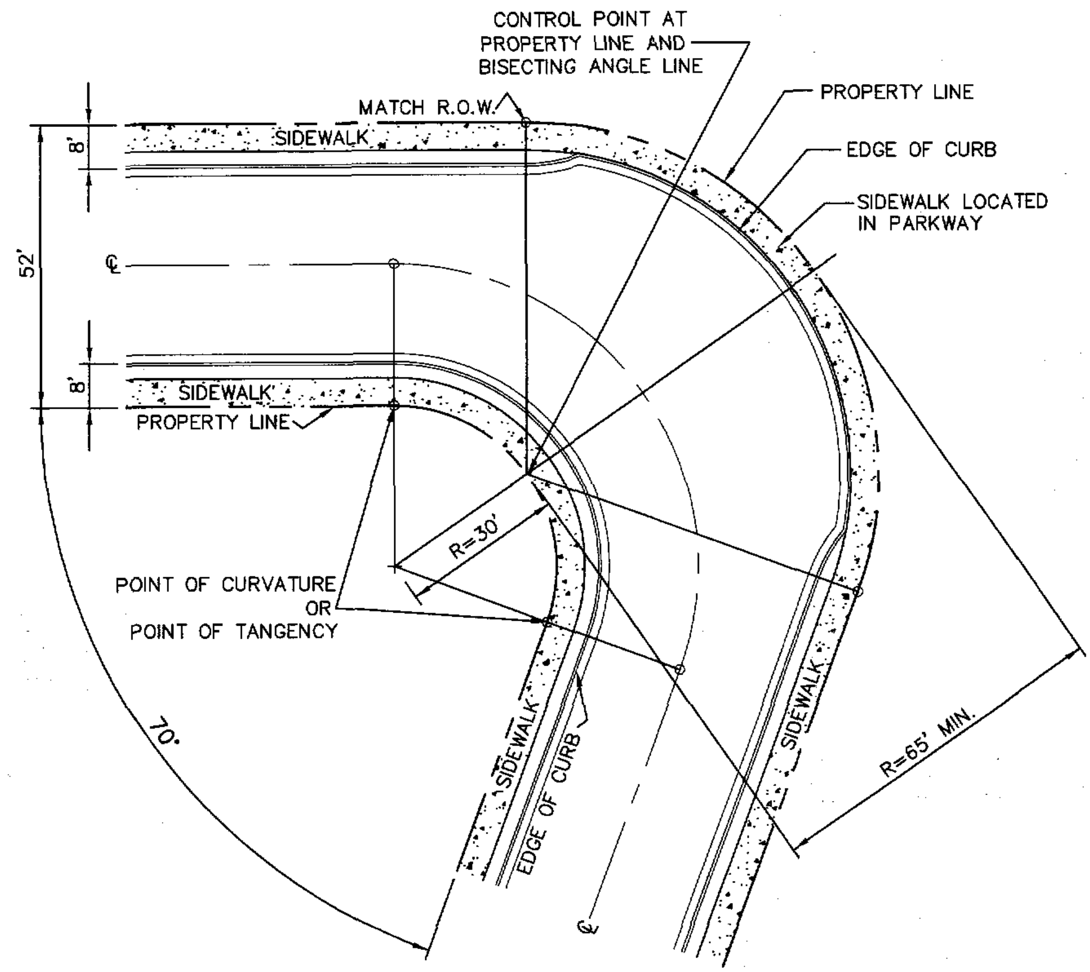

PROPOSED 70 DEGREE ANGLE (MIN.) TURNING HEEL.

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

PROPOSED 70 DEGREE
ANGLE (MIN.) TURNING HEEL
3-56

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Date JUNE 03, 2008	Drawn By QEC / J. R.

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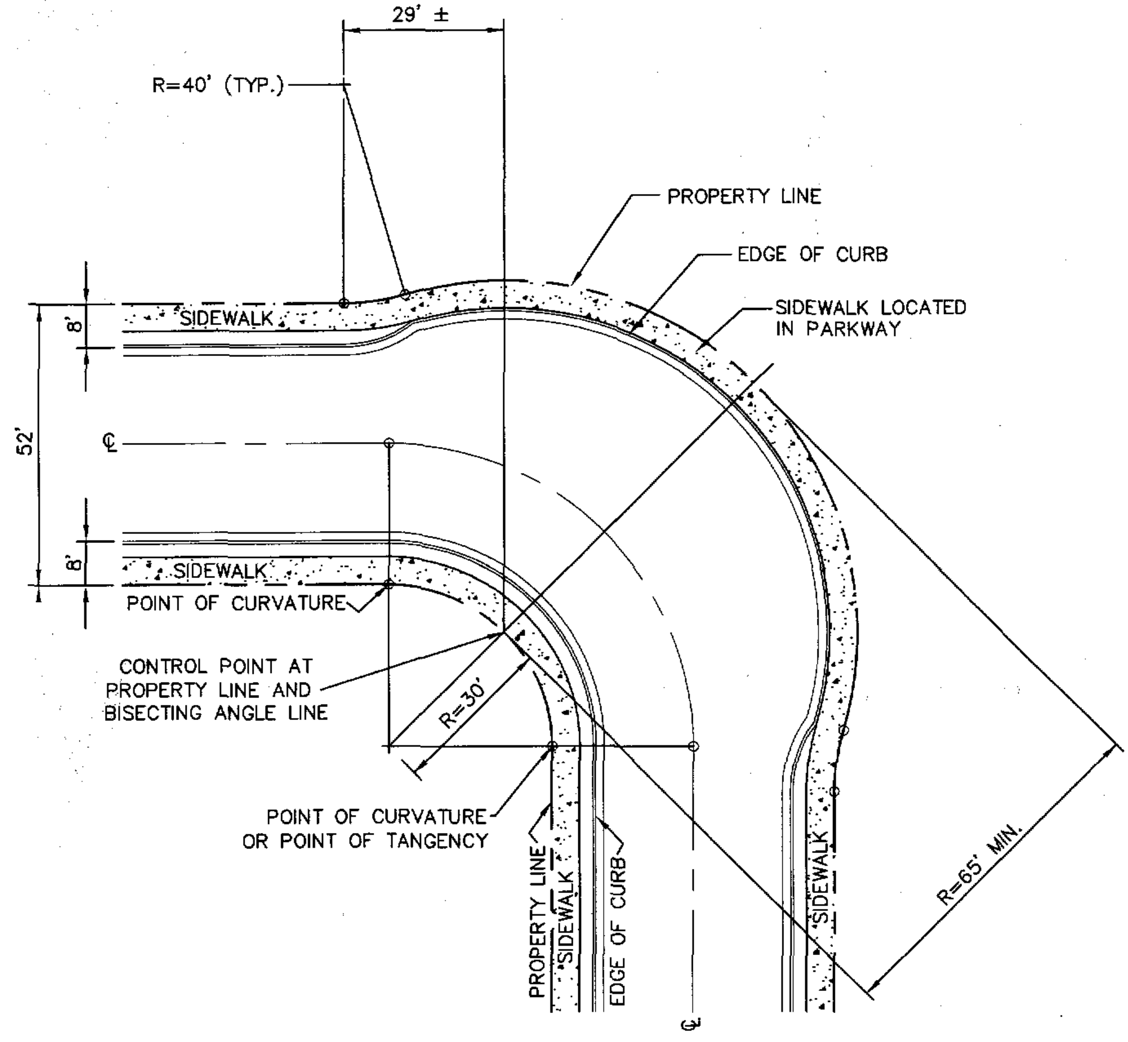

PROPOSED 90 DEGREE ANGLE TURNING HEEL.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	PROPOSED 90 DEGREE ANGLE TURNING HEEL 3-57 Approved By R. A. SHUBERT — Date JUNE 03, 2008 Checked By H. M. E. — Drawn By QEC / J. R.

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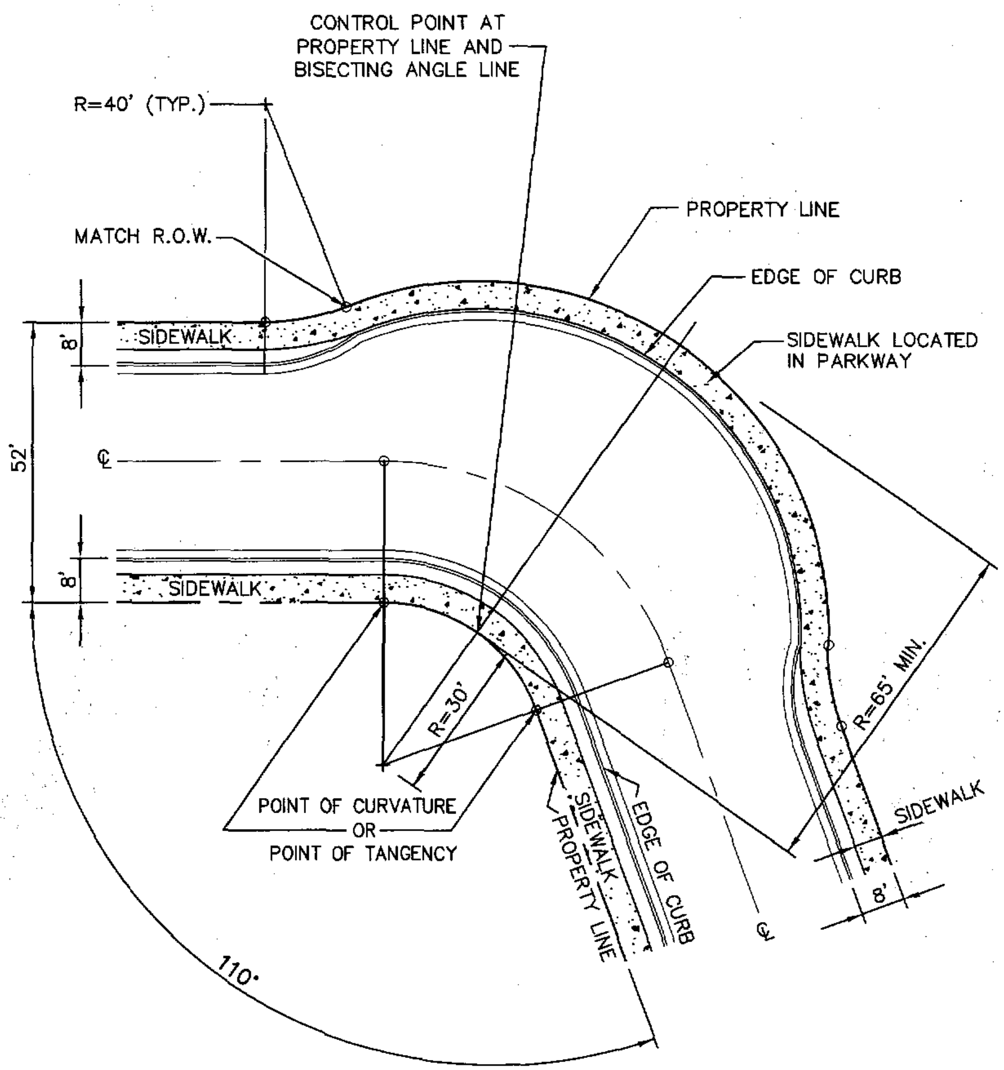

PROPOSED 110 DEGREE ANGLE (MAX.) TURNING HEEL.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	PROPOSED 110 DEGREE ANGLE (MAX.) TURNING HEEL 3-58 Approved By R. A. SHUBERT — Checked By H. M. E. Date JUNE 03, 2008 — Drawn By QEC / J. R.

SECTION 4

SECTION 4

FENCING

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ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

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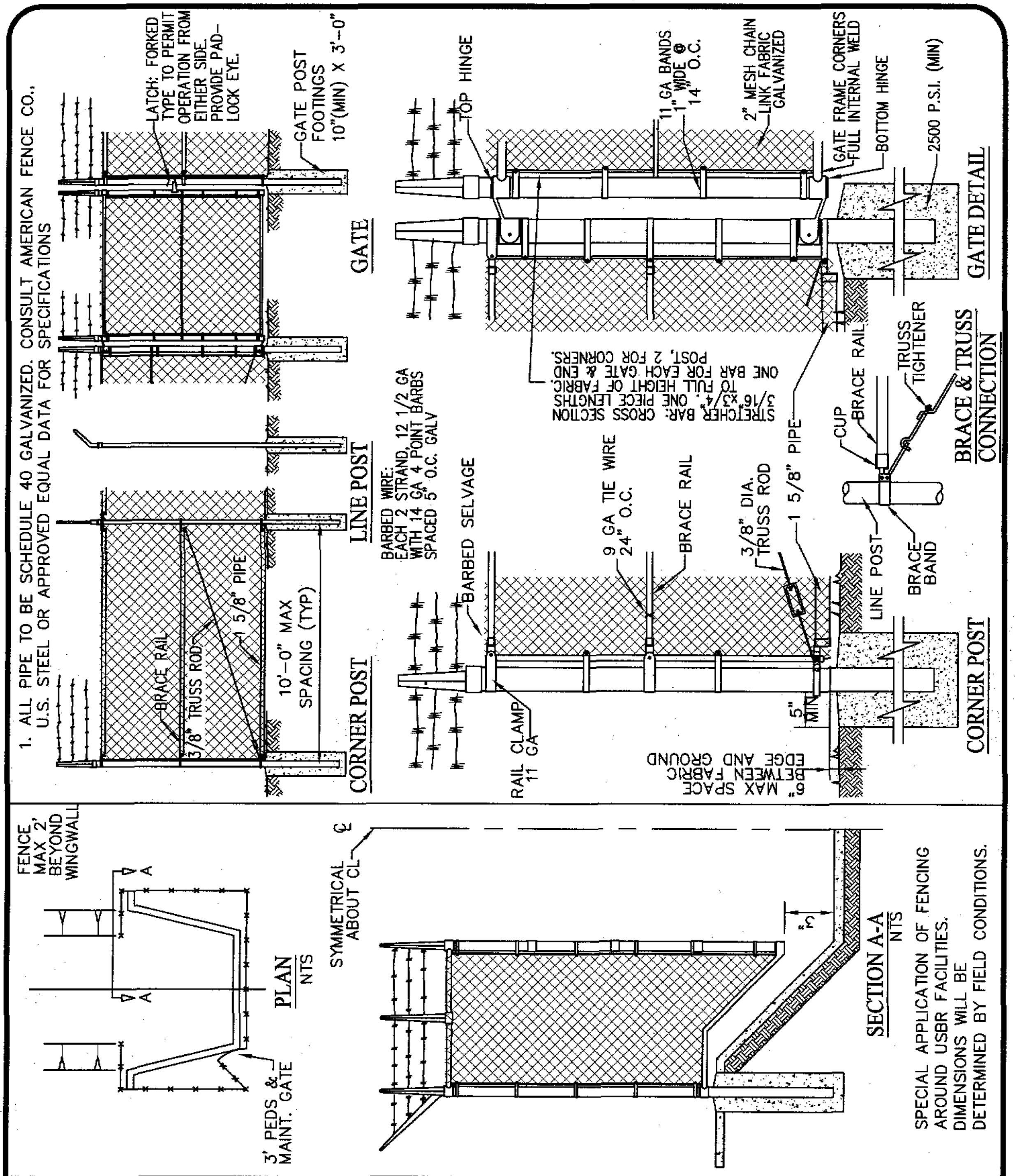

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

CHAINLINK STANDARD DETAILS 4-1

Approved By R. A. SHUBERT	Checked By H. M. E.
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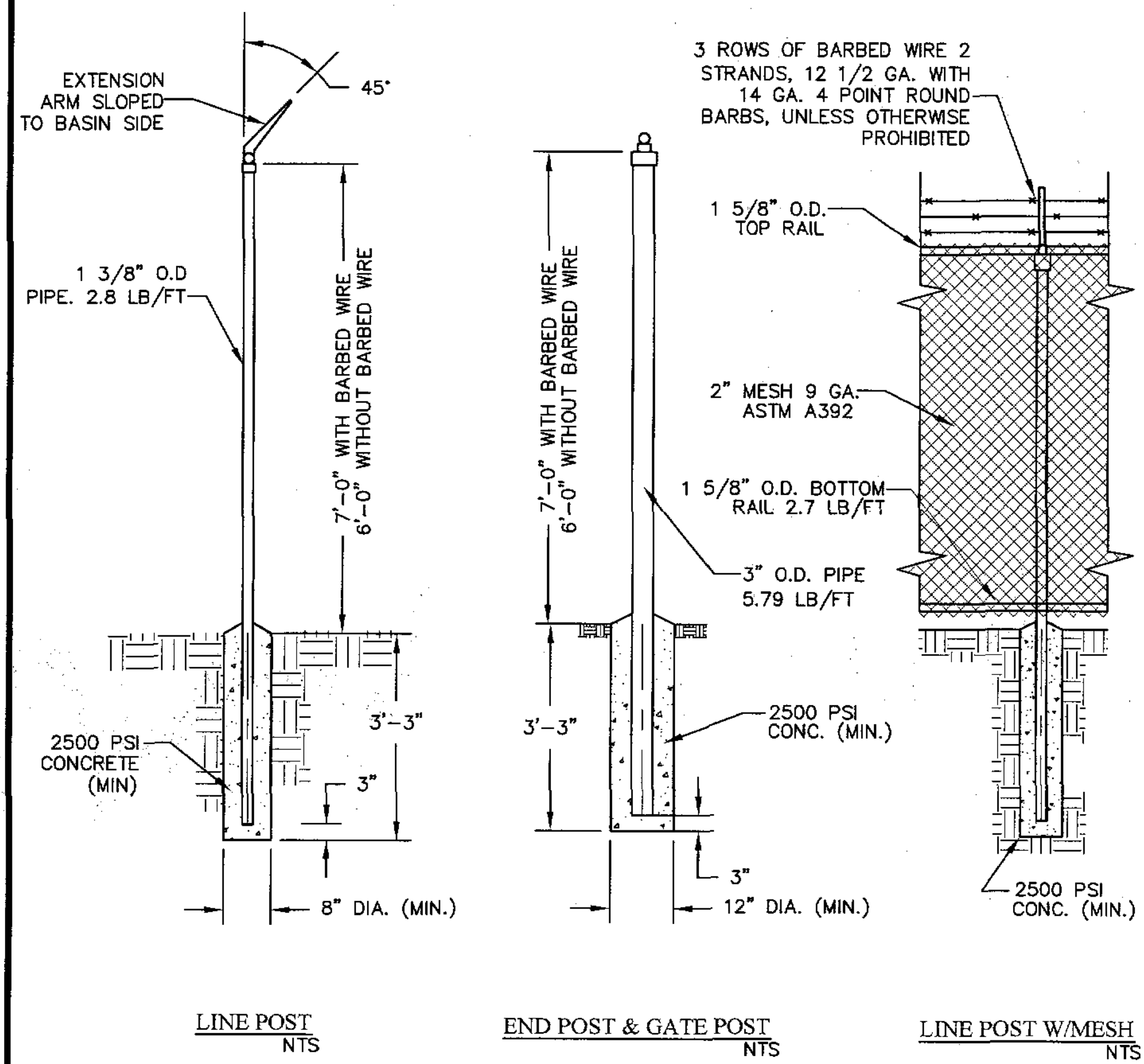

NOTE : ALL PIPE TO BE SCHEDULE 40

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	CHAINLINK FENCE POSTS 4-2
		Approved By R. A. SHUBERT / Date JUNE 03, 2008
		Checked By H. M. E. / Drawn By QEC / J. R.

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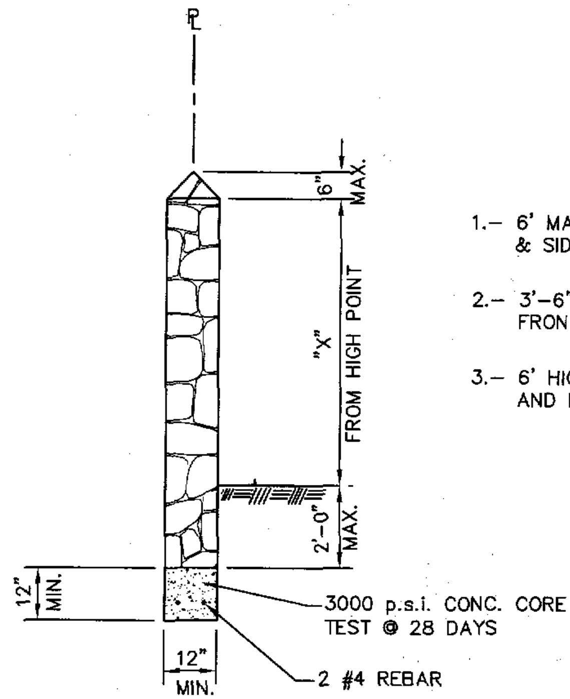

"X"

1.– 6' MAX. ALONG REAR & SIDE YARDS.

2.– 3'-6" MAX. ALONG FRONT YARDS.

3.– 6' HIGH @ DRAINAGE AND BASINS.

ROCKWALL
ADJACENT TO RESIDENTIAL LOTS

NOTES:

1. STONE FOR ROCKWALL SHALL BE AS NEARLY UNIFORM IN SECTIONS AS IS PRACTICABLE. THE STONE SHALL BE DENSE AND RESISTANT TO AIR AND WATER.
2. MORTAR SHALL BE TYPE "S" 1800 P.S.I. AS PER ASTM C270
3. MASONRY WALLS OVER SIX (6) FEET IN HEIGHT AND THOSE USED FOR EARTH RETENTION OVER TWO (2) FEET SHALL BE DESIGNED AS STRUCTURAL WALLS.
4. WALLS ADJACENT TO PONDING AREAS OR DRAINAGE DITCHES MAY BE CONSTRUCTED OF BRICK OR CINDER BLOCK AND SHALL NOT BE LESS THAN SIX (6) FEET HIGH.
5. ROCKWALL MORTAR JOINTS SHALL NOT EXCEED TWO (2) INCHES.
6. PROVIDE ONE (1) INCH EXPANSION JOINTS AT EVERY 100 FEET.
7. ALL STONE SHALL BE THOROUGHLY SOAKED BEFORE BEING PLACED.
8. NO RIVER ROCK SHALL BE ALLOWED FOR ROCKWALLS.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

ROCKWALL DESIGN

4-3

Approved By R. A. SHUBERT	Checked By H. M. E.
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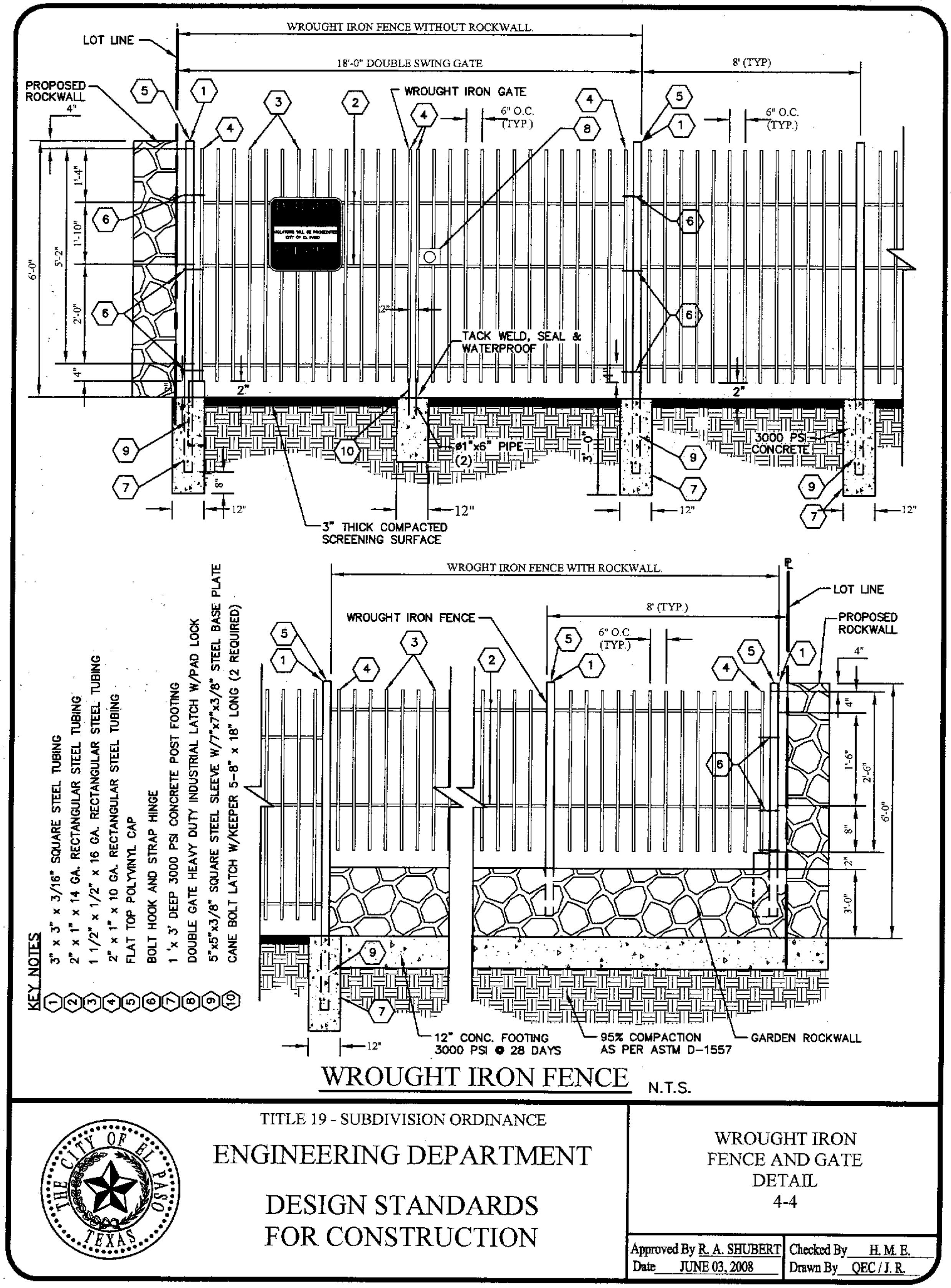

SECTION 5

SECTION 5

EARTH RETENTION AND EROSION CONTROL

TITLE **PAGE**

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TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

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Approved By R. A. SHUBERT Date JUNE 03, 2008

Checked By H. M. E. Drawn By QEC / J. R.

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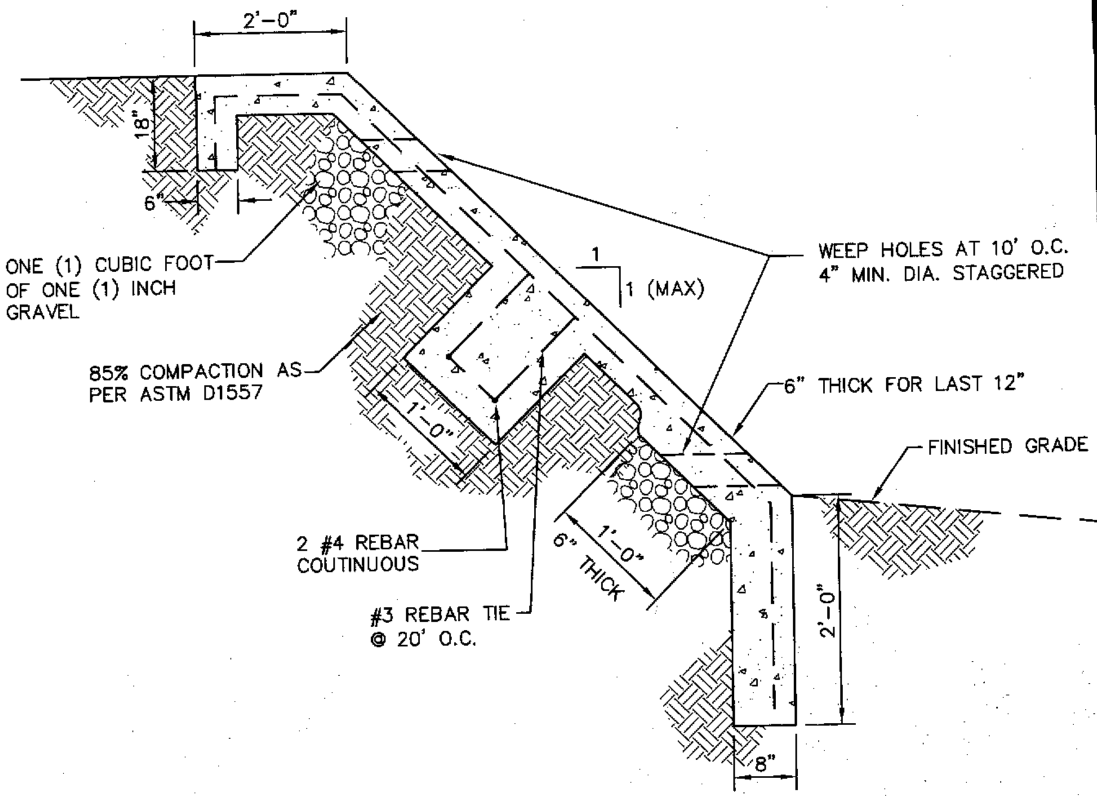

CONCRETE RIP-RAP DETAIL

SCALE: N.T.S.

NOTES:

1. CONCRETE RIP-RAP SHALL BE PLACED ON EMBANKMENTS OR SLOPES WHERE REQUIRED BY THE CITY ENGINEER FOR EROSION PROTECTION, EXCEPT FOR PONDING AREAS. (REFER TO SECTION 2)
2. CONCRETE RIP-RAP SHALL BE A MINIMUM OF 4" CONCRETE.
3. CONCRETE TO BE 3000 PSI WITH MIN. 6x6x#10 WWF
4. FOR SLOPES GREATER THAN 1:1 OR VERTICAL HEIGHT OF MORE THAN SIX(6) FEET, THE RIP-RAP SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER.
5. PROVIDE ONE (1) INCH EXPANSION JOINT AT EVERY FIFTY (50) FEET WITH #6 DOWELS AT 18 INCHES O.C.
6. PROVIDE DUMMY JOINTS AT TEN (10) FEET O.C.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	CONCRETE RIP RAP 5-1
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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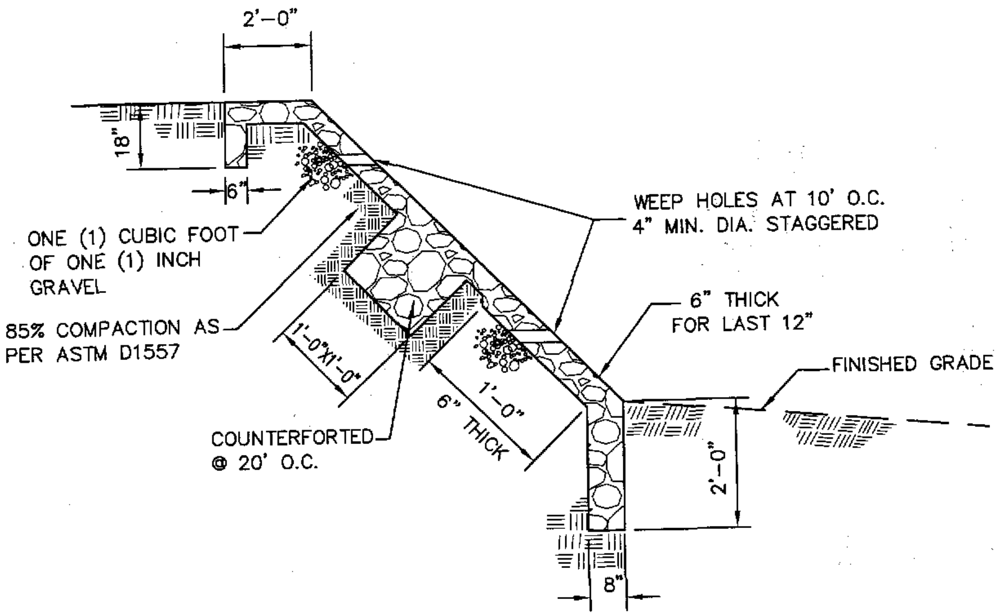

ROCK RIP-RAP DETAIL

NOTES:

1. ROCK RIP–RAP SHALL BE PLACED ON EMBANKMENTS OR SLOPES WHERE REQUIRED BY THE CITY ENGINEER FOR EROSION PROTECTION, EXCEPT FOR PONDING AREAS. (SEE SECTION 2)
2. ROCK RIP–RAP SHALL BE A MINIMUM OF 8" MORTARED ROCK.
3. STONE FOR ROCK RIP RAP SHALL BE AS NEARLY UNIFORM IN SECTION AS IS PRACTICABLE. STONE SHALL BE QUARRIED; FRACTURED RIVERROCK SHALL NOT BE PERMITTED.
4. MORTAR FOR ROCK RIP–RAP SHALL BE TYPE S, 1800 P.S.I. AS PER ASTM C270.
5. FOR SLOPES GREATER THAN 1:1 OR VERTICAL HEIGHT OF MORE THAN SIX (6) FEET, THE RIP RAP SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER.
6. PROVIDE ONE (1) INCH EXPANSION JOINT AT EVERY FIFTY (50) FEET.
7. PROVIDE DUMMY JOINTS AT TEN (10) FEET O.C.
8. NON–MORTARED ROCK RIP RAP SHALL BE ALLOWED WHERE APPROVED BY THE CITY ENGINEER.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

ROCK RIP RAP
5-2

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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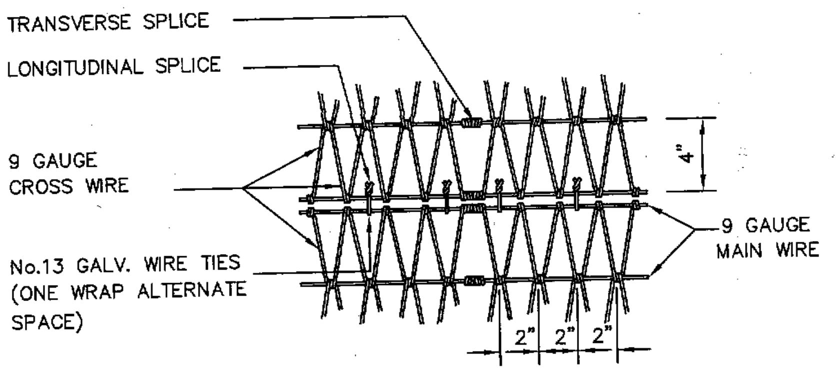
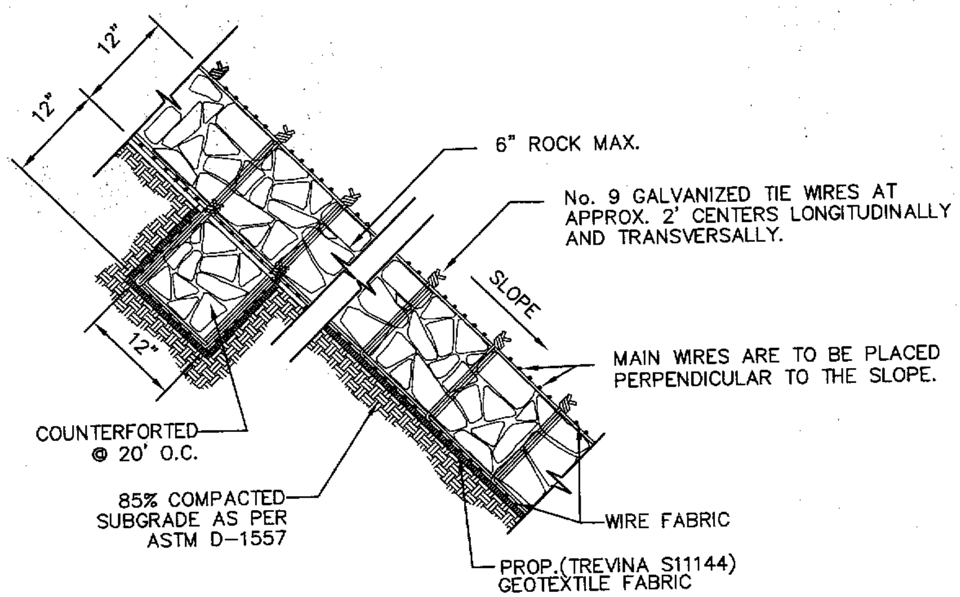


WIRE FABRIC AND SPLICE DETAIL
(FOR NON-COHESIVE SOIL) N.T.S.



TYPICAL SECTION

WIRE WRAPPED RIP-RAP DETAIL
N.T.S.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	WIRE WRAPPED RIP RAP 5-3
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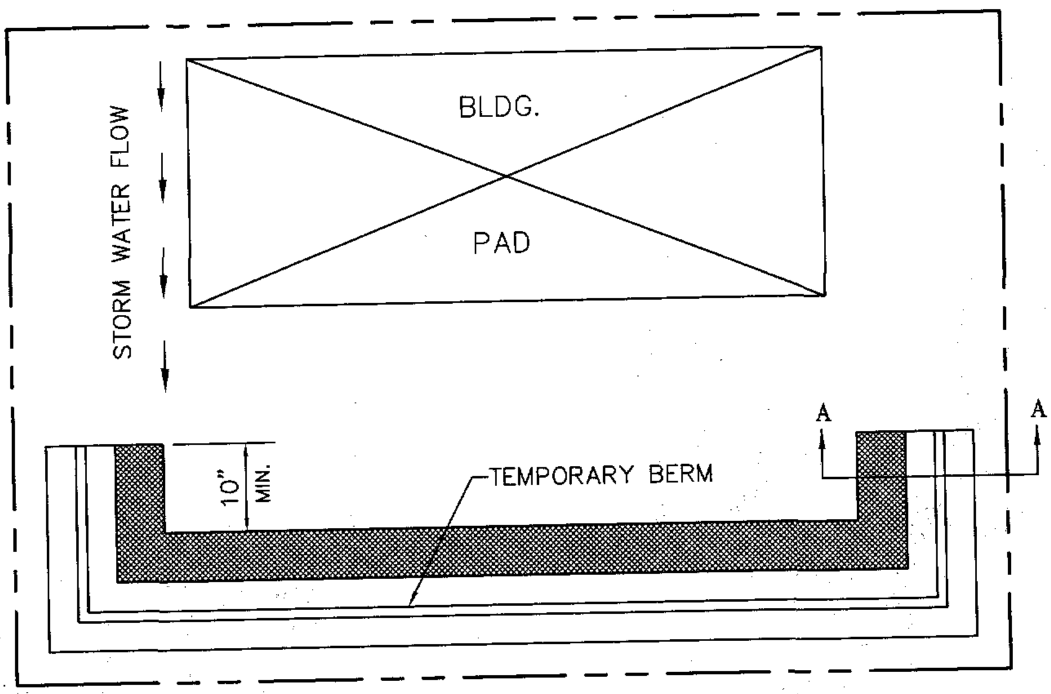
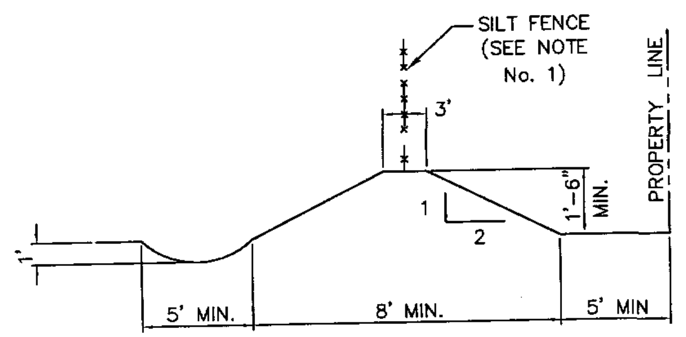


TYPICAL LOT LAYOUT FOR EROSION CONTROL
N.T.S.



NOTE:
1.– SILT FENCE SHALL BE PROVIDED PRIOR TO GRADING OF SITE AND IF THE SITE HAS SANDY SOIL CONDITIONS.

TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	TEMPORARY EROSION CONTROL 5-4	
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. B. Drawn By QEC / J. R.

SECTION 6

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SECTION 6

SIDEWALKS, DRIVEWAYS AND CURB RAMPS

THE CITY OF EL PASO TEXAS

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DESIGN STANDARDS FOR CONSTRUCTION

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Approved By R. A. SHUBERT Date JUNE 03, 2008

Checked By H. M. E. Drawn By OEC / J. R.

SECTION 6

SIDEWALKS, DRIVEWAYS AND CURB RAMPS

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

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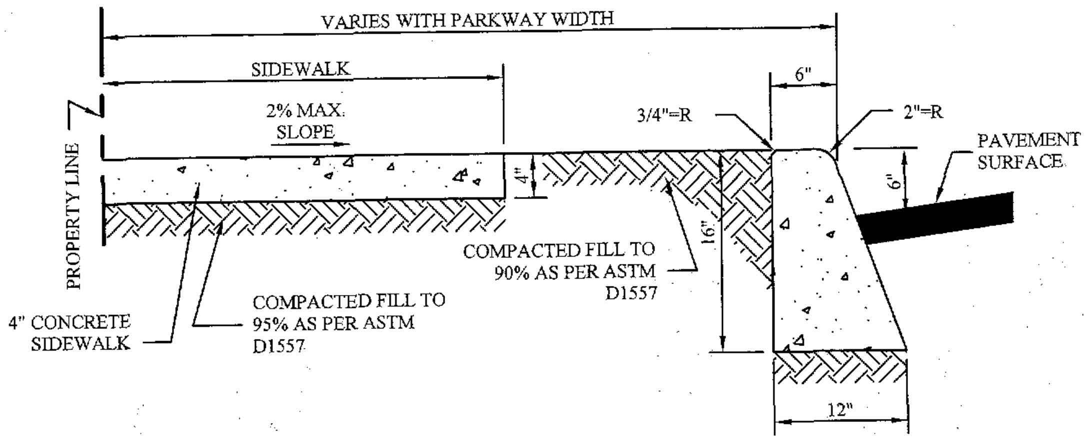
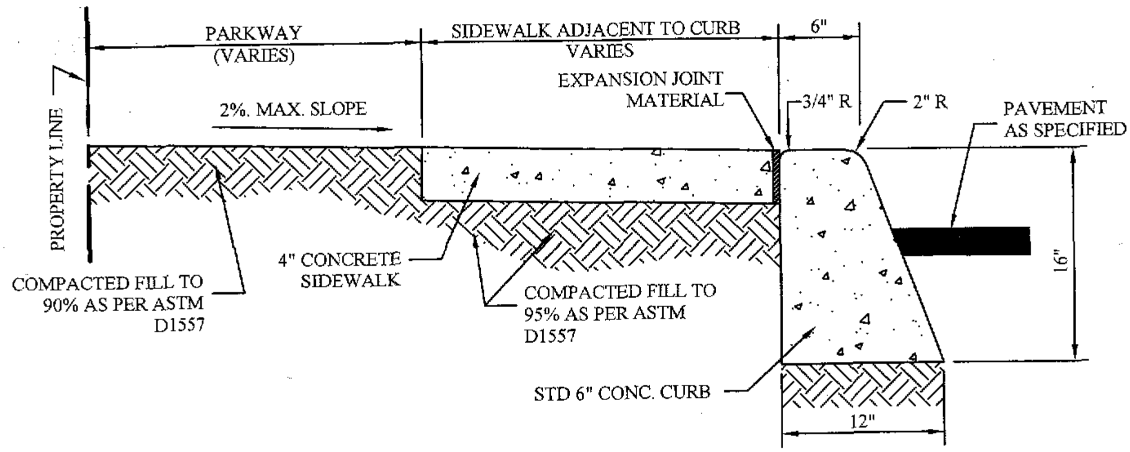


STANDARD CURB & SIDEWALK SECTION

NOTES:

1. CONCRETE SHALL BE 3000 P.S.I. MIN.
2. DUMMY JOINT REQUIRED AT 10' O.C. FOR CURB & GUTTER AND 5' O.C. FOR SIDEWALK.
3. EXPANSION MATERIAL REQUIRED AT CURB RETURNS AND AT 20' ON CENTER FOR SIDEWALKS WITH 1/2" PREMOLDED ASPHALT IMPREGNATED EXPANSION MATERIAL OR EQUAL.
4. EXPANSION JOINTS REQUIRED AT 50' O.C. WHEN FORMING FOR CURBS.



STANDARD 6" CURB WITH SIDEWALK SECTION

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	CURB WITH SIDEWALK SECTION 6-1

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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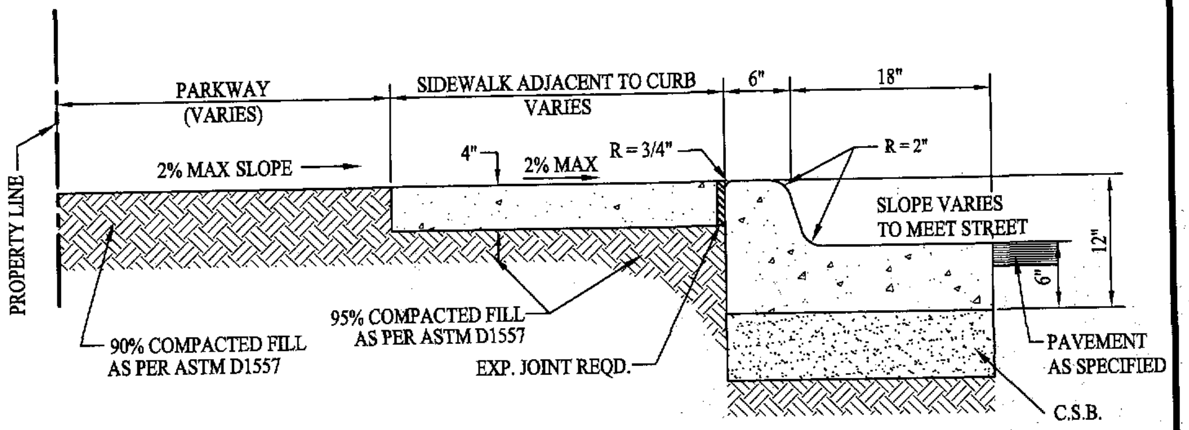

CURB & GUTTER WITH SIDEWALK SECTION

C.S.B.

NOTES:

1. CONCRETE SHALL BE 3000 P.S.I. MIN.
2. DUMMY JOINT REQUIRED AT 10' O.C. FOR CURB & GUTTER AND 5'O.C. FOR SIDEWALK.
3. EXPANSION MATERIAL REQUIRED AT CURB RETURNS, AND AT 20' ON CENTER FOR SIDEWALKS WITH 1/2" PREMOLDED ASPHALT IMPREGNATED EXPANSION MATERIAL OR EQUAL.
4. EXPANSION JOINTS REQUIRED AT 50' O.C. WHEN FORMING FOR CURBS.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	SIDEWALK ADJACENT TO CURB SECTION 6-2 Approved By R. A. SHUBERT — Checked By H. M. E. Date JUNE 03, 2008 — Drawn By QEC / J. R.

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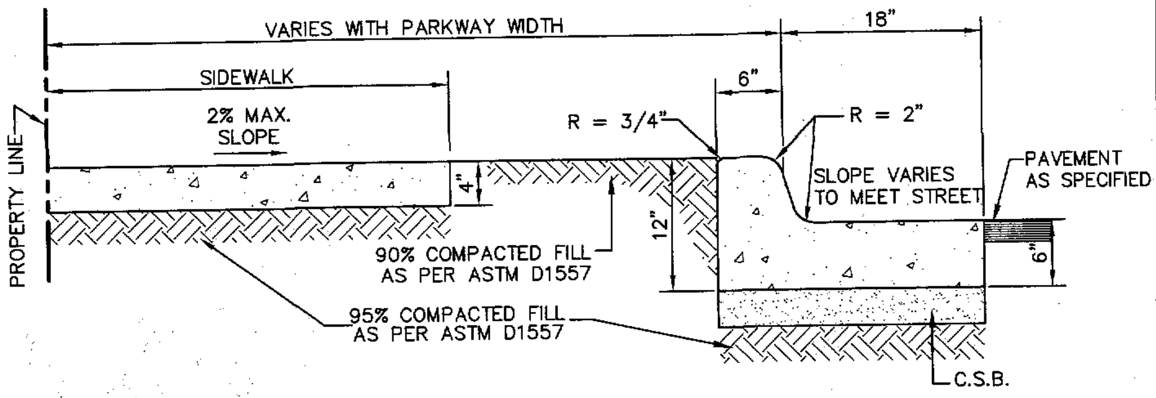

CURB & GUTTER WITH SIDEWALK SECTION

NOTES:

1. CONCRETE SHALL BE 3000 P.S.I. MIN.
2. DUMMY JOINT REQUIRED AT 10' O.C. FOR CURB & GUTTER AND 5' O.C. FOR SIDEWALK.
3. EXPANSION MATERIAL REQUIRED AT CURB RETURNS AND AT 20' ON CENTER FOR SIDEWALKS WITH 1/2" PREMOLDED ASPHALT IMPREGNATED EXPANSION MATERIAL OR EQUAL.
4. EXPANSION JOINTS REQUIRED AT 50' O.C. WHEN FORMING FOR CURBS.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

CURB WITH SIDEWALK SECTION 6-3

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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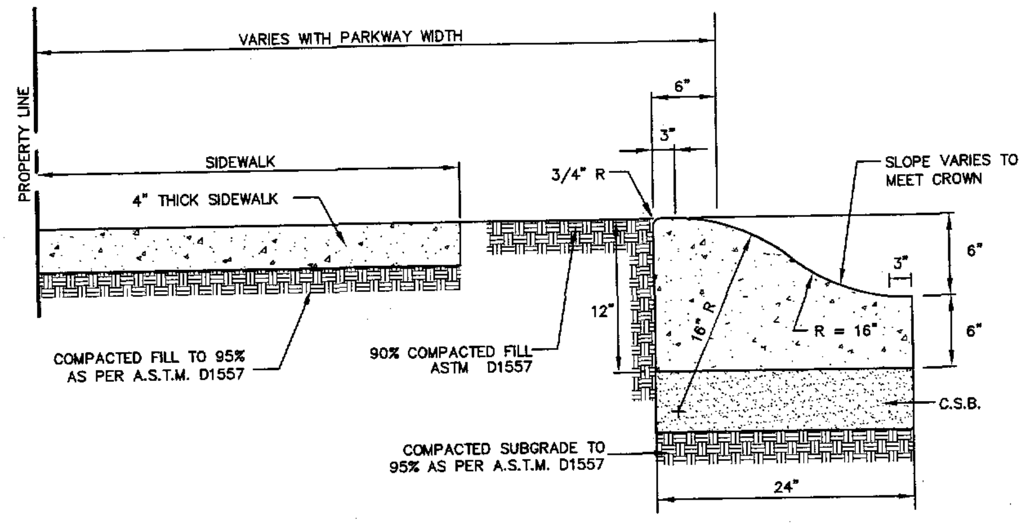
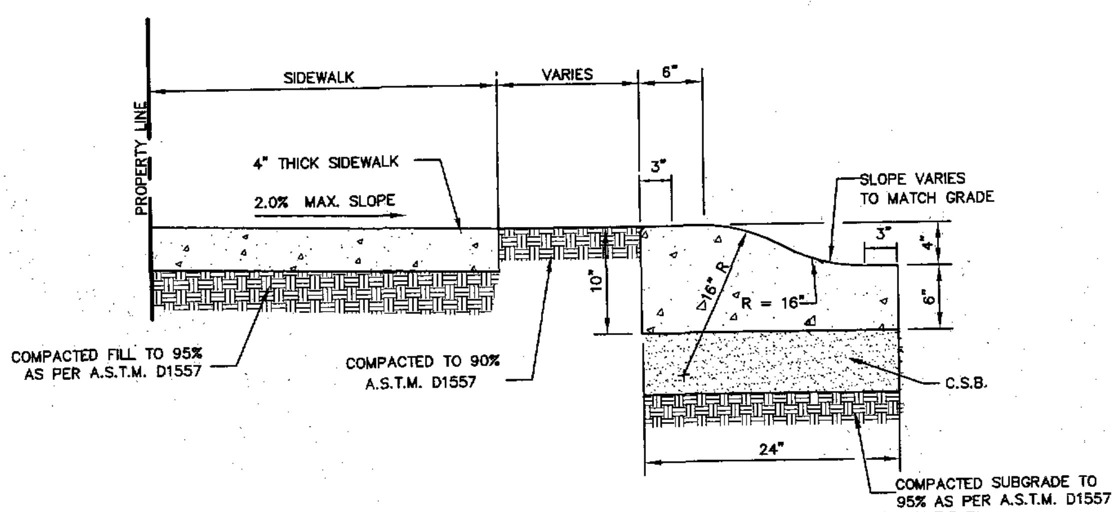


6" ROLLED CURB WITH SIDEWALK SECTION



4" ROLLED CURB WITH SIDEWALK SECTION

NOTES:
1. CONCRETE SHALL BE 3000 P.S.I. MINIMUM.
2. DUMMY JOINT REQUIRED AT 10' O.C. FOR HEADERS AND 5' O.C. FOR SIDEWALK.
3. EXPANSION JOINT MATERIAL REQUIRED AT CURB RETURNS, AND AT 20' O.C. FOR SIDEWALKS WITH 1/2" PRE-MOLDED ASPHALT IMPREGNATED EXPANSION MATERIAL.
4. EXPANSION JOINTS REQUIRED AT 50' O.C. WHEN FORMING FOR HEADERS.
5. PROVIDE EXPANSION JOINT MATERIAL WHERE SIDEWALK MEETS CURB, AND AT ALL SIDES WHERE CONCRETE PARKWAY MEETS SIDEWALK AND CURB.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

ROLLED CURB SECTIONS
6-4

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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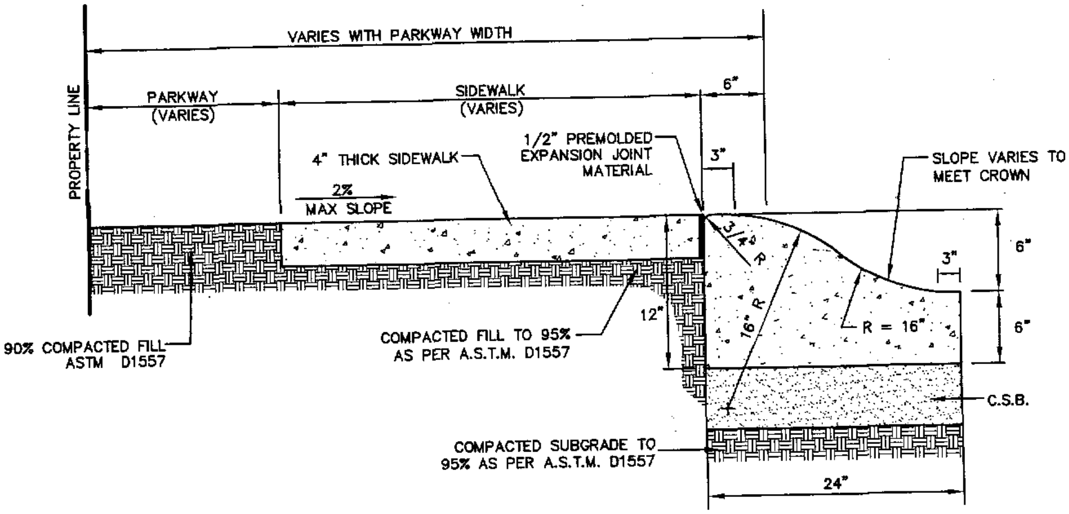
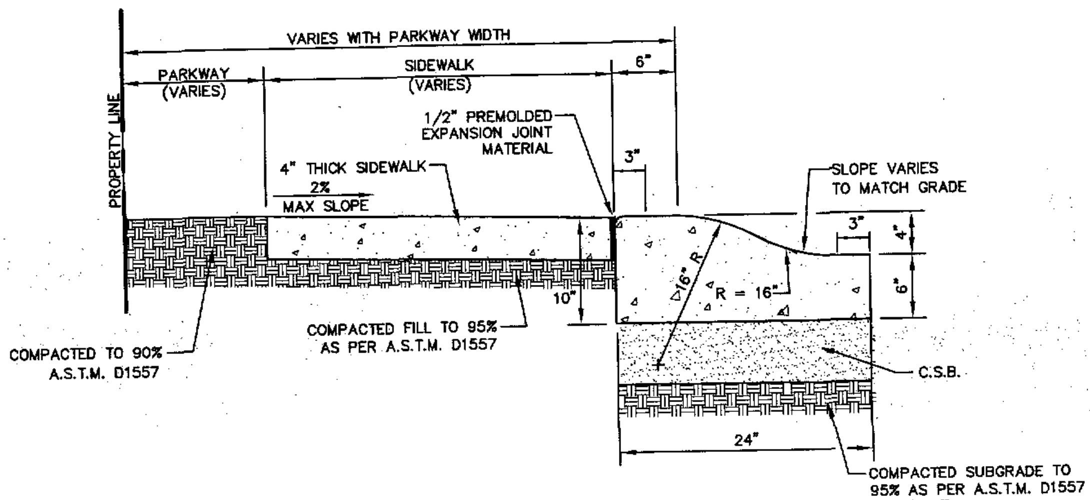


6" ROLLED CURB WITH SIDEWALK SECTION



4" ROLLED CURB WITH SIDEWALK SECTION

NOTES:

1. CONCRETE SHALL BE 3000 P.S.I. MINIMUM.
2. DUMMY JOINT REQUIRED AT 10' O.C. FOR HEADERS AND 5' O.C. FOR SIDEWALK.
3. EXPANSION JOINT MATERIAL REQUIRED AT CURB RETURNS, AND AT 20' O.C. FOR SIDEWALKS WITH 1/2" PRE-MOLDED ASPHALT IMPREGNATED EXPANSION MATERIAL.
4. EXPANSION JOINTS REQUIRED AT 50' O.C. WHEN FORMING FOR HEADERS.
5. PROVIDE EXPANSION JOINT MATERIAL WHERE SIDEWALK MEETS CURB, AND AT ALL SIDES WHERE CONCRETE PARKWAY MEETS SIDEWALK AND CURB.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

ROLLED CURB SECTIONS WITH SIDEWALK AGAINIST CURB

6-5

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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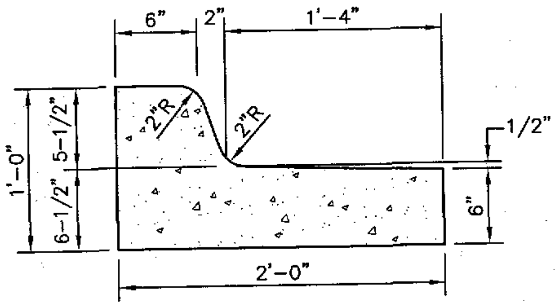
THE FOLLOWING CURB STANDARDS (PLATES 6-6 THROUGH 6-11) CAN ONLY BE USED WITH APPROVAL BY THE CITY ENGINEER:

FOR USE ON ALL CITY STREETS WHERE THE ROADWAY IS SUPERELEVATED. I.E. THE PAVEMENT SLOPES AWAY FROM THE CURB AND DRAINAGE IS TO BE DIVERTED FROM THE GUTTER SECTION.



TYPE "A" MODIFIED CURB & GUTTER

N.T.S.

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

TYPE "A" MODIFIED CURB AND GUTTER 6-6

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Date JUNE 03, 2008	Drawn By QBC / J. R.

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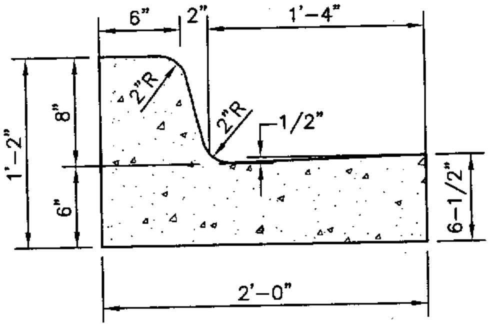
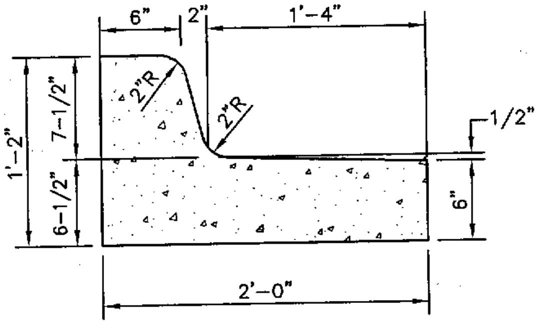
FOR USE ON ALL CITY STREET CLASSIFICATIONS AS A FUNCTION OF DRAINAGE AND TRAFFIC CONTROL. IT IS PERMISSIBLE TO MIX CURB HEIGHTS OF 6" & 8" WHEN APPROPRIATE FOR PROPER DRAINAGE CONVEYANCE. MINIMUM TRANSITION LENGTH OF 10' FROM 6" TO 8" CURB.
8" CURB NOT RECOMMENDED FOR STREETS WITH ON-STREET PARKING.



TYPE "B" 8" CURB & GUTTER

N.T.S.

FOR USE ON CITY STREETS WHERE THE ROADWAY IS SUPERELEVATED, I.E. THE PAVEMENT SLOPES AWAY FROM THE CURB AND DRAINAGE IS TO BE DIVERTED.



TYPE "C" 8" MODIFIED CURB & GUTTER

N.T.S.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	TYPE "B" AND "C" CURB AND GUTTER 6-7
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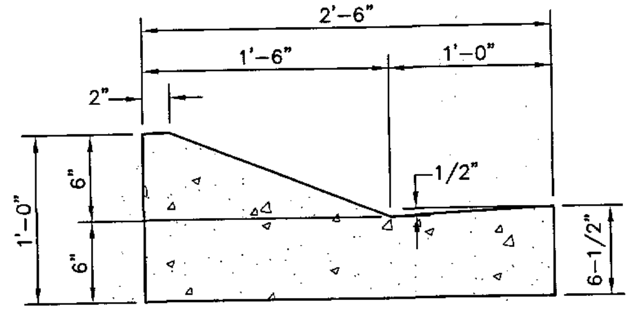

TYPE "D" DRIVE OVER CURB & GUTTER
N.T.S.

TITLE 19 - SUBDIVISION ORDINANCE
ENGINEERING DEPARTMENT
DESIGN STANDARDS
FOR CONSTRUCTION

TYPE "D" CURB AND
GUTTER
6-8

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
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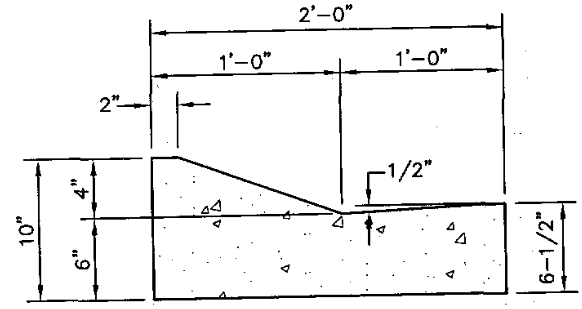

TYPE "E" DRIVE OVER CURB & GUTTER
N.T.S.

TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	TYPE "E" CURB 6-9	
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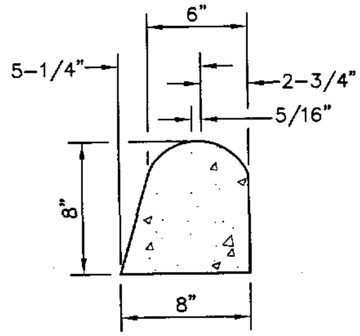
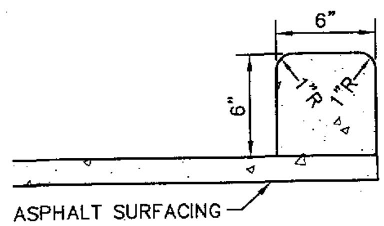
FOR USE ON STREETS WHERE THE ESTIMATED EXPANSION OF THE ROAD IS TO OCCUR WITHIN THE NEXT FIVE (5) YEARS.



TYPE "F" TEMPORARY ASPHALT CURB

N.T.S.

FOR USE ON STREETS WHEN EXPANSION TO THE CENTER IS PLANNED IN EXCESS OF FIVE (5) YEARS. NO DRAINAGE IS TO BE CONVEYED IN OR ON THE MEDIAN. CURB IS TO BE REMOVED.



TYPE "G" TEMPORARY EXTRUDED CONCRETE MEDIAN CURB

N.T.S.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	TEMPORARY CURB TYPES "F" AND "G" 6-10 Approved By R. A. SHUBERT — Checked By H. M. E. Date JUNE 03, 2008 — Drawn By QEC / J. R.

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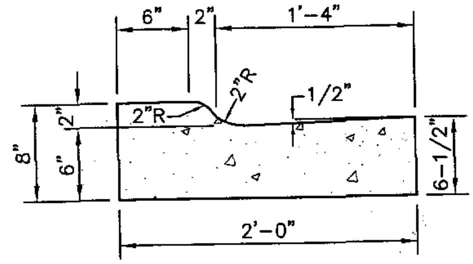
CAN BE USED ON DRIVEWAYS WITH APPROVAL BY THE CITY ENGINEER: EXCEPT WHERE ROLLOVER OR MOUNTABLE CURBING IS INSTALLED.



TYPE "H" DRIVEWAY CURB

N.T.S.

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

TYPE "H"
DRIVEWAY CURB
6-11

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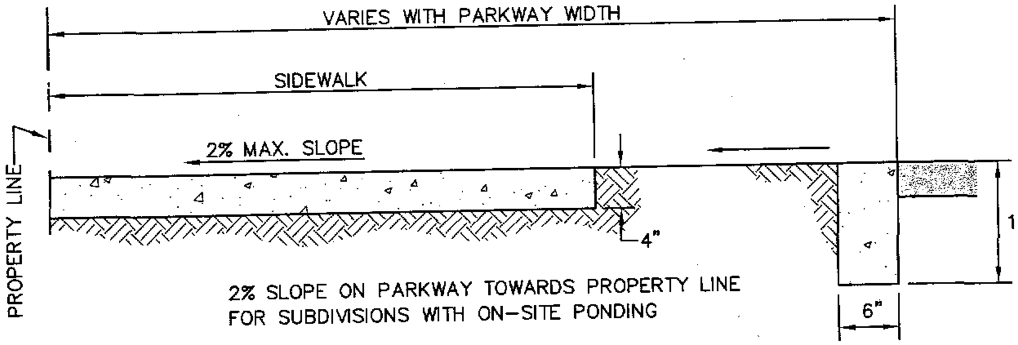
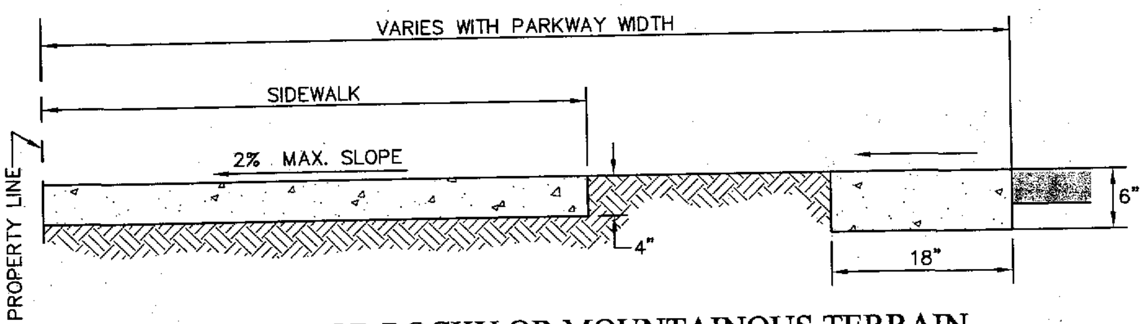


HEADER FOR EXPANSIVE SOIL



HEADER FOR ROCKY OR MOUNTAINOUS TERRAIN

NOTES:

1. CONCRETE TO BE 3000 P.S.I. MIN.
2. DUMMY JOINT REQUIRED AT 10' O.C. FOR HEADERS AND 5' O.C. FOR SIDEWALKS.
3. EXPANSION MATERIAL REQUIRED AT CURB RETURNS AND AT 20" O.C. FOR SIDEWALKS WITH 1/2" PREMOLDED ASPHALT IMPREGNATED EXPANSION MATERIAL OR EQUAL.
4. EXPANSION JOINTS REQUIRED AT 50' O.C. WHEN FORMING FOR HEADERS.
5. EXPANSION JOINTS REQUIRED FOR SIDEWALK AT 20' O.C.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	CONCRETE HEADER WITH SIDEWALK SECTION 6-12

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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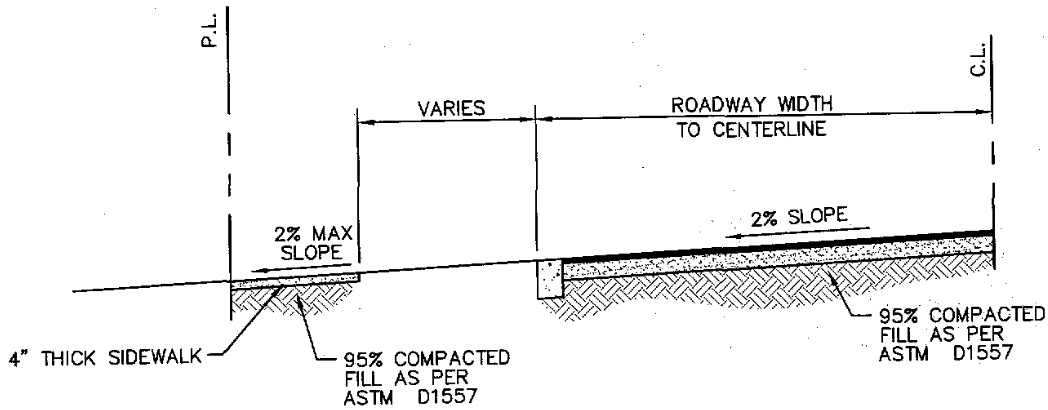

SIDEWALK FOR ON-SITE PONDING

NOTES:

1. CONCRETE FOR HEADERS AND SIDEWALKS SHALL BE 3000 P.S.I. (MIN.).
2. DUMMY JOINT AT 5'–0" O.C., MINIMUM 1/2" PREMOLDED ASPHALT IMPREGNATED EXPANSION JOINT AT 20' O.C. (SIDEWALK ONLY)

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

SIDEWALK FOR
ON-SITE PONDING
6-13

Approved By R. A. SHUBERT
Date JUNE 03, 2008

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Drawn By QEC / J. R.

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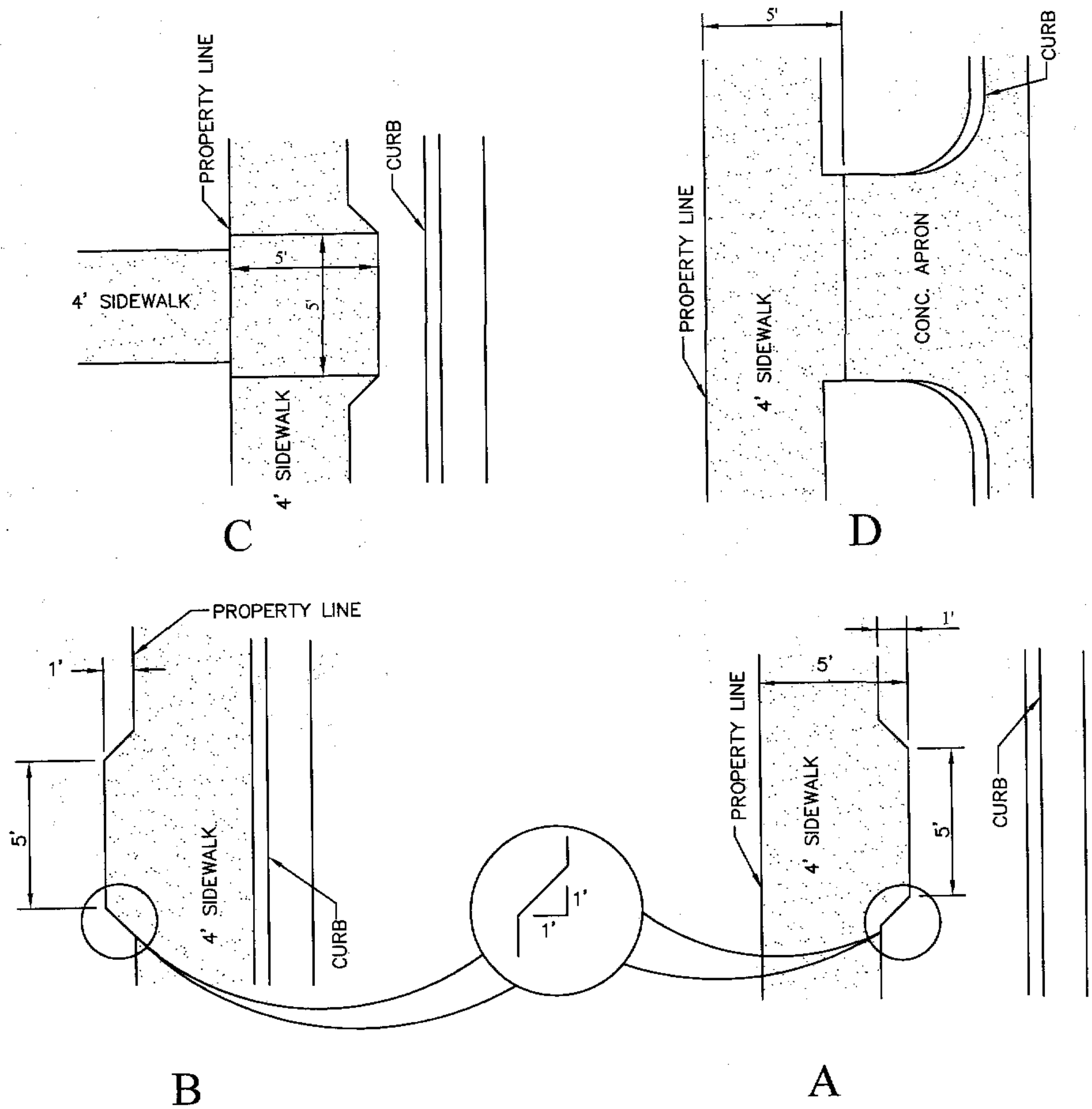

ACCESSIBLE PASSING SPACE DESIGN FOR 4 FT. SIDEWALKS

(SHALL BE SPACED AT EVERY 200' MAXIMUM)

TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	ACCESSIBLE PASSING SPACE DESIGN 6-14	
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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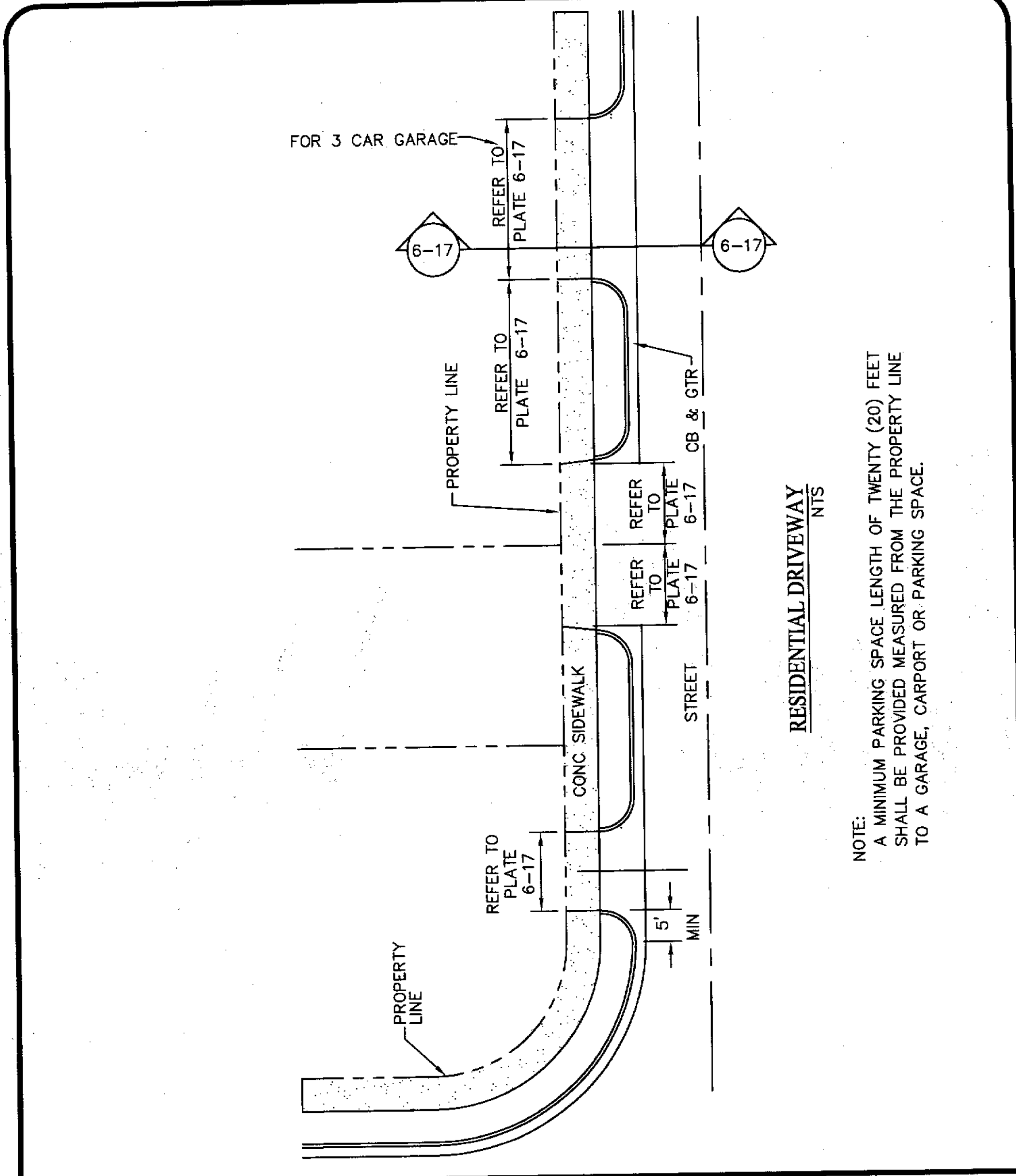

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

RESIDENTIAL DRIVEWAYS 6-15

Approved By R. A. SHUBERT	Checked By H. M. E.
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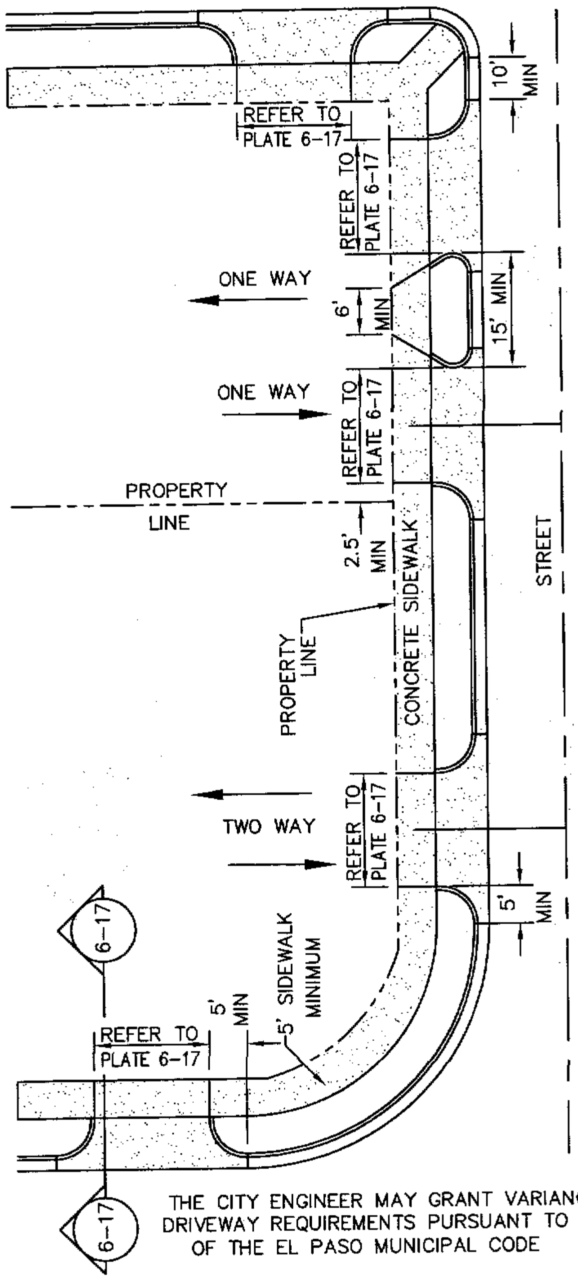

THE CITY ENGINEER MAY GRANT VARIANCES TO THE DRIVEWAY REQUIREMENTS PURSUANT TO SECTION 13.12.210 OF THE EL PASO MUNICIPAL CODE

COMMERCIAL/INDUSTRIAL DRIVEWAYS

NTS

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

COMMERCIAL / INDUSTRIAL DRIVEWAYS

6-15A

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
Drawn By QEC / J. R.

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Type I and Type II Two-Way Driveway Standards

Driveway	Type of Development	Curb				Minimum Edge to Edge Spacing Between Drives (ft.)
		Width (ft.)		Radius (ft.)		
		Min.	Max.	Min.	Max.	
Type I	Single-Family-60' lots	10	20	5	5	10
	Less than 60' lots, Duplex and Townhouse	15	25	10	10	20
	Multi-Resident Apartments	25	30*	10	10	20
Type II	Office, Commercial and Parking Lots	25	35	10	15	20
	Industrial	24	45	10	15	20
	Banks, Service Stations, and Convenience Stores with Gasoline Pumps	25	35**	10	15	1/3 x Frontage

* On 50 MPH streets

** Special approval required by City Engineer, or designee depending on location, traffic count, speed and angle of driveway

(TO BE MODIFIED BY THE CITY OF EL PASO TRAFFIC AND TRANSPORTATION DEPARTMENT)

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

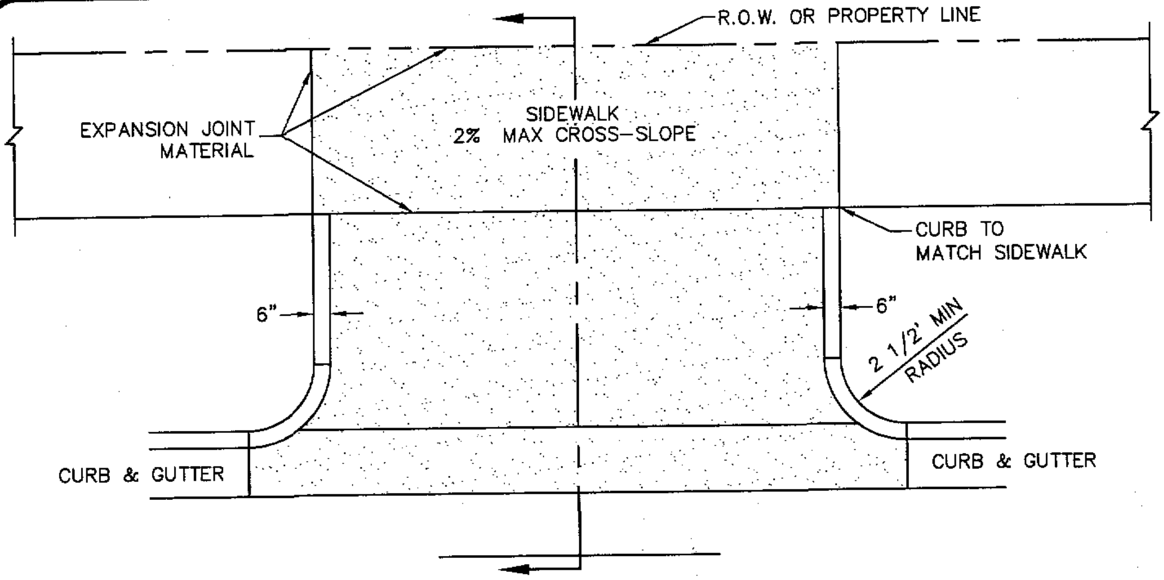
DESIGN STANDARDS FOR CONSTRUCTION

DRIVEWAY APPROACHES 6-16

Approved By R. A. SHUBERT
Date JUNE 03, 2008

Checked By H. M. E.
Drawn By QEC / I. R.

BACK TO TITLE INDEX PAGE

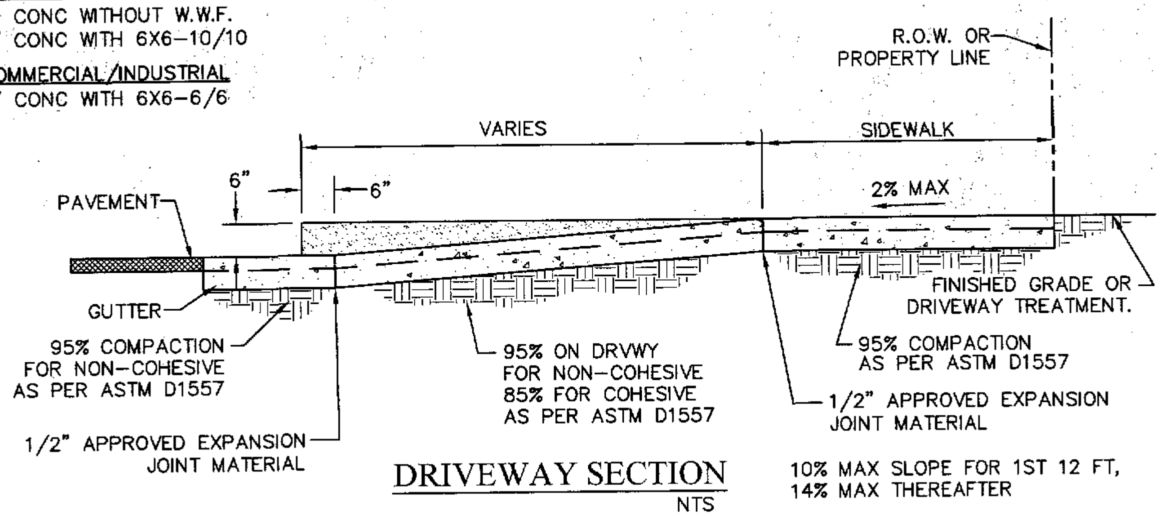


DRIVEWAY PLAN
NTS

DRIVEWAY WIDTH	MIN	MAX
COMMERCIAL/INDUSTRIAL	24'	35'
RESIDENTIAL (SINGLE FAMILY 60' LOTS)	10'	20'
LESS THAN 60' LOTS, DUPLEX, AND TOWNHOMES (REFER TO PLATE 6-16)	15'	25'

RESIDENTIAL
6" CONC WITHOUT W.W.F.
4" CONC WITH 6X6-10/10

COMMERCIAL/INDUSTRIAL
6" CONC WITH 6X6-6/6



DRIVEWAY SECTION
NTS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

CONCRETE APRON FOR DRIVEWAYS/ALLEYWAYS
6-17

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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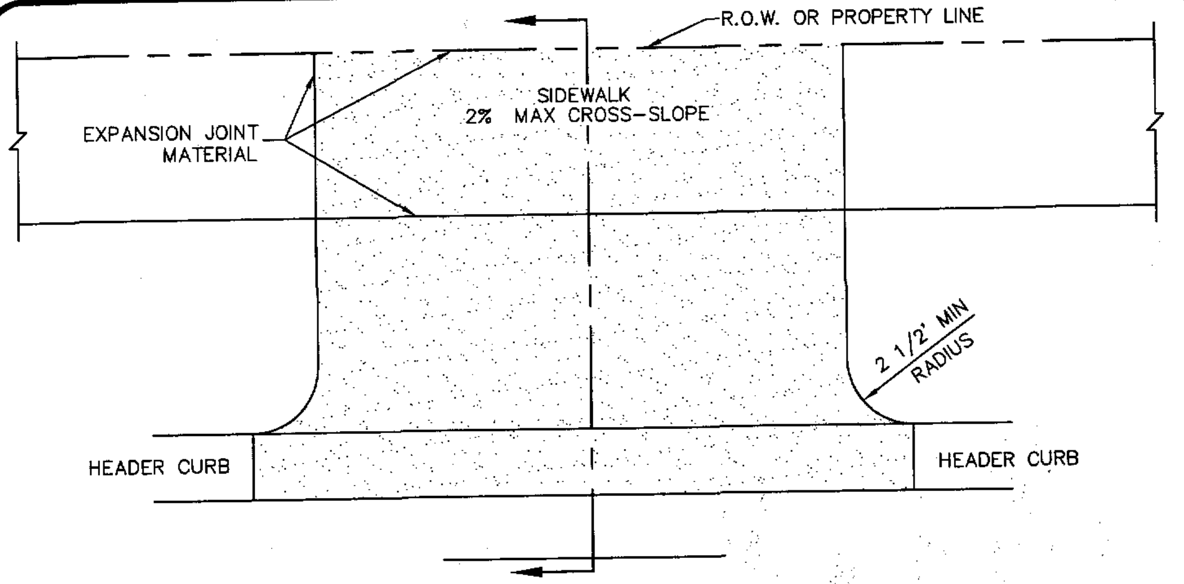
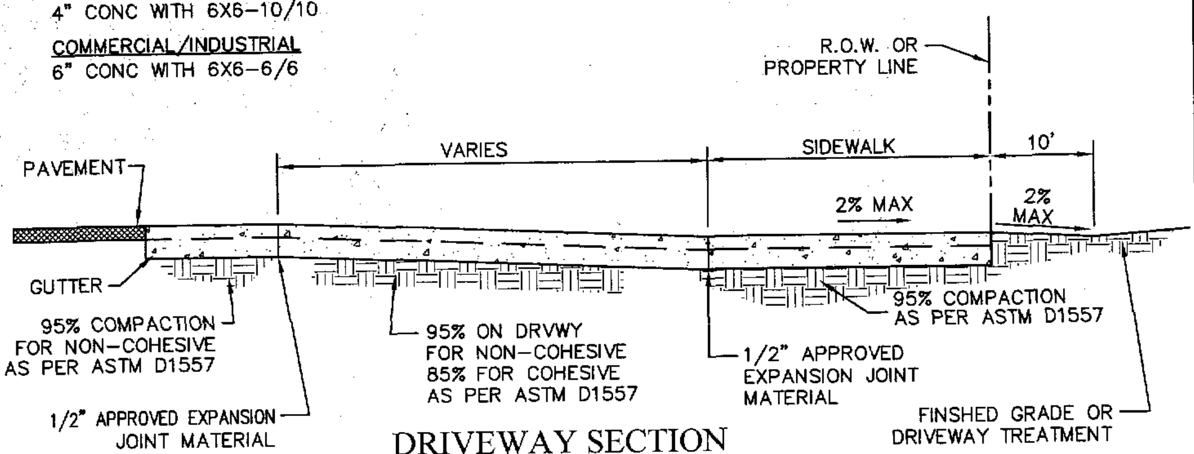


DRIVEWAY PLAN
NTS

DRIVEWAY WIDTH	MIN	MAX
COMMERCIAL/INDUSTRIAL	24'	35'
RESIDENTIAL (SINGLE FAMILY 60' LOTS)	10'	20'
LESS THAN 60' LOTS, DUPLEX, AND TOWNHOMES (REFER TO PLATE 6-16)	15'	25'

RESIDENTIAL
6" CONC WITHOUT W.W.F.
4" CONC WITH 6X6-10/10

COMMERCIAL/INDUSTRIAL
6" CONC WITH 6X6-6/6



DRIVEWAY SECTION
NTS

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

DRIVEWAY WITH
ON-SITE PONDING
6-18

Approved By R. A. SHUBERT
Date JUNE 03, 2008

Checked By H. M. E.
Drawn By QEC / J. R.

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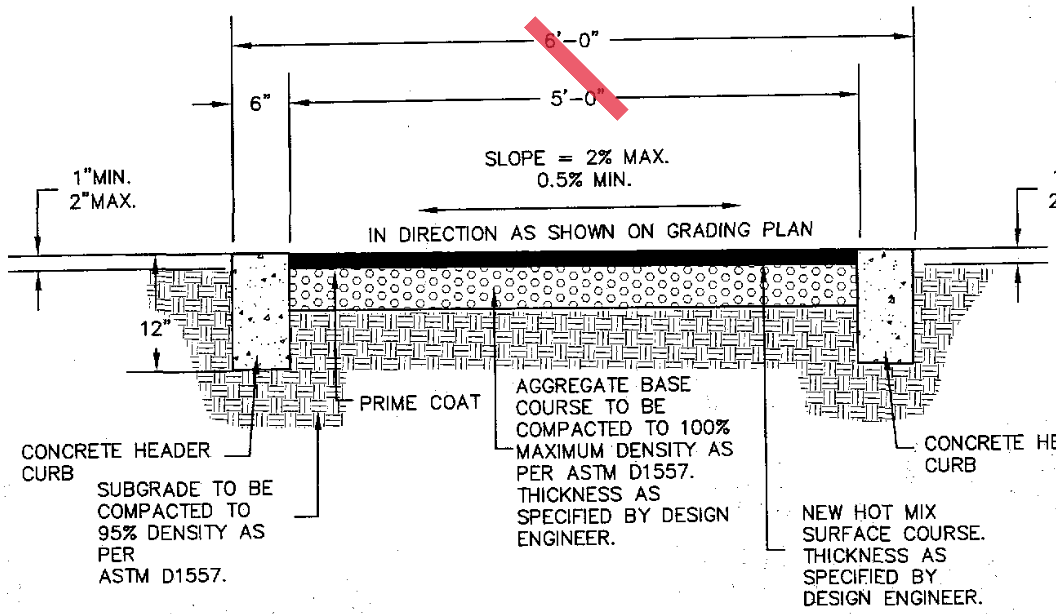

NOTES:

1. CONCRETE HEADER CURBS SHALL BE 3,000 P.S.I. MIN.
2. DUMMY JOINT REQUIRED AT 10' O.C.
3. 1/2" PREMOLDED BITUMINOUS EXPANSION JOINT (AASHTO M-33) IS REQUIRED FOR ALL CURB RETURNS.
4. SUBGRADE UNDER CURB MUST BE FORMED AND COMPACTED TO 95% ASTM D1557.
5. EXPANSION JOINTS REQUIRED AT 50' O.C. WHEN FORMING FOR CURBS.
6. REFER TO GRADING & DRAINAGE PLAN FOR DIRECTION OF FLOW.

ASPHALTIC WALKWAY/JOGGING PATH

SCALE: N.T.S.

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

ASPHALTIC WALKWAY/JOGGING PATH
6-19

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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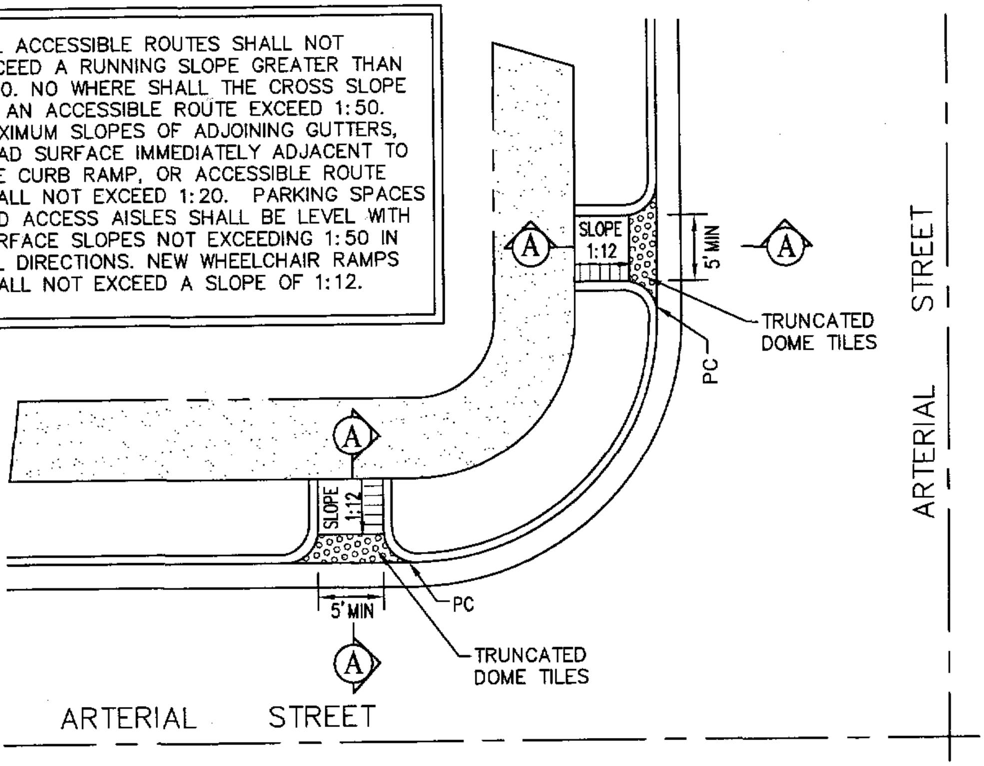
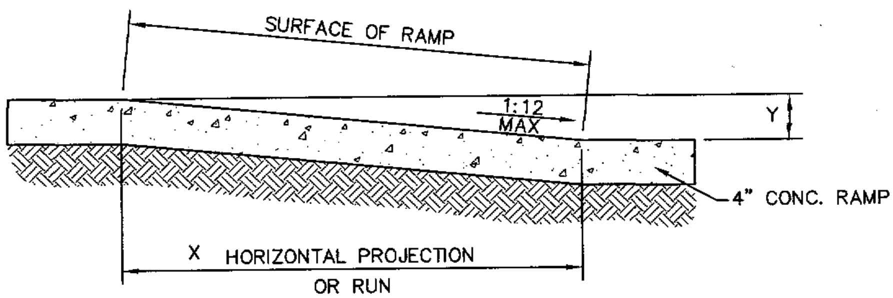
ALL ACCESSIBLE ROUTES SHALL NOT EXCEED A RUNNING SLOPE GREATER THAN 1:20. NO WHERE SHALL THE CROSS SLOPE OF AN ACCESSIBLE ROUTE EXCEED 1:50. MAXIMUM SLOPES OF ADJOINING GUTTERS, ROAD SURFACE IMMEDIATELY ADJACENT TO THE CURB RAMP, OR ACCESSIBLE ROUTE SHALL NOT EXCEED 1:20. PARKING SPACES AND ACCESS AISLES SHALL BE LEVEL WITH SURFACE SLOPES NOT EXCEEDING 1:50 IN ALL DIRECTIONS. NEW WHEELCHAIR RAMPS SHALL NOT EXCEED A SLOPE OF 1:12.



STRAIGHT CURB RAMP DESIGN WITH CURB RETURNS



SECTION A

NOTES:
(1) SLOPE = y:x, where x is level plane
(2) Cross–slope shall not exceed 1:50

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	STRAIGHT CURB RAMP DESIGN W/ CURB RETURNS 6-20
		Approved By R. A. SHUBERT Date JUNE 03, 2008 Checked By H. M. E. Drawn By QEC / J. R.

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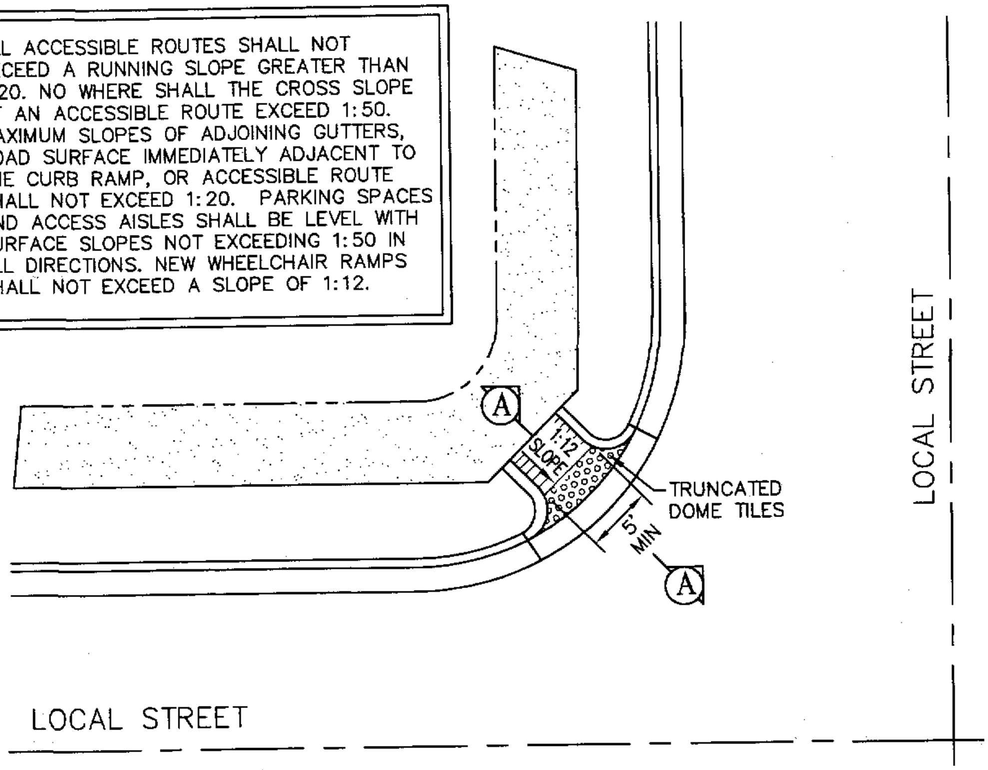
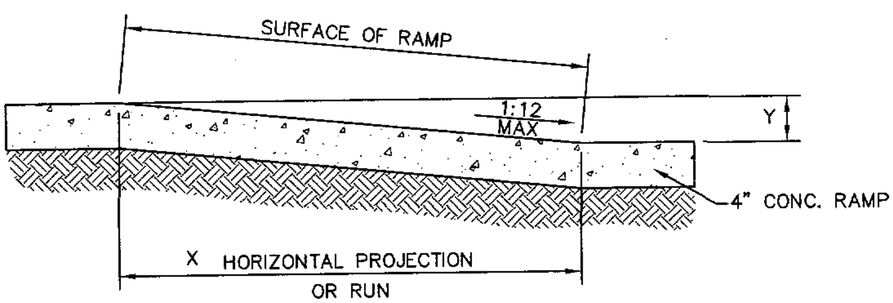
ALL ACCESSIBLE ROUTES SHALL NOT EXCEED A RUNNING SLOPE GREATER THAN 1:20. NO WHERE SHALL THE CROSS SLOPE OF AN ACCESSIBLE ROUTE EXCEED 1:50. MAXIMUM SLOPES OF ADJOINING GUTTERS, ROAD SURFACE IMMEDIATELY ADJACENT TO THE CURB RAMP, OR ACCESSIBLE ROUTE SHALL NOT EXCEED 1:20. PARKING SPACES AND ACCESS AISLES SHALL BE LEVEL WITH SURFACE SLOPES NOT EXCEEDING 1:50 IN ALL DIRECTIONS. NEW WHEELCHAIR RAMPS SHALL NOT EXCEED A SLOPE OF 1:12.



DIAGONAL CURB RAMP DESIGN WITH CURB RETURNS



SECTION A

NOTES:

(1) SLOPE = y:x, where x is level plane
(2) Cross–slope shall not exceed 1:50

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

DIAGONAL CURB RAMP DESIGN W/ CURB RETURNS 6-21

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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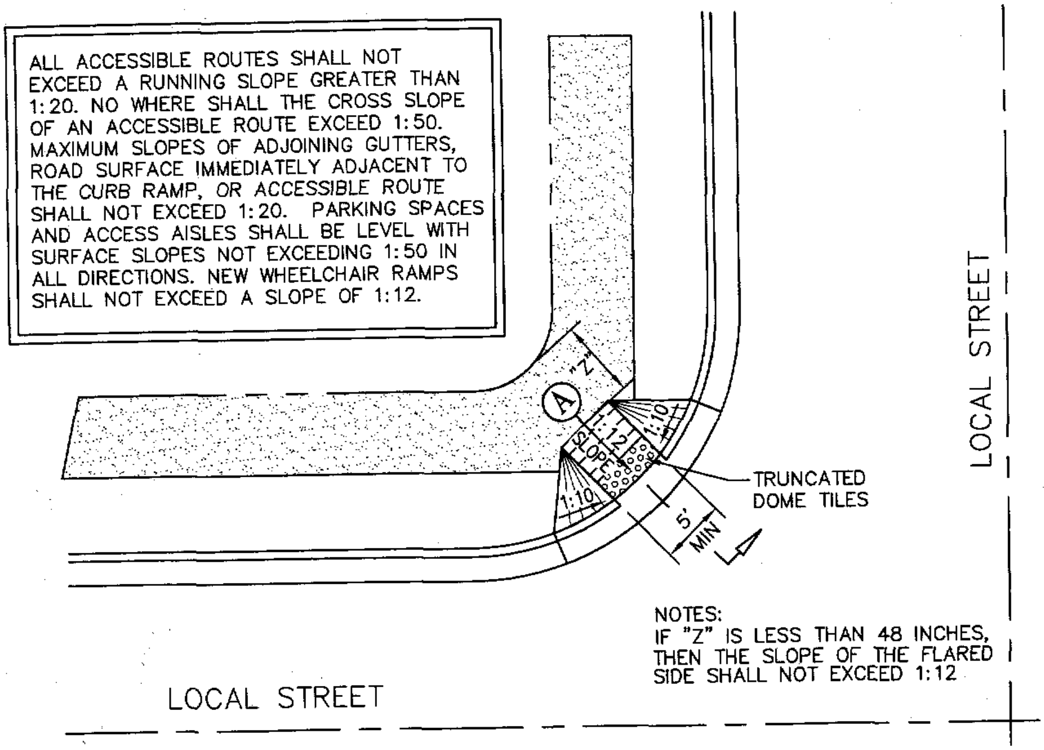
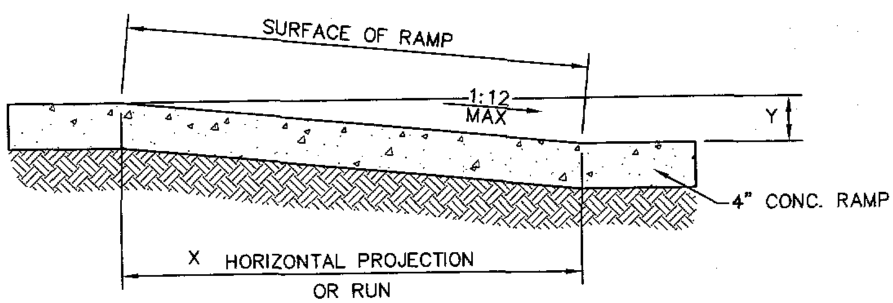


DIAGONAL CURB RAMP DESIGN WITH FLARED SIDES



SECTION A

NOTES:

(1) SLOPE = y:x, where x is level plane

(2) Cross–slope shall not exceed 1:50

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	DIAGONAL CURB RAMP DESIGN W/ FLARED SIDES 6-22 Approved By R. A. SHUBERT — Checked By H. M. E. Date JUNE 03, 2008 — Drawn By QEC / J. R.

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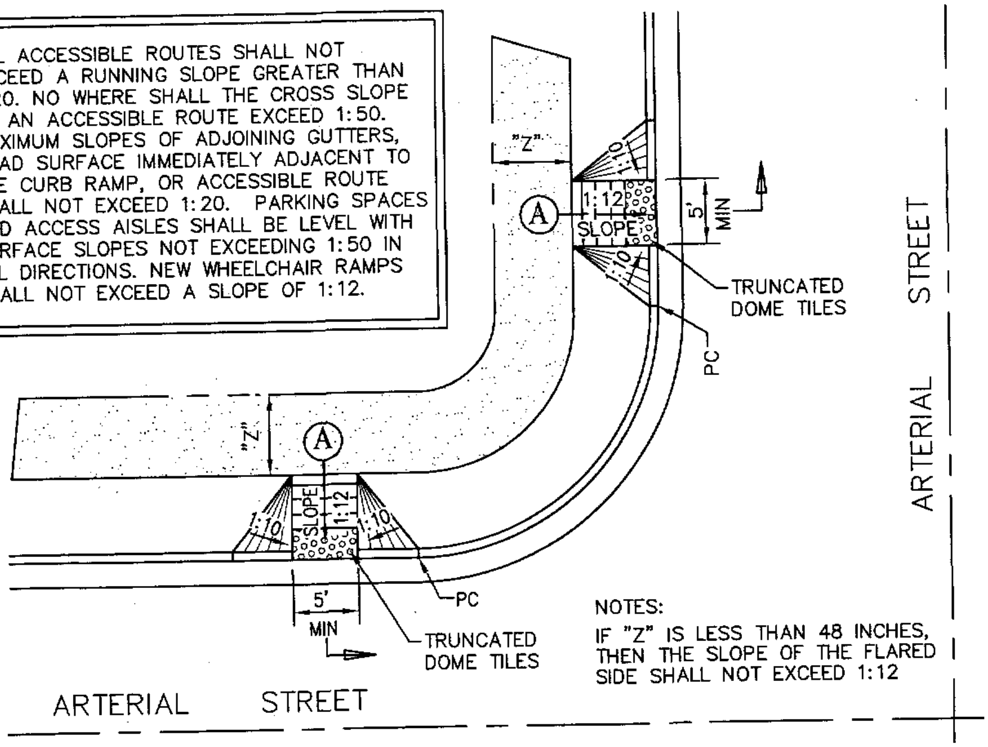
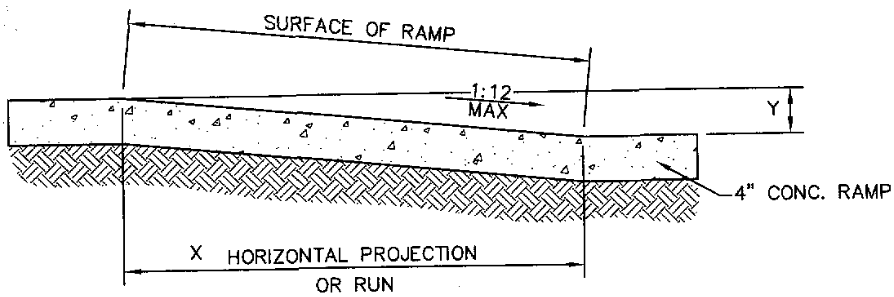
ALL ACCESSIBLE ROUTES SHALL NOT EXCEED A RUNNING SLOPE GREATER THAN 1:20. NO WHERE SHALL THE CROSS SLOPE OF AN ACCESSIBLE ROUTE EXCEED 1:50. MAXIMUM SLOPES OF ADJOINING GUTTERS, ROAD SURFACE IMMEDIATELY ADJACENT TO THE CURB RAMP, OR ACCESSIBLE ROUTE SHALL NOT EXCEED 1:20. PARKING SPACES AND ACCESS AISLES SHALL BE LEVEL WITH SURFACE SLOPES NOT EXCEEDING 1:50 IN ALL DIRECTIONS. NEW WHEELCHAIR RAMPS SHALL NOT EXCEED A SLOPE OF 1:12.



NOTES:
IF "Z" IS LESS THAN 48 INCHES, THEN THE SLOPE OF THE FLARED SIDE SHALL NOT EXCEED 1:12

STRAIGHT CURB RAMP DESIGN WITH FLARED SIDES



SECTION A

NOTES:

(1) SLOPE = y:x, where x is level plane
(2) Cross–slope shall not exceed 1:50

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

STRAIGHT CURB RAMP DESIGN W/ FLARED SIDES
6-23

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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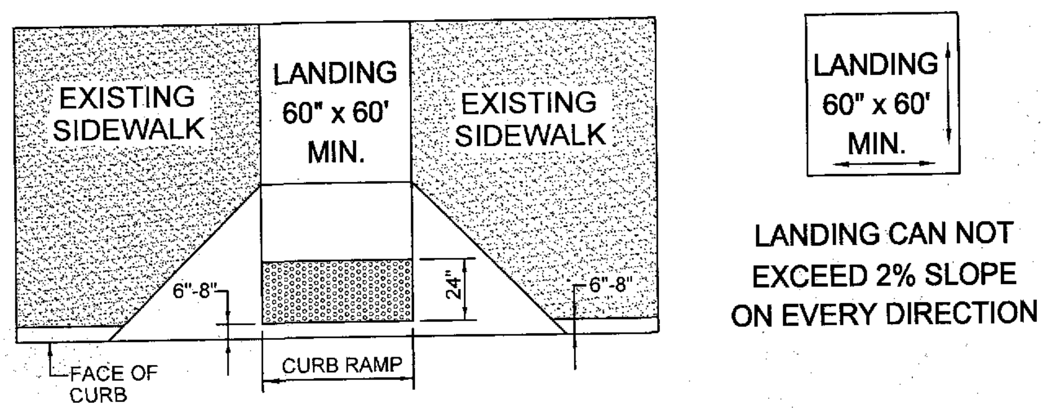
Width. The minimum width of curb ramps shall be 60 inches exclusive of flared sides. In areas where space does not permit a 60 inch width, the minimum width shall be no less than 36 inches as determined by the owner (Note; Landing can not exceed 2% slope on every direction). See Figure



TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

WHEEL CHAIR CURB RAMP WIDTH
6-24

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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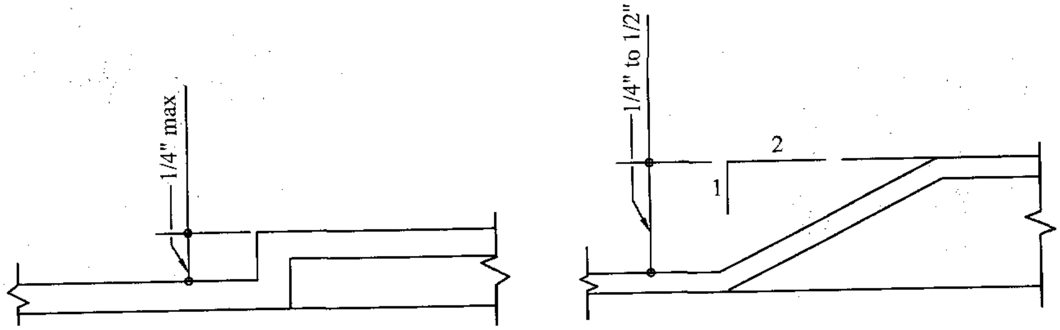

Changes in Level

Changes in Level

TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	RAMP SURFACE 6-25	
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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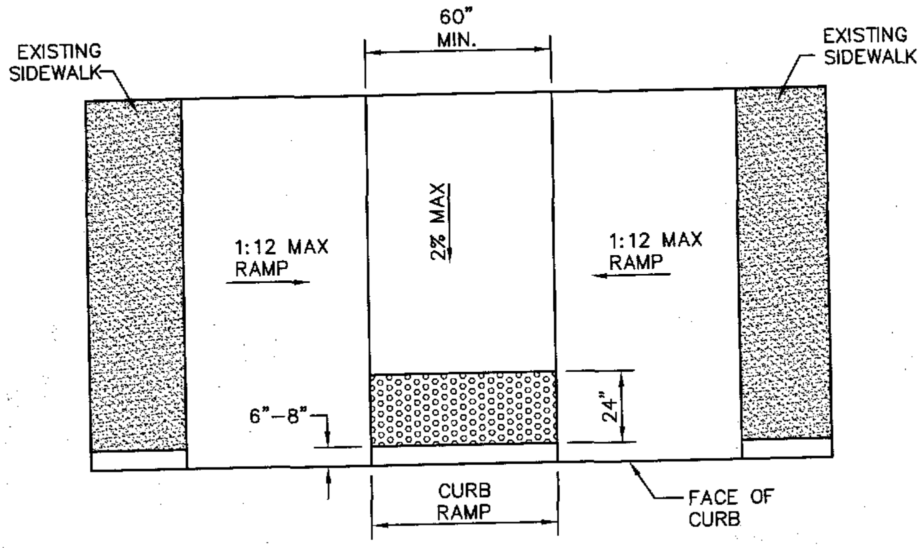

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

TRANSITION RAMP
WITH DETECTABLE
WARNING
6-26

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
Drawn By QEC / J. R.

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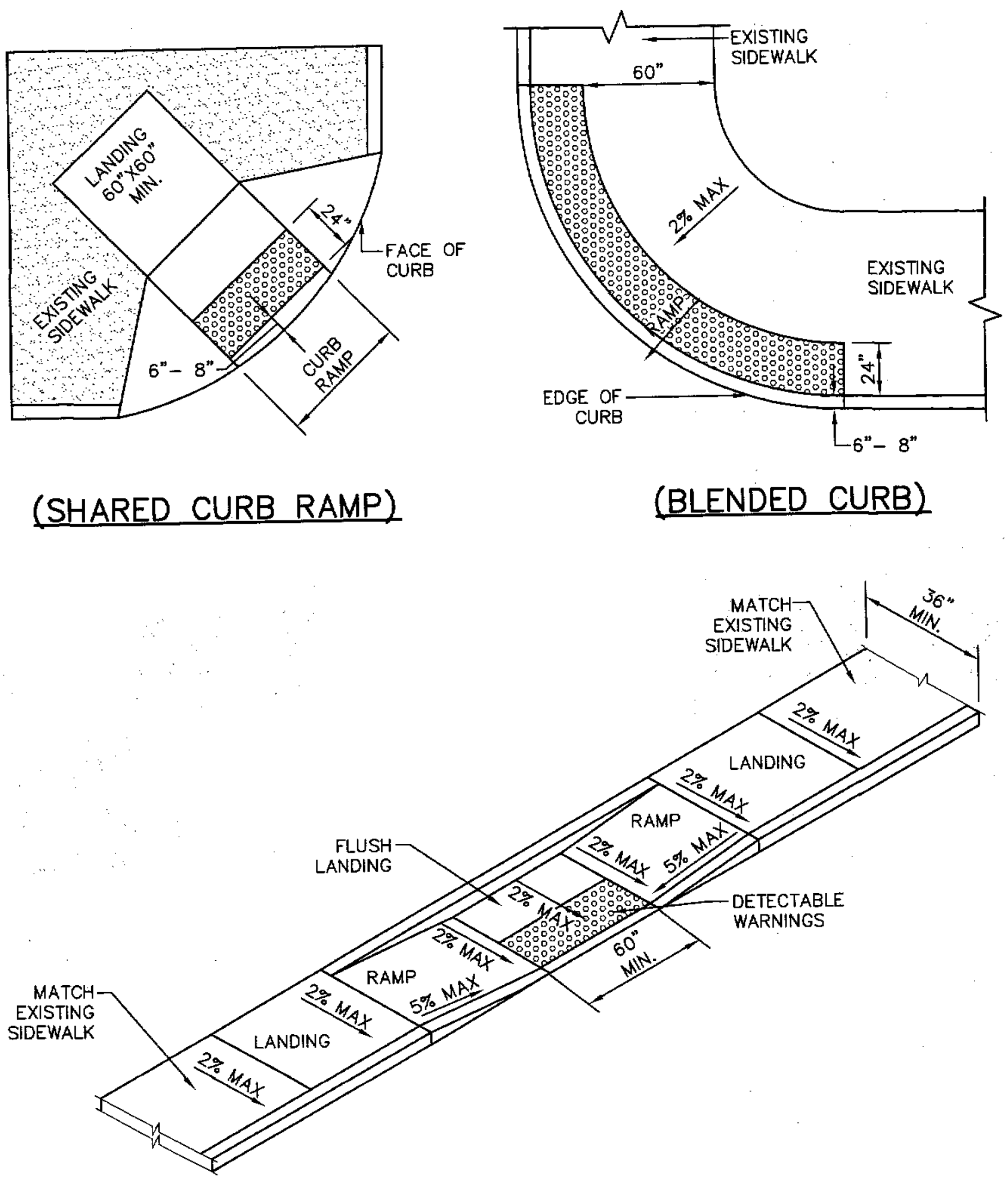

(TRANSITION RAMP: ISOMETRIC VIEW OF A TRANSITION RAMP AS CURRENTLY DEFINED. THE ILLUSTRATION IS BASED ON THE OLD "PARALLEL" STYLE RAMP)

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

LOCATION OF DETECTABLE WARNINGS ON VARIOUS RAMPS

6-27

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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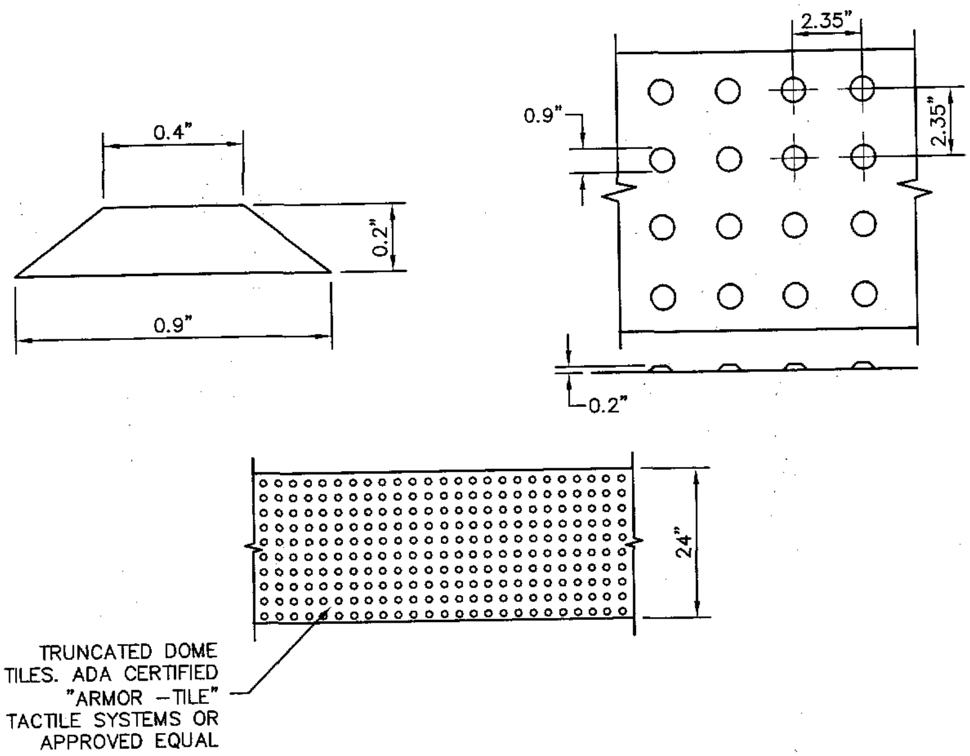

DOME SIZE AND SPACING. TRUNCATED DOMES SHALL HAVE A DIAMETER OF NOMINAL 0.9 INCHES (23 mm) AT THE BOTTOM, A DIAMETER OF 0.4 INCH (10 mm) AT THE TOP, A HEIGHT OF NOMINAL 0.2 INCHES (5 mm), AND A CENTER–TO–CENTER SPACING OF NOMINAL 2.35 INCHES (60 mm) MEASURED ALONG ONE SIDE OF A SQUARE ARRANGEMENT.

DOME ALIGNMENT. DOMES SHALL BE ALIGNED ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF TRAVEL TO PERMIT WHEELS TO ROLL BETWEEN DOMES. DETECTABLE WARNING SURFACES SHALL EXTEND 24 INCHES (610 mm) MINIMUM IN THE DIRECTION OF TRAVEL AND THE FULL WIDTH OF THE CURB RAMP, LANDING, OR BLENDED TRANSITION.

CONTRAST. THERE SHALL BE A MINIMUM OF 70 PERCENT CONTRAST IN LIGHT REFLECTANCE BETWEEN THE DETECTABLE WARNING AND AN ADJOINING SURFACE, OR THE DETECTABLE WARNING SHALL BE "RED BRICK" COLOR, UNLESS OTHERWISE DIRECTED BY THE OWNER. THE MATERIAL USED TO PROVIDE VISUAL CONTRAST SHALL BE AN INTEGRAL PART OF THE DETECTABLE WARNING SURFACE. CONTRAST SHALL BE PROVIDED BY PLACING AND MIXING TINT IN THE PLASTIC CONCRETE USED FOR THE DETECTABLE WARNING SURFACE. NO PAINTING OF SURFACE SHALL BE PERMITTED.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

DOME SIZE AND SPACING
6-28

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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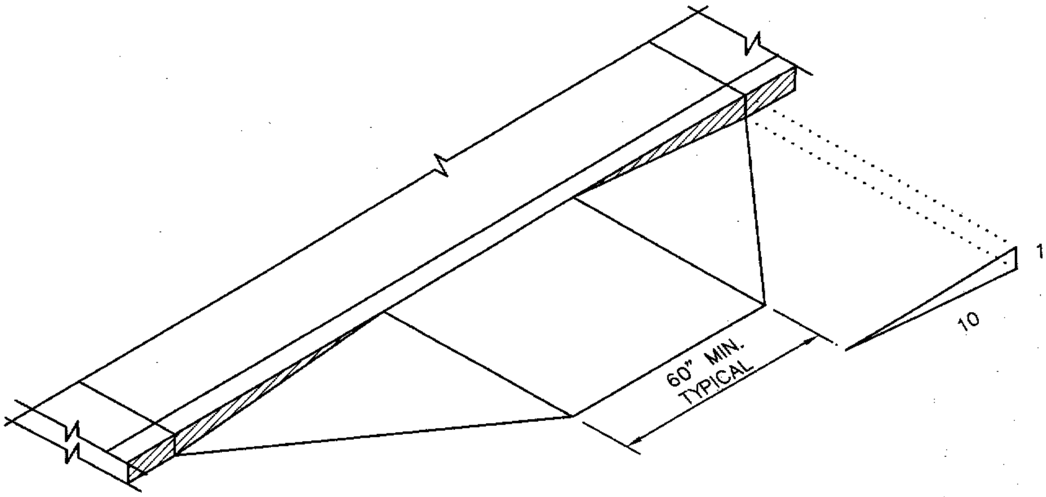

SIDES OF CURB RAMPS.
IF A CURB RAMP IS LOCATED WHERE PEDESTRIANS MUST TRAVEL ACROSS THE RAMP, OR WHERE IT IS NOT PROTECTED BY HANDRAILS OR GUARDRAILS, IT SHALL HAVE FLARED SIDES; THE MAXIMUM SLOPE OF THE FLARE SHALL BE 1:12. CURB RAMPS WITH RETURNED CURBS MAY BE USED WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	BUILT-UP CURB RAMP 6-29 Approved By R. A. SHUBERT — Checked By H. M. E. Date JUNE 03, 2008 — Drawn By QEC / J. R.

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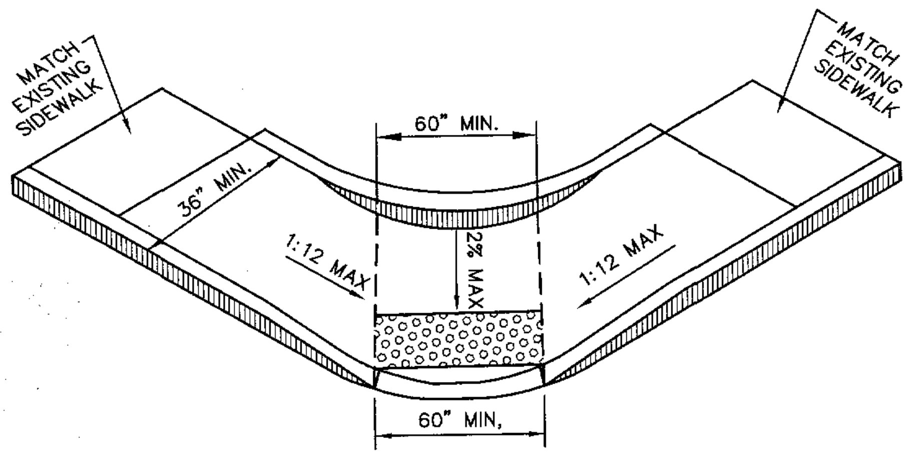

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

DIAGONAL SHARED RAMP
6-30

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
Drawn By QEC / J. R.

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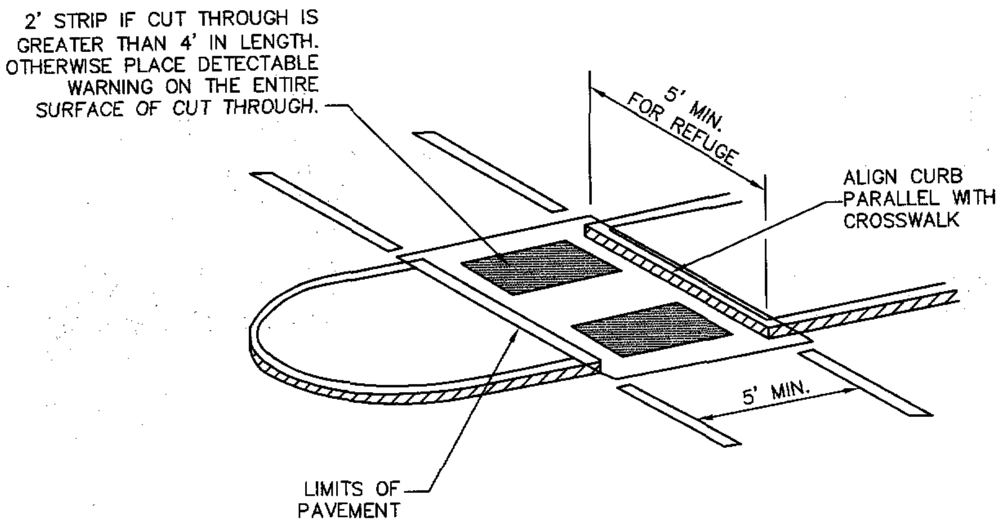

CURB RAMPS AT MEDIAN ISLANDS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

CURB RAMPS AT MEDIAN ISLANDS
6-31

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / I. R.

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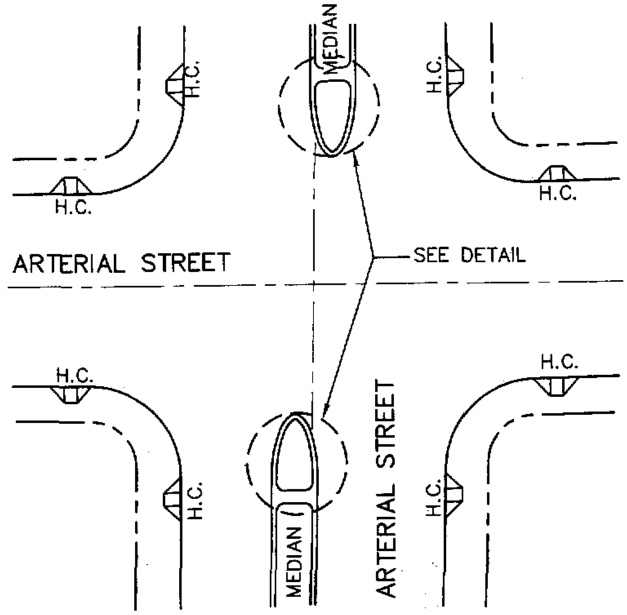
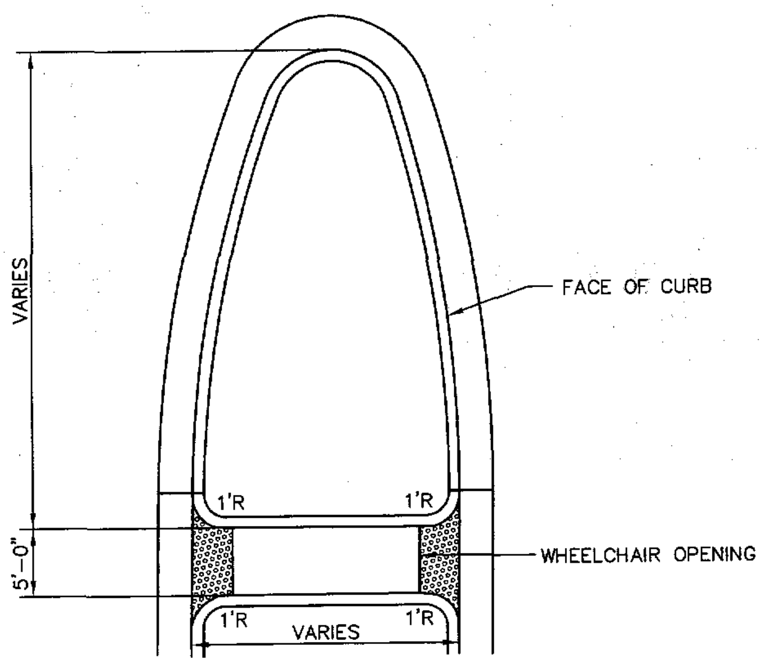


MEDIAN CURB RAMP DESIGN
ARTERIAL STREET



THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

MEDIAN CURB
RAMP DESIGN
(ARTERIAL)
6-32

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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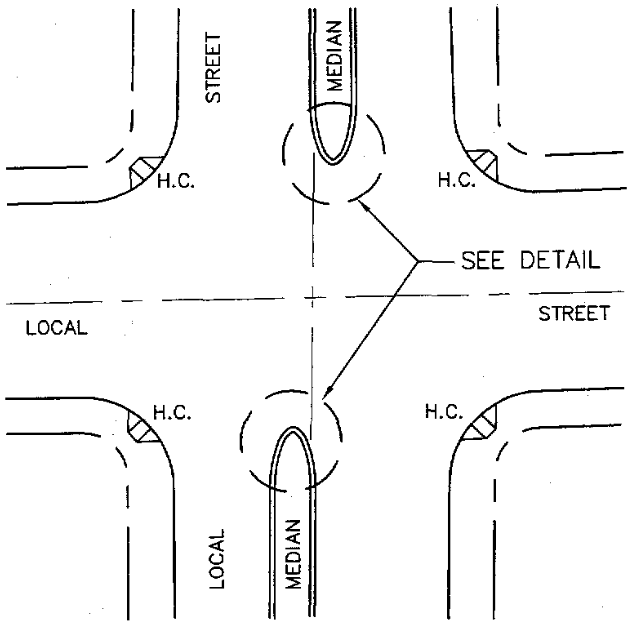
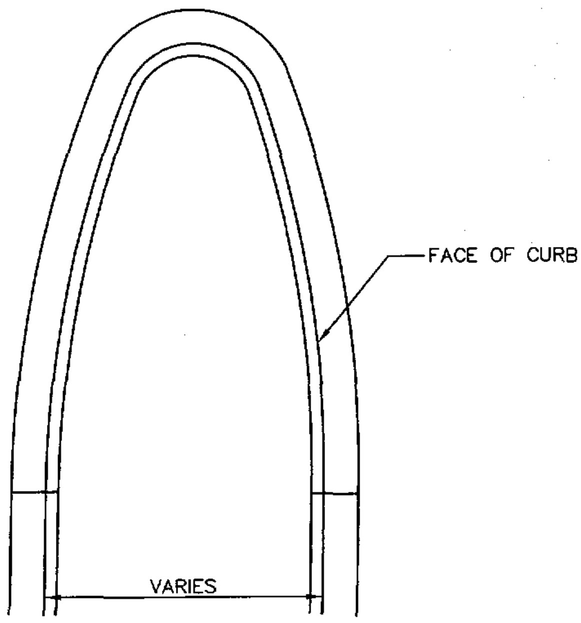


MEDIAN CURB RAMP DESIGN

LOCAL STREET



TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

MEDIAN CURB RAMP DESIGN (LOCAL)
6-33

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

SECTION 7

SECTION 7

SIGNAGE AND SIGNALIZATION

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TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

SECTION 7 TABLE OF CONTENTS

Approved By R. A. SHUBERT Date JUNE 03, 2008

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SPECIFICATIONS FOR ALUMINUM SIGN BLANKS

THESE SPECIFICATIONS DESCRIBE DETAILS AND MINIMUM REQUIREMENTS FOR ALUMINUM SIGN BLANKS, TO WHICH REFLECTIVE SHEETING WILL BE APPLIED.

1. ALL MATERIALS SHALL BE NEW AND UNWEATHERED AND SHALL BE OF DOMESTIC ORIGIN, MILLED, ROLLED, AND FINISHED IN DOMESTIC MILLS.

2. SIGN BLANKS SHALL BE 0.080 GAUGE ALODIZED-TREATED ALUMINUM, 5052-H38 ALLOY, FREE OF BURRS, CORROSION, WHITE RUST, AND DIRT, SUITABLE FOR APPLICATION OF REFLECTIVE SHEETING WITHOUT FURTHER PREPERATION.

3. EDGES OF BLANKS SHALL BE CUT TRUE AND SQUARE. CORNER RADII, HOLE DIAMETERS AND HOLE LOCATIONS SHALL BE AS DESCRIBED IN THE ALUMINUM SIGN BLANK BID D.H.T. STANDARDS.

4. ALL SIGN BLANKS WILL BE TREATED AS FOLLOWS:

A. DEGREASING

(1) VAPOR DEGREASING - BY TOTAL IMMERSION OF THE SIGN BLANK IN A SATURATED VAPOR OF TRICHLORETHYLENE OR PERCHLOROETHYLENE. TRADEMARK PRINTING SHALL BE REMOVED WITH LACQUER THINNER BEFORE DEGREASING.

OR

(2) ALKALINE DEGREASING - BY TOTAL IMMERSION OF THE SIGN BLANK IN A TANK CONTAINING ALKALINE SOLUTIONS, CONTROLLED AND TITRATED TO THE SOLUTION MANUFACTURER'S SPECIFICATIONS FOR TIME, TEMPERATURE, AND CONCENTRATION. IMMERSION TIME SHALL DEPEND UPON THE AMOUNT OF SOIL PRESENT, GAUGE OF THE METAL AND SOLUTION STRENGTH. RINSE THOROUGHLY WITH RUNNING WATER.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

SPECIFICATIONS FOR ALUMINUM SIGN BLANKS

7-1

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

BACK TO TITLE INDEX PAGE

B. ETCHING

(1) ACID ETCH - ETCH WELL IN 6-8% PHOSPHORIC ACID SOLUTION AT 100 DEGREES FAHRENHEIT OR PROPRIETARY ACID ETCHING SOLUTION. RINSE THOROUGHLY WITH RUNNING WATER .

OR

(2) ALKALINE ETCH - ETCH WELL THE PRE-CLEANED ALUMINUM SURFACE IN AN ALKALINE ETCHING MATERIAL THAT IS CONTROLLED BY TITRATION. USE TIME, TEMPERATURE, AND CONCENTRATION SPECIFIED BY THE SOLUTION MANUFACTURER . RINSE THOROUGHLY. REMOVE SMUT WITH AN ACIDIC CHROMIUM COMPOUND-TYPE SOLUTION AS SPECIFIED BY THE SOLUTION MANUFACTURER AND THEN RINSE THOROUGHLY.

C. CHROMATE CONVERSION COATING

COAT THE ALUMINUM BLANKS ACCORDING TO THE CHROMATE CONVERSION COATING MANUFACTURER'S INSTRUCTIONS. THE COATING SHALL CONFORM TO ASTM B449, CLASS 2, AND SHALL RANGE IN COLOR FROM SILVERY IRIDESCENT TO PALE YELLOW. THE COATING WEIGHT SHALL BE 10 TO 35 MG. PER SQ. FT WITH A MEDIAN OF 25 MG. PER SQ. FT. AS THE OPTIMUM COATING WEIGHT.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

SPECIFICATIONS FOR ALUMINUM SIGN BLANKS (continued) 7-2

Approved By R. A. SHUBERT Checked By H. M. E.
Date JUNE 03, 2008 Drawn By QEC / J. R.

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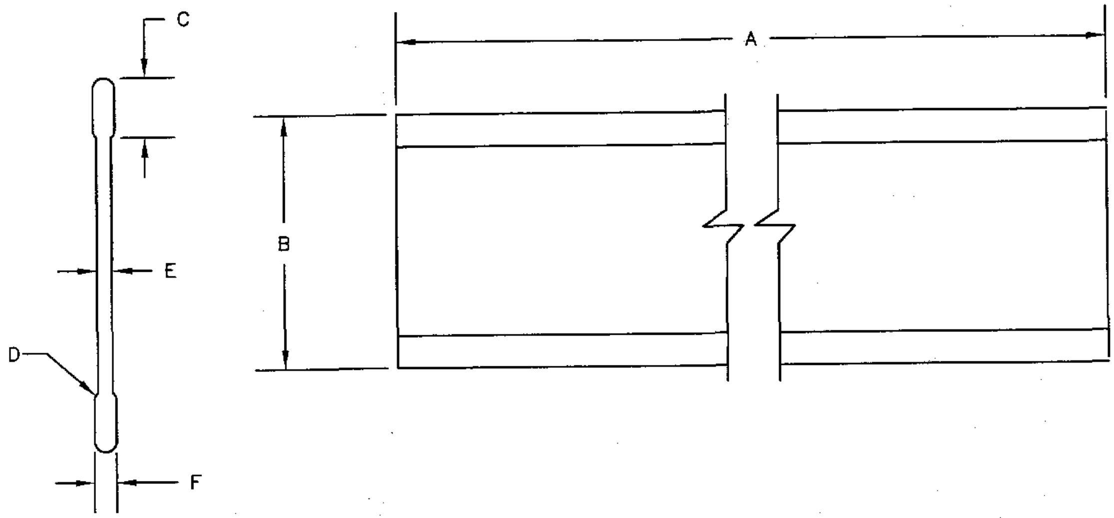


9" STREET NAME SIGN
EXTRUDED ALUMINUM SIGN BLANK

DIMENSIONS (INCHES)

A	B	C	D	E	F
30	9	0.800	1/4R	0.091	0.25
36	9	0.800	1/4R	0.091	0.25
42	9	0.800	1/4R	0.091	0.25
48	9	0.800	1/4R	0.091	0.25

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

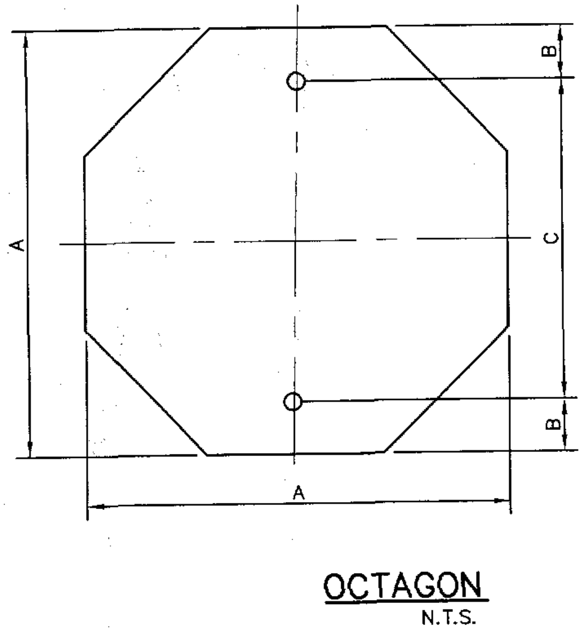
ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

9" STREET NAME SIGN
EXTRUDED ALUMINUM
SIGN BLANK
7-3

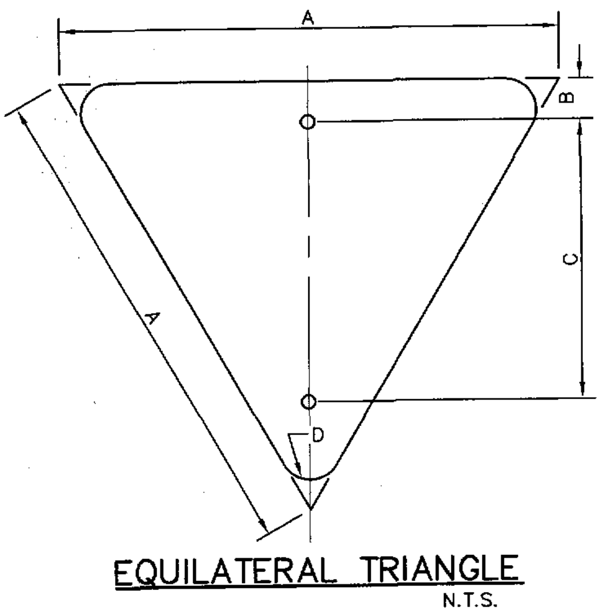
Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
Drawn By QEC / J. R.

BACK TO TITLE INDEX PAGE



3/8" HOLE DIA.

A	B	C
24	3	18
30	3	24
36	3	30



3/8" HOLE DIA.

A	B	C	D
36	3	21	2
42	3	24	2 1/2
48	3	35	3

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

D.H.T. BLANK STANDARDS

7-4

Approved By R. A. SHUBERT | Checked By H. M. E.
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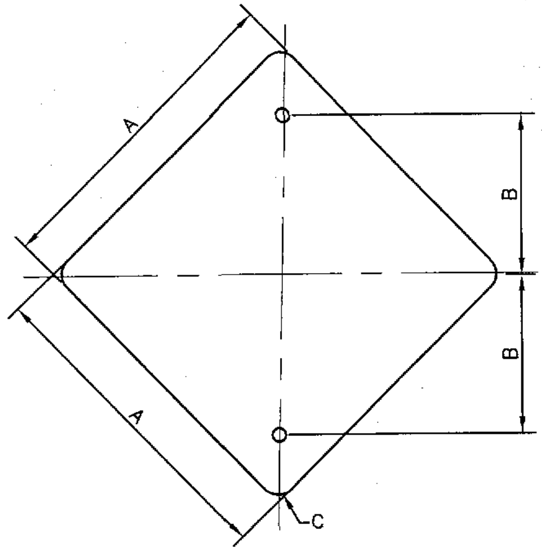
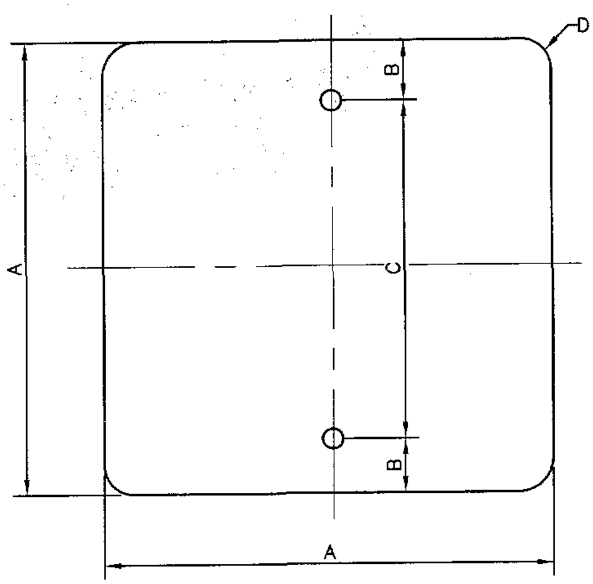


3/8" HOLE DIA.

A	B	C
24	12	1 1/2
30	15	1 7/8
36	18	2 1/4

DIAMOND
N.T.S.



3/8" HOLE DIA.

A	B	C	D
9	1	7	–
12	3	6	1 1/2
18	3	12	1 1/2
24	3	18	1 1/2
30	3	24	1 7/8
36	3	30	2 1/4

SQUARE
N.T.S.

TITLE 19 - SUBDIVISION ORDINANCE
ENGINEERING DEPARTMENT
DESIGN STANDARDS
FOR CONSTRUCTION

D.H.T. BLANK
STANDARDS
(continued)
7-5

Approved By R. A. SHUBERT
Date JUNE 03, 2008
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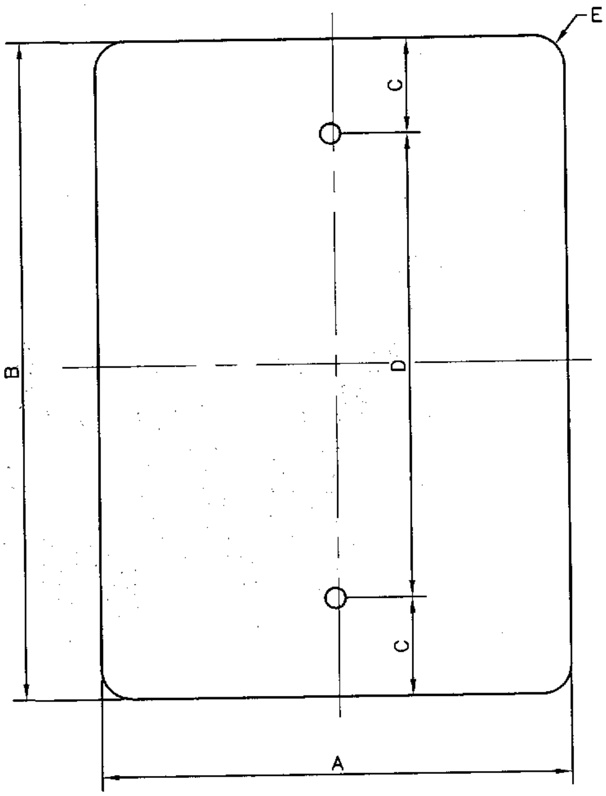
3/8" HOLE DIA.



VERTICAL RECTANGLE

N.T.S.

A	B	C	D	E
9	12	3	6	1 1/2
10	18	2	14	1 1/2
10	27	2	23	1 1/2
10	36	2	32	1 1/2
12	18	1-1/2	15	1 1/2
12	24	2	20	1 1/2
12	30	1-1/8	27-3/4	1 1/2
12	36	2	32	1 1/2
12	48	2	44	1 1/2
18	24	3	18	1 1/2
18	30	1-1/2	27	1 1/2
24	30	3	24	1 1/2
24	36	3	30	1 1/2
24	48	3	42	1 1/2
30	36	3	30	1 7/8
30	42	3	36	1 7/8

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

D.H.T. BLANK STANDARDS (continued) 7-6

Approved By R. A. SHUBERT
Date JUNE 03, 2008

Checked By H. M. E.
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CITY OF EL PASO
SPECIFICATIONS FOR REFLECTORIZED STREET NAME SIGNS

1. COLOR OF SIGNS : THE FINISHED SIGN MUST HAVE A REFLECTORIZED GREEN BACKGROUND. THE GREEN MUST CONFORM WITH THE BUREAU OF PUBLIC ROADS HIGHWAY GREEN. THE LEGEND MUST BE REFLECTORIZED SILVER WHITE (GREEN REVERSE SCREENED BACKGROUND WITH SILVER COPY).

2. LETTER DESIGN: THE LETTERING OF ALL LEGENDS MUST BE UPPER CASE LETTERS IN ACCORDANCE WITH "STANDARD ALPHABETS FOR HIGHWAY SIGNS" PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION.

3. LETTER SPACING: THE CONTROL FOR THE SPACING VALUES IN TRAFFIC LAYOUT IS THE DISTANCE RECOGNIZED AS AESTHETIC SPACING BETWEEN TWO STRAIGHT LETTERS (HN). A SPACING CONTROL OF TWO TIMES THE WIDTH OF THE STROKE OF THE LETTER SERIES TO BE USED MUST BE THE AESTHETIC CONTROL (100%). TWO AND ONE-HALF TIMES (2-1/2) THIS CONTROL MUST BE USED AS THE AESTHETIC WORD SPACE BETWEEN ELEMENTS IN THE PRIMARY LEGEND.

4. LAYOUT: THE MAXIMUM NUMBER OF LETTERS TO BE ACCOMMODATED ON A GIVEN LENGTH STREET NAME FACE MUST BE DETERMINED BY THE WIDEST LETTER SERIES POSSIBLE FOR THAT LEGEND AND THE SPACING CONTROL (100%) FOR THE SERIES USED MUST BE EXPANDED OR CONDENSED UP TO 25% IN 5% INCREMENTS.

5. THE SPACING CONTROL (100%) FOR THE SERIES USED MUST BE EXPANDED OR CONDENSED UP TO 25% IN 5% INCREMENTS FOR THE END MARGIN WITH MINIMUM OF 1".

6. THE WORD SPACE MUST BE EXPANDED UP TO 25% IN 5% INCREMENTS BUT NOT CONDENSED.

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	SPECIFICATIONS FOR REFLECTORIZED STREET NAME SIGNS 7-7
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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7. SPACE BETWEN PRIMARY AND BLOCK NUMBER AREA MUST BE 1/2 THE AESTHETIC WORK SPACE USED IN THE PRIMARY LEGEND.

8. SUFFIX LETTER SIZE FOR ALL LENGTHS MUST BE 2" CAPITALS, "C" SERIES, EXCEPT THAT SERIES "A" OR "B" WHERE SUFFIX ABBREVIATION EXCEEDS TWO LETTERS, MAY BE USED.

9. SIZE OF LEGEND: FOR 9" STREET NAME SIGNS, THE PRIMARY LEGEND, OR STREET NAME MUST HAVE CAPITAL LETTERS SIX INCHES (6") HIGH AND ALL SECONDARY LEGENDS, INCLUDING THE SUFFIX, BLOCK NUMBERS, MUST HAVE UPPER CASE LETTERS TWO AND ONE-HALF INCHES (2 1/2") HIGH.

10. SUFFIX LETTER SIZE FOR ALL LENGTHS MUST BE 2 1/2" CAPITALS, "C" SERIES, EXCEPT THAT SERIES "A" OR "B" WHERE SUFFIX ABBREVIATION EXCEEDS TWO LETTERS, MAY BE USED.

11. POSITION OF LEGEND: EACH SIGN FACE WILL CONSIST OF THE STREET NAME, SUFFIX, AND TWO ZEROS OF THE BLOCK NUMBER . THE ADDITIONAL NUMBERS OF THE BLOCK NUMBER WILL BE APPLIED BY THE CITY OF EL PASO. THE SUFFIX WILL BE LOCATED IN THE UPPER RIGHT CORNER AND THE BLOCK NUMBER IN THE LOWER RIGHT CORNER OF THE SIGN FACE AND THE STREET NAME CENTERED IN THE REMAINING SPACE.

12. SIGN FABRICATION: THE SIGN FACE MUST BE FABRICATED BY REVERSE SCREENING GREEN TRANSPARENT COLOR OVER SILVER REFLECTIVE SHEETING. TRANSPARENT PROCESS COLORS MUST BE AS RECOMMENDED BY THE SHEETING MANUFACTURER. CUT-OUT OR APPLIED LEGENDS ARE NOT PERMITTED. SIGN FACES MUST BE COMPRISED OF ONE PIECE OR PANEL OF REFLECTIVE SHEETING.

13. TYPE OF SHEETING: ENGINEER GRADE REFLECTIVE SHEETING MUST BE USED IN THE FABRICATION OF THE STREET NAME SIGN FACES.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

SPECIFICATIONS FOR REFLECTORIZED STREET NAME SIGNS (continued)

7-8

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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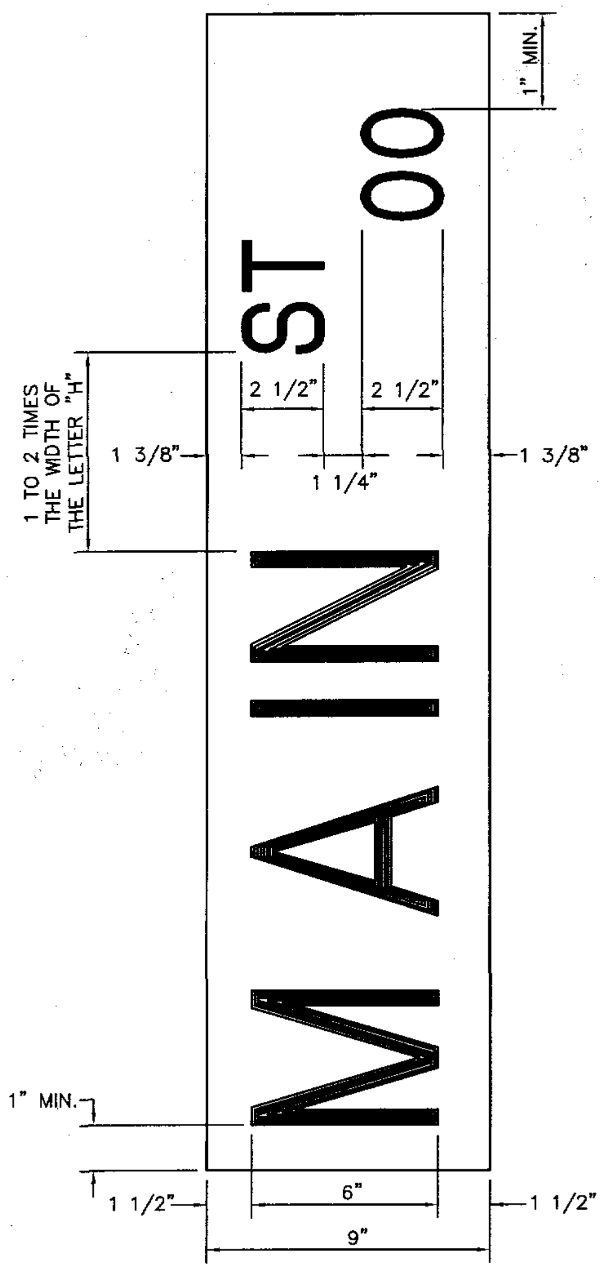
CITY OF EL PASO
LAYOUT FOR 9" STREET NAME SIGNS



SIGN CLASS	SIGN LENGTH	PRIMARY LETTERS SIZE & SERIES	SUFFIX & BLOCK NUMBER SIZE & SERIES
9" ARTERIAL STREETS	36" 42" 48"	6" C,D SERIES 6" C,D SERIES 6" A,B,C,D SERIES	3" C SERIES 3" C SERIES 3" C SERIES

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

9" STREET NAME SIGN

7-9

Approved By R. A. SHUBERT | Checked By H. M. E.
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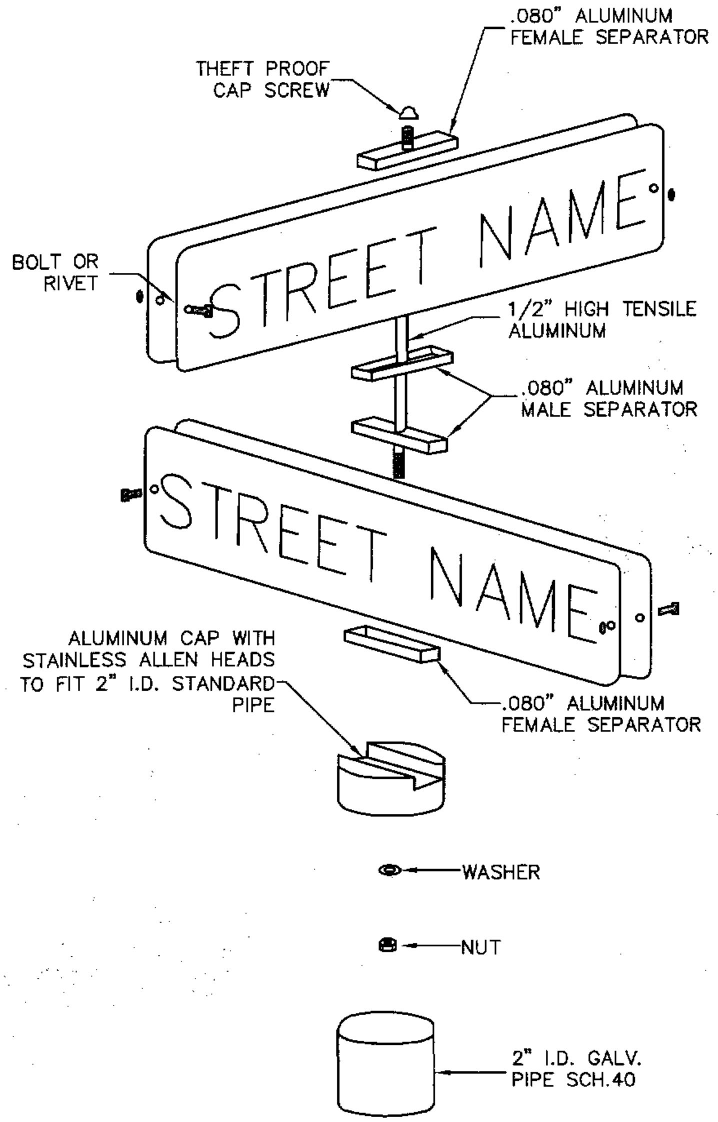

<u>9" STREET</u>
<u>NAME ASSEMBLY</u>

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	9" STREET NAME SIGN ASSEMBLY 7-10
		Approved By R. A. SHUBERT / Date JUNE 03, 2008 / Checked By H. M. E. / Drawn By QEC / J. R.

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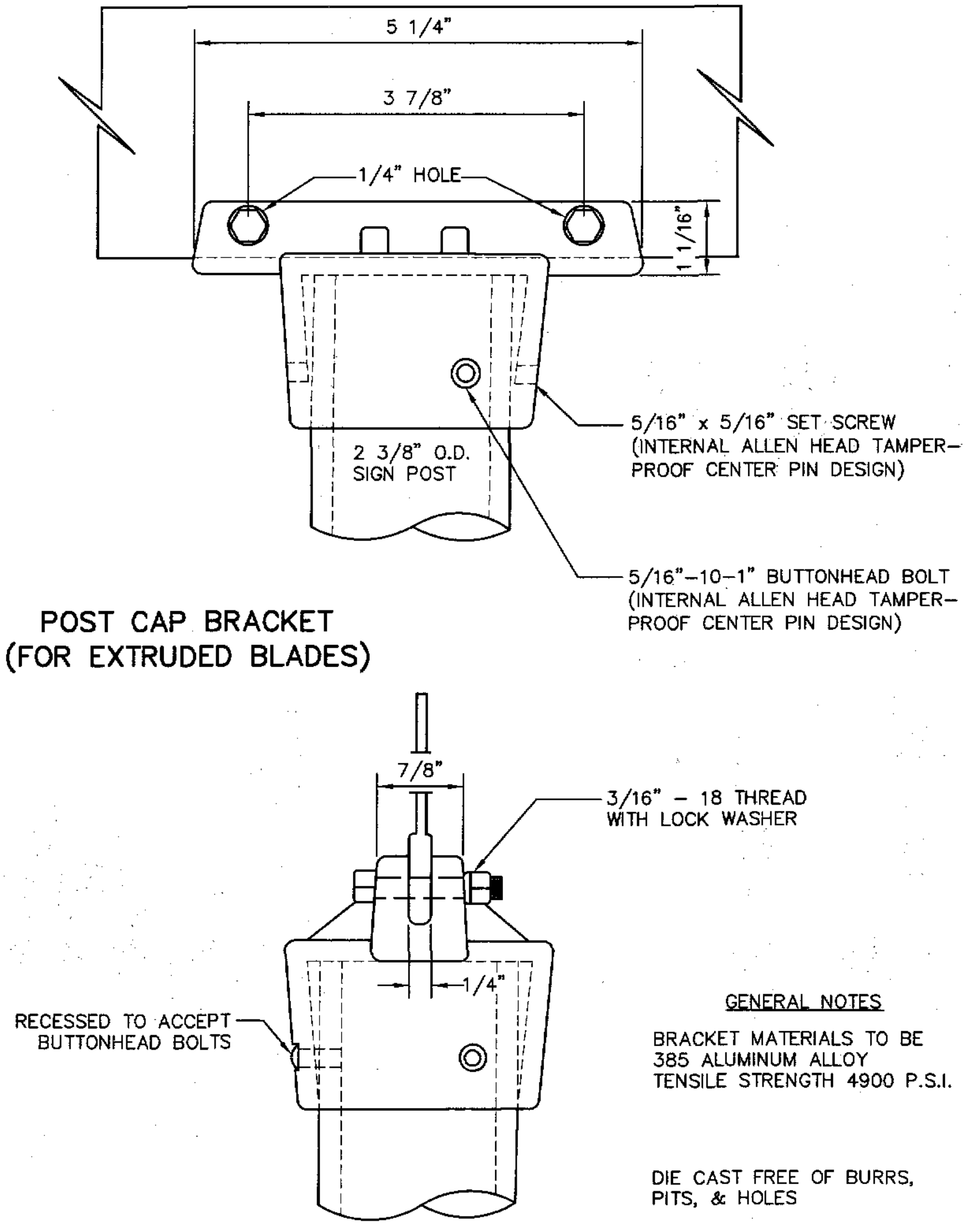

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

9" STREET NAME SIGN ASSEMBLY (continued) 7-11

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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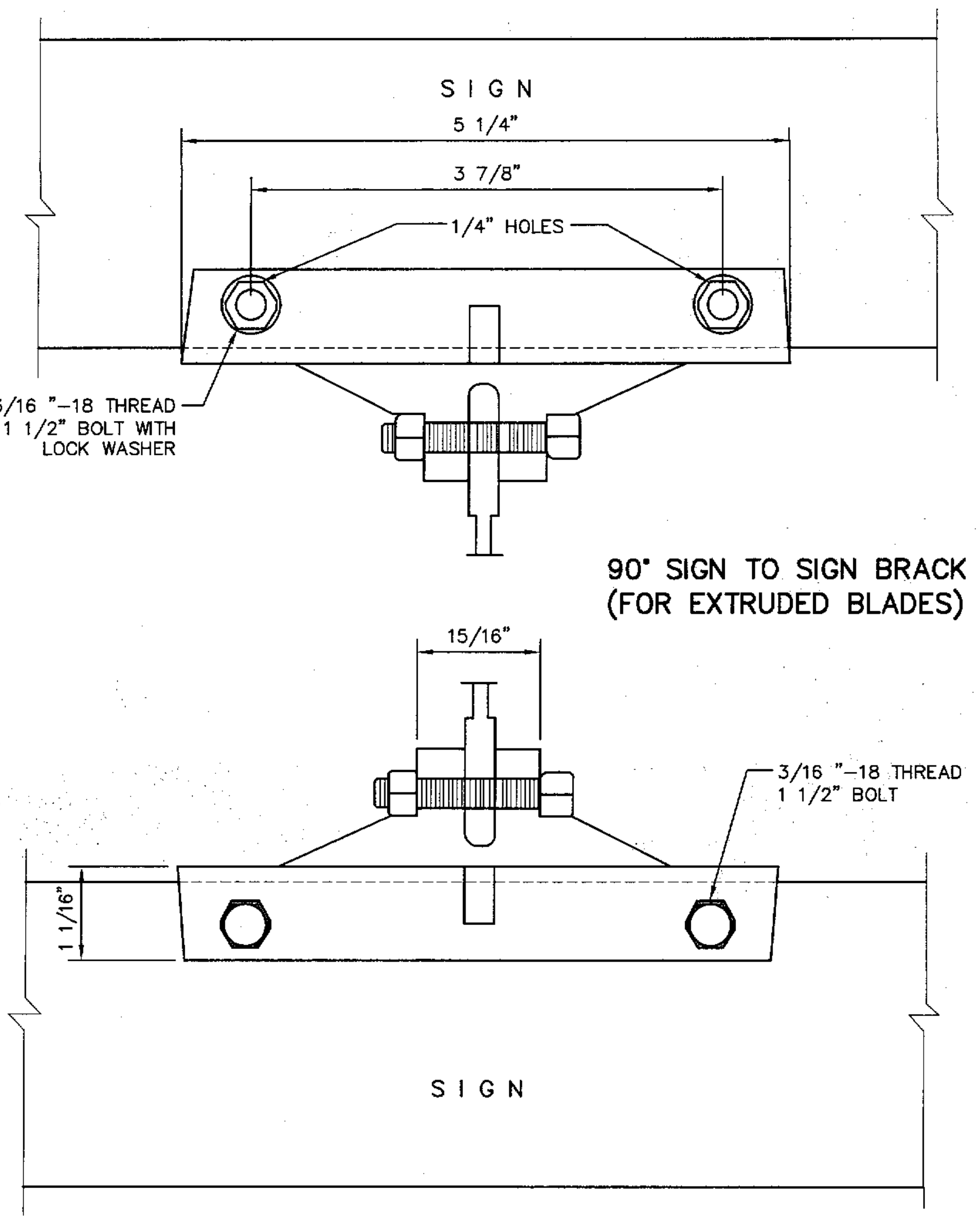

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

9" STREET NAME SIGN ASSEMBLY (continued)

7-12

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Date JUNE 03, 2008	Drawn By QBC / J. R.

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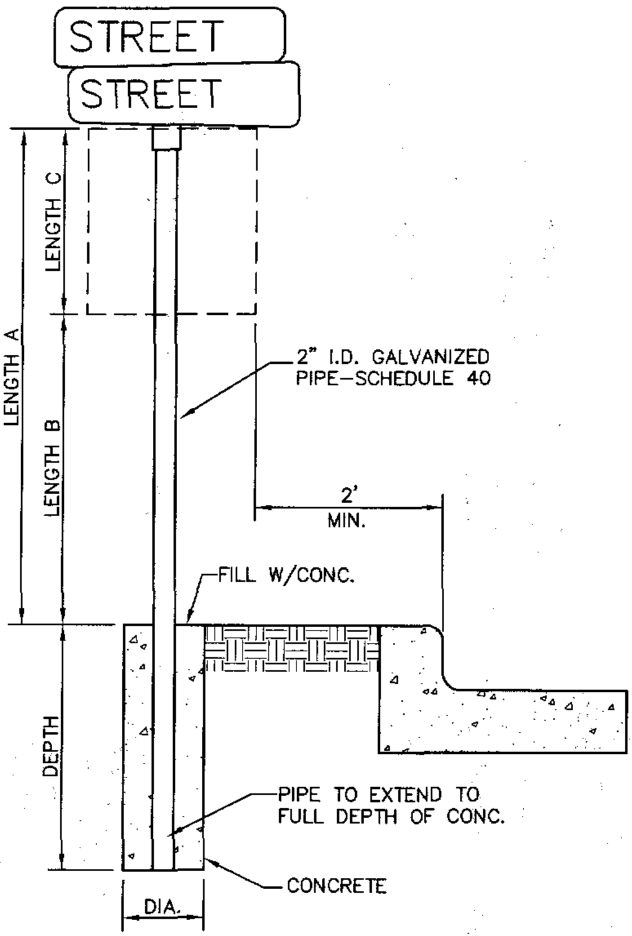

DIA.= 8" MIN IN SOIL OR GRAVEL
3" MIN. UNDER CONC SIDEWALK

SIGN POST INSTALLATION

LENGTH A	LENGTH B	LENGTH C	DEPTH
10 FT	7 FT	LARGER THAN 24"	2 FT
9 FT	7 FT	SMALLER THAN 24"	1 1/2 FT

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

SIGN POST INSTALLATION

7-13

Approved By R. A. SHUBERT Checked By H. M. E.
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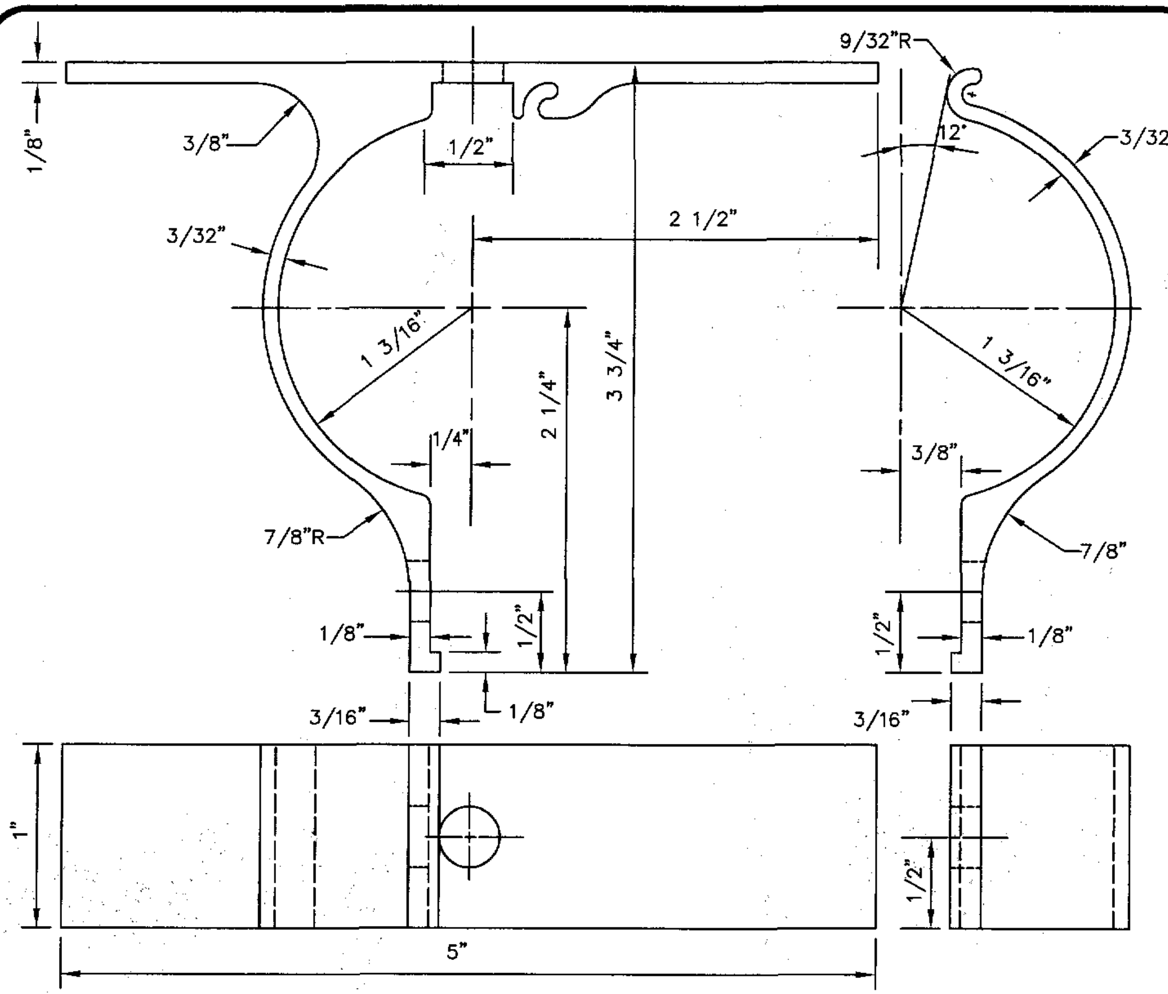

ALUMINUM SIGN CLAMP BRACKET FOR TRAFFIC CONTROL SIGNS

N.T.S.

NOTES:

1. ALL HOLES 3/8" PUNCH
2. FILLETS & ROUNDS 1/16"=R
3. FURNISH THE FOLOWING HARDWARE FOR EACH BRACKET:
   1 – 5/16"x 3/4" BOLTS
   1 – 5/16"x 1 1/4" BOLT
   2 – 5/16"x NUTS & LOCK WASHERS
   2 – FLAT WASHERS
4. THE BRACKET IS TO BE MADE FROM HIGH STRENGTH ALUMINUM ALLOY. THE BRACKET IS TO EMPLOY AN EXTRUDED INTERLOCKING FEATURE OFFERING A RIGID MEANS OF ATTACHING A FLAT SIGN TO A STANDARD 2" (2/8" O.D.) TUBULAR POST.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

ALUMINUM SIGN CLAMP BRACKET FOR TRAFFIC CONTROL SIGNS
7-14

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QBC / I. R.

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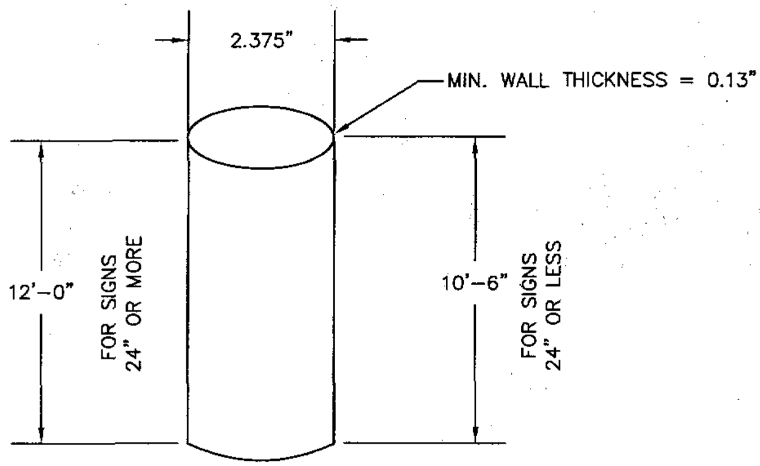
SIGN POST SPECIFICATIONS



NOTES:

1. WELD ALONG ITS LENGTH TO FORM VIRTUALLY SEAMLESS.
2. POST SHALL BE HOT–DIPPED ZINC GALVANIZED UNIFORMLY ON THE OUTSIDE WITH A NOMINAL ZINC WEIGHT OF 1.0 OUNCE PER SQUARE FOOT.
3. THE ZINC COATING IS TO BE OVER–COATED WITH A CHROMITE CONVERSION AND ACRYLIC COATING TO PROVIDE RESISTANCE TO RUSTING AND CORROSION.
4. THE INSIDE OF THE POST SHALL BE COATED WITH AN ORGANIC MATERIAL FOR PROTECTION AGAINST RUST.
5. BOTH ENDS ARE TO BE SQUARELY CUT WITHOUT FLARE.
6. POST SHALL BE FREE OF WARPS, CORROSION, OR OTHER DEFECTS.
7. RING WELDS OR SPLICES WILL NOT BE ACCEPTABLE.
8. BENDING STRENGTH AS SPECIFIED BY AASHTO FOR SCHEDULE 40 PIPE.
9. POST SHALL BE BUNDLED WITH METAL STRAPS AND SHALL NOT EXCEED 37 POST PER BUNDLE.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

SIGN POST SPECIFICATIONS 7-15

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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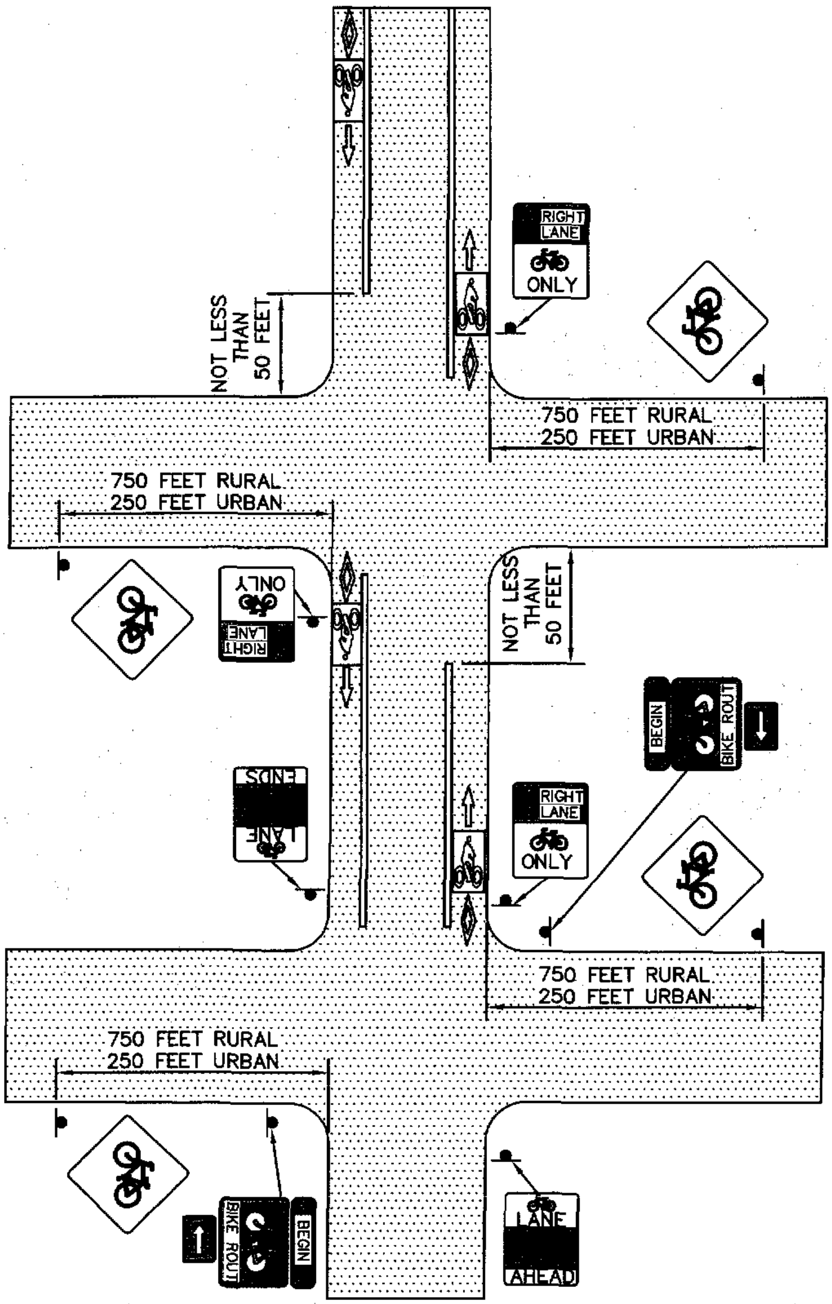

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

BIKE LANE SIGNS AND MARKINGS

7-16

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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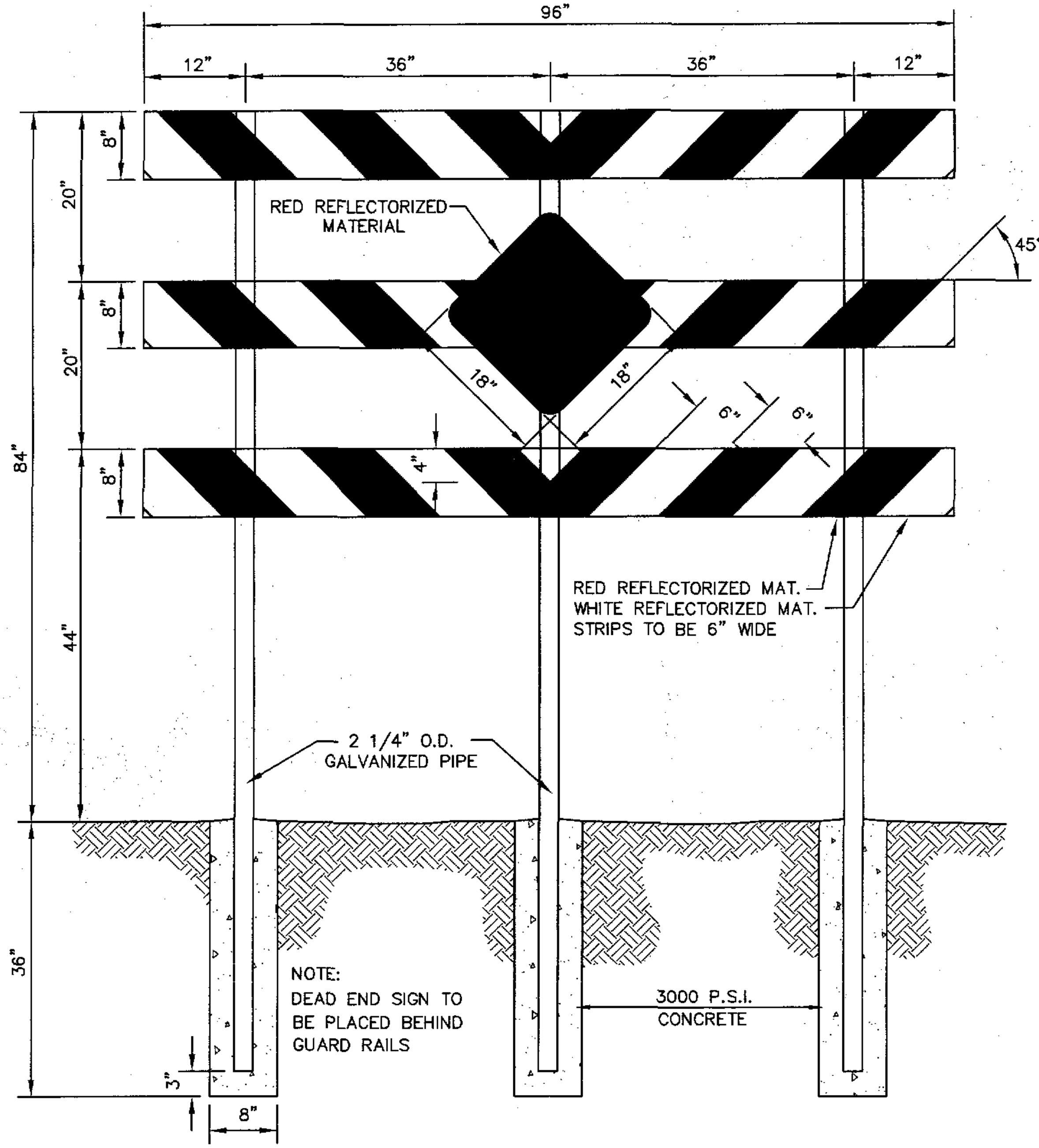

DEAD END SIGN

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

DEAD END SIGN

7-17A

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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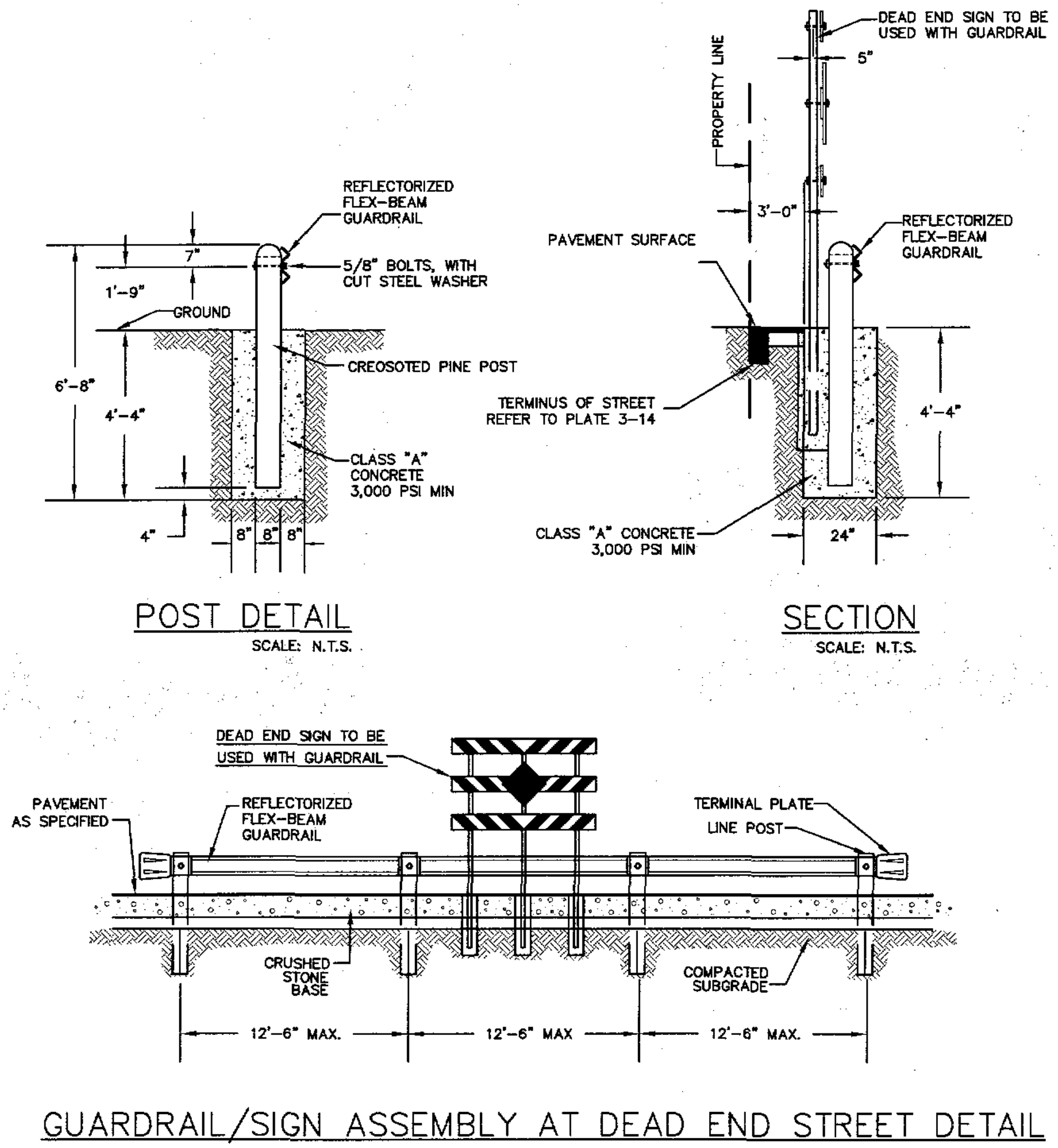

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	GUARDRAIL SIGN ASSEMBLY AT DEAD END 7-17B
		Approved By R. A. SHUBERT Checked By H. M. E. Date JUNE 03, 2008 Drawn By QEC / J. R.

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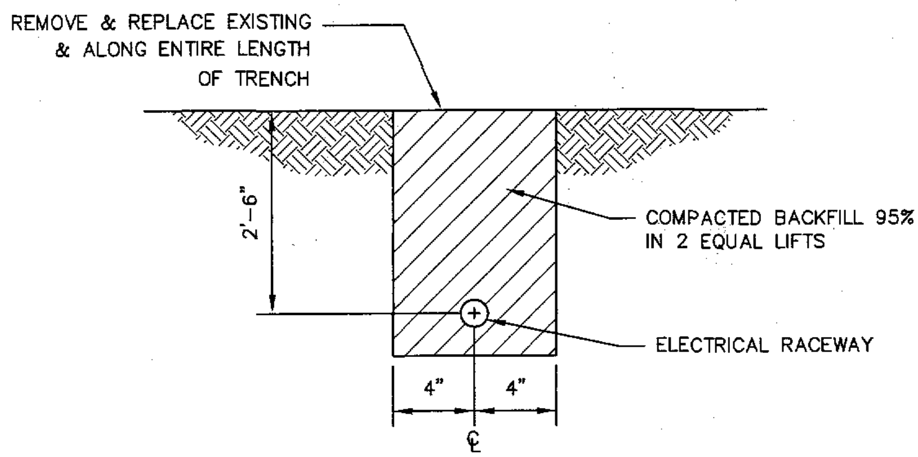
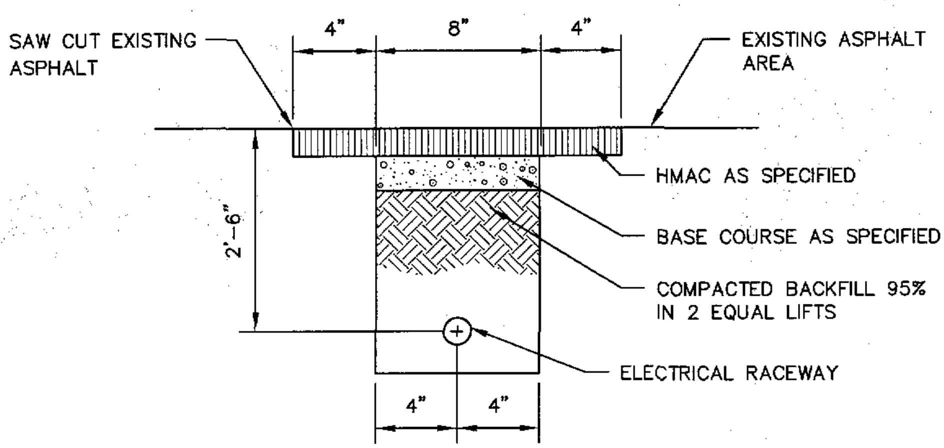


TYPICAL ELECTRICAL RACEWAY TRENCH DETAIL



TYPICAL ELECTRICAL RACEWAY TRENCH DETAIL

KEYED NOTES:

1. TRENCHES IN AREAS WITH GRASS, DIRT, PAVERS, ETC. SHALL BE REPLACED ALONG ENTIRE LENGTH OF TRENCH.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

TYPICAL ELECTRICAL
RACEWAY TRENCH
DETAIL
7-18

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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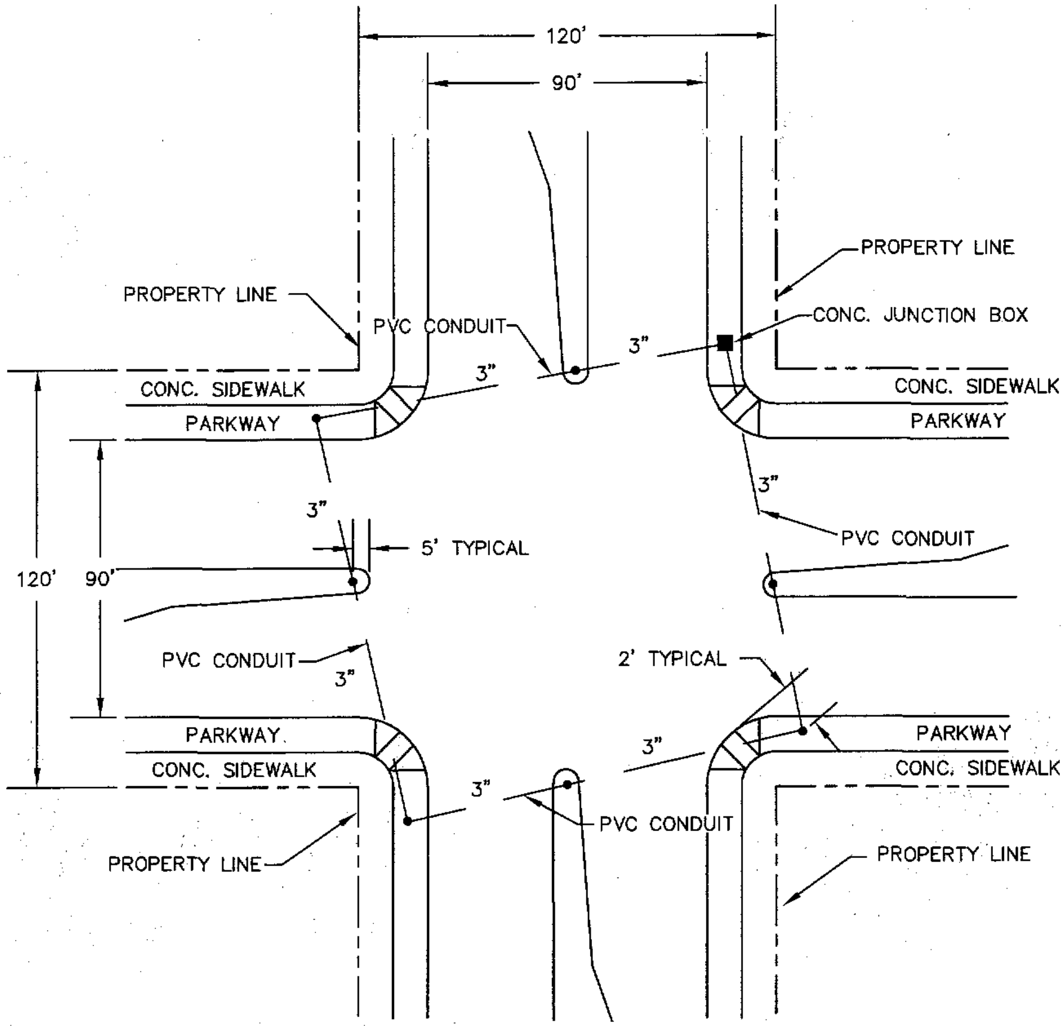

NOTE:
CONDUIT SHALL BE HIGH IMPACT P.V.C. – 3" SCHEDULE 40 AS PER CITY SPECIFICATIONS.

TYPICAL INTERSECTION

MAJOR ARTERIAL – MAJOR ARTERIAL

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	TRAFFIC SIGNAL CONDUIT LAYOUT (MAJOR-MAJOR) 7-19
		Approved By R. A. SHUBERT	Checked By H. M. E.
		Date JUNE 03, 2008	Drawn By QEC / J. R.

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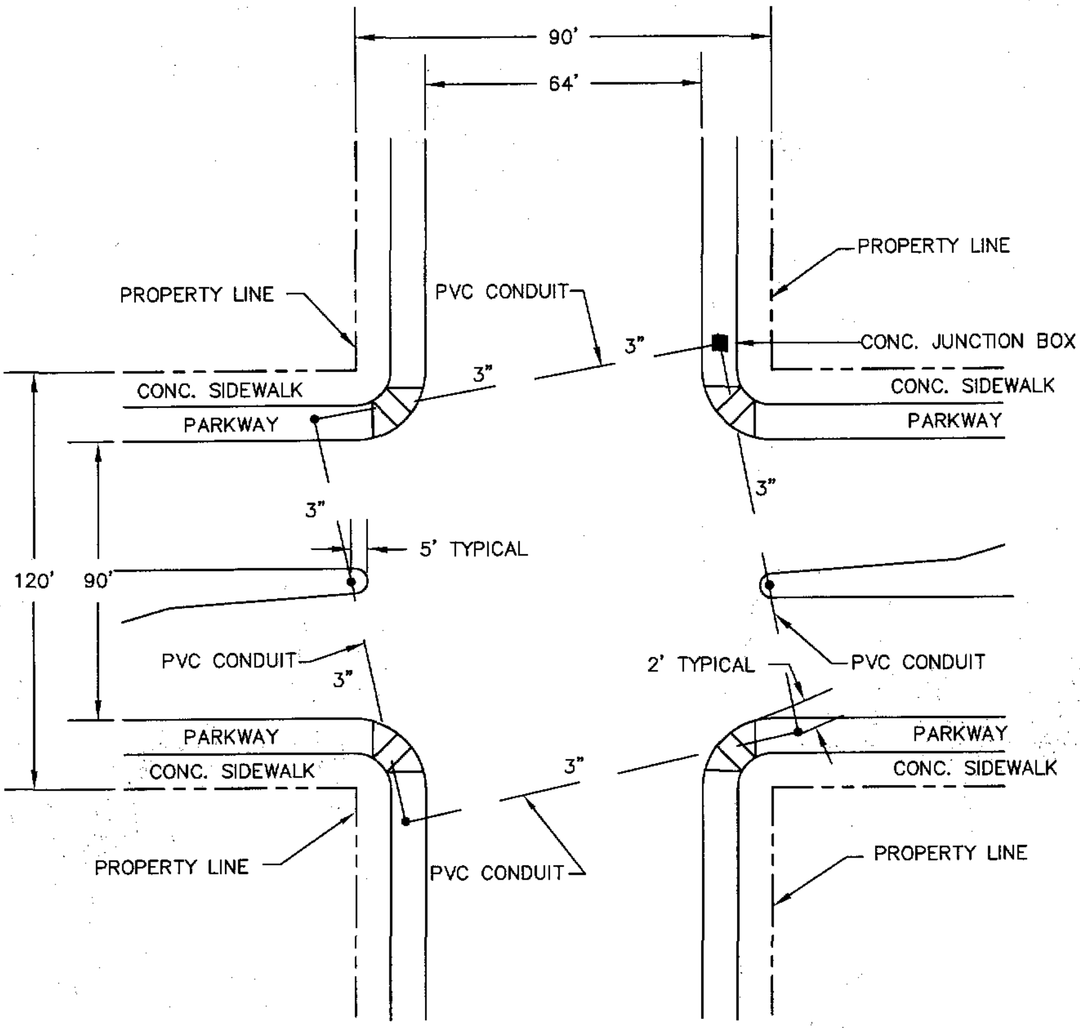

NOTE:
CONDUIT SHALL BE HIGH IMPACT P.V.C. – 3" SCHEDULE 40 AS PER CITY SPECIFICATIONS.

TYPICAL INTERSECTION

MAJOR ARTERIAL – MINOR ARTERIAL

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	TRAFFIC SIGNAL CONDUIT LAYOUT (MAJOR-MINOR) 7-20 Approved By R. A. SHUBERT Checked By H. M. E. Date JUNE 03, 2008 Drawn By QEC / J. R.

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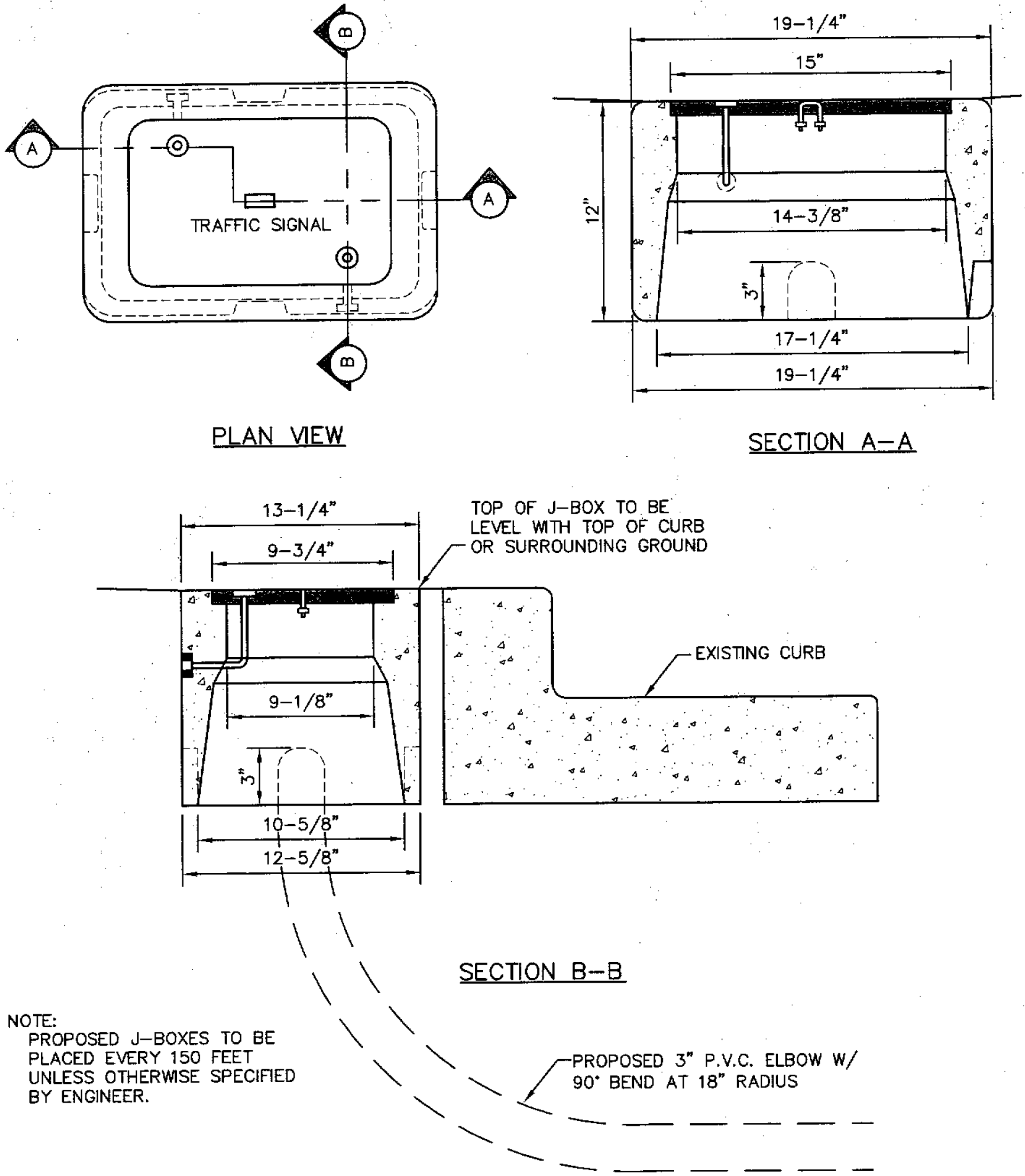

TYPICAL JUNCTION BOX

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

TYPICAL TRAFFIC SIGNAL JUNCTION BOX

7-21

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Date JUNE 03, 2008	Drawn By QEC / J. R.

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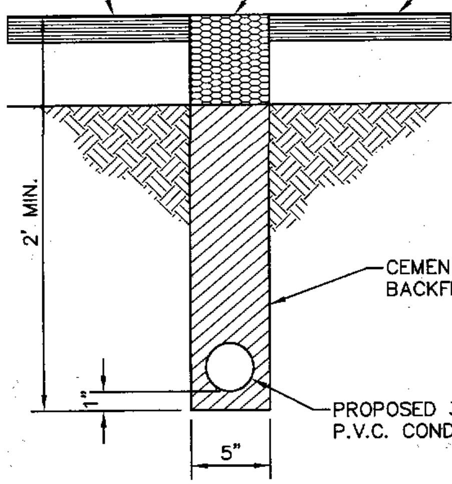
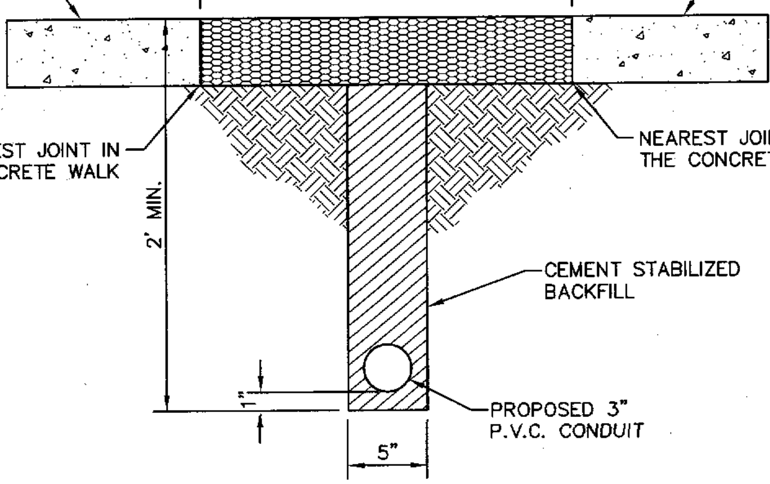


PAVEMENT CUT FOR CONDUIT PLACEMENT



SIDEWALK CUT FOR CONDUIT PLACEMENT

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	TYPICAL CUTS FOR CONDUIT PLACEMENT OF TRAFFIC SIGNALS 7-22 Approved By R. A. SHUBERT Date JUNE 03, 2008 Checked By H. M. E. Drawn By QEC / J. R.

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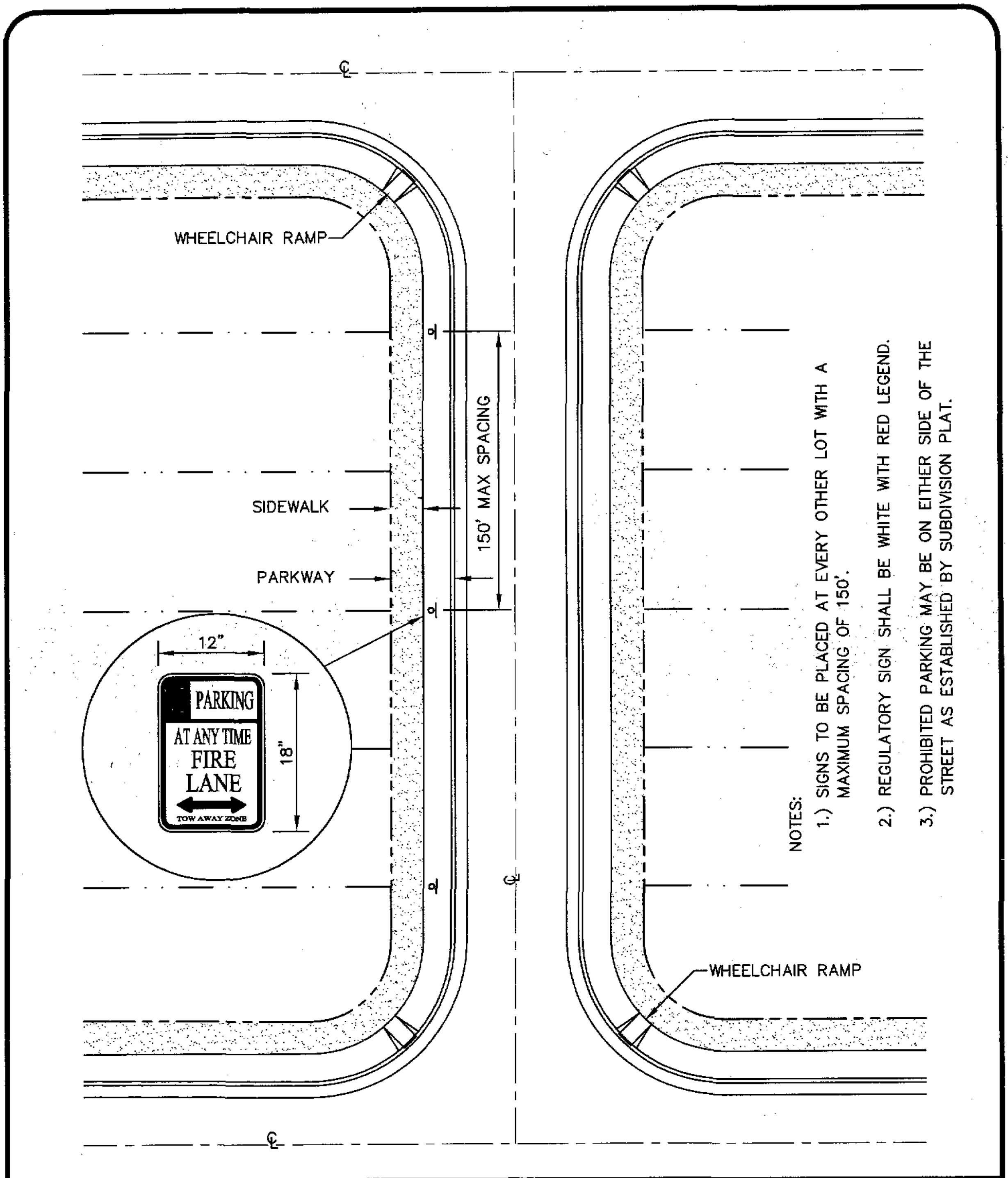

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

PROHIBITED PARKING SIGNAGE (FIRE-LANE)
7-23

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
Drawn By QEC / J. R.

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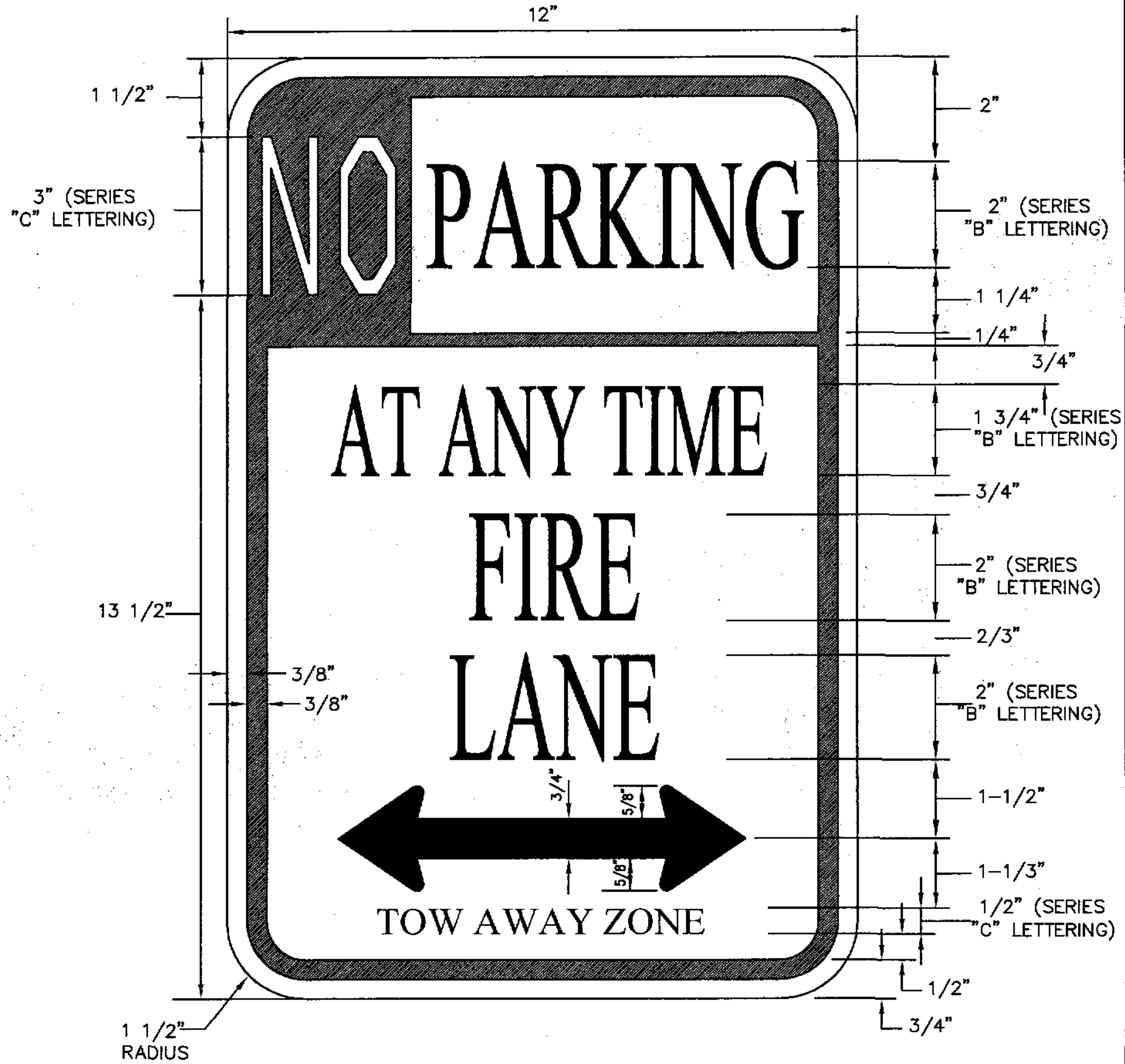

COLORS

LEGEND ---------------- RED
BACKGROUND ---------- WHITE

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	NO PARKING FIRE LANE SIGN 7-24
		Approved By R. A. SHUBERT Date JUNE 03, 2008 / Checked By H. M. E. Drawn By QEC / J. R.

SECTION 8

SECTION 8

STREET LIGHTING

TITLE **PAGE**

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THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

SECTION 8 TABLE OF CONTENTS

Approved By R. A. SHUBERT Date JUNE 03, 2008

Checked By H. M. E. Drawn By QEC / J. R.

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The Subdivider shall furnish and install street lights along all public and private streets, whether within the corporate limits or within the extraterritorial jurisdiction. Such street lights shall comply with the City of El Paso lighting ordinance found at Chapter 18.18 of the El Paso Municipal Code. The following standards shall apply in determining the number of street lights required, and are based on approved standards of the American National Standards Institute and the Illuminating Engineering Society of North America, a copy of which is maintained by the City Engineer:

Street Type	Required Spacing	Pole Type	Lamp Type	Height
Local streets	At intervals of not more than three hundred feet (300')	Wood or Metal	100 watt high pressure sodium	30 feet
Collector arterials	At intervals of not more than three hundred feet (300')	Wood or Metal	100 watt high pressure sodium	30feet

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

RESIDENTIAL STREET
LIGHTING
8-1

Approved By R. A. SHUBERT Checked By H. M. E.
Date JUNE 03, 2008 Drawn By QEC / J. R.

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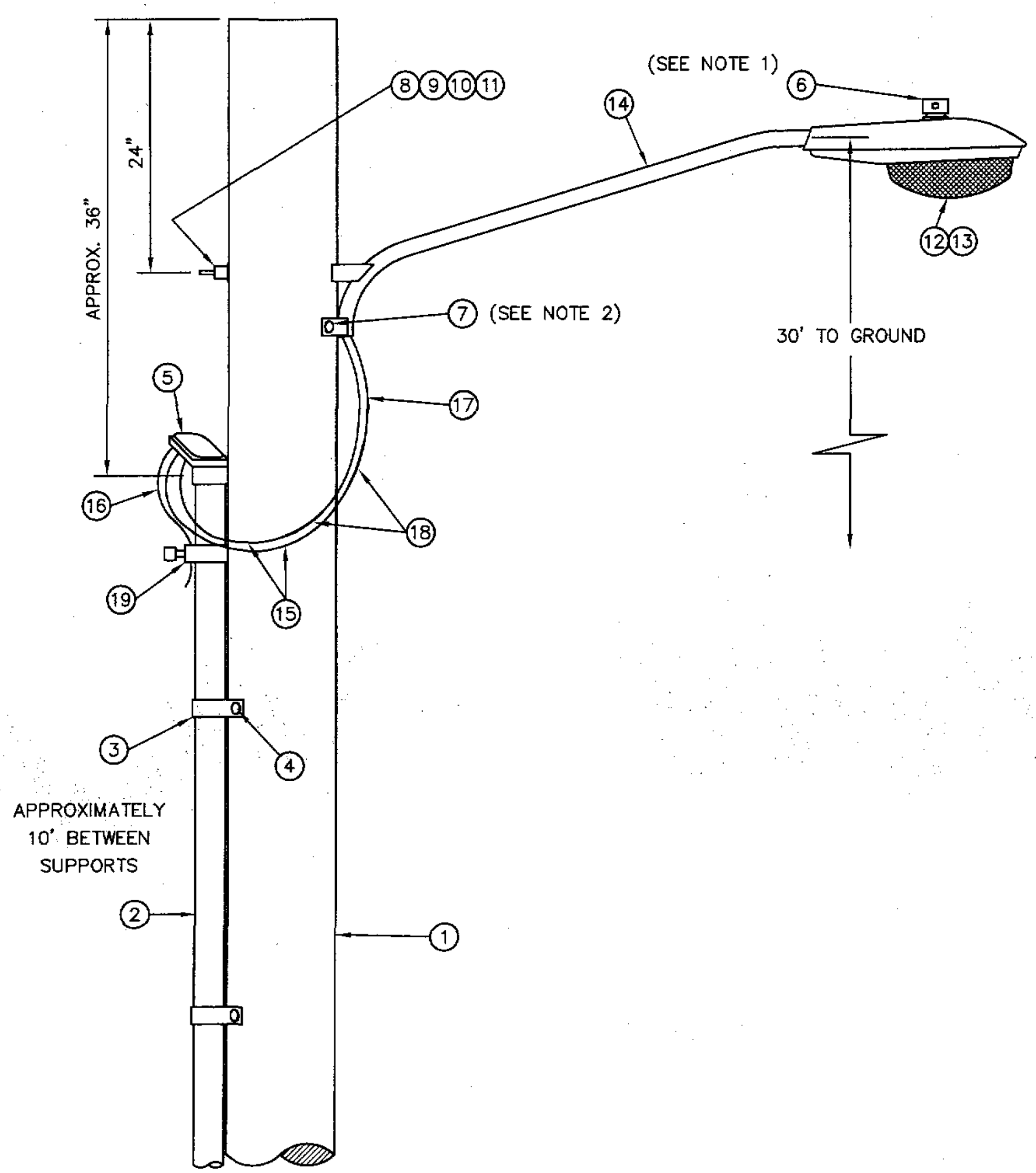

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

RESIDENTIAL STREET LIGHT WOOD POLE 8-2

Approved By R. A. SHUBERT	Checked By H. M. E.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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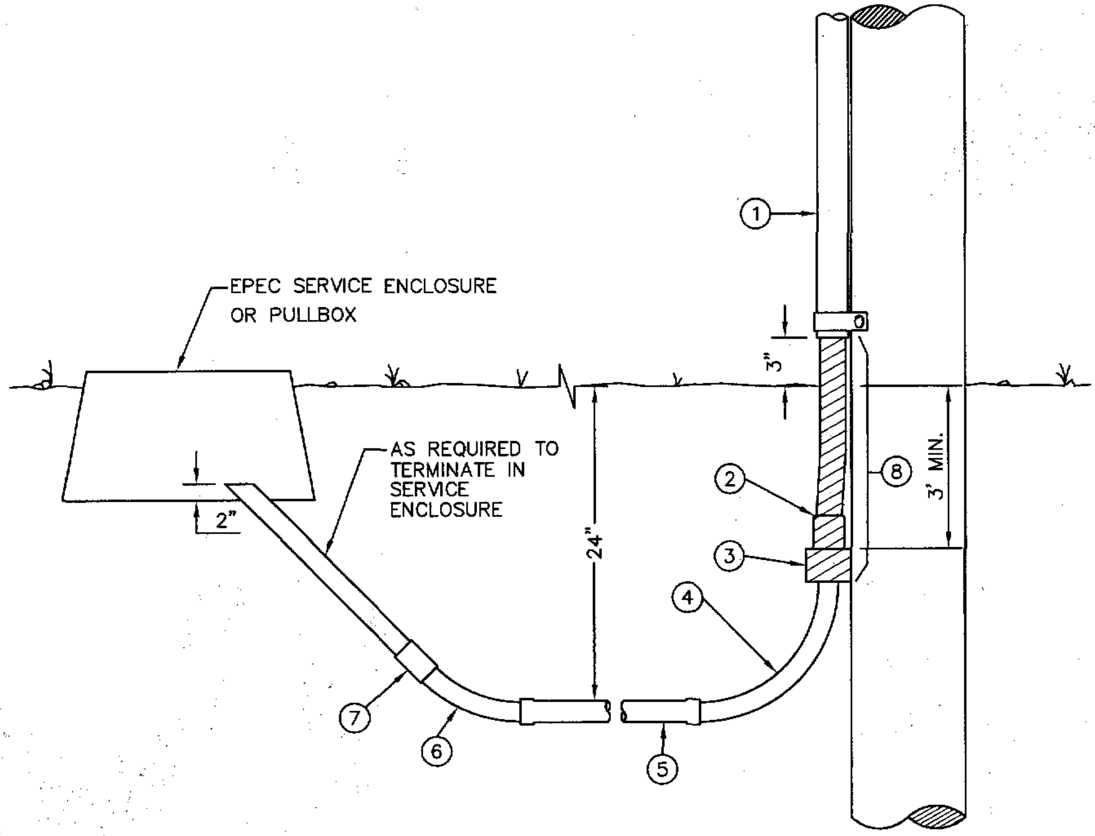

KEY NOTES:

1. 1/2" GALVANIZED RIGID CONDUIT
2. REDUCER 1' TO 1/2" BUSHING
3. 1" PVC FEMALE ADAPTER
4. 1" PVC 90° ELBOW
5. 1" PVC CONDUIT
6. 1" PVC 45° ELBOW
7. 1" PVC COUPLING
8. TAPE 1/2" RIGID CONDUIT (6")

THE CITY OF EL PASO TEXAS	TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	RESIDENTIAL STREET LIGHT WOOD POLE (connection to service enclosure) 8-3
	Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By QEC / J. R.

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ITEM No.	DESCRIPTION	STOCK No,	QTY.
1	POLE, 35 FT.-CLASS IV	009-035	1
2	GALVANIZED RIGID 1/2" CONDUIT	017-292	3
3	PIPE STRAP FOR 1/2' CONDUIT, 2-HOLE	017-334	7
4	LAG BOLT, 1/4" x 2"	002-330	6
5	WEATHERHEAD, 1/2" CONDUIT	017-293	1
6	PHOTOCELL, 240V-SEE NOTE 1	021-225	1
7	LAG BOLT, 1/2" x 4"	002-370	2
8	MACHINE BOLT, 5/8" x 8"	002-450	1
9	SQUARE GALV. WASHER, 2-1/4"x2"-1/4"	002-760	1
10	COIL-SPRING WASHER, 5/8"	002-786	1
11	LOCKNUT, 5/8"	002-705	1
12	LUMINAIRE, 100W H. P. S.	021-335	1
13	HPS LAMP, 100W	021-085	1
14	MAST ARM, 6' x 1-1/4"	021-200	1
15	COPPER CABLE, #12, 19 STRAND, 600 V	013-665	
16	COPPER CABLE, #12, SOLID, 600 V, GREEN	013-701	
17	CABLE, #10, 2 CONDUCTOR, 600 V, UF	013-600	8
18	SLEEVES, #12-10	005-140	2
19	GROUNDING CLAMP	021-215	1

KEYNOTES

1. MOUNT SO THAT CONTROL FACES NORTH.
2. ITEM 17 SHALL NOT BE SPLICED INSIDE ITEM 14.

DESIGN NOTES

1. INSTALLATION SHALL COMPLY WITH ALL LOCAL CODE REQUIREMENTS.
2. FOR ANY CLARIFICATION, EXCEPTIONS RO QUESTIONS REGARDING CODE INTERPRETATION, CALL EL PASO ELECTRIC CO. DISTRIBUTION DEVELOPMENT DEPARTMENT.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

RESIDENTIAL STREET LIGHTING MATERIAL LIST
8-4

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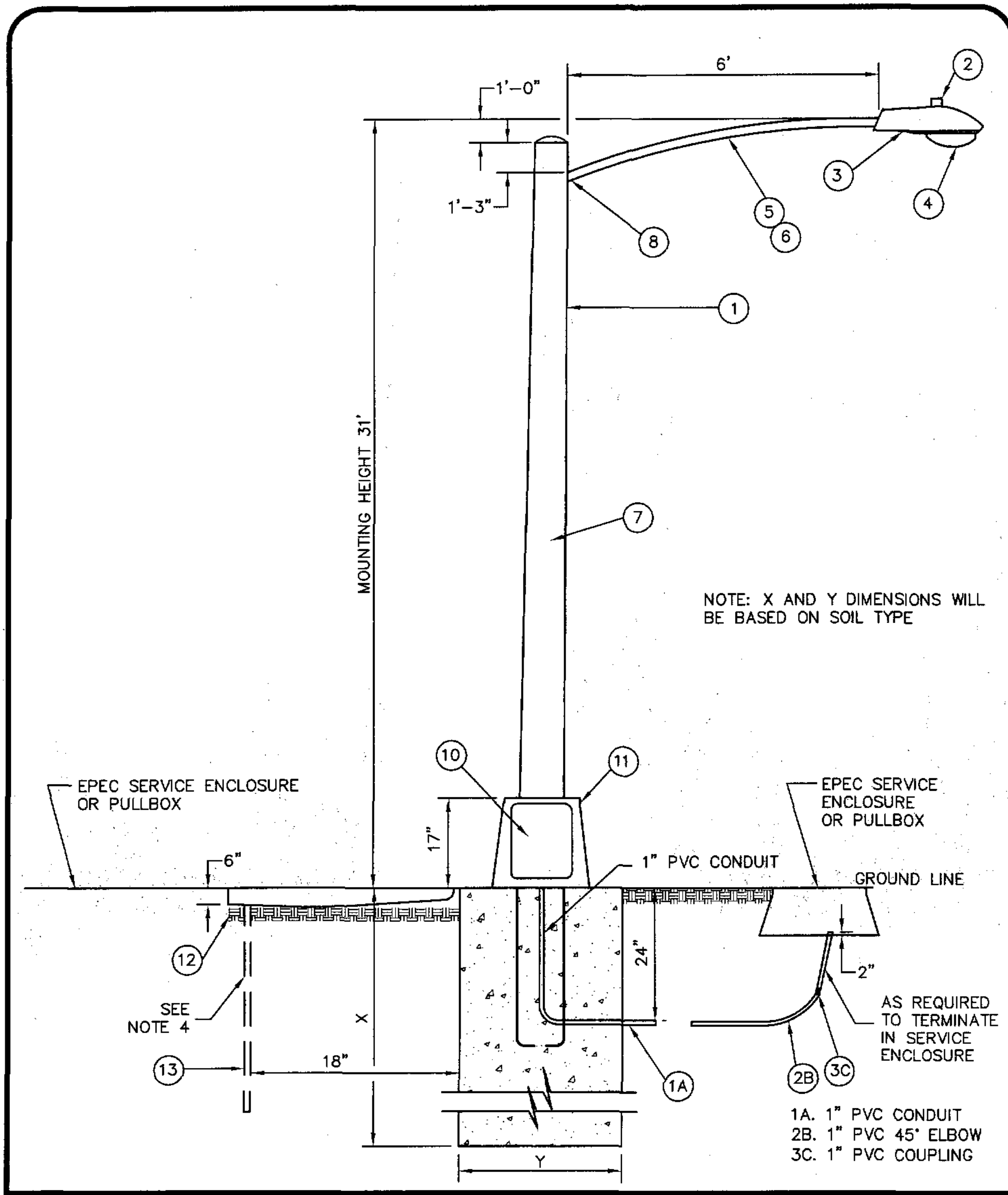

TITLE 19 - SUBDIVISION ORDINANCE

THE CITY OF EL PASO TEXAS

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

RESIDENTIAL STREET LIGHT STEEL POLE 8-5

Approved By R. A. SHUBERT	Checked By H. M. B.
Date JUNE 03, 2008	Drawn By QEC / J. R.

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ITEM No.	DESCRIPTION	STOCK No.	QTY.
1	POLE, 35 FT.–CLASS IV		1
2	PHOTOCELL, 240V–SEE NOTE 1	021–225	1
3	LUMINAIRE, 100W H. P. S.	021–335	1
4	HPS LAMP, 100W	021–085	1
5	MAST ARM, 6' x 1–1/4"	21–200	1
6	#10 SOLID CABLE 600 V	013–600	AS PEQ'D.
7	CABLE, #10, 3 CONDUCTOR, 600 V, UF	013–600	40' PLUS
8	SLEEVES, #12	05–145	AS REQ'D.
9	ROADWAY LUMINAIRE HPS 150 WATTS	21–340	1
10	BREAK–A–WAY FUSES 30 AMP.	21–250	2
11	ALUMINUM TRANSFORMER BASE	21–608	1
12	5/8' GROUND ROD CLAMP	07–561	1
13	5/8" x 10' CU BONDED GROUND ROD	08–626	1

KEYNOTES

1. MOUNT SO THAT CONTROL FACES NORTH.
2. ITEM 7 SHALL NOT BE SPLICED INSIDE ITEM 5.

DESIGN NOTES

1. INSTALLATION SHALL COMPLY WITH ALL LOCAL CODE REQUIREMENTS.
2. FOR ANY CLARIFICATION, EXCEPTIONS RO QUESTIONS REGARDING CODE INTERPRETATION, CALL EL PASO ELECTRIC CO. DISTRIBUTION DEVELOPMENT DEPARTMENT.
3. A GROUND ROD MUST BE USED,

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

RESIDENTIAL STREET
LIGHT STEEL POLE
(continued)
8-6

Approved By R. A. SHUBERT
Date JUNE 03, 2008
Checked By H. M. E.
Drawn By QEC / J. R.

SECTION 9

SECTION 9

TYPICAL LOT LAYOUT

BACK TO SECTION INDEX PAGE

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

SECTION 9
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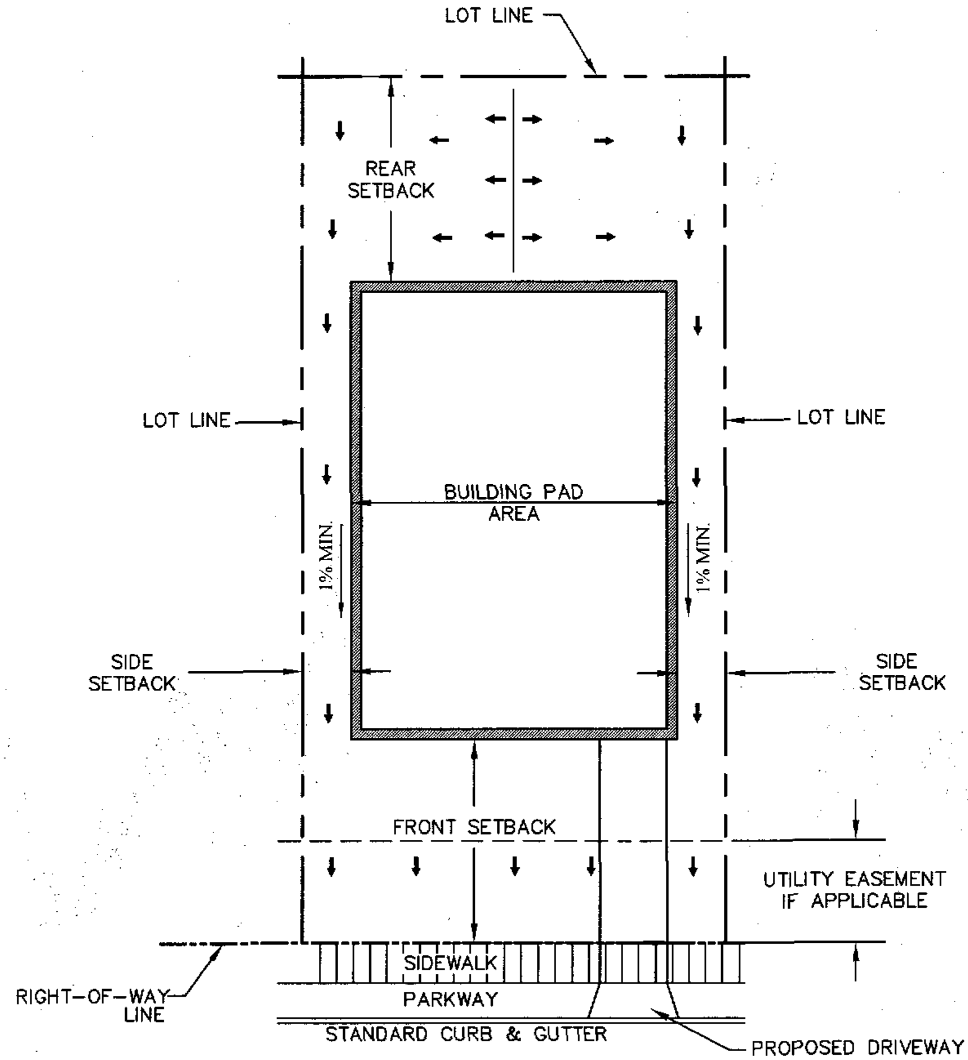

TYPICAL LOT LAYOUT

SCALE: N.T.S.

DRIVEWAY NOTE:

NOTE: DRIVEWAY SLOPES MUST BE 10% MAX. FROM GUTTER FOR FIRST 12 FT. AND 14% MAX. THEREAFTER (BLDG. CD. 18.08.060 C)
FOR SETBACK DIMENSIONS REFER TO ZONING ORDINANCE.

THE CITY OF EL PASO TEXAS — TITLE 19 - SUBDIVISION ORDINANCE ENGINEERING DEPARTMENT DESIGN STANDARDS FOR CONSTRUCTION	TYPICAL LOT LAYOUT 9-1
Approved By R. A. SHUBERT Date JUNE 03, 2008	Checked By H. M. E. Drawn By OEC / J. R.

SECTION 10

SECTION 10

TRAFFIC CALMING STANDARDS

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ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

SECTION 10 TABLE OF CONTENTS

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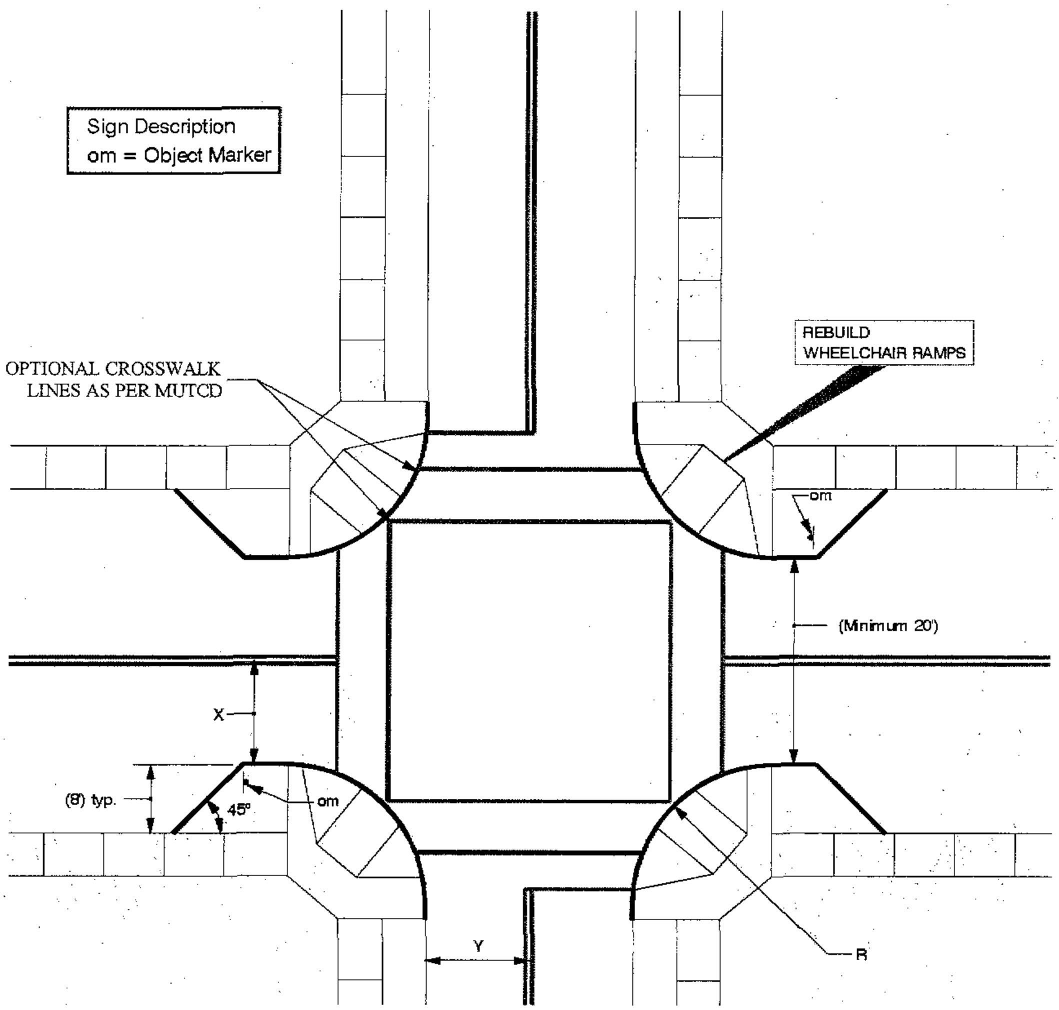
Bulbout
(Intersection Treatment)



For The Street Widths:		Use This Curb Radius
X	Y	R
12'	12'	40'
12'	14'	32'
12'	16'	26'
14'	12'	37'
14'	14'	35'
14'	16'	24'

NOTES:

1. Distance X is referenced from the center of the roadway to the lip of gutter.

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

BULBOUT
(INTERSECTION TREATMENT)
10-1

Approved By R. A. SHUBERT	Checked By H. M. E.
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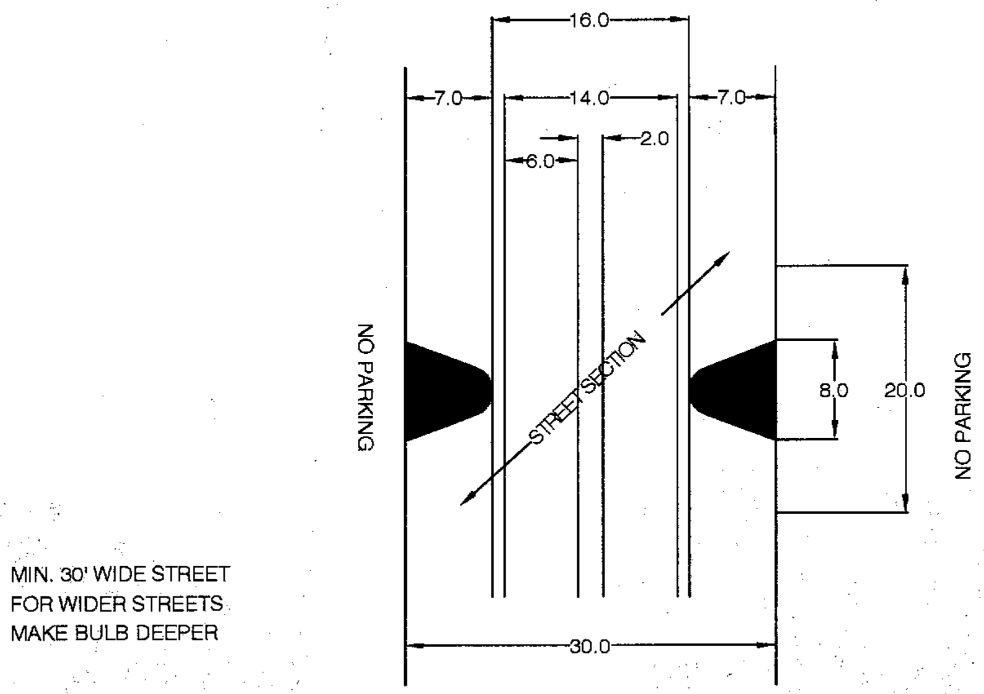
Bulbout
(Midblock Treatment)



THE BULB-OUT DRAWING SHOWN IS FOR A 30 FOOT WIDE STREET. IF A STREET IS WIDER, THE BULB WOULD BE DEEPER; EACH BULB SHOWN IS SEVEN FEET DEEP. THE WIDTH BETWEEN BULBS SHOULD BE 16 FEET, WHICH ALLOWS FOR ONE FOOT BETWEEN BULB AND CAR, SIX FEET PER CAR AND TWO FEET BETWEEN CARS. THIS WOULD REQUIRE CARS TO SLOW DOWN SUBSTANTIALLY IN ORDER TO PASS. THE BULB WOULD RESTRICT PARKING FOR APPROXIMATELY 20 FEET (ONE CAR LENGTH FOR PARKING PURPOSES) IN ORDER FOR THE BULB TO BE VISIBLE, ALLOW WIDER VEHICLES TO PULL TO THE RIGHT AND ALLOW AN OPPOSING VEHICLE TO PASS. IT MAY BE POSSIBLE TO PLANT A TREE IN EACH BULB.

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

BULBOUT (MIDBLOCK TREATMENT) 10-2

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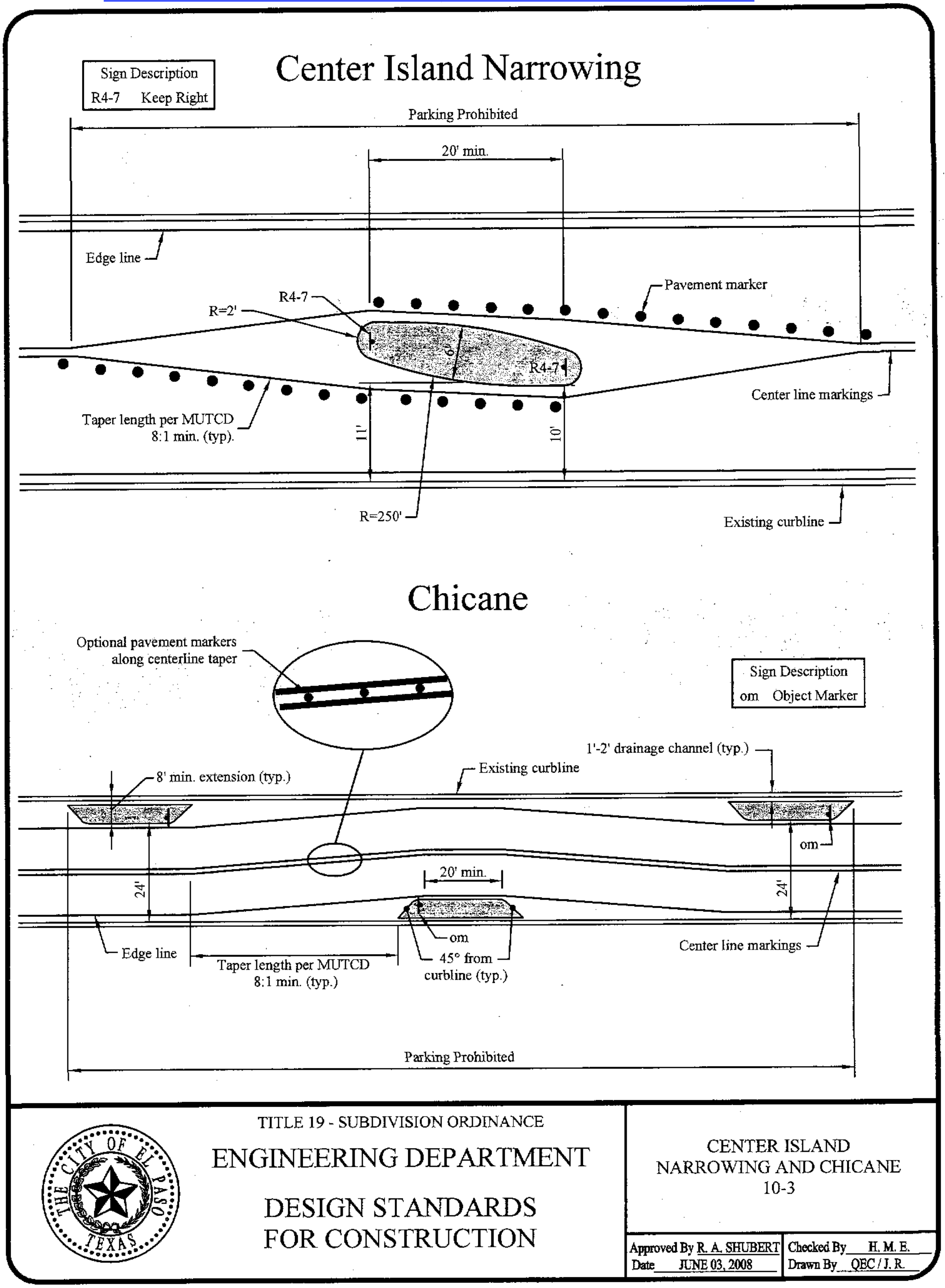

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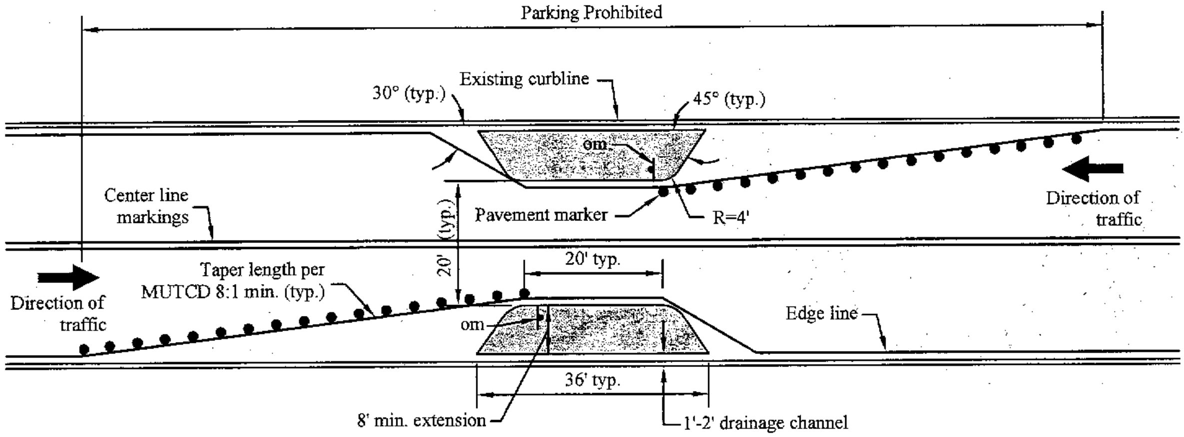
CHOKER



Sign Description
om = Object Marker

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

CHOKER

10-4

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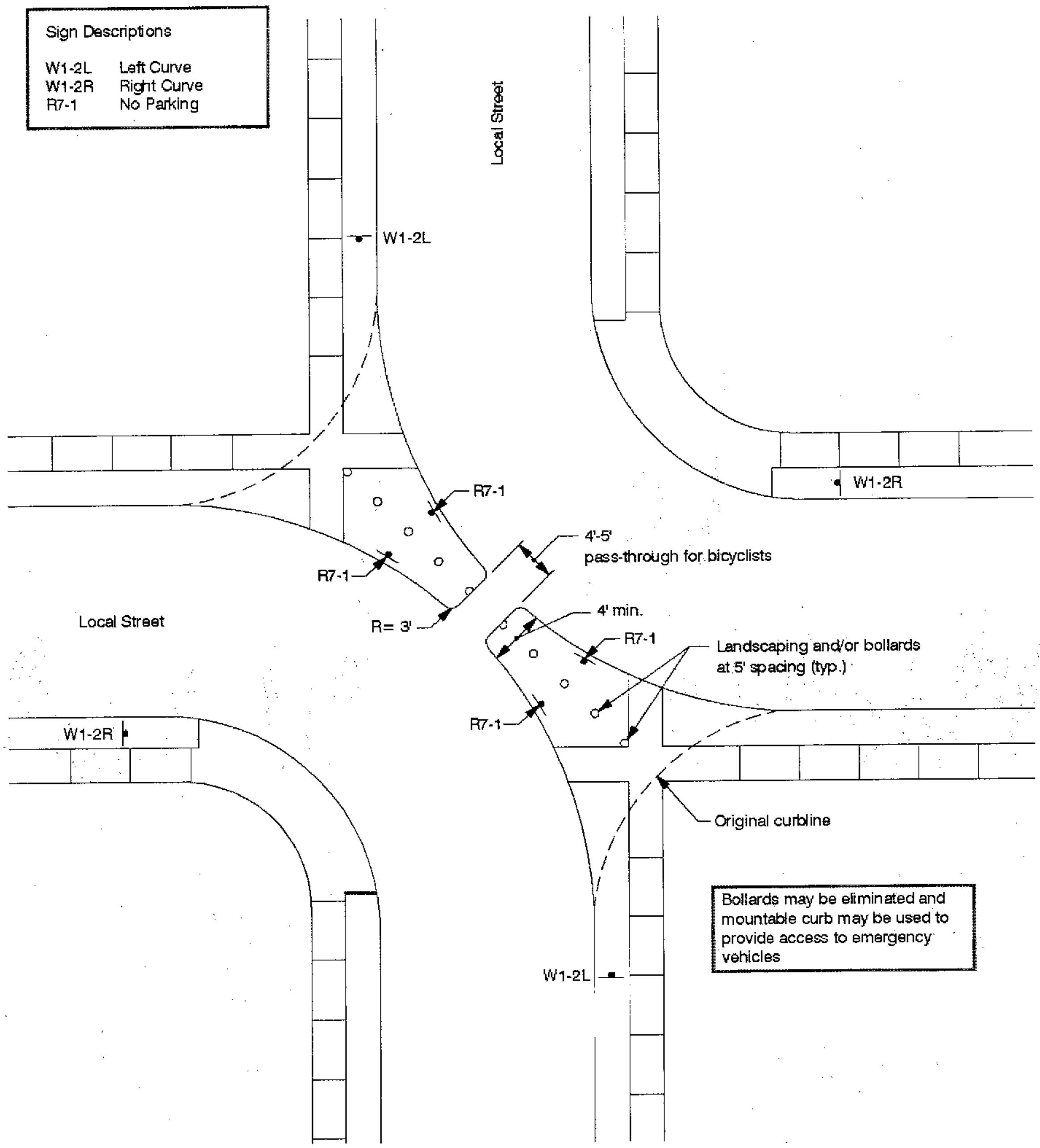
Diagonal Diverter



THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

DIAGONAL DIVERTER

10-5

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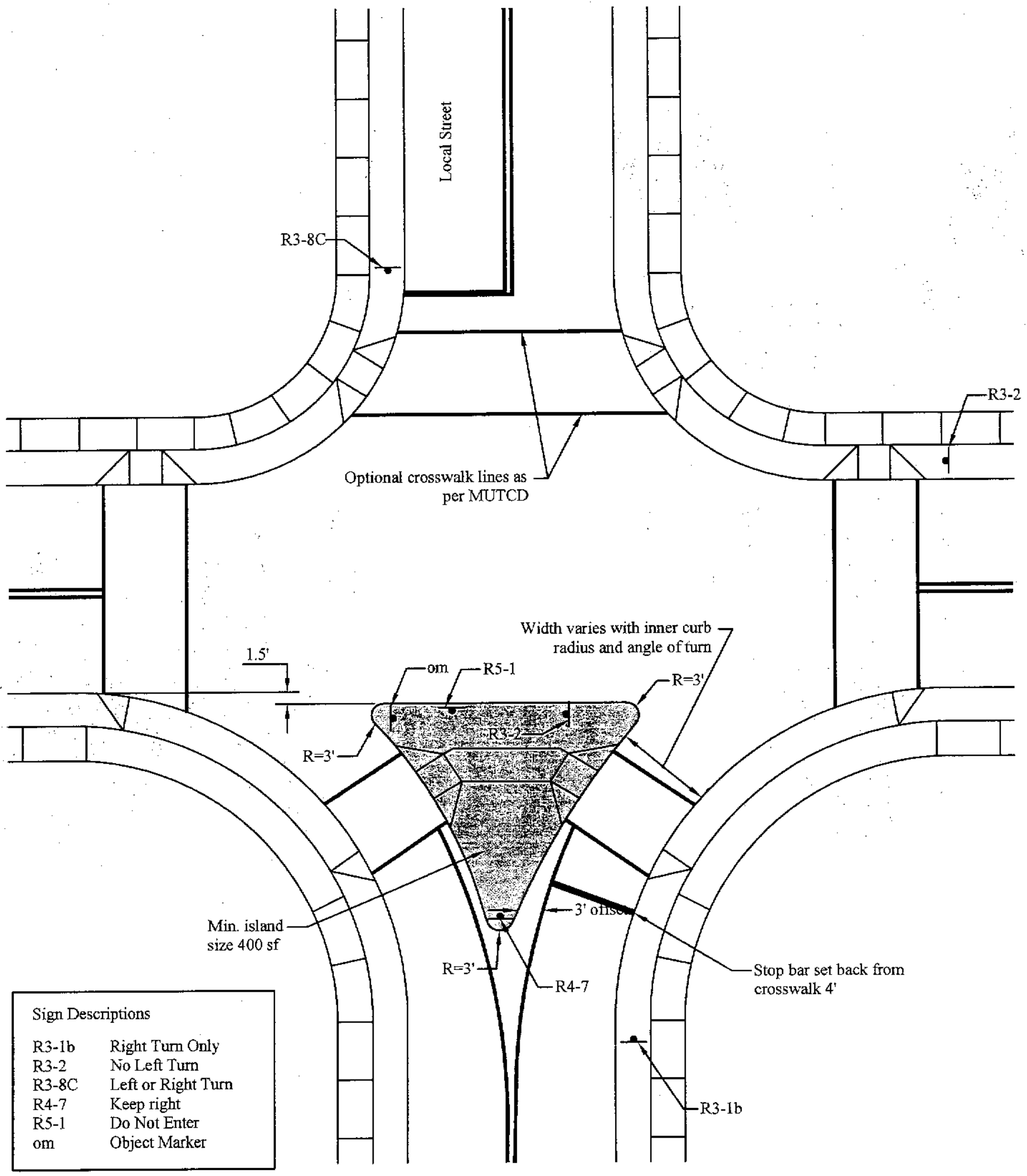
FORCED TURN ISLAND



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ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

FORCED TURN ISLAND
10-6

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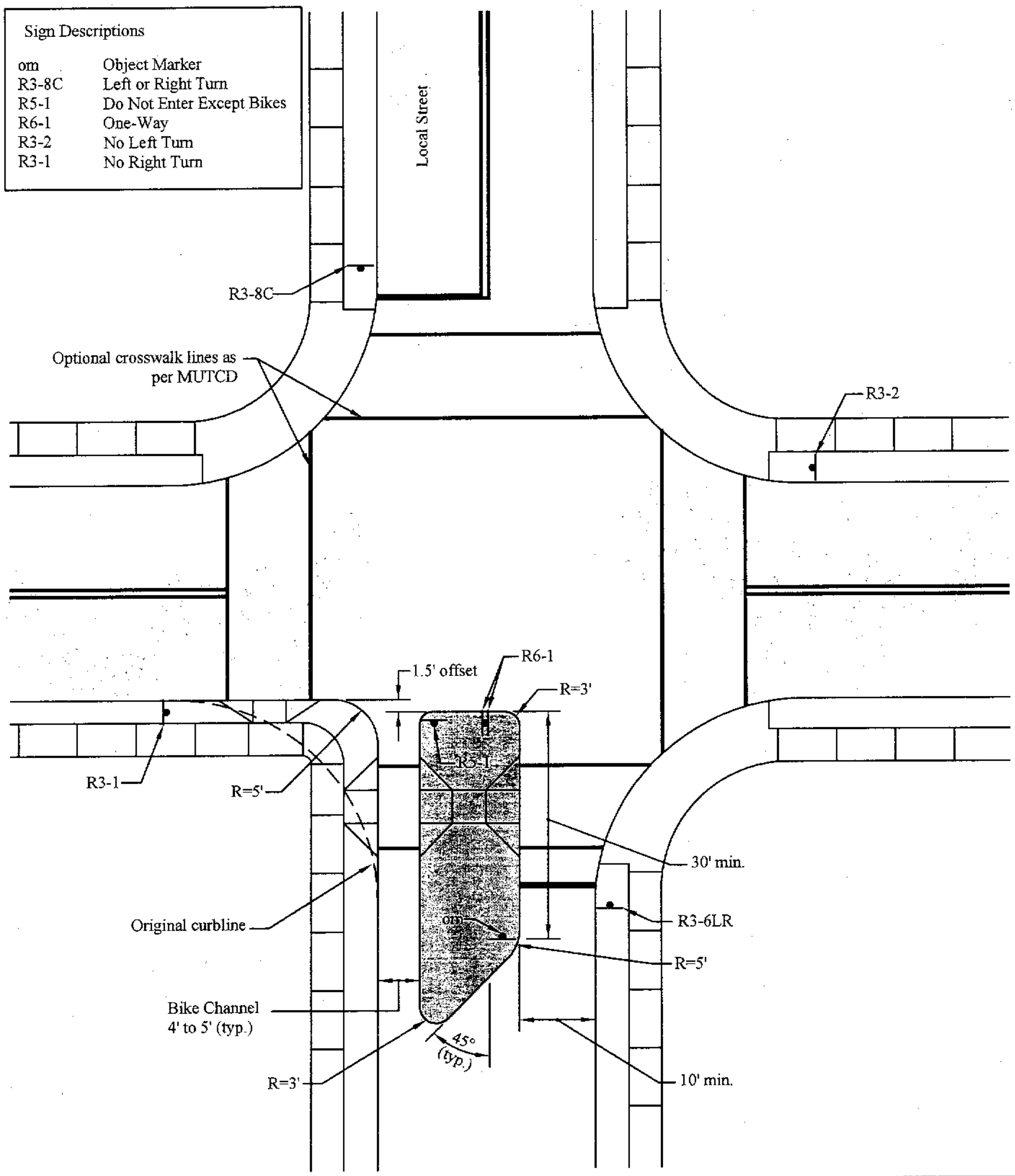
HALF CLOSURE



TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

HALF CLOSURE 10-7

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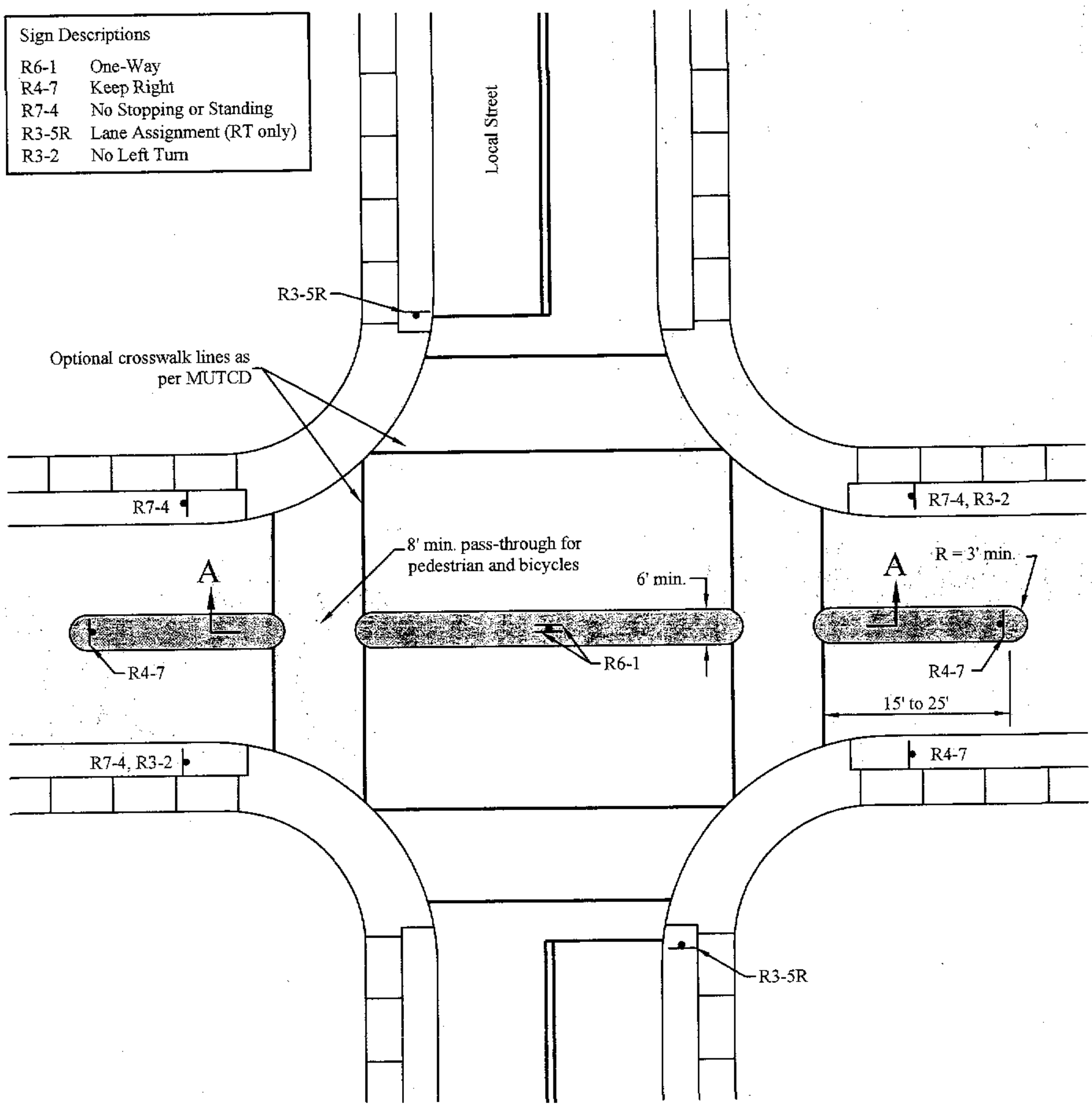
Median Barrier



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ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

MEDIAN BARRIER
10-8

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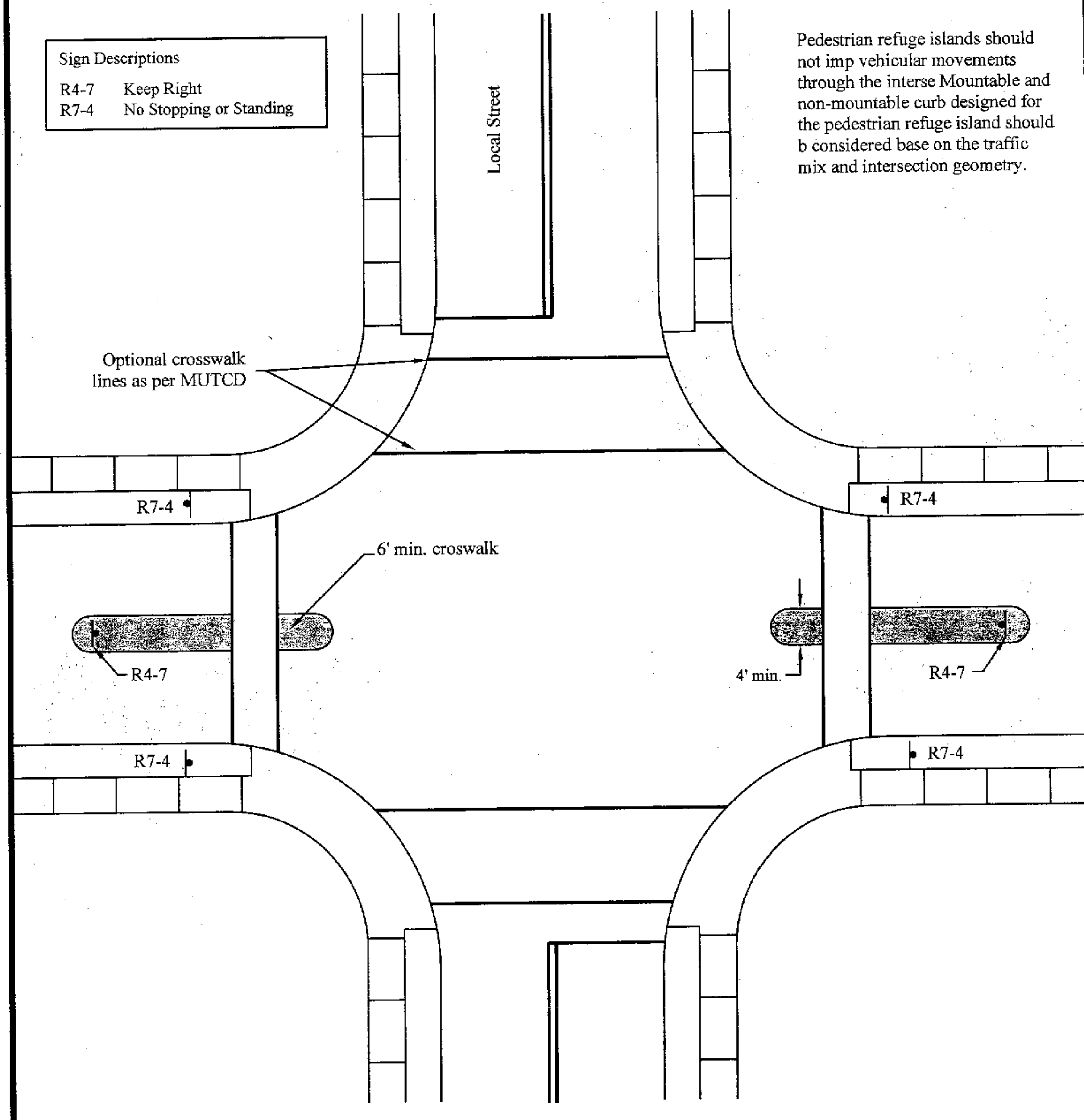
Pedestrian Refuge Island



TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

THE CITY OF EL PASO TEXAS

PEDESTRIAN REFUGE ISLAND
10-9

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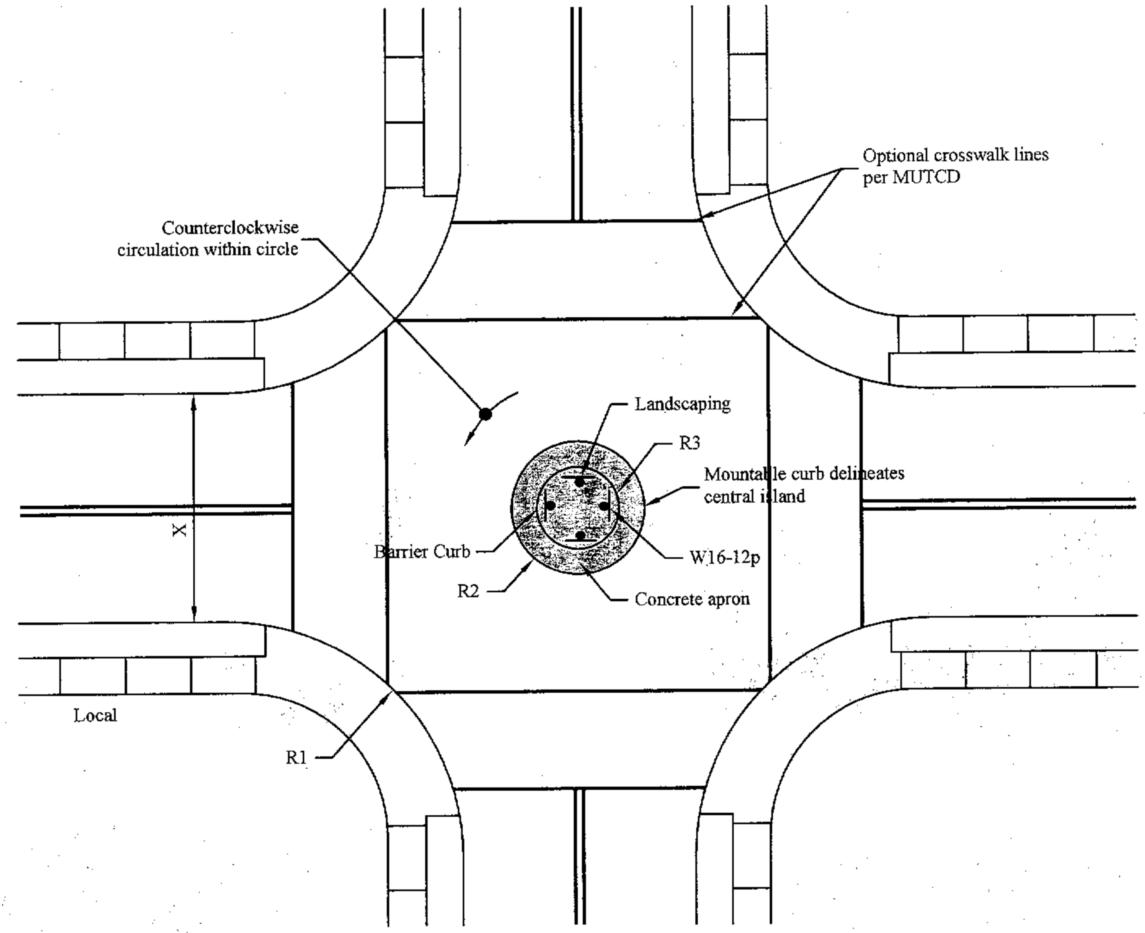
Traffic Circle



Sign Descriptions	
W16-12p	Traffic Circle

NOTE:

1. Assumes equal street widths; For unequal street widths, use Autoturn to ensure adequate turning radii for the desired design vehicle.

For The Street Width	Use This Curb Radius		
X	R1	R2	R3
34'	20'	20'	8'
	25'	24'	8'
32'	15'	12'	7'
	20'	18'	7'
	25'	20'	7'
30'	15'	11'	6'
	20'	15'	6'
	25'	16'	6'

THE CITY OF EL PASO TEXAS

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

TRAFFIC CIRCLE
10-10

Approved By R. A. SHUBERT
Date JUNE 03, 2008

Checked By H. M. E.
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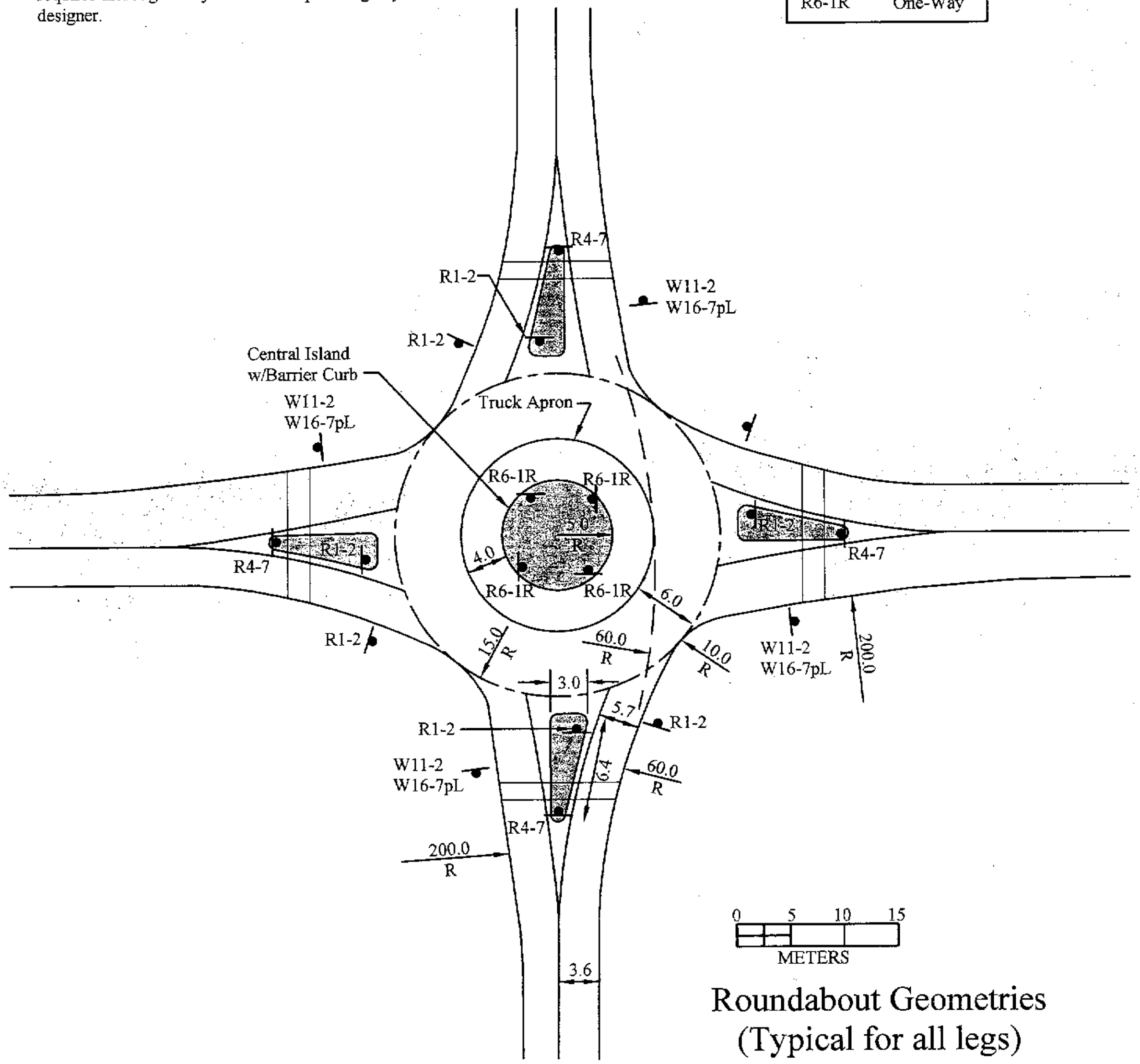
ROUNDABOUT

This figure illustrates the minimum roundabout configuration for a 90 degree intersection of two roadways with one lane in each direction. It is designed to accommodate a WB-15 design vehicle, or automobile traffic at a 25 mph speed. This is only an example and not a recommended design. Each intersection requires thorough analysis and a unique design by a roundabout designer.

Sign Descriptions

R1-2	Yield
W11.2	Pedestrian
W16-7pL	Arrow
R4-7	Keep Right
R6-1R	One-Way



Roundabout Geometries
(Typical for all legs)

TITLE 19 - SUBDIVISION ORDINANCE

ENGINEERING DEPARTMENT

DESIGN STANDARDS
FOR CONSTRUCTION

ROUNDABOUT
10-11

Approved By R. A. SHUBERT Date JUNE 03, 2008 | Checked By H. M. E. Drawn By QBC / J. R.

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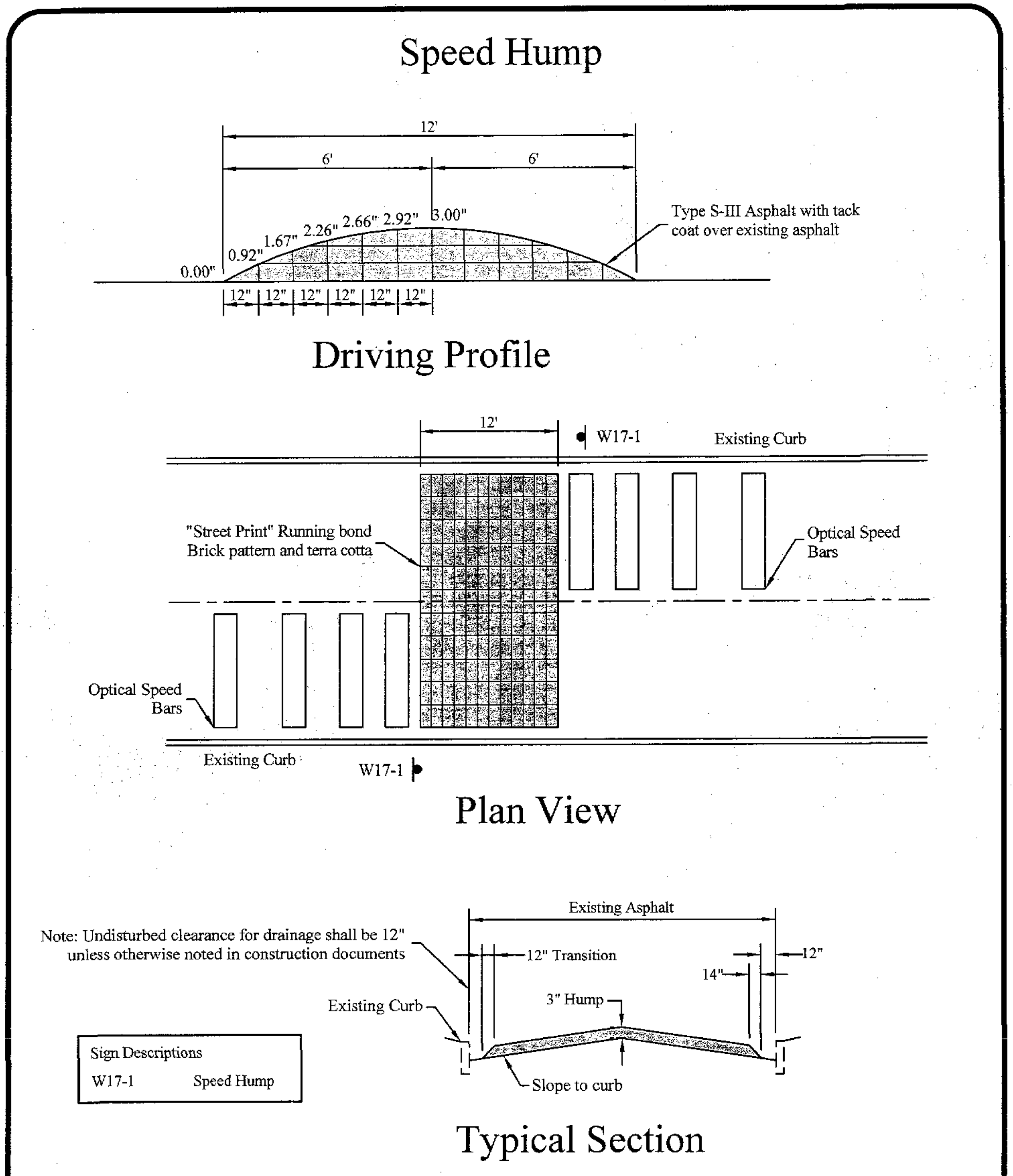

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ENGINEERING DEPARTMENT

DESIGN STANDARDS FOR CONSTRUCTION

SPEED HUMP
10-12

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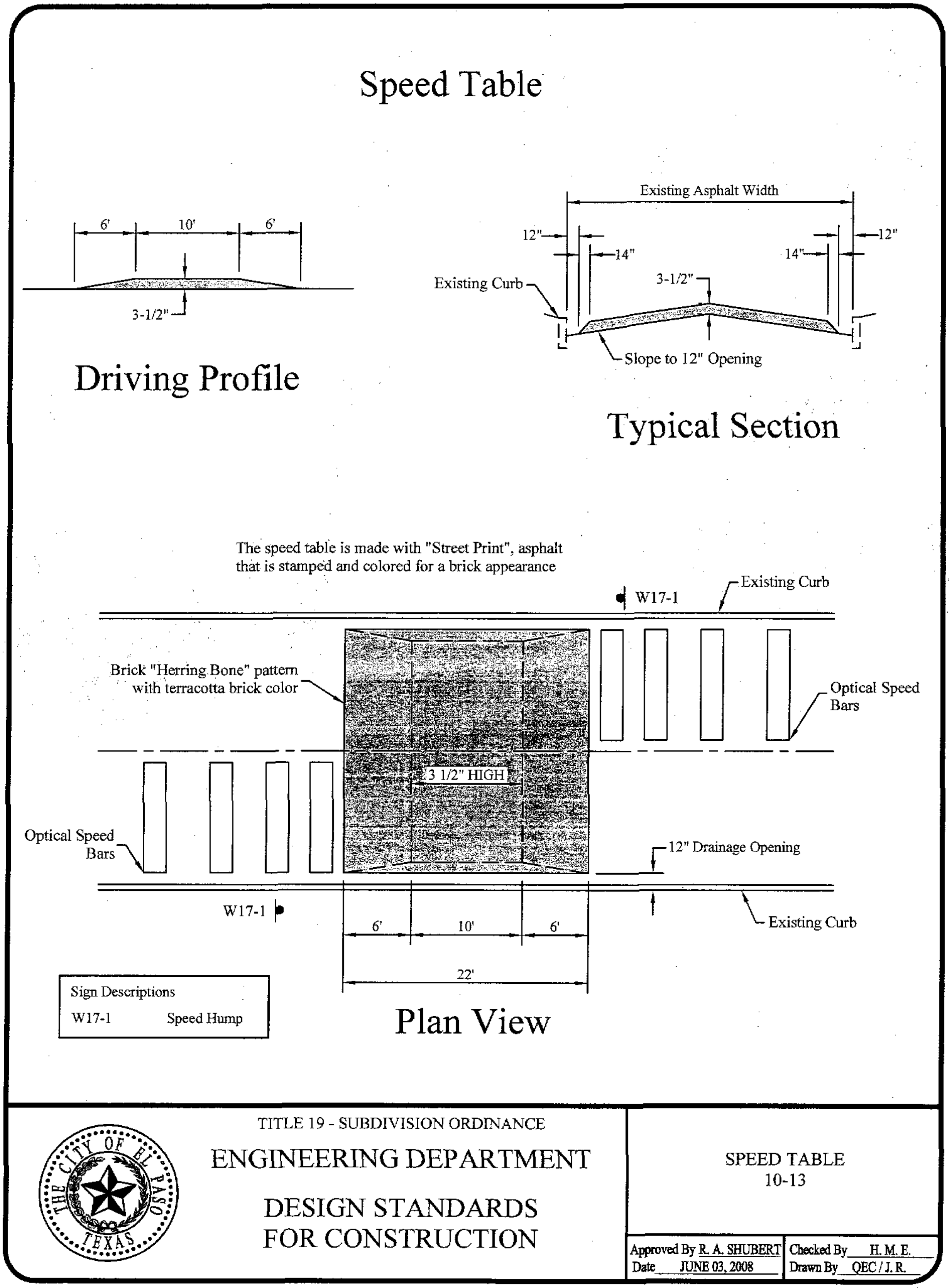

THE CITY OF EL PASO TEXAS

CITY OF EL PASO 2022

Street Design Manual