

CITY OF Boca Raton

ENGINEERING DESIGN STANDARDS MANUAL



City of Boca Raton
Municipal Services Department
2500 NW 1st Avenue
Boca Raton, Florida 33431



2012

A City for all seasons

CITY OF BOCA RATON FLORIDA

Engineering Design Standards Manual



2012

City of Boca Raton
Municipal Services Department
2500 NW 1st Avenue
Boca Raton Florida, 33431

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1.0 INTRODUCTION

The purpose of this Manual is to establish uniform minimum standards for the design and construction of required improvements acceptable to the City of Boca Raton. The standards established by this Manual are applicable to all new development. While it may not always be feasible to apply these standards to reconstruction or upgrading of existing infrastructure due to limitations imposed by existing structures, ownership, and land use, these standards will be applied to the extent that legal, economic and environmental considerations allow. It should be noted that deviations from the minimum standards set forth in this manual may be granted on a case by case basis upon approval of the City Engineer. Such deviations shall be based upon specific detailed situations that are clearly justified resulting in preferable environmental impacts and such deviations are not detrimental to the public welfare, or injurious to property or improvements in the surrounding area.

2.0 POLICY

City of Boca Ordinances provides that the City's Municipal Services Director shall establish and maintain the engineering design standards manual and such other standards for work within the public rights-of-way.

As defined in Chapter 26 of the City of Boca Ordinances, the Engineering design standards manual is defined as:

"Engineering design standards manual" shall mean the comprehensive set of specifications maintained and updated by the city for governing the minimum requirements for the design and construction of engineering works such as, but not limited to, streets, roads and highways; sidewalks; filling and grading; excavating; harbors and docks; bulkheads and seawalls; drainage installations and structures; water control work and water supply; paving installations; curbs and gutters, bridges, overpasses and underpasses; underground sewage collection and disposal systems; underground utility lane line assignment; levees, pumping stations and similar works, which is on file in the city.

The Engineer of Record (EOR) is responsible for the quality control of the plans and specifications. The EOR is responsible to safeguard the life, health, property and welfare of the public by promoting proper conduct in the practice of engineering and due care and regard for acceptable engineering principles and standards.

The City does not warrant that any design that is review and concurred by the City staff meets or exceeds standards of the City or engineering industry.

2.1 SPECIAL EXEMPTION TO THE CITY OF BOCA RATON ENGINEERING DESIGN STANDARDS

Property annexed by the City of Boca Raton after January 1, 2003 shall continue to be allowed to follow the Palm Beach County Land Development code.

3.0 OBJECTIVES

The planning, design, construction, reconstruction, maintenance, and operation of streets and highways should be predicated upon meeting the following objectives:

- Develop and maintain a highway system that provides the safest practicable environment for motorists, cyclists, pedestrians, and workers.
- Establish and maintain procedures for construction, maintenance, utility, and emergency operations that provide for safe highway and transit operating conditions during these activities.
- Provide streets and highways with operating characteristics that allow for reasonable limitations upon the capabilities of vehicles, drivers, cyclists, pedestrians, and workers.
- Provide uniformity and consistency in the design and operation of streets and highways.
- Provide for satisfactory resolution of conflicts between the surface transportation system and social and environmental considerations to aid neighborhood integrity.
- Reconstruct or modify existing facilities to reduce the hazard to the highway users.
- Reduce the deaths, injuries, and damage due to highway crashes.

4.0 DEFINITIONS

For definitions of elements associated with public works, refer to the MANUAL OF UNIFORM MINIMUM STANDARDS FOR DESIGN, CONSTRUCTION AND MAINTENANCE FOR STREETS AND HIGHWAYS (Commonly known as the "Florida Greenbook") latest edition.

The following abbreviations listed:

AASHTO.

“A Policy on Geometric Design of Highways and Streets” published by The American Association of State Highway and Transportation Officials, and updated time to time.

Architect.

The Architect as defined in s.481.203(3) Florida Statutes.

Architect of Record.

The Architect or Architectural Firm registered in the State of Florida that performs services for the Department in connection with the design and construction of buildings.

Architecture.

The practice of architecture as defined in s.481.203(6) Florida Statutes.

Article.

The numbered prime subdivision of a Section of the FDOT Specifications.

Bidder.

An individual, firm, or corporation submitting a proposal for the proposed work.

Bridge.

A structure, including supports, erected over a depression or over an obstruction such as water, highway or railway, or for elevated roadway, for carrying traffic or other moving loads, and having a length, measured along the center of the roadway, of more than 20 feet [6 m] between the inside faces of end supports. A multiple-span box culvert is considered a bridge, where the length between the extreme ends of the openings exceeds 20 feet [6 m].

Calendar day.

Every day shown on the calendar, ending and beginning at midnight.

City.

City of Boca Raton.

City Engineer.

The City of Boca Engineer, or appointed person by the Director of the City of Boca Raton Municipal Services Department; acting directly or through duly authorized representatives; such representatives acting within the scope of the duties and authority assigned to them.

Consultant.

The Professional Engineer or Engineering Firm, or the Architect or Architectural Firm, registered in the State of Florida and under contract to the Owner to perform professional services. The consultant may be the Engineer or Architect of Record or may provide services through and be subcontracted to the Engineer or Architect of Record.

Contract.

The term “Contract” means the entire and integrated agreement between the parties thereunder and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract Documents form the Contract between the Owner and the Contractor setting forth the obligations of the parties thereunder, including, but not limited to, the performance of the Work and the basis of payment.

Contractor.

The individual, firm, joint venture, or company contracting with the Owner to perform work.

County Standards.

The standards and details set forth by Palm Beach County Engineering division.

Culverts.

Any structure not classified as a bridge that provides an opening under the roadway.

Department or FDOT.

State of Florida Department of Transportation.

Designer of Record.

The Architect of Record or the Engineer of Record.

Downtown.

As defined in the City of Boca Raton Development Order No. 4035 - RULES OF THE BOCA RATON COMMUNITY REDEVELOPMENT AGENCY.

Engineer of Record.

The Professional Engineer or Engineering Firm registered in the State of Florida per State Statutes, that develops the criteria and concept for the project, performs the analysis, and is responsible for the preparation of the Plans and Specifications.

Equipment.

The machinery and equipment, together with the necessary supplies for upkeep and maintenance thereof, and all other tools and apparatus necessary for the construction and acceptable completion of the work.

Extra Work.

Any “work” which is required by the Engineer to be performed and which is not otherwise covered or included in the project by the existing Contract Documents, whether it be in the nature of additional work, altered work, deleted work, work due to differing site conditions, or otherwise. This term does not include a “delay”.

FDOT.

Florida Department of Transportation

FDOT Standards.

Design Standards for Design, Construction, maintenance and utility operations on the state highway system, latest edition booklet published by the Florida Department of Transportation and update time to time.

FHWA.

Federal Highway Administration

Greenbook.

The Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways of the State of Florida as promulgated and revised from time to time by the Florida Department of Transportation, Latest edition.

Highway, Street, or Road.

A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

Holidays.

Days designated by the State Legislature or Cabinet as holidays, which include, but are not limited to, New Year's Day, Martin Luther King's Birthday, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day and the following Friday, and Christmas Day.

Inspector.

An authorized representative of the Engineer, assigned to make official inspections of the materials furnished and of the work performed by the Contractor.

Laboratory.

The official testing laboratory used by the Contractor or Engineer.

Materials.

Any substances to be incorporated in the work under the Contract.

Median.

The portion of a divided highway or street separating the traveled ways for traffic moving in opposite directions.

MUTCD.

Manual of Uniform Traffic Control Devices latest edition published by FHWA.

Plans.

The approved plans, including reproductions thereof, showing the location, character, dimensions, and details of the work.

Proposal (Bid, Bid Proposal).

The offer of a bidder, on the prescribed form, to perform the work and to furnish the labor and materials at the prices quoted.

Proposal Form.

The official form or the expedite program generated bid item sheets on which the Department requires formal bids to be prepared and submitted for the work.

Proposal Guaranty

The security furnished by the bidder as guaranty that the bidder will enter into the Contract for the work if the Department accepts the proposal.

Right-of-Way.

The land that the City or Department has title to, or right of use, for the road and its structures and appurtenances, and for material pits furnished by the Department.

Roadbed.

The portion of the roadway occupied by the subgrade and shoulders.

Roadway.

The portion of a highway within the limits of construction.

Secretary.

Secretary of Transportation, State of Florida Department of Transportation, acting directly or through an assistant or other representative authorized by him; the chief officer of the Department of Transportation.

Section.

A numbered prime division of FDOT Specifications.

Special Provisions.

See definition for Specifications.

Specialty Engineer.

A Professional Engineer registered in the State of Florida, other than the Engineer of Record or his subcontracted consultant, who undertakes the design and drawing preparation of components, systems, or installation methods and equipment for specific portions of the project work. The Specialty Engineer may be an employee or officer of the Contractor or a fabricator, an employee or officer of an entity providing components to a fabricator, or an independent consultant.

The Specialty Engineer must be qualified in accordance with the Rules of the Department of Transportation, Chapter 14-75. Any Corporation or Partnership offering engineering services must hold a Certificate of Authorization from the Florida Department of Business and Professional Regulation.

For items of work not specifically covered by the Rules of the Department of Transportation, a Specialty Engineer is qualified if he has the following qualifications:

(1) Registration as a Professional Engineer in the State of Florida.

(2) The education and experience necessary to perform the submitted design as required by the Florida Department of Business and Professional Regulation.

Specifications.

The directions, provisions, and requirements contained herein, together with all stipulations contained in the Contract Documents, setting out or relating to the method and manner of performing the work, or to the quantities and qualities of materials and labor to be furnished under the Contract.

A. Standard Specifications: “Standard Specifications for Road and Bridge Construction” a bound book, applicable to all Department Contracts containing adopted requirements, setting out or relating to the method or manner of performing work, or to the quantities and qualities of materials and labor.

B. Supplemental Specifications: Approved additions and revisions to the Standard Specifications, applicable to all Department Contracts.

C. Special Provisions: Specific clauses adopted by the Department that add to or revise the Standard Specifications or supplemental specifications, setting forth conditions varying from or additional to the Standard Specifications applicable to a specific project.

D. Technical Special Provisions: Specifications, of a technical nature, prepared, signed, and sealed by an Engineer registered in the State of Florida other than the State Specifications Engineer or his designee, that are made part of the Contract as an attachment to the Contract Documents.

Standard Specifications.

See definition for Specifications.

State.

State of Florida.

Subgrade.

The portion of the roadbed immediately below the base course or pavement, including below the curb and gutter, valley gutter, shoulder and driveway pavement. The subgrade limits ordinarily include those portions of the roadbed shown in the plans to be constructed to a design bearing value or to be otherwise specially treated. Where no limits are shown in the plans, the subgrade section extends to a depth of 12 inches [300 mm] below the bottom of the base or pavement and outward to 6 inches [150 mm] beyond the base, pavement, or curb and gutter.

Substructure.

All of that part of a bridge structure below the bridge seats, including the parapets, backwalls, and wingwalls of abutments.

Superintendent.

The Contractor’s authorized representative in responsible charge of the work.

Superstructure.

The entire bridge structure above the substructure, including anchorage and anchor bolts, but excluding the parapets, backwalls, and wingwalls of abutments.

Supplemental Specifications

See definition for Specifications.

Technical Special Provisions.

See definition for Specifications.

Traveled Way.

The portion of the roadway providing for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

Work.

All labor, materials and incidentals required to execute and complete the requirements of the Contract including superintendence, use of equipment and tools, and all services and responsibilities prescribed or implied.

Working Day.

Any calendar day on which the Contractor works or is expected to work in accordance with the approved work progress schedule.

WUD Standards.

The City of Boca Raton Water Utilities Department's Manual of Minimum Engineering and Construction Standards.

5.0 Drafting Standards, Abbreviations and Symbols

The Contract plans set and specifications are the key documents for a project construction and on which ultimately, the City will based their review, and the contractor will base their bid and work on. Hence, it is imperative that the contract plans and specifications set forth the work to be done in a clear and concise manner.

The EOR is responsible to assure that the existing and proposed information on the plans is accurate.

Standard Abbreviations and Symbols used for plans preparation and permit drawings with the City of Boca Raton shall conform to the standard Abbreviations and symbols are shown in Indices 001 and 002 of the Florida Department of Transportation Design Standards for Design, Construction Maintenance and Utility operations on the State Highway system latest edition.

When deemed necessary by the City Civil engineer, for the clarification of special symbols or abbreviations, the plans shall provide a supplemental legend as required.

6.0 REFERENCE MANUALS

By reference, the following is made part of this manual:

- 1) Highway Capacity Manual – latest edition as published by the Transportation Research Board.
- 2) Manual on Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highway Administration, latest edition. (Developed with cooperation of the National Advisory Committee on Uniform Traffic Control Devices.)
- 3) A Policy on Design on Geometric Design of Highways and Streets, 2004. American Association of State Highway and Transportation Officials.
- 4) Transportation and Traffic Engineering Handbook, Institute of Transportation Engineers.
- 5) Roadside Design Guide, latest Edition. American Association of State Highway and Transportation Officials.
- 6) Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways, State of Florida, The Florida Department of Transportation, latest edition.

- 7) Traffic Engineering Manual, The Florida Department of Transportation.
- 8) Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, latest edition, The Florida Department of Transportation.
- 9) City of Boca Raton Public Utilities Manual, Latest Revision
- 10) Parking Standards, Urban Land Institute 2002.
- 11) The Dimensions of Parking, Urban Land Institute, latest edition.
- 12) Utility Accommodations Manual, Florida Department of Transportation.
- 13) Palm Beach County Land Development Code, Palm Beach County Florida.
- 14) Code of Ordinances, City of Boca Raton.
- 15) Guide for the Planning, Design, and Operation of Pedestrian Facilities, American Association of State Highway and Transportation Officials
- 16) Guide for the Development of Bicycle Facilities, American Association of State Highway and Transportation Officials
- 17) Military Handbook Seawalls, Bulkheads, and Quaywalls, US Navy

NOTE: In the event of a conflict between this manual and the above referenced publications, the Boca Raton Standard will apply or as specifically directed by the City Engineer.

7.0 CONSTRUCTION PLAN REQUIREMENTS

Construction plans submitted to the City for review and approval shall be clear and understandable. Construction plans shall clearly show in scaled drawing(s) existing conditions and identify the proposed improvements of the project. The construction plans shall show all pertinent information, be consistent with practices of plans prepared by other professionals within the industry and prepared to the satisfaction of the City's Civil Engineer and/or the Chief of Design.

Complete construction plans are prepared by an engineer registered in the state for the entire development of the area, together with a complete and accurate contour map using National Geodetic Vertical Datum (NGVD) and a drainage plan showing elevations of adjacent properties.

Sewer and water systems shall be reviewed and approved by the city staff, and all applicable regulatory agencies. Construction plans shall include the complete design of required sanitary sewer, water supply, storm drainage and street systems for the entire area to be subdivided. Due consideration shall be given to the problems that may be created by the subdivision of adjacent lands, especially as pertains to storm drainage, in order that conformity with the overall secondary master drainage plan will be obtained. The submission of such construction plans shall be accompanied by a fee as provided in the city municipal facilities and services user fee schedule.

8.0 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION

It should be the intent of the Engineer of Record to utilize Specifications adopted by the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction" (latest edition) and the supplements thereto, be used as the basis for construction of all work and require that all work performed by a contractor within the rights of way under the jurisdiction of the City of Boca Raton be constructed in compliance with said Specifications except as set forth and agreed upon by the City of Boca Raton.

In addition to these Standard Specifications, the Engineer of Record should stipulate Special Conditions and Special Provisions as needed, which pertain to the pertinent items of construction.

The Engineer, Applicant and Contractor's attention is directed to and prior to any excavation shall, comply with the requirements of Florida Statutes 553.851 "Protection of Underground Gas Pipelines" and 556, "Underground Facility Damage Prevention and Safety Act."

Further, that the Engineer, Applicant and Contractor's attention is directed to and prior to commencement of construction shall comply with Palm Beach County Land Development Code, Article 9, Section 9.3, D.1.d (8), "Construction Activities" and Appendix 9.3.C., "Best Management Practices," concerning construction, repairing or maintenance of any facility, or improvement to land and the handling, storage, containment and disposal of regulated substances in zones of influence numbers 1,2,3 and 4 of a (water) well.

9.0 Roadway Typical Sections

Every project that proposes improvements or modifications to a roadway or pedestrian facility under the jurisdiction of the City of Boca Raton shall be coordinated with the City Civil Engineer prior to permit submittal. This allows the City staff to be informed of the project, to identify and coordinate adjacent projects with both city officials and residents.

Prior to engineering permit submittal, the Engineer of Record shall prepare the proposed roadway typical section(s) in a 8-1/2" x 11" typical section approval package and submit three (3) copies of the package to the City Engineer (or designee) for review and comment. The Engineer may request this preliminary review in the form of a "hands on" meeting with the City Civil Engineer, if desired.

The roadway typical sections package shall clearly identify the proposed pertinent horizontal controls of the project at including but limited to:

1. Limits of Work
2. Number and width of roadway travel lanes
3. Pavement cross slopes
4. Design Speed
5. Roadside sideslopes and roadside treatment
6. Location/type of curb and/or curb and gutters
7. Location/type and width of bike facilities
8. Location/type and width of sidewalks
9. Proposed pavement design
10. Right-of-way width
11. Grass location and type.
12. Location/design parameters of drainage swales
13. Median type and width

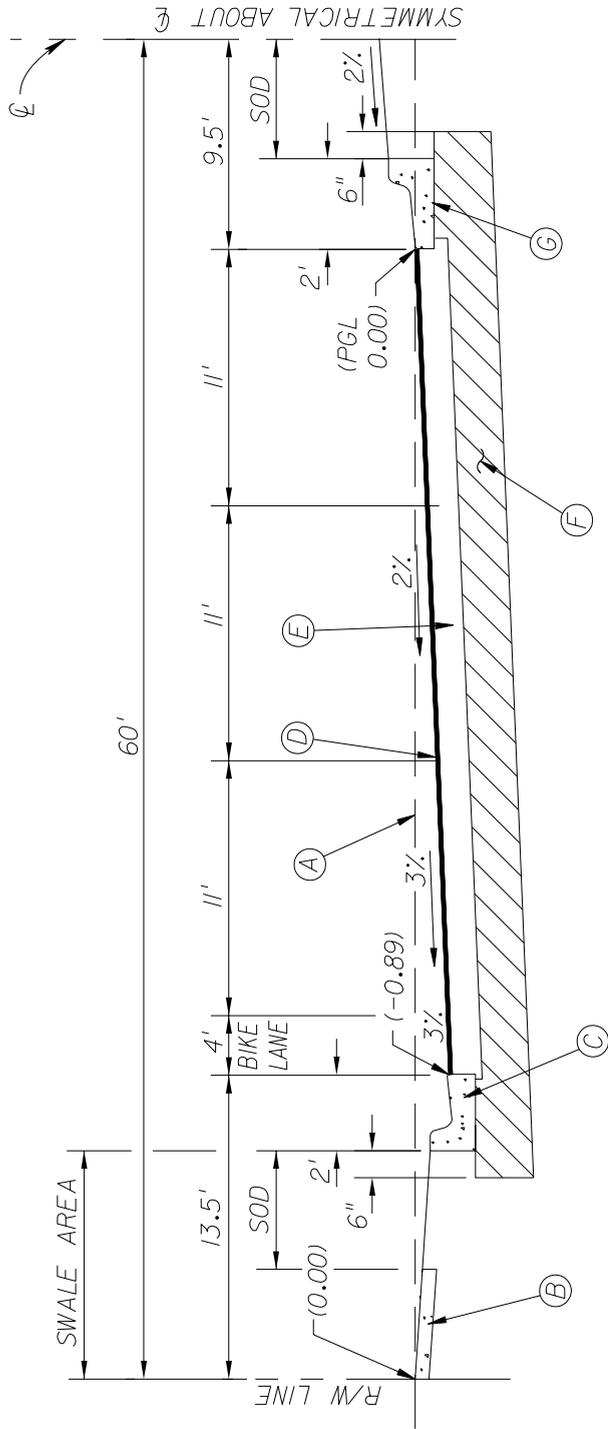
Multiple sections may be required to address various changes in the horizontal controls.

The Engineer of Record shall ensure that the proposed typical section elements are consistent with standards shown in the Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways, State of Florida.

Typical sections for roadways under the jurisdiction of FDOT or Palm Beach County may be submitted to the City for informational purposes; however, final approval of the typical section is subject to approval of the appropriate jurisdictional agency.

The selected design speed for the facility shall be consistent with other similar highway corridors operating in the same capacity as the project corridor. The design speed should be selected upon predicted driver behavior and based upon the probable maximum operating speed by vehicles on the street or highway. Since this may lead to interpretation of data, the Engineer of Record should consult with the City Civil Engineer on the proper design speed to be used. In no case, shall the design speed used for design be less than the posted speed limit.

The exhibit shown constitutes the level of detail expected for typical section packages and does not represent acceptable criteria for all similar facilities.



- (A) LEVEL LINE
- (B) CONCRETE SIDEWALK
- (C) TYPE F CURB AND GUTTER (Low Side)
- (D) TYPE S-III, ASPHALTIC SURFACE COURSE 1 1/2" THICK
- (E) COMPACTED LIMEROCK BASE 8" THICK, PRIMED FULL WIDTH
- (F) SUBGRADE STABILIZED TO 75 P.S.I. 12" THICK
- (G) TYPE F CURB AND GUTTER



City Of Boca Raton
 Municipal Services Department
 201 West Palmetto Park Road
 Boca Raton, Florida 33432

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**120' RW, 6 LANE DIVIDED
 WITH CURB & GUTTER**

10.0 Pavement Design

On streets and roadways within the jurisdiction of the City of Boca Raton, the Engineer of Record is responsible to verify that applicable sound engineering principles are used in the structural design of flexible and rigid pavement systems. The Engineer must recognize that in high volume, high loading areas, the thickness of the proposed pavement system may need to be greater than the minimum to ensure an adequate service life will be reached. The Engineer of Record should coordinate this address this with the City Civil Engineer, if consideration of thicker than minimum pavement systems should be considered for a specific area. FDOT's Flexible Pavement Design Manual shall be used as a basis of reference.

Minimum service life of new pavements shall be 20 years. The minimum service life of rehabilitated pavements shall be 10 years.

The Minimum acceptable Pavement Design systems for pavements within the jurisdiction of the City are as follows:

Arterials, Collector and Minor Roadways:

Stabilized Subgrade 12" (LBR 40), 8" limerock base and 1.5" Type S-1 Asphaltic Concrete.

Residential Driveways:

Subgrade shall be firm and unyielding, 6" limerock base and 1" Type S-1 Asphaltic Concrete.

Commercial Driveways:

Flexible pavement - Subgrade shall be firm and unyielding, 8" limerock base and 1.5" Type S-1 Asphaltic Concrete.

Driveways (Residential and Commercial) with Rigid Pavements:

Subgrade shall be firm and unyielding, 6" Concrete Pavement (Class I).

Acceptable Substitutions:

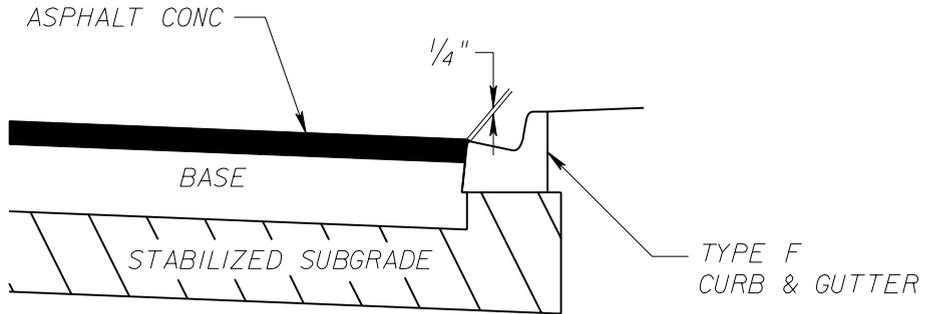
In lieu of 8" of Limerock base course, the Engineer may allow the contractor to substitute with 5" of Type B-12.5 (Asphaltic Concrete Base Course).

In lieu of Stabilized Subgrade (12" LBR 40), the Engineer may allow the contractor to substitute with 5.5" Limerock Base Course.

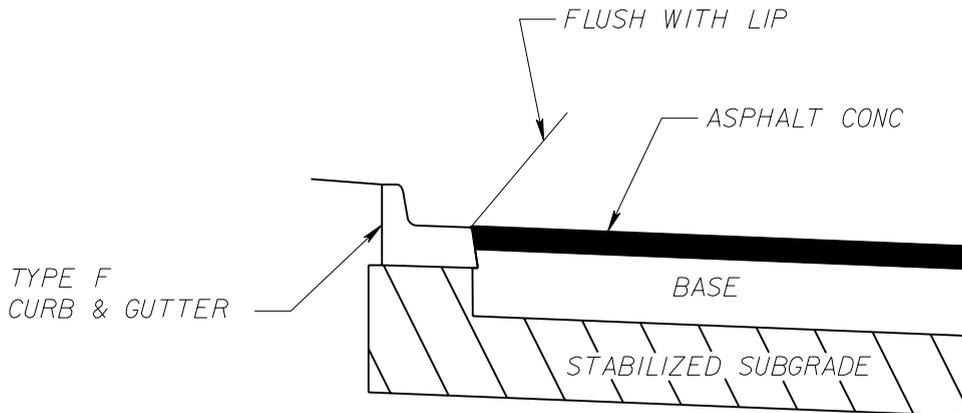
When the project proposes Type B-12.5 (Asphaltic Concrete) as the Base Course, the Stabilized Subgrade (12" LBR 40) course may be compensated with an additional 3.5" of Type B-12.5 (Asphaltic Concrete) Base Course. Thus, the 12" Stabilization (LBR 40) and 8" Limerock Base Course may be substituted with 8.5" Type B-12.5 (Asphaltic Concrete) Base Course on Subgrade that is firm and unyielding.

Pavement Design of areas other than roadways:

Pavement design of City maintained, non-roadway street pavements such as parking areas and maintenance aprons are to be designed to the discretion of the City Civil Engineer.



PAVEMENT
LOW SIDE CURB & GUTTER



PAVEMENT
HIGH SIDE CURB & GUTTER



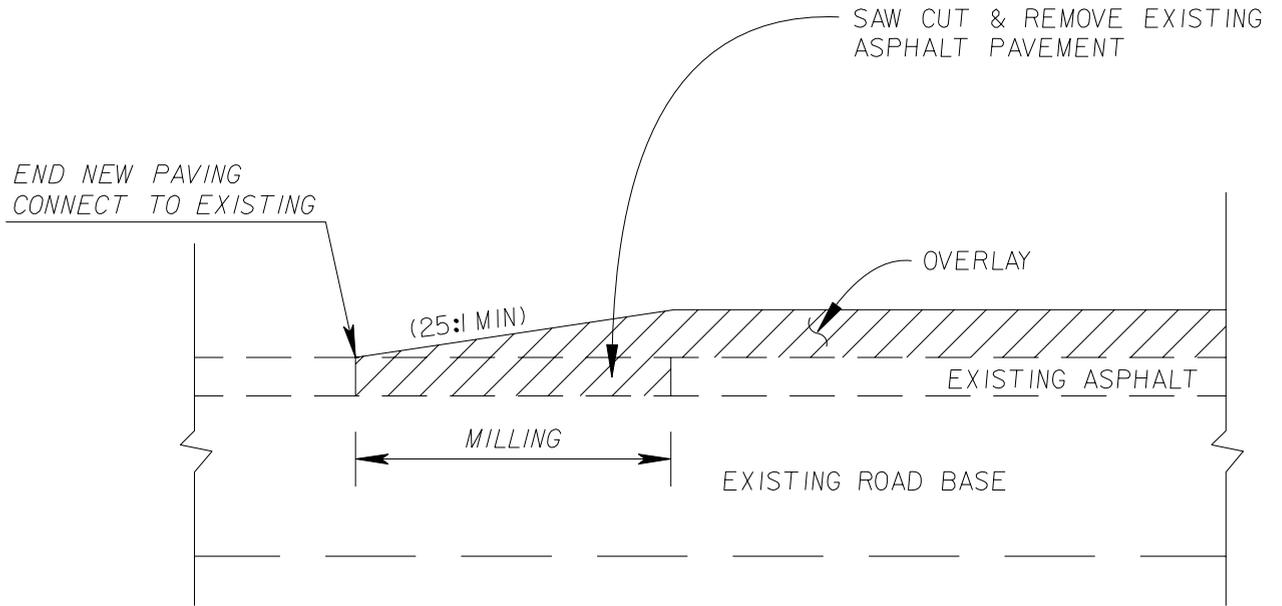
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CURB & GUTTER DETAILS

FIGURE
10.2



BUTT JOINT DETAIL



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PAVING DETAIL

11.0 Harbors, Docks, Bulkheads and Seawalls

The design, layout of Harbors, docks, bulkheads and seawalls are recommended to be performed by experienced engineers and should be closely coordinated by the Engineer of Record with the City Civil Engineer.

Boat travel in coastal waters is a public right established through the commerce clause of the U.S. Constitution which gives the Congress regulatory power over navigable waters—an authority that has been delegated to the U.S. Army Corps of Engineers (USACE).

Design parameters shown in the City of Boca Raton has a Marine Structures Code and the MILITARY HANDBOOK SEAWALLS, BULKHEADS, AND QUAYWALLS, US Navy, which can be used by the engineer for reference.

12.0 Livable Communities

It is the policy of the City to consider Transportation Design for Livable Communities (TDLC) features on the city roadways when such features are desired, appropriate and feasible. This involves providing a balance between mobility and livability. TDLC features should be based on consideration of the following principles:

1. Safety of pedestrians, bicyclists, motorists and public transit users.
2. Balancing community values and mobility needs.
3. Efficient use of energy resources.
4. Protection of the natural and manmade environment.
5. Coordinated land use and transportation planning.
6. Local and state economic development goals.
7. Complementing and enhancing existing design standards, systems and processes.

On-street parallel parking is preferred over angled parking on low speed urban streets. Angled parking causes conflicts with cars and bicycles, since drivers have poor visibility when backing out. Parallel parking can provide space for bike lanes, medians and wider sidewalks. The design of parking facilities should be coordinated with local transit agencies.

Curb extensions, sometimes called bulb-outs, may be used at intersections, or at mid-block locations where there is a marked crosswalk, provided there is a parking lane into which the curb may be extended. Curb extensions shorten the crossing distance, and provide additional space at intersections allowing pedestrians to see and be seen before entering a crosswalk. A curb extension is not generally used where there is no parking lane because of potential hazard to bicycle travel. The design must also take into consideration the needs of transit vehicles.

Personal security and safety is promoted by maximizing visibility in and along parking areas, building entrances, transit stops, sidewalks and roadways. This can be provided by the following techniques:

1. Providing lighting.
2. Lowering vegetation heights.
3. Removing hiding places.

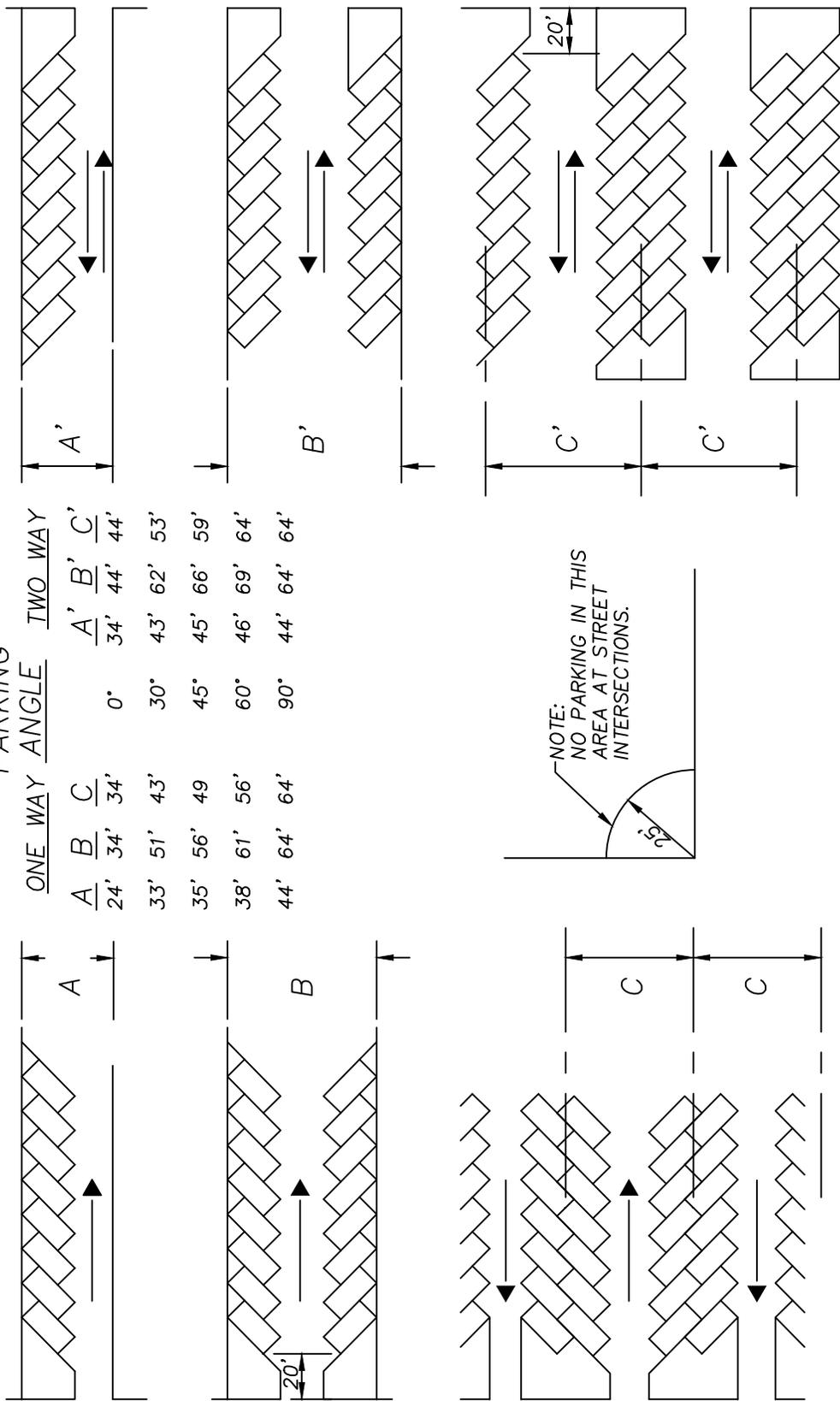
Examples for designing safer communities can be found in The National Crime Prevention Council's publication: [Crime Prevention Through Environmental Design](#).

PARKING LOT WIDTH DIMENSION SPECIFICATIONS

FOR ONE WAY TRAFFIC

FOR TWO WAY TRAFFIC

		ONE WAY		TWO WAY	
		A	B	A'	B'
PARKING ANGLE	0°	24'	34'	34'	44'
	30°	33'	51'	43'	53'
	45°	35'	56'	49'	59'
	60°	38'	61'	56'	64'
	90°	44'	64'	64'	64'



- NOTES:**
1. ALL EXAMPLES ABOVE SHOW 45 ANGLE PARKING WITH 10'x20' PARKING STALLS.
 2. TIRE BUMPER CURB REQUIRED WHEN PARKING SPACE FACES PROPERTY LINE.
 3. A MIN. BACKUP DISTANCE OF 20.00 FT. IS REQUIRED BETWEEN THE PROPERTY LINE & THE 1ST STALL.

FIGURE
12.1

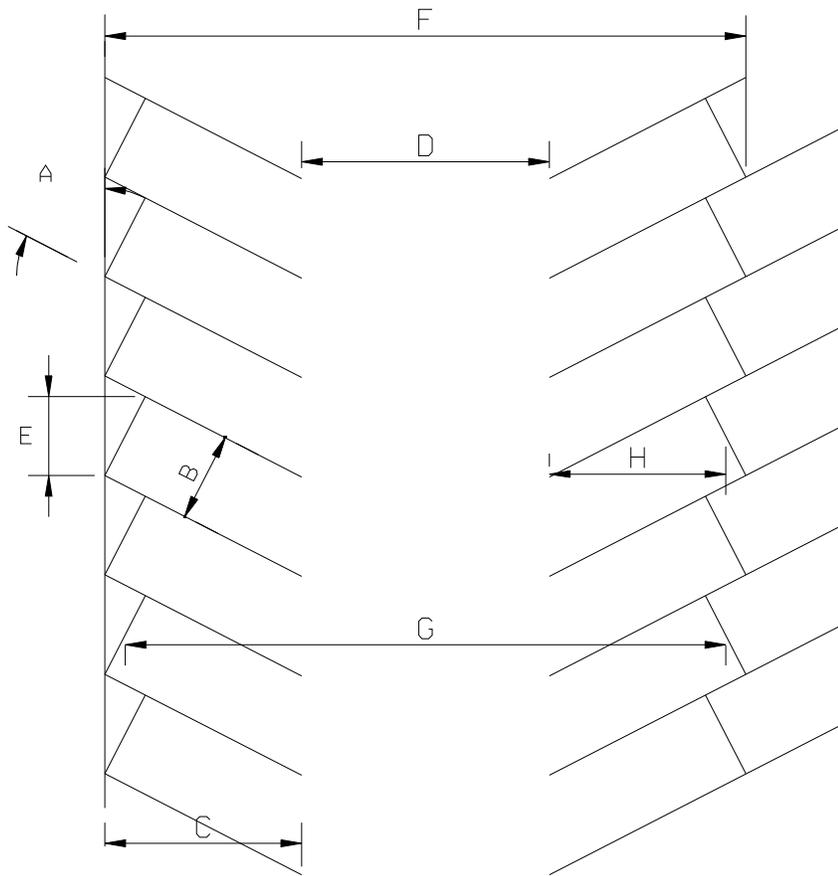


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PARKING LOT MINIMUM STANDARDS

PARKING STRUCTURE STANDARDS



ANGLE (DEGREES) STALL WIDTH FT. STALL DEPTH TO WALL AISLE(b) WIDTH (FT.) STALL WIDTH PARALLEL TO AISLE (FT.) WALL TO WALL (FT.) INTERLOCK TO INTERLOCK (FT.) STALL DEPTH TO INTERLOCK (FT.)

**FULL SIZE STALLS
(a) 9.0 Ft x 18.0 Ft**

A	B	C	D	E	F	G	H	Notes
45°	9.0	19.4	14.0	6.4	53.0	46.6	16.3	One-Way Isle only
60°	9.0	20.5	16.0	7.8	57.0	52.6	18.3	One-Way Isle only
75°	9.0	20.2	23.0	8.7	63.4	61.0	19.0	One-Way Isle only
90°	9.0	18.5	26.0	9.0	62.0	62.0	18.5	Two-Way Isle Only

**COMPACT SIZE STALLS (DOWNTOWN ONLY)
(a) 8.0 Ft x 16.0 Ft**

A	B	C	D	E	F	G	H	Notes
45°	8.0	16.6	14.0	11.3	47.2	41.6	13.8	One-Way Isle only
60°	8.0	17.4	15.0	9.3	49.8	45.8	15.4	One-Way Isle only
75°	8.0	17.0	18.0	8.3	52.0	50.0	16.0	One-Way Isle only
90°	8.0	16.0	24.0	8.0	56.0	56.0	16.0	Two-Way Isle Only

(A) NO COLUMN ENCROACHMENT ALLOWED
(B) ONE WAY DRIVES SHALL NOT BE PERMITTED FOR 90 DEGREE PARKING LAYOUTS.



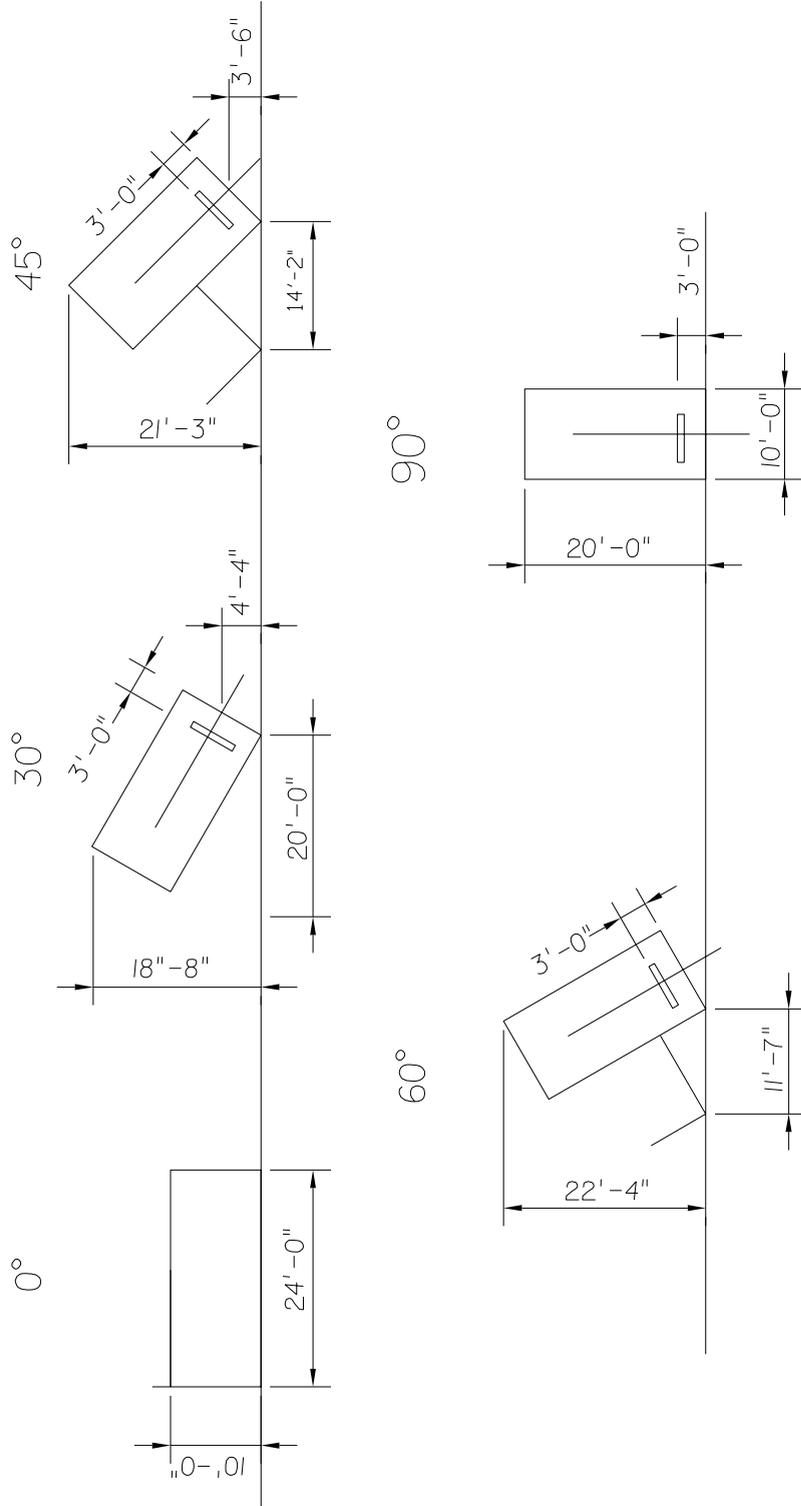
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**PARKING STRUCTURE
DIMENSION STANDARDS**

PARKING STALL DIMENSIONS

ORD. NO. 1339



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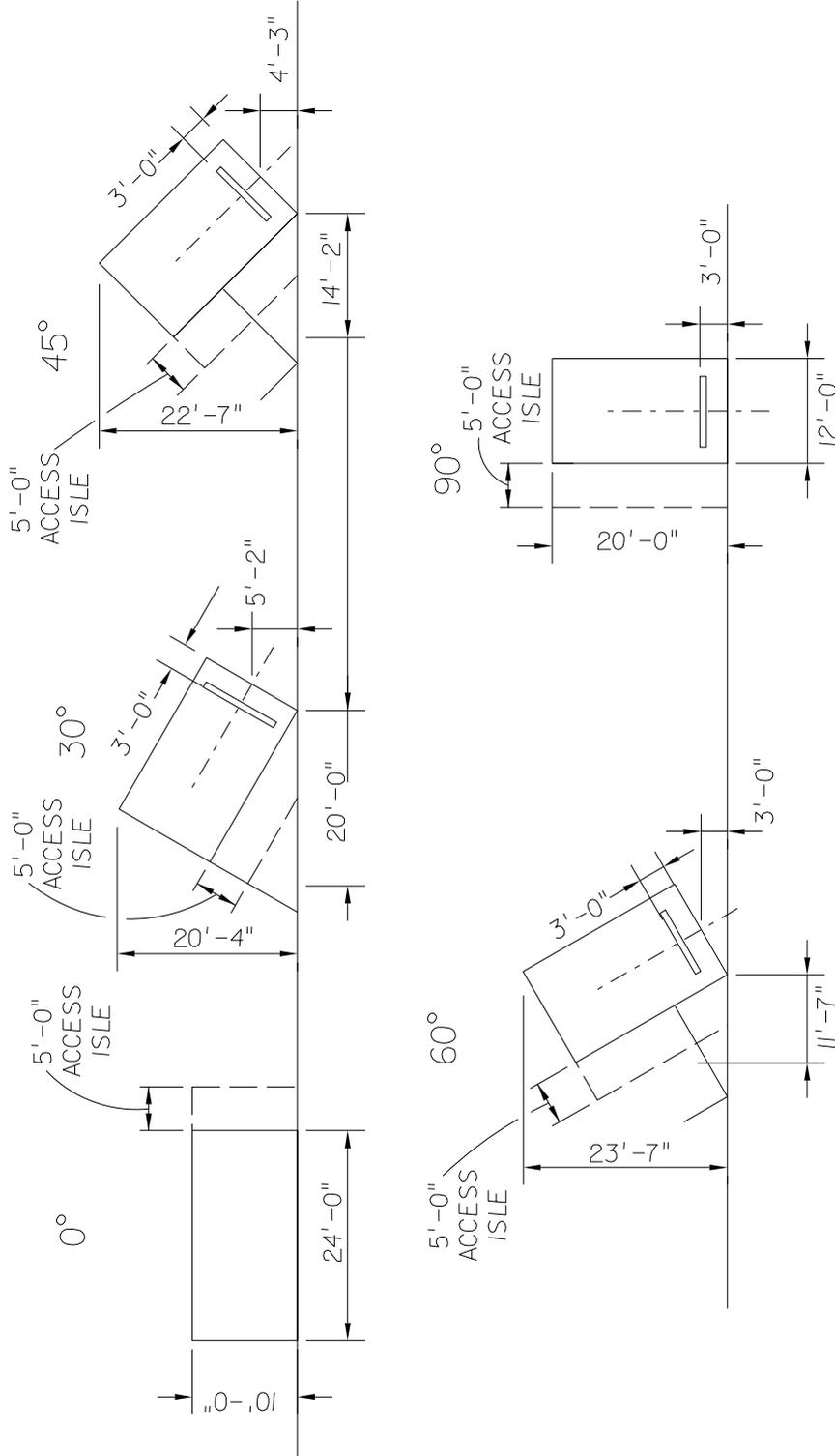
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REV.	
REV.	

PARKING STALL
DIMENSIONS

FIGURE 12.4

HANDICAPPED PARKING STALL DIMENSIONS

ORD. NO. 1339



NOTE: STALLS SHALL BE A MIN. OF 12'x20'



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HANDICAPPED PARKING STALL DIMENSIONS

PARKING CONTROL SERVICE RATES

TYPICAL SERVICE RATES PER LANE ^(a)
HOURLY CAPACITY

<u>TYPE OF CONTROL</u>	<u>AVERAGE HEADWAY (Sec/Veh)</u>	<u>Design (Veh/Hr)</u>	<u>Maximum (Veh/Hr)</u>
Entering:			
Clear aisle, no control	3.6	800	1,000
Ticket dispenser, no gate	5.0	575	720
Time Stamp and hand to driver	8.5	340	425
Coded-Card operated gate	8.9	340	425
Cashier, flat fee, no gate			
No information given	9.2	310	390
Direction-info needed	14.8	195	250
Ticket dispenser w/gate			
Sharp turn @ approach	9.5	305	380
Easy direct approach	5.5	520	650
Coin operated gate	20.4	140	175
Internal:			
Clear aisle or ramp, no parking	2.0	1,200	1,800
Straight ramp w/bend @ end	2.2	1,000	1,610
Circular ramp, 30' R @ C/I	2.2	840	1,650
Aisle with adjacent 9 x 18' stalls			
Inbound	3.5	830	1,040
Outbound	8.6	335	420
Exiting:			
Light street congestion	7.2	400	500
Moderate street congestion	9.0	320	400
Coded card/token-operated gate	9.0	320	400
Cashier, flat fee w/gate	13.4	215	270
Cashier, variable fee w/gate	19.5	150	185
Coin operated gate	20.4	140	175

(a) Assumes no significant interference by pedestrians, other traffic, etc.



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**PARKING STRUCTURE
DIMENSION STANDARDS**

PARKING STRUCTURE DESIGN STANDARDS

FIGURE
12.6

	<u>Desirable Standard</u>	<u>Minimum Standard</u>
Parking Floor Grades:	4%	5%
Ramps Without Parking:	7-8% (10' transition)	10%-12% (12' transition)
Driving Ramp & Lane Widths w/o Parking:		
One Way	16ft.	14ft.
Two Way	26ft.	24ft.
Vertical Unobstructed Clearance:	7.5ft. *	7.0ft. *
Vehicle Turning Radii (inside)	18ft.	15ft.
Operation Capacities:		
Filling (minutes)	30	45
Unloading (minutes)	30	45
Lighting Area:		
	<u>Desirable</u>	<u>Minimum</u>
	Footcandles	Footcandles
	Lux	Lux
Entrance	80-100	860-1080
Driving Aisles	10-15	110-160
Over-parked Vehicles	5-10	55-110
		50-80
		540-860
		8-10
		85-110
		3-5
		30-55

Compact Parking Allowed (Downtown Only):

Maximum 25% of total spaces required.
Each compact space must be individually signed.

Pedestrian Access:

Access provided within 150 feet of all parking spaces.

Elevators: (Recommended)

For all structures over two stories.
Number: 1 per 300 spaces for first 600 spaces.
1 per 600 spaces thereafter.

Reservoirs (Internal/External):

As required per Driveway Ordinance and service rates for type of structure control.

Curb Stops:

All interlocking parking stalls shall have curb stops.

Appropriate front-end overhang:

Standard size vehicles - 30 inches
Compact size vehicles - 24 inches

Security Measures:

Pull alarms and CCTV cameras shall be installed in all parking structures.
Locate these devices in garage stairwells and other appropriate locations
both inside and outside the parking structure.

Striping:

All parking spaces shall be double striped.

*** Provide minimum vertical clearance of 114 inches at accessible passenger locating zones and along at least one vehicle access route to such areas from site entrance(s) and exit(s).**

*** Provide minimum vertical clearance of 98 inches at the parking and along at least one vehicle access route to such spaces from site entrance(s) and exit(s).**

(A) MAXIMUM PARKING FLOOR GRADE FOR ANGLE PARKING OF 60° OR LESS.



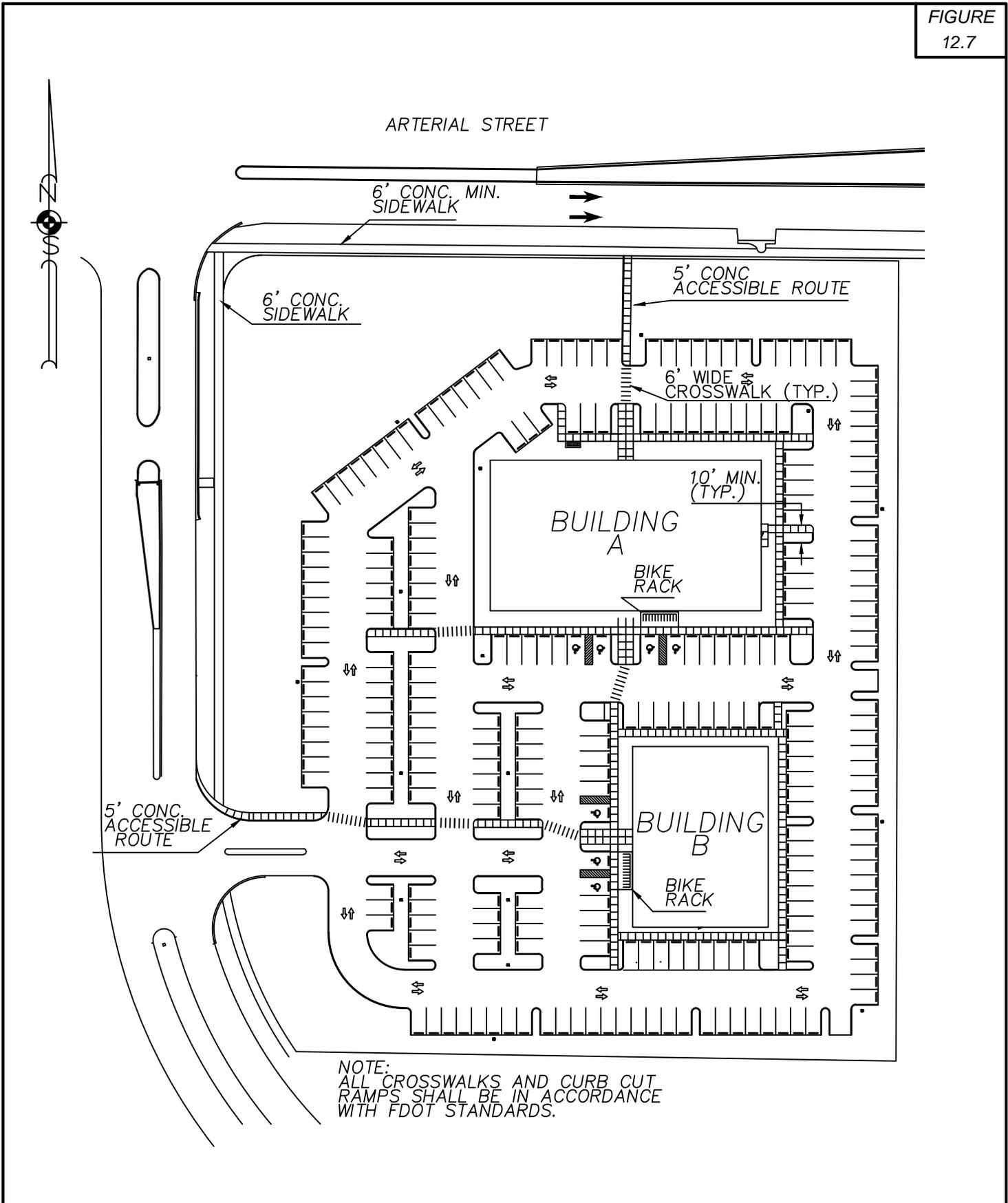
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PARKING STRUCTURE DIMENSION STANDARDS

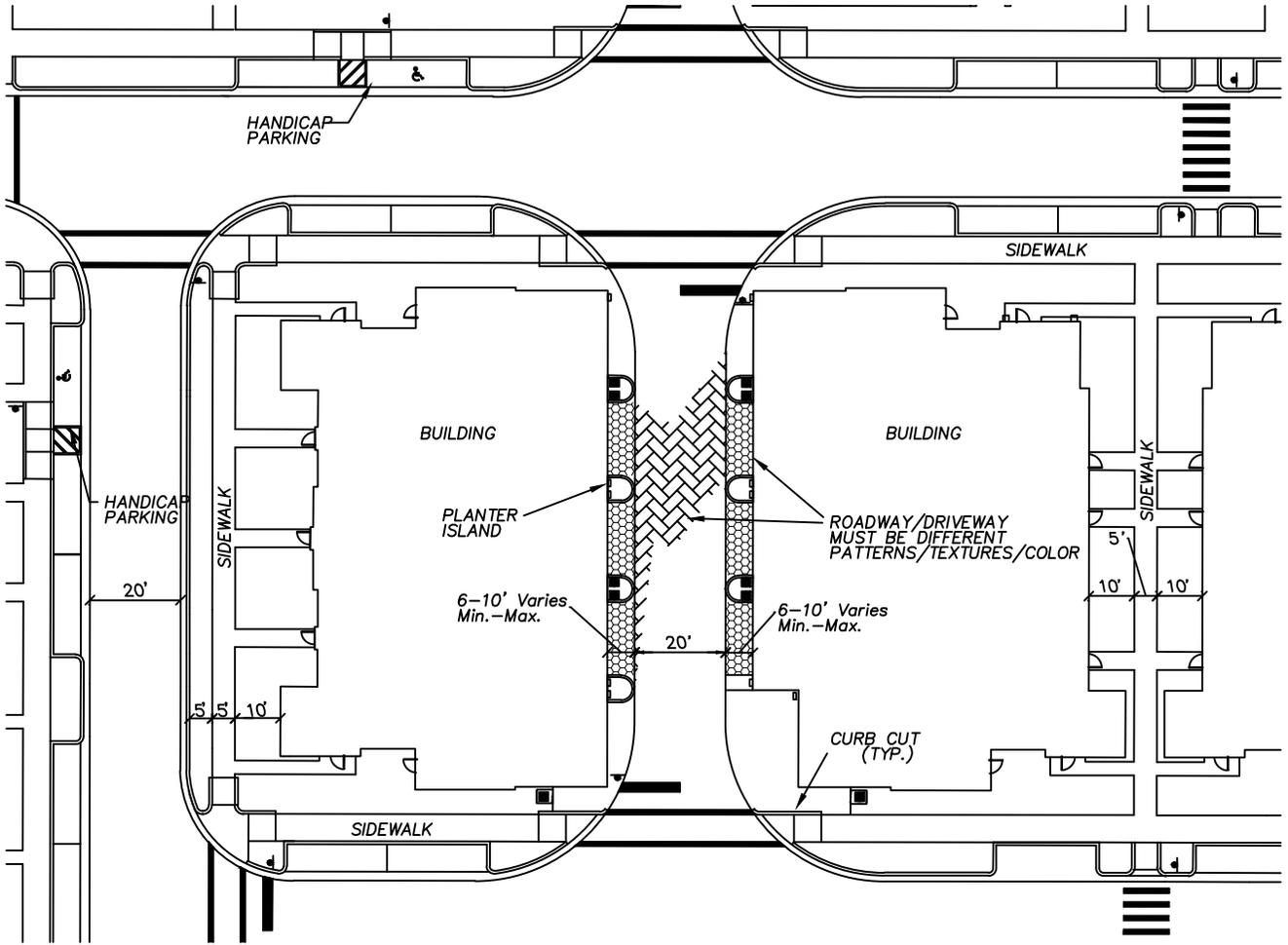
FIGURE
12.7



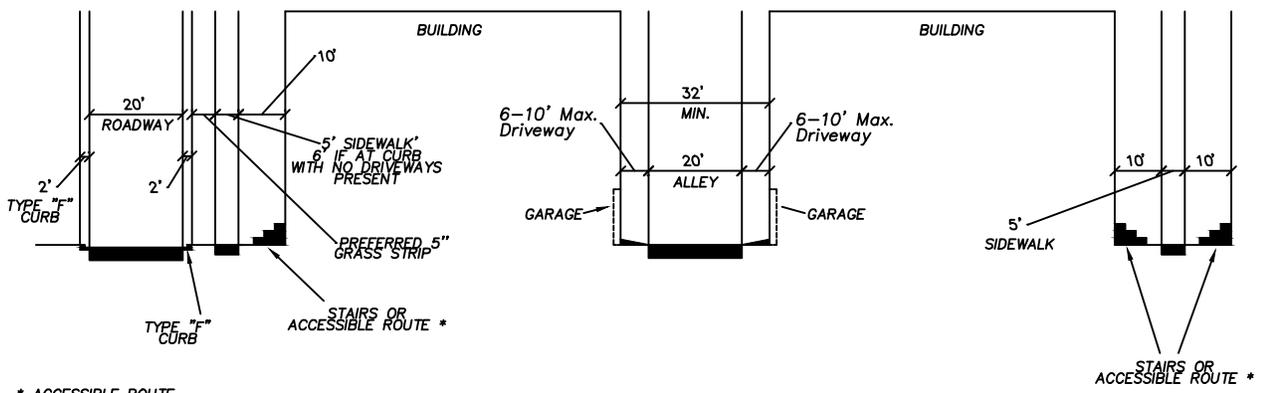
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**BICYCLE & PEDESTRIAN
CIRCULATION
CONCEPTUAL LAYOUT**



PLAN VIEW



CROSS SECTION VIEW (N.T.S.)

* ACCESSIBLE ROUTE
REQUIRED FOR UNITS
WITH ELEVATORS

STAIRS OR
ACCESSIBLE ROUTE *



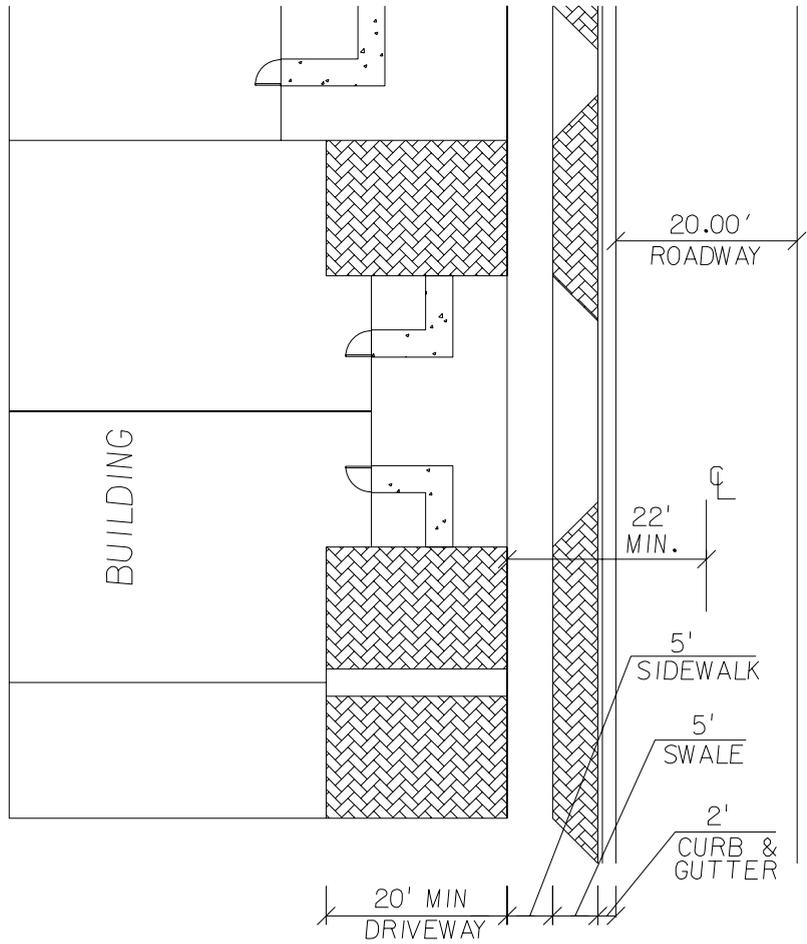
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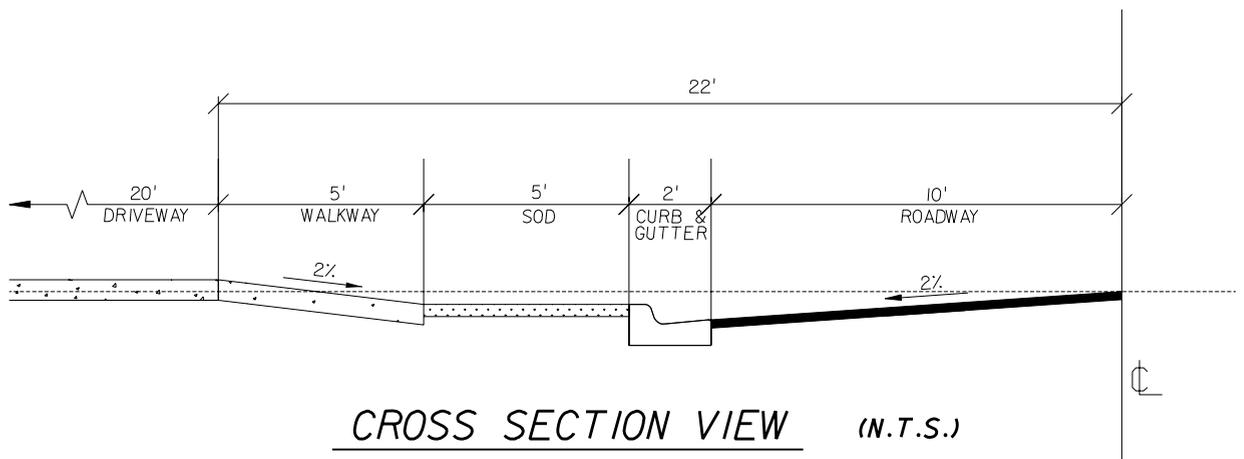
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**NEO-TRADITIONAL
DESIGN STANDARDS
(PRIVATE ROADS W/ ALLEYS)**

FIGURE
12.9



PLAN VIEW



CROSS SECTION VIEW (N.T.S.)



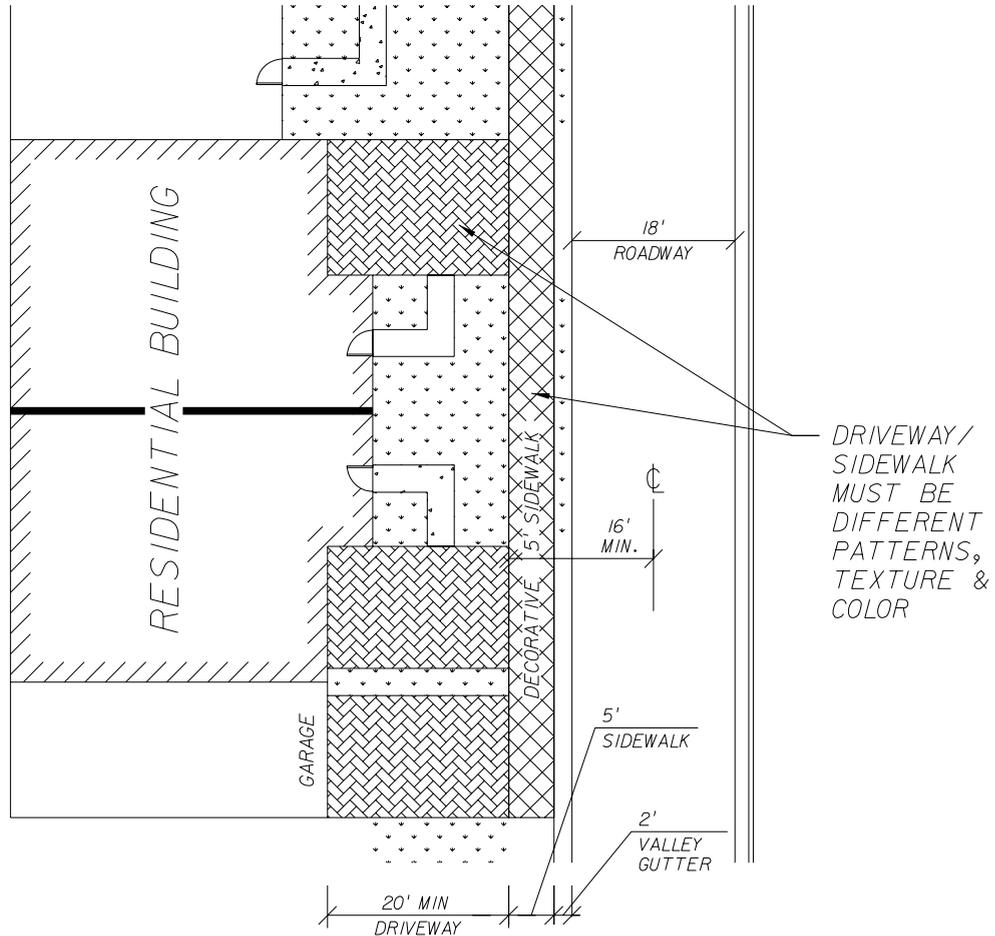
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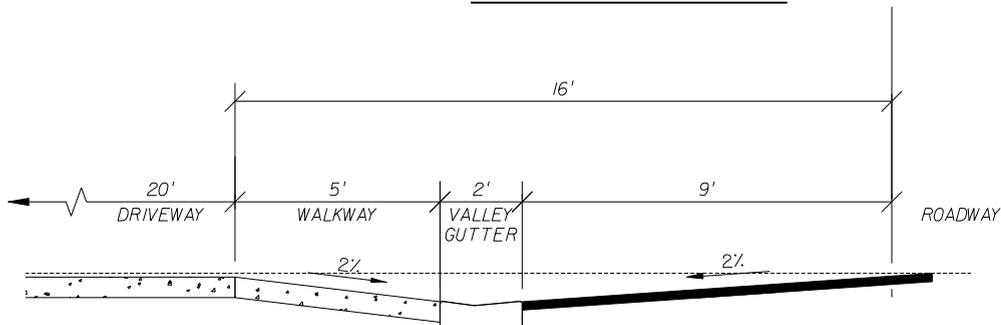
ORIG.	12-2007
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REV.	_____

**NEO-TRADITIONAL
DESIGN STANDARD
(PRIVATE ROAD W/ 44' SECTION)**

FIGURE
12.10



PLAN VIEW



CROSS SECTION VIEW (N.T.S.)



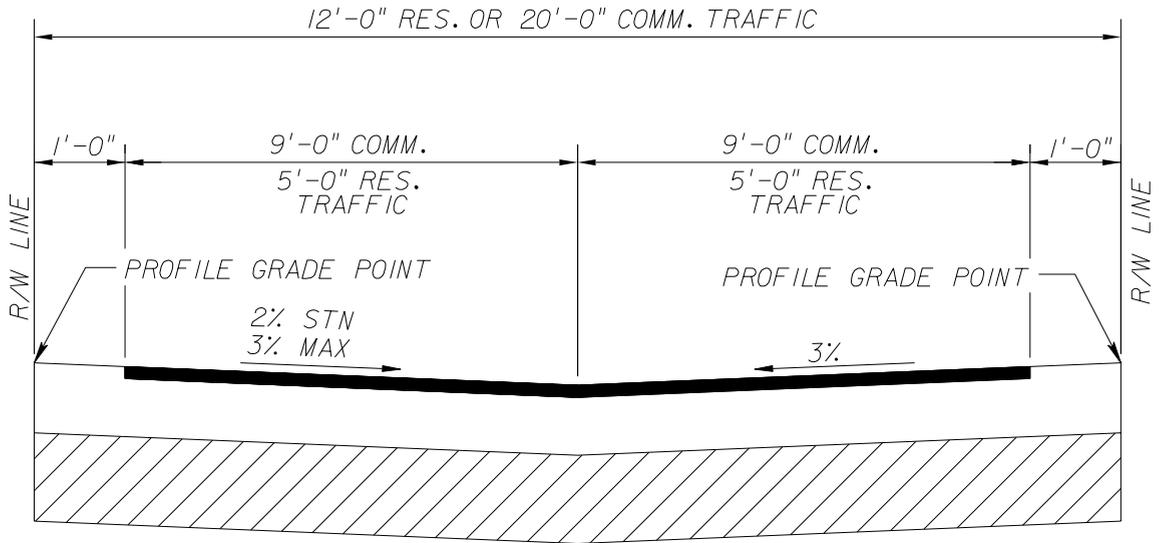
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**NEO-TRADITIONAL DESIGN STANDARD
(PRIVATE ROADS W/ 32' SECTION)
(ROADS SERVING 40 OR LESS UNITS)**

FIGURE
12.11



PAVEMENT DESIGN

BASE COURSE 8" THICK WITH TYPE S-I ASPHALTIC CONCRETE SURFACE
 COURSE 1 1/2" THICK OR CONCRETE (2800 PSI MIN) 6" THICK
 ON COMPACTED SUBGRADE (LBR 40).



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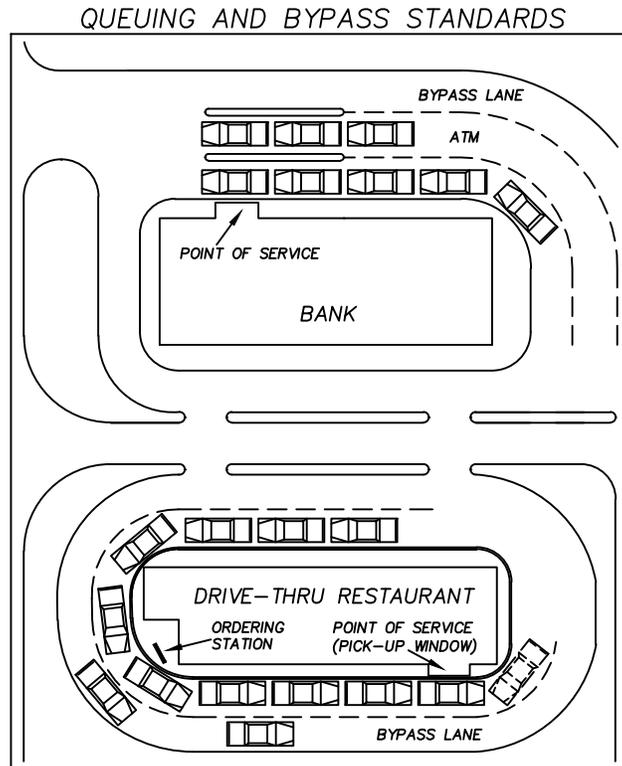
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INVERTED CROWN ALLEY

DRIVE-THRU QUEUING STANDARDS

1. Queuing shall be provided for all drive-thru establishments. Each queuing space shall be a minimum of ten feet by 20 feet, clearly defined and designed so as not to conflict or interfere with other traffic using the site. The dimensions for the individual point of service space may be reduced to nine by 20 feet. Unless otherwise indicated below, queuing shall be measured from the front of the stopped vehicle located at the point of service to the rear of the queuing lane. One additional queuing space shall also be provided after the point of service for all restaurant uses.

2. A bypass lane a minimum of ten feet wide shall be provided before or around the point of service and increased to fourteen feet wide if adjacent to a wall. Subject to the city traffic engineer's approval, a bypass lane may not be required if the queuing lane is adjacent to a vehicular use area which functions as a bypass lane. The bypass lane shall be clearly designated and distinct from the queuing area.



MINIMUM QUEUING STANDARDS TABLE

USE	NUMBER OF SPACES	REQUIRED BYPASS(1)
DRIVE-THRU FINANCIAL INSTITUTION TELLER LANES	5	Y
AUTOMATIC TELLER LANES	3	N
DRIVE-THRU RESTAURANT MINIMUM BEHIND ORDERING STATION	10 4	Y
DRIVE-THRU CAR WASH AUTOMATIC	5	N
SELF-SERVICE	4	Y
DRIVE-THRU PHARMACY	4	Y
DRIVE-THRU DRY CLEANING OR LAUNDRY	3	Y
DRIVE-THRU GENERAL RETAIL	4	Y

Note: All uses: A bypass lane shall be required if more than 5 queuing spaces are provided.



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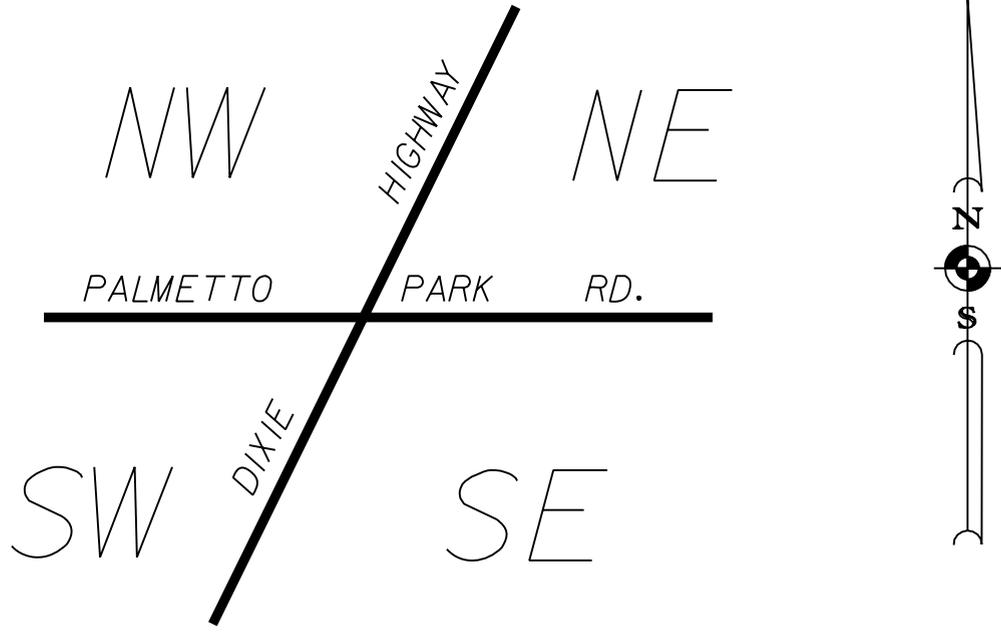
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DRIVE-THRU QUEUING STANDARDS

13.0 Street Designation

The City of Boca Raton utilizes the street and road specifications as shown on the following detail.

FIGURE
13.1



STREET AND ROAD SPECIFICATIONS

NORTH
SOUTH

- AVENUE
- WAY
- TERRACE
- COURT
- HIGHWAY

EAST
WEST

- STREET
- ROAD
- DRIVE
- PLACE
- LANE

MISC.

- BLVD.
- DIAGONALS
- FEDERAL
- STATE



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**STREET AND ROAD
DESIGNATIONS**

14.0 Drainage

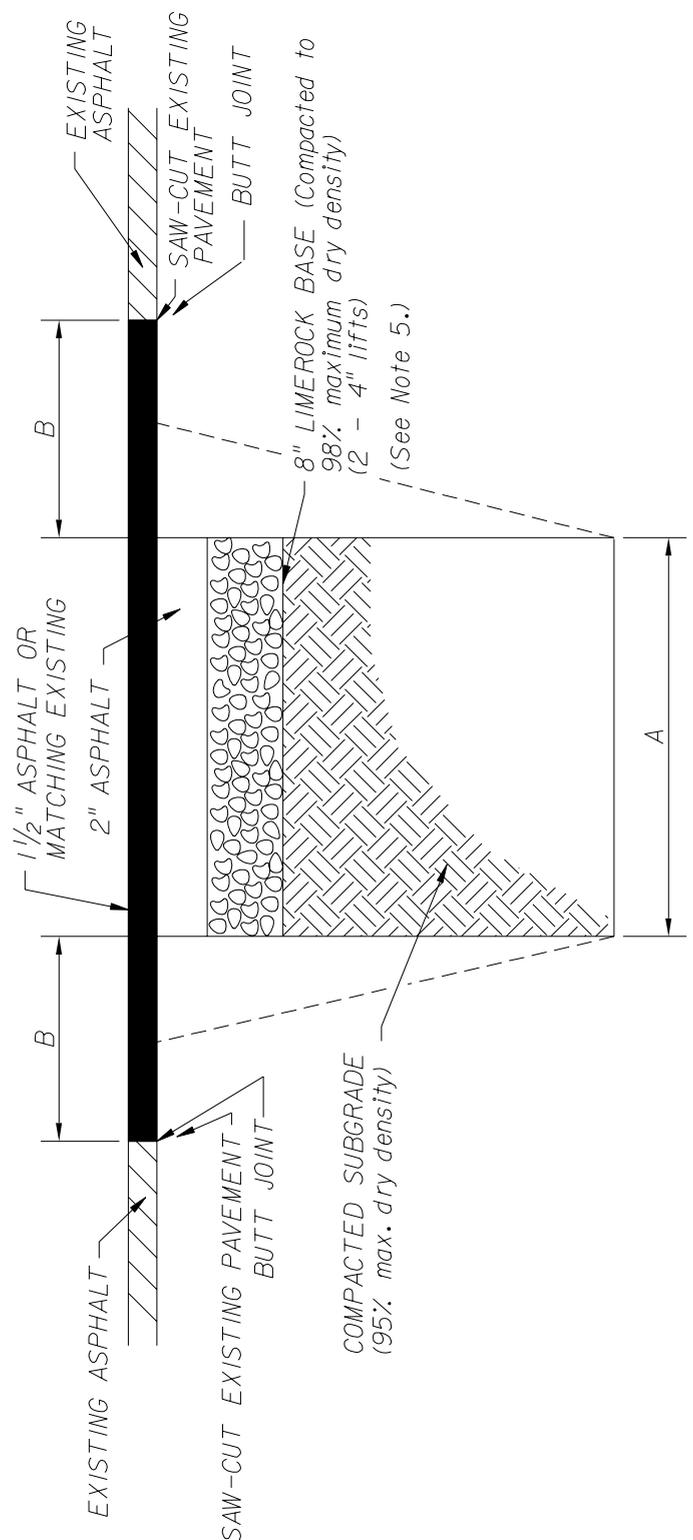
All drainage structures – inlets and manholes within the city jurisdiction shall conform to the Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, latest edition, The Florida Department of Transportation.

All drainage structure frames, covers, lids or grates that are within the city right of way shall be traffic bearing.

All pipes to be maintained by the City of Boca Raton shall be concrete reinforced pipe.

Installation and restoration of pavement for drainage and utility pipes in open cuts under City maintained streets shall conform to the Open cut detail.

FIGURE 14.1



NOTES

1. NO OPEN CUTS SHALL BE PERMITTED WITHIN CITY OWNED RIGHTS-OF-WAY WITHOUT WRITTEN PERMISSION OF THE CITY OF BOCA RATON.
2. CITY OF BOCA RATON MUNICIPAL SERVICES DEPARTMENT SHALL BE NOTIFIED FOR INSPECTION OF LIMEROCK AND SUBGRADE PRIOR TO RECONSTRUCTION OF ASPHALT.
3. FOR ANY CUTS GREATER THAN 36" THE CONTRACTOR MUST SUBMIT TO THE CITY OF BOCA RATON PUBLIC UTILITIES DEPARTMENT A SHOP DRAWING OF HIS PROPOSED PAVEMENT REPAIR FOR APPROVAL.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TRAFFIC IN ACCORDANCE WITH THE STATE OF FLORIDA, MANUAL ON TRAFFIC CONTROL & SAFE PRACTICES.
5. REFER TO FDOT INDEX FOR FLOWABLE FILL OPTION.

A WIDTH OF PAVT CUT (inches)	B LIMITS OF BUTT JOINT BEYOND PAVT CUT (feet)
24" Min.	4' Min.
30"	4.5'
36">	5'



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PAVEMENT REPAIRS
 FOR OPEN CUTS

15.0 Other Roadside Appenditures

Dumpster (Figure 15.1, 15.2 & 15.3)

Dumpster enclosure and design locations shall meet the requirements set forth in City of Boca Raton standards.

Mailboxes (Figures 15.4 & 15.6)

Mailboxes installed and maintained by the owner within the right of way of the city street shall meet the general requirements of the attached Mailbox detail.

- The location and construction of mailboxes shall conform to the rules and regulations of the United States Postal Service as modified by this design standard.
- Wood or steel support posts for both single and double mailbox mountings shall be embedded no more than 24" into the ground.
- No more than two mailboxes may be mounted on a single post.
- Lightweight Plastic newspapers receptacles may be mounted below the mailbox on the side of the support in conformance with USPS Domestic Mail Manual.
- Neighborhood Delivery and Collection Box Units are a specialized multiple mailbox installation that must be located outside the highway/street clear zone.
- At driveway entrances, mailboxes shall be placed on the far side of the driveway in the direction of the delivery route.
- No Concrete, Block, brick stone or rigid mailbox foundation structure or encasement above the ground line located within the highway /street clear zone, will be permitted.

Dome buttons (Figure15.5)

Residents will be allowed to install and maintain concrete domed buttons 2 feet off the roadway pavement as shown in attached detail.

Permanent Reference monuments (Figure15.7)

A permanent survey reference monument is an artificial or natural object that is permanent used or presumed to occupy any real property corner, point on a boundary line, or reference point.

Per Florida Statutes Section 177.031 Definitions

15) "P.R.M." means a permanent reference monument which must:

(a) Consist of a metal rod having a minimum length of 18 inches and a minimum cross-section area of material of 0.2 square inches. In certain materials, encasement in concrete is optional for stability of the rod. When used, the concrete shall have a minimum cross-section area of 12.25 square inches and be a minimum of 24 inches long.

(b) Be identified with a durable marker or cap with the point of reference marked thereon bearing either the Florida registration number of the Professional Surveyor and Mapper (PSM) in responsible charge or the certificate of authorization number of the legal entity, which number shall be preceded by LS or LB as applicable and the letters "P.R.M."

(c) Be detectable with conventional instruments for locating ferrous or magnetic objects.

If the location of the "P.R.M." falls in a hard surface such as asphalt or concrete, alternate monumentation may be used that is durable and identifiable.

Bicycle Parking Detail (Figure15.8)

Attached is the City's standard Bike parking rack detail.

Sprinklers

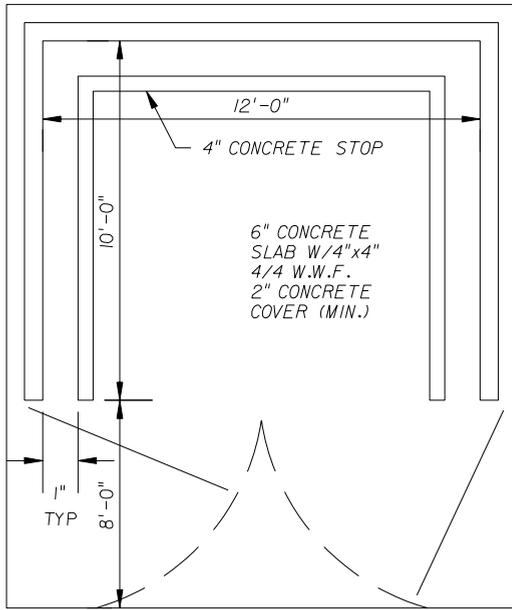
Residents and Owners may install and maintain irrigation sprinkler systems to irrigate grass within city right-of-way provided:

- The irrigation spray does not spray onto roadway pavement.
- The system is maintained by the owner on a routine basis.
- The owner is responsible to relocate the system at their own expenses

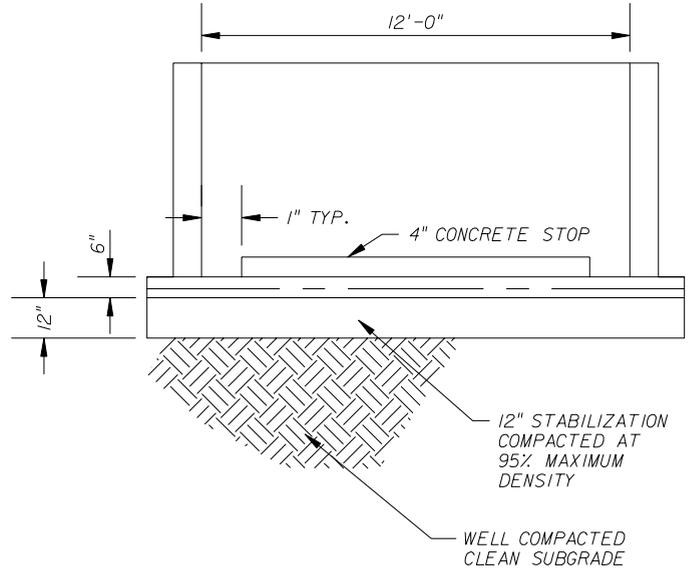
Vegetation Maintenance (Vertical Clearance Standard):

There shall be no encroachment of trees, tree limbs or other vegetation in or over the vehicular travel way lower than 14.5 feet or lower than 8 feet over sidewalks. There shall be no vegetation that violates the vertical clearance standard defined herein.

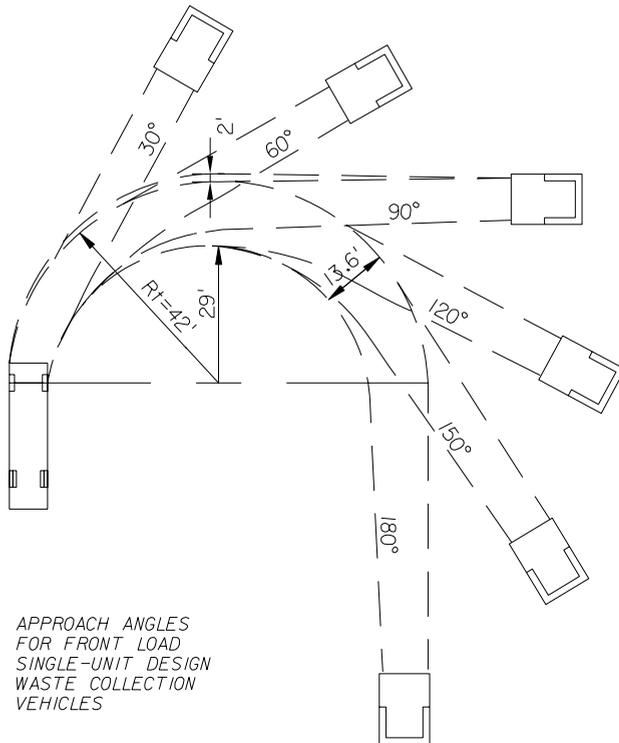
FIGURE
15.1



TOP



FRONT



NOTES:

1. ALL REINFORCING STEEL SHALL BE GRADE 40 OR EQUAL.
2. SLAB LOCATION SHALL MEET REQUIREMENTS OF CITY OF BOCA RATON SANITATION DIVISION.
3. ENCLOSURE WALLS AND DOORS SHALL BE DESIGNED, CONSTRUCTED AND FINISHED PER C.A.B. CRITERIA.
4. TRUCK APPROACH SHALL HAVE 60000 LB. G.V.W. CAPACITY (MIN.)
5. WHEN THE DOORS ARE OPEN THE OBSTRUCTED ACCESS SHALL BE EQUAL TO THE INSIDE WIDTH OF THE ENCLOSURE. NO FRAMING, HINGES OR OTHER ITEMS SHALL ENCROACH ON THIS OPENING.
6. ACCESS DOORS SHALL BE HUNG ON ENDS OF ENCLOSURE WALLS.
7. CONCRETE STOPS SHALL BE USED WITH CITY SERVICE AND APPROVED 2 C.Y. DUMPSTERS.



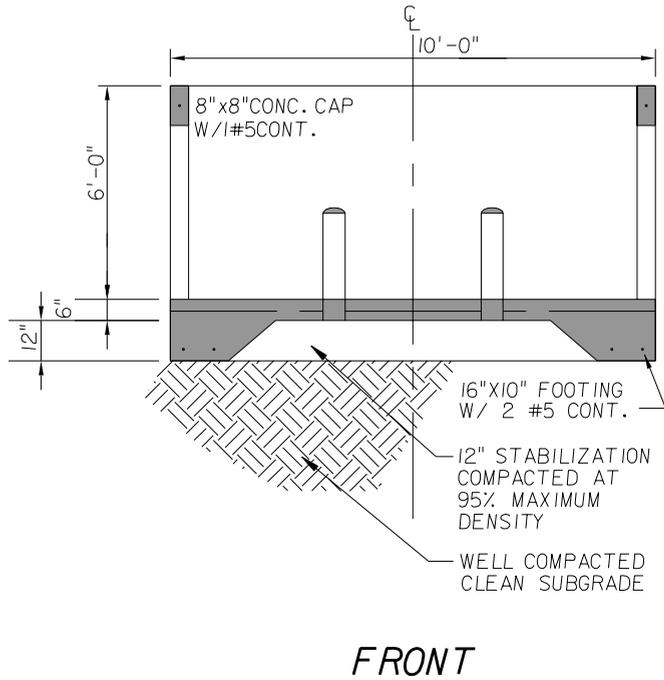
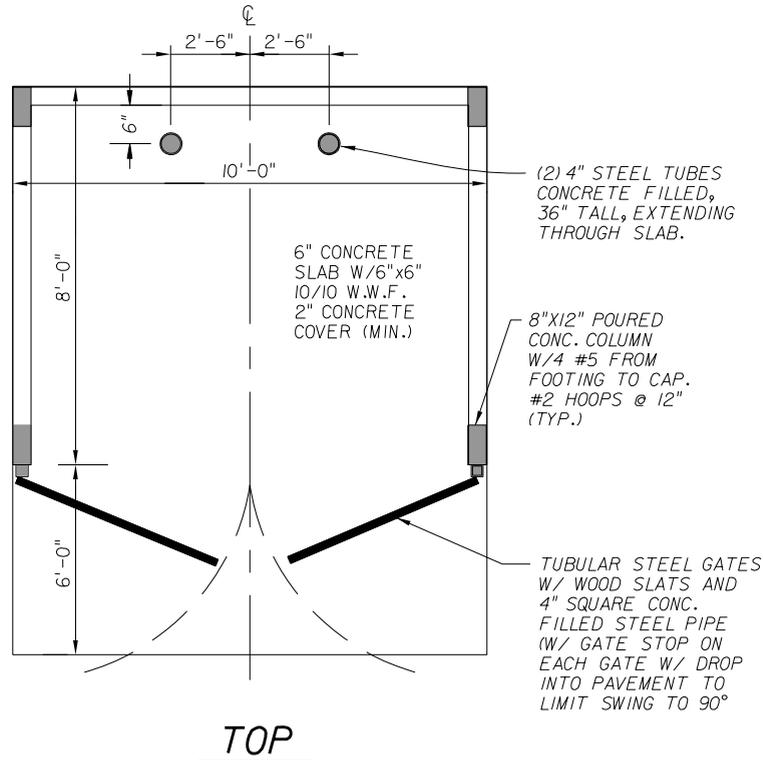
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DUMPSTER ENCLOSURE
COMMERCIAL
(SINGLE)

FIGURE
15.2



NOTES:

- 1.) ALL REINFORCING STEEL SHALL BE GRADE 40 OR EQUAL.
- 2.) SLAB LOCATION SHALL MEET REQUIREMENTS OF CITY OF BOCA RATON SANITATION DIVISION.
- 3.) ENCLOSURE WALLS AND DOORS SHALL BE DESIGNED, CONSTRUCTED AND FINISHED PER C.A.B. CRITERIA.
- 4.) TRUCK APPROACH SHALL HAVE 60000 LB. G.V.W. CAPACITY (MIN.)
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- 6.) ACCESS DOORS SHALL BE HUNG ON ENDS OF ENCLOSURE WALLS.
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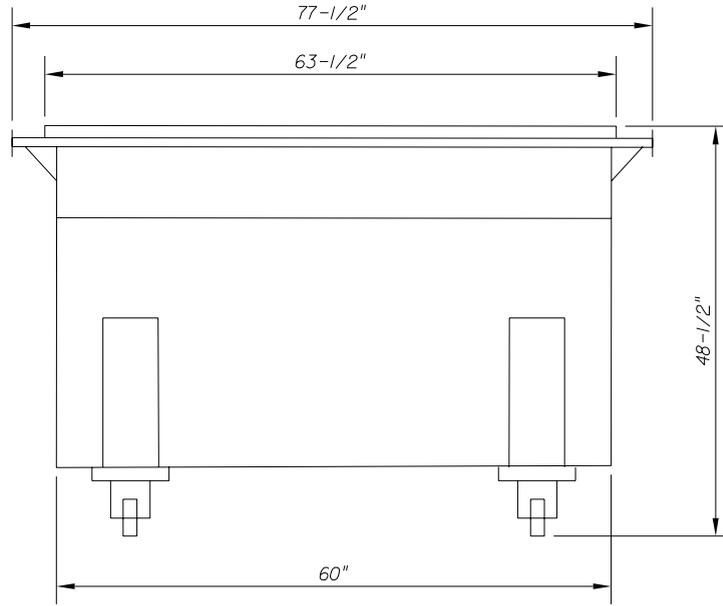
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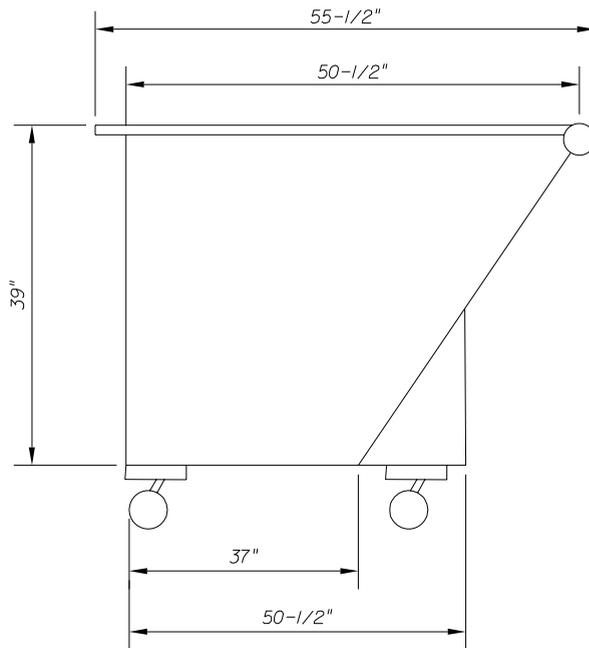
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DUMPSTER ENCLOSURE
RESIDENTIAL
(SINGLE)

FIGURE
15.3



FRONT



SIDE

NOTE:

ONLY A DUMPSTER OF THIS DESIGN,
SIZE AND CAPACITY WILL BE
EMPTIED BY THE SANITATION DIVISION.
DUMPSTER SUPPLIED BY OTHERS.

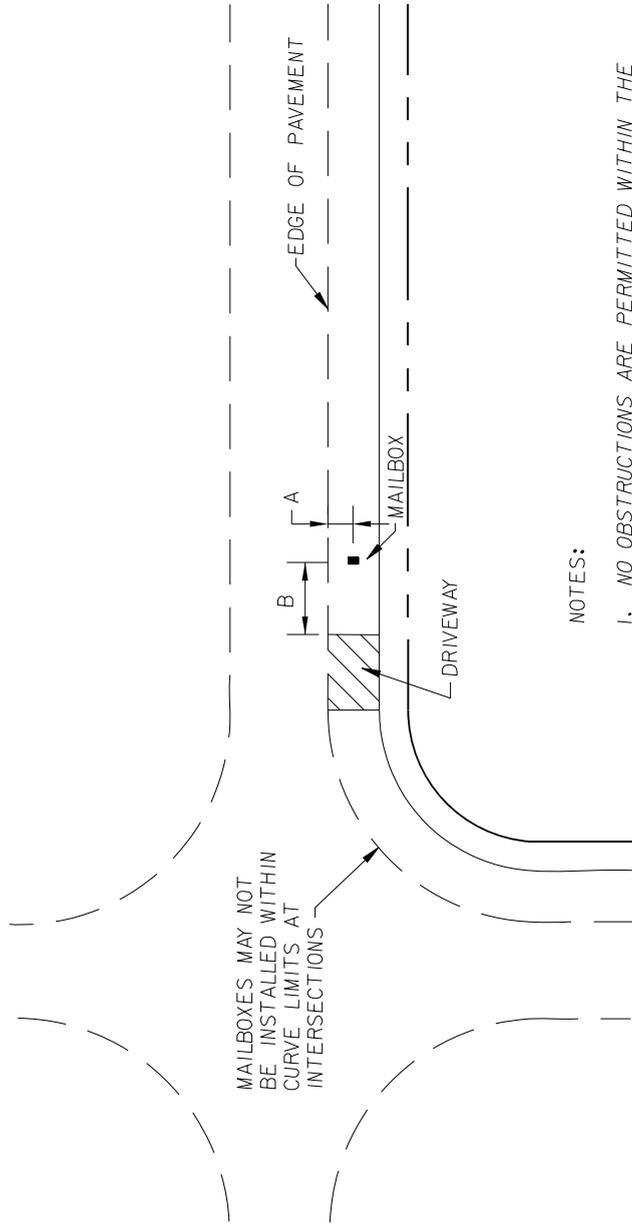


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**DUMPSTER ENCLOSURE
TWO CUBIC YARD LOAD**



NOTES:

1. NO OBSTRUCTIONS ARE PERMITTED WITHIN THE RIGHT OF WAY THAT WOULD PRECLUDE A MAIL CARRIER FROM PULLING OFF TRAFFIC LANES OF PAVEMENT TO MAKE DOOR DELIVERIES.
2. THE MAILBOX SHOULD BE SET 3-1/2' TO 4' ABOVE THE ROADWAY.
3. THE MAILBOX MUST BE LOCATED SO THAT THE MAIL CARRIER DOES NOT HAVE TO LEAVE HIS OR HER VEHICLE IN ORDER TO PLACE MAIL IN BOX.

DIMENSIONS	MAILBOX OFFSET- FEET	
	ARTERIAL	RESIDENTIAL
A	10	3
B	10	10

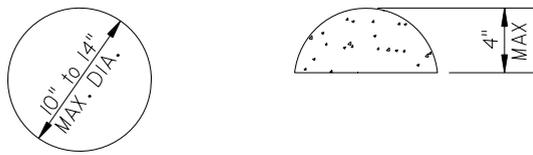
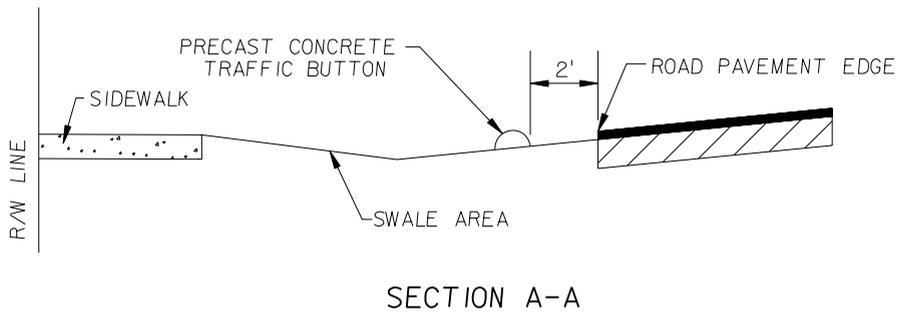
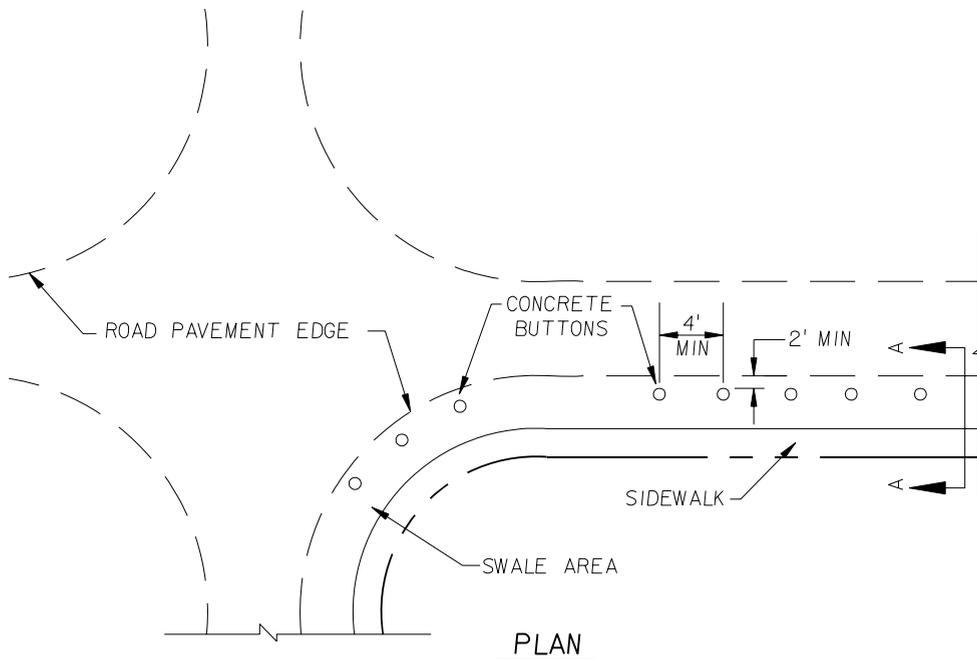


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**LOCATION OF MAILBOXES
WITHIN PUBLIC
RIGHT OF WAY**

FIGURE
15.5



NOTE: NO PYRAMIDS PERMITTED

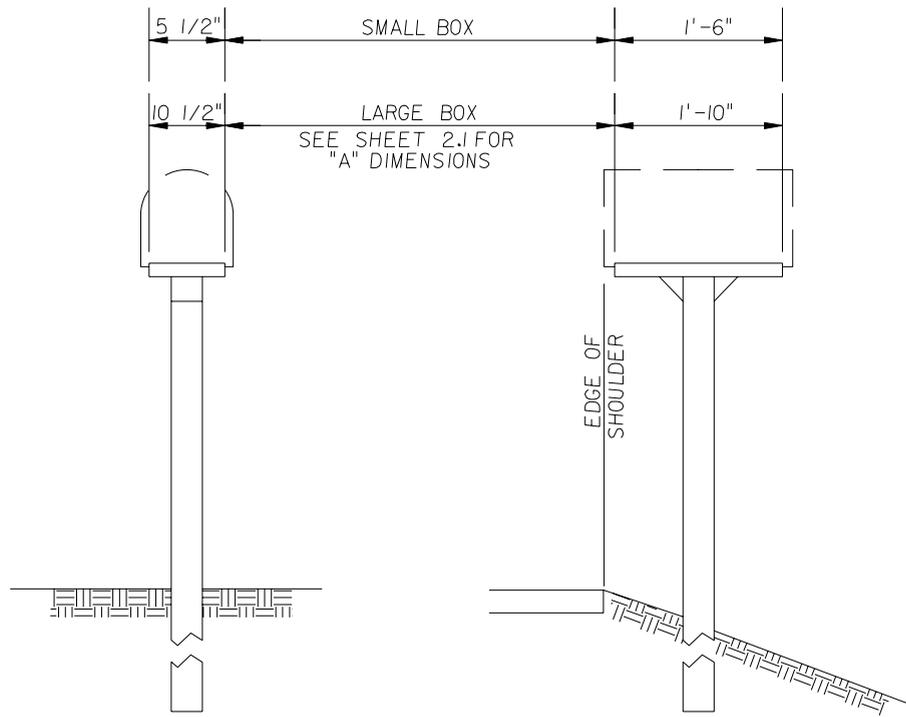


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**LOCATION OF RESIDENTIAL
ROADWAY MARKERS @ FILLETS
(WITHIN PUBLIC R/W)**



TYPICAL MAILBOX LOCATION & MOUNTING HEIGHT

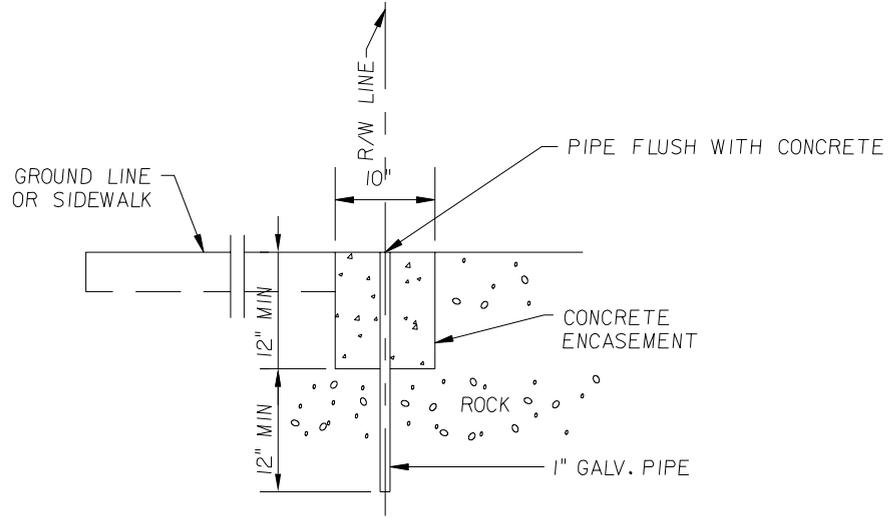


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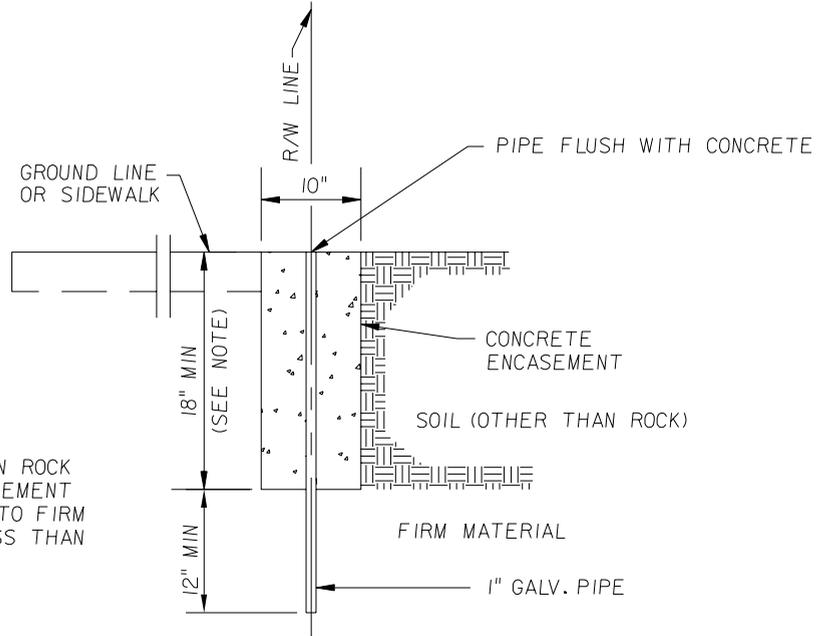
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MAILBOX DETAIL



INSTALLATION
IN ROCK



NOTE:

FOR SOIL OTHER THAN ROCK
THE CONCRETE ENCASEMENT
SHALL BE EXTENDED TO FIRM
MATERIAL BUT NO LESS THAN
18 INCHES.

INSTALLATION IN SOIL
(OTHER THAN ROCK)

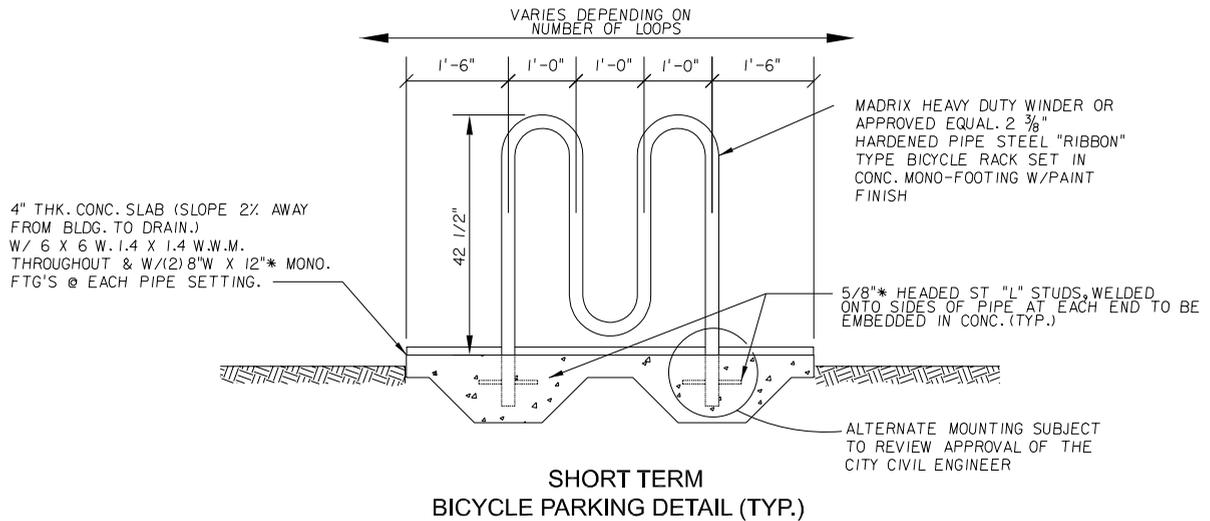
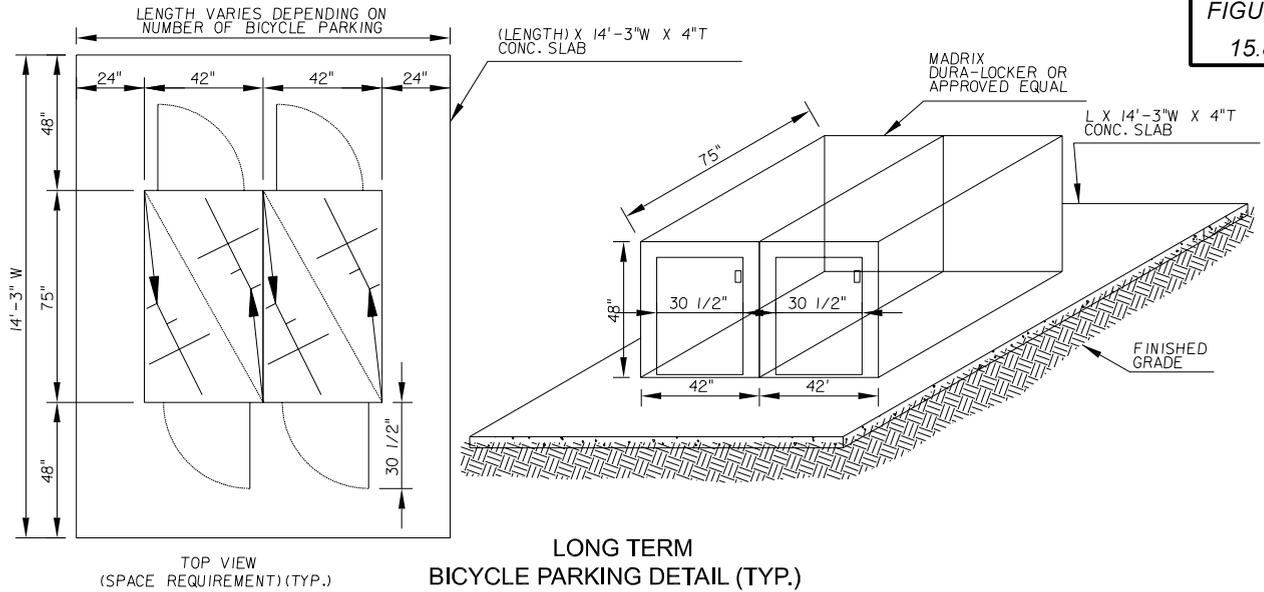


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**PERMANENT REFERENCE
MONUMENT**



NOTES:

- (A) ALL SHORT TERM BICYCLE PARKING SPACES SHALL INCLUDE A STATIONARY PARKING DEVICE ON A CONCRETE SURFACE WHICH ADEQUATELY SUPPORTS THE BICYCLE AND MUST HOLD AT LEAST 180 DEGREES OF THE WHEEL ARC.
- (B) ALL LONG TERM FACILITIES SHALL CONSIST OF A FULLY ENCLOSED LOCKABLE SPACE ACCESSIBLE ONLY TO OWNER/OPERATOR OF THE BICYCLE, OR ATTENDANT PARKING WITH A CHECK-IN SYSTEM ACCESSIBLE ONLY TO THE ATTENDANT(S), OR A LOCKED ROOM OR OFFICE INSIDE THE BUILDING.
- (C) WHERE NOT SPECIFIED, EITHER SHORT TERM OR LONG TERM PARKING IS PERMISSIBLE.
- (D) EACH SHORT TERM BICYCLE PARKING SPACE SHALL BE A MINIMUM OF TWO FEET WIDE AND
- (E) ALL REQUIRED PARKING FACILITIES SHALL BE FROM SIX FEET LONG, AND SHALL HAVE A MINIMUM OF EIGHT FEET OF OVERHEAD CLEARANCE.
- (F) FIXED OBJECTS WHICH ARE INTENDED TO SERVE AS BICYCLE PARKING FACILITIES SHALL BE CLEARLY LABELED AS AVAILABLE BICYCLE PARKING.
- (G) BICYCLE PARKING SHALL BE CONSISTENT WITH SURROUNDINGS IN COLOR AND DESIGN AND BE INCORPORATED WHENEVER POSSIBLE INTO BUILDING OR STREET FURNITURE DESIGN.
- (H) BICYCLE PARKING SHALL BE LOCATED AS NEAR THE PRINCIPAL ENTRANCE OF THE BUILDING AS PRACTICABLE.
- (I) BICYCLE PARKING SHALL BE LOCATED IN A CONVENIENT, HIGHLY VISIBLE, ACTIVE, WELL LIGHTED AREA.
- (J) BICYCLE PARKING SHALL BE LOCATED SO AS NOT TO IMPEDE PEDESTRIAN MOVEMENT.



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BICYCLE PARKING DETAIL (TYP.)

MINIMUM STANDARDS FOR TURNING RADII
FOR ON SITE DRIVES & PARKING FACILITIES

TYPE OF VEHICLE	INTERIOR RADIUS MIN.	EXTERIOR RADIUS MIN.
PASSENGER CAR	15'-6"	24'
TRUCK OR BUS	28'-6"	42'
SEMI-TRAILER	20'	40'

PUBLIC ROADS
MINIMUM STANDARDS
ROAD FILLET RADII

TYPE OF INTERSECTION	MIN. RADIUS	REMARKS
2 LANE MINOR-2 LANE MINOR	30*	ASSUMES 90° INTERSECTION MINIMUM 75°
2 LANE MINOR- 2 LANE COLLECTOR	30*	
2 LANE COLLECTOR 2 LANE COLLECTOR	30*	ASSUMES 90° INTERSECTION ANY VARIABLE FROM 90°- REQUIRES APPROVAL OF THE CITY ENGINEER.
2 LANE COLLECTOR 4 LANE ARTERIAL	40*	
4 LANE SECONDARY 4 LANE ARTERIAL	40*	
CUL-DE-SAC	42	84' DIA-FULL PAVEMENT

* NOTE:

FLUSH HEADER CURB SHALL BE PROVIDED AT ALL FILLET RADII
FROM POINT OF CURVE TO POINT OF TANGENCY +2.0 EACH END.

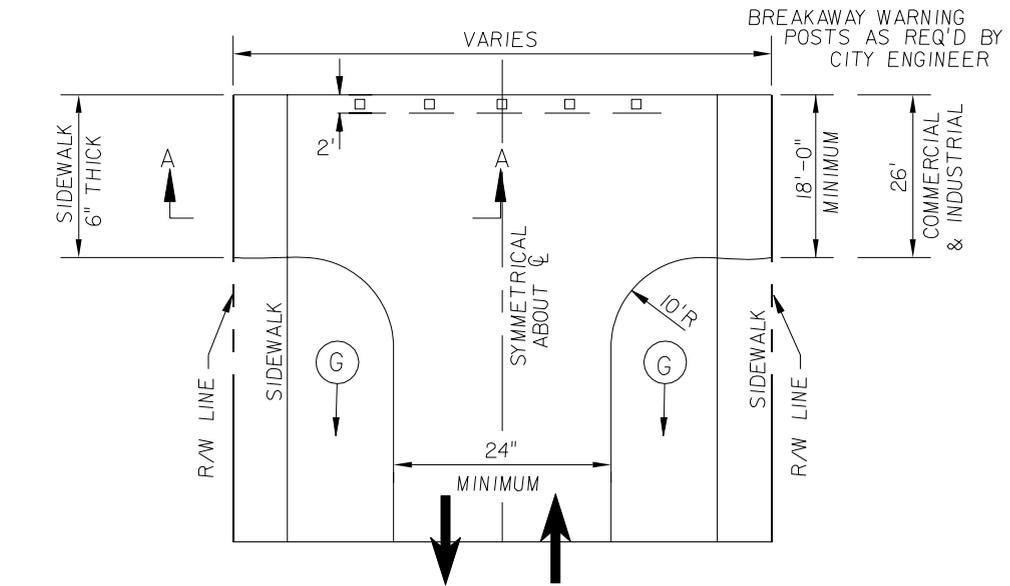


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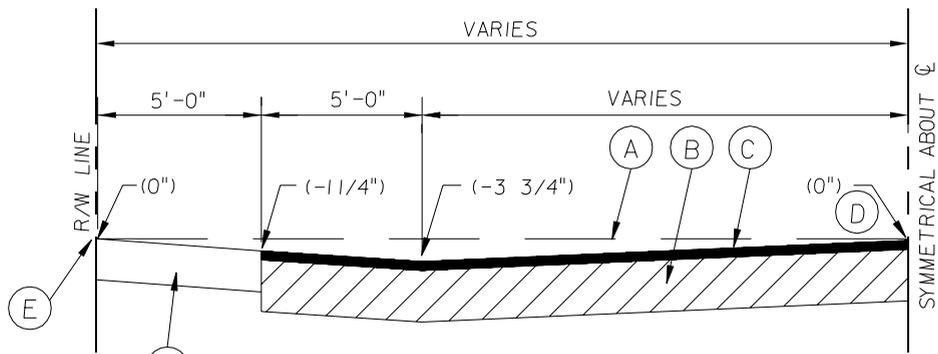
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TURNING RADIUS
STANDARDS



PLAN VIEW



SECTION A-A

- (A) LEVEL LINE
- (B) BASE COURSE, PRIMED ENTIRE WIDTH, 8" LIMEROCK
- (C) ASPHALTIC CONCRETE SURFACE COURSE 1" THICK, TYPE S-I
- (D) OFFSET FROM LEVEL LINE
- (E) RIGHT OF WAY LINE AT OR ABOVE FLOOD CRITERIA
- (F) CONCRETE SIDEWALK WHERE REQUIRED. (STD 7.1)
- (G) PROVISIONS FOR DRAINAGE MAY BE REQUIRED

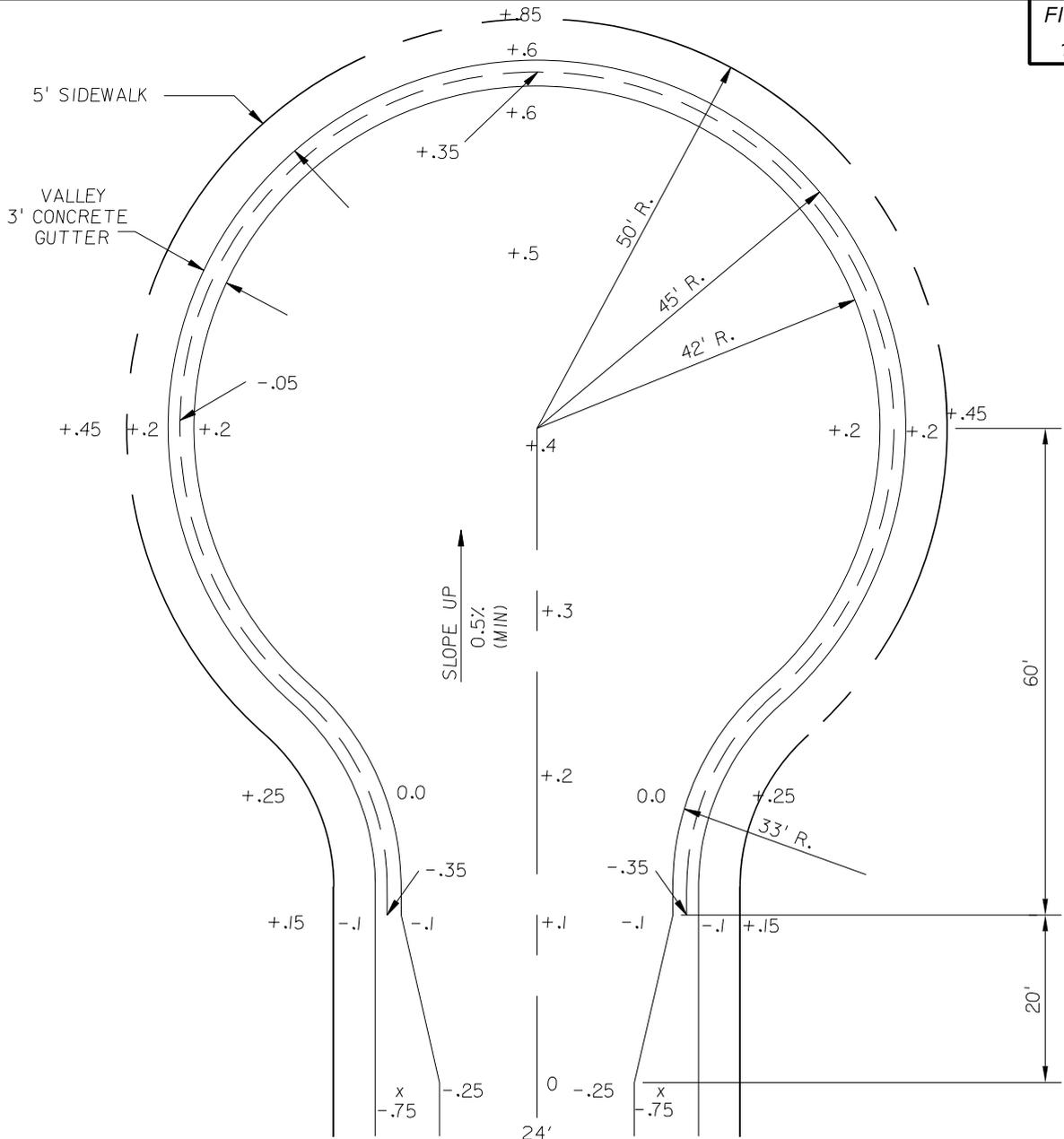


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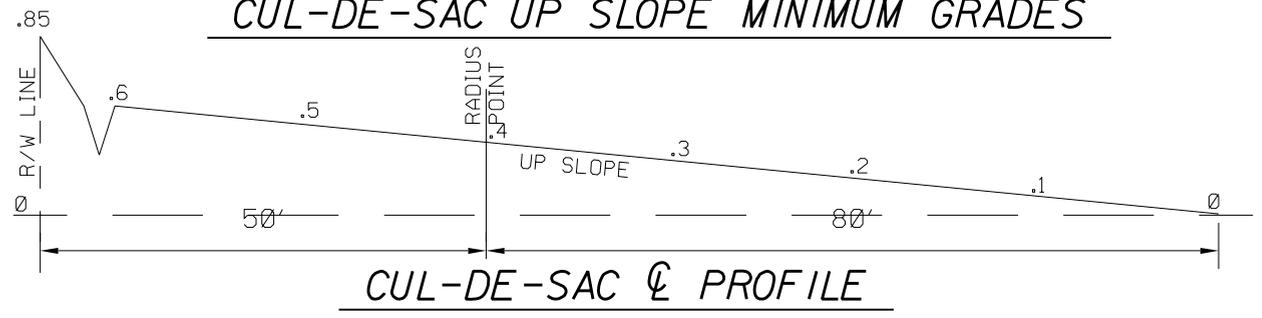
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T - TURNAROUND

FIGURE
15.11



CUL-DE-SAC UP SLOPE MINIMUM GRADES

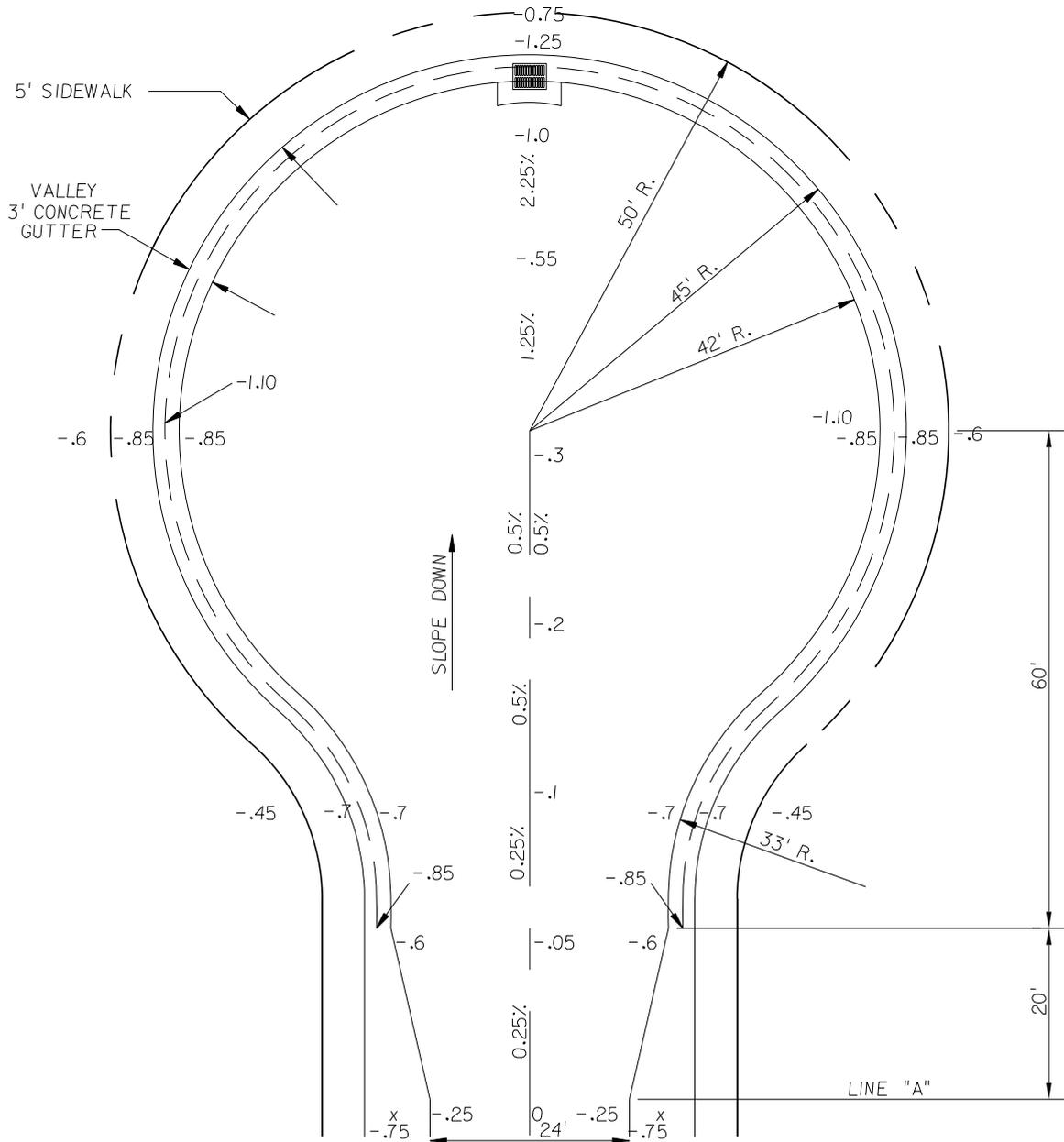


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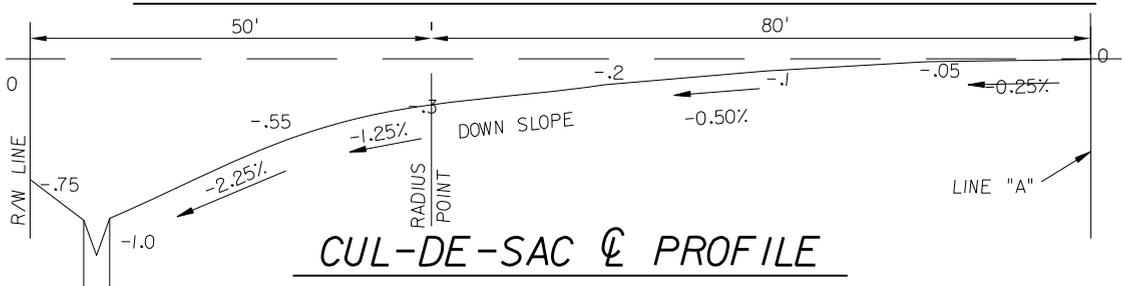
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**CUL-DE-SAC
50' R/W (100' DIA)
WITH MOUNTABLE GUTTER**

FIGURE
15.12



CUL-DE-SAC DOWN SLOPE MINIMUM GRADES



CUL-DE-SAC @ PROFILE



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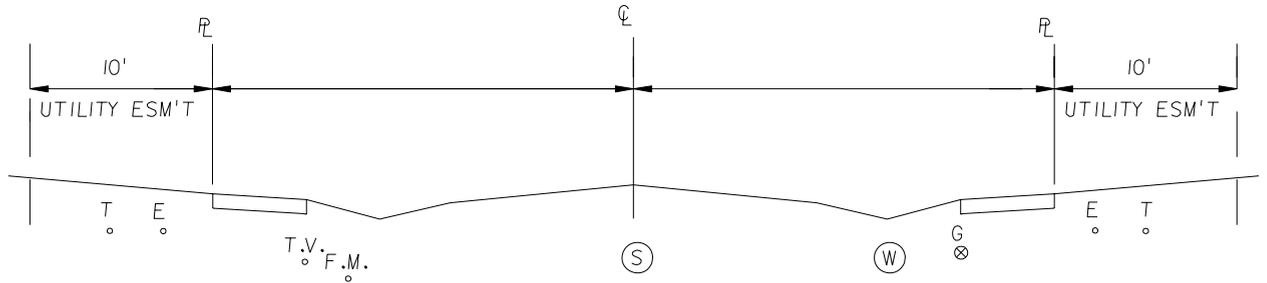
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**CUL-DE-SAC
50' R/W (100' DIA)
WITH MOUNTABLE GUTTER**

16.0 Location of Utilities within City Streets and Roads

The City of Boca Raton has a long established guideline for the general location of water, sanitary sewer, telephone, cable, electric and gas lines. Refer to the following sketch of those locations.

FIGURE
16.1



UTILITY LOCATIONS IN R/W

UTILITY	SIDE OF STREET	DIST. TO PL	COVER & REMARKS	UTILITIES MANUAL
B.R. WATER MAINS	E & S	9'	3'	W.S. I
B.R. SEWER MAINS	C	VARIES	3' MIN.	W.S.I S.S.3
B.R. FORCE MAINS	N & W	7'	30"	W.S. I
B.R. 2" WATER SERVICE	TO W & N		2' MIN.	W
B.R. SEWER LATERAL	C TO PL BOTH SIDES	P	30" MIN 36" MAX.	S.S II
B.R. FIRE HYDRANT	ALL	5'	3'	W.3
UNDERGROUND TELEPHONE	E & S	-7'	30" IN 10' ESMT.	
UNDERGROUND ELECTRIC	N & W	-3'	30" IN 10' ESMT.	
OVERHEAD TELEPHONE	N & W	0 TO 1'	ON ELECTRIC	
OVERHEAD ELECTRIC	N & W	0 TO 1'	BACK OF SIDEWALK	
OVERHEAD TELEPHONE	E & S	0 TO 1'	ON TELE. POLES	
CABLE TV IN R/W	N & W	5'	18" MIN.	
GAS IN R/W	E & S	5'	24' MIN.	
CABLE TV	IN 10' UTIL. ESMT.	-5'	18" MIN. & MAX.	
GAS MAX. 2" LINE	IN 10' UTIL. ESMT.	-1.5'	24" MIN. & MAX.	

NOTE: 1. SEE DETAIL 9.4 FOR LOCATION WITHIN REAR LOT EASEMENTS.
2. BR = CITY OF BOCA RATON.



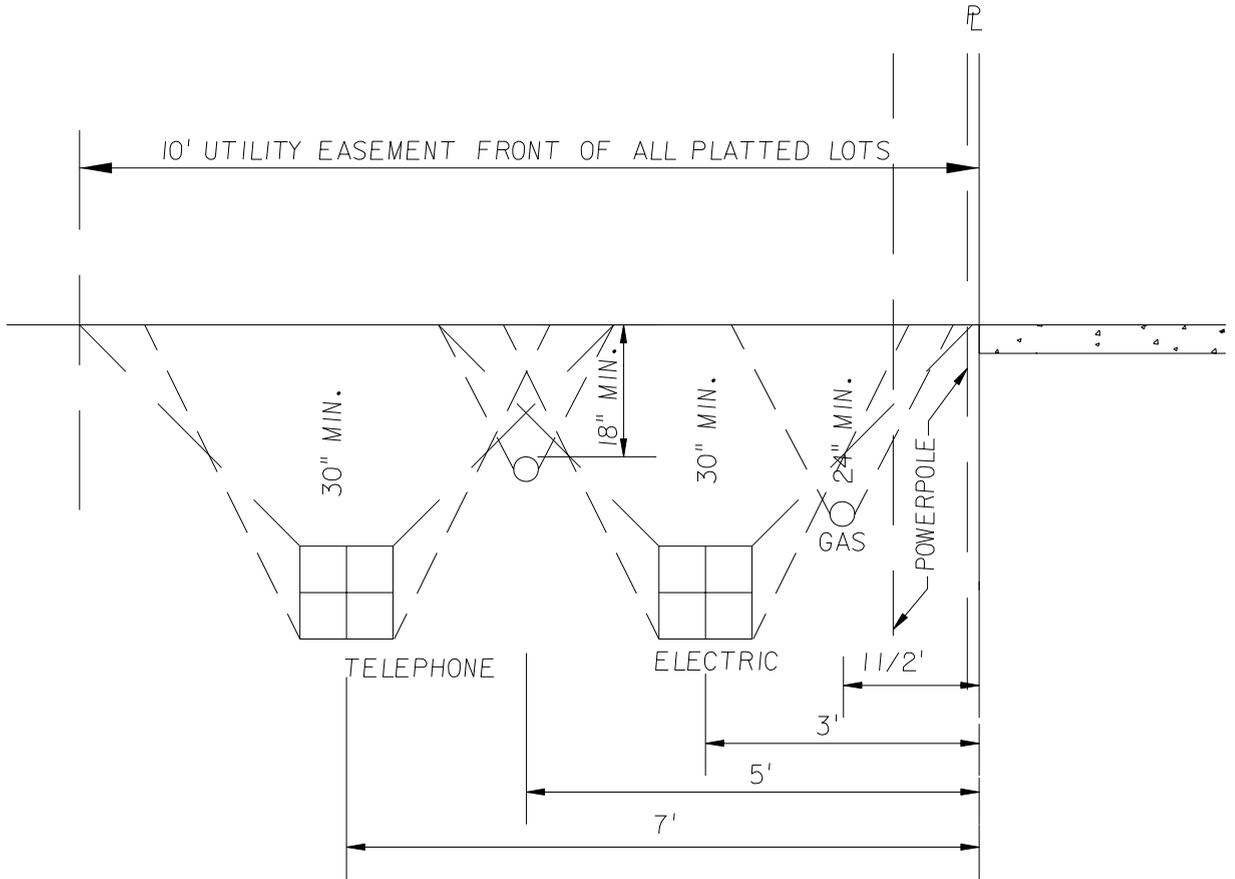
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**UTILITY LOCATION
IN RW AND EASEMENT**

FIGURE
16.2



--- = 1 HOR. 2 VERT. (1/2 /1)
 ——— = 1 HOR. 1 VERT. (1/1)



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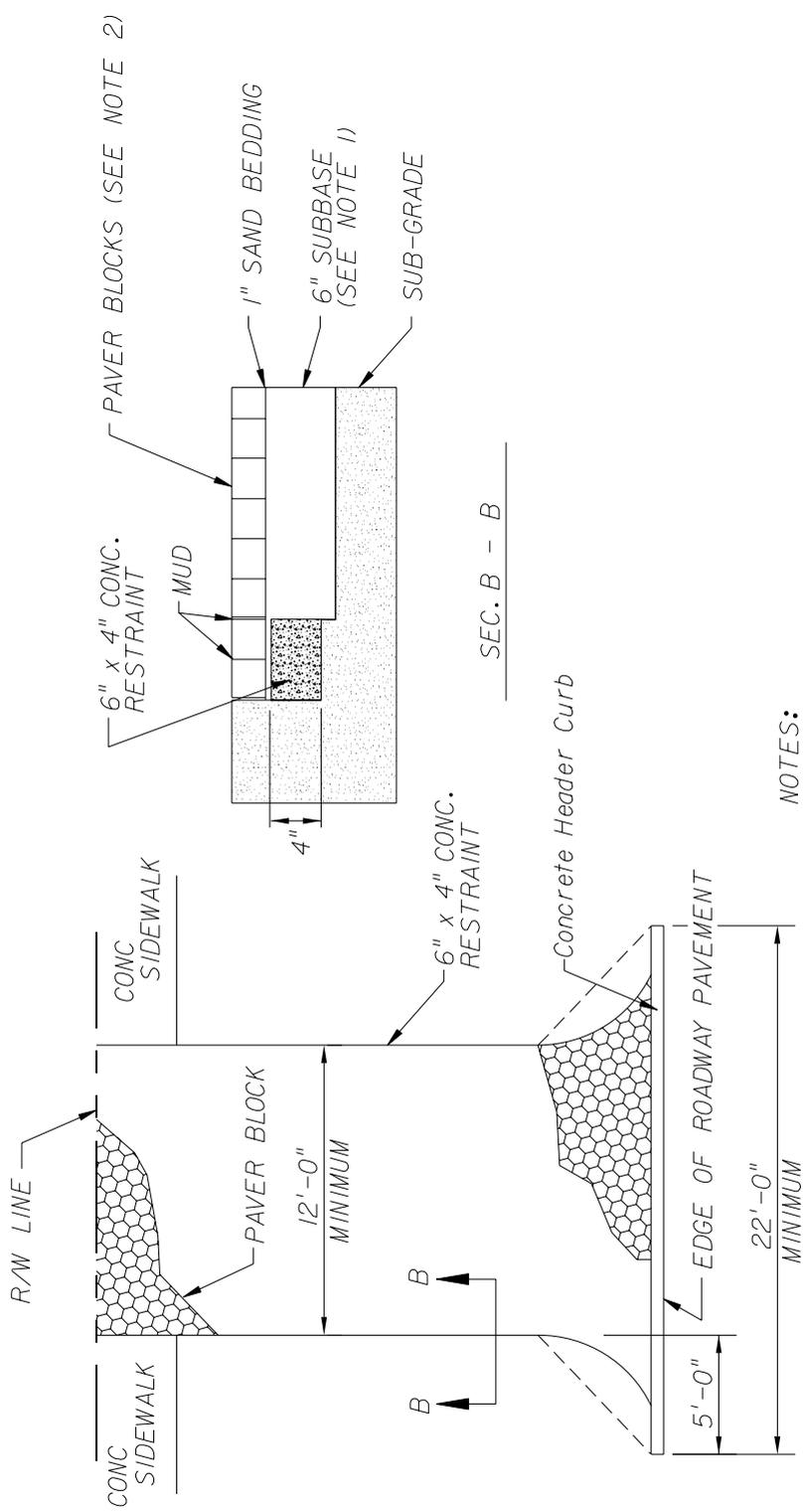
**UTILITY PLACEMENT
 IN 10' EASEMENT**

17.0 Driveways

Reference is made to driveways and turnouts shown in Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, latest edition, The Florida Department of Transportation.

Supplemental details and city requirements are shown in the following details.

FIGURE 17.1



NOTES:

- 1 - 6" COMPACTED LIME ROCK
- 2 - ALL SOLID CONCRETE PAVING UNITS MUST COMPLY WITH ASTM DESIGNATION C936-82, WITH A MINIMUM CONCRETE COMPRESSIVE STRENGTH OF 8000 PSI.

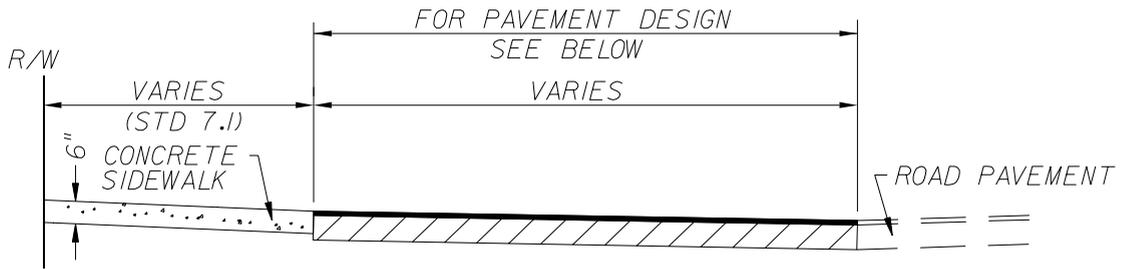
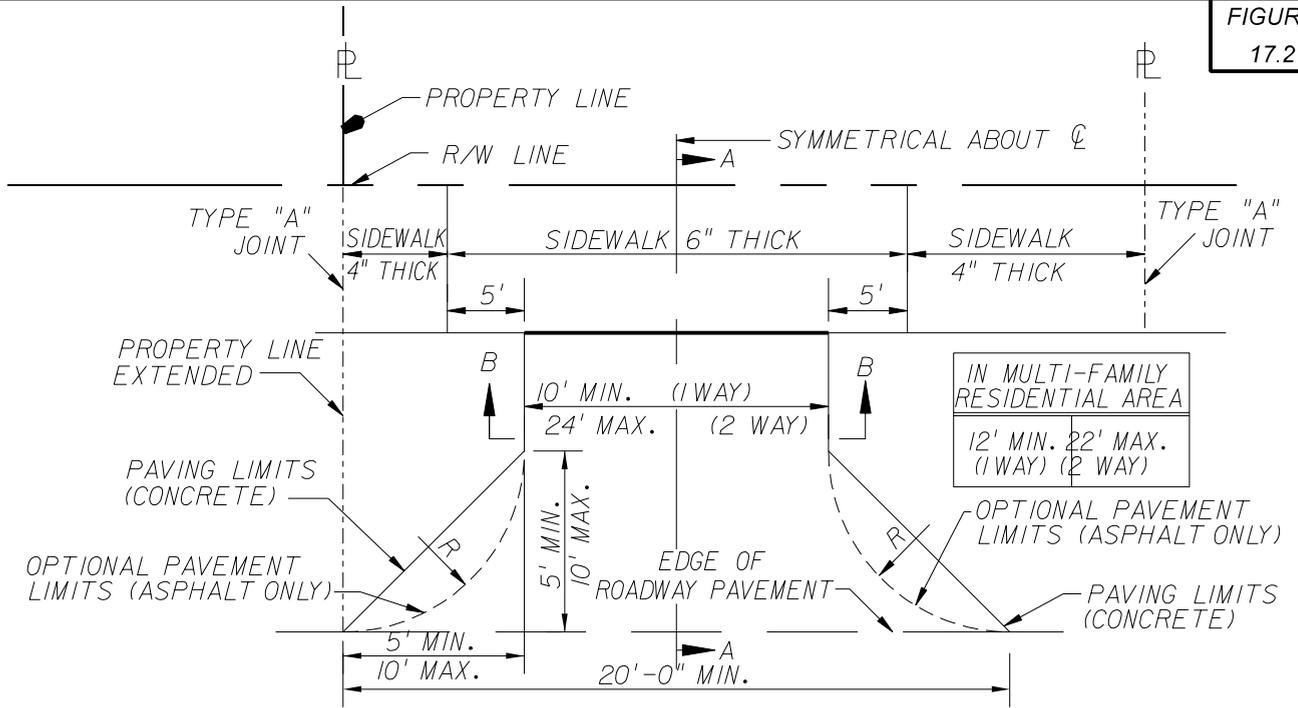


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**PAVER BLOCK DRIVEWAY
 (RESIDENTIAL)**

FIGURE
17.2



SECTION A-A



SECTION B-B

PAVEMENT DESIGN

BASE COURSE 6" THICK WITH ASPHALTIC CONCRETE SURFACE
 COURSE 1" THICK OR CONCRETE (2800 PSI MIN) 6" THICK
 ON COMPACTED SUBGRADE (LBR 20).



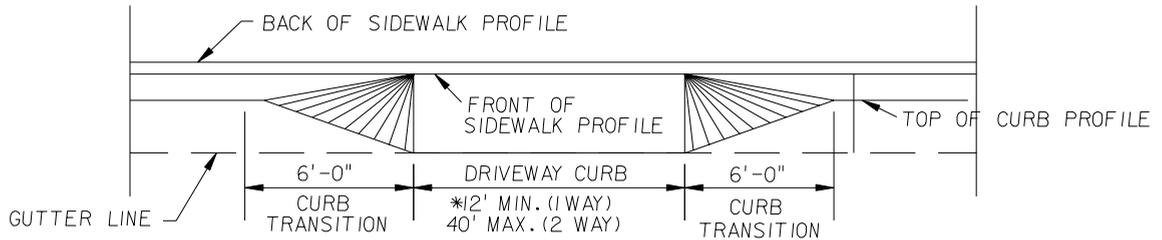
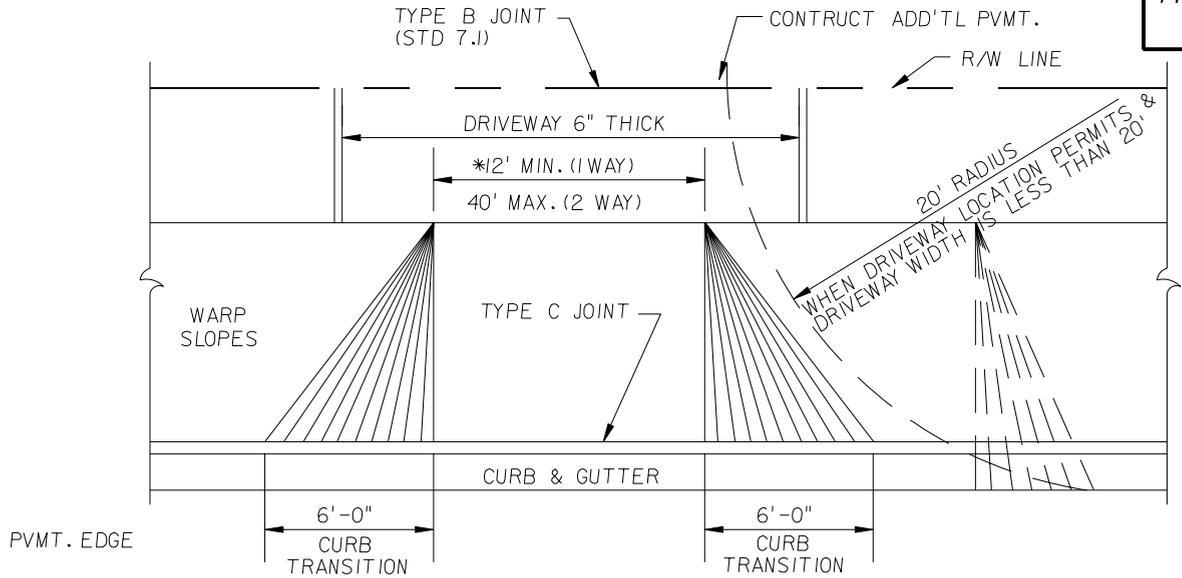
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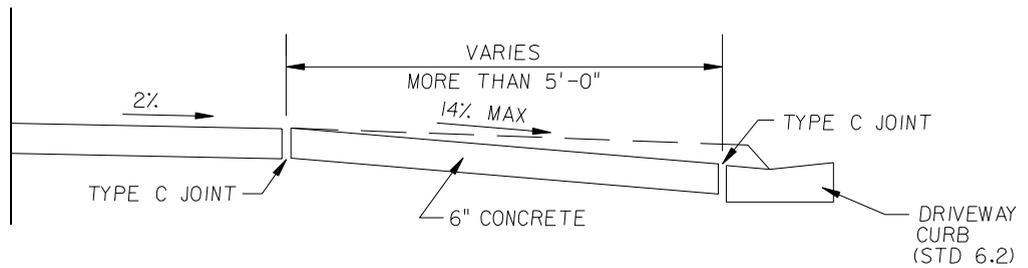
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**DRIVEWAY
 RESIDENTIAL**

FIGURE 17.3



* 10' MIN. MAY BE USED FOR SINGLE FAMILY RESIDENTIAL AREAS



FOR WIDTHS BETWEEN 40' & 60' SEE R 12.2

NOTE:

1. SPACE JOINTS IN ACCORDANCE SIDEWALK JOINT DETAIL.
2. WARP SLOPES TO MEET ADA REQUIREMENTS.

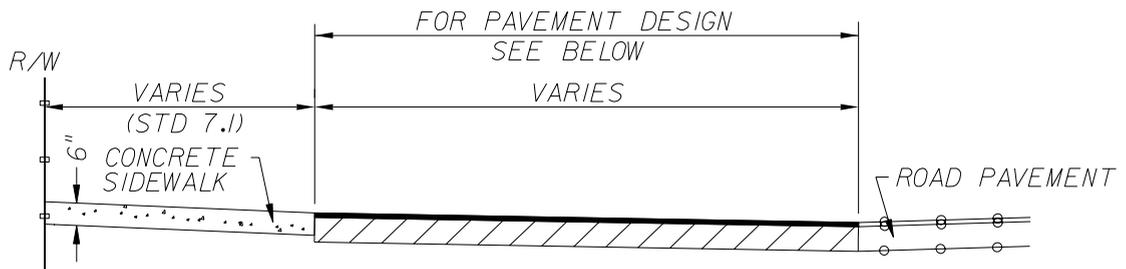
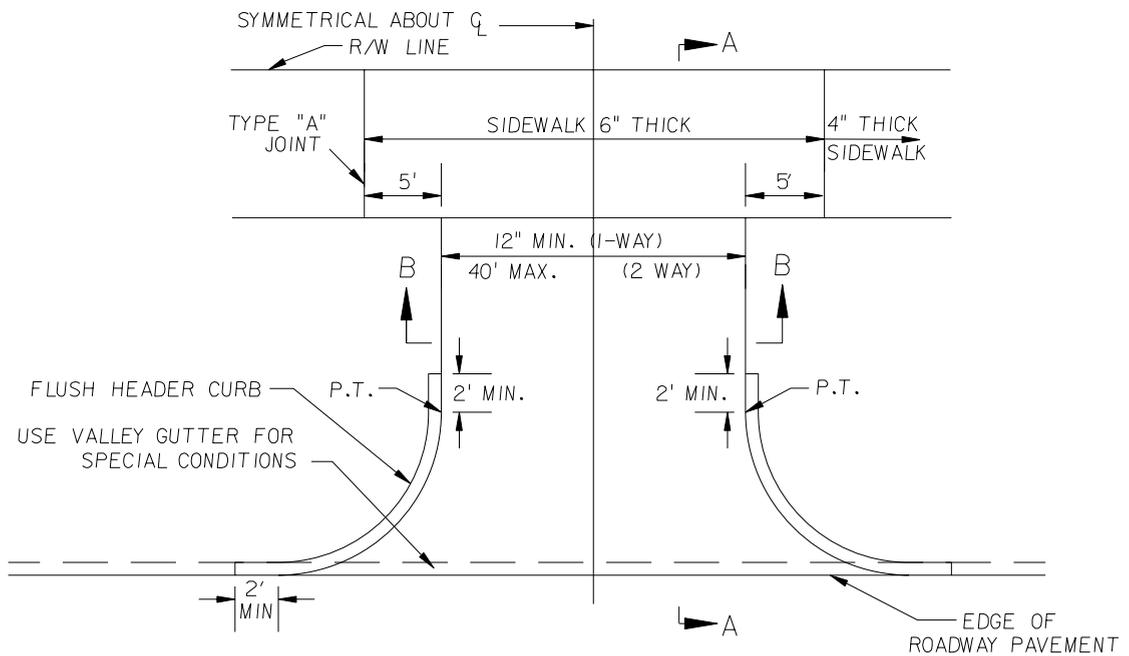


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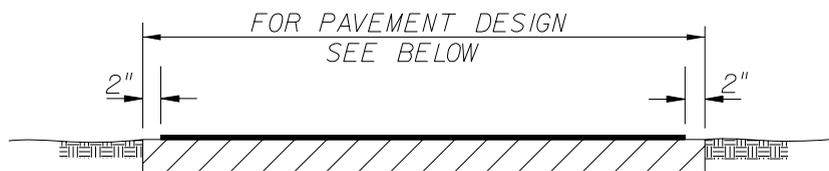
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**CONCRETE DRIVEWAY
 FLARED APRON**



SECTION A-A



SECTION B-B

PAVEMENT DESIGN

BASE COURSE 8" THICK WITH ASPHALTIC CONCRETE SURFACE
 COURSE 1 1/2" THICK OR CONCRETE (2800 PSI MIN) 6" THICK
 ON COMPACTED SUBGRADE (LBR 20).



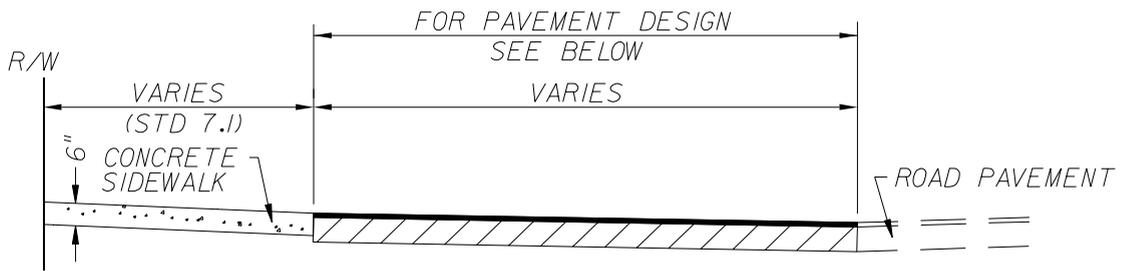
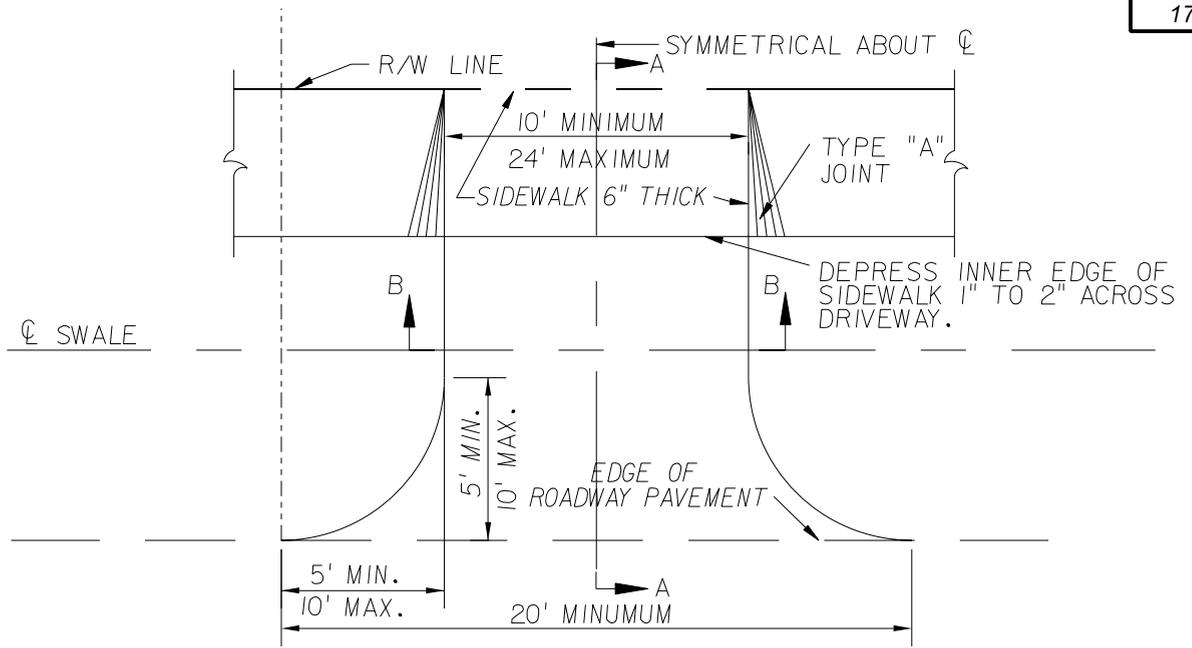
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**ASPHALT DRIVEWAY
 COMMERCIAL**

FIGURE
17.5



SECTION A-A



SECTION B-B

PAVEMENT DESIGN

BASE COURSE 6" THICK WITH ASPHALTIC CONCRETE SURFACE
 COURSE 1" THICK OR CONCRETE (2800 PSI MIN) 6" THICK
 ON COMPACTED SUBGRADE (LBR 20).

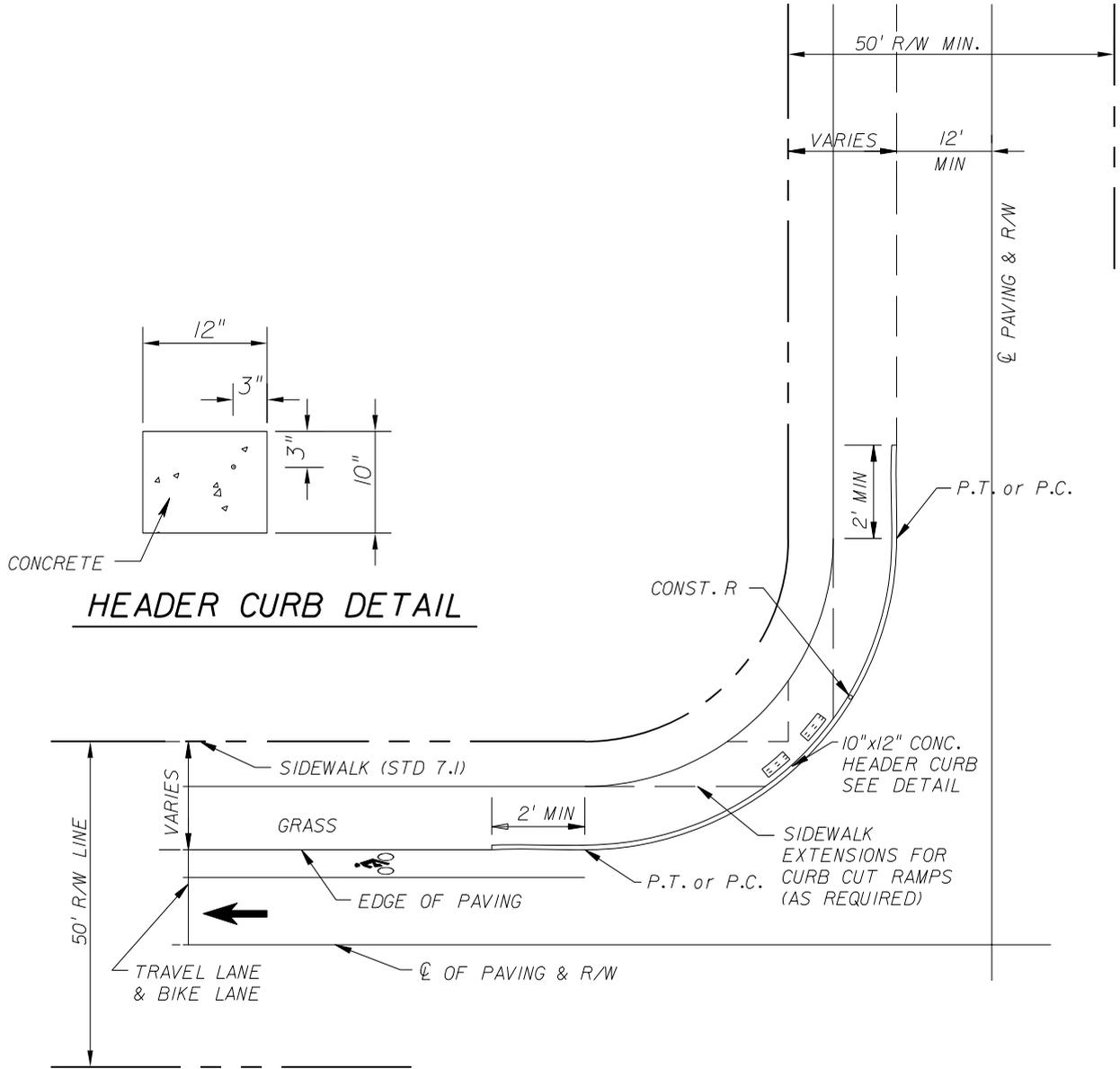


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**ASPHALT DRIVEWAY AND
 DEPRESSED SIDEWALK RESIDENTIAL
 R/W WIDTH OVER 60'**



CORNER LAYOUT
ALL SUBDIVISIONS
NEW OR CORRECTIVE
MEASURE FOR EXISTING
CONDITIONS



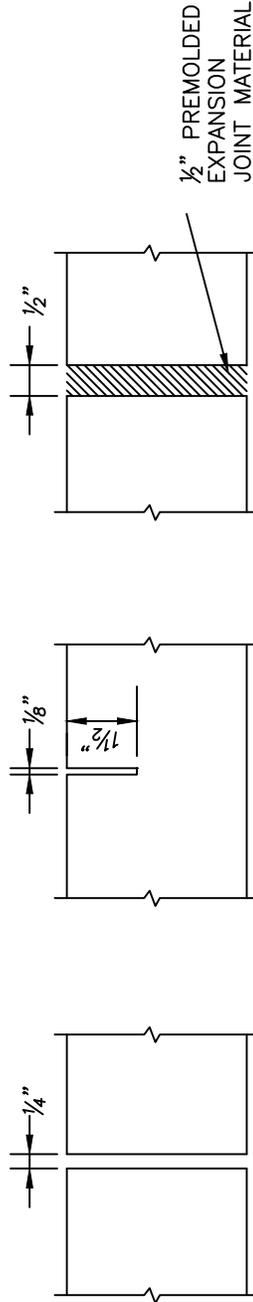
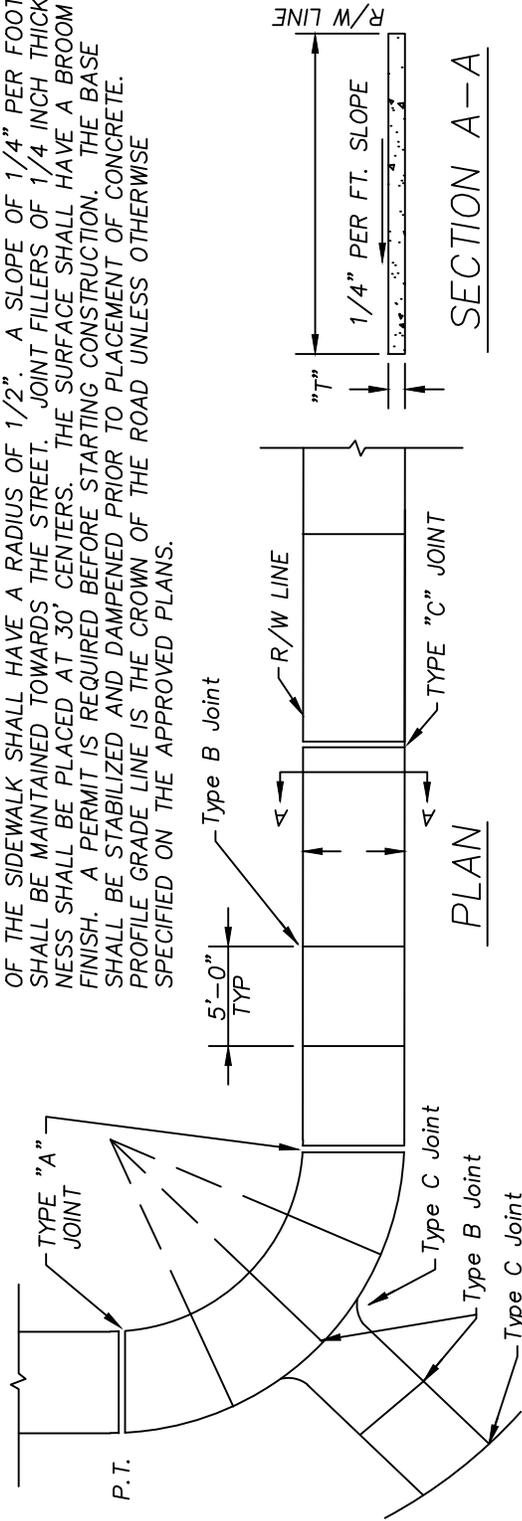
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HEADER CURB DETAILS

CONCRETE SHALL HAVE 28 DAYS COMPRESSIVE STRENGTH OF 2500 P.S.I. ALL WALKS SHALL BE MARKED IN SECTIONS NOT TO EXCEED FIVE FEET. THE EDGE OF THE SIDEWALK SHALL HAVE A RADIUS OF 1/2". A SLOPE OF 1/4" PER FOOT SHALL BE MAINTAINED TOWARDS THE STREET. JOINT FILLERS OF 1/4 INCH THICKNESS SHALL BE PLACED AT 30' CENTERS. THE SURFACE SHALL HAVE A BROOM FINISH. A PERMIT IS REQUIRED BEFORE STARTING CONSTRUCTION. THE BASE SHALL BE STABILIZED AND DAMPENED PRIOR TO PLACEMENT OF CONCRETE. PROFILE GRADE LINE IS THE CROWN OF THE ROAD UNLESS OTHERWISE SPECIFIED ON THE APPROVED PLANS.



SIDEWALK JOINTS

TABLE OF SIDEWALK JOINTS	
TYPE	LOCATION
"A"	P.C. AND P.T. OF CURVES JUNCTION OF EXISTING AND OF NEW SIDEWALK.
"B"	5'-0" CENTER TO CENTER ON SIDEWALK.
"C"	WHERE SIDEWALK ABUTS CONCRETE CURBS, DRIVEWAYS, AND SIMILAR STRUCTURES.

TABLE OF SIDEWALK THICKNESS — "T"	
LOCATION	"T"
OTHER	4"
AT DRIVEWAYS & 5' EITHER SIDE & AT SIDEWALK LEADS	6"



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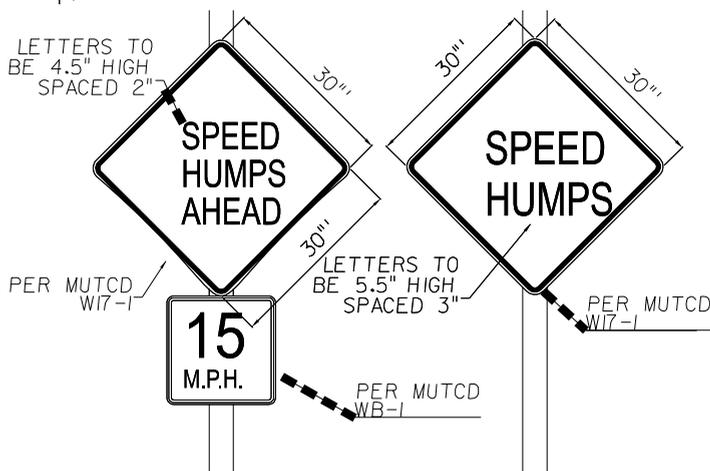
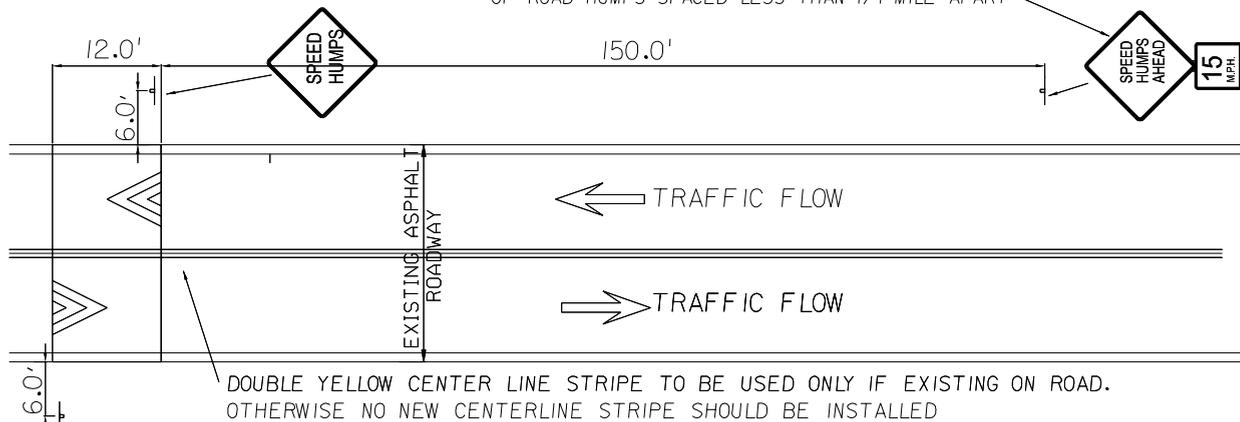
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SIDEWALK
CONSTRUCTION

18.0 Traffic Calming

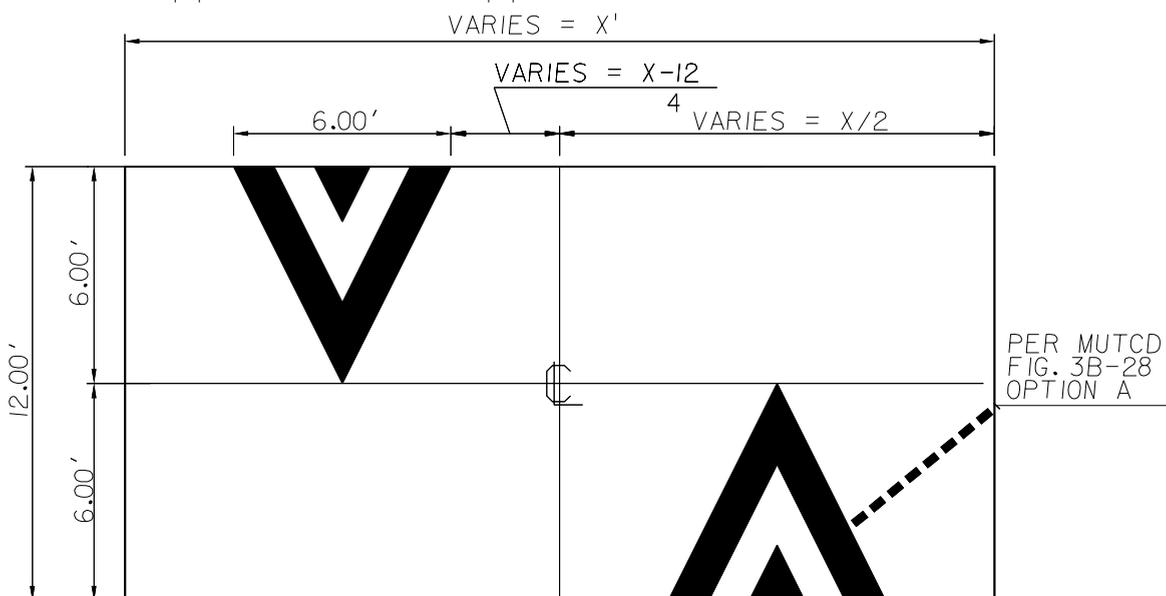
Traffic Calming in the City of Boca Raton is defined by the Traffic Calming Policy which is available online at <http://www.bocatraffic.org/> . This Traffic Calming Policy reflects the continued commitment of the City of Boca Raton to address a wide range of community goals and objectives, which include transportation mobility, efficiency and safety. While our community strives to be more sustainable and livable, a comprehensive traffic calming program will help harmonize transportation mobility with other community values. This Traffic Calming Policy also helps further the goals of the City's Comprehensive Plan, create a safer community, promote alternative modes of transportation, enhance the street environment and improve the overall quality of life.

ONE ADVANCED SIGN REQUIRED AT THE APPROACH TO A SERIES OF ROAD HUMPS SPACED LESS THAN 1/4 MILE APART



WARNING SIGN BLACK LETTERS 5" SERIES ON YELLOW BACKGROUND 1" BLACK BORDER.

NOTE:
WARNING FLAGS ON SIGNS SHALL BE USED FOR THE FIRST WEEK OF A NEW SPEED HUMP INSTALLED. ALL SIGNS AND ANY TEMPORARY MARKINGS SHALL BE INSTALLED ON THE SAME DAY AS THE SPEED HUMP. SIGNS MAY BE INSTALLED EARLIER AND COVERED IF NEEDED.

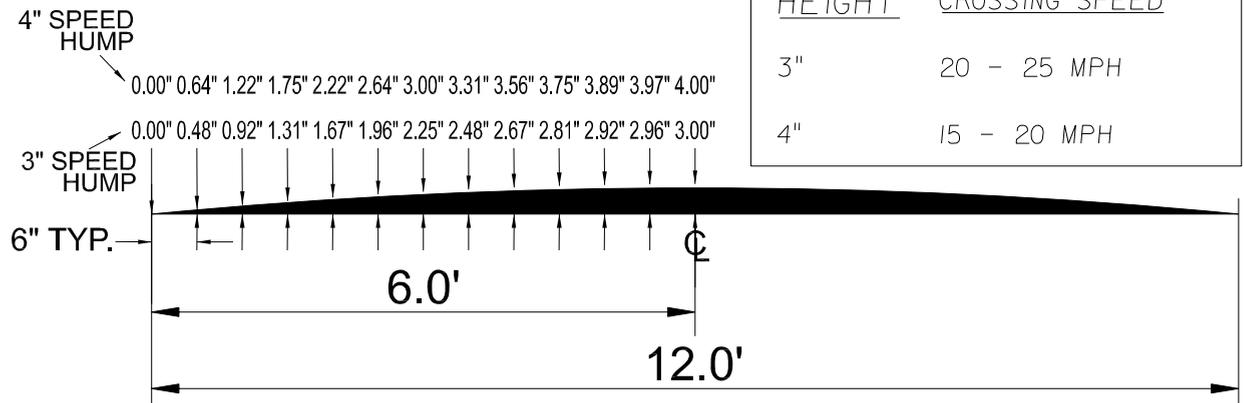


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**SPEED HUMP STANDARD
SIGNING AND PAVEMENT
MARKING DETAIL**

WATTS PROFILE I.T.E. SPEED HUMP



NOTES:

COORDINATION WITH STREET GEOMETRY

A THOROUGH ON-SITE ANALYSIS OF ROADWAY GEOMETRICS SHOULD BE PERFORMED TO ENSURE THAT SPEEDS HUMPS WILL NOT BE INTRODUCED AT A CRITICAL POINT IN THE ROADWAY SYSTEM. E.G., A SEVERE COMBINATION OF HORIZONTAL VERTICAL CURVATURE AND/OR STREET GRADIENTS.

COORDINATION WITH TRAFFIC OPERATIONS

SPEED HUMPS SHOULD NOT BE INSTALLED WITHIN 250 FT. OF A TRAFFIC SIGNAL OR WITHIN AN INTERSECTION OR DRIVEWAY. THIS SUGGESTION IS NOT INTENDED TO APPLY TO THE USE OF A RAISED INTERSECTION AS A VALID TRAFFIC MANAGEMENT TECHNIQUE.

COORDINATION WITH TRAFFIC CONTROL

TEMPORARY PAVEMENT MARKINGS SHALL BE INSTALLED ON THE SAME DAY AS SPEED HUMPS UNTIL PERMANENT MARKINGS ARE USED. ALL SIGNAGE ASSOCIATED WITH SPEED HUMPS SHALL BE INSTALLED ON THE SAME DAY AS THE SPEED HUMPS, OR IF THE SIGNAGE IS INSTALLED EARLIER, IT IS TO BE COVERED WITH BAGS AND THE BAGS SHALL BE REMOVED THE SAME DAY THE HUMPS ARE INSTALLED.

PLACEMENT

4 INCH SPEED HUMPS SHALL NORMALLY BE PLACED ON LOCAL RESIDENTIAL STREETS. 3 INCH SPEED HUMPS MAY BE USED ON 2- LANE COLLECTOR ROADWAYS WITH DAILY VOLUMES THAT EXCEED 3000 ADT.

CONSTRUCTION PROCEDURES

A TEMPLATE SHALL BE CONSTRUCTED TO VERIFY THE ACCURACY OF THE HUMPS PROFILE AND TO ENSURE THAT THE DESIRED VERTICAL DIMENSIONS ARE ATTAINED WITHIN REASONABLE TOLERANCES (NORMALLY ONE-QUARTER INCH OR LESS, PROVIDED THE HUMPS DOES NOT EXCEED 4 INCHES). IF THE PROFILE IS INCORRECT, HUMPS CHARACTERISTICS WILL BE CHANGED THAT MIGHT IMPACT TRAFFIC SAFETY OR CREATE INEFFECTIVE SPEED CONTROL. IF THE HUMPS IS CONSTRUCTED ON-SITE, IT IS RECOMMENDED THAT THE ROAD SURFACE BE EXCAVATED AT TAPERING EDGES TO PREVENT SPALLING. INSTALLING HUMPS IN TWO LIFTS WILL RESULT IN IMPROVED ACCURACY AND SHAPE CONFORMITY.



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SPEED HUMP STANDARDS

19.0 Roadway Lighting Criteria

Vision is vital to motoring safety, the expeditious movement of traffic and the most efficient use of our roadway and street systems. It is recognized that fixed roadway lighting systems increase night visibility as well as improving safety traffic movement and general use of our roadways.

Average Initial Illumination*

Arterials – 1.5 foot candles

Collectors – 1.0 foot candles

Local Streets – 0.8 foot candles

Alleys – 0.5 foot-candles

Uniformity Ratio – all facilities

6:1 Average to Minimum

10:1 Max to Minimum

*note: Initial Illumination does not account for light depreciation over time.

Light poles shall not be mounted in medians unless protected by barriers that are warranted for other reasons.

Refer to downtown parking standards for light levels in parking structures.

Detailed lighting analysis will be required to verify the above lighting criteria is met.

Coordination of service points, load center design and voltage drop calculations are the responsibility of the Engineer of Record.

Lighting Systems to be constructed, relocated, or maintained by Florida Power and Light Company:

Throughout the city, the City, reimburses FPL to maintain lighting systems per agreement. Layout of all new or relocated lighting systems under this agreement shall be designed according to the design criteria stated above. In addition, the lighting products used (poles, arms, luminaires and lamp wattages) shall meet the approved products list maintained by FPL. For FPL maintained lighting systems, the Engineer of Record is responsible to provide detailed lighting plans to FPL and obtain concurrence from both the City and FPL.