



*Planning & Development Services Dept.*

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**ADMINISTRATIVE ORDER**

**#EDG 000097-021407**

A full review of the Standard Drawings and Specifications contained within the “Engineering Development Guide 2005” has been completed by Public Works and PADS Staff. The Standard Drawings and Specifications have been modified in order to comply with current ADA, Federal, State, and County standards.

The Standard Drawings and Specifications contained in the document titled “Engineering Development Guide 2007” hereby replace the “Engineering Development Guide 2005” as of February 14, 2007.

The Engineering Development Guide 2007 shall become effective on the date this Administrative Order is signed. All applications that were determined to be complete prior to the effective date of the Engineering Development Guide 2007 are permitted to utilize the Engineering Development Guide 2005. In order to provide a transition between those applicants in the process of using Engineering Development Guide 2005, applicants may submit applications that conform to either Engineering Development Guide 2007 or Engineering Development Guide 2005 until MAY 31, 2007. On JUNE 1, 2007, only those applications that conform to the standards in the Engineering Development Guide 2007 will be accepted. All Standard Drawings, Specifications and Appendices associated with the Engineering Development Guide 2005 are otherwise null and void.

  
\_\_\_\_\_  
Director's Signature

2/15/07  
\_\_\_\_\_  
Date



**City of Shoreline  
Engineering Development Guide  
2007**

**Department of Public Works  
Department of Planning and Development Services**

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## **Section 1**

# **Addendum to the 1998 King County Surface Water Design Manual**

**Department of Public Works  
Department of Planning and Development Services**

## City of Shoreline Surface Water Design Manual

This addendum to the King County 1998 Surface Water Design Manual (KCSWDM) applies to development proposals within the City of Shoreline. The City of Shoreline has adopted the KCSWDM by reference with the following exceptions. These exceptions must be read in conjunction with the provisions for surface water management contained in chapters 13.10 and 20.60 of the Shoreline Municipal Code. Text changes are shown in italics.

### Section 1.1.1 - Projects Requiring Drainage Review:

The criteria for requiring drainage review in KCSWDM Section 1.1.1 are replaced by the following criteria.

Drainage review is required for any proposed project (except those proposing only routine maintenance, repair, or emergency modifications) that is subject to a City of Shoreline development proposal, permit, or approval listed in Section 1.1.1, AND which meets any of the following conditions:

1. Adds 1,500 square feet or more of **new impervious surface**, OR
2. Proposes to **construct or modify** a drainage pipe/ditch that is 12 inches or more in size/depth, or receives surface and storm water runoff for a drainage pipe/ditch that is 12 inches or more in size/depth, OR
3. Contains or is adjacent to a floodplain, stream, lake, wetland or closed depression, or a sensitive area as defined by the Critical Areas Ordinance, excluding seismic, coal mining, and volcanic hazard area, OR
4. Is located within a **Landslide Hazard Drainage Area** and adds 500 square feet or more of new impervious surface, OR
5. Is located within an identified **Critical Drainage Area**, OR
6. Is a redevelopment project proposing \$100,000 or more of improvements to an existing **high-use site**, OR
7. Is a redevelopment project proposing \$500,000 or more of site improvements and would create 1,500 square feet or more of contiguous **pollution-generating impervious surface** through any combination of **new and/or replaced impervious surface**.

### Section 1.2.3 - Core Requirements for Flow Control:

#### Acceptable Flow Control Levels

The KCSWDM defines three flow control levels for impact mitigation. For the City of Shoreline, Level 2 Flow Control is the minimum accepted standard. This level of flow control is designed to control the durations of geomorphically significant flows and thereby maintains existing channel and streambank erosion rates. For areas

where it is important to mitigate water level changes, the City may require Level 3 Flow Control.

### Existing Site Conditions

The definition for *existing site conditions* depends upon what, if any, activity has occurred since August 1995, the date of City of Shoreline incorporation.

- IF a drainage plan has been approved by the *City* since *August 1995* for any land conversion activity which includes the addition of more than 5,000 square feet of new impervious surface,
- THEN *existing site conditions* are those created by the site improvement and drainage facilities constructed per the approved plans.
- OTHERWISE, *existing site conditions* are those that existed prior to August 1995 as determined from aerial photographs and, if necessary, on knowledge of individuals familiar with the area. The intent is to mitigate unaddressed impacts created by site alterations or improvement, such as clearing, which have occurred since *August 1995*.

### **Section 1.2.7 - Financial Guarantees and Liability**

All drainage facilities constructed or modified for projects (except downspout infiltration and dispersion systems for single family residential lots) must comply with the liability requirements and the financial guarantee requirements of the City.

#### City Equivalents for County Agencies

For proposals located within the City of Shoreline, all references in the KCSWDM to the following King County departments are to be replaced by reference to City departments as follows:

- DNR (Department of Natural Resources) -- replace with **Shoreline Public Works Department**
- SWM (Surface Water Management) – replace with **Shoreline Public Works Department**
- WLR (Water and Land Resources) – replace with **Shoreline Public Works Department**
- DDES (Department of Development and Environmental Services) – replace with **Shoreline Planning and Development Services Department**

### **County Designations That Do Not Apply in the City**

The following designations are used in the 1998 KCSWDM but are not currently used in the City of Shoreline; any reference in the KCSWDM to such areas is to be disregarded for development applications within the City of Shoreline:

- Coal Mine Hazard Area
- Lake Management Plan

- Rural Residential Development
- Shared Facility

### **Section 1.2.8 - Shoreline Source Control BMP Manual**

Pursuant to chapter 13.10 of the Shoreline Municipal Code the City of Shoreline had adopted the *Urban Land Use BMPs, Volume IV* of the 1992 *Stormwater Management Manual for the Puget Sound Basin* (DOE SWMM), and future amendments by reference as the Source Control BMP Manual for the City of Shoreline.

The KCSWDM and DOE SWDM are available for use and examination by the public, in the following locations:

- Planning and Development Services Department
- Office of City Clerk
- Public libraries located within the City of Shoreline

### ***Section 1.2.9 – Alternative Methods***

*As provided for in Section 20.10.050 of the SMC and for the purpose of meeting the need to consider Low Impact Development (LID) and LEED systems as acceptable “alternate facility designs”, LID designs that are consistent with the BMPs outlined in Low Impact Development Technical Guidance Manual for Puget Sound, the 2005 King County Surface Water Design Manual, and/or LEED techniques employed to meet the intent of the adopted Surface Water Management Code shall be considered a Blanket Stormwater Adjustment and individual variances to use these design methodologies are not required. Provided, developments that employ LID BMPs and LEED technologies must be designed using the methodologies outlined in the 2005 KCSWDM.*



## **Section 2**

# **Engineering Development Guide**

**Department of Public Works  
Department of Planning and Development Services**

## CHAPTER 1 – GENERAL CONSIDERATIONS

### 1.01 Purpose

The purpose of the City of Shoreline Engineering Development Guide, subsequently referred to as the “Guidelines,” is to supplement the provisions of the City of Shoreline Municipal Code (SMC) 20.70.020.

### 1.02 General References

These Guidelines implement and are intended to be consistent with:

- A. City of Shoreline Municipal Code (SMC)
- B. City of Shoreline Development Code (SDC)
- C. City of Shoreline Surface Water Management Code, Chapter 13.10 SMC.
- D. City of Shoreline Comprehensive Plan, as amended.
- E. City of Shoreline Six Year Transportation Improvement Plan, as amended.
- F. City of Shoreline Storm Water Master Plan
- G. ADA Standards for Accessible Design

### 1.03 WSDOT/APWA Documents as Primary Design and Construction References

Except where these Guidelines provide otherwise, design detail, construction workmanship, and materials shall be in accordance with the following publications produced separately by Washington State Department of Transportation (WSDOT), or jointly by WSDOT and Washington State Chapter of American Public Works Association (APWA).

- A. WSDOT/APWA Standard Specifications for Road, Bridge, and Municipal Construction, as adopted herein by City of Shoreline, current edition as amended. These will be referred to as the "WSDOT/APWA Standard Specifications."
- B. The WSDOT/APWA Standard Plans for Road and Bridge Construction, to be referred to as the "WSDOT/APWA Standard Plans," current edition as amended.
- C. WSDOT Design Manual, current edition as amended.

- D. City Design Standards for the Construction of Urban Arterial and Collector Roads, adopted per RCW 35.78.030, current edition as amended.

#### 1.04 Other Specifications

The following shall be applicable when pertinent, when specifically cited in the Guidelines or when required by state or federal funding authority:

- A. Local Agency Guidelines, WSDOT, as amended
- B. Guidelines for Urban Arterial Program, WSDOT, as amended.
- C. Design criteria of federal agencies including the Federal Housing Administration, Department of Housing and Urban Development; and the Federal Highway Administration, Department of Transportation.
- D. A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), 2001, or current edition when adopted by WSDOT.
- E. Standard Specifications for Highway Bridges, adopted by AASHTO, current edition.
- F. U. S. Department of Transportation Manual on Uniform Traffic Control Devices, "MUTCD", as amended and approved by Washington State Department of Transportation, current edition.
- G. City of Seattle Traffic Control Manual for In Street Work, current edition
- H. Guide for the Development of Bicycle Facilities, adopted by AASHTO, current edition.
- I. 1998 King County Surface Water Design Manual
- J. Associated Rockery Contractors, Standard Rock Wall Construction Guidelines.
- K. National Electrical Installation Standards (NEIS)
- L. American Society for Testing and Materials (ASTM).

#### 1.05 Reference Datum

- A. Horizontal Datum: All survey work, including but not limited to mapping, platting, planning, design, right-of-way surveys, and construction surveys, shall be in the Washington State Plane Coordinate System, North Zone,

using NAD83 (1991) datum. The plans shall show the horizontal control used to establish ties to the datum, with type, size and location, date visited, and the State Plane coordinates for each monument used.

- B. Vertical Datum: All survey work, including but not limited to mapping, platting, planning, design, right-of-way surveys, and construction surveys, shall be in the North America Vertical Datum of 1998 (NAVD 1998). The plans shall show the benchmarks used to establish ties to the datum, with reference number, description, location and elevation of each benchmark used, and any project site benchmarks.

## 1.06 Definitions

"AASHTO": American Association of State Highway and Transportation Officials.

"ADA": Americans with Disabilities Act.

"ADT": Average daily trips.

"APWA": American Public Works Association.

"ATB": Asphalt treated base.

"Alley": A service roadway providing a primary or secondary means of automobile, service vehicle or emergency vehicle access to abutting property and not intended for primary traffic or pedestrian circulation.

"Amenity Zone": That area adjacent to the paved roadway and within the right-of-way, that is commonly landscaped, but may include other features for the City's benefit such as utilities, traffic signs, and mailboxes.

"Auxiliary Lane": The portion of the roadway adjoining the traveled way for parking, turning or other purposes supplementary to through-traffic movement.

"BMP": Best Management Practices

"Bulb": Round area for vehicle turnaround typically located at the end of a cul-de-sac street.

"CDF": Controlled Density Fill

"Commercial/ Non-Residential": For the purposes of this manual, a building, project, street, or area other than that associated with single-family or duplex structures. Note that the Land Use Code generally includes multifamily in the commercial category.

"Cul-de-sac": The bulb shaped turnaround at the terminus of a street end.

“CSTC”: Crushed Surfacing Top Course

"Developer": The person or entity who owns or holds purchase options or other development control over property for which development activity is proposed.

“Director:” The director of the City of Shoreline Planning and Development Services or designee

“Director of Public Works:” The director of the City of Shoreline Public Works or designee.

“DOE:” Washington State Department of Ecology

"Driveway": A privately maintained access to a single residential, commercial or industrial property.

“Driveway Approach”: That area between the edge of the pavement of the intersecting street to the edge of the right-of-way.

“Easement”: A grant by the property owner of the use of a strip of land by the public, corporation or persons for specific purposes.

"Engineer": A professional engineer licensed to practice in the State of Washington acting on behalf of an applicant or developer.

"Eyebrow": A partial bulb located adjacent to the serving road that provides access to lots and serves as a vehicle turnaround.

“Fire Apparatus Access Road”: As defined in the International Fire Code.

“Fire Lane”: As defined in the International Fire Code.

"Half-Street": Street constructed along edge of development, utilizing a portion of the regular width of right-of-way and permitted as an interim facility pending construction of the other half of the street by the adjacent owner.

"Internal Road": A road that is contained in the development.

“Inspector”: Designee of Director of Planning and Development Services and/or Department of Public Works

"Joint-Use Driveway": A jointly owned and maintained tract or easement serving two properties.

“KCSWDM”: King County Surface Water Design Manual

"Landing": A road or driveway approach area to any public or private road.

"Loop": Road of limited length forming a loop, having no other intersecting road, and functioning mainly as direct access to abutting properties. A loop may be designated for one-way or two-way traffic.

"MUTCD": Manual on Uniform Traffic Control Devices, current edition.

"Off-Street Parking Space": An area accessible to vehicles, exclusive of roadways, sidewalks, and other pedestrian facilities, that is improved, maintained and used for the purpose of parking a motor vehicle.

"Pavement Width": Paved area on shoulder-type roads or paved surface between curb, thickened edge or gutter flow line on all other roads.

"Pipe Stem": A strip of land having a width narrower than that of the lot or parcel to be served and is designed for providing access to that lot or parcel.

"Private Street": A privately owned and maintained access provided for by a tract, easement or other legal means (SMC 20.70.160).

"Professional Engineer": A professional civil engineer licensed to practice in the State of Washington.

"Project Manager": City of Shoreline staff member responsible for review of the development project.

"Public Street": Publicly owned facility-providing access, including the roadway and all other improvements, inside the right-of-way.

"Residential": A building, project, street, or area associated with single-family or duplex structures.

"Right-of-Way": Property granted or reserved for, or dedicated to, public use for street purposes and utilities, together with property granted or reserved for, or dedicated to, public use for walkways, sidewalks, bikeways, and parking whether improved or unimproved, including the air rights, sub-surface rights and easements thereto.

"Road": A public or recorded private thoroughfare providing pedestrian and vehicular access through neighborhoods and communities and to abutting property.

"Road" and "Street" will be considered interchangeable terms for the purpose of these Guidelines.

"Roadway": Pavement width plus any non-paved shoulders.

"Shoulder": The paved or unpaved portion of the roadway outside the traveled way that is available for emergency parking or non-motorized use.

"Traveled Way": The part of the road made for vehicle travel excluding shoulders and auxiliary lanes.

"Utility": Private or municipal corporations owning or operating, or proposing to own or operate facilities that comprise a system or systems for public service. Private utilities include only gas, electric, telecommunications, or water companies that are subject to the jurisdiction of the State Utilities and Transportation Commission and that have not been classified as competitive by the commission.

"WSDOT": Washington State Department of Transportation.

## CHAPTER 2 – STREET TYPES & GEOMETRICS

### 2.01 Street Classifications

- A. Existing Shoreline streets have been classified as shown in the Comprehensive Plan. The primary classes of Local Street and Arterial Street are described in subsections B and C. Based upon these classifications, the criteria for required right-of-way width, pavement width, and other geometrics are as stated in **Appendices A and B and Table 2.1**. See Standard Details 201 and 202 for typical cross sections of Local and Arterial Streets. Function is the controlling element for classification and shall govern right-of-way, road width and road geometrics. Other given elements such as access, arterial spacing and average daily traffic count (ADT) are typical.
- B. Arterials – The primary function of arterials is to provide a high degree of vehicular mobility by limiting property access. The vehicles on arterials are predominantly for through traffic. Arterials are generally connected with interstate freeways or limited access expressways. Sidewalks are required by the City’s development code. Arterials are further classified into three classes: Principal Arterials, Minor Arterials and Collector Arterials.
1. Principal Arterials have higher levels of local land access controls and regional significance as major vehicular travel routes that connect between cities within a metropolitan area. Access is partially controlled, and the street typically serves 20,000-plus ADT.
  2. Minor Arterials are generally designed to provide a high degree of intra-community connections and are less significant from a perspective of a regional mobility. Access is partially controlled, and the street typically serves 8,000 to 30,000 ADT.
  3. Collector Arterials assemble traffic from the interior of an area/community and deliver it to the closest Minor or Principal Arterials. Collector Arterials provide for both mobility and access to property are designed to fulfill both functions. Access is partially controlled, and the street typically serves 3,000 to 9,000 ADT.
- C. Local Streets – All other streets are generally designated as local streets. Shoreline further classifies local streets into two categories: Neighborhood Collectors and Local Streets.
1. Neighborhood Collectors channel traffic from local streets to Collector Arterials. In new and redeveloped areas sidewalks are typically

required by the City’s Municipal Code, and traffic calming devices are usually permitted.

2. Local Streets provide local access to residential areas. Metro and/or School buses are not allowed except for short distances, and with new development or redevelopment sidewalks are typically required by the City’s Municipal Code, although with some design flexibility.
- D. Alley – A service roadway providing a primary or secondary means of automobile, service vehicle, or emergency vehicle access to abutting property and not intended for primary traffic or pedestrian circulation.
  - E. Private Streets – A privately owned and maintained street providing vehicular access to residential properties.

2.02 Horizontal Curvature & Sight Distance Design Values

- A. The design values shown in Table 2.1 are minimum values necessary to meet the requirements for a selected design speed and road classification. A maximum of 8 percent superelevation may be used, upon approval of the Director, for design of improvements to existing arterials, as necessary, to meet terrain and right-of-way conditions. Superelevation run-off lengths on arterials, residential and commercial access streets shall be calculated in accordance with the WSDOT Design Manual.
- B. Superelevation is not required in the design of horizontal curves on urban residential access streets; however, horizontal curves must be designed based on design speed and selected cross section as indicated in Table 2.1. Table 2.1 is based on AASHTO "Low Speed Urban Streets" design methodology. Superelevation may be used on urban residential streets as necessary to meet terrain and right-of-way conditions.

**Table 2.1**  
**Arterial and Local Street Design Values**

Design Speed (mph)	25	30	35	40	45
Horizontal Curvature for 6 percent Superelevation, Radius (Ft.)	185	275	380	510	660
Horizontal Curvature for 8 percent (maximum allowable on arterials) Superelevation, Radius (Ft.)	170	250	350	465	600
Stopping Sight Distance (Ft.)	165	200	250	325	400
Entering Sight Distance (Ft.)	365	430	490	555	620
Minimum Run-Off Length (ft)	80	90	100	115	125
Passing Sight Distance (Ft.) for a 2-Lane Road		1,100	1,300	1,500	1,650

2.03 Private Streets

- A. See SMC Chapter 20.70.160 for requirements.
- B. The City of Shoreline will not accept private streets for maintenance as public streets until such streets are brought into conformance with these Guidelines. This requirement will include the design standard for the road classification placed upon the private street.
- C. Minimum width of private streets when allowed by the SMC:

**Table 2.2**

<u># of single family lots</u>	<u>Tract or Easement Width</u>	<u>Pavement/Traveled Way Width</u>	<u>Length</u>
4 or fewer	20 ft	20 ft	150 ft*
More than 4	24 ft	24 ft	150 ft*

\* The length may be extended upon approval from the Fire Department

2.04 Half Streets

- A. When allowed by the SMC, a half street shall meet the following requirements:
  - 1. Right-of-way width of the half street shall equal at least 30 feet; and
  - 2. If feasible, half street shall be graded consistent with locating centerline of the ultimate road section on the property line; and
  - 3. Traveled way shall be surfaced the same as the designated road type to a width not less than 20 feet, curb, amenity zone and sidewalk shall be constructed as required for the designated road type; and
  - 4. Property line edge of street shall be finished with temporary curbing, shoulders, ditches, and/or side slopes so as to assure proper drainage, bank stability, and traffic safety; and
  - 5. Half streets shall not intersect other half streets unless so approved by the Director.
- B. When a half street is eventually completed to a whole street, the completing builder shall reconstruct the original half street as necessary to produce a proper full-width street of designated section.

2.05 Cul-de-sacs, Eyebrows, and Hammerheads – Standard Detail 209

- A. Turnaround facilities shall be provided at street ends where the street length from the nearest intersection is more than 150 feet as measured from the centerline of intersecting street to end of dead-end street pavement and shall be constructed as follows:
1. Minimum right-of-way diameter across bulb section: 100 feet in a permanent cul-de-sac; 84 feet in a temporary cul-de-sac, with bulb area lying outside straight-street right-of-way provided as temporary easement pending forward extension of the street. Right-of-way may be reduced, provided utilities and necessary drainage are accommodated on permanent easements within the development. See Section 2.15.
  2. Minimum diameter of surfacing across bulb: 90 feet of paving in curb type road.
  3. Cul-de-sac Island: Optional feature for any cul-de-sac. If provided, island shall have full-depth vertical curb. Minimum diameter shall be 20 feet and there shall be at least; 30 feet of paved traveled way in a curb type section around the circumference. Island shall be landscaped. The adjoining lot owners shall maintain island through a maintenance agreement.
  4. Sidewalks shall be constructed on both sides of the stem and on the bulb.
- B. A dead end local street shall not be longer than 600 feet measured from centerline of intersecting street to center of cul-de-sac. The maximum length may be extended to 1,000 feet if 50 or fewer potential lots are to be served and there is provision for emergency vehicle turnaround near mid-length.
- C. The Director of Public Works may require an off-street walk or an emergency vehicle access to connect a cul-de-sac at its terminus with other streets, parks, schools, bus stops, or other pedestrian traffic generators, if the need exists. Off-street sidewalks shall be contained in the right-of-way or a sidewalk easement.
- D. If a street temporarily terminated at a property boundary during development serves more than three lots or is longer than 150 feet, a temporary bulb shall be constructed near the plat boundary. The paved bulb shall be 90 feet in diameter with sidewalks terminated at the point where the bulb radius begins. Removal of the temporary cul-de-sac,

restoration and extension of the sidewalk shall be the responsibility of the developer who extends the road.

- E. The maximum cross grade of a street at the street end shall be 8%
- F. Partial bulbs or eyebrows shall have a minimum paved radius and an island configuration. Island shall be offset two feet from edge of traveled way.
- G. A hammerhead per Standard Detail 209 may be used to fulfill the requirement to provide a turnaround facility where the street serves (or will serve) 4 or fewer single family residential units

## 2.06 Alleys

An alley is considered a public right-of-way. (See Standard Detail 203)

- 1. Serve a maximum of 20 lots, no dead ends or cul-de-sacs.
- 2. For new developments, minimum tract or easement width 20 feet with a pavement surface of 16 feet (including thickened edge), based on a ten-foot structure setback. For differing structure setback requirements, alley configuration shall be designated to provide for safe turning access to properties.
- 3. Paved surface shall have a thickened edge on one side and cross slope in one direction.
- 4. Public streets to which an alley connects or which provide access to the front boundary of the properties served by the alley shall be 28-foot minimum paved width with vertical curb. Alley entry shall be provided by a driveway approach.
- 5. Modifications to existing alleys serving commercial or industrial properties, in accordance with the above, will be determined on a case-by-case basis subject to approval by the City.

## 2.07 Intersections and Low Speed Curves

- A. Intersection traffic control shall be designed as specified in the MUTCD, City of Seattle Traffic Control Manual for In-Street Work (current edition), and by the Director of Public Works.
- B. Geometric Design Requirements:
  - 1. The angle of an intersection of two streets shall be 85° to 95°.

2. The minimum distance between adjacent parallel local and/or private streets shall be 150 feet, measured from nearest curb edge to nearest curb edge.
3. See Table 2.3 below for minimum curb radii at intersections:

**Table 2.3**  
**Curb Radius Design Values**

<b>Street Classification</b> (for highest street classification at intersection)	<b>Dimension</b>
Arterial to Arterial	25 feet
Arterial to Local Street	20 feet
Local Street to Local Street	20 feet
Transit/truck Route (as adopted by Comprehensive Plan)	30 feet
Where vehicular turn is prohibited	10 feet
Radii for curb setbacks and bulb-outs	10/20 feet

- C. The line of sight for drivers at intersections shall not be obstructed.
  - D. Intersection design may result in increased right-of-way width requirements.
  - E. On sloping approaches at an intersection, landings shall be provided with grade not to exceed one foot difference in elevation for a distance of 30 feet approaching an arterial or 20 feet approaching a residential or commercial street, measured from future right-of-way line (extended) of intersecting street.
  - F. Entering Sight Distance. See Table 2.1 for specific entering sight distance values based on required design speed.
- 2.08 Lane Widths for Arterials

The following lane width standards are used in the design of arterials:

**Table 2.4**

<b>Lane Type</b>	<b>Design Lane Width</b>
Traffic Lane and/or Turning Lane	12 Ft
Parking Lane	8 Ft
Parking Lane on Bus or Truck Route	10 Ft
Through Traffic Lane	11 Ft

Curb Lane	12 Ft
Bus Only Lane	12 Ft
Turn Only Lane	12 Ft
Bike Lane	5 Ft
Curb Lane (shared vehicle/bicycle)	14 Ft

2.09 Maximum Grade & Grade Transitions

- A. Maximum grade may be exceeded for short distances of 300 feet or less, upon showing that no practical alternative exists. Exceptions which exceed 15% will require verification by the Fire Marshal that additional fire protection requirements will be met. Grades exceeding 12 % shall be paved with asphalt concrete (AC) or portland cement concrete (PCC). Any 20% grade must be paved with PCC.
- B. Grade transitions shall be constructed as smooth vertical curves except in intersections where the difference in grade is one percent or less and upon approval of the Director of Public Works. The minimum vertical curve for roadways is 75 ft. The point of vertical curvature shall not encroach into a cross street any further than the center of pavement of the cross street.

**Table 2.5**

<b>Roadway Classification</b>	<b>Maximum Roadway Profile grade</b>
Principal Arterials	9%
Collector Arterial	10%
Minor Arterials	10%
Neighborhood Collector	10%
Local Streets	17%
Alleys	17%

2.10 Stopping Sight Distance (SSD)

Stopping Sight Distance applies to street classifications as detailed in Section 2.01. See Table 2.1 for specific SSD values based on required design speed. See Table 2.6 below for SSD Adjustment Values.

- A. Height of eye is 3.5' and height of object is 0.5'.
- B. Minimum SSD for any downgrade averaging three percent or steeper shall be increased by the values shown below for any downgrade averaging three percent or steeper (Source: AASHTO Policy on Geometric Design, Table III-2). Interpolate values for other design speeds and grades.

**Table 2.6**  
**SSD Adjustment Values (FT)**

Design Speed (MPH)	Downgrade		
	3%	6%	9%
45	25	55	105
40	20	40	75
35	15	30	55
30	10	20	30
25	0	10	20

- C. Sag vertical curves on local access streets with stopping sight distance less than that called for in Section 2.02, may be approved by the City if no practical design exists and if acceptable road lighting is provided throughout the curve and is maintained by a franchised utility.
- D. Intersecting Stopping Sight Distance
  - 1. Stopping sight distances for the design speeds of proposed neighborhood collector streets and arterials must be met when intersecting arterials.
  - 2. The minimum stopping sight distance on proposed intersection approaches for all other classifications of intersecting roadways shall be 125 feet.

2.11 Entering Sight Distance

Entering sight distance criteria will not apply to local access streets or neighborhood collectors. Specific ESD values for required design speeds are listed in Table 2.1.

- A. Entering vehicle eye height is 3.5 feet, measured from 10-foot back from edge of traveled way. Approaching vehicle height is 4.25 feet.
- B. Requirements in Standard Detail 215 apply to an intersection or driveway approach to a typical road under average conditions. In difficult topography the Director of Public Works may authorize a reduction in the ESD based on factors mitigating the hazard. Such factors may include an anticipated posted or average running speed less than the design speed or the provision of acceleration lanes and/or a median space allowing an intermediate stop by an approaching vehicle making a left turn.
- C. Where a significant number of trucks will be using the approach road, the Director of Public Works may increase the entering sight distance

requirements by up to 30 percent for single-unit trucks and 70 percent for semi-trailer combinations.

## 2.12 Medians

Medians shall conform to the following criteria:

- A. Median width shall be additional to, not part of, the specified width of traveled way.
- B. Edges shall be similar to outer road edges: formed vertical curb; except that median shoulders shall be minimum five feet in width.
- C. Twenty feet of drivable surface (which includes traveled way and paved shoulders) shall be provided on either side of the median.
- D. Median may be landscaped or pavement.
- E. Median shall be designed so as not to limit turning radii or sight distance at intersections. No portion of a side street median may extend into the right-of-way for an arterial street or be within 35 feet of an intersection.
- F. The Director of Public Works may require revisions to medians as necessary to provide for new access points and to maintain required sight distance.
- G. Non-yielding or non-breakaway structures shall not be installed in medians.
- H. Street trees shall be planted in median subject to approval by the Director of Public works.
- I. Pedestrian access across medians shall be as required by these Guidelines and shall conform to ADA standards.

## 2.13 One-Way Streets

Local access streets, including loops, may be designated one-way upon a finding by the Director of Public Works that topography or other site features make two-way traffic impractical.

## 2.14 Intersections with State or Federal Highways

In the event that the City has jurisdiction on a development that requires the construction or improvement of a commercial/industrial driveway or any classification of street that intersects a state or federal highway, at a minimum,

intersection spacing, entering sight distance and landing requirements shall be designed in accordance with these Guidelines. In the instance State or Federal standards exceed these Guidelines, State or Federal standards shall govern.

## 2.15 Slope, Wall, and Drainage Easements & Right-of-Way Reduction

### A. Easements

Either the functional classification or particular design features of a road may necessitate slope, sight distance, and wall or drainage easements beyond the right-of-way line. Such easements may be required in conjunction with dedication or acquisition of right-of-way pursuant to Chapter 20 of the SMC.

### B. Right-of-way reduction on local streets

In proposed developments served by underground utilities within easements, the right-of-way may be reduced to the minimum roadway width plus sidewalk and amenity zones with the approval of the City. Where it is desired to reduce right-of-way to a minimum width, the right-of-way, plus easement, shall allow for construction and maintenance of the following as appropriate, sidewalks, amenity zone, drainage facilities, sign placement, and also allow sidewalk widening around mailbox locations. On local streets, installation of fixed objects, other than required above ground utility structures, greater than four inches in diameter within four feet of back of sidewalk shall not be permitted.

## CHAPTER 3 – DRIVEWAYS, DRIVEWAY APPROACHES, SIDEWALKS, & TRAILS

### 3.01 Driveways & Driveway Approaches

- A. Driveway approaches shall be designed per Standard Details 301-307. Driveway design must be consistent with these Guidelines and 20.50.420 of the SMC. The following requirements also apply:
1. Driveway approaches shall be aligned with, or located to ensure the least amount of conflict with driveways on the opposite side of the street.
  2. Driveway approaches directly giving access onto arterials should be denied if alternate access is available.
  3. Landings on sloping driveway approaches are not to exceed a 7% slope for a distance of 30 feet approaching the back edge of sidewalk on an arterial, or a 10% slope for 20 feet approaching the back edge of sidewalk on a local street.
  4. The maximum driveway grade shall be 15%.
  5. All driveways shall be at 90° to the street, unless designated as right turn only.
  6. Where no curbing exists, an asphalt driveway approach may be used.
  7. The design of driveway approaches where the projected driveway usage is greater than 2,000 vehicles per day must be designed per Standard Details 301 – 307 and meet the following criteria:
    - a. Appropriate traffic control must be approved and provided;
    - b. A 100-foot storage area must be provided between the street and any turning or parking maneuvers within the development;
    - c. The opening is at least 100 feet from any other intersection opening;
    - d. The opening is at least 100 feet away from any other driveway on the property frontage under the control of the property owner; and

- e. Easements for traffic control devices are provided if they are to be located on private property.
  - 8. Where the building façade or other design element is less than 10 feet behind the sidewalk both pedestrian and vehicular sight distance shall be maintained.
  - 9. All abandoned driveway approaches on the same frontage shall be removed and the curbing and sidewalk, or shoulder, and ditch section shall be restored.
  - 10. No stamped driveway approaches are permitted in City right-of-way. In addition, no concrete is permitted in the right-of-way unless constructed per Standard Details 301-304.
  - 11. Maintenance of driveway approaches shall be the responsibility of the owner whose property they serve.
  - 12. For driveway approaches crossing an open ditch section, culverts shall be adequately sized to carry anticipated stormwater flows and in no case be less than 12 inches in diameter. The property owner making the installation shall be responsible for determining proper pipe size. The City may require the owner to verify the adequacy of the pipe size and to install catch basins.
  - 13. A residential driveway shall serve no more than two parcels.
  - 14. A joint use driveway easement may be used to serve two adjacent parcels:
    - a. Minimum easement width shall be sufficient width to accommodate the driveway, cross slope in one direction and curb or thickened edge on one side. Minimum easement length shall extend 20 feet from right-of-way line.
    - b. Driving surface shall be paved with approved materials. A paved approach shall be provided from the edge of pavement of the intersecting street to the edge of the right-of-way consistent with Details 301-304.
- B. Driveway approach widths shall be as shown in the table below:

**Table 3.1**  
Minimum Driveway Approach Widths (in feet)

Driveways Serving	Local Streets		Arterial Streets	
	Width		Width	
	Minimum	Maximum	Minimum	Maximum
1-2 Dwelling Units (attached or detached)	10'	20'	10'	20'
Multifamily	20'	30'	24'	36'
Commercial	24'	30'	30'	36'

1. Driveway approaches serving multifamily developments may be up to 30 feet in width, subject to the approval of the Director. A 36-foot wide multifamily or commercial driveway approach may be allowed when separate left- and right-turn exit lanes are approved by the Director. A commercial driveway wider than 36 feet may be approved through the Engineering Variance procedure.
2. Joint use single family and multifamily driveway approaches may be reduced to a minimum of 16 feet in width, subject to approval of the Director and the Fire Marshal.
3. Individual site conditions may necessitate the minimum required width of a driveway serving 1-2 dwelling units be increased to facilitate the safe movement of vehicles and/or when the driveway also serves public facilities.

C. Driveway Approach Details

1. Dimensions, slope, and detail shall be as indicated in Standard Details 301-307, and as further specified in the following subsections. See Section 2.01 for entering sight distance requirements.
2. For driveways designated as fire lanes and/or fire apparatus access roads the design standards delineated in the International Fire Code and Chapter 15 SMC shall also apply.
3. On frontages 100 feet or less, no more than one driveway approach per lot shall be constructed. A second driveway that serves a separate dwelling or lot may be permitted provided it can be demonstrated that due to site conditions a separate driveway is warranted. On frontages over 100 feet, two or more driveways per lot may be permitted, subject to approval by the City.
4. One-way driveways, or circular driveways, may be permitted if at least 100 feet separates driveway openings serving the same lot.

The driveway approach shall be 10-12 feet wide, subject to approval by the City.

5. No portion of a driveway approach shall be allowed within 3 feet of side property line extended in residential areas or 9 feet in commercial areas except as follows:
    - a. A joint use driveway approach may be located as provided in Standard Detail 307.
    - b. Driveways may utilize full width of narrow "flag pole" parcels or easements if approved by City.
    - c. On cul-de-sac bulbs as necessary for proposed residential access.
  6. Grade transitions, excluding the tie to the roadway, shall be constructed as smooth vertical curves. Ties to the roadway shall be constructed as shown in Standard Details 301 - 304. The maximum change in driveway grade, within the right-of-way, shall be 6% within any 10 feet of distance on a crest and 12% within any 10 feet of distance in a sag vertical curve. Driveways shall be graded to match into possible future widened road section without encroachment into graded shoulder or sidewalk. The designers of proposed developments must consider the access driveway profile when designing the serving road to ensure that required grade transitions can be complied with considering building set back and lot terrain conditions.
  7. Driveway approaches in existing rolled curb sections may not be constructed abutting and flush with sidewalk or back of curb without gapping or lowering height of curb.
- D. Existing driveway approaches may be reconstructed as they exist provided such reconstruction is compatible with the adjacent road and safety criteria.
- E. For commercial or industrial driveways with heavy traffic volumes or significant numbers of trucks, the City may require construction of the access/approach as a road intersection. This requirement will be based on traffic engineering analysis submitted by the applicant that considers, among other factors, intersection spacing, sight distance and traffic volumes.

### 3.02 Concrete Sidewalks

- A. Sidewalks shall be constructed:
1. Behind the amenity zone unless approved by the Director as part of a landscaping plan.
  2. To include an 18-inch root barrier placed between trees and sidewalks/curbs.
- B. Concrete sidewalk construction:
1. All sidewalks shall be constructed with Class 4000 concrete 5-inches thick with a non-slip broom finish.
  2. At driveway approaches, the concrete shall be 6 inches thick. In commercial/industrial areas, thickness may be increased dependent on use.
  3. Specialty finishes may be allowed with the approval of the Director of Public Works when the proposed material will provide a non-slip surface.
  4. In order to provide contrast required by the ADA, lampblack is required in all sidewalks. Mixture shall be 1lb. lampblack/yard of concrete. No lampblack shall be placed in curb ramps.
  5. The width of a sidewalk does not include the curb. Sidewalks shall maintain their full width around obstructions that cannot be relocated. Concrete sidewalk widths shall be constructed on each street classification as follows:
    - a. All Local Streets and Arterials abutting residential areas - 6 feet on both sides of street
    - b. Arterial Streets abutting zoning designations CB, I, NB, O, or RB zones - 8 feet on both sides of street
    - c. Alley – no sidewalk required
  6. The required width of a sidewalk in a commercial area may be greater than eight feet when it has been determined greater widths are warranted due to expected pedestrian traffic volume.

7. Surfacing shall be portland cement concrete as provided in Sections 3.03 and 4.01. See specifications for joints in Section 3.04 and Standard Detail 309.
8. The concrete shall be placed and finished per WSDOT 8-14.3(3).
9. All concrete shall be free of potmarks, graffiti, footprints, and tiremarks, in accordance with WSDOT 6-02.3(6).
10. Concrete sidewalks shall be cured for at least 72 hours. During curing time the sidewalks shall be protected from pedestrian and vehicle traffic.

### 3.03 Curbs, Gutters, and Sidewalks

- A. Type A vertical curb and gutter shall be used for street edges and shall always be used under the following conditions:
  1. on all arterials, neighborhood collectors, and local streets
  2. in drainage low spots where special drainage facilities are required
  3. on streets with grades greater than 8%
- B. Type A vertical curb and gutter shall be used on all street classifications. 24-inch width vertical curb shall be only used for uniformity or replacement.
- C. All curb and gutter shall be constructed with Class 4000 concrete furnished and placed in accordance with WSDOT/APWA Standard Specifications, Sections 6-02, 8-04, and 8-14. Cold weather precautions as set forth in WSDOT/APWA Standard Specifications Sections 5-05.3(14) and 6-02.3(6) shall apply.
- D. Rolled curbs may only be used to replace or match existing conditions as approved by the Director of Public Works.
- E. Subgrade compaction for curbs, gutters, and sidewalks shall meet a minimum 95% of maximum density.
- F. Extruded cement concrete curb shall be anchored to existing pavement by either steel tie bars or adhesive in conformance with WSDOT/APWA Standard Specification Section 8-04.
- G. Extruded asphalt curb shall be anchored by means of a tack coat of asphalt in accordance with WSDOT/APWA Standard Specification Section 8-04.

3.04 Expansion & Dummy Joints – See Standard Detail 309

- A. An expansion joint consisting of 3/8" or 1/4" x 2" full depth of premolded joint material shall be placed around fire hydrants, poles, posts, and utility castings and along walls or structures in paved areas. Joint material shall conform to the requirements of ASTM D994 (AASHTO M33).
- B. A dummy joint consisting of 3/8" or 1/4" x 2" of premolded joint material shall be placed in curbs and sidewalks at a minimum of 15 foot intervals and at sides of drainage inlets. When curbs and/or sidewalks are placed by slip-forming, a premolded strip up to 1/2" thick and up to full depth may be used.
- C. Dummy joints in sidewalks shall be located so as to match the joints in the curb whether the sidewalk is adjacent to curb or separated by an amenity zone.
- D. Tool marks consisting of 1/4" V-grooves shall be made in sidewalk at five foot intervals or equal to width of sidewalk, intermediate to the dummy joints.
- E. As alternative to expansion joints around structures, reinforcing bars may be embedded in concrete on four sides of structures.
- F. Interface between curb and adjacent sidewalks on integral pour construction shall be formed with 1/4" radius edging tool. On separate pour construction an expansion joint consisting of 3/8" or 1/4" x 2" full depth of premolded joint material shall be placed between the curb or thickened edge and the adjacent sidewalk.

3.05 Soft-Surface Path Construction (See Section 3.11 for Separated Walkways, Bikeways, and Trails)

- A. Width shall be 5' minimum unless otherwise approved by Director of Public Works.
- B. Acceptable surface materials are crushed rock, wood chips, and asphalt or other materials as approved by the Director of Public Works.
- C. The maximum grade shall not exceed 10%. Depending on site conditions, stairs and/or switchbacks may be required. For grades greater than 5%, the Director of Public Works may specify the type of paving material to be used.

3.06 Paved Path Construction - (See Section 3.11 for Separated Walkways, Bikeways, and Trails)

- A. Width shall be 5' minimum unless otherwise approved by Director of Public Works.
- B. Acceptable surface materials are asphalt concrete (asphalt) and Portland cement concrete (concrete) or other materials as approved by the Director of Public Works.
- C. The edges of asphalt paths shall be defined by 45 degree inverted thickened edges along both sides to prevent edge deterioration.
- D. The maximum grade shall not exceed 10% (5% when bicycle use is anticipated). Depending on site conditions, stairs and/or switchbacks may be required. The Director of Public Works may specify special paving and other treatment to be used on grades greater than 5%.
- E. Paths shall be a minimum of 5 feet from the edge of the vehicular travel way. A physical barrier may be required in lieu of the 5-foot separation when conditions dictate, particularly when bicycle use is anticipated as determined by the Director of Public Works.
- F. A 2-foot wide graded shoulder is required on either side of a paved bicycle pathway. The Director of Public Works may require a wider graded shoulder if heavy pedestrian use is anticipated.
- G. When asphalt paved paths are used, the widths shall correspond to the widths required for concrete sidewalks.

3.07 Curb Ramps

Curb ramps shall be provided at all sidewalks, paths, and pedestrian crossings with curb ramp sections or elevation changes (where crossing is permitted) in accordance with state law and federal guidelines established by the ADA. Ramps shall be designed as detailed in Standard Details 318, 319, and 320 and placed whenever possible as shown in Standard Details 315, 316, and 321.

3.08 Concrete Steps, Handrails/Guardrails, and Handicapped Access Ramps

- A. Steps shall only be used where acceptable alternative access is available for handicapped access and there is a need for a separate stairway. Where used, concrete steps shall be constructed in accordance with Standard Details 325 and/or 326 or other accepted design that is consistent with the WSDOT/APWA Standard Specifications. Handrails, whether for steps or

other applications, shall be provided consistent with Standard Details 323 and 324 and the WSDOT/APWA Standard Specifications.

- B. Ramps used to provide handicapped access shall have a maximum slope of 1 unit vertical to 12 units horizontal with a maximum rise of 30 inches between landings. Landings shall have a minimum length of five feet and five feet minimum width.
- C. Safety railing shall be provided and installed by the developer when a nonmotorized transportation facility will be above a slope or adjacent to a rock wall or retaining wall where the lowest finished elevation of the slope, rock wall, or retaining wall is 30 inches or more below the finished elevation of the facility, and
  - 1. The vertical wall face is less than 4 feet in horizontal distance from the near side face of the facility.
  - 2. The vertical wall face is greater than 4 feet in horizontal distance to the near side face of the facility, but the slope down to the wall top exceeds 1 vertical to 3 horizontal.
  - 3. The slopes adjacent to the facility average greater than 1 vertical to 2 horizontal.
- D. Guard rail shall be provided and installed by the developer as directed by the Director of Public Works. For purposes of warrants, design, and location, all guard-rails along public and private roadways shall conform to the criteria of the WSDOT Standard Plans and Specifications.

### 3.09 Amenity Zone

- A. All streets shall have an amenity zone except where protection of critical areas requires special consideration.
- B. The minimum amenity zone width is 4 feet.
- C. The amenity zone shall be located between the curb and the sidewalk on all streets.
- D. Street tree type and placement shall conform to section 20.50.480 of the SMC.
- E. Utilities, street light poles and traffic signs may be located in the amenity zone.

### 3.10 Asphalt Shoulders

- A. Asphalt paved shoulders may be used where approved by the Director of Public Works on existing roads to provide for bicycle and pedestrian use.
- B. Where shoulders are paved on one side only, they shall be delineated by a four-inch painted white line.

### 3.11 Separated Walkways, Bikeways, and Trails

Separated facilities are to be located on an easement or within the right-of-way when separated from the roadway by a drainage ditch or barrier. Where separated walkways, bikeways, or trails intersect with motorized traffic, sight distance, marking and signalization (if warranted) shall be as specified in MUTCD. Additionally, facilities shall be designed as follows:

- A. Separated asphalt walkways are designed primarily for pedestrians and are to be located within the right-of-way or easement.
- B. Soft surface pathways are designed for pedestrians. Such pathways shall be a minimum five feet wide with at least one and one-half foot clearance to obstructions on both sides and 10-foot vertical clearance. Pathways shall be designed and located so as to avoid drainage and erosion problems. Pathways shall be constructed of two and one-half inches of crushed surfacing top course or wood chips over cleared native material as approved by the City.
- C. Multi-purpose trails are typically designated for bicycle and pedestrian use and in general follow a right-of-way independent from any road.
- D. Separated bicycle path – see requirements for paved path construction
  - 1. Acceptable surface materials are asphalt and concrete.
  - 2. A two-way separated bike path shall be a minimum of 10 feet wide with a 2-foot wide minimum clear zone on both sides.
- E. Bicycle Lane
  - 1. Acceptable surface materials are asphalt and concrete.
  - 2. A bicycle lane on a public roadway shall be a minimum of 5 feet wide when curb and gutter is in place. The distance shall be measured from the face of curb to the near edge of the fogline that

designates the bicycle lane. An 18-inch Type A curb and gutter is required.

3. A bicycle lane on a public roadway shall be a minimum of 4 feet wide when no curb and gutter is in place. The width shall be measured from the edge of pavement to the near edge of the fogline that designates the bicycle marking. A minimum 2-foot-wide graded shoulder is required adjacent to the pavement.

F. Shared Roadway

1. Acceptable surface materials are asphalt and concrete.
2. The curb lane of a shared roadway shall be a minimum of 14 feet wide. The distance shall be measured from the face of curb to the near edge of the lane marking.

## CHAPTER 4 – SURFACING

### 4.01 Local and Arterial Streets, Pedestrian Facilities, and Bikeways

- A. The minimum paved section, with alternative combinations of materials, for Local and Arterial streets, shoulders, sidewalks and bikeways shall be as indicated in **Standard Details 201 or 202 and Appendix A or B**. These sections are acceptable only on visually good, well-drained, stable compacted subgrade. Any proposed exception to these materials will be subject to soils strength testing and traffic loading analysis and subject to review and approval by the Director of Public Works as outlined in Section 4.02 below.
- B. When a walkway or bikeway is incorporated into a road shoulder, the required shoulder section, if higher strength, shall govern. Subgrade compaction for bikeways and paved walkways shall meet a minimum of 90% maximum density.
- C. Driveway approaches shall be surfaced as follows:
  - 1. On curbed streets with sidewalks, driveway approaches shall be paved with portland cement concrete Class 4000 from curb to back edge of sidewalk. See Standard Details 301 - 304.
  - 2. On shoulder and ditch section, driveway approaches between edge of pavement and right-of-way line shall be surfaced as required by Standard Detail 306.
  - 3. On thickened edge roadways with underground utilities, portland cement concrete may be used for driveways between the thickened edge and the right-of-way line provided that a construction joint is installed at the right-of-way line.
- D. Street Widening/Adding Traveled Way to Existing Roads
  - 1. When an existing asphalt paved street is to be widened, the edge of pavement shall be sawcut to provide a clean, vertical edge for joining to the new asphalt. After placement of the new asphalt section, the joint shall be sealed and the street overlaid two inches, plus a pre-level course, full width throughout the widened area. The requirement for overlay may be waived by the Director of Public Works based on the condition of existing pavement and the extent of required changes to channelization.

2. When an existing shoulder is to become part of a proposed traveled way a pavement evaluation shall be performed. This evaluation shall analyze the structural capacity and determine any need for improvement. Designs based on these evaluations are subject to review and approval by the Director of Public Works. The responsibility for any shoulder material thickness improvement shall be considered part of the requirement for roadway widening.
3. Any widening of an existing roadway, either to add traveled way or paved shoulder shall have the same surfacing material as the existing roadway.

#### 4.02 Requirements for Local Streets on Poor Subgrade

The minimum material thicknesses indicated in Standard Details 201 or 202 and Appendix A or B are not acceptable if there is any evidence of instability in the subgrade. This includes free water, swamp conditions, fine-grained or organic soil, slides or uneven settlement. If there are any of these characteristics, the soil shall be sampled and tested sufficiently to establish a pavement design that will support the proposed construction. Any deficiencies, including an R-value of less than 55 or a CBR of less than 20, shall be fully considered in the design. Remedial measures may include, but are not limited to, a stronger paved section, a strengthening of subgrade by adding or substituting fractured aggregate, asphalt treated base, installing a geotextile, more extensive drainage or a combination of such measures. Both the soils test report and the resulting pavement design will be subject to review and approval by the Director of Public Works.

#### 4.03 Arterial Streets

Any pavement for arterial streets shall be designed using currently accepted methodology that considers the load bearing capacity of the soils and the traffic-carrying requirements of the roadway. Plans shall be accompanied by a pavement thickness design based on soil strength parameters reflecting actual field tests and traffic loading analyses. The analysis shall include the traffic volume and axle loading, the type and thickness of roadway materials and the recommended method of placement. Pavement sections shall not be less than those required for collector arterials.

#### 4.04 Materials & Lay-Down Procedures

Shall be in accordance with WSDOT/APWA Standard Specifications and the following requirements:

- A. Roadway surfacing shall consist of 2 inches Hot Mix Asphalt over 4 inches Asphalt Treated Base over 2 inches CSTC. When matching existing conditions, more material may be required. Existing roadway

design shall govern if existing roadway section is of higher strength than standard.

- B. Crushed surfacing top and base courses may be substituted for a structurally equivalent thickness of ATB. The substitution ratio of crushed surfacing to ATB shall be 1.6:1. Where base or top courses cannot be placed without possible contamination, then these courses shall be substituted by ATB.
- C. During surfacing activities utility covers in roadway shall be adjusted in accordance with Section 8.03.
- D. ATB may be used over isolated areas of unstable subgrade, providing the final lift of asphalt shall not be placed for a minimum of six months to allow time for the observation and repair of failures in the Subgrade and ATB.
- E. Asphalt pavers shall be self contained, power-propelled units. Truck mounted type pavers are not considered self propelled. Truck mounted pavers shall only be used for paving of irregularly shaped or minor areas as approved by the Director of Public Works, or as follows:
  - 1. pavement widths less the eight feet; and
  - 2. pavement lengths less than 150 feet.

#### 4.05 Pavement Markings, Markers, and Pavement Tapers

Pavement markings, markers or striping shall be used to delineate channelization, lane endings, crosswalks and longitudinal lines to control or guide traffic. Channelization plans or crosswalk locations shall be approved by the Director of Public Works.

Pavement markings for channelization and extruded or sprayed markings shall be as specified in the WSDOT Standard Specifications.

All pavement markings shall be laid out with spray paint and approved by the Director of Public Works before they are installed. Approval may require a three working day advance notice for layout approval.

## CHAPTER 5 – ROADSIDE FEATURES

### 5.01 Rock Facings and Segmental Retaining Walls

A. Rock facings may be used for the protection of cut or fill embankments up to a maximum height of eight feet above the keyway in stable soil conditions, which will result in no significant foundation settlement or outward thrust upon the walls. See Standard Details 501 - 504. For heights over eight feet above the keyway or when soil is unstable, a structural wall of acceptable design shall be used. As an exception, rock facing heights may exceed eight feet to a limited extent based on favorable soils analyses and a design by a geotechnical engineer or other professional engineer qualified in rock wall design, subject to approval by the Director of Public Works.

#### B. Materials

1. Size categories shall include:

Two-man rocks (200 to 700 pounds), 18"-28" in average dimension;  
Three-man rocks (701 to 2000 pounds), 28-36" in average dimension; and  
Four-man rocks (2001 to 4000 pounds), 36-48" in average dimension.

Four-man rocks shall be used for bottom course rock in all rock facings over six feet in height.

2. The rock material shall be as nearly rectangular as possible. No stone shall be used which does not extend through the wall. The quarried trap rock shall be hard, sound, durable and free from weathered portions, seams, cracks and other defects. The rock density shall be a minimum of 160 pounds per cubic foot, measured according to WSDOT Test Method 107 (Bulk Specific Gravity - S.S.D. basis). Additionally, rock subjected to the U.S. Army Corps of Engineers Test Method CRD-C-148 ("Method of Testing Stone for Expansive Breakdown on Soaking in Ethylene Glycol") must have less than 15 percent breakdown.

#### C. Keyway

A keyway consisting of a shallow trench of minimum 12-inch depth shall be constructed the full rockery length, and slightly inclined towards the face being protected. It shall be excavated the full rockery width including the rock filter layer. The keyway subgrade shall be firm and

acceptable to the Director of Public Works. See Standard Details 501 - 504.

D. Underdrains

1. A minimum six-inch diameter perforated or slotted drainpipe shall be placed in a shallow excavated trench located along the inside edge of the keyway. The pipe shall be bedded on and surrounded by "Gravel Backfill for Drains" (WSDOT/APWA 9-03.12(4)) to a minimum height of 18 inches above bottom of pipe. A filter fabric shall surround the gravel backfill and shall have a minimum one-foot overlap along the top surface of the gravel. The Director may waive this requirement for fabric if shown that soils and water conditions make it unnecessary. See Standard Details 501 - 504.
2. The perforated pipe shall be connected to the storm drain system or to an acceptable outfall.

E. Rock Selection and Placement: Rock selection and placement shall be such that there will be minimum voids and, in the exposed face, no open voids over six inches across in any direction. The final course shall have a continuous appearance and be placed to minimize erosion of the backfill material. The larger rocks shall be placed at the base of the facing so that it will be stable and have a stable appearance. The rocks shall be placed in a manner such that the longitudinal axis of the rock shall be at right angles to the face. The rocks shall have all inclined faces sloping to the back of the facing. Each course of rocks shall be seated as tightly and evenly as possible on the course beneath. The rocks shall be placed so that there are no continuous joint planes either horizontally or vertically. After setting each course of rock, all voids between the rocks shall be chinked on the back with quarry rock to eliminate any void sufficient to pass a two-inch square probe. See Standard Detail 501 - 504.

F. Rock Filter Layers: The rock filter layer shall consist of quarry spalls with a maximum size of four inches and a minimum size of two inches. This material shall be placed to a 12-inch minimum thickness between the entire facing and the cut or fill material. The backfill material shall be placed in lifts to an elevation approximately six inches below the top of each course of rocks as they are placed, until the uppermost course is placed. Any backfill material on the bearing surface of one rock course shall be removed before setting the next course.

G. Fill Rockery Facing Supporting Roadway Embankment: Embankment behind rockeries exceeding four feet in height above the keyway shall be reinforced with a geosynthetic fabric or geogrid specifically manufactured

for soil reinforcement, designed on a project specific basis by a qualified engineer. See Standard Detail 502.

H. Sidewalks Above Rockery Facings: When a sidewalk is to be built over a rock facing, the top of the facing shall be sealed and leveled with a cap constructed of cement concrete Class 3000 in accordance with the applicable provisions of Section 6-02 of the WSDOT/APWA Standard Specifications, but with reduced water content resulting in slump of not over two inches. See Standard Detail 503.

I. Fences and Handrails

When a walking surface is located on top of a wall or rockery, fences or a metal handrail shall be installed when rockery is three feet or greater in height. See Standard Details 501 - 504.

#### 5.02 Side Slopes

A. Side slopes shall generally be constructed no steeper than 2:1 on both fill slopes and cut slopes. Steeper slopes may be approved by the Director upon demonstration that the steeper slopes, based on soils analyses, will be stable. Side slopes on projects funded by federal grants shall be constructed in conformance with Local Agency Guidelines.

B. Side slopes shall be stabilized by grass sod or seeding or by other planting or surfacing materials acceptable to the Director of Public Works.

#### 5.03 Street Trees & Amenity Zones

A. Street trees and amenity zones should be incorporated into the design of road improvements for all classifications of roads. Such landscaping in the right-of-way shall be coordinated with off-street landscaping required on developer's property under the provisions of Chapter 20.50 SMC.

B. The design of amenity zones must be approved by the Director and Director of Public Works and must include a landscaping plan, in which utilities and traffic safety requirements are discussed.

C. Existing trees and landscaping shall be preserved where desirable and placement of new trees shall be compatible with other features of the environment. In particular, maximum heights and spacing shall not conflict unduly with overhead utilities, or root development with underground utilities.

D. New trees must be consistent with the approved street tree list (See Appendix C).

#### 5.04 Appurtenances

- A. An appurtenance is defined as a fixed object that may be a safety hazard located adjacent to a street.
- B. Appurtenances shall be located a minimum of 2.5 feet behind the face of the curb. Appurtenances shall not be located within the sidewalk area.
- C. A breakaway object is any object having properties up to that of a 4-inch by 4-inch wooden post at a point 6 inches above the ground. All breakaway objects shall be located a minimum of 2 feet behind the face of curb or 6 feet behind the edge of pavement.

#### 5.05 Mail Boxes

- A. Mailboxes shall be clustered together where practical and where reasonably convenient to the houses being served.
- B. When mailboxes are located in the sidewalk, the sidewalk shall be widened to provide the full design width around the mailboxes.
- C. In the case of new street construction, or street reconstruction that requires mailboxes to be moved, the designer and builder shall coordinate with the Station Master or Postmaster at the nearest post office. Mailbox locations approved by the U.S. Postal Service shall be shown on approved street construction plans.
- D. Mailboxes shall be installed as shown on Standard Details 514, 515, and 516.

#### 5.06 Street Illumination

- A. All lighting shall conform to NEIS standards. Street lighting system designs shall be stamped by a licensed engineer experienced with lighting design and shall include the following: luminaire spacing, illumination level, uniformity ratio, line losses, power source, the electrical and physical layout, installation details, plans and specifications. All designs must be approved by the Director of Public Works
- B. Street lighting system design requirements are as follows:
  - 1. For City-owned arterial systems, street lighting design shall be based on WSDOT/APWA Standard Plans and Specifications.

2. As-built street lighting plans for City-owned systems shall be provided to the City on CD-ROM in CAD or Portable Document Format (PDF) and on 22-inch by 34-inch mylars prior to final occupancy or final plat approval.
  3. Street lighting systems shall be designed to be accessible by a wheeled vehicle weighing 30,000 lbs.
  4. Luminaires in residential areas should be located near intersections, at street ends, at nonmotorized crossings, and mid-block of streets over 300 feet in length.
  5. Contractor cabinets equipped with electrical meters, time clocks, circuit breakers, and other required components are required on arterial installations of 5 or more street lights or as required by the Director of Public Works.
  6. The exact location of the power source shall be indicated together with the remaining capacity of that circuit. System continuity and extension shall be provided.
- C. Street lighting system for residential streets shall be designed and constructed on a separate power source from the arterial lighting system. All street light maintenance, installation and power costs for residential street systems shall be paid for by the property owner, homeowner, or homeowner's association unless part of a City approved lighting program.
- D. Street lighting is encouraged but not required along private streets. Street lighting systems for private streets shall be designed and constructed on a separate power source from the public street lighting system. All street light maintenance, installation, and power costs for private street systems shall be paid by the property owner, homeowner, or homeowners' association.

#### 5.07 Survey Monuments

- A. All existing survey monuments, which are disturbed, lost, or destroyed during surveying or building shall be replaced by a land surveyor registered in the State of Washington at the expense of the responsible builder or developer.
- B. Survey monuments shall be placed or replaced in accordance with recognized good practice in land surveying, and in conformance with Standard Detail 519.

#### 5.08 Roadway Barricades

Temporary and permanent barricades shall conform to the standards described in the MUTCD and City of Seattle Traffic Control Manual for In-Street Work.

#### 5.09 Bollards

When necessary to deny motor vehicle access to an easement, tract, or trail, except for maintenance or emergency vehicles, the point of access shall be closed by a line of bollards. These shall include one or more fixed bollards on each side of the traveled way and removable, locking bollards across the traveled way. Spacing shall provide one bollard on centerline of trail and other bollards spaced at minimum 50 inches on center on trails 10 feet wide or less measured from the center post in the center of the trail. Spacing shall be 60 inches on center on trails wider than 10 feet. Bollard design shall be in accordance with Standard Detail 505 or other design acceptable to the Director of Public Works. No fire apparatus access roads shall be blocked in this manner without the concurrence of the Fire Marshal. Bollards shall be located at least 10 feet laterally from the paved edge of roadway.

#### 5.10 Guardrail/Embankment Heights

Guardrail and end anchor installations shall conform to WSDOT/APWA Standard Plans.

Evaluation of embankments for guardrail installations shall be in accordance with the WSDOT Design Manual.

#### 5.11 Traffic Control Devices (Signing, Signals, and Pavement Markings)

The Director of Public Works shall review and approve all traffic control devices. All traffic control devices shall conform to the MUTCD and City of Seattle Traffic Control Manual for In-Street Work.

1. All signs such as street name, parking, stop, dead end, speed limit, and nonmotorized indicators will be field-located by the Inspector. It is the responsibility of the property owner to ensure that signs are maintained in good condition until the development and right-of-way are accepted by the City. Any damaged signs will be replaced by the property owner at her/his expense.
2. All channelization and pavement markings such as raised pavement markers, paint, thermoplastics, etc., shall be pre-marked by a City-

approved striping contractor, and the layout approved by the Inspector, prior to permanent installation by the contractor.

3. Temporary traffic control to insure traffic safety during construction activities shall be provided by the developer and installed per MUTCD standards and City of Seattle Traffic Control Manual for In-Street Work or as directed by the inspector.

## CHAPTER 6 – RESERVED

## CHAPTER 7 – DRAINAGE

### 7.01 General

- A. Designs: Drainage facilities shall be designed consistent with the 1998 King County Surface Water Design Manual (urban environments only) and Chapter 20.60, subchapter 3 of the SMC and the City of Shoreline Surface Water Design Code (Section 1: Addendum to the 1998 KCSWDM). Structures shall be placed and constructed as shown in the Standard Drawings.
- B. Specifications: Materials, construction, and testing are specified in the WSDOT/APWA Standard Specifications. The Director of Public Works may amend, delete, or add specifications or Standard Drawings.

## CHAPTER 8 – UTILITIES

### 8.01 Standard Utility Locations within the Right-of-Way

All utility structures shall be located in the amenity zone, at the back of sidewalk without encroaching onto private property, in the gutter line, or within the roadway as specified below. In no instance will new utility structures be allowed to be located in sidewalks, driveways, driveway approaches, or curb ramps. Utilities within the right-of-way on new roads or on roads where existing topography, utilities or storm drains are not in conflict shall be located as shown in typical sections, Standard Details 201 and 202, and as indicated below. Where existing utilities or storm drains are in place, new utilities shall conform to these Guidelines as nearly as practicable and yet be compatible with the existing installations. Above ground utilities located within intersections shall be placed so as to avoid conflict with placement of curb ramps.

- A. Gas & Water Lines:
  1. Designated Side of Roadway Centerline:  
GAS: 5 to 10 feet South and West  
WATER: 5 to 10 feet North and East

2. Depth: 24 inches minimum cover from finished grade, ditch bottom or natural ground.
- B. Individual water service lines shall:
1. Be placed with minimum 24-inch cover from finished grade, ditch bottom or natural ground.
  2. Use road right-of-way as necessary to make side connections.
  3. For any one connection, not extend more than 60 feet along or through the right-of-way, or the minimum width of the existing right-of-way.
  4. Water meter boxes, when placed or re-placed, shall be located on the right-of-way line immediately adjacent to the property being served within the 1 foot setback between the back of sidewalk and right-of-way line, unless otherwise approved by the Director. Meter box locations within the right-of-way may be approved by the Director of Public Works based on site conditions which make routine service access difficult or impractical.
- C. Sanitary Sewers: In the general case, five feet south and west of centerline; depth 96-inch minimum cover from finished grade, ditch bottom or natural ground.
- D. In the case of individual sanitary sewer service lines, which are force mains, the pipe shall:
1. Be minimum two inches I.D., or as required by the utility to maintain internal scouring velocity.
  2. If nonmetallic, contain wire or other acceptable proximity detection features; or be placed in a cast iron or other acceptable metal casing.
  3. Be placed with minimum three-foot cover from finished grade, ditch bottom or natural ground, within 10 degrees of perpendicular to road centerline, and extend to right-of-way line.
  4. Be jacked or bored under road unless otherwise approved by the Director of Public Works.

- E. Sanitary sewer and water lines shall be separated by a minimum of 10 feet in accordance with good engineering practice such as the Criteria for Sewage Work Design, Washington Department of Ecology, latest edition.
- F. Gravity systems, whether sanitary or storm drainage, shall have precedence over other systems in planning and installation except where a non-gravity system has already been installed under previous approved permit and subject to applicable provisions of such permits or franchises.
- G. Electric utilities, power, telephone, fibre-optic cable, cable TV: The City requires undergrounding for all projects that do not meet the exemptions stated in Chapter 13 and Chapter 20 of the SMC. Underground utilities with 36 inch minimum cover, either side of road, at plan location and depth compatible with other utilities and storm drains. For projects that meet the undergrounding exemptions in the SMC, every new placement and every replacement of existing utility poles and other utility structures above grade shall conform to the following:
  - 1. Utility poles or other obstacles may be placed within the right-of-way and shall be as far back as conditions allow from the traveled way or auxiliary lane.
    - a. On shoulder type roads, poles or obstacles shall be located back of ditches unless protected by concrete barrier, suitable impact attenuating device or placed more than three and one-half feet behind face of guardrail, as allowed by an approved variance from the Engineering standards.
    - b. On vertical curb type roads with a speed limit less than 40 miles per hour, poles or obstacles shall be placed clear of sidewalks and at least eight and one-half feet from face of curb in business areas and five and one-half feet from curb face in residential areas. On urban roads with a speed limit of 40 miles per hour or greater, poles and obstacles shall be placed as directed by the City.
    - c. Notwithstanding the other provisions regarding pole locations described in these standards, no pole shall be located so that it poses a hazard to the general public. Utilities shall place and replace poles with primary consideration given to public safety.
  - 2. The constraints on pole and obstacle locations will not apply to locations not accessible by moving vehicles, "breakaway" structures whose break-off resistance does not exceed that of 4" x 4" wood post or a 1-1/2-inch standard (hollow) iron pipe or to

"breakaway" fire hydrants installed to manufacturer's specifications.

3. Deviations from the pole and obstacle clearance criteria may be allowed when justified by suitable engineering study considering traffic safety. This deviation will only be considered for a Utility. Up to three contiguous damaged or weakened poles may be replaced at existing locations under permit in accordance with emergency procedures, however, sequential permits resulting in continuous replacement of a pole line shall not be allowed. A pole or other obstacle, which incurs repeated damage from errant vehicles, shall be relocated or protected.
  4. Locations of poles shall also be compatible with driveways, intersections, and other road features (i.e., they shall not interfere with sight distances, road signing, traffic signals, culverts, etc.). To the extent possible, utilities shall share facilities so that a minimum number of poles is needed.
  5. Where road uses leave insufficient overhang, anchor, and tree-trimming space for overhead utilities, consideration will be given to vary from the Guidelines or for the acquisition of additional easements and/or right-of-way for this purpose. Costs incurred for said acquisition shall be borne by the developer, builder, or other party initiating the road construction. The associated cost of relocating the utility shall not be borne by the City.
- H. Notwithstanding other provisions, underground systems shall be located at least five feet away from road centerline and where they will not otherwise disturb existing survey monumentation.

## 8.02 Underground Utility Installation

- A. General: The WSDOT/APWA Standard Specifications will generally apply unless otherwise stated below. Construction shall be in conformance with conditions outlined in the Right-of-Way Use Permit. Undergrounding of utilities is required pursuant to section 20.70.470 SMC.
1. Trench restoration shall be accomplished with a patch or an overlay as required by the Director of Public Works. Cement concrete pavement must be patched with cement concrete. A full overlay will be required for all trenches that occur in a street that has been overlaid within the past 5 years. Overlays shall run from property line to property line of road frontage subject to approval by the Director of Public Works. Corner lot overlays to be determined by Inspector.

2. If a patch is used, the trench limits shall be sawcut prior to final patch.
3. All trench and pavement cuts shall be made by sawcuts or by grinding. The sawcuts or grinding shall be a minimum of 1 foot outside the trench width.
4. If the Right-of-Way Use Permit requires an overlay, then the contractor may use a jackhammer or drum grinder for the cutting of the existing pavement.
5. If the existing material is determined by the Inspector to be suitable for backfill and the trench is not perpendicular to a travel lane or driveway, the contractor may use the native material as long as the top 8 inches is crushed surfacing material.
6. Backfill compaction shall be performed in 8- to 12-inch lifts. The compaction tests shall be performed in maximum increments of 2 feet. The test results shall be given to the Inspector for review and approval prior to paving. Material testing will be required for trench backfill (native or imported), asphalt, and concrete. Testing shall be performed by a certified independent testing laboratory. The cost of testing is the responsibility of the franchise utility or contractor. The number of tests required shall be the same as for asphalt density testing, or as directed by the Inspector.
7. Temporary restoration of trenches for overnight use shall be accomplished by using cold mix, asphalt-treated base (ATB), or steel plates. ATB used for temporary restoration may be dumped directly into the trench, bladed out, and rolled. After rolling, the trench must be filled flush with asphalt to provide a smooth riding surface.
8. If steel plates are being used to cover trenches temporarily, plates shall be pinned and cold mix asphalt shall be added to provide suitable transition from roadway to top of steel plate.
9. ATB shall be placed to the compacted depth as directed by the Director of Public Works. Asphalt cement shall be paving asphalt AR-4000W. Materials shall conform with Section 9-02 of the WSDOT Standard Specifications.
10. Tack shall be emulsified asphalt grade CSS-1 as specified in Section 9-02.1(6) of the WSDOT/APWA Standard Specifications and shall be applied to the existing pavement and edges of sawcuts

as specified in Section 5-04 of the WSDOT/APWA Standard Specifications.

11. Asphalt concrete Class B shall be placed on the prepared surface by an approved paving machine and shall be in accordance with the requirements of WSDOT Section 5-04 of the Standard Specifications, except that longitudinal joints between successive layers of asphalt concrete shall be displaced laterally a minimum of 12 inches, unless otherwise approved by the Inspector. Fine and coarse aggregate shall be in accordance with WSDOT Section 9-03.8 of the Standard Specifications. Asphalt concrete over 2 inches thick shall be placed in equal lifts not to exceed 2 inches each.
12. Cuts for trenches in all street surfaces, walks, and driveways shall be either ground or sawcut. Ground joints shall be feathered and shimmed to provide a smooth surface. Feathering and shimming shall be accomplished by raking out the oversized aggregates from the Class B mix. Surface smoothness shall conform to WSDOT Section 5-04.3(13) of the Standard Specifications. The paving shall be corrected by removal and repaving of the trench only.

B. Utility Cuts on Existing Traveled Roads

1. In trenching through existing pavement, the open cut shall be a neat-line cut made by saw cutting a continuous line ONLY. Trench sides shall be kept as nearly vertical as possible. Compaction and restoration must be done as detailed and immediately after the trench is backfilled, so as to cause least disruption to traffic. Cement concrete pavement shall be cut one foot outside the edge of the trench on each side.
2. In cuts parallel to road alignment:
  - a. All trench backfill under roadway shall be mechanically compacted to 95 percent of maximum density except for trenches over eight feet in depth. Throughout the length of any pipe run, manhole to manhole, in which any part is over eight feet deep, backfill at depths over four feet shall be compacted to 95 percent maximum density by either water settling (see Subsection 8.03C below) or mechanical compaction. The top four feet of the trench line shall then be mechanically compacted to 95 percent. All densities shall be determined by testing specified in Section 2-03.3(14)D of WSDOT/APWA Standard Specifications.

- b. In any trench in which 95 percent density cannot be achieved with existing backfill, the top four feet shall be replaced with gravel base as specified in the WSDOT/APWA Standard Specifications, Section 9-03.10. This new material shall then be mechanically compacted to 95 percent.
  - c. Restoration of a trench within an asphalt pavement shall include a minimum of six and one-half inches of crushed surfacing material and asphalt concrete Class B the same thickness as the existing asphalt pavement or a minimum of two inches, whichever is the greater. Pavement shall then be overlaid full width with a minimum of one inch compacted asphalt concrete Class B. The length of the cut will be determined by the Inspector after a review of surrounding pavement condition. Cuts/overlays may not terminate at a failing roadway segment. Any exceptions to this overlay requirement will be on a case-by-case basis, subject to approval by the Director of Public Works, considering the existing conditions of the pavement. Concrete pavement shall be restored consistent with Section 6-02 of the WSDOT/APWA Standard Specifications. Any concrete pavement traffic lane affected by the trenching shall have all affected panels replaced.
3. In cuts perpendicular to road alignment:
- a. In general, utility trenching through existing pavement across the road alignment will be discouraged. It will not be permitted unless it can be shown that alternatives such as boring or jacking are not possible due to conflicts or soil conditions, or unless the utility can be installed just prior to reconstruction or overlay of the road.
  - b. The entire trench shall be backfilled with CDF meeting the requirements of the WSDOT/APWA Standard Specifications. Steel plate(s) shall cover CDF for 48 hours prior to pavement placement. Backfill shall be placed and compacted mechanically in six-inch lifts with a City inspector present. If the capability can be demonstrated, based on compaction equipment or quality of backfill to achieve 95 percent density in thicker lifts, the depth of backfill lifts may be increased up to one foot. After backfill and compaction, an immediate cold mix patch shall be placed and maintained in a manner acceptable to the Director of Public Works. On asphalt pavement, a permanent hot mix patch the same thickness as the existing asphalt or a minimum of two inches, whichever is the

greater, shall be placed and sealed with a paving grade asphalt within 30 calendar days. Cement concrete pavement shall be connected to existing concrete pavement with rebar and restored with an eight-sack mix, using either Type II or Type III cement, within 30 calendar days.

C. Controlled Density Fill (CDF)

As an alternative to mechanical compaction, trench backfill above the bedding and below the base course or ATB may be accomplished by use of controlled density Fill (CDF) in a design mixture as specified in the WSDOT Standard Specifications. On crossings required to be opened to traffic prior to final trench restoration, steel plates may be used as approved by the Director of Public Works.

D. Testing

1. Consistent with the above and prior to placing any surface materials on the roadway, it shall be the responsibility of the developer to provide density test reports certified by a professional engineer. Compaction of all lifts of asphalt shall be at an average of 92% of maximum density as determined by WSDOT Test Method 705. The number of tests required per square foot of trenching shall be as follows:

- a. One test for less than 50 square feet of trenching area
- b. Two tests for 50 to 100 square feet of trenching area
- c. Three tests for 100-plus to 300 square feet of trenching area
- d. One test for every 200 square feet over 300 square feet of trenching area or every 100 lineal feet of trench, if applicable

Compaction of laterals or service line trenches shall be tested where directed by the Director of Public Works. Testing of CDF shall be in accordance with ASTM D4832.

2. Regardless of the compaction method, backfill below four feet must test to be not less than 90 percent maximum density and the upper four feet of backfill must test not less than 95 percent maximum density. Where this cannot be achieved, all affected backfill in the top four feet shall be removed and replaced by gravel base and mechanically compacted to 95 percent as in B.2 above.

Testing shall be performed by a certified independent testing laboratory. The cost of testing is the responsibility of the franchise utility or contractor. The testing is not intended to relieve the contractor from any liability for the trench restoration.

#### 8.03 Final Utility Adjustment (to Finish Grade)

- A. All utility covers, which are located on proposed asphalt roadways, shall be temporarily placed at subgrade elevation prior to placing crushed surfacing material.
- B. Final adjustment of all covers and access entries shall be made following final paving by:
  - 1. Saw-cutting or neat-line jack hammering of the pavement around lids and covers. Opening should not be larger than 12 inches beyond the radius of the cover.
  - 2. Removing base material, surfacing course, and frame; adding raising bricks; replacing frame and cover no higher than finished grade of pavement and no lower than one-half inch below the pavement.
  - 3. Filling and mechanically compacting around the structure and frame with crushed surfacing material or ATB, or pouring in five inch minimum thickness of cement concrete Class 4000 to within two inches of the top.
  - 4. Filling the remaining two inches with asphalt concrete Class B hot mix, compacted and sealed to provide a dense, uniform surface.
  - 5. Final adjustment of all covers and access entries shall be completed within 30 days of final paving.

#### 8.04 Final Cleanup, Restoration of Surface Drainage and Erosion Control

In addition to restoration of the road as described above, the responsible utility shall care for adjacent areas in compliance with Sections 1-04.11 "Final Cleanup", 8-01 "Roadside Seeding", and 8-02 "Roadside Restoration" in the WSDOT/APWA Standard Specifications. In particular:

- A. Streets and roads shall be cleaned and swept both during and after the installation work.

- B. Disturbed soils shall be final graded, seeded and mulched after installation of utility. In limited areas seeding and mulching by hand, using approved methods, will be acceptable.
- C. Ditch lines with erodible soil and subject to rapid flows may require seeding, jute matting, netting, or rock lining to control erosion.
- D. Any silting of downstream drainage facilities, whether ditches or pipe and catch basins, which results from the utility installation shall be mechanically cleaned out and the work site restored to a stable condition as part of site cleanup. Catch basins and pipes shall be vactored.

## CHAPTER 9 – INSPECTION AND TRAFFIC CONTROL

### 9.01 Notification and Inspection

- A. Any permit holders, utilities, or others intending to trench in existing or proposed traveled City roads shall notify City of Shoreline Public Works Department office not less than one working day prior to doing the work. This notification shall include:
  1. Location of work
  2. Method of compaction to be used
  3. Day and hour when compaction is to be done
  4. Day and hour when testing is to be done
- B. When trenching occurs within the street shoulder, the shoulder shall be restored to its original or better condition within 30 days of first opening the trench.
- C. The final patch shall be completed within 30 days of first opening the trench. Delays must be approved by the Inspector.

### 9.02 Traffic Control in Development Construction

- A. **Interim Traffic Control:** The permit holder/contractor shall be responsible for interim traffic control during construction on or along traveled City roads. When road or drainage work is to be performed on City roads that are open to traffic, the developer/contractor will be required to submit a traffic control plan for approval by the City prior to beginning the work. Traffic control shall follow the guidelines of Section 1-07.23 of the WSDOT/APWA Standard Specifications. All barricades, signs and flagging shall conform to the requirements of the MUTCD Manual and

City of Seattle Traffic Control Manual for In-Street Work. For more specific requirements for barricades, see WSDOT Standard Specifications. Signs must be legible and visible and should be removed at the end of each work day if not applicable after construction hours.

- B. Temporary Road Closures and Detours: When temporary road closures cannot be avoided the permit holder/contractor shall post "To Be Closed" signs a minimum of five days prior to the closing. The types and locations of the signs shall be shown on a detour plan. A detour plan must be prepared and submitted to the Director of Public Works at least 10 working days in advance, and approved prior to closing any City road. In addition, the permit holder/contractor must notify, in writing, local fire, school, law enforcement authorities, Metro transit, and any other affected persons as directed by the Director of Public Works at least five days prior to closing.
- C. Haul Routes: If the construction of a proposed development is determined by the City to require special routing of large trucks or heavy construction equipment to prevent impacts to surrounding roads, residences or businesses, the permit holder/contractor shall be required to develop and use an approved haul route.

When required, the haul route plan must be prepared and submitted to the Director of Public Works and approved prior to beginning or continuing construction. The haul route plan shall address routing, hours of operation, signage and flagging, and daily maintenance.

If the permit holder/contractor's traffic fails to use the designated haul route, the City may prohibit or limit further work on the development until such time as the requirements of the haul route are complied with.

- D. Haul Road Agreement: When identified as a needed, a haul road agreement shall be obtained by the franchised utility, developer or property owner establishing restoration procedures to be performed upon completion of the haul operation.



## **Section 3**

# **Standard Drawings and Details**

**Department of Public Works  
Department of Planning and Development Services**

## STANDARD DRAWINGS AND DETAILS

### 100. Reserved

### 200. Road Types & Geometrics

<u>Plan No.</u>	<u>Title</u>
201	Typical Local Street
202	Typical Arterial Street
203	Typical Alley
204	Half Street
205	Shoulder Treatment
206	Island Strips
207	Median
208	Reserved
209	Street Ends
210	Traffic Circles
211	Traffic Circle Details
212	Asphalt Traffic Circle Details
213	Speed Hump: Design, Pavement Marking, and Signing
214	Split Speed Hump
215	Intersection Landing
216	Reserved
217	Chicane

### 300. Driveways, Walks, and Trails

<u>Plan No.</u>	<u>Title</u>
301	Curb and Gutter Section Driveway
302	Driveway without Amenity Zone
303	Driveway with Reverse Slope
304	Driveway with Reverse Slope without Amenity Zone
305	Location and Width of New Driveways
306	Shoulder and Ditch Section Driveway
307	Joint Use Driveway
308	Reserved
309	Curb and Sidewalk Joints
310	Asphalt Thickened Edge
311	Temporary Asphalt Transition Ramp to Shoulder
312	Curbs
313	Extruded Curbs
314	Curb Extensions
315	Crosswalk with Single Approach Lane
316	Crosswalk with Multiple Approach Lanes
317	Reserved
318	Curb Ramp Type A
319	Curb Ramp Type A-3

**300. Driveways, Walks, and Trails (continued)**

<u>Plan No.</u>	<u>Title</u>
320	Curb Ramp Type C
321	Curb Ramp Locations
322	Reserved
323	Hand Rails
324	Public ROW Hand.Guardrail
325	Stairs
326	Cement Concrete Stairway
327	Fencing
328	Reserved
329	Typical Section for Trails
330	Reserved
331	Reserved
332	Trail Fencing/Screening
333	Trail Fencing/Screening Cross Section View
334	Trail Signs
335	Greenbelt Fence

**400. Surfacing**

<u>Plan No.</u>	<u>Title</u>
401	Channelization – Left Turn Lanes
402	Channelization – Vehicles & Bicycles
403	Pavement Marking Detail

**500. Roadside Features**

<u>Plan No.</u>	<u>Title</u>
501	Rock Facing – Cut Section
502	Rock Facing – Fill Section
503	Rock Facing Under Sidewalk
504	Rock Facing – Fill Section Reinforcement
505	Bollards
506	Street Signs – Standards & Locations
507	Reserved
508	Traffic Sign and Wood Post Installation
509	Traffic Sign and Wood Post Installation
510	Post Cap
511	Traffic Sign and 2” Square Metal Post Installation
511A	Traffic Signs – Surface Mount Installation
512	Object Marker Installation
513	Reserved
514	Mailbox Stand with Amenity Zone
515	Mailbox Stand without Amenity Zone
516	Neighborhood Delivery and Collection Box Unit Installation
517	Reserved
518	Reserved

**500. Roadside Features (continued)**

<u>Plan No.</u>	<u>Title</u>
519	Monuments
520	Reserved
521	Tree Staking in Sidewalk with Grate

**600. Reserved**

**700. Drainage**

<u>Plan No.</u>	<u>Title</u>
701	Beveled End Pipe Section
702	Trash Rack (Debris Cage)
703	Trash Rack (Debris Cage) – Conical
704	Reserved
705	Catch Basin Type 1
706	Catch Basin Type 1-L
707	Catch Basin Installation
708	Catch Basin Type 2 – 48”, 54”, 60”, 72”, and 96”
709	Catch Basin Details
710	Reserved
711	Reserved
712	Manhole Type 1 – 48”, 54”, and 60”
713	Manhole Type 2 – 72” and 96”
714	Manhole Type 3 - 48”, 54”, 60”, 72”, and 96”
715	Manhole Type 4
716	Manhole Details
717	Reserved
718	Reserved
719	Reserved
720	Locking Manhole Cover
721	Locking Manhole Cover Installation
722	Reserved
723	Curb Inlet
724	Through-Curb Inlet Frame
725	Through-Curb Inlet & Vertical Curb Installation
726	Vaned Grate
727	Reserved
728	Reserved
729	Standard Grate
730	Standard Frame w/ Vertical Curb Installation
731	Solid Cover
732	Reserved
733	Reserved
734	Rolled Curb Frame & Grate
735	Rolled Curb Frame & Grate Installation
736	Rolled Curb Vane Grate

**700. Drainage (continued)**

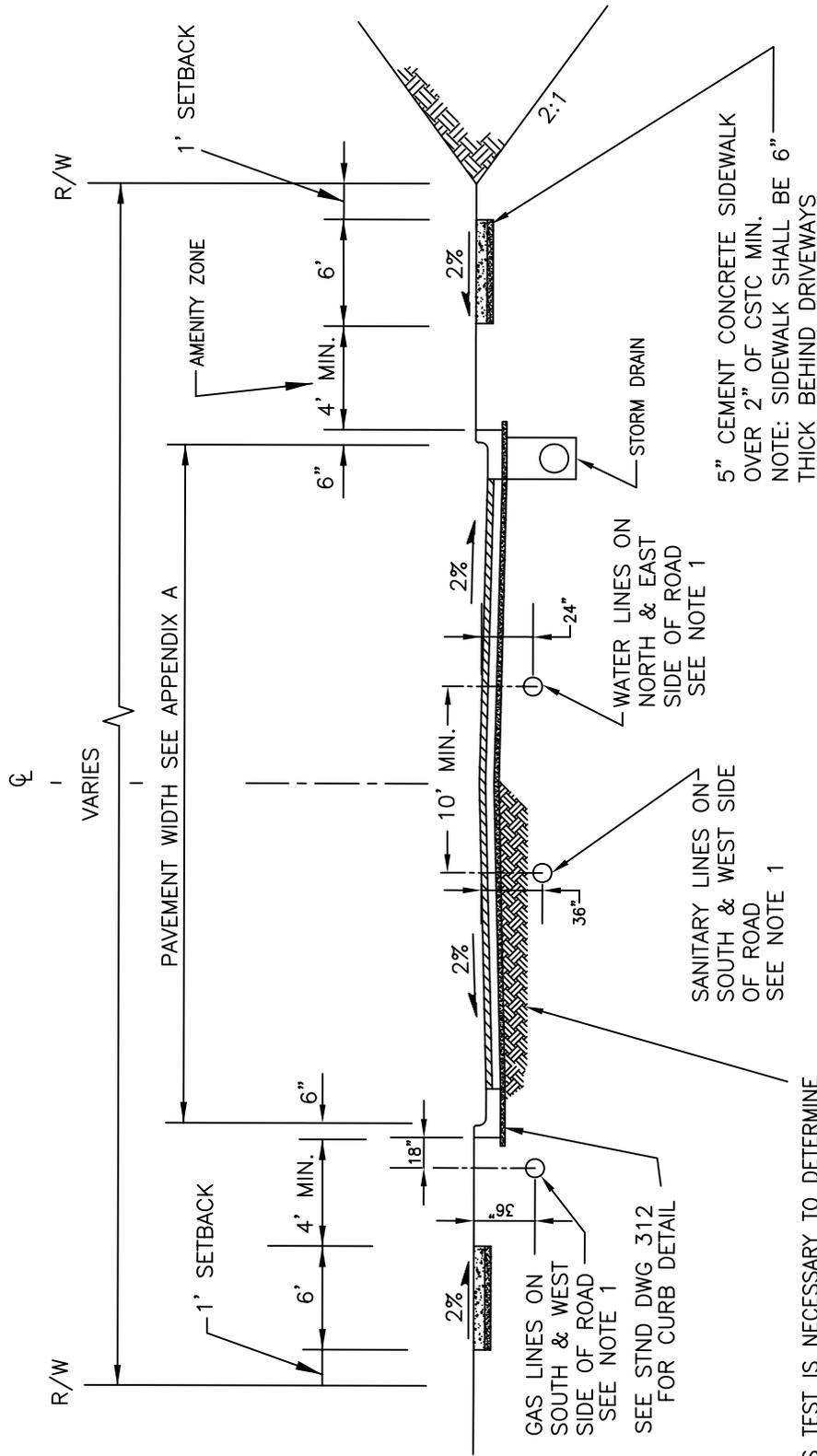
<u>Plan No.</u>	<u>Title</u>
737	Reserved
738	Reserved
739	Rock Lined Shoulder Ditches and Curb or Turnpiked Shoulders
761	Flow Restrictor (Tee)
762	FROP-T Shear Gate Detail
763	Flow Restrictor (Baffle)
764	Reserved
765	Floatable Material Separator 6" Or 8" Pipe
766	Floatable Material Separator 12" Or Larger
767	Reserved
768	Reserved
769	Reserved
770	Detention Pipe
771	Control Structure – 54" Diameter
772	Control Structure – 72" Diameter or Larger

**800. Utilities and Restoration**

<u>Plan No.</u>	<u>Title</u>
801	Flexible Pavement Restoration Details
802	Flexible Pavement Patching

**NOTES:**

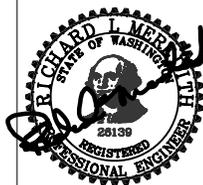
1. LOCATION OF UTILITY WHEN FEASIBLE
2. SUBGRADE SHALL BE COMPACTED TO 95% UNDER CURB, GUTTER, AND SIDEWALK
3. WATER METERS SHALL BE LOCATED IN 1' SETBACK BETWEEN BACK OF SIDEWALK AND R/W LINE. WATER METERS SHALL NOT BE LOCATED WITHIN SIDEWALK.



A SOILS TEST IS NECESSARY TO DETERMINE REQUIRED ASPHALT DEPTH. THE MINIMUM ALLOWABLE DEPTH IS 2" ASPHALT CONCRETE PAVEMENT CLASS "B" OVER 4" ATB OVER 2" CRUSHED SURFACING TOP COURSE. ADDITIONAL GRAVEL BORROW MAY BE REQUIRED.



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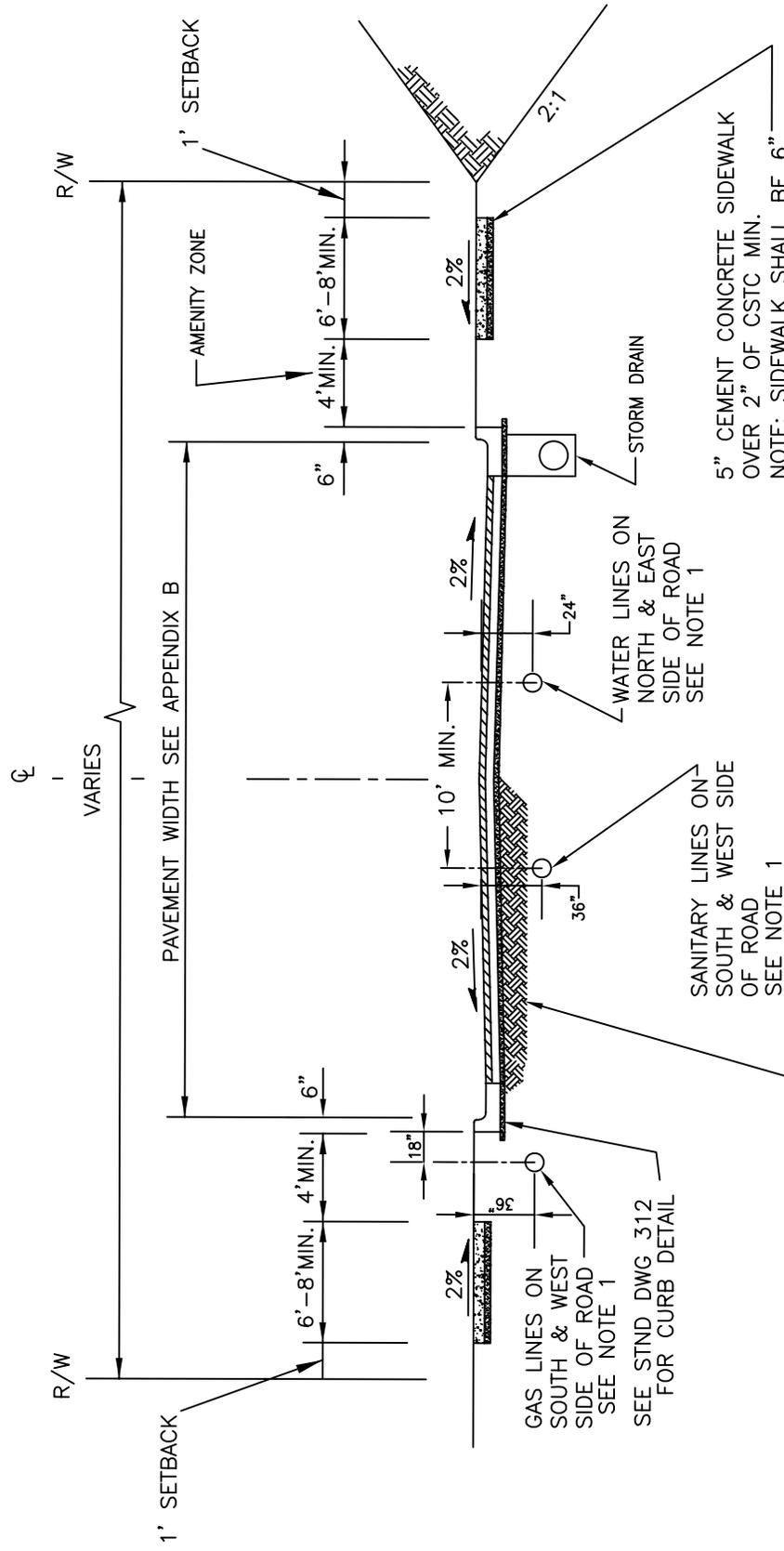
# Typical Local Street 201

NOT TO SCALE

Revision Date  
December 2006

**NOTES:**

1. LOCATION OF UTILITY WHEN FEASIBLE
2. SUBGRADE SHALL BE COMPACTED TO 95% UNDER CURB, GUTTER, AND SIDEWALK
3. WATER METERS SHALL BE LOCATED IN 1' SETBACK BETWEEN BACK OF SIDEWALK AND R/W LINE. WATER METERS SHALL NOT BE LOCATED WITHIN SIDEWALK.

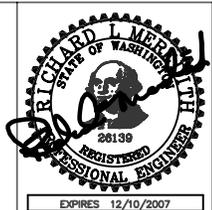


5" CEMENT CONCRETE SIDEWALK OVER 2" OF CSTC MIN.  
NOTE: SIDEWALK SHALL BE 6" THICK BEHIND DRIVEWAYS

A SOILS TEST IS NECESSARY TO DETERMINE REQUIRED ASPHALT DEPTH. THE MINIMUM ALLOWABLE DEPTH IS 2" ASPHALT CONCRETE PAVEMENT CLASS "B" OVER 4" ATB OVER 2" CRUSHED SURFACING TOP COURSE. ADDITIONAL GRAVEL BORROW MAY BE REQUIRED.



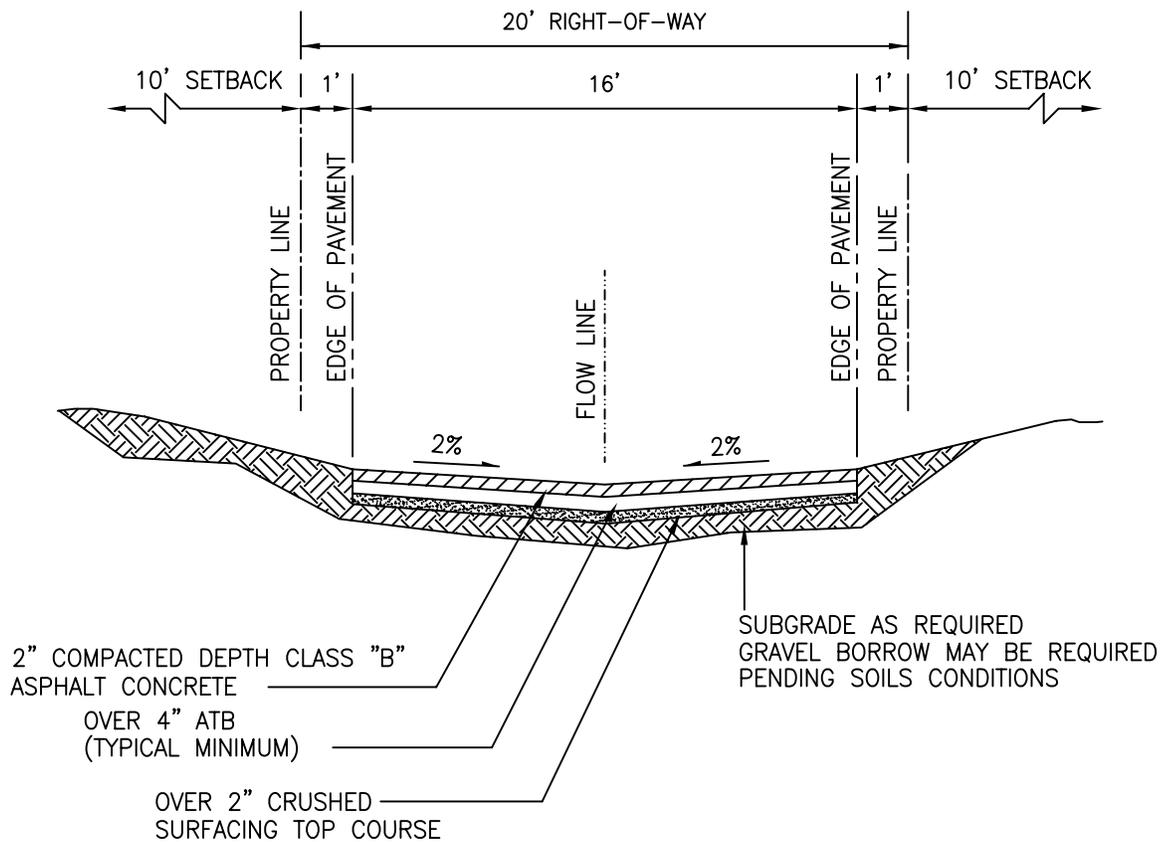
Public Works  
Planning and Development Services



# Typical Arterial Street

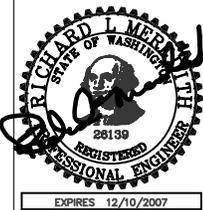
**202**

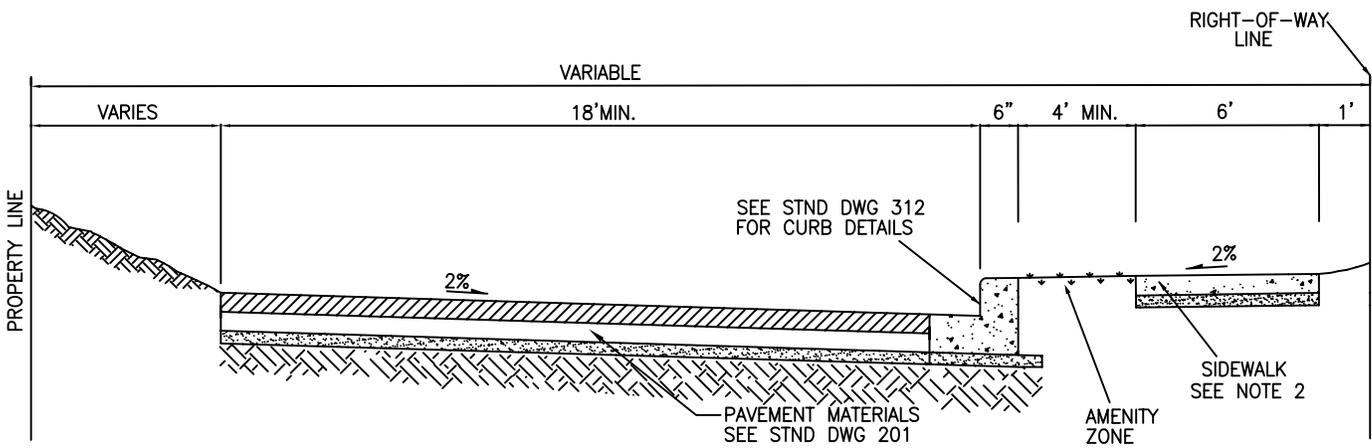
NOT TO SCALE  
Revision Date December 2006



**NOTE:**

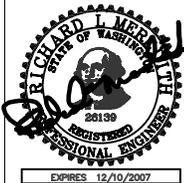
1. BUILDING SETBACK FROM ALLEYS IS 10' FROM PROPERTY LINE FOR SINGLE FAMILY.
2. REFER TO PROVISIONS FOR REAR AND SIDE YARD SETBACKS IN DEVELOPMENT CODE.
3. DRAINAGE TO BE COLLECTED AT LOWER END OF ALLEY.
4. COMPACTION TEST REQUIRED.
5. ALL UTILITY LIDS TO BE ADJUSTED TO GRADE.
6. FOR USE IN NEW DEVELOPMENT.

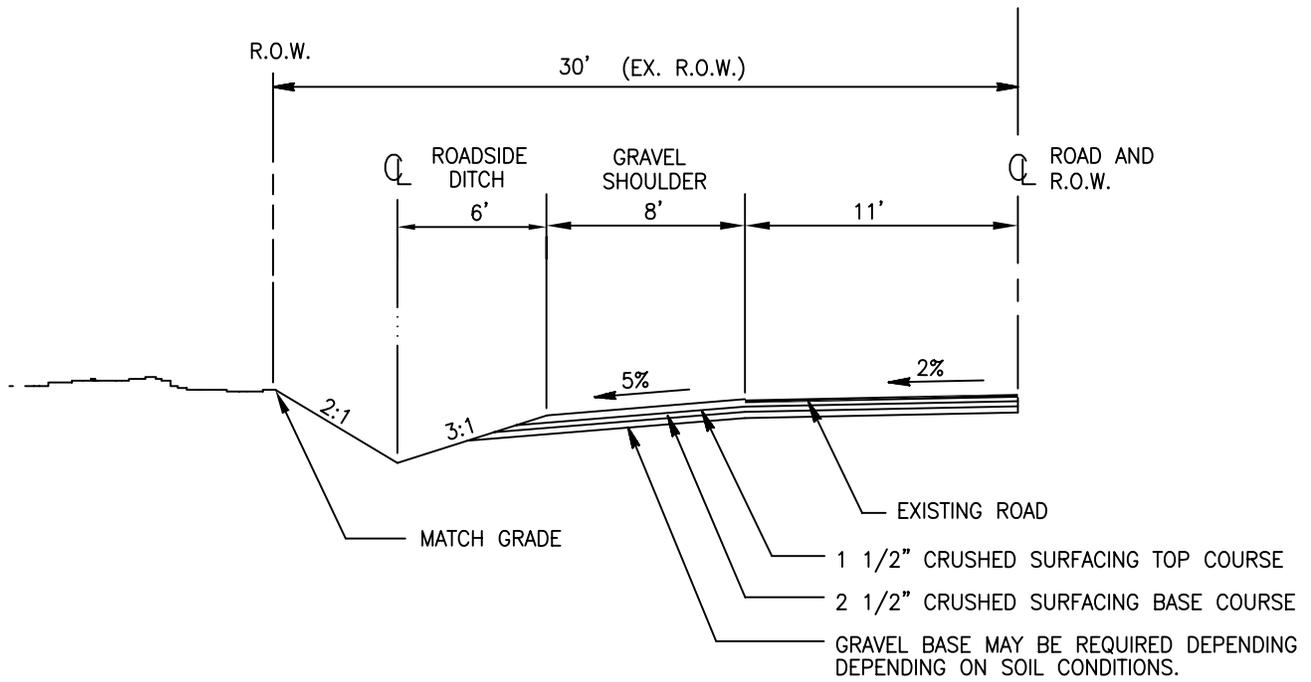
 <p><b>CITY OF SHORELINE</b></p>	<p>Public Works Planning and Development Services</p>		<h1 style="margin: 0;">Typical Alley</h1>	<h1 style="margin: 0;">203</h1>
				NOT TO SCALE
				Revision Date December 2006



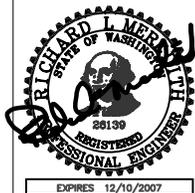
**NOTE:**

1. EDGE OF PAVEMENT TO BE CONSTRUCTED AS SHOWN FOR CUT OR FILL SECTION AS APPROPRIATE.
2. SEE STND DWGS 201 & 202 FOR SIDEWALK DETAILS.

 <p><b>CITY OF SHORELINE</b></p>	<p>Public Works Planning and Development Services</p>		<h1>Half Street</h1>	<h1>204</h1>
				NOT TO SCALE
				Revision Date December 2006



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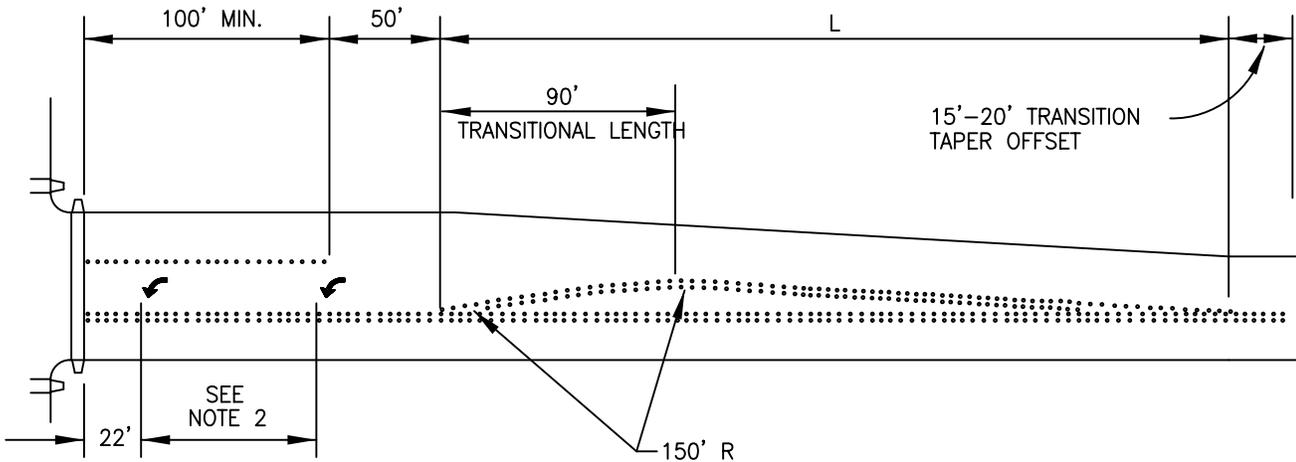


# Shoulder Treatment

# 205

NOT TO SCALE

Revision Date  
 December 2006



UNDER 40 MPH

L	$\frac{WT}{120} \times S_{SL}^2$ (SYMETRICAL ABOUT CENTERLINE)
	$\frac{WT}{60} \times S_{SL}^2$ (OFFSET)

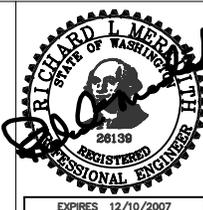
OVER 40 MPH

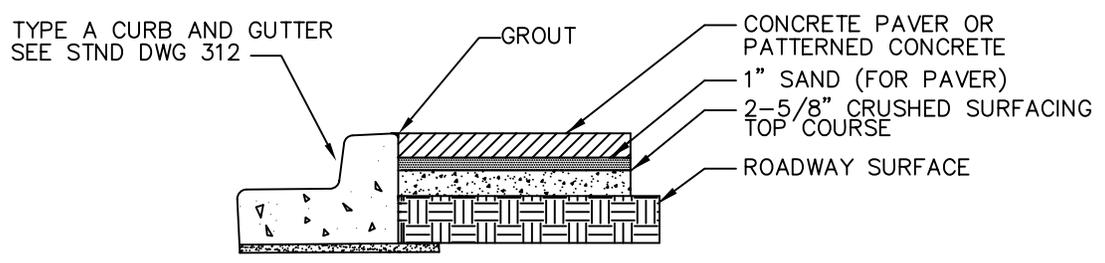
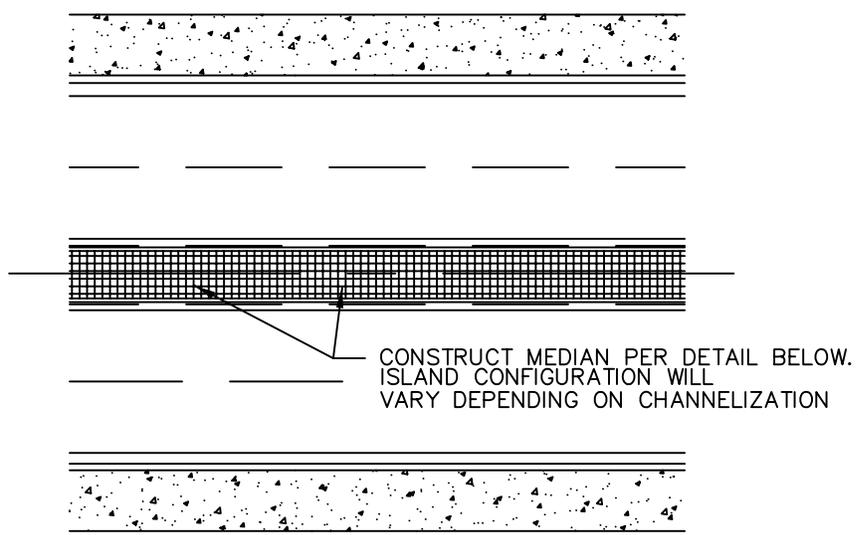
L	$\frac{WT}{2} \times S_{SL}$ (SYMETRICAL ABOUT CENTERLINE)
	$WT \times S_{SL}$ (OFFSET)

WT = WIDTH OF TURN LANE  
 S<sub>SL</sub> = POSTED SPEED LIMIT  
 L = LENGTH OF CHANNELIZATION

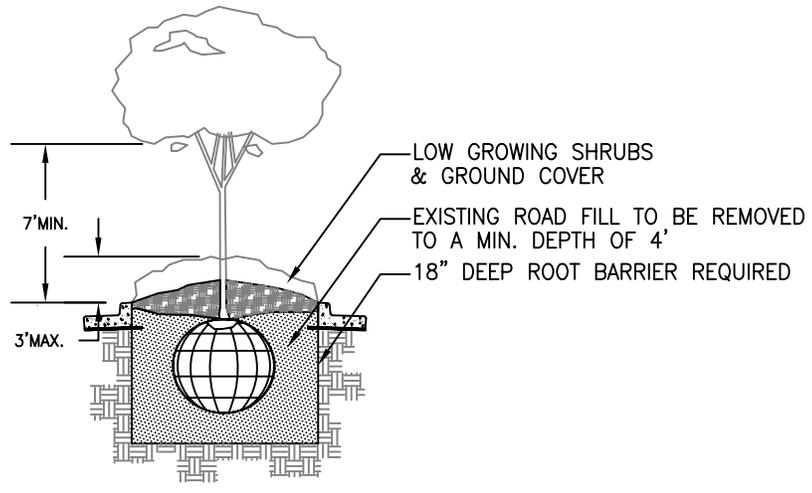
**NOTES:**

- FOR CROSSWALK DETAIL, SEE STND DWGS 315 & 316.
- SECOND ARROW SHALL BE LOCATED 75' TO 100' BACK OF FIRST ARROW OR AT BEGINNING OF POCKET.

 CITY OF SHORELINE	Public Works Planning and Development Services		<h1 style="margin: 0;">Island Strips</h1>	<h1 style="margin: 0;">206</h1>
				NOT TO SCALE
				Revision Date December 2006



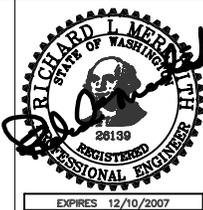
TYPICAL SECTION

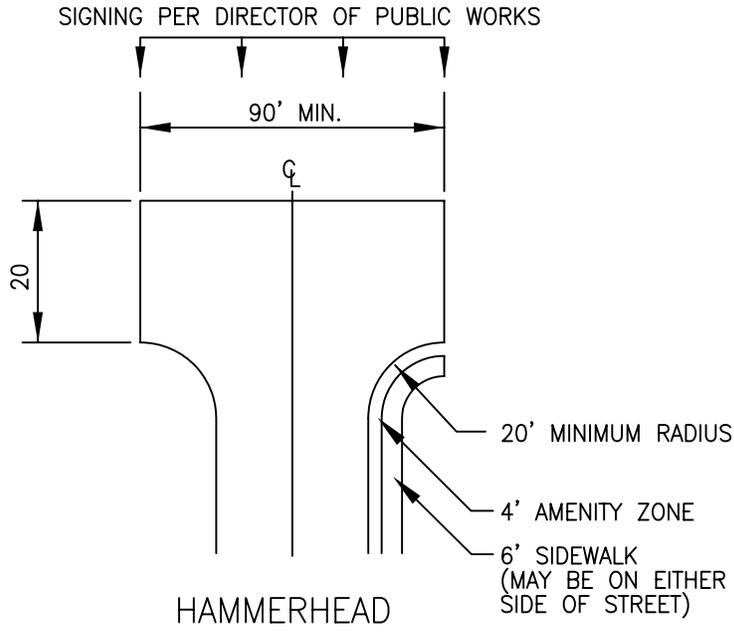
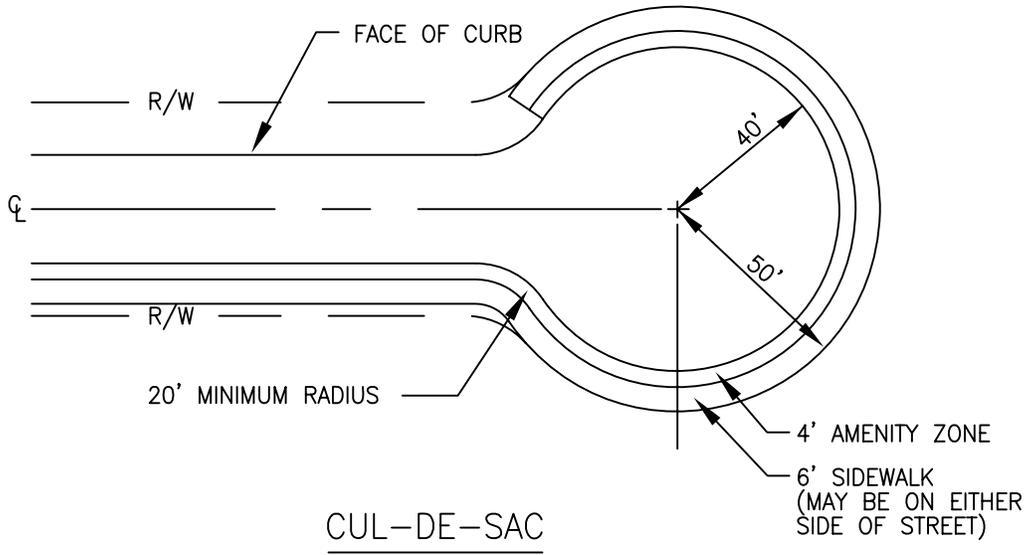


ALTERNATIVE SECTION  
FOR LANDSCAPE MEDIAN

**NOTE:**

1. LANDSCAPING PLAN TO BE APPROVED BY THE REVIEW ENGINEER
2. MEDIAN WIDTH SHALL BE A MINIMUM OF 4' FOR SHRUBS & A MINIMUM OF 8' FOR TREES TO ENSURE HEALTHY LANDSCAPING

	<p>Public Works Planning and Development Services</p>		<b>Median</b>	<b>207</b>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>

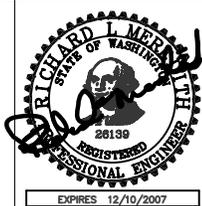


**NOTE:**

1. 50 FOOT MINIMUM RIGHT-OF-WAY RADIUS, SIDEWALKS AND UTILITIES MAY BE ON EASEMENT.
2. ALTERNATIVE DESIGNS BY APPROVAL OF THE DIRECTOR OR DESIGNEE.



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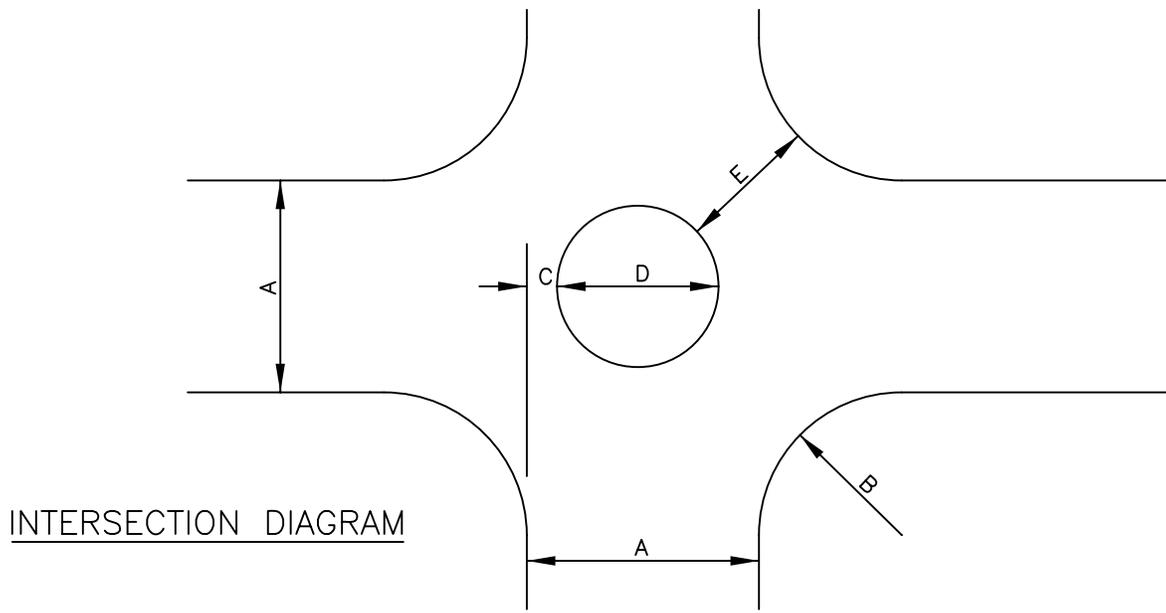


# Street Ends

# 209

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Revision Date  
December 2006



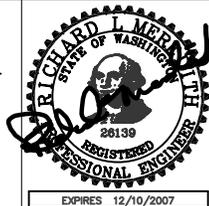
**OPTIMUM  
CRITERIA**

<u>OFF-SET DISTANCE</u>	<u>OPENING WIDTH</u>
5.5' MAX.	16' MIN.
5.0'	17' ±
4.5'	18' ±
4.0'	19' ±
3.5' OR LESS	20'

A STREET WIDTH	B CURB RETURN RADIUS	C OFF-SET DISTANCE	D CIRCLE DIAMETER	E OPENING WIDTH
20'	<15'	RECONSTRUCT CURBS		16'+ 17'+ 18'- 19'+
	15'	5.5'	9'	
	18'	5.0'	10'	
	20'	4.5'	11'	
	25'	4.0'	12'	
24'	<12'	RECONSTRUCT CURBS		16' 17'- 18'+ 20'-
	12'	5.5'	13'	
	15'	5.0'	14'	
	20'	4.5'	15'	
	25'	3.5'	17'	
25'	<12'	RECONSTRUCT CURBS		16'+ 17'- 18'- 18'+ 20'+
	12'	5.5'	14'	
	15'	5.0'	15'	
	18'	4.5'	16'	
	20'	4.5'	16'	
30'	10'	5.5'	19'	16'+ 17'- 17'+ 18'+ 19'+ 20'
	12'	5.0'	20'	
	15'	5.0'	20'	
	18'	4.5'	21'	
	20'	4.0'	22'	
32'	10'	5.5'	21'	16'+ 17'- 18'- 19'- 19'+ 20'
	12'	5.0'	22'	
	15'	4.5'	23'	
	18'	4.0'	24'	
	20'	4.0'	24'	
36'	10'	5.5'	21'	17'- 17'+ 18'+ 19'+ 20'- 20'
	12'	5.0'	26'	
	15'	4.5'	27'	
	18'	4.0'	28'	
	20'	3.5'	29'	
40'	10'	5.0'	30'	17'+ 18'+ 19'- 20'- 20'+ 20'
	12'	4.5'	31'	
	15'	4.0'	32'	
	18'	3.5'	33'	
	20'	3.0'	34'	
	25'	1.0'	38'	



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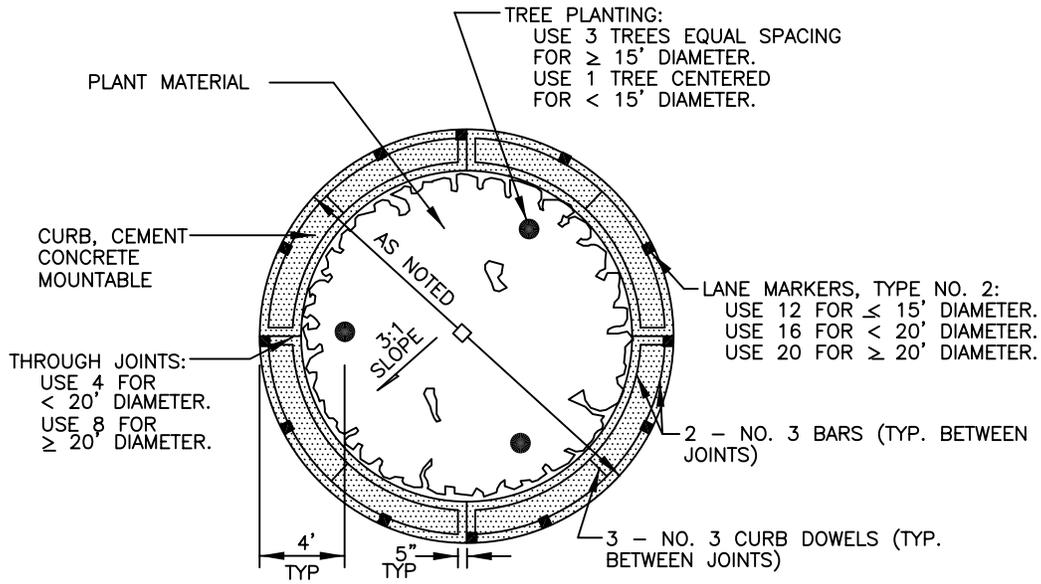


# Traffic Circle

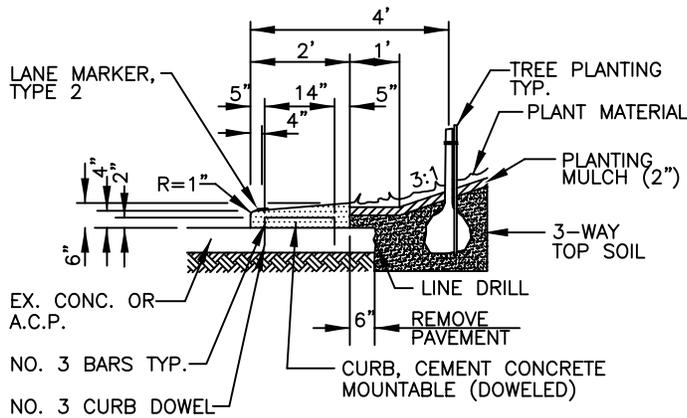
# 210

NOT TO SCALE

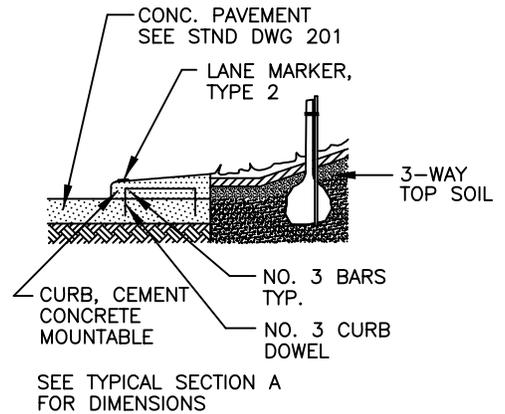
Revision Date  
December 2006



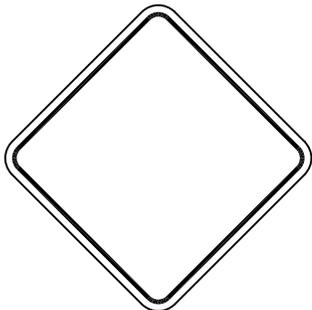
TYPICAL TRAFFIC CIRCLE



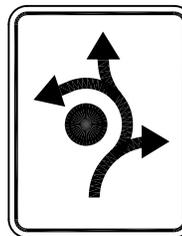
TYPICAL SECTION A



TYPICAL SECTION B



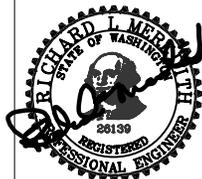
30" x 30" BLACK ON YELLOW  
PLACED IN CENTER OF TRAFFIC  
CIRCLE ON EACH APPROACH.



24" x 30" BLACK ON WHITE  
PLACED 50' - 100' BACK  
FROM TRAFFIC CIRCLE ON  
SPECIFIED APPROACH.



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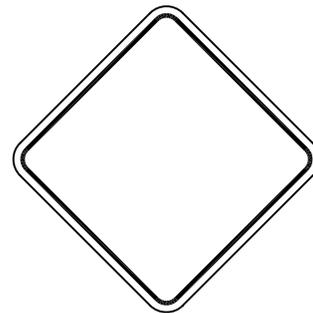
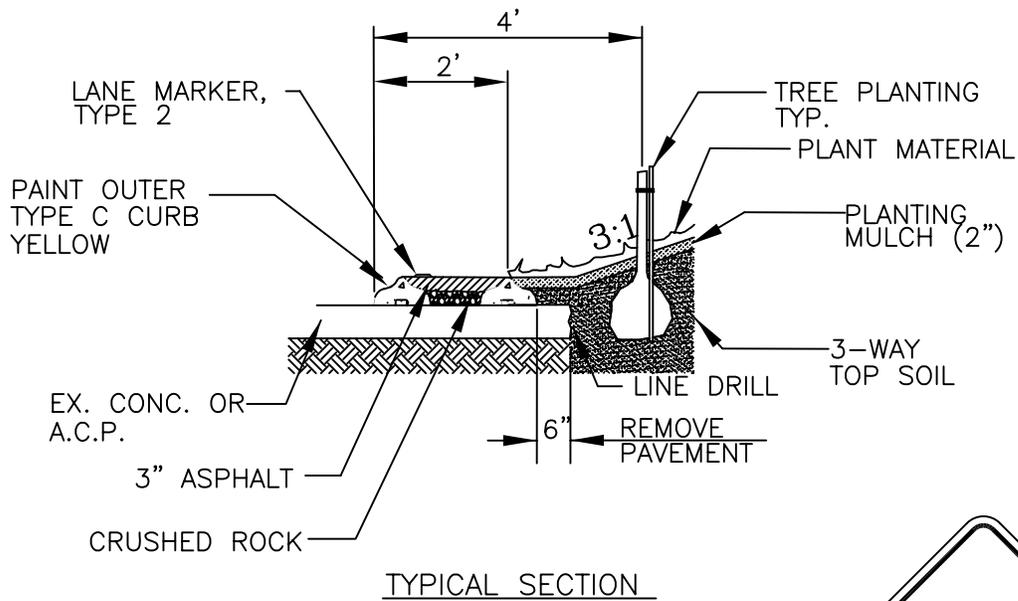
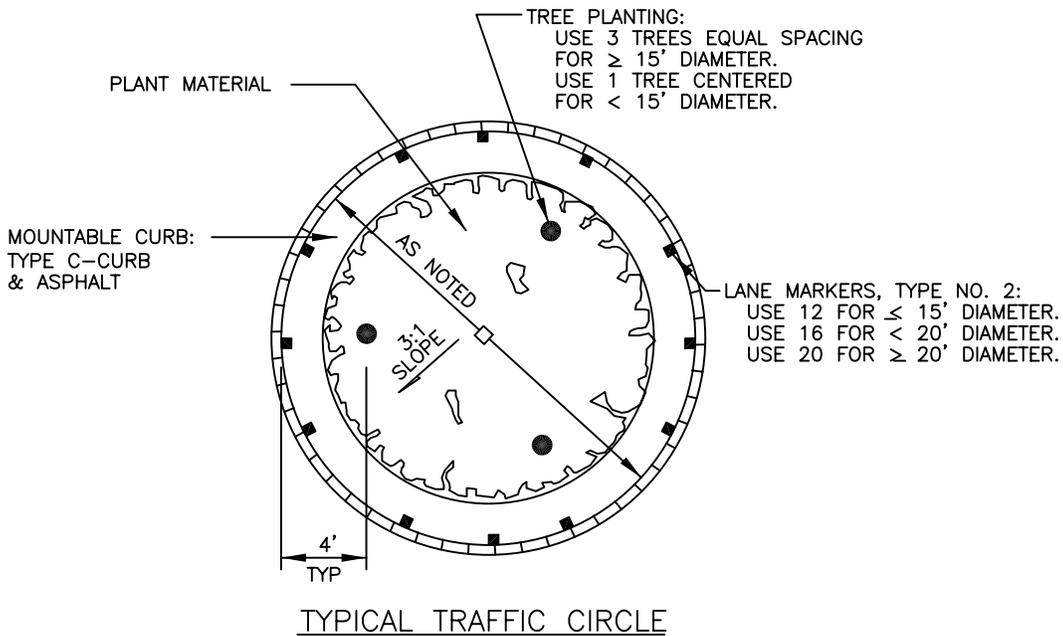


# Traffic Circle Details

**211**

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December 2006



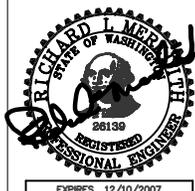
NOTE:

1. SHAPE TOPSOIL IN CENTER OF CIRCLE AT 3:1 SLOPE
2. PAINT OUTSIDE CURB YELLOW
3. MINIMUM 3" ASPHALT DEPTH
4. SIGNING SHALL BE CONSISTANT WITH STANDARD DETAIL 211

W17-81 30" x 30"  
 BLACK ON YELLOW PLACED  
 PLACED IN CENTER OF TRAFFIC  
 CIRCLE FOR EACH APPROACH.



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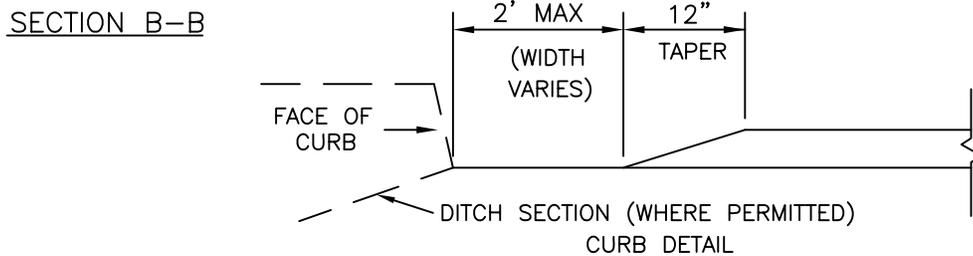
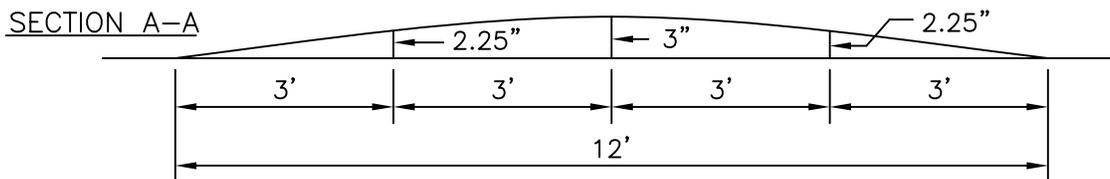
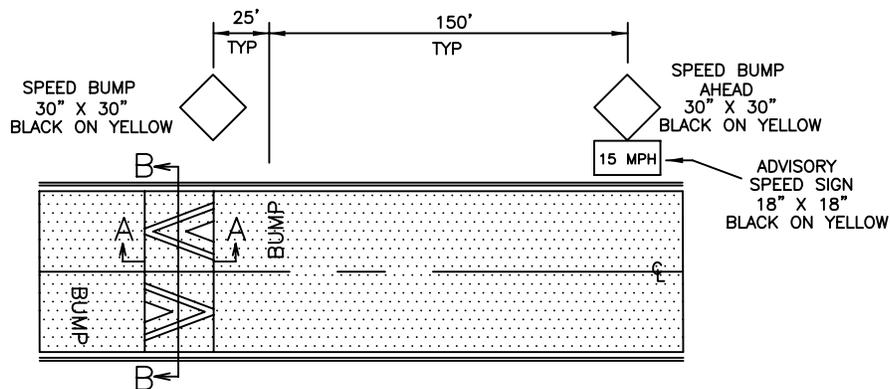
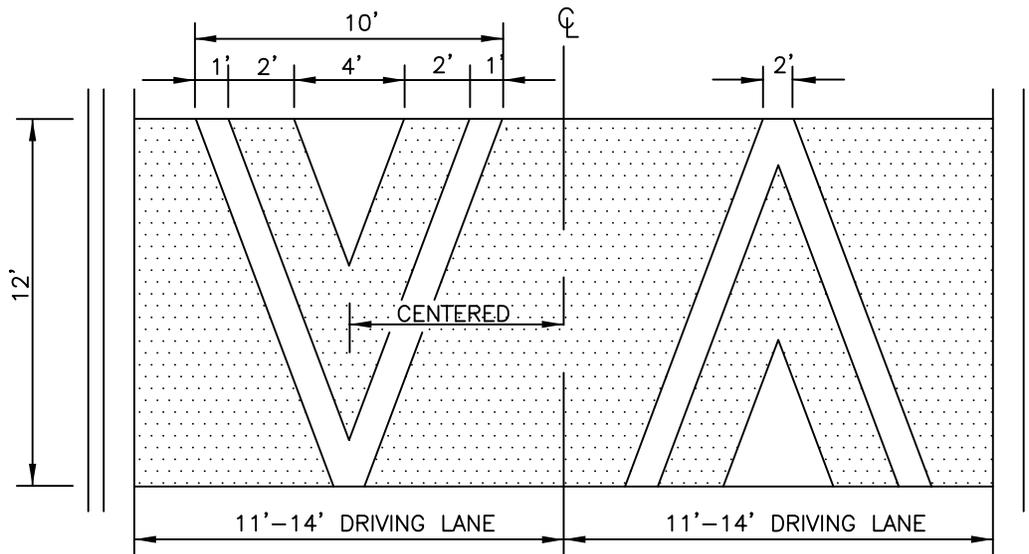


# Asphalt Traffic Circle Details

# 212

NOT TO SCALE

Revision Date  
 December 2006

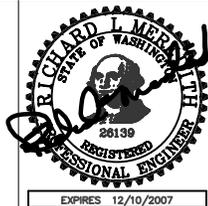


**NOTES:**

1. SIGN & LEGEND LOCATION SHALL BE VERIFIED BY THE DIRECTOR OR DESIGNEE PRIOR TO INSTALLATION.
2. LEGEND & 'V' MARKINGS TO BE THERMOPLASTIC.



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# Speed Hump: Design Pavement Marking, & Signing

**213**

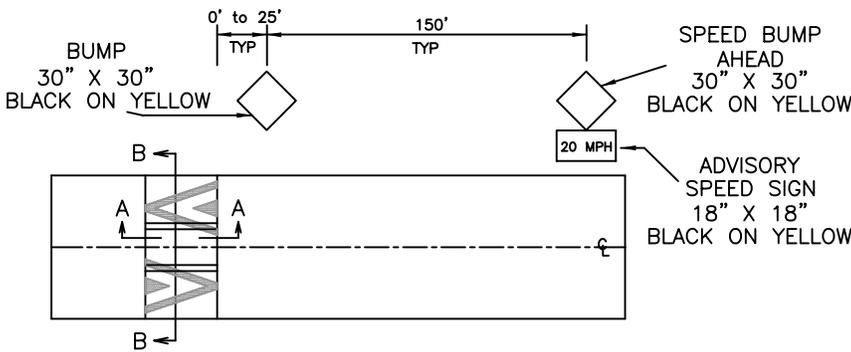
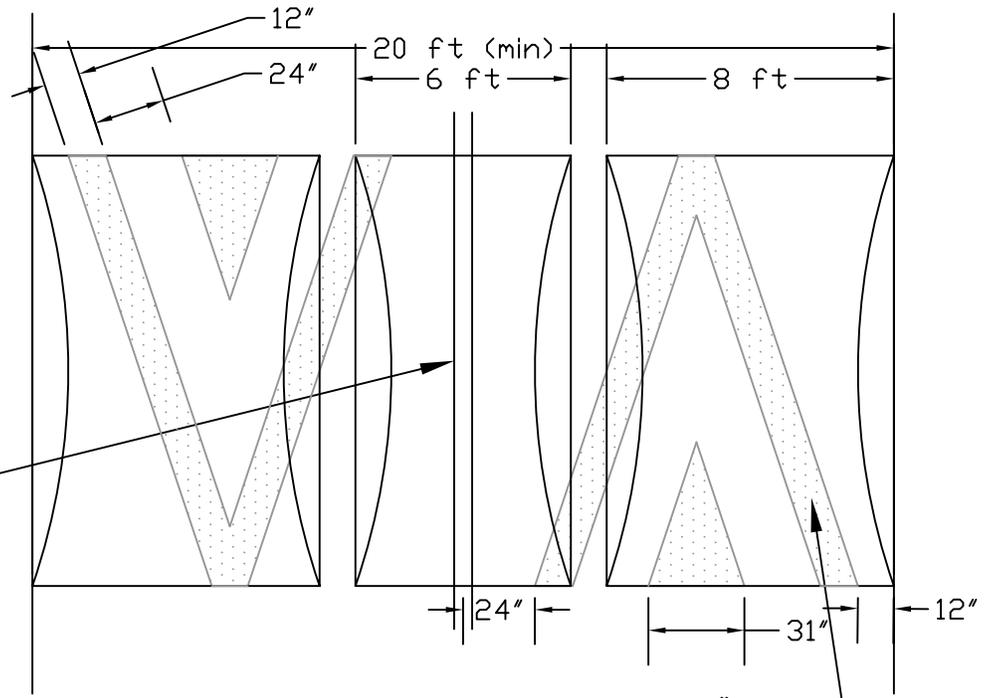
NOT TO SCALE

Revision Date  
December 2006

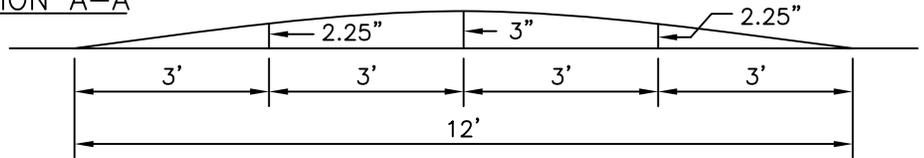
**NOTES:**

1. Sign & legend location shall be verified by the traffic engineer prior to installation.
2. Legend and "V" markings to be thermoplastic.

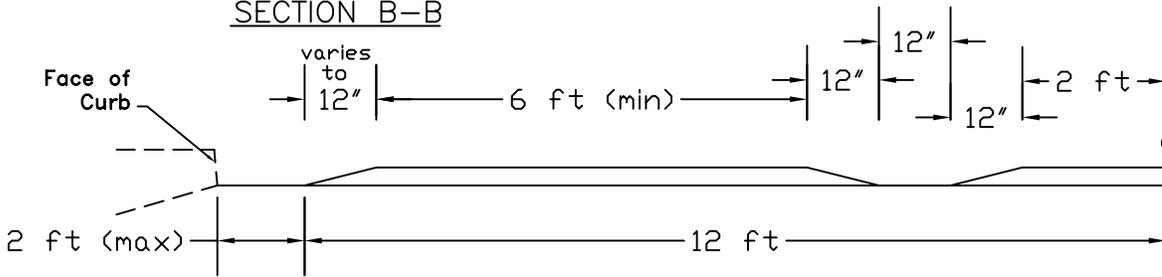
Double Yellow CL with type 1 Lane Marker's on 5 ft centers.  
 NOTE: extend double yellow centerline for 100 ft (min) each direction.



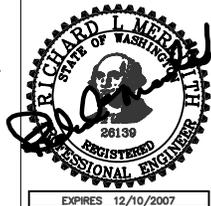
**SECTION A-A**



**SECTION B-B**



Public Works  
 Planning and  
 Development  
 Services

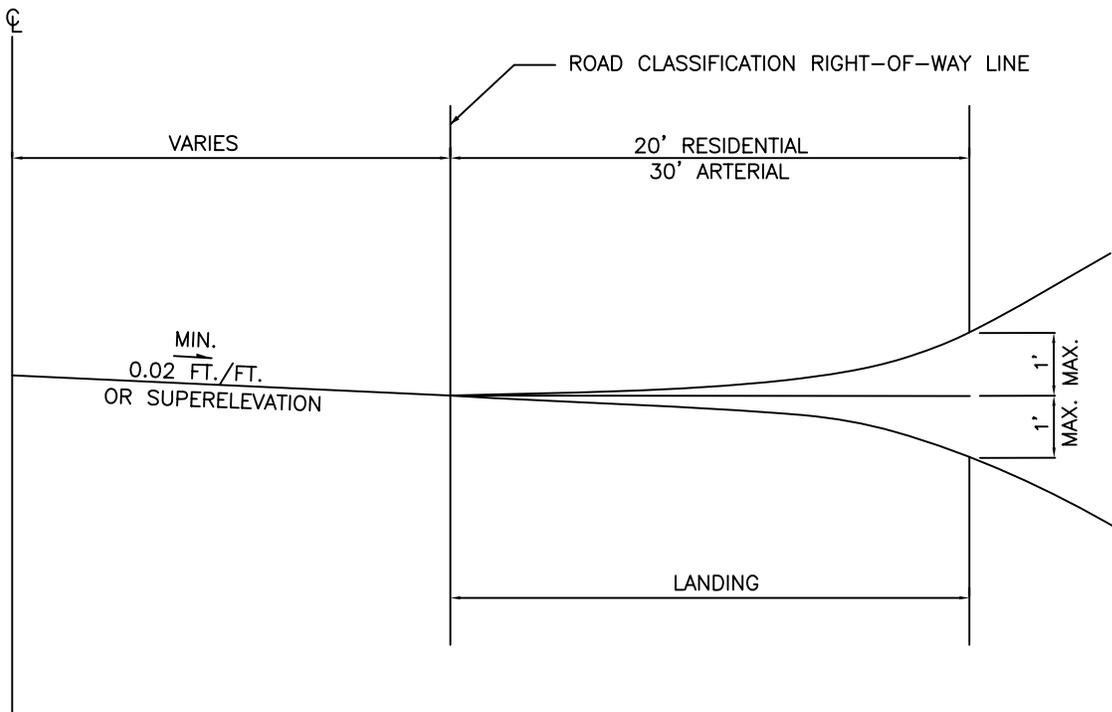


**Split Speed Hump**

**214**

NOT TO SCALE

Revision Date  
 December 2006



Public Works  
 Planning  
 and  
 Development  
 Services

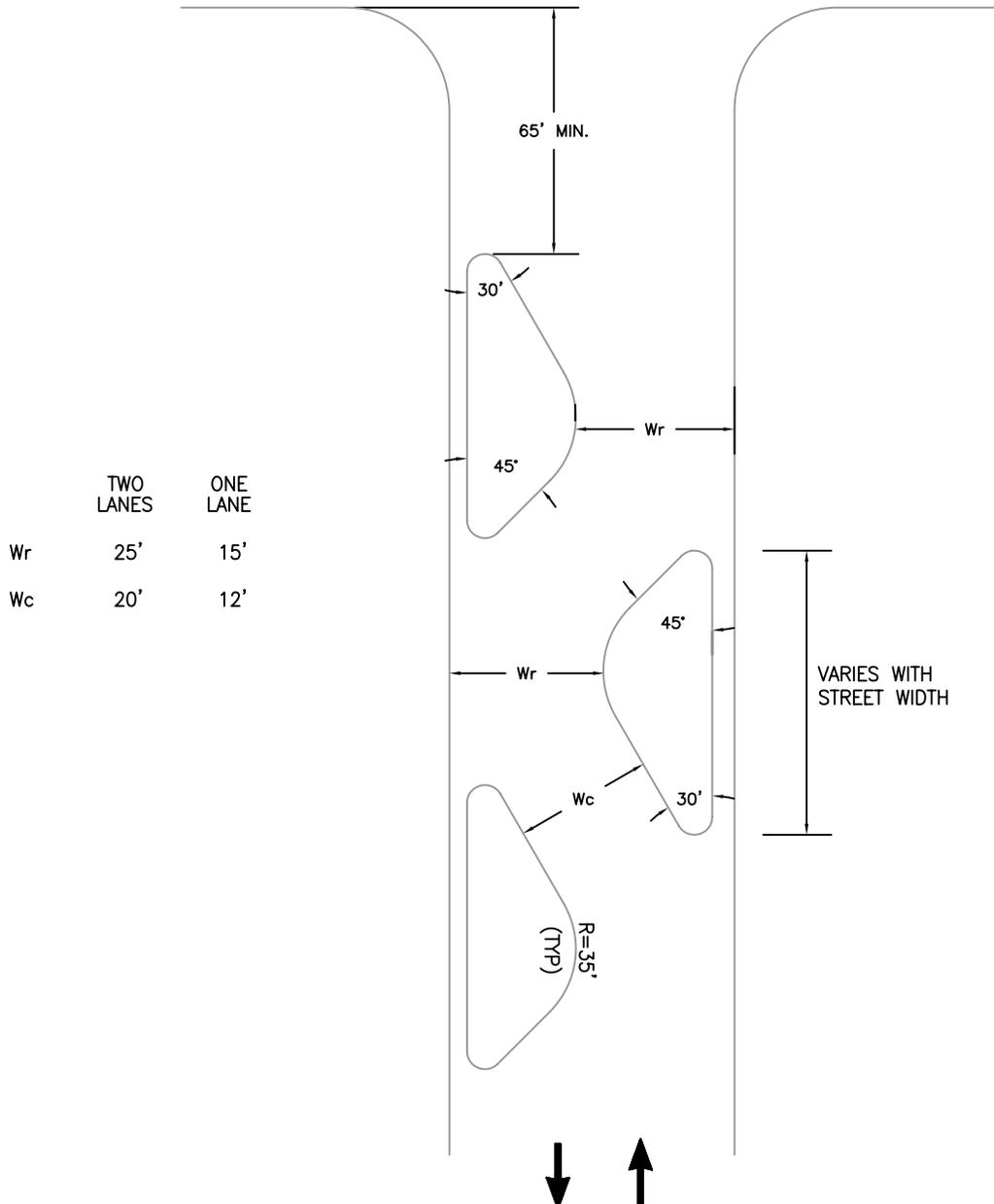


# Intersection Landing

**215**

NOT TO SCALE

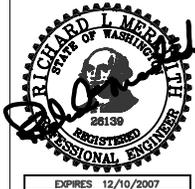
Revision Date  
 December 2006

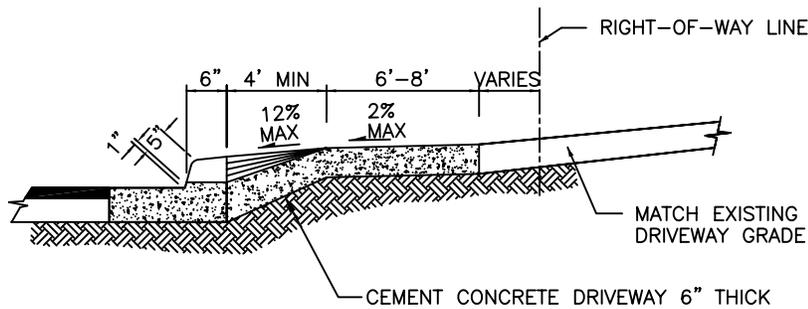
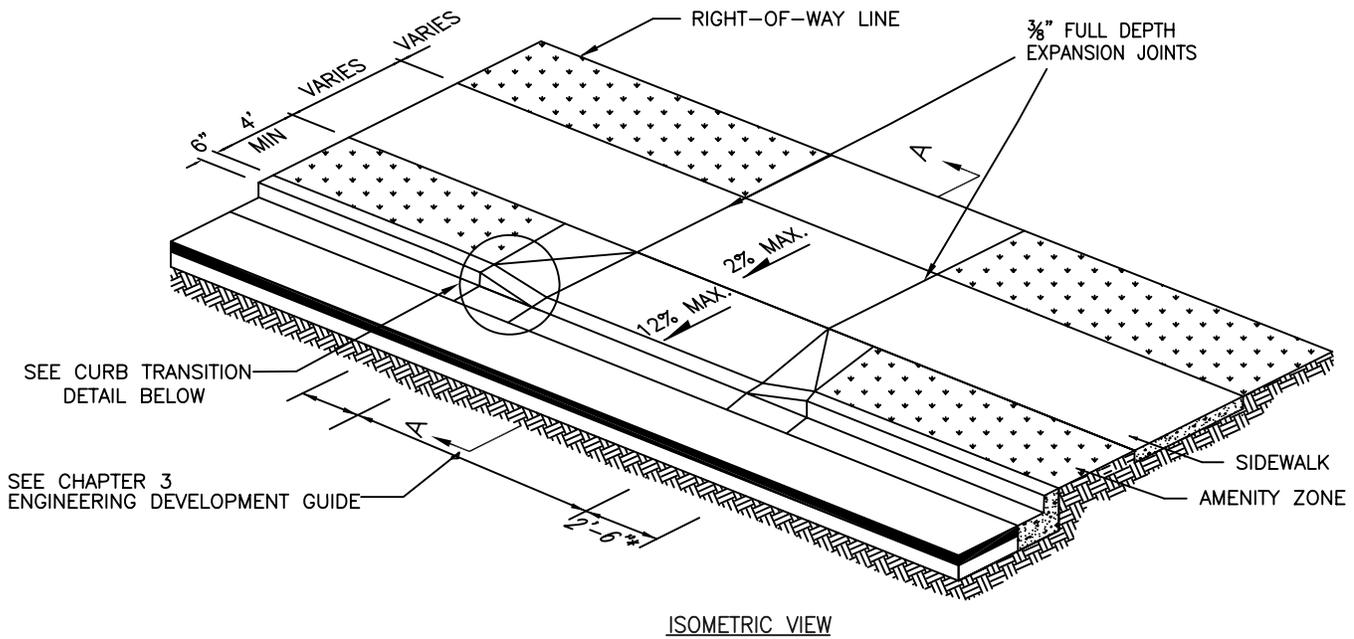


	TWO LANES	ONE LANE
Wr	25'	15'
Wc	20'	12'

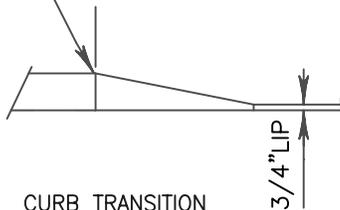
**NOTES:**

1. SPACING OF CHICANE SEGMENTS DEPENDANT ON SITE CONSIDERATIONS, e.g. DRIVEWAY LOCATIONS.
2. ISLAND PLANTINGS SHOULD NOT OBSCURE DRIVER'S VIEW OF CHICANE TRAFFIC.
3. DESIGN MUST ACCOMODATE A MINIMUM OF SU30 DESIGN VEHICLE.

 CITY OF SHORELINE	Public Works Planning and Development Services		<h1>Chicane</h1>	<h1>217</h1>
				NOT TO SCALE
				Revision Date December 2006



1/2" WIDE FULL DEPTH  
EXPANSION JOINT



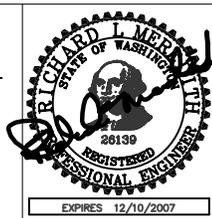
\*WING DIMENSIONS MAY REQUIRE MODIFICATION TO MEET  
ADA STANDARDS

**NOTE:**

1. ALL COMMERCIAL/INDUSTRIAL DRIVEWAYS SHALL HAVE AN EXPANSION JOINT LOCATED MID-WIDTH.
2. SEE CHAPTER 3, ENGINEERING DEVELOPMENT GUIDE.
3. MATERIAL - WSDOT CONCRETE CLASS 4000psi.
4. FULL DEPTH EXPANSION JOINT SHALL BE INSTALLED IF DRIVEWAY WIDTH IS 10' OR GREATER.
5. CURB SHALL BE IN COMPLIANCE WITH STND DWG 312.
6. NO REBAR SHALL BE PLACED IN CURB, GUTTER, DRIVEWAY, OR SIDEWALK.



Public Works  
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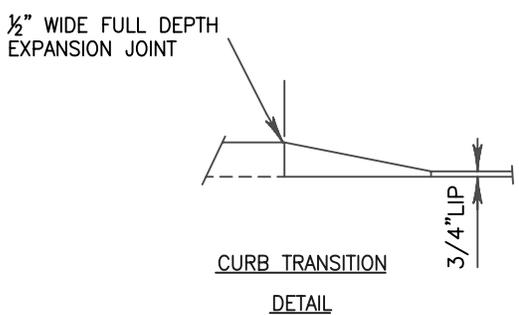
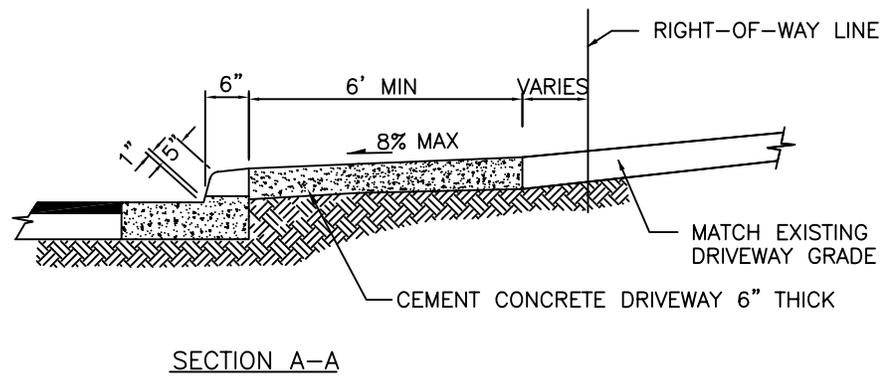
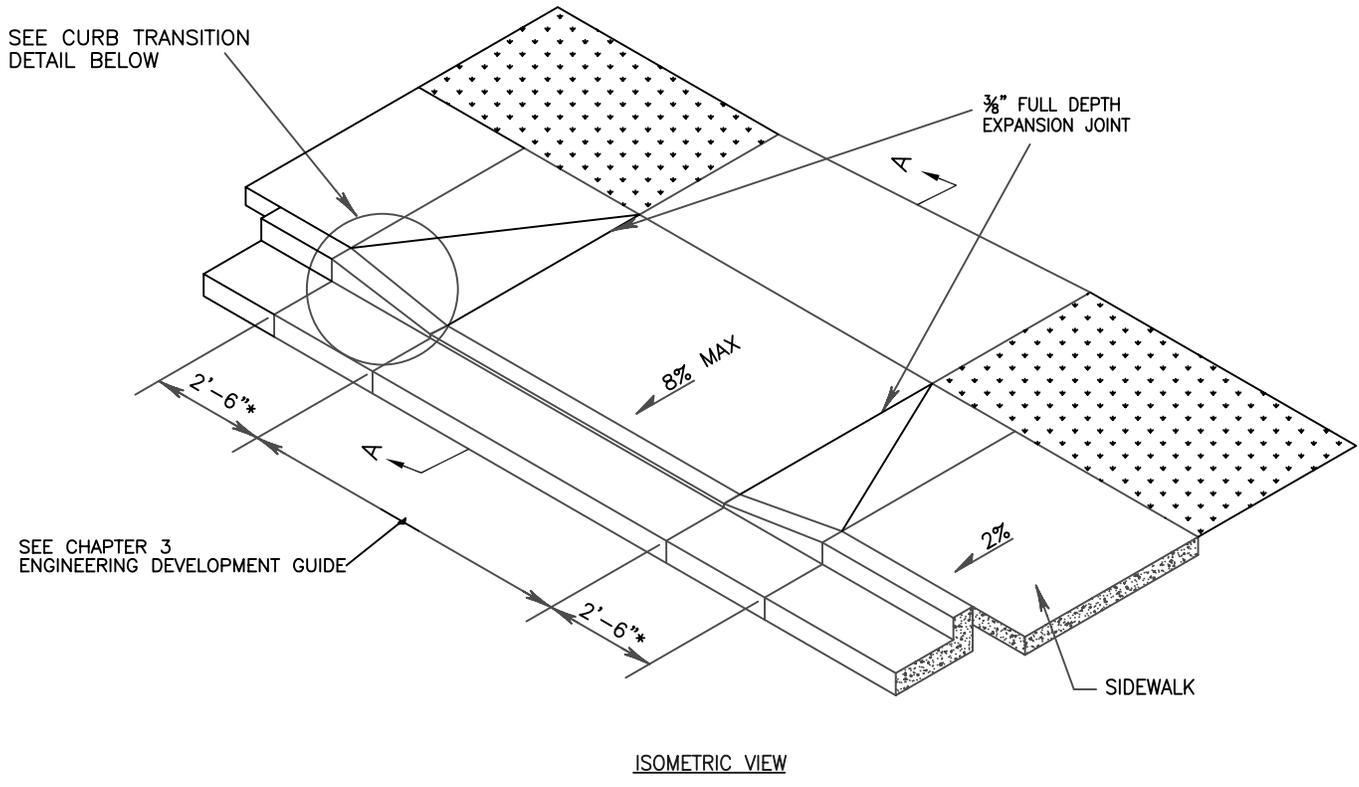


# Curb & Gutter Section Driveway Approach

**301**

NOT TO SCALE

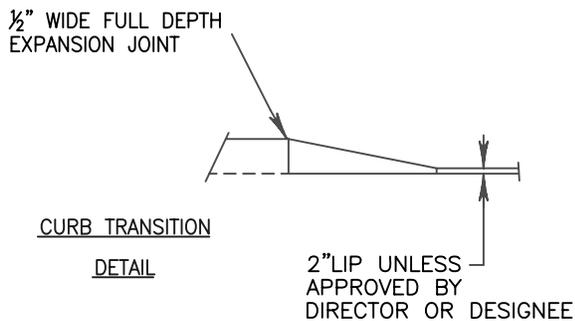
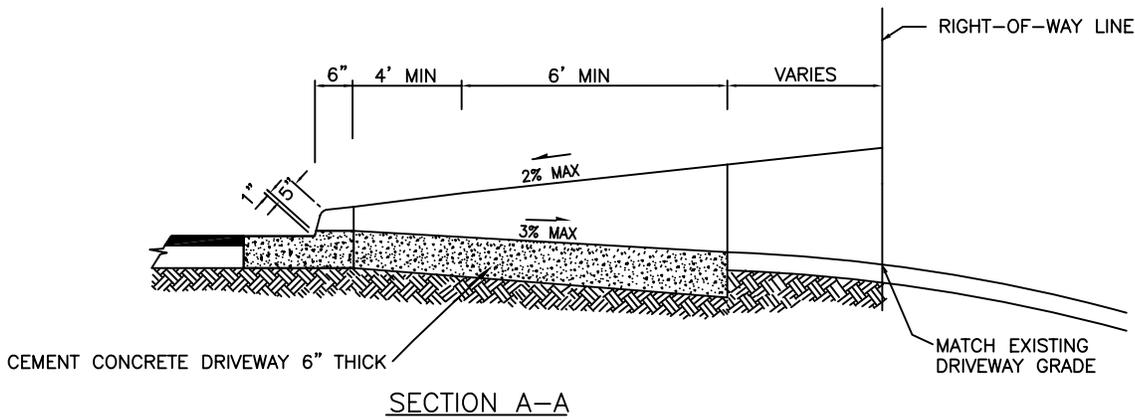
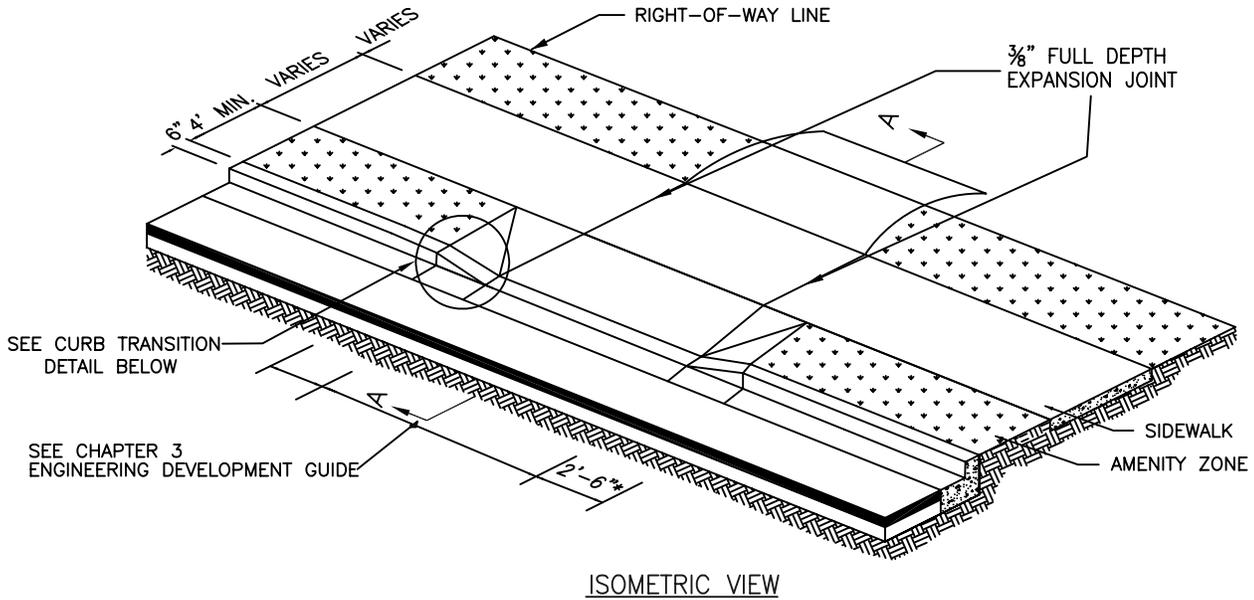
Revision Date  
December 2006



\*WING DIMENSIONS MAY REQUIRE MODIFICATION TO MEET ADA REQUIREMENTS.

- NOTE:**
1. SHALL ONLY BE USED TO MATCH EXISTING CONDITIONS OR WITH UPON APPROVAL OF THE DIRECTOR OR DESIGNEE.
  2. MATERIAL - WSDOT CONCRETE CLASS 4000psi.
  3. SEE CHAPTER 3, ENGINEERING DEVELOPMENT GUIDE.
  4. FULL DEPTH EXPANSION JOINT SHALL BE INSTALLED IF DRIVEWAY WIDTH IS 10' OR GREATER.
  5. CURB SHALL BE IN COMPLIANCE WITH STND DWG 312.
  6. NO REBAR SHALL BE PLACED IN CURB, GUTTER, DRIVEWAY, OR SIDEWALK.

	<p>Public Works Planning and Development Services</p>		<h1>Driveway Approach without Amenity Zone</h1>	<h1>302</h1>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>



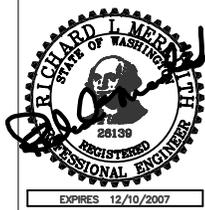
\*WING DIMENSIONS MAY REQUIRE MODIFICATION TO MEET ADA STANDARDS.

**NOTE:**

1. MATERIAL - WSDOT CONCRETE CLASS 4000psi.
2. SEE CHAPTER 3, ENGINEERING DEVELOPMENT GUIDE.
3. FULL DEPTH EXPANSION JOINT SHALL BE INSTALLED IF DRIVEWAY WIDTH IS 10' OR GREATER.
4. CURB SHALL BE IN COMPLIANCE WITH STND DWG 312.
5. MODIFICATION TO THIS DESIGN SHALL BE APPROVED BY THE DIRECTOR OR DESIGNEE THROUGH A VARIANCE REQUEST.
6. NO REBAR SHALL BE PLACED IN CURB, GUTTER, DRIVEWAY, OR SIDEWALK.



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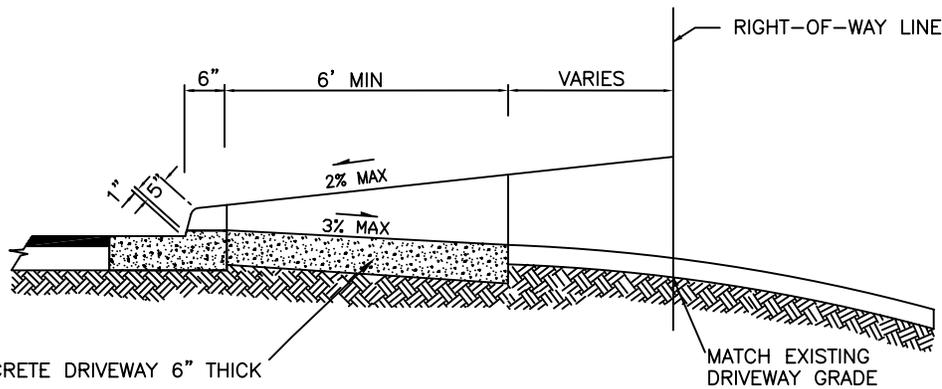
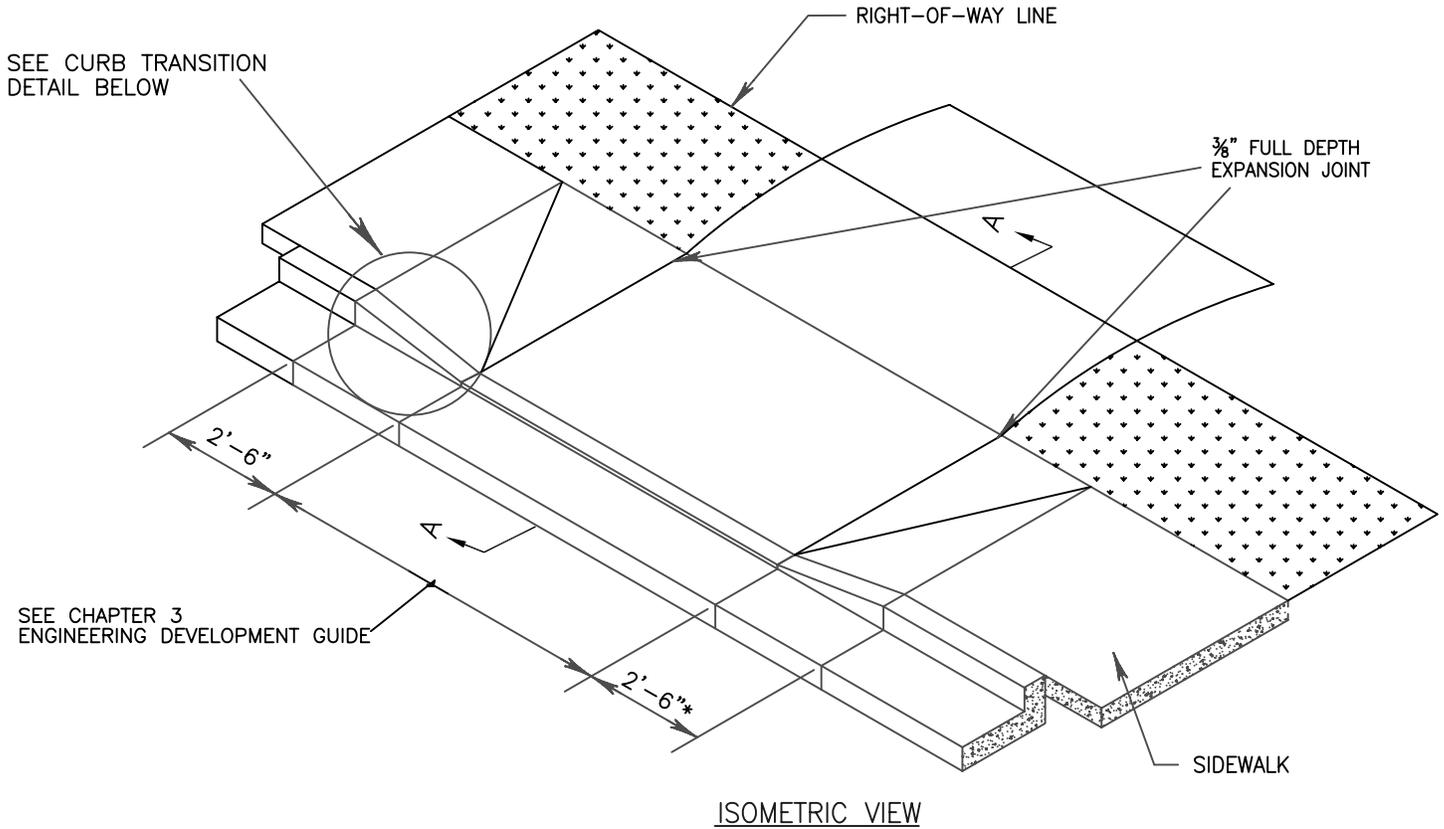


# Driveway Approach: Reverse Slope

**303**

NOT TO SCALE

Revision Date  
December 2006



CEMENT CONCRETE DRIVEWAY 6" THICK

MATCH EXISTING DRIVEWAY GRADE

1/2" WIDE FULL DEPTH EXPANSION JOINT



CURB TRANSITION

DETAIL

2" LIP UNLESS APPROVED BY DIRECTOR OR DESIGNEE

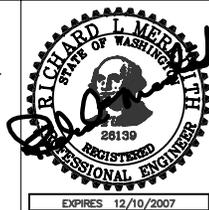
\*WING DIMENSIONS MAY REQUIRE MODIFICATION TO MEET ADA STANDARDS.

**NOTE:**

1. MATERIAL - WSDOT CONCRETE CLASS 4000psi.
2. SEE CHAPTER 3, ENGINEERING DEVELOPMENT GUIDE.
3. FULL DEPTH EXPANSION JOINT SHALL BE INSTALLED IF DRIVEWAY WIDTH IS 10' OR GREATER.
4. CURB SHALL BE IN COMPLIANCE WITH STND DWG 312.
5. MODIFICATION TO THIS DESIGN SHALL BE APPROVED BY THE DIRECTOR OR DESIGNEE THROUGH A VARIANCE REQUEST.
6. NO REBAR SHALL BE PLACED IN CURB, GUTTER, DRIVEWAY, OR SIDEWALK.



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Development  
Services

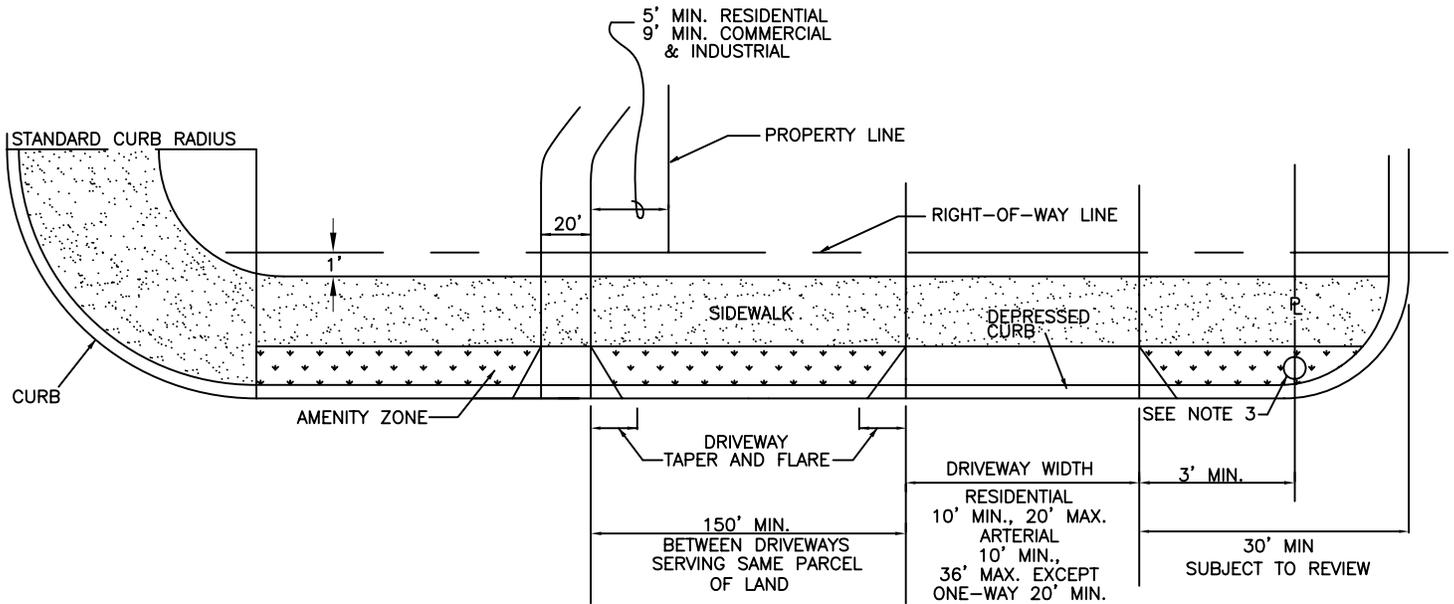


# Driveway Approach: Reverse Slope without Amenity Zone

**304**

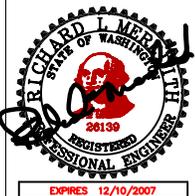
NOT TO SCALE

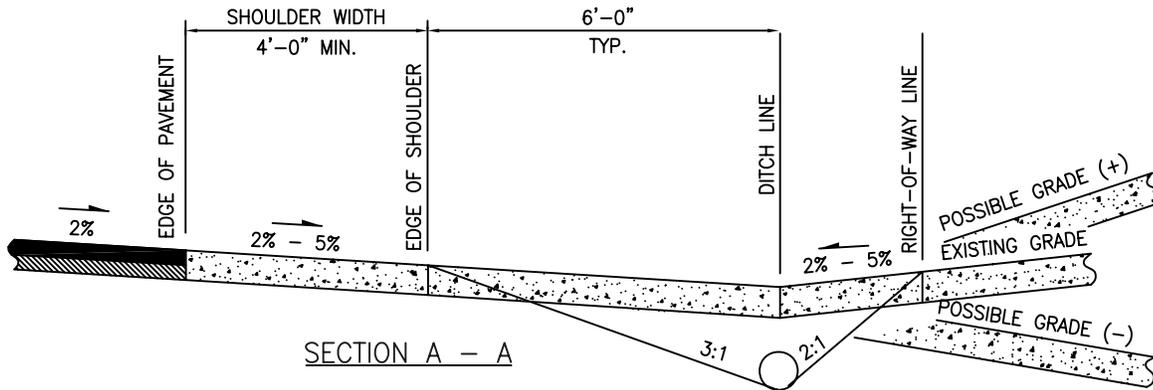
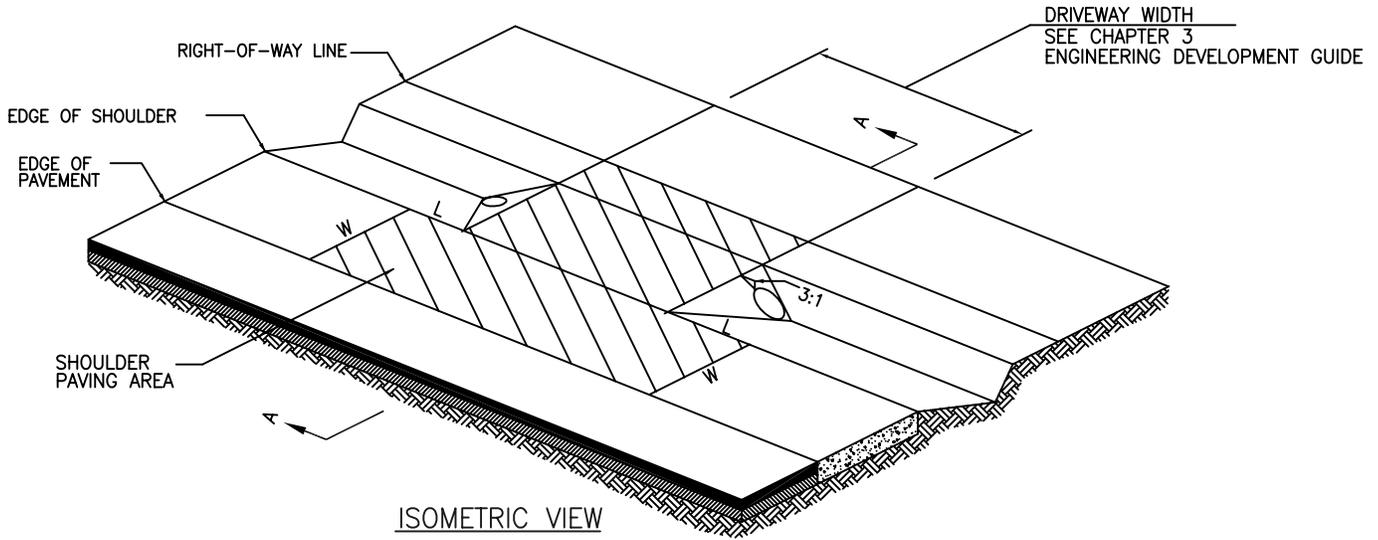
Revision Date  
December 2006



**NOTES:**

1. NO PORTION OF ANY DRIVEWAY SHALL ENCROACH IN CURB RETURN FOR INTERSECTION.
2. COMMERCIAL/INDUSTRIAL DRIVEWAYS MUST BE APPROVED BY THE ENGINEER, CONSIDERING BOTH TRAFFIC SAFETY AND THE ACTIVITY BEING SERVED. ALL COMMERCIAL/INDUSTRIAL DRIVEWAYS SHALL HAVE AN EXPANSION JOINT LOCATED MID-WIDTH.
3. FOR ROADWAY CLEARANCE OF UTILITY POLES, FIRE HYDRANTS, AND OTHER STRUCTURES SEE CHAPTER 5, ENGINEERING DEVELOPMENT GUIDE.
4. DRIVEWAYS SHALL BE LOCATED AS FAR FROM THE INTERSECTION AS POSSIBLE.
5. NO CATCH BASINS, METER BOXES, SEWER MANHOLES, STORM DRAIN MANHOLES OR CLEANOUTS IN DRIVEWAY AREA.

 <p><b>CITY OF SHORELINE</b></p>	<p>Public Works Planning and Development Services</p>		<h2 style="margin: 0;">Location &amp; Width of New Driveways</h2>	<h1 style="margin: 0;">305</h1>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>

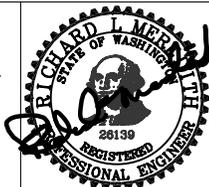


NOTES:

1. ALL COMMERCIAL/INDUSTRIAL DRIVEWAYS SHALL HAVE AN EXPANSION JOINT LOCATED MID-WIDTH.
2. PIPE SHALL BE:
  - A. SIZED TO CONVEY COMPUTED STORM WATER RUNOFF, AND
  - B. MIN. 12" DIAM., AND
  - C. EQUAL TO OR LARGER THAN EXISTING PIPES WITHIN 500' UPSTREAM.
3. EXPOSED PIPE ENDS SHALL BE BEVELED TO MATCH THE SLOPE FACE AND PROJECT NO MORE THAN 2" BEYOND SLOPE SURFACE. PROJECTING HEADWALLS ARE NOT ACCEPTABLE.
4. PIPE SHALL HAVE MIN. COVER OF 24" TO FINISH GRADE UNLESS APPROVED BY DIRECTOR OF PUBLIC WORKS & MANUFACTURER RECOMMENDATIONS.
5. PIPE SHALL BE INSTALLED IN A STRAIGHT UNIFORM ALIGNMENT AT A MIN. 0.5% SLOPE (0.5 FT. PER 100 FT.) WITH THE DOWNSTREAM END LOWER THAN THE UPSTREAM END.
6. PIPE MAY BE OMITTED IF ROADSIDE DITCH DOES NOT EXIST AND DRIVEWAY DOES NOT BLOCK NATURAL FLOW.
7. DRIVEWAY SLOPE SHALL MATCH TO BACK EDGE OF SHOULDER, BUT SHOULDER SLOPE AND EDGE OF SHOULDER SHALL NOT BE ALTERED AS A RESULT OF DRIVEWAY CONSTRUCTION.
8. PAVED DRIVEWAYS SHALL BE PAVED THROUGH RIGHT-OF-WAY WITH A.C. OR B.S.T. (4" MIN), BUT NOT P.C.C.
9. GRAVEL DRIVEWAYS SHALL BE PAVED BETWEEN THE EDGE OF PAVEMENT AND R/W WITH A.C. OR B.S.T. ONLY WITH DIMENSIONS L=W.
10. SEE CHAPTER 3, ENGINEERING DEVELOPMENT GUIDE.
11. SHOULDER SHALL BE IN COMPLIANCE WITH STND DWG 205.



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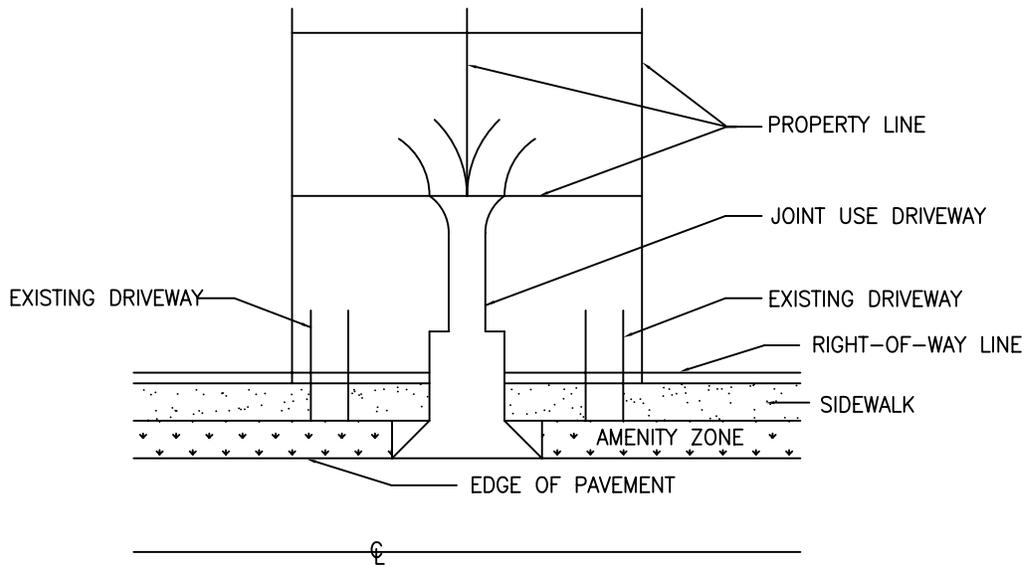


# Shoulder & Ditch Section Driveway

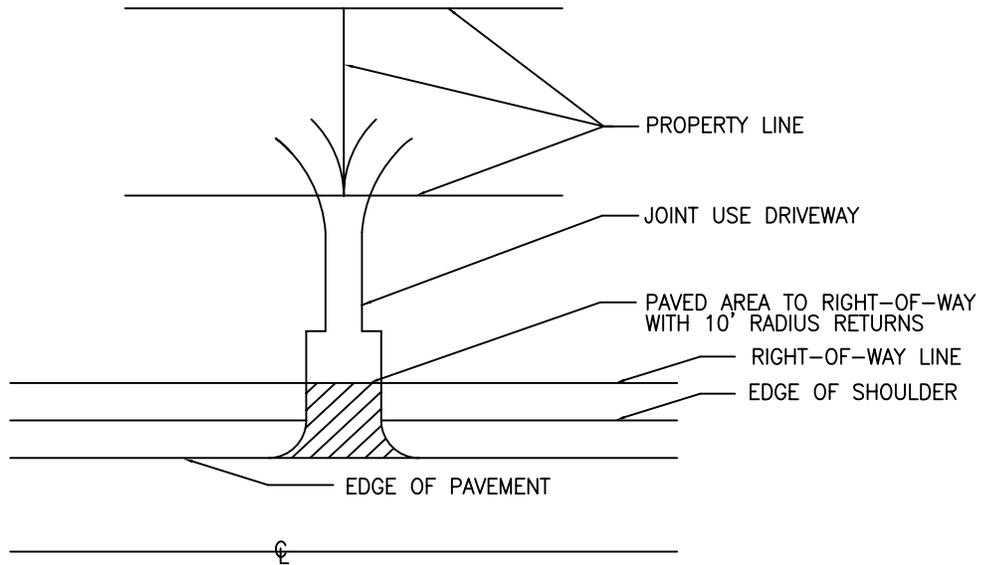
**306**

NOT TO SCALE

Revision Date  
December 2006



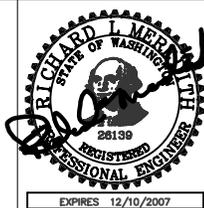
URBAN



RURAL



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and  
Development  
Services

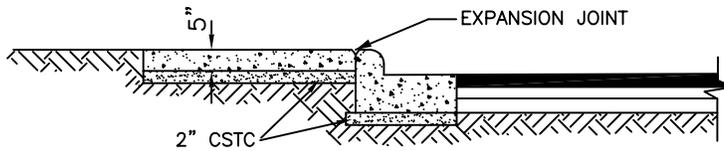
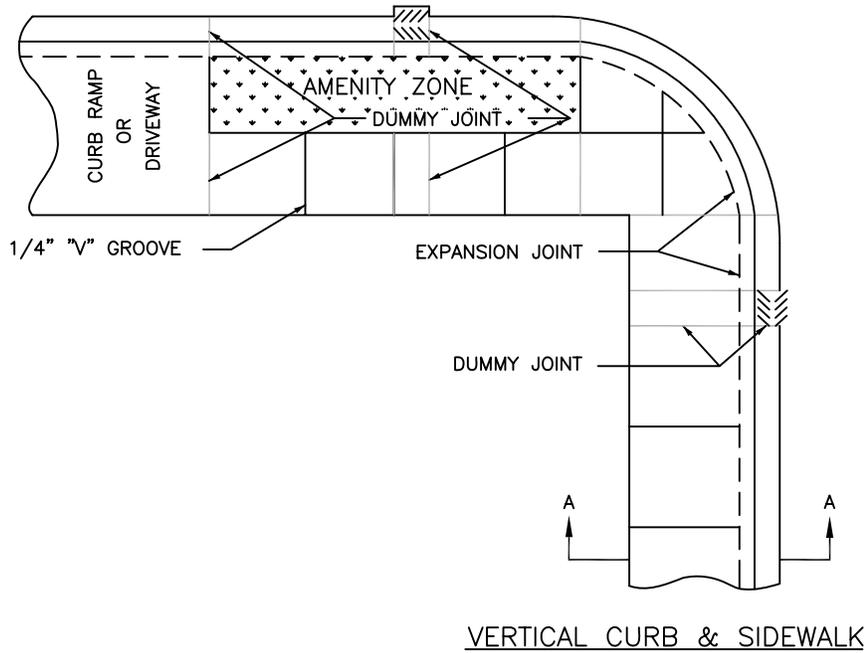


# Joint Use Driveway

# 307

NOT TO SCALE

Revision Date  
December 2006



SECTION A-A

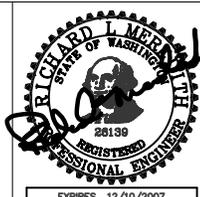
- DUMMY JOINT  
⊙ MAX. 15' C-C
- - - - - EXPANSION JOINT  
ALONG CURB
- 1/4" "V" GROOVE  
⊙ MAX. 5' C-C

**NOTES:**

1. FOR INTEGRAL POUR CONSTRUCTION, 1/4" EDGED GROOVE MAY REPLACE EXPANSION JOINT AT INTERFACE BETWEEN CURB AND ADJACENT SIDEWALK.
2. ROLLED CURB SHALL BE USED ONLY TO MATCH EXISTING CONDITIONS OR WITH DIRECTOR APPROVAL.
3. CONCRETE SHALL HAVE 4" PERIMETER EDGING.



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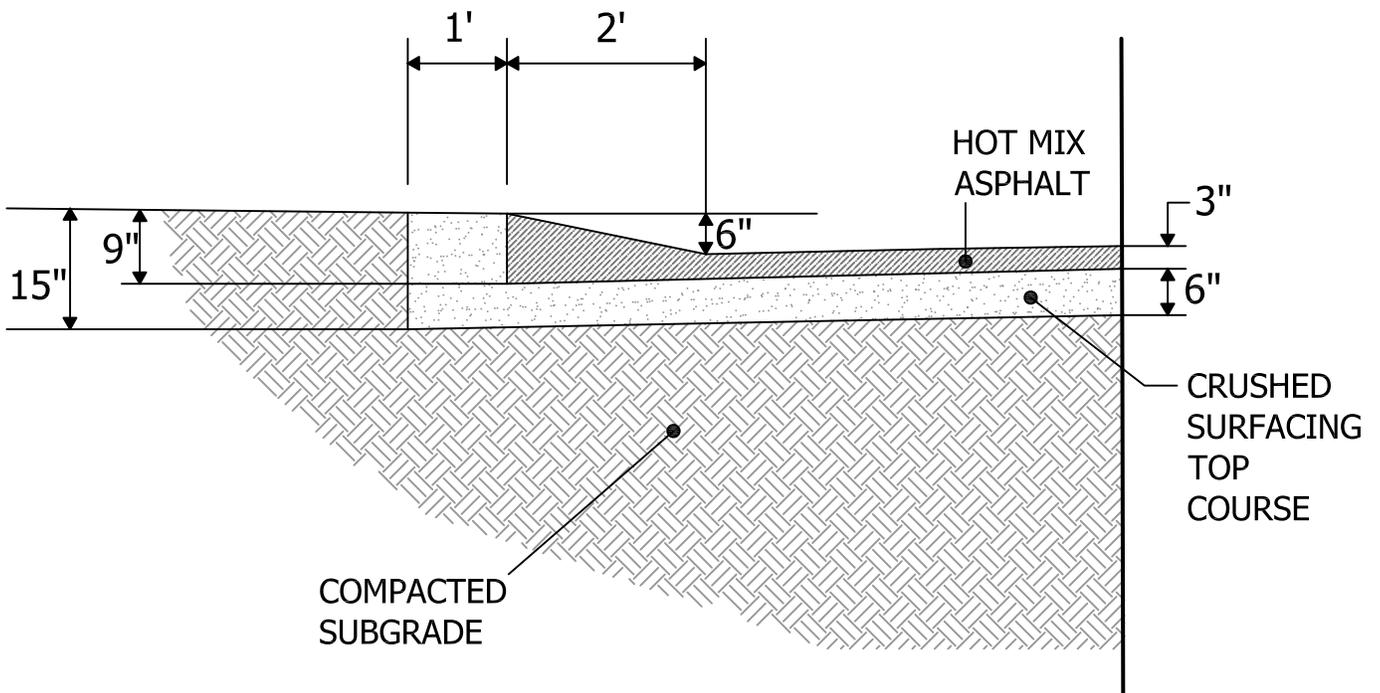


# Curb & Sidewalk Joints

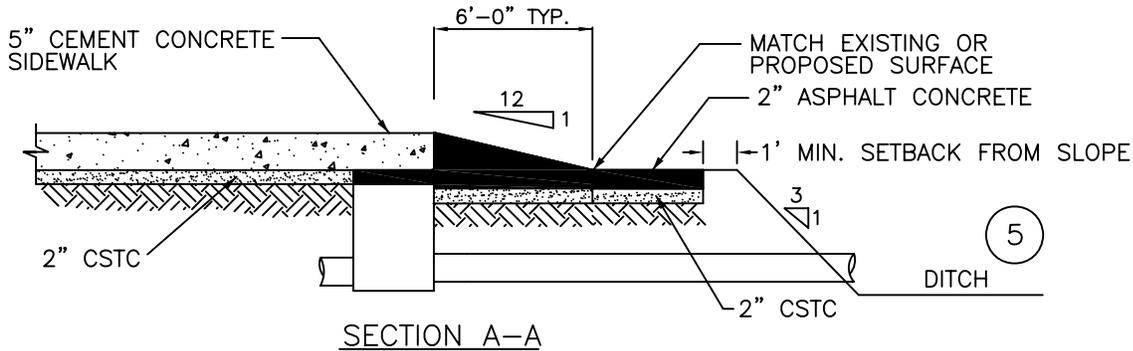
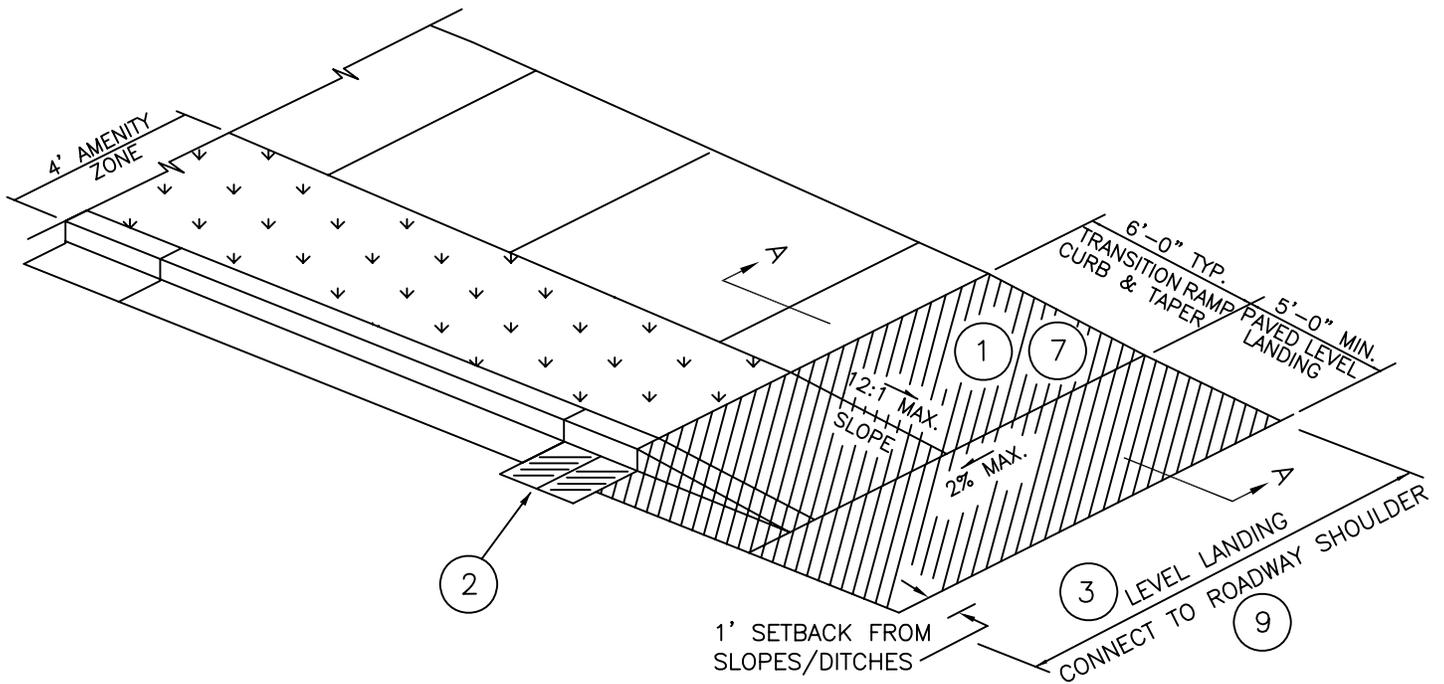
**309**

NOT TO SCALE

Revision Date  
December 2006



	<p>Public Works Planning and Development Services</p>		<h1>Asphalt Thickened Edge</h1>	<h1>310</h1>
				<p>NOT TO SCALE Revision Date December 2006</p>

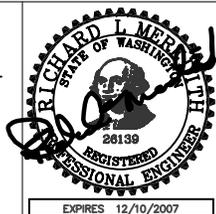


**NOTES:**

- ① RAMP, CURB TAPER, AND LEVEL LANDING ALL ASPHALT OVER 2" CSTC.
- ② CATCH BASINS LOCATE AT END OF IMPROVEMENTS TO FACILITATE FUTURE EXTENSIONS/CONNECTIONS.
- ③ FOR WIDTHS OF PAVEMENT AND SHOULDER SEE ENGINEERING DEVELOPMENT GUIDE AND STND DWG 201, 202, 204 & 205.
- ④ FOR WIDTHS OF SIDEWALK CHAPTER 3, ENGINEERING DEVELOPMENT GUIDE.
- ⑤ FOR TRANSITIONS ADJACENT TO DITCHES, DITCH SLOPING (3:1 TYPICAL), 1' SETBACK & PIPE BEVEL END DESIGN (SEE STND DWG 701) MAY BE REQUIRED.
- ⑥ FOR CURB AND SIDEWALK JOINTS SEE STND DWG 309.
- ⑦ DETECTABLE WARNING PATTERN (TRUNCATED DOMES) MAY BE REQUIRED IF RAMP CROSSES TRAVEL LANE OF PUBLIC STREET OR AS SPECIFIED BY THE CITY (SEE STND DWG 318).
- ⑧ CURB RADIUS REQUIRED AT INTERSECTIONS.
- ⑨ EXISTING SHOULDER MAY REQUIRE RESTORATION WITH CSTC.



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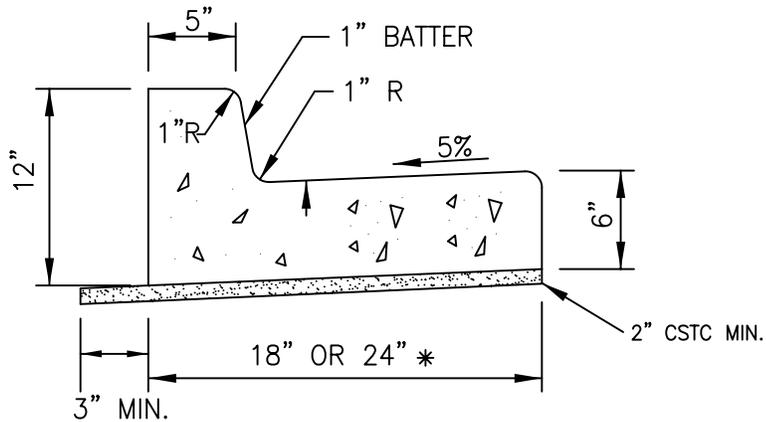


# Temporary Asphalt Transition Ramp to Shoulder

**311**

NOT TO SCALE

Revision Date  
December 2006

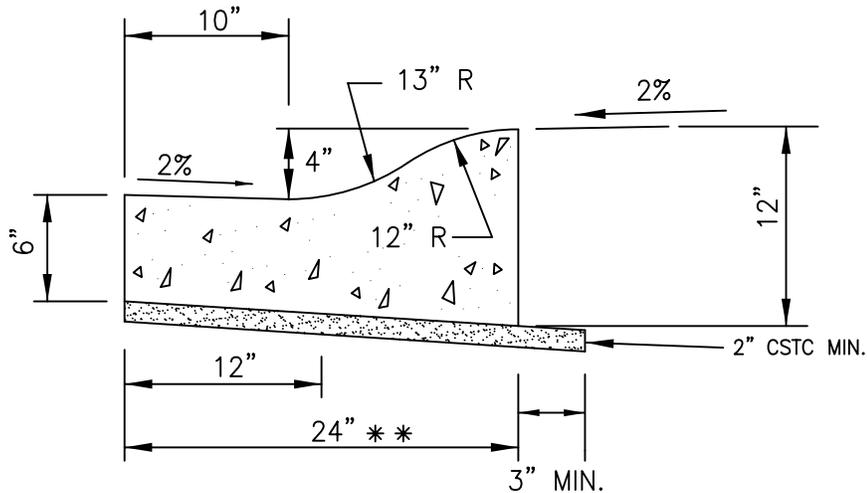


### TYPE A CURB AND GUTTER

\* SEE CHAPTER 3 , ENGINEERING DEVELOPMENT GUIDE FOR USE RESTRICTIONS.

NOTE:

MEDIAN CURBS SHALL MATCH ROADWAY CROSS SLOPES

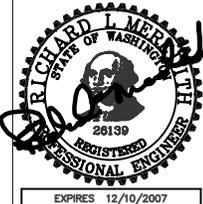


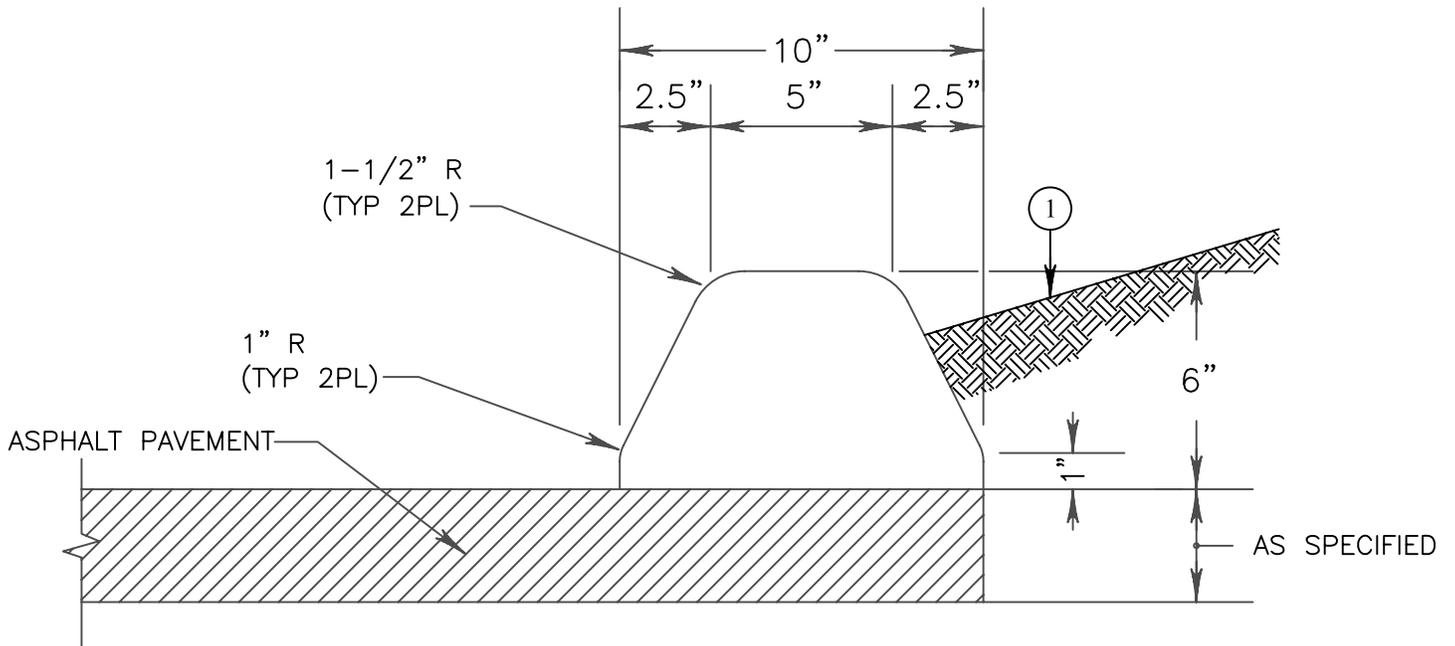
### ROLLED CURB AND GUTTER

\*\* SEE CHAPTER 3 , ENGINEERING DEVELOPMENT GUIDE FOR USE RESTRICTIONS.

NOTE:

1. MATERIAL – WSDOT CONCRETE CLASS 4000psi.

	<p>Public Works Planning and Development Services</p>		<b>Curbs</b>	<b>312</b>
				NOT TO SCALE
				Revision Date December 2006

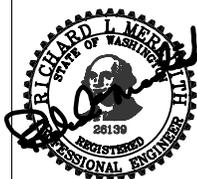


**NOTE:**

- ① EXTRUDED CURB SHALL BE SUPPORTED ON ONE SIDE WITH SOIL, CONCRETE, OR ASPHALT FOR STABILITY



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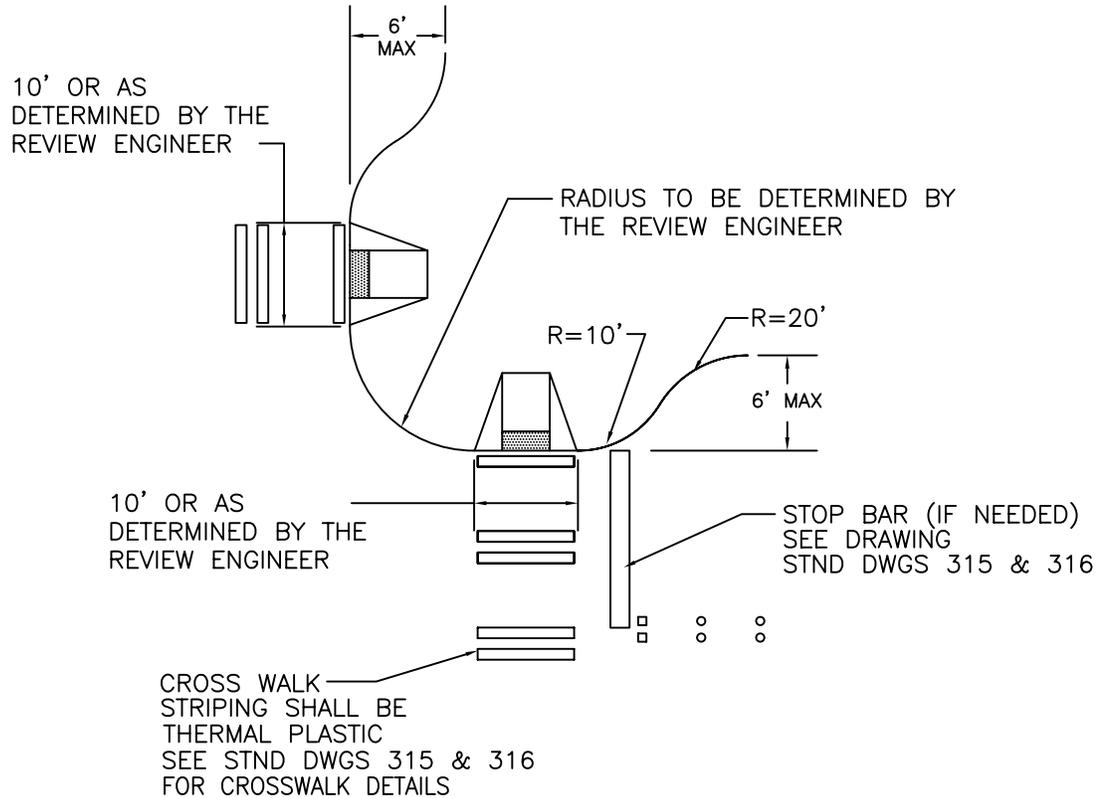


# Extruded Curbs

# 313

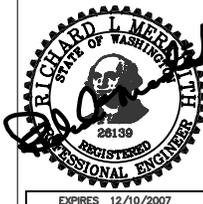
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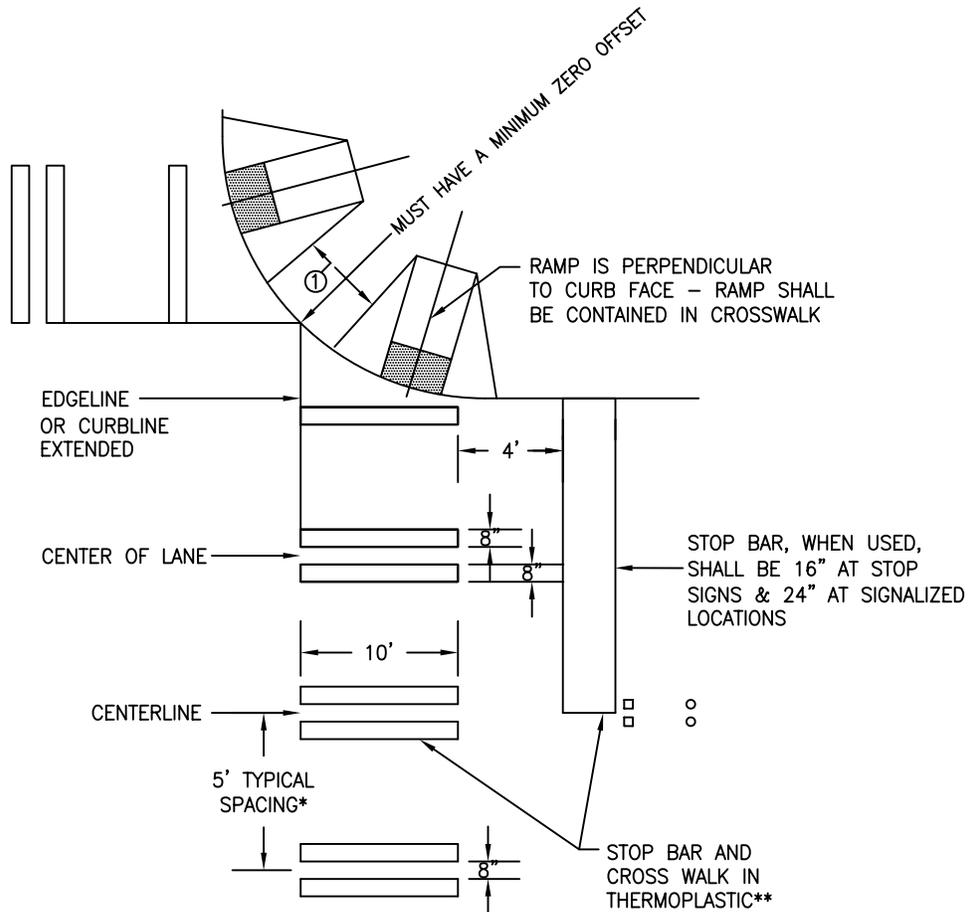
Revision Date  
December 2006



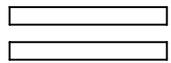
NOTES:

1. INTERSECTION RADII SHALL ACCOMMODATE DESIGN VEHICLES APPLICABLE TO STREET.
2. LENGTH OF CURB EXTENSIONS MUST RECOGNIZE SITE CONDITIONS, E.G. DRIVEWAY LOCATIONS.
3. IF CURB EXTENSIONS ARE PLACED ON DIAGONALLY OPPOSITE CORNERS OF AN INTERSECTION, A MINIMUM CLEAR OFFSET BETWEEN EXTENSIONS OF 15' SHOULD BE PROVIDED TO MINIMIZE VEHICULAR CONFLICTS WITHIN THE INTERSECTION.
4. ALL CURB EXTENSIONS SHALL BE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

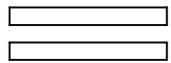
 CITY OF <b>SHORELINE</b>	Public Works Planning and Development Services		<h1 style="margin: 0;">Curb Extension</h1>	<h1 style="margin: 0;">314</h1>
				NOT TO SCALE
				Revision Date December 2006



\* IF LANES LINES ARE NOT MARKED

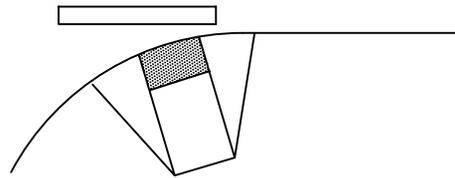


\*\* STOPBAR ONLY TO BE USED AT STOPSIGNS & SIGNALS

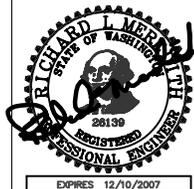


**NOTE:**

- ① CURB RAMP SHALL BE A MINIMUM OF 2' APART
2. IN ORDER TO PROVIDE SAFE STREETS FOR PEDESTRIANS, DRAINAGE STRUCTURES WILL BE REQUIRED TO MANAGE SURFACE WATER AT PAINTED/MARKED CROSSWALKS WHERE AFFECTED BY RUNOFF. SHEET FLOW IS ACCEPTABLE AT UNMARKED CROSSWALKS.



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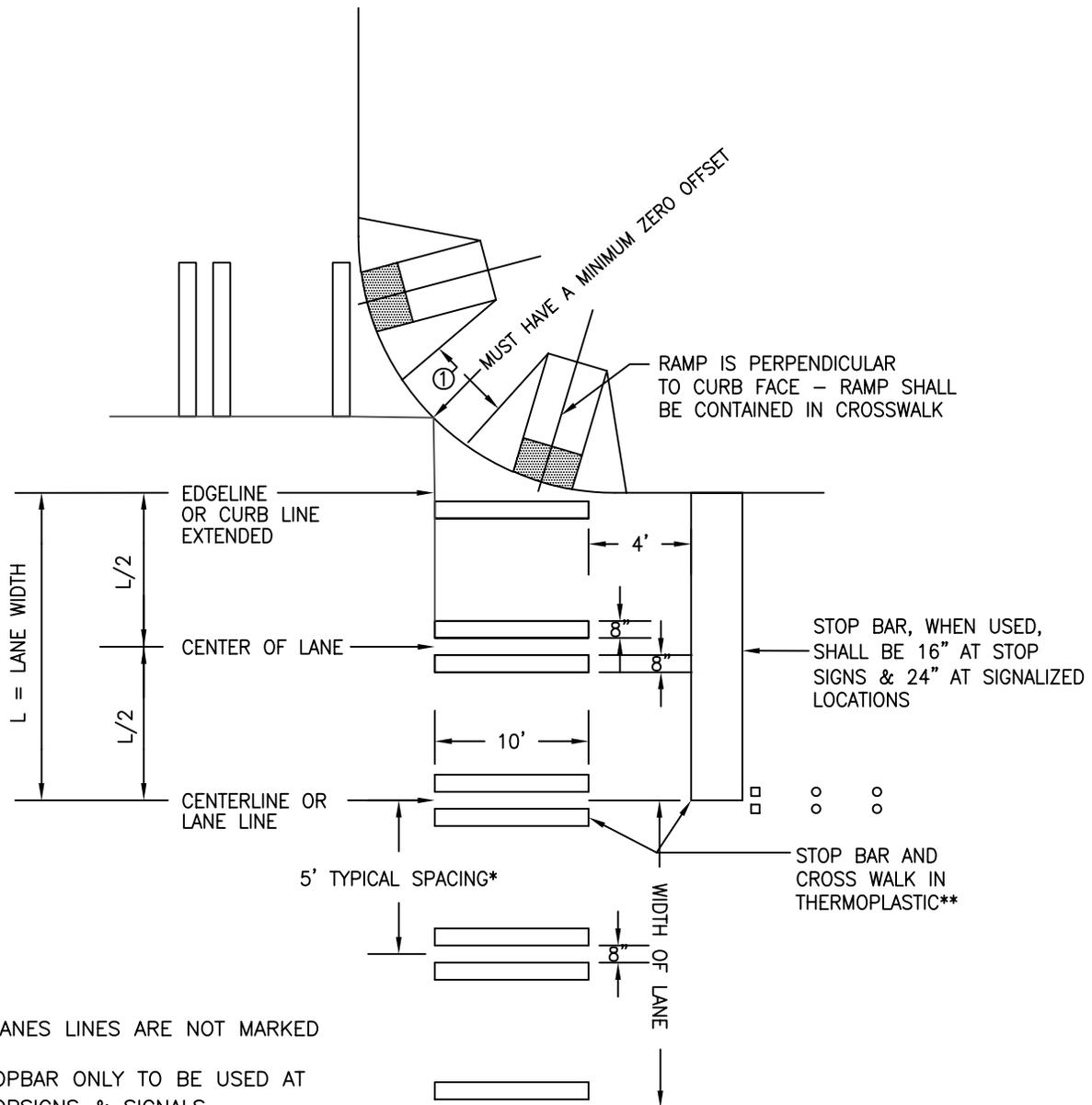


# Crosswalk with Single Approach Lane

**315**

NOT TO SCALE

Revision Date  
December 2006



\* IF LANES LINES ARE NOT MARKED

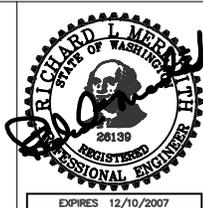
\*\* STOPBAR ONLY TO BE USED AT STOPSIGNS & SIGNALS

NOTE:

- ① CURB RAMPS SHALL BE A MINIMUM OF 2' APART
2. IN ORDER TO PROVIDE SAFE STREETS FOR PEDESTRIANS, DRAINAGE STRUCTURES WILL BE REQUIRED TO MANAGE SURFACE WATER AT PAINTED/MARKED CROSSWALKS WHERE AFFECTED BY RUNOFF. SHEET FLOW IS ACCEPTABLE AT UNMARKED CROSSWALKS.



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# Crosswalk with Multiple Approach Lanes

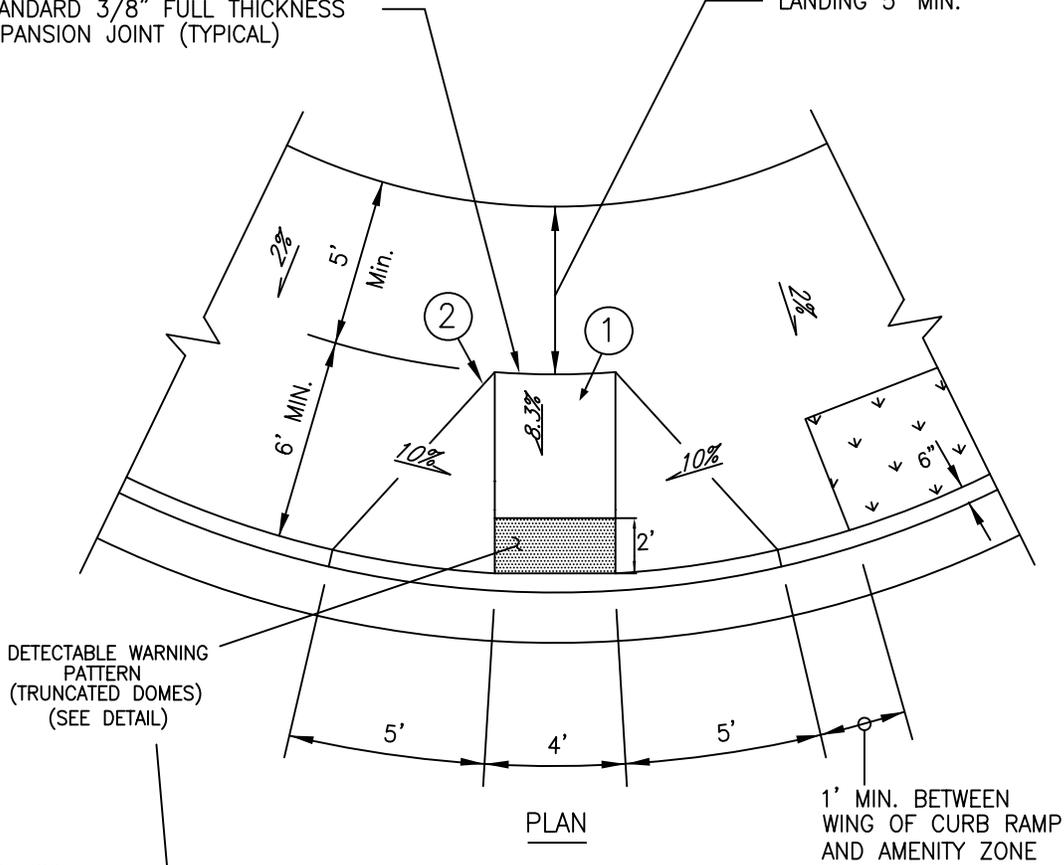
**316**

NOT TO SCALE

Revision Date  
December 2006

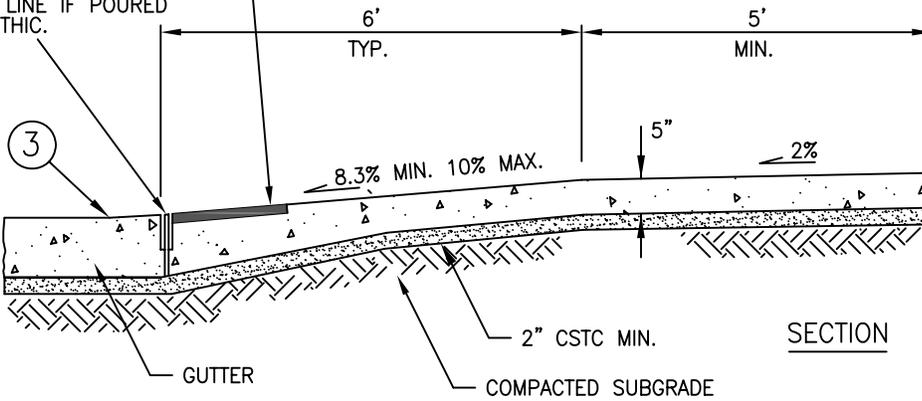
STANDARD 3/8" FULL THICKNESS EXPANSION JOINT (TYPICAL)

LANDING 5' MIN.



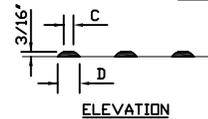
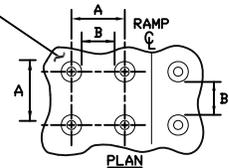
PLAN

3/8" EXPANSION JOINT. SCORE LINE IF POURED MONOLITHIC.



SECTION

DETECTABLE WARNING PATTERN (TRUNCATED DOMES) SHALL BE BLACK UNLESS APPROVED BY THE DIRECTOR OR DESIGNEE



	MIN.	MAX.
A	1 3/8"	2 3/8"
B	3/8"	1 1/2"
C	7/16"	3/4"
D	7/8"	1 1/16"

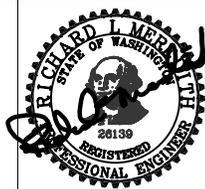
DETECTABLE WARNING PATTERN DETAIL  
TRUNCATED DOMES  
(SEE NOTE 6)

NOTES

- ① BROOM FINISH PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL
- ② FULL DEPTH EXPANSION JOINT
- ③ NO LIP AT GUTTER LINE
4. CURB RAMPS WILL BE POURED INTEGRAL WITH SIDEWALK AND SHALL BE ISOLATED BY EXPANSION JOINT MATERIAL ON ALL SIDES, BUT NOT AT END OF RAMP ADJACENT TO THE ROADWAY.
5. CATCH BASINS & INLETS SHALL BE INSTALLED A MINIMUM OF 12" FROM THE BASE OF CURB RAMP LANDING.
6. DETECTABLE WARNING PATTERN (TRUNCATED DOMES) SHALL BE FLUSH WITH RAMP TEXTURE +/- NO GREATER THAN 1/4".
7. CONCRETE SHALL BE A MINIMUM OF 5" NOT INCLUDING DETECTABLE WARNING PATTERN (TRUNCATED DOMES).
8. NO LAMPBLACK SHALL BE PLACED IN CURB RAMPS.



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Services

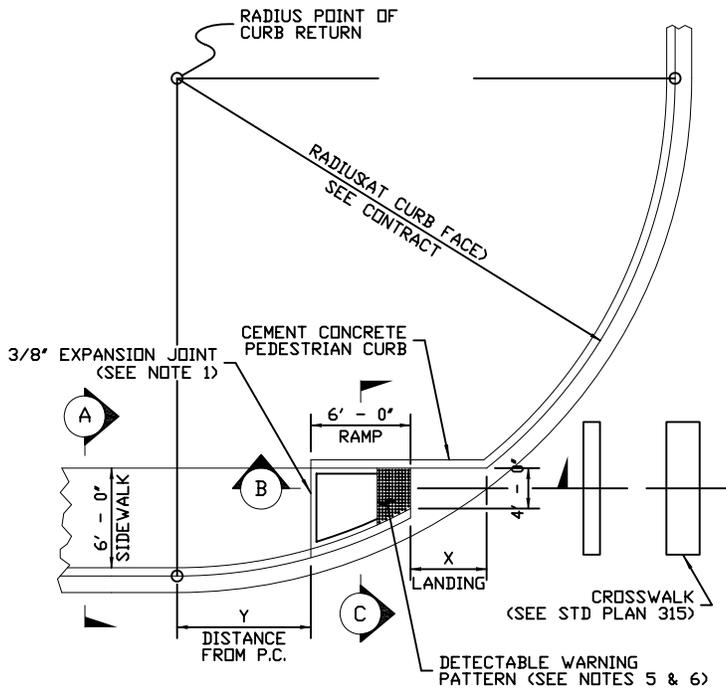


# Curb Ramp: Type A

# 318

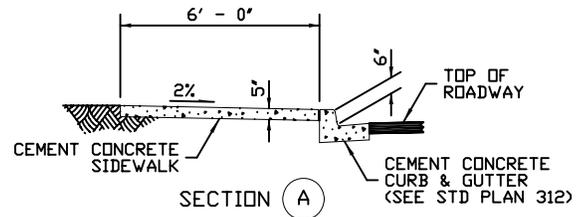
NOT TO SCALE

Revision Date  
December 2006

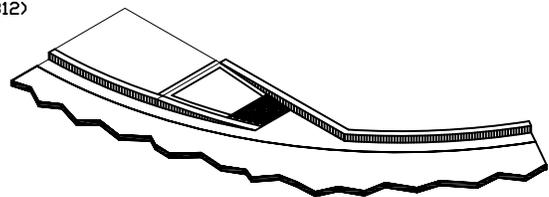
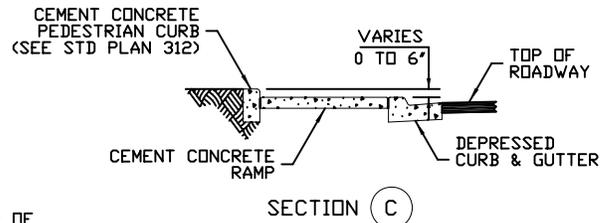
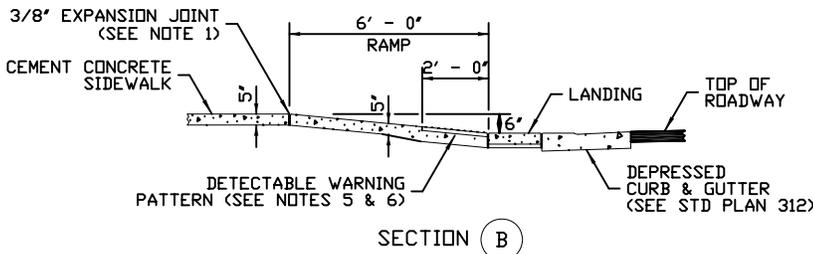


RADIUS (AT CURB FACE)	X	Y
20 FEET		2'-7 1/4"
30 FEET	7'-11 3/4"	4'-8 1/4"
40 FEET	9'-5 1/4"	6'-5"
50 FEET	10'-8 3/4"	7'-11 1/4"

INTERMEDIATE RADII CAN BE INTERPOLATED



SIDEWALK RAMP TYPE A-3  
PLAN



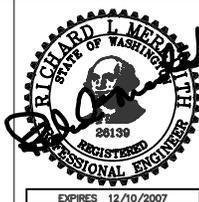
ISOMETRIC VIEW

**NOTES**

1. FULL DEPTH EXPANSION JOINT PER STD PLAN 309
2. CURB RAMPS SHALL BE ISOLATED BY EXPANSION JOINT MATERIAL ON ALL SIDES
3. 3/4" RADIUS DUMMY JOINT
4. CATCH BASINS & INLETS SHALL BE INSTALLED A MINIMUM OF 12" FROM THE BASE OF CURB RAMP LANDING.
5. DETECTABLE WARNING PATTERN (TRUNCATED DOMES) SHALL BE FLUSH WITH RAMP SURFACE +/- NO GREATER THAN 1/4".
6. SEE STD PLAN 318 FOR DETECTABLE WARNING PATTERN (TRUNCATED DOMES)
7. NO LAMPBLACK SHALL BE PLACED IN CURB RAMPS.



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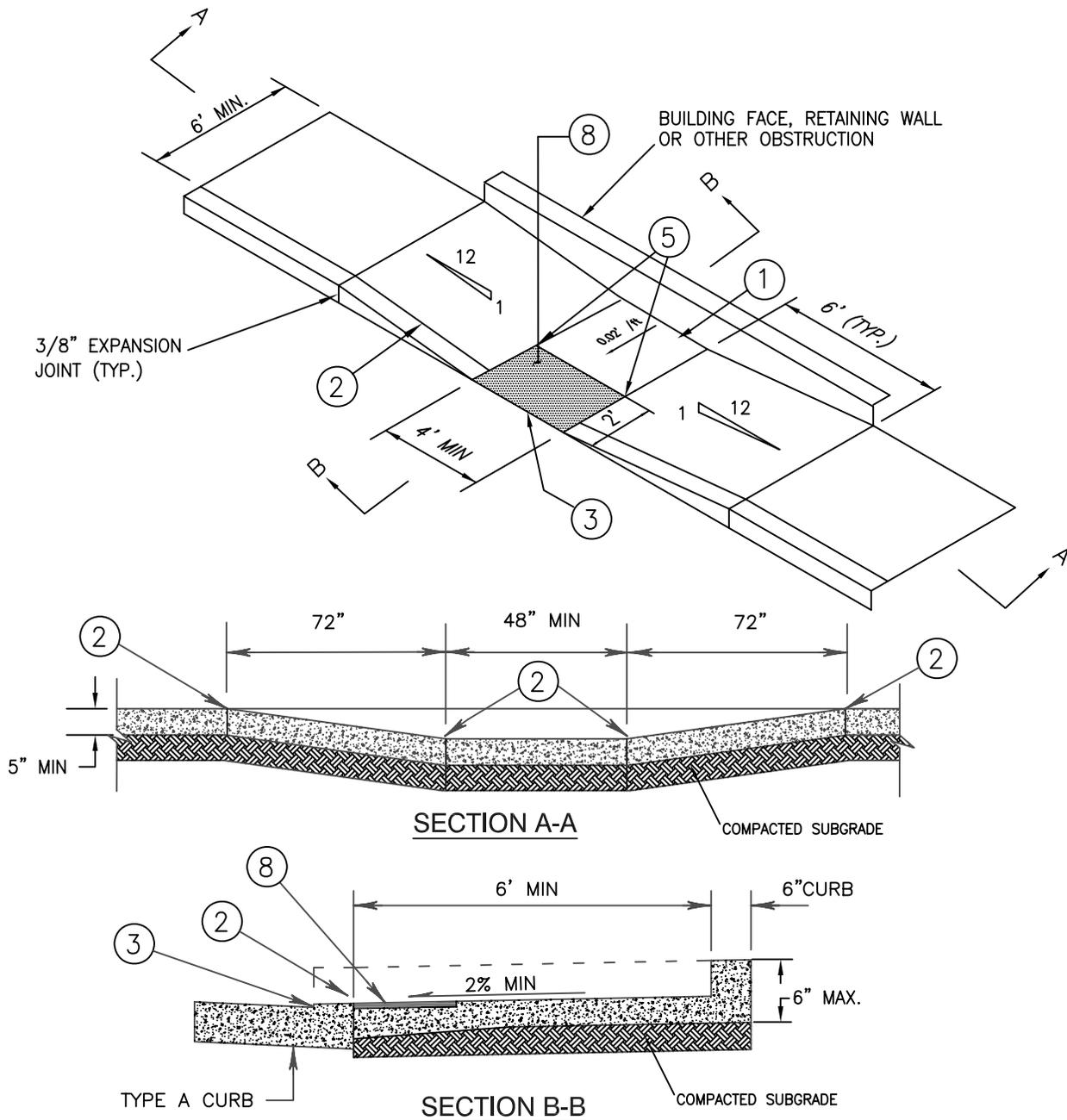


**Curb Ramp:  
Type A-3**

**319**

NOT TO SCALE

Revision Date  
December 2006

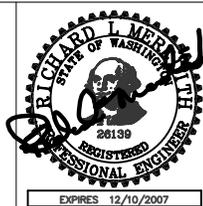


**NOTES:**

- ① BROOM FINISH PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL
- ② FULL DEPTH EXPANSION JOINT
- ③ NO LIP AT GUTTER LINE (NOT TO EXCEED 1/2").
- 4. CURB RAMPS SHALL BE ISOLATED BY EXPANSION JOINT MATERIAL ON ALL SIDES
- ⑤ 3/4" RADIUS DUMMY JOINT
- 6. CATCH BASINS & INLETS SHALL BE INSTALLED A MINIMUM OF 12" FROM THE BASE OF CURB RAMP LANDING.
- 7. DETECTABLE WARNING PATTERN (TRUNCATED DOMES) SHALL BE FLUSH WITH RAMP TEXTURE +/- NO GREATER THAN 1/4".
- ⑧ SEE STND DWG 318 FOR DETECTABLE WARNING PATTERN (TRUNCATED DOMES)
- 9. SEE STND DWGS 315 & 316 FOR SURFACE WATER REQUIREMENTS.
- 10. NO LAMPBLACK SHALL BE PLACED IN CURB RAMPS.



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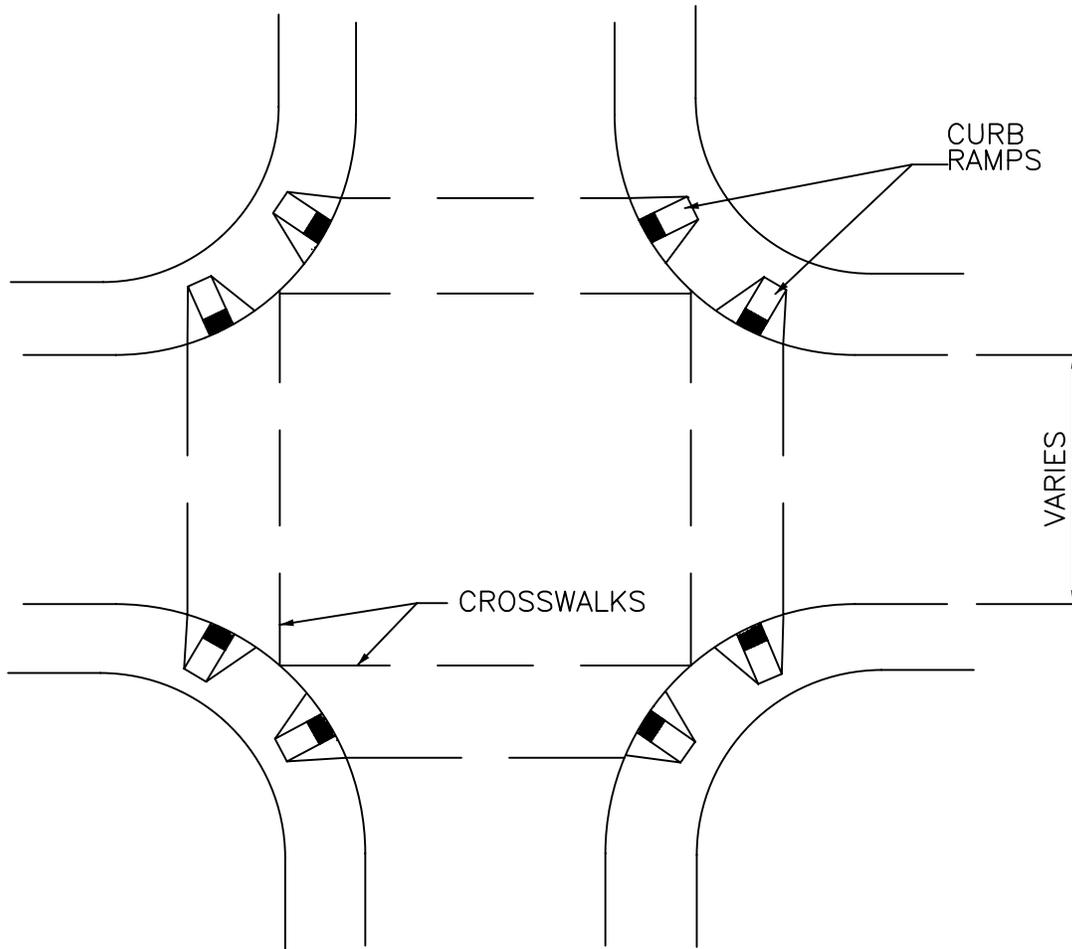


# Curb Ramp: Type C

# 320

NOT TO SCALE

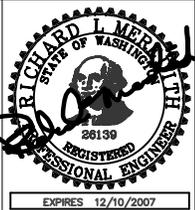
Revision Date  
December 2006

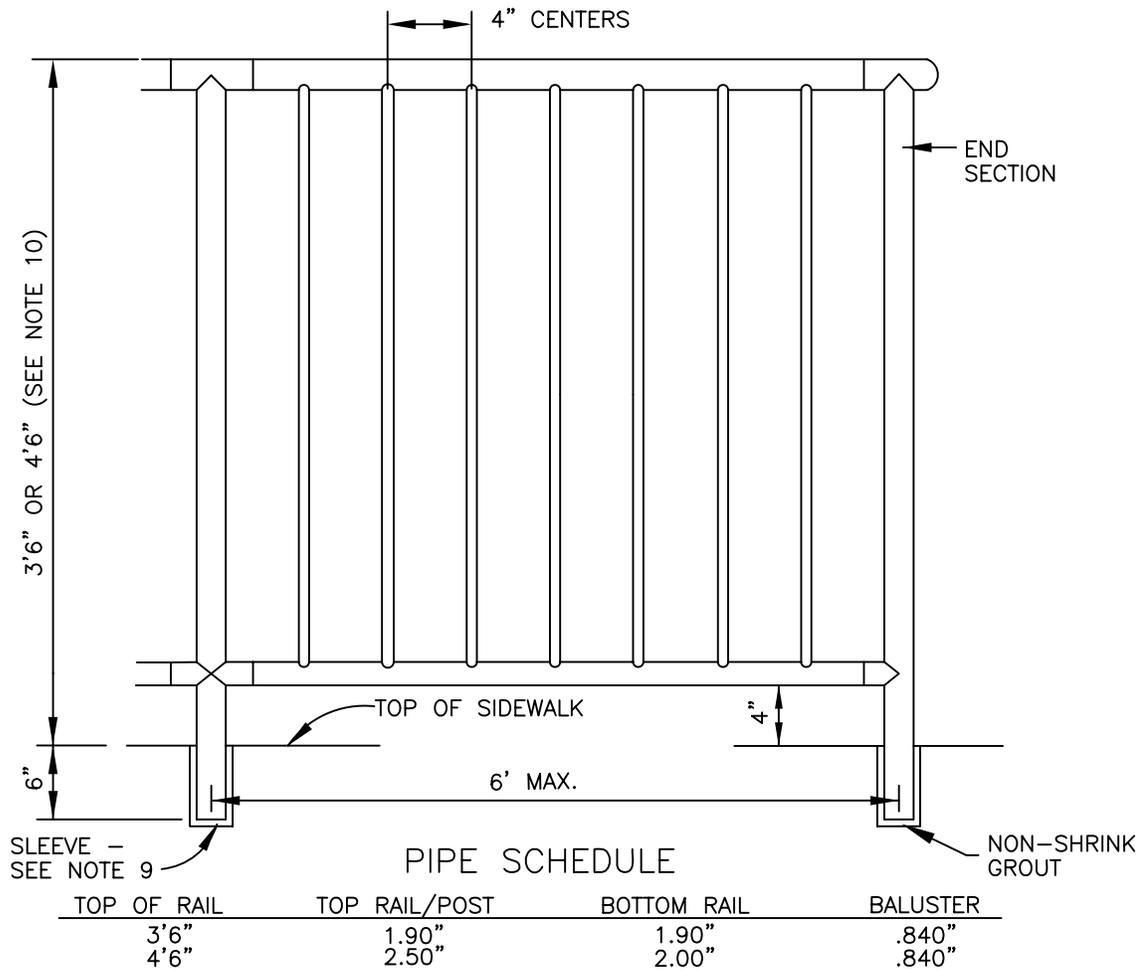


RAMP LOCATIONS  
FOR NEW CONSTRUCTION  
OR STANDARD RECONSTRUCTION

NOTES:

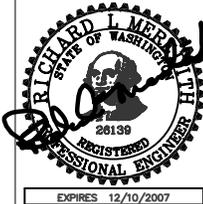
1. CURB RAMP CONSTRUCTION MUST COMPLY WITH CURRENT ADA STANDARDS.
2. CONSTRUCT RAMP WITH A MINIMUM 1' CLEARANCE FROM FIXED OBJECTS SUCH AS HYDRANTS, POLES, INLETS, AND OTHER UTILITIES.
3. CONSTRUCT RAMP IN ACCORDANCE WITH STND DWGS 318, 319 & 320..
4. CROSSWALKS ARE NOT ALWAYS MARKED.
5. WHEN RAMPS ARE CONSTRUCTED ON ONE SIDE OF STREET, RAMPS SHALL BE CONSTRUCTED AT CORRESPONDING LOCATIONS ON OPPOSITE SIDE OF STREET.
6. CROSSWALK SHALL INTERSECT AT THE CURB OR BEYOND – NOT IN THE STREET AREA.
7. IN ORDER TO PROVIDE SAFE STREETS FOR PEDESTRIANS, DRAINAGE STRUCTURES WILL BE REQUIRED TO MANAGE SURFACE WATER AT PAINTED/MARKED CROSSWALKS WHERE AFFECTED BY RUNOFF. SHEET FLOW IS ACCEPTABLE AT UNMARKED CROSSWALKS.

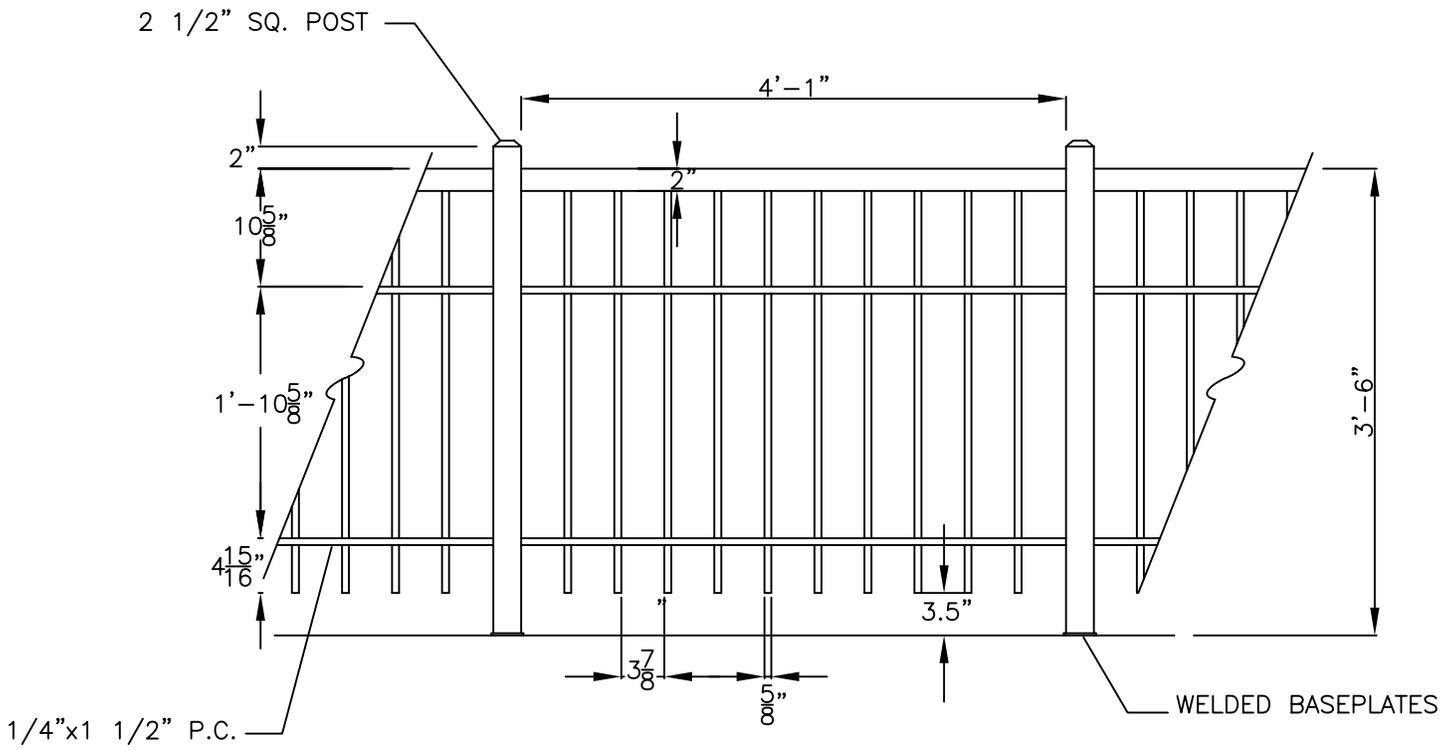
	Public Works Planning and Development Services		<h2 style="margin: 0;">Curb Ramp Locations</h2>	<h1 style="margin: 0;">321</h1>
				NOT TO SCALE
				Revision Date December 2006



**NOTES:**

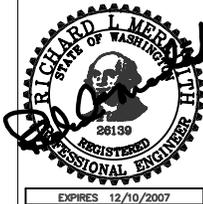
1. RAILING SHALL BE CV PIPE RAIL, GALVANIZED STEEL OR APPROVED EQUIVALENT. INSTALLATION PER MANUFACTURER'S RECOMMENDATIONS.
2. SHOP DRAWINGS OF RAILING SHALL BE SUBMITTED FOR APPROVAL SHOWING COMPLETE DIMENSIONS AND DETAILS OF FABRICATION AND INCLUDING AN ERECTION DIAGRAM. MATERIALS BEING USED SHALL BE SPECIFIED IN THE SHOP DRAWINGS.
3. ALL ALUMINUM PARTS SHALL BE GIVEN A CLEAR ANODIC COATING AT LEAST 0.0006 INCH THICK AND BE HOT WATER SEALED AND SHALL HAVE A UNIFORM FINISH.
4. PIPE RAILING AND PIPE RAILING SPLICES MAY BE HEATED TO NOT MORE THAN 400°F FOR A PERIOD NOT TO EXCEED 30 MINUTES TO FACILITATE FORMING OR BENDING.
5. CUTTING SHALL BE DONE BY SAWING OR MILLING AND ALL CUTS SHALL BE TRUE AND SMOOTH. FLAME CUTTING WILL NOT BE PERMITTED.
6. PIPE RAILING, PIPE BALUSTERS AND PIPE RAILING SPLICES SHALL BE ADEQUATELY WRAPPED TO ENSURE SURFACE PROTECTION DURING HANDLING AND TRANSPORTATION TO THE JOB SITE.
7. WELDING OF ALUMINUM SHALL BE IN ACCORDANCE WITH THE LATEST AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS.
8. ALLOW FOR EXPANSION AT APPROXIMATELY EVERY FOURTH POST.
9. RAILS, POSTS AND FORMED ELBOWS SHALL BE A.S.T.M. B-241 OR B-429 ALLOW 6063-T6 SCHEDULE 40 (STD. PIPE). BRACKETS, END CAPS AND OTHER FITTINGS SHALL BE A.S.T.M. 6063-T5. SPLICES AND REINFORCING SLEEVES SHALL BE DRAWN ALUMINUM TUBING 6063-T832. SLEEVE I.D. SHALL BE 1" GREATER THAN POST O.D.
10. TOP OF RAIL: 3 FEET 6 INCHES FOR PEDESTRIAN USES  
4 FEET 6 INCHES FOR COMBINED BICYCLE AND PEDESTRIAN USES

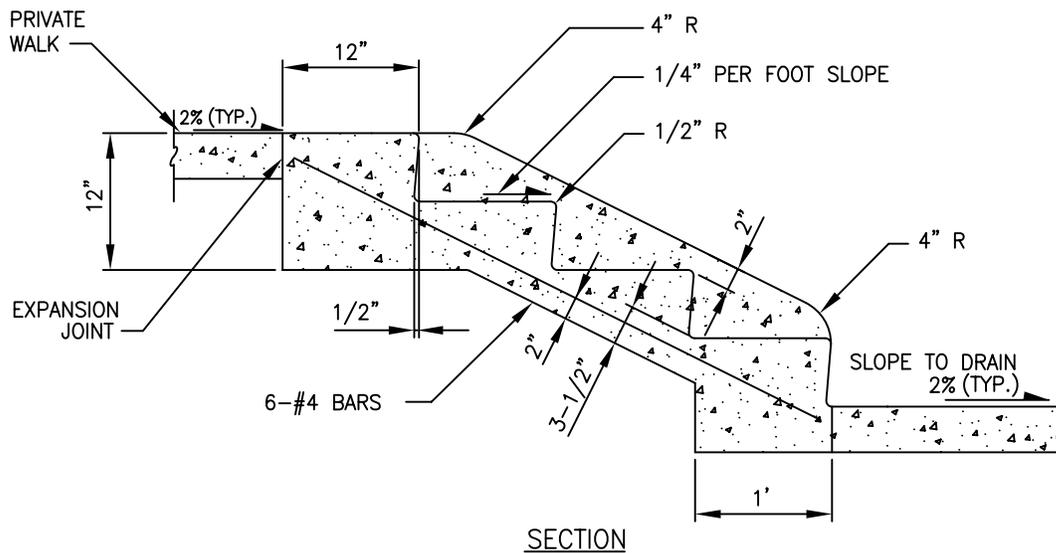
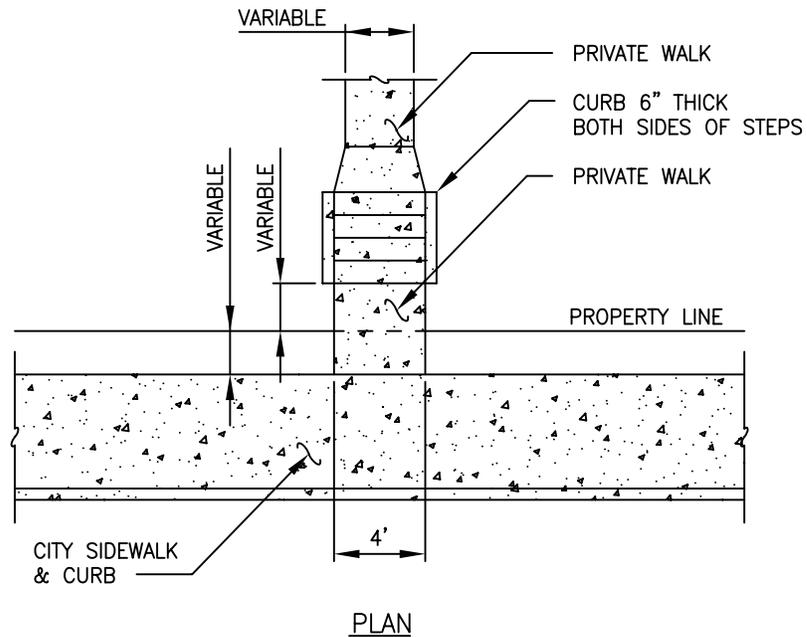
 <p>Public Works Planning and Development Services</p>		<h1>Handrails</h1>	<h1>323</h1>	
			NOT TO SCALE	
			Revision Date December 2006	



**NOTES:**

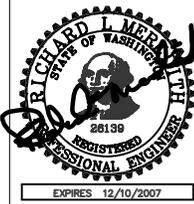
1. 50LB. RAIL LOADING PER IBC, CURRENT EDITION.
2. ALL CONCEALED FASTENERS THROUGHOUT
3. MILD STEEL

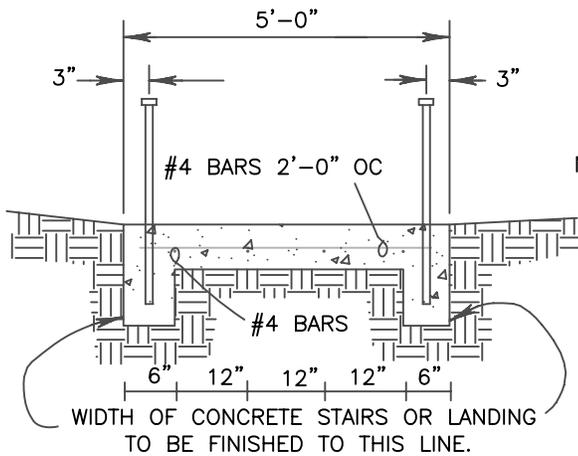
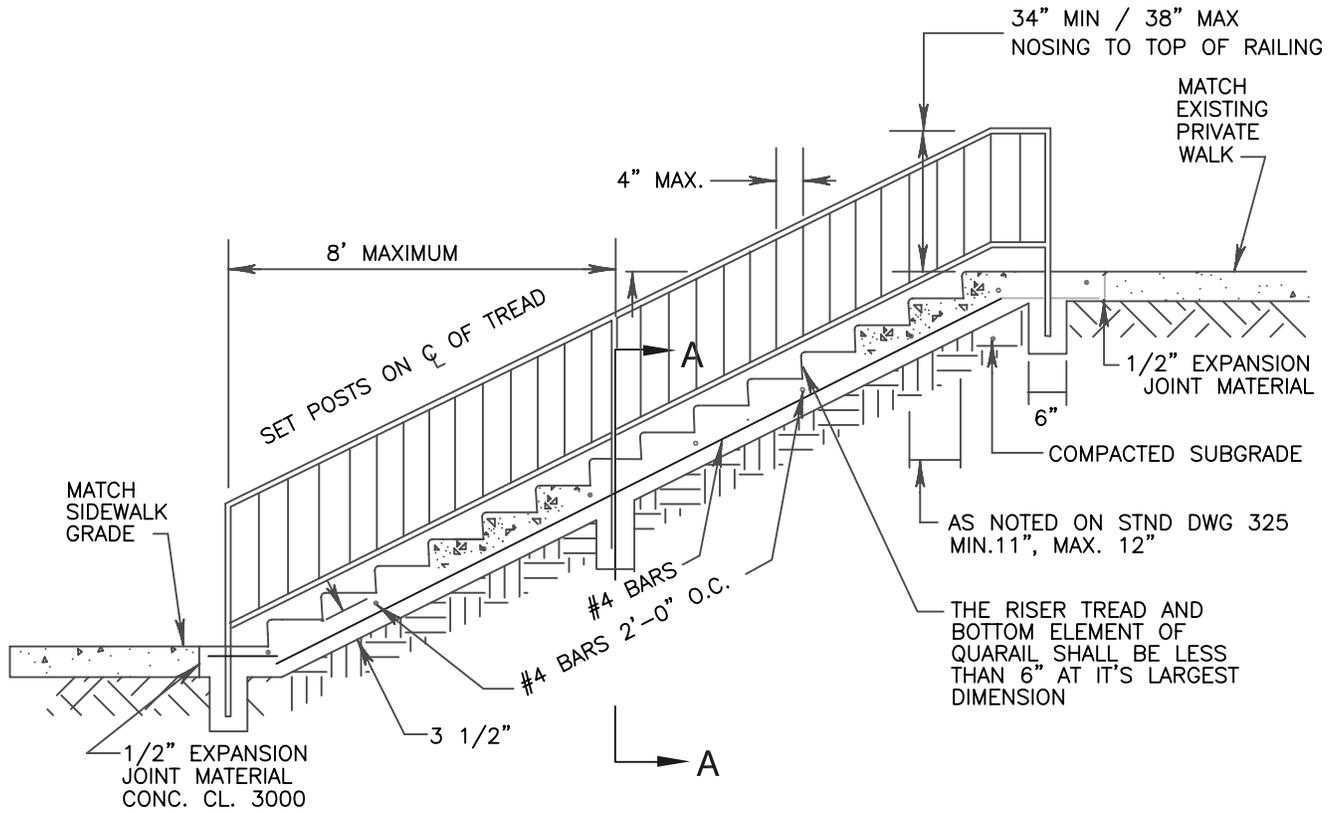
 <p><b>CITY OF SHORELINE</b></p>	<p>Public Works Planning and Development Services</p>		<p><b>Public Right-of-Way Hand/Guardrails</b></p>	<p><b>324</b></p>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>



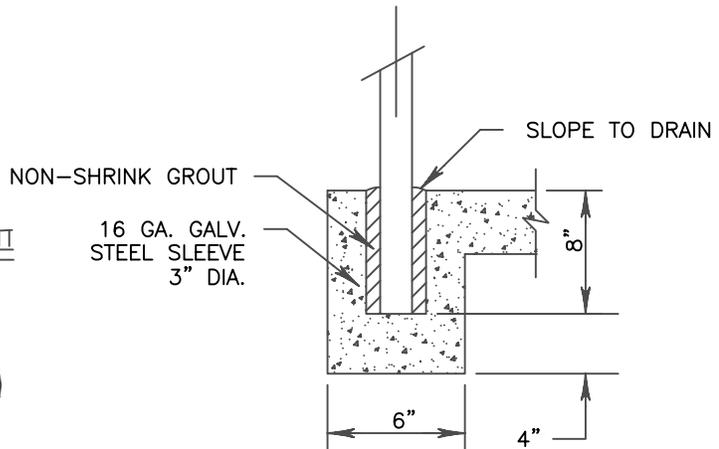
**NOTES:**

1. STEPS SHALL BE A MINIMUM OF 4'-0" WIDE, CURB TO CURB, PLUS 6" CURBS ON EACH SIDE.
2. CEMENT CONCRETE SHALL BE CLASS 4000psi TROWEL FINISH.
3. NUMBER OF STEPS SHALL SUIT INDIVIDUAL CONDITIONS, WITH TREAD AND RISER DIMENSIONS TO SUIT THE GRADE.
4. RISERS SHALL BE 5" MINIMUM, 7" MAXIMUM: TREAD SHALL BE 11" MINIMUM, 12" MAXIMUM.
5. HANDRAIL REQUIRED ON BOTH SIDES PER IBC.
6. ALL STEPS SHALL BE UNIFORM HEIGHT & DEPTH.

	<p>Public Works Planning and Development Services</p>		<h1 style="margin: 0;">Stairs</h1>	<h1 style="margin: 0;">325</h1>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>



**SECTION A-A**



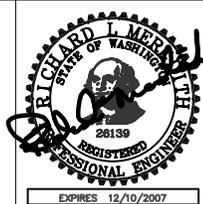
**POST DETAIL**

**NOTES:**

1. CEMENT CONCRETE STEPS AND CURBS SHALL BE CONSTRUCTED AS SHOWN ON STND DWG 325.
2. HEIGHT OF RAILING SHALL BE 36" MINIMUM, 38" MAXIMUM TOP OF NOSING TO TOP OF RAILING.
3. PEDESTRIAN RAILING SHALL BE CONSTRUCTED AS SHOWN ON STND DWGS 323 & 324.
4. CLEAR SPACE BETWEEN BALUSTERS SHALL BE A MAXIMUM OF 4".
5. ALL STEPS SHALL HAVE HANDRAIL ON BOTH SIDES.



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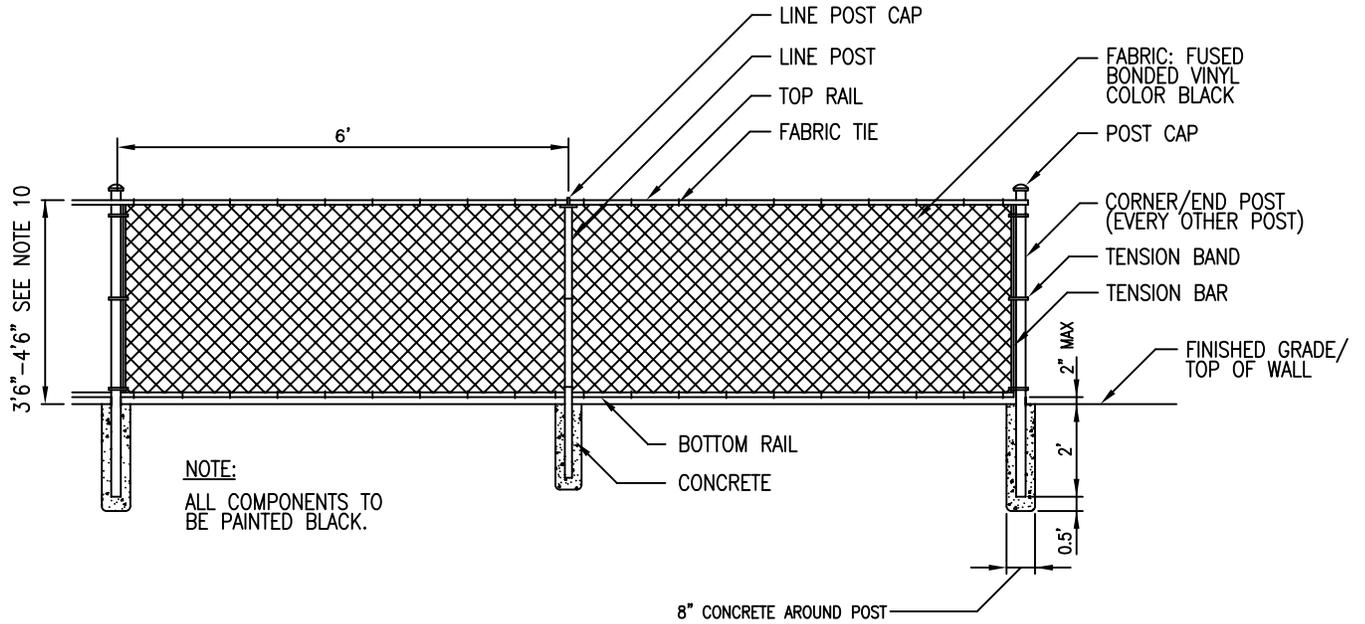


**Cement Concrete  
Stairway**

**326**

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December 2006

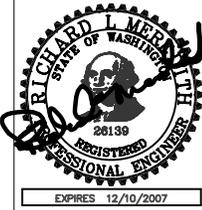


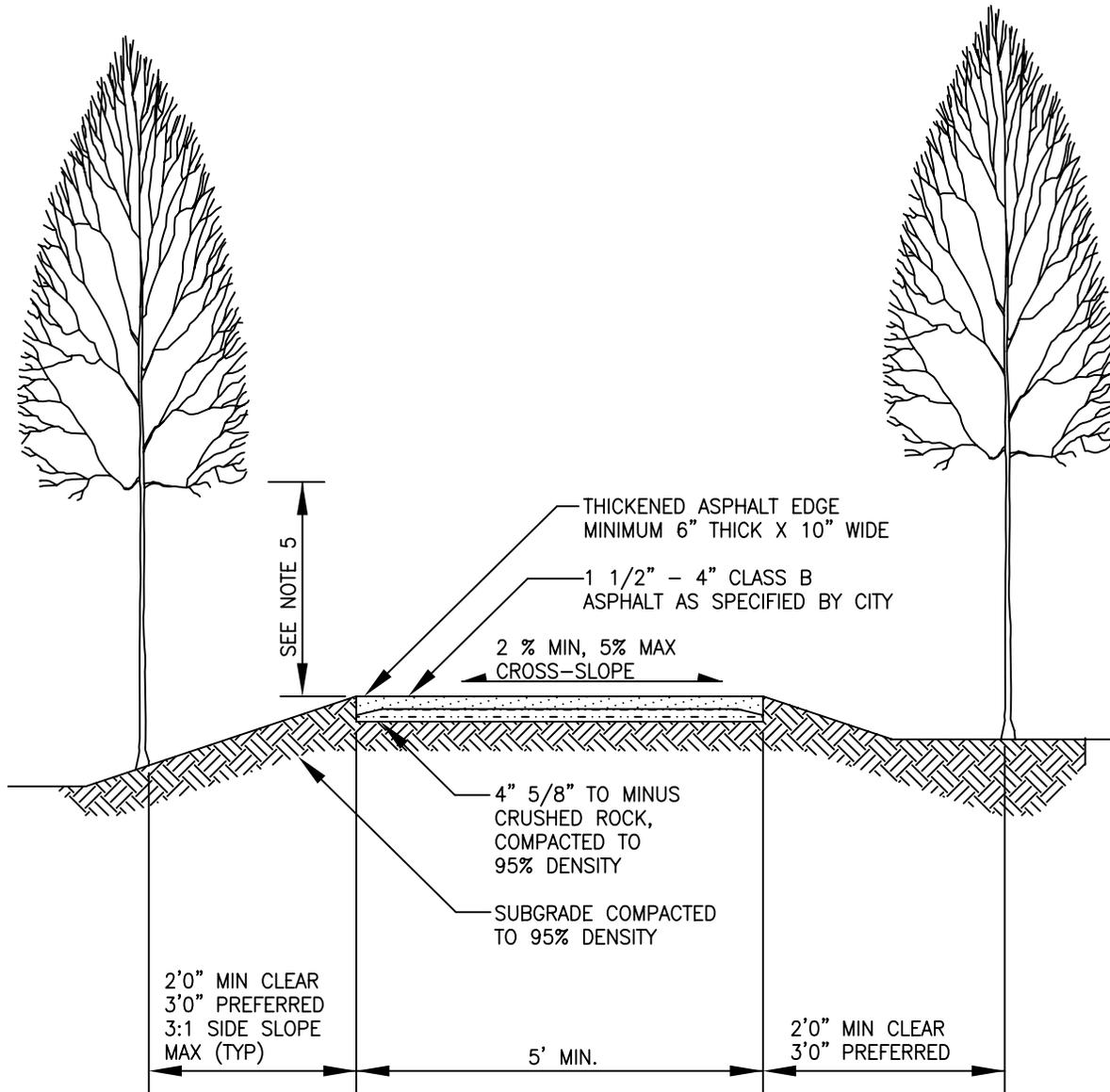
**PIPE SCHEDULE**  
(ALL DIMENSIONS I.D.)

TOP/BOTTOM RAIL	CORNER/END POST	LINE POST
1.25"	2.5"	2"

**NOTES:**

1. RAILING SHALL BE ALUMINUM PIPE RAIL OR APPROVED EQUIVALENT. INSTALLATION PER MANUFACTURER'S RECOMMENDATIONS.
2. SHOP DRAWINGS OF RAILING SHALL BE SUBMITTED FOR APPROVAL SHOWING COMPLETE DIMENSIONS AND DETAILS OF FABRICATION AND INCLUDING AN ERECTION DIAGRAM. MATERIALS BEING USED SHALL BE SPECIFIED IN THE SHOP DRAWINGS.
3. ALL ALUMINUM PARTS SHALL BE GIVEN A BLACK ANODIC COATING AT LEAST 0.0006 INCH THICK AND BE HOT WATER SEALED AND SHALL HAVE A UNIFORM FINISH.
4. WIRE FABRIC SHALL BE GIVEN A BLACK FUSED BONDED VINYL COATING TO MATCH FINISHED POSTS.
5. CUTTING SHALL BE DONE BY SAWING OR MILLING AND ALL CUTS SHALL BE TRUE AND SMOOTH. FLAME CUTTING WILL NOT BE PERMITTED.
6. ALL MATERIALS SHALL BE ADEQUATELY WRAPPED TO ENSURE SURFACE PROTECTION DURING HANDLING AND TRANSPORTATION TO THE JOB SITE.
7. ANY WELDING OF ALUMINUM SHALL BE IN ACCORDANCE WITH THE LATEST AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS.
9. RAILS, POSTS AND FORMED ELBOWS SHALL BE A.S.T.M B-241 OR B-429 ALLOY, 6063-T6 SCHEDULE 40 (STD. PIPE). BRACKETS, ENDCAPS AND OTHER FITTINGS SHALL BE A.S.T.M. 6063-T5. SPLICES AND REINFORCING SLEEVES SHALL BE DRAWN ALUMINUM TUBING 6063-T832.
10. TOP OF RAIL: 3 FEET 6 INCHES FOR PEDESTRIAN USES  
4 FEET 6 INCHES FOR COMBINED BICYCLE AND PEDESTRIAN USES
11. PUBLIC WORKS DIRECTOR APPROVAL IS REQUIRED FOR THE USAGE OF CHAIN LINK FENCE

 <b>CITY OF SHORELINE</b>	Public Works Planning and Development Services		<b>Fencing</b>	<b>327</b>
				NOT TO SCALE
				Revision Date December 2006

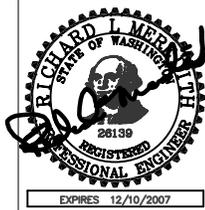


**NOTES:**

1. ALL PLANS MUST BE APPROVED BY THE CITY PRIOR TO CONSTRUCTION OF THE TRAIL. TRAIL CENTERLINE TO BE STAKED IN FIELD BY CONTRACTOR AND APPROVED BY THE APPROPRIATE CITY INSPECTOR.
2. ALL HAZARD TREES AND TREE LIMBS, AS DEFINED BY THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES HAZARD TREE BULLETIN, SHALL BE FELLED AND REMOVED FROM THE SITE.
3. SUBGRADE TO BE TREATED WITH AN APPROVED HERBICIDE PRIOR TO PLACING ASPHALT.
4. ONE-WAY BIKE PATH TO BE A MINIMUM OF 8' WIDE.
5. MINIMUM BRANCH CLEARANCE ABOVE TRAIL SURFACE = 7'-0" (TYPICAL), 10'-0" IF EQUESTRIAN USE IS ANTICIPATED.
6. SEE CHAPTER 3, ENGINEERING DEVELOPMENT GUIDE.



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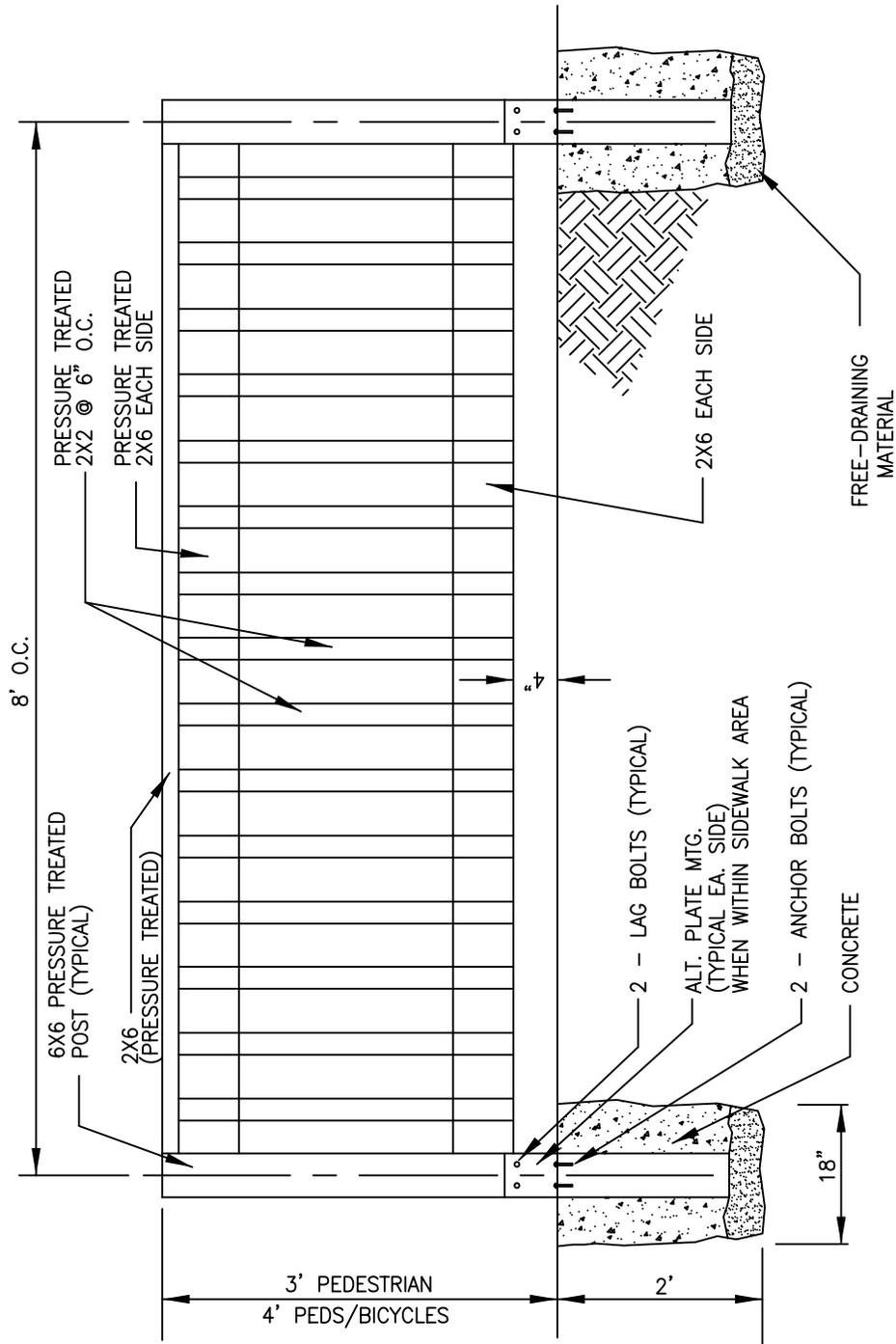


# Typical Section for Trails

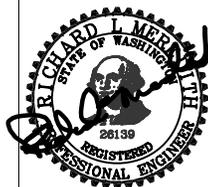
**329**

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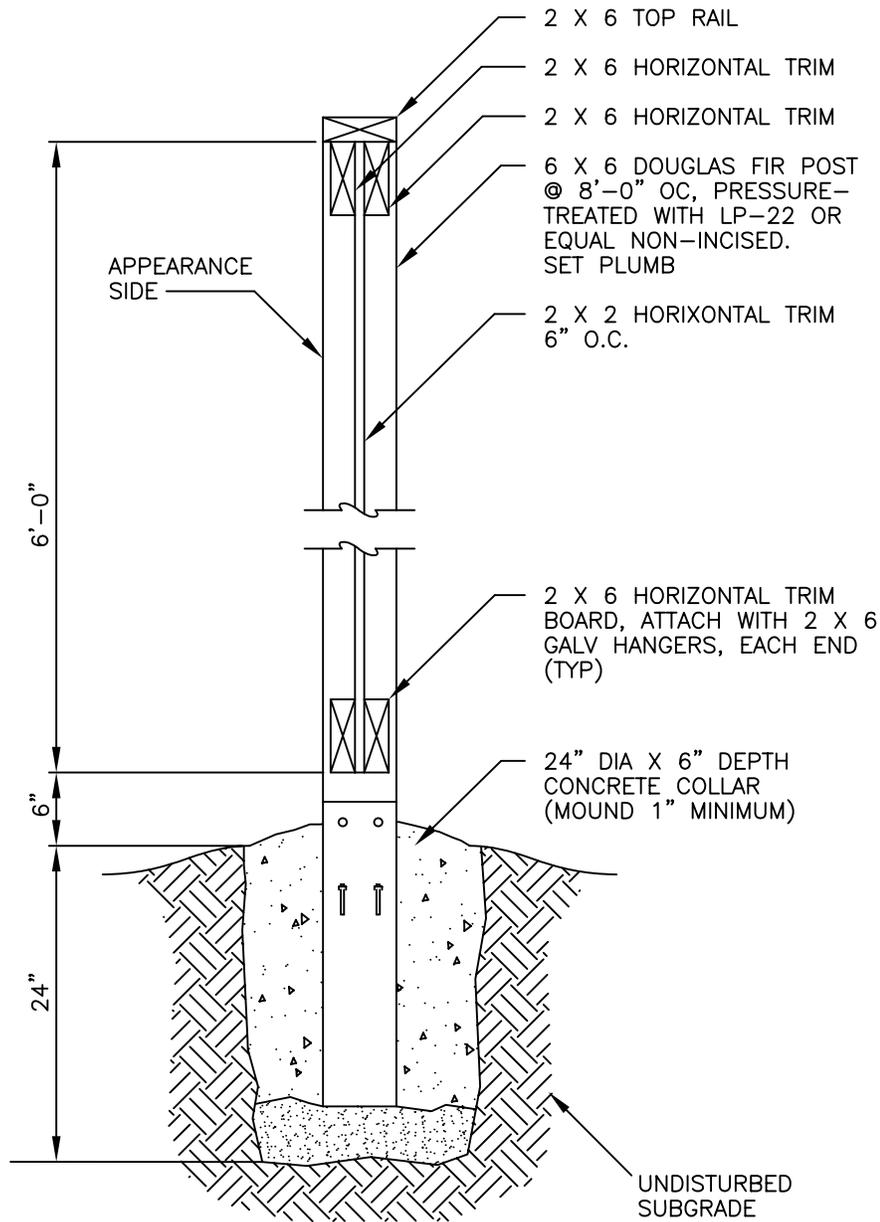


# Trail Fencing/ Screening

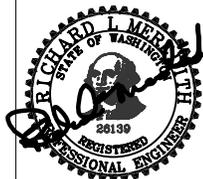
**332**

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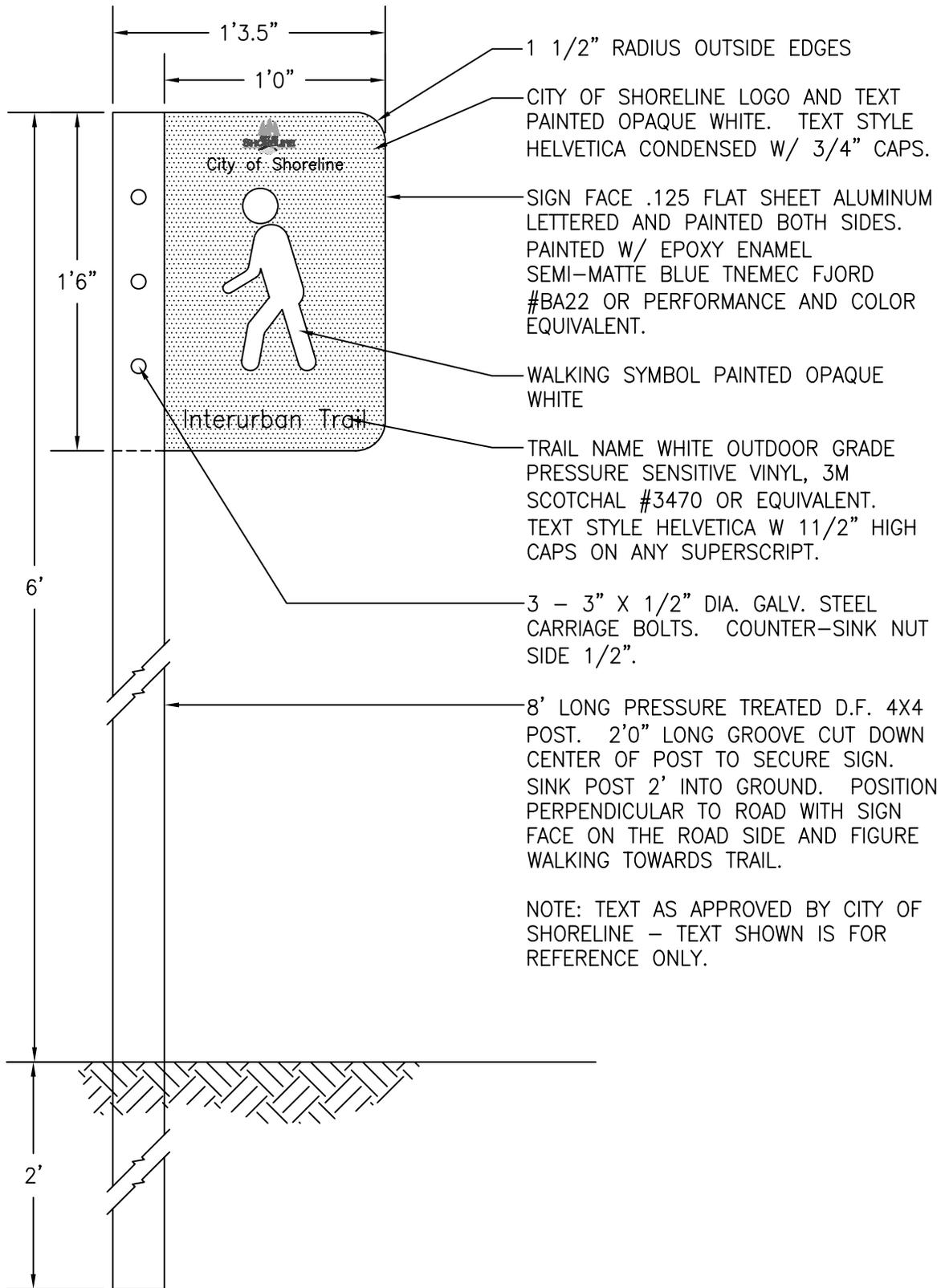


## Trail Fencing/ Screening Cross Section View

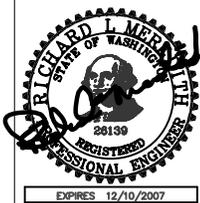
**333**

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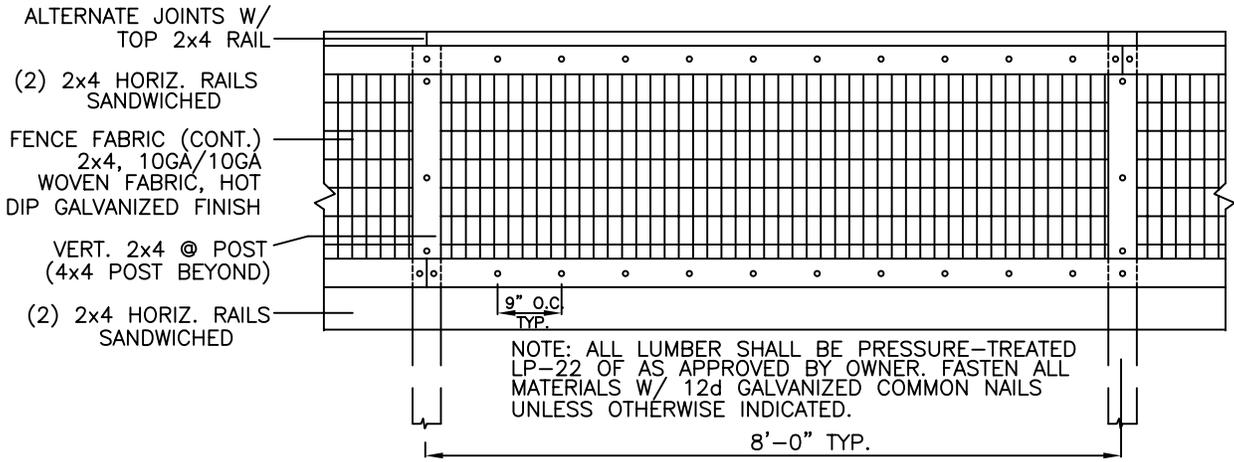


## Trail Signs

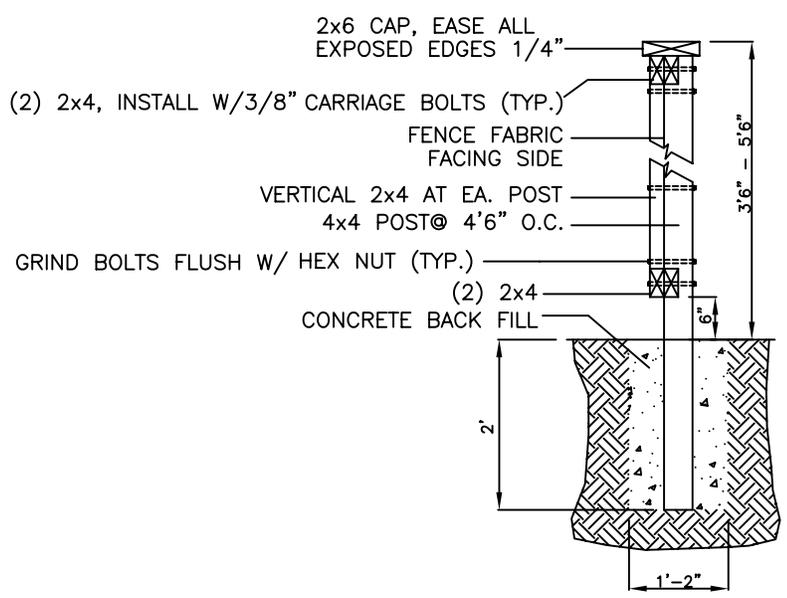
**334**

NOT TO SCALE

Revision Date  
December 2006

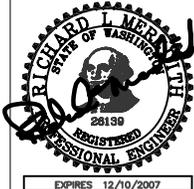


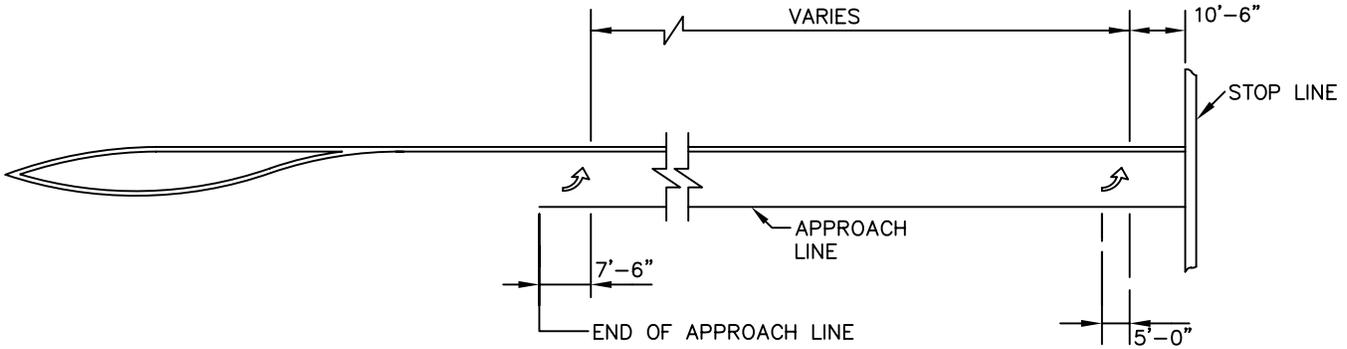
**ELEVATION** NOTE: HEIGHT VARIES,  
SEE CHAPTER 3, ENGINEERING DEVELOPMENT GUIDE



**SECTION**

**NOTE:** DIAGONAL BRACE RAILS (4x4) TO BE INSTALLED AT ALL END SECTIONS, TOP OF BRACE AT TOP OF END SECTION/CORNER.

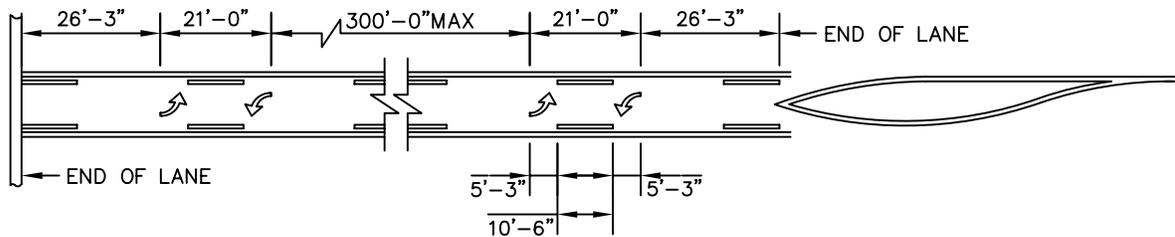
 <p><b>CITY OF SHORELINE</b></p>	<p>Public Works Planning and Development Services</p>		<h1 style="margin: 0;">Greenbelt Fence</h1>	<h1 style="margin: 0;">335</h1>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>



**TYPICAL LEFT TURN CHANNELIZATION**

NUMBER OF LEGENDS REQUIRED BASED ON THE LENGTH OF APPROACH LINES

APPROACH LINE LENGTH	LEGEND(S)
LESS THAN 50 FEET	1 ARROW AT X-WALK END OF POCKET
50 FEET-120 FEET	2 ARROWS
125 FEET-300 FEET	3 ARROWS (SECOND LEGEND LOCATED MIDWAY BETWEEN FIRST AND LAST LEGENDS)
OVER 300 FEET	ADDITIONAL ARROWS SPACED AT APPROX 100 FT INTERVALS BETWEEN FIRST AND LAST LEGENDS



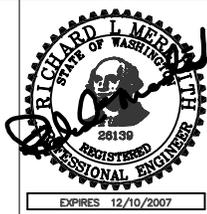
**TYPICAL TWO WAY LEFT TURN LANE LEGENDS**

NUMBER OF LEGEND SETS REQUIRED BASED ON THE LENGTH OF TYPICAL TWO WAY LEFT TURN LANES

LANE LENGTH	LEGEND SETS
LESS THAN 50 FEET	1 SET (CENTERED BETWEEN BOTH ENDS OF LANE)
50 FEET-300 FEET	2 SETS
OVER 300 FEET	3 SETS (SECOND LEGEND LOCATED MIDWAY BETWEEN FIRST AND LAST LEGENDS) ADDITIONAL SETS SPACED AT APPROX 300 FT INTERVALS



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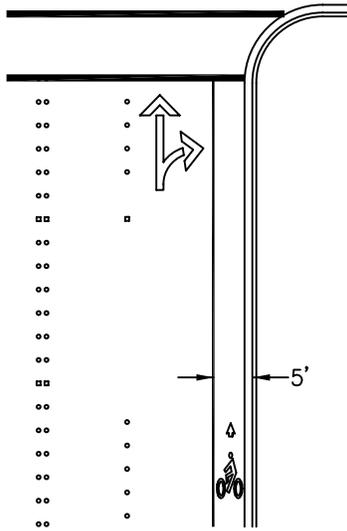


**Channelization -  
Left Turn Lanes**

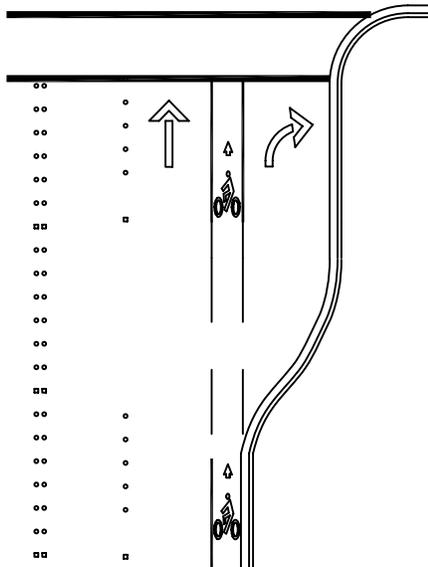
**401**

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Revision Date  
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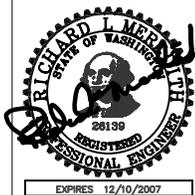
TYPICAL RIGHT-THROUGH LANE  
(BICYCLE LANE CONTINUES THROUGH INTERSECTION)



TYPICAL RIGHT TURN POCKET  
(BICYCLE LANE CONTINUES THROUGH INTERSECTION)



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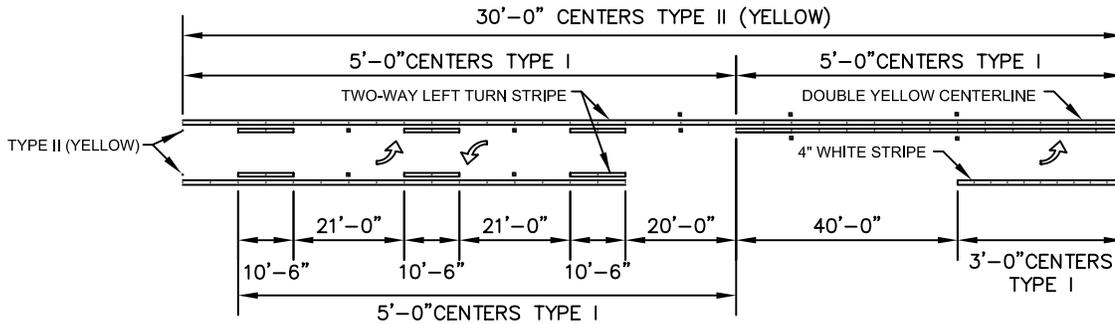
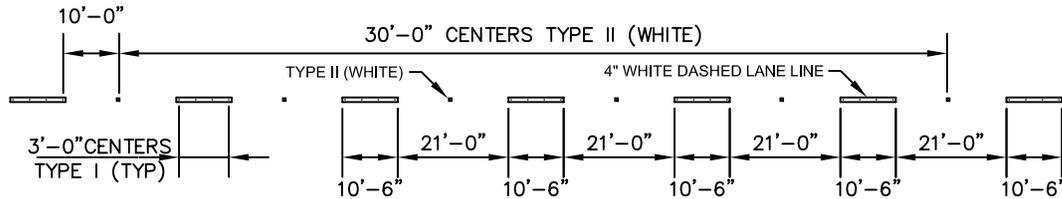


# Channelization - Vehicle & Bicycles

**402**

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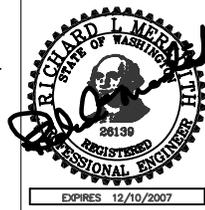


**TYPICAL TYPE I AND TYPE II TRAFFIC BUTTON (4") INSTALLATION DETAILS**

TRAFFIC BUTTONS SHALL BE INSTALLED TO CONFORM WITH TYPE OF PAVEMENT MARKING AND ARE TO BE ARRANGED AND SPACED AS SHOWN ON THIS DRAWING. COLOR OF TRAFFIC BUTTONS IS TO MATCH COLOR OR PAVEMENT MARKINGS. TRAFFIC BUTTONS SHALL BE INSTALLED PRIOR TO ANY PAINT LINE INSTALLATION, EXISTING CHANNELIZATION IN CONFLICT WITH NEW OR REVISED CHANNELIZATION SHALL BE REMOVED BY METHOD APPROVED BY THE DIRECTOR OR DESIGNEE



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Development  
Services

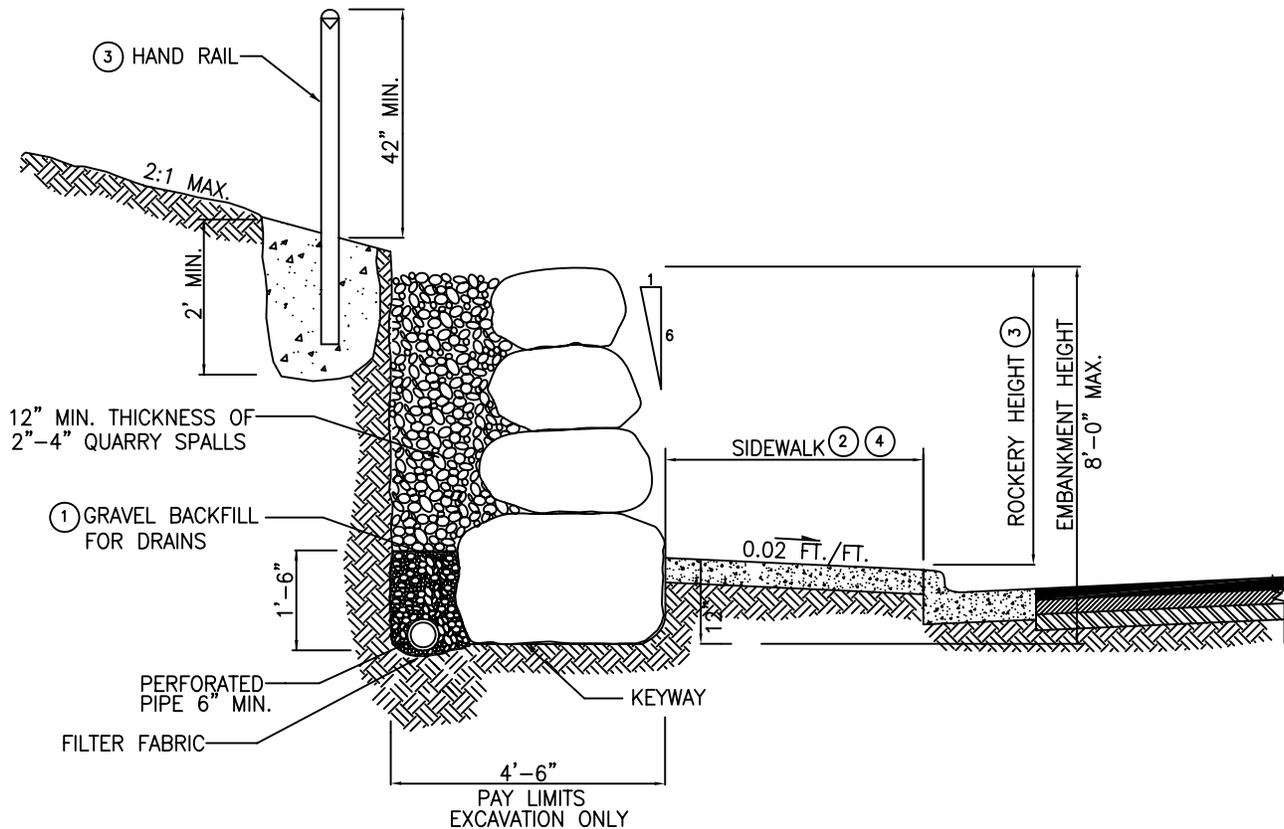


**Pavement Marking  
Detail**

**403**

NOT TO SCALE

Revision Date  
December 2006

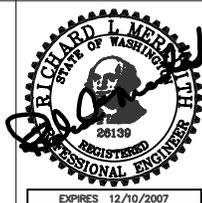


**NOTES:**

- ① SEE WSDOT/APWA 9-03.12[4]
- ② IF ROCKERY OR RETAINING WALL IS BEHIND ROLLED CURB, FACE OF ROCKERY OR RETAINING WALL MUST BE A MIN. OF 10' FROM TRAVELED WAY.
- ③ A HANDRAIL, PER STND DWG 324, IS REQUIRED WHEN ROCKERY HEIGHT IS 3' OR GREATER. THE USAGE OF A CHAIN LINK FENCE, PER STND DWG 327, MAY BE APPROVED BY PUBLIC WORKS DIRECTOR OR DESIGNEE.
- ④ BACK OF SIDEWALK SHALL BE A MINIMUM OF 8' FROM FACE OF CURB
- 5. ALL ROCKERIES OVER 4' IN HEIGHT ON PUBLIC OR PRIVATE PROPERTY SHALL HAVE A DETAILED, SIGNED, AND STAMPED DRAWING BY AN ENGINEER.



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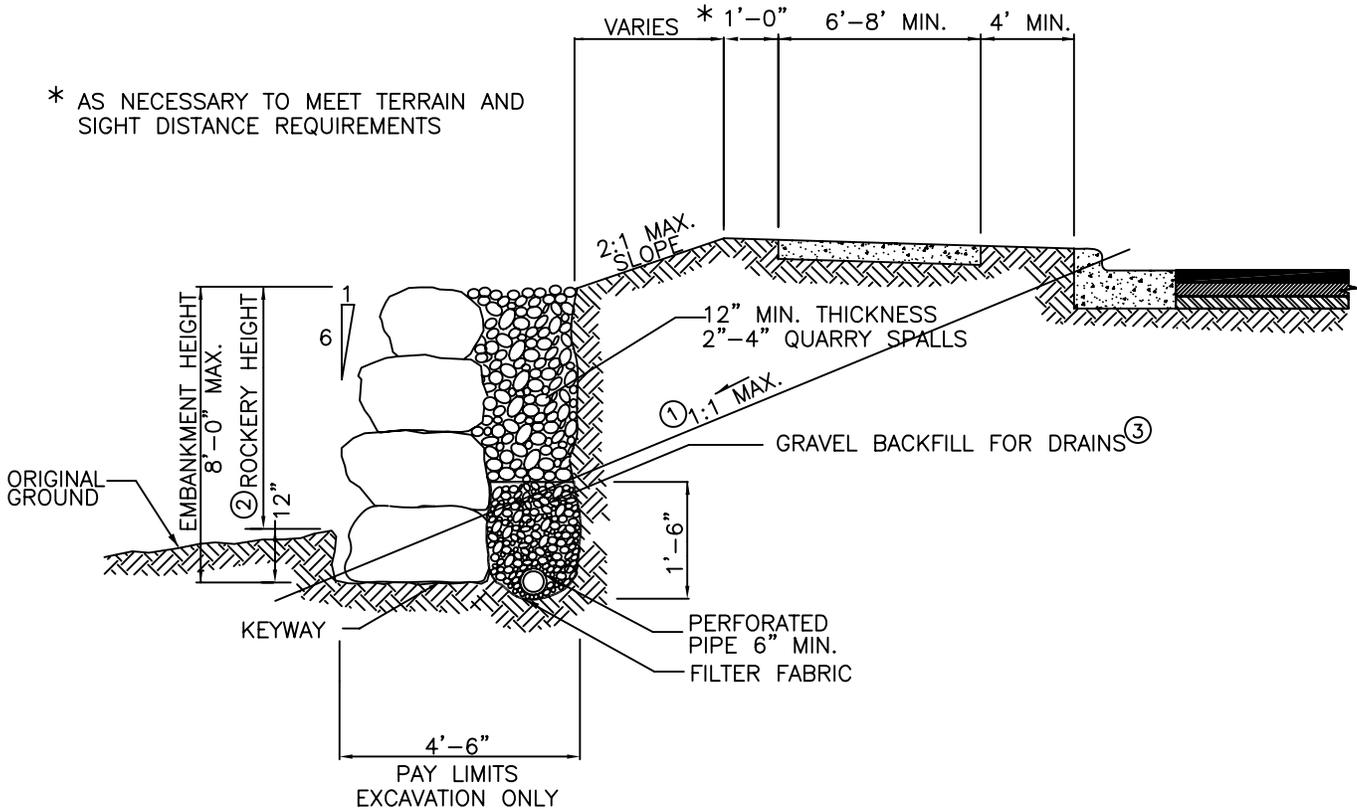
# Rock Facing - Cut Section

**501**

NOT TO SCALE

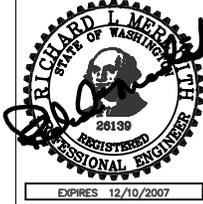
Revision Date  
December 2006

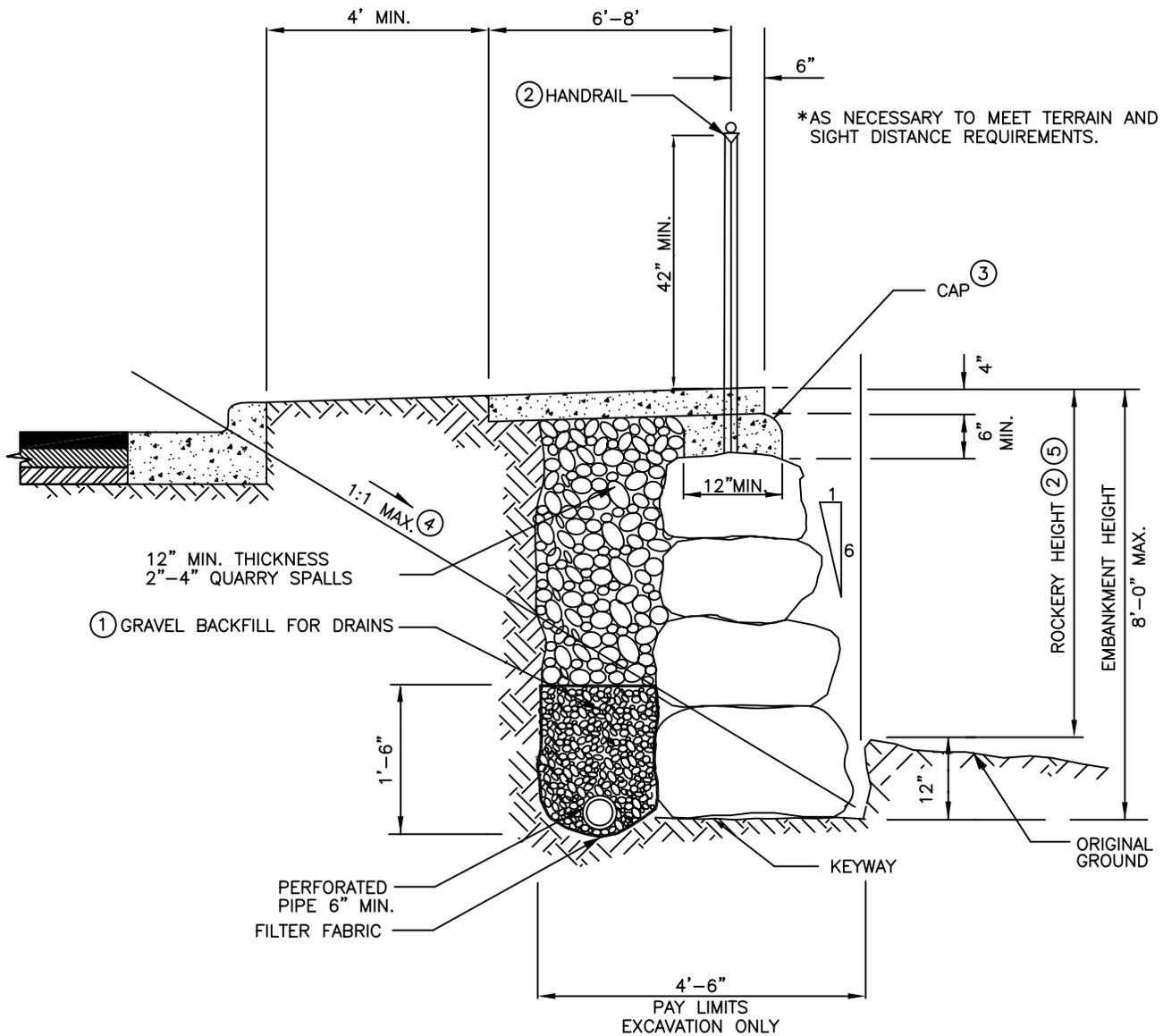
\* AS NECESSARY TO MEET TERRAIN AND SIGHT DISTANCE REQUIREMENTS



NOTES:

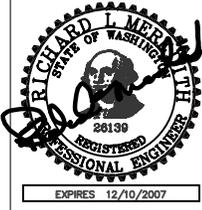
- ① FLATTER SLOPE MAY BE REQUIRED IN LESS STABLE SOIL.
- ② FOR ROCKERY HEIGHTS EXCEEDING 4', SEE STND DWG 504.
- ③ SEE WSDOT/APWA 9-03.12[4].
- 4. A HANDRAIL OR GUARDRAIL, PER STND DWG 324, IS REQUIRED WHEN ROCKERY HEIGHT IS 3' OR GREATER. THE USAGE OF A CHAIN LINK FENCE, PER STND DWG 327, MAY BE APPROVED BY THE PUBLIC WORKS DIRECTOR OR DESIGNEE.
- 5. TRAFFIC BARRIERS MAY BE REQUIRED ON ROADS WITH SPEED LIMITS OF 30 MPH OR GREATER, WHERE ROCKERY HEIGHTS EXCEED 6'. SEE CHAPTER 7 OF THE WSDOT DESIGN MANUAL.
- 6. ALL ROCKERIES OVER 4' IN HEIGHT ON PUBLIC OR PRIVATE PROPERTY SHALL HAVE A DETAILED, SIGNED, AND STAMPED DRAWING BY AN ENGINEER.

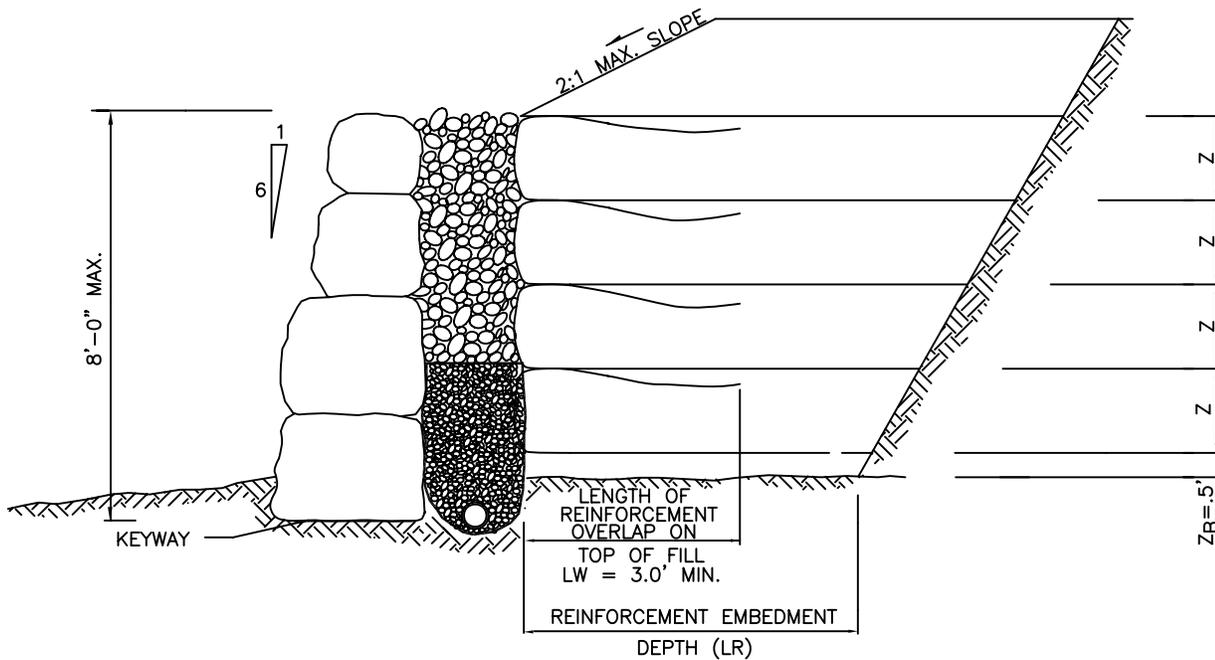
 <p><b>CITY OF SHORELINE</b></p>	<p>Public Works Planning and Development Services</p>		<h2 style="margin: 0;">Rock Facing - Fill Section</h2>	<h1 style="margin: 0;">502</h1>
NOT TO SCALE				
Revision Date December 2006				



**NOTES:**

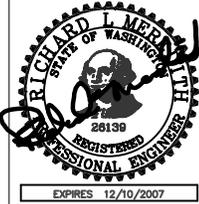
- ① WSDOT/APWA 9-03.12[4].
- ② A HANDRAIL OR GUARDRAIL, PER STND DWG 324, IS REQUIRED WHEN ROCKERY HEIGHT IS 3' OR GREATER. THE USAGE OF A CHAIN LINK FENCE, PER STND DWG 327, MAY BE APPROVED BY THE PUBLIC WORKS DIRECTOR OR DESIGNEE.
- ③ CAP SHALL BE CONCRETE CLASS 3000.
- ④ FLATTER SLOPE MAY BE REQUIRED IN LESS STABLE SOILS.
- ⑤ FOR ROCKERY HEIGHTS EXCEEDING 4', SEE STND DWG 504.
- 6. TRAFFIC BARRIERS MAY BE REQUIRED ON ROADS WITH SPEED LIMITS OF 30 MPH OR GREATER, WHERE HEIGHTS EXCEED 6'. SEE CHAPTER 7 OF THE WSDOT DESIGN MANUAL.
- 7. ALL ROCKERIES OVER 4' IN HEIGHT ON PUBLIC OR PRIVATE PROPERTY SHALL HAVE A DETAILED, SIGNED, AND STAMPED DRAWING BY AN ENGINEER.

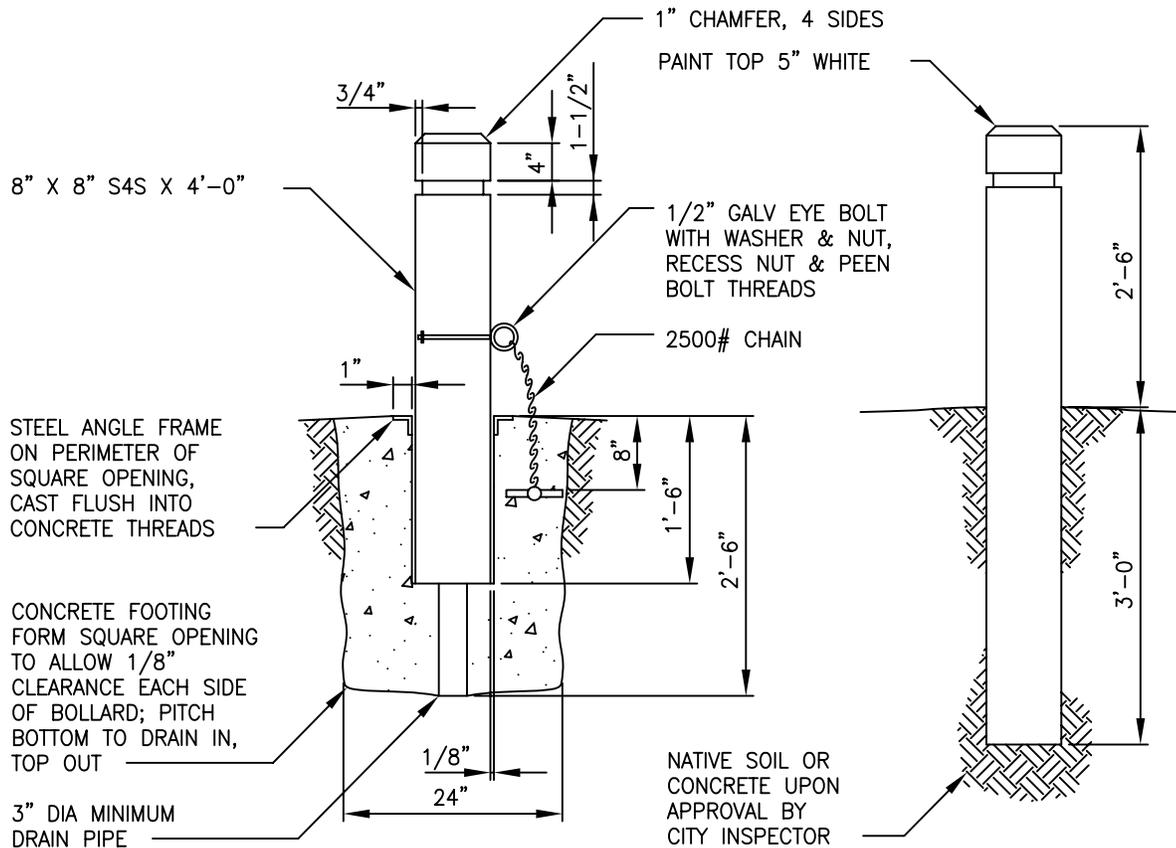
 <p><b>CITY OF SHORELINE</b></p>	<p>Public Works Planning and Development Services</p>		<h1 style="margin: 0;">Rock Facing Under Sidewalk</h1>	<h1 style="margin: 0;">503</h1>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>



**NOTES:**

1. ROCKERY FACINGS ARE TO BE CONSTRUCTED PER DRAWINGS STND DWGS 501, 502, & 503.
2. THE WALL FOUNDATION IS TO BE CLEARED OF ORGANIC MATTER AND DEBRIS AND THE UNDERLYING MINERAL SOIL COMPACTED TO 95 PERCENT OF THE MAX. DRY DENSITY. THE EMBANKMENT MATERIAL IS TO BE GRAVEL BORROW MEETING THE REQUIREMENTS OF 9-03.14 OF THE WSDOT STANDARDS. THE BACKFILL IS TO BE PLACED IN THIN LIFTS, NOT EXCEEDING SIX INCHES IN THICKNESS AND COMPACTED TO 95 PERCENT OF THE MAX. DRY DENSITY.
3. GEOSYNTHETIC FABRIC OR GEOGRID REQUIREMENTS INCLUDING TYPE, VERTICAL SPACING (Z), AND EMBEDMENT (LR), WILL BE DETERMINED ON A ROCKERY BY ROCKERY BASIS BY A PROFESSIONAL ENGINEER.
4.  $Z_B$  IS HEIGHT OF FIRST LAYER OF REINFORCEMENT ABOVE COMPACTED SUBGRADE ELEVATION.
5. EMBANKMENTS BEHIND ROCKERIES EXCEEDING 4' IN HEIGHT SHALL BE REINFORCED WITH GEOSYNTHETIC FABRIC OR GEOGRID.
6. ALL ROCKERIES OVER 4' IN HEIGHT ON PUBLIC OR PRIVATE PROPERTY SHALL HAVE A DETAILED, SIGNED, AND STAMPED DRAWING BY AN ENGINEER.

	<p>Public Works Planning and Development Services</p>		<h2 style="margin: 0;">Rock Facing - Fill Section Reinforcement</h2>	<h1 style="margin: 0;">504</h1>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>



REMOVABLE BOLLARD

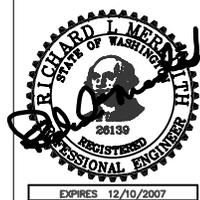
FIXED BOLLARD

NOTE:

1. TIMBER SHALL BE DOUGLAS FIR, DENSE CONSTRUCTION GRADE, AND SHALL BE PRESSURE TREATED.
2. NUTS, BOLTS, AND WASHERS CONFORM TO ASTM A307.
3. ALL STEEL PIPES SHALL BE GALVANIZED.
4. CONCRETE SHALL BE CLASS C.
5. A HASP MAY BE SUBSTITUTED FOR THE CHAIN UPON APPROVAL BY THE CITY INSPECTOR.
6. PITCH GRADE ON FIXED BOLLARD TO DRAIN AWAY FROM POST.
7. BOLLARD PLACEMENT SHALL BE APPROVED BY THE DIRECTOR OR DESIGNEE.



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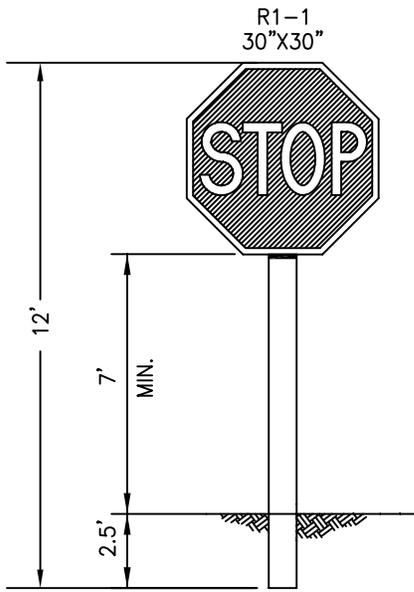


# Bollards

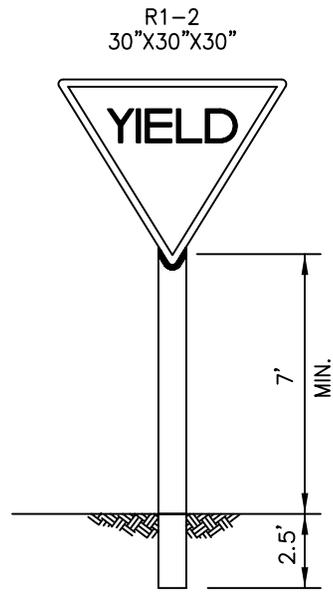
**505**

NOT TO SCALE

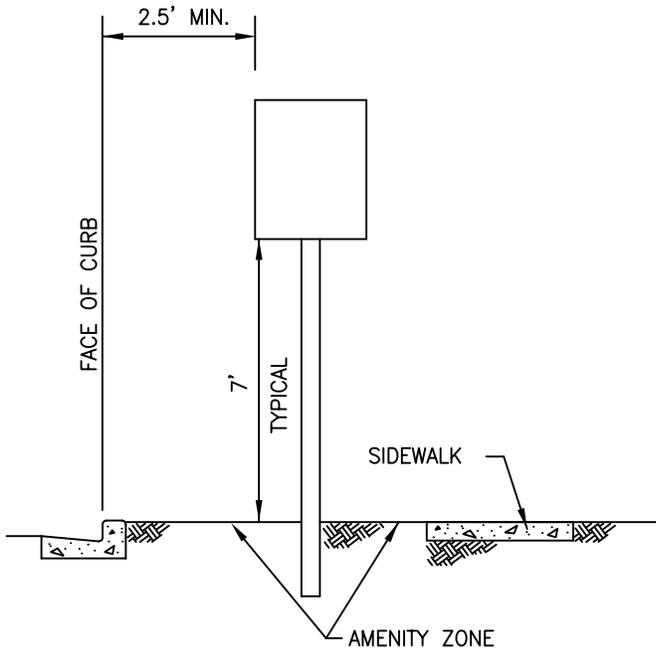
Revision Date  
December 2006



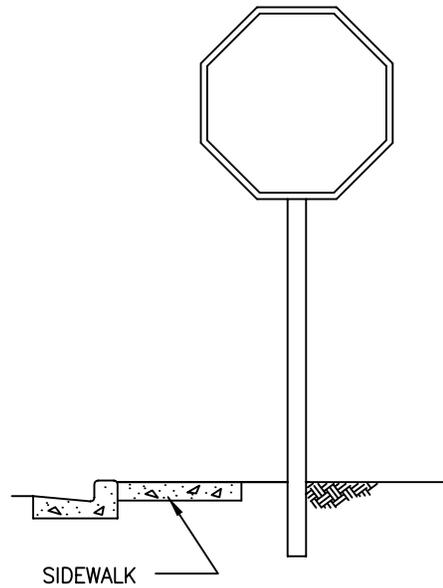
STOP SIGN



YIELD SIGN



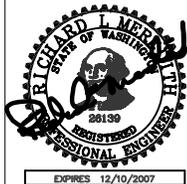
CURB AND SIDEWALK WITH AMENITY ZONE



CURB AND SIDEWALK WITHOUT AMENITY ZONE  
(SHALL BE USED ONLY TO MATCH EXISTING CONDITIONS OR WITH THE DIRECTOR'S APPROVAL)



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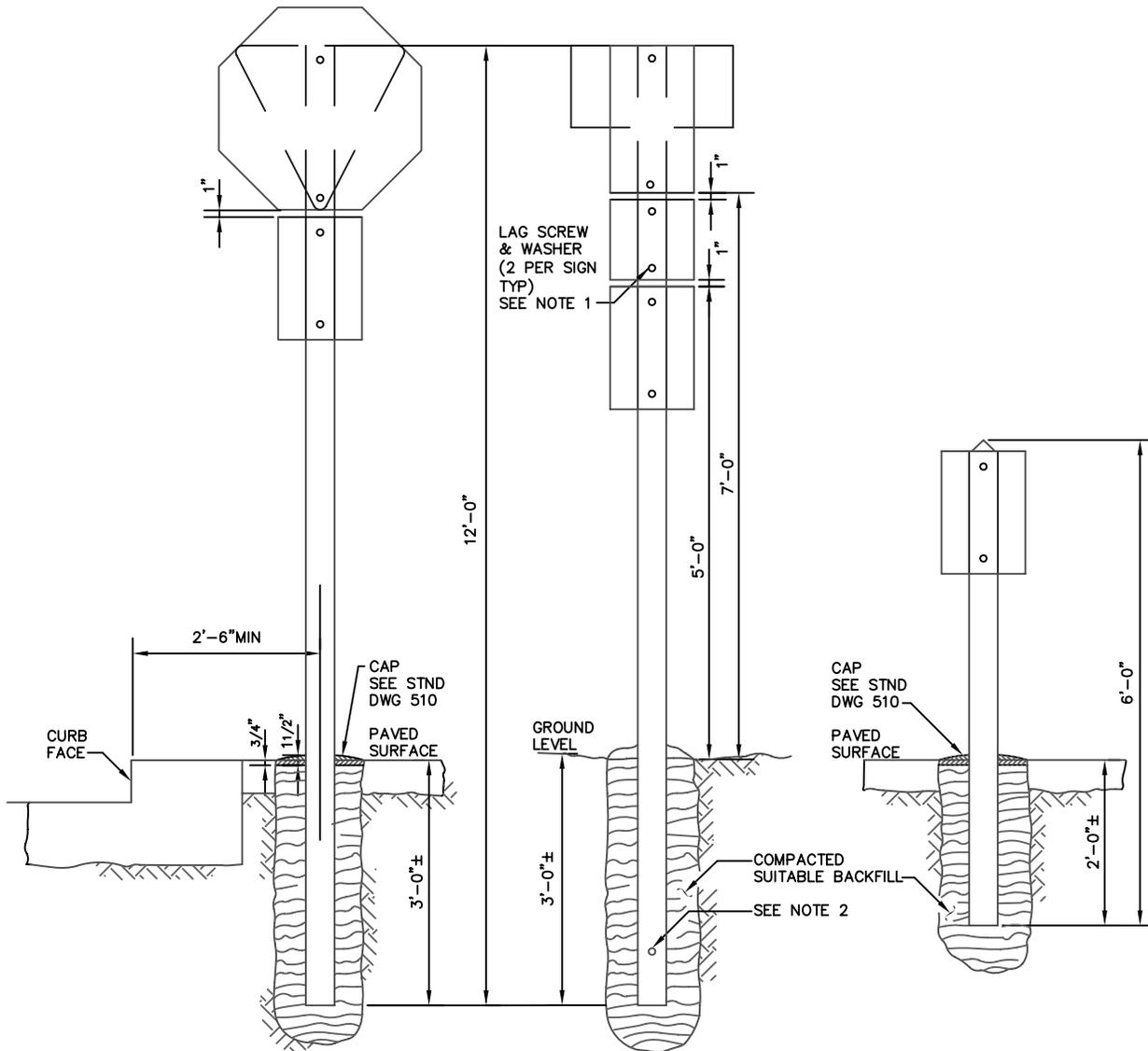


**Street Signs - Standards  
& Locations**  
(FOR USE ON NON-PUBLIC R-O-W ONLY)

**506**

NOT TO SCALE

Revision Date  
December 2006

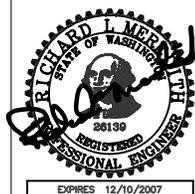


**NOTES:**

1. 5/16" X 3 1/4" GALVANIZED OR PLATED LAG SCREW & 3/8" ID X 1" OD NYLON WASHER.
2. INSTALL 30D GALV COMMON SPIKE ON THE FACE SIDE OF POST EXCEPT WHEN CONCRETE PAVING EXISTS. SPIKE SHALL BE 8" ABOVE BOTTOM OF POST AND SHALL PROTRUDE 2" FROM POST.
3. CONTACT SHORELINE PUBLIC WORKS (546-1700) FOR DETAILS REGARDING SIGN MESSAGE AND FOUNDATION.



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# Traffic Sign & Wood Post Installation

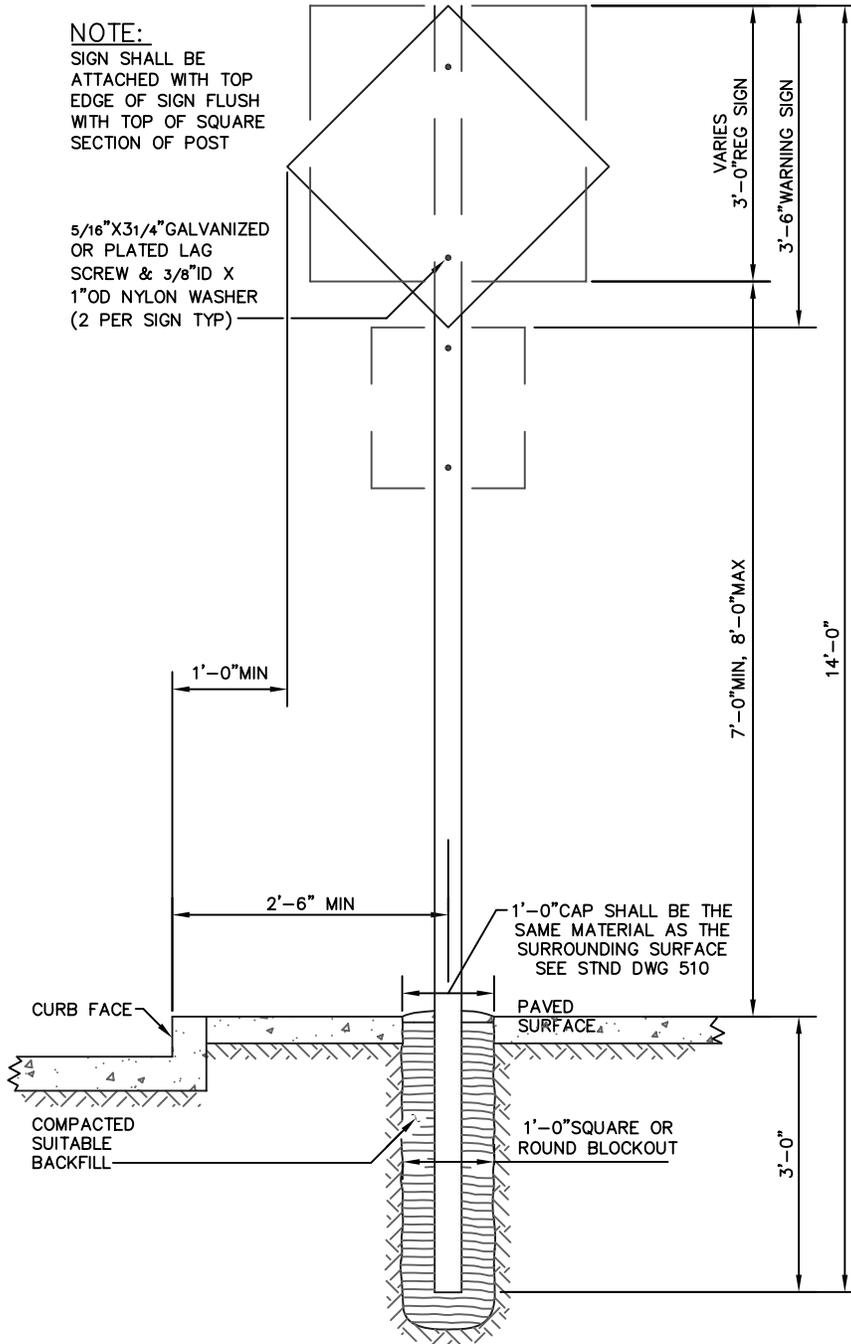
# 508

NOT TO SCALE

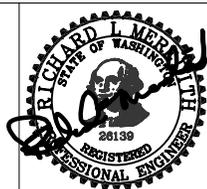
Revision Date  
December 2006

**NOTE:**  
SIGN SHALL BE ATTACHED WITH TOP EDGE OF SIGN FLUSH WITH TOP OF SQUARE SECTION OF POST

5/16"X3 1/4" GALVANIZED OR PLATED LAG SCREW & 3/8" ID X 1" OD NYLON WASHER (2 PER SIGN TYP)



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Services

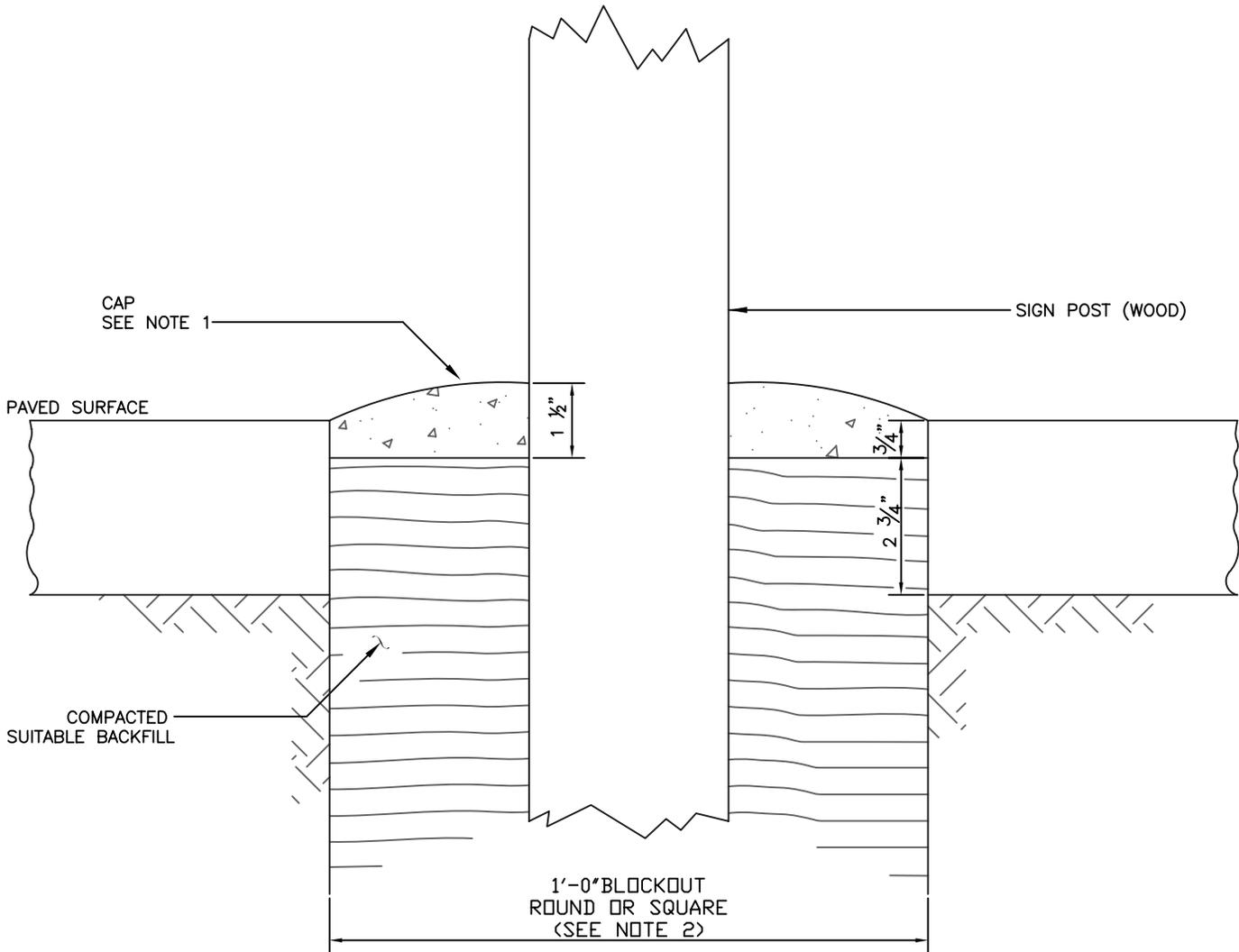


# Traffic Sign & Wood Post Installation

**509**

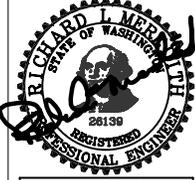
NOT TO SCALE

Revision Date  
December 2006

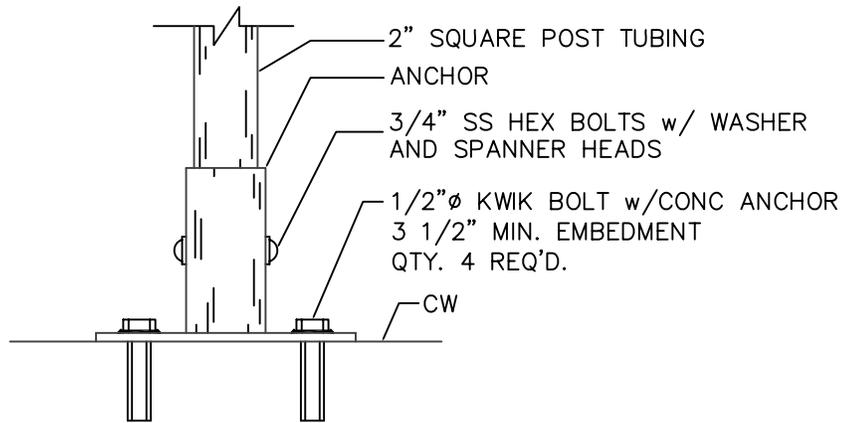


**NOTES:**

1. CAP SHALL BE MADE OF THE SAME MATERIAL AS THE SURROUNDING PAVED SURFACE AND SHALL BE MOUNDED FOR DRAINAGE AWAY FROM POST.
2. BLOCKOUTS SHALL BE PROVIDED FOR POST LOCATIONS WHERE NEW CONCRETE PAVEMENT (SIDEWALK, ROADWAY, ETC) IS BEING INSTALLED.
3. WHERE POST IS BEING INSTALLED IN EXISTING PAVED AREAS, HOLE IN PAVED SURFACE SHALL NOT EXCEED 1'-0" NOMINAL DIAMETER.

 CITY OF <b>SHORELINE</b>	Public Works Planning and Development Services	 RICHARD L. MERS STATE OF WASHINGTON 26138 REGISTERED PROFESSIONAL ENGINEER EXPIRES 12/10/2007	<h1 style="margin: 0;">Post Cap</h1>	<h1 style="margin: 0;">510</h1>
				NOT TO SCALE
				Revision Date December 2006

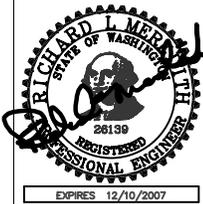


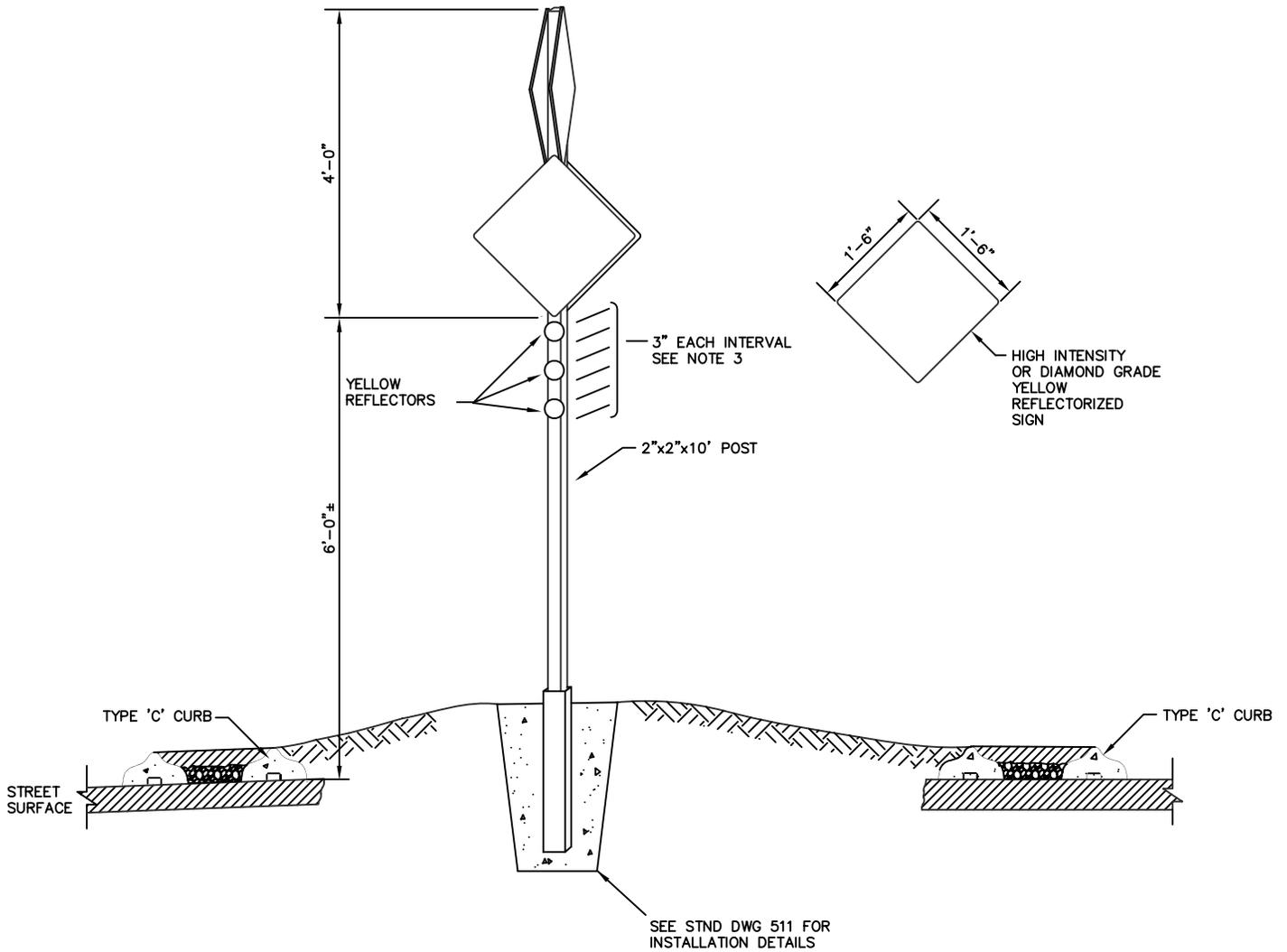


**SURFACE MOUNT INSTALLATION**

**NOTES:**

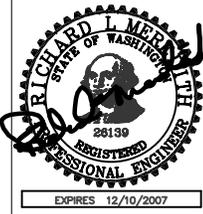
1. POST ANCHOR RIVETS SHALL BE 1 1/2" ABOVE GROUND LEVEL.
2. FOR POST RELOCATIONS, OLD CONCRETE SHALL BE REMOVED FROM POST.
3. WHERE SURFACE MOUNTED 2" SQUARE METAL POSTS ARE REQUIRED ON SLOPED SIDEWALK, THE CONTRACTOR SHALL PLUMB THE POST BY BUILDING A NON-SHRINK GROUT PAD UNDER PEDESTAL ASSEMBLY WITH SMOOTH 1H TO 1V TAPER ON THE GROUT EDGE. THE BOLT ANCHOR LENGTH SHALL BE ADJUSTED TO PROVIDE A MIN 3 1/2 INCH EMBEDMENT THROUGH THE GROUT INTO THE EXISTING CONCRETE.
4. POST SHALL BE ROLLED CARBON SHEET STEEL, ASTM A570 GRADE 50 AND BE HOT DIPPED GALVANIZED AASHTO M-120 YIELD STRENGTH 60,000 PSI MIN. POST SHALL HAVE 7/16" DIE-PUNCHED KNOCKOUTS ON 1" CENTERS FULL LENGTH ON ALL FOUR SIDES.
5. ANCHOR SHALL HAVE 4 7/16" HOLES ONE EACH SIDE 2" FROM TOP END. FINISH SHALL BE ZINC HOT DIPPED GALVANIZED MATERIAL TO MEET ASTM A500 GRADE B.
6. SURFACE MOUNTS TO BE USED ONLY AT THE DISCRETION OF TRAFFIC ENGINEER OR RIGHT-OF-WAY INSPECTOR.

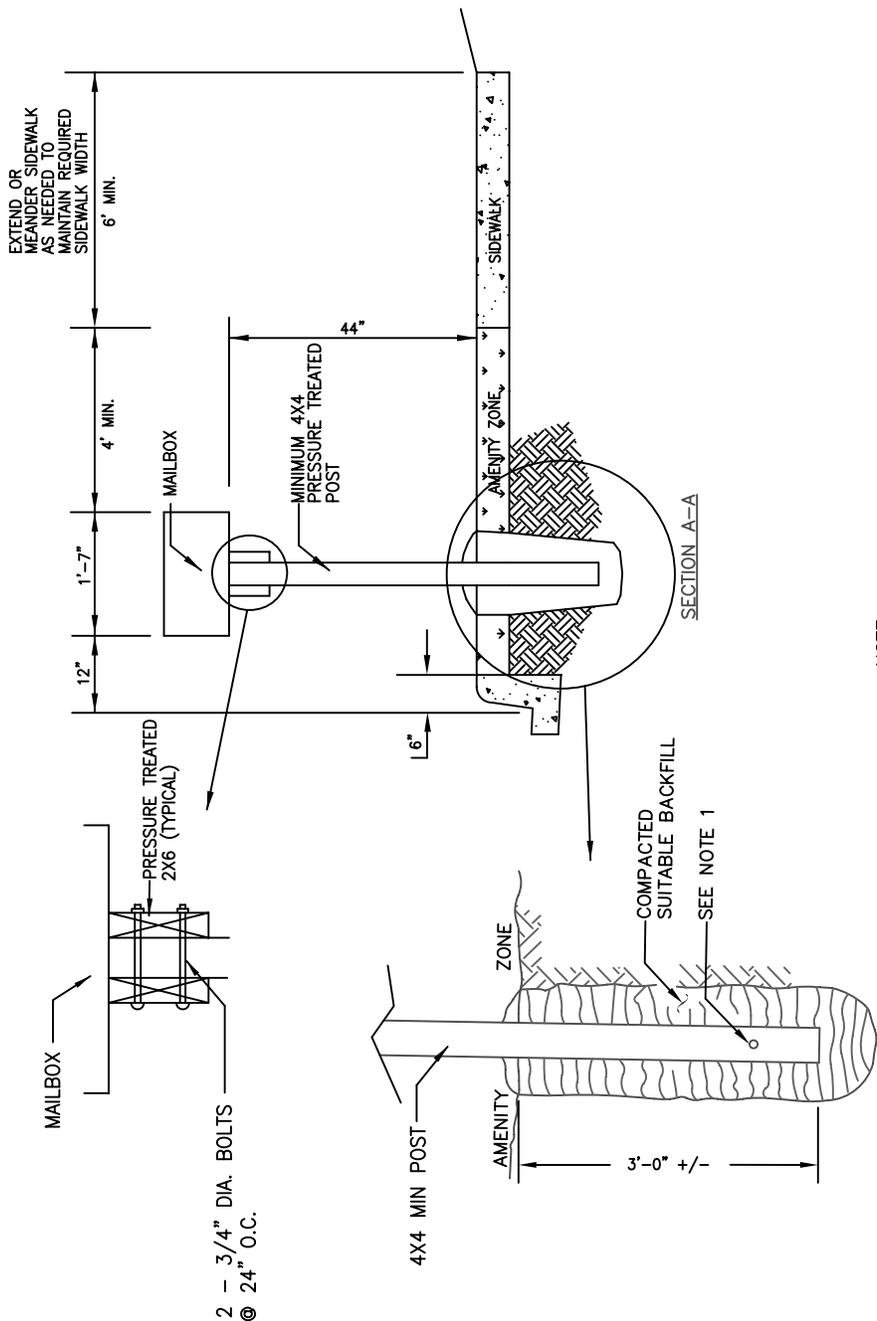
 CITY OF SHORELINE	Public Works Planning and Development Services		<h2>Traffic Sign - Surface Mount Installation</h2>	<h1>511A</h1>
				NOT TO SCALE
				Revision Date December 2006



**NOTES:**

1. IN THE CASE WHERE ALL APPROACHES OF THE INTERSECTION ARE PRIMARILY AT THE SAME LEVEL WITH RESPECT TO GRADES (LESS THAN 3%) THE LOWER SET OF SIGNS WILL FACE THE HIGHER VOLUME STREET.
2. IN THE CASE WHERE AN APPROACH HAS A GRADE LARGER THAN 3% THE HIGHER SIGNS WILL FACE THE APPROACH WITH THE HIGHEST GRADE TO ALLOW BETTER SIGHT DISTANCE.
3. PLACE A MINIMUM OF THREE (3) REFLECTORS ON EACH AND EVERY SIDE OF POST OR PLACE THREE (3) HIGH INTENSITY REFLECTORIZED STRIPS COMPLETELY AROUND POST.

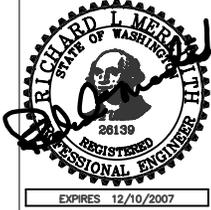
	<p>Public Works Planning and Development Services</p>		<h1 style="margin: 0;">Object Marker Installation</h1>	<h1 style="margin: 0;">512</h1>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>

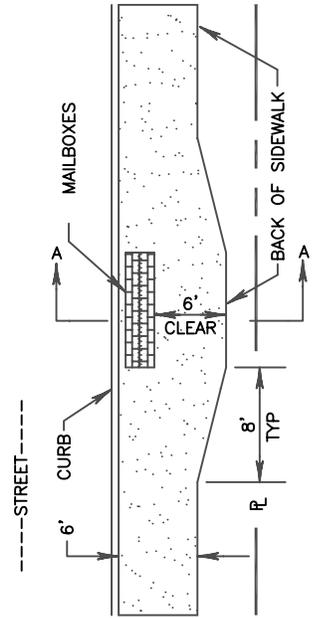
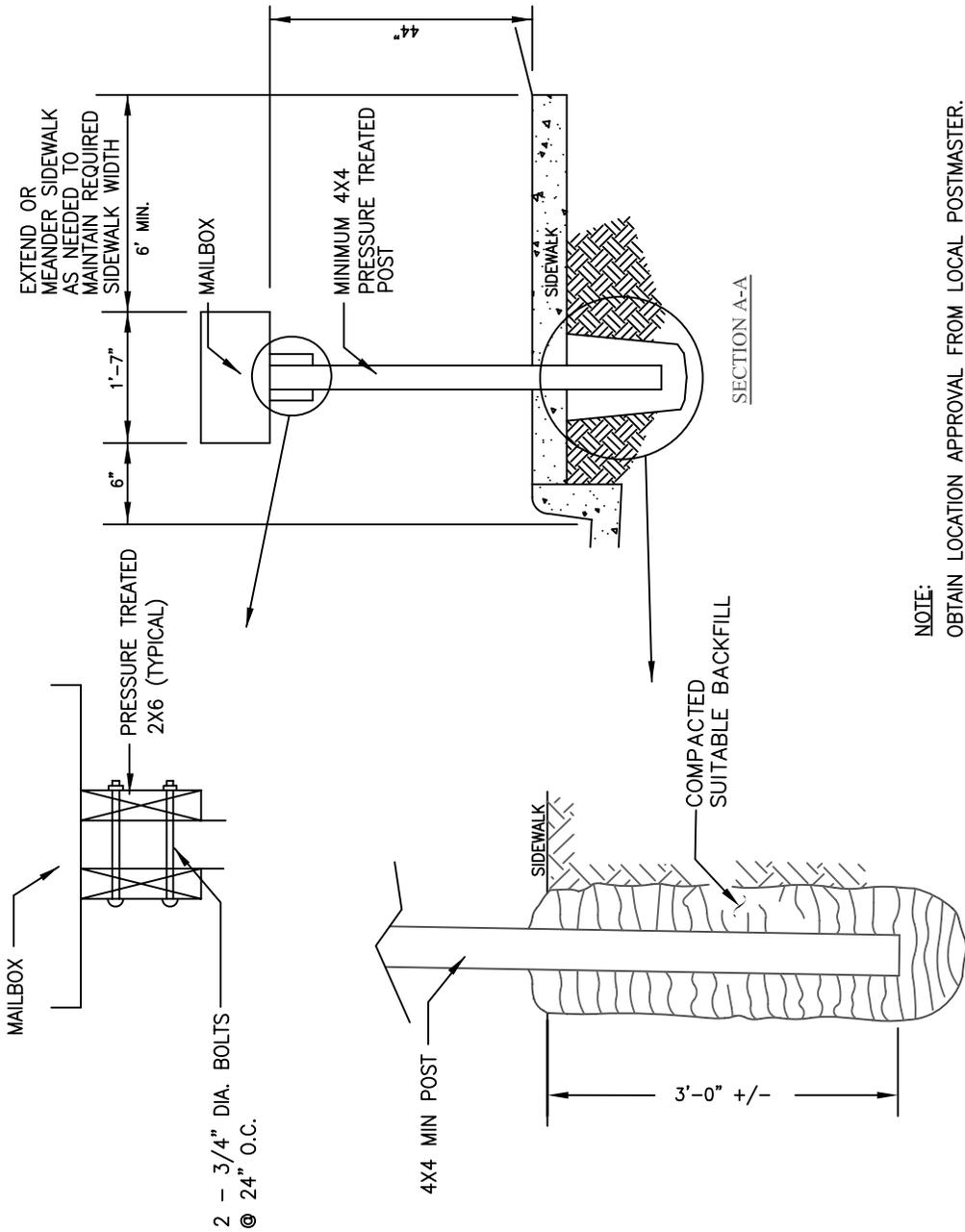


NOTE:  
OBTAIN LOCATION APPROVAL FROM LOCAL POSTMASTER.

**NOTE:**

1. INSTALL 30D GALV COMMON SPIKE ON THE FACE SIDE OF POST EXCEPT WHEN CONCRETE PAVING EXISTS. SPIKE SHALL BE 8" ABOVE BOTTOM OF POST AND SHALL PROTRUDE 2" FROM POST

 <p><b>CITY OF SHORELINE</b></p>	<p>Public Works Planning and Development Services</p>		<h1>Mailbox Stand</h1>	<h1>514</h1>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>

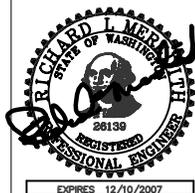


**NOTE:**  
OBTAIN LOCATION APPROVAL FROM LOCAL POSTMASTER.

**NOTE:**  
SHALL BE USED ONLY TO MATCH EXISTING CONDITIONS OR WITH DIRECTOR APPROVAL



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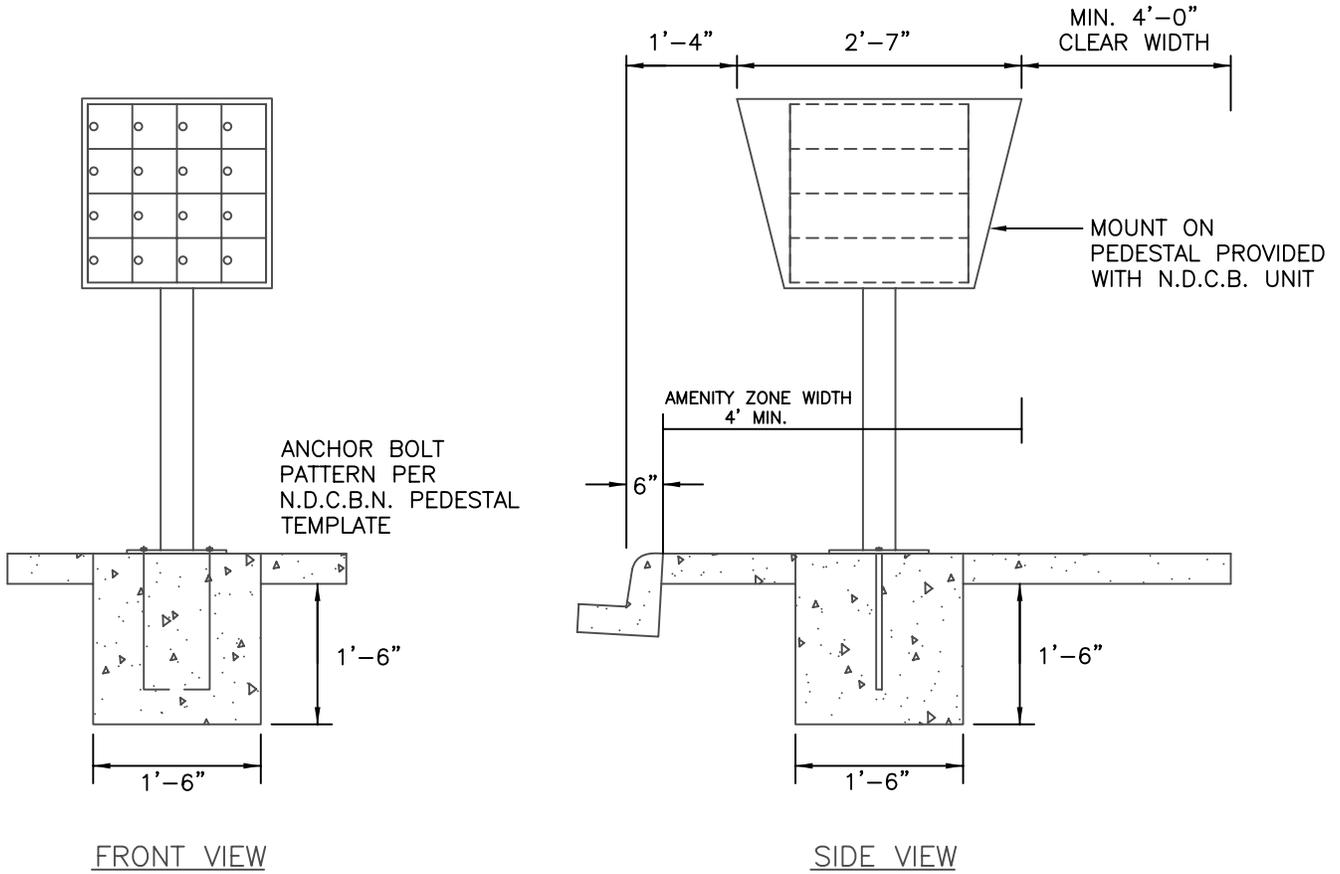


# Mailbox Stand without Amenity Zone

**515**

NOT TO SCALE

Revision Date  
December 2006



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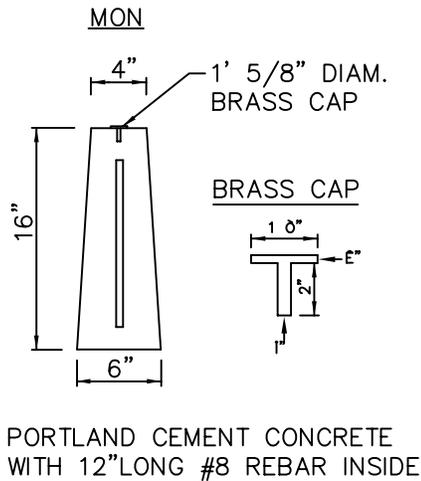


# Neighborhood Delivery & Collection Box Unit Installation

**516**

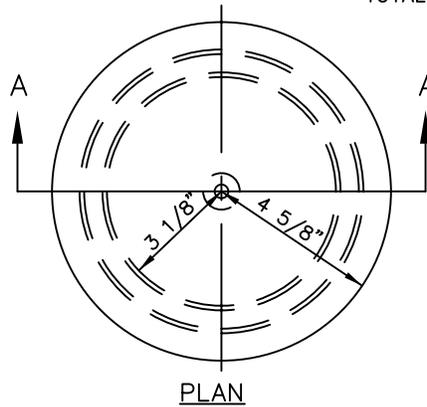
NOT TO SCALE

Revision Date  
December 2006

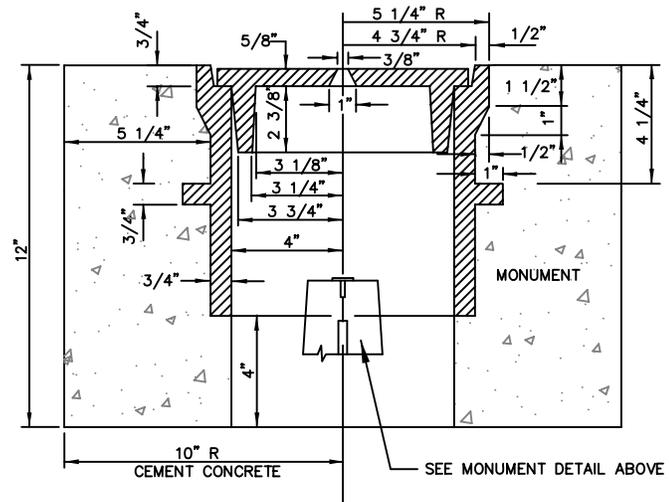
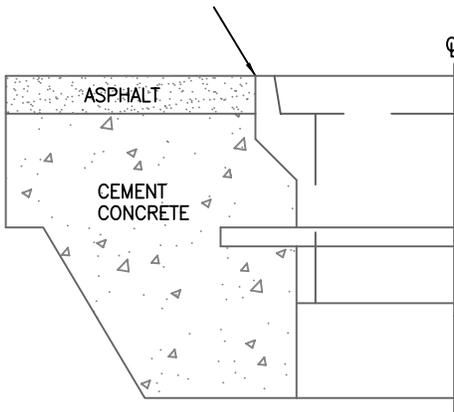


APPROXIMATE WEIGHTS STANDARD

CASE	60 LBS
COVER	19 LBS
TOTAL	79 LBS



MONUMENT SHALL BE FLUSH WITH ASPHALT AFTER OVERLAY



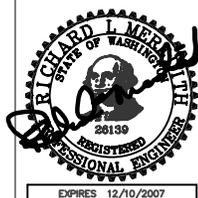
SECTION A-A

**NOTE:**

THE CASTINGS SHALL BE GRAY IRON CASTING, ASTM DESIGNATION A-48, CLASS 40. THE COVER AND SEAT SHALL BE MACHINED SO AS TO HAVE PERFECT CONTACT AROUND THE ENTIRE CIRCUMFERENCE AND FULL WIDTH OF BEARING SURFACE. WHEN THE MONUMENT CASE AND COVER ARE PLACED IN CEMENT CONCRETE PAVEMENT, THE CONCRETE CASE WILL NOT BE NECESSARY.



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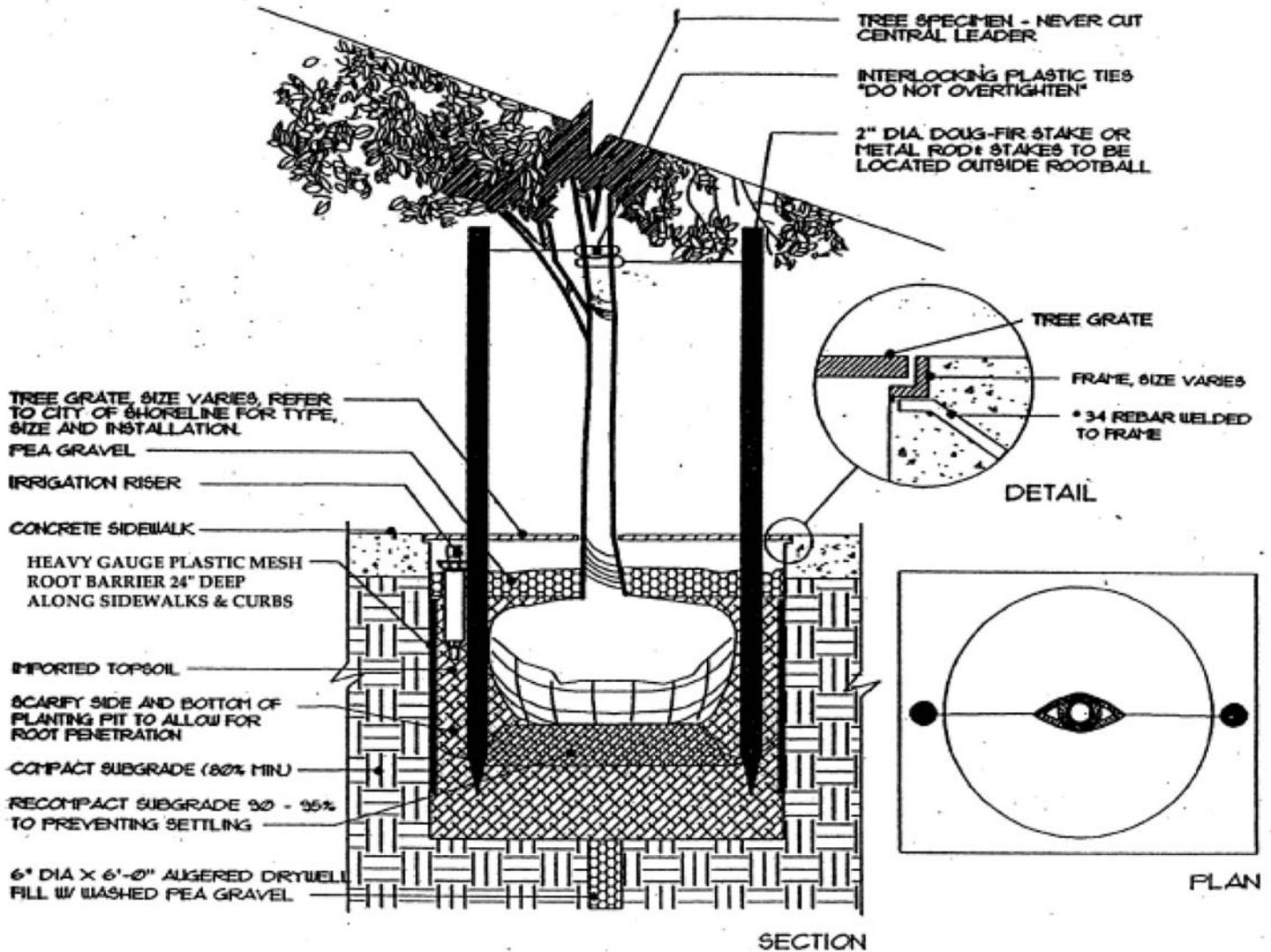


**Monuments**

**519**

NOT TO SCALE

Revision Date  
December 2006

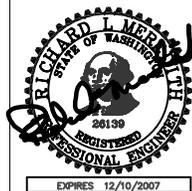


**NOTES:**

1. TREE PIT SHALL NOT BE LESS THAT (2) TIMES ROOT BALL DIA.
2. CUT ALL TIES & FOLD BACK BURLAP FROM UPPER 1/3 OF ROOT BALL.
3. WATER DAILY UNTIL ESTABLISHED, FERTILIZE & USE GROWTH HORMONE.
4. WHERE A CONTINUOUS PLANTING STRIP IS ALLOWED, WIDEN TREE PIT TO SIDEWALK.



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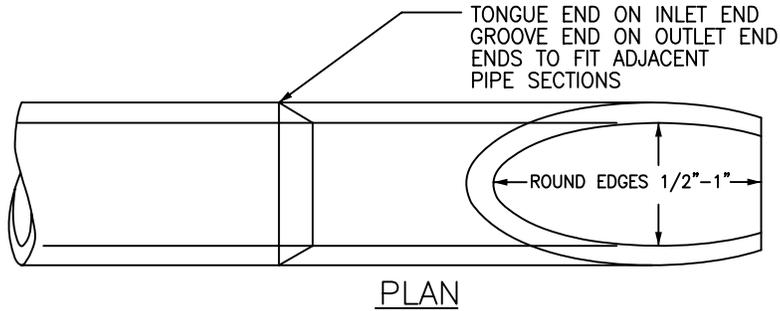


# Tree Staking in Sidewalk with Grate

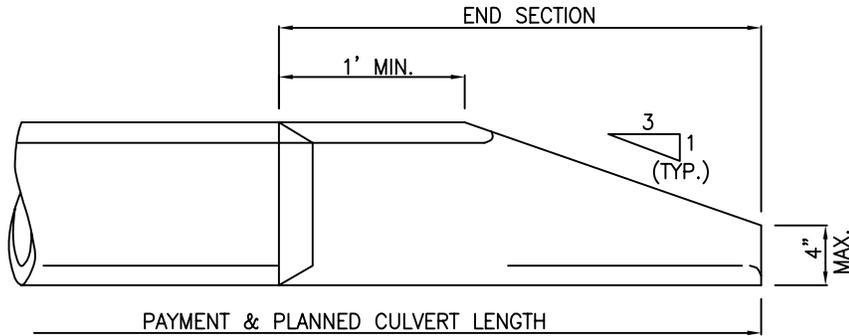
**521**

NOT TO SCALE

Revision Date  
 December 2006

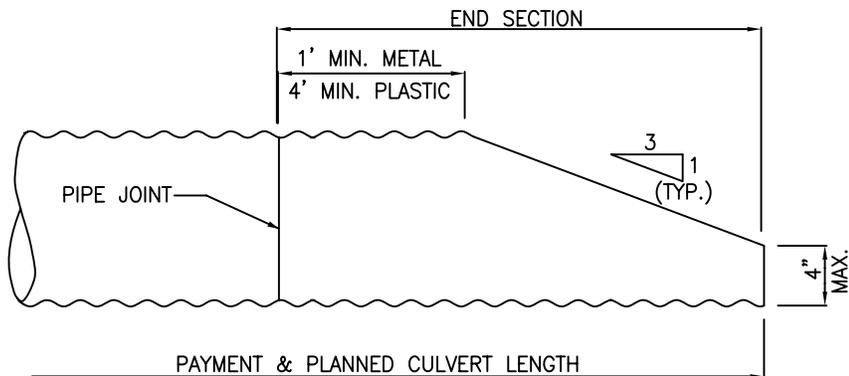


PLAN



ELEVATION

CONCRETE PIPE



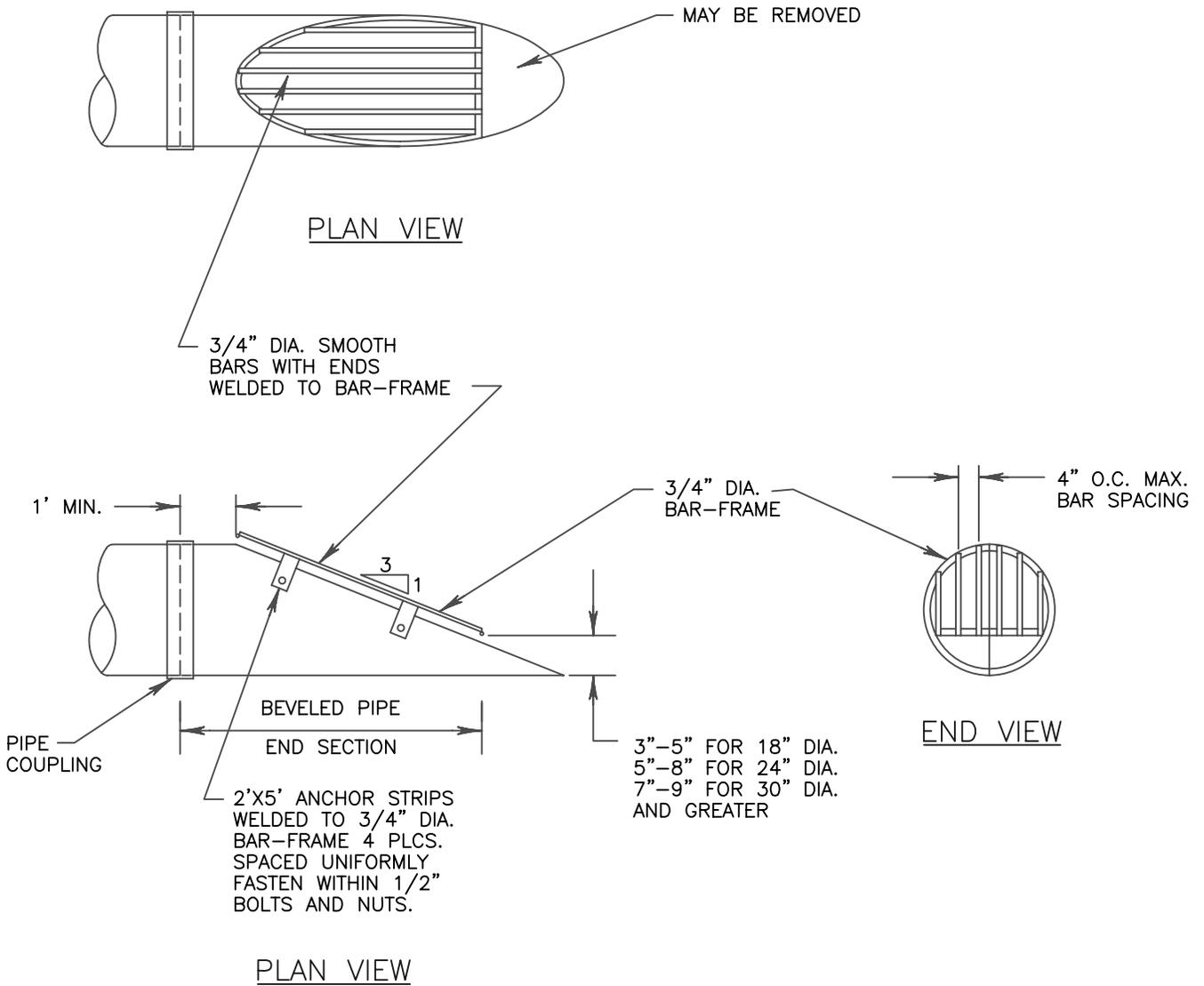
METAL & PLASTIC PIPE

NOTE:

1. SIDE SLOPE SHALL BE WARPED TO MATCH THE BEVELED PIPE END. WHEN CULVERT IS ON SKEW, BEVELED END SHALL BE ROTATED TO CONFORM TO SLOPE. IF SLOPE DIFFERS FROM 3:1, PIPE SHALL BE BEVELED TO MATCH SLOPE.

2. TRASH RACK MAY BE REQUIRED BY DIRECTOR OR DESIGNEE. (SEE STND DWG 702 FOR DETAILS)

	<p>Public Works Planning and Development Services</p>		<h1>Beveled End Pipe Section</h1>	<h1>701</h1>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>

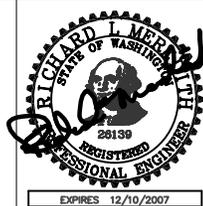


**NOTES:**

1. CMP END-SECTION SHOWN. FOR CONCRETE PIPE BEVELED END-SECTION, SEE STND DWG 701.
2. ALL PARTS MUST BE ALUMINUM OR STAINLESS STEEL.
3. TRASH RACKS REQUIRED ON ALL PIPES 18" TO 36" IN DIAMETER ENTERING A CLOSED SYSTEM IN COMPLIANCE WITH CURRENTLY ADOPTED SURFACE WATER DESIGN MANUAL.



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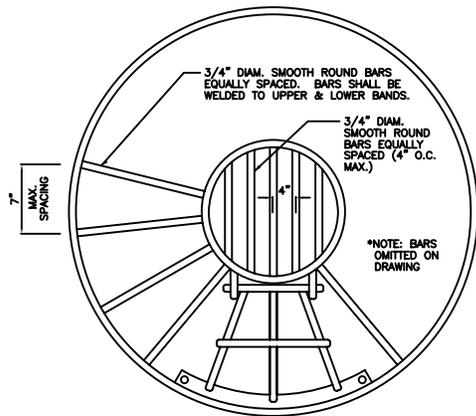


# Trash Rack (Debris Cage) - Pipe End

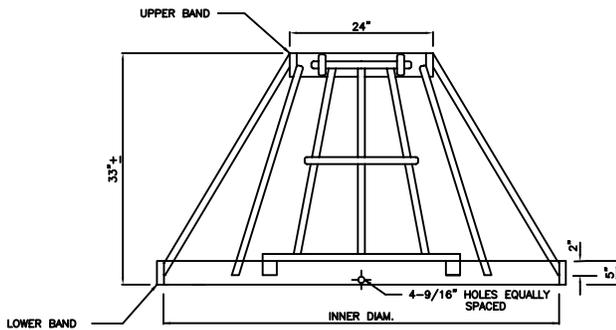
**702**

NOT TO SCALE

Revision Date  
December 2006

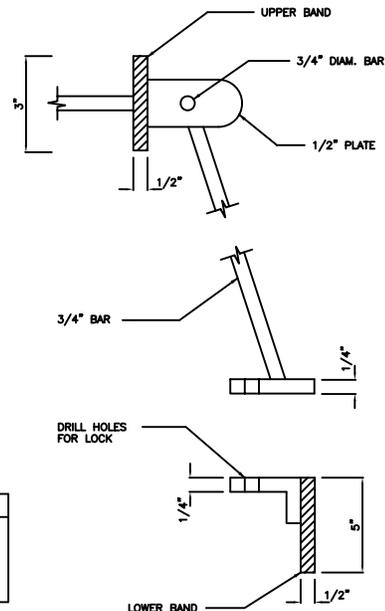


PLAN



ELEVATION

CB	INNER DIAM.
48"	58"
54"	65"
60"	72"
72"	86"
96"	114"



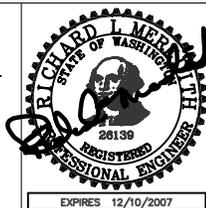
ENTRY GATE DETAIL

NOTES:

1. ALL STEEL IN PLATES, BARS AND BANDS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A38.
2. DEBRIS CAGE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 (AASHTO M111).



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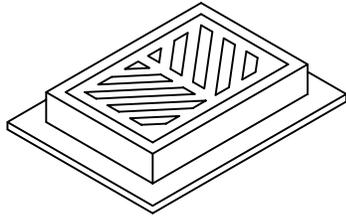
# Trash Rack (Debris Cage) - Conical

**703**

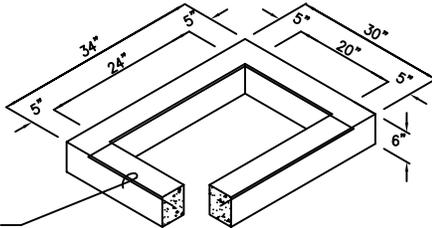
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Revision Date  
December 2006

FRAME AND GRATE  
SEE DWGS 729, 730,  
& 731 FOR DETAILS

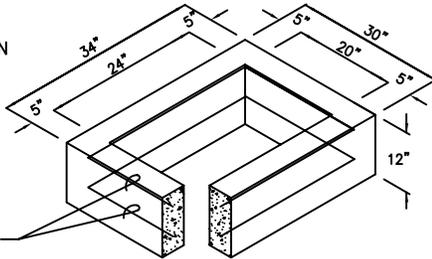


6" RISER SECTION

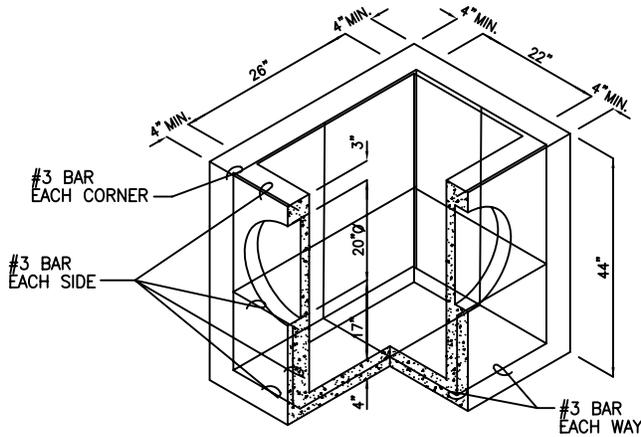


1 #3 BAR HOOP

12" RISER SECTION



2 #3 BAR HOOPS



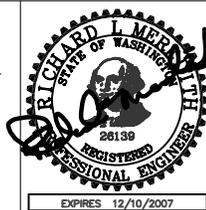
PRECAST BASE SECTION  
(MEASUREMENT AT THE TOP  
OF THE BASE)

NOTES:

1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASHTO M 199) & C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
2. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497 (AASHTO M 221). WIRE FABRIC COMPLY TO ASTM A497 (AASHTO M 221). WIRE FABRIC SHALL NOT BE PLACED IN KNOCKOUTS.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
5. KNOCKOUT OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS.
6. ROUND KNOCKOUTS MAY BE ON ALL 4 SIDES, WITH MAX. DIAM. OF 20". KNOCKOUTS MAY BE EITHER ROUND OR "D" SHAPE.
7. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
8. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED 1/2"/FT.
9. CATCH BASIN FRAME AND GRATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-62ID. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
10. FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.
11. FOR CATCH BASINS IN PARKING LOTS REFER TO WSDOT/APWA STANDARD DWG. B1-b.
12. EDGE OF RISER OR BRICK SHALL NOT BE MORE THAN 2" FROM VERTICAL EDGE OF CATCH BASIN WALL.



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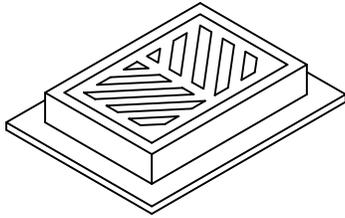
# Catch Basin Type 1

# 705

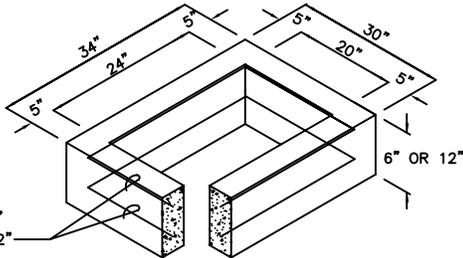
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Revision Date  
December 2006

FRAME AND GRATE  
SEE DWGS 729, 730,  
& 731 FOR DETAILS

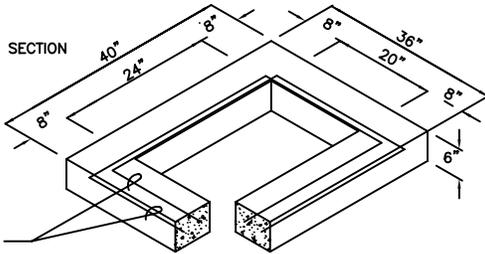


RISER SECTION



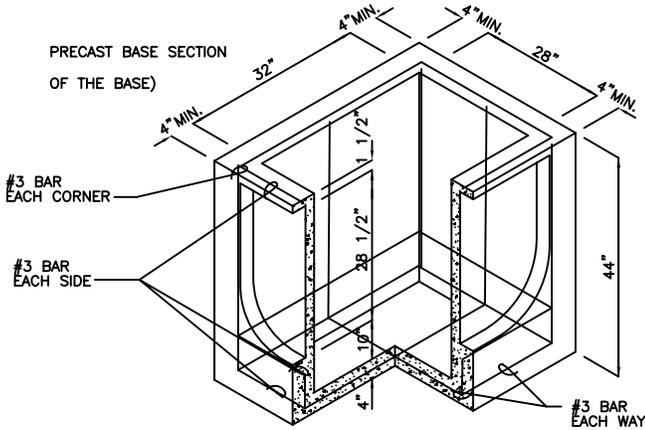
1 #3 BAR HOOP FOR 6"  
2 #3 BAR HOOP FOR 12"

6" REDUCING SECTION



2 #3 BAR HOOP

PRECAST BASE SECTION  
OF THE BASE)



#3 BAR  
EACH CORNER

#3 BAR  
EACH SIDE

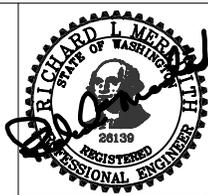
#3 BAR  
EACH WAY

NOTES:

1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASHTO M 199) & C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
2. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497 (AASHTO M 221). WIRE FABRIC COMPLY TO ASTM A497 (AASHTO M 221). WIRE FABRIC SHALL NOT BE PLACED IN KNOCKOUTS.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
5. KNOCKOUT OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS.
6. ROUND KNOCKOUTS MAY BE ON ALL 4 SIDES, WITH MAX. DIAM. OF 20". KNOCKOUTS MAY BE EITHER ROUND OR "D" SHAPE.
7. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
8. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED 1/2"/FT.
9. CATCH BASIN FRAME AND GRATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-62ID. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
10. FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.
11. FOR CATCH BASINS IN PARKING LOTS REFER TO WSDOT/APWA STANDARD DWG. B1-b.
12. EDGE OF RISER OR BRICK SHALL NOT BE MORE THAN 2" FROM VERTICAL EDGE OF CATCH BASIN WALL.



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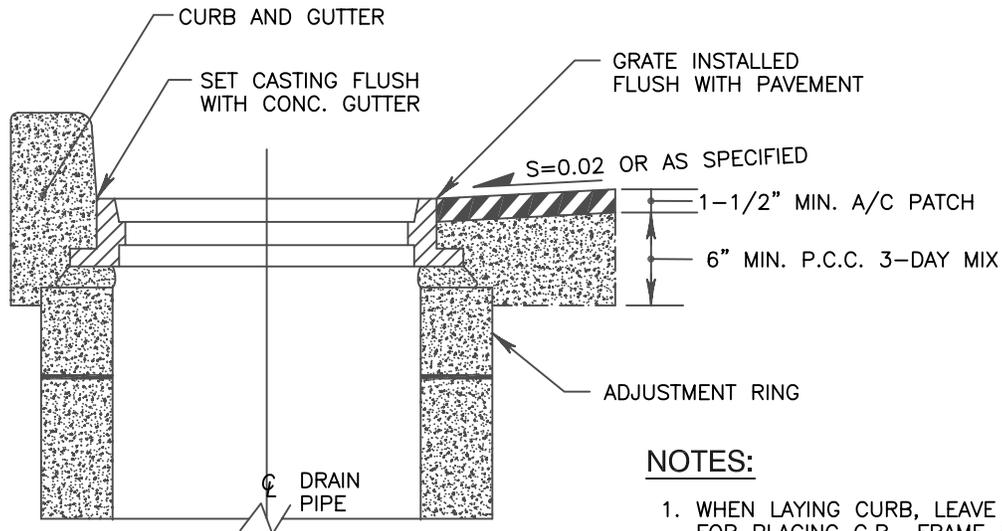


# Catch Basin Type 1-L

**706**

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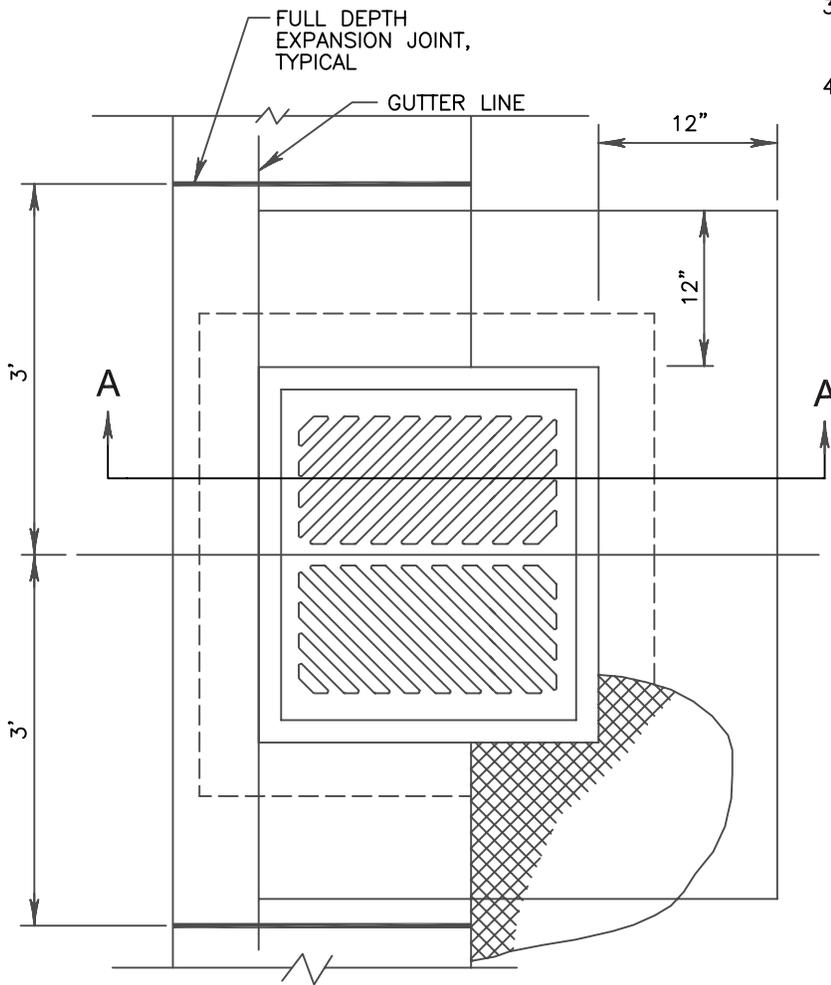
Revision Date  
December 2006



**SECTION A-A**

**NOTES:**

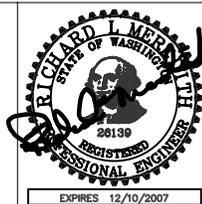
1. WHEN LAYING CURB, LEAVE 6' OUT FOR PLACING C.B., FRAME AND GRATE.
2. PLACE CURB AROUND C.B. USING CEMENT CONCRETE 3-DAY MIX.
3. AN APPROVED MATERIAL WHICH WILL PREVENT BONDING OF THE CURB TO FRAME, GRATE OR C.B. SHALL BE USED.
4. GROUT ALL JOINTS INSIDE AND OUTSIDE.



**PLAN VIEW**



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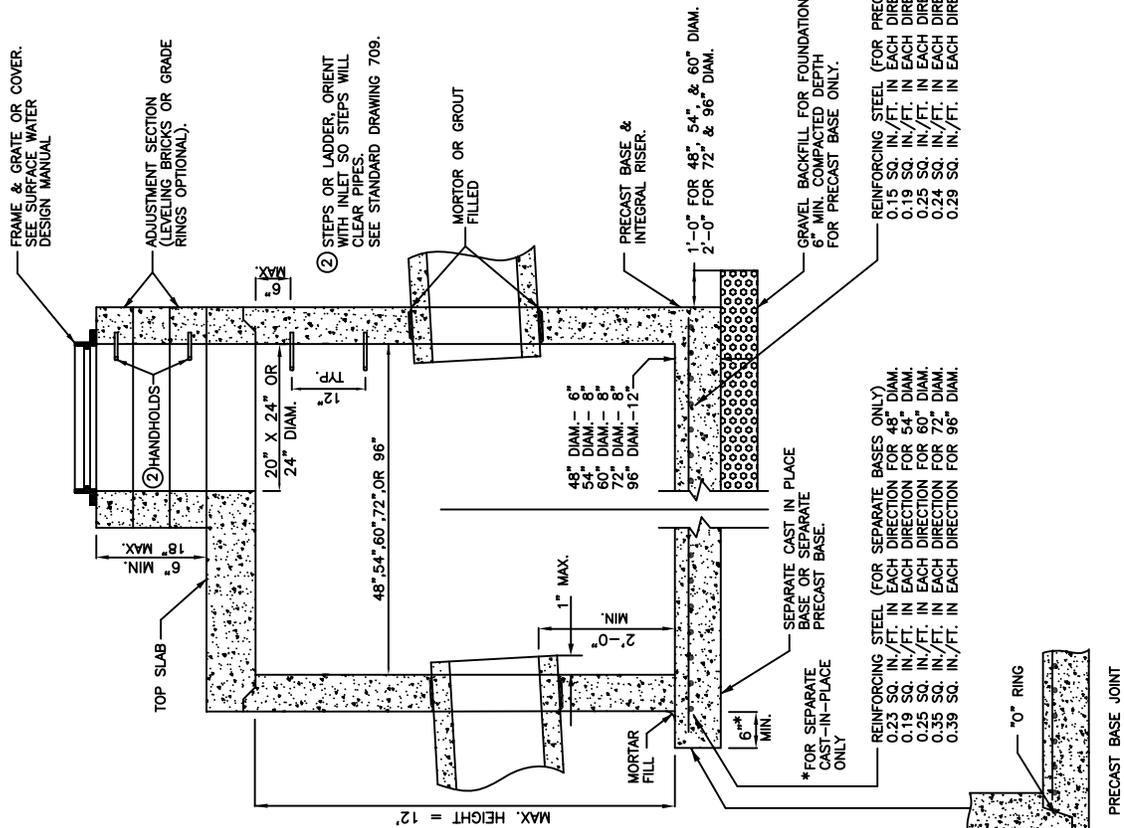
# Catch Basin Installation

**707**

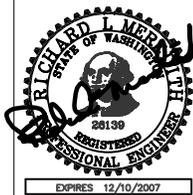
NOT TO SCALE

Revision Date  
December 2006

- CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (ASHTO M199) AND ASTM C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
- HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN CATCH BASIN SHALL HAVE 6" MIN. CLEARANCE. SEE STD DWG 709, CATCH BASIN DETAILS. HANDHOLDS SHALL BE PLACED IN ALTERNATING GRADE RINGS OR LEVELING BRICK COURSE WITH A MIN. OF ONE HANDHOLD BETWEEN THE LAST STEP AND TOP OF THE MANHOLE.
- ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. ALL PRECAST CONCRETE SHALL BE CLASS 4000.
- PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE WALL THICKNESS OF 2" MIN. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
- KNOCKOUT OR CUTOUT HOLE SIZE SHALL EQUAL PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS. MAX. HOLE SIZE SHALL BE 36" FOR 48" CATCH BASIN, 42" FOR 54" C.B., 48" FOR 60" C.B., 60" FOR 72" C.B., 84" FOR 96" C.B. MIN. DISTANCE BETWEEN HOLES SHALL BE 8" FOR 48", 54", AND 60" C.B.; 12" FOR 72" AND 96" C.B.
- CATCH BASIN FRAMES AND GRATES OR COVERS SHALL BE IN ACCORDANCE WITH SURFACE WATER DESIGN MANUAL AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
- ALL BASE REINFORCING STEEL SHALL HAVE A MIN. YIELD STRENGTH OF 60,000 PSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MIN. CLEARANCE.
- MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 POUNDS PER SQUARE FOOT. 9. FOR DETAILS SHOWING LADDER, STEPS, HANDRAILS AND TOP SLABS, SEE STD DWG 709.
- SEE THE WSDOT/APWA STANDARD SPECIFICATIONS SEC. 7-05.3 FOR JOINT REQUIREMENTS.



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# Catch Basin Type 2 - 48", 54", 60", 72" & 96"

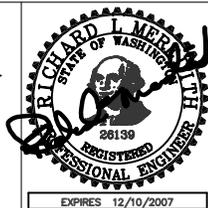
**708**

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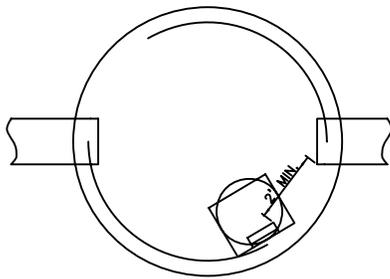
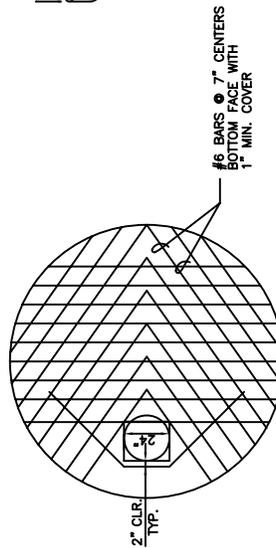
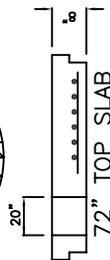
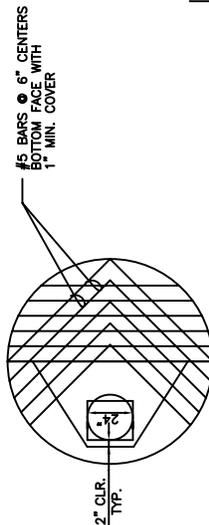
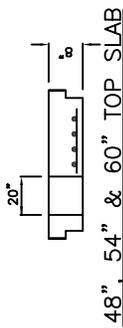
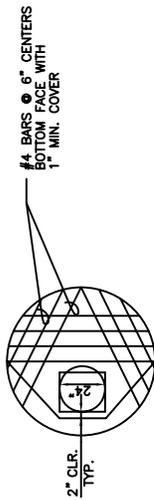


# Catch Basin Details

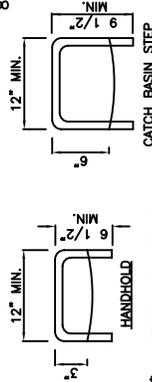
# 709

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December 2006

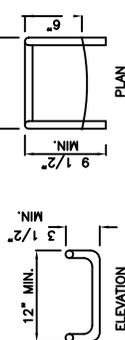


### TYPICAL ORIENTATION FOR ACCESS AND STEPS



HANDHOLD

\* ALL STEPS & RUNGS #8 GALV. DEFORMED REBAR OR COPOLYMER PROPYLENE.



CATCH BASIN STEP

PLAN

ELEVATION

12" MIN.

6"

1/2"

1/2"

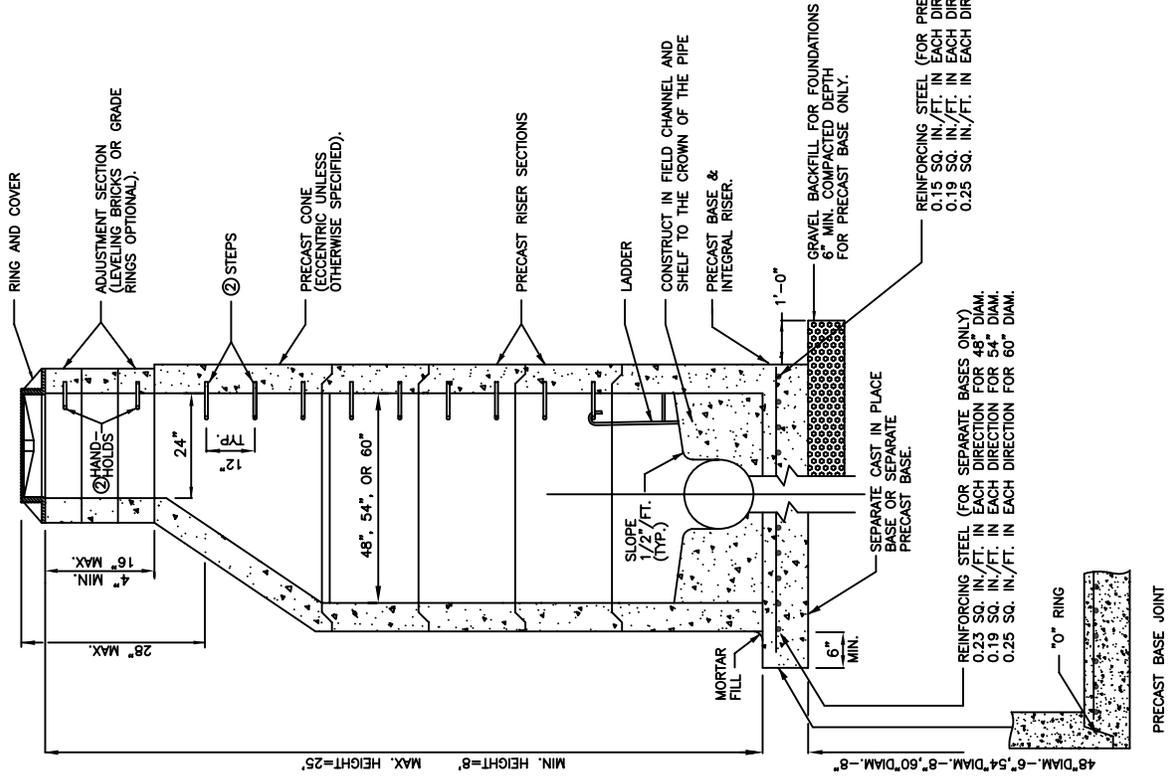
12" MIN.

6"

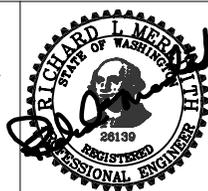
1/2"

NOTES:

1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M199 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
2. HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN MANHOLE SHALL HAVE 6" MIN. CLEARANCE. SEE STD DWG 716, "MANHOLE DETAILS." HANDHOLDS SHALL BE PLACED IN ALTERNATING GRADE RINGS OR LEVELING BRICK COURSE WITH A MIN. OF ONE HAND HOLD BETWEEN THE LAST STEP AND THE TOP OF THE MANHOLE.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. ALL PRECAST CONCRETE SHALL BE CLASS 4000. NON-REINFORCED CONCRETE IN CHANNEL AND SHELF SHALL BE CLASS 3000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE WALL THICKNESS OF 2" MIN. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. KNOCKOUT OR CUTOUT HOLE SIZE SHALL EQUAL PIPE OUTER DIAM PLUS MANHOLE WALL THICKNESS. MAX. HOLE SIZE SHALL BE 36" FOR 48" MANHOLE, 42" FOR 54" MANHOLE, 48" FOR 60" M.H. MIN. DISTANCE BETWEEN HOLES SHALL BE 8".
6. MANHOLE RINGS AND COVERS SHALL BE IN ACCORDANCE WITH SURFACE WATER DESIGN MANUAL AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
7. ALL BASE REINFORCING STEEL SHALL HAVE A MIN. YIELD STRENGTH OF 60,000 PSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MIN. CLEARANCE.
8. FOR HEIGHTS OF 12' OR LESS, MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 POUNDS PER SQUARE FOOT. FOR HEIGHTS OVER 12', MIN. SOIL BEARING VALUE SHALL EQUAL 3,800 POUNDS PER SQUARE FOOT.
9. FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE STD DWG 716, "MANHOLE DETAILS."
10. SEE THE WSDOT/APWA STANDARD SPECIFICATIONS SEC. 7-05.3 FOR JOINT REQUIREMENTS.



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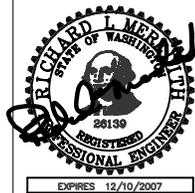
# Manhole Type 1 48", 54", & 60" 712

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# Manhole Type 2 72" & 96"

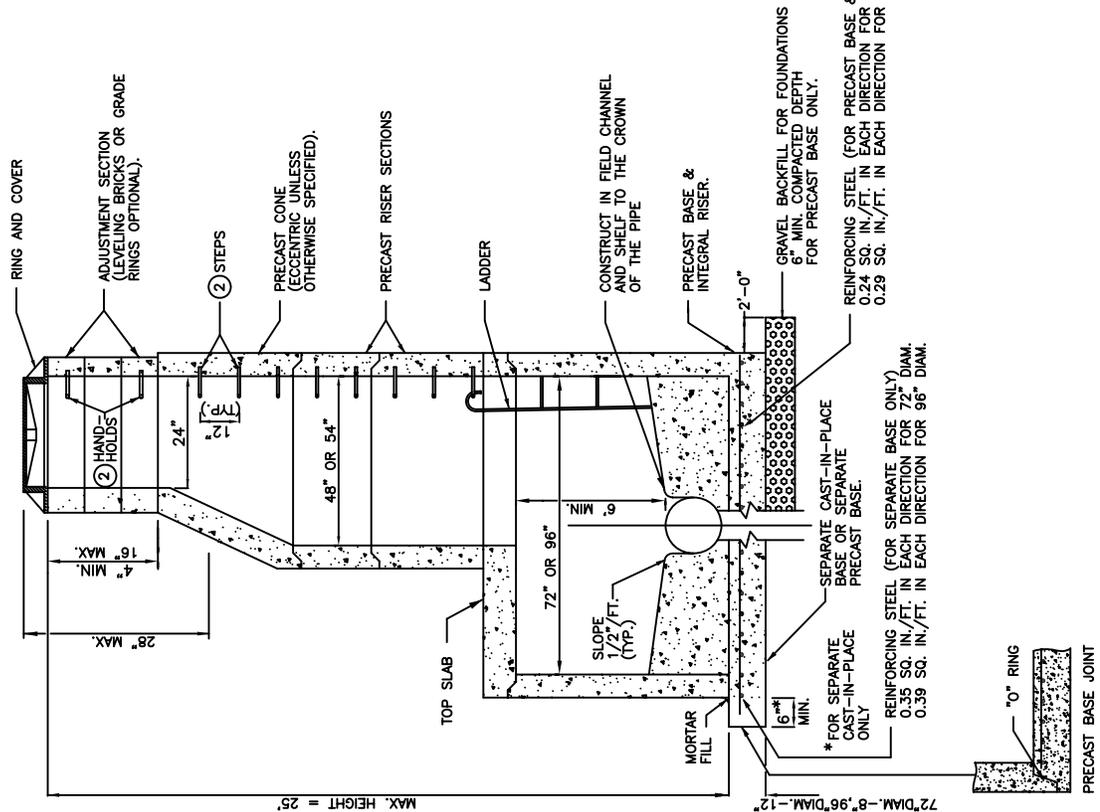
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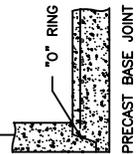
**NOTES:**

1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M199 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
2. HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN MANHOLE SHALL HAVE 6" MIN. CLEARANCE. SEE STD DWG 716, "MANHOLE DETAILS." HANDHOLDS SHALL BE PLACED IN ALTERNATING GRADE RINGS OR LEVELING BRICK COURSE WITH MIN. OF ONE HANDHOLD BETWEEN THE LAST STEP AND THE TOP OF THE MANHOLE.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. NON-REINFORCED CONCRETE IN CHANNEL AND SHELF SHALL BE CLASS 3000. ALL PRECAST CONCRETE SHALL BE CLASS 4000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE WALL THICKNESS OF 2" MIN. UNUSED KNOCKOUTS NEED NOT BE GROUDED IF WALL IS LEFT INTACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE REVIEW ENGINEER.
5. KNOCKOUT OR CUTOUT HOLE SIZE SHALL EQUAL PIPE OUTER DIAM. PLUS MANHOLE WALL THICKNESS. MAX. HOLE SIZE SHALL BE 60" FOR 72" MANHOLE, 84" FOR 96" MANHOLE. MIN. DISTANCE BETWEEN HOLES SHALL BE 12".
6. MANHOLE RINGS AND COVERS SHALL BE IN ACCORDANCE WITH STORM WATER DESIGN MANUAL AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
7. ALL BASE REINFORCING STEEL SHALL HAVE A MIN. YIELD STRENGTH OF 60,000 PSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MIN. CLEARANCE.
8. FOR HEIGHTS OF 12' OR LESS, MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 POUNDS PER SQUARE FOOT. FOR HEIGHTS OVER 12', MIN. SOIL BEARING VALUE SHALL EQUAL 3,800 POUNDS PER SQUARE FOOT.
9. FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE STD DWG 716, "MANHOLE DETAILS."
10. SEE THE WSDOT/APWA STANDARD SPECIFICATIONS SEC. 7-05.3 FOR JOINT REQUIREMENTS.



REINFORCING STEEL (FOR PRECAST BASE & INTEGRAL RISER ONLY)  
0.24 SQ. IN./FT. IN EACH DIRECTION FOR 72" DIAM.  
0.29 SQ. IN./FT. IN EACH DIRECTION FOR 96" DIAM.

\* FOR SEPARATE CAST-IN-PLACE PRECAST BASE ONLY  
REINFORCING STEEL (FOR SEPARATE BASE ONLY)  
0.39 SQ. IN./FT. IN EACH DIRECTION FOR 72" DIAM.  
0.39 SQ. IN./FT. IN EACH DIRECTION FOR 96" DIAM.





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# Manhole Type 3 48", 52", 60", 72" & 96"

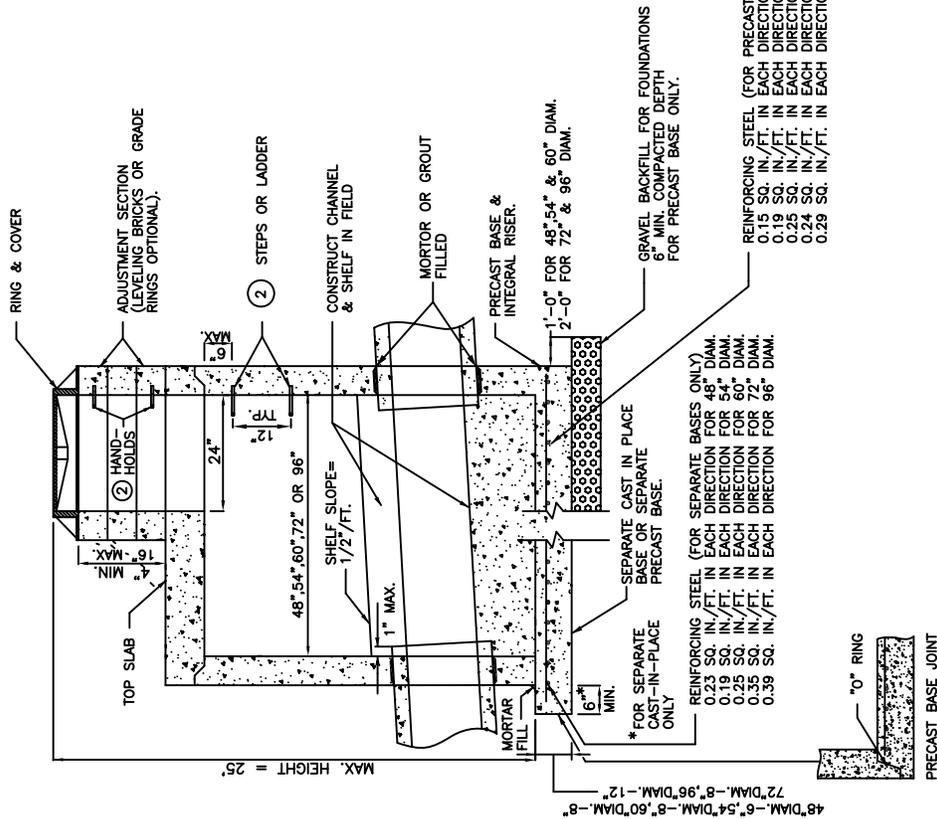
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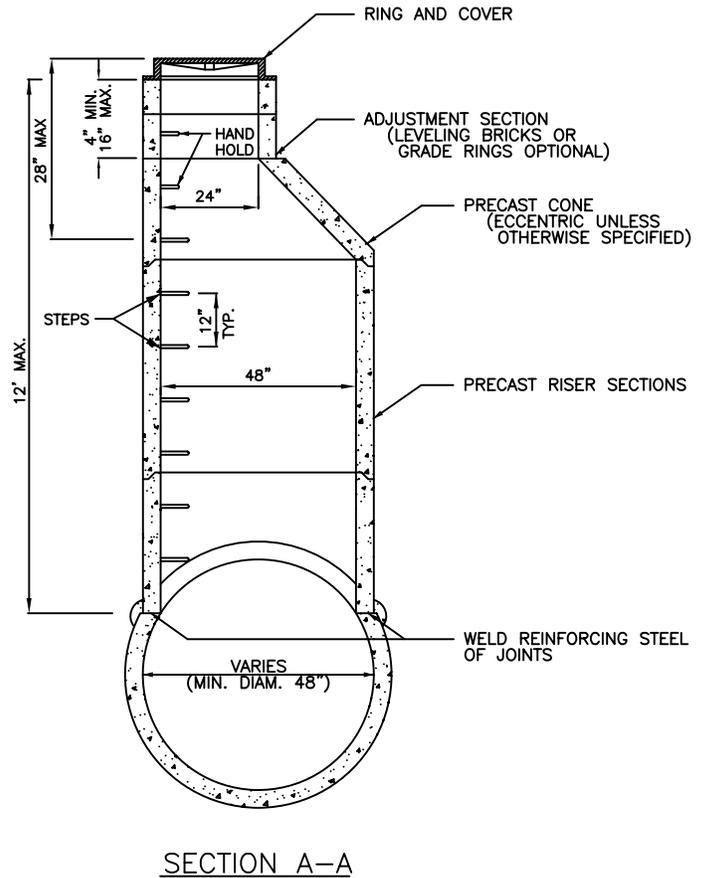
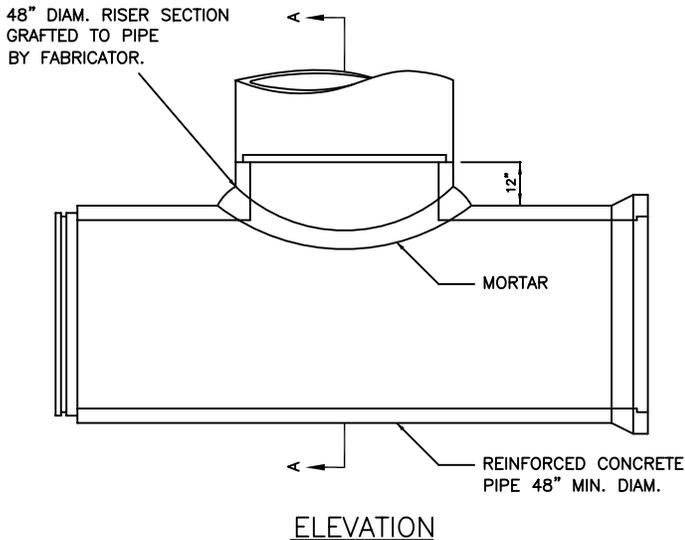
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December 2006

NOTES:

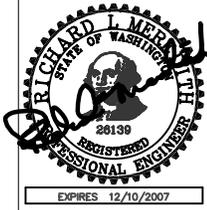
- MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M199 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
- HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN MANHOLE SHALL HAVE 6" MIN. CLEARANCE. SEE STND DWG 716, "MANHOLE DETAILS." HANDHOLDS SHALL BE PLACED IN ALTERNATING GRADE RINGS OR LEVELING BRICK COURSE WITH A MIN. OF ONE HANDHOLD BETWEEN THE LAST STEP AND THE TOP OF THE MANHOLE.
- ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. NON-REINFORCED CONCRETE IN CHANNEL AND SHELF SHALL BE CLASS 3000. ALL PRECAST CONCRETE SHALL BE CLASS 4000.
- PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE WALL THICKNESS OF 2" MIN. UNUSED KNOCKOUTS NEED NOT BE GROUDED IF WALL IS LEFT INTACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE REVIEW ENGINEER.
- KNOCKOUT OR CUTOUT HOLE SIZE SHALL EQUAL PIPE OUTER DIAM. PLUS MANHOLE WALL THICKNESS. MAX. HOLE SIZE SHALL BE 36" FOR 48" M.H., 42" FOR 54" M.H., 48" FOR 60" M.H., 60" FOR 72" M.H., 84" FOR 96" M.H. MIN. DISTANCE BETWEEN HOLES SHALL BE 8" FOR 48", 54", AND 60" M.H., 12" FOR 72" AND 96" M.H.
- MANHOLE RINGS AND COVERS SHALL BE IN ACCORDANCE WITH SURFACE WATER DESIGN MANUAL AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
- ALL BASE REINFORCING STEEL SHALL HAVE A MIN. YIELD STRENGTH OF 60,000 PSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MIN. CLEARANCE.
- FOR HEIGHTS OF 12' OR LESS, MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 POUNDS PER SQUARE FOOT. FOR HEIGHTS OVER 12', MIN. SOIL BEARING VALUE SHALL EQUAL 3,800 POUNDS PER SQUARE FOOT.
- FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE STND DWG 716, "MANHOLE DETAILS."
- SEE THE WSDOT/APWA STANDARD SPECIFICATIONS SEC. 7-05.3 FOR JOINT REQUIREMENTS.





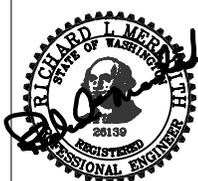
**NOTE:**

1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M199 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
2. HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN CLEARANCE. STEPS IN MANHOLE SHALL HAVE 6" MIN CLEARANCE. SEE STND DWG 716, "MANHOLE DETAILS."
3. MANHOLE RINGS & COVERS SHALL BE IN ACCORDANCE WITH THE SURFACE WATER DESIGN MANUAL & MEET THE STRENGTH OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
4. ALL PRECAST CONCRETE SHALL BE WSDOT CLASS 4000psi.
5. FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, & TOP SLABS, SEE STND DWG 716, "MANHOLE DETAILS."
6. NOT FOR USE IN TRAFFIC BEARING AREAS.

 <p>CITY OF SHORELINE</p>	<p>Public Works Planning and Development Services</p>		<h1 style="margin: 0;">Manhole Type 4</h1>	<h1 style="margin: 0;">715</h1>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>



Public Works  
Planning  
and  
Development  
Services

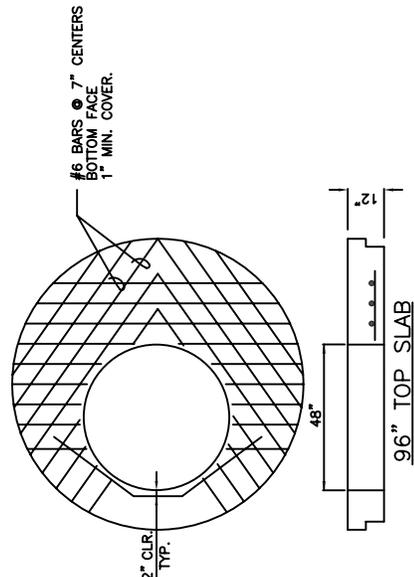
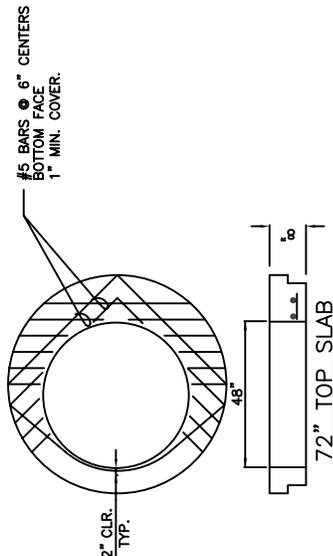
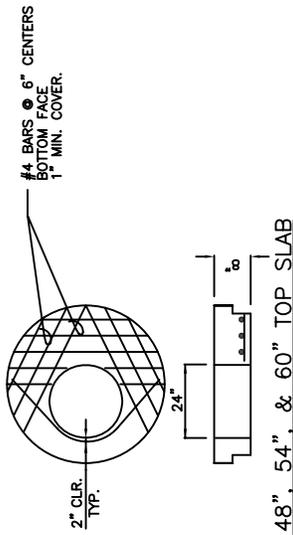


# Manhole Details

## 716

NOT TO SCALE

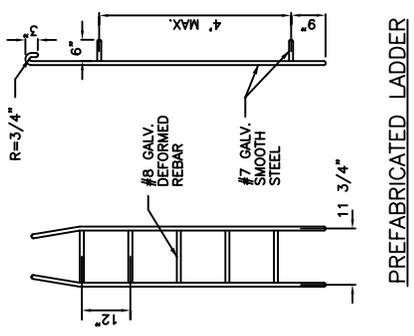
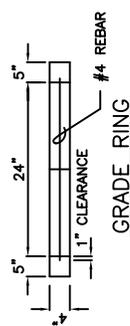
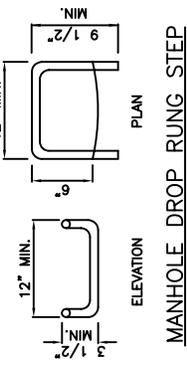
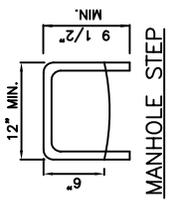
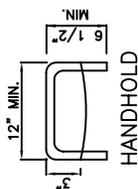
Revision Date  
December 2006

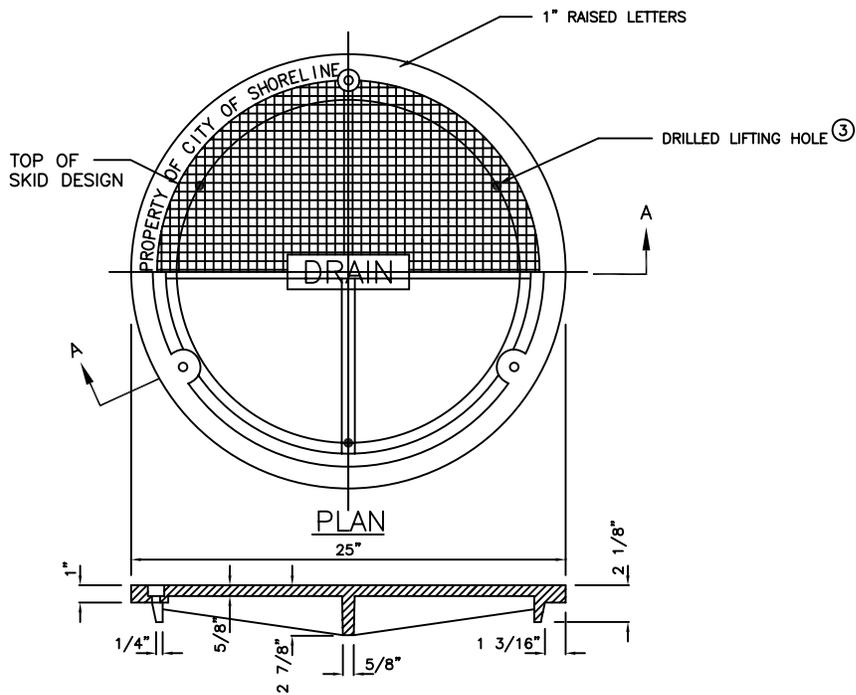


NOTES:

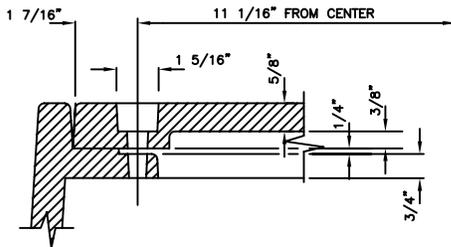
1. PROPRIETARY MANHOLE HANDHOLDS AND STEPS ARE ACCEPTABLE, PROVIDED THAT THEY CONFORM TO SEC. R, ASTM C478, ASHTO M199 AND MEET ALL WISHA REQUIREMENTS.
2. MANHOLE STEP/HANDHOLD LEGS SHALL BE PARALLEL OR APPROXIMATELY RADIAL AT THE OPTION OF THE MANUFACTURER, EXCEPT THAT ALL STEPS IN ANY MANHOLE SHALL BE SIMILAR. PENETRATION OF OUTER WALL BY A LEG IS PROHIBITED.
3. HANDHOLDS AND STEPS SHALL HAVE "DROP" RUNGS OR PROTRUBERANCES TO PREVENT SIDEWAYS SLIP.
4. LADDERS OR STEPS SHALL EXTEND TO WITHIN 16" OF BOTTOM OF MANHOLE.
5. HANGING LADDERS SHALL BE PERMANENTLY FASTENED AT TOP BY HANGING ON STEP OR BY BOLTING OR EMBEDDING IN CONCRETE. EACH SHALL BE EMBEDDED AT BOTTOM IN BASE.
6. ADDITIONAL SAFETY FEATURES MAY BE REQUIRED IN VERY DEEP OR UNUSUAL STRUCTURES.

\*ALL STEPS & RUNGS  
DIAM. GALV. REBAR OR  
COPOLYMER PROPYLENE.

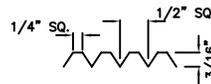




SECTION A-A



BOLT-DOWN DETAIL



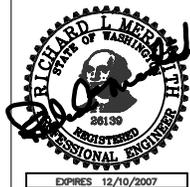
COVER SKID DESIGN DETAIL

NOTES:

1. USE WITH THREE LOCKING BOLTS 5/8"-11 NC STAINLESS TYPE 304 STEEL SOCKET HEAD (ALLEN HEAD) CAP SCREWS 2" LONG. DRILL HOLES SPACED 120° AT 11 1/16" RADIUS.
2. MATERIAL IS DUCTILE IRON ASTM A536 GRADE 80-55-06
- ③ DRILL THREE 1 INCH HOLES SPACED AT 120 AND 9 1/2" RADIUS.



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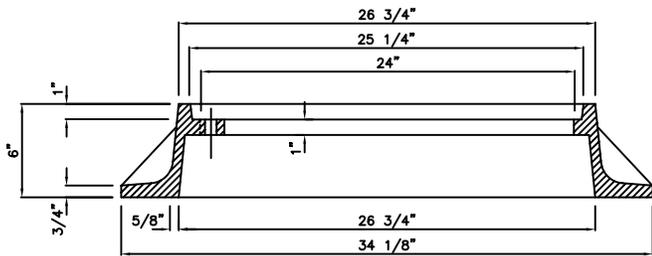
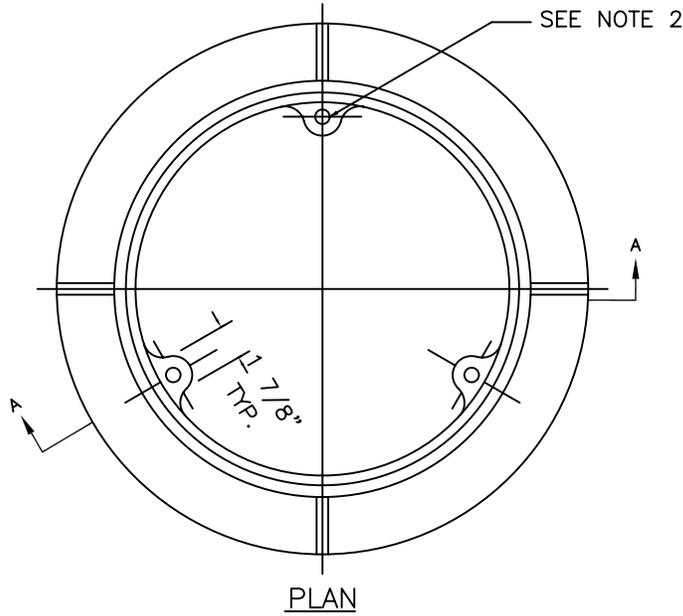


# Locking Manhole Cover

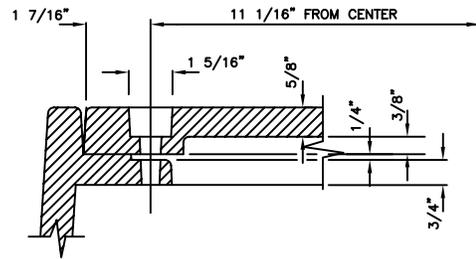
**720**

NOT TO SCALE

Revision Date  
December 2006



SECTION A-A



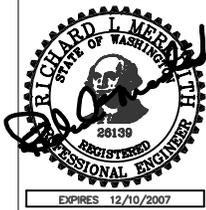
BOLT-DOWN DETAIL

**NOTE:**

1. MATERIAL IS CAST IRON ASTM A4B CLASS 30.
2. DRILL AND TAP THREE  $\frac{5}{8}$ "-11 NC HOLES THROUGH FRAME AT 120° AND 11  $\frac{1}{8}$ " RADIUS.



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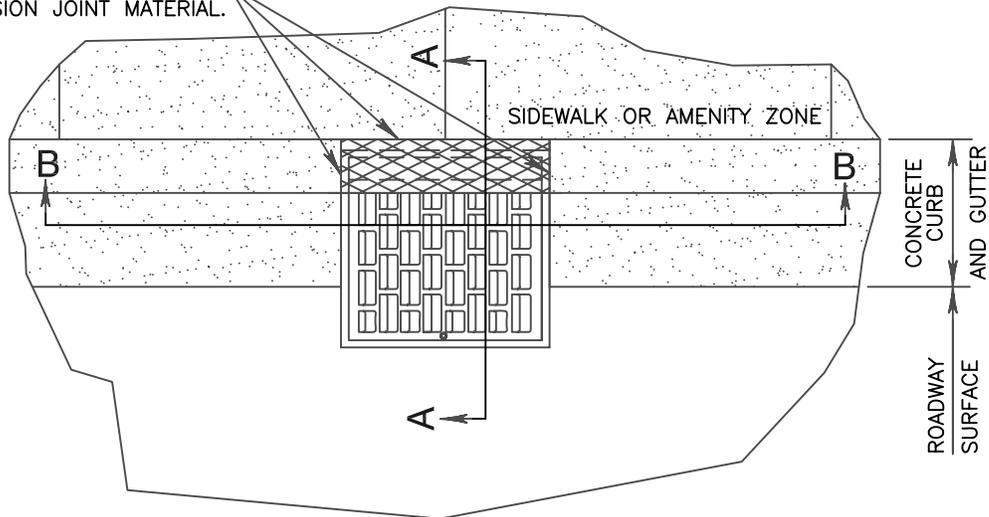
# Locking Manhole Cover Installation

**721**

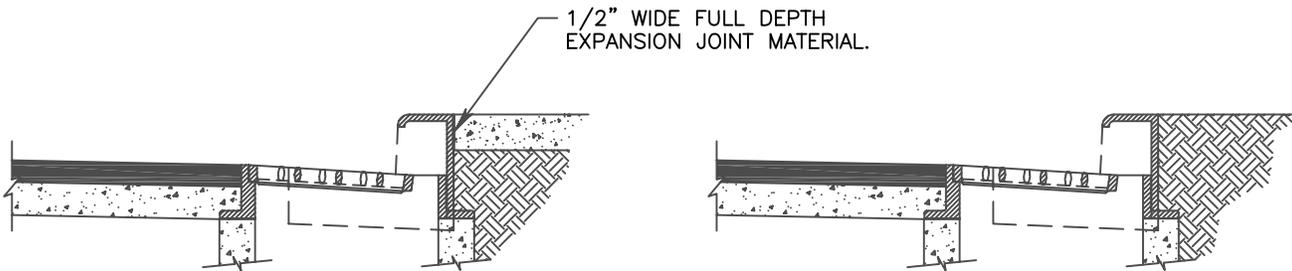
NOT TO SCALE

Revision Date  
December 2006

1/2" WIDE FULL DEPTH EXPANSION JOINT MATERIAL.



**PARTIAL PLAN VIEW**

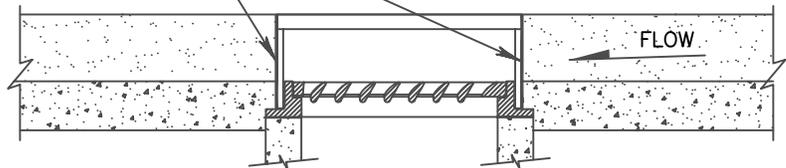


INLET WITH SIDEWALK

INLET WITH AMENITY ZONE

**SECTION A-A**

1/2" WIDE FULL DEPTH EXPANSION JOINT MATERIAL.



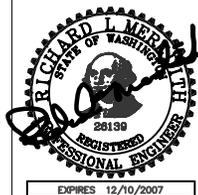
**SECTION B-B**

**NOTE:**

1. SET TO GRADE AND CONSTRUCT ROAD AND GUTTER TO BE FLUSH WITH FRAME.
2. SEE STND DWGS 726 & 729 FOR TYPES OF GRATE USE.
3. SEE STND DWG 724 FOR FRAME DETAIL.



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**Through-Curb Inlet**

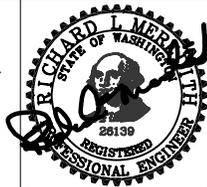
**723**

NOT TO SCALE

Revision Date  
December 2006



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Services

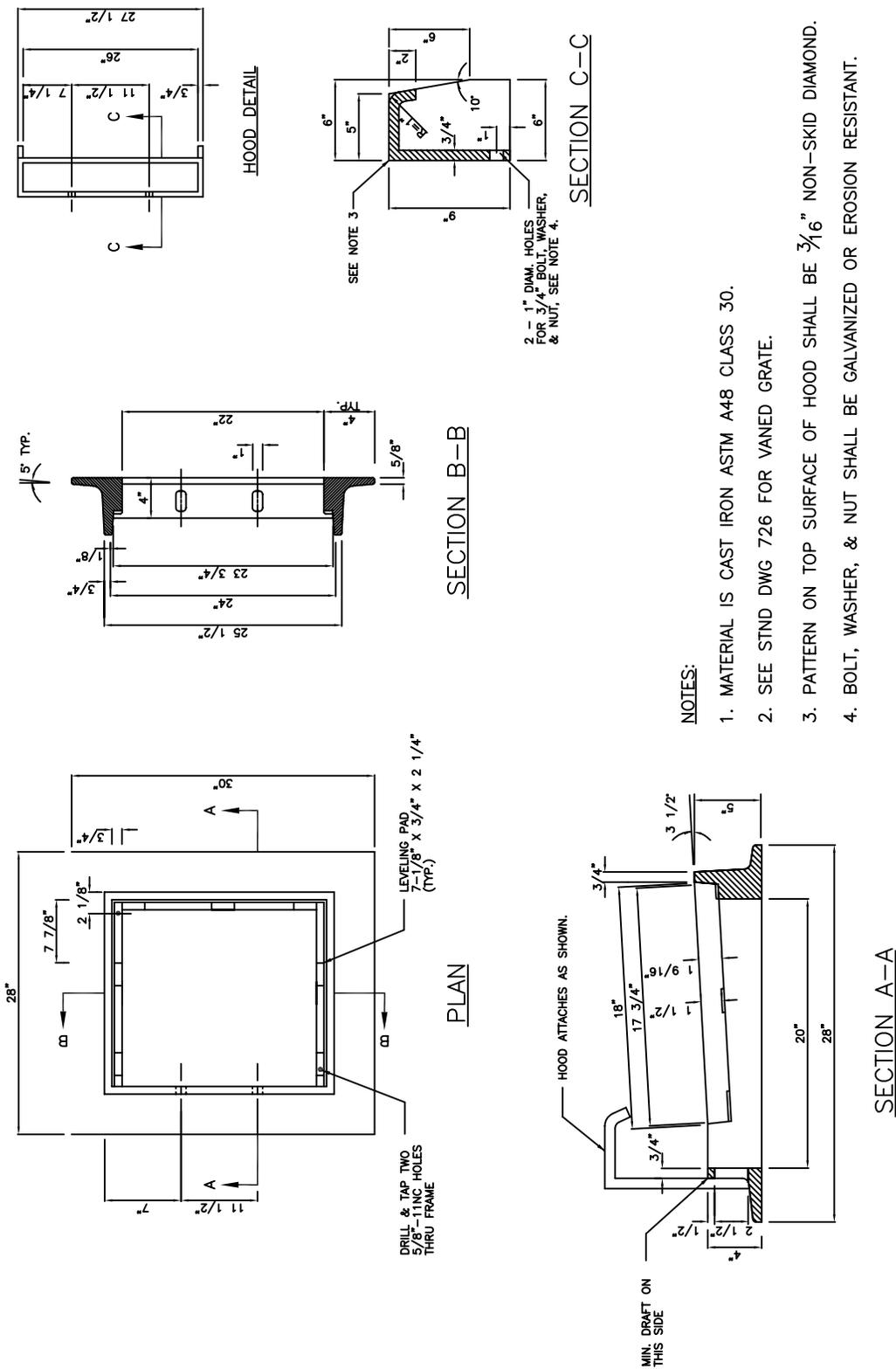


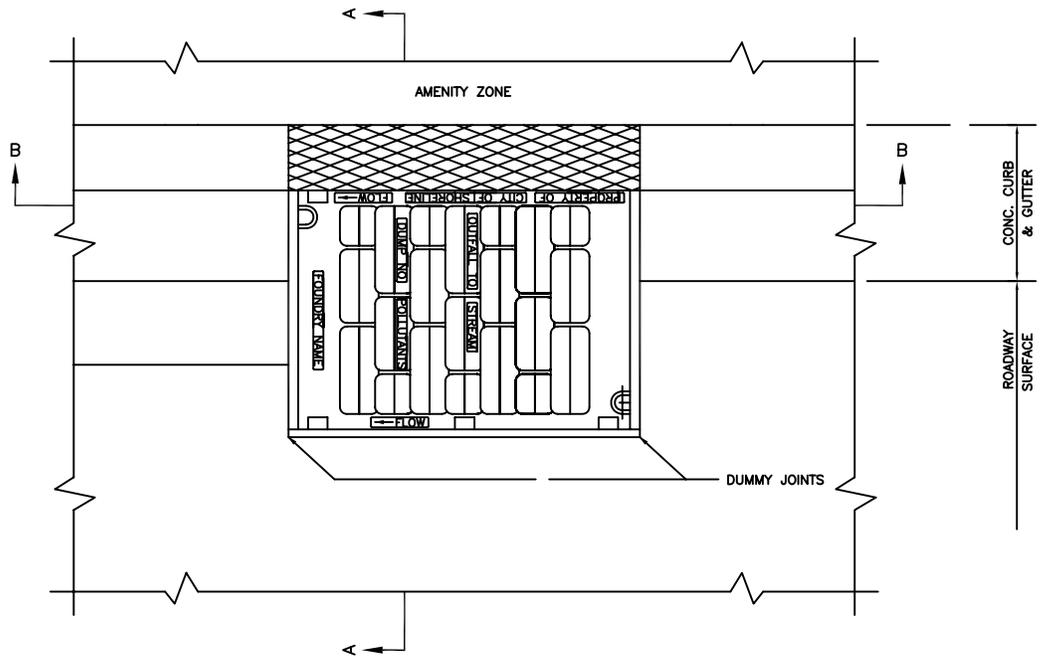
# Through-Curb Inlet Frame

**724**

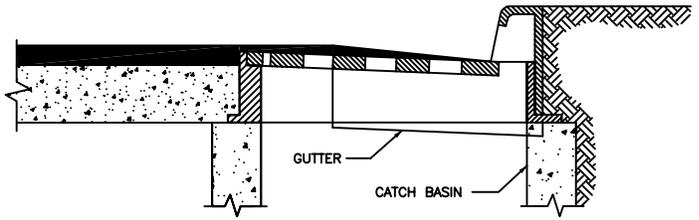
NOT TO SCALE

Revision Date  
December 2006

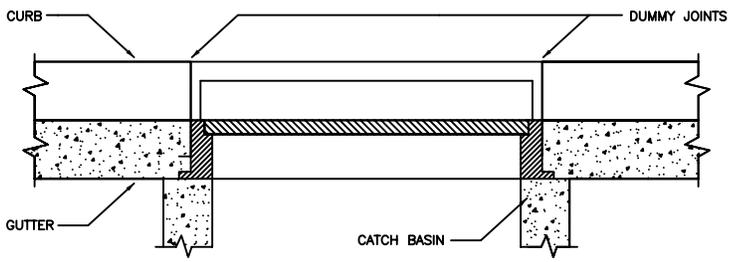




PLAN



SECTION A-A

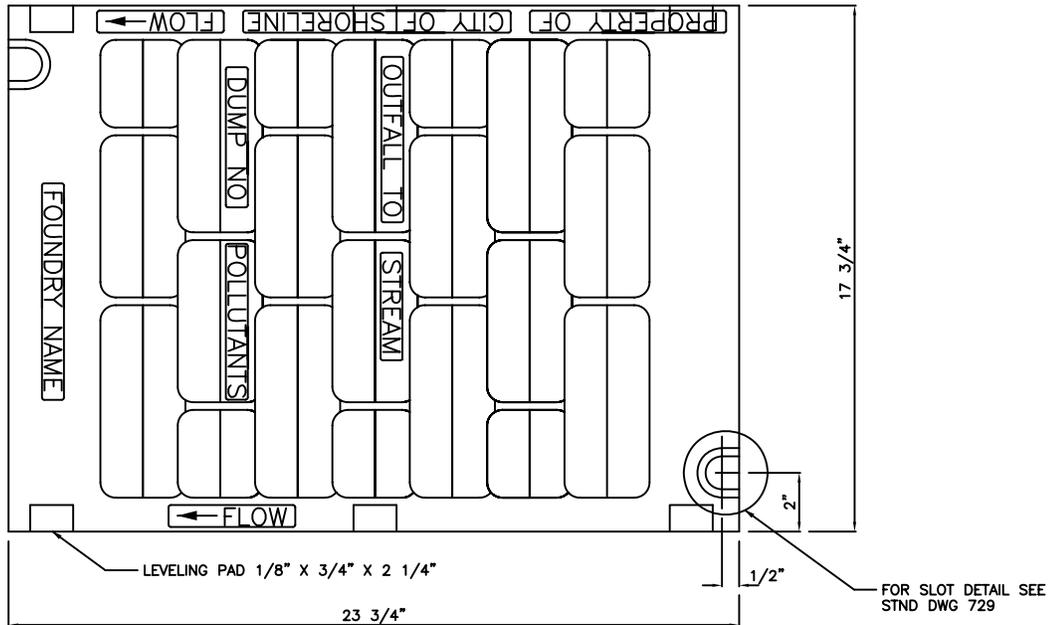


SECTION B-B

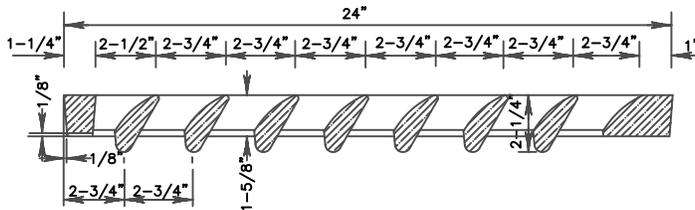
NOTE:

1. SET TO GRADE AND CONSTRUCT ROAD AND GUTTER TO BE FLUSH WITH FRAME.

	<p>Public Works Planning and Development Services</p>		<h1>Through-Curb Inlet &amp; Vertical Curb Installation</h1>	<h1>725</h1>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>



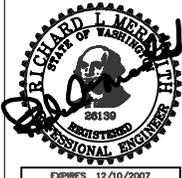
PLAN



ELEVATION

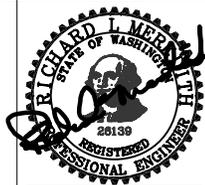
**NOTES:**

1. SELF-LOCK VANED GRATE MANUFACTURER SUBJECT TO APPROVAL BY THE DIRECTOR OR DESIGNEE.
2. USE WITH TWO LOCKING BOLTS  $\frac{5}{8}$ "-11 NC STAINLESS TYPE 304 STEEL SOCKET HEAD (ALLEN HEAD) CAP SCREWS 2" LONG. NOTE SLOT DETAIL.
3. MATERIAL IS DUCTILE IRON ASTM A536 GRADE 80-55-06.
4. "OUTFALL TO STREAM DUMP NO POLLUTANTS" MAY BE LOCATED ON THE BORDER AREA.
5. THE WORDS "PROPERTY OF CITY OF SHORELINE" SHALL BE OMITTED IF GRATE IS ON PRIVATE SYSTEM.
6. USE ON SLOPES GREATER THAN 6%.

	<p>Public Works Planning and Development Services</p>		<b>Vaned Grate</b>	<b>726</b>
				NOT TO SCALE
				Revision Date December 2006



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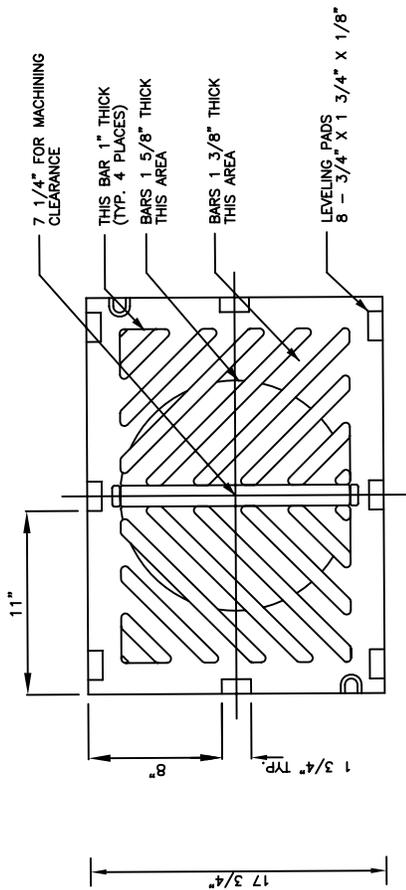


# Standard Grate

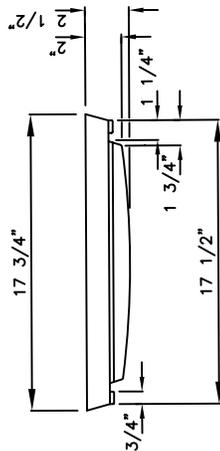
# 729

NOT TO SCALE

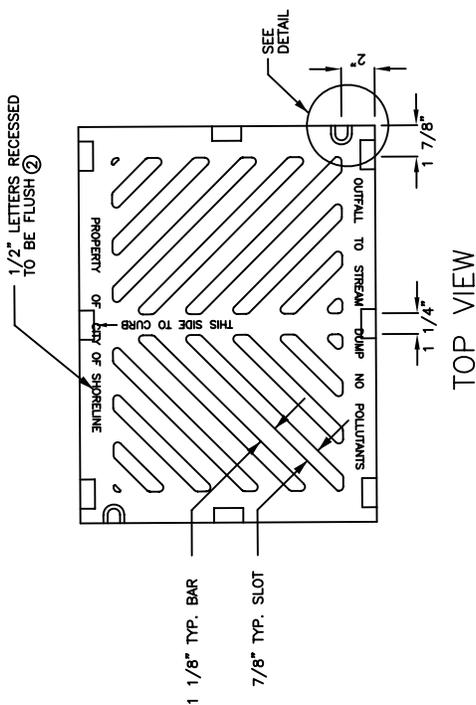
Revision Date  
December 2006



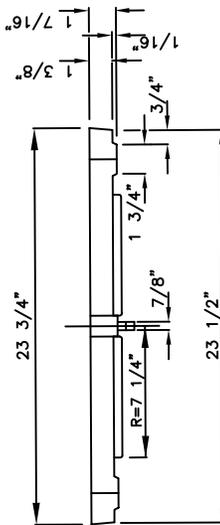
BOTTOM VIEW



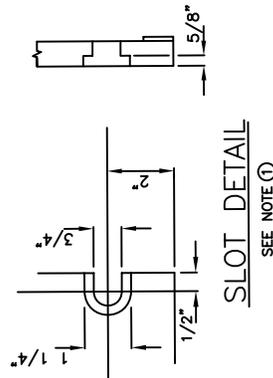
END VIEW



TOP VIEW

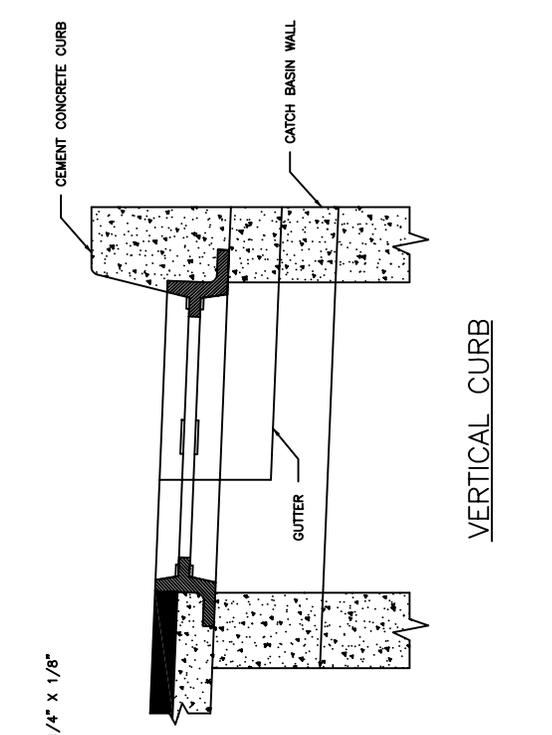


SIDE VIEW



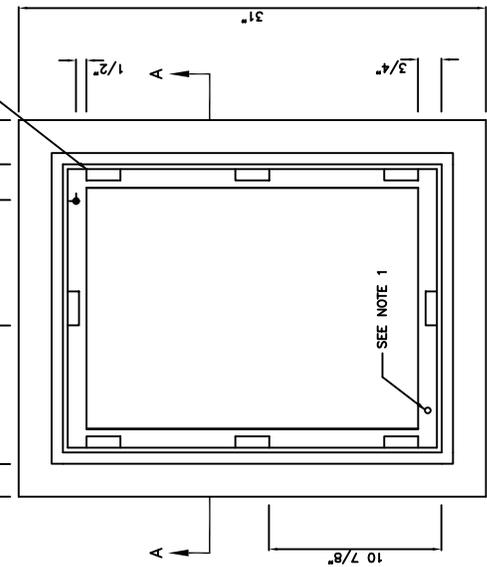
NOTES:

- ① SLOT FORMED AND RECESSED FOR 5/8"-11 NC X 2" SOCKET HEAD (ALLEN HEAD) CAP SCREW.
- ② THE WORDS "PROPERTY OF CITY OF SHORELINE" SHALL BE OMITTED IF GRATE IS ON PRIVATE SYSTEM.
3. ALL CASTINGS SHALL HAVE A BITUMINOUS COATING.
4. GRATE SHALL BE CAST IRON PER ASTM A48 CLASS 30 UNLESS OTHERWISE SPECIFIED.

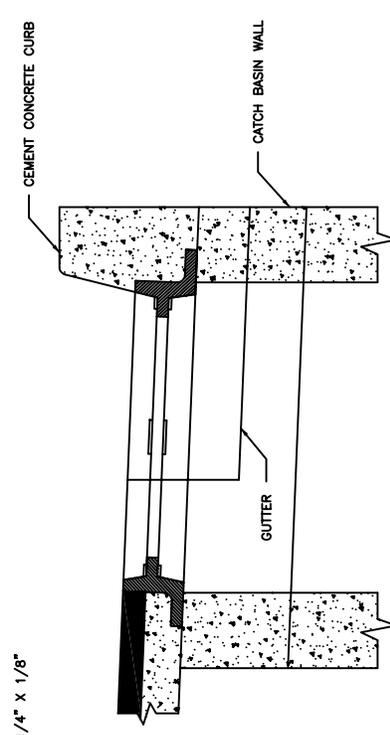


LEVEL PAD 16 - 3/4" X 2 1/4" X 1/8"

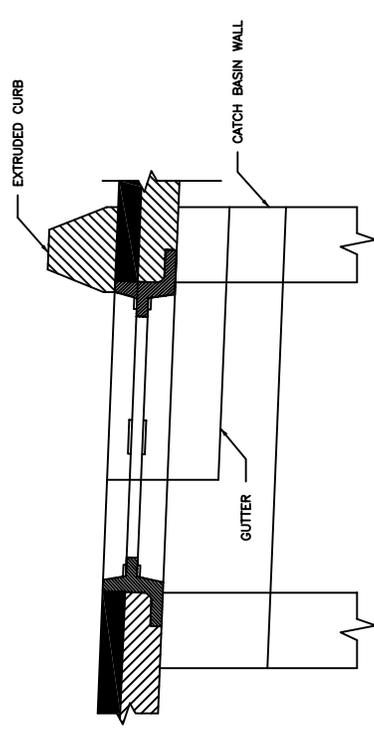
25"  
7 7/8"  
-2 1/2"



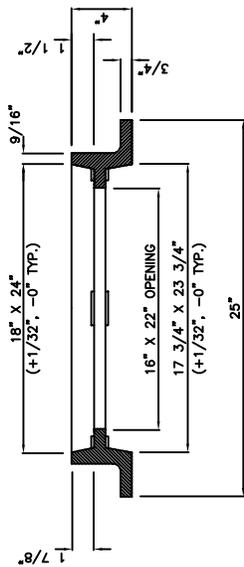
PLAN



VERTICAL CURB



EXTRUDED CURB



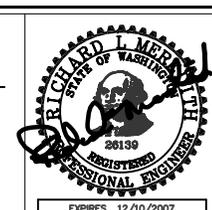
SECTION A-A

NOTES:

1. DRILL & TAP FOR, AND PROVIDE, TWO LOCKING BOLTS 5/8"-11 NC STAINLESS TYPE 304 STEEL SOCKET HEAD (ALLEN HEAD) CAP SCREWS 2" LONG WHEN USED WITH SOLID COVER (STND DWG 731) OR WHEN SPECIFIED BY ENGINEER.
2. FRAME MATERIAL IS CAST IRON PER ASTM A48 CLASS 30.
3. SET FRAME TO GRADE & CONSTRUCT ROAD & GUTTER TO BE FLUSH WITH FRAME.



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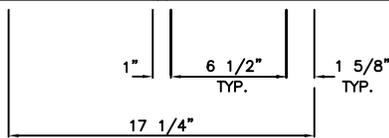
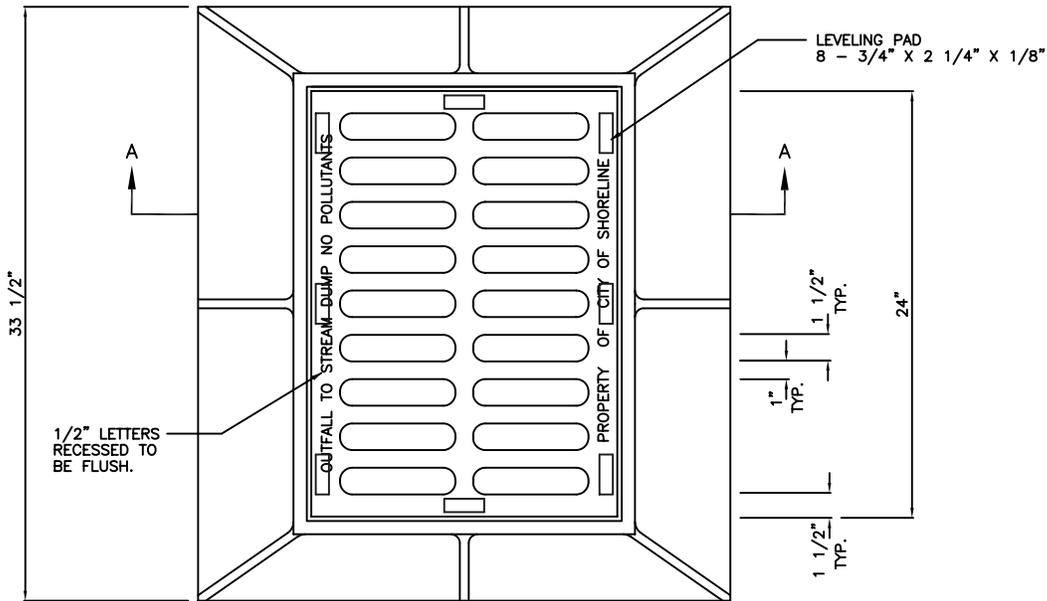


# Standard Frame with Vertical Curb Installation

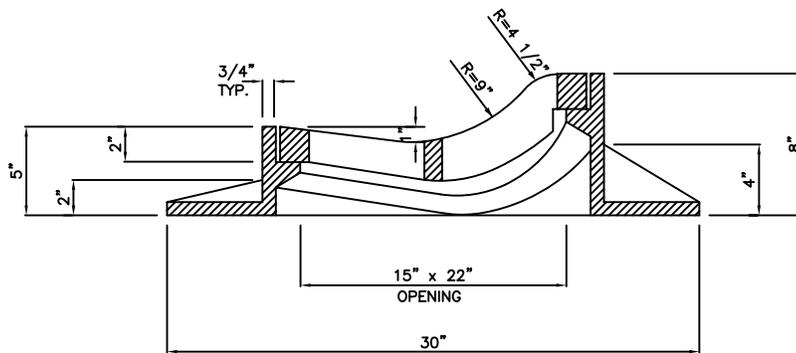
**730**

NOT TO SCALE  
Revision Date  
December 2006





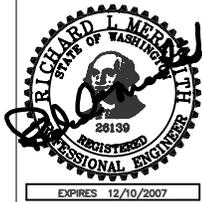
PLAN

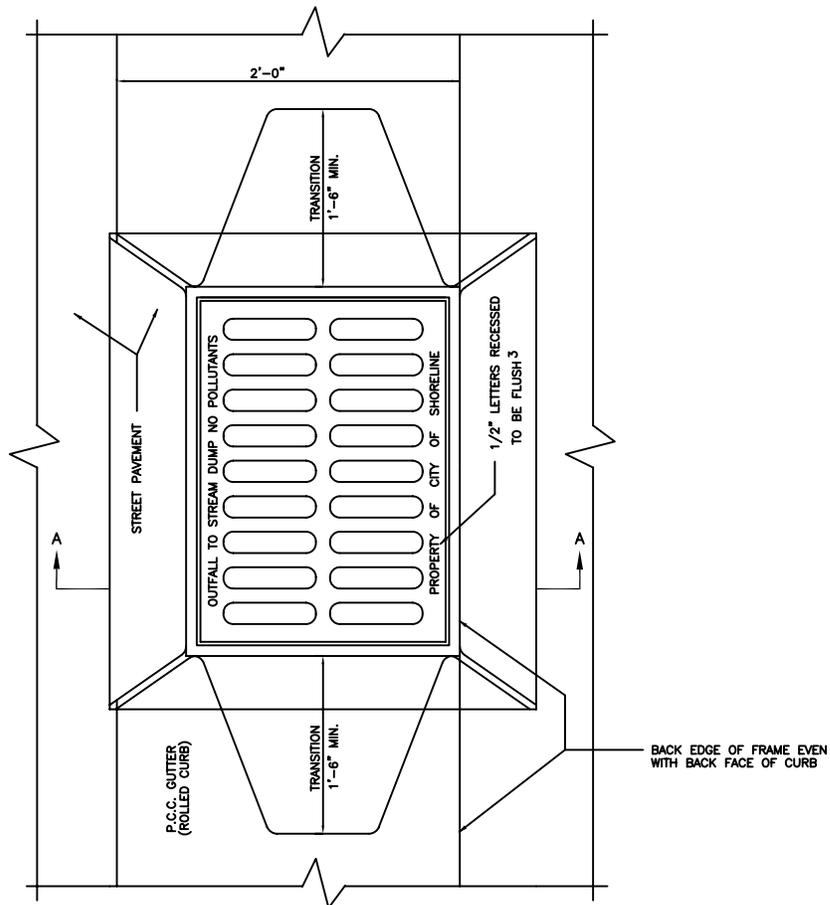


SECTION A-A

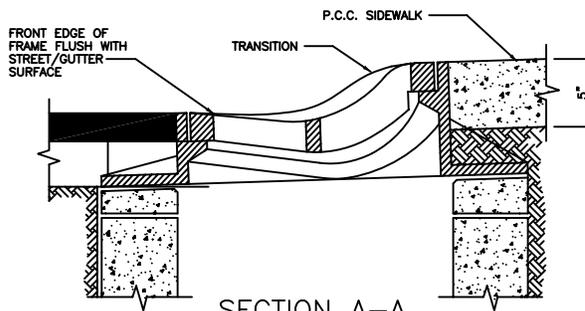
NOTES:

1. MATERIAL IS CAST IRON PER ASTM A48 CLASS 30.
2. THE WORDS "PROPERTY OF CITY OF SHORELINE" SHALL BE OMITTED IF ON A PRIVATE SYSTEM.
3. NOT TO BE USED ON THICKENED EDGE ROADWAYS.

	<p>Public Works Planning and Development Services</p>		<h2 style="margin: 0;">Rolled Curb Frame and Grate</h2>	<h1 style="margin: 0;">734</h1>
				<p>NOT TO SCALE</p>
				<p>Revision Date December 2006</p>



PLAN



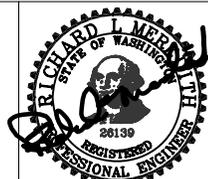
SECTION A-A

**NOTES:**

1. SET FRAME TO GRADE & CONSTRUCT ROAD & CURB TO BE FLUSH AT FRONT & BACK OF FRAME.
2. THE WORDS "PROPERTY OF CITY OF SHORELINE" SHALL BE OMITTED IF GRATE IS ON A PRIVATE SYSTEM.
3. NOT TO BE USED ON THICKENED EDGE ROADWAYS.



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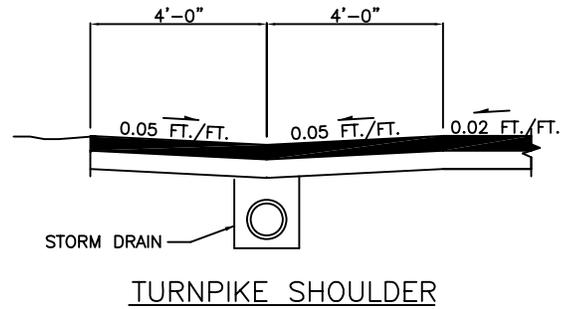
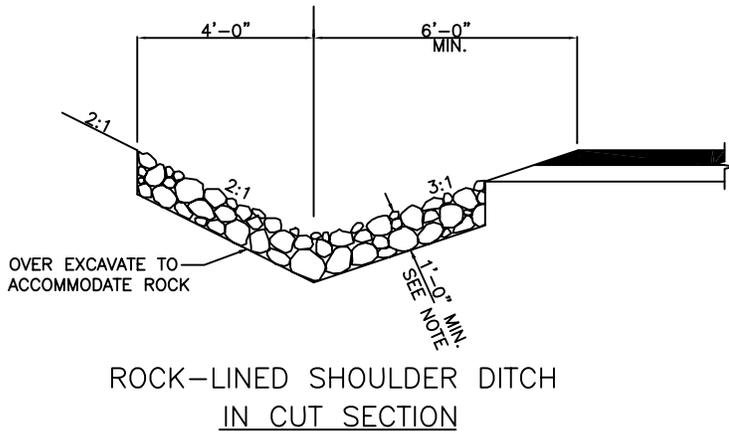
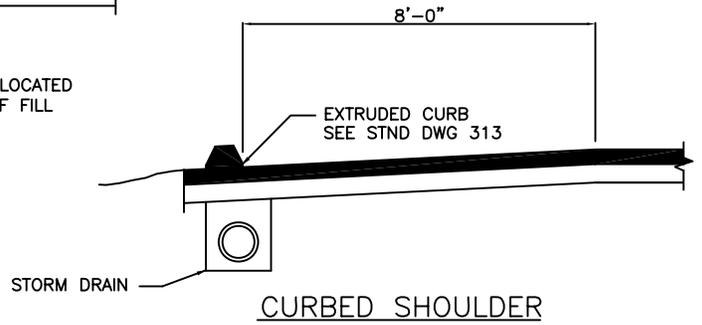
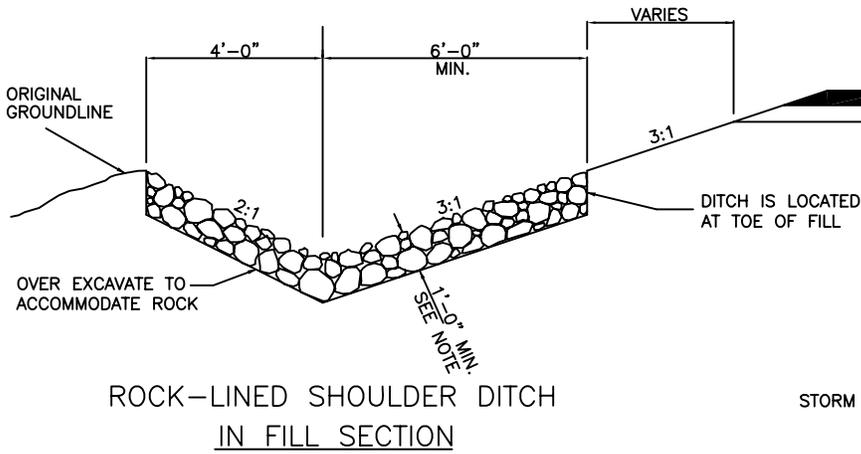
# Rolled Curb Frame & Grate Installation

**735**

NOT TO SCALE

Revision Date  
December 2006



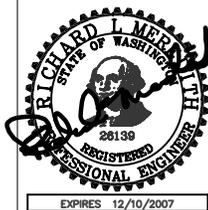


**NOTE:**

1. DEEPER ROCK FILL MAY BE REQUIRED.



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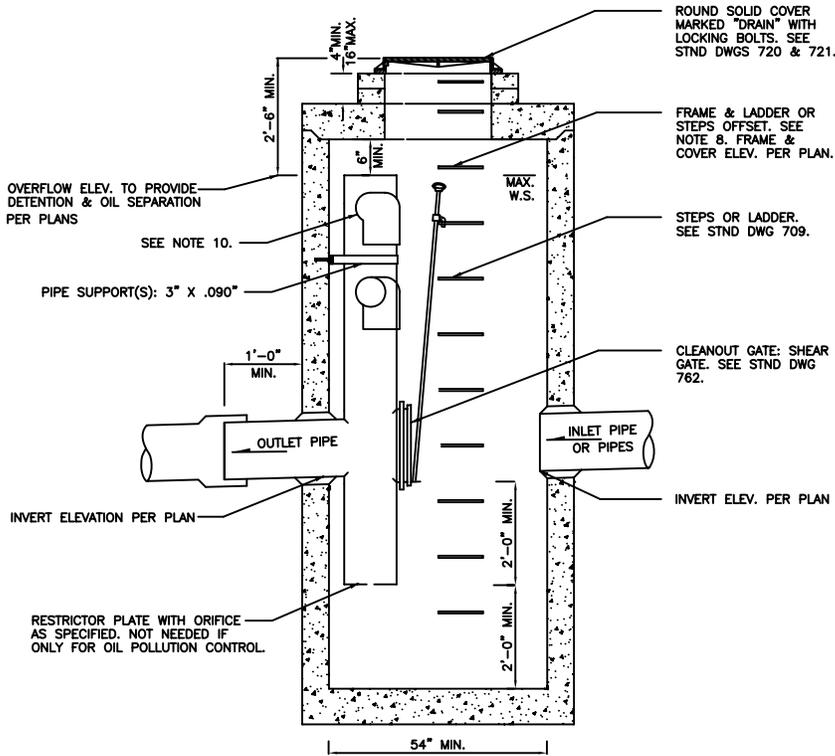


**Rock Lined Shoulder Ditches &  
Curbed or Turnpike Shoulders**

**739**

NOT TO SCALE

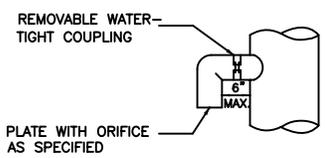
Revision Date  
December 2006



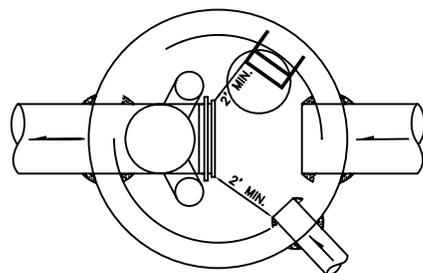
NOTES:

1. PIPE SIZES AND SLOPES: PER PLANS.
2. OUTLET CAPACITY: NOT LESS THAN COMBINED INLETS.
3. EXCEPT AS SHOWN OR NOTED, UNITS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS FOR CATCH BASIN TYPE 2, 54" MIN. DIAM.
4. PIPE SUPPORTS AND RESTRICTOR/SEPARATOR SHALL BE OF SAME MATERIAL, AND BE ANCHORED AT 3' MAX. SPACING BY 5/8" DIAM. STAINLESS STEEL EXPANSION BOLTS OR EMBEDDED 2" IN WALL.
5. THE RESTRICTOR/SEPARATOR SHALL BE FABRICATED FROM .060" ALUMINUM, OR .064" ALUMINIZED STEEL, OR .064" GALVANIZED STEEL PIPE; IN ACCORDANCE WITH AASHTO M 36, M 196, M 197 AND M 274. GALVANIZED STEEL SHALL HAVE TREATMENT 1.
6. OUTLET SHALL BE CONNECTED TO CULVERT OR SEWER PIPE WITH A STANDARD COUPLING BAND FOR CORRUGATED METAL PIPE, OR GROUTED INTO THE BELL OF CONCRETE PIPE.
7. THE VERTICAL RISER STEM OF THE RESTRICTOR/SEPARATOR SHALL BE THE SAME DIAM. AS THE HORIZONTAL OUTLET PIPE, WITH AN 8" MIN. DIAM.
8. FRAME AND LADDER OR STEPS OFFSET SO THAT:
  - A. CLEANOUT GATE IS VISIBLE FROM TOP.
  - B. CLIMB DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE.
  - C. FRAME IS CLEAR OF CURB.
9. IF METAL OUTLET PIPE CONNECTS TO CEMENT CONCRETE PIPE: OUTLET PIPE TO HAVE SMOOTH O.D. EQUAL TO CONCRETE PIPE I.D. LESS 1/4".
10. MULTI-ORIFICE ELBOWS MAY BE LOCATED AS SHOWN OR ALL ON ONE SIDE OF RISER TO ASSURE LADDER CLEARANCE.

**CATCH BASIN TYPE 2**  
DIAM. AS REQUIRED  
SEE STND DWG 708.



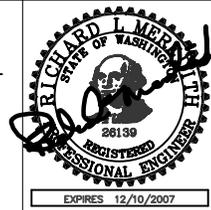
**ELBOW DETAIL**



**PLAN**



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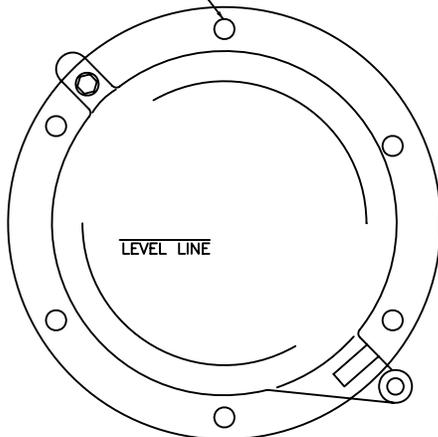
**Flow Restrictor (Tee)**

**761**

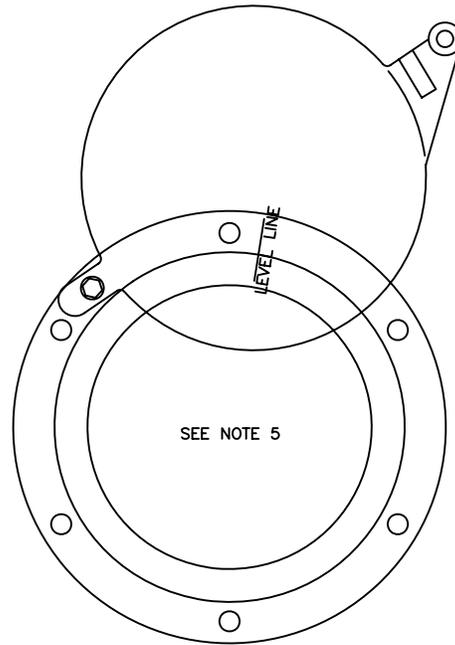
NOT TO SCALE

Revision Date  
December 2006

SIX EVENLY SPACED HOLES ON 10 3/8" BOLT CIRCLE FOR BOLTING TO FLANGE CONNECTION.

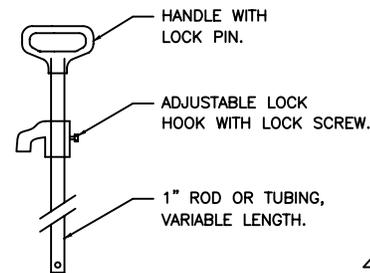


FRONT

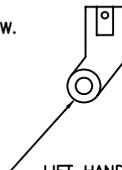


SEE NOTE 5

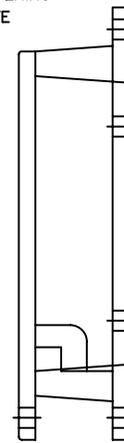
MAXIMUM OPENING OF GATE



LIFT HANDLE



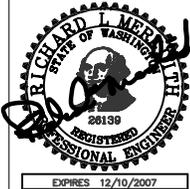
LIFT HANDLE SHALL BE ATTACHED PER MANUFACTURER'S RECOMMENDATIONS.



SIDE

**NOTES:**

1. SHEAR GATE SHALL BE ALUMINUM ALLOY PER ASTM B-26-ZG-32a OR CAST IRON ASTM A48 CLASS 308 AS REQUIRED.
2. GATE SHALL BE 8" DIAMETER UNLESS OTHERWISE SPECIFIED.
3. GATE SHALL BE JOINED TO TEE SECTION BY BOLTING (THROUGH FLANGE), WELDING, OR OTHER SECURE MEANS.
4. LIFT ROD: AS SPECIFIED BY MANUFACTURER WITH HANDLE EXTENDING TO WITHIN 1 FOOT OF COVER & ADJUSTABLE HOOK LOCK FASTENED TO FRAME OR UPPER HANDHOLD.
5. GATE SHALL NOT OPEN BEYOND THE CLEAR OPENING BY LIMITED HINGE MOVEMENT, STOP TAB, OR SOME OTHER DEVICE.
6. NEOPRENE RUBBER GASKET REQUIRED BETWEEN RISER MOUNTING FLANGE AND GATE FLANGE.
7. MATING SURFACES OF LID AND BODY TO BE MACHINED FOR PROPER FIT.
8. FLANGE MOUNTING BOLTS SHALL BE 3/8" DIAMETER STAINLESS STEEL.
9. ALTERNATIVE CLEANOUT/SHEAR GATES TO THE DESIGN SHOWN ARE ACCEPTABLE, PROVIDED THEY MEET THE MATERIAL SPECIFICATIONS ABOVE AND HAVE A SIX BOLT, 10 3/8" BOLT CIRCLE FOR BOLTING TO THE FLANGE CONNECTION.

	<p>Public Works Planning and Development Services</p>		<h1 style="margin: 0;">FROP-T Shear Gate Detail</h1>	<h1 style="margin: 0;">762</h1>
				NOT TO SCALE
				Revision Date December 2006



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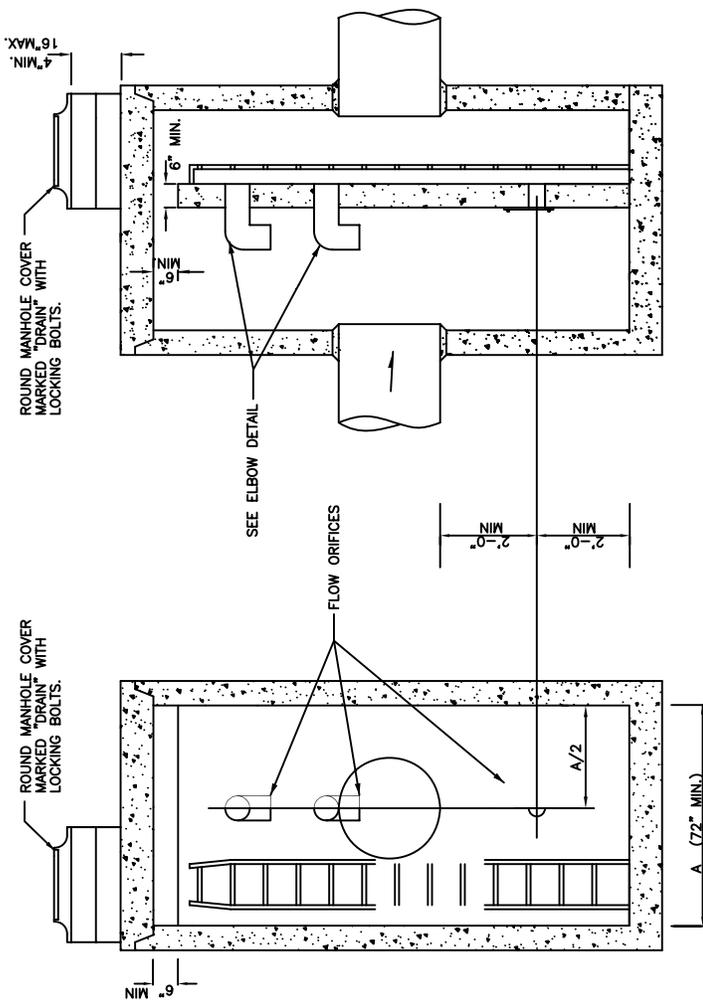


# Flow Restrictor (Baffle)

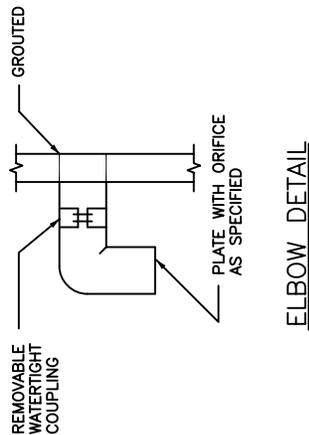
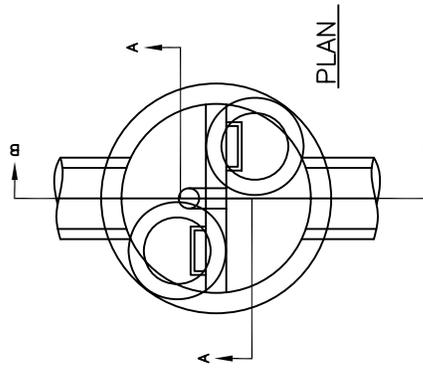
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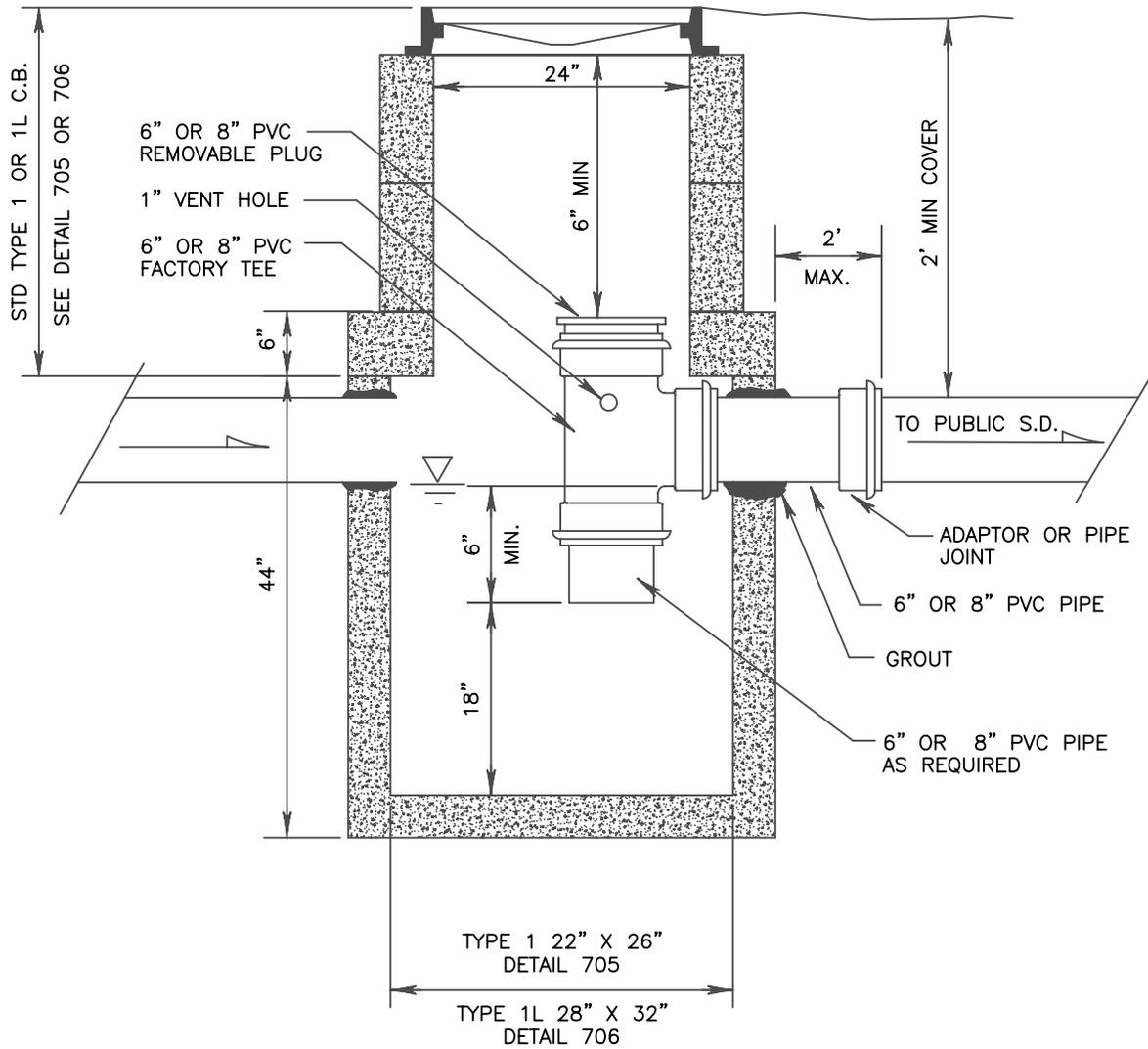


SECTION B-B



**NOTES:**

1. PIPE SIZE, SLOPES, AND ALL ELEVATIONS: PER PLANS.
2. OUTLET CAPACITY: NOT LESS THAN COMBINED INLETS.
3. CATCH BASIN: TYPE 2 TO BE CONSTRUCTED IN ACCORDANCE WITH STND DWG 708 & AASHTO M199 UNLESS OTHERWISE SPECIFIED.
4. COVERS: ROUND, SOLID MARKED "DRAIN" WITH LOCKING BOLTS. SEE STND DWGS 720 & 721.
5. ORIFICES: SIZED & LOCATED AS REQUIRED, WITH LOWEST ORIFICE MIN 2" FROM BASE.
6. BAFFLE WALL SHALL HAVE #4 BAR AT 12" SPACING EACH WAY.
7. PRECAST BAFFLE WALL SHALL BE KEYED & GROUTED IN PLACE.
8. BOTTOM ORIFICE PLATE TO BE 1/4" MIN GALVANIZED STEEL & ATTACHED WITH 1/2" STAINLESS STEEL BOLTS. OMIT ORIFICE PLATE ID ONLY FOR OIL SEPARATION.
9. UPPER FLOW ORIFICE SHALL BE ALUMINIZED STEEL OR GALVANIZED STEEL. SEE STND DWG 761, GALVANIZED STEEL SHALL HAVE TREATMENT 1.

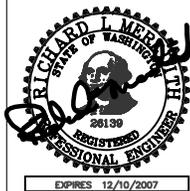


**NOTE:**

1. MAX. RIM EL. INV. EL. DIFFERENCE GREATER THAN 5' SEE STND DWG 766.
2. GROUT ALL JOINTS INSIDE AND OUTSIDE.



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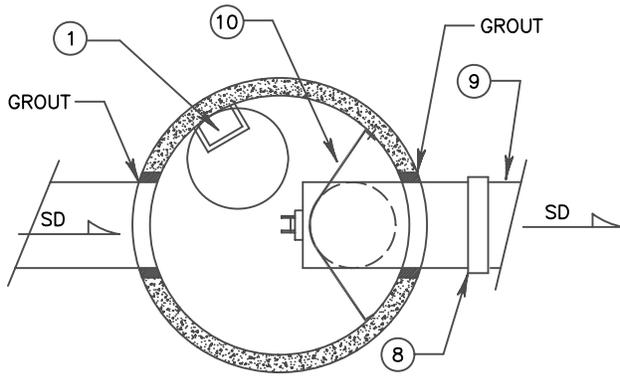


**Floatable Material  
Separator - 6" or 8" Pipe**

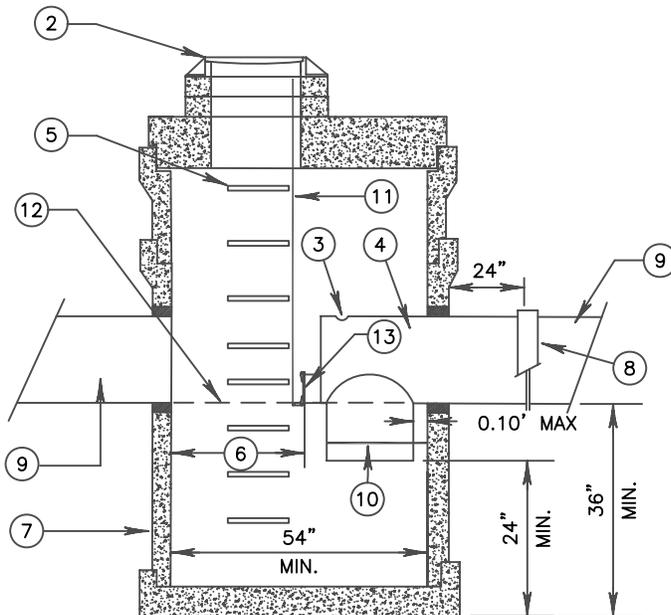
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**PLAN**



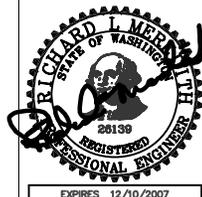
**ELEVATION**

**NOTES:**

- ① INSTALL MANHOLE ACCESS SO THAT LIFT GATE IS VISIBLE THROUGH OPENING AND STEPS CLEAR INLET AND RESTRICTOR UNIT.
- ② INSTALL STND DWG 721 WITH LOCKING COVER OR WHEN IT IS TO BE A CB THEN USE STND DWG 707.
- ③ 1" VENT HOLE.
- ④ SEPARATOR ASSEMBLY.
- ⑤ HANDHOLDS: SEE STND DWG 709.
- ⑥ MIN CLEARANCE:  
36" FOR OUTLETS OF 24" AND LARGER  
18" FOR OUTLETS OF 18" AND SMALLER
- ⑦ 54" TYPE 2 CB OR LARGER.
- ⑧ BAND STRAP WITH GASKET.
- ⑨ SEE PLAN AND SPECIFICATIONS FOR SIZE AND TYPE OF PIPE ENTERING AND EXITING CB.
- ⑩ SECURE SEPARATOR TO CB WITH 8 GA ALUMINUM STRAP. BOLT TO CB WALL WITH STAINLESS STEEL ANCHOR BOLTS AND TACK WELD TO SEPARATOR UNIT.
- ⑪ LIFT HANDLE SEE STND DWG 762.
- ⑫ INV. EL. : SEE PLANS AND SPECIFICATIONS.
- ⑬ CLEAN OUT AT 8" DIA. MIN.  
12" FOR 24" DIA. AND LARGER  
OUTLET PIPE.
- ⑭ GROUT ALL JOINTS INSIDE AND OUTSIDE.



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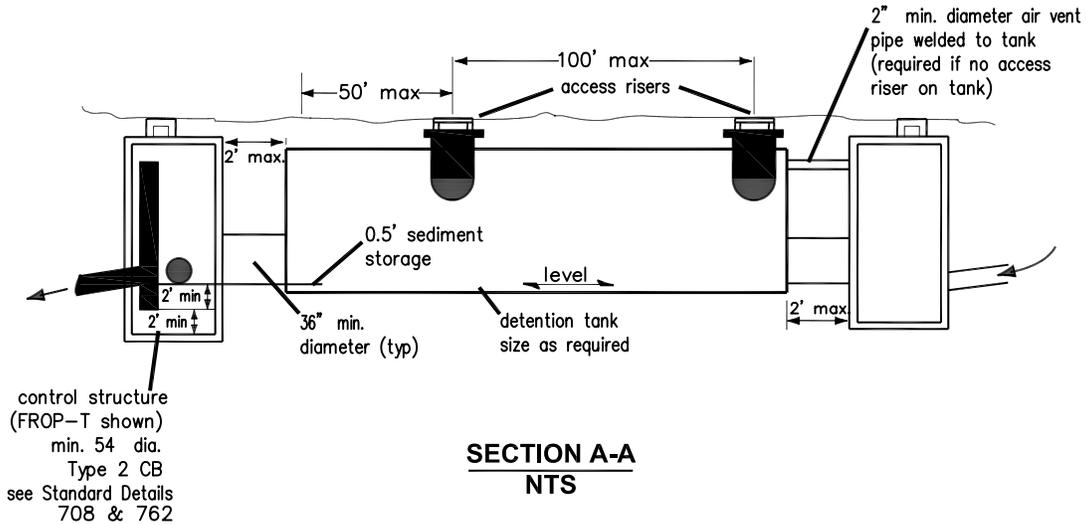
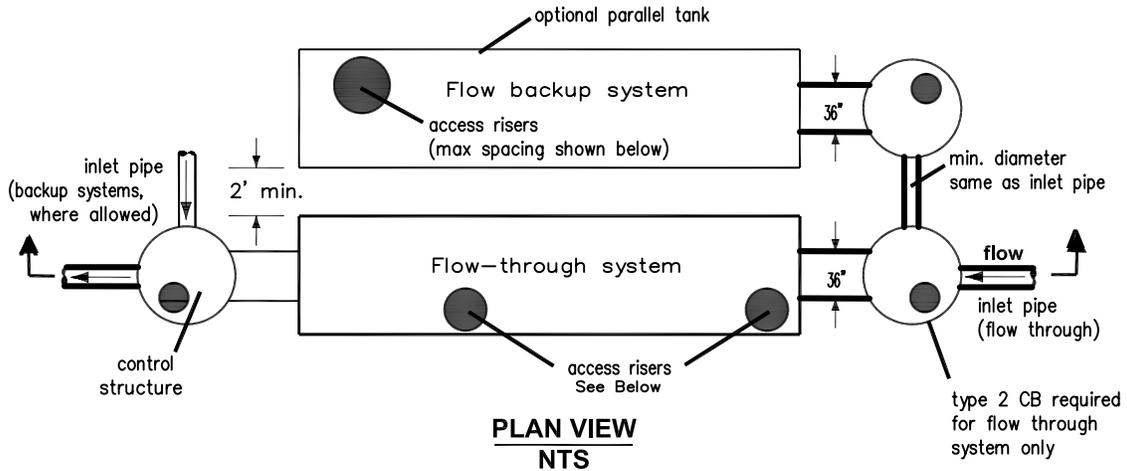


**Floatable Material  
Separator - 12" & Larger**

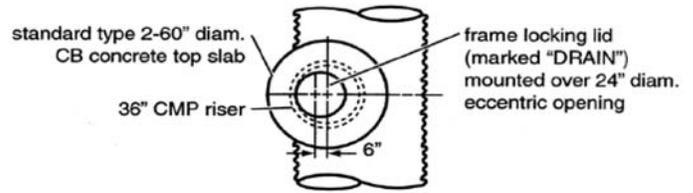
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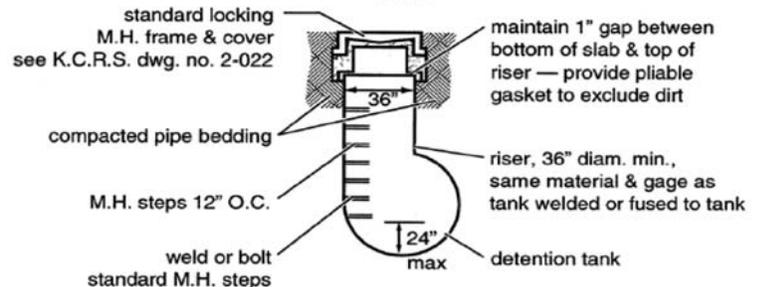
Revision Date  
December 2006



**ACCESS RISERS**



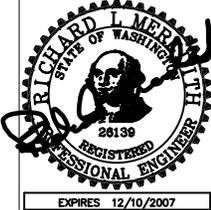
**PLAN**  
NTS

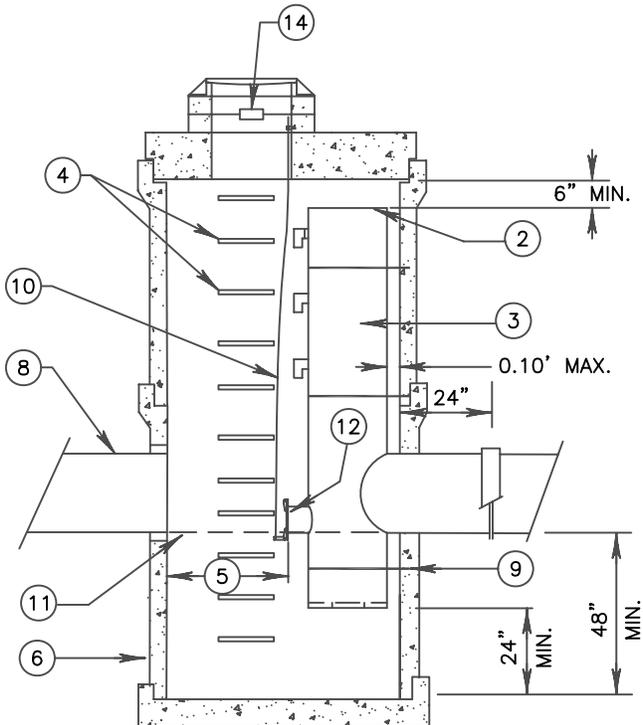
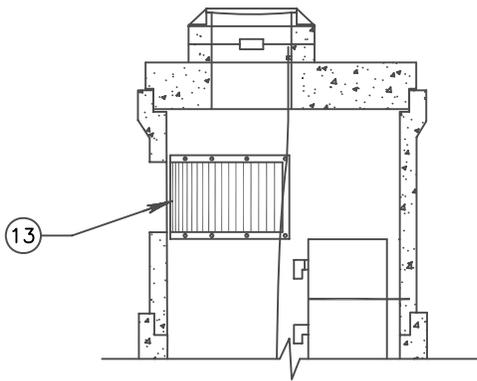
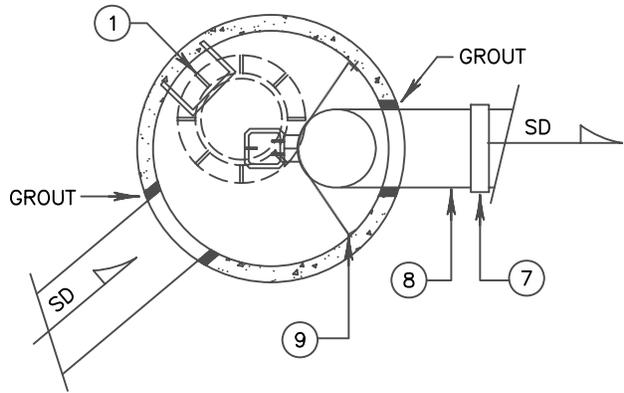


**SECTION**  
NTS

**NOTES:**

1. ALL METAL PARTS CORROSION RESISTANT
2. ALL STEEL PARTS GALVANIZED AND ASPHALT COATED (TREATMENT 1 OR BETTER)
3. USE ADJUSTING BLOCKS AS REQUIRED TO BRING FRAME TO GRADE
4. MUST BE LOCATED FOR ACCESS BY MAINTENANCE VEHICLES
5. MAY SUBSTITUTE WSDOT SPECIAL TYPE IV MANHOLE (RCP ONLY)
6. EASEMENTS & SETBACKS PERSUANT TO KCSWDM.

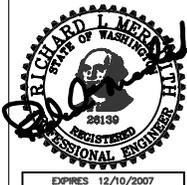
 CITY OF SHORELINE	Public Works Planning and Development Services		<h1 style="margin: 0;">Detention Pipe</h1>	<h1 style="margin: 0;">770</h1>
				NOT TO SCALE
				Revision Date December 2006

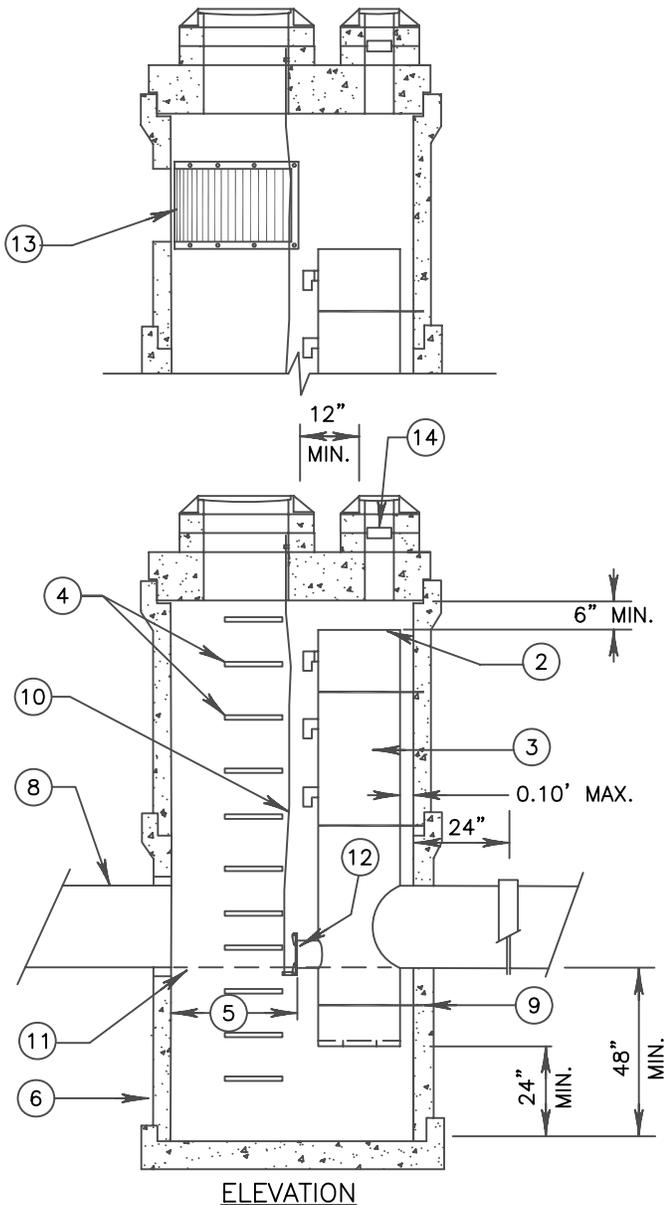
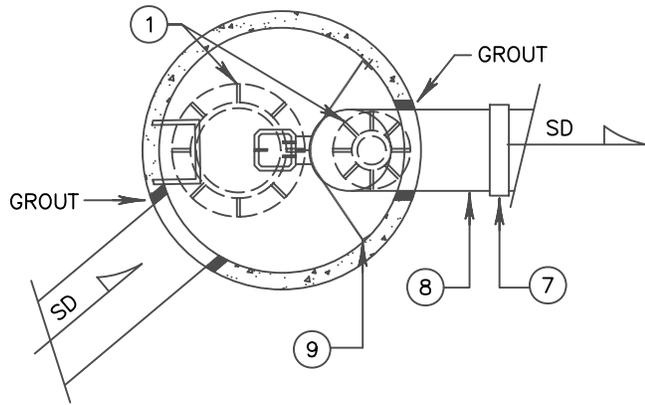


ELEVATION

**DETAIL NOTES:**

- ① INSTALL 1-24" DIA. MH. ACCESS PER SNTD DWG 716, SO THAT THE LIFT GATE IS VISIBLE AND THE STEPS ARE CLEAR AND DIRECTLY ACCESSABLE.
- ② OVERFLOW ELEVATION - SEE PLANS.
- ③ RESTRICTOR UNIT - SEE STND DWG 762.
- ④ POLYPROPLENE PLASTIC STEP
- ⑤ MIN CLEARANCE:  
36" FOR OUTLETS OF 24" AND LARGER  
18" FOR OUTLETS OF 18" AND SMALLER
- ⑥ 54" TYPE 2 CB OR LARGER.
- ⑦ BAND STRAP WITH GASKET
- ⑧ SEE PLAN AND SPECIFICATIONS FOR SIZE AND TYPE OF PIPE ENTERING AND EXITING CB.
- ⑨ SECURE RESTRICTOR TO CB WITH 8 GA ALUMINUM STRAPS BOLT TO CB WALL WITH STAINLESS STEEL ANCHOR BOLTS. ONE STRAP ABOVE AND BELOW OUTLET REQUIRED, INTERMEDIATE STRAPS REQUIRED FOR RESTRICTOR RISERS GREATER THAN 12' ABOVE OUTLET.
- ⑩ LIFT HANDLE CONNECTOR-SEE STD DWG 762.
- ⑪ INVERT ELEVATION: SEE PLANS AND SPECIFICATIONS.
- ⑫ SHEAR GATE - SEE STD DWG 762.
- ⑬ FOR POND APPLICATIONS EXPAND THE STRUCTURE HIGHER AND PROVIDE A FRAMED OVERFLOW DEBRIS GRATED OPENING ABOVE THE RESTRICTOR UNIT
- ⑭ I.D. PLATE PER K.C.S.W.D.M. CORE REQ. #1.2.6

	<p>Public Works Planning and Development Services</p>		<h1 style="margin: 0;">Control Structure - 54" Diameter</h1>	<h1 style="margin: 0;">771</h1>
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			Revision Date December 2006	



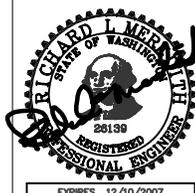
**NOTES:**

- ① INSTALL 1-18" AND 1-24" DIA. MH. ACCESS PER STND DWG 716, ONE SO THAT THE LIFT GATE IS VISIBLE AND THE STEPS ARE CLEAR AND DIRECTLY ACCESSABLE. THE OTHER IS OVER THE RESTRICTOR UNIT.
- ② OVERFLOW ELEVATION - SEE PLANS.
- ③ RESTRICTOR UNIT - SEE STND DWG 761.
- ④ POLYPROPLENE PLASTIC STEP
- ⑤ MIN CLEARANCE:  
36" FOR OUTLETS OF 24" AND LARGER  
18" FOR OUTLETS OF 18" AND SMALLER
- ⑥ 72" TYPE 2 CB OR LARGER.
- ⑦ BAND STRAP WITH GASKET
- ⑧ SEE PLAN AND SPECIFICATIONS FOR SIZE AND TYPE OF PIPE ENTERING AND EXITING CB.
- ⑨ SECURE RESTRICTOR TO CB WITH 8 GA ALUMINUM STRAPS BOLT TO CB WALL WITH STAINLESS STEEL ANCHOR BOLTS. ONE STRAP ABOVE AND BELOW OUTLET REQUIRED, INTERMEDIATE STRAPS REQUIRED FOR RESTRICTOR RISERS GREATER THAN 12' ABOVE OUTLET.
- ⑩ LIFT HANDLE CONNECTOR-SEE STD DWG 762.
- ⑪ INVERT ELEVATION: SEE PLANS AND SPECIFICATIONS.
- ⑫ SHEAR GATE - SEE STND DWG 762.
- ⑬ FOR POND APPLICATIONS EXPAND THE STRUCTURE HIGHER AND PROVIDE A FRAMED OVERFLOW DEBRIS GRATED OPENING ABOVE THE RESTRICTOR UNIT
- ⑭ I.D. PLATE PER K.C.S.W.D.M. CORE REQ. #1.2.6

**ELEVATION**



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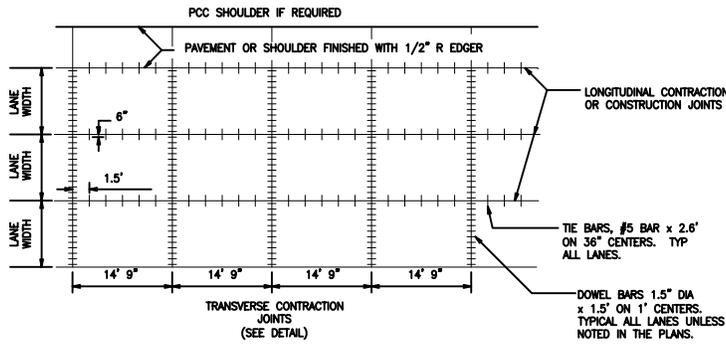


**Control Structure -  
72" Diameter or  
Larger**

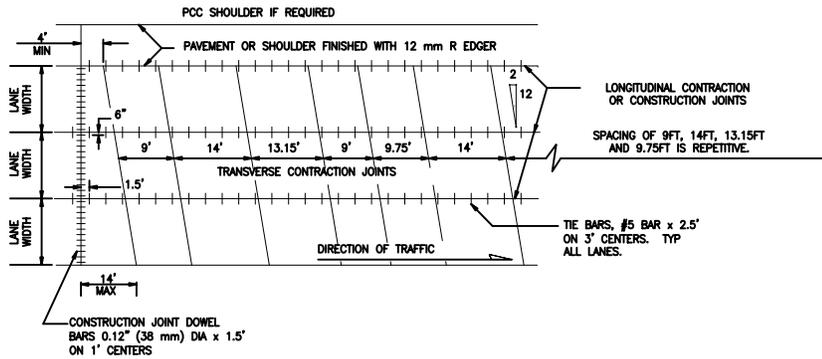
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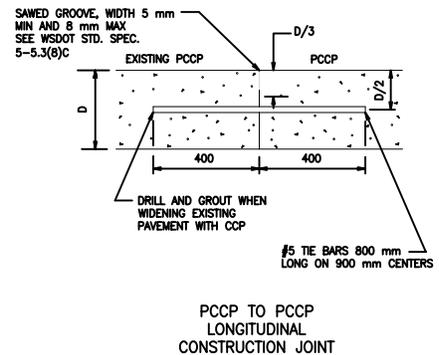
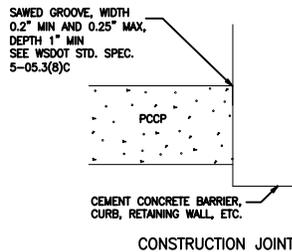
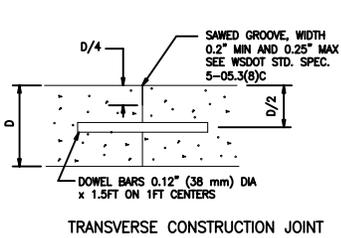
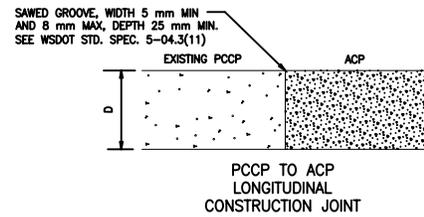
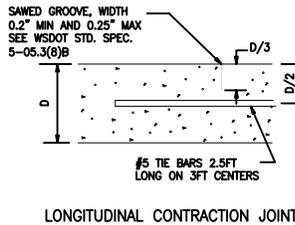
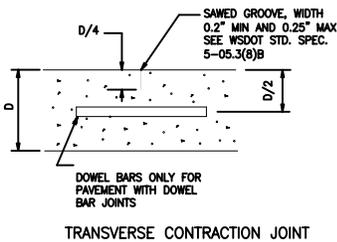
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CEMENT CONCRETE PAVEMENT - DOWEL BAR JOINTS



CEMENT CONCRETE PAVEMENT - PLAIN JOINTS



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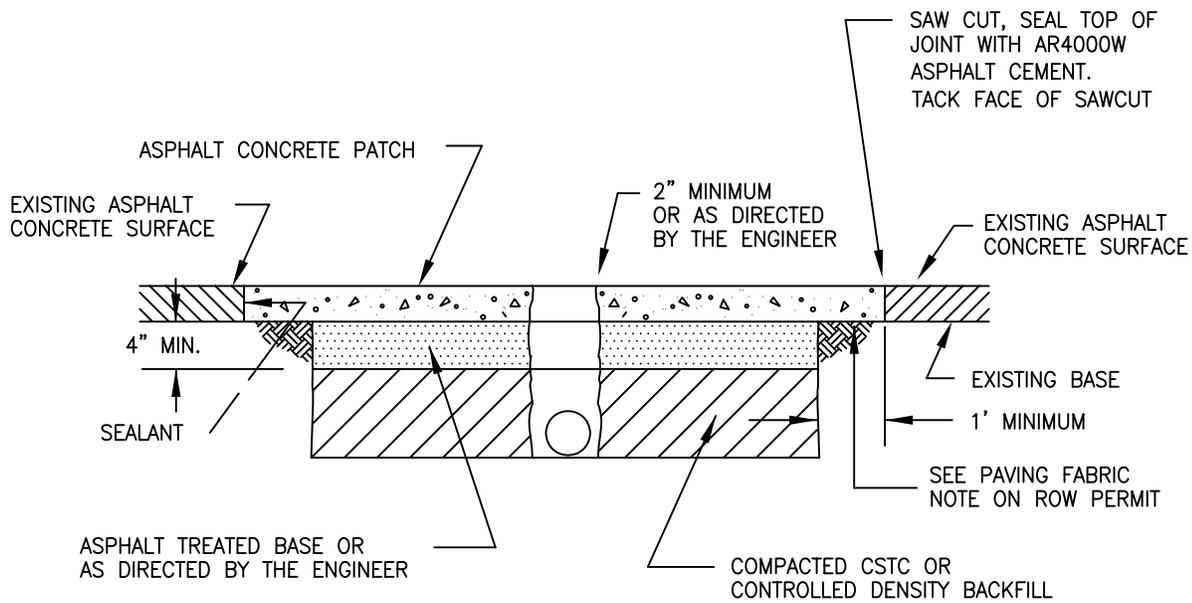


# Rigid Pavement Restoration Details

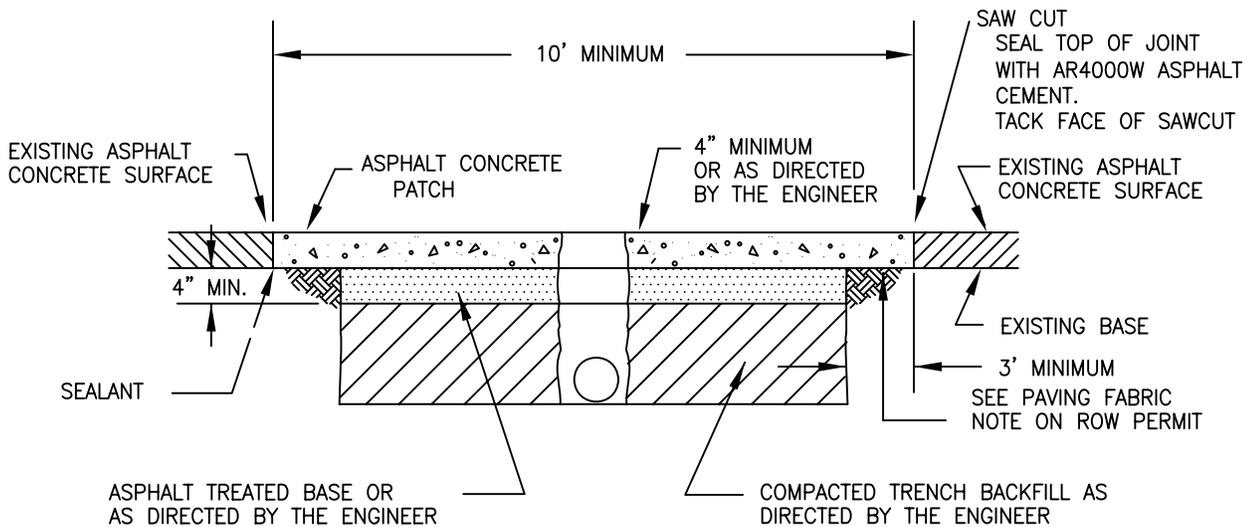
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TYPICAL PATCH FOR FLEXIBLE PAVEMENT  
WHEN PARALLEL TO ROADWAY CENTERLINE



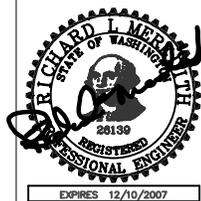
TYPICAL PATCH FOR FLEXIBLE PAVEMENT  
WHEN PERPENDICULAR TO ROADWAY CENTERLINE

**NOTES:**

1. PORTLAND CEMENT CONCRETE SHALL BE CLASS 4000.
2. ASPHALT CONCRETE MIX SHALL BE CLASS "B."
3. ALL TRENCH BACKFILL SHALL BE CRUSHED SURFACING COURSE MATERIAL.



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# Flexible Pavement Patching

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## **Appendices**

- Appendix A**     Local Streets – Geometric Criteria
- Appendix B**     Arterial Streets – Geometric Criteria
- Appendix C**     Street Trees

**Department of Public Works  
Department of Planning and Development Services**

## Appendix A: Local Streets – Geometric Criteria

STREET CLASSIFICATION	ALLEY	NEIGHBORHOOD COLLECTOR	LOCAL STREET
Function	Not intended for through traffic, utility and service corridor.	Inter-neighborhood streets connecting two or more neighborhoods and providing inter-residential travel. (Streets providing local access for business, commercial, industrial, and multifamily uses.)	Neighborhood streets, low traffic volumes.
Access	Access to abutting properties.	Access limited to abutting lots not fronting on residential streets.	As main function, access to abutting properties.
ADT	Under 200	400 to 4,000	100 - 399
Design Speed(mph) (1)	5 mph over posted speed limit	5 mph over posted speed limit	5 mph over posted speed limit
Min. Radius (ft.)	See Table 2.1 Engineering Development Guide	See Table 2.1 Engineering Development Guide	See Table 2.1 Engineering Development Guide
Max. Grade (%) (2) Flat (0 – 8%) Rolling (9 – 15%) Steep (15% or greater)	See AASHTO Geometric Design of Streets and Highways 2004	See AASHTO Geometric Design of Streets and Highways 2004	See AASHTO Geometric Design of Streets and Highways 2004
Required Minimum Right-of-Way (ft.) (3)	20	60	60
Min. Pavement Width (ft.) (3)	16	28	24
Type of Curb	N/A	Type A	Type A
Max. Superelevation	See Table 2.1 Engineering Development Guide	See Table 2.1 Engineering Development Guide	See Table 2.1 Engineering Development Guide

**NOTES:**

1. Design speed is a basis for determining geometric elements not herein specified.
2. Max. grade may be exceeded for short distances provided no practical alternative exists and subject to approval by the Engineer.
3. Additional right-of-way and pavement width may be required subject to traffic study or analysis approved by the Director of Public Works.

## Appendix B: Arterial Streets – Geometric Criteria

STREET CLASSIFICATION	PRINCIPAL	MINOR	COLLECTOR
Function	Inter-community highways connecting larger community centers and facilities.	Intra-community highways connecting community centers and facilities.	Intra-community highways connecting residential neighborhoods with community centers and facilities.
Access	Partially Controlled	Partially Controlled	Partially Controlled
ADT (X1,000)	20+	8-30	3-9
Design Speed (mph) (1)	5 mph over posted speed limit	5 mph over posted speed limit	5 mph over posted speed limit
Min. Radius (ft.)	See Table 2.1 Engineering Development Guide	See Table 2.1 Engineering Development Guide	See Table 2.1 Engineering Development Guide
Max. Grade (%) (2)  Flat (0 – 8%) Rolling (9 – 15%) Steep (15% and greater)	See AASHTO Geometric Design of Streets and Highways 2004	See AASHTO Geometric Design of Streets and Highways 2004	See AASHTO Geometric Design of Streets and Highways 2004
Required Min. Right-of-Way (ft.) (3)  3 Lane 4 Lane 5 Lane 7 Lane	60 70 82 110	60 70 82	60 70 82
Pavement Width (ft.) (3)	See Table 2.4 Engineering Development Guide	See Table 2.4 Engineering Development Guide	See Table 2.4 Engineering Development Guide
Type of Curb	Type A	Type A	Type A
Max. Superelevation	See Table 2.1 Engineering Development Guide	See Table 2.1 Engineering Development Guide	See Table 2.1 Engineering Development Guide

**NOTES:**

1. Design speed is a basis for determining geometric elements not herein specified and does not imply posted or legally permissible speed.
2. Max. grade may be exceeded for short distances provided no practical alternative exists and subject to approval by the Engineer.
3. Additional right-of-way and pavement width may be required subject to traffic study or analysis approved by the Director of Public Works.
4. See Table 2.4 for Arterial Lane Widths



**Appendix C**  
Street Trees

**Department of Public Works**  
**Department of Planning and Development Services**

**RECOMMENDED STREET TREE PLANTING SCHEDULE - Shoreline, WA.**

**Small Trees: 15' to 25' Height. Appropriate under lower power lines.  
Good for standard 4' amenity zones.**

Botanical Name Common Name	Height in feet	Spread in feet	Flowers	Fall Color	Comments/Notes
<i>Acer ginnala</i> 'Flame' Amur Maple	20	20		red	Select for single stem; can be multi-trunked.
<i>Acer grandidentatum</i> 'Schmidt' Rocky Mt. Glow Maple	25	15		yellow to red	Intense Fall color.
<i>Acer griseum</i> Paperbark Maple	25	20		red	Smooth, peeling, cinnamon colored bark.
<i>Acer palmatum</i> Japanese Maple	20	24	small red	yellow, orange, red	Hundreds of varied cultivars. Can be slow growing.
<i>Acer platanoides</i> 'Globosum' Globe Norway Maple	15	18		yellow	Rounded top, aka lollipop top, and compact growth.
<i>Amelanchier x grandiflora</i> 'Princess Diana' Serviceberry	25	20	white	bright red	Good for limited space. Select for single stem.
<i>Amelanchier x grandiflora</i> 'Autumn Brilliance' Serviceberry	20	15	white	bright red	Reliable bloom. Light grey bark.
<i>Cercis canadensis</i> Eastern Redbud	25	30	pink	yellow	Blooms before leaves are out.
<i>Cornus kousa</i> 'Chinensis' Chinese Kousa Dogwood	20	20	white	reddish to scarlet	Most resistant to diseases of dogwood, drought resistant.
<i>Fraxinus pennsylvanica</i> 'Johnson' Leprechaun Ash	18	16		yellow	A miniature in every way.
<i>Magnolia x loebneri</i>	20	20	white	yellow	Single stem cultivars with mature height of 20'.
<i>Oxydendrum arboreum</i> Sourwood	20	15	white	orange, scarlet	Slow growing.

**RECOMMENDED STREET TREE PLANTING SCHEDULE - Shoreline, WA.**

**Medium Trees: 26' to 49' Height. Not appropriate under lower power lines. Good for standard 4' or larger amenity zones (wider amenity zones recommended where space allows).**

<b>Botanical Name Common Name</b>	<b>Height in feet</b>	<b>Spread in feet</b>	<b>Flowers</b>	<b>Fall Color</b>	<b>Comments/Notes</b>
<i>Acer campestre</i> 'Evelyn' Queen Elizabeth Maple	35	30		yellow	More upright branching than the species.
<i>Acer platanoides</i> 'Columnar' Columnar Norway Maple	35	15		yellow	Narrow & upright.
<i>Acer platanoides</i> 'Parkway' Parkway Maple	40	25	yellow	yellow	
<i>Acer pseudoplatanus</i> 'Atropurpureum' Spaethii Maple	40	30		not significant	Leaves green on top, purple underneath.
<i>Acer rubrum</i> 'Bowhall' Bowhall Maple	40	15		yellow orange	Narrow & tightly formed.
<i>Acer rubrum</i> 'Karpick' Karpick Maple	40	20		yellow to red	May work under very high power lines with arborist's approval.
<i>Acer rubrum</i> 'Scarsen' Scarlet Sentinel Maple	40	20		yellow orange	
<i>Acer truncatum x A. platanoides</i> 'Keithsform' Norwegian Sunset Maple	35	25	yellow	yellow-orange/red	
<i>Acer truncatum x A. platanoides</i> 'Warren Red' Pacific Sunset Maple	30	25	yellow	yellow-orange/red	Early Fall color.
<i>Aesculus x carnea</i> 'Briottii' Red Horsechestnut	30	35	large 10" red clusters	no	Smaller & resists heat and drought better than other horse chestnuts.
<i>Betula jacquemontii</i> Jacquemontii Birch	40	30		yellow	White bark makes for good winter interest.
<i>Carpinus betulus</i> 'Columnar' Columnar European Hornbeam	40	20		yellow	
<i>Carpinus betulus</i> 'Fastigiata' Pyramidal European Hornbeam	35	25		yellow	Symmetrical, heat & drought resistant.
<i>Fagus sylvatica</i> 'Dawyck Purple' Dawyck Purple Beech	40	12		no	Purple foliage, branches erect & close together.
<i>Fraxinus americana</i> 'Autumn Applause' Ash	40	25		purple	
<i>Fraxinus pennsylvanica</i> 'Patmore' Patmore Ash	45	35		yellow	Extremely hardy, may be seedless.
<i>Ginkgo biloba</i> 'Autumn Gold' Autumn Gold Ginkgo	45	35		yellow	
<i>Ginkgo biloba</i> 'Princeton Sentry' Princeton Sentry Ginkgo	40	15		yellow	Very narrow growth.

<i>Gleditsia triacanthos</i> Shademaster Honeylocust	45	35	not noticeable	yellow	Do not confuse with 'Sunburst'.
<i>Koelreuteria paniculata</i> Goldenrain Tree	30	30	bright yellow	yellow	Midsummer blooming.
<i>Malus 'Tschonoskii'</i> Tschonoskii Crabapple	28	14	white	scarlet	Sparse green fruit, pyramidal.
<i>Parrotia persica</i> Persian Parrotia	30	20	Showy Stamens	yellow - orange red	Select for single stem; can be multi-trunked.
<i>Pyrus calleryana</i> 'Aristocrat' Pear	40	28	white	red	
<i>Pyrus calleryana</i> 'Autumn Blaze' Pear	30	25	white	scarlet	Vigorous.
<i>Pyrus calleryana</i> 'Capital' Pear	35	12	white	copper	Smaller than 'Aristocrat', may break up in snow.
<i>Pyrus calleryana</i> 'Redspire' Pear	35	25	white	yellow to red	Pyramidal.
<i>Quercus alba x Quercus robur</i> 'Chrimschmidt' Crimson Spire Oak	45	15		rusty red	Columnar, mildew resistant.
<i>Quercus robur</i> 'fastigiata' Skyrocket Oak	45	15		yellow-brown	Columnar variety of oak.
<i>Styrax japonicus</i> Japanese Snowbell	25	25	white	yellow	Plentiful, green ½" seeds.
<i>Tilia americana x euchlora</i> 'Redmond' Redmond Linden	35	20	fragrant	yellow	Pyramidal, needs water.
<i>Tilia cordata</i> 'Chancole' Linden	35	20	not noticeable	yellow	Pyramidal.
<i>Tilia cordata</i> 'Chancole' Chancelor Linden	35	20	not noticeable	yellow	Pyramidal.
<i>Tilia cordata</i> 'Greenspire' Greenspire Linden	40	30		yellowish	Symmetrical, pyramidal form.
<i>Zelkova serrata</i> 'Musashino' Musashino Zelkova	45	20			
<i>Zelkova serrata</i> 'Village Green' Village Green Zelkova	40	38		rusty red	



**RECOMMENDED STREET TREE PLANTING SCHEDULE - Shoreline, WA.**

**Large Trees: Not appropriate under wires. Good for amenity zones greater than 8' (wider amenity zones recommended where space allows).**

Botanical Name Common Name	Height in feet	Spread in feet	Flowers	Fall Color	Comments/Notes
<i>Acer freemanii</i> Autumn Blaze Maple	50	40		orange-red	
<i>Acer nigrum</i> 'Greencolumn' Greencolumn Maple	50	20		yellow-apricot	Good heat resistance.
<i>Acer platanoides</i> 'Emerald Queen' Emerald Queen Maple	50	40		yellow	
<i>Cercidiphyllum japonicum</i> Katsura Tree	40	40		yellow to orange	Heart-shaped foliage.
<i>Fagus sylvatica</i> 'Zlatia' Zlatia Beech	50	35		yellow to golden green	Slow growing.
<i>Fraxinus pennsylvanica</i> 'Urbanite' Urbanite Ash	50	40		deep bronze	
<i>Quercus ruba</i> Red Oak	50	45		red	Fast growing.
<i>Ulmus parvifolia</i> 'Emer II' PP#7552 Allee Elm	50	35		yellow - orange to rust red	Disease tolerant: Dutch Elm & Phloem Necrosis.