2016 Road Design and Construction Standards



City of Burien Public Works
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Burien, WA 98166

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TABLE OF CONTENTS

CHAPTER 1: GENERAL CONSIDERATIONS 1

1.01 Shortened Designation 1
1.02 Applicability 1
1.03 Severability 1
1.04 Authority and Duties of Inspectors 1
1.05 Responsibility to Provide Roadway Improvements 2
1.06 General References 3
1.07 WSDOT/APWA Documents as Primary Design and Construction References 3
1.08 Other Specifications and Guidelines 4
1.09 Cultural Resources 4
1.10 Engineering Plans, Final Corrected Plans, and Final Plat Plans 5
1.11 Variances 8
1.12 Errors and Omissions 9
1.13 Penalties and Financial Guarantees 10
1.14 Changes to this Manual 10
1.15 Pavements 10
1.16 Definitions of Terms 11

CHAPTER 2: ROAD TYPES AND GEOMETRICS 20

2.01 Road Classifications 20
2.02 Roadway Types 20
2.03 Horizontal Curvature and Sight Distance Design Values 26
2.04 Short Plats 27
2.05 Private Access Streets 28
2.06 Skinny Streets 29
2.07 Half Streets 29
2.08 Cul-de-sacs, Islands, and Hammerheads 30
2.09 Alleys and Private Access Tracts 32
2.10 Commercial Alleys 33
2.11 Maximum Grade and Grade Transitions 35
2.12 Stopping Sight Distance 35
2.13 Entering Sight Distance (ESD) 35
2.14 Medians (Optional Design Feature) 35
2.15 One-Way Streets 35
2.16 Bus Zones and Turn-Outs 36
2.17 Slope, Wall, and Drainage Easements and Right-of-Way Reduction 36
2.18 Access and Circulation Requirements 36
2.19 Traffic Signals and Roundabouts 37

CHAPTER 3: DRIVEWAYS, SIDEWALKS, BIKEWAYS, TRAILS 53

3.01 Driveways 53
3.02 Concrete Sidewalks 55
3.03 Cosntruction of Curbs, Gutters, and Sidewalks 56
3.04 Expansion and Dummy Joints 57
3.05 Curb Ramps 57
3.06 Concrete Steps, Metal Handrail and Barrier-Free Access Ramps 59
3.07 Asphalt Shoulders 59
3.08 Unpaved Shoulders 60
3.09 Separated Pedestrian Walkways and Trails 60
3.10 School Access 60
3.11 Bikeways 60

CHAPTER 4: SURFACING....86

4.01 RESIDENTIAL STREETS, SIDEWALKS, SHOULDERS, WALKWAYS, AND BIKEWAYS....86
4.02 DRIVEWAY SURFACING....88
4.03 STREET WIDENING....88
4.04 REQUIREMENTS FOR RESIDENTIAL STREETS ON POOR SUBGRADE....89
4.05 ARTERIALS AND COMMERCIAL ACCESS STREETS....89
4.06 MATERIALS AND LAY-DOWN PROCEDURES....90
4.07 ASPHALT SURFACING REPAIRS....91
4.08 PAVEMENT MARKINGS, MARKERS, AND PAVEMENT TAPERS....91

CHAPTER 5: ROADSIDE FEATURES....102

5.01 ROCK FACINGS....102
5.02 SIDE SLOPES....104
5.03 STREET TREES AND LANDSCAPING....104
5.04 MAIL BOXES....110
5.05 STREET ILLUMINATION....111
5.06 SURVEY MONUMENTS....112
5.07 ROADWAY BARRICADES....113
5.08 BOLLARDS....113
5.09 GUARDRAIL/EMBANKMENT HEIGHTS....113
5.10 ROADSIDE OBSTACLES....114
5.11 BURIEN TOWNCENTER STREETSCAPE FEATURES....115

CHAPTER 6: BRIDGES, SPECIAL CULVERTS, AND STRUCTURAL WALLS....154

6.01 BRIDGE PRINCIPAL REFERENCES....154
6.02 BRIDGE GEOMETRICS....154
6.03 BRIDGE DESIGN CRITERIA....155
6.04 SPECIAL CULVERTS....156
6.05 STRUCTURAL WALLS....156

CHAPTER 7: DRAINAGE....157

7.01 GENERAL....157
7.02 ROAD DITCHES....157
7.03 STORM SEWERS AND CULVERTS....158
7.04 CATCH BASIN LOCATIONS AND JUNCTIONS....159
7.05 FRAMES, GRATES, AND COVERS....159
7.06 EROSION CONTROL....161
7.07 TRENCHES....161
7.08 VEGETATED STORMWATER FACILITIES IN RIGHTS-OF-WAY....161

CHAPTER 8: UTILITIES AND INSTALLATION....198

8.01 FRANCHISING POLICY AND PERMIT PROCEDURE....198
8.02 STANDARD UTILITY LOCATIONS WITHIN THE RIGHT-OF-WAY....198
8.03 UNDERGROUND INSTALLATIONS....202
8.04 NOTIFICATION AND INSPECTION....205
8.05 FINAL ADJUSTMENT (TO FINISH GRADE)....205
8.06 FINAL CLEANUP, RESTORATION OF SURFACE DRAINAGE AND EROSION/SEDIMENT CONTROL....205

CHAPTER 9: CONSTRUCTION CONTROL AND INSPECTION....207

9.01 BASIS FOR CONTROL OF THE WORK....207
9.02 INSPECTION....207
9.03 PENALTIES FOR FAILURE TO NOTIFY AND OBTAIN APPROVAL....209
9.04 CONTROL OF MATERIALS....209
9.05 CONSTRUCTION CONTROL IN DEVELOPMENTS....210
9.06 SUBGRADE....212

9.07 TRAFFIC CONTROL IN DEVELOPMENT CONSTRUCTION 212
9.08 CITY FORCES AND CITY CONTRACT ROAD INSPECTION 213
9.09 CALL BEFORE YOU DIG 213
9.10 UTILITY CERTIFICATION 213

LIST OF TABLES

TABLE 2.1(A): ARTERIALS (CURB ROADWAY SECTION) 23
TABLE 2.1(B): LOCAL ACCESS ROADWAYS (CURB ROADWAY SECTION) 24
TABLE 2.1(C): RESIDENTIAL AND COMMERCIAL ACCESS STREETS (CURB ROADWAY SECTION) 25
TABLE 2.2: ARTERIAL AND LOCAL ACCESS ROADWAYS DESIGN VALUES 26
TABLE 2.3: RESIDENTIAL ACCESS STREETS DESIGN VALUES 27
TABLE 2.4: INTERSECTIONS AND LOW SPEED CURVES 34
TABLE 3.1: PEDESTRIAN AND BICYCLE FACILITIES CLASSIFICATION HIERARCHY, SURFACE AND MINIMUM WIDTH 62
TABLE 4.1: RESIDENTIAL STREETS, SHOULDERS, SIDEWALKS, WALKWAYS AND BIKEWAYS 87

LIST OF FIGURES

FIGURE 2.1: VERTICAL CURB TYPE ROADWAY 38
FIGURE 2.2: ROLLED CURB TYPE ROADWAY 39
FIGURE 2.3: CUL-DE-SACS 40
FIGURE 2.4: TEMPORARY CUL-DE-SAC 41
FIGURE 2.5: HAMMERHEAD TURNAROUND 42
FIGURE 2.6: URBAN EYEBROW 43
FIGURE 2.7: HALF STREET 44
FIGURE 2.8: RESIDENTIAL ACCESS STREETS, SKINNY STREETS 45
FIGURE 2.9: COMMERCIAL ALLEY 46
FIGURE 2.10: INTERSECTION SIGHT TRIANGLES 47
FIGURE 2.11: MEASURING SIGHT DISTANCE 48
FIGURE 2.12: INTERSECTION LANDING 49
FIGURE 2.13: CUL-DE-SAC ALTERNATIVE PLAN WITH BIORETENTION 50
FIGURE 2.14: CUL-DE-SAC ALTERNATIVE SECTION WITH BIORETENTION 51
FIGURE 2.15: TYPICAL STREET SECTION BIORETENTION ALTERNATIVES 52
FIGURE 3.1: CURB AND SIDEWALK JOINTS 63
FIGURE 3.2: CURB DETAILS 64
FIGURE 3.3: SHOULDER AND DITCH SECTION DRIVEWAY 65
FIGURE 3.4: TYPE 1 DRIVEWAY APPROACH 66
FIGURE 3.5: TYPE 2A DRIVEWAY APPROACH 67
FIGURE 3.6: TYPE 2B DRIVEWAY APPROACH 68
FIGURE 3.7: COMMERCIAL / INDUSTRIAL DRIVEWAY APPROACH – PARALLEL SIDEWALK 69
FIGURE 3.8: LOCATION AND WIDTH OF NEW SIDEWALKS 70
FIGURE 3.9: JOINT USE DRIVEWAY TRACT 71
FIGURE 3.10: VERTICAL CURB AND SIDEWALK 72
FIGURE 3.11: PERPENDICULAR CURB RAMPS 73
FIGURE 3.12: PARALLEL CURB RAMPS 74
FIGURE 3.13: SINGLE DIRECTIONAL CURB RAMPS 75
FIGURE 3.14: DETECTABLE WARNING SURFACE DETAILS 76

FIGURE 3.15: CURB RAMP PLACEMENT....77
FIGURE 3.16: TYPICAL INTERSECTION PLAN WITH ASYMMETRICAL LANES....78
FIGURE 3.17: NON-MOTORIZED FACILITY TYPES 1 AND 2....79
FIGURE 3.18: NON-MOTORIZED FACILITY TYPES 3 AND 4....80
FIGURE 3.19: NON-MOTORIZED FACILITY TYPES 5 AND 6....81
FIGURE 3.20: NON-MOTORIZED FACILITY TYPES 7 AND 8....82
FIGURE 3.21: NON-MOTORIZED FACILITY TYPES 9 AND 10....83
FIGURE 3.22: NON-MOTORIZED FACILITY TYPES 11 AND 12....84
FIGURE 3.23: NON-MOTORIZED FACILITY TYPES 13....85
FIGURE 4.1: PAVEMENT MARKINGS....93
FIGURE 4.2: INTERSECTION APPROACH STRIPING....94
FIGURE 4.3: PAVEMENT MARKING DETAIL....95
FIGURE 4.4: PAVEMENT SYMBOLS....96
FIGURE 4.5: MERGE AND DUAL LANES....97
FIGURE 4.6: BIKE LANE AND RIGHT TURN DROP....98
FIGURE 4.7: BIKE LANE AND RIGHT TURN POCKET....99
FIGURE 4.8: LEFT TURN LANES....100
FIGURE 4.9: REFUGE ISLANDS....101
FIGURE 5.1: CLEARANCE OF ROADSIDE OBSTACLES ON SHOULDER ROAD TYPE....124
FIGURE 5.2: ROADWAY BARRICADES....125
FIGURE 5.3: ROCK FACING, CUT SECTION....126
FIGURE 5.4: ROCK FACING, FILL SECTION....127
FIGURE 5.5: ROCK FACING UNDER SIDEWALK....128
FIGURE 5.6: ROCK FACING, FILL SECTION REINFORCEMENT....129
FIGURE 5.7: CONCRETE STEPS AND METAL HANDRAIL....130
FIGURE 5.8: METAL HANDRAIL....131
FIGURE 5.9: STREET TREE LOCATION....132
FIGURE 5.10: TREE SETBACKS/BLOCKOUTS/ROCKERIES AT SIDEWALK....133
FIGURE 5.11: TREE PLANTING IN PLANTING STRIPS....134
FIGURE 5.12: LARGER FILLS AROUND TREES....135
FIGURE 5.13: MINOR FILLS AROUND TREES....136
FIGURE 5.14: MAILBOX INSTALLATION TYPE 1 AND 2 (1 OF 4)....137
FIGURE 5.15: MAILBOX INSTALLATION TYPE 1 AND 2 (2 OF 4)....138
FIGURE 5.16: MAILBOX INSTALLATION TYPE 1 AND 2 (3 OF 4)....139
FIGURE 5.17: (NCBDU) MAILBOX INSTALLATION TYPE NEIGHBORHOOD DELIVERY AND COLLECTION BOX (4 OF 4)....140
FIGURE 5.18: BOLLARDS....141
FIGURE 5.19: ROADWAY SURVEY MONUMENT WITH CASE AND COVER....142
FIGURE 5.20: OFF ROADWAY SURVEY MONUMENT....143
FIGURE 5.21: TRANSVERSE JOINT PLANING AND FEATHERING AT VERTICAL CURB....144
FIGURE 5.22: SIDEWALK SCORING PATTERN....145
FIGURE 5.23: TYPE 1 TREE GRATE....146
FIGURE 5.24: TYPE 2 TREE GRATE....147
FIGURE 5.25: DECORATIVE BOLLARD....148
FIGURE 5.26: BENCH LAYOUT DETAIL....149
FIGURE 5.27: DECORATIVE ROADWAY LUMINAIRE AND POLE....150
FIGURE 5.28: DECORATIVE LIGHTING POLE FOUNDATION....151
FIGURE 5.29: DECORATIVE LUMINARE ELECTRICAL DETAILS....152
FIGURE 5.30: PLANTER CURB RAILING DETAILS....153
FIGURE 7.1: BEVELED END PIPE SECTION....162
FIGURE 7.2: FIELD TAPPING OF CONCRETE PIPE....163
FIGURE 7.3: CATCH BASIN TYPE 1....164
FIGURE 7.4: CATCH BASIN TYPE 1-L....165
FIGURE 7.5: CATCH BASIN TYPE 2 48, 54, 60, AND 96....166
FIGURE 7.6: CATCH BASIN DETAILS....167
FIGURE 7.7: MANHOLE TYPE 1 48, 54, AND 60....168

FIGURE 7.8: MANHOLE TYPE 2 72 AND 96 169
FIGURE 7.9: MANHOLE TYPE 3 48, 54 60 72 96 170
FIGURE 7.10: MANHOLE TYPE 4 171
FIGURE 7.11: MANHOLE DETAILS 172
FIGURE 7.12: CURB INLET 173
FIGURE 7.13: STANDARD GRATE 174
FIGURE 7.14: STANDARD FRAME WITH VERTICAL OR EXTRUDED CURB INSTALLATION 175
FIGURE 7.15: SOLID COVER 176
FIGURE 7.16: THROUGH CURB INLET FRAME 177
FIGURE 7.17: THROUGH CURB INLET FRAME WITH VERTICAL CURB INSTALLATION 178
FIGURE 7.18: VANED GRATE 179
FIGURE 7.19: ROLLED CURB FRAME AND GRATE 180
FIGURE 7.20: ROLLED CURB FRAME AND GRATE INSTALLATION 181
FIGURE 7.21: ROLLED CURB VANED GRATE 182
FIGURE 7.22: LOCKING MANHOLE COVER 183
FIGURE 7.23: LOCKING MANHOLE FRAME 184
FIGURE 7.24: ROCK-LINED DITCHES AND CURBED SHOULDERS 185
FIGURE 7.25: RESTRICTOR DETAIL 186
FIGURE 7.26: TEE SECTION SHEAR GATE DETAIL 187
FIGURE 7.27: FLOW RESTRICTOR CONTROL DEVICE BAFFLE TYPE 188
FIGURE 7.28: DEBRIS CAGE 189
FIGURE 7.29: EXTENDED DEBRIS CAGE 190
FIGURE 7.30: BEEHIVE GRATE 191
FIGURE 7.31: CURB EXTENSION PLANTING TEMPLATE OPTION 1 192
FIGURE 7.32: CURB EXTENSION PLANTING TEMPLATE OPTION 2 193
FIGURE 7.33: INLET TO BIORETENTION CURB EXTENSION 194
FIGURE 7.34: OUTLET FROM BIORETENTION CURB EXTENSION 195
FIGURE 7.35: SIDE CURB CUT OPTION 1 – TO BIORETENTION PLANTER 196
FIGURE 7.36: SIDE CURB CUT OPTION 2 – TO BIORETENTION SWALE OR CELL 197

LIST OF APPENDICES

Appendix A: Bioretention Plant List

CITY OF BURIEN ROAD DESIGN AND CONSTRUCTION STANDARDS 2016

PURPOSE

The City of Burien has adopted these road design and construction standards primarily for a two-fold purpose:

1. To set forth specific, consistent and acceptable road design and construction elements for developers and other private parties constructing or modifying road or right-of-way facilities which require City licenses or permits;

2. To establish uniform criteria to guide the City's own design and construction of new City roads or reconstruction of existing roads.

In addition, these City of Burien Road Design and Construction Standards, hereafter known as the Standards, are intended to support the City of Burien's goals for achieving affordable housing, providing adequate facilities for development in an efficient manner, complying with storm water management and environmental and cultural resource policies, and to balance these goals with the general safety and mobility needs of the traveling public.

The City requires standardization of road design elements where necessary for consistency and to assure so far as practical that motoring, bicycling, transit, equestrian, and pedestrian public safety needs are met. Considerations include safety, convenience, pleasant appearance, proper drainage, economical maintenance, and cultural and environmental resource protection. The Standards also provide requirements for the location and installation of utilities within the right-of-way.

The City's permitting and licensing activities require the adoption of specific identifiable standards to guide private individuals and entities in the administrative process of procuring the necessary City approval. Yet, the City must have flexibility to carry out its general duty to provide streets, roads, and highways for the diverse and changing needs of the traveling public. These Standards are not intended to represent the legal standard by which the City's duty to the traveling public is to be measured.

These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by design professionals. It is expected that land surveyors, engineers, architects, and contractors will bring to each project the best of skills from their respective area of expertise. These Standards are not intended to limit unreasonably any economically maintained innovative or creative efforts or lower impact development alternatives that could result in equivalent or improved safety, quality, and maintainability. Environmental constraints may require more intense or rigorous design parameters than would be otherwise required. However, any proposed departure from the Standards will be judged on the likelihood that such variance will produce a compensating or comparable result, in every way safe and adequate for the public.

CHAPTER 1. GENERAL CONSIDERATIONS

1.01 Shortened Designation

These City of Burien Road Design and Construction Standards will be cited routinely in the text as the "Standards."

1.02 Applicability

These Standards shall apply prospectively to all newly constructed road and right-of-way facilities, both public and private, within the City of Burien. In the event of conflict with the Surface Water Design Manual, improvements within the roadway right-of-way shall meet the requirements of these Standards.

The Standards apply to modifications of roadway features or existing facilities which are within the scope of reconstruction, widening, required off-site road improvements for land developments, or capital improvement projects when so required by the City of Burien or to the extent they are expressly referred to in project plans and specifications. These Standards are not intended to apply to "resurfacing, restoration, and rehabilitation" projects, also known as 3R projects, as those terms are defined in the Washington State Department of Transportation (WSDOT) Local Agency Guidelines Manual (LAG), as amended; however, the Public Works Director or his or her designee may at his/her discretion consider the Standards as optional goals for the design and construction of 3R projects.

The Standards shall apply to every new placement and every planned, non-emergency replacement of existing utility poles and other utility structures within the City of Burien right-of-way. Every effort shall be made to meet the Standards during emergency replacement of existing utility poles and other structures.

1.03 Severability

If any part of these Standards as adopted by ordinance shall be found invalid, all other parts shall remain in effect.

1.04 Authority and Duties of Inspectors

The Public Works Director or his or her designee may designate inspectors to inspect all materials used and all work performed. Such inspection may extend to any or all parts of the work and to the preparation and/or manufacture of the materials to be used. The inspector will not be authorized to revise, alter, or relax the provisions of these Standards.

All roadway and drainage infrastructures must be inspected. Subgrade inspection will not commence until density tests confirm that the compaction is in accordance with the specifications. The inspector has the authority to reject defective material and suspend work that is being done improperly. The inspector may advise the applicant or contractor of any faulty work or materials; however,

failure of the inspector to advise the applicant or contractor does not constitute acceptance or approval. The inspector has the authority to require revisions to approved engineering plans when necessary due to conflicting field conditions.

1.05 Responsibility to Provide Roadway Improvements

A. Any land development, which will impact the service level, safety, or operational efficiency of roads serving such land development or is required by other City code or ordinance to improve such roads, shall improve those roads in accordance with these Standards. Off-site roadway improvements shall be based on an assessment of the impacts of the proposed land development by the Reviewing Agency.

B. Any land development abutting and using existing roads shall improve the frontage of those roads in accordance with these Standards. The extent of improvements shall be based on an assessment of the impacts of the proposed land development by the Reviewing Agency.

C. Any land development that contains internal roads shall construct or improve those roadways in accordance with these Standards, unless otherwise specified in City of Burien Code Title 19.

D. For commercial developments, these Standards shall apply unless otherwise determined by the Public Works Director or his or her designee. These Standards shall apply to commercial developments with public/dedicated rights-of-way or easements, unless otherwise determined by the Public Works Director or his or her designee.

E. For a commercial establishment on a shoulder and ditch type road, where development of adjoining lands and highway traffic assume urban characteristics as determined by the Public Works Director or his or her designee, the frontage shall be finished with curb, gutter, and sidewalk, with pipe drainage, all in accordance with these Standards. Access shall be limited by means of concrete curbing.

F. Subdivisions, short subdivisions, binding site plans or any other developments that are subject to recording shall not be recorded until there is a recorded continuous public maintained access, or an access that is covered by a maintenance financial guarantee to the development site, except as provided for in Section 3.06. Additionally, the City will not accept a road or the drainage improvements within the road rights-of-way for maintenance until the road is directly connected to a City maintained or an acceptable publicly maintained road. This requirement also applies to public roadways located within a commercial development and those public roadways created through the binding site plan process and any other permit process.

G. All new and reconstructed road and development projects shall provide applicable pedestrian, and bicycle improvements that meet the Standards, unless otherwise approved by the Public Works Director or his or her designee.
H. If a development project provides access from a City street, but abuts a property not being developed, then the Standards will allow a “half-street”. A “half-street” must abut the neighboring property line and be sized to accommodate the anticipated volume of the individual project. While the “half-street” may not meet minimum Standards, when the neighboring property develops and completes the other portion of the “half-street”, all Standards must be met.

1.06 General References

The Standards are intended to be consistent with:

A. City of Burien Comprehensive Plan, November 1997, as amended.

B. Burien Municipal Code, as amended, including:

Title 10, Vehicles and Traffic
Title 12, Streets and Sidewalks
Title 13, Water and Sewers
Title 14, Environmental Protection
Title 15, Buildings and Construction
Title 17, Subdivisions
Title 18, Interim Zoning Code
Title 19, Zoning

C. Downtown Burien Handbook, March 2000
D. City of Burien Pedestrian and Bicycle Facilities Plan, June 2004
E. Burien Storm Drainage Master Plan, 2005
F. Implementing guidelines on drainage prepared by Surface Water Division, King County Department of Public Works, and hereafter referred to as the “Surface Water Design Manual”
G. Des Moines Memorial Drive Corridor Management Plan, October 2006

1.07 WSDOT/APWA Documents as Primary Design and Construction References

Except where these Standards provide otherwise, the design detail, construction workmanship, and materials shall be in accordance with the following publications:

A. WSDOT/APWA Standard Specifications for Road, Bridge, and Municipal Construction, as adopted by City of Burien, 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. A policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), current edition
D. City and County Design Standards for the Construction of Urban and Rural Arterial and Collector Roads, adopted in accordance with RCW 35.78.039 and RCW 43.33.020, current edition.

1.08 Other Specifications and Guidelines

The following specifications and guidelines shall be applicable when pertinent, when specifically cited in the Standards, when required as a development condition, or when required by state or federal funding authority.

A. Local Agency Guidelines, WSDOT, current edition.
B. Guidelines for Urban Arterial Program, WSDOT, current edition.
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), current edition.
E. Standard Specifications for Highway Bridges, adopted by AASHTO, current edition.
F. Department of Transportation Manual on Uniform Traffic Control Devices, (MUTCD), current editions, as amended and approved by WSDOT.
G. Guide for the Development of Bicycle Facilities, adopted by AASHTO, current edition.
H. American Society for Testing and Materials (ASTM).
I. Metro Transportation Facility Design Guidelines, current edition.
J. Roundabouts: An Informational Guide, FHWA, current edition.
K. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals, current edition.
L. For design and construction of permeable pavements, including subgrade and subgrade compaction, the WSDOT/APWA Local Agency General Special Provisions Division 4 and 5, current edition.

1.09 Cultural Resources

All impacts to any significant cultural resources shall be avoided where and whenever possible. To maximize the opportunities to plan for avoidance, significant cultural resources within or adjacent to a road or development project shall be identified as early in the planning process as possible. For projects in and adjacent to archaeological sites, consultation with the Washington State Department of Archaeology and Historic Preservation is also required (RCW 27.53).

1.10 Engineering Plans, Final Corrected Plans, and Final Plat Plans

A. Engineering Plans: Engineering plans for private development proposals shall be prepared and submitted to the Reviewing Agency. At a minimum the plans shall meet the following:

1. A professional engineer licensed in the state of Washington shall prepare the engineering plans. The plans must be reviewed and approved by the Reviewing Agency prior to beginning construction.

2. The plans must be signed and stamped by the responsible professional engineer prior to submittal to the Reviewing Agency.

3. The plans shall be 24”x 36” or 22”x 34” sheet size, dark line on light background. The sheets shall be good quality reproducible ink on bond paper. Engineer scale shall be required.

4. At a minimum, the plans title block shall include the project name and number, applicant’s/developer’s name, and the name, address, seal, date and signature of the responsible professional engineer.

5. All topographic features within and adjacent to proposed improvements and within sufficient area to assess impacts of slopes, drainage, access, future extensions, etc. shall be incorporated into the plans.

6. All existing and proposed public and private utilities, including water and sewer, telephone, power, gas, cable, and any other utilities within the project area shall be shown on the plans.

7. Delineate existing and proposed drainage facilities such as culverts, catch basins, ditches, etc., indicate direction of flow, size, type of pipe, invert and rim elevations.

8. Identification of adjacent roads, neighborhoods, addresses or any other information to facilitate locations and future reference.

9. Profile drawings shall have a horizontal scale of not more than 50 feet to the inch or a vertical scale of not more than 10 feet to the inch. Plan views shall be of a corresponding horizontal scale.

10. a. Survey Requirements: Vertical. The vertical datum on all engineering plans, plats, binding site plans and short plats shall be the North American vertical datum of 1988 and shall be tied to at least one King County Survey Control Network benchmark. If a King County Survey Benchmark does not exist within one-half mile of the subject property, or two hundred fifty feet or greater of total vertical difference exists between the starting benchmark, a new benchmark will need to be established and accepted by King County Survey Unit.

b. Survey Requirements: Horizontal. The horizontal component on all engineering plans, plats, binding site plans and short plats shall be the North American datum of 1983/91 as its coordinate base and basis for bearings. All horizontal control for these projects shall be referenced to a minimum of two King County Survey horizontal control monuments. If two horizontal control monuments do not exist within one mile of these projects, new survey control will need to be established and accepted by King County Survey Unit. .

11. The plans shall clearly identify all existing and proposed improvements, such as the right-of-way and/or easement lines, the roadway, sidewalks, shoulders, utilities, drainage facilities, rock facings, retaining walls and driveways. Existing and proposed driveway cross sections are required.

12. Curb return elevations at a minimum shall be shown at quarter points at all intersections to verify drainage and to facilitate a smooth transition.

13. Roadway profiles shall include existing and proposed centerline elevations at 50-foot stations or less; centerline grades and vertical curves, including stations and elevations at PVC's, PVI's, and PVT's. When existing or proposed roadway includes superelevation, a superelevation diagram shall be included.

14. Detail drawing shall contain adequate dimensions, sections, views, notes, and call outs to construct the structure, or permit preparation of detailed shop drawings by the fabricator when necessary. Use of very light gray shading and very light hatching is acceptable, provided they do not obscure data and other pertinent information at full and reduced scale.

15. Channelization plans for intersections shall be provided at a 1"= 20' scale.

16. Channelization plans for connecting roadways may be 1"= 40' scale.

17. The plans must include existing and proposed monuments. The roadway centerline, easements, and other pertinent data will be referenced to existing monuments.

18. When applicable, the plans shall incorporate the engineering plan requirements of the King County Surface Water Design Manual.

19. The Public Works Director or his or her designee may require additional plan elements in addition to those cited above.

B. Waiver of Plan Requirements: Subject to review, the Public Works Director or his or her designee may waive plan requirements, wholly or in part, based on the following criteria:

1. No more than 2,000 square feet will be cleared and graded within the right-of-way or easement; and

2. The existing grade or slope in the road right-of-way or easement does not exceed 8 percent; and
3. The work will not intercept a stream, wetland, or sensitive area buffer, or otherwise impact sensitive areas and natural surface drainage as set forth in City of Burien Code Title 19
4. Plans do not include a retention/detention facility; and
5. The work is required of a short plat development, or a right-of-way use permit and involves less than 100 lineal feet of existing public road improvement; and
6. City of Burien standard drawings, submitted with required permits, are sufficient to describe the improvement to be constructed.

C. Record Plans/Final Corrected Plans: Plan sheets are subject to a physical test that includes wet/dry erasers.

1. Final corrected plans for archiving shall be original documents on mylar and are produced in a manner that ensures durability, resistance to damage from use or exposure to water or light, and allows for the detection of any alteration. The plans shall be of suitable quality for producing legible prints through reductions, scanning, microfilming or other standard copying procedure. Electronic copies of the final corrected plans shall be submitted in either PDF or AutoCAD format.

2. Acceptable processes to create record plans include black ink on 4 mil polyester drafting film (mylar), photographic mylar, mylar created using an ink jet printer process, or other processes approved by the Engineer. The following criteria shall be used to evaluate acceptability:

    a. Substrates (such as polyester, polyethylene or polypropylene) shall be durable and capable of producing copies without loss, distortion or transfer of print or images. Ink shall be pigmented and ultraviolet (UV) resistant.

    b. Drawing materials used for final corrected plans shall ensure that the documents are stable, reproducible document for a minimum of 50 years.

3. Unacceptable processes to create record drawings include, but are not limited to:

    a. Mylars that have material affixed by adhesive.

    b. Mylars that have shading, except for detail drawings as allowed in this section and when very light shading is used to delineate edge of existing pavement/surface.

c. Electrostatic mylars such as a xerographic process or mylars created by heat sensitive electrostatic plotting, except as approved by the Engineer.

d. Ammonia process (sepia type) mylars.

D. Final Plat Plans/Maps: An electronic copy, in either PDF or AutoCAD format, of the final plat map(s) shall be submitted to the reviewing agency when the plans/maps are forwarded to the County Assessor's office in accordance with WAC 332-130.

E. Plans shall comply with Section 1.11(C) prior to receiving final construction approval.

F. Engineering plans shall be reviewed to ensure that all road elements proposed for public maintenance will be maintained by the City. Maintenance plans may be required for specialized features. For purposes of public maintenance, a maximum reach of 16 feet by a backhoe type bucket shall be assumed.

1.11 Variances

A. A road variance is required for any design or construction deviation from these Standards. Detailed procedures for applicants requesting variances and appealing variance decisions are published by the Department of Public Works.

B. Variances from these Standards may be granted by the Public Works Director or his or her designee upon evidence that such variances are in the public interest and that requirements for safety, function, fire protection, transit needs, appearance and maintainability based upon sound engineering and technical judgment are fully met.

C. Variance requests for subdivisions should be proposed at preliminary plat stage and prior to any public hearing. All known variances must be approved prior to approval of the engineering plans for construction. It is the responsibility of the Public Works Director or his or her designee to interpret the Standards. Any anticipated variances from these Standards, which do not meet the International Fire Code will require concurrence by the City of Burien Fire Marshal.

D. Applications for Road Variances:
   1. Applications for proposed variances shall be written and include a specific description of the proposed alternative along with supporting documentation. Documentation may include, but not be limited to, a record of successful use by other agencies, or evidence of meeting criteria for quality such as AASHTO and ASTM standards.
   2. The applicant shall indicate those sections of the Standards, which are relevant to the proposed alternative.

3. Applications for location of utilities by an entity allowed under a franchise agreement must be prepared and submitted by that entity.
4. Variance requests not associated with a development proposal subject to review by the Department of Public Works shall be directed to the Public Works Director or his or her designee.
5. Variance requests associated with a development proposal subject to review shall be directed to the Public Works Director or his or her designee, City of Burien Department of Public Works on forms prescribed by the Public Works Director or his or her designee and, and shall be accompanied by the variance review fee as adopted by the City of Burien's fee schedule.
6. Variance application forms and submittal requirements are available on the City of Burien Internet site.

E. Questions regarding interpretation of these Standards may be directed to the Department of Public Works.

F. The City of Burien has granted the Public Works Director or his or her designee the decision-making authority for road variances in the following specified areas that relates to development permits.

1. Offsite Road Improvement Requirements (Section 1.05A)
2. Engineering Plan Requirements (Section 1.10)
3. Determine Roadway Types (Section 2)
4. Private Access Tracts and Private Streets – Not to exceed 16 lots (Section 2.05)
5. Alley Design (Section 2.09A)
6. Street Grade Transitions (Section 2.11)
7. Stopping Sight Distance for Sag Residential Curves (Section 2.12)
8. Off-Street Walkway – Location (Section 3.02)
9. Paved Shoulders (Section 3.07)
10. Unpaved Shoulders (Section 3.08)
11. Mailbox Location (Section 5.04)
12. Bollard Design (Section 5.08)

Note: Under these circumstances, road variance decisions by the Public Works Director or his or her designee are required only when the applicant disagrees with the Public Works Director or his or her designee.

1.12 Errors and Omissions

At the discretion of the Public Works Director or his or her designee, any significant errors or omissions in the approved plans or information used as a basis for such approvals may constitute grounds for withdrawal of the approvals and/or stoppage of any or all permitted work. It shall be the responsibility of the applicant, developer, or contractor to show cause why such work should continue,

and make such changes in plans that may be required by the Public Works Director or his or her designee before the plans are re-approved.

1.13 Penalties and Financial Guarantees

Failure to comply with these Standards will be cause for denial of plan or development permit approval, revocation of prior approvals, withholding and reductions of financial guarantees, withholding final inspection approval, withholding occupancy certificates (temporary and permanent), legal action for forfeiture of financial guarantee, code enforcement, and/or other penalties as provided by law.

A. PERFORMANCE/RESTORATION FINANCIAL GUARANTEES: Any construction work on City of Burien right-of-way (both maintained and unmaintained) other than Capital Improvement Projects by the City, City maintenance work, or as waived by City of Burien ordinance 17.10.090, Ord 29.1(3) - 1993, shall be guaranteed by a restoration financial guarantee or Public Agency Service Agreement (PASA). All work on private road and drainage facilities, required as a condition of a City approval process, shall be guaranteed by a performance financial guarantee at the time of plat recording. The Public Works Director or his or her designee shall determine the amount and form of the financial guarantee. The minimum restoration and/or performance guarantee shall be $2,000.00.

B. MAINTENANCE/DEFECT GUARANTEES: The successful performance of the right-of-way improvements or related drainage facilities shall be guaranteed for a period of at least two years (or other period if updated by City of Burien Code) from the date of the Construction Approval. The Public Works Director or his or her designee shall determine the amount and form of the maintenance financial guarantee. The minimum maintenance guarantee shall be $2,000.00. Maintenance guarantees will not be required when the required performance guarantee is $2,000.00.

1.14 Changes to this Manual

The Public Works Director or his or her designee may incorporate minor changes to these Standards as they become necessary. General updates shall include an opportunity for public review and comments.

1.15 Pavements

Within these Standards, the terms “pavement”, “concrete”, and “asphalt” may be understood to include the permeable versions of the materials where usage of permeable pavements is both feasible in accordance with the Surface Water Design Manual and allowed in these Standards.

1.16 Definitions of Terms

When referring to these Standards the definitions below shall apply:

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ADT	The Average Daily Traffic (ADT) is the general unit of measure for traffic defined as the total volume during a given time period (in whole days), greater than one day and less than one year, divided by the number of days in that time period.
Alley	A privately maintained thoroughfare, tract, or easement, usually narrower than a street, which provides access to the rear boundary of one or more lots and is not intended for general traffic circulation.
Applicant	Applicant means a property owner, or a public agency or public or private utility which owns a right-of-way or other easement or has been granted possession and use of a right-of-way or other easement in a written agreement signed by the property owner or has obtained a court order in a condemnation proceeding adjudicating that the use for which the agency or utility seeks to condemn the right-of-way or easement is a public use, or any person or entity designated or named in writing by the property or easement owner to be the applicant, in an application for a development proposal, permit or approval, or their successors or assigns.
Appurtenance	Equipment and/or accessories that are part of an operating system or subsystem.
APWA	American Public Works Association
As-Built Drawings	See Final Corrected Plans
ASTM	American Society for Testing and materials
ATB	Asphalt treated base
Auxiliary Lane	The portion of the roadway adjoining the traveled way for parking, turning or other purposes supplementary to through-traffic movement.
Backfill	Replacement of excavated material with suitable material compacted as specified.

Best Management Practice (BMP)	Any schedule of activities, prohibition of practices, maintenance procedure, or structural and/or managerial practice approved by the City that, when used singly or in combination, prevents or reduces release of pollutants and other adverse impacts to surface water, stormwater and groundwater.
Bikeway	A generic term for any road, street, path, or way which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.
Bioretention	A stormwater best management practice consisting of a shallow landscaped depression designed to temporarily store and promote infiltration of stormwater runoff. Bioretention uses a specified soil mix and plants to provide infiltration capacity, treatment, uptake, and transpiration.
BMC	Burien Municipal Code
Breakaway Structure	A structure that has been crash tested in accordance with National Cooperative Highway Research Program procedures – NCHRP 230.
Boring	Grade and alignment controlled mechanical method of installing a pipe or casing under a road or stream without disturbing the surrounding medium.
Bulb	A round area for vehicle turnaround typically located at the end of a cul-de-sac street.
Bus Zone	A designated space for loading and unloading transit passengers.
Channelization	The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands or other suitable means to facilitate the safe and orderly movement of both vehicles and pedestrians.
Clear Run-Out Area	The area beyond the toe of a non-recoverable slope available for safe use by an errant vehicle.
Clear Zone	The total roadside border area starting at the edge of the traveled way available for use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope, and/or a clear run-out area.

CMP	Corrugated metal pipe
Compaction	The densification of a fill by mechanical means.
Critical Areas	Aquifer recharge areas, fish and wildlife habitat conservation areas, frequently flooded areas, geologically hazardous areas, streams, and wetlands
CSBC	Crushed surfacing base course
CSTC	Crushed surfacing top course
Cul-de-sac	A short street having one end open to traffic and the other temporarily or permanently terminated by a vehicle turnaround at or near the terminus.
Cultural Resources	Material evidence of human activities, occupations, and systems illustrated by districts, sites, landscapes, structures, objects, artifacts, ruins, buildings, and natural features that have been or are important in human history and prehistory, and in the maintenance of living cultures.
Dead End	A road/street without an exit.
Design Speed	The speed approved by the Public Works Director or his or her designee for the design of the physical features of a road as established by Sections 2.01 and 2.03, for residential and commercial access streets or equal to 10 miles per hour above the posted speed limit for arterials.
Developer	See Applicant
Development	Any improvements to a property that require a building permit issued by the City of Burien.
Development Engineer	The Department of Public Works employee responsible for the conditioning, review, inspection, and approval of right-of-way use permits, and road and drainage improvements constructed as part of development permits administered by Department of Public Works. The Development Engineer or his/her authorized representative shall be a professional civil engineer registered and licensed under the laws of the State of Washington.
Driveway	A privately maintained access to residential, commercial or industrial properties.
Dwelling Unit	One or more rooms designed for occupancy by a person or family for living and sleeping purposes,

	containing kitchen facilities and rooms with internal accessibility, for use solely by the dwelling's occupants; dwelling units include but are not limited to single detached units, townhouses, condominiums, apartments, factory built housing, mobile homes, and accessory units.
Eyebrow	A partial bulb located adjacent to the serving road that provides access to lots and serves as a vehicle turnaround.
Final Corrected Plans	The plan set which is certified to contain a true and accurate representation of the actual field conditions for the project during construction, or upon completion of construction. Also known as "As-Built Drawings".
Geometrics	The physical arrangement of the visible elements of a road such as alignment, grade, curvature, width and side slopes.
Grade	Rate or percent of change in slope measured along the centerline of the roadway or access point either ascending or descending from or along the roadway/access point.
Half-Street	A road section built adjacent to the property line that serves a maximum of 35 dwelling units or equivalent ADT, which eventually will be completed to a full width road section when the adjacent property is developed.
Hammerhead	An alternative turnaround at the terminus of a road running lateral to the road at the end. Serves not more than 4 dwelling units.
HMA	Hot mix asphalt
In-fill Development	The development of a parcel of land in a highly developed urban area.
Intersection	The area from the intersection of a roadway to the radius tangent point or stop bar on each approach, whichever is greater.
Joint-Use Driveway	A jointly owned and maintained driveway serving two properties.
Landing	A road or driveway approach area to any public or private road. Also, the level area at the back of the sidewalk ramp, typically four-feet wide.

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. The desired maximum length of a loop is 600-feet.
Lot	A physically separate and distinct parcel of property, which has been created pursuant to the City of Burien subdivision regulations, or was legally created prior to February 28, 1993.
Low Impact Development	An innovative ecosystem based approach to land development and storm water management that results in fewer environmental impacts.
Low Volume Road	A rural collector arterial with an ADT of 400 or less.
MPH	Miles per hour
MUTCD	The Manual on Uniform Traffic Control Devices, published by the U.S. Department of Transportation.
New Construction	New construction involves the construction of a new roadway facility or structure where nothing of its type currently exists.
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 Widening	Pavement widening projects are expansion of the roadway surface for vehicular use and may involve earthwork, drainage and paving elements. These projects are considered alterations of the roadway and must address ADA accessibility for pedestrians.
Pavement Width	Paved area on shoulder-type roads or paved surface between curb or gutter flow line on all other roads as depicted on Drawings 2.1 through 2.3, and 2.5.
Permeable Pavement	Pervious concrete, porous asphalt, permeable pavers or other forms of pervious or porous paving material intended to allow passage of water through the pavement section. It often includes an aggregate base that provides structural support and acts as a stormwater reservoir.
Permittee	See Applicant

PI	Point of intersection
Pipe Stem	A strip of land having a width narrower than that of the lot or parcel to be served and designed for providing access to that lot or parcel.
Plan of Record	See Final Corrected Plans
Posted Speed	The speed limit actually signed along the roadway.
Private Access Tract	A privately owned and maintained tract that is 150 feet or less in length that provides vehicular access to six or fewer residential properties.
Private Street/Road	A privately owned and maintained access provided for by a tract, easement or other legal means, typically serving sixteen or less potential dwelling units.
Professional Engineer	A professional civil engineer registered and licensed to practice in the State of Washington.
PS&E	Plans, Specifications and Estimate
PT	Point of tangent
Public Street	Publicly owned facility-providing access, including the roadway and all other improvements, inside the right-of-way.
Public Works Director	City of Burien Public Works Director, as appointed by the Burien City Manager under RCW 35.23.021 or his/her authorized representative.
RCW	Revised Code of Washington
Reconstruction	Reconstruction projects add additional lanes to an existing roadway or bridge and 50 percent or more of the project length involves vertical or horizontal alignment changes.
Recoverable Slope	A slope on which the driver of an errant vehicle can regain control of the vehicle. Slopes of 4H:1V or flatter are considered recoverable.
Rehabilitation	Work similar to restoration except the work may include reworking or strengthening the base or sub base, recycling or reworking existing materials to improve their structural integrity, adding underdrains, replacing or restoring malfunctioning joints, substantial pavement under-sealing when essential for stabilization, pavement grinding to restore smoothness-providing adequate structural thickness remains, removing and replacing

	deteriorated materials; crack and joint sealing but only when the required shape factor is established by routing or sawing, improving or widening shoulders.
Restoration	Work performed on pavement or bridge decks to render them suitable for resurfacing. This may include supplementing the existing roadway by increasing surfacing and paving courses to provide structural capability, and widening up to a total of ten feet. Restoration will generally be performed within the exiting right-of-way.
Resurfacing	The addition of a layer or layers of paving material to provide additional structural integrity, improve serviceability, and rideability.
Reviewing Agency	City of Burien Department of Public Works or its successor agency responsible for reviewing subdivisions and other developments within their jurisdiction.
Right-of-Way	Public land, property, or property interest, (e.g., an easement), usually in a strip, as well as bridges, trestles, or other structures, acquired for or devoted to transportation purposes. This does not include recreational or nature trails except where they intersect with or are located within road rights-of-way.
Road	A facility serving three lots or more and providing public or private access including the roadway and all other improvements inside the right-of-way.

NOTE: "Road" and "Street" will be considered interchangeable terms for the purpose of this document.

Roadway	Pavement width plus any paved or non- paved shoulders**.**
Skinny Streets	Narrower residential streets. Skinny streets are intended to reduce the amount of land used for streets. Skinny streets are generally 20-24 feet wide, the width depending on the parking configuration and number of dwelling units served.
Shared Roadway	A roadway that is open to both bicycle and motor vehicle travel. This may be an existing roadway, a street with wide curb lanes, or a road with 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.
Sidewalk	A facility designated for pedestrian and non-vehicular traffic. Walkways are typically constructed of concrete. Separation from vehicle traffic may be provided by pavement striping, curbing, a ditch or open space.
Street Frontage	Any portion of a lot or combination of lots that directly abuts a public right-of-way. If a single ownership is divided into smaller tax lots, the original ownership lot shall be considered as a single lot for the purpose of defining street frontage.
Surety	A bonding company, for example.
Surface Water Design Manual	The version of the King County Surface Water Design Manual adopted in accordance with Title 13.10 BMC.
Surveyor	A professional land surveyor registered and licensed by the State of Washington.
Temporary	Lasting for a "limited" time.
Traffic Engineer	Traffic Engineer responsible for design, operation and maintenance of traffic control devices.
Traveled Way	The portion of a street or road intended for the movement of vehicles, between curbs or shoulders, including turn lanes, but excluding bike lanes, parking lanes and/or shoulders.
Turn Out	The paved or concrete area outside the roadway or traveled way for a transit vehicle.
Unmaintained Road	A road within the city right-of-way that is accessible to public travel but is not maintained by the City.
Unopened Right-of-Way	A city right-of-way that exists by dedication or deed, but for which no vehicular roadway has been constructed.
Utility	A privately, publicly, or cooperatively owned line, facility, or system for producing, transmitting, or distributing communications, cable television, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, or any other similar commodity which directly or indirectly serves the public. Additionally, the privately, publicly, or

	cooperatively owned company that owns the line, facility, or system.
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation.
3-R	Resurfacing, restoration, and rehabilitation of existing roadways with minimal changes to alignment or grade.
2-R	Resurfacing and restoration of existing roadways by supplementing the existing road prism.

CHAPTER 2. ROAD TYPES AND GEOMETRICS

2.01 Road Classifications

City roads are classified functionally as indicated in the City of Burien Comprehensive Plan. Function is the controlling element for classification and shall govern right-of-way, road width, road geometrics and optional use of permeable pavement. Other given elements such as access, arterial spacing, and average daily traffic count (ADT) are typical. It is necessary to classify streets for purposes of traffic operations, control, and enforcement. Typically, arterials will have higher speed limits and more stringent traffic control measures at intersections, (e.g., traffic signals or stop signs), than non-arterials. In planning, functional classification establishes the hierarchy of roads necessary for a complete transportation system that serves all types of travel needs. Each road has a specified function that produces a comprehensive network for travel and access throughout an area, when combined with the rest of the system.

Land Development in the City of Burien

Land development in the City of Burien shall provide "curb" type road improvements, unless the subject property is in an area of Burien that is served by streets with gravel shoulder and ditch. A curb type road typically requires a curb and sidewalk, with drainage and stormwater runoff treatment typically provided by a gutter and bioretention or other low impact development feature, .

Streets with gravel shoulder and ditch require no sidewalk. Where driveways access private property from the public street, either a culvert with 2’ of soil coverage or a cast iron pipe connecting the drainage ditch is acceptable. Exceptions to this may be approved by the Public Works Director or his or her designee on residential access streets that are located in long-term, low-density neighborhoods and where a pattern of "shoulder" type roads is firmly established.

2.02 Roadway Types

A. Limited Access

1. Limited Access

   State Route 509, from MP 23.47 to MP 24.29B, is within the City of Burien. As a state highway, this roadway is owned, maintained and administered by the Washington State Department of Transportation (WSDOT). WSDOT Standards for Access Permitting for limited access highways are identified in Chapters 468-54 and 468-58 of the Washington Administrative Code.

B. Arterials

1. Principal Arterial

   Principal arterials provide for movement across and between large subareas of an urban region and serves predominantly “through traffic”. They carry the highest traffic volume and serve major centers of activity and are fed by other arterials and local access streets. Principals are expected to provide a high degree of mobility; therefore, access to abutting properties is very restricted.

2. Minor Arterial

   Minor arterials interconnect with and augment the principal arterial system. They provide intra-community continuity connecting community centers and facilities. A minor arterial may also serve “through traffic”. Access is partially restricted.

3. Collector Arterial

   Collector arterials typically are intra-community roadways connecting residential neighborhoods with community centers and facilities. They accumulate traffic from local roadways and distribute that traffic to roadways that are higher in the hierarchy of classification. Access is partially restricted.

C. Local Roadways

There are several roadway classifications for urban local roadways. They are listed below:

1. Neighborhood Collectors

   Neighborhood collector streets are the highest in the local roadway classification hierarchy. They connect two or more neighborhoods and typically connect to arterials or other neighborhood collectors. Direct driveway connections to neighborhood collectors are restricted.

2. Subcollectors

   Subcollector streets are the second highest in the local roadway classification hierarchy. Subcollectors provide circulation within neighborhoods and typically connect to neighborhood collectors. Although they typically allow direct driveway access there are some project related exceptions.

3. Subaccess

   Subaccess streets are permanent cul-de-sacs or short loop streets that connect to subcollectors. Subaccess streets are not supportive of through traffic. They provide direct driveway connections.

4. Minor Access

   A minor access street is a permanent cul-de-sac or short loop street with low traffic volumes that provides circulation and access to off-street parking within a residential development boundary. Like subaccess streets, a minor access street allows direct driveway connections.

D. Local Roadways without curbs

1. In certain areas of Burien, the roadways described above (Neighborhood Collectors, Subcollectors, Subaccess and Minor Access) are constructed with a gravel shoulder and drainage ditch rather than curbs and sidewalks.

2. Residential access streets with a “curbless” treatment may be built in areas that are characterized as long-term, low-density neighborhoods where a pattern of "shoulder" type roads is firmly established. Where drainage ditches exist for stormwater conveyance, they must be re-established as part of the road improvements. Conversion of a drainage ditch to the roadside bioretention ditch BMP in accordance with the minimum design requirements of the Surface Water Design Manual is encouraged.

E. Access Streets

There are several roadway classifications for access streets. Typically "curb" type road improvements are provided along these streets unless otherwise approved by the Public Works Director or his or her designee. The classifications are listed below:

1. Attached - Dwelling Access

   Attached-dwelling access streets typically serve town houses or party wall style condominiums, apartments, and other multiple-dwelling developments.

2. Multi Family - Dwelling Access

   Multi Family - Dwelling access streets typically serve dense multiple-dwelling developments.

3. Business Access

   Business access streets typically serve very dense multi-family or mixed use buildings that combine commercial and residential uses, office buildings, and other professional service buildings.

4. Industrial Access

   Industrial access streets typically serve manufacturing, processing, storing and handling activities. These roadways generally route industrial vehicles from the arterial system to and within industrial districts.

5. Commercial Minor Access

   Commercial minor access streets provide circulation and access to parking and loading sites within multiple-dwelling, business, and industrial developments.

TABLE 2.1(A) – ARTERIALS (CURB ROADWAY SECTION)

Classification	Principal	Minor	Collector
Access	Controlled with very restricted access to abutting properties.	Partially controlled with infrequent access to abutting properties.	Partially controlled with infrequent access to abutting properties.
Arterial Spacing[1]	660'	660'	250'
Design Speed[2]	Up to 40 mph	Varies 35 to 40 mph	Varies 35 to 40 mph
Horizontal Curvature	See Table 2.2	See Table 2.2	See Table 2.2
Maximum Grade[3]	9%	10%	12%
Typical Traveled Way	44 to 56 feet	44 to 56 feet	25[8] to 34 feet
Typical Roadway Width	44 to 66 feet	44 to 66 feet	25[8] to 44 feet
Typical Lane Width	11 feet	11 feet	11 feet
Typical Left Turn Lane Width	12 feet	12 feet	12 feet
Typical Right Turn Lane Width	12 feet	12 feet	12 feet
Typical Widened Curb Lane Width[6]	14 feet	14 feet	14 feet
Typical Bike Lane Width	5 feet	5 feet	5 feet
Maximum Superelevation[5]	6%	6%	6%
Minimum Stopping Sight Distance	See Table 2.2	See Table 2.2	See Table 2.2
Minimum Entering Sight Distance	See Table 2.2	See Table 2.2	See Table 2.2
Minimum Right-of-Way Width[4]	100 feet	84 feet	84 feet
Minimum Sidewalk Width [7]	See Section 3.02	See Section 3.02	See Section 3.02
Curb Type	Vertical	Vertical	Vertical
Permeable Pavement Allowed On Travel Lanes	No	No	No

[1] For arterial spacing, distances are given only as general guidelines. Topographic conditions in Burien will affect these dimensions.

[2] Design speed is a basis for determining geometric elements and does not imply posted or legally permissible speed.

[3] Maximum grade may be exceeded for short distances.

[4] Criteria for federal and state funding may require greater traveled way, roadway and right-of-way widths. Greater widths also may be required for the construction of bike lanes, equestrian trails, and other non-motorized use.

[5] See Section 2.04 for allowed uses of superelevations greater than 6 percent.

[6] A widen curb lane is provided to accommodate bicycles.

[7] Within the downtown core of Burien, the sidewalk widths should comply with the Downtown Burien Handbook

[8] No on-street parking

TABLE 2.1(B) – LOCAL ACCESS ROADWAYS (CURB ROADWAY SECTION)

Classification	Neighborhood Collectors	Subcollectors	Subaccess	Minor Access
Access	Restricted, Lots front on local access street where feasible.	As needed with some restrictions.	Subaccess streets are not supportive of through traffic. Generally permanent cul-de-sacs or short loop[1] streets that connect to subcollectors.	Permanent cul-de-sacs or short loops with low traffic volumes that provide circulation and access to off-street parking within residential development limits.
Public or Private	Public Streets	Public Streets	Public Streets	Public or Private (See Section 2.06)
Serving Potential Number of Lots or Dwelling Units	Over 100	100 Maximum	50 Maximum	16 Maximum
Design Speed[2]	35 mph	30 mph	Low Speed Curve (See Section 2.10)	Low Speed Curve (See Section 2.10)
Max Superelevation	See Section 2.10	See Section 2.10	See Section 2.10	See Section 2.10
Horizontal Curvature	See Table 2.2	See Table 2.2	Low Speed Curve (See Section 2.10)	Low Speed Curve (See Section 2.10)
Maximum Grade[3]	11%	12%	12%	12%
Minimum Stopping Sight Distance	See Table 2.2	See Table 2.2	150 feet	150 feet
Minimum Entering Sight Distance	See Table 2.2	See Table 2.2	-	-
Typical Traveled Way	22 feet[5]	22 feet	22 feet	22 feet
Typical Right of Way Width	56 feet	48 feet	44 feet	40 feet
Minimum Roadway Width	32 feet[5]	28 feet	24 feet	22 feet
Minimum Half Street Width	20 feet	20 feet	20 feet	20 feet
Minimum One Way Paved Width	20 feet	20 feet	20 feet	20 feet
Minimum Sidewalk Width[4]	See Section 3.02	See Section 3.02	See Section 3.02	See Section 3.02
Curb Type	Vertical	Vertical/Rolled	Vertical/Rolled	Vertical/Rolled
Permeable Pavement Allowed On Travel Lanes	No	No	400 ADT or less	400 ADT or less

[1] See Section 2.15 for one-way loops.

[2] Design speed is a basis for determining geometric elements and does not imply posted or legally permissible speed.

[3] Maximum grade may be exceeded for short distances. See Section 2.11.

[4] Within the downtown core of Burien, the sidewalk widths should comply with the Downtown Burien Handbook.

[5] Neighborhood collectors intersecting with arterials shall be 36 feet wide for the first 150 feet.

TABLE 2.1(C) – RESIDENTIAL and COMMERCIAL ACCESS STREETS (CURB ROADWAY SECTION)

Classification	Attached Dwelling Access Streets	Multifamily Dwelling Access Streets	Business Access Streets	Industrial Access Streets	Minor Access Streets
Access	As needed with some regulation.	As needed with some regulation.	As needed with some regulation.	As needed with some regulation.	As needed with only minimal restrictions.
Public or Private Street	Typically public streets serving R-12 through R-24 zones.	Typically public streets serving R-12 through R-24 zones	Typically public streets serving CN, CI, DC, CC1 CC2, CR, and O zones.	Typically public streets serving I Zones	Public or private streets.
Design Speed	25 mph	25 mph	35 mph	25 mph	Low Speed Curve- See Section 2.10
Maximum Superelevation	6%	6%	6%	6%	-
Horizontal Curvature	See Table 2.3	See Table 2.3	See Table 2.3	See Table 2.3	Low Speed Curve - See Section 2.10
Maximum Grade	12%	12%	12%	11%	12%
Minimum Stopping Sight Distance[3]	See Table 2.3	See Table 2.3	See Table 2.3	See Table 2.3	150 feet
Minimum Entering Sight Distance[1]	See Table 2.3	See Table 2.3	See table 2.3	See Table 2.3	-
Typical Right of Way Width	56 feet	56 feet	60 feet	60 feet	44 feet
Typical Roadway Width[2, 3]					
Parking Two Sides	36 feet	36 feet	38 feet	40 feet	36 feet
Parking One Side	28 feet	28 feet	32 feet	32 feet	30 feet
Minimum Roadway Width[2]					
Parking Two Sides	28 feet	28 feet	36 feet	36 feet	36 feet
Parking One Side	28 feet	28 feet	30 feet	30 feet	30 feet
No Parking	20 feet	20 feet	24 feet	24 feet	20 feet
Minimum Sidewalk Width[4,5]	See Section 3.02	See Section 3.02	See Section 3.02	See Section 3.02	See Section 3.02
Minimum Half-Street Width	20 feet	20 feet	20 feet	20 feet	20 feet
Minimum One-Way Paved Width	20 feet	20 feet	22 feet	24 feet	20 feet
Curb Type	Vertical	Vertical	Vertical	Vertical	Vertical
Permeable Pavement Allowed on Travel Lanes	400 ADT or less	400 ADT or less	400 ADT or less	400 ADT or less	400 ADT or less

[1] Standard Entering Sight Distance (ESD) shall apply at intersections and driveways except when a driveway intersects a minor access street, unless otherwise approved by the Public Works Director or his or her designee.

[2] These minimum dimensions for the paved portion of will require through connection to other public streets and restricts of parking at the intersections. Approval by the Public Works Director or Development Engineer is required when these minimums are proposed.

[3] The right-of-way may be reduced to minimum roadway width, plus storm drainage, sidewalk, one-foot behind sidewalk, provided that the curbing is vertical, the minimum clear zone requirements are met, and potential serving utilities are accommodated within permanent public easements.

[4] If a new development is proposed in a location where no sidewalks exist within 100', then no sidewalks will be required. In some cases, determined by the Public Works Director, an agreement to construct sidewalks or to participate in future sidewalk construction may be required.

[5] Within the downtown core of Burien, the sidewalk widths should comply with the Downtown Burien Handbook

2.03 Horizontal Curvature and Sight Distance Design Values

A. The values shown in Tables 2.2 and 2.3 are minimum design values. A maximum of 8 percent superelevation may be used, upon approval of the Public Works Director or his or her designee, 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 residential access streets; however, horizontal curves must be designed based on design speed and selected cross section as indicated in Table 2.2. This table 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 2.2 – ARTERIAL AND LOCAL ACCESS ROADWAYS DESIGN VALUES

Design Speed (mph)	15	20	25	30	35	40
Horizontal Curvature, Normal Crown Section, Radius (Ft)	50	107	198	333	510	762
Horizontal Curvature for 6% *(maximum allowable on neighborhood collectors and local access streets)* Superelevation, Radius (Ft.)	39	81	144	231	340	485
Horizontal Curvature for 8% (*maximum allowable on arterials*) Superelevation, Radius (Ft.) (requires approval of the Public Works Director or his or her designee)	38	76	134	214	314	444

Stopping Sight Distance (Ft.)[2,3,4]	80	115	155	200	250	305
Entering Sight Distance (Ft.)[2,3,4]	170	225	280	335	390	445

[1] See Section 2.12.

[2] See Section 2.13. Entering sight distance shown is for a stopped passenger vehicle to turn left onto a two-lane highway with no median and .level grades. For other conditions the time gap must be adjusted and required sight distance recalculated. (See AASHTO – Intersection Control section).

[3] For multilane roadways: For left turns onto two-way roadways with more than two lanes, add 0.5 seconds for passenger cars or 0.7 seconds for trucks for each additional lane from the left, in excess of one, to be crossed by the turning vehicle.

[4] For minor and approach grades: If the approach grade is an upgrade that exceeds 3 percent; add 0.2 seconds for each percent grade for left turns.

TABLE 2.3 – ACCESS STREETS DESIGN VALUES

Design Speed (mph)	15[1]	20[2]	25	30	35
Horizontal Curvature, for 6% Superelevation, Radius (Ft.)	39	81	144	231	340
Horizontal Curvature, for 4% Superelevation, Radius (Ft.)	42	86	154	250	371
Horizontal Curvature, for 2% Superelevation, Radius (Ft.)	44	92	167	273	408
Horizontal Curvature, Normal Crown Section, Radius (Ft.)	50	107	198	333	510
Stopping Sight Distance (Ft.)	80	115	155	200	250
Entering Sight Distance (Ft.)	170	225	280	335	390

[1] Applies to “Skinny” streets

[2] Applies to One Way streets

2.04 Short Plats

This section is limited to residential short subdivisions of four lots or less. The City of Burien will not accept streets for maintenance within short plats when the roads providing access to the short plat are private and already have the potential to serve more than the number of lots specified in Section 2.05. In addition, a Declaration of Covenants for Maintenance is required as part of the short plat approval.

A. Residential Short Plats

1. When a residential short plat adds one additional lot to an existing lot that already has a permitted habitable residential dwelling unit, a paved shoulder and associated drainage improvements, including water quality

and flow control devices. may be constructed along the short plat frontage as an alternative to curb, gutter, and sidewalk improvements, provided:

a. The surrounding roadways frontage improvements are of similar character; and,

b. The potential development of the neighborhood is low and consists primarily of in-fill.

2. When the short plat access street extends more than 150 feet measured from the centerline of the nearest street intersection and serves or will serve more than two lots, a turnaround shall be provided. Based on the Fire Marshal's requirements and general traffic operations, the turnaround may be a cul-de-sac or a hammerhead as shown in figures 2.3, 2.4 and 2.5.

3. The total access tract width shall be a minimum of 20 feet and the roadway surfacing shall be asphalt. For a two-lot short plat, the paved surface width shall be no less than 18 feet. For a three- or four-lot short plat, the paved surface width shall be no less than 20 feet.

4. The geometric design criteria shall meet the requirements of a residential minor access roadway.

2.05 Private Access Streets

A. While public streets, owned and maintained by the City, usually best serve community street requirements, private streets may be appropriate for some local access streets. Usually these are minor access streets, either residential or commercial.

B. Private streets may be approved only when they are:

1. Permanently established by right-of-way, tract or easement providing legal access to each affected lot, dwelling unit, or business and sufficient to accommodate required improvements, to include provision for future use by adjacent property owners when applicable; and

2. Built to the Standards, as set forth herein, and

3. Accessible at all times for emergency and public service vehicle use; and

4. Not obstructing, or part of, the present or future public neighborhood circulation plan developed in processes such as the City of Burien Comprehensive Plan, City of Burien Transportation Plan, or Capital Improvement Program; and

5. Not going to result in land locking of present or future parcels; and

6. Not needed as public roads to meet the minimum road spacing requirements of these Standards; and

7. Designed to serve a maximum potential of 16 single-family dwelling units when the entire length of the private road system to the nearest public maintained road is considered. The maximum potential is the number of dwelling units that can possibly be served by the road when physical barriers, zoning or other legal constraints are considered; and

8. Owned and maintained by a condominium association or equivalent homeowners association, capable and legally responsible owner or homeowners' association or other legal entity made up of all benefited property owners; and

9. Clearly described on the face of the plat, short plat, binding site plan, site development permit or other development authorization and clearly signed at street location as a private street, for the maintenance of which The City of Burien is not responsible.

10. Provide sidewalks along the private streets that connect to the public sidewalks at the adjoining public streets. These private sidewalks should provide connections through the project for public access to adjoining areas.

C. The City of Burien will not accept private streets for maintenance as public streets until such streets are brought into conformance with current City of Burien Code and these Standards.

D. Best Management Practices (BMP'S) should be used when maintaining private roadways.

E. City of Burien will not accept private streets within short plats when the roads providing access to the plat are private and already have the potential to serve more than the number of lots specified in Section 2.05(B.7). If a short plat has been proposed on a property to which the only access is over private streets that fail to meet the standards specified in this section, the proposal shall be denied.

2.06 "Skinny Streets"

New residential developments may use narrower streets to use less land for roadways. Called "Skinny Streets", these residential access streets are less than 28' wide, but no narrower than 20'. The widths of these streets are dependent on the presence of parking on one or both sides of the street. The dimensional standards for "skinny streets" are identified as the minimum allowed values in Chart 2.1(C) and illustrated in figure 2.8

2.07 Half Streets

A. A half street, figure 2-7, may be permitted as an interim facility when:

1. Such street shall not serve as primary access to more than 35 dwelling units or equivalent ADT; and

2. Such alignment is consistent with or will establish a reasonable circulation pattern; and

3. There is reasonable assurance of obtaining the prescribed additional right-of-way from the adjoining property with topography suitable for completion of a full-section road.

B. A half street shall meet the following requirements:

1. Right-of-way width of the half street shall be a minimum width of thirty feet and sufficient to construct the roadway and related grading; and

2. The half street shall be graded consistent with locating the centerline of the ultimate road section as close as possible to the property line; and

2. Traveled way shall be surfaced the same as the designated road type to a width not less than 20 feet, 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 in order to assure proper drainage, bank stability, and traffic safety; and

5. Half streets shall not intersect other half streets or exceed these requirements unless so approved by the Public Works Director or his or her designee, and

6. The intersection of a half street shall be improved to full width standards, and

7. Improvements to half-streets shall meet the requirements of Section 4.03 of these Standards.

C. 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 crowned street of a designated section.

D. Obtaining any right-of-way or easements to accomplish the above shall be the responsibility of the applicant or developer.

2.08 Cul-de-sacs, Islands, and Hammerheads

A. Cul-de-sacs: Whenever a dead-end street serves or will serve more than six units or extends more than 150 feet from centerline of accessing street to farthest extent of surfaced traveled way, a widened "bulb," figure 2-3 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.

2. Minimum diameter of surfacing across bulb: 80 feet of paving in curb-type road.

3. Sidewalks shall be constructed on both sides of the cul-de-sac.

4. A permanent cul-de-sac shall not be longer than 600 feet measured from centerline of intersecting loop or through street to the center of the bulb section. On the basis of pertinent traffic planning factors such as topography, sensitive areas and existing development, the Public Works Director or his or her designee will consider variances to this requirement.

5. The Public Works Director or his or her designee may require an emergency vehicle access and/or an off-street walkway to connect a cul-de-sac at its terminus with other streets, parks, schools, bus stops, or other pedestrian traffic generators.

6. If a street temporarily terminates at a property boundary, serves or will serve more than six lots, or is longer than 150 feet, a temporary bulb shall be constructed near the development boundary. The paved bulb shall be 80 feet in diameter with sidewalks terminated at the point where the bulb radius begins. Removal of the temporary constructed cul-de-sac and construction of the extension of the sidewalk shall be the responsibility of the applicant/developer who extends the road. See figure 2-4.

7. The maximum cross slope in a bulb shall not exceed 6 percent in any direction.

8. Partial bulbs or eyebrows shall have a minimum paved radius and an island configuration as shown on figure 2-6. Island shall be offset two feet from edge of roadway.

9. Temporary cul-de-sac easements are extinguished, when applicable, through the right-of-way vacation process.

10. When a commercial access street change from a public to private designation a public turnaround shall be required, regardless whether another fire access turnaround is provided elsewhere, except as noted in Section 2.08(A).

B. Cul-de-sac Island: A cul-de-sac island is an optional feature for any cul-de-sac when bulb paved diameter is 80 feet or less; mandatory when bulb paved diameter exceeds 80 feet. If provided, island shall have full-depth cement concrete vertical curb and gutter. Minimum island diameter shall be 10 feet and there shall be at least 30 foot wide paved traveled way in a shoulder-type section and a 30-foot wide paved traveled way in a curb-type section around the circumference. An island shall be grassed, landscaped, or contain

bioretention, if feasible. See figures 2-13 and 2-14 for cul-de-sac alternative with bioretention. The adjoining property owners are responsible for the landscaped and or grassed area within the island, including landscaping within a bioretention facility.

C. Hammerheads: A hammerhead may be used to satisfy the turnaround requirements where a private street serves or will serve 6 or fewer lots. See figure 2-5.

2.09 Alleys and Private Access Tracts

The geometric design criteria for sub-access streets shall be used to design alleys. An alley is considered a private road that provides secondary access.

A. Alleys

1. An alley shall serve a maximum of 48 dwelling units; have a maximum length of 400 feet, no dead ends or cul-de-sacs. In new construction, an alley can be used as a secondary access, provided they have a minimum width of 16 feet and have a one-way direction designation.

2. The tract width shall be sufficient to construct the alley and related grading. The minimum tract width shall be 20 feet with a pavement surface width of 18 feet (including curb) based on a 5-foot structure setback. For differing structure setback requirements, the alley surfacing width may be reduced if designed to provide for safe turning access to properties.

3. Paved surface shall have a curb on one side and cross slope in one direction to control surface runoff.

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. Where connecting streets are curb type sections, driveway cuts shall be required.

5. Development proposals which propose the use of alleys for daily access must improve existing alleys to provide a paved, all weather surface and associated drainage improvements. Alleys proposed for daily access are subject to approval by the Public Works Director or his or her designee.

6. Alleys shall not intersect other alleys.

B. Private Access Tracts

Private access tracts shall meet the geometric design criteria for minor access streets and the following:

1. A private access tract shall serve a maximum of six dwelling units.

2. Minimum tract width of 26 feet with a maximum length of 150 feet, measured from centerline of intersecting street to furthest extent of paved

tract. In addition, if the tract width is inadequate to provide for the necessary drainage facilities and utilities serving the development, an easement may be required to provide additional width.

3. Pavement width shall be a minimum of 20 feet including curb (rolled, extruded, or thickened edge) and gutter in urban areas.

4. Pedestrian connections from the public sidewalks within the public right of way will be required within the private access tract.

2.10 Commercial Alleys

The geometric design criteria for sub-access streets shall be used to design alleys. An alley is considered a public or private road that provides secondary access to commercial buildings fronting other streets.

A. Alleys

1. The tract width shall be sufficient to construct the alley and related grading. The minimum tract width shall be 20 feet with a pavement surface width of 18 feet (including curb) based on a 2-foot structure setback. This width is subject to Fire Marshall approval. See figure 2.9.

2. Surface runoff from the pavement surface must be controlled.

3. 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.

4. Alleys shall not intersect other alleys.

5. New construction adjacent to downtown alleys shall be setback from the alley exit to provide a sight line triangle as illustrated in Figure 2.10.

TABLE 2.4 – INTERSECTIONS AND LOW-SPEED CURVES

A. Intersections

1. Angle of intersection (measured at 10 feet beyond road classification right-of-way)	Minimum 85 degrees Maximum 95 degrees
2. Minimum centerline radius (2-lane) (radii are for minor or subaccess streets)	55 feet
2. Minimum curb radius	
a. Arterials and roads classified neighborhood collector or higher:	35 feet
b. Residential access street intersections where the highest classification involved is subcollector:	25 feet
4. Minimum right-of-way line radius:	25 feet

B. Spacing between adjacent intersecting streets, whether crossing or T-connecting, shall be as follows:

When highest classification involved is:	Minimum centerline offset shall be:
Principal arterial	1,000 feet
Minor arterial	500 feet
Collector arterial	300 feet
Neighborhood collector	150 feet
Any lesser street classification	100 feet

C. 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 (intersected by an imaginary 2 percent grade extended from crowned road to right-of-way line) of intersecting street as provided in Section 2.03. See figure 2.11.

D. Roundabout intersections taking the place of standard intersections shall be designed in accordance with current USDOT/FHWA guidelines and the WSDOT Design Manual.

E. Entering Sight Distance. See Sections 2.03, and 2.13 for design requirements. See Tables 2.1 or 2.2 for specific entering sight distance values based on required design speed.

F. Low Speed Curves: applicable to subaccess and minor access streets only.

	Up to 75°	75° & Over
1. Minimum centerline radius (two-lane):	100 feet	55 feet
2. Minimum curb radius:	80 feet	35 feet
3. Minimum right-of-way line radius:	70 feet	25 feet

2.11 Maximum Grade and Grade Transitions

A. Maximum roadway grade as shown in Tables 2.1(A), 2.1(B) and 2.1(C) may be exceeded for short distances of 300 feet or less, upon showing that no practical alternative exists. Grades greater than 15 percent that exceed the 300-foot distance must be approved by the Public Works Director or his or her designee through the road variance process. Additionally, the maximum grade shall not exceed 15 percent unless verification is obtained from the Fire Marshal that additional fire protection requirements will be met and the applicant's engineer must demonstrate what method will be used to ensure drainage will be controlled. Grades exceeding 12 percent shall be paved with hot mix asphalt (HMA) or Portland cement concrete (PCC).

B. Grade transitions shall be constructed as smooth vertical curves, without angle points, except in intersections where the difference in grade is one percent or less and upon approval of the Public Works Director or his or her designee.

2.12 Stopping Sight Distance

Stopping Sight Distance shall be calculated in accordance with "A policy on Geometric Design of Highways and Streets", (AASHTO).

2.13 Entering Sight Distance (ESD)

Entering Sight Distance shall be calculated in accordance with "A policy on Geometric Design of Highways and Streets", (AASHTO).

2.14 Medians (Optional Design Feature)

Median width shall be additional to, not part of the specified width of traveled way. Edges shall be similar to outer road edges: either extruded or formed vertical curb; or shoulder and ditch; except that median shoulders shall be four feet in width minimum. Twenty feet of drivable surface (which includes traveled way and paved shoulders, if any) shall be provided on either side of the median. The median may be grassed, landscaped, or surfaced with aggregate or pavement. 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. The Public Works Director or his or her designee may require revisions to medians as necessary to provide for new access points and to maintain required sight distance. Non-yielding or non-breakaway structures shall not be installed in medians. Street trees may be planted in the median subject to approval by the Public Works Director or his or her designee.

2.15 One-Way Streets

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

2.16 Bus Zones and Turn-Outs

During the design of arterials and neighborhood collectors, the designer shall contact the transit agencies and the local school district to determine bus zone (stop) locations and other bus operation needs. The project shall provide wheelchair accessible landing pads at designated bus zones, and where required shall include bus bulbs and shelter pads. Pedestrian and disabled access improvements within the right-of-way to and from the bus loading zone or turn-out from nearby businesses or residences shall also be provided as part of the road improvement. Metro's publication, "Metro Transportation Facility Design Guidelines," or other applicable agencies guidelines may require additional surfacing requirements.

2.17 Slope, Wall, and Drainage Easements and 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. The Public Works Director or his or her designee may require such easements in conjunction with dedication or acquisition of right-of-way. The design engineer must document there is sufficient right-of-way to include cuts and fills and necessary clear zone.

B. Right-of-Way Reduction: The right-of-way width may be reduced to minimum roadway width, plus storm drainage, sidewalk, one-foot behind sidewalk, provided that potential serving utilities are accommodated within permanent public easements. The reduced right-of-way, plus easement, at a minimum shall allow for construction and maintenance of the sidewalks, one-foot behind sidewalk, planting strips, drainage facilities, and sign placement. Additionally, they shall allow for sidewalk widening around mailbox locations.

2.18 Access and Circulation Requirements

In order to provide a second access to a residential subdivision, short subdivision, binding site plan or planned unit development, no neighborhood collector or neighborhood access street shall serve more than 100 lots or dwelling units or have an ADT of greater than 1000 vehicles per day unless the street is connected in at least two locations with another street that functions at a level consistent with Sections Street Connectivity Evaluation Criteria (See Appendix).

A. The second access requirement may be satisfied through use of connecting a new street to an existing street in an adjacent neighborhood if:

No other practical alternative exists, or

Existing street was previously stubbed indicating intent for future access, or

An easement had been recorded specifically for said purpose.

B. The second access requirement may not be satisfied through the use of an existing roadway network in the existing adjacent neighborhood if:

A more practical alternative exists, or

Existing streets do not meet the minimum roadway requirements

These provisions are not intended to preclude the state statute on land locking.

2.19 Traffic Signals and Roundabouts

A. Roundabouts may be considered at intersections within the City of Burien. Proposed roundabouts shall be evaluated consistent with WSDOT Design Manual Sections 910.08 and 915.01.

B. Preparation of Traffic Signal plans and specifications and other traffic control devices shall be consistent with the WSDOT standard specifications and procedures for maintenance and operations. All designs must be prepared by a licensed engineer, registered in the State of Washington, with experience in preparation of traffic signal plans / specifications. A pre-design meeting must be scheduled by the applicant to coordinate with the City on general requirements and identify the parameters of the design. "Boiler plate" specifications for traffic signals will be provided by the City on disc for the applicant to prepare final specifications for approval by the Director of Public Works.

1. The applicant is responsible for securing any state and local permits needed for traffic signalization and regulatory signing and marking.
2. All signals shall be equipped with preemption that is compatible with the equipment approved by the Fire Marshall. New traffic signals installations shall include a minimum of one spare conduit run (2" minimum) for any arterial crossing.
3. Warrants for traffic signals shall be consistent with the practices set forth in the MUTCD. The Director of Public Works shall determine consistency with these practices based on submitted information by the applicant when determining if a traffic signal is warranted and consistent with city planning.
4. Traffic signal interconnect to nearby affected signals may be required for any new traffic signal installation to promote progression of traffic and improved efficiency of the travel stream.

FIGURE 2.1 - VERTICAL CURB TYPE ROADWAY

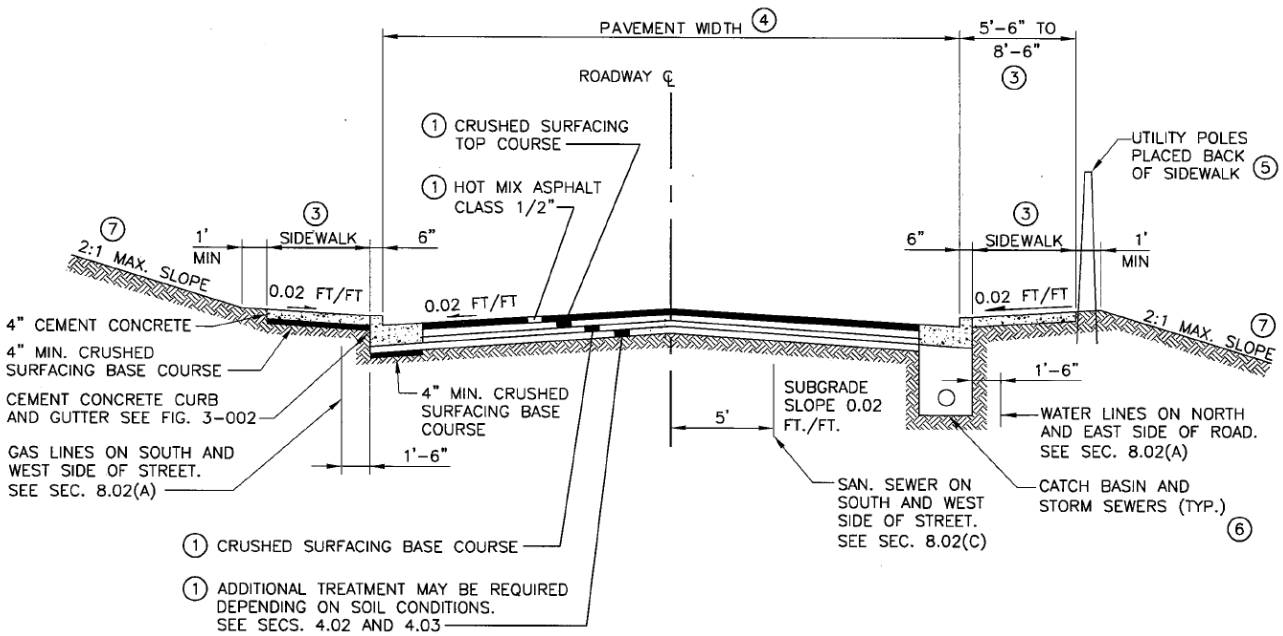


FIG 2.1

NOTES:

1. THIS DRAWING ILLUSTRATES A TYPICAL ASPHALT CONCRETE ROAD SECTION, OPTIONAL DESIGN SECTION. ACTUAL SURFACING DESIGN FOR ARTERIALS AND COMMERCIAL ACCESS STREETS SHALL BE BASED ON SECTION 4.05
2. GRADES:
   MINIMUM 0.5%
   MAXIMUM SEE SECS. 2.03 AND 2.11
3. SIDEWALKS SHALL BE 8 FT. WIDE IN BUSINESS DISTRICTS AND 6.5 FT. WIDE ON ARTERIALS IN NEXT TO TRAFFIC LANE, 5 FT. WIDE IF NEXT TO PARKING OR BIKE LANE, OR BEHIND PLANTING STRIP. SEE SECTION 3.02 3
4. SEE SECS. 2.02 AND 2.03 FOR WIDTHS OF PAVEMENT, SHOULDER, AND RIGHT-OF WAY.
5. SEE SEC. 8.02G AND FIG. 5-001 FOR CLEARANCE OF UTILITY POLES.
6. SEE CHAPTER 7 FOR CATCH BASIN AND STORM SEWER LOCATIONS AND DRAINAGE DETAILS.
7. SEE SEC. 5.02 FOR SIDE SLOPE REQUIREMENTS.

FIGURE 2.2 - ROLLED CURB TYPE ROADWAY

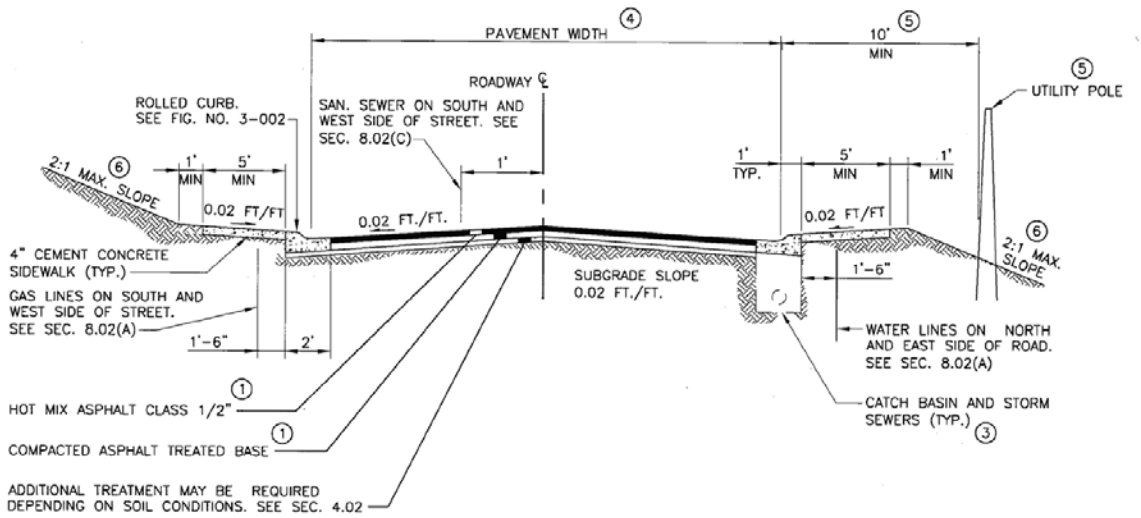
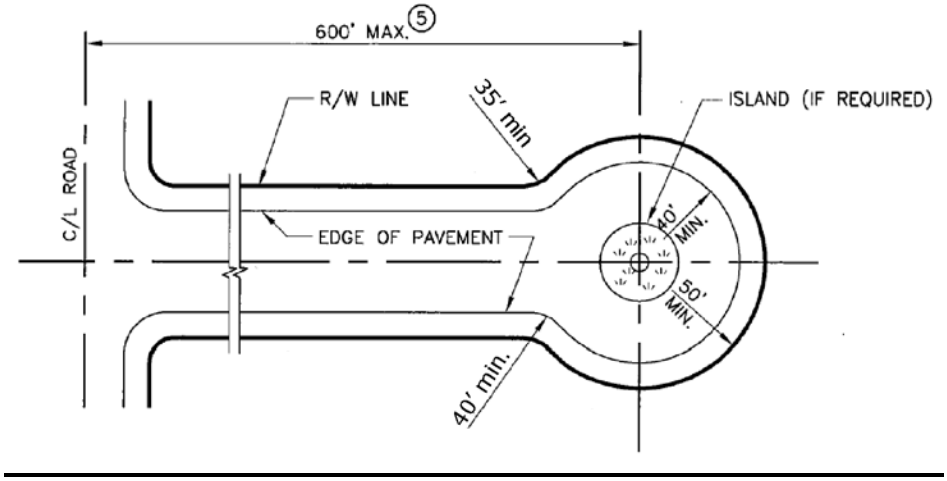


FIG 2.2

NOTES:

1. THIS DRAWING ILLUSTRATES A TYPICAL ASPHALT CONCRETE ROAD SECTION, OPTIONAL DESIGN SECTION. SEE CHAPTER 4 FOR OTHER ALTERNATIVES AND POSSIBLE REQUIREMENTS FOR FRACTURED AGGREGATE OR INCREASED THICKNESS OF SURFACING MATERIALS.
2. GRADES:
   MINIMUM 0.5%
   MAXIMUM SEE SECS. 2.03 AND 2.11
3. SEE CHAPTER 7 FOR CATCH BASIN AND STORM SEWER LOCATIONS. SEE FIGS. 7-017, 7-019, 7-020 AND 7-021 FOR GRATE DETAILS.
4. SEE SECS. 2.03 FOR WIDTHS OF PAVEMENT AND RIGHT-OF-WAY.
5. SEE SEC. 8.02G AND FIG 5-001 FOR CLEARANCE OF UTILITY POLES.
6. SEE SEC. 5.02 FOR SIDE SLOPE REQUIREMENTS.
7. A PAVEMENT WIDTH OF 20 FT. IS ALLOWED FOR URBAN 4-LOT SHORT PLATS. THE PUBLIC WORKS DIRECTOR OR DEVELOPMENT ENGINEER SHALL DETERMINE ANY NEED FOR SIDEWALKS.

FIGURE 2.3 - CUL-DE-SACS



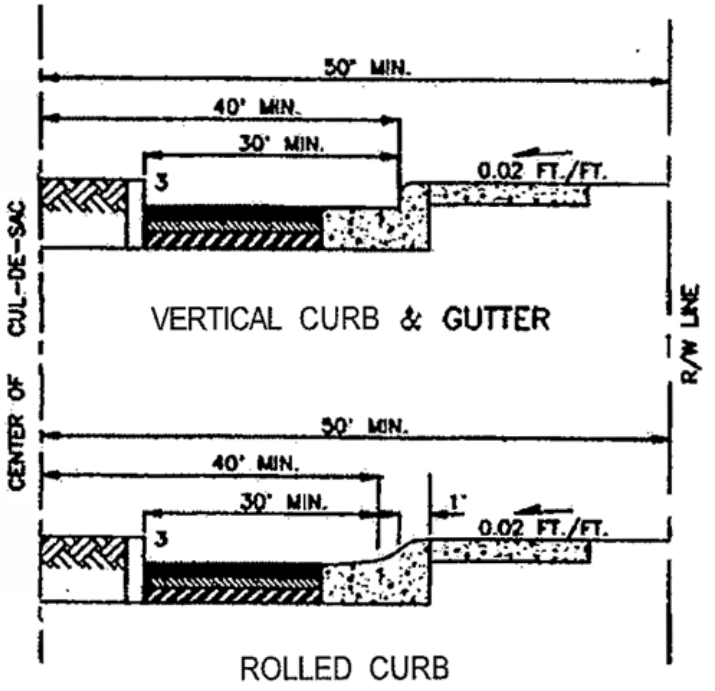


FIG 2.3

NOTES:

1. SEE SEC. 2.08.
2. EXTRUDED CURB IS ALSO ACCEPTABLE FOR OUTER EDGE AS ALTERNATIVE TO SHOULDER AND DITCH. SEE FIG. 2-005.
3. ISLAND AT CENTER OF BULB SHALL HAVE VERTICAL OR EXTRUDED CURB. SEE FIG. NO. 3-002.
4. ISLAND IS MANDATORY WHEN RADIUS OF PAVED AREA EXCEEDS 40 FT.
5. SEE SEC. 2.08 FOR CUL-DE-SAC LENGTH EXCEPTION.
6. SEE SECS. 2.03 AND 2.08 FOR RIGHT-OF-WAY REDUCTION REQUIREMENTS.
7. NO CURBSIDE PARKING IS ALLOWED IN CUL-DE-SAC

FIGURE 2.4 - TEMPORARY CUL-DE-SAC

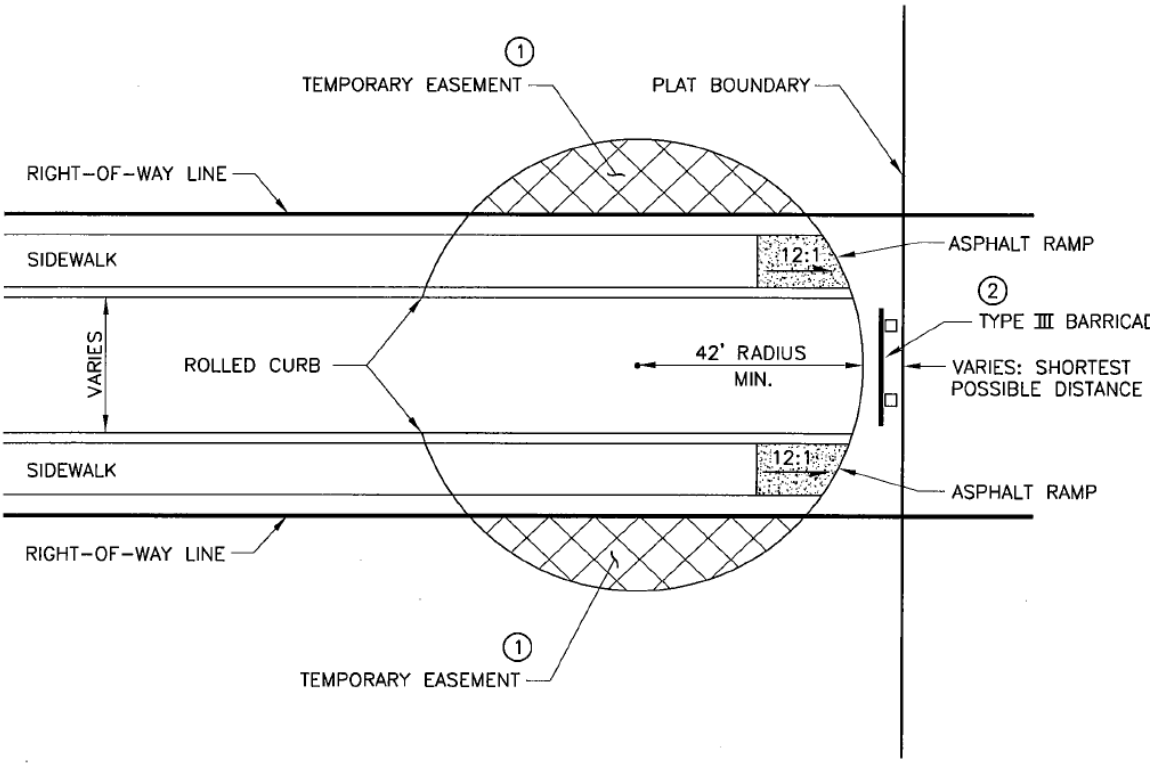


FIG 2.4

NOTES:

1. SEE SEC. 2.08.
2. BARRICADE REQUIRED AT END OF BULB. SEE SEC. 5.07.
3. ON NEIGHBORHOOD COLLECTOR ROADS, THE SIDEWALK SHALL NOT BE EXTENDED THRU THE TEMPORARY CUL-DE-SAC.

FIGURE 2.5 - HAMMERHEAD TURNAROUND

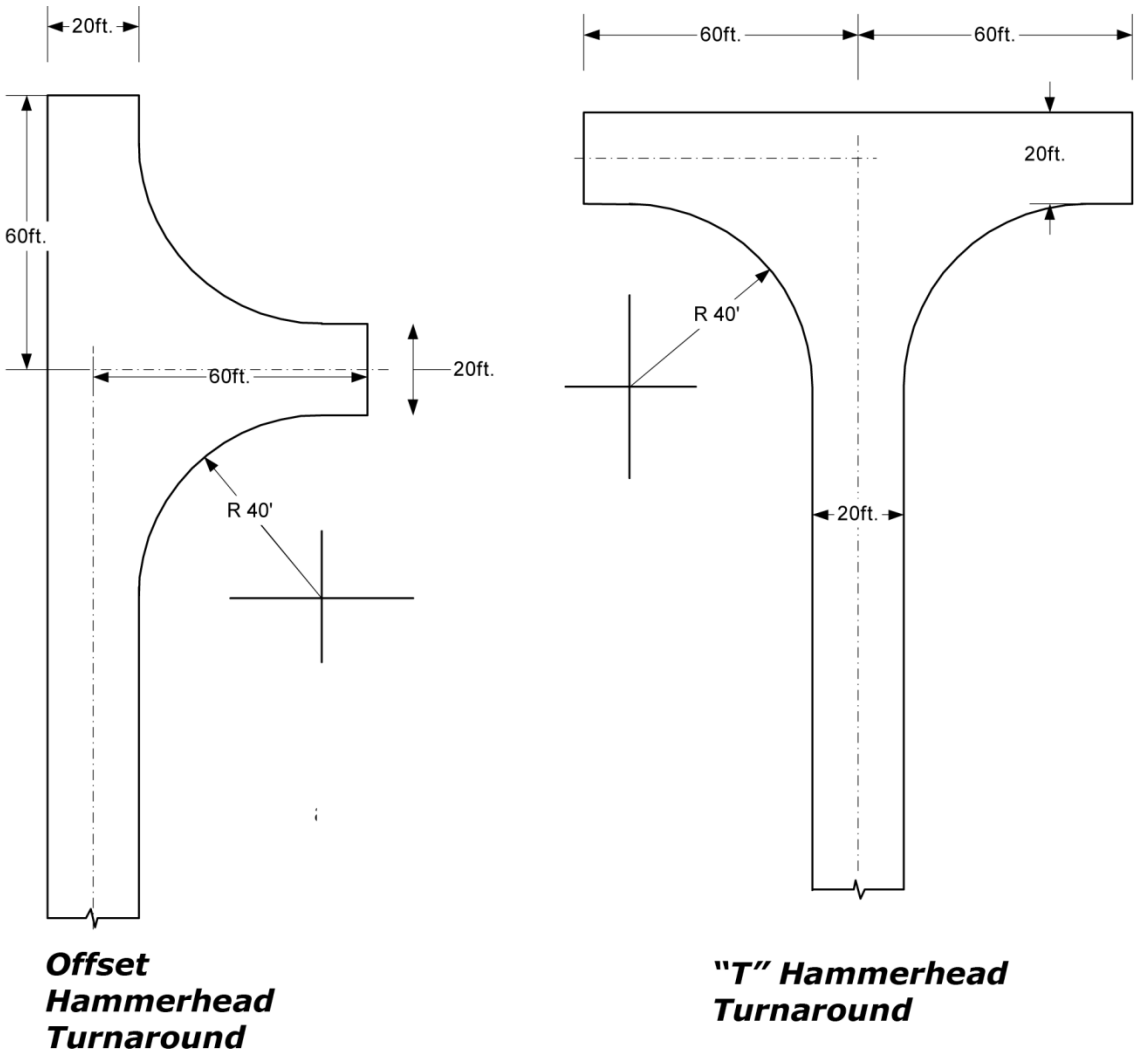


FIG 2.5

NOTES:

1. HAMMERHEAD WIDTH RANGES BETWEEN 90' TO 120', DEPENDENT UPON ROADWAY LENGTH. SIDEWALKS AND UTILITIES MAY BE LOCATED WITHIN PUBLIC EASEMENTS.
2. ALTERNATIVE DESIGNS BY APPROVAL OF THE PUBLIC WORKS DIRECTOR OR HIS OR HER DESIGNEE AND FIRE MARSHAL.
3. TURNAROUND FACILITIES CANNOT BE LOCATED ON DRIVEWAYS.
4. ALL STREET ENDS SHALL BE SIGNED PER THE MUTCD.
5. 20' ROAD DIMENSIONS ARE BASED UPON UNOBSTRUCTED WIDTH.
6. NO CURBSIDE PARKING IS ALLOWED FOR ROADS BUILT TO THE 20' MINIMUM WIDTH.

FIGURE 2.6 - URBAN EYEBROW

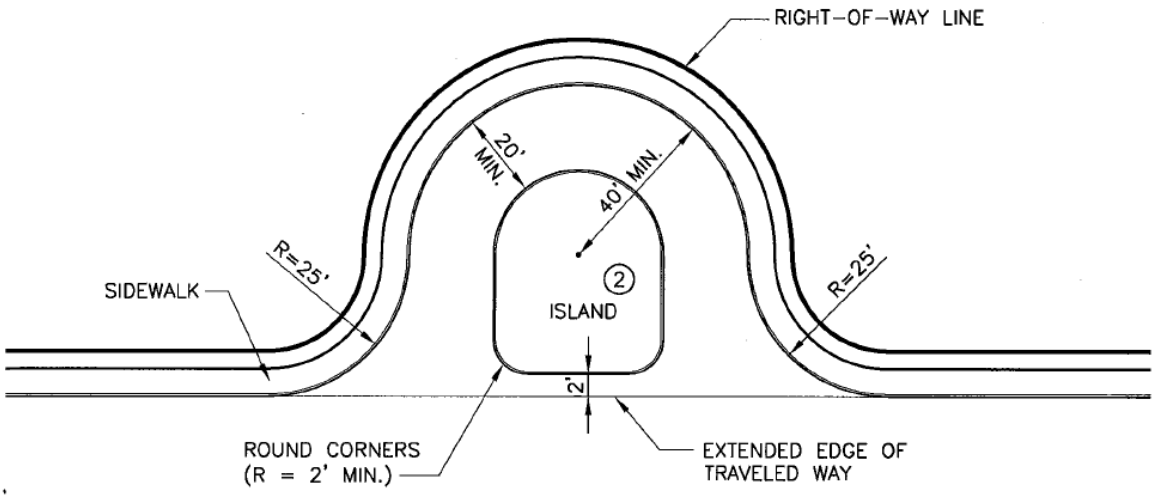


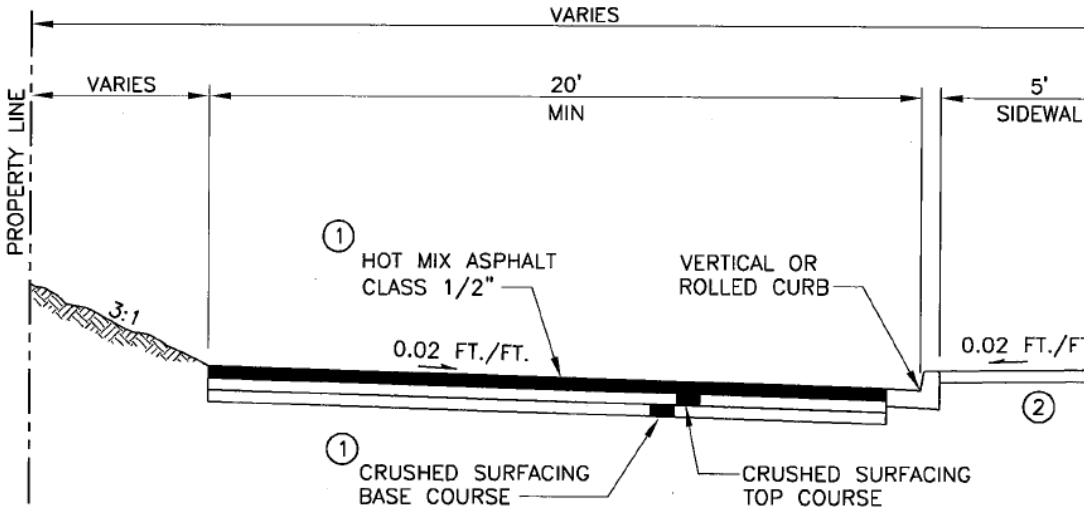
FIG 2.6

NOTES:

1. SEE SEC. 2.08(B)
2. ISLAND REQUIRED ON EYEBROWS WITH RADIUS GREATER THAN 25 FEET.
3. MIN. ISLAND DIAMETER SHALL BE 10 FEET.
4. ISLAND SHALL HAVE VERTICAL OR EXTRUDED CURB. SEE FIG. 3-002

FIGURE 2.7 - HALF STREET

ROLLED CURB SECTION



GRAVEL SHOULDER STREETS

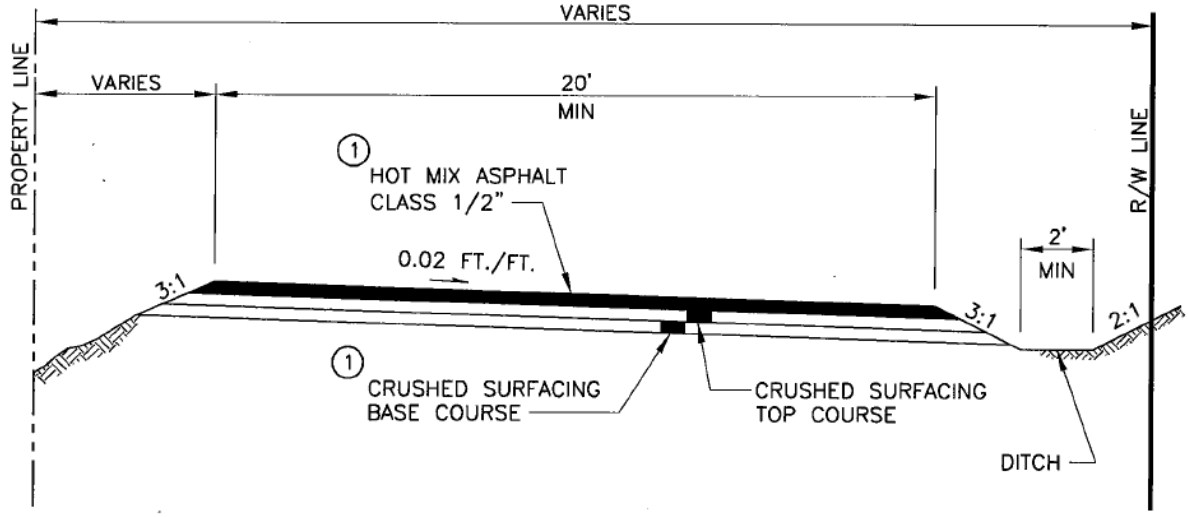
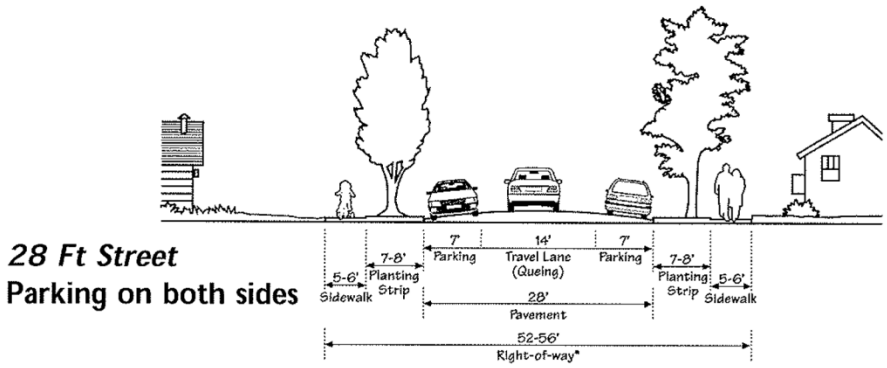


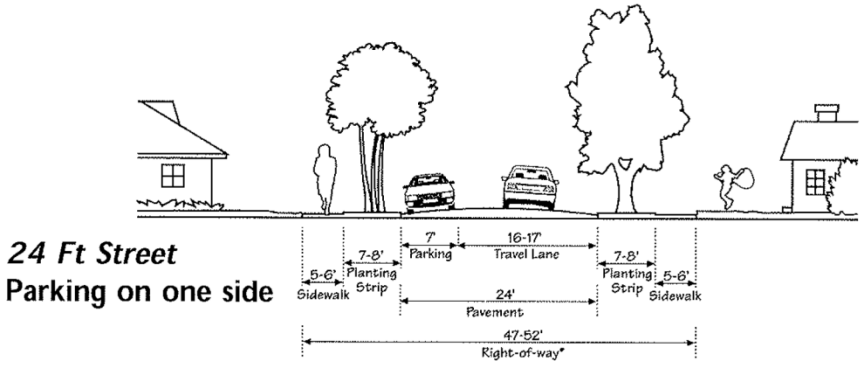
FIG 2.7

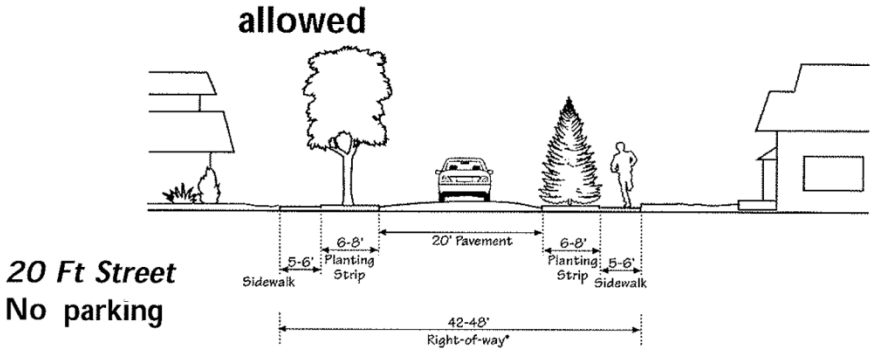
NOTES:

1. SEE CHAPTER 4 FOR SURFACING REQUIREMENTS.
2. SEE SEC. 2.07 FOR HALF-STREET REQUIREMENTS.
3. SEE SEC. 3.02 FOR CONCRETE SIDEWALK REQUIREMENTS.
4. EDGE OF PAVEMENT TO BE CONSTRUCTED AS SHOWN FOR CUT OR FILL SECTION AS APPROPRIATE.

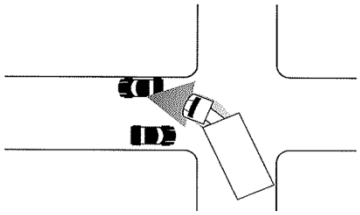
FIGURE 2.8 - RESIDENTIAL ACCESS STREETS, "SKINNY STREETS"







On narrow streets, parked cars near the intersection can interfere with the turning movements of large vehicles.



The solution is to prohibit on-street parking within 20 - 50 feet of intersections.

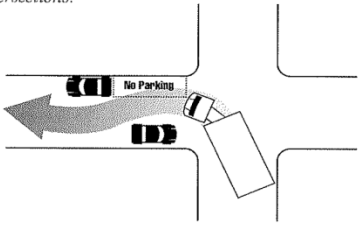


FIGURE 2.9 - COMMERCIAL ALLEY

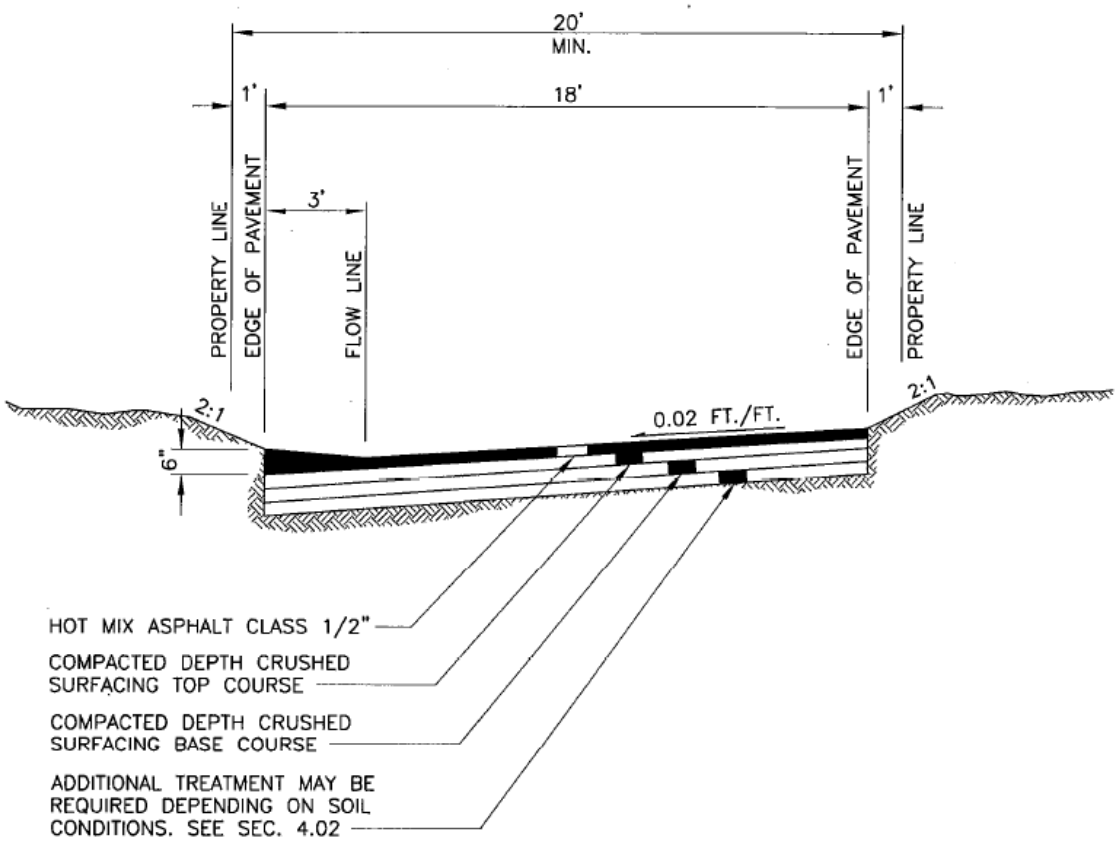


FIG 2.9

NOTES:

1. SEE SEC. 2.09 FOR ALLEY REQUIREMENTS.
2. SURFACING REQUIREMENTS FOR ALLEYS SHALL MEET THE APPLICABLE CRITERIA OF CHAPTER 4.

FIGURE 2.10 - INTERSECTION SIGHT TRIANGLES

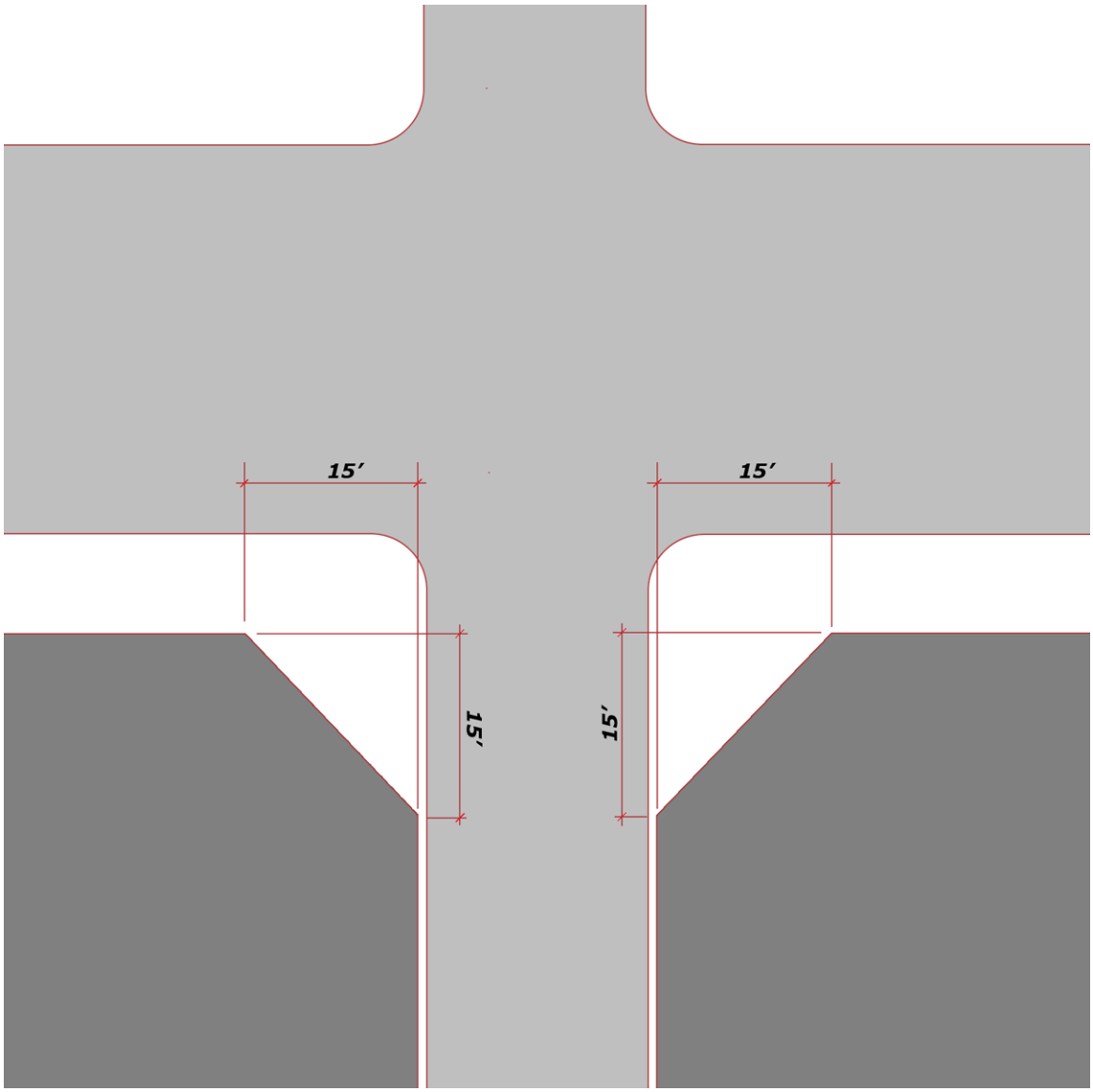


FIGURE 2.11 - MEASURING SIGHT DISTANCE

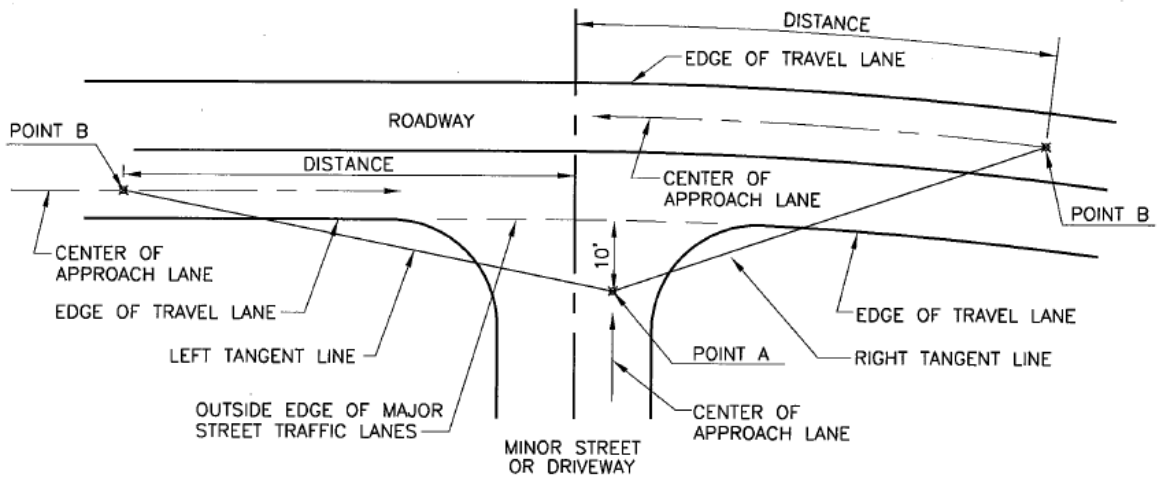


FIG 2.11

NOTES:

1. PARKING STRIPS OR LANES DESIGNATED FOR PARKING ONLY ARE OUTSIDE THIS REFERENCE LINE AND ARE NOT INCLUDED IN THE MAJOR STREET TRAFFIC LANES.
2. SEE STOPPING SIGHT DISTANCE SEC. 2.12.
3. SEE ENTERING SIGHT DISTANCE, SEC. 2.13.
4. ALL STREET ENDS SHALL BE SIGNED PER THE MUTCD.

FIGURE 2.12 - INTERSECTION LANDING

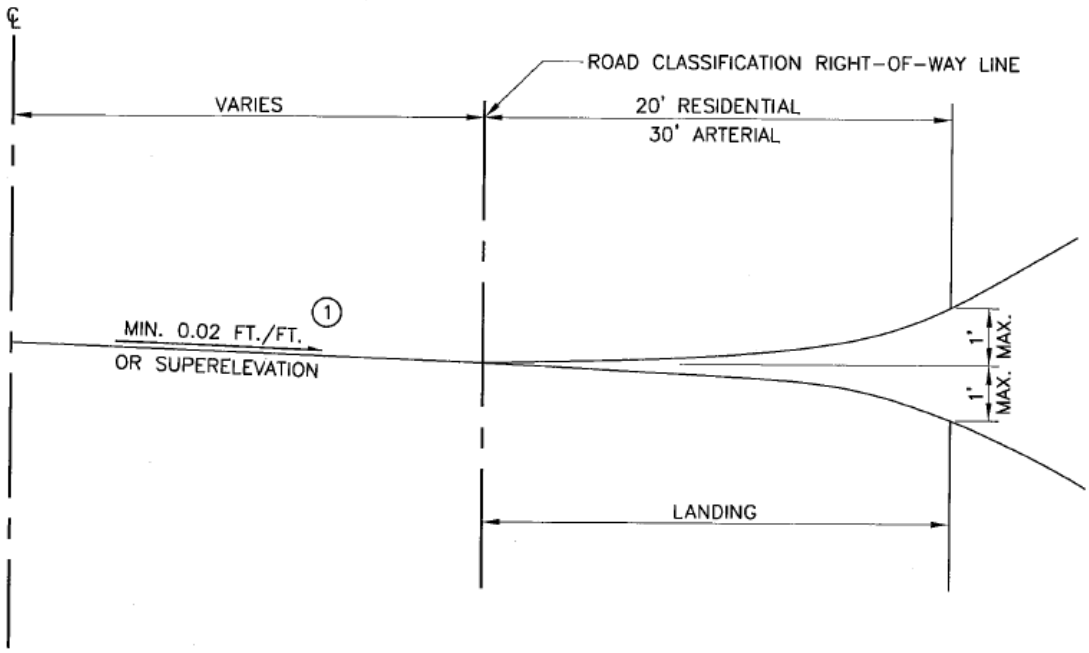


FIG 2.12

NOTES:

1. SEE SEC. 2.03, Tables 2.1(A), 2.1(B) and 2.1(C) FOR SUPERELEVATION REQUIREMENTS.
2. SEE TABLE 2.4 FOR LANDING REQUIREMENTS

FIGURE 2.13 – CUL-DE-SAC ALTERNATIVE PLAN WITH BIORETENTION

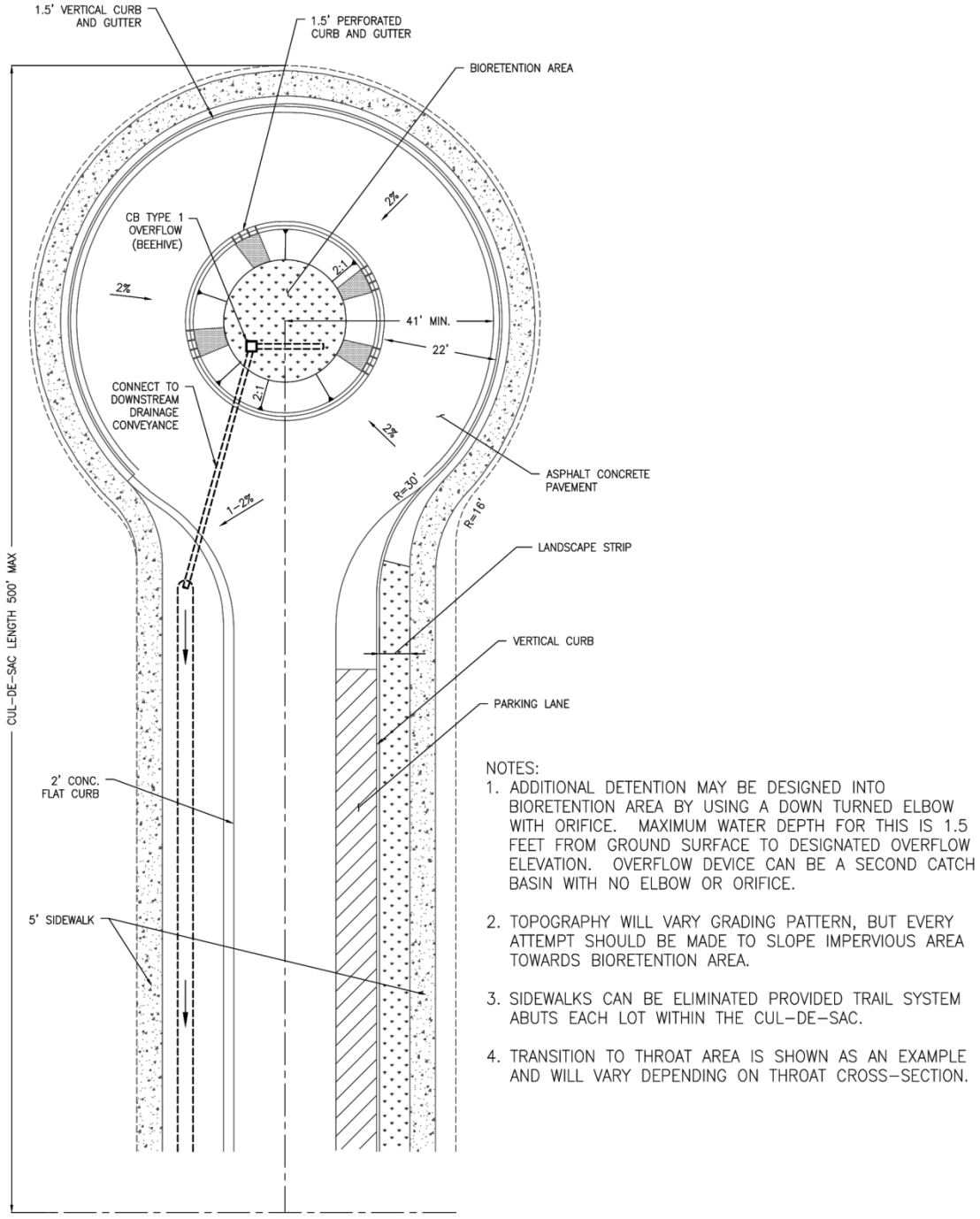
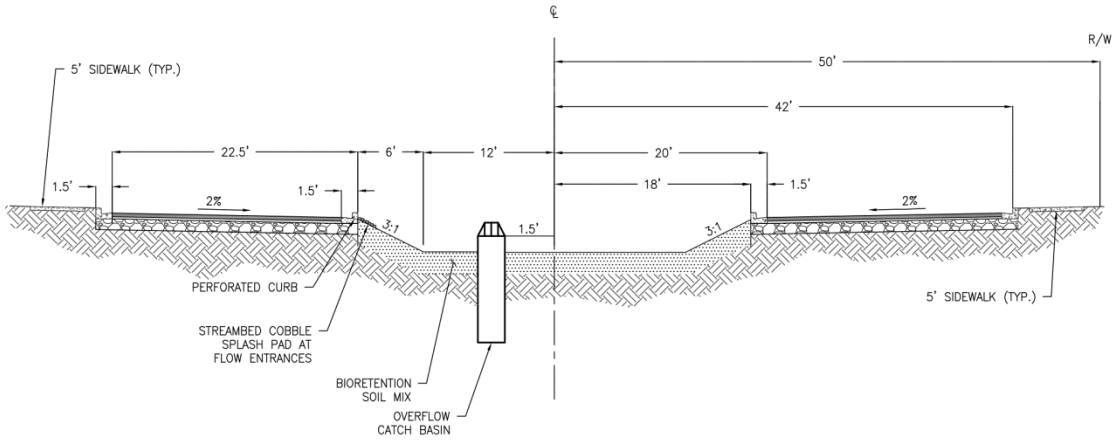


FIGURE 2.14 – CUL-DE-SAC ALTERNATIVE SECTION WITH BIORETENTION

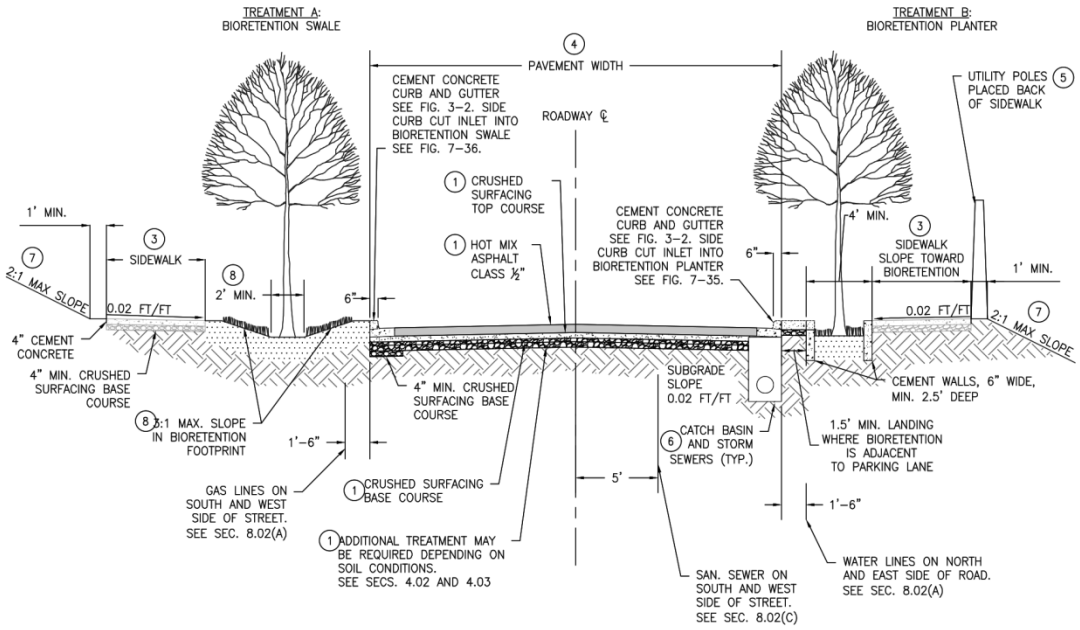


TYPICAL CUL-DE-SAC BIORETENTION CELL

NOTES

1. OVERFLOW CATCH BASIN RIM ELEV. SHALL BE SET 18" ABOVE FINISHED GRADE, AND OUTFALL TO A CONVEYANCE PIPE WITHIN THE DEVELOPMENT.
2. IN BIORETENTION AREA, BIORETENTION SOIL, COMPOSITION AND PH LEVELS SHALL MEET THE STANDARDS SET FORTH IN THE KING COUNTY SURFACE WATER DESIGN MANUAL.
3. BIORETENTION AREA SHALL BE VEGETATED WITH NATIVE TREES AND SHRUBS. HOWEVER VEGETATION WITHIN 6 FEET OF THE BACK OF CURB SHALL NOT BE OVER 18 INCHES IN HEIGHT.

FIGURE 2.15 – TYPICAL STREET SECTION BIORETENTION ALTERNATIVES



NOTES:

1. THIS DRAWING ILLUSTRATES A TYPICAL ASPHALT CONCRETE ROAD SECTION, OPTIONAL DESIGN SECTION. ACTUAL SURFACING DESIGN FOR ARTERIALS AND COMMERCIAL ACCESS STREETS SHALL BE BASED ON SECTION 4.05.
2. GRADES:
   MINIMUM 0.5%
   MAXIMUM SEE SECS. 2.03 AND 2.11
3. SIDEWALKS WIDTHS SHALL BE PER SECTION 3.02.
4. SEE SECS. 2.02 AND 2.03 FOR WIDTHS OF PAVEMENT, SHOULDER, AND RIGHT–OF–WAY.
5. SEE SEC. 8.02G AND FIG. 5–001 FOR CLEARANCE OF UTILITY POLES.
6. SEE CHAPTER 7 FOR CATCH BASIN AND STORM SEWER LOCATIONS AND DRAINAGE DETAILS.
7. SEE SEC. 5.02 FOR SIDE SLOPE REQUIREMENTS.
8. BIORETENTION SHALL HAVE 2' MIN. BOTTOM WIDTH AND SWALE SHALL HAVE 3H:1V MAX. SIDE SLOPES.
9. SIDE CURB CUT INLETS SHALL BE MIN. 25' O.C.

CHAPTER 3. DRIVEWAYS, SIDEWALKS, BIKEWAYS, TRAILS

3.01 Driveways

This section provides driveway standards for connections to public and private roads. It is not the intent of these Standards to govern design or location of driveways on private property except where they connect to the road right-of-way. However, fire access requirements governed by the Uniform Fire Code and the Burien Zoning Code, establish criteria for driveway widths. No new driveway connection shall be constructed which does not conform to this chapter and minimum sight distance criteria established in Sections 2.03, 2.11 and 2.12.

A. Dimensions, slope, and detail shall be as indicated in Figures 3.3, through 3.9, as further specified in the following subsections. See Sections 2.03 and 2.13 and Tables 2.2 and 2.3 for entering sight distance and Section 2.13 for stopping sight distance requirements.
B. New Driveways Requirements:

1. Driveways directly giving access on to arterials may be denied if alternate access is available.

2. All abandoned driveway areas on the same frontage shall be removed, and the curbing and sidewalk or shoulder and ditch section shall be properly restored.

3. Maintenance of driveway approaches shall be the responsibility of the owner whose property they serve.

4. Driveways shall be paved with asphalt between the edge of the paved surface and the right-of-way line, except when on curb and gutter section roadways. See Fig. 3.3.

5. For driveways crossing an open ditch section, culverts shall be adequately sized to carry anticipated storm water flows and in no case be less than 12 inches) in diameter, and at a minimum the culvert shall be equal to or larger than existing pipes within 500 feet upstream. Pipe should be long enough to allow for the minimum 3:1 beveled ends, Fig. 7.1. Culverts should have a minimum of 2 feet of soil cover or be made of ductile iron pipe. The property owner making the installation shall be responsible for determining proper pipe size. The Public Works Director or his or her designee may require the owner to verify the adequacy of pipe size.

6. Storm drainage from driveway surfaces must be accounted for in the roadway drainage design. Direct discharge to roadway surfaces and sidewalks are not allowed.

C. Location and Width of New Driveways. Refer to Fig. 3.8.

1. A residential driveway shall typically serve only one parcel except as noted below. The minimum width of a residential driveway is 10-feet and the maximum width is 20 feet except if: the driveway /parking area serves a 3-car or larger garage; no more than 15% of the required setback is displaced by the driveway.

   A driveway serving more than one parcel shall be classed as a commercial driveway, or a private street, except as provided in 3.a. below.

   In accordance with BMC 19.20.100.4, driveways for all other developments may cross required setbacks or landscaped areas abutting a public right-of-way in order to provide access between the off-street parking areas and the street. Maximum width within the setback or landscaped area is 12 feet for one-way traffic and 24 feet for two-way traffic. A wider encroachment may be allowed, provided no more than 20 percent of the required landscaping or setback area is displaced by the driveway.

2. On frontages 75 feet or less, no more than one driveway per lot shall be constructed. On frontages over 75 feet, the Public Works Director or his or her designee may permit two or more driveways per lot, subject to approval.

3. No portion of driveway width shall be allowed within 5 feet of side property lines where it intersects with the street right-of-way line in residential areas or 9 feet in commercial areas except as follows:

   a. A joint-use driveway tract may be used to serve two parcels:

      i. Minimum driveway tract width shall be 20 feet with an 18-foot paved surface cross slope in one direction and curb or thickened edge on one side. Joint use driveway shall have a maximum length of 150’ from right-of-way line. When required, radius returns on paved apron shall have 10-foot radii.

      ii. The Public Works Director or his or her designee may allow use of an easement if the only access to a serving roadway is through an adjacent parcel not owned by the applicant, or for urban residential short plats to satisfy minimum lot width requirements.

   b. Driveways may utilize full width of narrow "pipe-stem" parcels or easements if approved by Public Works Director or his or her designee.

   c. On cul-de-sac bulbs, eyebrows, or hammerheads as necessary for proposed residential access.

4. 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 driveway Figs. 3.3 through 3.9. The maximum change in driveway grade, within the right-of-way, shall be 8 percent within any 10 feet of distance on a crest and 12 percent within any 10 feet of distance in a sag vertical curve. Whenever there is a potential for future roadway widening, the driveway shall be graded to match the future widened road section without encroachment into graded shoulder or sidewalk. The design engineer for proposed developments shall 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. Driveways with slope exceeding 2 percent shall be designed to ensure surface water does not impact the right-of-way adjacent to the driveway.

5. Driveways in rolled curb sections may be constructed abutting and flush with sidewalk or back of curb without gapping or lowering height of curb.

D. Existing driveways may be reconstructed at their existing location provided such reconstruction is compatible with the adjacent road. For new development and/or changes in land use, existing driveway connections, which do not conform to this chapter, shall be reconstructed to the requirements for new driveways.
E. The minimum width for a commercial/business district driveway is 25 feet, and the maximum width is 35-feet.
F. For commercial or industrial driveways with heavy traffic volumes or significant numbers of trucks, the Public Works Director or his or her designee may require construction of the access 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.
G. Notwithstanding any other provisions, driveways will not be allowed where they are prohibited by separate City Council action or where they are determined by the Public Works Director or his or her designee to create a hazard or impede the safe operation of traffic on the roadway.

3.02 Concrete Sidewalks

Sidewalks shall be required and constructed on urban category, curb and gutter type streets, Figs. 2.2 and 2.3, unless otherwise allowed by these Standards or the Public Works Director or his or her designee. They shall be located and constructed as follows:

A. On all arterials, neighborhood collectors, subcollectors, subaccess, attached dwelling, business access streets, and industrial access streets, both sides.

B. On minor access streets (commercial), both sides unless alternative routes are provided for pedestrians.

C. On minor access streets (residential) exceeding 150 feet, both sides.

D. On any cul-de-sacs, both sides.

E. Extended off-street walkways may be required by the Public Works Director or his or her designee to provide direct connections for ease and safety of pedestrians.

F. Sidewalks shall be constructed next to the curb or behind the bioretention curb extension or planter, if provided, except in those situations where the Public Works Director or his or her designee approves the construction of a planting strip adjacent to the curb.

G. Sidewalk Widths

1. Within the Downtown area

Sidewalk widths, planting strips and other features shall conform to the standards identified in the Downtown Burien Handbook

2. Outside of the Downtown Area

a. Sidewalks shall be a minimum width of 5 feet on residential access streets and arterials. Minimum sidewalk width shall be six and one-half feet on arterials if curb is next to traveled lane. Sidewalks shall be a minimum width of eight feet on commercial access streets.

b. At least 8 feet wide:

i. In business/commercial districts where most of the store frontage is within 80 feet of the street right-of-way.

ii. Within the curb radius returns of all arterial intersections where curb ramps are required.

iii. Within designated bus zones to provide a landing area for wheelchair access to transit services.

3. With specified width greater than 8 feet where the Public Works Director or his or her designee determines this is warranted by expected pedestrian traffic volume.

H. With Portland cement concrete surfacing as provided in Sections 3.03 and 4.01. See specifications for joints in Section 3.04 and Fig. 3.1.

3.03 Construction of Curbs, Gutters, and Sidewalks

A. Subgrade compaction for curbs, gutters, and sidewalks shall meet a minimum 95 percent of maximum density. A minimum 4-inch section of crushed surfacing is required below the curb, gutter and sidewalk.

B. Concrete for curbs, gutters, and sidewalks shall be Class 4000, furnished and placed in accordance with WSDOT/APWA Standard Specifications, Sections 6.2, 8.4, and 8-14. Cold and hot weather precautions as set forth in

WSDOT/APWA Standard Specifications Sections 5.5.3(14) and 6.3.3(6) A shall apply. Once concrete is placed it shall be troweled smooth with a steel trowel. Before jointing or edging, the surface of the walk shall be lightly brushed in a transverse direction with a soft brush. Concrete sidewalks shall be cured for at least 72 hours. Curing shall be by means of moist burlap or quilted blankets or other approved methods. During this curing period, all traffic, both pedestrian and vehicular, shall be excluded.

C. 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 8.4. Joints shall be spaced at ten (10) foot intervals and in accordance with Fig. 3.1.

D. Extruded asphalt curbs shall be constructed in accordance with WSDOT/APWA Standard Specification Section 8.4 and anchored by means of a tack coat of asphalt.

3.04 Expansion and Dummy Joints

A. An expansion joint consisting of 3/8 inch or1/4 inch of pre-molded joint material shall be placed full depth 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). See Fig. 3.1.

B. An expansion joint consisting of 3/8 inch or 1/4 inch of pre-molded joint material shall be placed in the upper two inches of curbs and sidewalks at 10-foot intervals and at sides of drainage inlets. When curbs and/or sidewalks are placed by slip forming, a pre-molded strip up of 1/2 inch thick expansion joint, with a 2 inch to full depth section as described above.

C. Expansion joints in sidewalk shall be located so as to match the joints in the curb whether sidewalk is adjacent to curb or separated by planting strip.

D. Tool marks consisting of 1 inch V-grooves must be made in sidewalk at five-foot intervals, intermediate to the expansion joints.

E. Interface between curb and adjacent sidewalk on integral pour construction shall be formed with 1- inch radius edging tool. On separate pour construction an expansion joint consisting of 3/8 inch or 1/4 inch of pre-molded joint material shall be placed full depth between the curb or thickened edge and the adjacent sidewalk.

3.05 Curb Ramps

On all curbed streets, ramped sections to facilitate passage of disabled persons shall be constructed through the curb and sidewalk at street intersections and other crosswalk locations, Fig. 3.10. Where a ramp is constructed on one side of the street, a ramp shall also be provided on the opposite side of the street. Two ramps shall be provided per radii.

Curb ramps shall be positioned so that a ramp opening is situated within the marked crosswalk or crossing area if unmarked, Fig. 3.10. The ramps shall have detectable warnings consisting of raised truncated domes with a minimum diameter of 0.9 inches and a height of 0.2 inches and center-to-center spacing of a minimum 3.35 inches and are required to have contrasting surfaces. The detectable warning surface shall contrast visually with the adjacent gutter, street or roadway, or walkway surfaces. The detectable warning pattern shall be yellow and in compliance with WSDOT/APWA Standard Specification Section 8.14.3(3), except that painting of the truncated domes will not be allowed due to ongoing maintenance costs associated with painting the domes. Placement of gratings, access covers, and other appurtenances shall not be located on curb ramps, landings and gutters within the pedestrian access route. Additionally, the following requirements apply to perpendicular and parallel curb ramps.

A. Perpendicular Curb Ramps:

1. Perpendicular curb ramps shall have a running slope that cuts through or is built up to the curb at right angles or meets the gutter grade break at right angles.
2. The running slope shall be 5 percent minimum and 8.3 percent maximum but shall not require the ramp length to exceed 4.5 m (15.0 ft.).
3. The cross slope at intersections shall be 2 percent maximum. The cross slope at midblock crossings shall be permitted to be warped to meet street or highway grade.
4. A landing 1.2 m (4.0 ft.) minimum by 1.2 m (4.0 ft.) minimum shall be provided at the top of the curb ramp and shall be permitted to overlap other landings and clear space. Running and cross slopes at intersections shall be 2 percent maximum. Running and cross slope at midblock crossings shall be permitted to be warped to meet street or highway grade.
5. Flared sides with a slope of 10 percent maximum, measured parallel to the curb line, shall be provided where a pedestrian circulation path crosses the curb ramp.
6. Grade breaks at the top and bottom of perpendicular curb ramps shall be perpendicular to the direction of ramp run. At least one end of the bottom grade break shall be at the back of curb. Grade breaks shall not be permitted on the surface of curb ramps, landings, and gutter areas within the pedestrian access route. Surface slopes that meet at grade breaks shall be flush.
7. The counter slope of the gutter or street at the foot of a curb ramp or landing shall be 5 percent maximum.
8. Beyond the curb face, a clear space of 4.0 ft. minimum by 4.0 ft. minimum shall be provided within the width of the crosswalk and wholly outside the parallel vehicle travel lane.

B. Parallel Curb Ramps:

1. Parallel curb ramps shall have a running slope that is in-line with the direction of sidewalk travel.
2. The running slope shall be 5 percent minimum and 8.3 percent maximum but shall not require the ramp length to exceed 15.0 ft.
3. The cross slope shall be 2 percent maximum.
4. A landing 4.0 ft. minimum by 4.0 ft. minimum shall be provided at the bottom of the ramp run and shall be permitted to overlap other landings and clear floor or ground space. Running slope and cross slopes at intersections shall be 2 percent maximum. Running and cross slope at mid-block crossings shall be permitted to be warped to meet street or highway grade.
5. Where a parallel curb ramp does not occupy the entire width of a sidewalk, drop-offs at diverging segments shall be protected.
6. Grade breaks shall not be permitted on the surface of curb ramps, landings, and gutter areas within the pedestrian access route. Surface slopes that meet at grade breaks shall be flush.
7. The counter slope of the gutter or street at the foot of a curb ramp, landing, or blended transition shall be 5 percent maximum.
8. Beyond the curb face, a clear space of 4.0 ft. minimum by 4.0 ft. minimum shall be provided within the width of the crosswalk and wholly outside the parallel vehicle travel lane.

In general, when a feature in the right-of-way is altered, the requirements for new construction must be applied to the maximum extent feasible within the scope or boundary of the project that has been planned. The ADA Guidelines state that an alteration is a change in a space or element that affects, or could affect, the accessibility or usability of that space or element.

3.06 Concrete Steps, Metal Handrail and Barrier-Free Access Ramps

A. Steps shall only be used where acceptable alternative access is available for barrier-free access, and there is a need for a separate stairway. Where used, concrete steps shall be approved by the Public Works Director or his or her designee and constructed in accordance with Fig. 5.7 or other design acceptable to the Public Works Director or his or her designee and consistent with the WSDOT/APWA Standard Specifications. Handrails, whether for steps or other applications, shall be provided consistent with Fig. 5.7 and the WSDOT/APWA Standard Specifications.

B. Ramps used to provide barrier-free access shall have a maximum slope of 12:1 with a maximum rise of 30 inches between landings. Landings shall have a minimum length of 4-feet and should be of sufficient width to allow wheelchairs to pass, generally 4-feet minimum width for two-way traffic.

3.07 Asphalt Shoulders

When allowed, paved shoulders shall be placed in conformance with Table 4.1.

A. In urban areas, asphalt paved shoulders may be used where approved by the Public Works Director or his or her designee 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 white thermoplastic edge line.

3.08 Unpaved Shoulders

Some areas of Burien historically do not have paved shoulders. To provide consistency within these neighborhoods, new roadway construction or improvements to existing roadways may not be required to install curbs and gutters. The Public Works Director or his or her designee must be consulted as to the shoulder paving requirement in these areas. In these areas, existing drainage facilities must be retained or restored to functionality.

3.09 Separated Pedestrian Walkways and Trails

Separated pedestrian walkways and trails shall be provided where designated in the City of Burien Comprehensive Plan; the City of Burien Pedestrian and Bicycle Facilities Plan, and the Downtown Burien Handbook, or where required by the Public Works Director or his or her designee because of anticipated significant public usage.

Separated facilities are typically located on an easement or within the right-of-way when separated from the roadway by a drainage ditch or barrier. Where multi-purpose trails intersect with motorized traffic, sight distance, marking and signalization (if warranted) shall be as provided in MUTCD.

Every effort shall be made to include safe bikeways on all new roadways and reconstruction projects, unless bicyclists are prohibited by law from using the roadway. An exception also may be granted if the designers can demonstrate that there is no need for accommodation or the cost exceeds 20 percent of the project's construction cost. They shall be located and designed according to the City of Burien Comprehensive Plan, City of Burien Pedestrian and Bicycle Facilities Plan, or as directed by other City code or policy.

3.10 School Access

When school access is required as part of development approval, the surfacing shall be a concrete sidewalk or full-width delineated shoulder unless another alternative is available and approved by the Public Works Director or his or her designee through a road variance request.

3.11 Bikeways

Bikeways shall be located and designed according to the of Burien Comprehensive Plan, City of Burien Pedestrian and Bicycle Facilities Plan, or as directed by other City code or policy. Every effort shall be made to include safe

bikeways on all new roadways and reconstruction projects, unless bicyclists are prohibited by law from using the roadway. An exception also may be granted if the designers can demonstrate that there is no need for accommodation or the cost exceeds 20 percent of the project's construction cost.

The planning and design of bikeways in any category shall be in accordance with the WSDOT Design Manual and the AASHTO Guide for the Development of Bicycle Facilities, current edition.

Bikeways are generally shared with other transportation modes. When substantial bike usage is expected, which would benefit from construction of a bikeway, the facility may be required to be designed exclusively for bicycle use. However, where there is limited right-of-way availability or environmental constraints the bikeway may be a shared roadway facility. Bikeways are categorized below based on degree of separation from motor vehicles and other transportation modes. This classification does not denote preference of one type over another.

TABLE 3.1 – Pedestrian and Bicycle Facilities Classification Hierarchy, Surface and Minimum Width

Type	Title	Surface	Minimum Width
1. Fig. 3.17	Shared-Use Commuter Path	Asphalt or Concrete	10’
2. Fig. 3.17	Shared-Use Recreation Path	Asphalt or Concrete	10’
3. Fig. 3.18	Bicycle Lane	Asphalt or Concrete	5’ - May be wider to accommodate high bicycle speeds
4. Fig. 3.18	Shared Roadway/Bikeway	Asphalt or Concrete	Bicyclists share travel lane, wider outside travel lane preferred
5. Fig. 3.19	Commercial District Sidewalk	Concrete	10’-20’
6 Fig. 3.19.	Sidewalk Adjacent to Roadway	Concrete	5’
7. Fig. 3.20	Sidewalk/Pathway with Planting Strip or Swale	Asphalt or Concrete	5’
8. Fig. 3.20	Pedestrian-Only Paved Path	Asphalt or Concrete	5’
9. Fig. 3.21	Widened Shoulder	Asphalt or Crushed Rock	2’
10. Fig. 3.21	Soft Surface Multi-Use Path	Crushed Rock	8’ minimum, 12’ maximum
11. Fig. 3.22	Primary Walking Trail	Crushed Rock	6’ minimum, 10’ maximum
12. Fig. 3.22	Walking Trail	Crushed Rock	3’-6’
13. Fig. 3.23	Rustic Trail	Existing Natural Surface	As narrow as 1’

FIGURE 3.1 - CURB AND SIDEWALK JOINTS

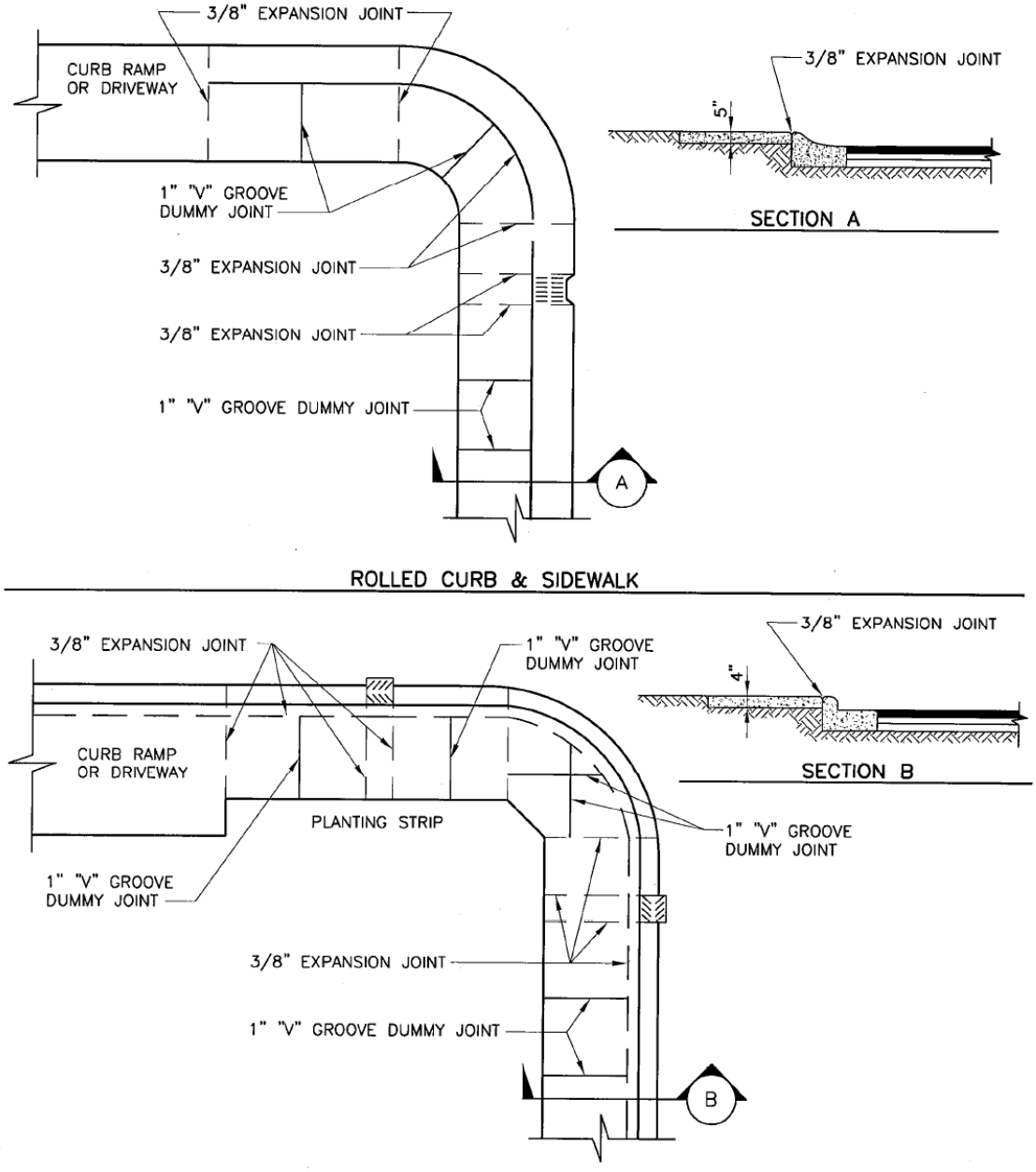


FIG 3.1

NOTES:

1. SEE SEC. 3.04 FOR JOINT REQUIREMENTS.
2. 1 IN. EDGED GROOVE MAY REPLACE 3/8" EXPANSION JOINT AT INTERFACE BETWEEN CURB AND ADJACENT SIDEWALK FOR SEPARATE POUR CONSTRUCTION.

FIGURE 3.2 - CURB DETAILS

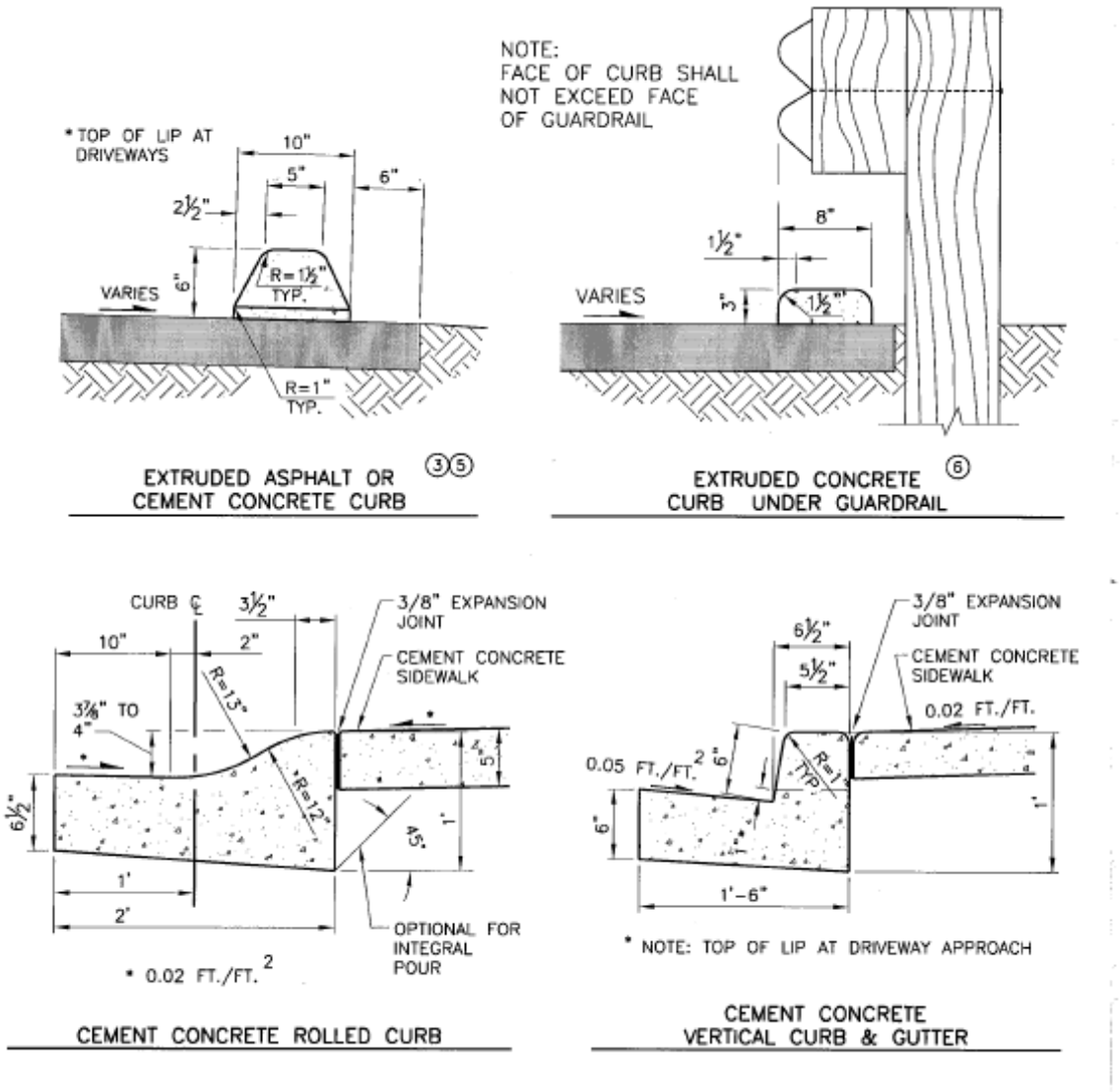


FIG 3.2

NOTES:

1. SEE SEC. 3.04 FOR JOINT REQUIREMENTS.
2. ROLL GUTTER TO MATCH POSITIVE SUPERELEVATION.
3. SEE FIG. 2-5 FOR CONFIGURATION OF FILL AND WALKWAY BEHIND CURB IF REQUIRED.
4. 1 IN. EDGED GROOVE MAY REPLACE 3/8" EXPANSION JOINT AT INTERFACE BETWEEN CURB AND ADJACENT SIDEWALK FOR SEPARATE POUR CONSTRUCTION.
5. SEE SEC. 3.03 FOR EXTRUDED CURB ANCHORAGE.

FIGURE 3.3 - SHOULDER AND DITCH SECTION DRIVEWAY

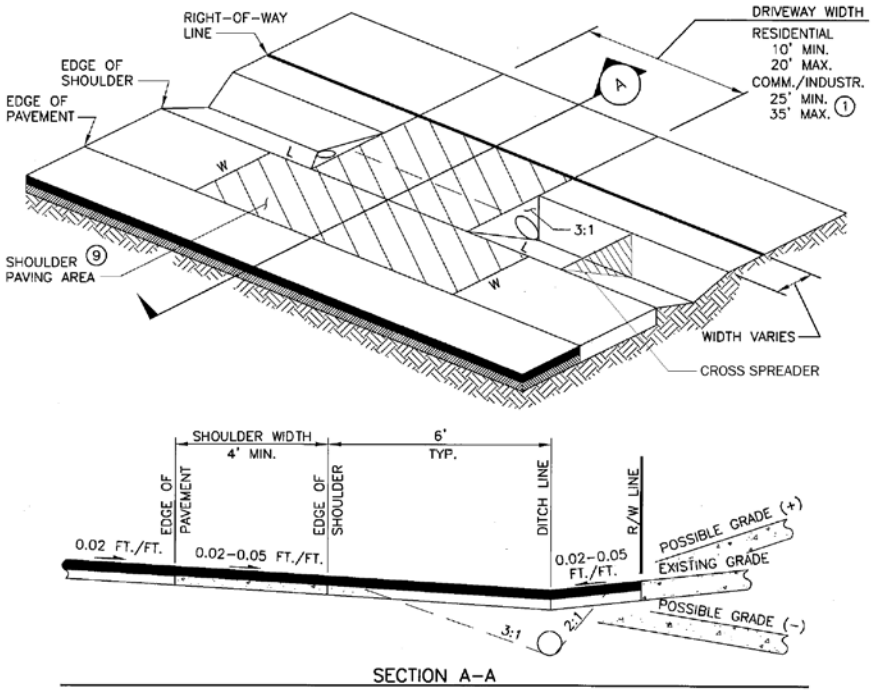
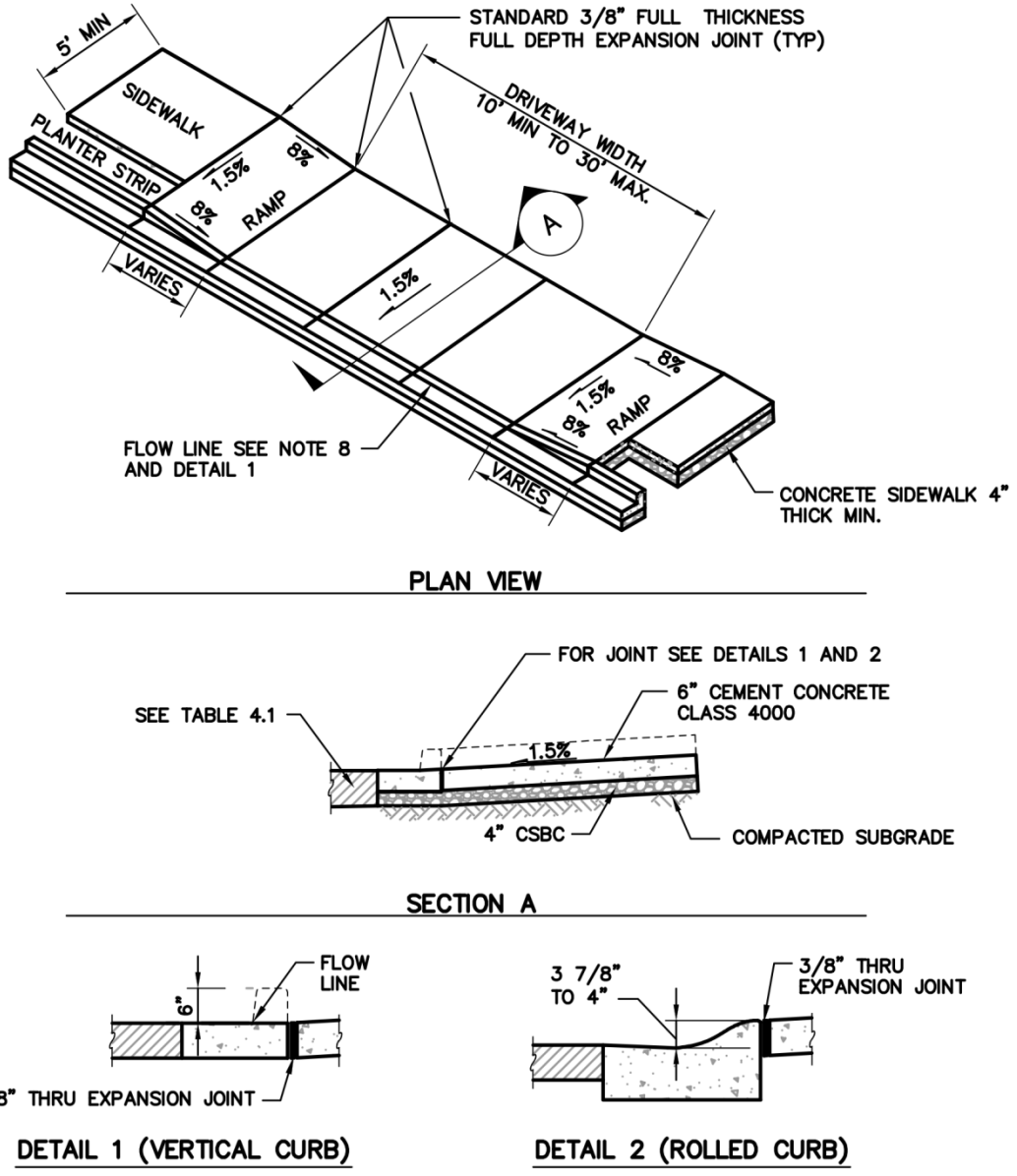


FIG 3.3

NOTES:

1. WITHIN THE RIGHT-OF-WAY DRIVEWAYS SHALL BE PAVED FROM THE RIGHT-OF-WAY LINE TO THE EDGE OF PAVEMENT WITH HOT MIX ASPHALT. NO CONCRETE IS ALLOWED WITHIN THE RIGHT-OF-WAY UNLESS AS SPECIFIED IN SEC. 4.02.
2. COMMERCIAL/INDUSTRIAL DRIVEWAYS WIDER THAN 35 FT. MAY BE APPROVED BY THE COUNTY ROAD ENGINEER CONSIDERING BOTH TRAFFIC SAFETY AND THE ACTIVITY BEING SERVED. ALL COMMERCIAL/INDUSTRIAL DRIVEWAYS SHALL HAVE AN EXPANSION JOINT LOCATED MID-WIDTH. (SEE SEC. 3.04.)
3. PIPE SHALL BE:
    A. SIZED TO CONVEY COMPUTED STORM WATER RUNOFF, AND
    B. MIN. 12" DIAMETER, AND
    C. EQUAL TO OR LARGER THAN EXISTING PIPES WITHIN 500 FT. UPSTREAM.
4. 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.
5. ALL TYPES OF PIPE SHALL HAVE MINIMUM 24" COVER TO FINISH GRADE.
6. 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.
7. PIPE MAY BE OMITTED IF ROADSIDE DITCH DOES NOT EXIST AND DRIVEWAY DOES NOT BLOCK NATURAL FLOW.
8. 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.
9. GRAVEL DRIVEWAYS SHALL BE PAVED BETWEEN THE EDGE OF THE PAVEMENT AND R/W WITH A.C. OR B.S.T. ONLY WITH DIMENSIONS L=W.
10. SEE SEC. 3.01 AND 4.01 FOR DRIVEWAY AND SURFACING STANDARDS.
11. PIPING OF DITCHES SHALL BE ALLOWED ONLY WHERE DRIVEWAY ACCESS IS NECESSARY.
12. ADD STANDARD CROSS SPREADER TO DISPERSE FLOW

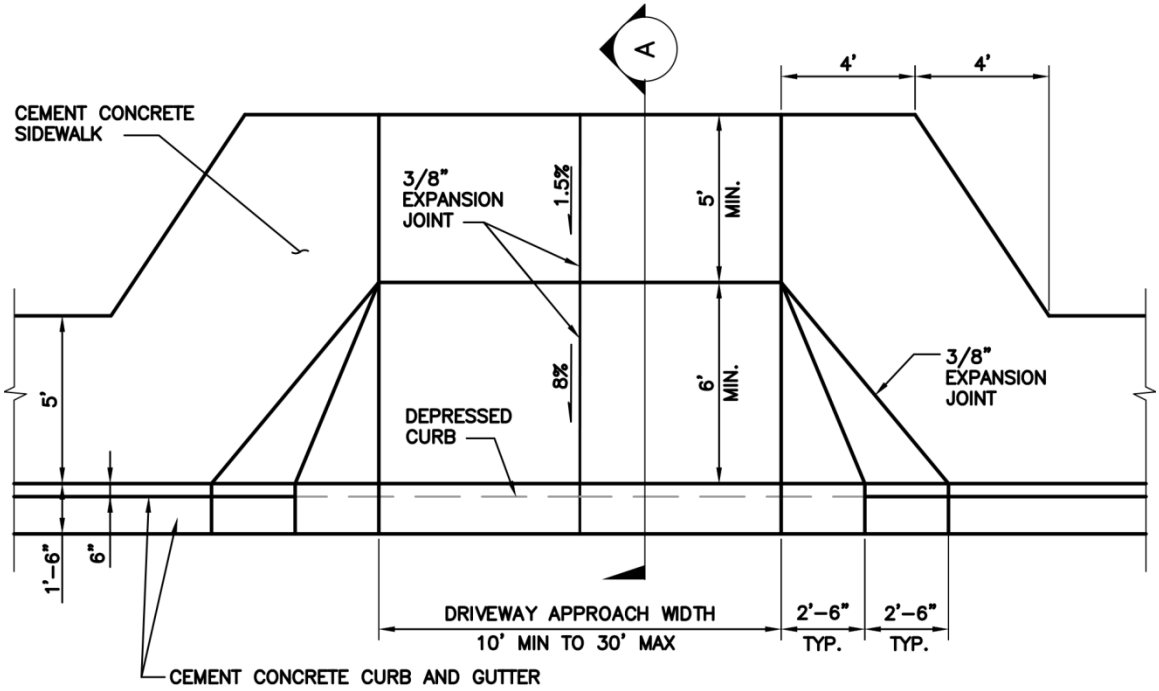
FIGURE 3.4 - TYPE 1 DRIVEWAY APPROACH

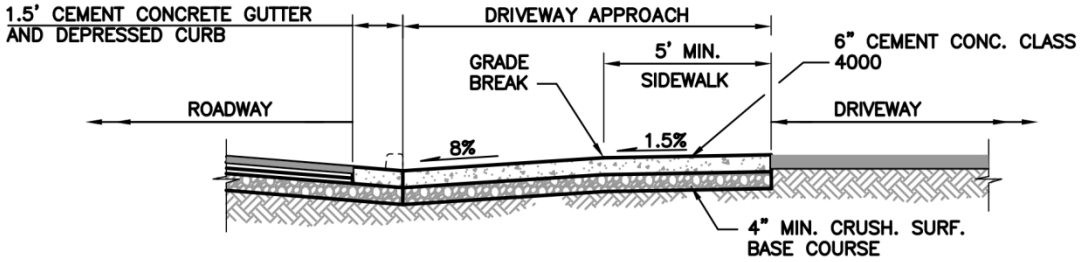


NOTES

1. ALL JOINTS SHALL BE CLEANED AND EDGED.
2. SEE SECTION 4.01 FOR SURFACING REQUIREMENTS.
3. CONCRETE PAVEMENT SHALL BE BRUSHED TRANSVERSELY WITH A FIBER OR WIRE BRUSH OF A TYPE APPROVED BY THE ENGINEER. SURFACE DISCONTINUITIES GREATER THAN 1/4" WILL NOT BE ACCEPTED.
4. 3/8" THRU EXPANSION JOINTS SHALL BE PLACED AT BACK, SIDES AND FRONT. MAXIMUM EXPANSION JOINT SPACING IS 14' CENTER TO CENTER. EXPANSION JOINTS SHALL BE FLUSH WITH THE ADJACENT CONCRETE AND PERPENDICULAR TO THE CURBLINE.
5. SEE SECTION 3.01 FOR ADDITIONAL DRIVEWAY REQUIREMENTS.
6. RAMP LENGTH SHALL BE DETERMINED DURING DESIGN OR IN THE FIELD TO A ACHIEVE A MAXIMUM SLOPE OF 8% OR A 15' MAXIMUM LENGTH.
7. RAMP SHALL BE A CONSTANT SLOPE. NO GRADE BREAKS WILL BE ALLOWED WITHIN THE LENGTH OF THE RAMP.

FIGURE 3.5 - TYPE 2A DRIVEWAY APPROACH



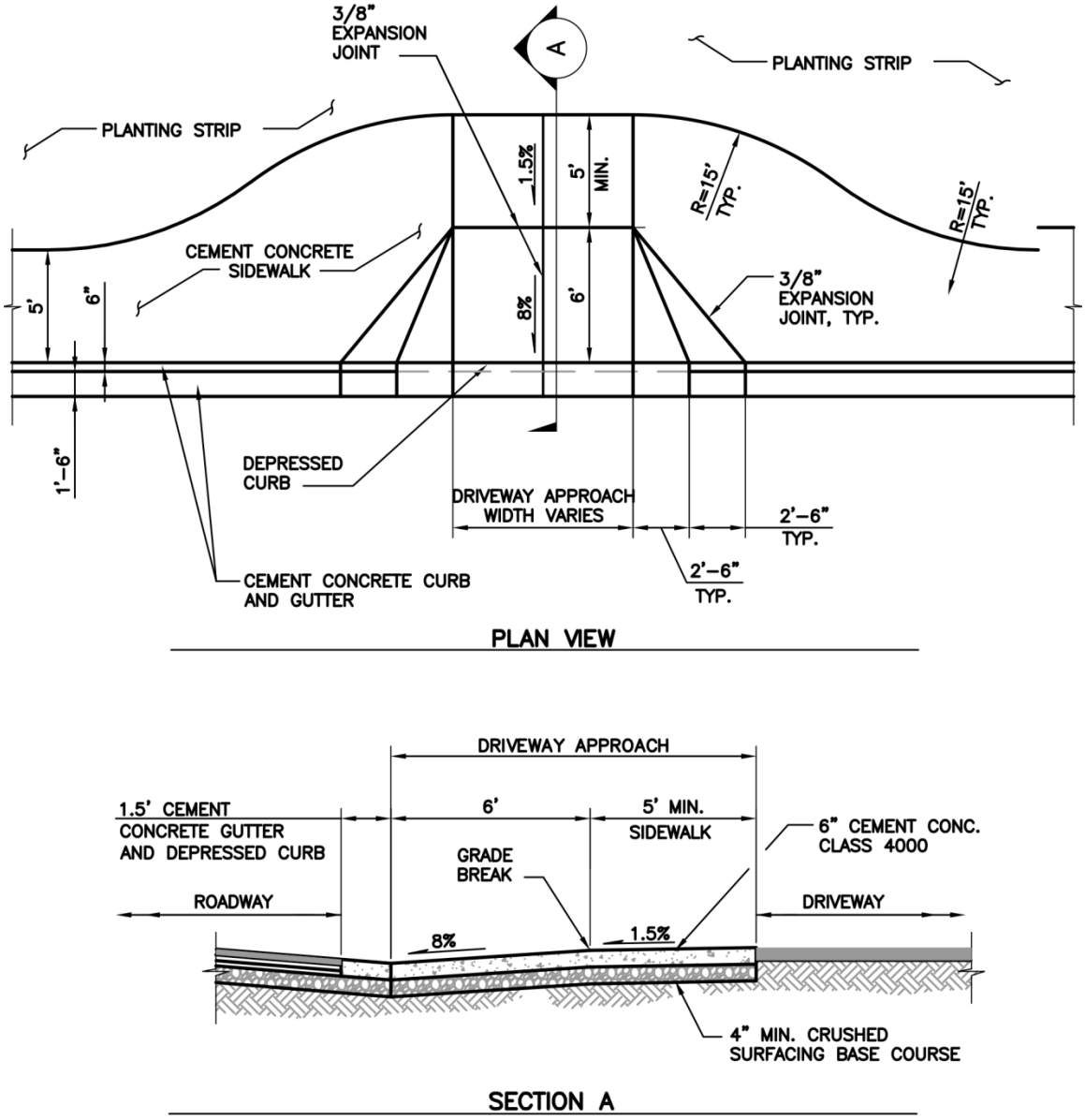


SECTION A

NOTES

1. ALL JOINTS SHALL BE CLEANED AND EDGED.
2. SEE SECTION 4.01 FOR SURFACING REQUIREMENTS.
3. CONCRETE PAVEMENT SHALL BE BRUSHED TRANSVERSELY WITH A FIBER OR WIRE BRUSH OF A TYPE APPROVED BY THE ENGINEER. SURFACE DISCONTINUITIES GREATER THAN 1/4" WILL NOT BE ACCEPTED.
4. 3/8" THRU EXPANSION JOINTS SHALL BE PLACED AT BACK, SIDES AND FRONT. MAXIMUM EXPANSION JOINT SPACING IS 14' CENTER TO CENTER. EXPANSION JOINTS SHALL BE FLUSH WITH THE ADJACENT CONCRETE AND PERPENDICULAR TO THE CURBLINE.
5. SEE SECTION 3.01 FOR ADDITIONAL DRIVEWAY REQUIREMENTS.

FIGURE 3.6 - TYPE 2B DRIVEWAY APPROACH

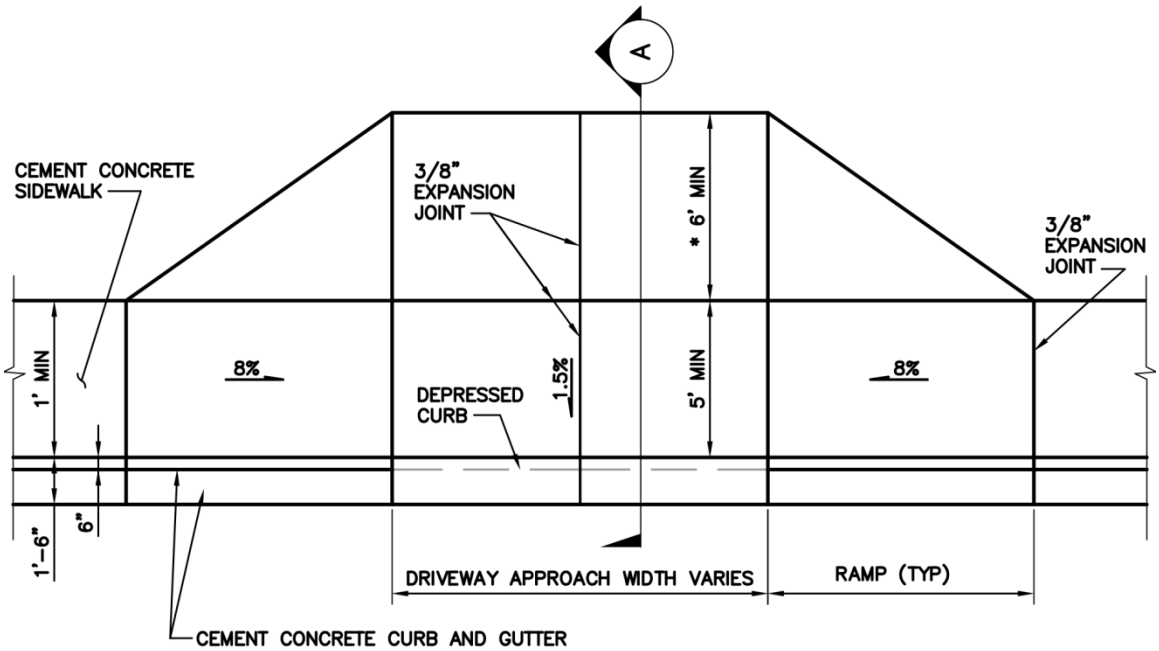


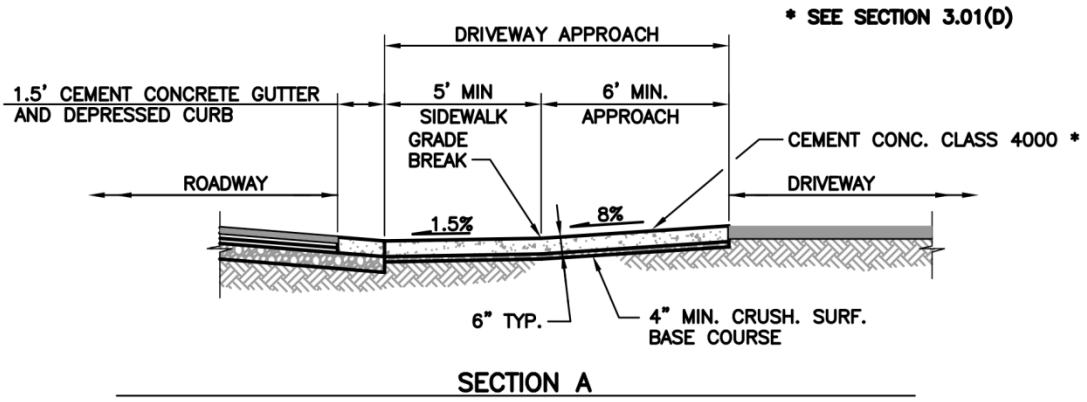
NOTES

1. ALL JOINTS SHALL BE CLEANED AND EDGED.
2. SEE SECTION 4.01 FOR SURFACING REQUIREMENTS.
3. CONCRETE PAVEMENT SHALL BE BRUSHED TRANSVERSELY WITH A FIBER OR WIRE BRUSH OF A TYPE APPROVED BY THE ENGINEER. SURFACE DISCONTINUITIES GREATER THAN 1/4" WILL NOT BE ACCEPTED.
4. 3/8" THRU EXPANSION JOINTS SHALL BE PLACED AT BACK, SIDES AND FRONT. MAXIMUM EXPANSION JOINT SPACING IS 14' CENTER TO CENTER. EXPANSION JOINTS SHALL BE FLUSH WITH THE ADJACENT CONCRETE AND PERPENDICULAR TO THE CURBLINE.
5. SEE SECTION 3.01 FOR ADDITIONAL DRIVEWAY REQUIREMENTS.

.

FIGURE 3.7 - COMMERCIAL / INDUSTRIAL DRIVEWAY APPROACH – PARALLEL SIDEWALK





SECTION A

NOTES

1. ALL JOINTS SHALL BE CLEANED AND EDGED.
2. SEE SECTION 4.01 FOR SURFACING REQUIREMENTS.
3. CONCRETE PAVEMENT SHALL BE BRUSHED TRANSVERSELY WITH A FIBER OR WIRE BRUSH OF A TYPE APPROVED BY THE ENGINEER. SURFACE DISCONTINUITIES GREATER THAN 1/4" WILL NOT BE ACCEPTED.
4. 3/8" THRU EXPANSION JOINTS SHALL BE PLACED AT BACK, SIDES AND FRONT. MAXIMUM EXPANSION JOINT SPACING IS 14' CENTER TO CENTER. EXPANSION JOINTS SHALL BE FLUSH WITH THE ADJACENT CONCRETE AND PERPENDICULAR TO THE CURBLINE.
5. SEE SECTION 3.01 FOR ADDITIONAL DRIVEWAY REQUIREMENTS.

FIGURE 3.8 - LOCATION AND WIDTH OF NEW DRIVEWAYS

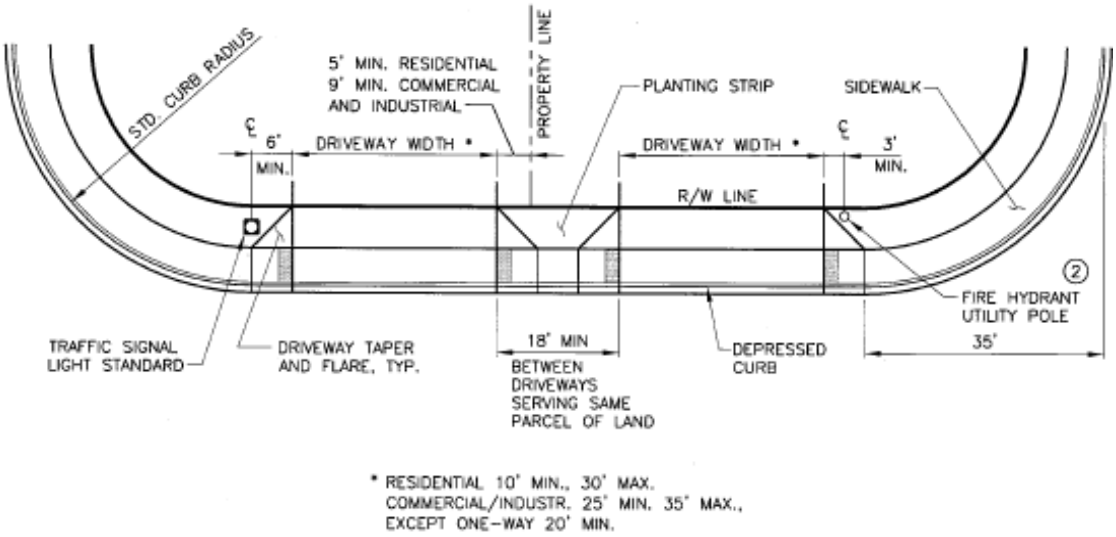


FIG 3.8

NOTES:

1. NO POSITION ON ANY DRIVEWAY SHALL ENCROACH IN CURB RETURN.
2. SEE SEC. 8.02(G) AND FIG. 5-001 FOR ROADWAY CLEARANCE OF UTILITY POLES AND STRUCTURES.
3. DRIVEWAYS SHALL BE LOCATED AS FAR FROM THE INTERSECTION AS POSSIBLE.
4. COMMERCIAL/INDUSTRIAL DRIVEWAYS WIDER THAN 35 FT. MAY BE APPROVED BY THE COUNTY ROAD ENGINEER CONSIDERING BOTH TRAFFIC SAFETY AND THE ACTIVITY BEING SERVED. ALL COMMERCIAL/INDUSTRIAL DRIVEWAYS SHALL HAVE AN EXPANSION JOINT LOCATED MID-WIDTH. (SEE SEC. 3.04.)
5. SEE SEC. 3.01 FOR DRIVEWAY STANDARDS. SEE SEC. 4 FOR SURFACING REQUIREMENTS

FIGURE 3.9 - JOINT USE DRIVEWAY TRACT

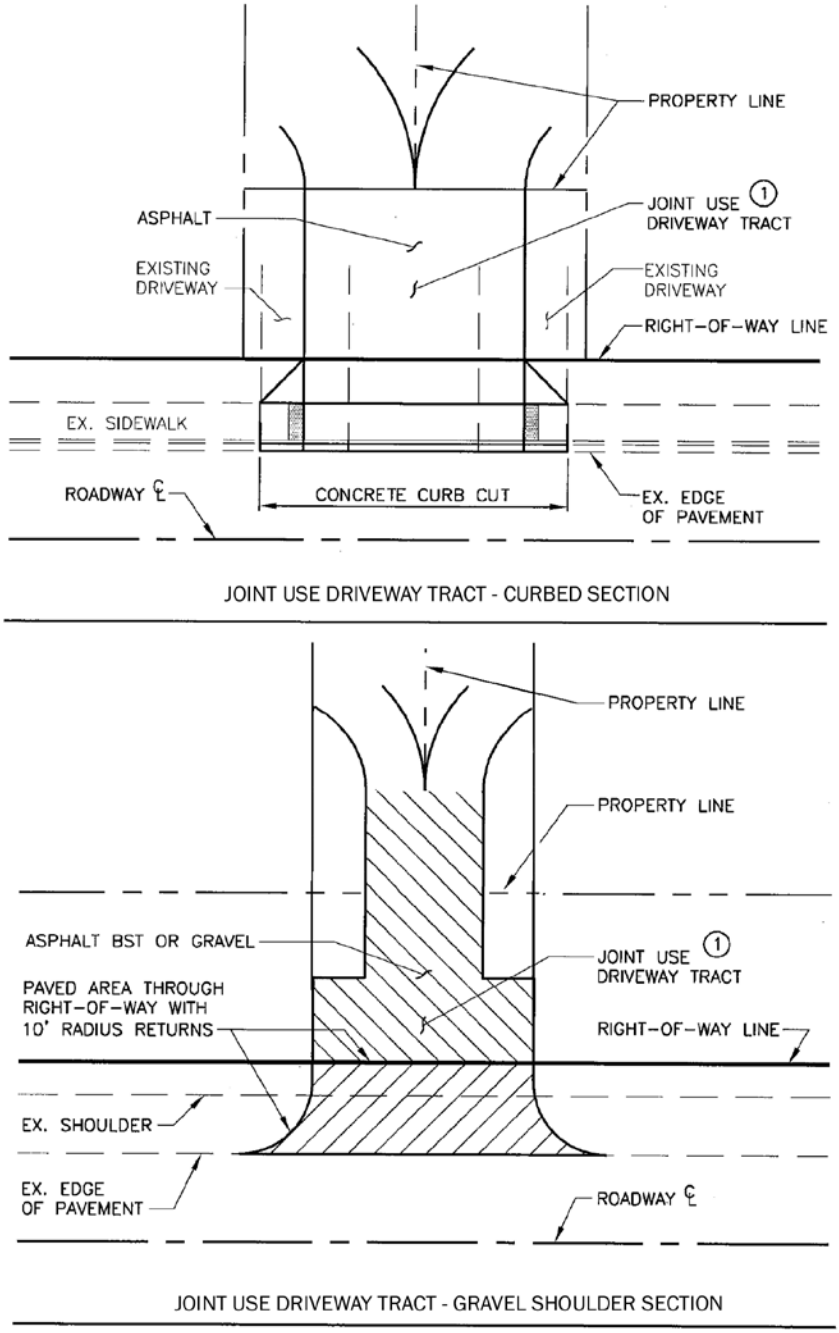


FIG 3.9

NOTES:

1. SEE SEC. 3.01 FOR TRACT WIDTH AND PAVING REQUIREMENTS.
2. SEE FIGS. 3-012, 3-013, AND 3-014 FOR DESIGN REQUIREMENTS.

FIGURE 3.10 - VERTICAL CURB AND SIDEWALK

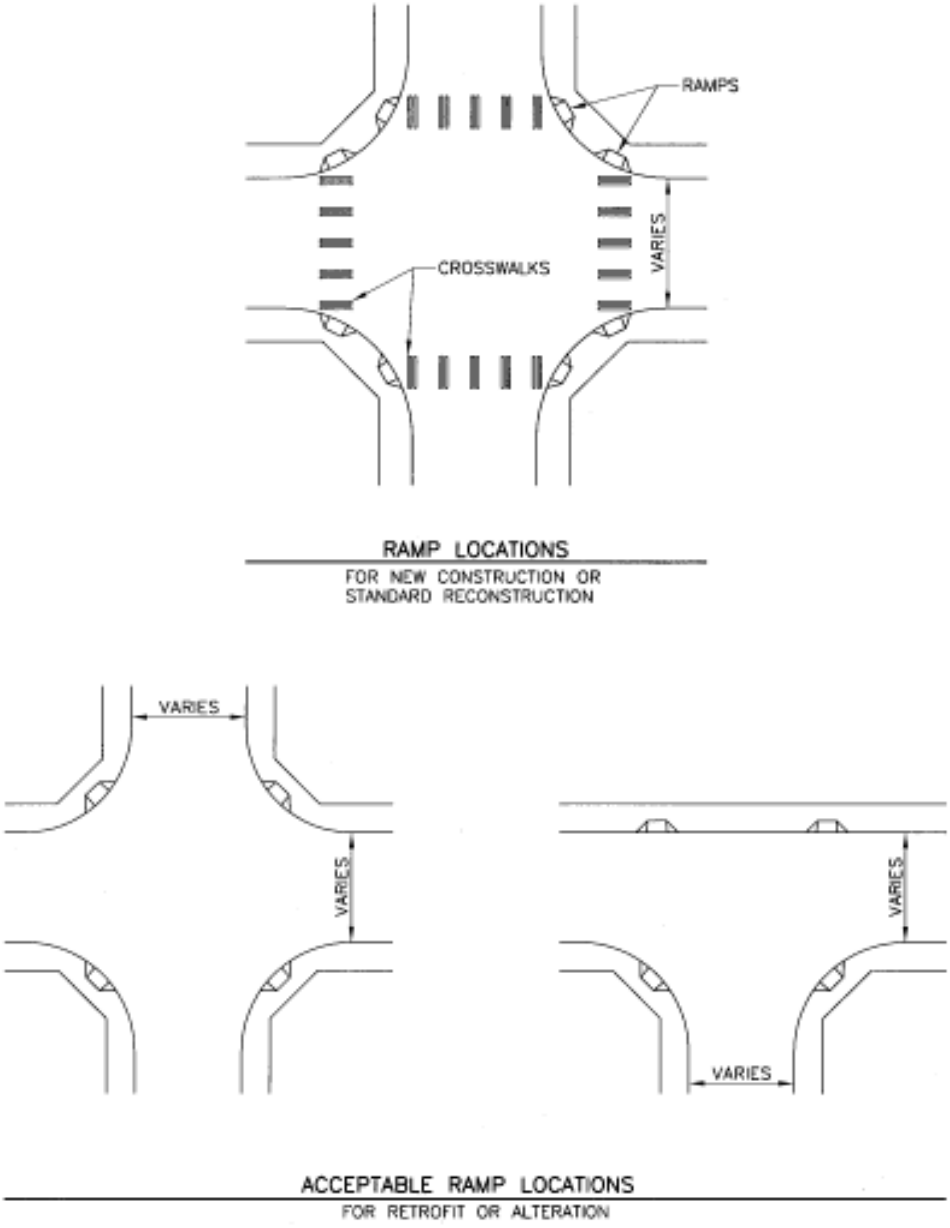
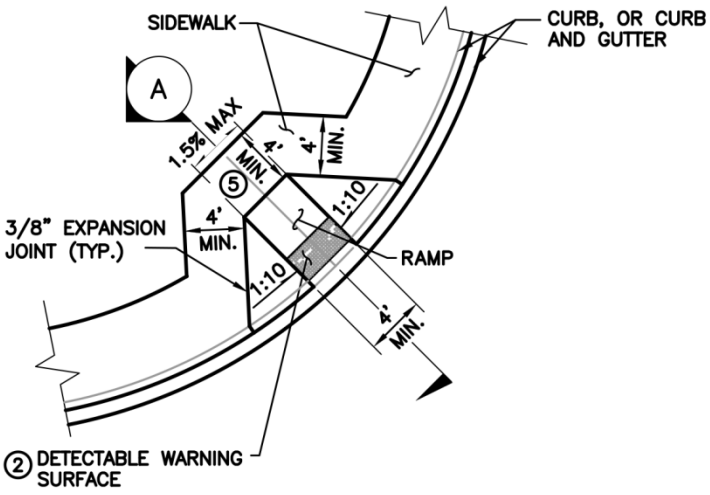


FIG 3.10

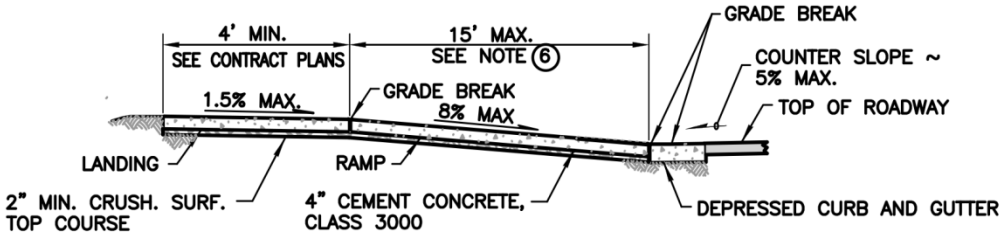
NOTES:

1. PLACEMENT OF GRATINGS, ACCESS COVERS AND OTHER APPURTENANCES SHALL NOT BE LOCATED ON THE CURB RAMPS, LANDINGS AND GUTTERS WITHIN THE PEDESTRIAN ACCESS ROUTE.
2. CONSTRUCT RAMP IN ACCORDANCE WITH FIGS. 3.11, 3.12, 3.13, AND 3.15.
3. CROSSWALKS ARE NOT ALWAYS MARKED.

FIGURE 3.11 – PERPENDICULAR CURB RAMPS



TYPE A PLAN VIEW

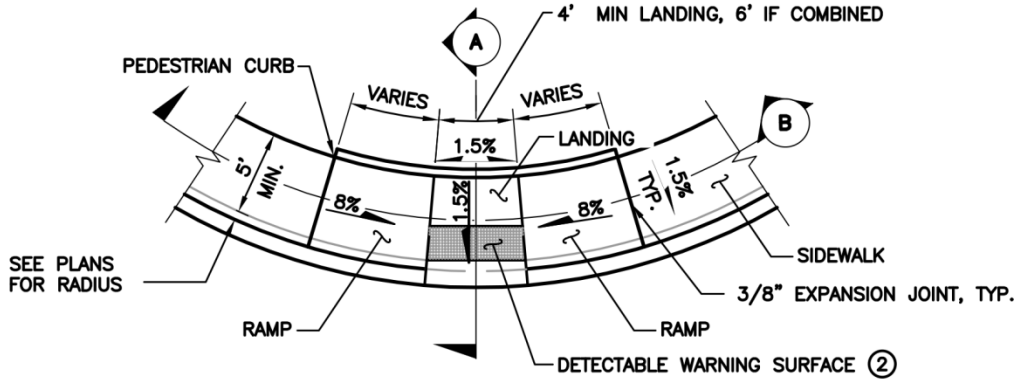


SECTION A

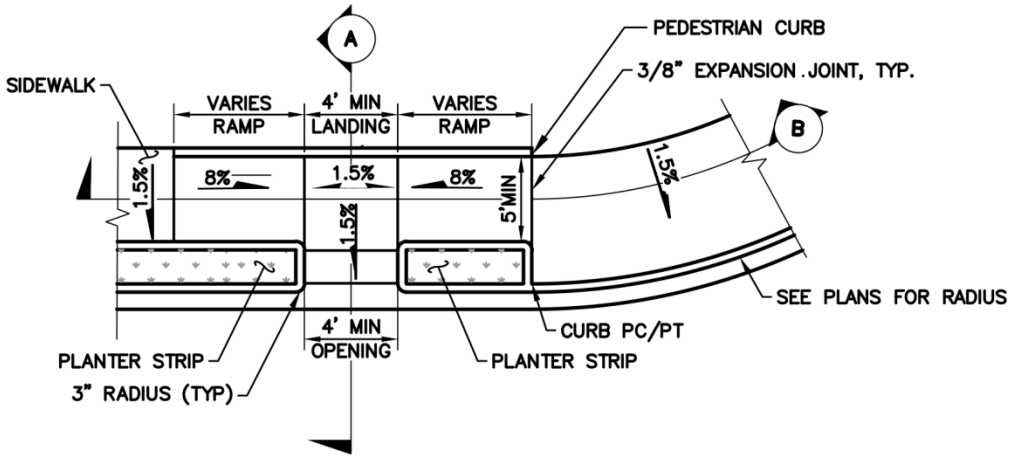
NOTES

1. GRATINGS, ACCESS COVERS, JUNCTION BOXES AND OTHER APPURTENANCES SHALL NOT BE LOCATED ON CURB RAMPS, LANDINGS AND GUTTERS WITHIN THE PEDESTRIAN ACCESS ROUTE.
2. INSTALL DETECTABLE WARNING SURFACE PER FIG 3.14.
3. CONCRETE PAVEMENT SHALL BE BRUSHED TRANSVERSELY WITH A FIBER OR WIRE BRUSH OF A TYPE APPROVED BY THE ENGINEER. SURFACE DISCONTINUITIES GREATER THAN 1/4" WILL NOT BE ACCEPTED.
4. 3/8" THRU EXPANSION JOINTS SHALL BE PLACED AT BACK, SIDES AND FRONT. MAXIMUM EXPANSION JOINT SPACING IS 14' CENTER TO CENTER. EXPANSION JOINTS SHALL BE FLUSH WITH THE ADJACENT CONCRETE AND PERPENDICULAR TO THE CURBLINE.
5. LANDING SHALL BE MINIMUM 4 X 4' AND SHALL BE 1.5% OR LESS IN ALL DIRECTIONS.
6. RAMP LENGTH SHALL BE DETERMINED DURING DESIGN OR IN THE FIELD TO A ACHIEVE A MAXIMUM SLOPE OF 8% OR A 15' MAXIMUM LENGTH.
7. RAMP WIDTH SHALL BE 4' MIN. FOR ONE DIRECTION CROSSINGS OR 6' MIN. FOR COMBINED CROSSINGS. SEE FIGURE 3.15 FOR RAMP PLACEMENT.
8. SEE FIGURE 3–1 FOR CURB AND SIDEWALK JOINT PLACEMENT.

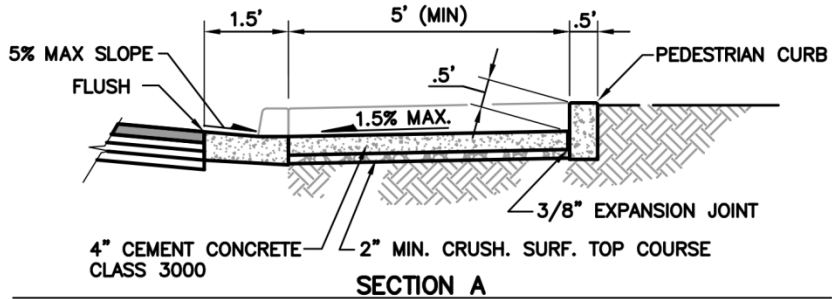
FIGURE 3.12 – PARALLEL CURB RAMPS



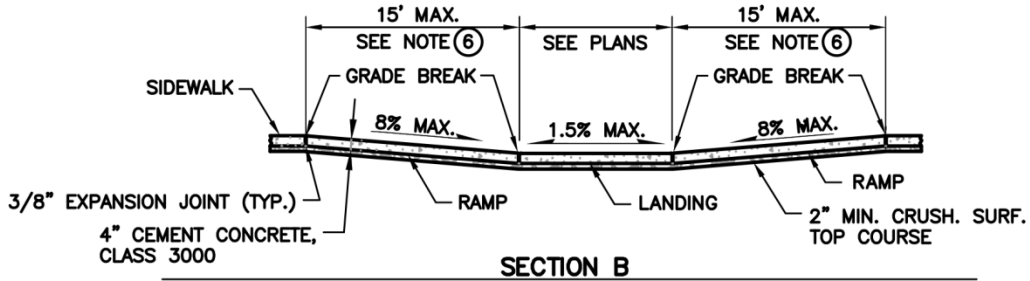
PARALLEL CURB RAMP TYPE A PLAN VIEW



PARALLEL CURB RAMP TYPE B PLAN VIEW



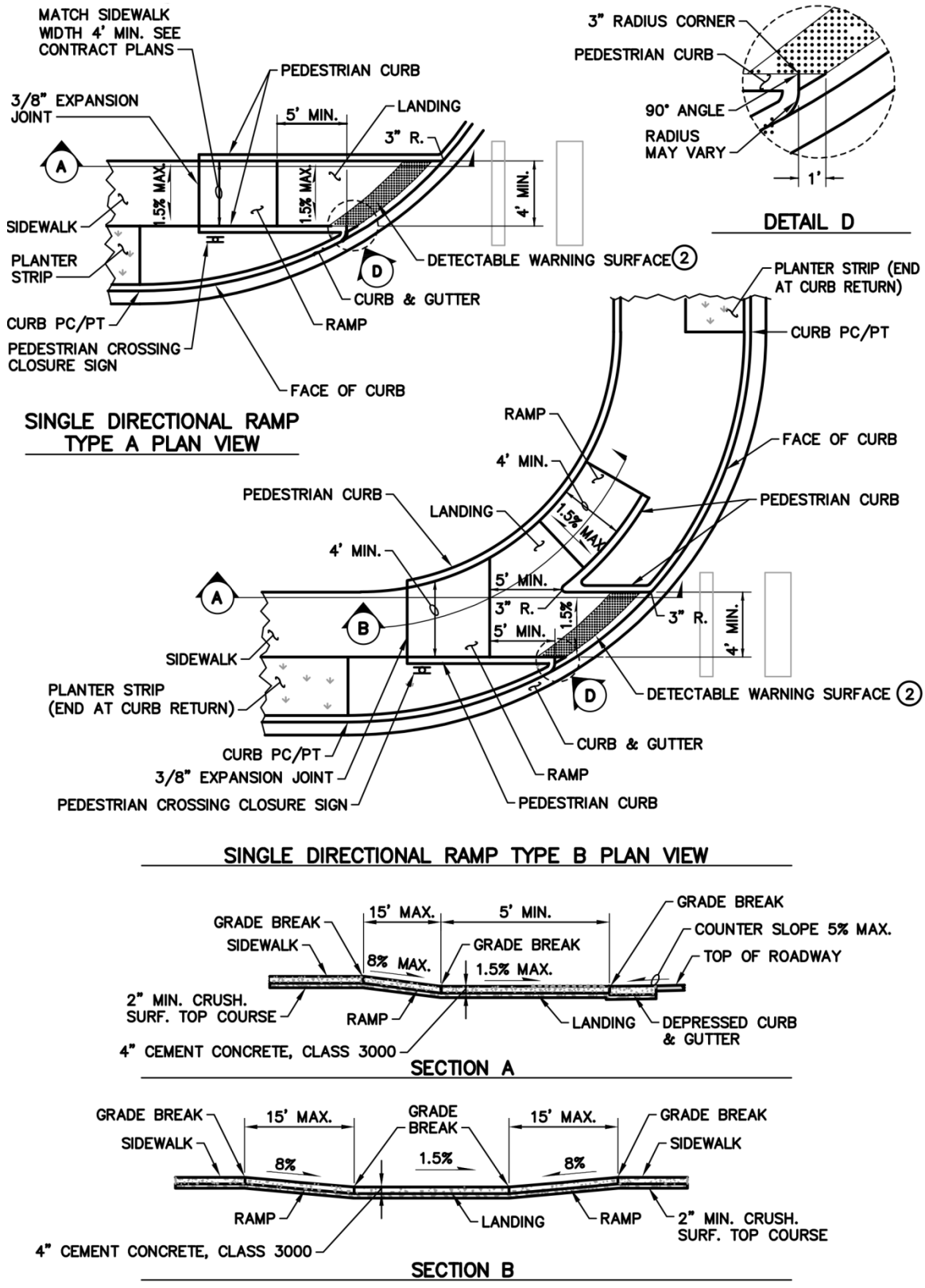
SECTION A



SECTION B

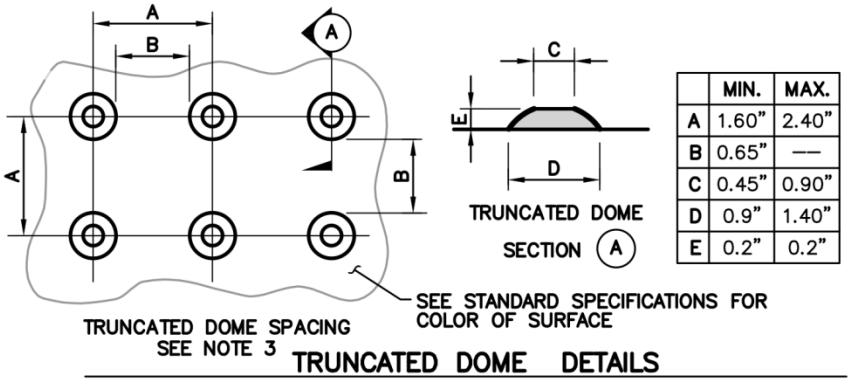
SEE FIGURE 3.11 FOR ADDITIONAL CONSTRUCTION NOTES

FIGURE 3.13 – SINGLE DIRECTIONAL CURB RAMPS



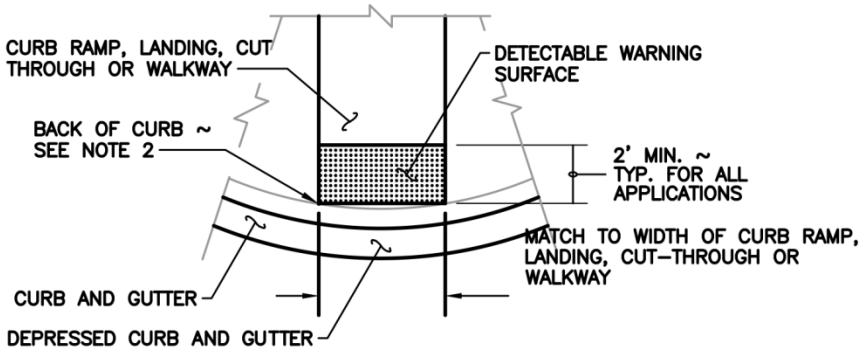
SEE FIGURE 3.11 FOR ADDITIONAL CONSTRUCTION NOTES

FIGURE 3.14 - DETECTABLE WARNING SURFACE DETAILS



	MIN.	MAX.
A	1.60"	2.40"
B	0.65"	—
C	0.45"	0.90"
D	0.9"	1.40"
E	0.2"	0.2"

TRUNCATED DOME DETAILS

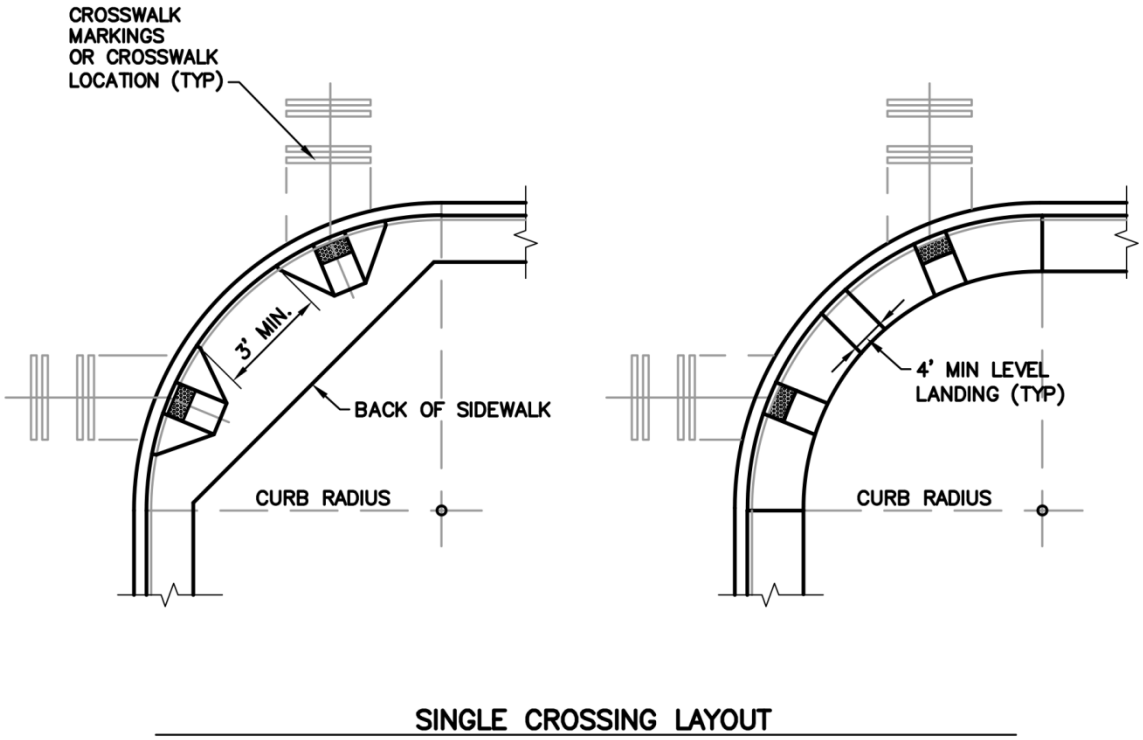


PERPENDICULAR, PARALLEL AND COMBINED RAMPS

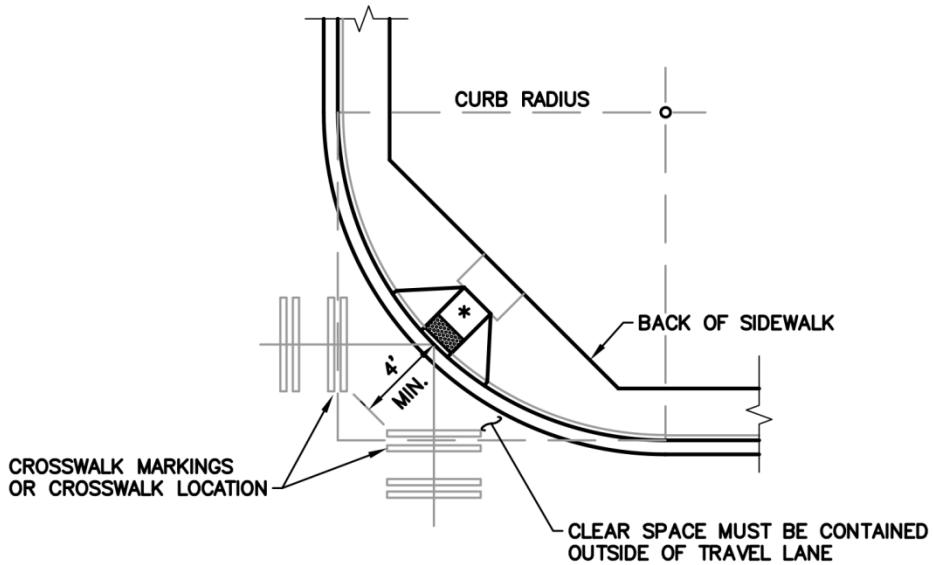
NOTES

1. THE DETECTABLE WARNING SURFACE SHALL EXTEND THE FULL WIDTH OF THE CURB RAMP (EXCLUSIVE OF FLARES) OR THE LANDING.
2. THE DETECTABLE WARNING SURFACE SHALL BE PLACED AT THE BACK OF CURB, BUT NEED NOT FOLLOW THE RADIUS.
3. THE ROWS OF TRUNCATED DOMES SHALL BE ALIGNED TO BE PERPENDICULAR TO THE GRADE BREAK AT THE BACK OF CURB.
4. THE ROWS OF TRUNCATED DOMES SHALL BE ALIGNED TO BE PARALLEL TO THE DIRECTION OF TRAVEL.
5. IF CURB AND GUTTER ARE NOT PRESENT, SUCH AS A SHARED–USE PATH CONNECTION,THE DETECTABLE WARNING SURFACE SHALL BE PLACED AT THE PAVEMENT EDGE.

FIGURE 3.15 - CURB RAMP PLACEMENT



SINGLE CROSSING LAYOUT



* RAMP TYPE MAY BE PERPENDICULAR, PARLALLEL, OR COMBINED. 6' MIN OPENING WIDTH

COMBINED CROSSING LAYOUT

FIGURE 3.16 - TYPICAL INTERSECTION PLAN WITH ASYMMETRICAL LANES

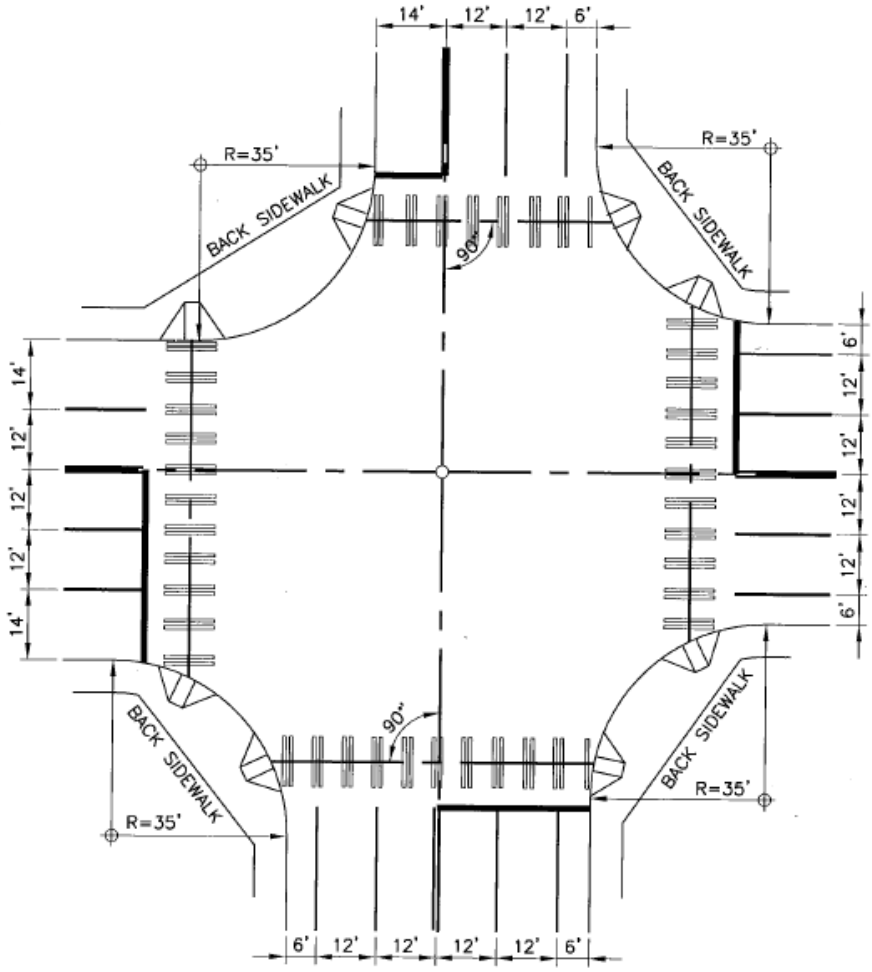
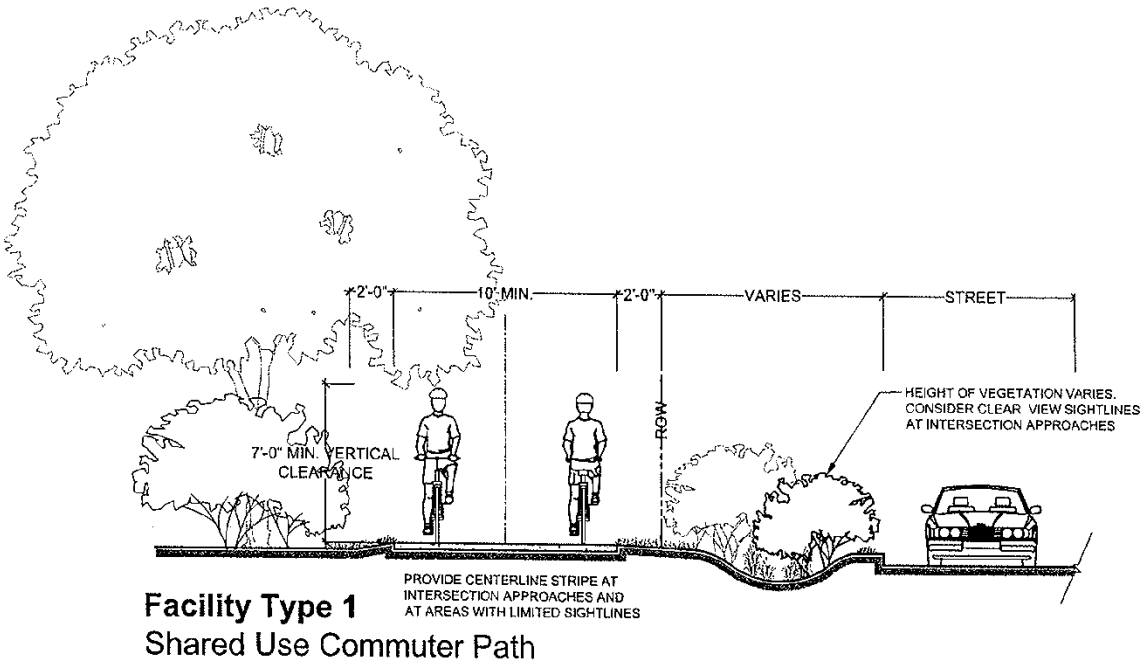
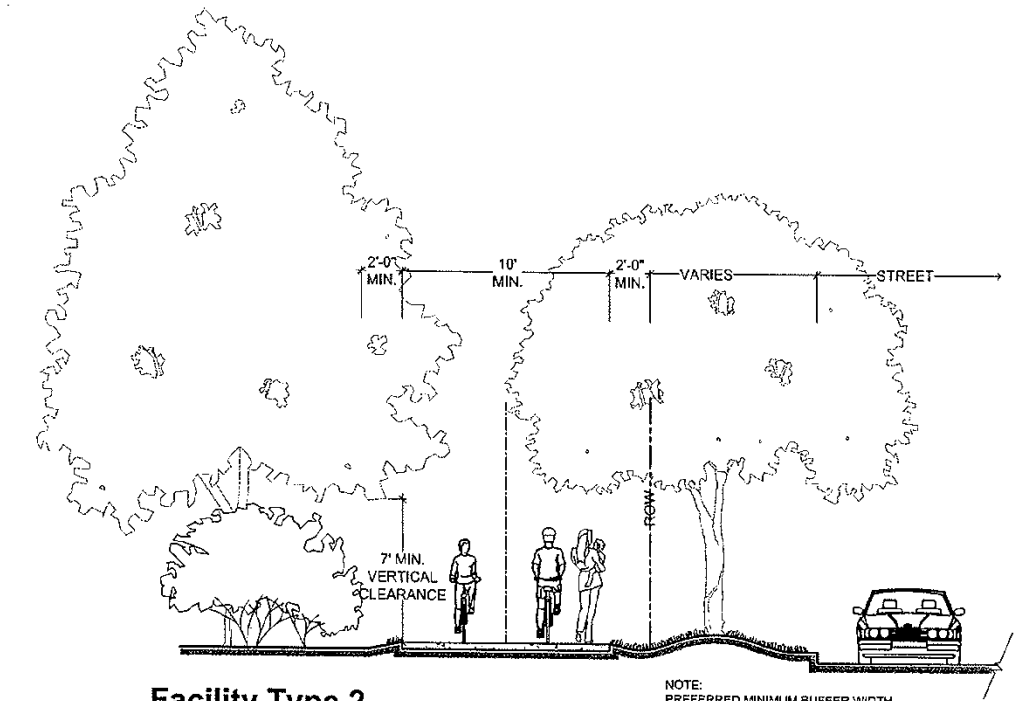


FIGURE 3.17 - NON-MOTORIZED FACILITY TYPES 1 AND 2



Facility Type 1
Shared Use Commuter Path

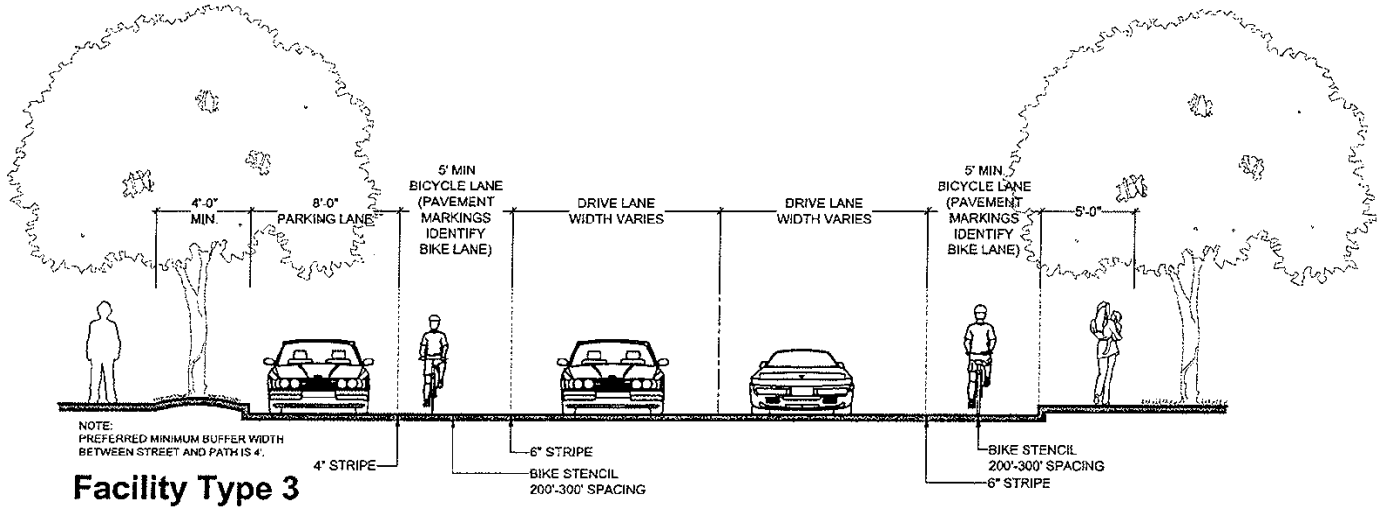


Facility Type 2
Shared Use Recreation Path

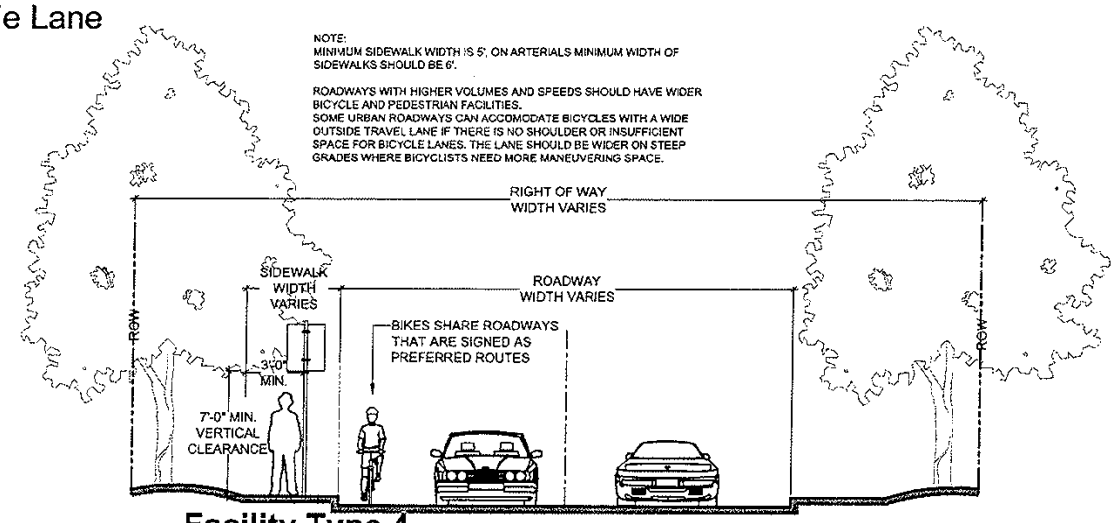
NOTE:
PREFERRED MINIMUM BUFFER WIDTH BETWEEN STREET AND PATH IS 4'.

PROVIDE CLEAR VIEW SIGHTLINES AT INTERSECTION APPROACHES (TYPICAL FOR ALL FACILITY TYPES)

FIGURE 3.18 - NON-MOTORIZED FACILITY TYPE 3 AND 4

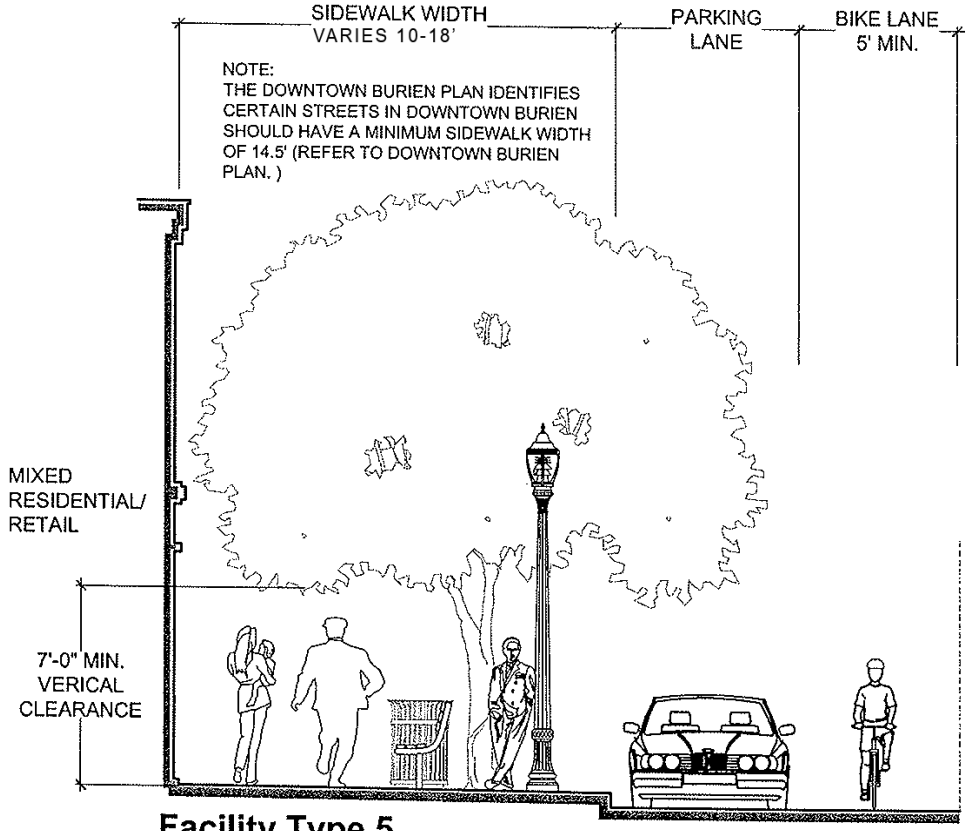


Facility Type 3
Bicycle Lane

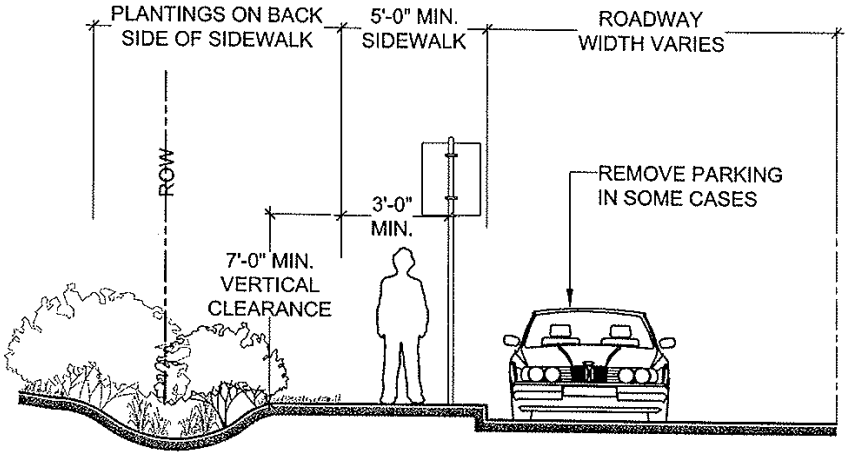


Facility Type 4
Shared Roadway/ Bikeway

FIGURE 3.19 - NON-MOTORIZED FACILITY TYPE 5 AND 6

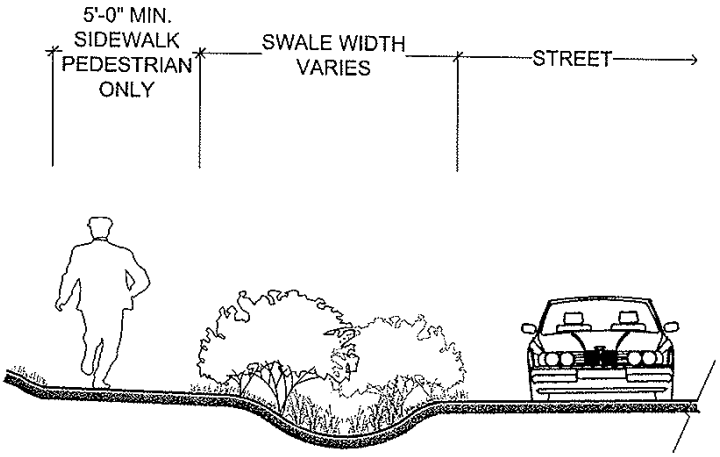


Facility Type 5
Commercial District Sidewalk

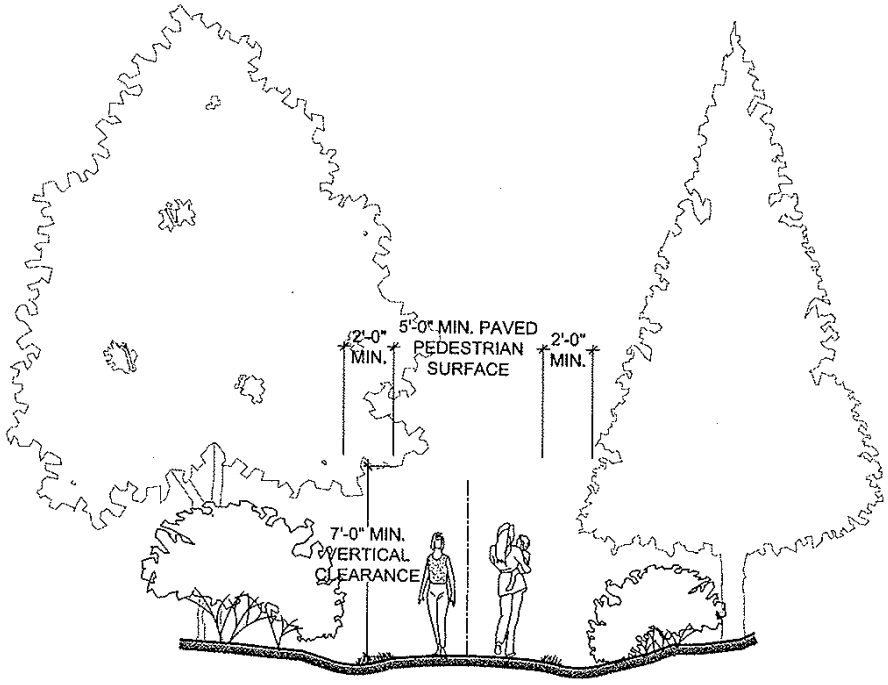


Facility Type 6
Sidewalk Adjacent to Roadway
(Curb & Gutter)

FIGURE 3.20 - NON-MOTORIZED FACILITY TYPE 7 AND 8

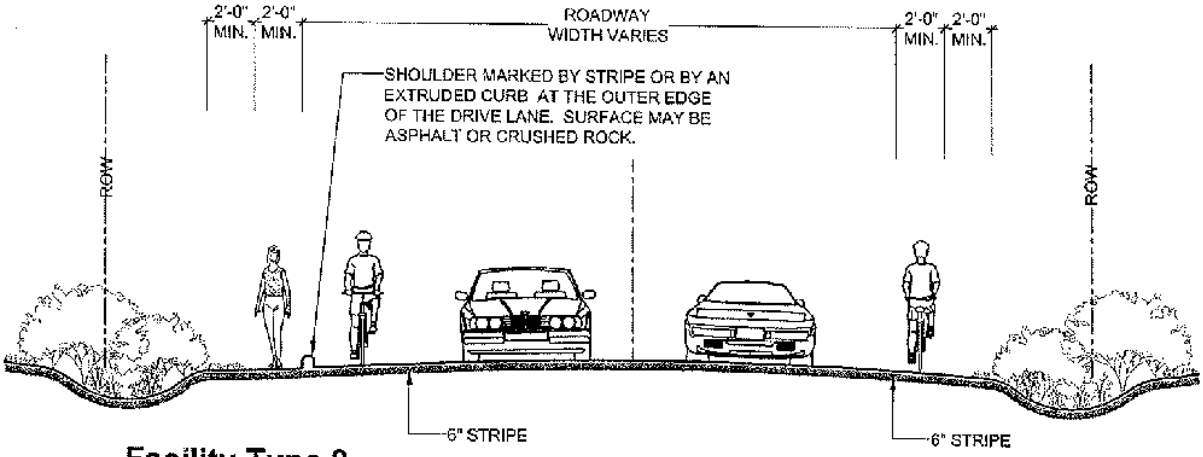


Facility Type 7
Sidewalk/ Pathway with Planting Strip or Swale (Curb & Gutter or Natural Drainage)

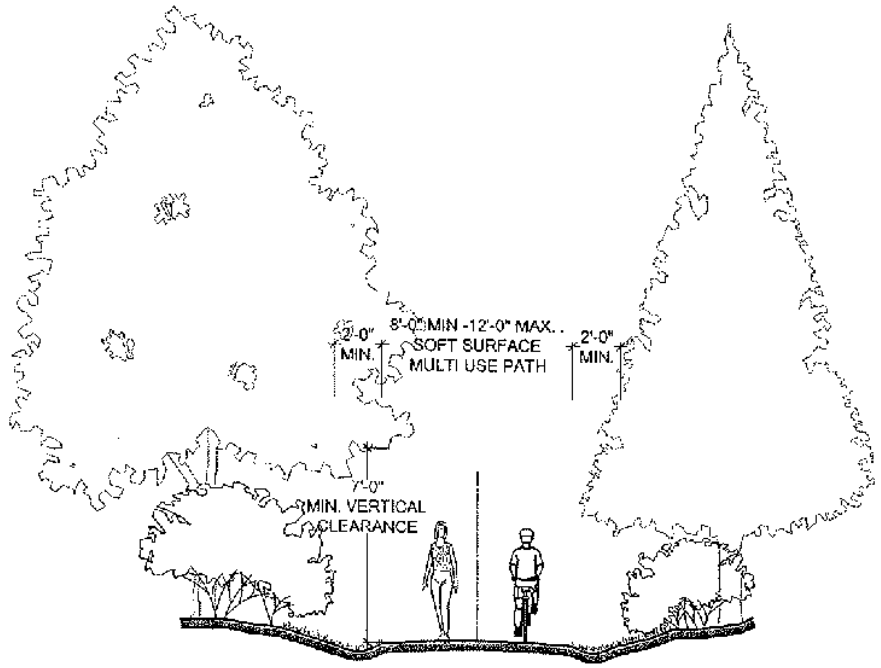


Facility Type 8
Pedestrian Only Paved Path

FIGURE 3.21 - NON-MOTORIZED FACILITY TYPE 9 AND 10

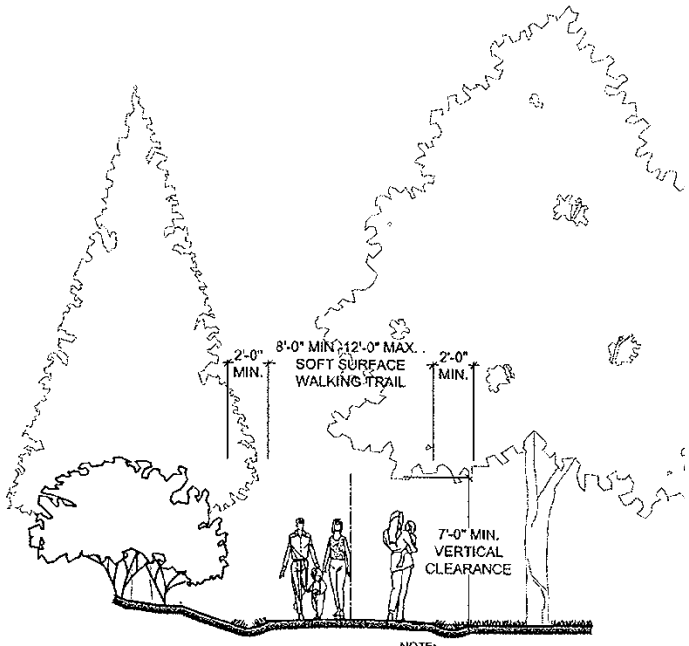


Facility Type 9
Widened Shoulder

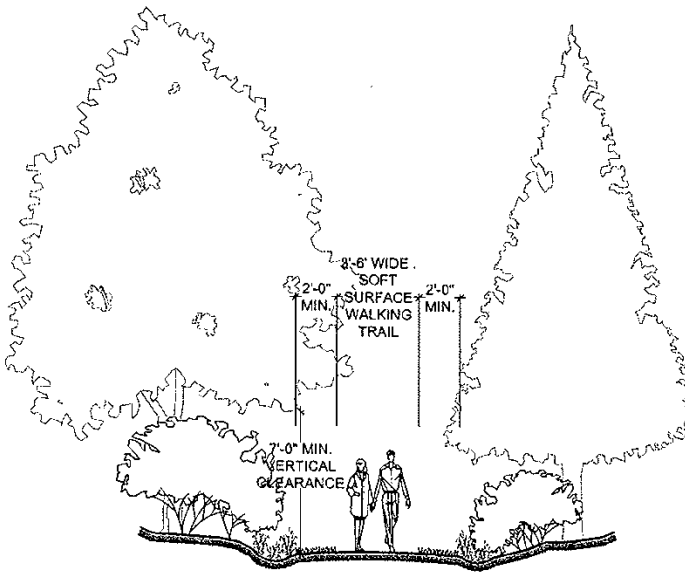


Facility Type 10
Soft Surface Multi-Use Path

FIGURE 3.22 - NON-MOTORIZED FACILITY TYPES 11 AND 12

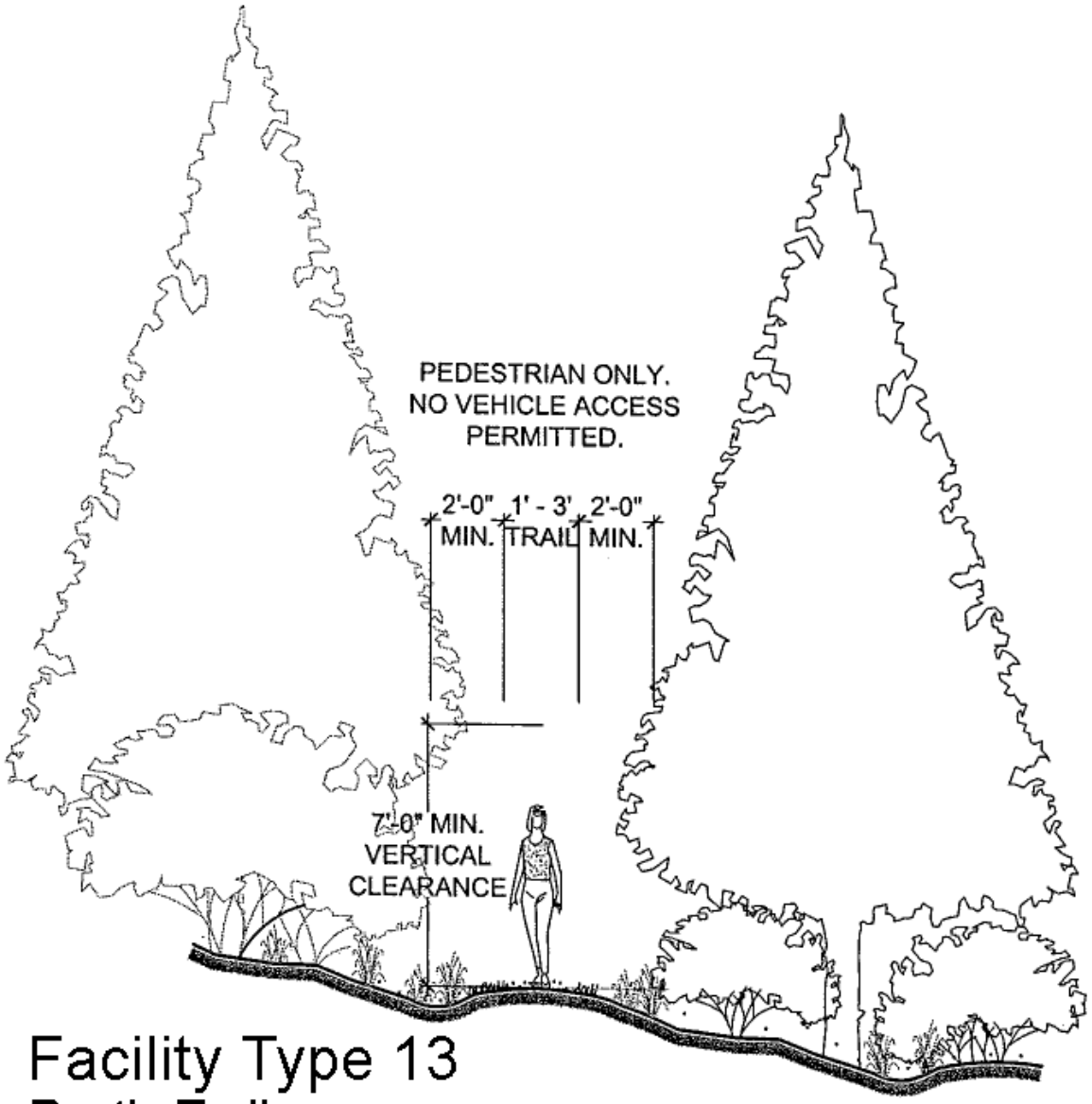


Facility Type 11
Primary Walking Trail



Facility Type 12
Walking Trail

FIGURE 3.23 - NON-MOTORIZED FACILITY TYPE 13



CHAPTER 4. SURFACING

4.01 Residential Streets, Sidewalks, Shoulders, Walkways, and Bikeways

The minimum paved section, with alternative combinations of materials, for new and reconstructed residential streets, lanes, shoulders, sidewalks and bikeways shall be as indicated in Table 4-1, unless a permeable pavement is proposed. These sections are acceptable only on stable compacted subgrade constructed with suitable materials. 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 Public Works Director or his or her designee as outlined in Section 4.04 below. At any time during construction, should a question on the suitability or placement of native soil or import materials exist, the inspector may require a geotechnical evaluation to address soil conditions. When required, the report shall be prepared, stamped, and signed by a licensed civil engineer registered in the State of Washington and include an assessment of the site conditions and recommendations for corrective actions. A copy of maximum density curves and all associated compaction test reports shall be included with the report. All materials shall meet the requirements of the WSDOT Standard Specifications unless otherwise approved.

Where permeable pavement is proposed, a licensed geotechnical engineer registered in the State of Washington shall prepare and stamp a pavement section design. The design shall be suitable to support expected traffic loading based on the typical ADT for the roadway classification and the minimum design requirements for permeable pavements in Appendix C of the Surface Water Design Manual. Permeable pavement section designs are subject to review and approval by the Public Works Director or his or her designee.

Table 4.1 – Residential Streets, Shoulders, Sidewalks, Walkways and Bikeways

TYPE OF FACILITIES	HOT MIX ASPHALT (HMA) CLASS ½"	HMA CLASS ¾" or 1"[1]	BITUMINOUS SURFACE TREATMENT	CRUSHED SURF. TOP COURSE	CRUSHED SURF. BASE COURSE	PORTLAND CEMENT CONCRETE
RESIDENTIAL STREETS						
Preferred Design Section	2"	4"				
Optional Design Section[2]	3"			1½"	8"	
SHOULDERS						
Preferred Design Section	2"	4"				
Optional Design Section[2] I	3"			1½"	8"	
Optional Design Section II (Subcollectors, Subaccess, Minor Access Roadways)				1½"	2½"	
SIDEWALKS						
Vertical Curb Design Section						4" Class 4000,
Rolled Curb Design Section						5" Class 4000,
SIDEWALKS AT DRIVEWAYS						
Residential						4"
Commercial						6"
Commercial (Heavy Truck)						8"
WALKWAYS & BIKEWAYS[3]*						
Shared Use Commuter Path	2½"					
Shared Use Recreation Path	2					
Bicycle Lane in right of way	Match requirements of street type					
Pedestrian Only Paved Path	3½"					
Soft Surface Multi-Use Path				1½"		

1. Class ¾" or 1" is acceptable.
2. The optional roadway design section can be used when the following criteria are met:
   a. The top two (2) feet of subgrade meets the requirements for Gravel Borrow in accordance with the WSDOT/APWA Standard Specifications, and
   b. Paving will take place only between May 1st and September 30th, and
   c. Paving shall begin within five (5) working days of a passing subgrade proof roll, provided the weather permits, and the subgrade is maintained in a suitable condition.
3. 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 95 percent maximum density.

4.02 Driveway Surfacing

Driveways may be surfaced as desired by the owner, except:

1. On curbed streets with sidewalks, driveway shall be paved with Portland cement concrete Class 4000 (28 MPa) from curb to back edge of sidewalk.
2. On shoulder and ditch sections, the driveway between edge of pavement and right-of-way line shall be HMA as required by Fig. 3.3.
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.

4.03 Street Widening

1. When an existing asphalt paved street is to be widened, the edge of the driving lane shall be sawcut to provide a clean, vertical edge for joining to the new asphalt. The existing asphalt may require grinding and/or removal as directed by the Inspector, depending on the condition of the surface and as needed to control surface water flow. After placement of the new asphalt section, the joint shall be sealed and the full width of the street overlaid with a minimum of 2-inch HMA, Class 1/2", plus a prelevel course, full width throughout the widened area. All failures and cracking on road surfaces must be repaired prior to the overlay, see Section 4.06. When the Public Works Director or his or her designee determines that potential impacts from a development warrant subgrade repairs prior to the overlay, the applicant must provide a geotechnical report that includes recommendations for repairing the subgrade. The exception to this requirement must be through the road variance process.
2. If an existing shoulder is proposed to be incorporated into a future 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 Public Works Director or his or her designee. The responsibility for any shoulder material thickness improvement shall be considered part of the requirement for roadway widening. The shoulder shall be replaced in width as specified in Sections 3.03.
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, except widening that includes bike lanes or parking lanes may use permeable pavements for those surfaces where feasible in accordance with the Surface Water Design Manual.
4. Any widening or channelization will require a full-width overlay, see paragraph one of this section.

4.04 Requirements for Residential Streets on Poor Subgrade

The minimum material thickness indicated in Section 4.01 is not acceptable if there is any evidence of instability in the subgrade. This includes but is not limited to free water, swamp conditions, fine-grained or organic soil, slides or uneven settlement. If any of these characteristics are present, the soil shall be sampled, tested, and a pavement section designed in accordance with Section 4.05. Both the soils test report and the resulting pavement design will be subject to review and approval by the Public Works Director or his or her designee.

4.05 Arterials and Commercial Access Streets

Rigid pavement designs for arterial and commercial access streets shall be prepared by a licensed professional civil engineer registered in the State of Washington and in accordance with the current "AASHTO Guide for Design of Pavement Structures, 1993 Edition." Flexible pavements shall be designed using a layered design analysis in accordance with the "AASHTO Guide for Design of Pavement Structures," 1993 edition. The pavement design shall be based on soil parameters reflecting actual field or laboratory tests, and a traffic loading analysis. A subsurface investigation shall be performed in order to provide information on any materials that would cause settlement, stability, or drainage problems. Soil used for the design analysis shall be representative of the native subgrade conditions. The traffic loading analysis shall include traffic volume, percentage growth rate, and axle loadings. Materials shall meet WSDOT specifications. The following design inputs shall be used for calculation of the pavement section:

1. Pavement Design Life = 20 years
3. Reliability (R) = 85%
3. Overall Standard Deviation (So) = 0.50
4. Design Serviceability Loss (ΔPSI) = 1.5
5. Drainage Coefficient (m) < 1.0
6. Layer Coefficients
   a. Hot Mix Asphalt: < 0.44
   b. Crushed Surfacing: < 0.14

7. Resilient Modulus (Mr)
   a. HMA: Mr = 450,000 psi
   b. Crushed Surfacing Materials: Mr = 28,000 psi
   c. Subgrade Soil: The subgrade Mr is based on actual field or laboratory tests. The subgrade Mr value used in the pavement design is not to exceed 15,000 psi.

Resilient modulus values for the subgrade soil shall be determined by Laboratory M_r tests or Falling Weight Deflectometer tests (FWD) performed in situ or default M_r values based on soil classification per the Unified Soil Classification System (USCS). The soil classification shall be based on laboratory testing of representative samples of subgrade soil.

USCS soil types shall be determined per ASTM D 2487. Default M_r values based on the USCS are as follows:

Class	M_r (psi)	USCS Soil Type
A	15,000	GW, GP, GW-GM, GP-GM
B	12,500	GM, SW, SP
C	10,000	SW-SM, SP-SM, SM, ML[1]
D	7,500	GW-GC, GP-GC, SW-SC, SP-SC, SM, ML[2]
E	2,500	GC, GC-GM, SC, SC-SM,CL, CL-ML
F	Special Design[3]	MH, CH, OL, OH, Peat

(1) Nonplastic

(2) Plastic

(3) Class F soils require a special design required to stabilize the subgrade and will be subject to review and approval by the Public Works Director or his or her designee.

1. Pavement design sections shall not be less than those required for residential streets.
2. The roadway section for a multi-family residential development can be design and constructed to meet the requirements of a residential roadway section.

4.06 Materials and Lay-Down Procedures:

Materials and lay-down procedures shall be in accordance with WSDOT/APWA Standard Specifications and the following requirements:

A. Prior to placement of the curb, gutter, and pavement section, a proof roll shall be performed and observed by the inspector to confirm the subgrade is firm and unyielding. A single or dual axle dump truck, loaded to a minimum 90 percent maximum gross weight capacity, shall be used to perform the proof roll. The subgrade must comply with the requirements of Section 8.03, 9.04, and 9.05 of these Standards.

B. During surfacing activities utility covers in roadway shall be adjusted in accordance with Section 8.05.

C. Asphalt pavers shall be self-contained, power-propelled units. Truck mounted 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 Public Works Director or his or her designee, or as follows:
   1. Pavement widths less than 8 feet; and
   2.. Pavement lengths less than 150 feet

D. Hot mix asphalt (HMA) for wearing course shall not be placed on any traveled way between October 1 of any year and April 1 of the following year without written approval from the Inspector. Prior to placement of HMA, a tack coat shall be thoroughly and uniformly applied to all existing paved surfaces in accordance with Section 5-04.3(5)A of the WSDOT/WPWA Standard Specifications. Asphalt for prime coat shall not be applied when the

ground temperature is lower than fifty degrees Fahrenheit without written approval from the Inspector.

When discharged from the mixing batch plant, the temperature of the HMA shall not exceed the maximum temperature recommended by the asphalt binder manufacturer. Documentation of recommended temperatures shall be submitted prior to placement.

A maximum water content of 2 percent in the mix, at discharge, will be allowed providing the water causes no problems with handling, stripping, or flushing. If the water in the HMA causes any of these problems, the moisture content shall be reduced as directed by the inspector. The asphalt shall have a temperature of not less than 260 degrees Fahrenheit. For surface temperature limitations, see Section 5-04.3(16) of the WSDOT/APWA Standard Specifications. Each truckload shall be covered with a suitable tarpaulin while in transit and while waiting to be unloaded to prevent unnecessary heat loss.

E. Unfavorable Weather

Asphalt shall not be applied to wet material. Asphalt shall not be applied during rainfall or before any imminent storms that might damage the construction. The Inspector will have the discretion as to whether the surface and materials are dry enough to proceed with construction.

4.07 Asphalt Surfacing Repairs

When repairing shallow holes and gouges in asphalt, the surface must be thoroughly cleaned. The bottom and edges of the hole/gouge shall be swabbed with asphalt tack. HMA shall then be placed into the hole or gouge and thoroughly tamped or rolled. The edges shall then be sealed in accordance with Section 5-04.3(19) of the WSDOT/APWA Standard Specifications.

For failures or holes/gouges exceeding 1” in depth, the minimum repair area shall be three feet beyond the perimeter. The existing pavement shall be sawcut or removed by a pavement grinder. Asphalt for tack coat shall be applied to all surfaces of existing pavement in the repair area. HMA shall be placed in lifts of not greater than 0.35- foot compacted depth and shall be thoroughly and uniformly compacted to not less than 91 percent of the maximum density as determined by AASHTO Test Method T-209. Edges shall be sealed in accordance with Section 5-04.3(19) of the WSDOT/APWA Standard Specifications.

4.08 Pavement Markings, Markers, and Pavement Tapers

Pavement markings and raised pavement markers shall be used to delineate channelization, transit lanes, bus zones, lane endings, crosswalks and longitudinal lines to control or guide all users of the roadway system and shall conform to Figs. 4.1 through 4.9. When removal of existing pavement markings are required a full-width overlay must be performed to remove any reflections of the old markings.

A. Channelization

Channelization plans and crosswalk locations shall be approved by the Public Works Director or his or her designee. Channelization plans shall be provided at a 1"= 20' scale.

Channelization shall be required when through traffic is diverted around a lane or obstacle; when connecting full-width streets with different cross sections; and when extending an existing street with a new cross section different than the existing one. Channelization shall also be required to redirect traffic back to its original alignment.

Pavement markings for channelization shall be reflectorized hot or cold applied plastic. Extruded or sprayed markings shall be dressed with glass beads for initial reflectance. All materials shall have beads throughout to maintain reflectance as the material wears.

Where pavement widening less than 300 feet in length is abruptly ended and edge lines do not direct traffic to through lanes, Type 2 lane markers shall be installed at 10-foot centers near the end of the paved area at a 10:1 taper.

B. Crosswalks

Crosswalks shall be installed at all intersections controlled by traffic signals and other areas approved by the Traffic Engineer. Crosswalks shall consist of pairs of longitudinal lines 8 inches wide by 10 feet long and with an eight-inch separation. A pair of these lines shall be installed in line with each lane line and at the midpoint of each lane.

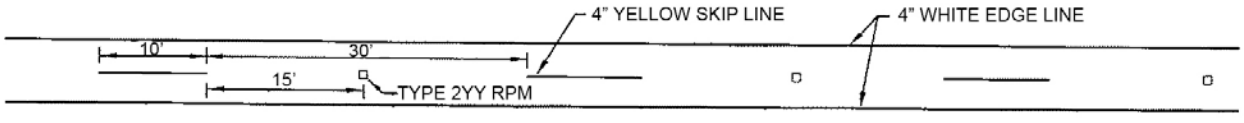
C. Installation

All pavement markings shall be laid out with spray paint and approved by the Public Works Director or his or her designee before they are installed. Approval shall require advance notice of ten working days to have field layout approved by the Public Works Director or his or her designee or to make arrangements to meet the Public Works Director or his designee on site during the installation.

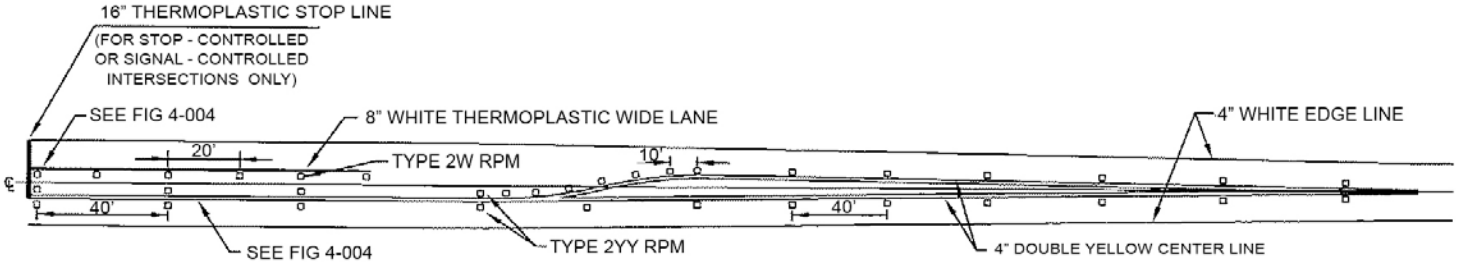
D. Fire apparatus road marking

Pavement markings that indicate fire apparatus access zones shall comply with BMC 15.20.100

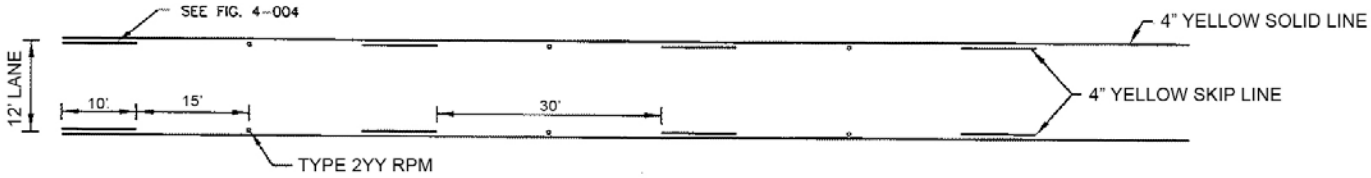
FIGURE 4.1 - PAVEMENT MARKINGS



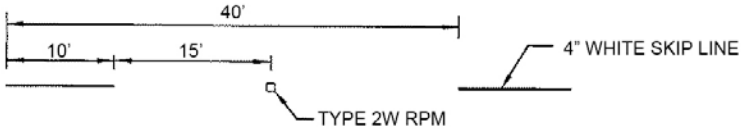
SINGLE LANE TWO-WAY TRAFFIC



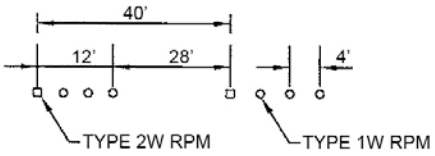
LEFT TURN LANE AND MEDIAN



TWO-WAY LEFT TURN LANE

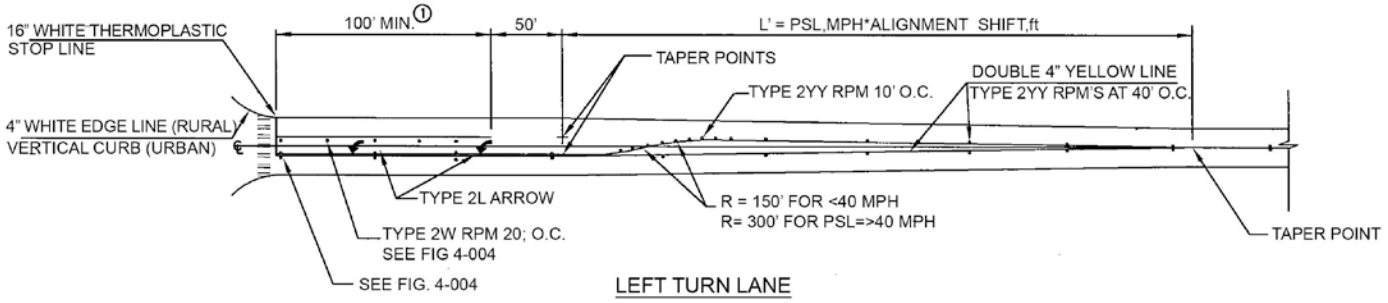


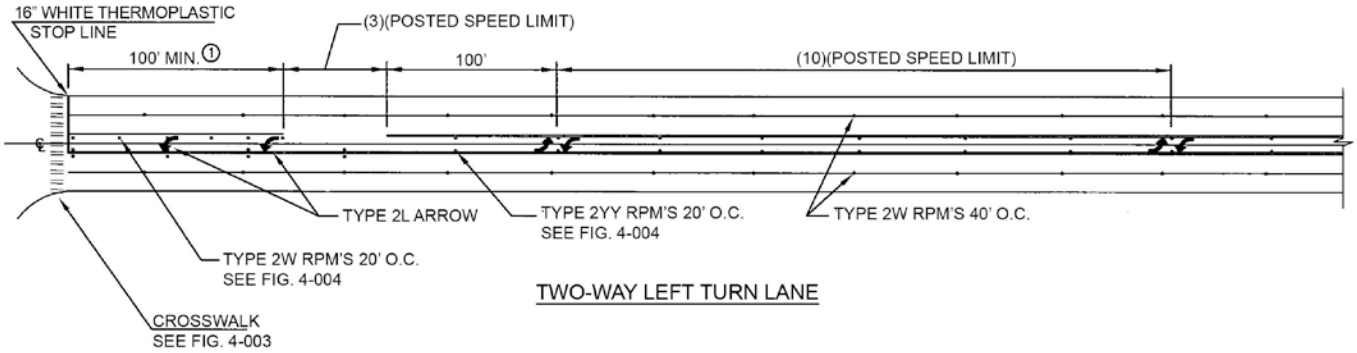
LANE SEPERATION

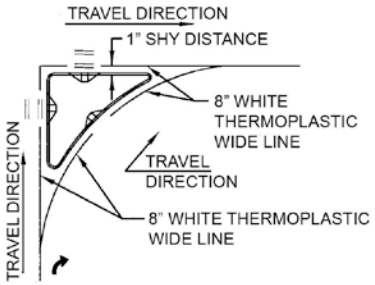


TRAVEL DIRECTION
ALTERNATE LANE MARKINGS

FIGURE 4.2 - INTERSECTION APPROACH STRIPING







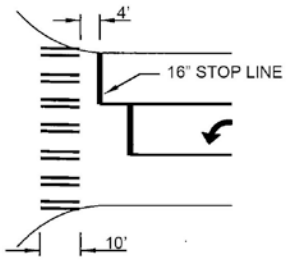
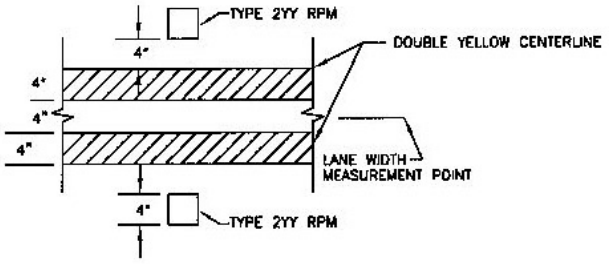


FIG 4.2

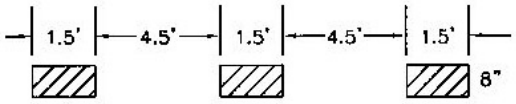
NOTES:

1. POCKET LENGTHS SHALL BE SUPPORTED BY TRAFFIC ANALYSIS.
   PSL = POSTED SPEED LIMIT

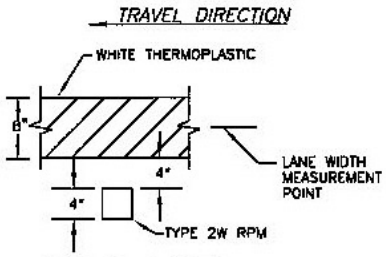
FIGURE 4.3 - PAVEMENT MARKING DETAIL



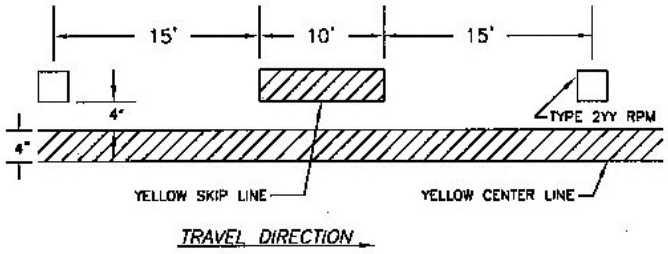
CENTERLINE



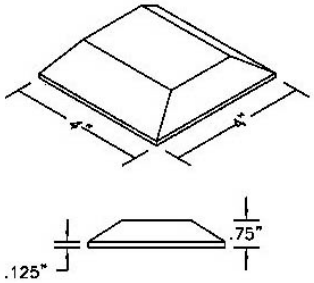
LANE EXTENSION LINE



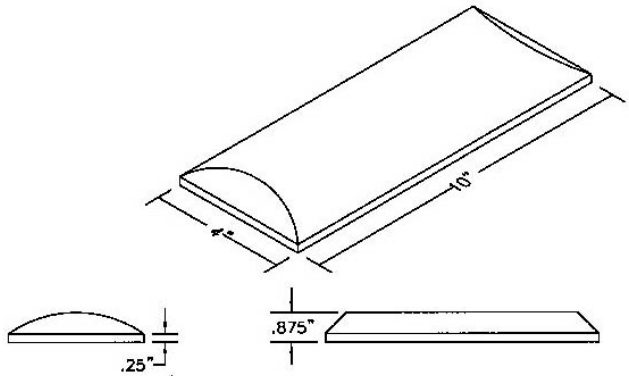
WIDE LINE



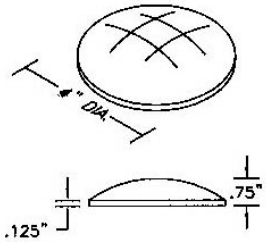
TWO-WAY LEFT TURN LANE



TYPE 2 RPM



TYPE 3 RPM



TYPE 1 RPM

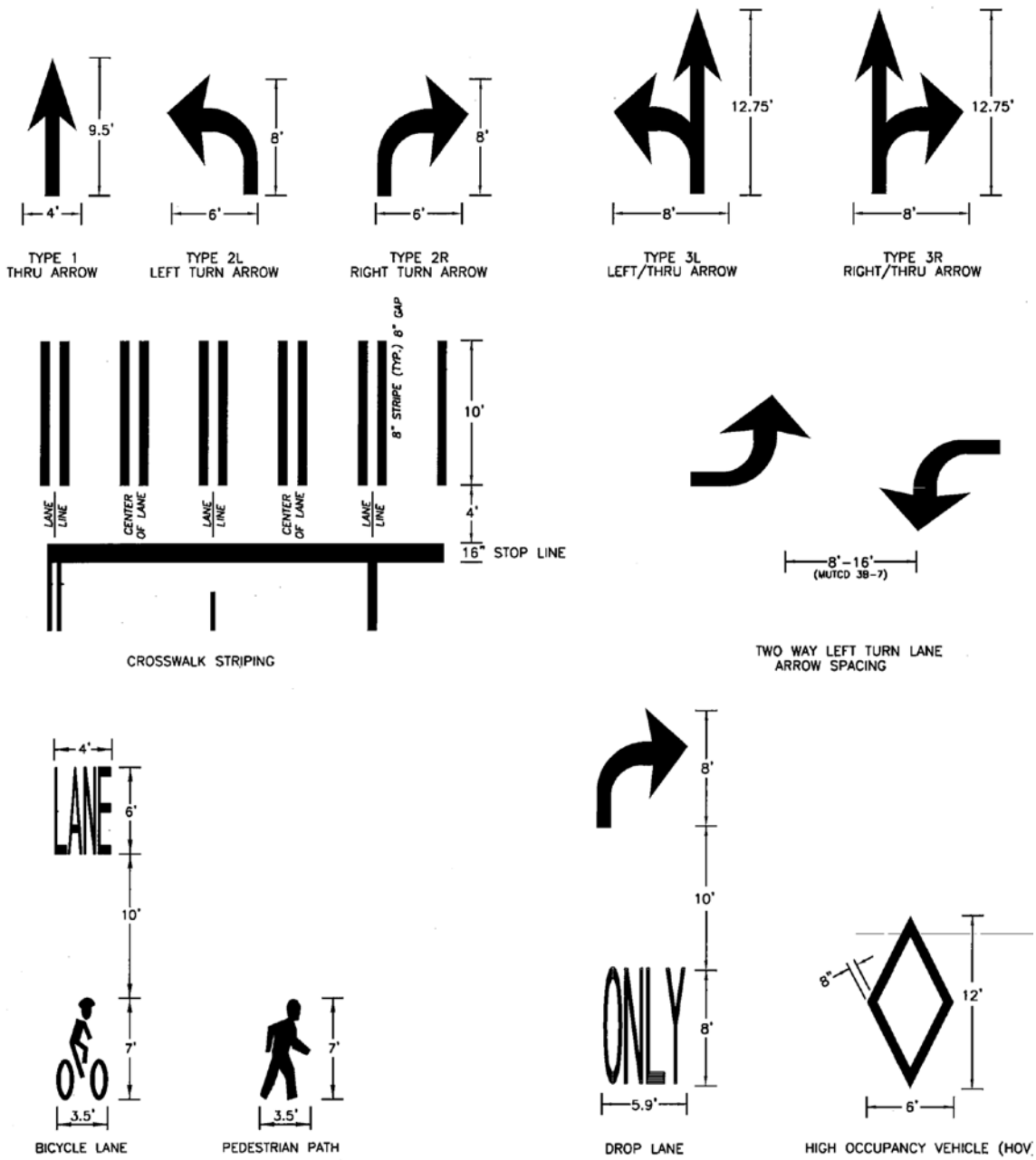
RAISED PAVEMENT MARKER COLORS	
TYPE 1W	NONREFLECTORIZED WHITE
TYPE 1Y	NONREFLECTORIZED YELLOW
TYPE 2W	REFLECTORIZED WHITE – ONE SIDE ONLY
TYPE 2Y	REFLECTORIZED YELLOW – ONE SIDE ONLY
TYPE 2YY	REFLECTORIZED YELLOW – BOTH SIDES

FIG 4.3

NOTES:

1. ALL PAVEMENT SYMBOLS SHALL BE THERMOPLASTIC.

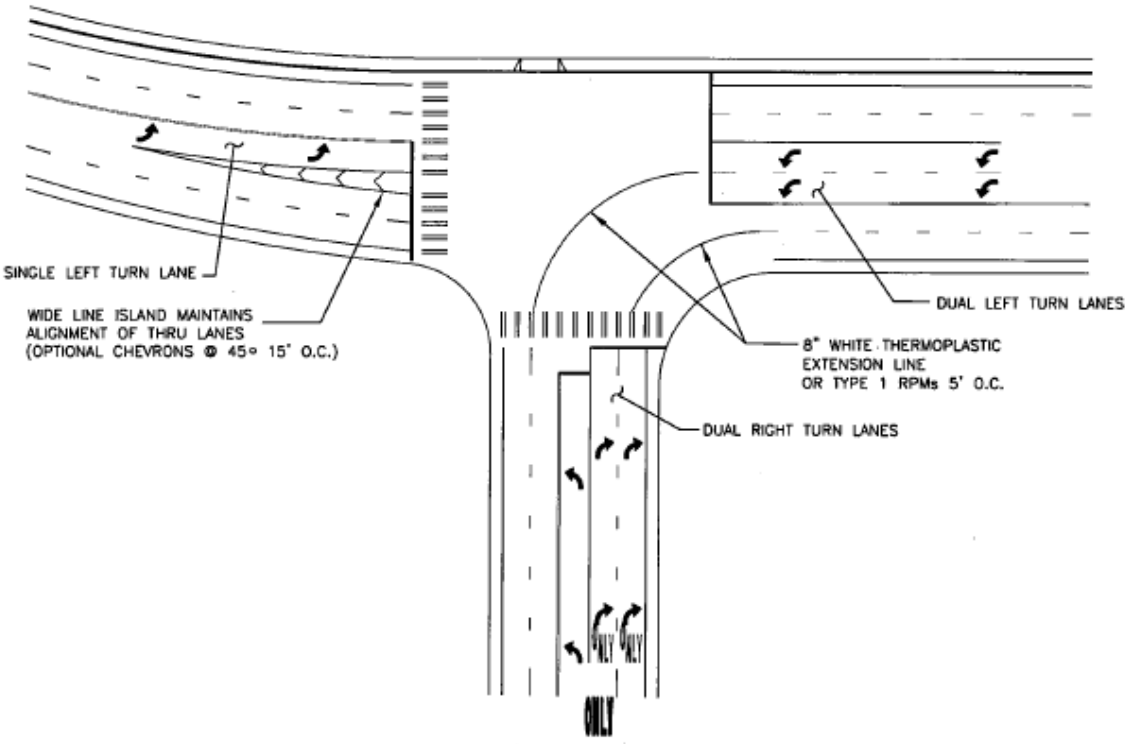
FIGURE 4.4 - PAVEMENT SYMBOLS

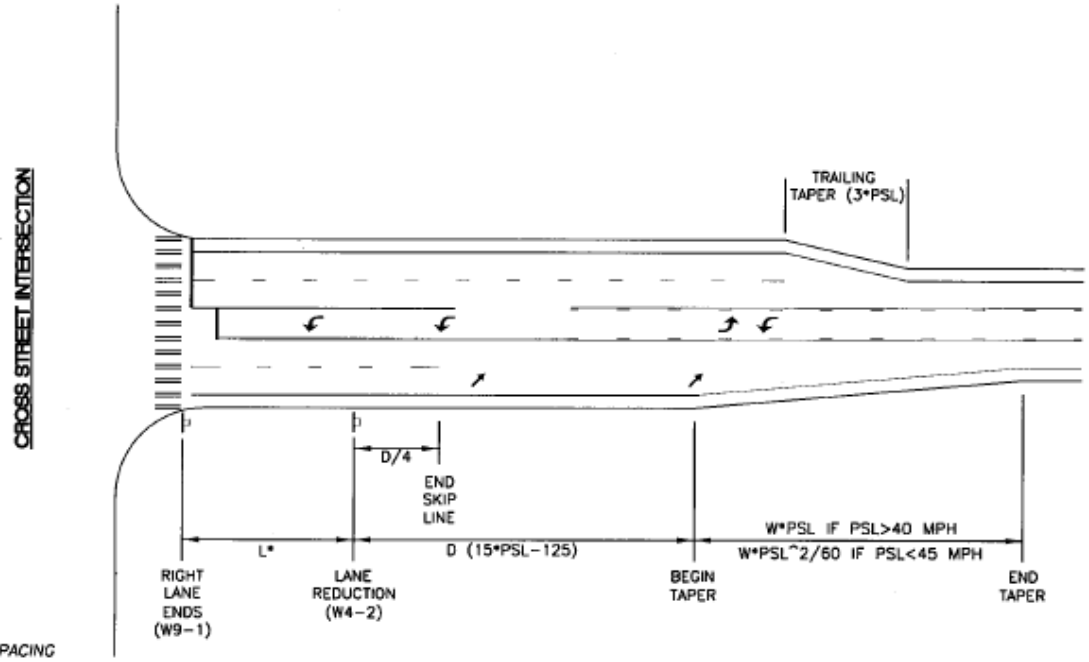


NOTES

1. ALL PAVEMENT SYMBOLS SHALL BE THERMOPLASTIC.

FIGURE 4.5 - MERGE AND DUAL LANES





*SIGN SPACING

L, ft	PSL, MPH
175'	35 MPH (Min.)
250'	40 MPH
300'	45 MPH
400'	50 MPH

FIGURE 4.6 - BIKE LANE AND RIGHT TURN DROP

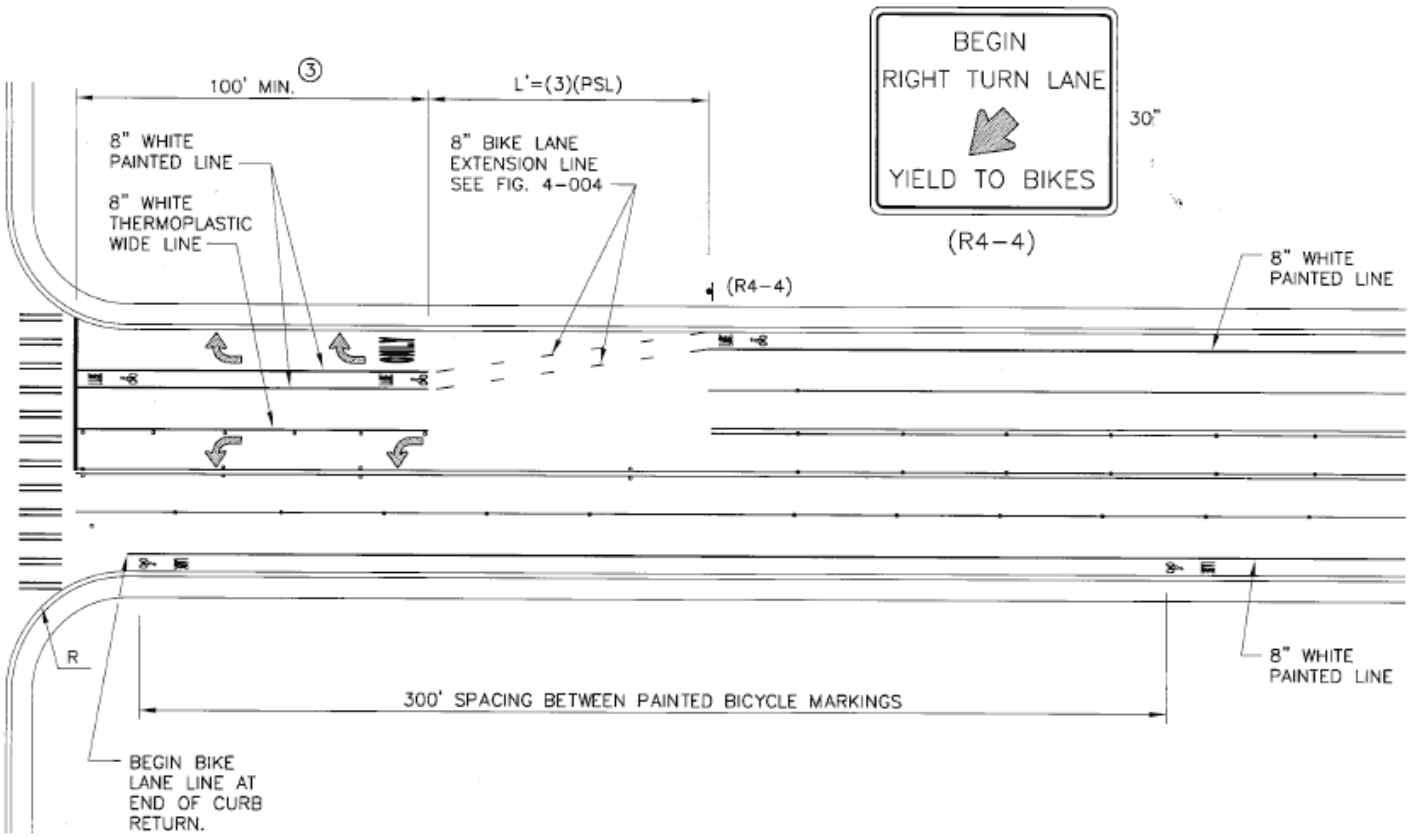


FIG 4.6

NOTES:

1. CLASS II BIKE LANE WIDTH MUST BE 5 FT.
2. IF R > 45 FT., A RAISED ISLAND FOR RIGHT TURN CHANNELIZATION IS RECOMMENDED.
3. POCKET LENGTH SHALL BE SUPPORTED BY TRAFFIC ANALYSIS.
4. PLACE R3-18 SIGN IF THE BIKE LANE TERMINATES AT OR BEFORE THE APPROACHING INTERSECTION.
5. RIGHT TURN LANES, LEFT TURN LANES, AND TWO-WAY LEFT TURN LANES SHALL BE 12 FT. IN WIDTH.
6. TURN LANE ARROWS SHALL BEGIN AT THE START OF THE TURN LANE AND 40 FT. BEHIND THE STOP LINE. IF NEEDED LONGER LANES MAY BE REQUIRED. ADDITIONAL ARROWS 150 FT. APART.

FIGURE 4.7 - BIKE LANE AND RIGHT TURN POCKET

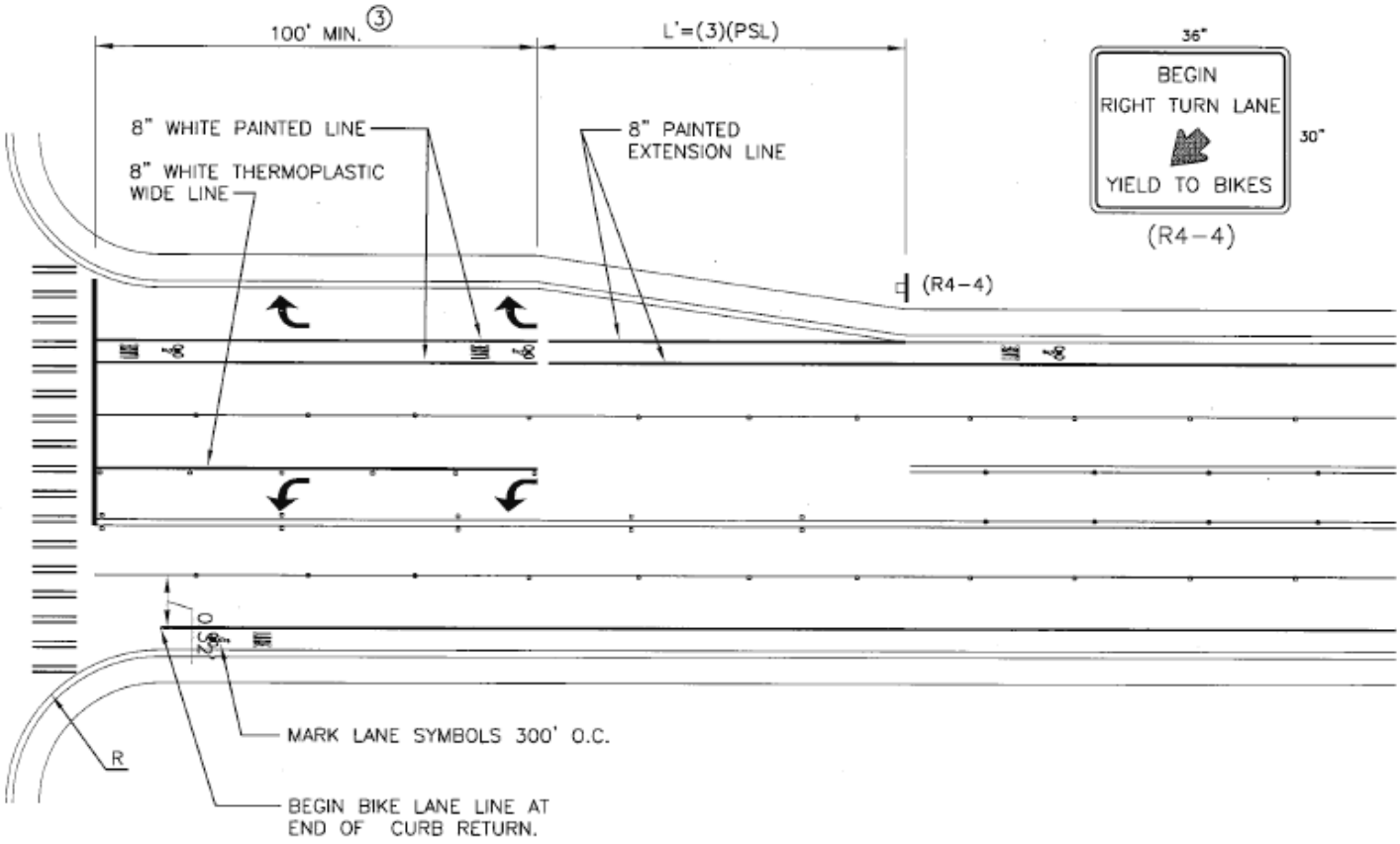
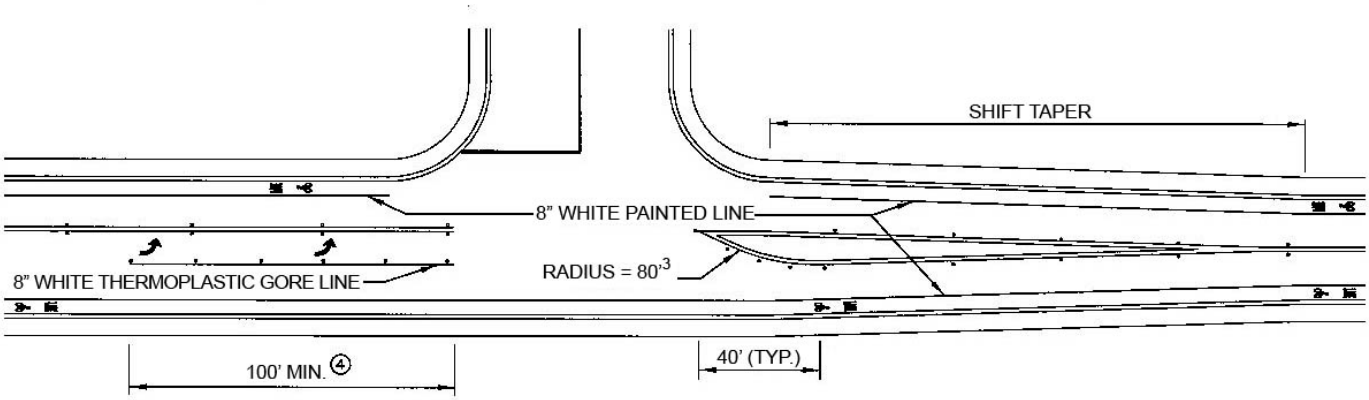


FIG 4.7

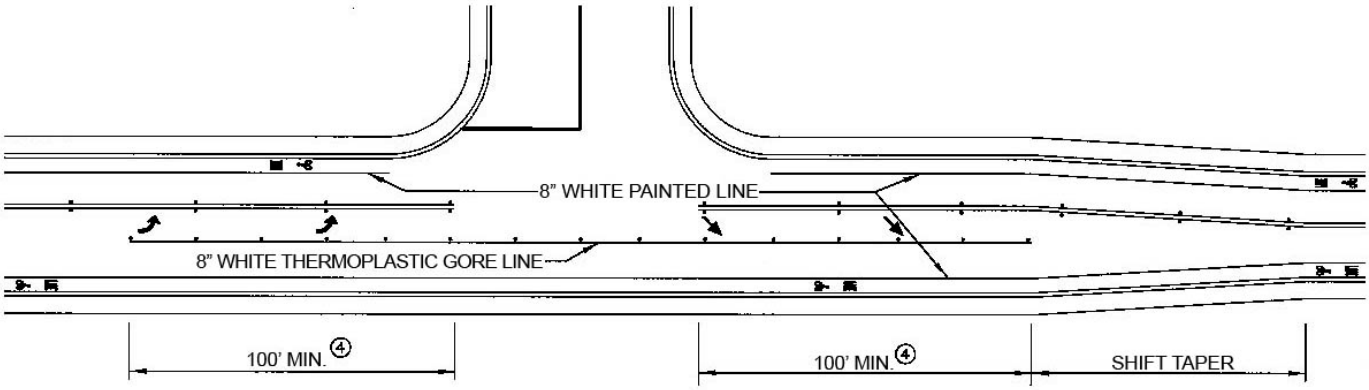
NOTES:

1. CLASS II BIKE LANE WIDTH IS 5 FT.
2. IF R > 45 FT., A RAISED ISLAND FOR RIGHT TURN CHANNELIZATION IS RECOMMENDED.
3. POCKET LENGTH SHALL BE SUPPORTED BY TRAFFIC ANALYSIS.
4. PLACE R3-18 SIGN IF THE BIKE LANE TERMINATES AT OR BEFORE THE APPROACHING INTERSECTION.
5. RIGHT TURN LANES, LEFT TURN LANES, AND TWO-WAY LEFT TURN LANES SHOULD ALL BE 12 FT. IN WIDTH.

FIGURE 4.8 - LEFT TURN LANES



LEFT TURN WITH MEDIAN ISLAND



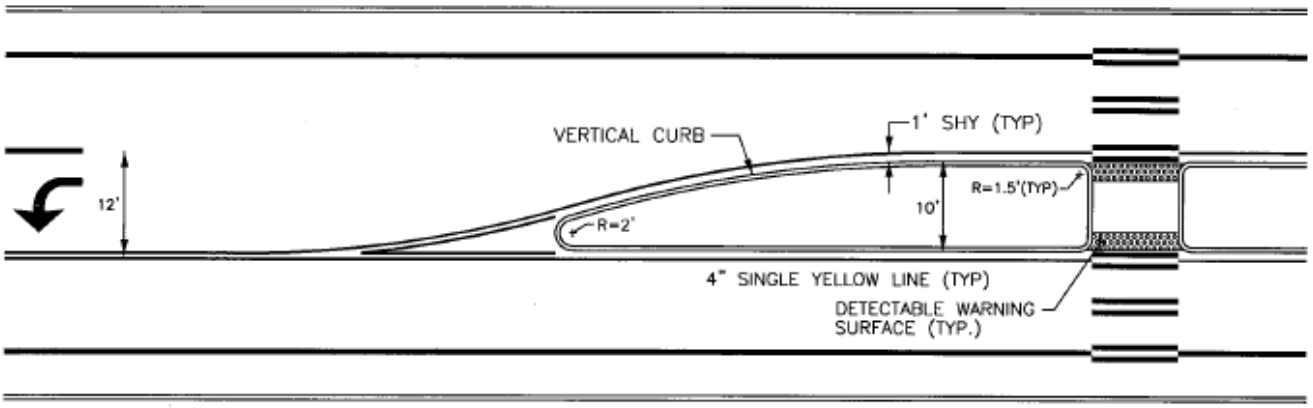
LEFT TURN REFUGE LANE

FIG 4.8

NOTES:

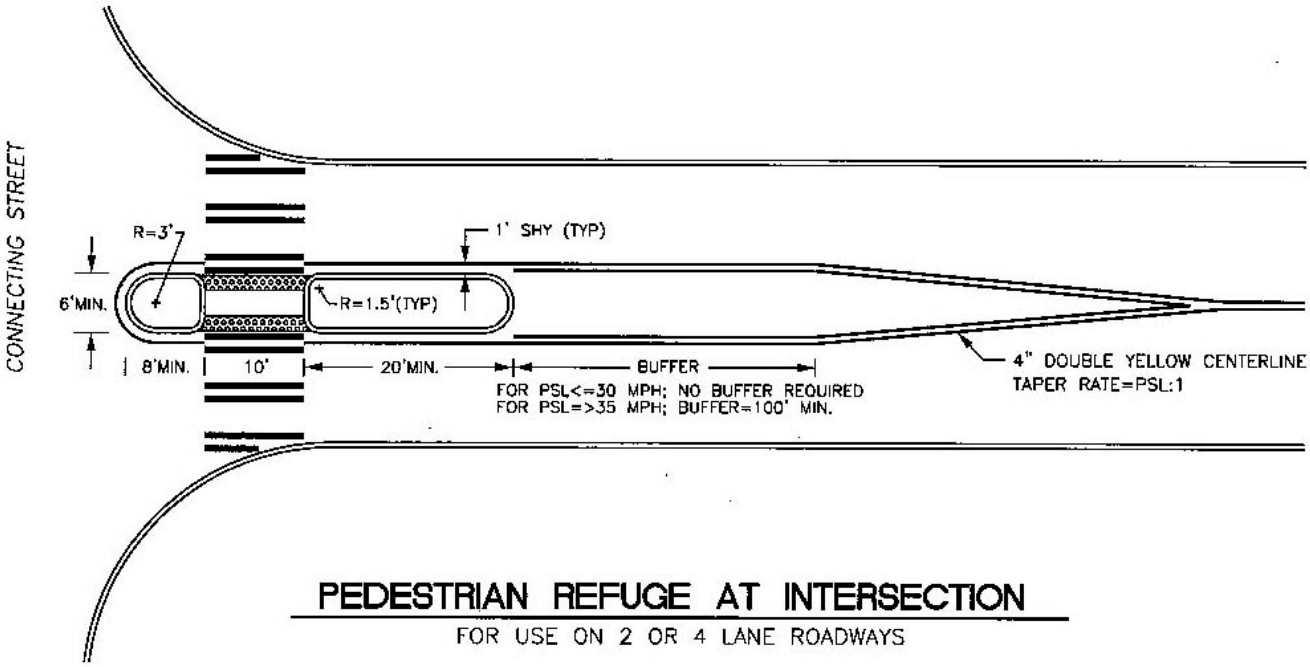
1. TYPE 2L ARROW SPACING: BEGINNING OF THE TURN POCKET AND 40 FT. FROM THE END OF THE POCKET.
2. TYPE 1 ARROW SPACING: END OF THE REFUGE LANE AND 40 FT. FROM THE BEGINNING OF THE REFUGE LANE.
3. RADIUS SHALL ACCOMMODATE LEFT TURNING VEHICLES.
4. POCKET LENGTHS SHALL BE SUPPORTED BY TRAFFIC ANALYSIS.

FIGURE 4.9 - REFUGE ISLANDS



PEDESTRIAN REFUGE AT MIDBLOCK

FOR USE ON 3 OR 5-LANE ROADWAYS



PEDESTRIAN REFUGE AT INTERSECTION

FOR USE ON 2 OR 4 LANE ROADWAYS

FIG 4.9

NOTES:

1. RAISED MEDIAN ISLANDS SHALL BE FULLY ILLUMINATED.
2. LANDSCAPING FOR ISLANDS SHALL MAINTAIN SIGHTLINES FOR ALL VEHICLE MOVEMENTS.
3. NOSE OF ISLAND AT INTERSECTION SHALL ALLOW FOR TRUCK TURNING.
4. CROSSWALK MARKINGS ARE REQUIRED IF NEAR EDGE OF CROSSWALK IS FURTHER THAN 10' FT. FROM EDGE OF CONNECTING STREET.

CHAPTER 5. ROADSIDE FEATURES

5.01 Rock Facings

A. Rock facings may be used for the erosion protection of cut or fill embankments up to a maximum height of 8 feet above the keyway in stable soil conditions, which will result in no significant foundation settlement or outward thrust upon the walls. See Figs. 5.3 through 5.6. Fill rock facing heights greater than four feet must be reinforced with geo-fabric or geo-grid. A structural wall of acceptable design, stamped by a licensed structural engineer, is required for rock facings heights greater than 8 feet above the keyway or when soil is unstable. As an exception, rock-facing heights may exceed 5 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 Public Works Director or his or her designee. Terracing of rock facings is subject to approval by the Public Works Director or his or her designee. Terracing shall not surcharge lower rock facings.

B. Materials
   1. Size categories shall include:

Two-man rock	200 to 700 lb.	18 to 28in.
Three-man rock	701 to 2,000 lb.	28 to 36 in.
Four-man rock	2,001 to 4,000 lb.	36 to 48 in.

   Four-man rocks shall be used for bottom course rock in all rock facings over 6 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. Rock quality shall meet all the test requirements of Section 9-13, "Riprap, Quarry Spalls, and Slope Protection" of the current Washington State Department of Transportation (WSDOT) Standard Specifications."

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 Public Works Director or his or her designee. See Figs. 5.3 through 5.6.

D. Underdrains

1. A minimum 6 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 "Gravel Backfill for Drains" (WSDOT/APWA 9.3.12(4)). The pipe shall be completely surrounded and covered with the gravel backfill to a minimum height of 18 inches from the bottom of the trench. Non-woven geotextile for underground drainage shall surround the gravel backfill and shall have a minimum one-foot overlap along the top surface of the gravel. This requirement for geotextile may be waived by the Public Works Director or his or her designee, if shown that soils and water conditions make it unnecessary. See Figs. 5.3 through 5.6.
2. The perforated pipe shall be connected to the storm drain system or to an acceptable outfall. Cleanouts must be provided at main angle points.

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 6 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 2-inch square probe. See Figs. 5.3 through 5.6.

F. Rock Filter Layers

The rock filter layer shall consist of quarry spalls with a maximum size of 4 inches and a minimum size of 2 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 6 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 rock facings exceeding 4 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 Figs. 5.4 and 5.6.

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 4000 in accordance with the applicable provisions of Section 6.2 of the WSDOT/APWA Standard Specifications, but with reduced water content resulting in slump of not over 2 inches. See Fig. 5.5.

I. Fences and Handrails
A chain link fence or metal handrail shall be installed when rockery is 18 inches or greater in height or as required by the Public Works Director or his or her designee. See Figs. 5.3 through 5.5, 5.7 and 5.8.

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 Public Works Director or his or her designee upon showing that the steeper slopes, based on soil analyses, will be stable. Side slopes on projects funded by federal grants shall be constructed in conformance with WSDOT Local Agency Guidelines.

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

5.03 Street Trees and Landscaping

A. Street trees and landscaping should be incorporated into the design of road improvements for all classifications of roads. Such landscaping in the right-of-way, by applicants/developers, shall be coordinated with off-street landscaping required on applicant's property under the provisions of City of Burien Code Title 12.17.

B. The preservation of existing trees and vegetation is strongly encouraged, where feasible. Placement of new trees and landscaping shall be compatible with road features and natural elements of the environment. In particular, mature tree heights and spacing shall not conflict unduly with overhead utilities or impact line of sight. Natural root growth shall not impact sidewalks, curbs and underground utilities. Street tree planting shall conform to the standards in the drawings contained herein.

C. The preference in approving the planting of trees within the public right-of-way shall be for planting at back of walk. Planting strips shall be approved by the Public Works Director or his or her designee only as part of a landscape plan in which the standards have duly been considered, including but not limited to compatibility with above and below ground utilities, size and growth habit, traffic safety, and a lifetime maintenance commitment for the caring of the planting strip and the repairing of any associated damages to sidewalks, curbs & gutters, drainage, and other structures.

D. When the Public Works Director or his or her designee allows planting strips to be located adjacent to the curb they shall meet the following requirements:

1. The minimum width from back of curb to sidewalk shall be 4 feet on residential streets and 5 feet on arterials.
3. Minimum distance from the center of any tree to the face of curb shall be 3 feet.
3. Only deciduous trees and shrubs that mature less than 24 inches in height, such as ground covers or grasses shall be planted in the planting strips.
4. All trees shall be staked so as to be parallel to the walk and curbs. All tree planting shall include the installation of an approved root barrier adjacent to walks and curbs for each tree, unless otherwise approved by the Public Works Director or his or her designee.
5. Location of trees shall take into consideration fixed objects so as not to obstruct sight distance, bus shelters, street signs, luminaries, mailboxes, utility boxes and other fixtures.
6. The top 12 inches of soil within the entire planting strip shall be removed prior to planting and replaced with appropriate topsoil conducive to good plant growth. Provision for drainage and watering shall be considered required relative to the plant species approved. Permanent irrigation systems are not allowed in the right-of-way. The applicant/developer shall ensure that temporary irrigation systems are either removed or properly disconnected to prevent water leakage prior to final roadway acceptance by the City.
7. The Public Works Director or his or her designee may restrict the use of plant materials in the right-of-way where sight distance, traffic safety, pedestrian conflicts and maintenance issues are of concern.

E. Minimum setback of trees in right-of way from fixed objects shall meet the following criteria, as shown in Fig. 5.9:

1. 50 feet from intersection vertical curb line
3. 20 feet from luminaries and utility poles
3. 20 feet from signs
4. 15 feet from bus shelters,
5. 10 feet from driveways
6. 10 feet from utility vaults/boxes
7. 10 feet back of sidewalk for all evergreen trees
8. 5 feet from hydrants
9. 2 feet from back of sidewalk for all deciduous trees
10. Outside identified sight distance restricted areas

F. All trees adjacent to walkways shall have a 7-foot minimum branching height at time of planting. This may be reduced if trees are more than 5 feet back of sidewalk. Minimum height clearance of existing trees adjacent to new road shall be 15 feet above the finished roadway grade.

G. Commercial root barriers shall be required for all trees planted back of sidewalks and curbs. See Fig. 5.11.

H. The use of tree blockouts, Fig. 5.10, shall meet ADA standards for minimum sidewalk clearance of 36 inches. Tree grates that meet ADA standards may be considered for meeting the minimum sidewalk width.

I. Trees planted within the City of Burien clear zone shall have a breakaway mature trunk diameter of four inches or less. Trees with mature trunk diameters of greater than 4 inches shall be located outside the clear zone. City of Burien clear zone setbacks for larger diameter trees shall meet the requirements of Section 5.10. See Fig. 5.10.

J. Traffic islands and circles may be paved or planted with low shrubs (24" mature height or less) and ground covers, if long-term maintenance is provided by the applicant and they have no traffic or pedestrian safety issues. Bioretention may also be used. These planter islands shall be at least 9 feet wide from curb face to face. The first 20 feet of these islands may be planted with low shrubs and ground covers. Deciduous trees may be used if set back a minimum of 20 feet from the front of the island and evergreens at a minimum of 30 feet, provided they meet the requirements of 5.03(I).

K. When rock facings or retaining walls are proposed adjacent to sidewalks, they shall generally be placed as close to the right-of-way line as practicable and a minimum of 10 feet from the edge of the traveled way or edge line and in accordance with Fig. 5.1.

L. Planting of street trees within the right-of-way shall be in accordance with the list herein. Planting of street trees in bioretention facilities within the right-of-way shall be in accordance with Appendix A, Bioretention Plant List. Alternative tree plantings, not on this list, may be used subject to review and approval by the Public Works Director or his or her designee.

M. Deciduous trees identified as not acceptable in planting strips less than fifteen feet wide include, but are not limited to: london plane, sycamore, sweetgum, soft maple, alder, boxelder, black locust willow species, oak, elm, mountain ash, cherry, cottonwood, lombardy poplar, yellow or tulip poplar, walnut, catalpa, paulownia, honeylocust, hawthorne, big leaf maple, madrona, fruit bearing trees or any other tree the department determines has potential to disrupt utilities or impact roadway improvements.

N. This tree list is a guide for selecting street trees for planting within the right-of-way and no preference is given by their order of listing. There may be other tree species and varieties not on this list that may be acceptable to the Public Works Director or his or her designee. Unless otherwise approved, no trees that: bear fruit, have poisonous features or thorns, host disease, require special maintenance, cause damage to infrastructure or pose any health or safety risk to the general public will be approved for use as street trees. The approved street trees are as follows:

SMALL / MEDIUM TREES:

Small/medium trees are acceptable for use in planting strips 4 feet or wider. Use of a root barrier required. (Maintenance of some species listed is required to maintain clearance under lower power lines).

- Abies koreana / Korean fir
- Acer buereraneum / Trident maple
- Acer campestre ‘Evelyn’ / Hedge maple
- Acer circinatum / Vine maple
- Acer ginnala / Amur maple
- Acer glabrum / Douglas maple
- Acer griseum / Paperbark maple
- Acer japonicum ‘Acontifolium’ / Fullmoon maple
- Acer palmatum / Japanese maple
- Albizia julibrissin / Silk tree
- Amelanchier spp. / Serviceberry
- Arbutus unedo / Strawberry tree
- Calodcedrus decurrens / Incense cedar
- Cercidiphyllum japonicum / Katsura
- Cercis Canadensis / Eastern Redbud
- Chamaecyparis nootkatensis ‘pedula’ / Weeping Alaska cedar
- Chamaecyparis obtuse / Hinoki cypress
- Cornus florida / Flowering dogwood
- Cornus kousa / Kousa dogwood
- Cornus mas / Cornelian cherry
- Corylus cornuta / Western hazelnut
- Cotinus coggygria / Smoke tree
- Crataegus crus-galli / Cockspur hawthorn
- Crataegus x lavallei / Carriere hawthorn
- Crataegus phaenopyrum / Washington thorn
- Cupressus arizonica / Arizona cypress
- Fraxinus pennsylvanica ‘Johnson’ / Leprechaun ash

- Halesia Carolina / Silver bell
- Ilex aquifolia / Christmas holly
- Juniperus scopulorum / Rocky Mt. juniper
- Laegerstroemia indica / Crape myrtle
- Lithocarpus densiflorus / Tanbark oak
- Magnolia salicifolia / Anise magnolia
- Magnolia soulangiana / Saucer magnolia
- Magnolia stellata / Star magnolia
- Malus x zumi ‘calocarpa’ / Crabapple
- Myrica californica / Wax myrtle
- Oxydendron arboretum / Sourwood
- Parrotia persica / Persian parrotia
- Picea omorika / Serbian spruce
- Pinus contorta / Shore pine
- Prunus blireiana / Blireiana plum
- Prunus serrulata ‘Kwanzan’ / Flowering cherry
- Prunus yedoensis ‘Akebono’ / Flowering cherry
- Stewartia psseudocamillia / Japanese stewartia
- Styrax japonica / Japanese styrax
- Styrax obassia / Fragrant snowbell
- Syringa reticulata / Japanese tree lilac
- Taxus bacatta ‘Stricta’ / Irish yew
- Thuja occidentalis / Pyramidalis
- Tsuga mertensiana / Mountain hemlock

MEDIUM TREES:

Acceptable for use in planting strips 6 feet or wider. Use of a root barrier required. (Not for use under power line locations).

- Aesculus x carnea ‘Briottii’ / Red horsechestnut
- Cercidiphyllum japonicum / Katsura
- Crataegus crus-galli / Cockspur hawthorn
- Fraxinus pennsylvanica ‘Patmore’ / Patmore ash
- Ginko biloba ‘/ Ginko (males only)
- Ginko biloba ‘Princeton Sentry’ / Princton Sentry ginko (males only)
- Halesia monticola ‘Silverbell’ / Mountain silverbell
- Magnolia grandiflora / Evergreen magnolia
- Prunus cerasifera / Flowering plum
- Pyrus calleryana ‘Chanticler’ / Flowering pear
- Quercus ilex / Holly oak
- Robinia x ambigua ‘Idahoensis’ / Pink Idaho locust

- Sorbus aria / White Beam mountain ash
- Sorbus aucuparia / European mountain ash
- Styrax japonica / Japanese snowbell
- Tilia cordata / Little Leaf linden
- Tilia cordata 'Chantcole' / Columnar linden

LARGER TREES:

Acceptable for use in planting strips that are 15 feet minimum, or when planted 10 feet back of sidewalk. Use of a root barrier is required unless waived by the Public Works Director. (Not for use under power line locations).

- Acer platanoides '/ Norway maple
- Acer pseudoplatanus / Sycamore maple
- Acer rubrum / Red maple
- Acer rubrum 'October Glory' / October Glory maple
- Acer rubrum 'Bowhall' / Bowall columnar Maple
- Acer saccharum '/ Sugar maple
- Betulus jacquemontii, / Jacquemonti birch
- Betula papyrifera / Paper birch
- Carpinus betulus / European hornbeam
- Carpinus betulus 'Fastigiata' / Columnar hornbeam
- Fagus sylvatica / Green or Copper beech
- Fraxinus latifolia / Oregon ash
- Fraxinus pennsylvanica / Green ash
- Gleditsa tricanthus var inermis/ Skyline Thornless Honey Locust
- Liquidambar styraciflua / Sweet gum
- Liriodendron tulipifera / Tulip tree
- Nyssa sylvatica / Tupelo
- Platanus acerifolia / Sycamore or London plane tree
- Quercus garryana / Garry oak
- Quercus palustris / Pin oak
- Quercus robur / English oak
- Quercus rubra / Red oak
- Ulmus carpinifolia 'Homestead'/Homestead Scotch Elm
- Zelkova serrata / Japanese zelkova

O. All street tree plans shall duly consider the natural form, size, habits, (including trunk diameter growth), impact on current and future sight distance, disease resistance, hardiness, level of maintenance, etc. in selecting the appropriate tree(s).

P. The preparation and planting of street trees is required to follow the general details, specifications and corresponding text contained within the adopted Standards. Alternative planting practices and emerging technologies that achieve the same intent of these requirements will be considered and may be approved during the review process.

Q. Within the downtown area, tree selection shall comply with the approved list within the Downtown Burien Streetscape Design Plan.

5.04 Mail Boxes

A. The responsibilities for location support structures and installation of mailboxes in connection with the construction or reconstruction of City roads are as follows:

1. The Public Works Director or his or her designee will:

   a. Require road improvement plans, whether for construction by the Department of Transportation or by a private builder, to show clearly the designated location or relocation of mailboxes, whether single or in clusters.

   b. Require with this information any necessary widening or reconfiguration of sidewalks with suitable knockouts or open strips for mailbox posts or pedestal.

   c. Require these plans to include a statement on the first sheet that mailbox locations as shown on these plans have been coordinated with the serving post office at (City/Community), Washington. This will be a prerequisite to plan approval.

   d. Require construction of mailbox locations in accordance with these plans, through usual inspection and enforcement procedures.

2. The Postmaster or designated serving post office will:

   a. Designate location and manner of grouping of mailboxes when so requested by the design agency. Note on the plans the type of mailbox delivery: NDCBU (Neighborhood Delivery and Collection Box Unit), or Rural type box. Authenticate by stamp or signature when these data have been correctly incorporated into the plans.

   b. Do all necessary coordination with owners or residents involved to secure agreement as to mailbox location and to instruct them regarding mailbox installation. Actually install or relocate NDCBUs if these are the types of box to be used in the neighborhood.

3. Owners or residents served by mailboxes, at time of original installation, will:

a. If using individual mailboxes, clustered or separate, install and thereafter maintain their own mailboxes as instructed by the post office.

b. If NDCBU delivery, rely on Post Office to provide and maintain NDCBUs.

4. Applicants or their contractors shall:

a. Where there are existing mailboxes and no plans to replace them with NDCBUs:

When it becomes necessary to remove or otherwise disturb existing mailboxes within the limits of any project, install the boxes temporarily in such a position that their function will not be impaired. After construction work has been completed, reinstall boxes at original locations or at new approved locations as indicated on the plans or as directed by the Public Works Director or his or her designee. Use only existing posts or materials except that any damage caused by the builder or his/her contractor is to be repaired at the expense of the applicant.

b. Where there are existing NDCBUs or plans to install NDCBUs:
Call on the Postmaster or designated serving post office to locate or relocate NDCBUs and make the necessary installation.

B. Installation methods are as follows:

1. Mailboxes, in the general case, shall be set in accordance with Figs. 5.14, 5.15, 5.16, or 5.17. Boxes shall be clustered together when practical and when reasonably convenient to the houses served.

2. NDCBUs will be installed by the Postal Service generally in accordance with Fig. 5.17.

3. Non-yielding and non-breakaway mailbox structures will not be allowed within the clear zone. See Section 5.10 of these Standards. The use of concrete filled metal pipe for any mailboxes, or the use of horizontally mounted wooded members to support multiple mailboxes is expressly prohibited.

5.05 Street Illumination

Street illumination shall be provided on all roadways. Illumination will also be required as identifiers when a local road intersects an arterial. Illumination of roadways with turn channelization will include all lane tapers.

The illumination system shall be designed to provide a minimum of 1.2 foot-candles with an average-to-minimum uniformity ration of 3:1, except at intersections where the system shall be designed to provide a minimum of 1.5 foot-candles with an average-to-minimum uniformity ratio of 3:1.

The illumination system for arterial streets and downtown area streets shall be designed to provide a minimum of 1.0 foot-candles with an average-to-minimum uniformity ratio of 3:1, except at intersections where the system shall be designed to provide a minimum 1.5 foot-candles with an average-to-minimum uniformity ratio of 3:1. The street standards for the Downtown area are specified in the Downtown Handbook. Refer to the City of Burien Street Lighting Standards for Poles and Luminaries

A photometric analysis of the lighting pattern for a specific project may be substituted for these standards if approved by the Public Works Director or his or her designee.

When illumination is required for sag vertical curves the system shall be designed to provide a minimum of 0.4 foot-candles within the limits of the sag curve with a maximum average foot-candle value of 1.0. If an intersection is adjacent to the sag vertical curve, the illumination must include the intersection.

Steel poles shall be used for the street illumination system unless otherwise approved.

5.06 Survey Monuments

A. Monuments that conform with Fig. 5.19 shall be placed at all street intersections, boundary angle points, points of curves in streets and at such intermediate points as may be required by the Public Works Director or his or her designee.

B. All existing monuments, which are disturbed, lost, or destroyed during construction or surveying, shall be replaced by a land surveyor registered in the State of Washington at the expense of the responsible applicant, contractor, builder, developer, or utility per RCW 58.09.130 and 58.04.015.

C. Plat monumentation shall comply with these standards and in conformance with Fig. 5.19 and 5.20 on developments such as subdivisions, residential, commercial, binding site plans, or any other construction that establish new roadways or reconstruct existing roadways. Monuments shall be set along the center of the right of way at the PC's and PT'S of curves. When the PI of the curve falls within the paved area of the road, a PI monument may be set in lieu of setting monuments at the PC and PT.

D. All lot and block corners shall be set with an iron pipe or steel reinforcing bar at least 24 inches in length within 90 days after recording of the plat. All lot corners shall be identified with the land surveyor's registration number.

E. The monument case will be installed after the final course of surfacing has been placed on the road.

5.07 Roadway Barricades

Temporary and permanent barricades shall conform to the standards described in Section 6C-8 of the Manual on Uniform Traffic Control Devices (MUTCD) and Fig. 5.3.

A. Type I or Type II barricades may be used when traffic is maintained through the area being constructed / reconstructed.

B. Type III barricades shall be used when roadways and/or proposed future roadways are closed to traffic. Type III barricades shall extend completely across a roadway (as a fence) or from curb to curb. Where provision must be made for access of equipment and authorized vehicles, the Type III barricades may be provided with movable sections that can be closed when work is not in progress, or with indirect openings that will discourage public entry. Where job site access is provided through the Type III barricades, the applicant/contractor shall assure proper closure at the end of each working day.

C. Unless otherwise approved, Type III permanent barricades shall be installed to close arterials or other through streets hazardous to traffic. They shall also be used to close off lanes where tapers are not sufficiently delineated.

D. Type III barricades shall be used at the end of a local access street terminating abruptly without a cul-de-sac bulb or on temporarily stubbed off streets. Each such barricade shall be used together with an end-of-road marker.

5.08 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 a minimum of 50 inches on center on trails 10 feet wide or less. Spacing shall be 60 inches on center on trails wider than 10 feet. Bollard design shall be in accordance with Fig. 5.18 or other design acceptable to the Public Works Director or his or her designee. No fire apparatus access roads shall be blocked in this manner without the concurrence of the Fire Marshal. Bollards shall be located outside the designated clear zone.

5.09 Guardrail/Embankment Heights

New roadways shall be designed with due regard to safety for the traveling public. To ensure a safe roadway configuration, the following features shall be included in the roadway design in order of preference:

A. Provide 4:1 or flatter fill slopes adjacent to the roadway where vertical drops will be greater than 6’.
B. Provide 3:1 or flatter fill slopes where 4:1 slopes cannot be provided and vertical drops will exceed 6’.

C. Design location of storm water runoff ponds where they are not accessible from errant vehicles.
D. Evaluate need for barrier systems and provide design in conformance with WSDOT/APWA Standard Plans, Standard Specifications, and the WSDOT Design Manual

5.10 Roadside Obstacles

Non-yielding or non-breakaway structures exceeding 6 inches in height, including rock facings, retaining walls and any other objects, which may be potential hazards to the traveling public shall be placed with due regard to safety. On shoulder or mountable curb roads, such as rolled curb, extruded curb, or thickened edge, hazardous objects that are essential to the roadway network shall be placed as close to the right-of-way line as practicable and a minimum distance of 10 feet measured from the edge of the traveled way or edge line and in accordance with Fig. 5.1.

Non-essential items, (e.g., decorative items) shall not be placed within the right-of-way unless otherwise approved by the Public Works Director or his or her designee through the road variance process. Additionally, no open water facilities, with the exception of ditches and bio-swales shall be located within the road right-of-way, unless the Public Works Director or his or her designee grants a road variance. Landscaping placed within the right-of-way shall meet the minimum requirements specified in Section 5.03 of these Standards.

On urban vertical curb roadways with speed limits less than 40 miles per hour, hazardous objects shall be placed as far from the edge of the traveled way or edge line as practical. Such an object shall not be placed in a sidewalk or with the object edge nearest the roadway less than 8.5-feet from the face of curb in commercial/business areas and 5.5-feet from face of curb in residential areas. On urban roads with speed limits of 40 miles per hour or greater, hazardous objects shall be placed as close to the right-of-way line as practicable and a minimum distance of 10 feet from the edge of the traveled way or edge line and in accordance with Fig. 5.1. When sidewalks are constructed or will be constructed in the future, structures shall be placed a minimum distance of two (2) feet behind the sidewalk. The Public Works Director or his or her designee must approve the placement of roadside obstacles within a planter strip, provided the minimum roadside obstacle requirements are met. Placement of utility structures shall be in accordance with requirements of Chapter 8 and Fig. 5.1 to include constraints on placement of poles on the outside of curves. The applicant or his engineer may apply for the setback variance for the obstacle or utility structure when justified by a traffic safety evaluation. The applicable utility company shall be contacted for the opportunity to submit a written recommendation.

5.11 Burien Towncenter Streetscape Features

The Towncenter of Burien is a designated area within the City. Within the Towncenter area, special standards for concrete sidewalks, bollards, benches, tree grates, planter railings, and decorative pedestrian luminaires and poles have been specified to provide this area a unique character.

A. Cement Concrete Sidewalks

1. Description

   Cement concrete sidewalks, four inches thick, shall be constructed as shown on the roadway sections in the Plans in accordance with the KCRS (Dwg. Nos. 3-001, 3-004, 3-005, 4-004 and Std. Plan F-3 as applicable).

   At driveways, sidewalks shall have a depth of five inches. The driveway areas will be measured separately from sidewalks.

2. Materials

   a. Colored Concrete Sidewalks

      Colored concrete for Colored Cement Sidewalks shall consist of SGS Color-Flo Liquid Concrete Color, liquid dye, manufactured by Solomon Color Co. (www.solomoncolors.com) and distributed by Stoneway Concrete (425) 226-1000 or approved equal. Color shall be 920 slate (light gray), one percent (1% loading). Liquid dye shall be predispersed pigment in an aqueous base liquid. No powder or dry shake shall be accepted.

      Follow the Manufacturer's general guidelines to assure proper dispersal and mixing of liquid dye, including aggregates, additives and finishing

      The colored concrete for Colored Cement Sidewalks shall be installed to match color banding on SW 152nd Street. The contractor shall also match the plain concrete behind the banding on SW 152nd Street.

   b. Construction Requirements

      Where noted on the plan, planters without curbs shall be formed into the sidewalk.

      Full depth expansion joints for cement concrete sidewalk shall be constructed with a maximum spacing of 10 feet and shall be depressed and scored to match the scoring of the sidewalk. Score joints shall be constructed as indicated on the plans.

      As detailed on the plans, elastomeric joint material shall be placed between all masonry or concrete structures and the back of sidewalk and pressure treated (ground contact) board shall be placed between wood structures and the back of sidewalk.

c. Placing and Finishing Concrete

For Colored Concrete Sidewalk installation, initial floating should be discontinued as soon as surface becomes wet. Floating may be resumed after the surface water disappears. The final broom finish may be completed after floating. DO NOT COVER FOG OR OTHERWISE ATTEMPT TO CURE THE COLORED CONCRETE SLAB AFTER FINAL FINISH, THIS WILL CREATE UNEVEN COLORING.

c. Scoring Lines

See Figure 5.22 for sidewalk scoring requirements

B. Decorative Bollards

1. Materials

a. Materials

Decorative Bollards shall be one-piece, cast iron, non-removable bollard with cast-in attachment, ~8" diameter by 35-3/16" height, Model # SJ-CI, San Jose Bollard, powder-coated finish, color: black, as manufactured by Urban Accessories, and distributed by ARCHITECREATION, Seattle, WA (206) 932-4730 or approved equal.

Grout shall be nonshrink, nonmetallic grout, premixed, factory packaged, nonstaining, noncorrosive nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for exterior applications.

b. Construction Requirements

Install each Decorative Bollard in concrete sidewalk as shown in Figure 5-25.

C. Benches

1. Description

This work shall consist of installing benches as shown on the Plans and as specified herein.

2. Materials

a. Materials

Type 1 Bench shall be steel, 6-foot or 8-foot length, as indicated on the plans, Model Bench 58, polyester powder coat finish, color: black, as manufactured by Du Mor, Inc., and distributed by Recreation Resources, Inc., Salem, OR (503) 585-5777 or approved equal.

Expansion bolts shall be stainless steel sized to fit, bench. Bolt length shall be 4"minimum.

Type 2 Bench Victor Stanley model "Steelsites" RB-12 with arm rests (6' length, backless bench), electrostatically powder-coated with TGIC polyester powder coating finish, color: black, as manufactured by Victor Stanley (800) 368-2573, or approved equal.

b. Construction Requirements

Install each bench in concrete sidewalk with approved expansion bolts. See Figure 5.26 for layout details

D. Trash Receptacles

1. Description

This work shall consist of installing trash receptacles as shown on the Plans and as specified herein.

2. Materials

Trash receptacles shall be Model S-42 with S-2 spun steel dome, 36 gallon, steel, powder coat finish, color: black, as manufactured by Victor Stanley, Inc., and distributed by Wildwood Playgrounds, Portland, OR (503) 288-5797 or approved equal.

Expansion bolts shall be stainless steel sized to fit, trash receptacle. Length shall be 4"minimum.

E. Tree Grates

1. Description

This work shall include installing tree grates and associated frames at the locations shown on the Plans and as specified herein.

2. Materials

Tree grates shall be Urban Accessories, Model OT TITLE 24-RCT, cast iron ASTM A 48 class 35b or better, or approved equal (425) 487-0488. Size as shown on the Plans. Finish shall be powder coat, color matte black.

Tree grate frames, and mounting attachments, cast iron ASTM A 48 class 35b or better, by Urban Accessories or approved equal (425) 487-0488. Size to match tree grate. Finish shall be powder coat, color matte black. Provide recommended bolts and associated fasteners per manufacturer.

Mounting attachments for Type 1 frame shall be:

3 sides, S – standard for new surround slabs

1 side, R- retro fit for use in existing back of curb.

Mounting attachments for Type 2 frame shall be:

4 sides, S – standard for new surround slabs.

3. Grate location

   See Figures 5-23 and 5-24 for coordination of tree grate with sidewalk scoring patterns

F. Decorative Planter Railing

1. Description

   This work shall consist of fabricating Decorative Planter Railing in accordance with details shown in Plans and as specified herein.

2. Materials

   Materials shall meet the requirements of the following sections unless noted:

Structural Steel and Related Materials	9-06
Paint	6-07

   Color shall be black, matte finish.

   Skate Block Type 2 shall be Ravensforge Skateblocks “Flat Bar – Square Corner, FB90”, custom size to fit railing, 2” x 1 1/2” x 3/4”, cast aluminum, manufactured by Ravensforge Coneg 888-743-3400, or approved equal. Contractor shall verify size prior to installation; Skate Block Type 2 shall match size and shape of Skate Block installed on railings along 152nd ST between 4th and Ambaum. The Skate Block Type 2 shall be bolted and installed per manufacturer’s recommendation and painted to match railings.

3. Construction Requirements

   The Contractor shall provide 6 sets of shop drawings of fabrication, fastening locations and installation of Planter Railing prior to fabrication. Field verify planter curb lengths.

G. Cement Concrete Seat Wall

1. Description

   This work shall consist of construction and installation of the Concrete Seat Wall in accordance with details shown in Plans and as specified herein.

2. Materials

   Materials shall meet the requirements of the following sections unless noted:

Concrete Structures	6-02

   The Skate Block Type 3 for the Concrete Seat Wall shall be Skate Stoppers AS Maple Series, 1” radius, Bronze Finish. Install per manufacturer’s

recommendations, with two part epoxy or approved equal.

3. Construction Requirements

   The Concrete Seat wall shall be constructed as detailed on the Plans. Full depth expansion joints for Concrete Seat Wall shall be constructed in locations as indicated on the plans. The wall finish shall be a light sand blast top and sides.

   Elastomeric joint material shall be placed between the Concrete Seat Wall and the back of sidewalk, as detailed on the plans.

   Layout and location of the Concrete Seat Wall shall be approved prior to construction by the Engineer.

H. Irrigation System

1. Pipe, Tubing and Fittings

   All pipe and tubing shall be PVC or approved equal. All fittings shall be Sch 80 PVC. All sleeving shall be Sch 40 PVC.

2. Polyvinyl Chloride Pipe and Fittings

   PVC pipe shall be Schedule 40 PVC pipe for the main, laterals and sleeves.

3. Drip Tubing

   Carflex Liquidtight, Flexible, Nonmetallic Conduit by Carlon shall be used to house all drip tubing pulled through illuminations poles to hanging flower baskets.

4. Automatic Controller

   Automatic controllers shall be as shown on the Plans. Supply and install on pedestal mount in cabinets, including foundation.

5. Sprinkler Heads

   Pop-up spray heads, impact heads and bubblers shall be as shown on the Plans or approved equal.

6. Valve Boxes and Protective Sleeves

   Valve boxes for automatic control valve with extensions as necessary and bypass assemblies shall be Series 1419E by Carson, Model 141 9E-1 2B or approved equal.

   Valve boxes for quick coupler shall be Series 610 by Carson or approved equal.

   Main DCVA and Meter Vaults: Precast concrete with hinged locking metal lid

as manufactured by Utility Vault, model 25-TA, or approved equal.

7. Automatic Control Valves

   Automatic Control Valves shall be as shown on the Plans or approved equal.

8. Quick Coupling Equipment

   Quick Coupling shall be as shown on the Plans or approved equal.

9. Pressure Regulation Valves

   Pressure Regulation valve shall be as shown on the Plans or approved equal.

10. Electrical Wire and Splices

    Electrical Wire shall be #14 UF wire. Utilize 3M DBY splice kits.

I. Towncenter Decorative Lighting

1. Decorative Pedestrian Luminaire Pole

   The ornamental pole shall be capable of supporting one (1) luminaire, and shall be complete in all respects. No welding will be allowed at the site at the time of erection. See Figure 5-27 for additional information on the Decorative Pedestrian Luminaire and Pole and Figure 5-28 for foundation details. . The aluminum pole shall be fluted tapered and shall consist of two (2) sub-assemblies:

   a. The Pole Sub-Assembly shall be Cyclone PD15 type (or approved equal) and shall have mounting height of 12 feet. The pole shall be 5-inch diameter shaft with 12 flutes. The shaft shall be constructed of seamless extruded tube of 6063 aluminum alloy per ASTM B221 and shall be full-length heat treated after welding on the base flange to T-6 temper. Pole shaft shall be free of longitudinal welds. Four galvanized anchor bolts sized per manufacturer's specifications and bolt covers shall be provided with each pole. Anchor bolts shall include double nuts (leveling) and washers. Anchor bolts shall have an "L" bend at the bottom and a minimum of 7 inches threads at the top. All nuts, washers and threaded ends shall be hot-dip galvanized per ASTM A-123. The anchor bolts and pole anchor base shall be capable of resisting the bending moment of the shaft at its yield strength stress. The anchor base shall be cast aluminum 1-inch thick plus 1-inch reinforcement. The anchor base shall be provided with round holes accepting an 11-1/2-inch diameter bolt circle or with slots accepting 8- to 12-inch diameter bolt circles. Longitudinal welds shall be butt welded by the submerged arc process and circumferential welds shall be welded with a permanent backup ring. All butt welds shall be ground flush with the base metal.

b. The Decorative Base Sub-Assembly shall be Cyclone BD46A decorative cast aluminum split base cover (or prior approved equal). The base shall be constructed of aluminum alloy 356 per ASTM B26 or B108. Base shall be secured to pole with two ¼-inch hex socket set screws.

c. Auxiliary pole equipment shall include the following components (see the Plans for equipment configuration):

d. Festoon outlets shall be provided on poles (as shown in the Plans) at a mounting height of 11.5 feet from the ground. The festoon circuit is to be fed and fused separately from the street lighting circuit. Festoon outlets shall be per the Plans.

e. Two (2) plant support brackets (as shown in the Plans) shall be Cyclone #BP2 (or approved equal) and shall be orientated parallel to the curb line and 180 degree from each other at a height of 10.5 feet from the base of the pole.

f. Flagpole holder (to be provided by others) shall be installed by the Contractor and oriented perpendicular to the curb on the curbside at a height of 8 feet from the base of the pole. The flagpole holder shall be extruded aluminum conduit with 1/8-inch wall, 1-inch in diameter and 5-inches in length. The flagpole holder shall be attached using 3/8-inch self-tapping screws with tamper resistant heads. The flagpole holder shall have one (1) hole drilled and tapped for #1/4-20 UNC by 1" long located at 1-1/4-inch from the top of the rod.

g. Irrigation line shall be provided in each pole. The ¼-inch irrigation line shall extend from the waterline connection to the end of the plant support on the luminaire pole. A ½-inch non-metallic, liquid tight conduit (PolyTuff I or approved equal) shall be supplied by the pole manufacturer. The irrigation conduit shall be installed in each pole by the manufacturer. A ½-inch hole shall be drilled in the luminaire pole by the manufacturer just above the plant support to feed the drip line. The Contractor shall feed the irrigation line through the conduit within each luminaire pole. A ½-inch non-metallic, liquid tight tee shall be installed on the irrigation line just outside the pole to split the irrigation line. The irrigation lines shall be attached to the plant support arms and positioned over the planter basket.

h. Banner Brackets (where required) shall be furnished and installed by the Contractor and they shall be as described in Section 8-36.2 of these Special Provisions.

i. Finish: All decorative pedestrian luminaire pole sub-assemblies, parts and attachments shall be factory prime and finish painted. The finish color shall be "Textured Burien Green" (Semi-Gloss, Kelly Moore #00-1088 RNT with anti-graffiti coating – this is custom color made at the Renton Kelly Moore Store 425-228-1750). The Contractor is to purchase

a one gallon sample for use as a color match for the Engineer's approval prior to factory finish coating.

2. Decorative Luminaires

a. Luminaires Mounted On Decorative Pedestrian Luminaire Poles

Luminaire shall be Cyclone Lighting Inc. CY1401-F1AP-PR3-LAC-100HPS-QT-S1, or prior approved equal in accordance with the Plans. Lamp shall be 100-watt, 240 Volt AC, clear burning, high-pressure sodium vapor light source with an average rated life of 24,000 hours.

IES-ANSI Light distribution pattern:

Lateral: Type III

Vertical: Short

Control: Non-Cutoff

Luminaires shall be a prismatic acrylic glow top with a decorative cast aluminum ring and finial, which tops an acrylic or polycarbonate, injection-molded refractor, equipped with a cast aluminum-mounting ring. The luminaire base shall consist of a permanent molding aluminum fitter.

The Contractor shall ascertain the correct lamp socket setting from the luminaire manufacturer to achieve the distribution pattern indicated above. For warrantee purposes all lamps shall be dated on the base with the installation month and year.

The ballast shall be quad rated 120\208\240\277 volts +/- 10% and shall be auto-reg design. The ballast shall be suitable for operating a 100 watt high-pressure sodium vapor lamp per ANSI # S54.

Housing Color: Housing shall be factory prime and finish painted. The color shall be "Textured Burien Green".

b. Luminaires Mounted On Decorative Roadway Luminaire Poles and Traffic Signal Poles

Luminaire shall be Hadco #TF6 (or prior approved equal) in accordance with the Plans. Lamp shall be 150W or 250W (see the Plans), 240 Volt AC, clear burning, high-pressure sodium vapor light source with an average rated life of 24,000 hours.

IES-ANSI Light distribution pattern:

Lateral: Type III

Vertical: Short

Control: Cutoff

The housing shall be tool-less lamp and ballast (twist-lock assembly) access type with hinged lens frame with stainless steel latch and fasteners. A weather-proof ballast assembly shall isolate the ballast from water and heat for longer life. The optical assembly shall include hydro-formed aluminum reflector with polished, etched and clear anodized semi-specular finish. The globe shall be polycarbonate long type.

The Contractor shall ascertain the correct lamp socket setting from the luminaire manufacturer to achieve the distribution pattern indicated above. For warrantee purposes all lamps shall be dated on the base with the installation month and year. The ballast shall be quad rated 120\208\240\277 volts +/- 10% and shall be auto-reg design. The ballast shall be suitable for operating a 150 watt high-pressure sodium vapor lamp per ANSI # S54.

Housing Color: Housing shall be factory prime and finish painted. The color shall be "Textured Burien Green"

3. Control Equipment

Illumination circuits shall be controlled by a combination of photoelectric controls and lighting contactors as noted in the contract. The photocell shall be mounted on top of the luminaire closest to the electrical service. A 3/C #12 IMSA cable shall be provided from the photocell to the electrical service.

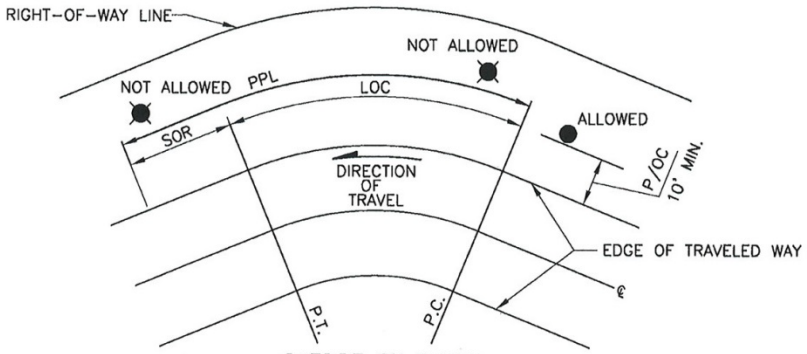
4. Photoelectric Controls

The photoelectric control shall be the twist-lock type and the light sensitive element shall be a solid state photo diode. The control shall be designed to turn on at 3 foot-candles (32 lux) and turn off at 1.8 foot-candles (20 lux). The lighting control shall not drift by more than 1 percent over a 10-year period. The photoelectric control shall have a minimum 1-year warranty.

5. Illumination Circuit Splices

Illumination circuit splices at below grade locations shall be as detailed on the Plans.

FIGURE 5.1 - CLEARANCE OF ROADSIDE OBSTACLES ON SHOULDER ROAD TYPE



OUTSIDE OF CURVE
POSTED 40 MPH & OVER

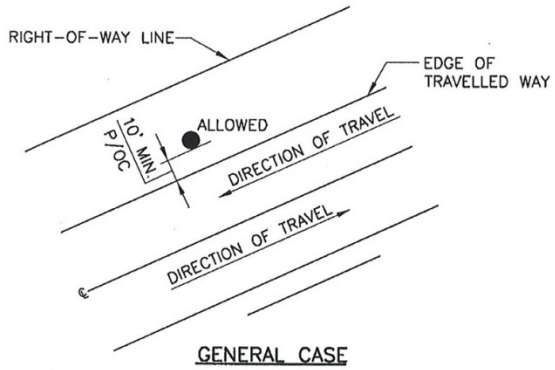
LOC: LENGTH OF CURVE (FEET) AT EDGE OF TRAVELED WAY FROM P.C. TO P.T.

SOR: SAFETY OVERRUN (FEET) BEYOND P.T.

PPL: PROHIBITED POLE LOCATION (PPL)– FEET–FEET (LOC + SOR) WHERE POLES OR OBSTACLES MUST BE REMOVED OR BARRICADED.

PPL (FEET) ON OUTSIDE OF CURVES WITH POSTED SPEED LIMIT OF 40 MPH & OVER	
40 MPH	LOC + 220 (SOR)
45	LOC + 255
50	LOC + 290
55	LOC + 325

APPLIES TO ROADWAY WITH SHOULDER OR MOUNTABLE CURB ON OUTSIDE OF CURVE, WITH:
–RADIUS LESS THAN 2500 FT., AND
–POSTED SPEED GREATER THAN OR EQUAL TO 40 M.P.H.



GENERAL CASE

P/OC: POLE/OBSTACLE CLEARANCE TO NEAREST FACE OF POLE/OBSTACLE.

APPLIES: TO ROADWAY WITH SHOULDER OR MOUNTABLE CURB ON:

1. TANGENT, OR
2. INSIDE OF CURVE, OR
3. OUTSIDE OF CURVE, EITHER WITH
   –POSTED SPEED LESS THAN 40 MPH OR
   –RADIUS GREATER THAN 3500 FT. ON ROADWAY MEETING ALL CURRENT DESIGN STANDARDS.

FIG 5.1

NOTES:

1. THE STANDARDS SHALL APPLY TO EVERY NEW PLACEMENT AND EVERY PLANNED. NON-EMERGENCY REPLACEMENT OF EXISTING POLES AND OTHER UTILITY STRUCTURES.
2. NO POLES MAY BE REPLACED ON THE OUTSIDE OF A CURVE WITH A POSTED SPEED LIMIT OF 40 MPH OR OVER UNLESS APPROVED THROUGH A VARIANCE REQUEST

FIGURE 5.2 - ROADWAY BARRICADES

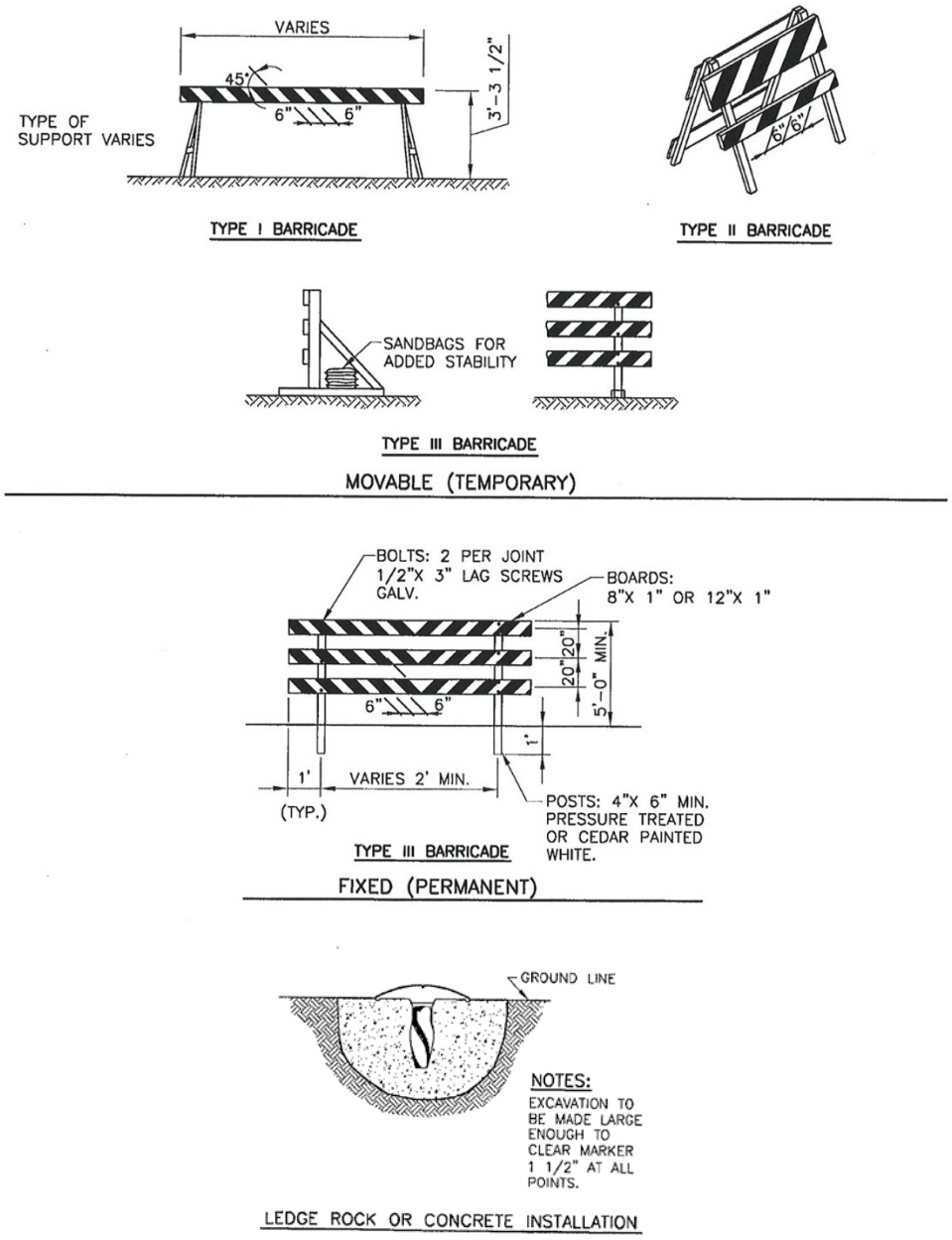


FIG 5.2

NOTES:

1. ORANGE AND WHITE IF TEMPORARY.
2. RED AND WHITE IF PERMANENT.
3. REFLECTORIZED
4. SLANT BOTH DIRECTIONS FROM MIDDLE IF TRAFFIC PASSES BOTH ENDS.
5. WIDTH 6 IN. EXCEPT 4 IN. IF RAILS ARE LESS THAN 3 FT. LONG
6. SLANT DOWNWARD TO MIDDLE AT END OF DEAD-END OR CLOSED ROAD.
7. SEE SEC. 5.07 AND MUTCD SEC. 6C-8.

FIGURE 5.3 - ROCK FACING, CUT SECTION

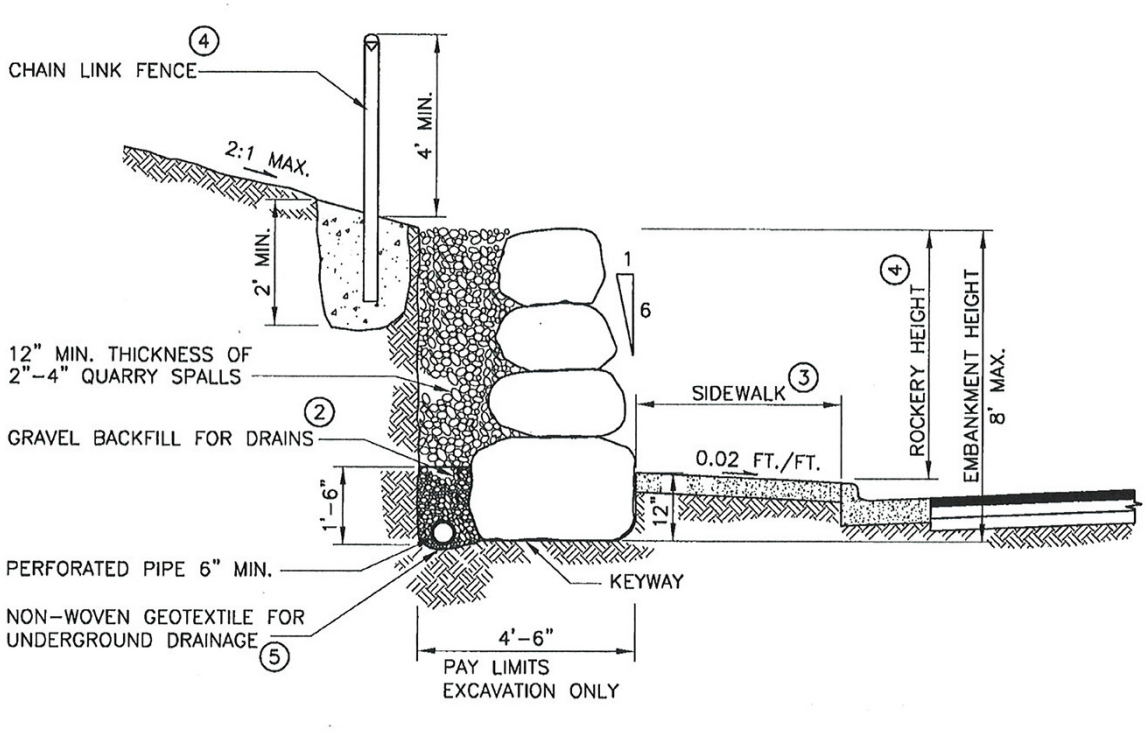


FIG 5.3

NOTES:

1. SEE SEC. 5.01
2. WSDOT/AWPA 9-03/12[4]
3. FACE OF ROCKERY OR RETAINING WALL MUST B E A MIN. OF 10 FT. FROM TRAVELED WAY IF ROCKERY OR RETAINING WALL IS BEHIND ROLLED CURB OR ON A RURAL SECTION.
4. CHAIN LINK FENCE, TYPE NO. 4 OR 6 (WSDOT/AWPA STANDARD), REQUIRED WHEN ROCKERY HEIGHT IS 18 IN. OR GREATER.
5. WSDOT/AWPA STANDARD SPECIFICATION SECTION 9-33
6. THE ROCK FACING FOUNDATION AND/OR KEYWAY IS TO BE CLEARED OR ORGANIC MATTER AND DEBRIS AND THE UNDERLYING MINERAL SOIL COMPACTED TO A MINIMUM 95% OF THE MAXIMUM DRY DENSITY.

FIGURE 5.4 - ROCK FACING, FILL SECTION

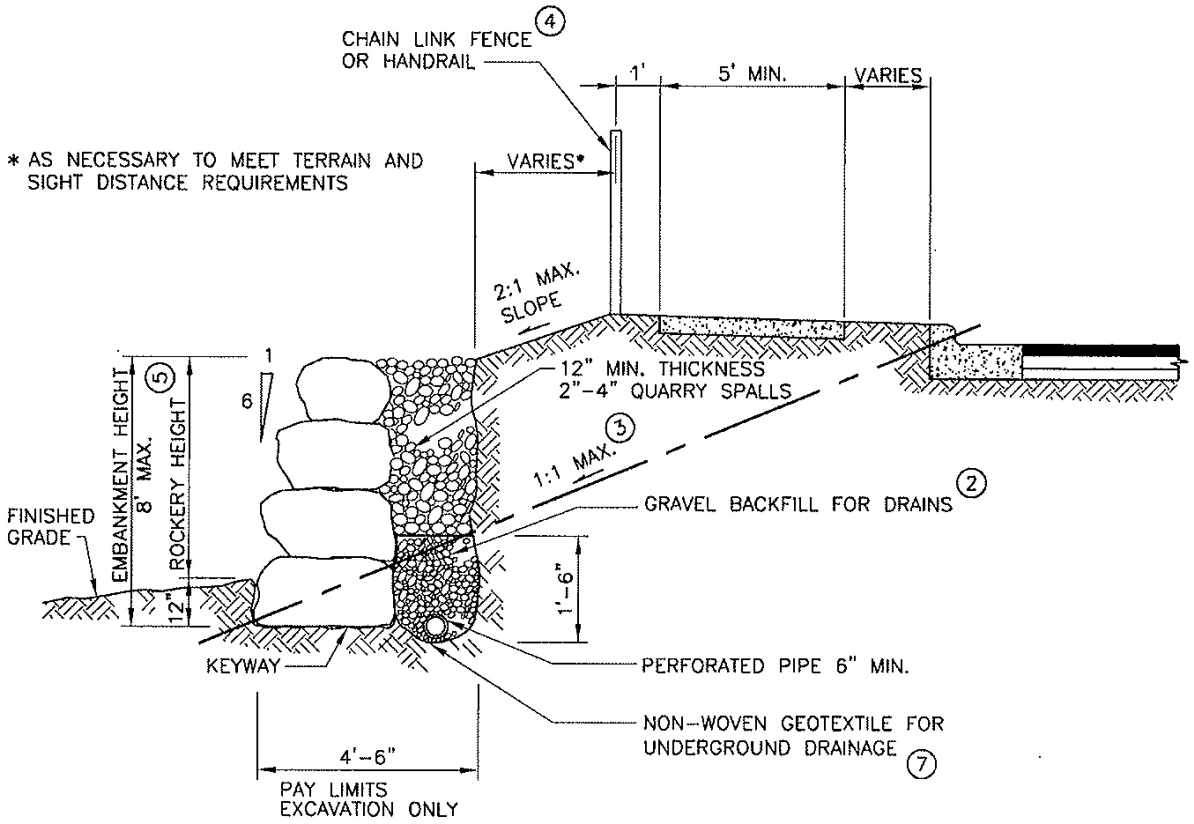


FIG 5.4

NOTES:

1. SEE SEC. 5.01
2. WSDOT/AWPA 9-03/12[4]
3. FLATTER SLOPE MAY BE REQUIRED IN LESS STABLE SOIL.
4. CHAIN LINK FENCE, TYPE NO. 4 OR 6 (WSDOT/AWPA STANDARD), REQUIRED WHEN ROCKERY HEIGHT IS 18 IN. OR GREATER. SEE FIG 5.8 NOTE 8
5. FOR ROCKERY HEIGHTS EXCEEDING 4 FT., SEE FIG 5.6
6. TRAFFIC BARRIERS MAY BE REQUIRED ON ROADS WITH SPEED LIMITS OF 40 MPH OR GREATER, WHERE ROCKERY HEIGHTS EXCEED 6 FT. SEE CHAPTER 7 OF THE WSDOT DESIGN MANUAL.
7. WSDOT/APWA STANDARD SPECIFICATION SECTION 9-33
8. SEE NOTE 6 OF FIG 5.3

FIGURE 5.5 - ROCK FACING UNDER SIDEWALK

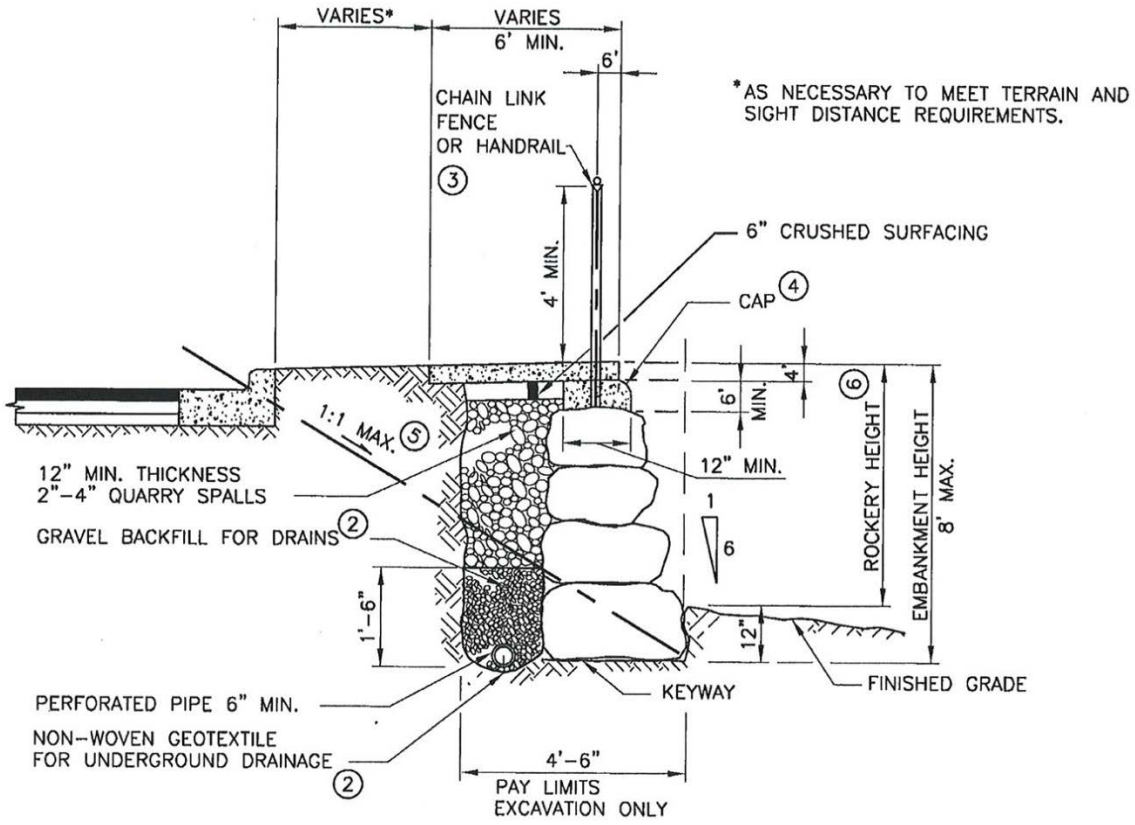


FIG 5.5

NOTES:

1. SEE SEC 5.01
2. WSDOT/AWPA 9-03/12[4]
3. CHAIN LINK FENCE, TYPE NO. 4 OR 6 (WSDOT/AWPA STANDARD), REQUIRED WHEN ROCKERY HEIGHT IS 18 IN. OR GREATER.
4. CAP SHALL BE CONCRETE CLASS 4000 (SEE SEC. 5.01 (H))
5. FLATTER SLOPE MAY BE REQUIRED IN LESS STABLE SOIL.
6. FOR ROCKERY HEIGHTS EXCEEDING 4 FT., SEE FIG 5.6
7. TRAFFIC BARRIERS MAY BE REQUIRED ON ROADS WITH SPEED LIMITS OF 40 MPH OR GREATER, WHERE ROCKERY HEIGHTS EXCEED 6 FT. SEE CHAPTER 7 OF THE WSDOT DESIGN MANUAL.
8. SEE NOTE 7 ON FIG 5.4
9. SEE NOTE 6 ON FIG 5.3

FIGURE 5.6 - ROCK FACING, FILL SECTION REINFORCEMENT

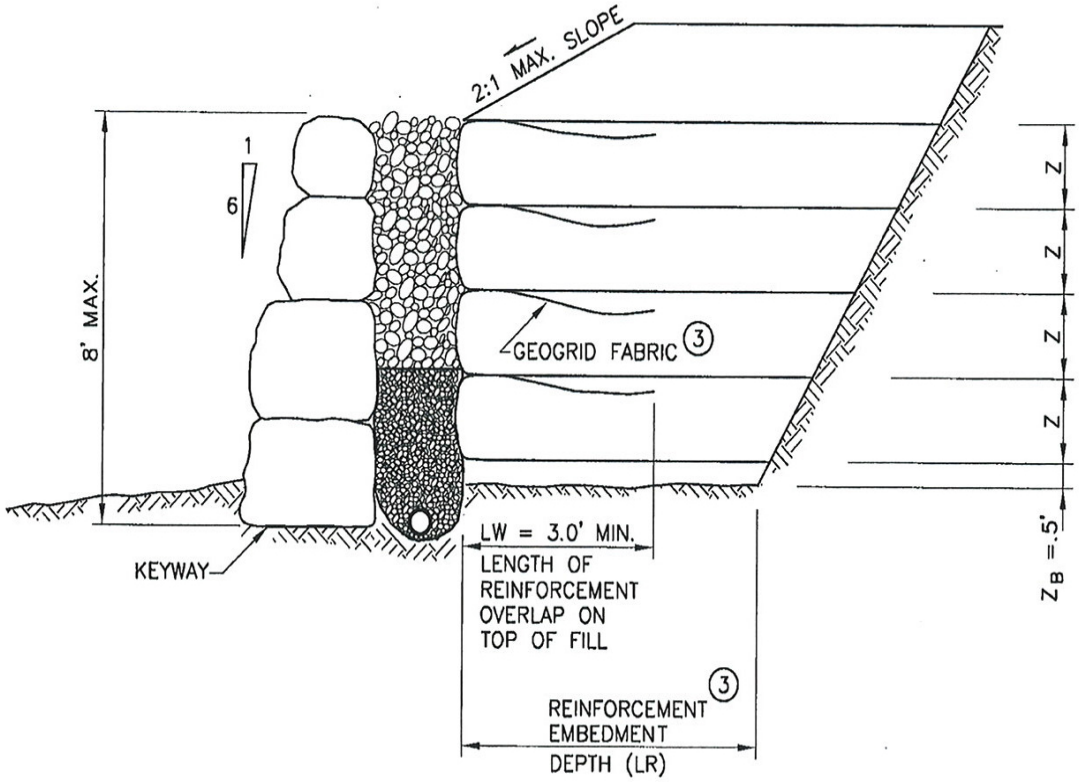


FIG 5.6

NOTES:

1. ROCKERY FACINGS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH SECTION 5.01.
2. THE WALL FOUNDATION IS TO BE CLEARED OR ORGANIC MATTER AND DEBRIS AND THE UNDERLYING MINERAL SOIL COMPACTED TO A MINIMUM 95% OF THE MAXIMUM DRY DENSITY. THE EMBANKMENT MATERIAL IS TO BE GRAVEL BORROW MEETING 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% OF THE MAXIMUM DRY DENSITY.
3. GEOSYNTHETIC REINFORCEMENT 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 FT. IN HEIGHT SHALL BE REINFORCED WITH GEOSYNTHETIC FABRIC OR GEOGRID.
6. CHAIN LINK FENCE, TYPE NO. 4 OR 6 (WSDOT/AWPA STANDARD), REQUIRED WHEN ROCKERY HEIGHT IS 18 IN. OR GREATER.

FIGURE 5.7 - CONCRETE STEPS AND METAL HANDRAIL

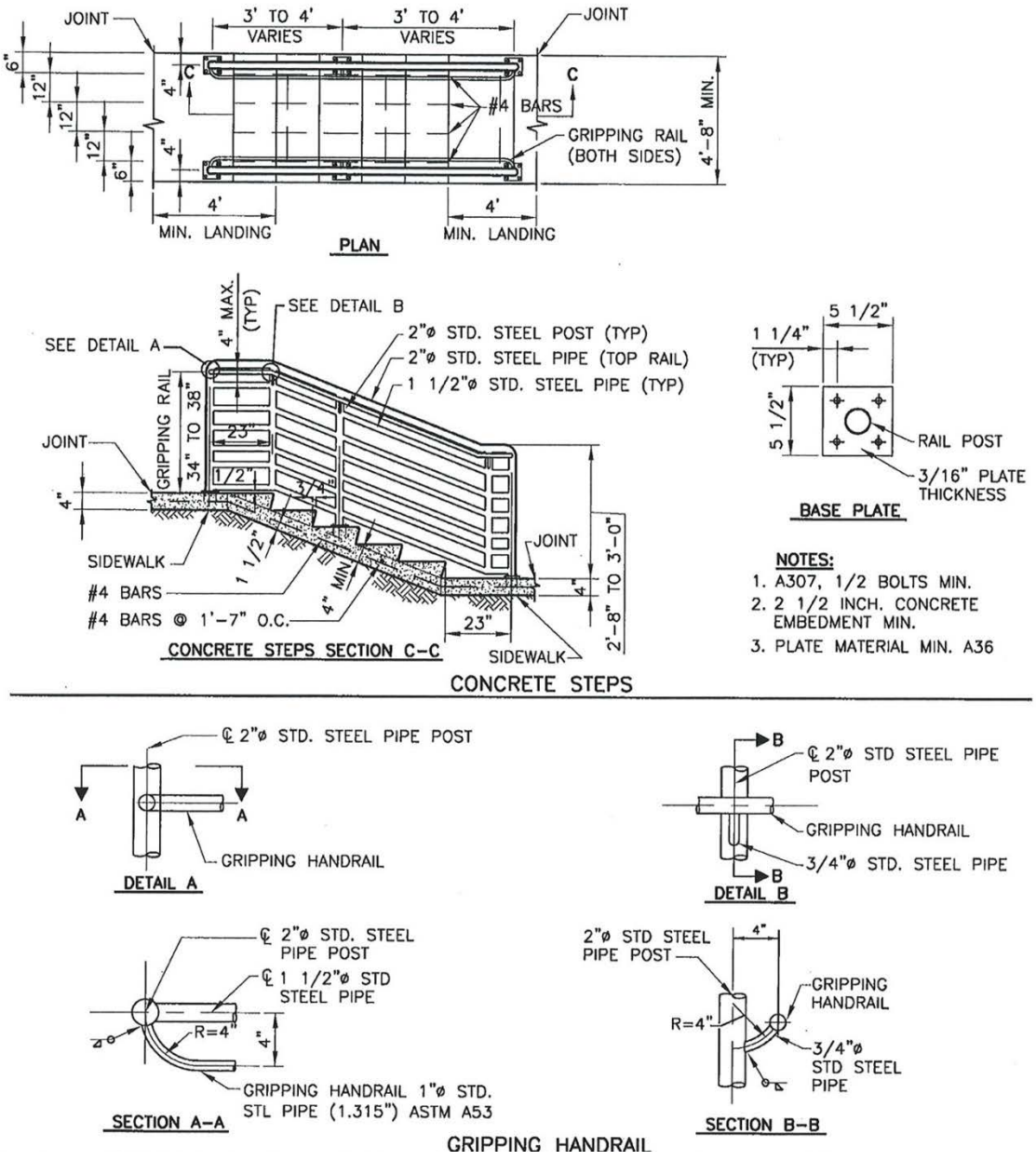


FIG 5.7

NOTES:

1. CONCRETE: CEMENT CONCRETE CLASS 4000.
2. ALL STEPS: SAME DIMENSIONS, WITHIN 3/8 IN. MAX DIFFERENCE.
3. RISERS: 7 ½ IN MAX., 5 IN, MIN.
4. TREADS: 12 IN. MAX., 11 IN. MIN., WITH TRANSVERSE 0.01 FT./FT. SLOPE.
5. METAL HANDRAIL REQUIRED FOR 4 STEPS OR MORE SEE NOTES BELOW.
6. REINFORCING BARS SHALL MEET THE REQUIREMENTS OF ASTM A-615, GRADE 60 AND ARE REQUIRED FOR 4 STEPS OR MORE.
7. SEE SEC 3.05.
8. MAX. VERTICAL DISTANCE BETWEEN LANDINGS IS 12 FT.

FIGURE 5.8 - METAL HANDRAIL

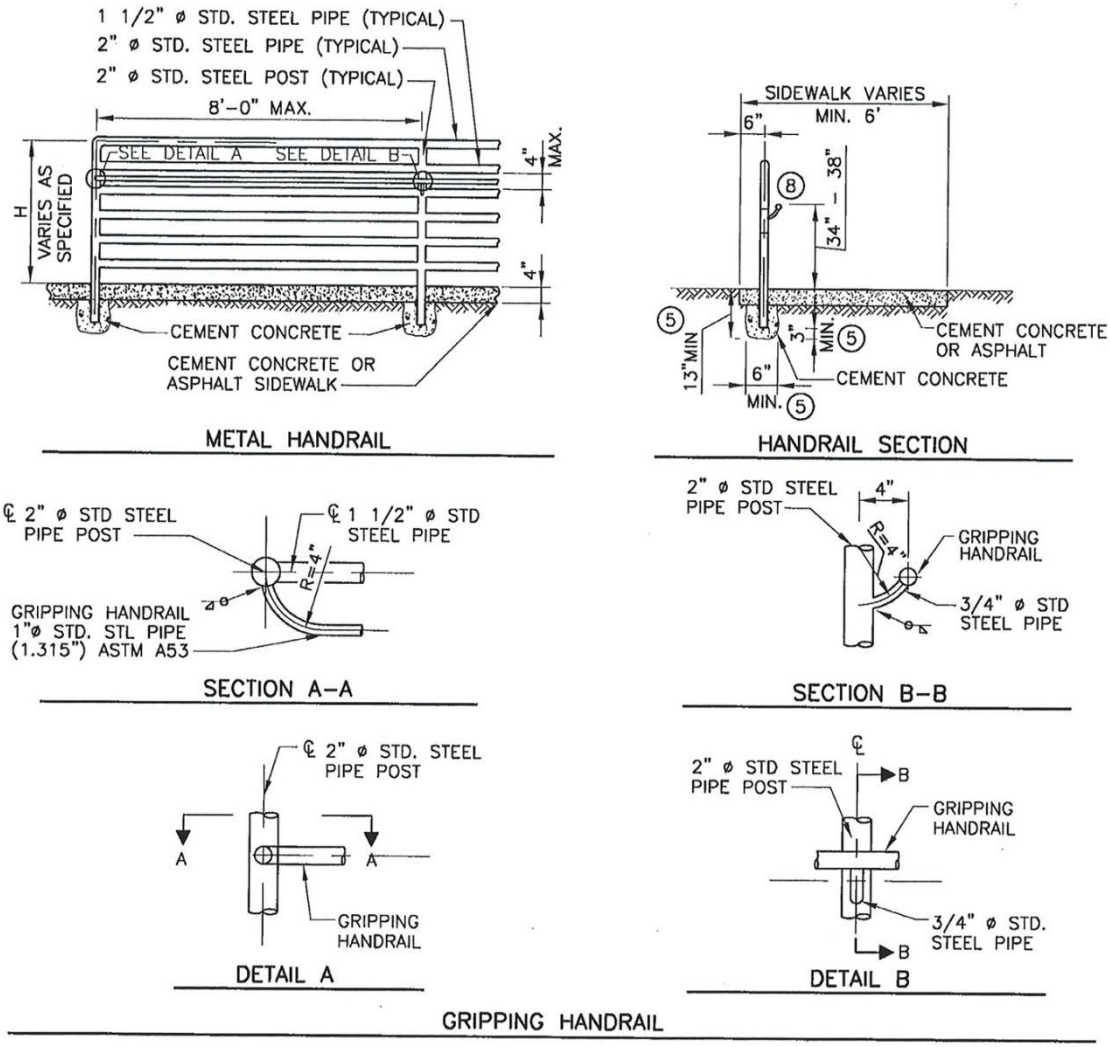


FIG 5.8

NOTES:

1. RAILS TO BE MINIMUM A53 TYPE E, GRADE B, 2 IN. NOMINAL DIAMETER, MINIMUM SECTION MODULUS 0.561 IN 3 (GALV. STEEL OR ALUM?)
2. POSTS, HANDRAILS, CONNECTIONS, JOINTS AND HARDWARE SHALL HAVE SMOOTH SURFACE.
3. ALL STEEL SHALL BE GALVANIZED. ANY WELDING OR REPAIR IN THE FIELD SHALL BE PAINTED IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATION SECTION 6-07.3.
4. FOOTINGS TO BE MINIMUM CONCRETE CLASS 4000.
5. POSTS SET DEPTH AND CONCRETE FOOTING DIMENSIONS SHALL BE REVIEWED AND DETERMINED BY PUBLIC WORKS DIRECTOR OR HIS OR HER DESIGNEE BASED ON LOCAL SOIL AND SITE CONDITIONS.
6. SEE AASHTO 2.7.2 AND AASHTO 2.7.3 FOR RAIL VERTICAL SPACING REQUIREMENTS.
7. SEE SEC. 3.06.
8. GRIPPING HANDRAIL IS REQUIRED IF SIDEWALK GRADE IS 5% OR GREATER.
9. THE RAILING SHALL MEET THE REQUIREMENTS OF THE AASHTO STANDARDS SPECIFICATIONS FOR HIGHWAY AND BRIDGES.

FIGURE 5.9 - STREET TREE LOCATION

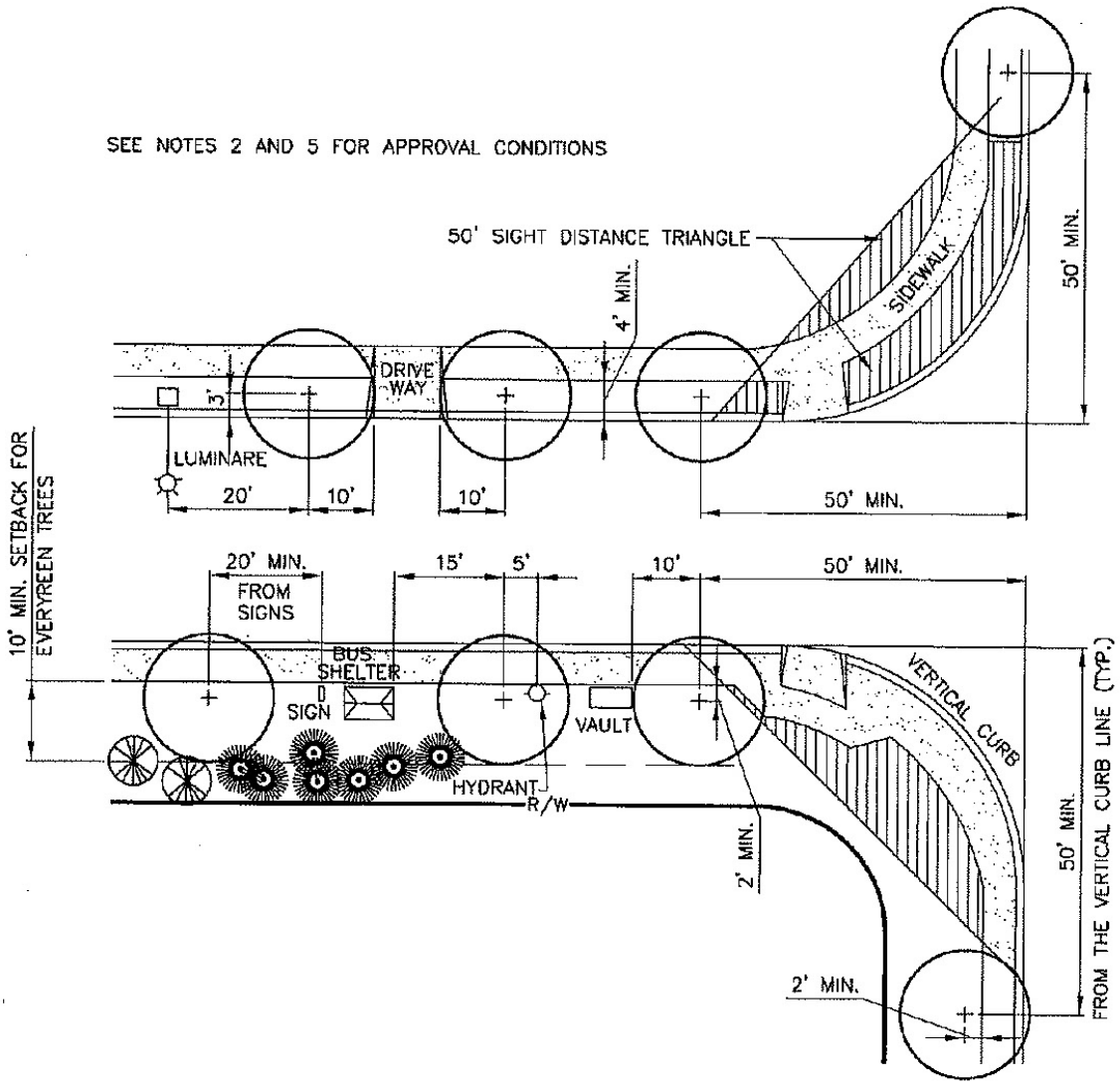


FIG 5.9

NOTES:

1. TREES SHALL GENERALLY BE PLANTED BACK OF THE SIDEWALK. PLANTING STRIPS WILL BE APPROVED ONLY AS PART OF A LANDSCAPING PLAN IN WHICH PLANT MAINTENANCE, COMPATIBILITY WITH UTILITIES AND TRAFFIC SAFETY ARE DULY CONSIDERED.
2. IF PLANTING STRIPS ARE APPROVED:
   A) MIN. DISTANCE FROM CENTER OF ANY TREE TO FACE OF VERTICAL CURB SHALL BE 3 FT.
   B) TREES SHALL BE STAKED IN A MANNER NOT TO OBSTRUCT SIDEWALK TRAFFIC.
   C) MINIMUM CLEAR SIDEWALK WIDTH SHALL BE 5 FT. IN RESIDENTIAL OR 8 FT. IN BUSINESS DISTRICTS WHERE BLOCK-OUTS OCCUR.
3. PLANS SHALL BE COORDINATED WITH METRO SERVICE PLANNING ON BUS ROUTES. PHONE 206-684-1622.
4. SEE SEC. 5.03.

FIGURE 5.10 - TREE SETBACKS/BLOCKOUTS/ROCKERIES AT SIDEWALK

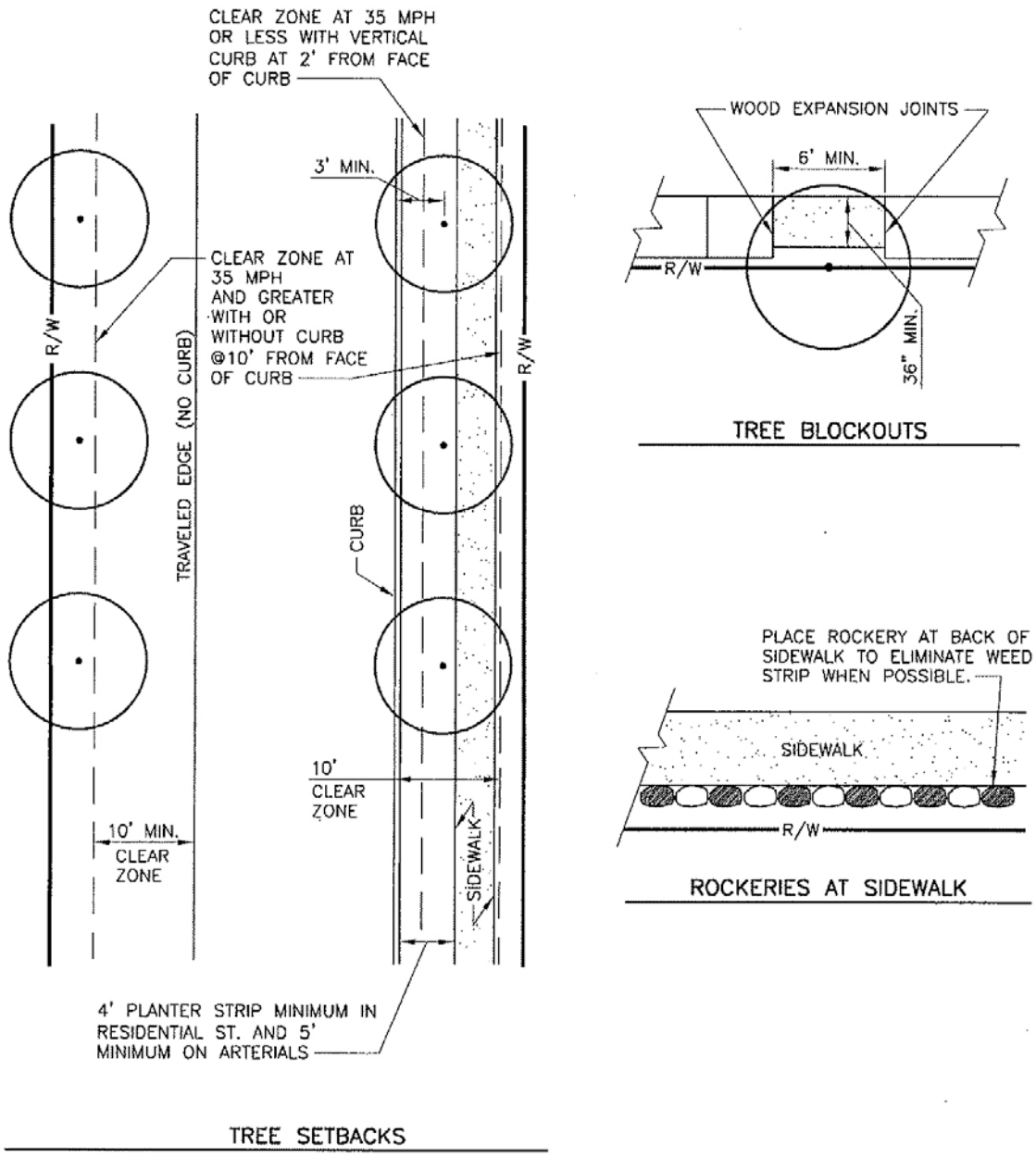


FIG 5.10

NOTES:

1. ROOTBARRIERS REQUIRED FOR ALL TREES IN PLANTER STRIP (UNLESS WAIVED BY PUBLIC WORKS DIRECTOR OR HIS OR HER DESIGNEE).
2. REFER TO FIG 5.9 FOR SPECIFIC SETBACKS.

FIGURE 5.11 - TREE PLANTING IN PLANTING STRIPS

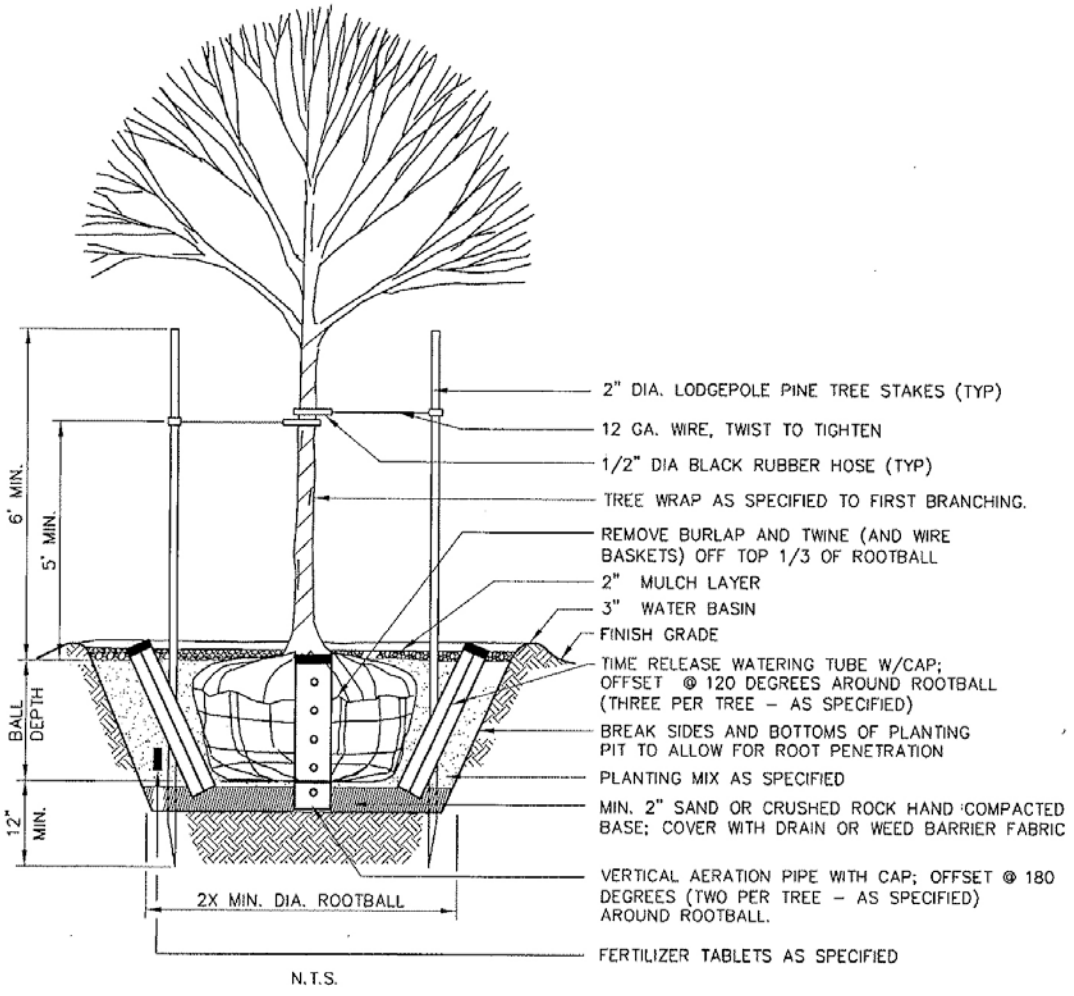


FIG 5.11

NOTES:

1. PLANT TREES 1 IN HIGHER THAN DEPTH GROWN IN NURSERY. TREE PIT SHALL NOT BE LESS THAN (2) TIMES DIAMETER OF ROOTBALL.
2. ROOTBARRIERS SHALL BE 12 IN. DEEP AND 8 L.F. ON EACH SIDE OF ROOTBALL ADJACENT TO CURBS AND PAVED SURFACES.
3. THERE SHALL BE A MINIMUM ROOTBALL DIAMETER OF 10 IN. PER TRUNK CALIPER INCH AS MEASURED 6 IN. ABOVE ROOTBALL.

FIGURE 5.12 - LARGER FILLS AROUND TREES

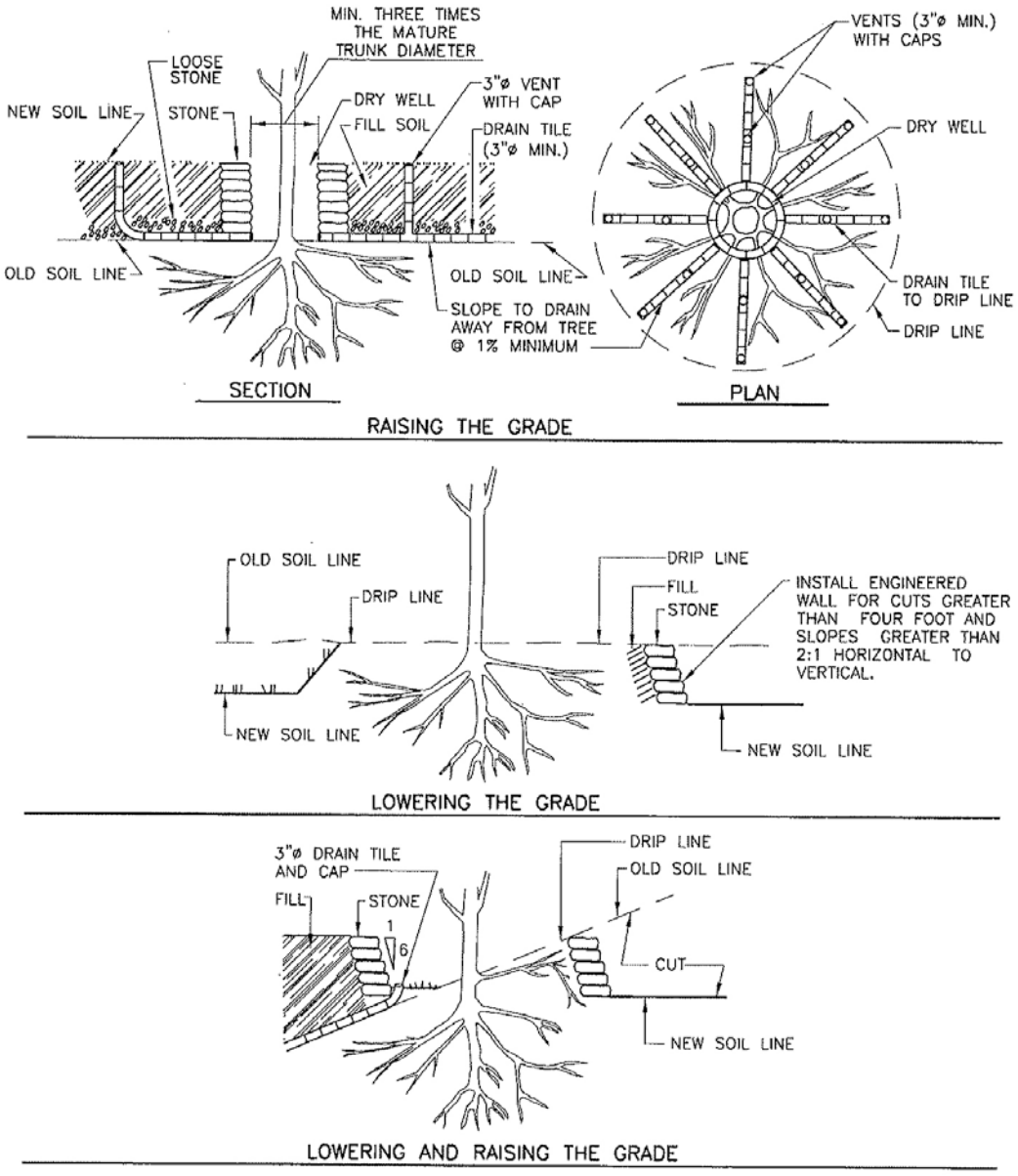


FIG 5.12

NOTES:

1. ALL DRAIN TILE SHALL BE PERFORATED AND WRAPPED IN PERMEABLE DRAIN OR CLOTH SOCKS DESIGNED FOR PERFORATED PIPE.
2. MINIMUM BATTER ON DRY WELLS WALLS SHALL BE 1:6 HORIZONAL TO VERTICAL.
3. ALL FILL SOIL SHALL BE COMPACTED BY HAND EQUIPMENT ONLY.

FIGURE 5.13 - MINOR FILLS AROUND TREES

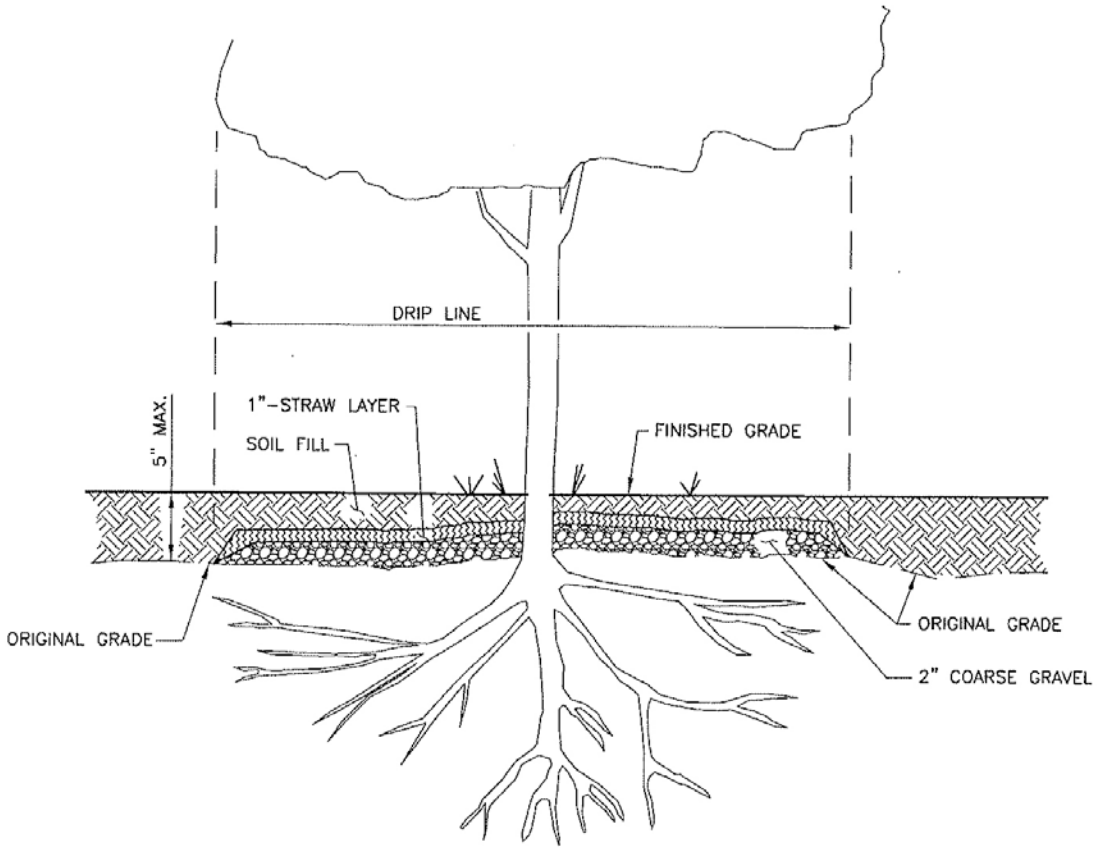
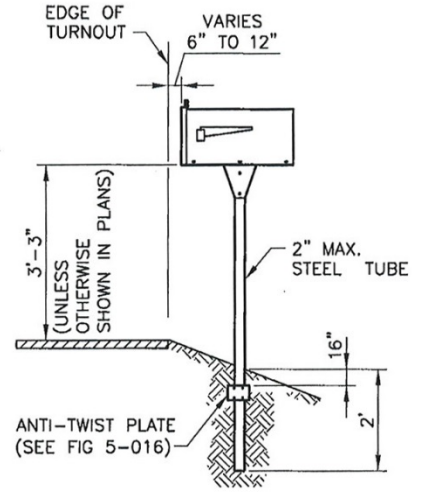


FIG 5.13

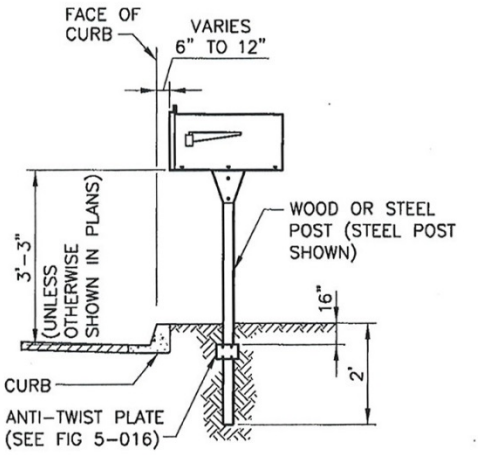
NOTES:

1. EXTEND GRAVEL AND STRAW OUT TO DRIPLINE OF TREE.
2. COMPACT SOIL BY HAND EQUIPMENT ONLY.

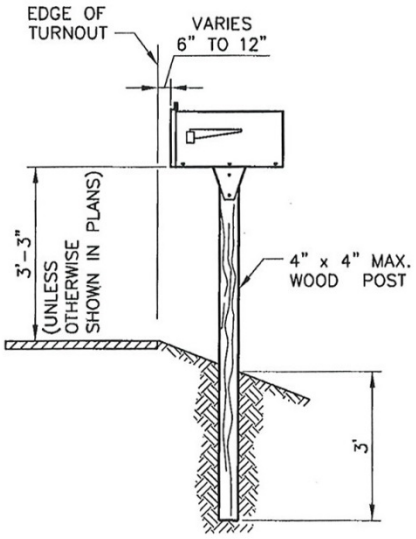
FIGURE 5.14 - MAILBOX INSTALLATION TYPE 1 AND 2 (1 OF 4)



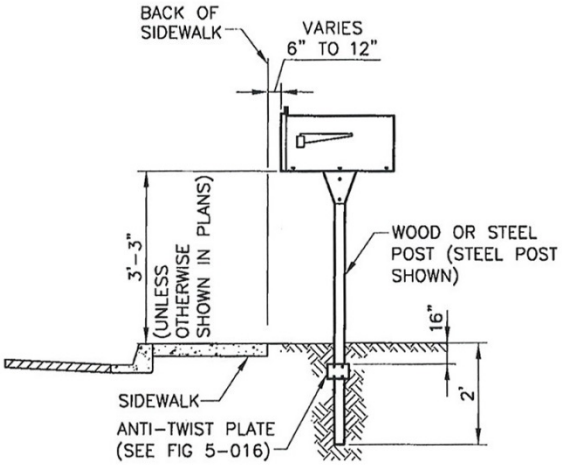
TYPE 1 (STEEL POST OPTION)



TYPE 1 INSTALLED BEHIND CURB

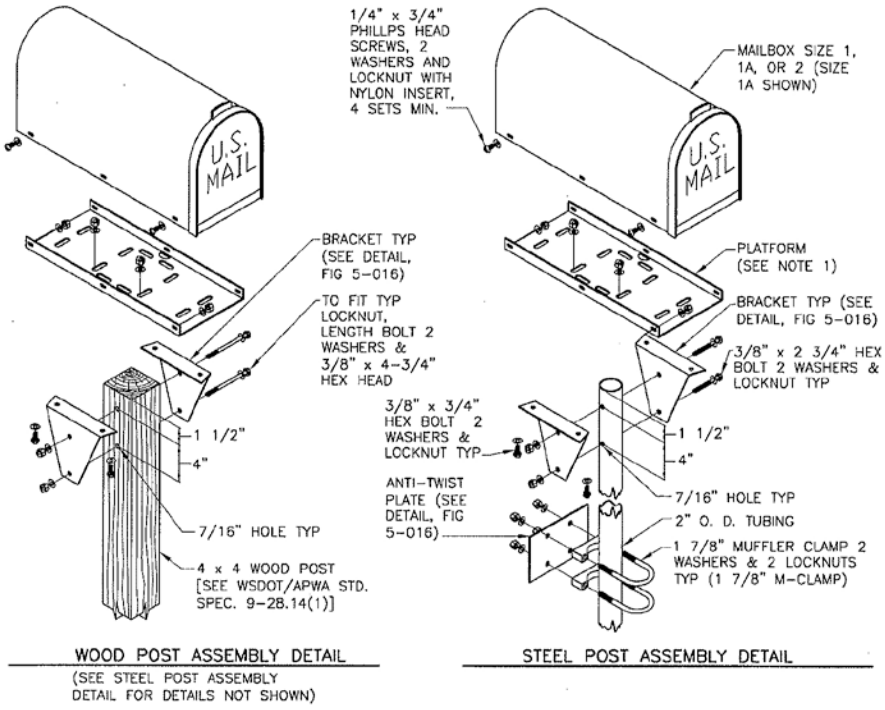


TYPE 1 (WOOD POST OPTION)



TYPE 1 INSTALLED BEHIND SIDEWALK

FIGURE 5.15 - MAILBOX INSTALLATION TYPE 1 AND 2 (2 OF 4)



MAILBOX & PLATFORM DIMENSIONS						
SIZE	MAILBOX DIM.			PLATFORM DIM.		
	L	W	H	L	W	H
1	19"	6 1/2"	8 1/2"	17"	6 3/8"	1"
1A	21"	8"	10 1/2"	19"	7 7/8"	1"
2	24"	11 1/2"	13 1/2"	21"	11 3/8"	1"

STEEL POST FASTENERS			
BOLT SIZE	QUANTITY	WASHERS	LOCKNUTS
3/8" DIA x 2 3/4"	2	4	2
3/8" DIA x 3/4"	4	8	4
1/4" DIA x 3/4"	4	8	4
1 7/8" M-CLAMP	2	4	4

WOOD POST FASTENERS			
BOLT SIZE	QUANTITY	WASHERS	LOCKNUTS
3/8" DIA x 4-3/4"	2	4	2
3/8" DIA x 3/4"	4	8	4
1/4" DIA x 3/4"	4	8	4

FIG 5.15

NOTES:

1. AN ALTERNATIVE PLATFORM MAY BE INSTALLED, PROVIDED THAT IT IS COMPATIBLE WITH THE BRACKET SHOWN,
2. A TYPE 2 SUPPORT IS REQUIRED FOR INSTALLING MUTIPLE MAIL BOXES ON ONE SUPPORT. NO MORE THAN 5 MAILBOXES ARE ALLOWED ON A TYPE 2 SUPPORT.
3. ATTACH A NEWSPAPER BOX TO A STEEL POST WITH TWO 1 7/8" MUFFLER CLAMPS SPACED 4" APART. FIELD DRILL 7/16 IN. HOLES IN THE NEWSPAPER BOX TO FIT. USE 2 ½" X ¼" LAG BOLTS TO ATTACH NEWSPAPER BOXES TO WOOD POSTS. NEWSPAPER BOXES MUST NOT EXTEND BEYOND THE FRONT OF THE MAILBOX WHEN THE MAILBOX DOOR IS CLOSED.
4. SPACING OF MAILBOX MOUNTING HOLES VARIES AMONG MANUFACTURES. ATTACHMENT OF THE MAILBOX TO THE PLATFORM MAY REQUIRE DRILLING ADDITIONAL HOLES THROUGH THE MAILBOX TO FIT THE PLATFORM.
5. CENTER THE MAILBOX ON THE PLATFORM TO ENSURE SPACE FOR THE MAILBOX DOOR TO OPEN AND TO ALLOW SPACE FOR INSTALLING THE FASTENERS.

FIGURE 5.16 - MAILBOX INSTALLATION TYPE 1 AND 2 (3 OF 4)

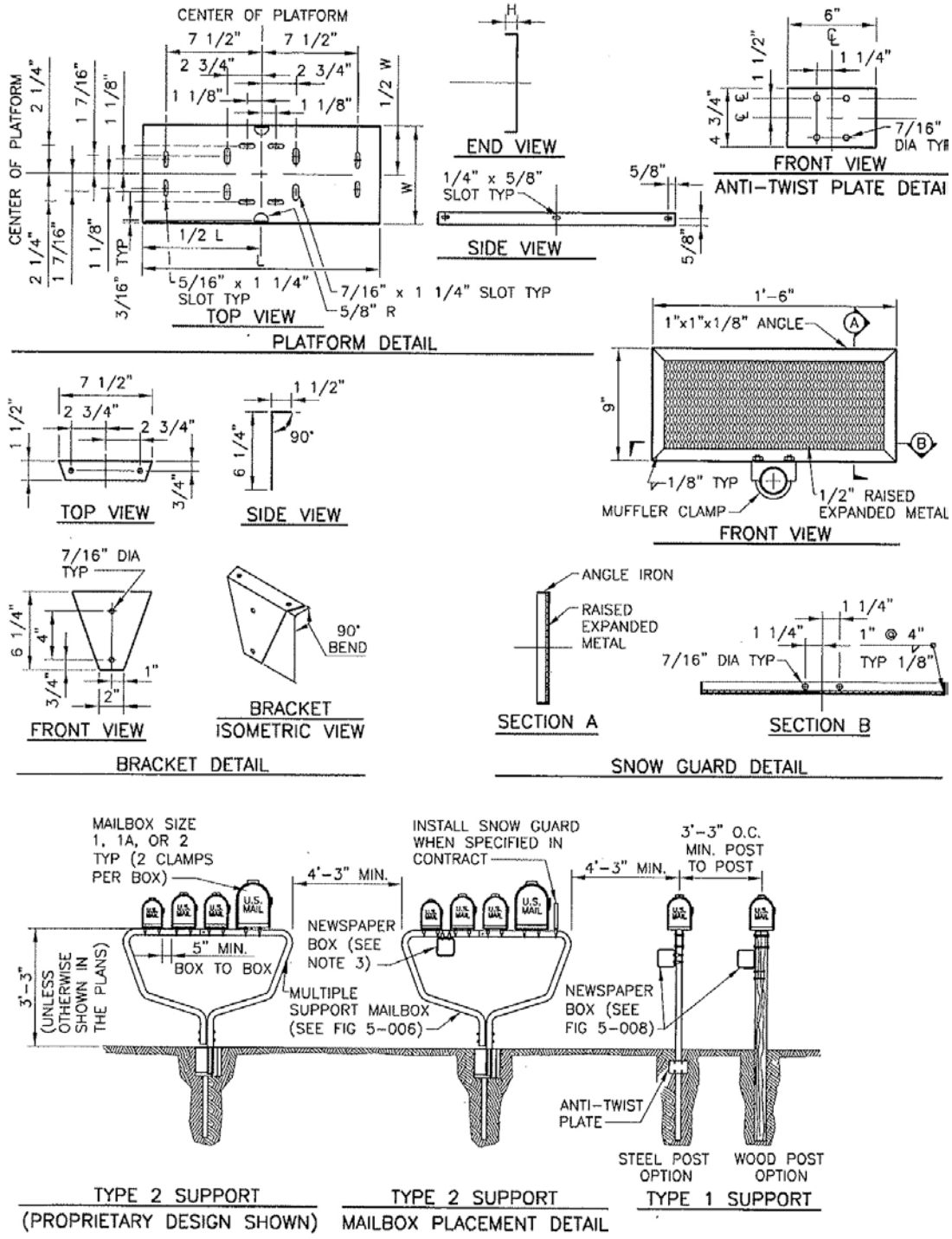


FIGURE 5.17 - (NCBDU) MAILBOX INSTALLATION TYPE NEIGHBORHOOD DELIVERY AND COLLECTION BOX (4 OF 4)

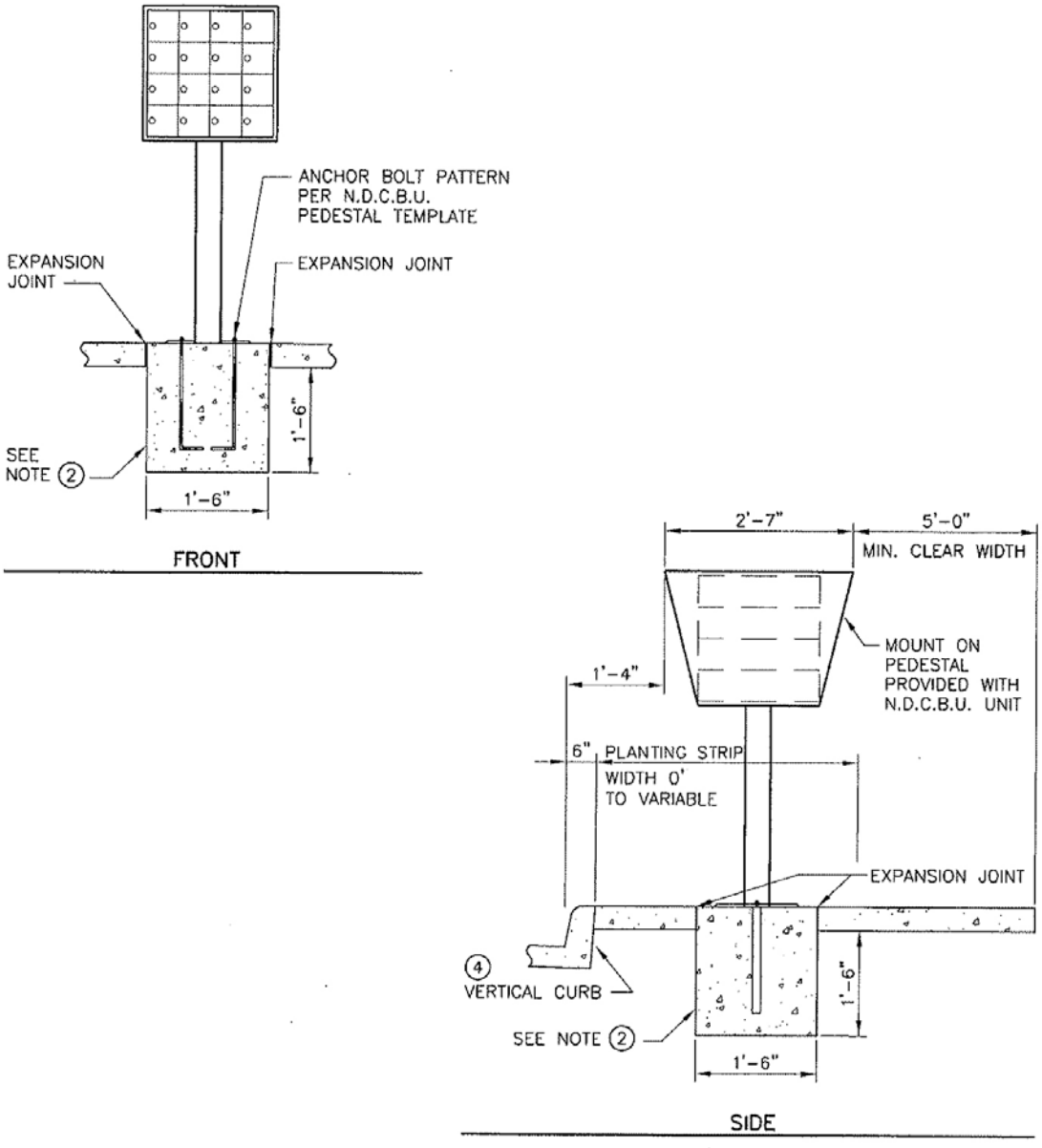


FIG 5.17

NOTES:

1. SEE SEC. 5.04
2. INSTALLATION OF N.D.C.B.U. (INCLUDING CONSTRUCTION OF BASE) WILL BE DONE BY U.S. POSTAL SERVICE.
3. SEE SEC. 3.04 FOR JOINT REQUIREMENTS.
4. WHEN A N.D.C.B.U. IS INSTALLED ALONG A ROLLED CURB SECTION, IT SHALL COMPLY WITH SECTION 5.10.

FIGURE 5.18 - BOLLARDS

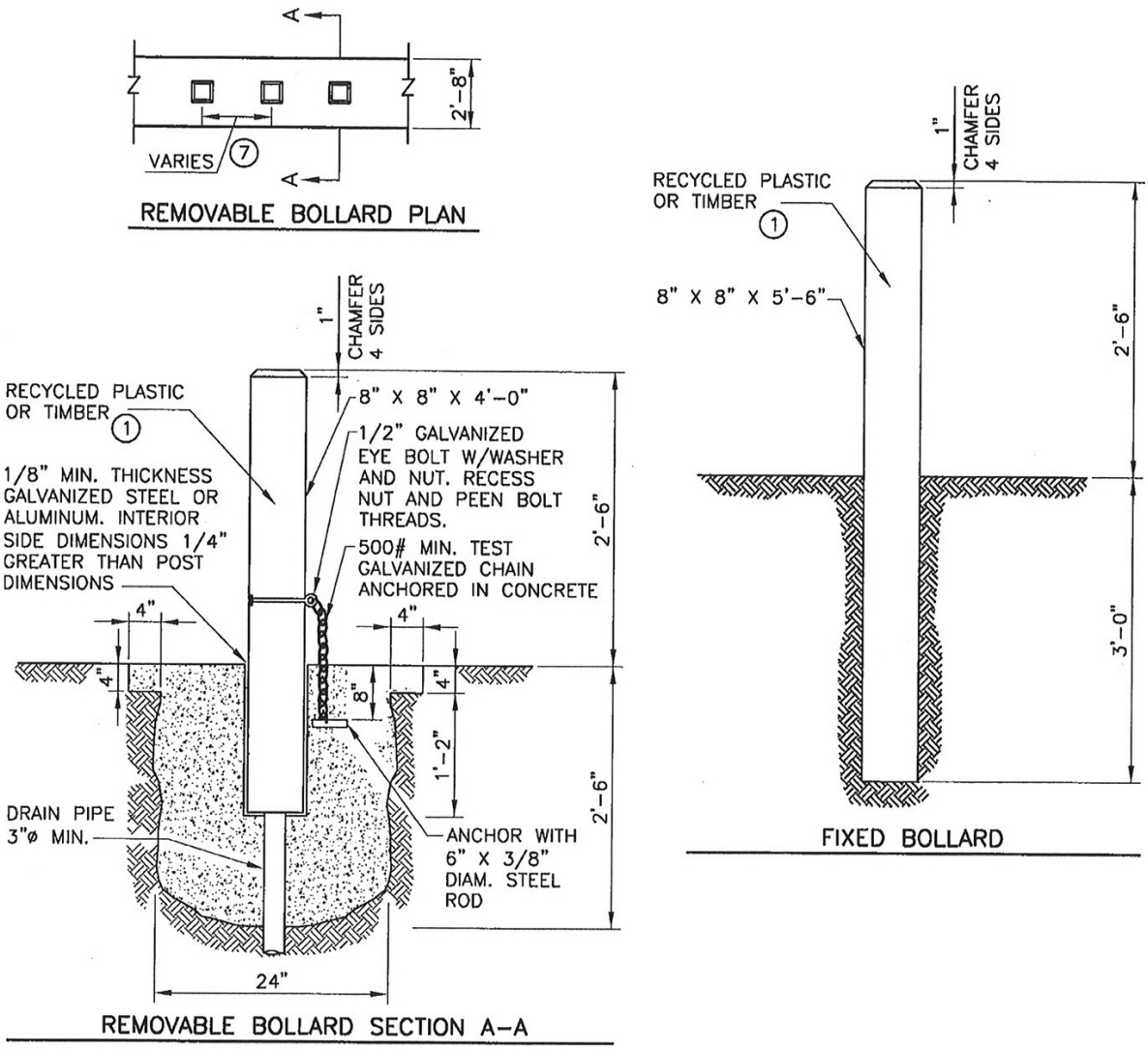


FIG 5.18

NOTES:

1. RECYCLED PLASTIC BOLLARD SHALL BE WHITE. TIMBER SHALL BE DOUGLAS FIR, DENSE CONSTRUCTION GRADE, AND SHALL BE PRESSURE TREATED WITH A WATERBORNE PRESERVATIVE (ACA, CCA, ACZA) IN ACCORANCE WITH THE REQUIREMENTS OF SEC. 9-09.3 (1) OF THE WSDOT/APWA STANDARD SPECIFICATIONS. TOP 5 IN. OF TIMBER SHALL BE PAINTED WHITE.
2. STEEL TUBE SHALL CONFORM TO ASTM A53 GRADE A.
3. NUTS, BOLTS, & WASHERS SHALL CONFORM TO ASTM A307.
4. ALL STEEL PARTS SHALL BE GALVANIZED.
5. CONCRETE SHALL BE CLASS 4000.
6. SEE SEC. 5.08.
7. MIN. 5O IN. SPACING ON TRAILS LESS THAN 10 FT. WIDE. 60 IN. SPACING ON TRAILS 10 FT. OR WIDER.

FIGURE 5.19 - ROADWAY SURVEY MONUMENT WITH CASE AND COVER

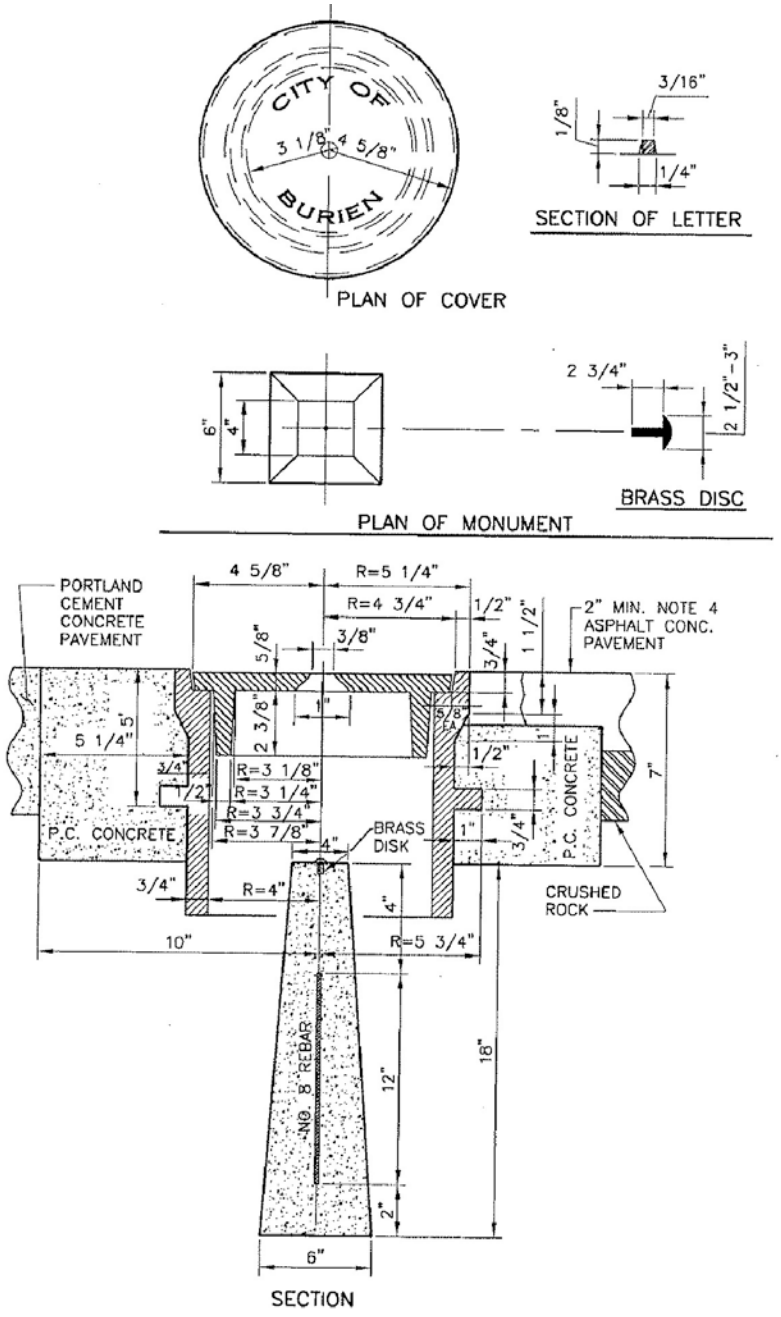


FIG 5.19

NOTES:

1. CASTINGS SHALL BE GRAY IRON ASTM A48, AASHTO M 105, CLASS 30.
2. COVER AND SEAT SHALL BE MACHINED FOR PERFECT CONTACT AROUND CIRCUMFERENCE AND FULL WIDTH OF BEARING SURFACE.
3. APPROXIMATE WEIGHTS, STANDARD.

CASE	60 LBS
COVER	19 LBS
TOTAL	79 LBS

4. PAVEMENT SHALL BE HOT MIX ASPHALT OR APPROVED SUBSTITUTE.
5. CONCRETE SHALL BE CLASS 4000.

FIGURE 5.20 - OFF-ROADWAY SURVEY MONUMENT

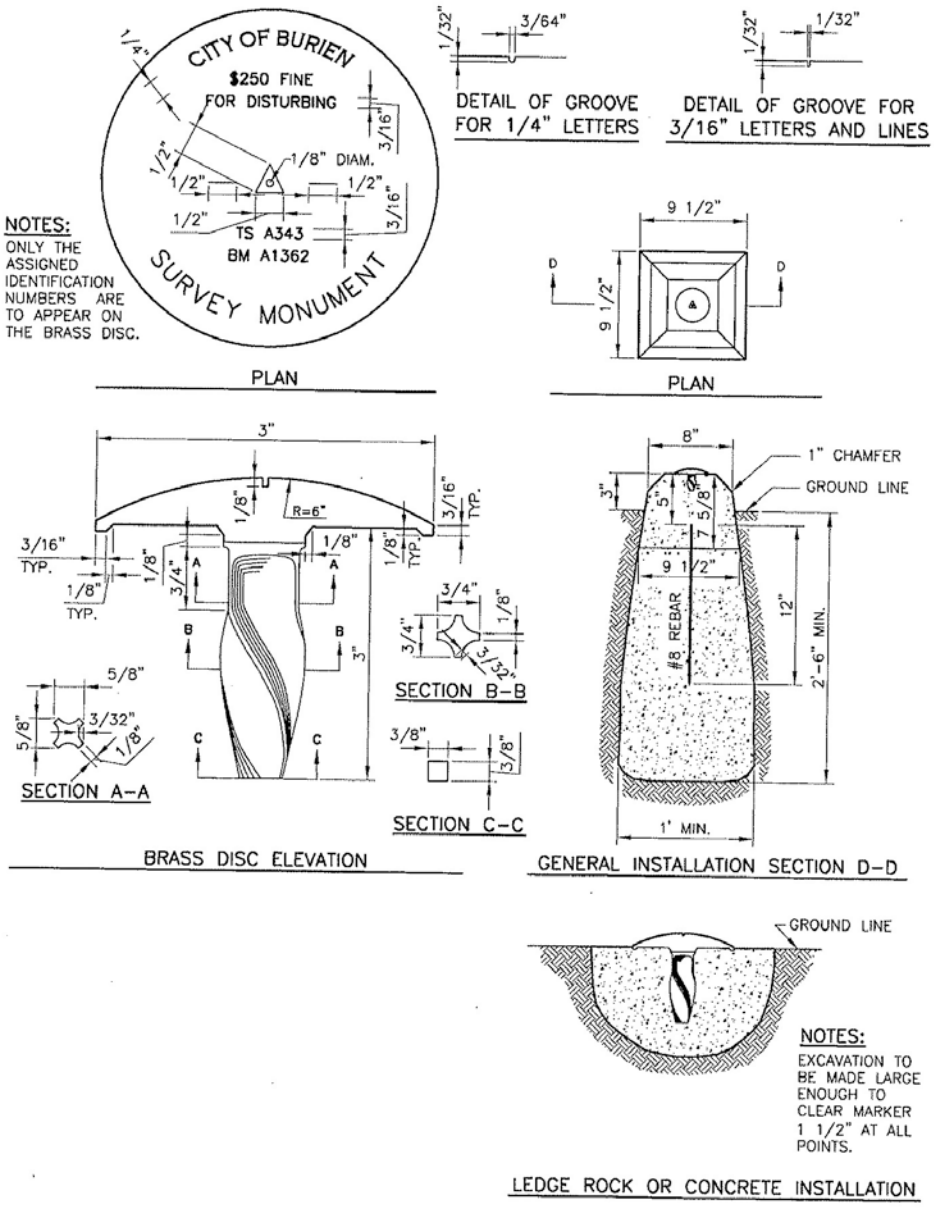
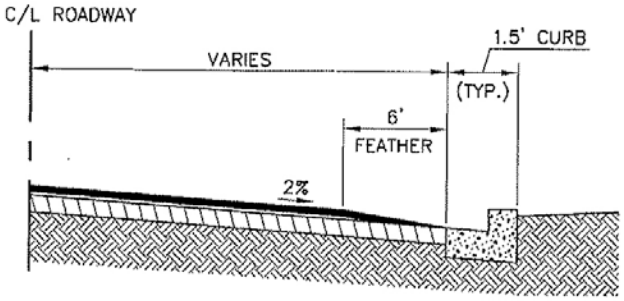


FIG 5.20

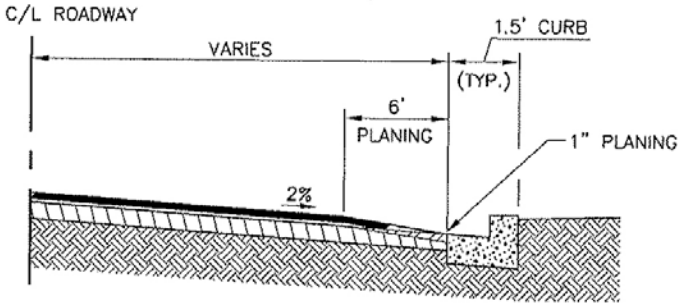
NOTES:

1. THE BRASS DISC SHALL BE CAST OF YELLOW BRASS SAE 14.
2. CONCRETE SHALL BE CLASS 4000.
3. THE HOLE SHALL BE 2.5 FT. MIN. IN DEPTH OR 0.5 FT BELOW THE DEEPEST RECORDED FROST LINE. ALL LOOSE MATERIAL SHALL BE REMOVED FROM THE BOTTOM OF THE HOLE SO THAT THE CONCRETE IS ON FIRM, UNDISTURBED EARTH.
4. THE TOP OF THE CONCRETE SHALL BE TROWLED SMOOTH AND THE BRASS DISC SET IN THE CENTER WITH ITS TOP EDGE FLUSH AND LEVEL.
   COORDINATES OR ELEVATIONS SHALL NOT BE PLACED ON THE BRASS DISCS.

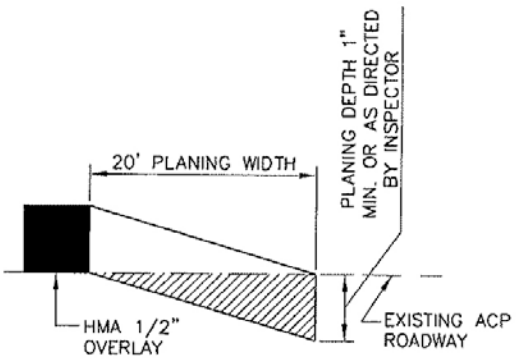
FIGURE 5.21 - TRANSVERSE JOINT PLANING AND FEATHERING AT VERTICAL CURB



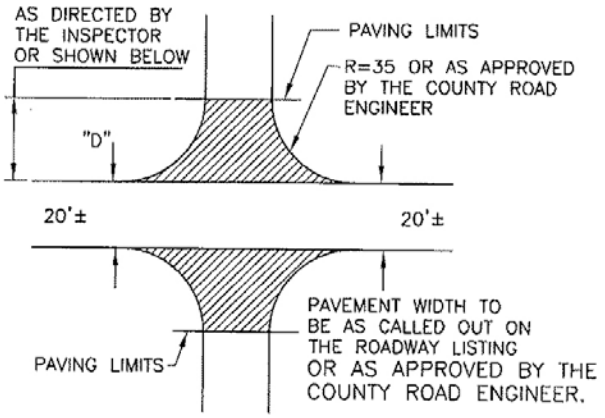
FEATHERING AT VERTICAL CURB



PLANING AT VERTICAL CURB

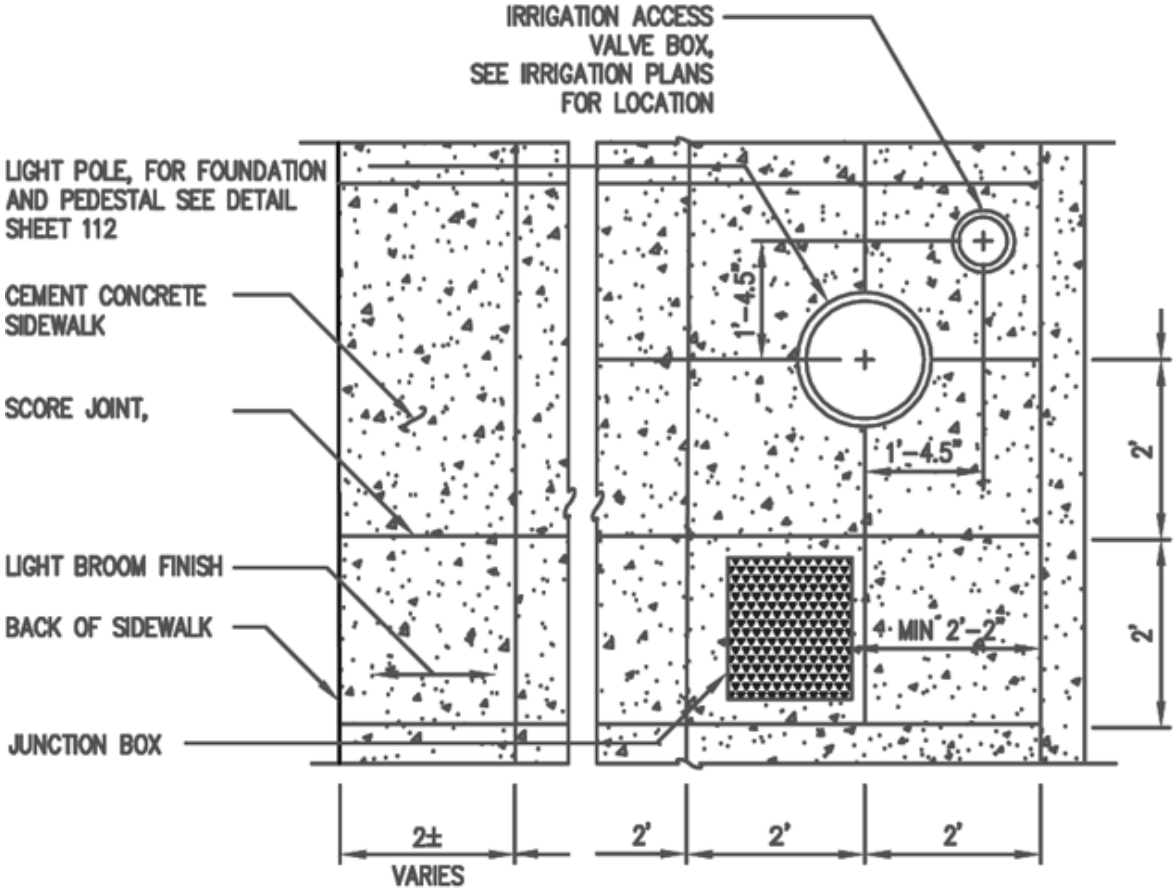


TRANSVERSE JOINT PLANING



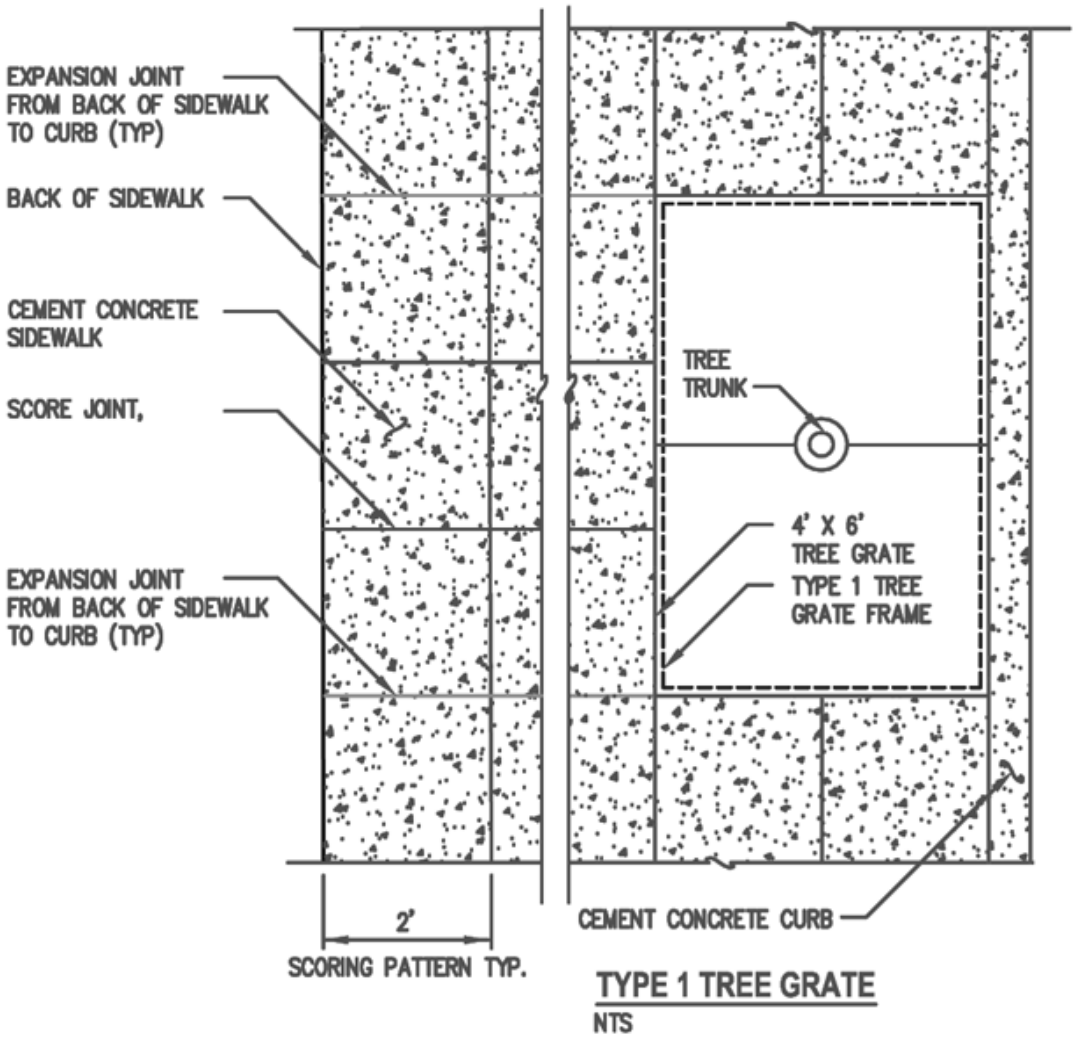
TYPICAL INTERSECTION

FIGURE 5.22 - SIDEWALK SCORING PATTERN

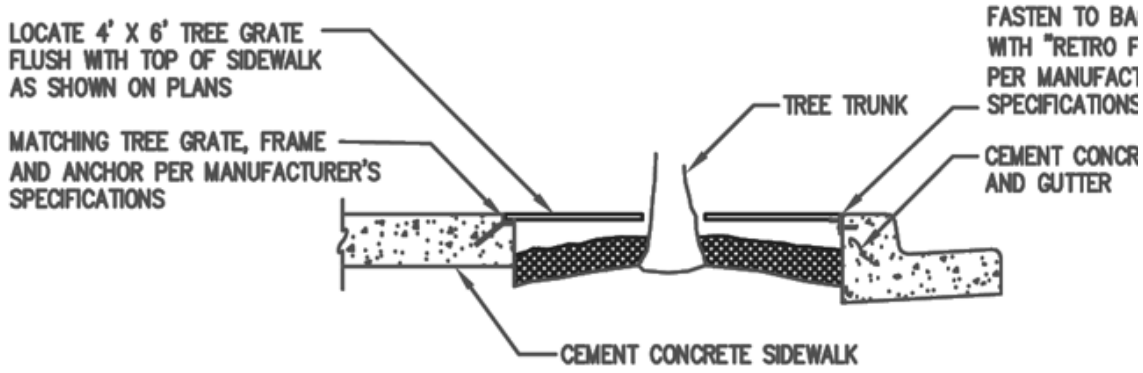


SIDEWALK SCORING PATTERN
NTS

FIGURE 5.23 - TYPE 1 TREE GRATE

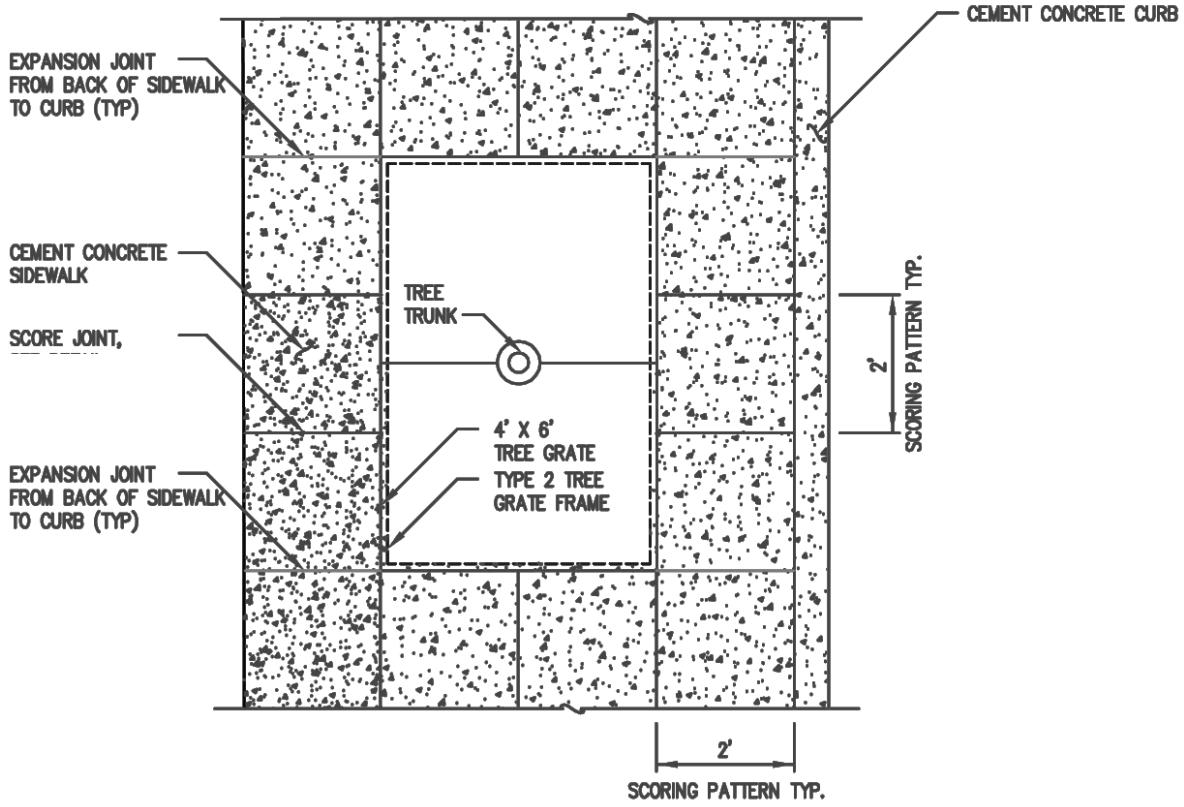


TYPE 1 TREE GRATE
NTS

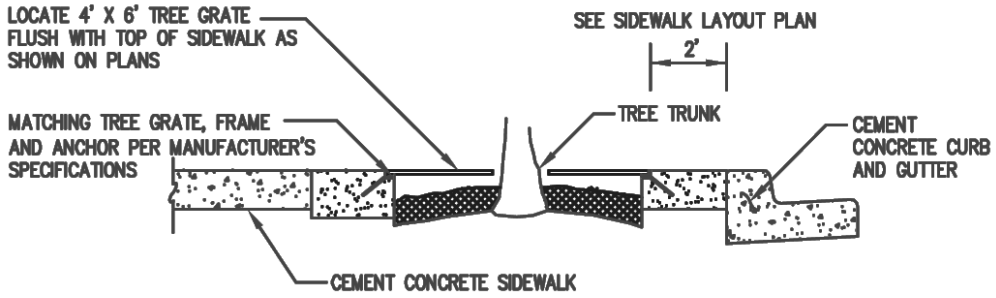


TYPE 1 TREE GRATE FRAME SECTION
NTS

FIGURE 5.24 - TYPE 2 TREE GRATE

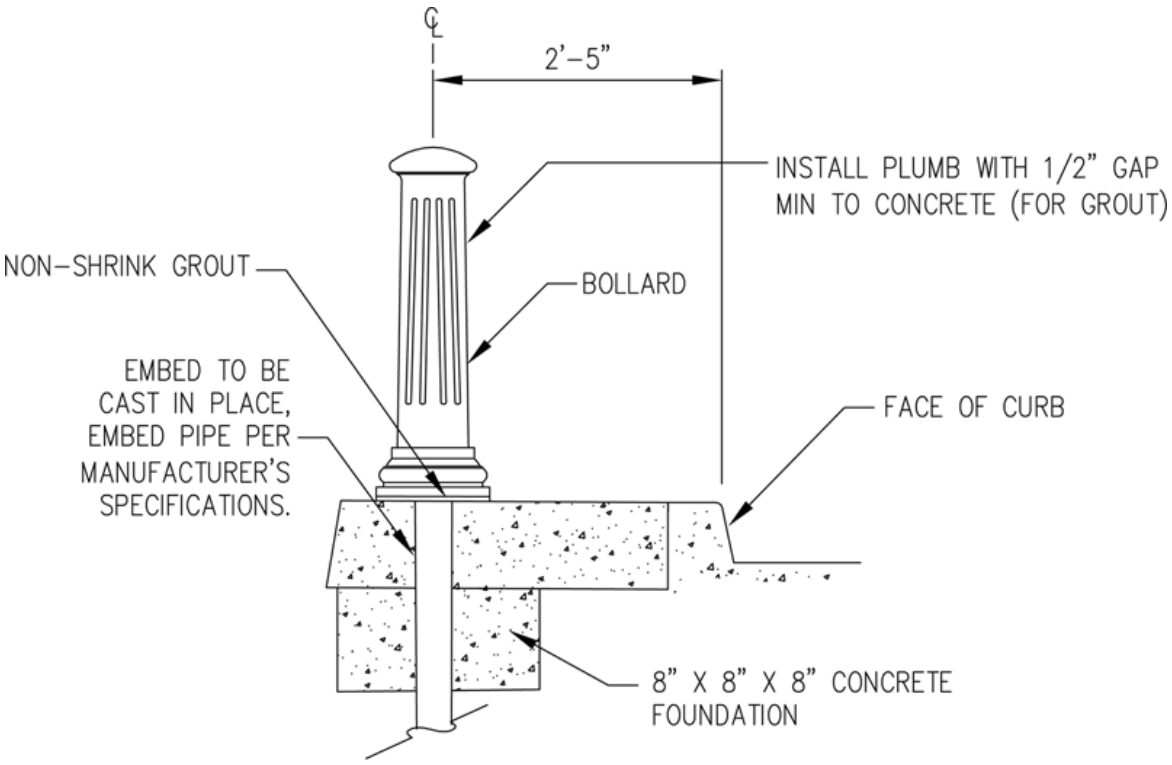


TYPE 2 TREE GRATE
NTS



TYPE 2 TREE GRATE FRAME SECTION

FIGURE 5.25 - DECORATIVE BOLLARD



DECORATIVE BOLLARD DETAIL

NTS

FIGURE 5.26 - BENCH LAYOUT DETAIL

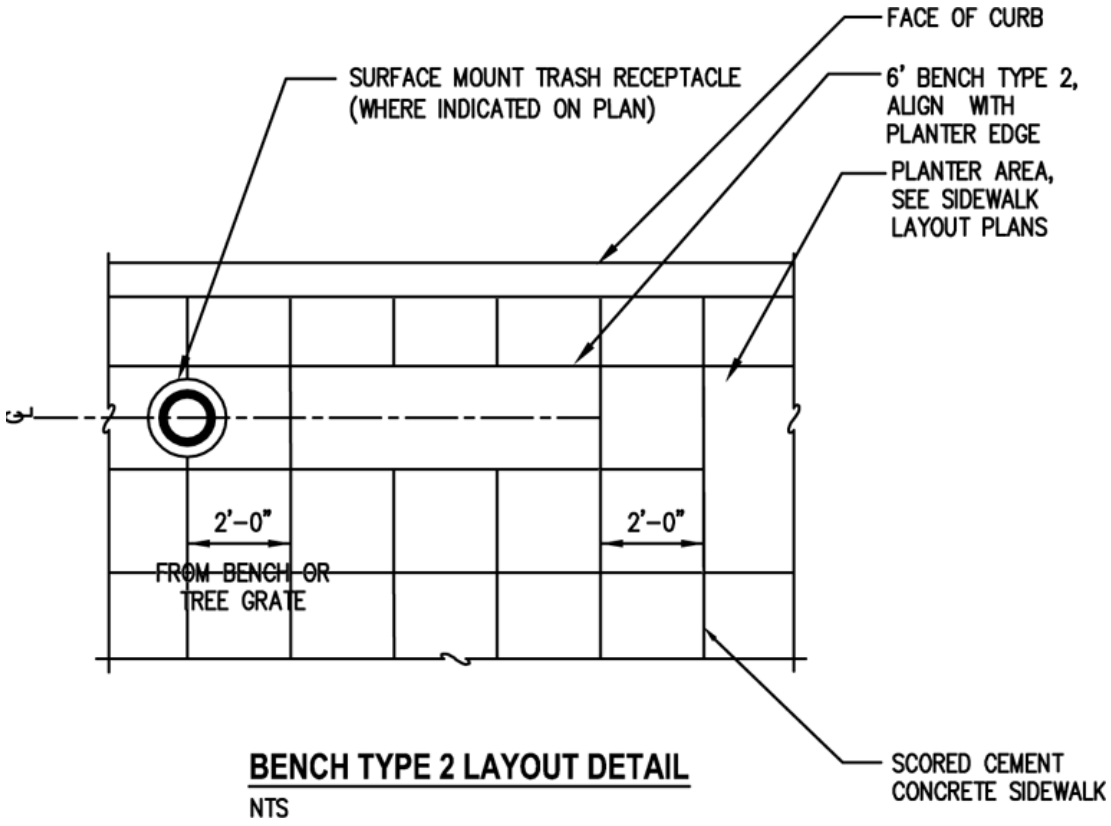
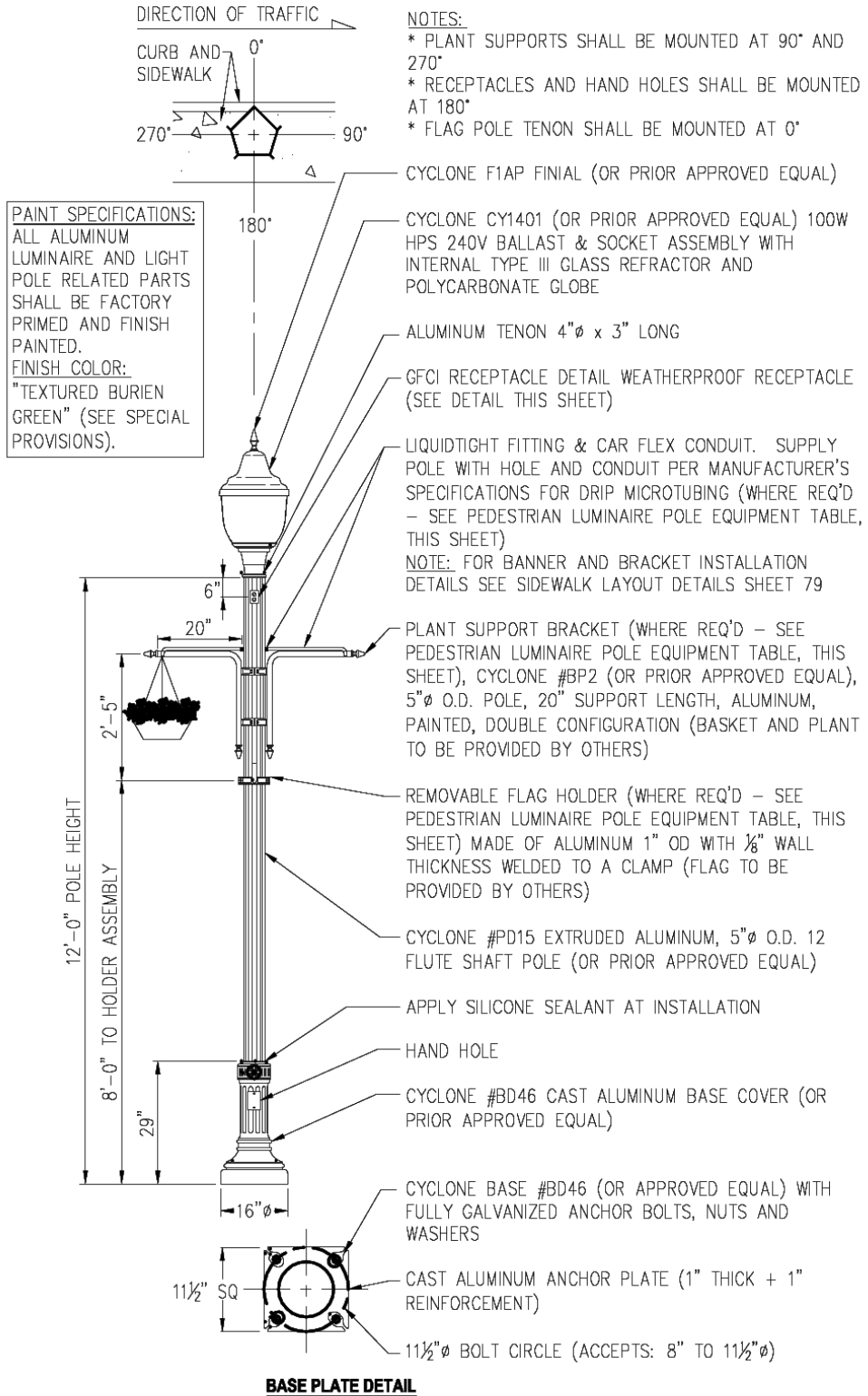
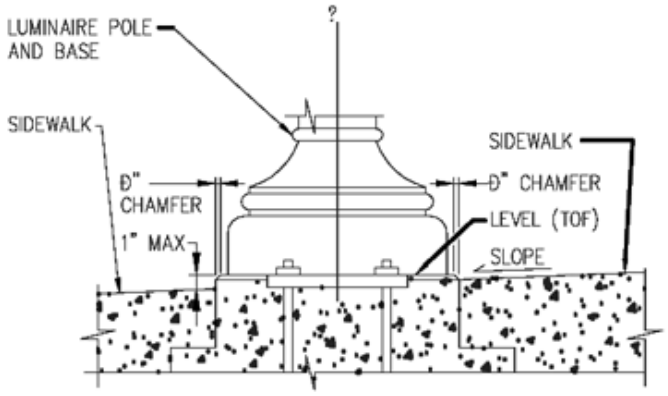


FIGURE 5.27 - DECORATIVE ROADWAY LUMINAIRE AND POLE

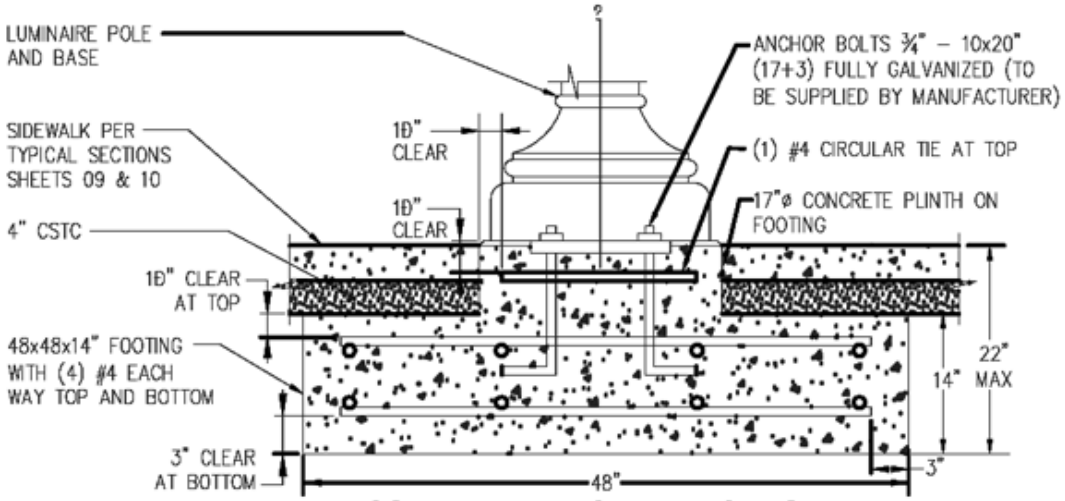


DECORATIVE PEDESTRIAN LUMINAIRE AND POLE

FIGURE 5.28 - DECORATIVE LIGHTING POLE FOUNDATION

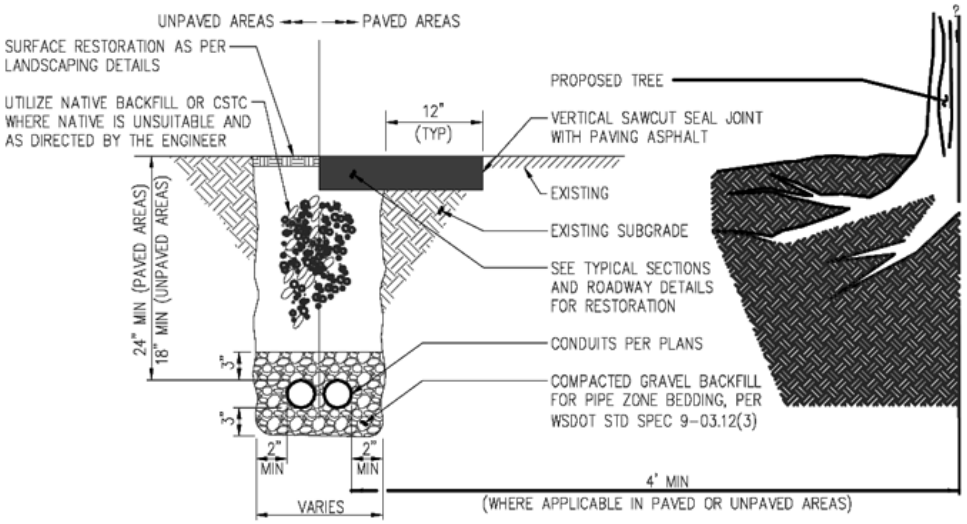


TOP OF FOUNDATION DETAIL
(FOR LUMINAIRE POLES PLACED IN THE SIDEWALK)



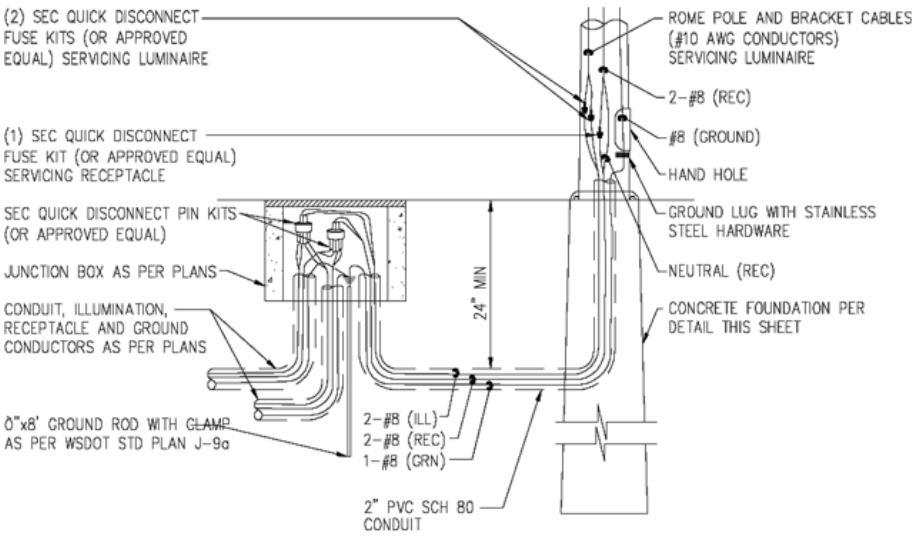
DECORATIVE PEDESTRIAN POLE SPREAD FOOTING FOUNDATION DETAIL

FIGURE 5.29 - DECORATIVE LUMINAIRE ELECTRICAL DETAILS

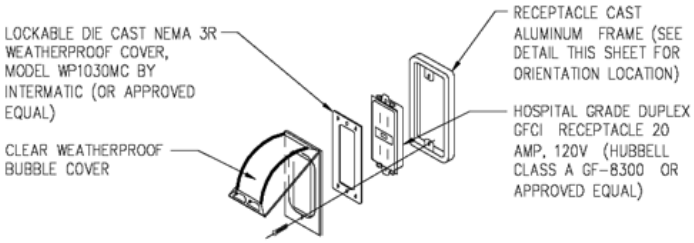


NOTES:
1. EXISTING ASPHALT PAVEMENT MUST BE SAWCUT TO PROVIDE A CLEAN STRAIGHT EDGE BEFORE CONDUIT PLACEMENT.
2. EXISTING MATERIAL DISTURBED UNDER THE CONDUIT SHALL BE REPLACED WITH BEDDING MATERIAL AND COMPACTED TO 95% MAX DENSITY.
3. BACKFILL MATERIAL SHALL BE INSTALLED IN AN APPROVED MANNER TO INSURE NO DAMAGES TO THE CONDUIT.
4. IF NATIVE MATERIAL IS DETERMINED UNSATISFACTORY BY THE ENGINEER, USE CRUSHED SURFACING TOP COURSE, PER WSDOT STD SPEC 9-03.9(3).

CONDUIT TRENCH DETAIL

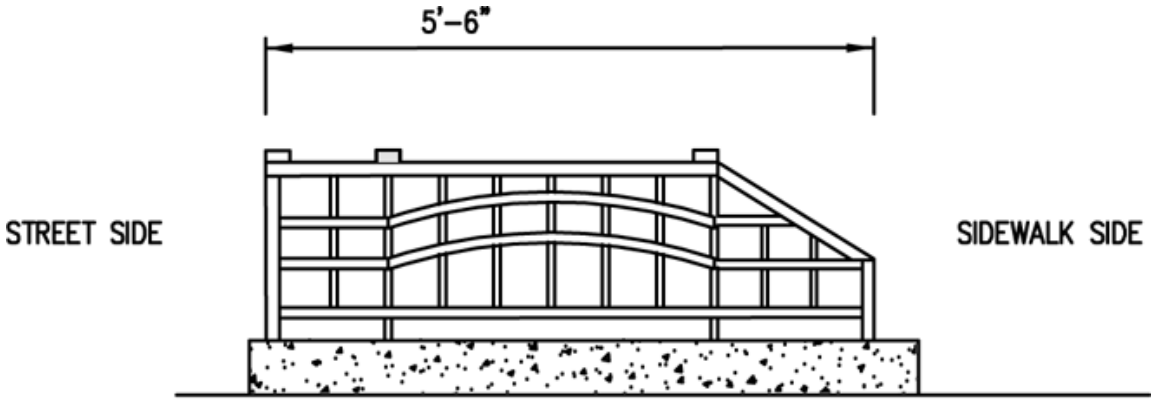


TYPICAL LUMINAIRE / JUNCTION BOX WIRING DETAIL



RECEPTACLE DETAIL

FIGURE 5.30 - PLANTER CURB RAILING DETAILS



ELEVATION OF PERPENDICULAR SEGMENT TO CURB
(PLANTER LOCATED ON 5TH NORTH OF 151ST)

NOTE: CONTRACTOR SHALL FIELD VERIFY DIMENSIONS OF PLANTERS, PROVIDE 1/4" WEEP HOLES ON UNDERSIDE OF TUBE STEEL RAILINGS @ 2' O.C. AND INSIDE OF TUBE CORNER POSTS NEAR TOP.

PLANTER CURB RAILING DETAILS
NTS

CHAPTER 6. BRIDGES, SPECIAL CULVERTS, AND STRUCTURAL WALLS

6.01 Bridge Principal References

Except as specified below, City of Burien bridges, whether on public roads or on private roads, shall be designed and constructed to meet the minimum requirements set forth in the latest edition, including all interim addenda of "AASHTO Standard Specifications for Highway Bridges," or "AASHTO LRFD Bridge Design Specifications" and in accordance with the most current requirements of WSDOT/APWA Standard Specifications. Bridge traffic barrier and approach railings shall be provided in accordance with those references and the WSDOT Bridge Design Manual and WSDOT/APWA Standard Plans. All new bridges shall be designed to carry an AASHTO HS 25 or HL93 (LRFD) unless otherwise approved by the Public Works Director or his or her designee. The work shall comply with current City of Burien critical area code requirements. Pedestrian bridges shall be designed in accordance with the most current AASHTO "Guide Specifications for Design of Pedestrian Bridges".

6.02 Bridge Geometrics

A. In general, the bridge shall comprise the full width and configuration of the road being served, (e.g. traveled way plus curb, sidewalks, walkway, bike lane, equestrian lane and/or shoulder on one or both sides). Requirements of utilities shall be duly considered. Bridge roadway width shall be measured between curbs or between faces of bridge traffic barrier; whichever is less.
B. On designated bike routes, combination bridge traffic barrier and bicycle railings shall be used. Where typical speed is 35 mph or higher and significant pedestrian, bike and/or equestrian traffic can be expected, the Public Works Director or his or her designee may require that the lanes for these other modes of traffic be separated from motor vehicle traffic by use of a bridge traffic barrier and further protected by a rail at the outer edge.
C. Approach railings and transitions shall be made structurally continuous with bridge railings and shall meet AASHTO specifications as cited in Section 6.01.
D. Overhead vertical clearances for motor traffic on the traveled way or under overpasses shall be 16.5 feet minimum. Vertical clearance for bridges over railroad tracks shall comply with the minimum vertical clearance required by the WSDOT Design Manual and also may require negotiations with the railroad company concerning necessary clearances. Vertical clearance of structures above a walkway or sidewalk shall be eight feet minimum and shall be 10 feet minimum on designated equestrian routes unless otherwise specified.
E. Best available flood data, as defined in the Department of Development and Environmental Services Public Rule, Sensitive Areas: Flood Hazard Areas, shall be used to establish the 100-year water surface elevation in consultation

with the Department of Natural Resources and Parks, Flood Hazard Reduction Services Section

F. For stream crossing locations where the 100-year peak flow exceeds 100 cfs, the height of bridge clearance above rivers and streams shall be a minimum three feet above the 100-year water surface elevation unless otherwise required by the Public Works Director or his or her designee based on an evaluation of conveyance factors as specified in subsection G of this section. For stream crossing locations where the 100-year peak flow is 100 cfs or less, there is no specific clearance requirement, but bridges must meet the standards in the City of Burien Surface Water Design Manual.
G. Evaluation of conveyance factors shall consider hydraulic capacity, bed aggradations, debris passage, safety margins, and bridges and levees, as specified in Section 4.3.3.1 of the Surface Water Design Manual.
H. For future bridge inspection and maintenance access beneath the actual structure of the bridge, a minimum three feet of clearance between the low chord of the bridge and final grade shall be maintained along the entire bridge.

6.03 Bridge Design Criteria

A. Unless otherwise approved by the Public Works Director or his or her designee, concrete approach slabs will be required for all new bridges and shall be constructed in accordance with WSDOT/APWA Standard Plans.
B. New bridge plans shall be designed in accordance with WSDOT/APWA Standard Specifications to prevent corrosion of reinforcing steel.
C. Criteria under other recognized road and bridge project classifications, such as those of 3-R projects, set forth in WSDOT Local Agency Guidelines, may be applied under conditions deemed appropriate by the Public Works Director or his or her designee.
D. The construction or reconstruction of bridges will necessitate submittal of the following items to the Public Works Director or his or her designee:
    1. Design calculations
    3. Load rating analysis
    3. Hydraulic report
    4. Scour analysis
    5. Material certification of the major load bearing members
    6. Pile driving records, for all pile supported foundations
    7. Plans of Record (As-built plans)
E. The construction or reconstruction of bridges will necessitate the Public Works Director’s or his or her designee’s approval of the following:
    1. Bridge type
    3. Foundation type
    3. Size and shape of the hydraulic opening
    4. Vertical clearance between the superstructure and the design water surface, including sensitive areas
    5. Location of piers and abutments
    6. Roadway cross section
    7. Bridge traffic barrier and approach guardrail type

8. Aesthetic treatments
9. Expansion joints (the design of bridge expansion joints shall consider the presence of bicycle traffic).

6.04 Special Culverts

All corrugated metal structures and reinforced concrete 3-sided and 4-sided box culverts shall be designed in accordance with the most current AASHTO Standard Specifications for Highway Bridges.

6.05 Structural Walls

Structural retaining walls shall be designed in accordance with the most current AASHTO "Standard Specifications for Highway Bridges" and the most current WSDOT Bridge Design Manual.

CHAPTER 7. DRAINAGE

7.01 General

A. Designs: Drainage facilities shall be designed consistent with City of Burien Municipal Code Section 13.10 and the City of Burien Surface Water Design Manual. No drainage from downspouts, splash blocks, etc. shall discharge across a sidewalk, walkway, or roadway. 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 Public Works Director or his or her designee may amend, delete, or add specifications or Standard Drawings.

C. Conflicts: Where technical conflicts may occur between this document and the Surface Water Design Manual, the Public Works Director or his or her designee shall decide which document governs.

7.02 Road Ditches

The following standards shall only apply in design of drainage ditches not requiring drainage review under the provisions of the Surface Water Design Manual.

A. On grades up to 6 percent, use of the roadside bioretention ditch BMP in accordance with the Surface Water Design Manual is encouraged, otherwise grass-lined ditches with grasses as specified in 7.02D shall be used for the drainage requirement. These ditches shall be designed and constructed in accordance with Figs. 2.1, 2.4 and 2.6. If grass cannot be readily established by usual seeding method, other methods such as sodding or seeding with slope mat protections shall be used as necessary. For grades between 3 percent and 6 percent, grass lining alone may not be sufficient to stop erosion. Preferred methods to further reduce potential erosion problems include the use of check dams, matting, or wider ditch sections. Rock-lined ditches shall be avoided whenever possible. See Fig. 7.24.

B. Where the grade is over 6 percent and not over 9 percent, the Public Works Director or his or her designee may direct use of a standard rock-lined ditch or alternatively a closed (pipe) drainage system under a paved shoulder with asphalt curb or turnpike shoulder. As an exception, cul-de-sacs with over 6 percent grade shall be provided with pipe drainage and not with rock-lined ditches.

1. The standard rock lining shall be in accordance with the Surface Water Design Manual and Section 9-13.6 of the WSDOT/APWA Standard Specifications. Rock gradation shall be as follows:
    - Passing 8-inch square sieve 100 percent

- Passing 3-inch square sieve 40 percent max.
- Passing 3/4-inch square sieve 10 percent max.

2. Rocks shall be placed so as to form a firm, dense, protective mat consistent with examples in Fig. 7.24 and conforming to the design surface of the ditch. Individual rocks shall not protrude more than 3 inches from that surface.

C. Where the grade exceeds 9 percent, pipe drainage, a special rock-lined ditch or other approved methods shall be provided unless otherwise waived by the Public Works Director or his or her designee. The special rock-lined ditch shall be designed by a professional engineer, based on soils and hydraulic analyses. Design shall include rock sizing, together with filter rock gradations and/or construction geotextile, and be subject to approval by the Public Works Director or his or her designee.

D. Grass seed mixture by weight may be 10 percent Colonial bentgrass, 40 percent Tall or Red fescue, 10 percent White clover, hydroseed at 120 lbs./acre, handseed at 3 lbs./1,000 square feet. Where there is high groundwater, the following species may be substituted or added: Meadow or Pacific foxtail, Timothy, or Redtop.

7.03 Storm Sewers and Culverts

A. Minimum pipe size shall be 12-inch diameter. Eight-inch diameter may be permitted on cross street laterals less than 66 feet long to avoid utility conflict or meet shallow gradient. Pipe shall be installed in accordance with section 7.8 of the WSDOT/APWA Standard Specifications.

B. All flexible storm sewer pipe and culvert material shall be covered by a minimum two feet of cover unless the applicant submits detailed plans accompanied by manufacture’s recommendations specifying allowable cover less than two feet in depth. All non-flexible storm sewer pipe and culvert material shall be covered by a minimum of one foot of cover.

C. Driveway culverts shall conform to Fig. 3.3.

D. Pipes specified in Section 7.2, 7.3, and 7.4 of the WSDOT/APWA Standard Specifications are allowed.

E. Solid wall polyethylene (SWPE) pipe with maximum SDR of 33.5, minimum cell Class ASTM D3350.6 and meeting City Specifications for ductile iron pipe with restrained mechanical joints may be used for outfalls on steep slopes. Above ground installation of SWPE does not require pipe bedding.

F. Thermoplastic pipe, (e.g., SWPE) shall be tested using the deflection test procedure described in Section 7-17.3 of the WSDOT/APWA Standard Specifications.

G. Concrete pipe shall be rubber gasketed and metal pipe shall be gasketed and securely banded. Leak testing shall be conducted if required by the Public Works Director or his or her designee.

H. Bevel the projecting ends of culverts within the right-of-way per Fig. 7.1.

7.04 Catch Basin Locations and Junctions

A. Catch basins shall be spaced no greater than 150 feet for grades less than one percent, 200 feet for grades between 1 percent and 3 percent and 300 feet for grades 3 percent and greater.

B. Catch basins, Figs. 7.3 through 7.6, or surface drainage into roadside bioretention facilities, rather than inlets shall be used to collect storm water from road surfaces, unless approved by the Public Works Director or his or her designee.

C. Connections to pipe systems may be made without placing a catch basin or manhole on the mainline by meeting all of the following conditions:

1. The mainline pipe is 48 inches or greater and at least two times the size of the connecting pipe.

3. Make connections in accordance with the manufacturer's recommendations. Standard shop fabricated tees, wyes and saddles shall be used, except for concrete pipe connections constructed in accordance with Fig. 7.3.

3. There shall be a catch basin or manhole on the connecting pipe within 2 to 10 feet of the external wall of the main line. See Fig. 7.3.

4. Offset angle of connecting pipe to mainline, horizontally and vertically, shall be less than 45 degrees.

5. 2-point survey control shall be used to set catch basin locations.

D. Use Type 2 catch basins, Fig. 7.5, where the depth to the invert of the pipe exceeds 5 feet.

E. Manholes, Figs. 7.7 through 7.11, may be used in lieu of catch basins if they do not collect surface water. Manholes must be used if inverts are greater than 18 ft., per Fig. 7.5.

F. Roof and yard drains, or other concentrated flow from adjacent property shall not discharge over the surface of roadways, sidewalks, walkways, or shoulders.

G. Catch basins or manholes are required when joining differing types of pipes.

H. The location of at least two points of all catch basins shall be surveyed to ensure that the catch basin, frame and grate will properly align with finished curb, horizontally and vertically.

7.05 Frames, Grates, and Covers

A. Metal castings for drainage structures shall not be dipped, painted, welded, plugged or repaired.

B. Porosity in metal castings for drainage structures shall be considered a workmanship defect subject to rejection by the inspector.

C. Castings for manhole rings shall be gray-iron conforming to the requirements of AASHTO M 105, Grade 30B. Covers shall be ductile iron conforming to ASTM A 536, Grade 80-55.6. Manhole rings and covers shall meet the strength requirements of Federal Specification RR-F-621 E. All mating surfaces shall be machine finished to ensure a non-rocking fit.

D. All manhole rings and covers shall be identified as specified in the WSDOT/APWA Standard Specifications, Section 9.5.15.

E. Castings for metal frames for catch basins and inlets shall be cast steel, gray iron, or ductile iron as specified in Sections 9.6.8, 9.6.9, or 9.6.14 of the WSDOT/APWA Standard Specifications.

F. Castings for metal frames for catch basins, inlets, grates and solid metal covers shall meet the strength requirements of Federal Specification RR-F-621 E.

G. Castings for grates and solid metal covers for catch basins and inlets shall be cast steel or ductile iron as specified in Sections 9.6.8 or 9.6.14 of the WSDOT/APWA Standard Specifications. The foundry name and material designation shall be embossed on the top of the grate. The material shall be identified as “CS” for cast steel and “DUC” or “DI” for ductile iron and shall be located near the manufacturer’s name.

H. Grates and covers shall be seated properly to prevent rocking, including the replacement of existing covers with solid metal covers.

I. Subject to prior approval by the Public Works Director or his or her designee, other types and materials and drainage hardware may be used provided that recognized specifications are available to control quality and acceptable user experience with the product can be shown.

J. Unless otherwise specified, vaned grates, Fig. 7.18, shall be used with standard frame in the traveled way, gutter, or shoulder. Vaned grates shall not be located within crosswalks.

K. At sag vertical curves, on the end of downgrade cul-de-sacs, or before intersections with a grade four percent or greater, an analysis shall be done to assure that typical catch basin grates will collect the surface runoff. To collect excessive volumes of runoff or protect against plugged grates and overflow situations, the Public Works Director or his or her designee will require the use of through-curb inlet frames on vertical curbs, Fig. 7.17. On rolled curbs use through curb frames, Fig. 7.19, that require a hand formed curb taper extending three feet on either side of the frame. Where the through-curb inlets cannot be used, place a catch basin at the low point and two extra inlets located not greater than 0.1 foot above the low point grate within a spacing of 25 feet.

L. Use rolled curb frame and (vaned) grates along rolled curbs. See Fig. 7.21.

M. New catch basins that do not collect runoff shall use solid locking covers. See Fig. 7.23. Existing catch basins, which no longer collect runoff, shall have their frame and grates replaced with solid covers, Fig. 7.15).

N. All storm drain covers and grates need not be locking. However, when located outside the improved right-of-way area locking lids are required, unless otherwise approved by the custodial agency; additionally, all control structures storm drain covers shall be locking regardless of their location.

O. Slit drains may be used when approved by the Public Works Director or his or her designee. At a minimum slit drains shall have catch basins at either end unless used as a driveway culvert. The maximum distance between catch basins along a slit drain shall be 50 feet.

7.06 Erosion Control

Provide erosion control as required in the City of Burien Surface Water Design Manual or as specified by other guidelines and/or regulatory requirements.

When using geotextile for temporary silt fences, the material shall be designed specifically for erosion control. It shall meet the requirements of WSDOT Standard Specifications, Section 9-33.1, Table 6.

Fencing must be inspected regularly for damage. Silt fencing does break down under UV light. Sediment collected behind the fence must be removed so that this material does not push the fence over. Geotextile for permanent erosion control and ditch lining shall meet the requirements of WSDOT Standard Specifications.

7.07 Trenches

All trenches shall comply with Section 8.03 of these Standards.

7.08 Vegetated Stormwater Facilities in Rights-of-Way

Vegetated stormwater facilities in the right-of-way, such as bioretention, shall comply with Section 5.03 of these Standards.

Bioretention curb extensions shall be planted in accordance with Fig. 7.31 or Fig. 7.32. Alternative planting designs may be used subject to review and approval by the Public Works Director or his or her designee.

FIGURE 7.1 - BEVELED END PIPE SECTION

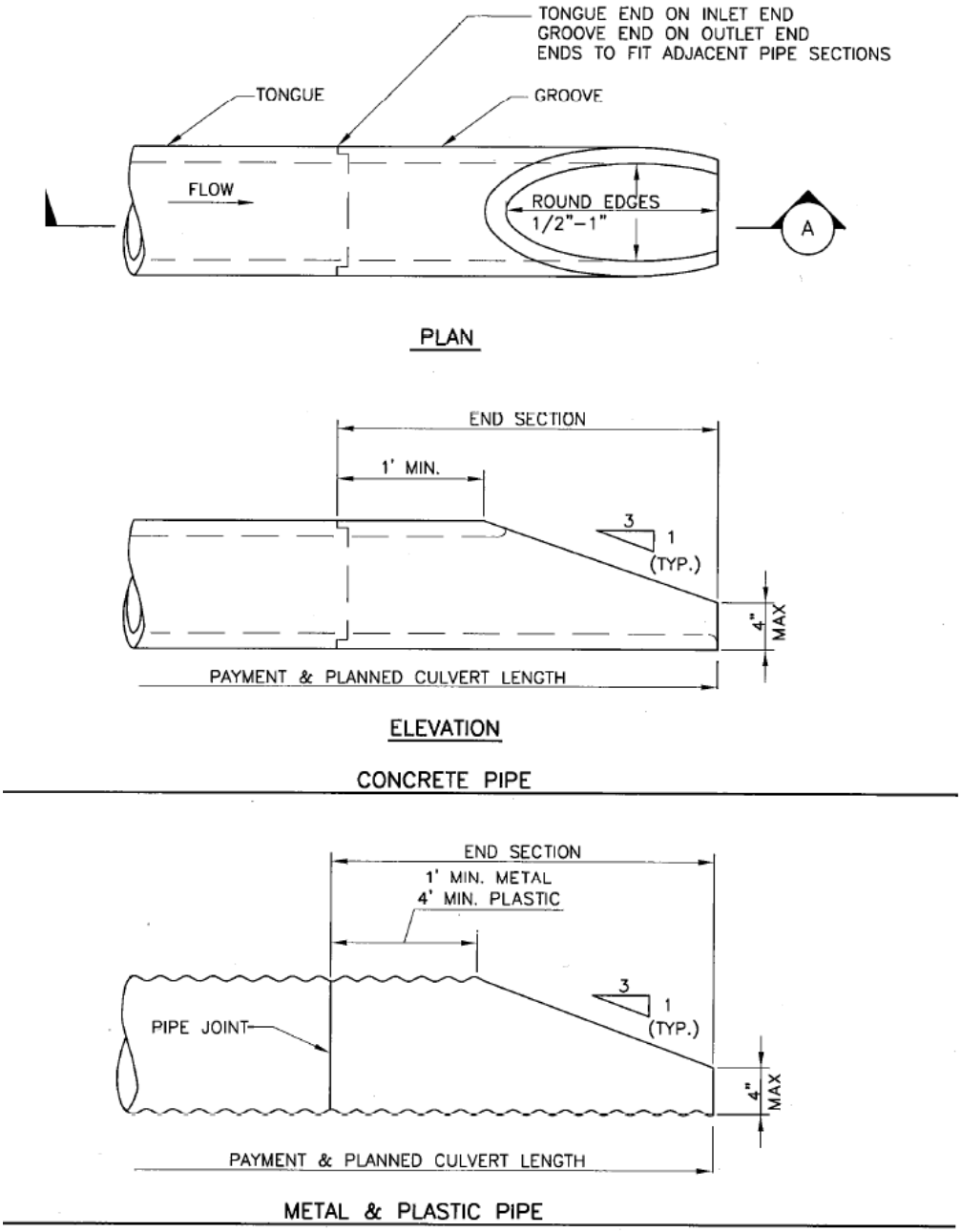


FIG 7.1

NOTES:

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

FIGURE 7.2 - FIELD TAPPING OF CONCRETE PIPE

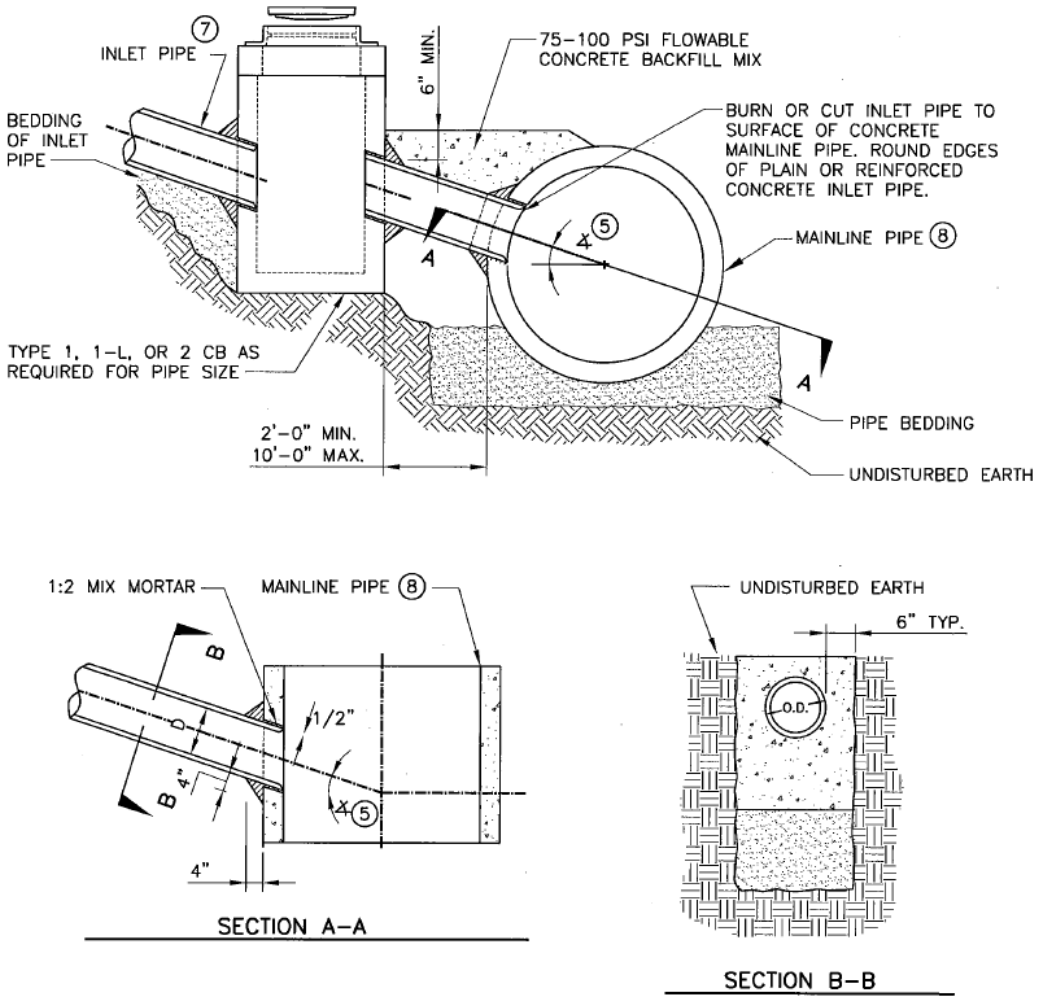


FIG 7.2

NOTES:

1. "D" THE INSIDE DIAMETER OF THE INLET PIPE, SHALL BE 24 IN. OR LESS. FOR LARGER VALUES OF "D", USE AN APPROVED STRUCTURE.
2. IN NO CASE SHALL THE OUTSIDE DIAM. OF THE INLET PIPE EXCEED ONE-HALF THE INSIDE DIAM. OF THE MAIN STORM SEWER.
3. THE CENTERLINE OF THE INLET PIPE SHALL BE ON RADIUS OF THE MAIN STORM DRAIN.
4. THE MIN. OPENING INTO THE EXISTING STORM DRAIN SHALL BE THE OUTSIDE DIAM. OF THE INLET PIPE PLUS 1 IN.
5. FIELD TAPPING ONLY WHERE ANGLE IS 0" TO 45".
6. SEE SEC. 7.04.
7. SEE SEC. 7.03 FOR ALLOWED INLET PIPE TYPE.
8. MAINLINE SHALL HAVE 48 IN. MIN. DIAM.

FIGURE 7.3 - CATCH BASIN TYPE 1

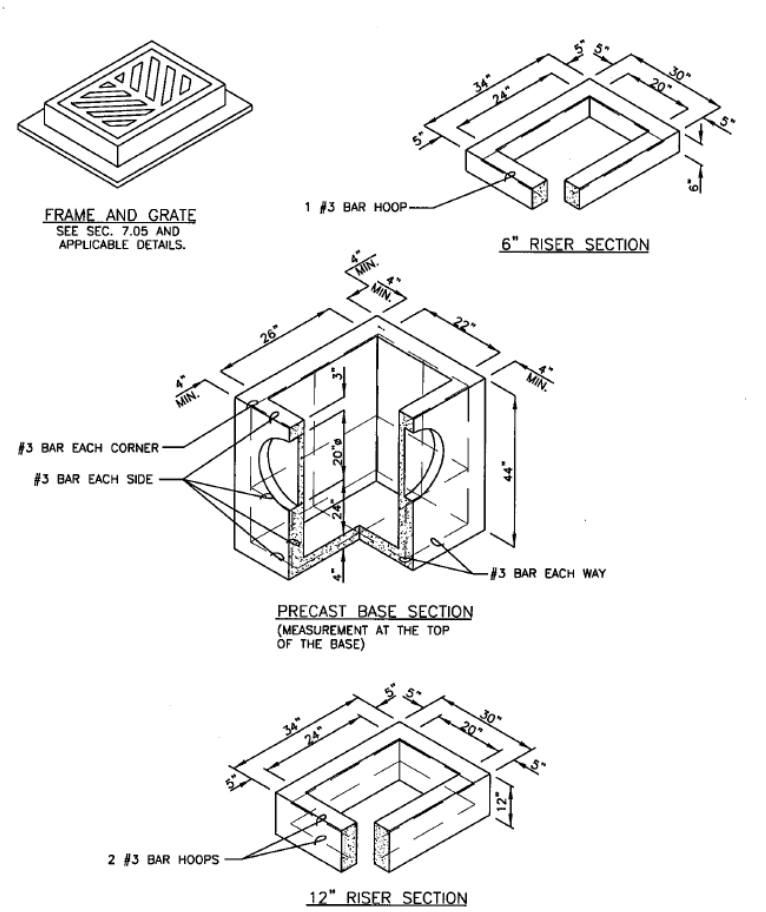


FIG 7.3

NOTES:

1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASTO 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 SQ. IN. PER FT. MAY BE USED. WELDED WIRE FABRIC SHALL 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 IN TACT.
5. KNOCKOUT OR CUTOUT HOLD SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS.
6. ROUND KNOCKOUTS MAY BE ON ALL 4 SIDES, WITH MAX. DIAMETER OF 20 IN. KNOCKOUTS MAYBE EITHER ROUND OR "D" SHAPE.
7. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5 FT.
8. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED ½" PER FOOT.
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 IN. FROM VERTICAL EDGE OF CATCH BASIN WALL.

FIGURE 7.4 - CATCH BASIN TYPE 1-L

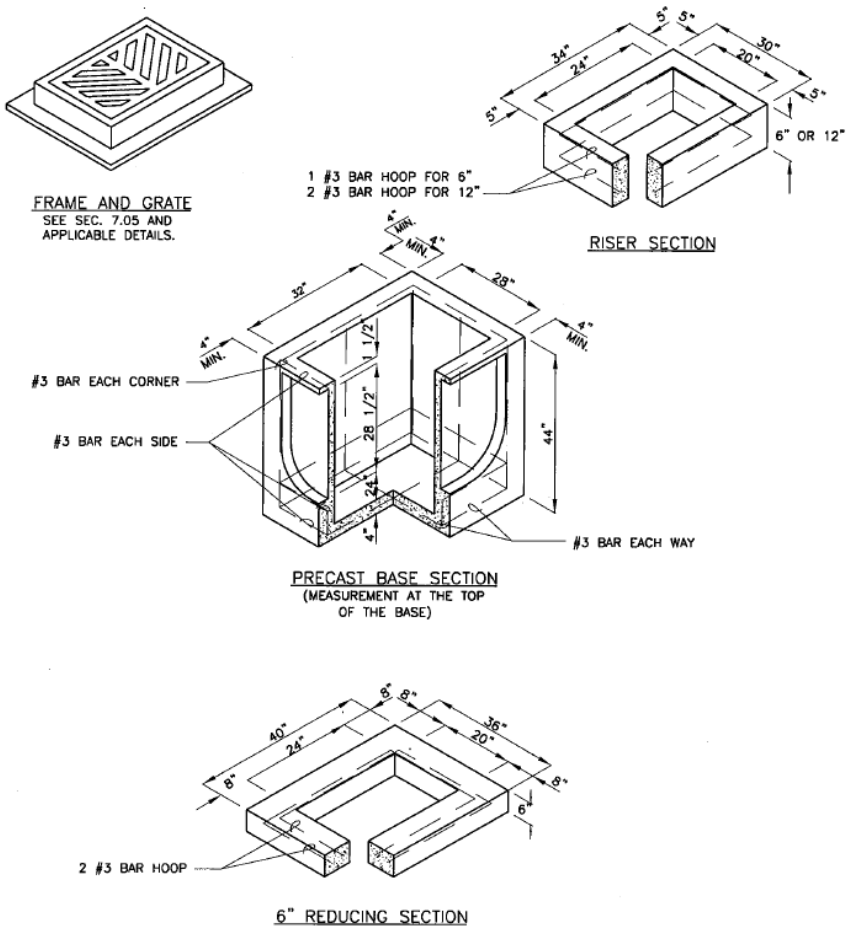


FIG 7.4

NOTES:

1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASTO 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 SQ. IN. PER FT. MAY BE USED. WELDED WIRE FABRIC SHALL 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 IN TACT.
5. KNOCKOUT OR CUTOUT HOLD SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS.
6. KNOCKOUTS MAY BE ON ALL 4 SIDES WITH MAX. DIAM. OF 28 IN. KNOCKOUTS MAY BE EITHER ROUND OR "D" SHAPE.
7. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED ½" PER FOOT.
8. CATCH BASIN FRAME AND GRATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS 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.
9. FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.
10. MAX. DEPTH FROM FINISHED GRADE TO PIPE INVERT SHALL BE 5 FT.
11. EDGE OF REDUCING SECTION OR BRICK SHALL NOT BE MORE THAN 2 IN. FROM VERTICAL EDGE OF CATCH BASIN WALL.

FIGURE 7.5 - CATCH BASIN TYPE 2 48",54", 60", AND 96"

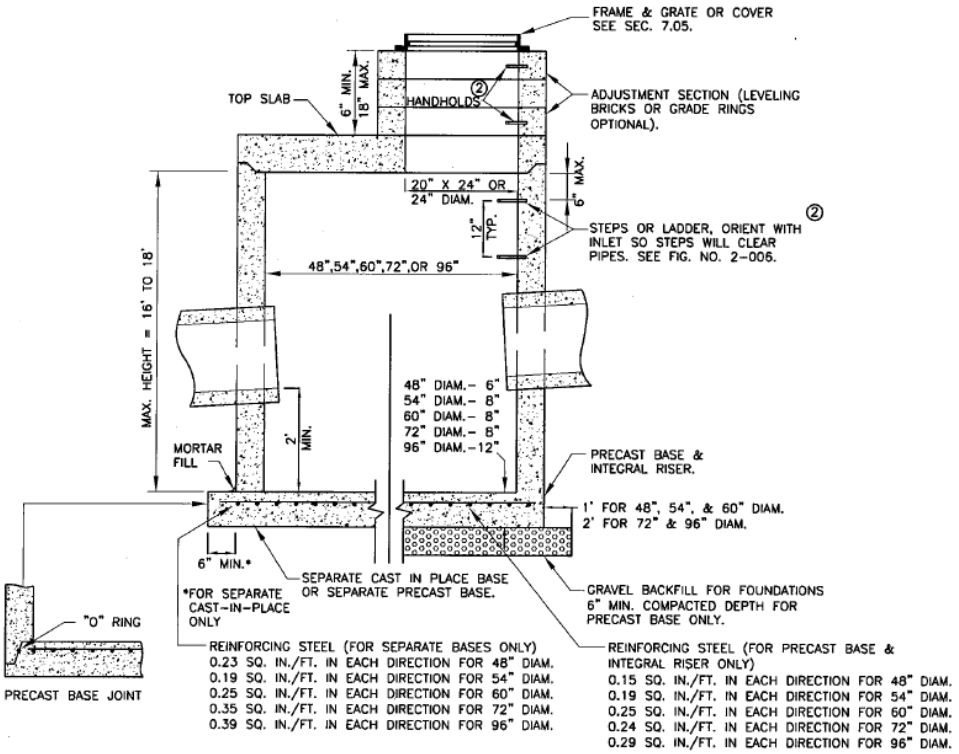


FIG 7.5

NOTES:

1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASTO M 199) & C890 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 CATCH BASIN SHALL HAVE 6 IN. MIN. CLEARANCE. SEE FIG. 7-006, CATCH BASIN DETAILS. HANDHOLDS SHALL BE PLACED IN ALTERING GRADE RINGS OR LEVELING BRICK COURSE WITH A MIN. OF ONE HANDHOLD BETWEEN THE LAST STEP AND TOP OF THE MANHOLE.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. ALL PRECAST 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 IN TACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. KNOCKOUT OR CUTOUT HOLE SIZE EQUAL PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS. MAX. HOLE SIZE SHALL BE 36 IN. FOR 48 IN. CATCH BASIN, 42 IN. FOR 54 IN. CB, 48 IN. FOR 60 IN. CB, 60 IN FOR 72 IN. CB, 84 IN. FOR 96 IN. CB. MIN DISTANCE BETWEEN HOLES SHALL BE 8 IN. FOR 48 IN., 54 IN., AND 60 IN. CB; 12 IN. FOR 72 IN. AND 96 IN. CB.
6. CATCH BASIN FRAME AND GRATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS 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 IN. MIN. CLEARANCE.
8. MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 POUNDS PER SQUARE FOOT.
9. FOR DETAILS SHOWING LADDER, STEPS, HANDRAILS AND TOP SLABS, SEE FIG. 7-006.
10. SEE THE WSDOT/APWA STANDARD SPECIFICATIONS SEC. 7-053.3 FOR JOINT REQUIREMENTS.

FIGURE 7.6 - CATCH BASIN DETAILS

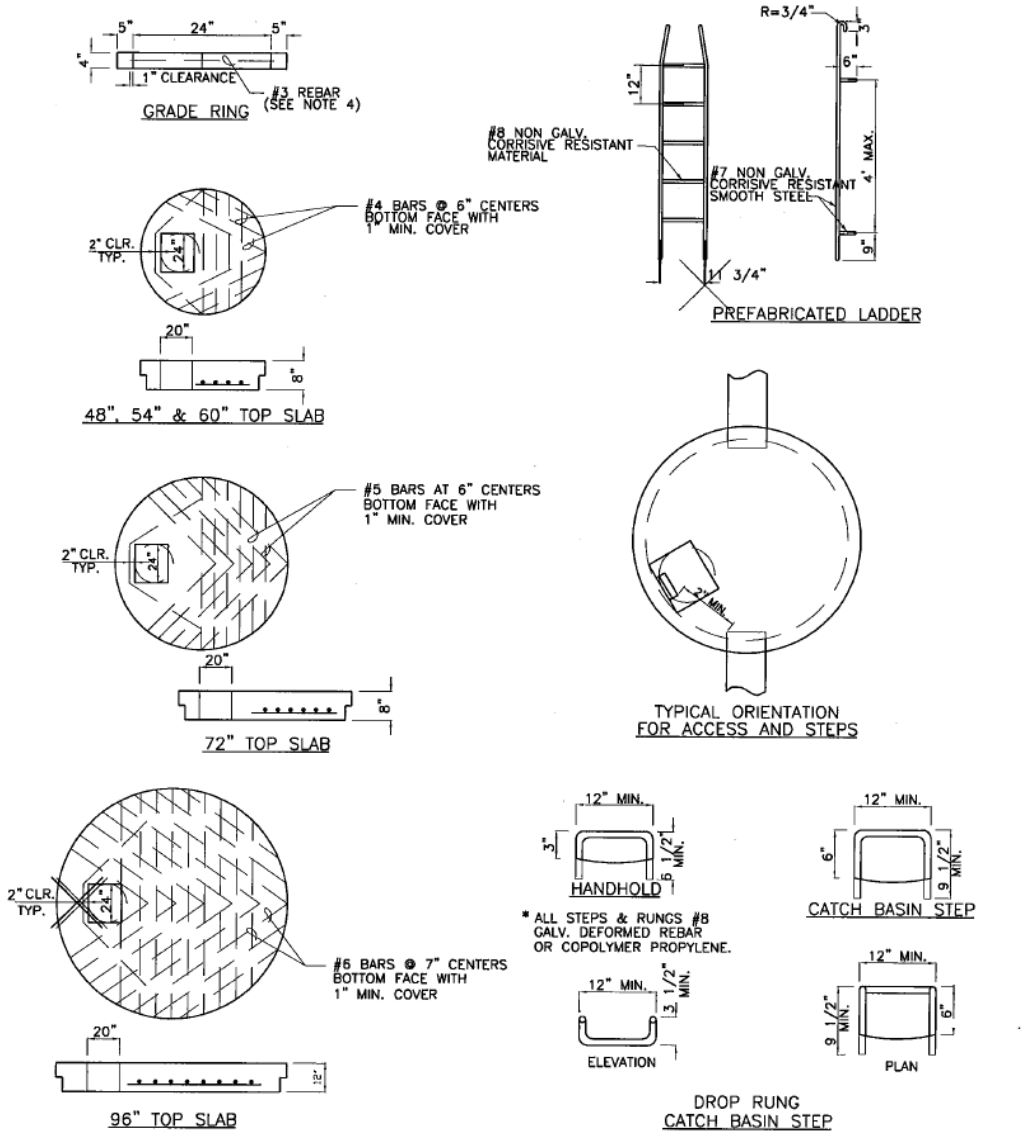


FIG 7.6

NOTES:

1. PROPRIETARY CATCH BASIN HANDHOLDS AND STEPS ARE ACCEPTABLE, PROVIDED THAT THEY CONFORM TO SEC. R ASTM C478, AASHTO M-199 AND MEET ALL WISHA REQUIREMENTS.
2. CATCH BASIN STEP/HANDHOLD LEGS SHALL BE PARALLEL OR APPROXIMATELY RADIAL AT THE OPTION OF THE MANUFACTURER, EXCEPT THAT ALL STEPS IN ANY CATCH BASIN SHALL BE SIMILAR. PENETRATION OF OUTER WALL BY A LEG IS PROHIBITED.
3. HANDHOLDS AND STEPS SHALL HAVE “DROP” RUNGS AS SHOWN ON DETAIL OR PROTUBERANCES TO PREVENT SIDEWAYS SLIP.
4. SLAB OPENING MAY BE 24” X 20” OR 24” DIAM.
5. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQ. IN. PER FT. MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497.
6. LADDERS OR STEPS SHALL EXTEND TO WITHIN 16 IN. OF BOTTOM OF CATCH BASIN.
7. HANGING LADDERS SHALL BE PERMANENTLY FASTENED AT TOP BY HANGING ON STEP OR BY BOLTING OR EMBEDDED AT BOTTOM IN BASE.
8. ADDITIONAL SAFETY FEATURES MAY BE REQUIRED IN VERY DEEP OR UNUSUAL STRUCTURES.

FIGURE 7.7 - MANHOLE TYPE 1 48", 54", AND 60"

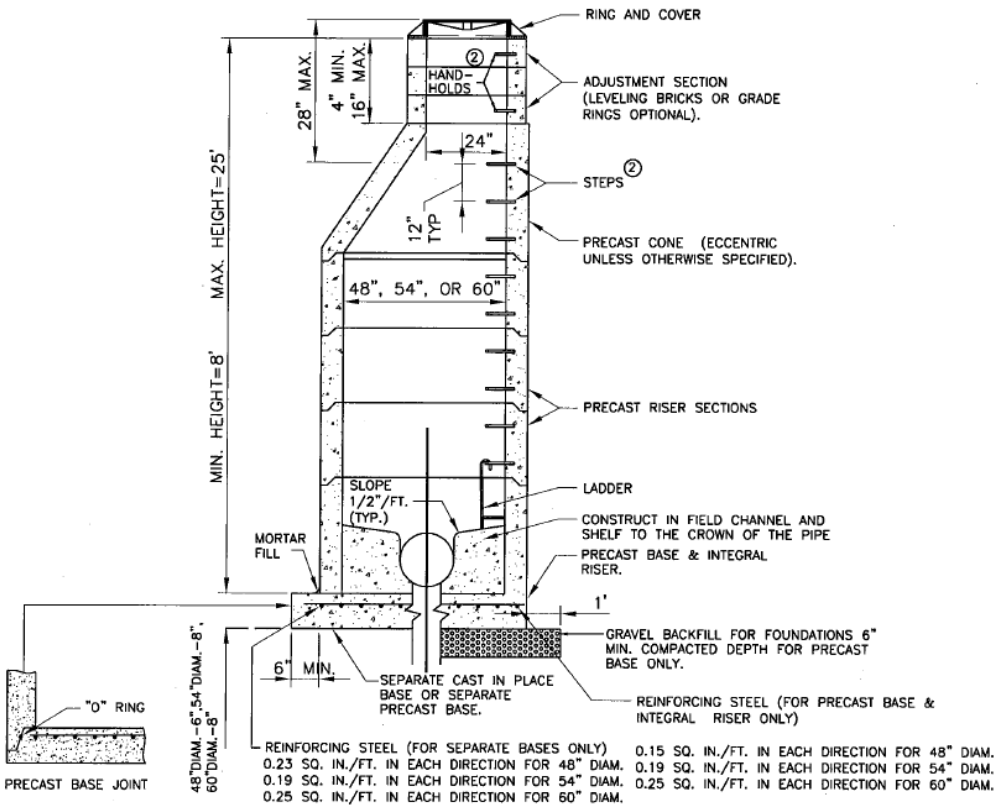


FIG 7.7

NOTES:

1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M199 UNLESS OTHERWISE SHOWN ON PLANTS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS
2. HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN MANHOLE SHALL HAVE 6 IN. MIN. CLEARANCE. SEE FIG. 7-011, "MANHOLE DETAILS." HANDHOLDS SHALL BE PLACED IN ALTERING GRADE RINGS OR LEVELING BRICK COURSE WITH A MIN. OF ONE HANDHOLD BETWEEN THE LAST STEP AND 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 A WALL THICKNESS OF 2 IN. MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT IN TACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. KNOCKOUT OR CUTOUT HOLE SIZE EQUAL PIPE OUTER DIAM. PLUS MANHOLE WALL THICKNESS. MAX. HOLE SIZE SHALL BE 36 IN. FOR 48 IN. MANHOLE, 42 IN. FOR 54 IN. MANHOLE, 48 IN. FOR 60 IN. M.H. MIN. DISTANCE BETWEEN HOLES SHALL BE 8 IN.
6. MANHOLE RINGS AND COVERS SHALL BE IN ACCORDANCE WITH SEC. 7.05 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 OD THE BASE WITH 1 IN. MIN. CLEARANCE.
8. FOR HEIGHTS OF 12 FT. OR LESS, MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 LBS. PER SQ. FT. FOR HEIGHTS OVER 12 FT. MIN. SOIL BEARING VALUE SHALL EQUAL 3,800 LBS. PER SQ. FT.
9. FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE FIG, 7-011, "MANHOLE DETAILS."
10. SEE THE WSDOT/APWA STANDARD SPECIFICATIONS SEC. 7-053.3 FOR JOINT REQUIREMENTS.

FIGURE 7.8 - MANHOLE TYPE 2 72" AND 96"

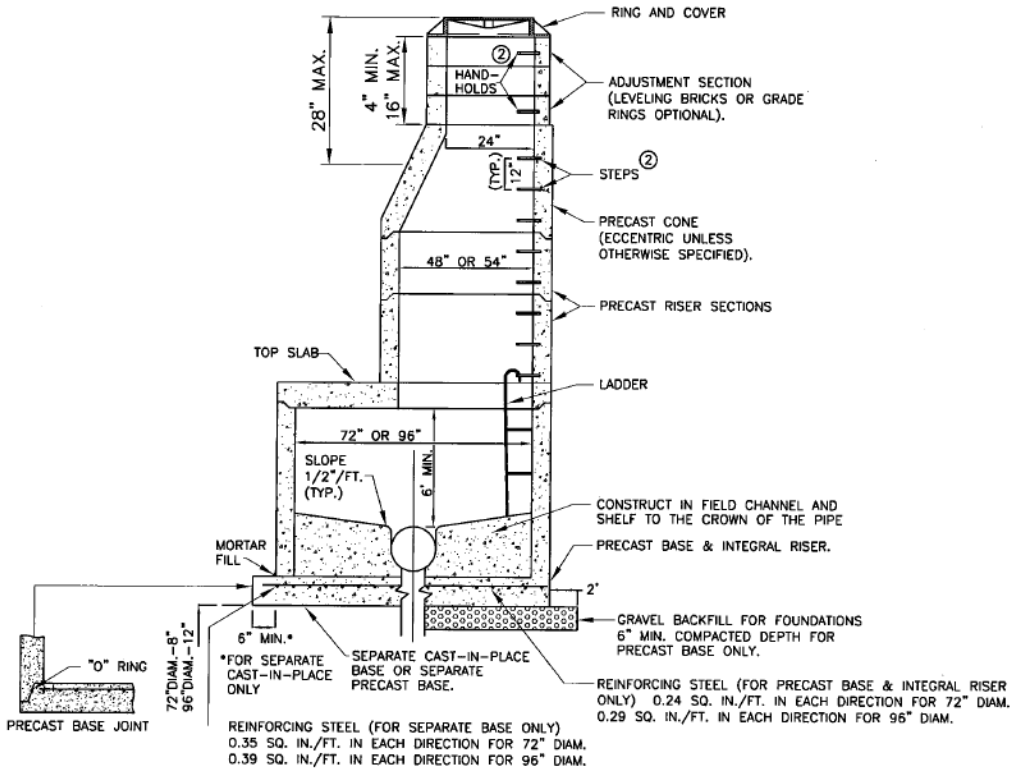


FIG 7.8

NOTES:

1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M199 UNLESS OTHERWISE SHOWN ON PLANTS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS
2. HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN MANHOLE SHALL HAVE 6 IN. MIN. CLEARANCE. SEE FIG. 7-011, "MANHOLE DETAILS." HANDHOLDS SHALL BE PLACED IN ALTERING GRADE RINGS OR LEVELING BRICK COURSE WITH A MIN. OF ONE HANDHOLD BETWEEN THE LAST STEP AND 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 A WALL THICKNESS OF 2 IN. MIN. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT IN TACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. KNOCKOUT OR CUTOUT HOLE SIZE EQUAL PIPE OUTER DIAM. PLUS MANHOLE WALL THICKNESS. MAX. HOLE SIZE SHALL BE 60 IN. FOR 48 IN. MANHOLE, 42 IN. FOR 54 IN. MANHOLE, 48 IN. FOR 60 IN. M.H. MIN. DISTANCE BETWEEN HOLES SHALL BE 8 IN.
6. MANHOLE RINGS AND COVERS SHALL BE IN ACCORDANCE WITH SEC. 7.05 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 IN. MIN. CLEARANCE.
8. FOR HEIGHTS OF 12 FT. OR LESS, MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 LBS. PER SQ. FT. FOR HEIGHTS OVER 12 FT. MIN. SOIL BEARING VALUE SHALL EQUAL 3,800 LBS. PER SQ. FT.
9. FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE FIG, 7-011, "MANHOLE DETAILS."
   SEE THE WSDOT/APWA STANDARD SPECIFICATIONS SEC. 7-053.3 FOR JOINT REQUIREMENTS.

FIGURE 7.9 - MANHOLE TYPE 3 48", 54", 60", 72", 96"

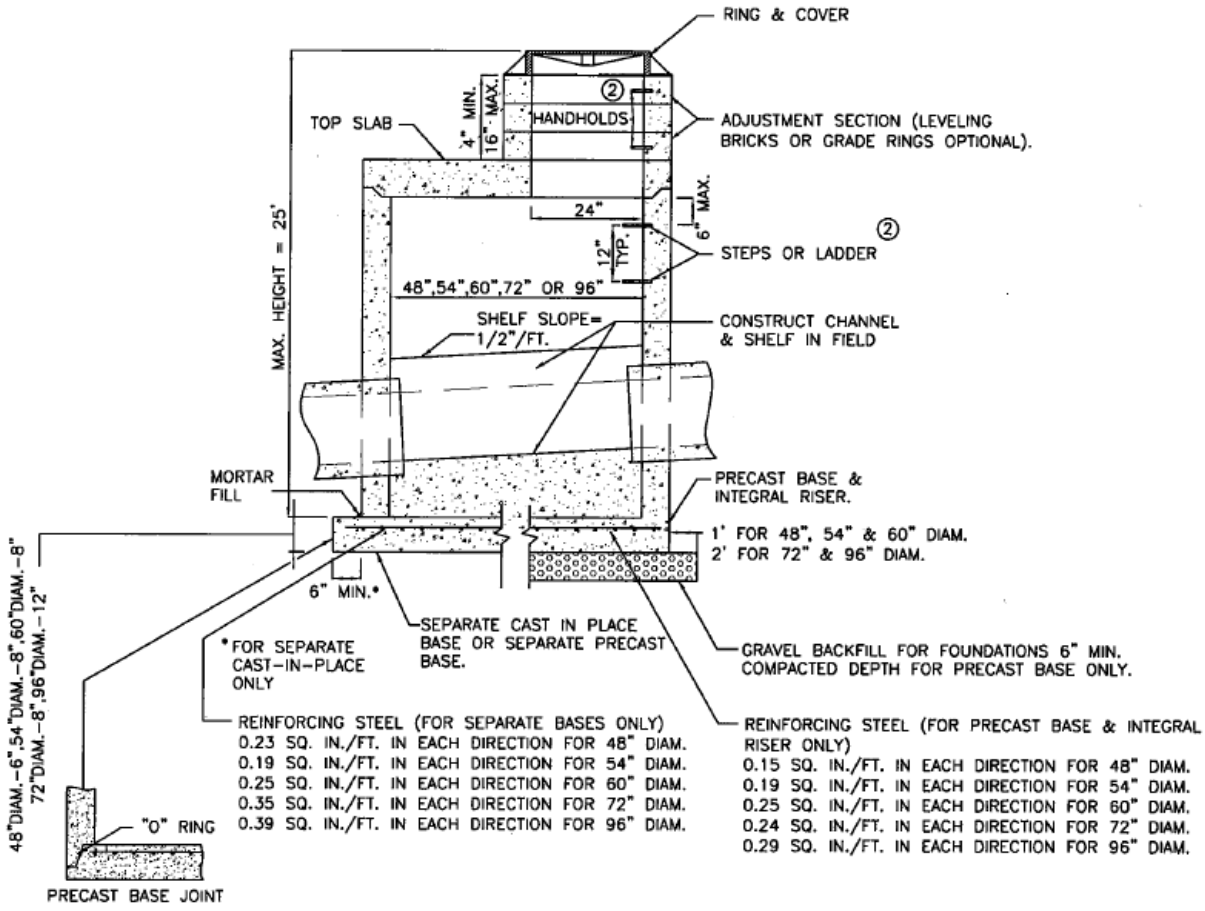


FIG 7.9

NOTES:

1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M199 UNLESS OTHERWISE SHOWN ON PLANTS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
2. HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN MANHOLE SHALL HAVE 6 IN. MIN. CLEARANCE. SEE FIG. 7-011, "MANHOLE DETAILS." HANDHOLDS SHALL BE PLACED IN ALTERING GRADE RINGS OR LEVELING BRICK COURSE WITH A MIN. OF ONE HANDHOLD BETWEEN THE LAST STEP AND 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 A WALL THICKNESS OF 2 IN. MIN. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT IN TACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. KNOCKOUT OR CUTOUT HOLE SIZE EQUAL PIPE OUTER DIAM. PLUS MANHOLE WALL THICKNESS. MAX. HOLE SIZE SHALL BE 36 IN. FOR 48 IN. M.H., 42 IN. FOR 54 IN. M.H., 48 IN. FOR 60 IN. M.H., 60 IN FOR 72 IN. M.H., 84 IN. FOR 96 IN. M.H. MIN. DISTANCE BETWEEN HOLES SHALL BE 8 IN. FOR 48 IN., 54 IN., AND 60 IN. M.H.; 12 IN. FOR 72 IN. AND 96 IN. M.H.
6. MANHOLE RINGS AND COVERS SHALL BE IN ACCORDANCE WITH SEC. 7.05 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 IN. MIN. CLEARANCE.
8. FOR HEIGHTS OF 12 FT. OR LESS, MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 LBS. PER SQ. FT. FOR HEIGHTS OVER 12 FT. MIN. SOIL BEARING VALUE SHALL EQUAL 3,800 LBS. PER SQ. FT.
9. FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE FIG, 7-011, "MANHOLE DETAILS."
10. SEE THE WSDOT/APWA STANDARD SPECIFICATIONS SEC. 7-053.3 FOR JOINT REQUIREMENTS.

FIGURE 7.10 - MANHOLE TYPE 4

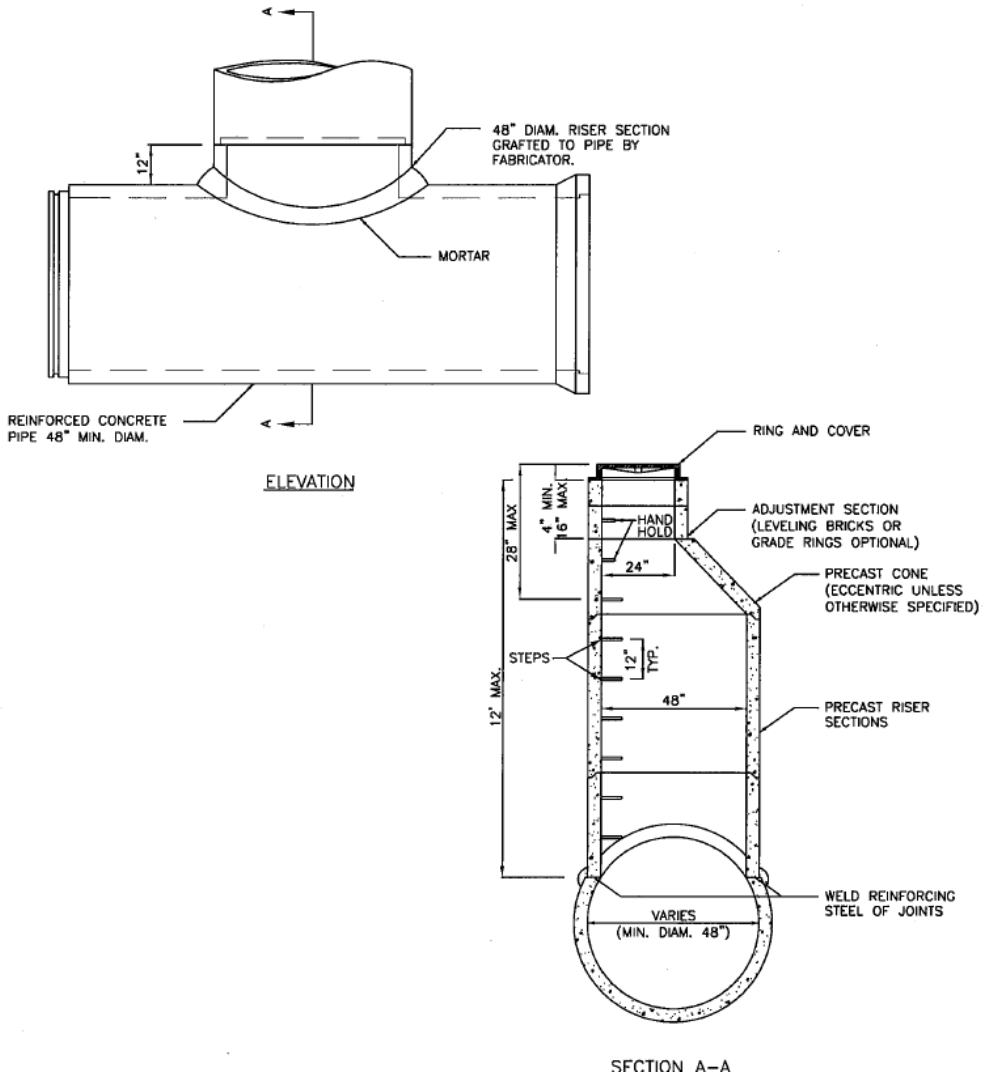


FIG 7.10

NOTES:

1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M199 UNLESS OTHERWISE SHOWN ON PLANTS OR NOTED IN THE WSDOT/APWA STANDARD SPECIFICATIONS.
2. HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN MANHOLE SHALL HAVE 6 IN. MIN. CLEARANCE. SEE FIG. 7-011, "MANHOLE DETAILS."
3. MANHOLE RINGS AND COVERS SHALL BE IN ACCORDANCE WITH SEC. 7.05 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.
4. ALL PRECAST CONCRETE SHALL BE CLASS 4000.
5. FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS, AND TOP SLABS, SEE FIG, 7-011, "MANHOLE DETAILS."
6. NOT FOR USE IN TRAFFIC BEARING AREAS.

FIGURE 7.11 - MANHOLE DETAILS

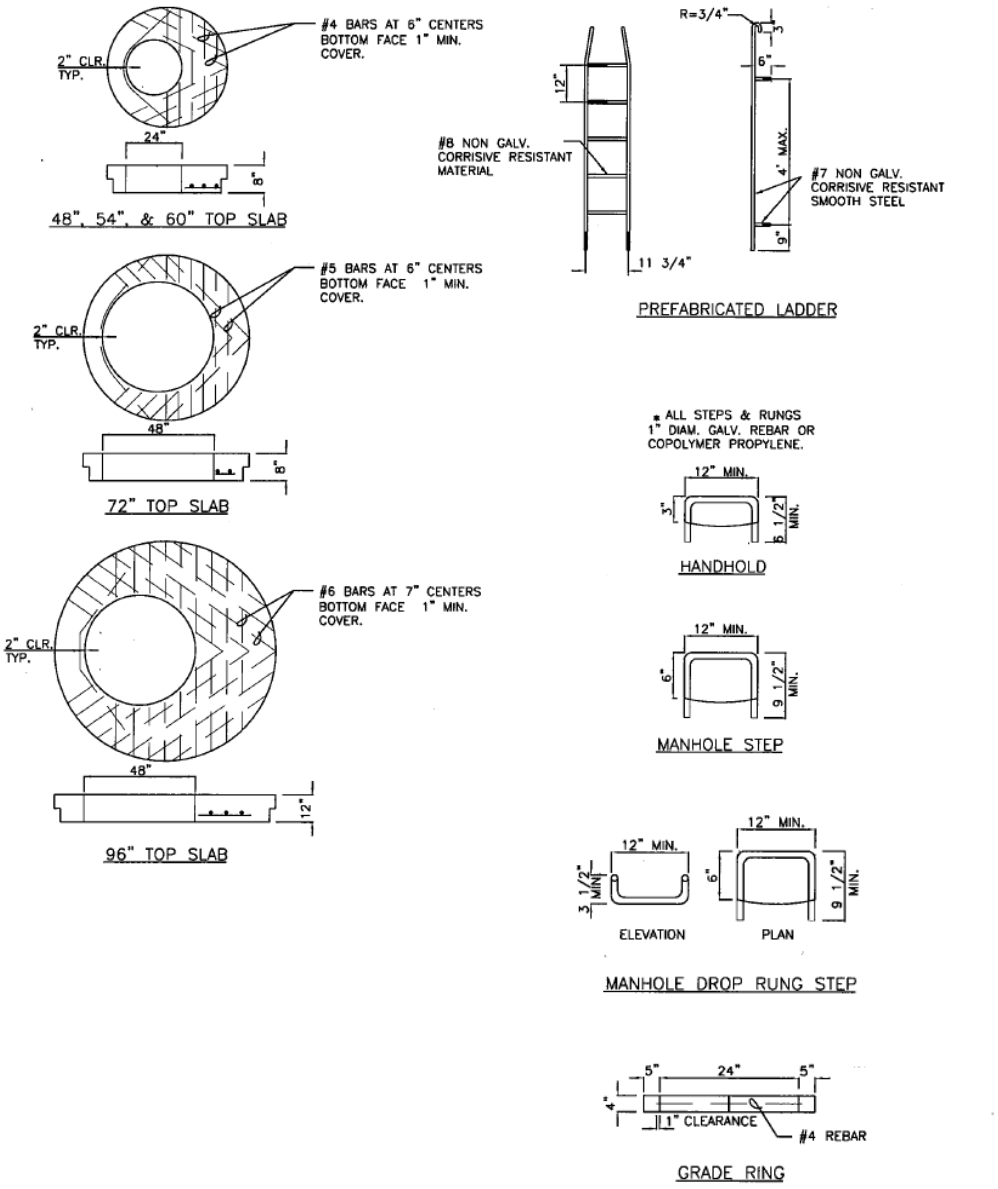


FIG 7.11

NOTES:

1. PROPRIETARY MANHOLE HANDHOLDS AND STEPS ARE ACCEPTABLE, PROVIDED THAT THEY CONFORM TO SEC. R ASTM C478, AASHTO M-199 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 CATCH BASIN SHALL BE SIMILAR. PENETRATION OF OUTER WALL BY A LEG IS PROHIBITED.
3. HANDHOLDS AND STEPS SHALL HAVE “DROP” RUNGS OR PROTUBERANCES TO PREVENT SIDEWAYS SLIP.
4. LADDERS OR STEPS SHALL EXTEND TO WITHIN 16 IN. 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.

FIGURE 7.12 - CURB INLET

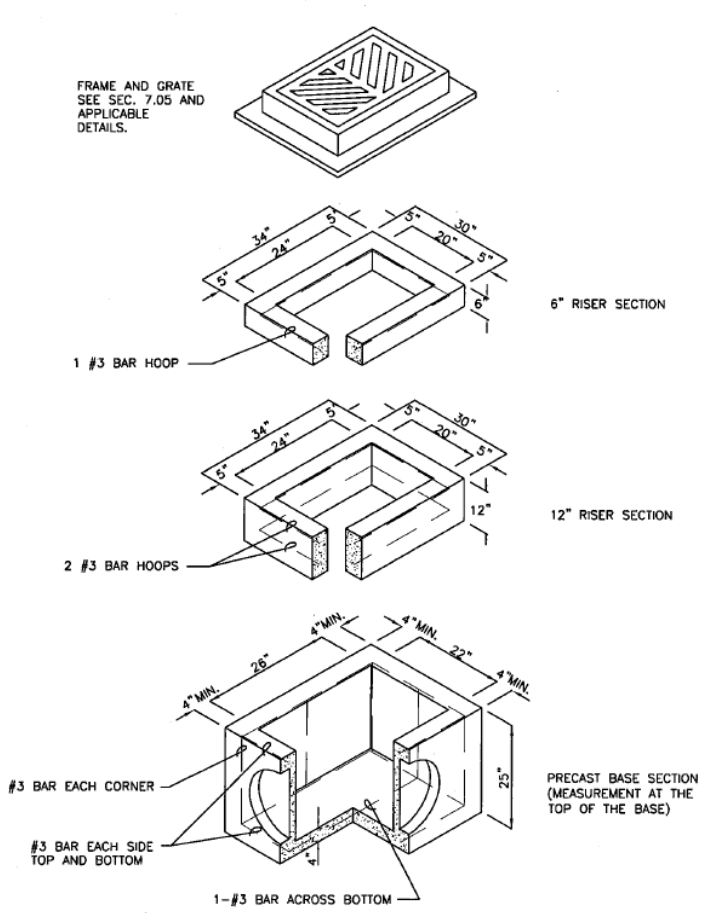


FIG 7.12

NOTES:

1. CURB INLET TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 & C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.
2. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQ. IN. PER FT. MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497. 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 IN. MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT IN TACT.
5. KNOCKOUT OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS CURB INLET WALL THICKNESS.
6. ROUND KNOCKOUTS MAY BE ON ALL 4 SIDES WITH MAX. DIAM. OF 17 IN.
7. THE MAX. DEPTH FROM FINISHED GRADE TO PIPE INVERT SHALL BE 5 FT.
8. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED ½" PER FOOT.
9. CONCRETE INLET FRAME AND GRATES 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.

FIGURE 7.13 - STANDARD GRATE

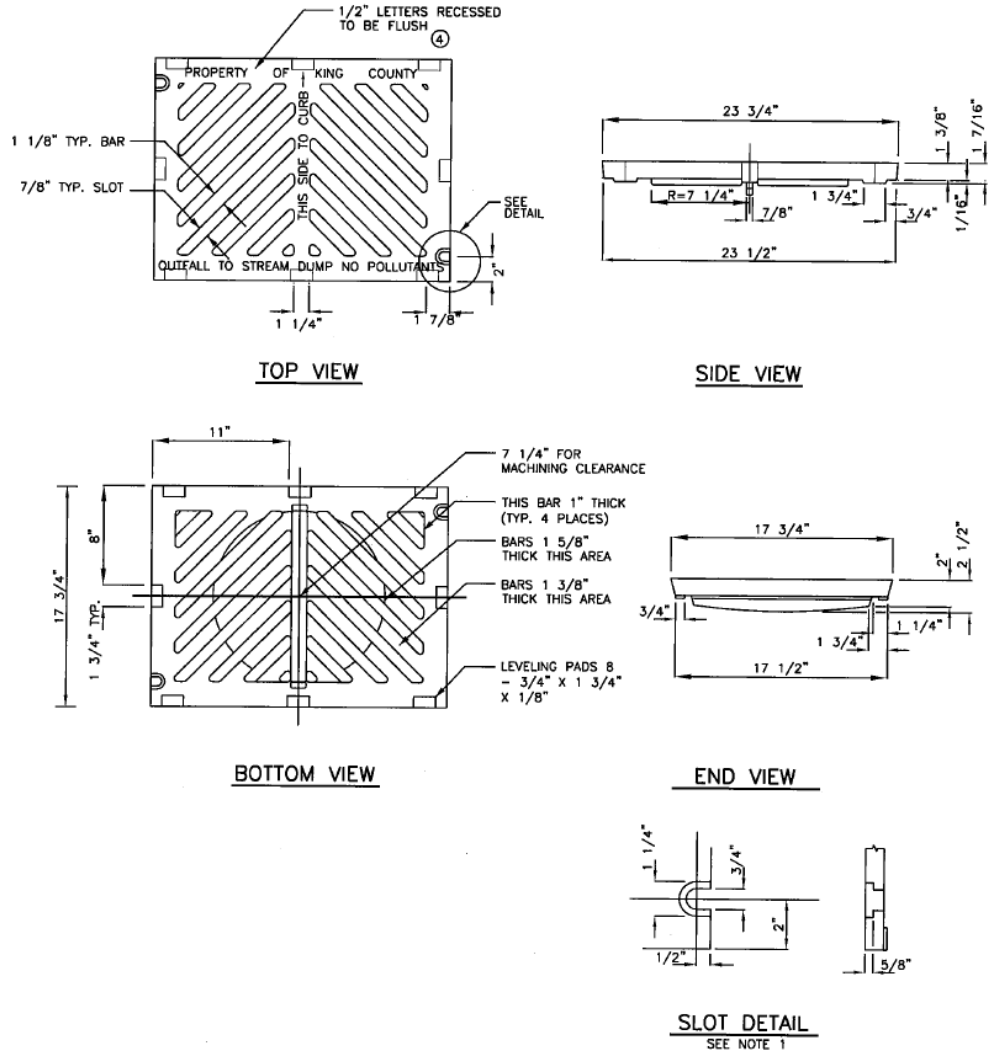


FIG 7.13

NOTES:

1. SLOT FORMED AND RECESSED FOR 5/8 IN. – 11 NC X 2 IN. SOCKET HEAD (ALLEN HEAD) CAP SCREW.
2. GRATE SHALL BE CAST IRON PER ASTM A48 CLASS 30 UNLESS OTHERWISE SPECIFIED.
3. SEE SEC. 7.05.
4. THE WORDS “PROPERTY OF KING COUNTY” SHALL BE OMITTED IF GRATE IS ON PRIVATE SYSTEM.
5. GRATES SHALL BE MIN. 32 IN. CLEAR OF WHERE WHEELCHAIR RAMPS ARE FLUSH WITH PAVEMENT.

FIGURE 7.14 - STANDARD FRAME WITH VERTICAL OR EXTRUDED CURB INSTALLATION

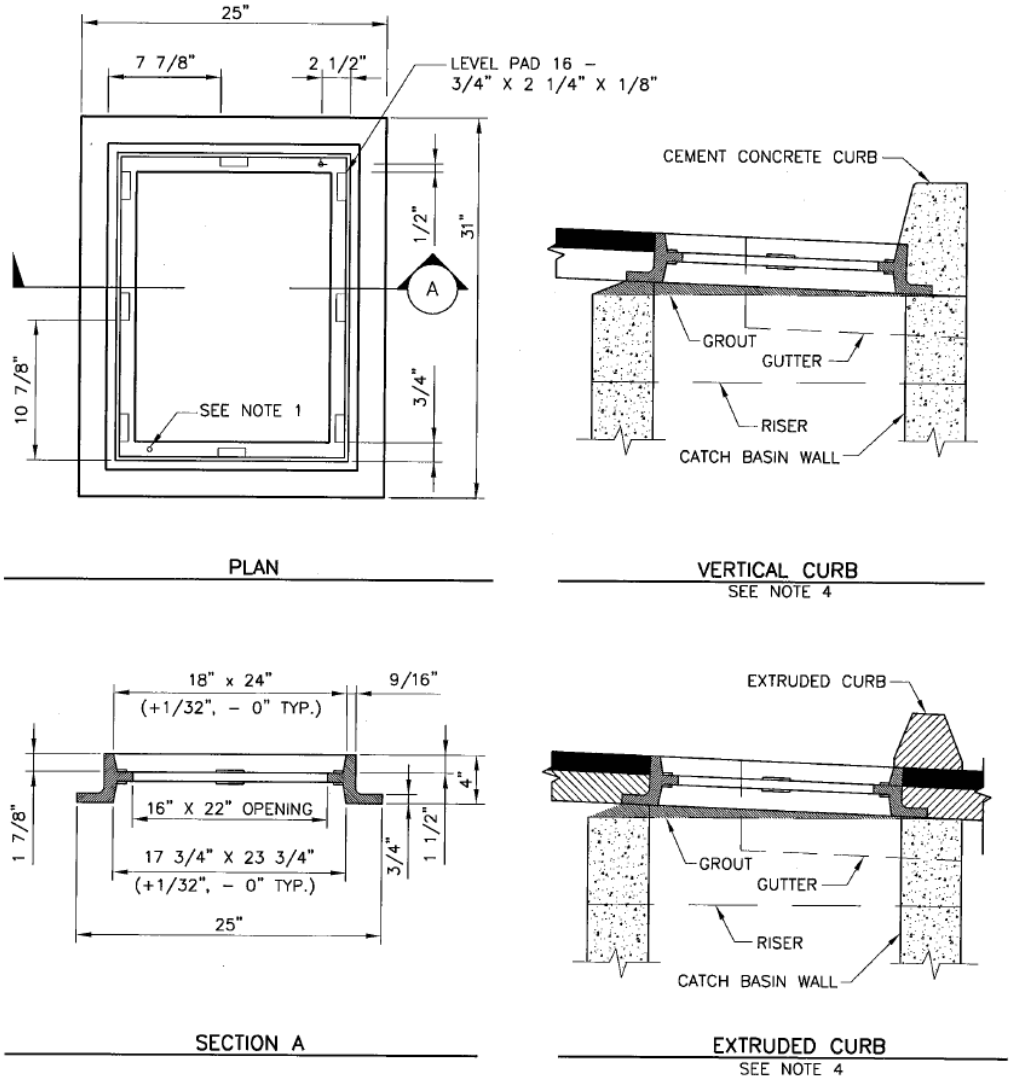


FIG 7.14

NOTES:

1. DRILL AND TAP FOR, AND PROVIDE, TWO LOCKING BOLTS 5/8 IN. – 11 NC STAINLESS TYPE 304 STEEL SOCKET (ALLEN HEAD) CAP SCREWS 2 IN. LONG WHEN USED SOLID COVER (FIG. 7-015) OR WHEN SPECIFIED BY ENGINEER.
2. FRAME MATERIAL IS DUCTILE IRON PER ASTM A48 CLASS 30.
3. SET FRAME TO GRADE AND CONSTRUCT ROAD AND GUTTER TO BE FLUSH WITH FRAME.
4. SEE SEC. 7.05.

FIGURE 7.15 - SOLID COVER

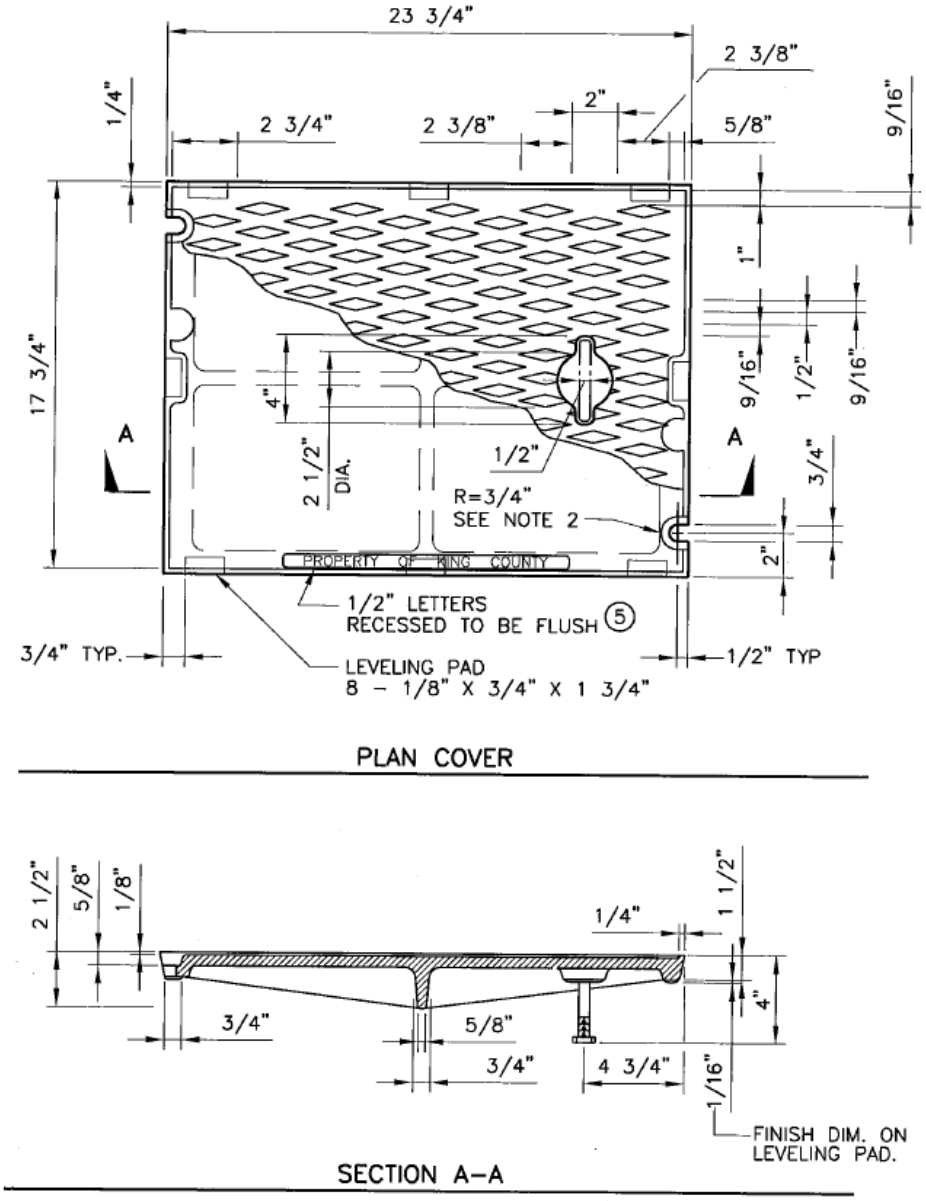


FIG 7.15

NOTES:

1. USE FRAME (FIG. 7-104) DRILLED AND TAPED FOR LOCKING BOLTS
2. USE WITH TWO LOCKING BOLTS 5/8 IN. AND 11 NC STAINLESS STEEL. TYPE 304 STEET SOCKET HEAD (ALLEN HEAD) CAP CREWES. MIN. 2 IN. LONG.
3. MATERIAL CAST IN IRON PER ASTM A48 CLASS 30
4. SEE SEC 3.08

FIGURE 7.16 - THROUGH-CURB INLET FRAME

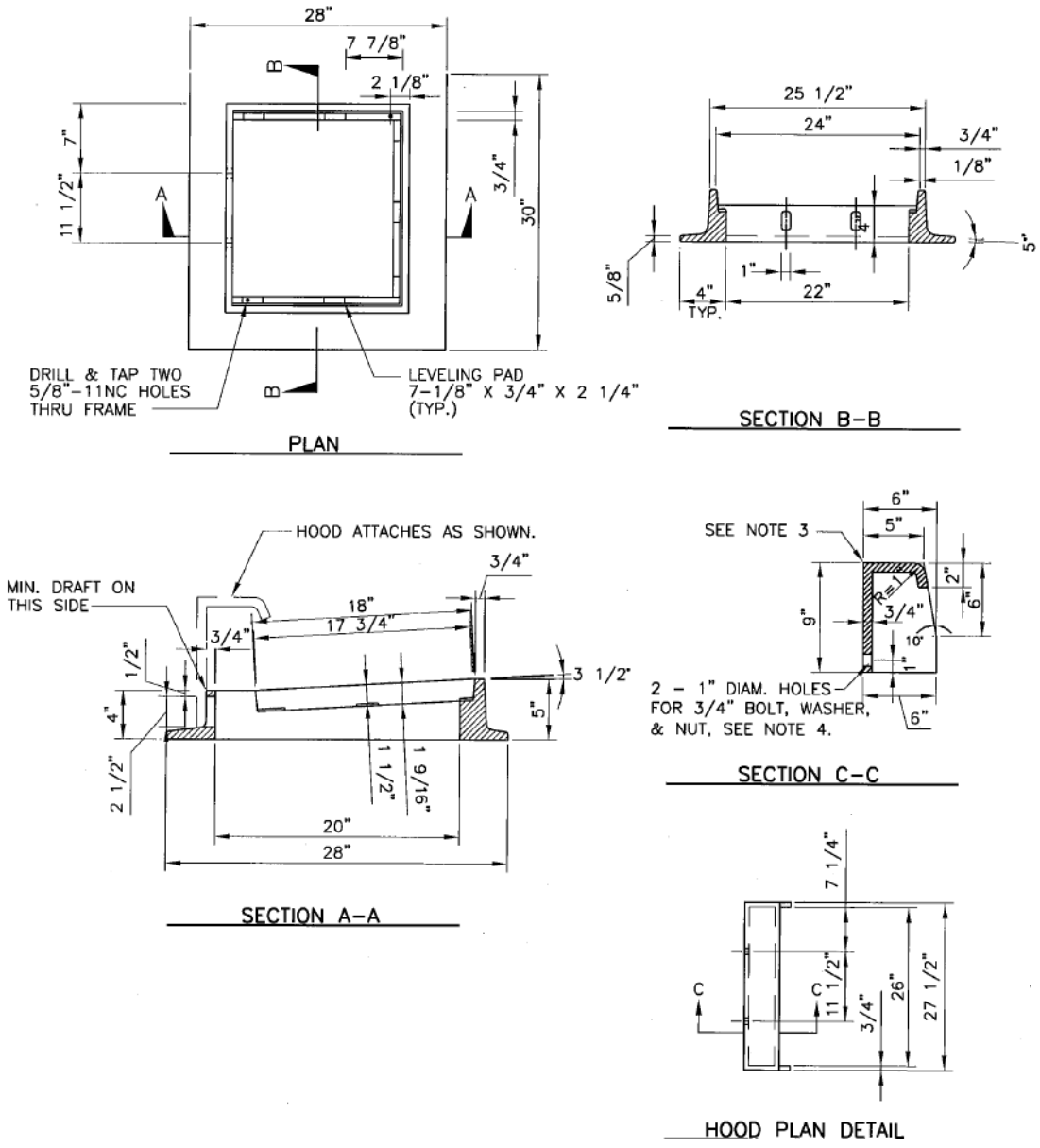


FIG 7.16

NOTES:

1. MATERIAL IS CAST IRON ASTM A48 CLASS 30.
2. SEE FIG. 7-018 FOR VANED GRATE.
3. PATTERN ON TOP SURFACE OF HOOD SHALL BE 3/16 IN. NON-SKID DIAMOND.
4. BOLT, WASHER, AND NUT SHALL BE GALVANIZED OR CORROSION RESISTANT.
5. SEE SEC. 7.05.

FIGURE 7.17 - THROUGH-CURB INLET FRAME WITH VERTICAL CURB INSTALLATION

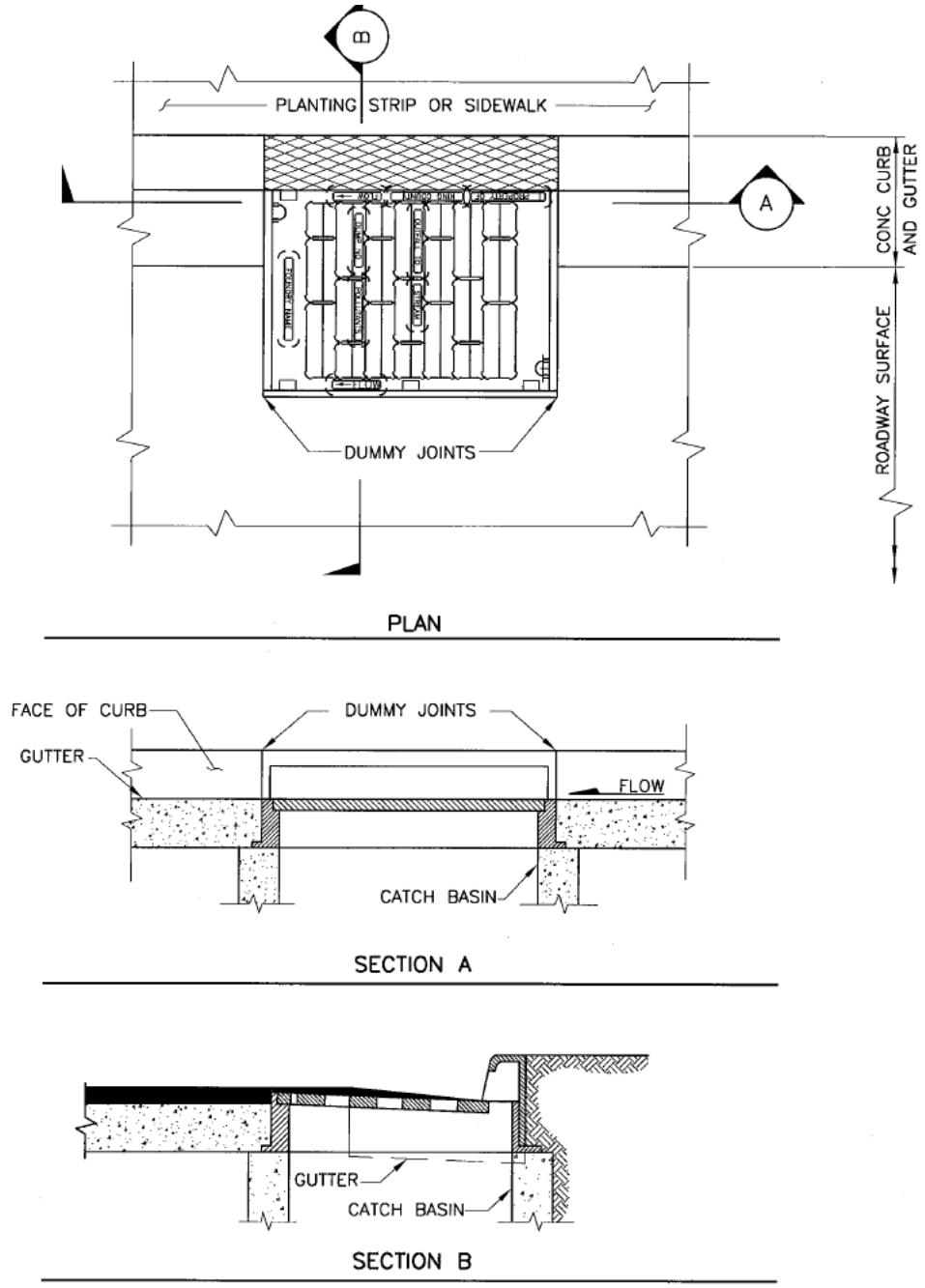


FIG 7.17

NOTES:

1. SET TO GRADE AND CONSTRUCT ROAD AND GUTTER TO BE FLUSH WITH FRAME.
2. SEE SEC. 3.04 FOR JOINT REQUIREMENTS.

FIGURE 7.18 - VANED GRATE

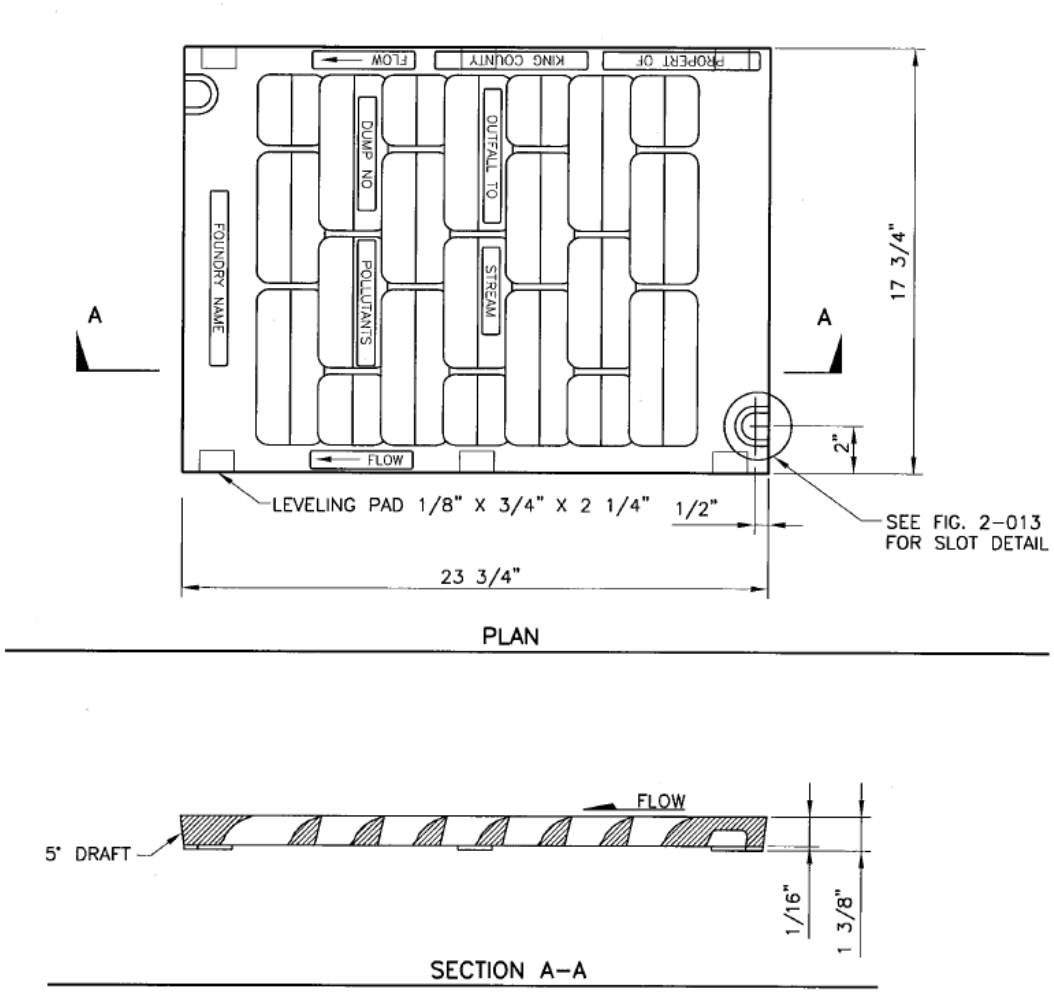


FIG 7.18

NOTES:

1. SELF-LOCK VANED GRATE MANUFACTURER SUBJECT TO APPROVAL BY ENGINEER.
2. USE WITH TWO LOCKING BOLTS 5/8 IN. -11 NC STAINLESS TYPE 304 STEEL SOCKET HEAD (ALLEN HEAD) CAP SCREWS 2 IN. 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 BORDER AREA.
5. SEE SEC. 3.08.

FIGURE 7.19 - ROLLED CURB FRAME AND GRATE

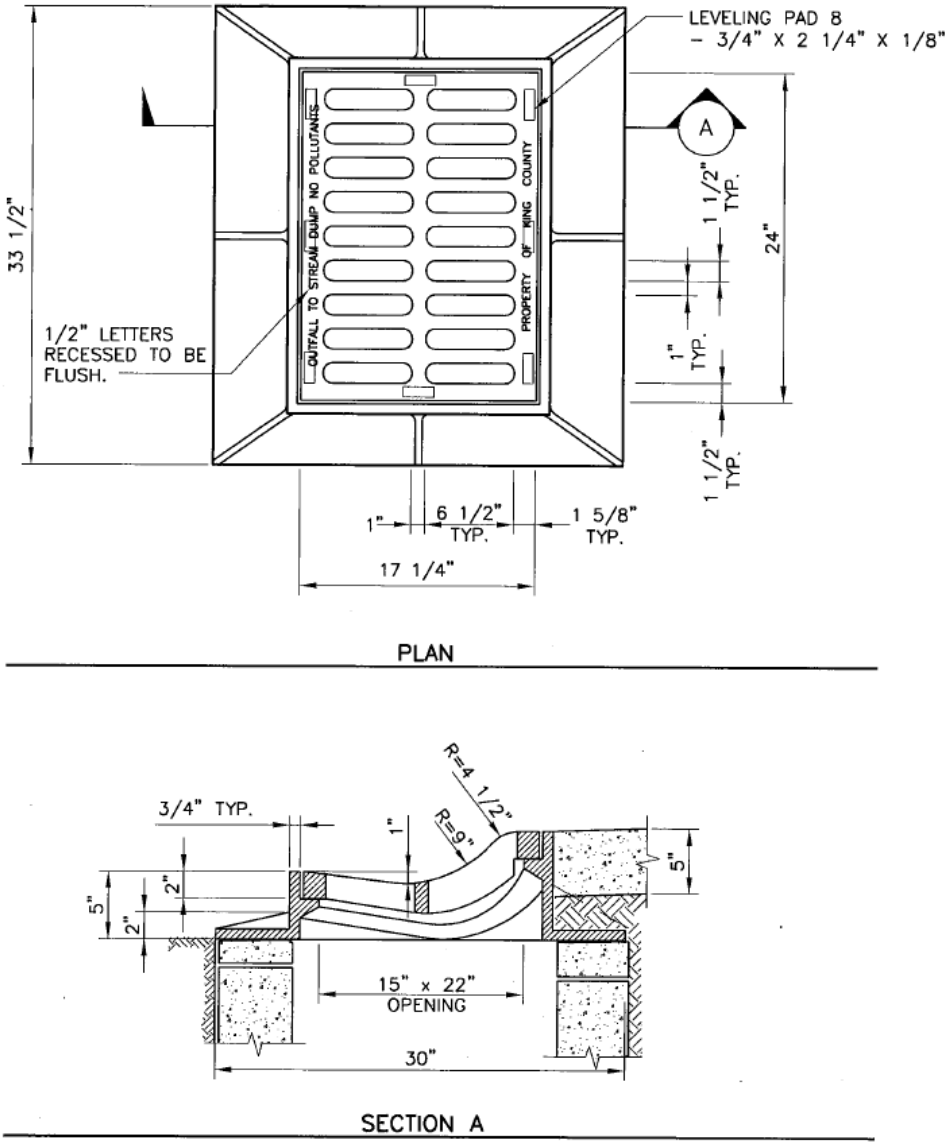


FIG 7.19

NOTES:

1. MATERIAL IS CAST IRON ASTM A48 CLASS 30.
2. SEE SEC. 7.05.
3. NOT TO BE USED ON THICKENED EDGE ROADWAYS.

FIGURE 7.20 - ROLLED CURB FRAME AND GRATE INSTALLATION

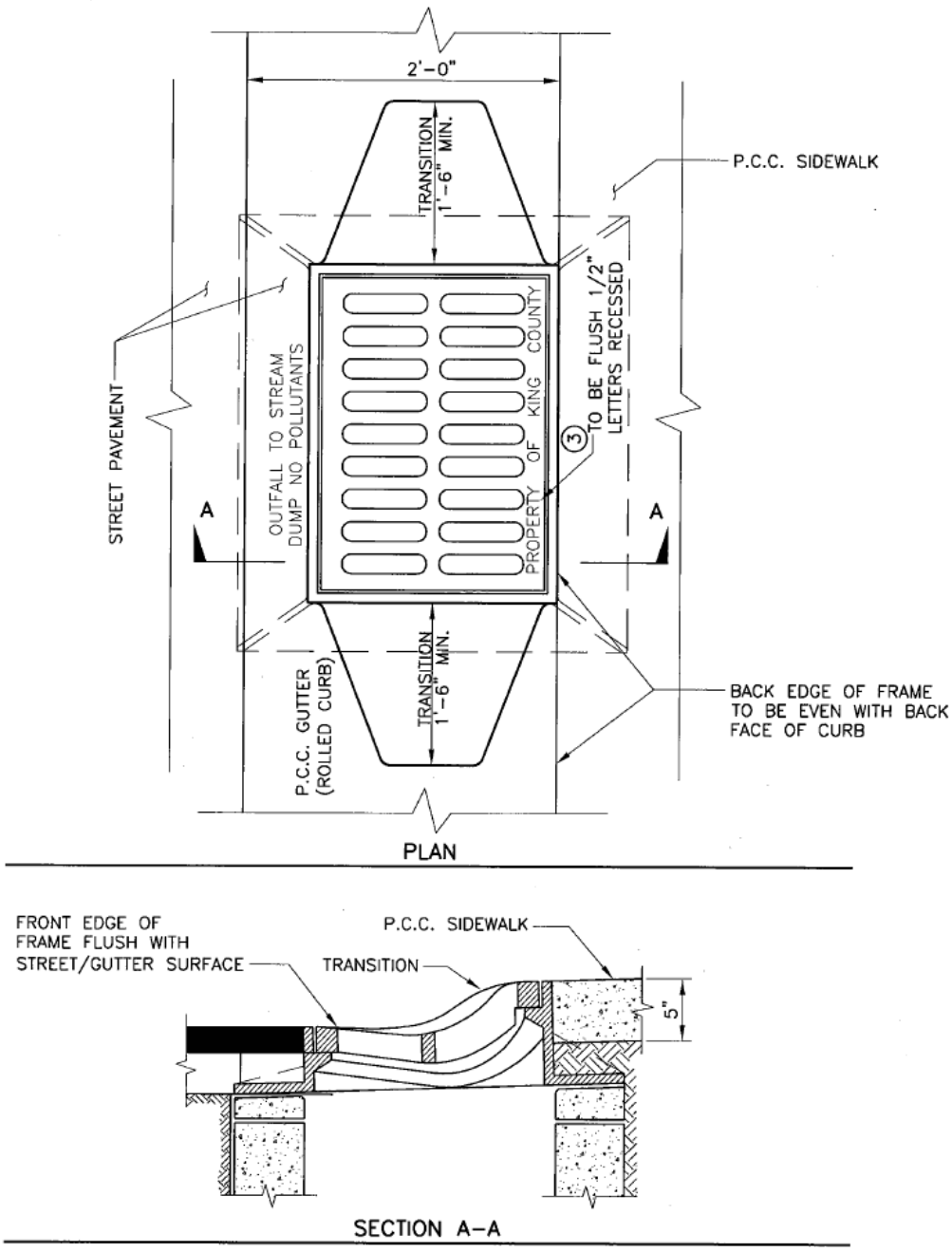


FIG 7.20

NOTES:

1. SET FRAMES TO GRADE AND CONSTRUCT ROAD AND CURB TO BE FLUSH AT FRONT AND BACK OF FRAME.
2. SEE SEC. 7.05.
3. NOT TO BE USED ON THICKENED EDGE ROADWAYS.

FIGURE 7.21 - ROLLED CURB VANED GRATE

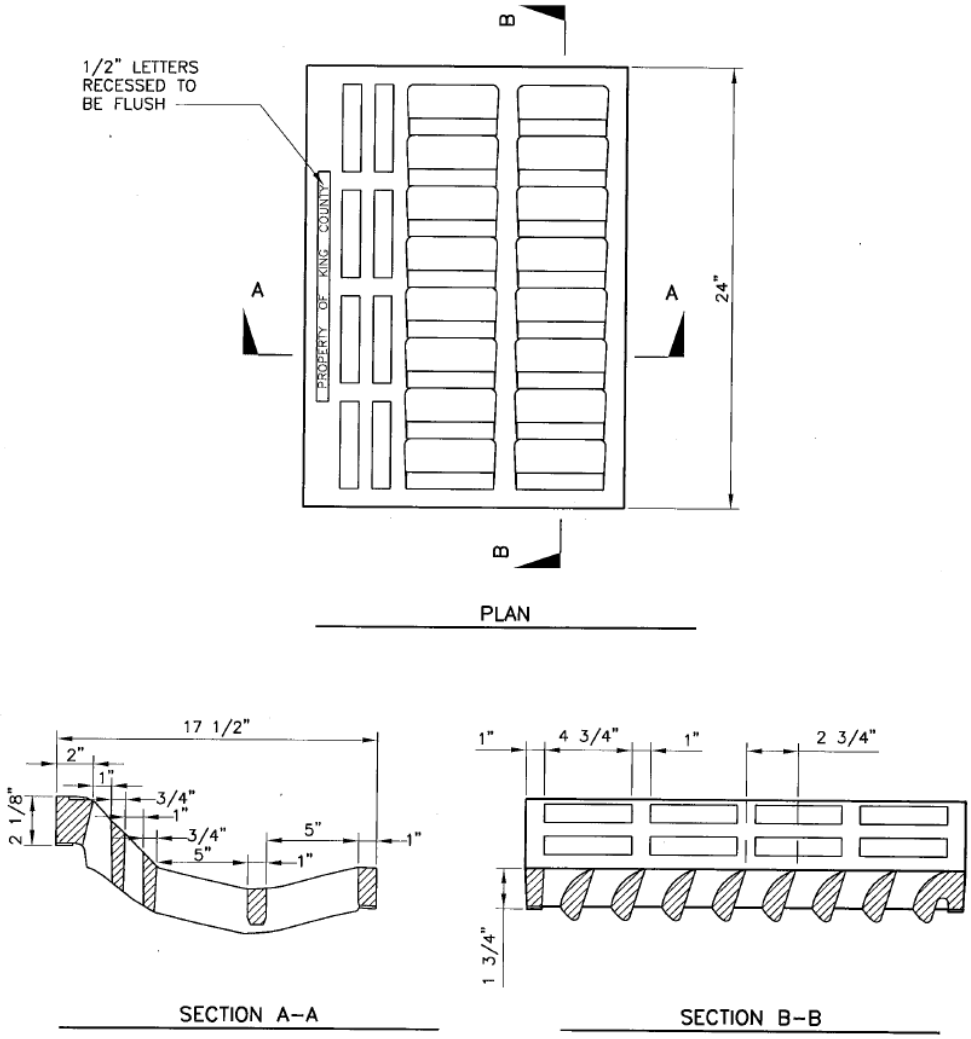


FIG 7.21

NOTES:

1. MATERIAL IS CAST IRON ASTM A48 CLASS 30.
2. SEE SEC. 7.05.
3. THE WORDS “PROPERTY OF KING COUNTY” SHALL BE OMITTED IF GRATE IS ON PRIVATE SYSTEM.

FIGURE 7.22 - LOCKING MANHOLE COVER

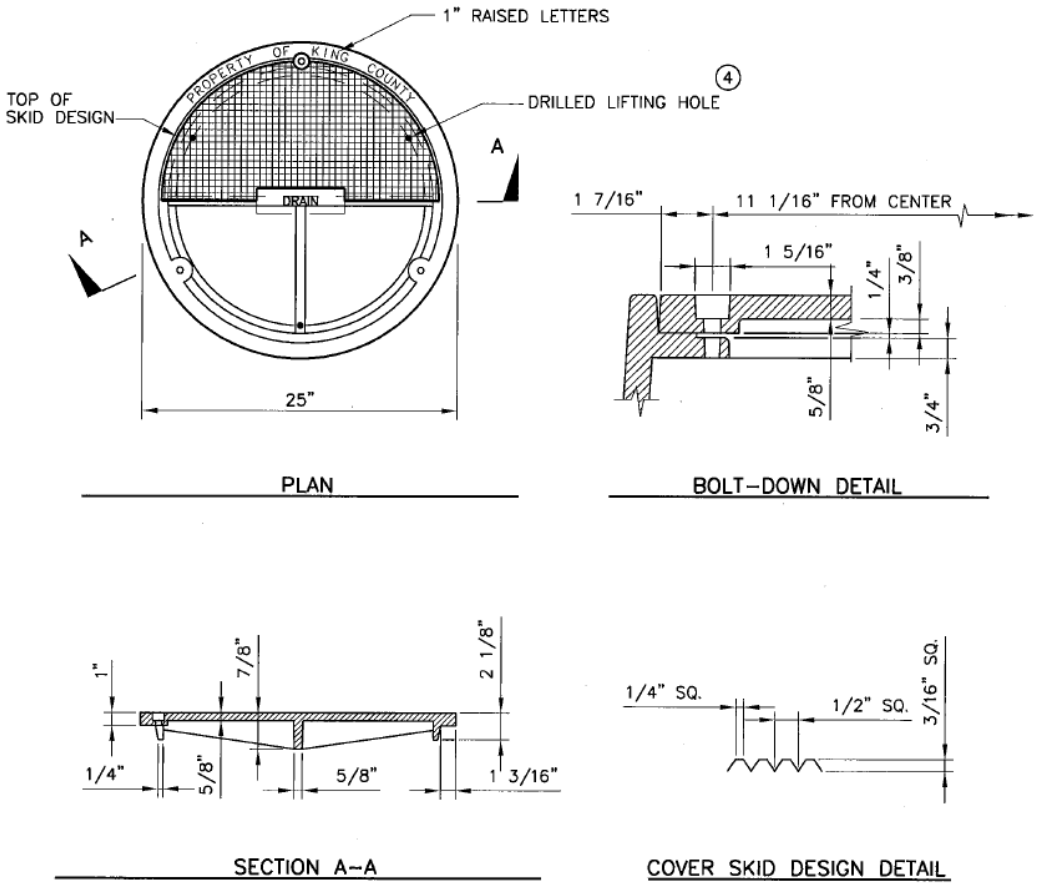


FIG 7.22

NOTES:

1. USE WITH THREE LOCKING BOLTS 5/8 IN. – 11 NC STAINLESS TYPE 304 STEEL SOCKET HEAD (ALLEN HEAD) CAP SCREWS 2 IN. LONG. DRILL HOLES SPACED 120' AT 11 1/16 IN. RADIUS.
2. MATERIAL IS DUCTILE IRON ASTM A536 GRADE 80-55-06.
3. SEE SEC. 3.08.
4. DRILL THREE 1 IN. HOLES SPACED AT 120' AND 9 ½ IN. RADIUS.

FIGURE 7.23 - LOCKING MANHOLE FRAME

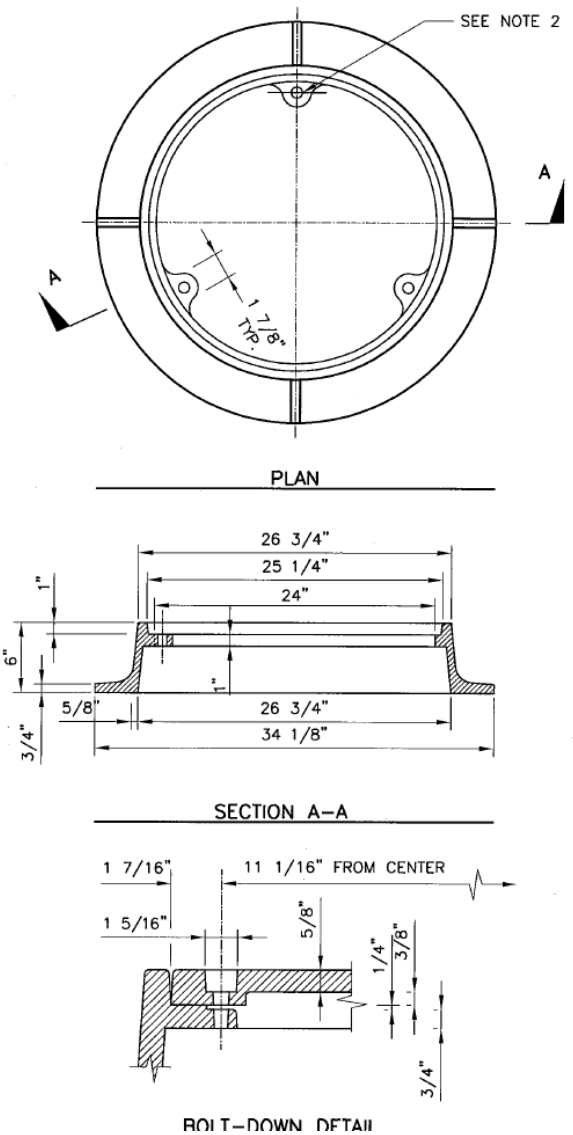


FIG 7.23

NOTES:

1. MATERIAL IS CAST IRON ASTM A48 CLASS 30.
2. DRILL AND TAP THREE 5/8 IN. -11 NC HOLES THROUGH FRAME AT 120’ AND 11 1/16 IN. RADIUS.
3. SEE SEC. 7.05.

FIGURE 7.24 - ROCK-LINED DITCHES AND CURBED SHOULDERS

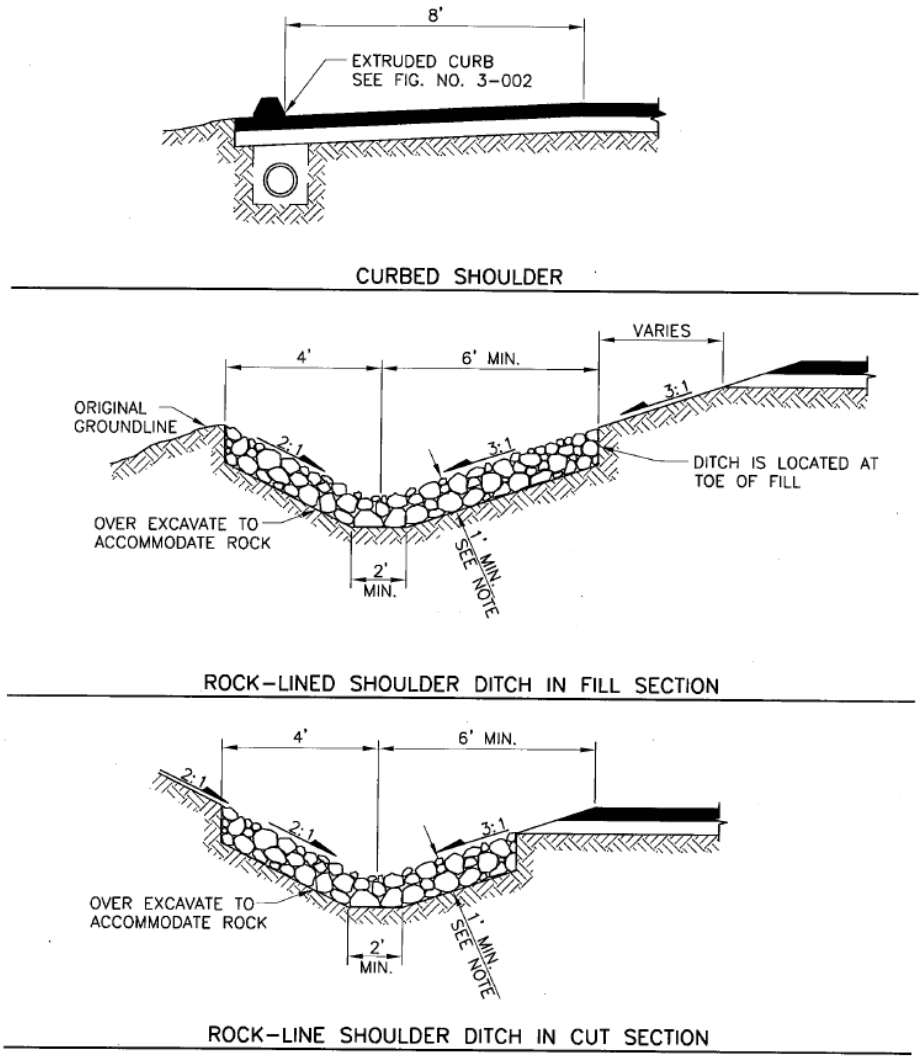


FIG 7.24

NOTES:

1. DEEPER ROCK FILL MAY BE SPECIFIED
2. SEE SEC. 7.02.

FIGURE 7.25 - RESTRICTOR DETAIL

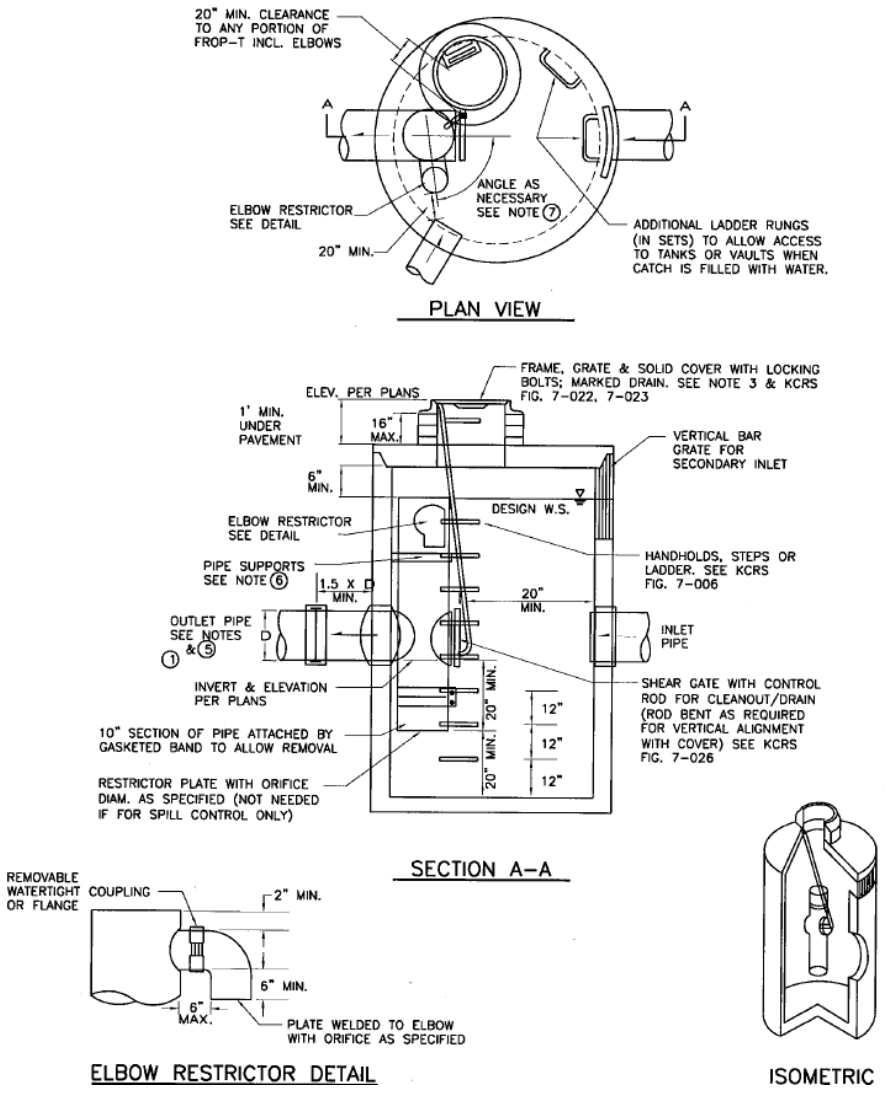


FIG 7.25

NOTES:

1. USE A MINIMUM OF A 54 IN. DIAM. TYPE 2 CATCH BASIN.
2. OUTLET CAPACITY: 100-YEAR DEVELOPED PEAK FLOW.
3. METAL PARTS: CORROSION RESISTANT, NON-GALVANIZED PARTS PREFERRED. GALVANIZED PIPE PARTS TO HAVE ASPHALT TREATMENT 1.
4. FRAME AND LADDER OR STEPS OFFSET SO:
   A: CLEANOUT GATE IS VISIBLE FROM TOP;
   B: CLIMB-DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE.
   C: FRAME IS CLEAR OF CURB.
5. IF METAL OUTLET PIPE CONNECTS TO CEMENT CONCRETE PIPE, OUTLET PIPE TO HAVE SMOOTH O.D. EQUAL TO CONCRETE PIPE I.D. LESS ¼ IN.
6. PROVIDE AT LEAST ONE 3 X 0.090 GAUGE SUPPORT BRACKET ANCHORED TO CONCRETE WALL WITH 5/8 IN. STAINLESS STEEL EXPANSION BOLTS OR EMBEDDED SUPPORTS 2 IN. INTO M/H WALL (VERTICAL SPACING).
7. LOCATE ELBOW RESTRICTOR(S) AS NECESSARY TO PROVIDE MIN. CLEARANCE AS SHOWN.
8. LOCATE ADDITIONAL LADDER RUNGS IN STRUCTURES USED AS ACCESS TO TANKS OR VAULTS TO ALLOW ACCESS WHEN CATCH BASIN IS FILLED WITH WATER.

FIGURE 7.26 - TEE SECTION SHEAR GATE DETAIL

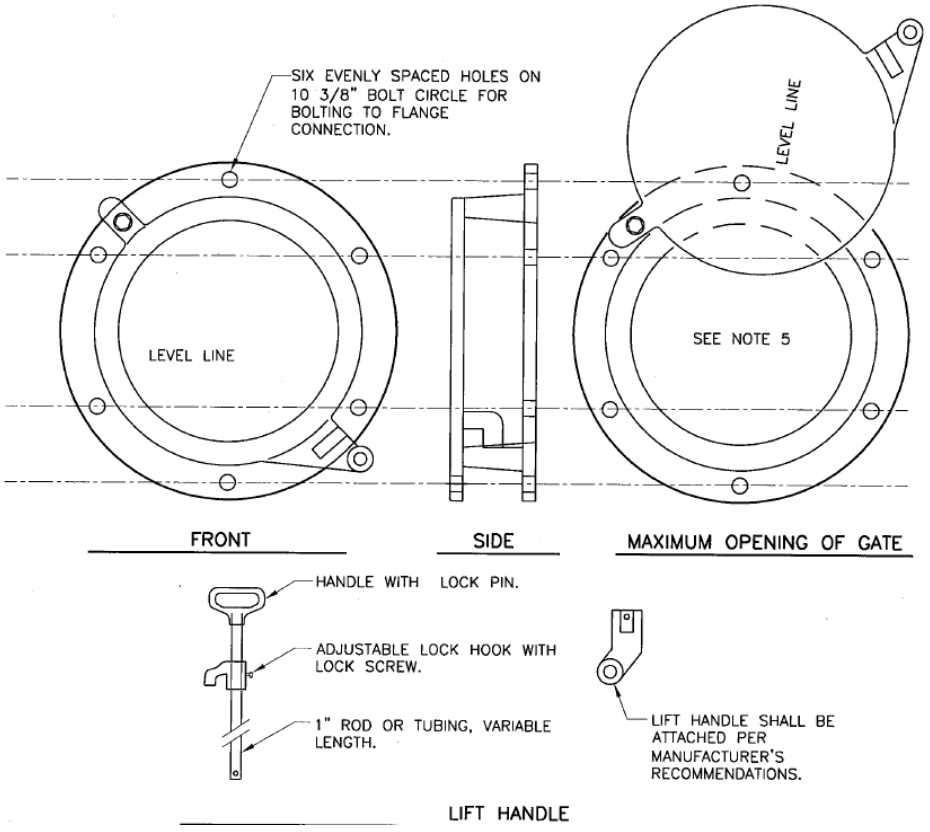


FIG 7.26

NOTES:

1. SHEAR GATE SHALL BE ALUMINUM ALLOY PER ASTM B-26-ZG-32A OR CAST IRON ASTM A48 CLASS 30B AS REQUIRED.
2. GATE SHALL BE 8 IN. DIAM. 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 MFR. WITH HANDLE EXTENDING TO WITHIN ONE FOOT OF COVER AND 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 MATCHED FOR PROPER FIT.
8. FLANGE MOUNTING BOLTS SHALL BE 3/8 IN. DIAMETER STAINLESS STEEL.
9. ALTERNATE CLEANOUT/SHEAR GATES TO THE DESIGN SHOWN ARE ACCEPTABLE, PROVIDED THEY MEET THE MATERIAL SPECIFICATIONS ABOVE AND HAVE A SIX BOLT, 10 3/8 IN. BOLT CIRCLE FOR BOLTING TO THE FLANGE CONNECTIONS.

FIGURE 7.27 - FLOW RESTRICTOR CONTROL DEVICE BAFFLE TYPE

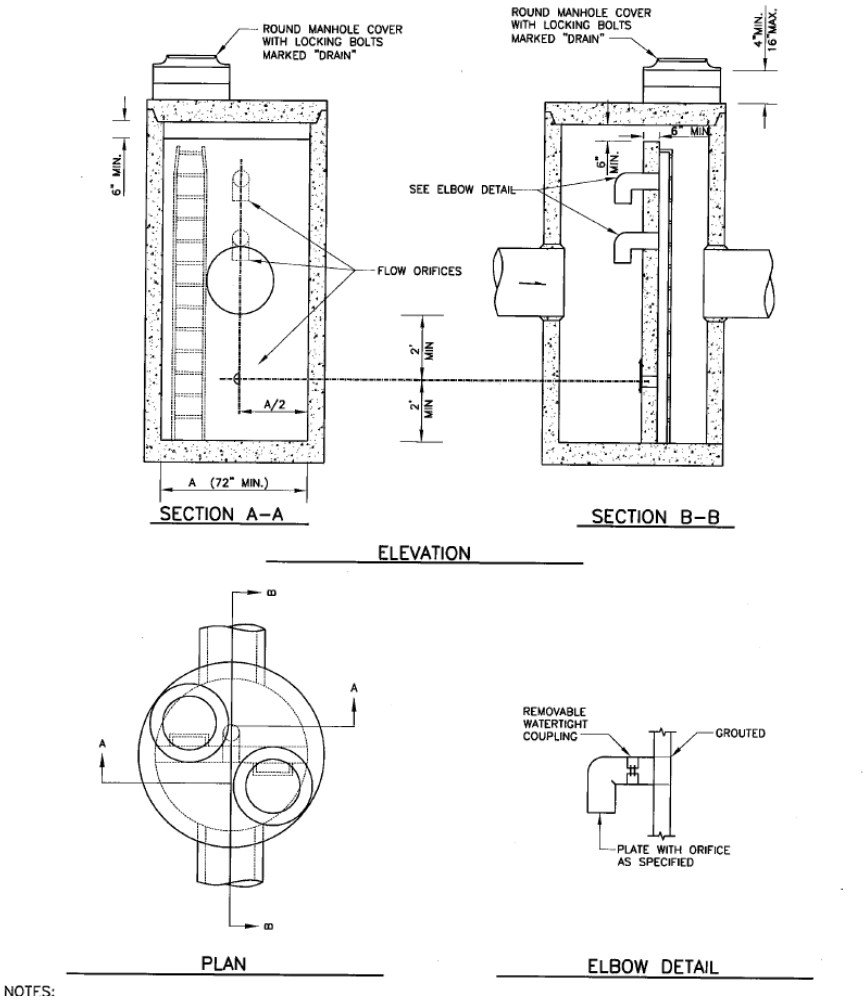


FIG 7.27

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 FIG. 7-055 AND AASHTO M199 UNLESS OTHERWISE SPECIFIED.
4. COVERS: ROUND, SOLID MARKED “DRAIN,” WITH LOCKING BOLTS. SEE FIG. 7-022 AND 7-023.
5. ORIFICES: SIZED AND LOCATED AS REQUIRED, WITH LOWEST ORIFICE MIN. 2 FT. FROM BASE.
6. BAFFLE WALL SHALL HAVE #4 BAR AT 12 IN. SPACING EACH WAY.
7. PRECAST BAFFLE WALL SHALL BE KEYED AND GROUTED IN PLACE.
8. BOTTOM ORIFICE PLATE TO BE ¼ IN. MIN. NON-GALVANIZED CORROSIVE RESISTANT MATERIAL AND ATTACHED WITH 1/2 IN. STAINLESS STEEL BOLT. OMIT ORIFICE PLATE IF ONLY FOR OIL SEPARATION.
9. UPPER FLOW ORIFICE SHALL BE ALUMINUM, ALUMINIZED STEEL OR GALVANIZED STEEL. SEE FIG. 7-025. NON GALVANIZED CORROSIVE RESISTANT MATERIAL SHALL HAVE TREATMENT 1.

FIGURE 7.28 - DEBRIS CAGE

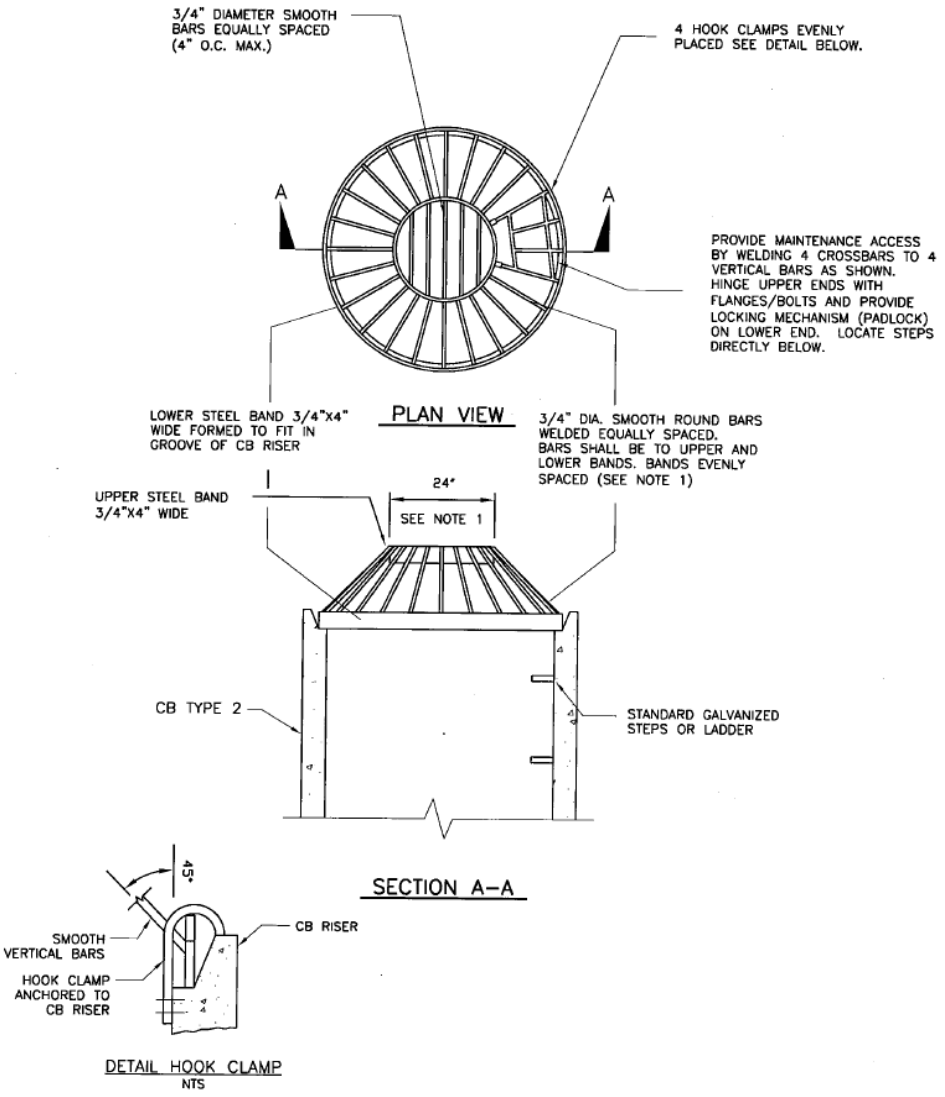


FIG 7.28

NOTES:

1. DIMENSIONS ARE FOR ILLUSTRATION ON 54 IN.DIAMETER CB. FOR DIFFERENT DIAMETER CB'S ADJUST TO MAINTAIN 45º ANGLE ON "VERTICAL" BARS AND 4 IN. O.C. MAXIMUM SPACING OF BARS AROUND LOWER STEEL BAND.
2. METAL PARKS MUST BE CORROSION RESISTANT, STEEL BARS MUST BE GALVANIZED.
3. THIS DEBRIS BARRIER IS ALSO RECOMMENDED FOR USE ON THE INLET TO ROADWAY CROSS-CULVERTS WITH HEIGHT POTENTIAL FROM DEBRIS COLLECTIONS (EXPECT TYPE 2 STREAMS.)
4. USE OF THIS STRUCTURE WITHIN THE ROAD RIGHT-OF-WAY SHALL MEET THE MINIMUM CLEAR ZONE REQUIREMENTS.

FIGURE 7.29 - EXTENDED DEBRIS CAGE

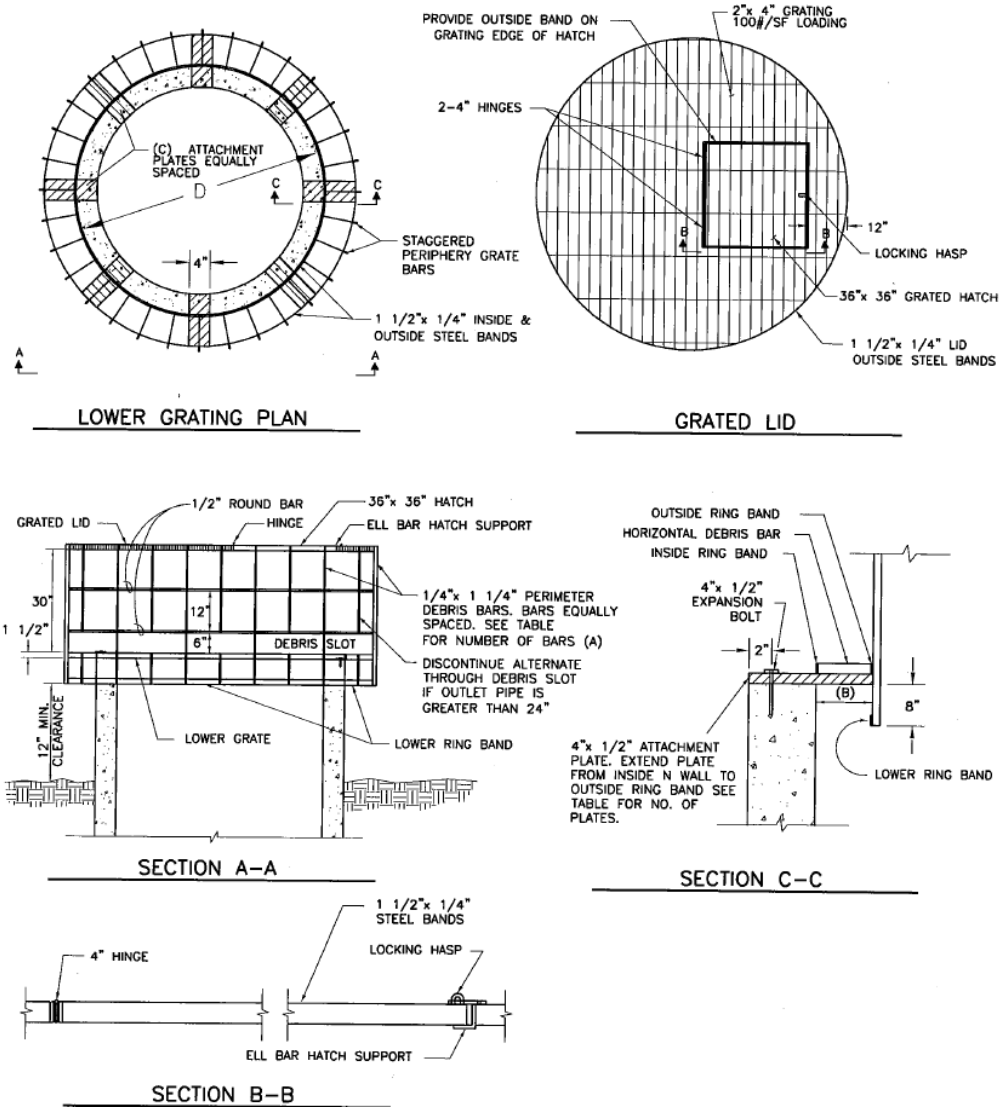


FIG 7.29

NOTES:

1. ALL PARTS OF THE CAGE SHALL BE GALVANIZED STEEL AND JOINTS WELDED. IN ADDITION WHERE SPECIFIED, DEBRIS CAGE SHALL BE SHOP PAINTED FLAT BLACK. WHERE PAINTING IS SPECIFIED PRE-TREAT GALVANIZED METAL PER MIL-D-15328 THEN FINISH WITH FLAT BLACK ETCHING PRIMER 2 MILS DRY.
2. UNLESS INDICATED OTHERWISE ALL BANDS AND BARS SHALL BE 1 ½" X ¼".
3. GRATED LID SHALL BE CONSTRUCTED TO WITHSTAND A 100 PSF LOADING.

FIGURE 7.30 – BEEHIVE GRATE

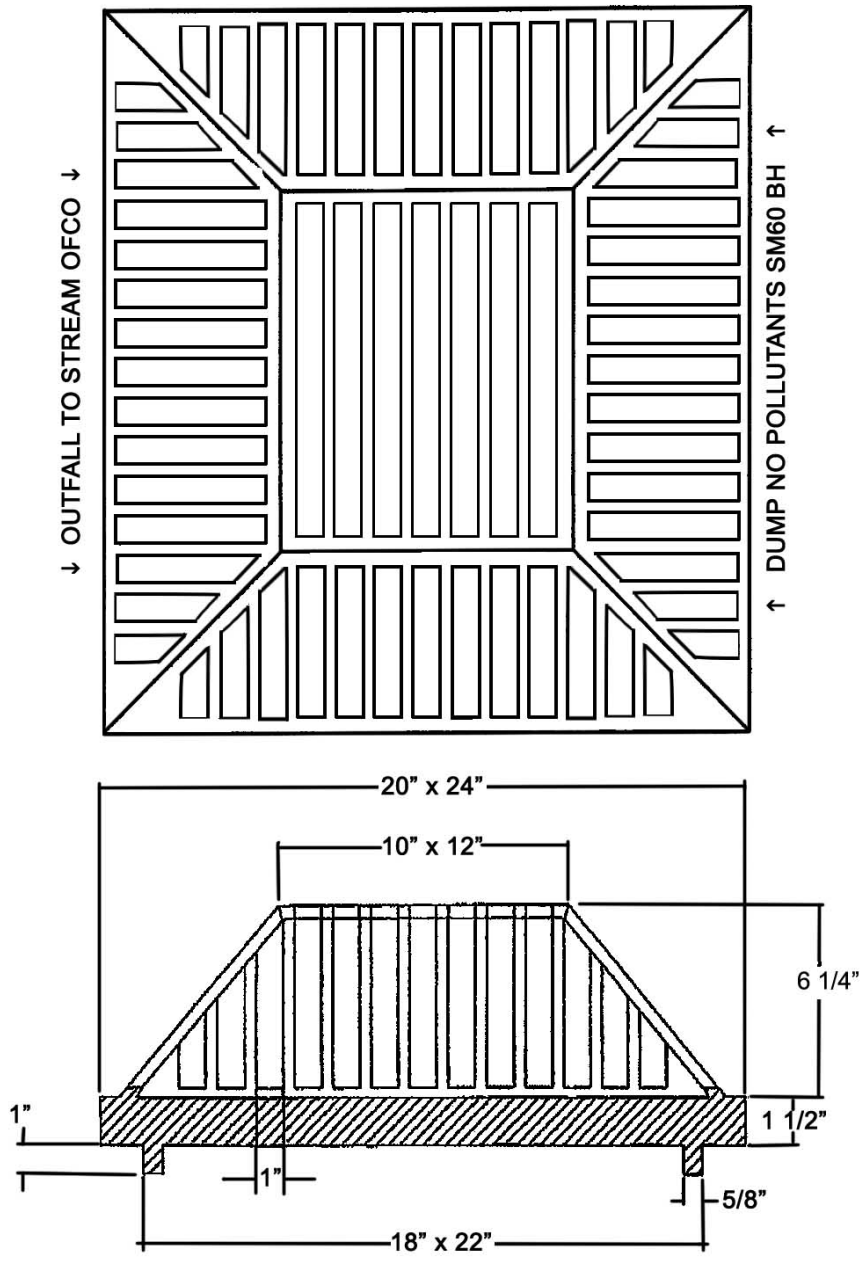
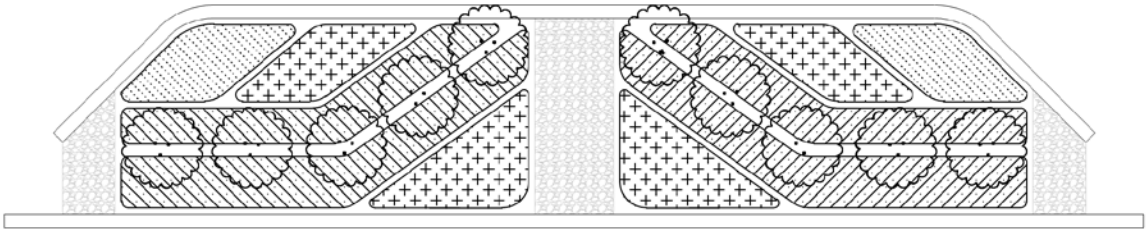


FIG 7.30

NOTES:

1. FOR USE WITH SM60 20"X24" FRAME

FIGURE 7.31 – CURB EXTENSION PLANTING TEMPLATE OPTION 1

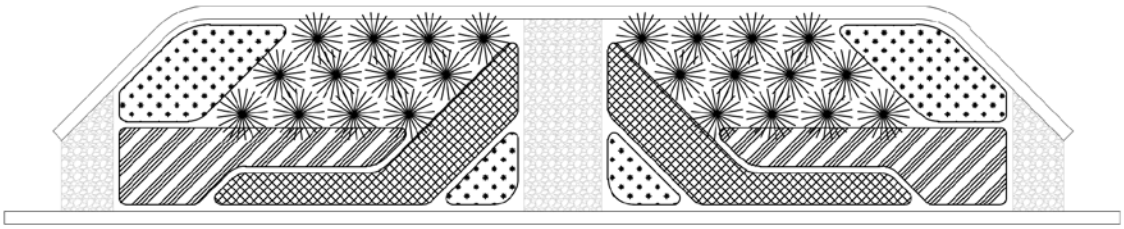


CURB EXTENSION PLANTING TEMPLATE 1

NOT TO SCALE

CURB EXTENSION PLANT TEMPLATE LIST 1	
PLANT SYMBOL	PLANT NAME
	Carex oshimensis var. 'Evergold' Variegated Japanese Sedge
	Cornus sericea var. 'Flavimera' Yellow Twig Dogwood
	Heuchera Alumroot
	Ophiopogon planiscarpos Black Mondo Grass

FIGURE 7.32 – CURB EXTENSION PLANTING TEMPLATE OPTION 2

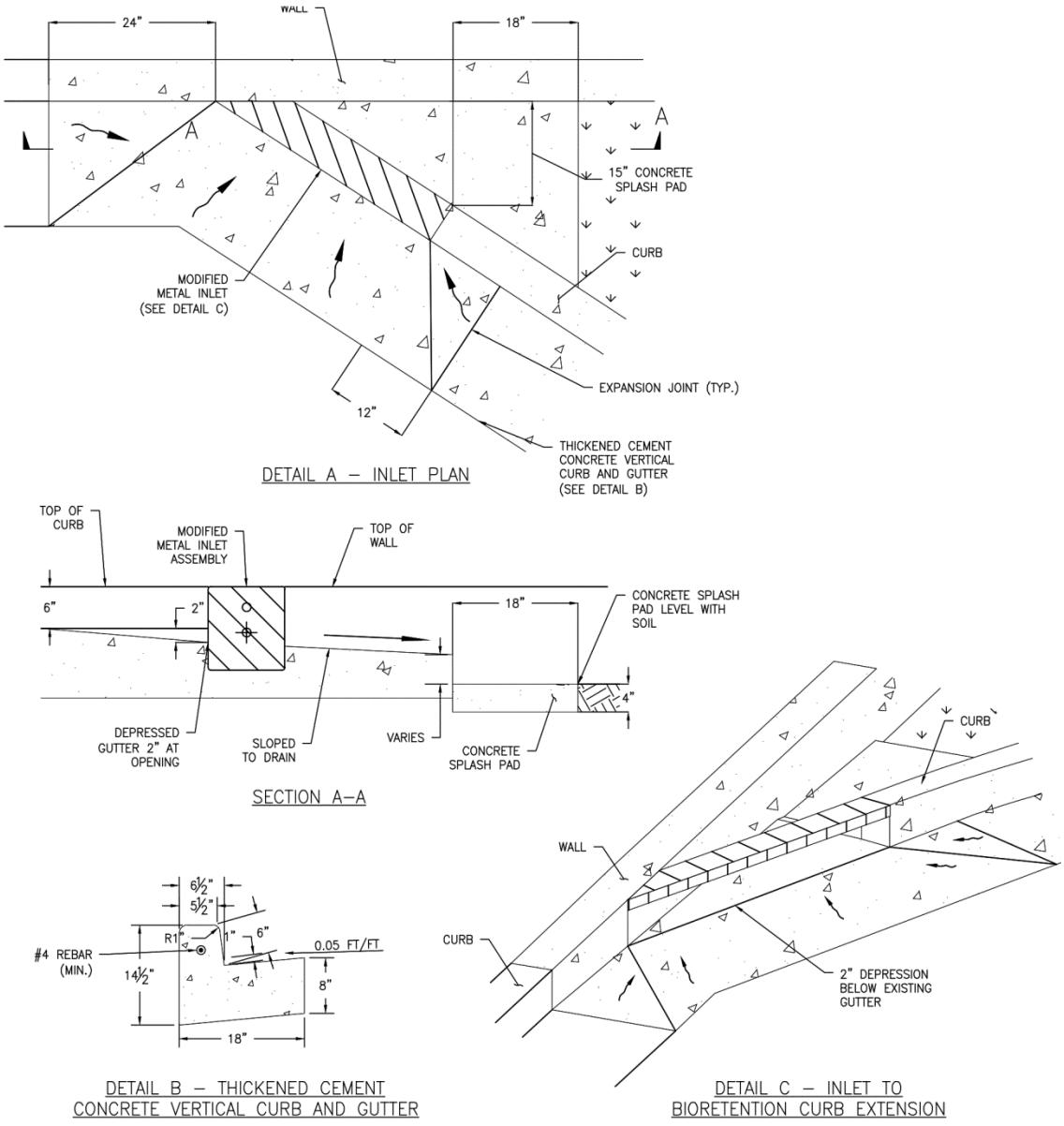


CURB EXTENSION PLANTING TEMPLATE 2

NOT TO SCALE

CURB EXTENSION PLANT TEMPLATE LIST 2	
PLANT SYMBOL	PLANT NAME
	Cammasia quamash Common cammas
	Deschampsia cespitosa Tufted hair grass
	Festuca glauca Blue Fescue
	Scirpus acutus Hardstem Bulrush

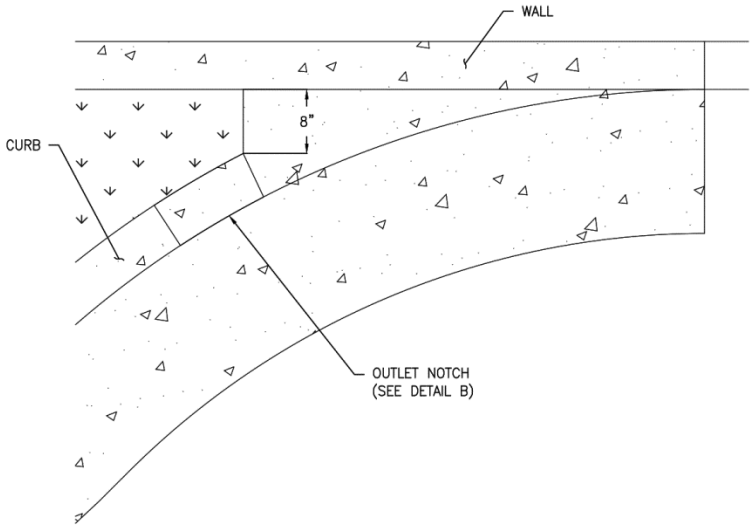
FIGURE 7.33 – INLET TO BIORETENTION CURB EXTENSION



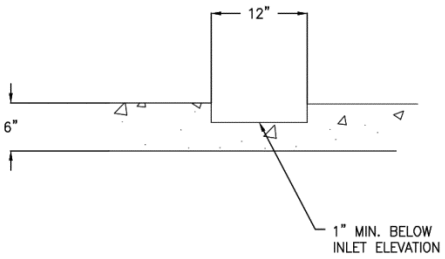
NOTES:

1. ADDITIONAL CONCRETE INLETS, CAN BE ADDED IF NECESSARY (PREFERABLY IMMEDIATELY DOWNSTREAM OF EACH CHECK DAM TO MINIMIZE POTENTIAL BACKFLOW).
2. SAWCUT BEYOND FACILITY AND TRANSITION EXISTING CURB TO NEW CURB AND GUTTER AT 1" PER FOOT AS NECESSARY.
3. INLET MAY BE MODIFIED TO MAXIMIZE FLOW ENTRY TO STORMWATER FACILITY.
4. CONCRETE SPLASH PAD REQUIRED AT ALL INLETS.
5. BOND NEW CURB AND GUTTER TO EXISTING CURB AND GUTTER WITH EPOXY AND DOWEL CONNECTION.

FIGURE 7.34 – OUTLET FROM BIORETENTION CURB EXTENSION



DETAIL A – OUTLET FROM BIORETENTION CURB EXTENSION



DETAIL B – OUTLET NOTCH SECTION VIEW

NOTES:

1. SAWCUT BEYOND FACILITY AND TRANSITION EXISTING CURB TO NEW CURB AND GUTTER AT 1" PER FOOT AS NECESSARY.
2. MODIFY INLET AND OUTLET DESIGN AS NEEDED FOR SITE.
3. ENSURE OUTLET NOTCH ELEVATION IS 2" BELOW LOWEST INLETS AND SIDEWALK NOTCHES.

FIGURE 7.35 – SIDE CURB CUT OPTION 1 – TO BIORETENTION PLANTER

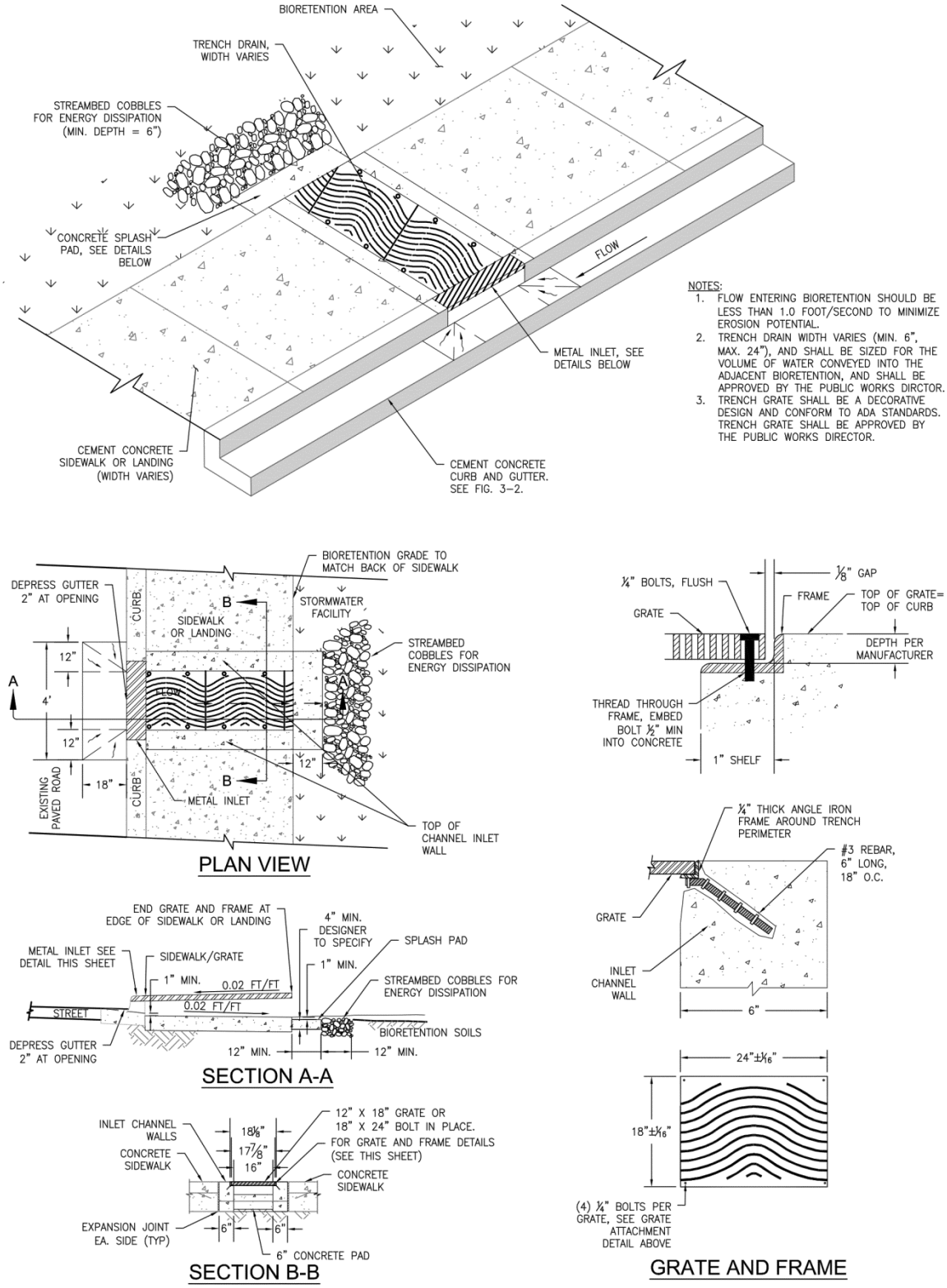
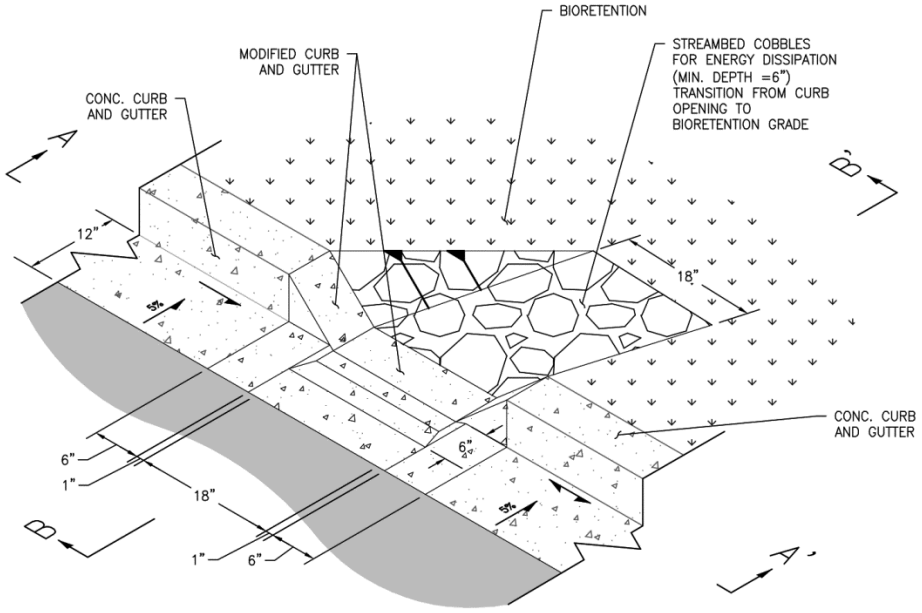
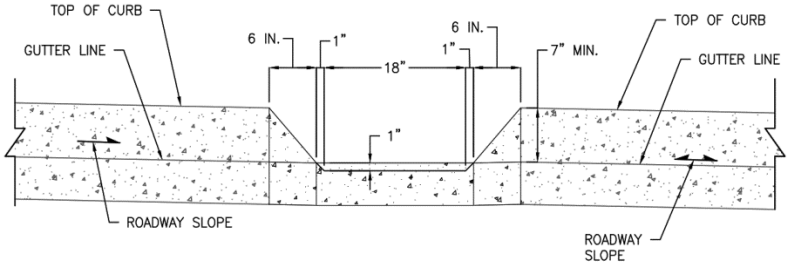
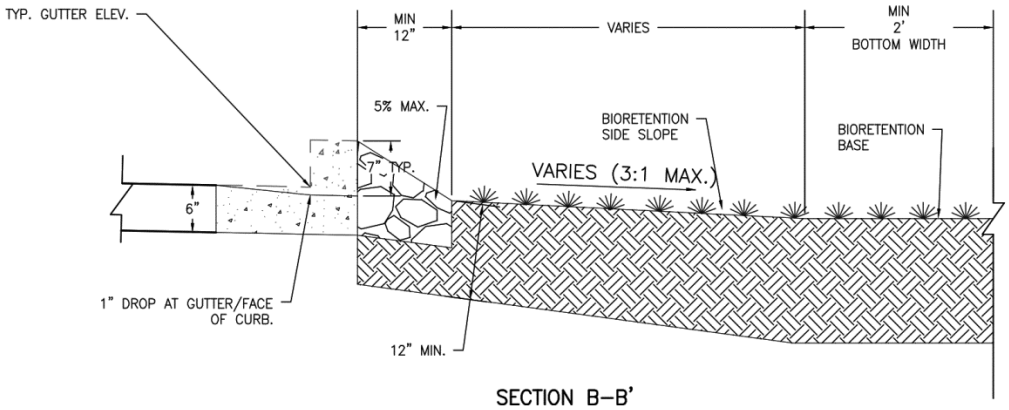


FIGURE 7.36 – SIDE CURB CUT OPTION 2 – TO BIORETENTION SWALE OR CELL





SECTION A–A'



SECTION B–B'

CHAPTER 8. UTILITIES and INSTALLATION

8.01 Franchising Policy and Permit Procedure

A. Utilities to be located within existing and proposed City road right-of-way shall be constructed in accordance with current franchise and/or permit procedure, the City's regulations, and in compliance with these Standards. In their use of the right-of-way, utilities will be given consideration in concert with the traffic-carrying requirements of the road which are, namely, to provide safe, efficient and convenient passage for motor vehicles, pedestrians, and other transportation uses. Aesthetics shall be a consideration. Underground installation of electric and telecommunication utilities will be strongly encouraged, particularly in urban development. Utilities are subject to Burien Municipal Codes and policies relating to drainage, erosion/sedimentation control and sensitive areas as set forth in KCC 9.04 and the Surface Water Design Manual.

B. All permits for new placement and replacement of existing utility poles and other utility structures above grade shall be accompanied by written certification from the utility's professional engineer or from an agent authorized by the utility to certify that the installations conform to these Standards and that the proposed work is in conformity with sound engineering principles relating to highway safety.

C. Requests for exceptions to these Standards will be processed in accordance with variance procedure as referenced in Section 1.13.

8.02 Standard Utility Locations within the Right-of-Way

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, Figs. 2.1 through 2.5, and as indicated below. Where existing utilities or storm drains are in place, new utilities shall conform to these Standards 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. Mains and service connections to all lots shall be completed prior to placing of surface materials.

A. Gas and Water Lines:

1. Shoulder-and-Ditch Section: In shoulder 3 feet from edge of traveled lane.

2. Curb and Gutter Section: Preferable: 1.5 feet back of curb, or at distance which will clear root masses of street trees if these are present or anticipated. Otherwise: In the street as close to the curb as practical without encroachment of the storm drainage system.

3. Designated Side of Centerline: GAS: South and West. WATER: North and East.

4. Depth: 36 inches minimum cover from finished grade, ditch bottom or natural ground.

B. Individual water service lines and side sewers shall:

1. Be placed with minimum 36-inch cover from finished grade, ditch bottom or natural ground.

2. Use road right-of-way only 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 replaced, shall be located on the right-of-way line immediately adjacent to the property being served, unless otherwise approved by the Public Works Director or his or her designee.

C. Sanitary Sewers: In the general case, 5 feet south and west of centerline; depth 36-inch minimum cover from finished grade, ditch bottom or natural ground.

1. Side Sewers shall be provided to all adjacent lots or parcels.

2. Side Sewers shall be placed within ten (10) degrees of perpendicular to road centerline.

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 Public Works Director or his or her designee.

E. Sanitary and water lines shall be separated 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, cable TV, fiber optic conduit: When placed underground, utilities shall with BMC 12.40.070. It is preferable that these utilities are placed underground with 36-inch minimum cover, either side of road, at plan location and depth compatible with other utilities and storm drains. Otherwise, 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 approved essential roadside obstacles may be placed within the right-of-way and shall be as far back from the traveled way or auxiliary lane as practicable. When allowed they shall be located as follows:

   a. On shoulder type or mountable curb roads, installation of new or relocated poles or obstacles shall be located behind existing ditches and in accordance with the criteria in Section 5.10 and Drawing No. 5.1. Placement of barrier between the traveled way and the pole or obstacle shall not satisfy this requirement unless the barrier already exists for other purposes and the pole provides a minimum of 3.5-foot separation from the barrier or unless allowed by an approved variance. Variances will be considered only when other reasonable alternatives do not exist.

   b. On vertical curb-type roads with a speed limit less than 40 mph, poles or obstacles shall be placed clear of sidewalks and at least 8.5-feet from face of curb in commercial/business areas and 5.5-feet from curb face in residential areas. On urban roads with speed limits of 40 miles per hour or greater, hazardous objects shall be placed as close to the right-of-way line as practicable and a minimum of 10 feet from the edge of the traveled way or edge line and in accordance with Fig. 5.1. The Public Works Director or his or her designee must approve placement of utility poles and other essential roadside obstacles structures within planter strips.

   c. Notwithstanding 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. Existing utility poles that do not comply with City standards and are struck are considered to be a hazard by the City and shall be mitigated by the utility in accordance with these Standards. Additionally, existing utility poles that comply with City standards and are struck at least two times within the same ten-year period shall be mitigated by the responsible utility in accordance with these Standards.

d. Every effort shall be made to meet the standards during emergency replacement of existing utility poles and other structures. After a pole has been replaced, all utilities sharing that pole shall have a maximum of 180 days to relocate their facilities to the new pole and remove the old pole.

2. The above constraints on pole and obstacle location will not apply to locations not accessible by moving vehicles, "breakaway" structures whose break-off resistance does not exceed that of a single 4 inches x 4 inches wood post or a 1.5-inch standard (hollow) iron pipe or to "breakaway" fire hydrants installed to manufacturer's specifications.

3. Deviations from these pole and obstacle clearance criteria will only be allowed through an approved variance when justified by suitable engineering study considering traffic safety. For franchised utility permits, the Utility may request a variance from pole and obstacle clearance criteria. 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 outside the clear zone.

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 are needed.

5. Where road uses leave insufficient overhang, anchor, and tree-trimming space for overhead utilities, additional easements and/or right-of-way may be required to accommodate the utilities. The costs associated with additional easements and/or right-of-way for this purpose shall be borne by the applicant, builder, or other party initiating the improvement. The associated cost of relocating the utility shall not be borne by The City of Burien.

H. Notwithstanding other provisions, underground systems shall be located at least 5-feet away from the road centerline. Additionally, the underground

systems shall not disturb existing survey monumentation, unless there is no reasonable alternative.

8.03 Underground Installations

All hard surface roadways shall be jacked or bored. Exceptions will be on a case-by-case basis with the expressed permission of the Public Works Director or his or her designee. The current WSDOT/APWA Standard Specifications, Sections 7.8 and particularly 7.8.3(3) will generally apply unless otherwise stated.

A. New Roadway Construction, Reconstruction and Widening

1. Cuts on traveled way

When approved, the open cut shall be a neat-line cut made by either saw cutting or jackhammering a continuous line. Trench sides shall be kept as nearly vertical as possible. Compaction and restoration must be done as detailed below and immediately after the trench is backfilled, so as to cause least disruption to traffic. The asphalt or cement pavement shall be cut a minimum of one foot beyond all edges of the trench.

2. Cuts parallel and traverse to road alignment:

a. The entire trench must meet 95 percent of the maximum density as determined by the compaction control tests described in Section 2.3.3(14)D of the WSDOT/APWA Standard Specifications regardless of trench depth, a contractor can use native mineral soil or can import a mineral soil as backfill, provided the material meets the requirements of Section 9.3.14(3) of the WSDOT/APWA Standard Specifications for Common Borrow. The material shall not contain more than three-percent organic material by weight. The material shall be mechanically compacted to a minimum of 95 percent of maximum density in lifts as described by Section 8.03.B.3a of these Standards. When the material remaining in the trench bottom is unsuitable, the excavation shall be continued to such additional depth and width as required by the Inspector. In any trench where compaction cannot be attained with the native or unclassified backfill, the trench must be backfilled and compacted with “Gravel Borrow ”that meets the requirements of WSDOT/APWA Standard Specifications, Section 9.3.14(1). The “Gravel Borrow” shall be mechanically compacted to a minimum of 95 percent of maximum density.

After backfill and compaction an immediate cold mix patch shall be placed and maintained in a manner acceptable to the Public Works Director or his or her designee. On asphalt pavement, a permanent hot mix patch the same thickness as the existing asphalt or a minimum of 2 inches, whichever is greater, shall be placed and sealed with a paving

grade asphalt within 30 calendar days. Cement concrete pavement shall be restored in accordance with Section 5.5.3(22) of the WSDOT/APWA Standard Specifications.

b. Backfill used for trenches exceeding 15 feet in depth will require a soil analysis prior to plan approval.

c. Backfill outside the roadway prism shall be excavated material free of wood waste, debris, clods and/or any rocks exceeding six-inches in any dimension and meet compaction requirements of Section 9.05 of these Standards.

d. Restoration of a trench within an asphalt pavement shall include a minimum of 6.5 inches of crushed surfacing material and HMA the same thickness as the existing asphalt pavement or a minimum of 2 inches, whichever is the greater. Pavement shall then be overlaid full width with a minimum of 1.5 inches compacted HMA. Prior to the overlay, transverse joints and vertical curb lines shall be planed in accordance with Fig. 5.21. Exceptions to this overlay requirement will be granted only through variance, subject to approval by the Public Works Director or his or her designee, after considering the pre-existing condition, damage caused by construction, and rating of the pavement. Concrete pavement shall be restored consistent with Section 5.5 of the WSDOT/APWA Standard Specifications. Any concrete pavement traffic lane affected by the trenching shall have all affected panels replaced.

B. Existing Roadways

1. Cuts on Traveled Way

All hard surface roadways shall be jacked or bored. Exceptions will be on a case-by-case basis with the expressed permission of the Public Works Director or his or her designee if it can be shown that jacking or boring are not possible due to conflicts or soil conditions, or unless the utility, including drainage structures, can be installed just prior to reconstruction or overlay of the roadway.

2. Cuts Parallel to Road Alignment:

In cuts parallel to the road alignment, the entire trench shall meet the requirements of Section 8.03A(2) of these Standards. Trench restoration shall satisfy the requirements of Section 8.03A(2)(d) when cuts occur within the traveled way. All cuts outside the traveled way that are located in paved areas shall be restored. The restoration shall include but is not limited to repairing all failures and cracking of the paved surface,

repairing failures caused by the construction activity, rebuilding the cross slope to uniformity, and overlaying the area where the pavement was removed.

3. Cuts Traverse to Road Alignment

   a. Without exception, the entire trench shall be backfilled with 1 ¼-inch minus crushed surfacing base course meeting the requirements of Section 9.3.9(3) of the WSDOT/APWA Standard Specifications. Backfill shall be placed and compacted mechanically in 6- inch lifts to 95 percent of the maximum density as determined by the compaction control tests described in Section 2.3.3(14)D of the WSDOT/APWA Standard Specifications. 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 1 foot. If the Inspector approves use of CDF, it shall meet the requirements of Section 8.03(C) of these Standards.

   b. After backfill and compaction, an immediate cold mix patch shall be placed and maintained in a manner acceptable to the Public Works Director or his or her designee. On asphalt pavement, a permanent hot mix patch the same thickness as the existing asphalt or a minimum of 2 inches, whichever is the greater, shall be placed and sealed with a paving grade asphalt within 30 calendar days. Cement concrete pavement shall be restored with an eight-sack mix, using either Type II or Type III cement, within 30 calendar days.

C. Controlled Density Backfill:

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 backfill (CDF) in a design mixture according to Section 2.9.3(1) E of WSDOT/APWA Standard Specifications. The contractor shall provide a mix design in writing and the CDF shall not be placed until the Engineer has reviewed the mix design. CDF shall meet the requirements of Section 6.3.3(5)C of the WSDOT/APWA Standard Specifications and shall be accepted based on a Certificate of Compliance. The producer shall provide a Certificate of Compliance for each truckload of control density fill. The Certificate of Compliance shall verify that the delivered material is in compliance with the mix design. Testing of CDF shall be in accordance with ASTM D4833.

Note: On crossings required to be opened to traffic, and prior to final trench restoration, steel plates shall be installed by the contractor as directed by the Public Works Director or his or her designee.

8.04 Notification and Inspection

Consistent with Section 9.02 of these Standards, any applicant, utility, or others intending to trench existing or proposed traveled City roads shall notify the City as set forth in Section 9.02 of these Standards for all work associated with a land use permit, and not less than one working day prior to beginning utility construction. This notification shall include:

1. Location of the work and application/permit number
3. 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.

Telephone number is as follows:
Land Use Inspection 206-248-5525

As set forth in Section 9.03 of these Standards, failure to notify may necessitate testing or retesting by City of Burien at the expense of the Applicant or Utility. Furthermore, the work may be suspended pending satisfactory test results.

8.05 Final Adjustment (To Finish Grade)

A. All utility covers, including drainage, 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 placing in 5-inch minimum thickness of cement concrete Class 4000 to within 2 inches of the top.

   4. Filling the remaining 2 inches with HMA 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.

8.06 Final Cleanup, Restoration of Surface Drainage and Erosion/Sediment Control

In addition to restoration of the road as described above, the responsible applicant, utility, contractor, etc., shall care for adjacent areas in compliance with Sections

1.4.11 "Final Cleanup" and 8.1 "Roadside Seeding" 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, 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 construction activity shall be cleaned out and the work site restored to a stable condition as part of site cleanup.

E. Remove all temporary erosion and sediment control materials and fencing and dispose of properly.

CHAPTER 9. CONSTRUCTION CONTROL AND INSPECTION

9.01 Basis for Control of the Work

A. Work performed in the construction or improvement of public or private roads shall be done in accordance with these Standards and approved plans and any other specifications (Section 1.07) or guidelines. It is emphasized that no work may be started until such plans are approved. Any revision to such plans shall be approved, by the Public Works Director or his or her designee before being implemented.

B. The Public Works Director or his or her designee is authorized to enforce the Standards as well as other referenced or pertinent specifications or guidelines. He/she will appoint project engineers, assistants, and inspectors as necessary to inspect the work and they will exercise such authority as the Public Works Director or his or her designee may delegate.

C. Provisions of Section 1.5 of the WSDOT/APWA Standard Specifications shall apply, with the term "Engineer" therein construed to be the Public Works Director as defined in Section 1.13.

9.02 Inspection

Generally, on all privately developed infrastructure road and drainage facility construction proposed or in progress by a private developer, control and inspection will be done by the Department of Public Works. The custodial agency, (i.e., Road Services Division and Water and Land Resources Division) performs the maintenance/defect inspections. The Public Works Director or his or her designee must approve any variances from the Standards during construction.

The applicant is ultimately responsible for quality control of construction and the assurance of meeting the standards. The Department of Public Works inspectors monitor these activities with enforcement authority when requirements are not met. All work conducted on electrical and communications systems shall be inspected by the King County Department of Transportation Electrical Inspector. The LUIS Inspector coordinates the inspections.

All materials provided by the contractor shall be subject to inspection and approval by the Public Works Director or his or her designee at any time during the progress of work until final acceptance. The contractor’s construction schedule shall include sufficient time for materials testing and any required verification by the Inspector.

The Public Works Director or his or her designee has the authority to reject defective material and suspend work that is being done improperly. The Public Works Director or his or her designee may advise the applicant or contractor of any faulty work or materials; however, failure of the Inspector to advise the applicant or contractor does not constitute acceptance or approval. At the Public

Works Director's or his or her designee's order, the applicant/contractor shall immediately remedy, remove, replace, or dispose of unauthorized or defective work or materials and bear all the costs of doing so.

All roadway and drainage infrastructures must be inspected. Subgrade inspection will not commence until density tests confirm that the compaction is in accordance with the specifications. Prior to any critical task being started the applicant/developer must schedule in advance with the Department of Public Works: At a minimum the following critical tasks require advance notification:

A. Preconstruction Conference: Three working days prior notice. Conference must precede the beginning of construction and include the applicant, contractor, design engineer, utilities, and other applicable participants. Plan approvals and permits must be in hand prior to the conference.

B. Clearing and Temporary Erosion/Sedimentation Control: One working day notice prior to initial site work involving drainage and installation of temporary erosion/sediment control. Such work to be in accordance with Section 7.06 and the approved plans.

C. Utility and Storm-Drainage Installation: One working day notice prior to trenching and placing of storm sewers and underground utilities such as sanitary, water, gas, power, telephone, and TV lines. See Section 8.03 for additional information.

D. Utility and Storm Drainage Backfill and Compaction: One working day notice before backfill and compaction of storm sewers, drainage structures, and underground utilities.

E. Subgrade Completion: One working day notice at stage that underground utilities and roadway grading are complete; to include placement of gravel base if required. Inspection to include compaction tests and certifications described in Sections 8.03 and 9.04 of these Standards and observation of the proof roll.

F. Curb and Sidewalk Forming: One working day notice to verify proper forming and preparation prior to placing concrete.

G. Curb and Sidewalk Placement: One working day notice to check placement of concrete.

H. Sidewalk Forming: One working day notice to verify forms and crushed surfacing base preparation.

I. Crushed Surfacing Placement: One working day notice to check placement and compaction of crushed surfacing base course and top course.

J. Paving: Three working days' notice in advance of paving with asphalt or Portland cement concrete.

K. Structural: Three working days' notice prior to each critical stage such as placement of foundation piling or footings, placement and assembly of major components, and completion of structure and approaches. Structural tests and

certification requirements will be as directed by the Public Works Director or his or her designee.

L. Punchlist Inspection: 15 working days prior to overall check of road or drainage project site, to include completion of paving and associated appurtenances and improvements, cleaning of drainage system, and all necessary clean-up. Prior to approval of construction work, acceptance and release of construction performance financial guarantees, the applicant/contractor shall pay any required fees, submit any required maintenance and defect financial guarantees, provide a certificate of monumentation and submit required archival quality plans (see Section 1.11), final corrected plans (as-built drawings) reflecting all minor and design plan changes of the road and drainage systems. The Public Works Director or his or her designee shall specify the number of blue-line sets as warranted by the type of improvement. Mylars and blue-line drawings shall not have shading or adhesive addition in any areas except as allowed in Section 1.10 of these Standards.

M. Final Maintenance Inspection: The final maintenance inspection is performed by the Department of Public Works 45 days prior to the end of the maintenance period. Prior to release of the maintenance financial guarantee, there shall be successful completion of the maintenance period as described in Section 1.14, replacement/repair of any failed facilities, and the payment of any outstanding fees.

9.03 Penalties for Failure to Notify and Obtain Approval

Notification by the applicant or the applicant's contractor, at the necessary time frames noted above, is essential for the City to verify, through inspection, that the work meets the standards. Failure to notify and obtain approval will result in the City requiring sampling and testing with certification by an approved private laboratory. Costs of such testing and certification shall be borne by the applicant. If the test results conclude that the unauthorized work doesn't meet the Standards, the applicant will be required to remove the unauthorized material and replace it with materials that meet the Standards at his/her own expense. At the time that such action is directed by the Public Works Director or his or her designee, further work on the development may be limited or prohibited until all directed tests have been completed, approved, and all corrections identified by the City have been made to the satisfaction of the Public Works Director or his or her designee. If necessary, the City may take further action as set forth in Burien Municipal Code Title 23, Enforcement**.**

9.04 Control of Materials

A. Source of Supply and Quality of Materials: The contractor shall notify the Public Works Director or his or her designee of proposed sources of supply for all materials to be furnished. The Public Works Director or his or her designee shall approve the source of supply of each of the materials before the delivery is started. Representative preliminary samples or test data of the

character and quality prescribed may be required to be submitted by the contractor or producer for examination by the Public Works Director or his or her designee.

Only materials conforming to the requirements of the WSDOT/APWA Standard Specifications shall be used in the work, unless otherwise approved by the Public Works Director or his or her designee. Any material proposed to be used may be inspected or tested at any time during their preparation and use. If after testing it is found that sources of supply that have been approved do not furnish a uniform product, or if the product from any approved source proved unacceptable at any time, the contractor shall furnish approved materials from other approved sources. Any approved material that becomes unfit shall not be used.

B. Samples and Tests: At the direction of the Public Works Director or his or her designee, the applicant shall direct a certified testing laboratory to conduct necessary field and/or lab tests of materials or methods. All testing shall be in accordance with WSDOT, ASTM and/or AASHTO standards. The applicant/developer shall furnish samples of all materials as requested by the Public Works Director or his or her designee. Materials shall not be used until approved.

The testing laboratory and Inspector should be present during all field tests. Regardless, the Public Works Director or his or her designee shall be furnished certified copies of the complete test reports directly from the testing laboratory.

9.05 Construction Control in Developments

The provisions of Section 2.3 of the WSDOT/APWA Standard Specifications apply in all respects to development construction unless otherwise instructed by the Public Works Director or his or her designee. The following elements are mentioned for clarification and emphasis:

A. Embankment and Cut Section Compaction: Each layer of the entire embankment shall be compacted to 95 percent of the maximum density as determined by the compaction control tests described in Section 2.3.3(14)D of the WSDOT/APWA Standard Specifications – Method C. In the top two-feet, horizontal layers shall not exceed four-inches in depth before compaction. No layer below the top two-feet shall exceed eight-inches in depth before compaction. The Contractor shall use compacting equipment approved by the Engineer. Any embankment inaccessible to large compacting equipment shall be compacted with small mechanical or vibratory compactors. Controlled Density Fill shall be used in areas that are difficult to reach with any equipment. The moisture content of the material shall not vary more than 3 percent above or below optimum determined by the tests described in Section 2.3.3(14)D.

B. Testing for In-Place Density and Moisture Content

1. Prior to placing any surfacing material on the roadway, it will be the responsibility of the applicant/contractor to provide density test reports reviewed and approved by a professional engineer and accepted by the Public Works Director or his or her designee. Optimum moisture content, maximum density, in-place density and moisture content shall be determined by methods cited in Section 2.3.3(14) D of WSDOT/APWA Standard Specifications or by other test procedures approved by the Public Works Director or his or her designee. For work to be accepted, tests must show consistent uniform density and moisture content as required by tests referenced above.

2. Compaction reports are required for all projects. The reports shall include a sketch showing the locations the tests were taken. Compaction testing shall be accomplished as backfill or embankment construction progresses. At a minimum, compaction tests are required at the following locations. Additional tests and/or shorter intervals may be required by the inspector.

    a. Embankment: In fill sections every 1,000 cubic yards or fraction thereof on each lift of fill. In cut sections, once for every 100 linear feet or 500 square yards, whichever results in a greater number of tests.

    b. Trench lines: At one hundred fifty (150) foot intervals (or between structures if less than 150 feet) and for every two (2) foot depth of material placed or as required by the Public Works Director or his or her designee.

    c. Road and shoulder subgrade: At fifty (50) foot intervals.

    d. All curb and gutter locations: At one hundred fifty (150) foot intervals, each side.

    e. Crushed Surfacing: At one hundred (100) foot intervals.

    f. All sidewalk, walkway and/or bikeway locations: At one hundred fifty (150) foot intervals, each side.

    g. Drainage structures: For every two (2) foot of backfill at each structure, unless controlled density fill is used.

    h. Hot Mix Asphalt (HMA): A minimum of five (5) density tests per 400 tons or portion thereof.

In cases where tests or frequency of testing do not meet the minimum standard, corrective action shall be taken as directed by the applicant's engineer and approved by the inspector. Retests shall show passing densities prior to placing the next lift of fill.

C. Unsuitable Foundation Excavation

The contractor shall excavate unstable natural ground before building any embankment over it. This unstable material may include peat, muck, swampland, buried logs and stumps, or other material not fit for a base. If unsuitable material is encountered, the applicant/contractor shall immediately contact the Inspector. No fill, backfill or permanent parts of a structure shall progress until authorized by the Public Works Director or his or her designee. Corrective actions may include, but are not limited to, over excavation, dewatering and/or development and approval of a special design section. The contractor shall excavate such material to the boundaries set by the Public Works Director or his or her designee.

9.06 Subgrade

In preparing the roadbed for surfacing before any paving, the requirements outlined in Sections 2.6.3(1) and 2.6.3(2) of the WSDOT/APWA Specifications shall be met. After the subgrade preparation has been completed, it shall be thoroughly checked by the applicant/contractor using a level, string line, crown board, or other means to determine that the subgrade conforms to the approved roadway section and the Standards prior to placing any surfacing material.

9.07 Traffic Control in Development Construction

A. Interim Traffic Control: The applicant/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 applicant/contractor will be required to submit a traffic control plan for approval by the Public Works Director or his or her designee prior to beginning the work. Traffic control shall follow the guidelines of Section 1.7.23 of the WSDOT/APWA Standard Specifications. All barricades, signs and flagging shall conform to the requirements of the MUTCD Manual. For more specific requirements for barricades, see Section 5.07 and Fig. No. 5.3. Signs must be legible and visible and should be removed at the end of each workday if not applicable after construction hours.

B. Temporary Road Closures and Detours: When temporary road closures cannot be avoided the applicant/contractor shall post "This Road Will Be Closed" signs a minimum of 10 days prior to the closing. The types and locations of the signs shall be shown on a detour plan. A proposal for a road closure and a detour plan must be prepared and submitted to the Department of Public Works at least 20 working days in advance, (40 calendar days if arterial) and approved prior to closing any City road. In addition, the applicant/contractor must notify, in writing, local fire, school, and law enforcement authorities, Metro transit, and any other affected persons as directed by the Public Works Director or his or her designee at least 10 days prior to closing.

C. Haul Routes: If the construction of a proposed development is determined by the Public Works Director or his or her designee to require special routing of large trucks or heavy construction equipment to prevent impacts to surrounding roads, residences or businesses, the applicant/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 Public Works Director or his or her designee 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 developer/contractor‘s traffic fails to use the designated haul route, the Public Works Director or his or her designee 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 need by the SEPA review process or by the Public Works Director or his or her designee, 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.

9.08 City Forces and City Contract Road Inspection

Road construction performed by City forces or by contract for the City will be inspected under the supervision of the Public Works Director or his or her designee.

9.09 Call Before You Dig

Builders are responsible for timely notification of utilities in advance of any construction in right-of-way or utility easements. The utility One-Call Center phone number (1-800-424-5555) should be prominently displayed on the work site.

9.10 Utility Certification

All permits for new placement and replacement of existing utilities and utility structures shall be accompanied by written certification from the utility’s professional engineer or from an agent authorized by the utility to certify that the installations conform to these Standards, and that the proposed work is in conformity with sound engineering principles relating to street and roadway safety.