

City of Horseshoe Bay  
Transportation Design Criteria Manual

November 10, 2022

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## I. GENERAL:

This manual provides design criteria for the various streets and roadways within the City of Horseshoe Bay. The criteria described herein are minimum values. The design engineer shall provide higher values where feasible. Exceptions to these criteria shall be approved by the Development Review Committee.

### A. REFERENCE STANDARDS

Street design at a minimum must comply with the American Association of State Highway and Transportation Officials (AASHTO) Manual, A Policy on Geometric Design of Highways and Streets, 2018, the Institute of Transportation Engineers Report, Guidelines for Urban Major Street Design, 1984, and the International Fire Code, 2021.

### B. STREET CLASSIFICATIONS

**Local Street.** The primary function of a local street is to serve abutting land use and traffic within a residential subdivision or low-density area. A local street is not generally continuous through several subdivisions. Local streets are not intended to carry through traffic. On-street parking is generally permitted. Design speed ranges from 25 to 30 mph. Average Daily Traffic (ADT) is generally less than two thousand (2000) vehicle trips daily. Reference Figure 1 – Local Street Section.

**Collector Street.** The primary function of a collector street is to intercept traffic from intersecting local streets and expedite the movement of this traffic in the most direct route to an arterial street or other collector street. On-street parking is generally not permitted. Design speed ranges from 30 to 35 mph. ADT is generally between two thousand (2000) and six thousand (6000) vehicle trips daily. Reference Figure 2 – Collector Street Section.

**Arterial Street.** Arterial streets are designed to carry high volumes of through traffic. Access is usually limited to intersections and major driveways. Arterial streets serve as a link between major activity centers within the urban area. On-street parking is generally not permitted. Design speed ranges from 45 to 50 mph. ADT is greater than 6000 vehicle trips per day. Reference Figure 3 – Arterial Street Section.

## II. STREET DESIGN CRITERIA

### A. INTERSECTIONS

Street must intersect one another at 90-degree angles or as close as possible within a range of 80 to 100 degrees. Offset intersections are encouraged in residential subdivisions. The design of the intersection shall consider the requirements of an accessible route in accordance with the ADA, placement of signal poles, location of curb ramps, and drainage patterns.

### B. SIGHT DISTANCE CRITERIA

Stopping Sight Distance. Intersection design must provide the minimum stopping sight distance so that drivers can see objects in the road or the control device (i.e. signs or signal heads) in advance of completing the required action. The following stopping sight distances shall be used for level terrain without excessive grades. Refer to the latest edition of AASHTO's A Policy on Geometric Design of Highways and Streets to calculate stopping sight distance for steeper grades.

<b>MINIMUM STOPPING SIGHT DISTANCE (feet)</b>					
<b>Design Speed mph</b>	<b>Street Grade in Percent</b>				
	<b>Upgrades</b>		<b>Flat</b>	<b>Down Grades</b>	
	6%	3%	0%	-3%	-6%
30	184	200	200	205	215
35	229	237	250	257	271
40	278	289	305	315	333
45	331	344	360	378	400

Intersection Sight Distance. Intersection sight distance shall be provided at intersections to allow the drivers of stopped vehicles a sufficient view of the intersecting collector, arterial, or highway to decide when to enter or to cross it. Specified areas along intersection approach legs and across their included corners should be clear of obstructions that might block a driver's view of potentially conflicting vehicles. These specified areas are known as clear sight triangles and are illustrated in the standard details section of this manual.

Refer to the latest edition of AASHTO's "A Policy on Geometric Design of Highways and Streets" to determine the intersection sight distance and clear sight triangle requirements for design of new intersections or evaluation of sight distance for existing intersections.

At an intersection of two streets or at the intersection of a driveway and a street, nothing shall be erected, placed, allowed to grow, or planted so that it impedes vision between the height of three feet and ten feet above the curb within a triangle formed by the intersecting streets or street and driveway, and measuring 40 feet along the sides of the triangle that face the intersection. This requirement may provide adequate sight triangle clearances to meet the intersection sight distance criteria and should be provided as a minimum. In situations

where greater sight triangle lengths need to be provided for adequate intersection sight distance, the higher value will govern.

### C. DRIVEWAYS

The design and location of driveways must balance the need for access to and from an abutting property with the safe, efficient flow of traffic on the adjoining street. This section provides both the design criteria for driveways and the access management policy for driveways.

The number, location, or spacing of driveways shall be limited for arterial street classifications to ensure their primary function of mobility. Conversely, the primary function of local streets is to provide access, and therefore driveway spacing is less restrictive.

- i. Type I Driveway. A concrete driveway approach intended to provide vehicular access from a roadway to a lot or parcel of land which is a location for a one- or two-family residence.
- ii. Type II Driveway. A concrete driveway approach intended to provide vehicular access from a roadway to a lot or parcel of land used for any development or purpose other than one- or two-family residences.

<b>TYPE I DRIVEWAY CRITERIA</b>			
	<b>Minimum</b>	<b>Desirable</b>	<b>Maximum</b>
<b>Single Family</b>			
Width <sup>d</sup>	12'	18'	25'
Curb Return Radius	5'	5'	10'
Throat Length <sup>a</sup>	Extended to property ROW line-minimum		
Spacing Between Driveways <sup>b, c</sup>	Limited to one driveway per property (except where a circular driveway or 2 unit driveways are approved)		
Distance from Intersecting Street <sup>e</sup>	50'		
<b>Duplexes and Townhomes</b>			
Width <sup>d</sup>	12'	18'	
Curb Return Radius	5'	5'	
Throat Length <sup>a</sup>	(Extended to property R.O.W line-minimum)		
Spacing Between Driveways <sup>b, c</sup>	35'		--
Distance from Intersecting Street <sup>e</sup>	50'		
a) Distance from street to first conflict point. b) Semicircular driveways acceptable with minimum spacing between driveway entrance and exit of thirty-five feet (35'). (Measured from inside edge to inside edge of driveway approach at the property line). c) When two (2) driveways are used (one (1) per unit; two (2) maximum), single family standards for width and curb return radius shall apply. Distances are measured edge to edge. d) Driveway width is the width of the paved surface exclusive of curb radii or wings. e) Distance from intersection measured edge to edge.			

<b>TYPE II COMMERCIAL DRIVEWAY CRITERIA</b>						
<b>Driveway Type</b>	<b>Roadway Type</b>					
	<b>Local Street</b>		<b>Collector</b>		<b>Arterial</b>	
	<b>Min.</b>	<b>Max.</b>	<b>Min.</b>	<b>Max.</b>	<b>Min.</b>	<b>Max.</b>
<b>ONE WAY</b>						
Width <sup>a,b</sup>	15'	20'	15'	20'	18'	25'
Curb Return Radius <sup>c</sup>	10'	25'	15'	25'	20'	30'
Throat Length <sup>d</sup>	--	--	50'	--	50'	--
Distance Between Entry and Exit Drive	50'	--	50'	--	75'	--
Driveway Spacing <sup>g</sup>	100'	--	200'	--	250'	--
Distance from Intersecting Street <sup>h</sup>	100'	--	200'	--	250'	--
<b>TWO WAY UNDIVIDED</b>						
Width <sup>b</sup>	25'	40'	25'	40'	30'	45'
Curb Return Radius <sup>c</sup>	10'	25'	15'	25'	20'	30'
Throat Length <sup>d</sup>	--	--	50'	--	50'	--
Driveway Spacing <sup>g</sup>	100'	--	200'	--	250'	--
Distance from Intersecting Street <sup>h</sup>	100'	--	200'	--	250'	--
<b>TWO WAY DIVIDED</b>						
Width <sup>a,b,f</sup> (each side of median)	20'	24'	20'	24'	20'	30'
Curb Return Radius <sup>c</sup>	15'	25'	15'	25'	20'	30'
Throat Length <sup>d</sup>	50'	--	50'	--	50'	--
Median Width <sup>e</sup>	4'	15'	4'	15'	4'	15'
Median Length	10'	--	10'	--	20'	--
Driveway Spacing <sup>g</sup>	100'	--	200'	--	250'	--
Distance from Intersecting Street <sup>h</sup>	100'	--	200'	--	250'	--
<p>a) Greater width may be required for Fire Department emergency access.</p> <p>b) Thirty foot (30') minimum width may be required on state highways.</p> <p>c) Radius shall be increased to accommodate appropriate design vehicle using full driveway width. Use WB-62 vehicle unless otherwise approved by the DRC.</p> <p>d) Distance from the ROW to first conflict point. Provide minimum stated herein unless another value is required by the findings of a City-approved TIA.</p> <p>e) Refer to TxDOT Standards for driveways constructed on TxDOT roadways.</p> <p>f) When a divided driveway is the fourth leg of an intersection, a thirty-six foot (36') width may be permitted to match the opposing street configuration.</p> <p>g) Driveway spacing may be reduced as required due to pre-existing use or developmental conditions, as approved by the Transportation Department.</p> <p>h) Distance from intersection measured edge to edge.</p>						

**D. CUL-DE-SAC AND SINGLE OUTLET STREETS**

Cul-de-sac: Cul-de-sac streets serve a network of streets with one (1) point of access. The maximum length shall be seven hundred and fifty (750) feet, measured from the centerline of the nearest intersecting street to the center point of the cul-de-sac. Lengths exceeding seven hundred and fifty (750) feet, will require a recommendation from the City’s Fire Department and approval by the Development Review Committee. Collectors and arterial streets shall not terminate in a cul-de-sac. Dead-end streets that are stubbed out for future extension must terminate in an open-ended cul-de-sac, unless the dead-end street is less than one hundred and fifty (150) feet long, in which case the cul-de-sac bubble may be omitted.

Single Outlet: Single outlet streets shall only be permitted on local streets. For streets greater than 750 feet in length mid-block turnarounds (or cross-streets/loop streets), increased pavement widths, and utilization of divided roadways will be required.

<b>CUL-DE-SAC AND SINGLE OUTLET STREET CRITERIA</b>		
Maximum ADT	Less than 300	
Street Width	30 feet	
Maximum throat Length	750 feet	
Design Speed	20 mph	
Maximum ADT	1,000 – 2,500	
Street Width	36 feet	
Maximum throat Length	1,200 feet*	1,800 feet*
Design Speed	25 mph	30 mph
Maximum ADT	2,500-4,000	
Street Width	2 – 24 foot lanes with 10 foot median*	
Maximum throat Length	2,000 feet*	
Design Speed	30 mph	
Maximum ADT	Greater than 4,000	
Street Width	TIA required	
*750’ absolute maximum length of street between turn around bubbles or breaks in median		

**E. WATER CROSSINGS**

All water crossings shall be perpendicularly traversed with a culvert or bridge structure designed to pass the fully developed 100-year design storm flow without causing excessive backwater or overtopping of the structure and without creating excessive downstream velocities. Low water crossings will not be permitted.



III. PAVEMENT DESIGN

A. GUIDELINES FOR FLEXIBLE AND RIGID PAVEMENT DESIGN:

General Pavement System Components shall comply with TxDOT standards. Flexible and rigid pavement systems consist of the sequence of material layers (top to bottom) listed in the Typical Pavement System Components Table below.

<b>TYPICAL PAVEMENT SYSTEM COMPONENTS</b>			
<b>Material Layer</b>	<b>Specification</b>	<b>HMAC Pavement</b>	<b>Concrete Pavement</b>
Hot Mix Asphaltic Concrete (HMAC)	TxDOT Item 340/341	X	N/A
Concrete Pavement	TxDOT Item 360	N/A	X
Bond Breaker	TxDOT Item 340/341	N/A	O
Flexible Base	TxDOT Item 247	X	N/A
Treated Base	TxDOT Item 276 (Cement) TxDOT Item 292 (Asphalt)	N/A	X
Treated Subgrade -Lime -Cement -Lime-Cement	TxDOT Item 260 TxDOT Item 275	O	O
Geosynthetics (Geogrid, Tensor® or Better)	TxDOT Item 5001 TxDOT Item DMS 6240	O	O
Native Subgrade: -Proof Rolling -Recompaction (Rolling)	TxDOT Item 216 TxDOT Item 210	X	X
Notes: X = Include O = May be included based on design analysis results and DRC’s approval			

B. PAVEMENT SECTIONS

Depending on site conditions and expected traffic volumes, thicker pavement sections may be required by the design procedures detailed in subsequent paragraphs of this section. Any representative pavement sections included herein do not relieve the Pavement Engineer from the responsibility of designing a cross section that is appropriate for the site-specific soil conditions to meet the required design life of 20 years for flexible pavement or 30 years for rigid pavement. Representative pavement sections are included in Representative Flexible Pavement Sections by Subgrade Type and Street Classification Table.

<b>REPRESENTATIVE FLEXIBLE PAVEMENT SECTIONS BY SUBGRADE TYPE AND STREET CATEGORY</b>				
<b>Street Classification</b>	<b>Existing Subgrade Conditions</b>	<b>Flexible Pavement Layer Thickness</b>		
		<b>HMAC (inches)</b>	<b>Flexible Base (inches)</b>	<b>Treated Subgrade (inches)</b>
Arterial	Very High Swell	RAR	RAR	RAR
	High Swell	8.5	24	12
	Moderate Swell	8.5	23	10
	Low Swell	8.5	22	10
Collector	Very High Swell	RAR	RAR	RAR
	High Swell	6.5	18	12
	Moderate Swell	6	18	10
	Low Swell	6	16	8
Local	Very High Swell	RAR	RAR	RAR
	High Swell	3	14	10
	Moderate Swell	3	10	10
	Low Swell	3	8	8

**Notes:**

1. RAR – Remove and Replace existing subgrade material with suitable non-expansive fill material per the recommendations of the geotechnical engineer.
2. Very High Swell: Subgrade with very high swelling potential, represented by PI > 50. Such cases will likely require deep treatment to reduce PVR to acceptable values.
3. High Swell: Subgrade with high swelling potential, represented by PI = 36 to 49.
4. Moderate Swell: Subgrade with moderate swelling potential, represented by PI = 20 to 35.
5. Low Swell: Subgrade with low swelling potential, represented by PI < 20.
6. The pavement sections in this table should be considered representative for each street classification. Different pavement sections may be required based on the results of a project-specific Pavement Design Report or as directed by the City.
8. All materials shall be in accordance with TxDOT Specifications.
9. Minimum HMAC pavement thickness is 2.5 inches.

#### IV. TRAFFIC IMPACT ANALYSIS (TIA)

##### A. PURPOSE

The City requires a TIA be performed if it is determined that a proposed site development is expected to have an impact on operation of a City street or State road within the City limits. Such studies are necessary to define the possible magnitude of impact(s) of the proposed development on traffic operation of affected streets. The City may require any and all public improvements, or a proportionate share, as recommended by the TIA be implemented to provide accommodation of the traffic generated by the proposed development. These guidelines detail the procedures to be utilized when conducting a TIA for a proposed site development.

These guidelines have been developed to ensure that the TIA will include the necessary information in a format that allows the City to review and make informed comments and decisions in a timely manner.

Before any work is performed on the TIA, it is required that the applicant meet with the DRC to determine the scope of requirements for the TIA. Items to be agreed upon include, but are not limited to: study area and intersections, applicable standards and methodologies, ultimate analysis year, growth rate methodologies, and nearby proposed developments to be analyzed.

##### B. DETERMINING NEED FOR TIA

A Traffic Impact Analysis is conducted to enable the City to identify the potential impacts of a proposed development and determine any roadway improvements necessary to provide an acceptable level of service. The TIA should be conducted during the initial stages of the site development review and approval process to adequately consider the impacts the development will have on the City's transportation network.

Not all developments will have a significant enough impact to require a TIA. The use of engineering judgment is necessary in making this determination and consideration should be given not only to changes in projected traffic volumes but also safety and capacity deficiencies which could impact the highway system. At a minimum, a TIA shall be performed when any of the following conditions are satisfied:

- i. The proposed development is expected to generate 1,000 or more vehicle trips per day (total inbound and outbound development traffic.)
- ii. The proposed development is expected to generate 100 or more vehicle trips during a peak hour of the adjacent roadway.
- iii. Development is 100 acres or larger. This acreage is inclusive of all right-of-ways, reserves, and easements.
- iv. Zoning or rezoning requests.
- v. Amendment to City Thoroughfare Plan.
- vi. When required by the DRC.

To assist City in determining whether a TIA should be performed, the applicant must provide the number of trips generated with each plat and/or site plan for developments that do not have an approved TIA. Trips generated must be calculated using the latest edition of the Institute of Transportation Engineers Trip Generation Manual.

If the development land use is not known at the time of the submittal then the applicant should make an assumption based on the maximum trip generation for the most feasible development of the site. Should this be the case, at a minimum, designer should evaluate the type of land use allowed by the city's zoning ordinance criteria, the maximum amount of developable land including setbacks and other restrictions such as detention, easement, etc., logical assumptions by the designer, and adjacent land uses. If the proposed land use is not listed in the Trip Generation Manual, the City shall require a letter from a Texas registered professional engineer, documenting the type of development proposed and identifying the number of trips generated based on either a trip generation study performed for a similar land use or designer's professional opinion if such report is not available. This letter must be signed and sealed by a registered professional engineer in the State of Texas.

#### C. TIA REPORT REQUIREMENTS

The report shall include, at a minimum, the following information:

- i. Executive summary
- ii. Study purpose and objectives
- iii. Description of the proposed development and study area
- iv. Existing conditions in the development
- v. Recorded or approved nearby development
- vi. Trip generation and trip distribution
- vii. Projected future traffic volumes
- viii. Assessment of the change in roadway operating conditions resulting from the development traffic
- ix. Recommendations for site access and transportation improvements needed to maintain traffic flow to, from, within, and past the site at an acceptable and safe level of service
- x. Exhibits to show all existing, proposed, and future facilities on the site, all proposed traffic movements, and all existing, generated, future background and proposed traffic volumes within the existing and proposed street network
- xi. Appendices to include detailed site plan, existing traffic volume data, crash data, available timing schedules for existing traffic signals in the study area, all Synchro (or similar software) reports, and any other analysis required per the scoping meeting.

The analysis shall be presented in a straightforward and logical sequence. It shall lead the reader step-by-step through the various stages of the process and resulting conclusions and recommendations. The analysis shall be presented in a manner that allows the reviewer to easily duplicate the calculations. The recommendations shall specify the time period within which the improvements should be made, particularly if the improvements are associated with various phases of the development construction. The recommendations shall also specify the time period for any required monitoring of operating conditions. Data shall be presented in tables, graphs, maps, and diagrams wherever possible for clarity and ease of review. Electronic copies of the traffic simulation software files shall be submitted with the report.

#### D. PROCESS OF ANALYSIS

The Traffic Impact Analysis report shall conform with the following process of analysis:

- i. Preparer – The report shall be prepared under the supervision of a qualified and experienced transportation engineer with specific training in traffic and transportation engineering and at least two (2) years of experience related to preparing Traffic Impact Analysis reports. A professional engineer, registered in the state of Texas, shall seal the report.
- ii. Study Area - The study area shall be based on the characteristics of the surrounding area. The DRC and the traffic engineer preparing the study shall mutually agree upon the intersections.
- iii. Design Year – The traffic forecasts shall be prepared for the anticipated opening year of the development, assuming full build-out and occupancy. This year is referred to as the “Design Year”. If development is phased, provide forecast for each phase of the development.
- iv. Trip Generation Rates – The Traffic Impact Analysis report shall include a table showing the categories and quantities of land uses, with the corresponding trip generation rates or equations, and resulting number of trips. The trip generation rates used must be either from the latest edition of “Trip Generation Manual” (Institute of Transportation Engineers (ITE), Washington, D.C.) or from a local study of corresponding land uses and quantities and approved by the DRC. All sources must be referenced in the study and calculations must be documented and included in the study report.
- v. Pass-by and/or Shared Trips – If pass-by or shared trips are a major consideration for the land use in question, studies of similar land uses must be conducted or referenced. Any significant difference between the sums of single-use rates and proposed mixed-use estimates must be justified in the report. Pass-by trips and/or shared trips shall be shown separately and clearly in diagram form at each driveway and intersection affected. Designer to follow ITE Trip Generation Handbook or regional Metropolitan Planning Organization studies from similar land uses.

- vi. Non-Site Traffic Estimates – Estimates of non-site traffic shall be made and will consist of through traffic and traffic generated by all other developments within the study area for which preliminary estimated or final plans have been recently approved, but which are not yet built and occupied.
- vii. Estimates of Trip Distribution – Trip distribution shall be estimated for the site design year and shown separately and clearly using diagrams. A multi-use development may require more than one distribution and coinciding assignments for each phase. Consideration must also be given to whether inbound and outbound trips will have similar distributions.
- viii. Trip Assignments – Assignments must be made considering logical routings, available roadway capacities, left turns at critical intersections, and projected (and perceived) minimum travel times. In addition, multiple paths should often be assigned between origins and destinations to achieve realistic estimates rather than assigning all the trips to the route with the shortest travel time. The assignments must be carried through the external site access points and in large projects, through the internal roadways. When the site has more than one access driveway, logical routing and possibly multiple paths should be used to obtain realistic driveway volumes. If a thorough analysis is required to account for pass-by trips, Trip reductions must be removed from the assignments in a logical fashion and a separate exhibit showing the final site trip distribution shall be included in the report.

Upon completion of the initial site traffic assignment, the results should be reviewed to see if the volumes appear logical given characteristics of the road system and trip distribution. Adjustments should be made if the initial results do not appear to be logical or reasonable.

- ix. Existing Traffic Impacts – Traffic estimates for any site with current traffic activity must reflect not only new traffic associated with the site’s development, but also the trips subtracted from the traffic stream because of the removal of an existing land use.
- x. Capacity Analysis – Capacity analysis must be performed at each of the major streets and project site access intersection locations, signalized and unsignalized, within the study area. Signalized intersections in coordinated systems must be analyzed as a system. In addition, analysis must be completed for roadway segments, deemed sensitive to site traffic within the study area. These may include such segments as weaving sections, ramps, internal site roadways, parking facility access points, and reservoirs for vehicles queuing off-site and on-site. Other locations may be deemed appropriate depending on the situation. The operational analysis and methodology in the current version of the “Highway Capacity Manual, Special Report 209” (Transportation Research Board, National Research Council, Washington, D.C.) should be used for analyzing existing conditions, traffic impacts, access requirements, or other future conditions for which traffic, geometric and control parameters can be established.

- xi. Internal Site Review – A review of the site shall be made and must include traffic circulation, pedestrian accommodations, vehicle storage requirements and any other traffic concerns.
- xii. Required Levels of Service – The recommendations of the traffic impact analysis shall provide safe and efficient movement of traffic within and adjacent to the proposed development, while minimizing the impact to non-site trips. The current levels of service must:
  - a) Be maintained if they are “C” or less, and
  - b) Not deteriorate to worse than “C” if they are currently “A” or “B”.
- xiii. Intersection Geometry – Analysis shall include a thorough evaluation of intersection geometry at affected driveways and intersections to determine the need for and required length of turn lanes.
- xiv. Pedestrians and Bicycles - TIA must consider and provide adequate and safe facilities for pedestrians, bicyclists, and those with disabilities to ensure that the internal circulation system and external access points are designed to minimize conflicts with vehicular traffic. Pedestrian circulation should be comprehensive and provide connections between buildings, and from all streets, and signals into the site.
- xv. Schools – For sites where schools are proposed, site specific analysis of school site plan must be performed as part of the TIA to consider and provide a safe routes to school plan, crossing locations, necessary traffic control, traffic calming devices, driveway locations, pedestrian and bicycle circulation, on-site drop off/pick-up area with adequate queuing to avoid back-ups onto public streets, and bus circulation.
- xvi. School Zone Speed Limit - If TIA recommends designation of a school zone, a school zone speed study and report must be performed to define the required speed limit and the installation of appropriate signage. This report must be signed and sealed by a registered professional engineer in the State of Texas.
- xvii. Traffic Signal Warrant Analysis – Traffic signal warrant analyses, if requested by the City during the scoping meeting, must be performed based on the procedure outlined in the latest edition of the Texas Manual on Uniform Traffic Control Devices.
- xviii. Roundabouts - If a roundabout is proposed as part of the development, the TIA must present justifications for such installation. Design of roundabout must be in accordance with requirements of Chapter 6 and the latest edition of AASHTO’s “A Policy on Geometric Design of Highways and Streets”.
- xix. Service and Delivery Vehicles - As warranted, TIA must consider and provide adequate facilities and circulation for the movement of service and delivery vehicles to and from the site. Of particular interest is that adequate turning paths are provided for large service vehicles to allow entry and exit without encroaching upon opposing lanes or

curbed areas. In addition, sufficient storage areas and loading zones must be provided to avoid parking and circulation routes issues for other vehicles.

- xx. Responsibility for Improvements – The report shall include a list of required improvements, the anticipated date the improvement will be required, and a cost estimate for each recommended improvement. The applicant shall be responsible for the improvements required to provide safe and convenient ingress and egress to the development site.

Report Approval – Approval of a specific development is contingent upon approval of the traffic impact analysis and agreement by the office of the City Engineer on required improvements.



STANDARD TYPICAL DETAILS

DETAIL 100 – LOCAL STREET SECTION

DETAIL 101 – COLLECTOR STREET SECTION

DETAIL 102 – ARTERIAL STREET SECTION

DETAIL 103 - CUL-DE-SAC DETAIL

DETAIL 104 – INTERSECTION SIGHT TRIANGLES

DETAIL 105 - TYPE I DRIVEWAY

DETAIL 106 – TYPE II DRIVEWAY

DETAIL 107 – DRIVEWAY PROFILES

DETAIL 108 – SIDEWALK/SHARED USE PATH

DETAIL 109 – SIDEWALK CURB RAMP

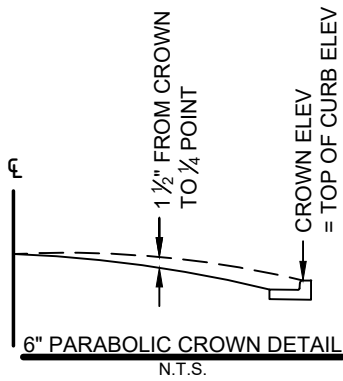
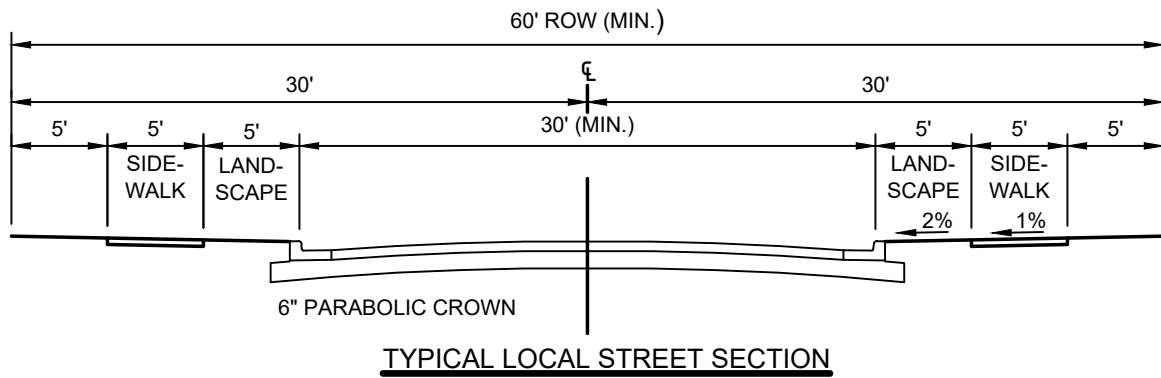
DETAIL 110 – DETECTABLE WARNING – PAVER

DETAIL 111 – REINFORCED CURB AND GUTTER SECTION

DETAIL 112 – CURB EXPANSION JOINT DOWEL DETAIL

DETAIL 113 - FIRE LANE MARKING DETAIL

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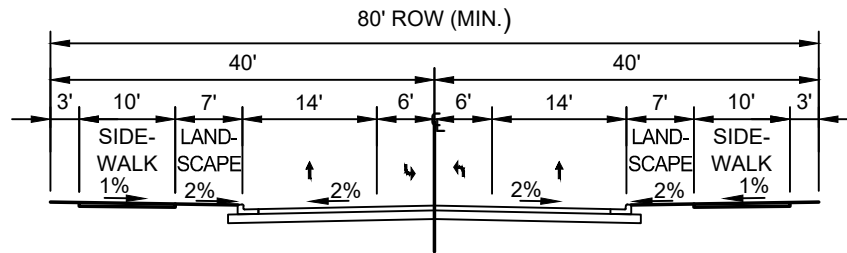
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# CITY OF HORSESHOE BAY

## TYPICAL LOCAL STREET SECTION

DETAIL 100

Date:  
10/24/2022

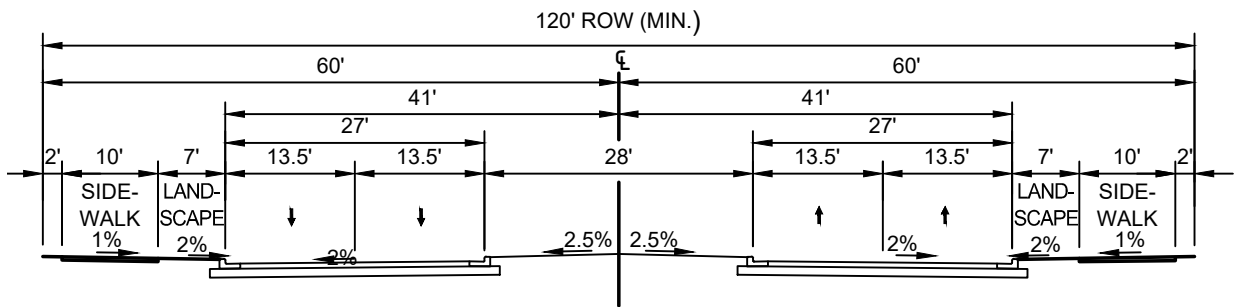


**TYPICAL COLLECTOR STREET SECTION**  
**THREE LANE W/ SHARED USE PATH**

**CITY OF HORSESHOE BAY**  
**TYPICAL COLLECTOR STREET SECTION**

**DETAIL 101**

Date:  
10/24/2022

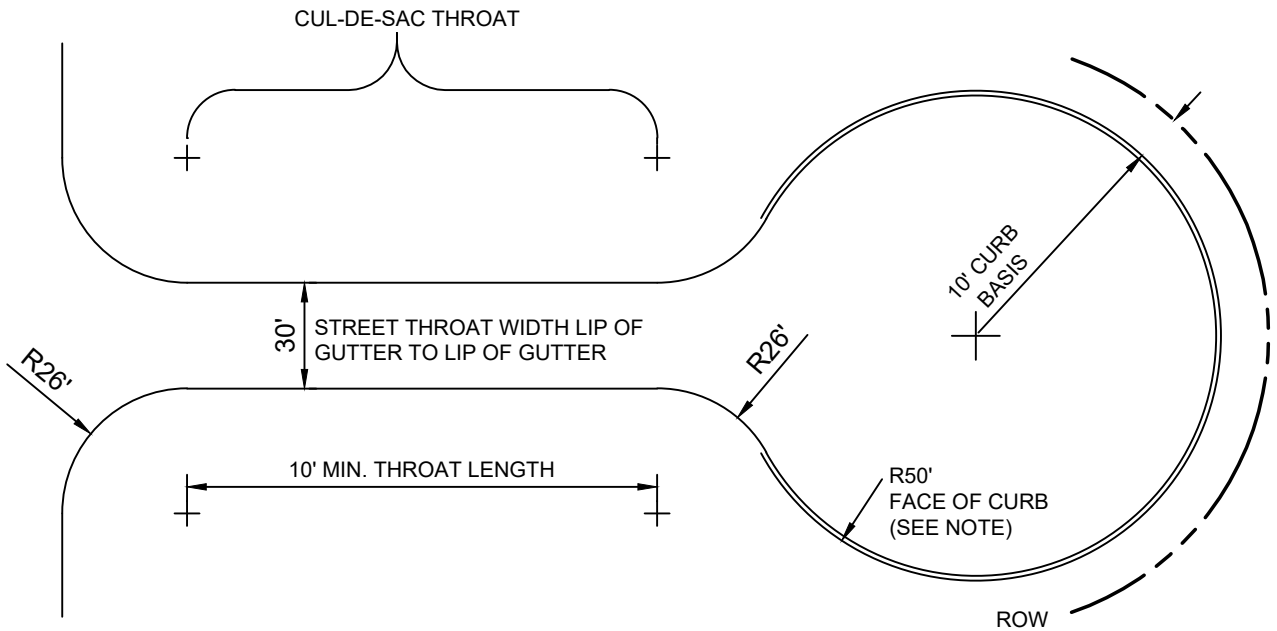


TYPICAL ARTERIAL STREET SECTION  
FOUR LANE W/ SHARED USE PATH

DETAIL 102

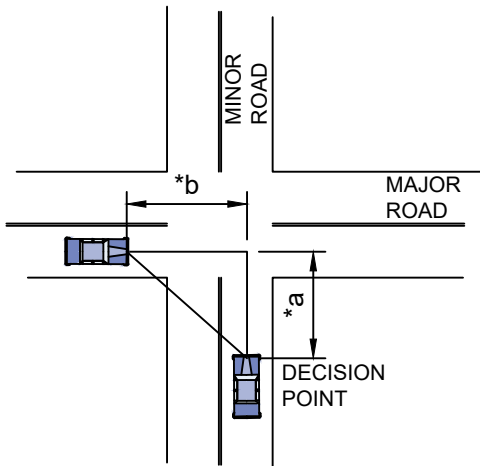
CITY OF HORSESHOE BAY  
TYPICAL ARTERIAL STREET SECTION

Date:  
10/24/2022

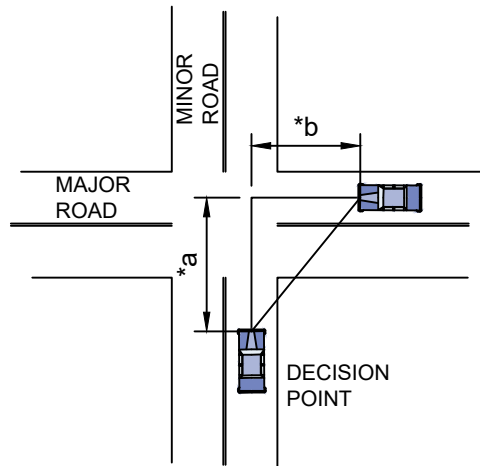


**DESIGN CRITERIA FOR LOCAL CUL-DE-SAC**

NOTE:  
WHEN THE STREET LENGTH IS EQUAL TO OR LESS  
THAN 150', A 40' RADIUS TO FACE OF CURB MAY BE  
UTILIZED FOR DESIGN OF CUL-DE-SAC.



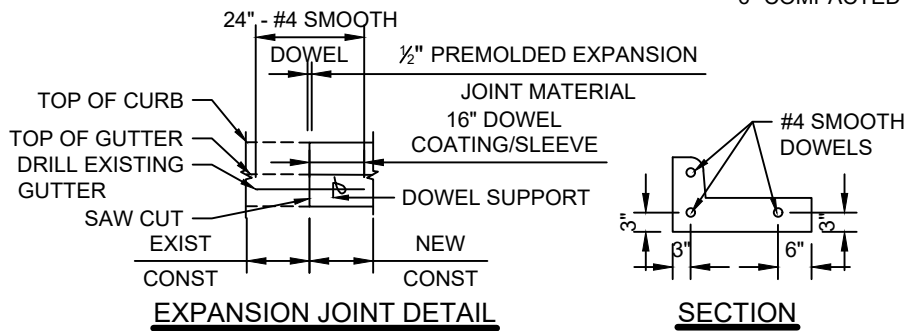
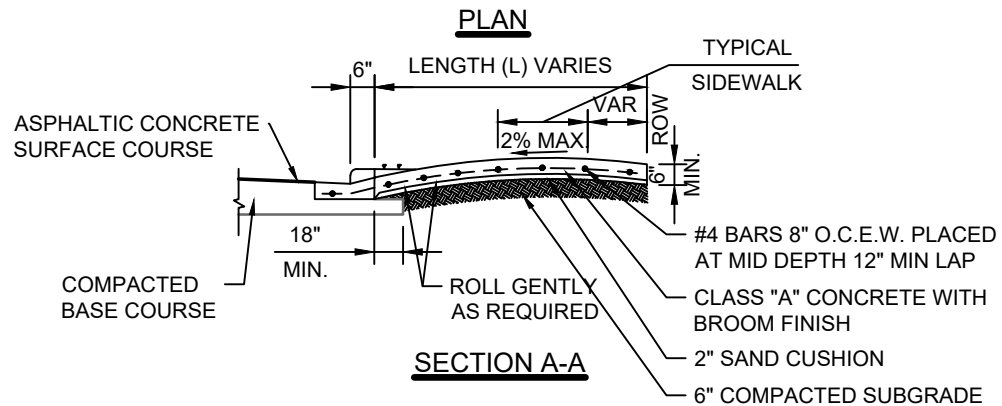
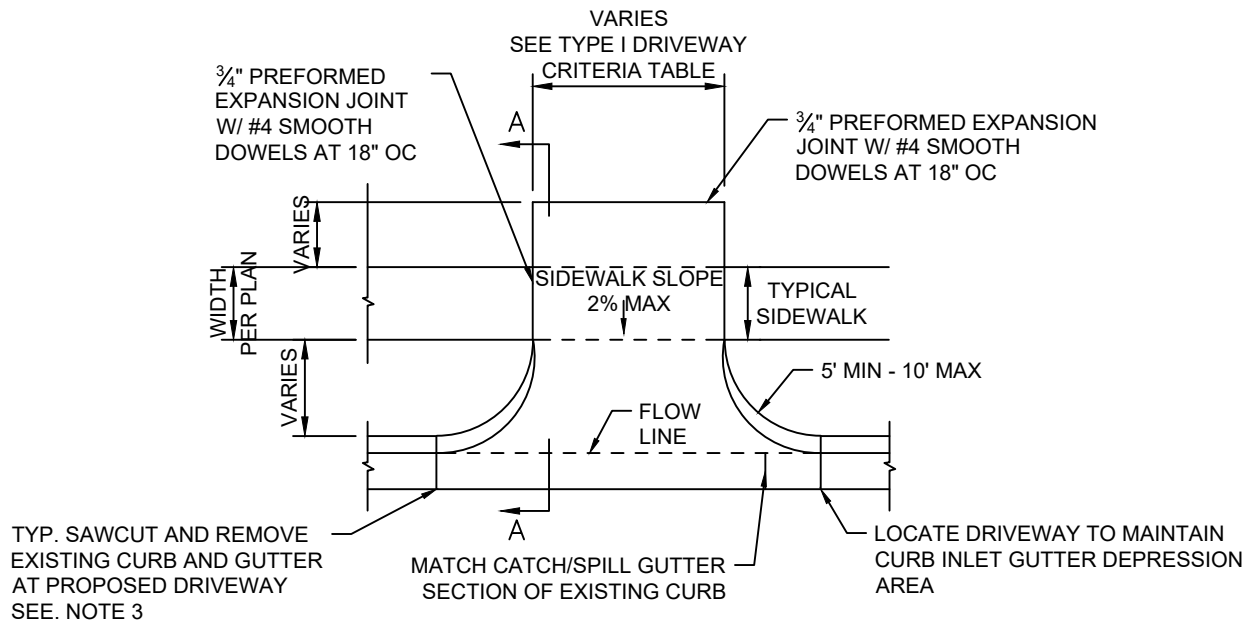
SIGHT TRIANGLE  
TO THE LEFT



SIGHT TRIANGLE  
TO THE RIGHT

\* REFER TO LATEST EDITION OF AASHTO'S A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS TO EVALUATE SIGHT TRIANGLES

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**NOTES:**

1. PLACE 3/4 INCH EXPANSION JOINTS AT LOCATIONS SHOWN OR AS DIRECTED BY THE ENGINEER.
2. FORM CONTROL JOINTS 1/4 INCH WIDE AND 3/4 INCH DEEP AT A MAXIMUM SPACING OF 10'.
3. IF THE NEAREST EXISTING EXPANSION JOINT IS 5 FEET OR LESS FROM THE DRIVEWAY RADIUS, THEN REMOVE AND REPLACE CURB AND GUTTER TO THE NEAREST EXPANSION JOINT.
4. SIDEWALKS SHALL BE CONSTRUCTED PER CURRENT ADA STANDARDS.

**DETAIL 105**

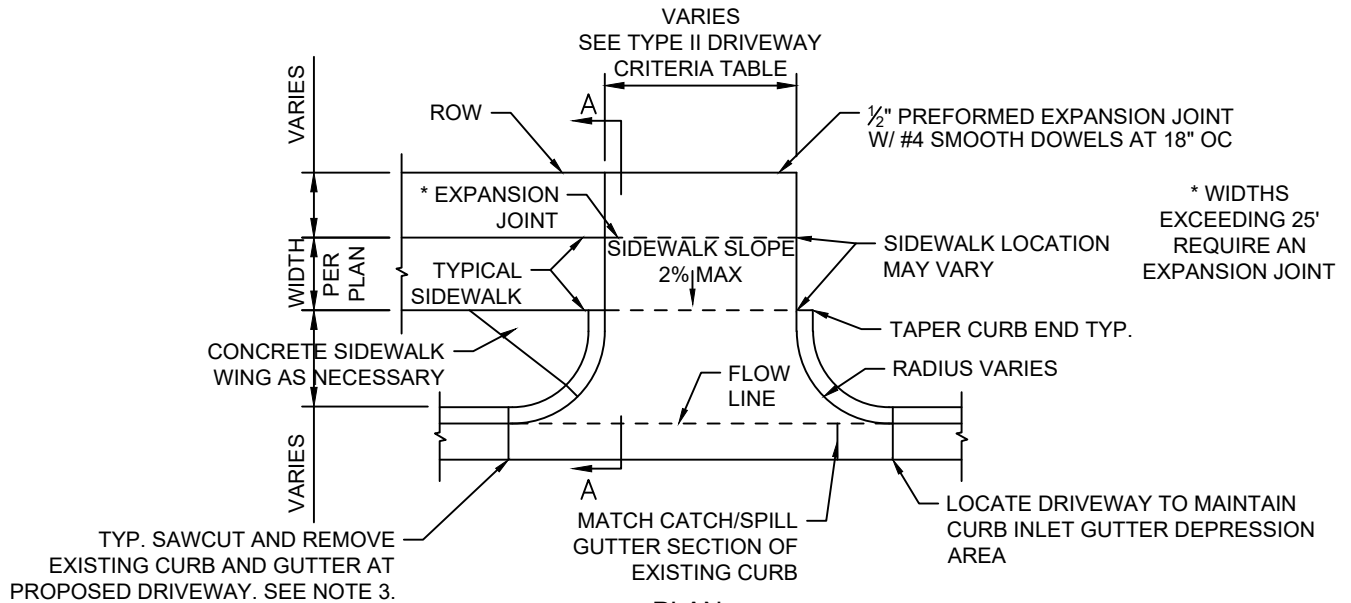
**CITY OF HORSESHOE BAY**  
**TYPE I RESIDENTIAL DRIVEWAY**

Date:  
 11/10/2022

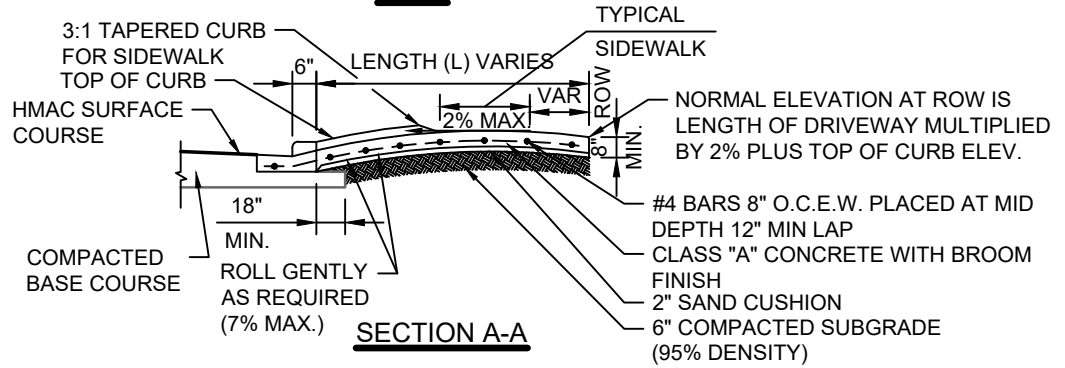
Nov 10, 2022 - 2:54pm

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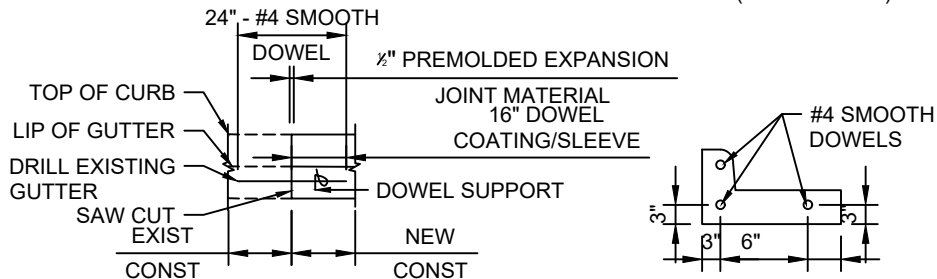
Nov 10, 2022 - 2:58pm



**PLAN**



**SECTION A-A**



**SECTION**

**NOTES:**

1. PLACE 1/2 INCH EXPANSION JOINTS AT LOCATIONS SHOWN OR AS DIRECTED BY THE ENGINEER.
2. FORM CONTROL JOINTS 1/4 INCH WIDE AND 3/4 INCH DEEP AT A MAXIMUM SPACING OF 10'.
3. IF THE NEAREST EXISTING EXPANSION JOINT IS 5 FEET OR LESS FROM THE DRIVEWAY RADIUS, THEN REMOVE AND REPLACE CURB AND GUTTER TO THE NEAREST EXPANSION JOINT. SAWCUT BETWEEN EXISTING CURB/ASPHALT SO THAT NO DAMAGE OCCURS TO EXISTING ROADWAY.
4. SIDEWALKS SHALL BE CONSTRUCTED PER CURRENT ADA STANDARDS.

**EXPANSION JOINT DETAIL**

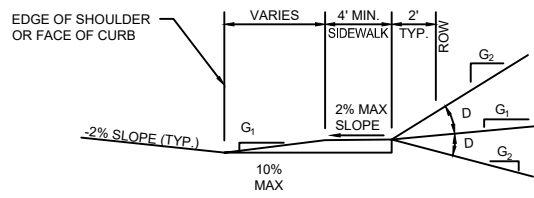
**DETAIL 106**

**CITY OF HORSESHOE BAY**

**TYPE II COMMERCIAL OR MULTIFAMILY DRIVEWAY**

Date:  
11/10/2022





DRIVEWAY VOLUME (ADT)	D=GRADE CHANGE	
	STD.	MAX
>1500	0%	3%
500-1500	3%	7%
< 500	7%	15%

# CITY OF HORSESHOE BAY

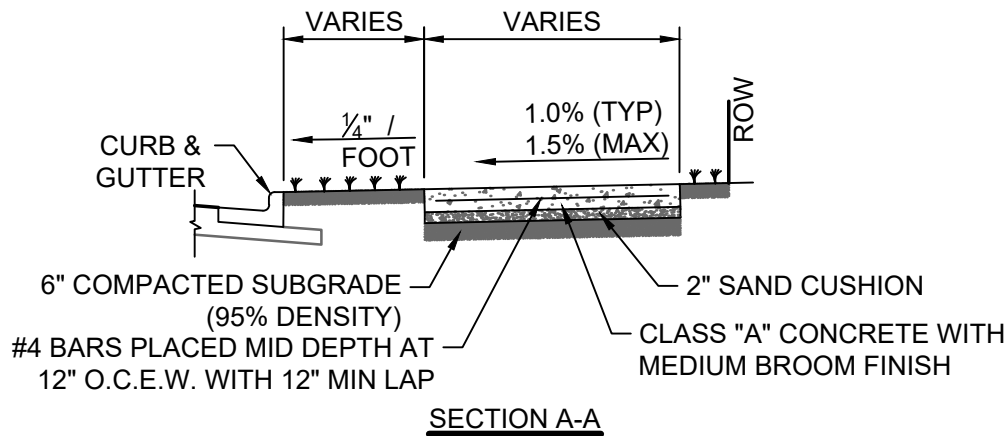
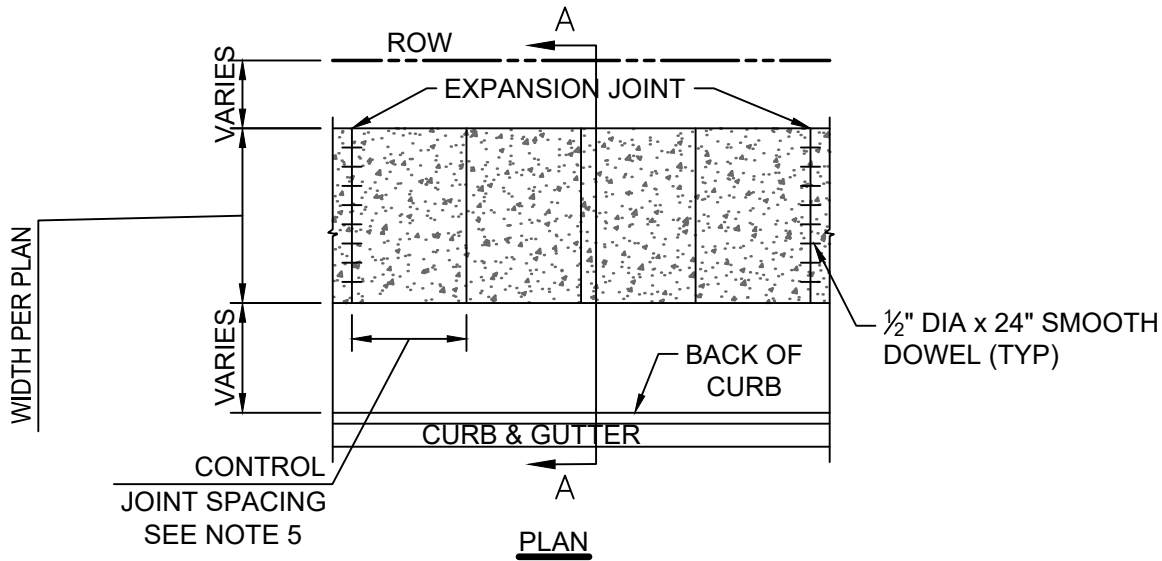
## DRIVEWAY PROFILES

DETAIL 107

Date:  
10/24/2022

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Oct 24, 2022 - 2:39pm



### NOTES:

1. CONCRETE IS CLASS "A" BROOM FINISHED. (TXDOT ITEM 421 & 531)
2. REINFORCING ARE #4 BARS PLACED AT 12 INCHES O.C.E.W. PROER CHAIRS SHALL BE USED TO SUPPORT STEEL REINFORCEMENT. WELDED WIRE FABRIC NOT PERMITTED.
3. PLACE EXPANSION JOINT AT A MAXIMUM SPACING OF 40 FEET. TERMINATE WORKDAY PRODUCTION AT AN EXPANSION JOINT.
4. PLACE 1/2 INCH WIDE EXPANSION MATERIAL WHERE SIDEWALK ABUTS AN EXISTING STRUCTURE, DRIVEWAY, OR OBSTRUCTION PROTRUDING THROUGH THE SIDEWALK.
5. FORM CONTROL JOINT 1/4 INCH WIDE AND 3/4 INCH DEEP AT AN EQUAL SPACING TO WIDTH OF SIDEWALK.
6. ROUND OUT EDGES AND JOINTS TO A 1/4 INCH RADIUS.
7. CONSTRUCTION CURB RAMPS IN ACCORDANCE WITH TXDOT STANDARD "PEDESTRIAN FACILITIES CURB RAMPS".
8. WHEN SIDEWALK IS A DESIGNATED SHARED USE PATH, CURB RAMP CLEAR WIDTH SHALL MATCH THE WIDTH OF THE SHARED USE PATH.
9. SIDEWALKS SHALL BE CONSTRUCTED PER CURRENT ADA STANDARDS.

DETAIL 108

CITY OF HORSESHOE BAY

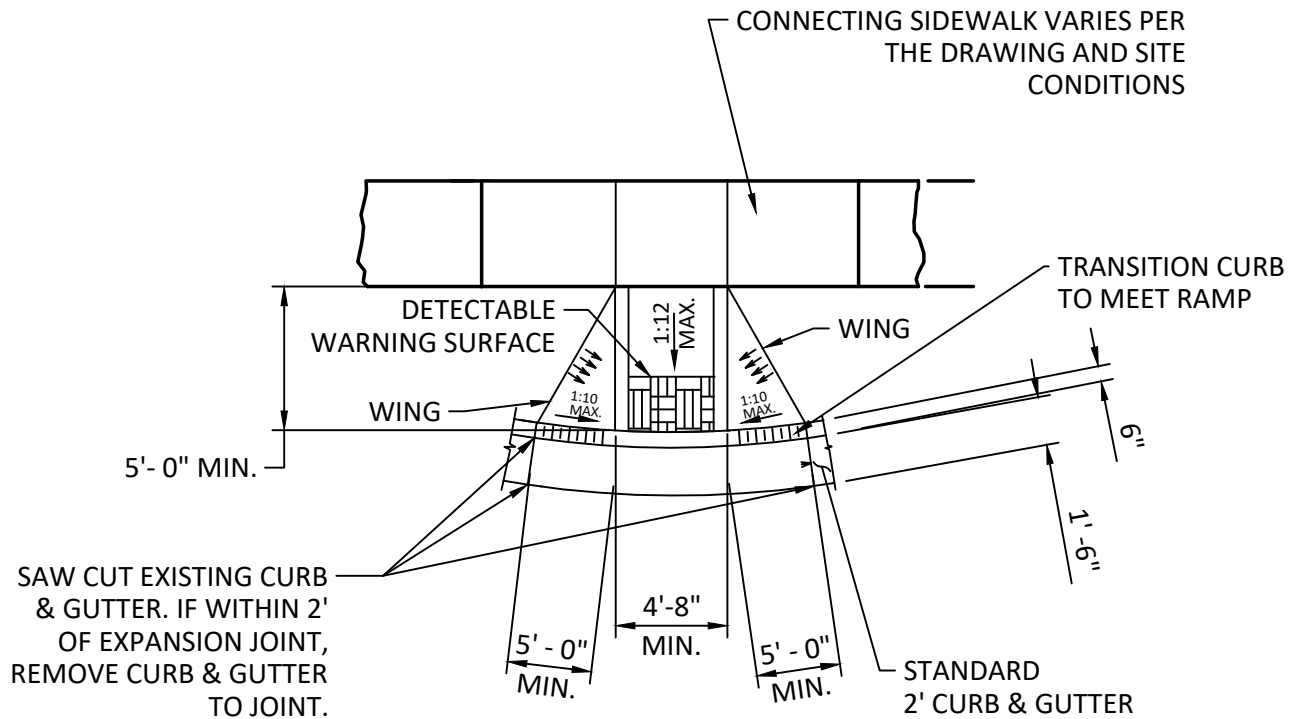
SIDEWALK/SHARED USE PATH

Date:  
10/24/2022

1 OF 1

X:\C02\2020\20001-01 task order 1 basic engineering serv\3-production\03-sheets\C02-20001-01 RAMPS.dwg

Oct 24, 2022 - 2:39pm



**GENERAL NOTES:**

1. THIS STANDARD REPRESENTS A TYPICAL CURB RAMP DESIGN FOR A NEWLY CONSTRUCTED INTERSECTION WITH A 20' RADIUS. LARGER RADII, STREET GRADES, LIMITED SIGHT DISTANCES, STREET CLASSIFICATION, SIGNALIZATION AND OTHER FACTORS MAY REQUIRE THE ENGINEER OR DESIGNATED REPRESENTATIVE TO MODIFY THIS STANDARD.
2. ALTHOUGH CURB RAMPS MAY BE PLACED WITHIN THE RADIUS, PLACING THE RAMP OUTSIDE OF THE RADIUS WILL ALLOW FOR THE GREATEST DIFFERENCE IN ELEVATION BETWEEN THE RAMPS.
3. WINGS ARE REQUIRED ONLY IF PEDESTRIANS WOULD NORMALLY CROSS THE RAMP.
4. LANDINGS SHALL BE FLAT AND MATCH PT, PC OR TOP OF CURB ELEVATION.
5. CURB RAMPS WILL BE PERPENDICULAR TO ROADWAY CENTERLINES AND SHALL ALIGN WITH EACH OTHER.
6. GRADES ON SIDEWALKS LEADING TO OR FROM THE RAMPS SHALL FOLLOW CURB GRADES.
7. THE SLOPE OF THE SIDEWALK WHICH IS LOCATED WITHIN THE RADIUS AND CONNECTS TWO CURB RAMPS SHALL NOT EXCEED 1:20. THE DEVELOPER, AS PART OF THE CURB RAMP INSTALLATION, SHALL CONSTRUCT THIS CONNECTING SIDEWALK.
8. STRIPING AND SIGNAGE NOT REQUIRED IN ALL INSTANCES. STOP BARS, IF REQUIRED, SHALL BE LOCATED 1.2 m (4') FROM CROSSWALK.
9. IF A MEDIAN EXTENDS INTO THE CROSSWALK AREA, AN OPENING SHALL BE PROVIDED IN THE MEDIAN THE SAME WIDTH AS THE CURB RAMP.
10. CURB INLETS SHALL NOT BE LOCATED WITHIN 10' OF A CURB RAMP.
11. GUTTER SHALL PROVIDE SMOOTH TRANSITION TO RAMPS.

DETAIL 109

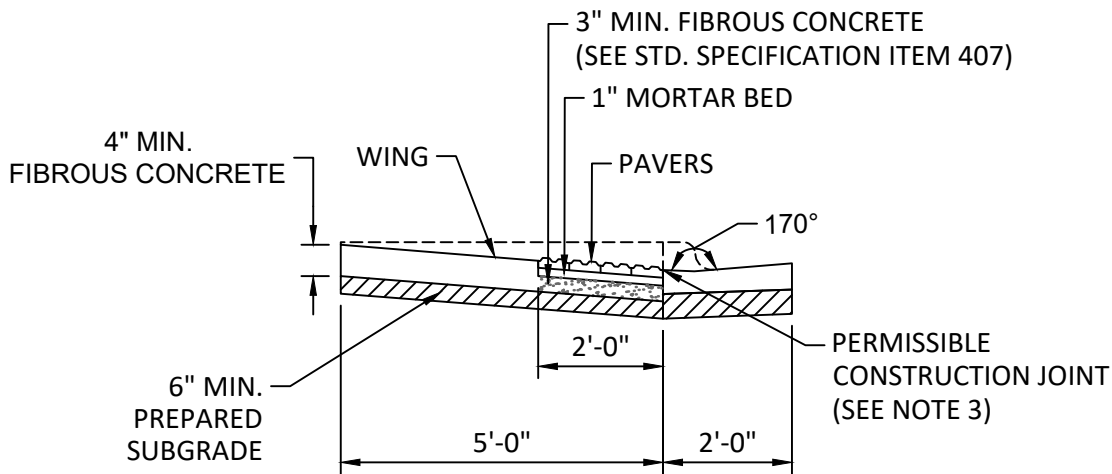
# CITY OF HORSESHOE BAY

## SIDEWALK CURB RAMP

DATE:  
10/24/2022

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Oct 24, 2022 - 2:40pm



CROSS SECTION

GENERAL NOTES:

1. PAVERS ARE REQUIRED FOR ALL CURB RAMP INSTALLATIONS.
2. PAVERS WILL HAVE DETECTABLE WARNING THAT CONSISTS OF RAISED TRUNCATED DOMES WITH A DIAMETER OF 0.9" (23 mm), A NOMINAL HEIGHT OF 0.2" (5 mm) AND A NOMINAL CENTER TO CENTER SPACING OF 2.35" (60 mm) AND SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT (Re: ADAAG SECTION 4.29.2). MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE. PAVER PATTERN SHALL BE BASKET WEAVE UNLESS DIRECTED OTHERWISE BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.
3. THE PERMISSIBLE CONSTRUCTION JOINT BETWEEN THE PAVERS AND THE ADJOINING SURFACE SHALL BE LIMITED TO ¼" (6 mm) JOINT SIZE. GAPS LARGER THAN 4" (6 mm) MUST BE APPROVED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. ALL JOINTS BETWEEN BRICKS AND ADJOINING SURFACE SHALL BE MORTAR FILLED UNLESS DIRECTED OTHERWISE BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.
4. CURB RAMPS WITH RETURNED CURB MAY ONLY BE USED WHERE PEDESTRIANS WOULD NOT NORMALLY WALK DIAGONALLY ACROSS THE RAMP.
5. CURB RAMPS TO BE LOCATED AT ALL INTERSECTIONS AND CROSS WALKS.

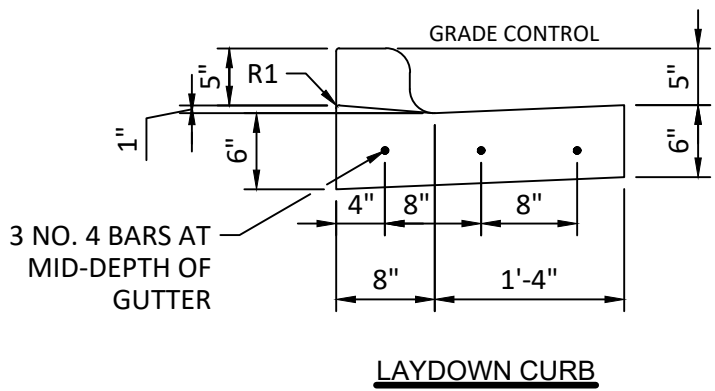
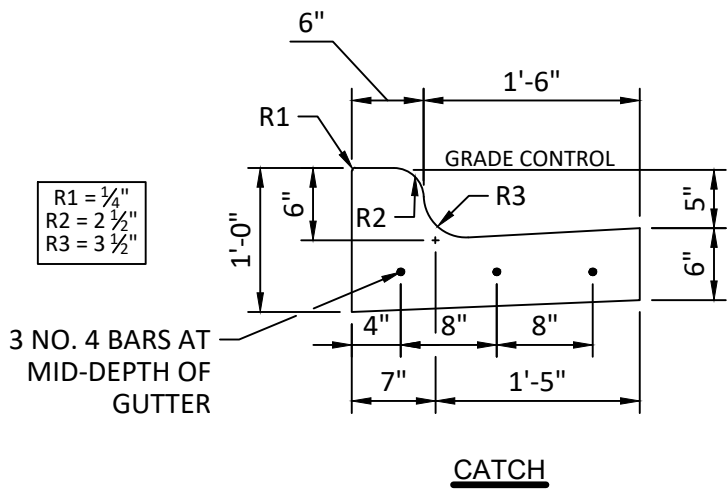
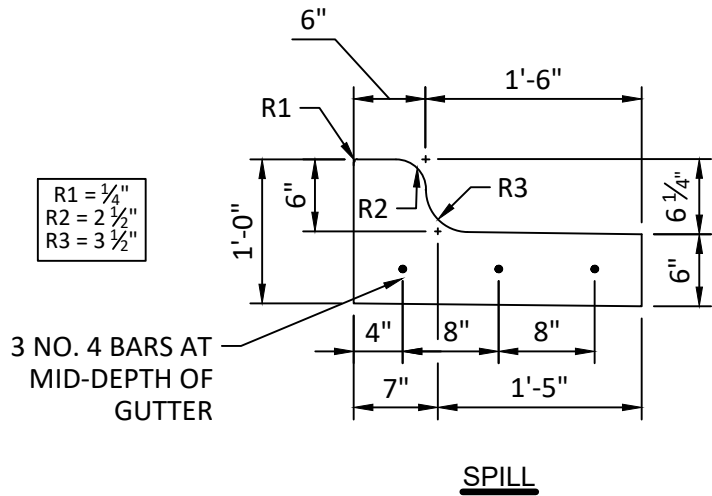
DETAIL 110

CITY OF HORSESHOE BAY

DETECTABLE WARNING - PAVER

DATE:  
10/24/2022

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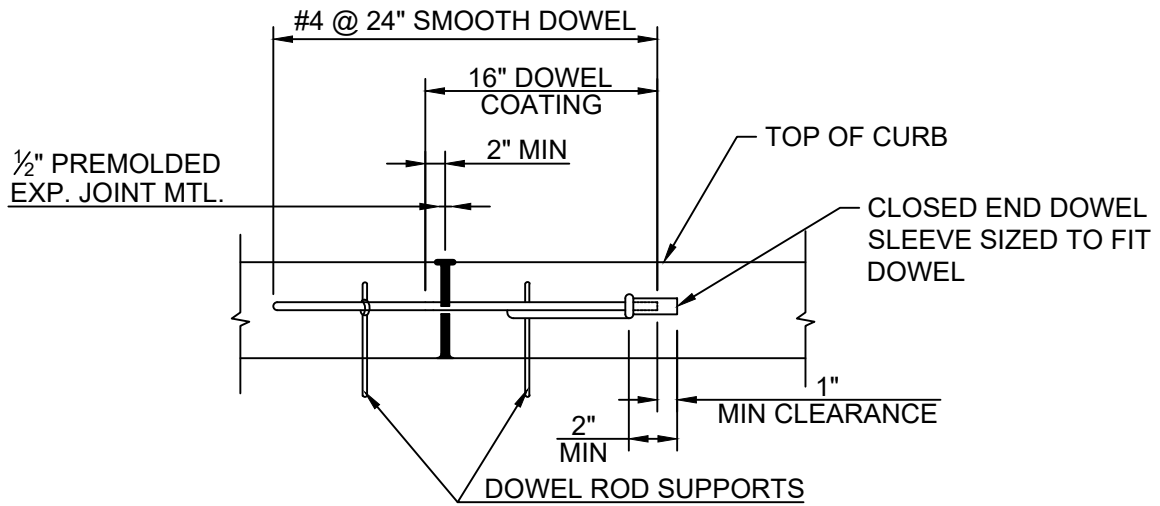


# CITY OF HORSESHOE BAY

## REINFORCED CURB AND GUTTER SECTION

DETAIL 111

DATE:  
10/24/2022



**CURB EXPANSION JOINT DOWEL DETAIL**

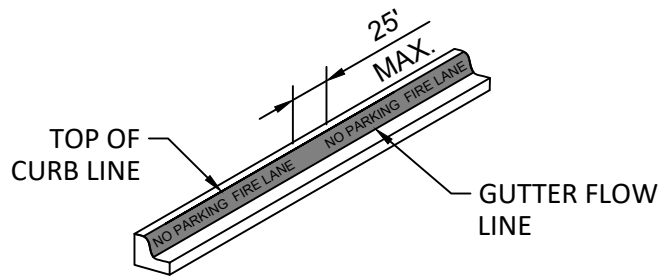
**NOTES:**

- 1. SEE STANDARD 111 FOR TYPICAL CURB AND GUTTER SECTIONS.

DETAIL 112

**CITY OF HORSESHOE BAY**  
**CURB EXPANSION JOINT DOWEL DETAIL**

Date:  
10/24/2022



**NOTES:**

1. FIRE LANE STRIPING TO BE 6" WIDE RED PAINT WITH "NO PARKING FIRE LANE" IN 4" TALL WHITE LETTERS, WORDING MAY NOT BE SPACED GREATER THAN 25' APART. STRIPING TO BE PAINTED ON THE FACE OF CURB WHEN PRESENT AND PAINTED FLAT ON THE PARKING SURFACE WHEN IT IS NOT.
2. FIRE LANES SHALL BE A MINIMUM OF TWENTY SIX (26') FEET WIDE WITH A MINIMUM INSIDE RADIUS OF TWENTY SIX (26') FEET.
3. ANY DEAD END FIRE LANE MORE THAN ONE HUNDRED AND FIFTY (150') LONG SHALL PROVIDE A NINETY SIX (96') FOOT DIAMETER CUL-DE-SAC AT THE CLOSED END IN ACCORDANCE WITH THE INTERNATIONAL FIRE CODE SECTION.

**CITY OF HORSESHOE BAY**  
**FIRE LANE MARKING**

**DETAIL 113**

DATE:  
10/24/2022