City of Port Orchard
Development Guidelines

2014

Prepared by: Andrea Archer-Parsons, P.E., Assistant City Engineer
Table of Contents

Chapter 1 – Overview of City Development Guidelines ........................................................................................................ 1
  1.1 City Organization
  1.2 Site Improvements Overview
      A. Clearing and Grading Permits
      B. Right-of-Way Permit
      C. Significant Tree Retention Plan
      D. Construction Stormwater General Permit (Construction NPDES)
      E. Hydraulic Project Approval (HPA)
      F. Drainage Requirements
      G. Environmentally Sensitive Areas
      H. Shoreline Master Program
      I. State Environmental Policy Act (SEPA)
      J. Road and Driveway Standard Plans
      K. Access Requirements
      L. Bonding Requirements
      M. Record Drawing Requirements
      N. Construction Inspections

Chapter 2 – Land Development ..................................................................................................................................................... 11
  2.1 Application Procedures
      A. Subdivision Definition
      B. Site Development Definition
      C. Methods of Public Notice
  2.2 Clearing and Grading
      A. Clearing and Grading Submittal Requirements
      B. Application Documents
  2.3 Right-of-Way
  2.4 Documents and Preparation
      A. Plan Preparation and Application
      B. Standard Plan Notes
  2.5 Bond Requirements
      A. General Information
      B. Types of Bonds
      C. Performance Bonds
      D. One-Time Bond Reduction
      E. Maintenance Bonds
      F. Determining Bond Amount
      G. Bond Release
Chapter 3 – Land Development Permits ................................................................. 34
  3.1 Applications
  3.2 Tree Retention
  3.3 Critical Areas Regulations
  3.4 Shoreline Master Program
  3.5 State Environmental Policy Act (SEPA)
  3.6 Shoreline Master Program Policies & Regulations
  3.7 Building Permits and Codes
  3.8 Permits and Forms

Chapter 4 – Street Types and Geometrics .......................................................... 39
  4.1 Streets – FAQ’s
      A. What do I need to know about access and design?
      B. What do I need to know about use of the street during construction?
      C. Where can I find additional information?
  4.2 Street Classifications
      A. Function
      B. Terrain
  4.3 Street Design Criteria
      A. Public Streets
      B. Private Streets
      C. Half Streets
      D. Cul-de-sacs and Eyebrows
      E. Alleys and Private Access Tracts
      F. Intersections
      G. Maximum Grade and Grade Transitions
      H. Stopping Sight Distance (SSD)
      I. Entering Sight Distance (ESD)
      J. Medians
      K. One-Way Streets
      L. Bus Zones and Turn-Outs
      M. Intersections with State or Federal Highways
      N. Slope, Wall and Drainage Easements
      O. Access and Circulation Requirements
      P. Ingress/Egress and Utility Easements
      Q. Design Variation Request

Chapter 5 – Driveways, Sidewalks, Curbs, and Trails........................................ 56
  5.1 Overview
  5.2 General Design Guidelines
      A. Sub-grade
      B. Surfacing Material
Chapter 5 – Sidewalks

5.3 Driveways
A. New Driveways Design Details
B. Existing Driveways
C. New Commercial Driveways
D. Prohibited Driveways

5.4 Sidewalks
A. Design Guidance
B. Curb Ramps
C. Concrete Steps
D. ADA Access Ramps

5.5 Curbs and Gutters
A. Curb Overview
B. Vertical Curbs and Rolled Curbs

5.6 Expansion Joints
A. Design Guidance

5.7 Pedestrian, Bicycle, and Equestrian Trails
A. Separated Pedestrian Trail
B. Bikeways
C. Equestrian Trail Facilities
D. Asphalt Shoulder Trails

Chapter 6 – Pavement Surfacing

6.1 Overview

6.2 Streets
A. Residential Streets, Pedestrian and Bikeways
B. Requirements for Residential Streets on Poor Sub-Grade
C. Arterials and Commercial Access Streets
D. Additional Information

6.3 Materials and Lay-Down Procedures
A. Requirements

6.4 Pavement Markings, Markers and Pavement Tapers
A. Types

6.5 Driveway Surfacing
A. Exceptions

6.6 Street Widening/Adding Traveled Way to Existing Streets
A. General Requirements

6.7 Monumentation
A. Survey Monuments

6.8 Pervious Pavement
A. Permitted Applications
B. Essential Components
C. Options for the Wearing Course

Chapter 7 – Roadside Features

7.1 Overview
7.2 Side Slopes
   A. General
7.3 Street Signage
7.4 Street Trees, Landscaping and Irrigation
   A. Street Trees and Landscaping
   B. Planting Strips
   C. Existing Trees and Landscaping
   D. New Trees
7.5 Mailboxes
   A. City Engineer
   B. Port Orchard Postmaster
   C. Owners or Residents
   D. Builders or Contractors
   E. Installation Methods
7.6 Street Illumination
   A. Requirements
   B. Ownership and Maintenance
   C. General Considerations
   D. Design Standards
7.7 Street Barricades
   A. Type I or II
   B. Type III Barricades
7.8 Bollards
   A. General
7.9 Guardrail/Embankment Heights
7.10 Off-Street Parking Spaces
7.11 On-Street Parking Required
7.12 Roadside Obstacles
   A. General

Chapter 8 – Structures – Culverts, Vaults, and Walls
B. Use of Culvert Types
C. Culvert Types
8.3 Vaults
8.4 Walls
A. Terms
B. General
C. Retaining Walls
D. Rockeries or Rock Walls
E. Segmental Gravity Walls
F. Requirements for Retaining Walls, Rockeries and Rock Walls
   Located Within a Public Right of Way

Chapter 9 – Surface Water Management

9.1 Overview
9.2 Construction Stormwater General Permit
9.3 Design
   A. Design Standards
   B. Conveyance
   C. Clearing, Grading, and Erosion Control
9.4 Hydraulics
   A. Hydraulic Analysis
   B. What is the HPA Permit?
9.5 Maintenance
   A. Maintenance
   B. Clearing of Permanent Retention/Detention Areas

Chapter 10 – Franchise Utilities

10.1 Port Orchard Goals
   A. Franchise Utility Permit Specifications
10.2 Regulations
   A. Permit and Plan Submittal Requirements
10.3 Construction Schedule Coordination Requirement
   A. Construction Schedule Coordination Requirement
   B. Emergency Repair Work
   C. Construction Standards
   D. Erosion Control
   E. Traffic Control
   F. Restoration
   G. Summary

Chapter 11 – Design Standards for Water Extensions

11.1 Introduction
11.2 Water Availability
   A. General
   B. Non-Binding Water Availability
   C. Annexation

11.3 Water Main Extensions
   A. Extension Application
   B. Compliance with SEPA or NEPA
   C. Compliance with Endangered Species Act
   D. Attorney’s Fees in Disputes, Arbitration, or Litigation
   E. Administrative Procedures

11.4 Design Standards for Water Main Extension
   A. General
   B. Plans
   C. Mechanical (Water)
   D. Cross-Connection Control Regulations

11.5 Standard Specifications for Construction
   A. General
   B. Site Work
   C. Concrete
   D. Special Construction (Pipeline Casings)

Chapter 12 – Design Standards for Sanitary Sewer Extensions ........................................... 152

12.1 Introduction

12.2 Sanitary Sewer Availability
   A. General
   B. Non-Binding Sanitary Sewer Availability
   C. Binding Commitments for Sanitary Sewer Availability
   D. Annexation

12.3 Sanitary Sewer Main Extensions
   A. Extension Application
   B. Compliance with SEPA or NEPA
   C. Compliance with Endangered Species Act
   D. Attorney’s Fees in Disputes, Arbitration, or Litigation
   E. Administrative Procedures

12.4 Design Standards for Sanitary Sewer Main Extensions
   A. General
   B. Plans
   C. Sewer Piping and Fittings
   D. Sewer Pipe and Fittings Installation
   E. Test Equipment
   F. Individual Grinder Pump Equipment
   G. Pretreatment Systems
H. Generators
I. Pump Stations

12.5 Standard Specifications for Construction
A. General
B. Site Work
C. Concrete
D. Special Construction (Pipeline Casings)

Chapter 13 – Construction Control and Inspection

13.1 General
A. Call Before You Dig
B. Basis for Control of the Work

13.2 Materials
C. Control of Materials
D. Sub-Grade

13.3 Testing
A. Embankment and Cut Section Compaction
B. Density Testing

13.4 Traffic Control
A. Interim Traffic Control
B. Temporary Street Closures and Detours
C. Haul Routes

13.5 Inspections
A. Subdivision, Commercial and Right-of-Way Land Use Inspection
B. City Forces and City Contract Street Inspection
C. Penalties for Failure to Notify Land Use Inspection

13.6 Record/As-Built Drawings
A. Record Documents

Appendices

Definitions & Acronyms
Standard Forms
Current Rates
Development Agreements
Impact Fees

A
B
C
D
E
### Chapter 4 – Street Types and Geometrics

#### Principal Arterial
- Principal Arterial A – Four Lanes (with Center Lane or Median) & One Multi-Use Path ... 400
- Principal Arterial B – Four Lanes (with Center Lane or Median) & Bike Lanes ... 401
- Principal Arterial C – Two Lanes (with Center Lane or Median) & One Multi-Use Path ... 402
- Principal Arterial D – Two Lanes (with Center Lane or Median) & Bike Lanes ... 403

#### Minor Arterial
- Minor Arterial A – Four Lanes (with Center Lane or Median) & One Multi-Use Path ... 420
- Minor Arterial B – Four Lanes (with Center Lane or Median) & Bike Lanes ... 421
- Minor Arterial C – Two Lanes (with Center Lane or Median) & One Multi-Use Path ... 422
- Minor Arterial D – Two Lanes (with Center Lane or Median) & Bike Lanes ... 423
- Minor Arterial E – Two Lanes with One Multi-Use Path ... 424
- Minor Arterial F – Two Lanes with Bike Lanes ... 425

#### Collector
- Collector A – Two Lanes (with Center Lane or Median) & One Multi-Use Path ... 440
- Collector B – Two Lanes (with Center Lane or Median) & Bike Lanes ... 441
- Collector C – Two Lanes with One Multi-Use Path ... 442
- Collector D – Two Lanes with Bike Lanes ... 443

#### Local
- Local A – 2 Lanes ... 460

#### McCormick Woods
- McCormick Woods A – St. Andrews Dr. SW (Public) – Fill Sections ... 480
- McCormick Woods B – St. Andrews Dr. SE (Public) (Cut) & Hawkstone ... 481
- McCormick Woods C – 30 Foot Road Sections – Private and Public ... 482
- McCormick Woods D – 40 Foot Road Section – Public ... 483
- McCormick Woods E – McCormick West Entry & Gleneagle Connector ... 484
- McCormick Woods F – McCormick West Sub-Collector Details ... 485
- McCormick Woods G – McCormick West Local Road Minor – Loop & W/Median ... 486
- McCormick Woods H – McCormick West Local Road Minor & Local Minor Access Lane ... 487
- McCormick Woods I – McCormick West Private Access Tract ... 488
- McCormick Woods J – McCormick North Phase III – Road 1 ... 489
- McCormick Woods K – McCormick North Phase III – Roads 2 Thru 5 ... 490
Chapter 5 – Driveways, Sidewalks, Curbs, and Trails

Curb and Gutter
Curb and Gutter A – Cement Concrete Curb and Gutter ................................................................. 500
Curb and Gutter B – Cement Concrete Pedestrian Curb ............................................................... 501

Driveways
Driveways A – Entering Sight Distance ......................................................................................... 520
Driveways B – Residential Driveway .......................................................................................... 521
Driveways C – Commercial Driveway ......................................................................................... 522

Sidewalks
Sidewalks A – Cement Concrete Sidewalk .................................................................................. 540
Sidewalks B – Wheel Chair Ramps ................................................................................................ 541
Sidewalks C – Concrete Steps and Metal Handrail ..................................................................... 542

Pedestrian, Bicycle and Equestrian Trails
Pedestrian, Bicycle and Equestrian Trails A – Separated Pedestrian Trail .................................... 560
Pedestrian, Bicycle and Equestrian Trails B – Bikeways ............................................................... 561
Pedestrian, Bicycle and Equestrian Trails C – Equestrian Trail ................................................... 562

Chapter 6 – Pavement Surfacing

Typical Street Section
Typical Street Section A – Principal Arterial ............................................................................... 600
Typical Street Section B – Minor Arterial .................................................................................... 601
Typical Street Section C – Collector ............................................................................................ 602
Typical Street Section D – Local .................................................................................................. 603

Markings
Markings A – Lane Markers .......................................................................................................... 620
Markings B – Raised Pavement Lane Marking Details ................................................................. 621
Markings C – Pavement Marking Details ................................................................................... 622
Markings D – Two-Way Left Turn Lane Marking Detail .............................................................. 623
Markings E – Pavement Marking Typical Details ...................................................................... 624
Markings F – Symmetrical Left Turn Pocket Detail ...................................................................... 625
Markings G – Two-Way Left Turn to Left Turn Lane ................................................................. 626
Markings H – Typical Crosswalk Striping ................................................................. 627
Markings I – Typical Crosswalk Alignment – Arterial Collector ........................................... 628
Markings J – Typical Crosswalk Alignment – Arterial Local Access ........................................ 629
Markings K – Typical Arrows, Stop Bar and Only .................................................................... 630
Markings L – Bike Lane Symbols ........................................................................................................ 631

Driveway Surfacing
Driveway Surfacing A – Concrete Driveway ...................................................................................... 640
Driveway Surfacing B – Shoulder & Ditch Section .................................................................................. 641

Monumentation
Monumentation A – Survey Control Monument ................................................................................ 660

McCormick Woods
McCormick Woods A – St. Andrews Dr. SW (Public) – Fill Sections ................................................. 680
McCormick Woods B – St. Andrews Dr. SE (Public) (Cut) & Hawkstone ........................................... 681
McCormick Woods C – 30 Foot Road Sections – Private and Public ....................................................... 682
McCormick Woods D – 40 Foot Road Section – Public ........................................................................ 683
McCormick Woods E – McCormick West Entry & Gleneagle Connector ............................................. 684
McCormick Woods F – McCormick West Sub-Collector Details .......................................................... 685

Chapter 7 – Roadside Features
Street Sign Detail................................................................................................................................. 700

Chapter 11 – Design Standards for Water Extensions

Restoration, Taps and Blocking
Restoration, Taps and Blocking A – Separation Standards ................................................................. 1100
Restoration, Taps and Blocking B – Water Main Trench ...................................................................... 1101
Restoration, Taps and Blocking C – Wet Tap ......................................................................................... 1102
Restoration, Taps and Blocking D – Thrust Blocking ......................................................................... 1103

Fire Suppression
Fire Suppression A – Residential Fire Sprinkler Metering ................................................................ 1120
Fire Suppression B – Fire Service Connection – External DDCV/PIV/FDC ............................................ 1121

Pressure Reduction
Pressure Reduction A – Pressure Reducing Station ............................................................................... 1140
Pressure Reduction B – Service Pressure Reducing Valve .................................................................... 1141
Services
Services A – 5/8, 3/4 or 1 Inch Water Service ................................................................. 1160
Services B – 1-1/2 or 2 Inch Water Service ................................................................. 1161
Services C – Double Water Service ............................................................................. 1162
Services D – 3, 4, and 6 Inch Compound Meter Service ........................................... 1163
Services E – Double Check Backflow Assembly – Below Ground ................................ 1164
Services F – Double Check Backflow Assembly – Above Ground ................................ 1165
Services G – Double Check Backflow Assembly – In Basement .................................. 1166

System Appurtenances
System Appurtenances A – 2” Blow Off Assembly ..................................................... 1180
System Appurtenances B – Fire Hydrant Assembly ................................................... 1181
System Appurtenances C – Valve Marker and Valve Extension ............................... 1182
System Appurtenances D – Air-Vac Assembly ............................................................ 1183
System Appurtenances E – Valve Box ......................................................................... 1184

Chapter 12 – Design Standards for Sanitary Sewer Extensions

Trenches and Pipe Connections
Trenches and Pipe Connections A – Sewer Trench Detail ............................................. 1200
Trenches and Pipe Connections B – HDPE Flange Connection ................................... 1201

Manholes
Manholes A – Manhole Detail 48” ............................................................................... 1220
Manholes B – Manhole Detail 72” ............................................................................... 1221
Manholes C – Top Sections and Channelization ........................................................... 1222
Manholes D – Manhole Detail – Saddle ....................................................................... 1223
Manholes E – Manhole Detail – Ladder ....................................................................... 1224
Manholes F – Outside Drop Manhole Connection ....................................................... 1225
Manholes G – Force Main Inside Drop/Receiving Manhole ......................................... 1226
Manholes H – Force Main Drop Clip Support ............................................................... 1227

Laterals and Service Connections
Laterals and Service Connections A – Typical House Sewer Lateral ......................... 1240
Laterals and Service Connections B – Single Service Connection ............................. 1241
Laterals and Service Connections C – Double Service Connection ......................... 1242

Cleanouts
Cleanouts A – Sewer Cleanout Detail .......................................................................... 1260
Cleanouts B – Force Main Cleanout ........................................................................... 1261
Chapter 1
OVERVIEW OF CITY DEVELOPMENT GUIDELINES

Welcome to the City of Port Orchard!

The City of Port Orchard is a small city that is proud of its community heritage. We have many unique assets — families, the beach and inlet, hillsides and open space, good schools and churches, festivals, distinctive neighborhoods, and a vibrant Downtown. Perhaps, most of all, Port Orchard is fortunate to have citizens who take pride in their City and work hard to preserve and enhance its unique character and quality of life. The 2014 version of the Development Guidelines has been re-designed to provide the necessary guidance for development within the City.

The Development Guidelines were prepared to provide guidance to the Developer's and Engineers preparing plans for land development improvements within the City of Port Orchard. Engineers are assumed to use good engineering judgment and not limit their designs to minimums or maximums stated in the manual. The challenge is upon you, as a developer, to develop a project that will enhance our neighborhoods and our City.

Existing site conditions such as terrain, drainage, etc., may cause specific challenges and the engineer is advised to discuss these problems and receive approval for deviations from the City of Port Orchard prior to submittal of the preliminary plat maps and/or improvement plans. We welcome intelligent growth that furthers our vision of our city.

It is the Developer’s responsibility to check with the City of Port Orchard Public Works Office to make sure they have the latest update of the Development Guidelines.

1.1 City Organization

1.2 Site Improvements Overview

A. Clearing and Grading Permits
B. Right-of-Way Permit
C. Significant Tree Retention Plan
D. Construction Stormwater General Permit (Construction NPDES)
E. Hydraulic Project Approval (HPA)
F. Drainage Requirements
G. Environmentally Sensitive Areas
H. Shoreline Master Program
I. State Environmental Policy Act (SEPA)
J. Road and Driveway Standard Plans
K. Access Requirements
L. Bonding Requirements
M. Record Drawing Requirements
N. Construction Inspections
1.1 City Organization

The City of Port Orchard is governed by the Mayor and a City Council of seven elected officials. The elected body develops the ordinances and sets the policies that the City Staff implements. Each of the Department Heads report directly to the Mayor.

There are six Department Heads in the City;

- Police Chief,
- City Treasurer,
- City Clerk,
- Community Development Director,
- Public Works Director,
- Court Administrator.

The Community Development Director supervises the Planners, Code Enforcement Officer, Building Inspector and serves as the Building Official. The Public Works Director serves as the City Engineer and supervises the Public Works staff. Additionally, administered by the Public Works Director are the water, sewer, surface water management, street and parks facilities. South Kitsap Fire and Rescue provides fire protection service for the City.

The Developer will typically coordinate primarily between three departments: Department of Community Development (DCD), Public Works, and the Fire Department. The DCD enforces the land use codes, such as zoning, landscaping, views, critical areas, and signage. The Fire Marshall enforces the Fire Code in close cooperation with the Building Department. The Code Enforcement Officer in the DCD issues the home addresses. The Finance Department collects water and sewer connection fees, as they are required. The Public Works Department oversees the roads, water, sewer and stormwater systems, and the construction of this infrastructure during site development.

The DCD will assist the Developer with land use and development code questions. The planning staff will process land use applications such as subdivisions, rezones and variances. They also implement the Shoreline Management Program, provide staff support to the Planning Commission, and review all building permits for compliance to the land use rules. A pre-application meeting with the planning staff is strongly recommended.

The City Engineer oversees the processing of the various applications. These include clearing and grading permits, stormwater permits, site development permits, right of way permits, water connections, and sewer connections. Additionally, they oversee the day to day operation of the streets, water, sewer and stormwater systems.

The Building Inspector performs the building plan review and construction field inspections. He inspects building projects to assure compliance with the appropriate building codes, with the
exception of the Electrical Code. The County Health District has jurisdiction over the on-site
sewer systems or septic systems.

Before approving any project, the City Staff will review the proposal with the Developer to help
eliminate potential conflicts with the Codes or Ordinances.

The Planning, Building, and Public Works Staff are located in City Hall, 216 Prospect Street.
Office hours are 8:00 AM to 4:30 PM, Monday through Friday. Land use applications and permit
applications will not be received or issued after 4:00 PM. Unfortunately, no fees can be accepted
after 4:00 PM. The office telephone number for Public Works is (360) 876-4991, for DCD is (360)
874-5533, and the fax is (360) 876-4980.
1.2 Site Improvements Overview

A. Clearing and Grading Permits

1. A Clearing and Grading Permit is required for any of the following activities:
   a. New Development and Redevelopment projects that meet any of the following thresholds:
      i. The new, replaced, or total of new plus replaced impervious surfaces is 2,000 square feet or more
      ii. Causes 7,000 square feet or more of land disturbing activities.
      iii. Converts ¾ acre, or more, of native vegetation to lawn or landscaped areas
      iv. Converts 2.5 acres, or more, of native vegetation to pasture.
   b. Clearing over 1,000 square feet
   c. Grading over 50 cubic yards
   d. Clearing and grading for the following:
      i. Road and Street Improvements
      ii. Preliminary Plat
      iii. Short Plat
      iv. Underground Storage Tanks
      v. Construction of retaining walls or rockeries that do not require a building permit (if over 2 feet in height, engineering is required, if over 4 feet in height, a permit is required in addition to the engineering)
   e. All projects within Sensitive Areas
   f. Projects along Puget Sound

2. City of Port Orchard Staff reviews requirements for the clearing and grading permit. Some items may be waived at the discretion of the City Engineer and City Development Director, due to size or complexity of the project:
   a. Items able to be waived by the City Development Director:
      i. SEPA Status
      ii. Landscaping Plan
      iii. Environmentally Sensitive Areas (ESA)
      iv. Compliance with Shoreline Master Program
      v. Zoning/Land Use Compliance:
      vi. Significant Tree Retention Plan
   b. Items able to be waived by the City Engineer:
      i. Site Plan
      ii. TESC Plans
      iii. Grading and Drainage Plan
      iv. Drainage Report
      v. Road Plans
      vi. Street Standards
      vii. Fire Access and Hydrant Availability
      viii. Right of Way Permit
ix. Approved Water and Sewer Plans
x. Bonding Requirements
xi. Record Drawings

3. See Appendix B of the Development Guidelines for submittal checklist, application, and additional information related to the clearing and grading permit.

B. **Right-of-Way Permit**

A right-of-way permit is required whenever work is proposed within the City right-of-way.

Simple permits are reviewed and issued by the City Engineer. These typically include permits for dry utility installations such as gas, cable, phone, etc.

Standard right-of-way permit applications are reviewed by the City Engineer and typically include review of restoration of City right-of-way associated with water, sewer, and storm drainage connections, or the installation of a driveway apron in the right-of-way. The permit is issued by the City Engineer.

C. **Significant Tree Retention Plan**

Tree permits are required for the removal of trees with a main trunk equal to or larger than eighteen inches in diameter at breast height only in subdivisions and commercial development. Chapter 16.50 of the City of Port Orchard Municipal Code provides guidance on how many trees may be removed.

Tree permits not associated with construction are reviewed and issued by the Community Development Director. Tree permits associated with construction are reviewed by the Public Works Director, Community Development Director and City Engineer. The permit is then issued by the City Engineer concurrently with the clearing and grading permit.

Typically, the tree plan must be shown on the engineering site plan in order to check for conflicts with proposed utilities, driveways, etc.

D. **Construction Stormwater General Permit (Construction NPDES)**

1. **Background**

   In accordance with National Environmental Protection Agency (EPA) requirements, the Department of Ecology will issued a stormwater general permit for construction to the contractor to help reduce construction related stormwater impacts. Owners/Contractors are required to prepare and implement erosion and sediment control measures to control runoff during construction.

2. **Objectives**

   The objectives of the construction stormwater permit are to minimize erosion and sediments from rainfall runoff, and to identify, reduce, eliminate or prevent pollution of stormwater. These objectives are met through the implementation of a Stormwater
Pollution Prevention Plan (SWPPP). The SWPPP must be developed and approved by the City Engineer and implemented before construction can begin.

3. Construction sites requiring stormwater permit coverage

Construction activities that require this permit are any land disturbing activities such as clearing, grading, excavating, and/or demolition that:

a. Disturb one or more acres of land area, OR
b. Are “part of a larger common plan of development or sale” that will ultimately disturb one or more acres of land, AND
c. Discharge stormwater from the site into state surface water(s) or into storm drainage systems, which discharge to state surface waters.

Ecology can also require a permit for any size construction site, if it determines the site is a significant contributor of pollutants to waters of the state.

Construction activities that require a permit also include clearing forested areas, if the clearing is in preparation for construction activities.

This permit is required in addition to any other local or state government permits for erosion and sediment control.

4. Who needs to apply?

The operator of the construction site must apply for permit coverage. The operator can be either the party with operational control over construction plans and specifications or the party in charge of day-to-day activities related to the Stormwater Pollution Prevention Plan (SWPPP). The operator, also known as the Permittee, is responsible for applying and following the terms of the Construction Stormwater General Permit.

All municipal governments must apply for permit coverage for construction projects with one acre or more of disturbed area that discharge stormwater to state waters.

5. How and where to apply

Applicants must submit the permit application called a Notice of Intent (NOI) to Ecology before going out to the first public notice and at least 60 days prior to the start of construction activities. You may download a NOI (application form) from the website at: http://www.ecy.wa.gov/programs/wq/stormwater/construction/ or contact the Public Works Department for a hardcopy.

E. Hydraulic Project Approval (HPA)

A Hydraulic Project Approval (HPA) is required for any construction activity that uses, diverts, changes, or obstructs the bed or flow of state waters. The HPA is applied for using a JARPA – Joint Aquatic Resource Permit Application. This form is submitted to the Washington Department of Fish and Wildlife. The major types of activities in freshwater requiring an HPA include, but are not limited to: stream bank protection; construction of bridges, piers, and docks; pile driving; channel change or realignment; conduit (pipeline)
crossing; culvert installation; dredging; gravel removal; pond construction; placement of outfall structures; log, log jam, or debris removal; installation or maintenance of water diversions; and mineral prospecting.

Major saltwater activities requiring an HPA include, but are not limited to: construction of bulkheads, fills, boat launches, piers, dry docks, artificial reefs, dock floats, and marinas; placement of utility lines; pile driving; and dredging.

It is important to emphasize that the above are only examples of major types of activities requiring an HPA and that any construction activity that uses, diverts, changes, or obstructs the bed or flow of state waters requires an HPA.

Applications are available online at:
http://www.epermitting.org/site/alias__resourcecenter/jarpa/9983/jarpa.aspx

F. Drainage Requirements

1. Stormwater Requirements

Stormwater requirements for the City of Port Orchard are governed by Chapter 15.32 of the City of Port Orchard Municipal Code (POMC) and the currently adopted Stormwater Management Manual. Additionally, The City of Port Orchard requires the use of Low Impact Development practices per POMC Chapter 16.80.

2. Drainage Review

Drainage review is required for most projects, and typically, drainage plans are submitted as part of the clearing and grading permit application submittal. If your project falls below any of the following thresholds, drainage review may be waived by the City Engineer:

a. Less than 2,000 square feet of new, replaced or new plus replaced impervious surface
b. Less than 7,000 square feet of land disturbing activities
c. Less than 1,000 square feet of clearing

3. Ecology Minimum Requirements

The 2005 ECY Drainage Manual has 10 minimum requirements including:

a. Preparation of Stormwater Site Plans
b. Construction Stormwater Pollution Prevention
c. Source Control of Pollution
d. Preservation of Natural Drainage Systems and Outfalls
e. On-site Stormwater Management
f. Runoff Treatment
g. Flow Control
h. Wetlands Protection
i. Basin/Watershed Planning
j. Operation and Maintenance
G. Environmentally Sensitive Areas

Chapter 14 of the City of Port Orchard Municipal Code covers Environmentally Sensitive areas.

The following environmentally sensitive areas are regulated by the City of Port Orchard:

1. Wetlands
2. Streams
3. Fish and Wildlife Habitat Areas
4. Geologic Hazard Areas
5. Aquifer Recharge and Wellhead Protection Areas

If your site is located within or adjacent to an environmentally sensitive area, there may be additional development restrictions or requirements, such as special reports and studies, buffers, enhanced treatment, etc.

H. Shoreline Master Program

The City of Port Orchard has adopted a Shoreline Master Program, which establishes a Shoreline Residential Area. This area is described as "All areas from the Puget Sound shore to 200 foot inland."

I. State Environmental Policy Act (SEPA)

The Community Development Director will determine whether a project is exempt from SEPA.

Generally, the following conditions require a SEPA review:

1. Any fill or excavation of 500 cubic yards or more. Excavation for foundations is exempt, unless the project is within a sensitive area
2. Removal or installation of underground storage tanks 10,000 gallons or larger
3. Development within or immediately adjacent to an environmentally sensitive area as defined by POMC Chapter 14.04
4. Any project that requires coverage under the State’s Construction Stormwater General Permit

For additional information, see the Citizen’s Guide to SEPA Review and Commenting at the following link: http://www.ecy.wa.gov/programs/sea/sepa/citizensguide/citizensguide.htm

J. Road and Driveway Standard Plans

Details of standard road, driveway sections, and turn-around geometry are provided in this document. The City Engineer may approve deviations from the standard plans on a case-by-case basis, provided they meet loading requirements for fire access and conform to current Fire District standards.
K. Access Requirements

The City of Port Orchard uses two basic criteria when determining driveway/access requirements, Fire Access and Fire Flow.

1. Fire Access Requirements:
   a. Serving 1-2 Lots: Private Driveways serving one or two lots are required to have a minimum of 12’ paved or all-weather access, with 15’ total clear width. This access and clear area shall be an approved load-bearing surface. If serving 2 homes, the easement width shall be 15’.
   b. Private Lanes or Roads serving three or more lots require the dwellings to be sprinklered.
   c. Access serving 5 or more lots requires a local access street per City requirements or a private access road. All dwellings shall include a fire suppression sprinkler system.

2. Fire Flow Requirements:
   All lots shall meet one of the following requirements:
   a. An available fire hydrant properly spaced along street frontage no greater than maximum distance to property per the currently adopted International Fire Code (IFC), and in combination with a driveway no greater than 200’ to the dwelling along an approved route; or
   b. An approved fire suppression system.

1. Notes:
   a. All-weather surfacing must meet the live load bearing requirements for H20 loading and the edge must be clearly visible for emergency vehicles.
   b. An approved turn-around is required if the access is longer than 200 feet from the public ROW to the most distant residential structure as measured along an approved route.
   c. Private driveway grades shall not exceed 12% without Fire Marshall approval. The Fire Marshall may evaluate steeper grades with consideration to fire protection and department capabilities for fire and rescue emergencies.
   d. Projects unable to meet these Fire Access and Fire Flow requirements shall be required to obtain a variance.

L. Bonding Requirements

Performance and Maintenance Bonds are required on all projects that influence the public, such as roads, water, sewer and storm, by the City Engineer.

See Bond Requirements and Procedures in Chapter 2 for more information.
M. Record Drawing Requirements

Record drawings are required prior to final construction acceptance for all clearing and grading and Site Development Activity (SDAP) permits. The drawings shall reflect the locations of all facilities, utilities, and appurtenances installed as part of the construction of the project. Final acceptance of the project will not be granted until the Record Drawings are submitted and accepted by the City Engineer.

N. Construction Inspections

All construction performed under a site development activity permit will have all or a combination of the following mandatory construction inspections at specified milestones:

1. Pre-Construction Meeting
2. Clearing Limits
3. Initial TESC (prior to beginning clearing and grading of site)
4. Erosion
5. Site Stabilization
6. Sewer
7. Water
8. Stormwater Conveyance
9. Foundation Drains (Building Department)
10. Roof Drains (Building Department)
11. Detention/Retention System
12. Storm Drainage
13. Paving
14. Final Construction Approval
15. Record Drawing
Chapter 2

LAND DEVELOPMENT

This chapter will address specific land use standards and reference City of Port Orchard Public Works codes that apply to actions related to the development of a property. This chapter does not address land use permits and entitlements. It will reference special development agreements that apply and which will be included in the appendices. Items included in this chapter:

2.1 Application Procedures
   A. Subdivision Definition
   B. Site Development Definition
   C. Methods of Public Notice

2.2 Clearing & Grading
   A. Clearing and Grading Submittal Requirements
   B. Application Documents

2.3 Right-of-Way

2.4 Documents and Preparation
   A. Plan Preparation and Application
   B. Standard Plan Notes

2.5 Bond Requirements
   A. General Information
   B. Types of Bonds
   C. Performance Bonds
   D. One-Time Bond Reduction
   E. Maintenance Bonds
   F. Determining Bond Amount
   G. Bond Release
2.1 Application Procedures

Submittal requirements and procedures shall be as prescribed in the following for subdivision applications and commercial site development applications. Application packages for Boundary Line Adjustments (BLAs), Short Plats, and Subdivisions are available from the City of Port Orchard’s Department of Community Development.

A. “Subdivision” is the division of property into five or more lots or the re-division of any property that has been divided under the Short Subdivision (four or less lots) procedure within five years.

1. Subdivision Application: The subdivision process has four steps: a Pre-Application meeting, Preliminary Plat approval, Site Development Activity Permit (SDAP) Application, and Final Plat Acceptance. The Hearing Examiner is responsible for Subdivision or Preliminary Plat approval. The City Engineer is responsible for SDAP Application phase acceptance. The Department of Community Development is responsible for processing the application for the Final Plat and recommending approval of the Plat to City Council.

2. Pre-Application Meeting: A Pre-Application meeting may occur before a Preliminary Plat or Site Development Application can be submitted. The intent of the pre-application meeting is to reach concurrence on the applicable design parameters, site layout and drainage concept. If deemed necessary, a joint site visit may be conducted by members of the Department of Community Development, the applicant and the applicant’s engineer. Pre-application packets are available from the Department of Community Development.

3. Preliminary Plat: After a successful pre-application meeting, if needed, Applicants are permitted to submit a Preliminary Plat Application to the Department of Community Development. Within 28 days of receiving the application, department staff will determine if it is complete.

If the application is deemed complete, the City will notify the applicant in writing along with instructions for public noticing (See Section 2.1.C). If not, the applicant will be contacted by mail from the Department of Community Development outlining what additional information is needed.

During the preliminary plat review process, staff may conduct an environmental analysis of the project if subject to the requirements of the State Environmental Policy Act (SEPA). The City has the option of using the Optional SEPA notification provisions, which allow for a single public comment period. This option may be used if the City can reasonably determine that the project is unlikely to have adverse environmental impacts.

To ensure that the public has an opportunity to review the proposal, public notice will be posted on the project site, published in the local newspaper and mailed to surrounding...
property owners. The three specific public notice requirements are provided in Chapter 14.04 of the Port Orchard Municipal Code.

The project will not be scheduled for a public hearing before the Port Orchard Hearing Examiner until resolution of project issues is reached.

At the completion of Preliminary Plat approval, a written notice of decision will be mailed to the applicant and all parties of record.

Approval of the preliminary plat expires five years, or per current State Law, after the Hearing Examiner decision if an application for final plat is not made with the City.

4. Road Names and Lot Addressing: Applications will need to be submitted with the Site Development Application Permit so the Community Development Department may assign the road names, lot numbers, and suite numbers. These items are required to be on the Final Plat at time of submittal.

5. Site Development Application Permit (SDAP) Review: Applicants may submit a Site Development Application Permit to the Public Works Department. Within 28 days of receiving the application, department staff will determine if it is complete.

   If the application is deemed complete, the City will notify the applicant in writing with instructions for scheduling a Pre-Construction Meeting. If not, the applicant will be contacted by mail outlining what additional information is needed.

6. Final Plat Review: The applicant can request Final Plat approval once the applicant receives preliminary plat approval, constructs the necessary site improvements (streets, drainage and utilities) in accordance with City standards, specifications, any conditions of the preliminary plat approval, or provides a financial guarantee for all unfinished improvements and receives City approval of the improvements or financial guarantee within five years.

B. “Site Development” is a general term used to describe all non-single (one home) family residential development (i.e., development of commercial, office, multi-family or mixed-use).

1. Site Development Application: The Site Development process has three steps: Pre-Application meeting, Site Plan Review and Acceptance, and Structural Review and a Certificate of Occupancy. The City Engineer is responsible for Site Plan acceptance. Structural Review and final issuance of the Certificate of Occupancy (C of O) are granted by the Building Official.

2. Pre-Application Meeting: A Pre-Application meeting may occur before a Site Development Application can be submitted. The intent of the pre-application meeting is to reach concurrence on the applicable design parameters, site layout and drainage concept. If deemed necessary, a joint site visit may be conducted by members of the Department of Community Development, the applicant and the applicant’s engineer. Pre-application packets are available from the Department of Community Development.
3. Site Plan Review and Acceptance: After a successful pre-application meeting, if needed, Applicants are permitted to submit a formal Site Development Application to the Public Works Department. Within 28 days of receiving your application, the Public Works Department staff will determine if it is complete. If the application is deemed complete, the City will notify the applicant in writing along with instructions for scheduling a Pre-Construction Meeting. If not, the applicant will be contacted by mail outlining what additional information is needed.

During the Site review process, Department of Community Development Staff may conduct an environmental analysis of the project if subject to the requirements of the State Environmental Policy Act (SEPA). The City has the option of using the Optional SEPA notification provisions, which allow for a single public comment period. This option may be used if the City can reasonably determine that the project is unlikely to have adverse environmental impacts.

All commercial and multi-family projects are subject to compliance with the Port Orchard Development Guidelines. The guidelines promote responsible site design, respectful architecture and community values.

4. Structural Review and Certificate of Occupancy: The applicant shall contact the City of Port Orchard’s Department of Community Development for Structural Review and Certificate of Occupancy requirements.

C. The required three (3) methods of public notice for each project application are also included in the SEPA process, are as follows:

1. Posting – A notice board shall be installed in accordance with the City’s posting requirements. Additional signs may be required for larger sites or sites with multiple frontages. After installation, the planner shall submit a completed affidavit of posting to be incorporated into the planning files. Maintenance of the notice board is the responsibility of the applicant.

2. Mailing – The Applicant must provide four sets of mailing labels for all property owners within 1000 feet of the subject property. Labels must be provided in three-column format.

3. Publishing – The Department of Community Development will publish the notice of application in a local newspaper with general circulation.

2.2 CLEARING AND GRADING

A. Clearing and Grading Submittal Requirements

Land Use Actions that require a clearing and grading permit include: road and street improvements, construction on an approved preliminary plat or short plat, installation of retaining walls or rockeries that do not require a building permit (under 4’ high), and all
other grading activities that include over 1,000 square feet of clearing, or earthwork activities that move more than 50 cubic yards of earth.

Any fill or excavation of 500 cubic yards or more requires a State Environmental Policy Act (SEPA) checklist. Excavation for foundations is exempt, unless the project is within a sensitive area. Other activities that require a SEPA checklist include: installation or removal of underground storage tanks over 10,000 gallons, roadway installations, work within sensitive areas, and all projects that disturb 1 acre or more.

B. Application Documents.

The following documentation must be submitted with your application:

☐ Three (3) site plans showing, at a minimum, the following:

1. All information required for General Site Plan preparation (see separate handout in Appendix B) plus the following information:

   a. Adjacent right-of-way improvements including edge of pavement, catch basins and all utilities. Include invert elevations and pipe sizes for sanitary and storm sewer

   b. Designate clearing, filling and grading limits

   c. Finished floor elevations of all structures, finished spot elevations at critical points along concrete, gutters or asphalt

   d. Nominal area calculations of the project site including existing and proposed building and impervious areas. Also include project data per building permit application requirements

☐ A completed SEPA Checklist.

☐ Two copies of a Wetland Report, if applicable

☐ Two copies of a Tree Retention Plan

☐ Detailed drainage plans consistent with the 2005 Department of Ecology (Ecology) Stormwater Management Manual for Western Washington and Chapter 15.32 of City of Port Orchard Municipal Code. At a minimum, plans shall show how stormwater will be handled prior to leaving the site and how it will enter the City’s storm drain system or be tight-lined to Puget Sound. Show existing and proposed footing drains, downspouts, catch basins, yard drains, and pipe locations. Show all pertinent design information including invert elevations, finished rim elevations, pipe size, material, length, and slope. Calculations for conveyance, detention, and treatment if required shall be included in the
stormwater report. Use Western Washington Hydrology Model (WWHM), where applicable, for storm water modeling.

1. All catch basins shall have an eighteen-inch (18”) minimum sump. Traffic bearing catch basin, rim and pipe required for all driving surface locations. All pipe materials shall be PVC ASTM 3034-SDR 35, ADS (N-12), ductile iron, concrete, or equal as approved by City Engineer.

2. All new or reconstructed impervious driveway and parking areas must be served by an oil/water separator before discharge into the storm drain system or Puget Sound. Show proposed system. As a minimum, oil/water separator shall consist of Type-1 catch basin with a PVC tee installed inside with 12” minimum tailpipe and 12” minimum riser pipe. Required minimum 12” clearance from bottom of tailpipe to bottom of catch basin and minimum 6” from top of riser pipe to top of catch basin.

☐ Submit a separate drawing showing temporary erosion and sedimentation control facilities consistent with the current adopted City of Port Orchard Stormwater Management Manual, to protect City rights-of-way, public storm drains, adjacent properties and watercourses, including but not limited to, temporary construction entrance, catch basin protection, silt fence installation, check dams, sedimentation pond/trap, and applicable details and notes. Also, identify construction sequence and construction schedule for the work.

☐ Three copies of the site Drainage Report prepared in accordance with the current adopted City of Port Orchard Stormwater Management Manual and Chapter 15.32 of the City of Port Orchard Municipal Code.

☐ An estimate of probable construction costs associated with grading, drainage, and erosion control facilities. A performance bond is required to be secured prior to starting construction.

☐ Two copies of a Right-of-Way Use Permit and Associated Traffic Control Plan, if applicable.

☐ Permit & Review Fees

Please Note:

The property owner bears the responsibility for the accuracy and completeness of all information provided with or affecting the application submittal.

If the property contains or is adjacent to Sensitive Areas (wetlands; streams; riparian corridors; lakes, ponds, or slopes per POMC 18.08), additional information may be required.
If you have any questions concerning your application submittal, please stop by City Hall or call (360)876-4991 between 8 a.m. and 4 p.m., Monday through Friday.

2.3 RIGHT-OF-WAY

ROW Disturbance of surface includes, but not limited to, street trenching, utility installation, driveway resurfacing, driveway installation, boring & curb cuts, culverts, painting & re-channelization, haul routes, fencing and landscaping, temporary street closures, lane closures, oversize truck loads, fairs, concerts, and public functions. This permit may be issued for those activities that will alter the appearance of or disturb the surface, super-surface, or sub-surface of the right of way.

Call ONE CALL (800) 424-5555 or 811) 48 hours before you dig. "It's the law." RCW 19.122.

1. Application Documents:
   Submit the number of copies specified with your application.
   - □ 1 copy of Submittal Checklist
   - □ 3 copies of Right-of-Way Permit Application
   - □ 3 copies of a site plan depicting the following:
     a. site location, address, names of adjacent or nearby streets, adjacent property lines and work area boundaries
     b. north arrow
     c. scale – 1” = 20’ to 1” = 50’
     d. driveway entrances, fire hydrants, mail boxes, trees, etc.
     e. detail showing proposed restoration of the roadway surface after trenching
   - □ 3 copies of a temporary erosion control plan, if applicable
   - □ 3 copies of a traffic control plan, if applicable
   - □ 3 copies of a shoring plan, if applicable
   - □ 3 copies of Tree Retention Plan, if applicable
   - □ 3 copies of Environmentally Sensitive Areas checklist, if applicable
   - □ All fees as required by the City of Port Orchard Fees & Charges Ordinance.
Other information and requirements as deemed necessary by the City in order to process the application consistent with the requirements of the POMC.

2.4 DOCUMENTS AND PREPARATION

A. Plan Preparation and Application

1. Engineering Plan Preparation

All development proposals (Commercial or Subdivision) shall meet the following minimum engineering plan preparation standards:

a. A professional Civil Engineer, licensed in the state of Washington, shall prepare, sign and stamp the engineering plans, in accordance with RCW 18.43.070, prior to submittal to the City of Port Orchard.

b. Plan sheets shall be 24” x 36” in size, dark line on light background.

c. The cover sheet shall include:

i. Project title.

ii. Vicinity map with north arrow.

iii. Project Address

iv. The Section, Township and Range.

v. Index of plan sheets.

vi. The applicant and/or developer’s name.

vii. The name, address, seal, date and signature of the responsible professional engineer.

viii. Impervious Area (Existing and Proposed)

ix. Legend of symbols and line types used

d. All subsequent sheets shall include:

i. Project title.

ii. Project Address

iii. The section, Township and range.

iv. The name, address, seal, date and signature of the responsible professional engineer.

e. Plan Views shall include:

i. A north arrow and an engineer’s scale.
a. The north arrow shall be generally oriented to the top or to the right side of the sheet.

b. Typical scale for subdivisions: 1” = 50’.

c. Typical scale for commercial developments: 1” = 20’, 1” = 30’ or 1” = 50’.

ii. All found and reference survey monuments.

iii. The datum (shall be NAVD 1988) or benchmark used to establish horizontal and vertical control.

iv. Proposed road names, centerline bearings, and dimensions for right-of-way, street and easement widths.

v. Stationing for street centerline, points of curvature, tangency, and intersections. Street alignments shall read from left to right, and stationing shall increase from west to east and south to north. Negative stationing will not be allowed.

vi. All elements of the proposed street section, including centerline, curb and gutter, planter strip, sidewalk, right-of-way, utility easements, medians, turn and/or bike lanes, etc.

vii. All existing and proposed utilities. Line work shall be faded into the background, but dark enough to be legible on copy.

viii. Section lines, project boundary lines, lot lines, etc.

ix. All topographic features within and adjacent to proposed improvements and within sufficient area to assess impacts of slopes, drainage, access, slopes, future extensions, etc.

a. Existing and proposed contours shall be shown at 1’ intervals for grades less than 10%.

b. 2’ intervals shall be shown for grades between 10% and 30%.

c. 5’ intervals for grades greater than 30%.

x. All existing and proposed drainage features and facilities, showing direction of flow, size and type of each drainage pipe, structure, channel, pond, etc.

xi. Curve data, including radius, arc length, delta and semi-tangent length for all street centerlines, curb returns and cul-de-sac bulbs.

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

xiii. Plan views should be oriented for the most efficient use of paper.
f. A separate Plan and Profile sheet shall be prepared for each street alignment.

   Unless otherwise approved by the City Engineer, corresponding plan and profile views shall be presented on a single sheet, of matching street station segment, and oriented with aligning stationing, or best fit.

g. Profile Views shall include:

   i. An engineer’s scale. Horizontal scale shall match corresponding plan view (typical scale: 1” = 50’). Vertical scale should allow for adequate depiction of street, storm, sewer and water grades and structures, while minimizing profile breaks (typical scale: 1” = 10’, minimum scale: 1” = 5’, maximum scale: 1” = 20’).

   ii. The datum or benchmark used to establish vertical control. Datum shall be NAVD 1988 unless otherwise approved by the City of Port Orchard.

   iii. 1” grid lines with station labels at 100’ intervals and elevation labels spanning the elevation range of the existing and proposed grades.

   iv. Existing and proposed centerline elevations at 50’ stations, positioned along the bottom of the profile view.

   v. Existing centerline profile based on topographic survey, accurate to within 0.1’ on unpaved surfaces and 0.01’ on paved surfaces.

   vi. Proposed design information, including grades, grade break stations and elevations, and vertical curve information, including length, stations and elevations for PVC, PVI and PVT, A.D., and K-values, and high or low point and elevation, if applicable.

   vii. Profiles for curbed streets shall show only the tops of both curbs, with breaks at all curb returns. Profiles for half-street improvements shall show the top of curb and the opposite edge of pavement. Profiles for fire access streets, private access streets, alleys and shouldered roads shall show the centerline only.

   viii. Profiles for street widening (where grind and overlay is not proposed) shall show the existing centerline, the existing street at the saw cut line and the proposed top of curb.

      Street widening calculations shall be included with the submittal of the design plans. The calculations shall show:

      a. Widening cross-slope: 2% to 4%.

      b. Change in cross-slope maximum: 1.0%.

      c. Curb grade minimum: 0.5% (0.8% preferred).

   ix. Station and elevation labels shall be added to the proposed profile at the start and end of improvements, curb returns, cross-slope transitions, width tapers, and any other spot or segment not defined by the street section.
x. Station and centerline labels shall be added to the profile at all intersections.

h. Cul-De-Sac designs shall include:
   i. An alignment of the face of curb, starting at the PC of the bulb (either side),
      continuing around the bulb and ending at the opposite PC.
   ii. A profile of the existing ground and proposed face of curb.
   iii. Reference points at both PCs and PCCs and quarter points around the bulb.
        Reference points shall be labeled on both the plan and profile views.

i. Detail drawings shall include:
   i. A north arrow and engineer’s scale (typical scale: 1” = 20’).
   ii. A detail title, description or reference note.
   iii. Adequate line work, dimensions, spot elevations, sections, views and notes to
        construct the street element, structure or facility. Irrelevant background
        information should be removed to avoid detail clutter.
   iv. Intersection details shall note the station equation and the finished grade
       elevation at the point of intersection. Curb return information shall include
       corresponding street stations at all PCs and PTs and top of curb elevations at the
       ends and quarter points to verify drainage and to facilitate smooth transitions.

j. Drafting Standards:
   i. Fonts – Lettering shall be legible and easily understood by the reviewer.
      Lettering shall be of sufficient size and boldness to produce clear and readable
      text when scanned or copied, but small enough for efficient use of paper. A
      typical note font should be approximately 0.08” to 0.10” in height. Submitted
      plans not meeting these criteria will be returned to the design engineer for
      correction.
   ii. Line types and Symbols – A list of standard drafting line types and symbols shall
       be shown on all drawings submitted for review.
       Line weights shall be of sufficient boldness to produce clear and legible line
       work when scanned or copied. Line weights shall differ between line type
       applications for drawing clarity and efficiency.
   iii. Save all drawings to AutoCAD 2014.

k. The order of sheets in a set of engineering plans should follow the natural
   progression of construction of the development. The typical set of engineering
   drawings will include the following sheets:
   i. Cover Sheet
   ii. Notes
iii. Existing Conditions/Demolition Plan
iv. Erosion and Sediment Control Plan(s)
v. Grading Plan(s)
vi. Composite Utility Plan (i.e. water, sewer, power, phone, etc.)
vii. Street and Drainage Plan(s)
viii. Details
ix. Channelization Plan
x. Lighting Plan
xi. Landscape Plan

l. City of Port Orchard Standard Plans shall be referenced in the construction notes or added to the engineering plans as independent details. Changes to Standard Plans shall include removal of the City’s title block and emphasis on the modification.

m. City of Port Orchard Standard Plan Notes must be included in all plan sets. The City of Port Orchard Standard Plan Notes are provided in Section 2.4B.

At the applicant’s discretion, notes which in no way apply to the project may be omitted; however, the remaining notes must not be renumbered. For example, if General Note #3 were omitted, the remaining notes should be numbered 1, 2, 4, 5, etc. If additional site specific notes are considered necessary, they shall be added to the end of the appropriate section.

n. Bond Quantity Worksheet

A Site Improvement Bond Quantity Worksheet (BQW) shall be completed for every development project. The City of Port Orchard standard Bond Quantity Worksheet is provided in of the Appendix 200.

o. Plan Expiration

i. Engineering plan approval will expire with the expiration of the Site Development Permit which is a maximum of 3 years from issuance or in accordance with POMC 15.32 Stormwater Management, unless a one-time 2-year extension is granted.

ii. Preliminary Plat approval for subdivisions shall be effective in accordance with Washington State Law.

iii. Commercial Site Development Permits shall become null and void if the developer fails to commence and documented all site development work within three (3) years of the issuance date of the permit, in accordance with POMC 15.32.
p. Waiver of Plan Requirements: Subject to review, the City Engineer may waive plan
requirements, wholly or in part, based on the following criteria:

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

ii. The existing grade or slope in the road right-of-way or easement does not
exceed 12 percent; and

iii. The work will not intercept a stream, wetland, or sensitive area buffer, or
otherwise impact sensitive areas and natural surface drainage; and

iv. Plans do not include a retention/detention facility; and

v. 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 street improvement; and

vi. City of Port Orchard Standard Details, submitted with the required permits, are
sufficient to describe the improvement to be constructed.

B. Standard Plan Notes

The following Standard Plan Notes must be included in all plan sets. At the applicant's
discretion, notes, which in no way apply to the project, may be omitted; however, the
remaining notes must not be renumbered. For example, if General Note #3 were omitted,
the remaining notes should be numbered 1, 2, 4, 5, etc. If additional site specific notes are
considered necessary, they shall be added to the end of the appropriate section.

General Notes:

1. All construction shall be in accordance with all currently adopted WSDOT and APWA
Specifications and Plans, and the City of Port Orchard Municipal Code, the currently
adopted City of Port Orchard Developer’s Handbook, the currently adopted Surface
Water Design Manual and the conditions of preliminary subdivision approval. It shall be
the sole responsibility of the applicant and the professional civil engineer to correct any
error, omission, or variation from the above requirements found in these plans. All
corrections shall be at no additional cost or liability to the City of Port Orchard.

2. The design elements within these plans have been reviewed according to the Port
Orchard Design Standards. Some elements may have been overlooked or missed by the
City of Port Orchard City Engineer. Any variance from adopted standards is not allowed
unless specifically approved by the City of Port Orchard City Engineer, prior to
construction.

3. Approval of these road, grading and drainage plans does not constitute an approval of
any other design (e.g., water, sewer, gas, electrical, etc.).
4. Before any construction or development activity, a preconstruction meeting must be held between the City of Port Orchard Public Works Department, the Applicant and the Applicant’s Construction Representative.

5. Proof of liability insurance shall be submitted to the City of Port Orchard prior to the preconstruction meeting.

6. A copy of these approved plans must be on the job site whenever construction is in progress.

7. Construction noise shall comply with the current POMC Section 9.24.050.

8. It shall be the Applicant /Contractor’s responsibility to obtain all right-of-way permits and construction easements necessary before initiating off-site work within a City of Port Orchard street right-of-way.

9. Franchised utilities or other installations that are not shown on these approved plans shall not be constructed unless an approved set of plans is submitted to the City of Port Orchard prior to construction.

10. Datum shall be NAVD 1988 unless otherwise approved by the City of Port Orchard.

11. Groundwater system construction shall be within a right-of-way or appropriate drainage easement, but not underneath the roadway section. All groundwater systems must be constructed in accordance with Section B1 3.02 of the APWA Standard Specifications.

12. All utility trenches shall be backfilled and compacted in accordance with the City of Port Orchard Standard.

13. All roadway subgrade shall be backfilled, compacted to 95% maximum density and prepared for surfacing in accordance with WSDOT Standard Specification 2-06.3.

14. Open cutting of existing roadways is not allowed unless specifically approved by the City of Port Orchard City Engineer and noted on these approved plans. Any open cut shall be restored in accordance with the City of Port Orchard Standard Specification.

15. The Contractor shall be responsible for providing adequate safeguards, safety devices, protective equipment, flaggers, and any other needed actions to protect the life, health, and safety of the public, and to protect property in connection with the performance of work covered by the contractor. Any work within the traveled right-of-way that may interrupt normal traffic flow shall require at least one flagger for each lane of traffic affected. Refer to “Traffic Control,” of the WSDOT Standard Specifications shall apply in its entirety. Traffic control plans shall follow the currently adopted MUTCD Manual as applicable.

16. To protect significant trees from the impacts of the proposed development, the Applicant shall provide the best protection for significant trees per the regulations. At a minimum, any significant trees to be retained shall be fenced two feet outward from the identified drip line. Trees that sustain damage during the course of construction shall be
replaced pursuant to POMC. A representative of the City of Port Orchard DCD Staff shall verify protective fencing placement per this condition prior to issuance of a notice to proceed for grading and clearing. The City shall inspect for compliance with the tree plan prior to a final inspection. The inspection shall also evaluate the condition of retained trees and any and all corrections will be required to be completed prior to a final inspection and release of any post financial guarantees for the site.

Drainage Notes (also refer to Chapter 9 Surface Water Drainage):

17. All storm pipe and appurtenances shall be laid in accordance with City of Port Orchard Design and Construction Standards. This shall include leveling and compacting the trench bottom, the top of the foundation material and any required bedding to a uniform grade so that the entire drainage facility is supported by a uniformly dense unyielding base.

18. All storm pipe shall be subject to a low pressure air test in accordance with WSDOT Standard Specification 7-04.3(1)F and a video inspection in accordance with the Port Orchard Design Standards.

19. Storm pipe cover, measured from the finished grade elevation to the top of the outside surface of the pipe, shall be 2 feet minimum (3 feet for PVC), unless authorized by the City of Port Orchard City Engineer under the following circumstances:
   a. Under drainage easements, driveways, parking stalls, or other areas subject to light vehicular loading, the pipe cover may be reduced to 1 foot minimum if the cover is consistent with the manufacturer’s recommendations.
   b. In areas not subject to vehicular loads, such as landscape planters and yards, the pipe cover may be reduced to 1 foot minimum.
   c. If ductile iron pipe is used, the pipe cover may be reduced to 1 foot minimum.

20. Steel pipe shall be galvanized and have asphalt treatment #1 or better inside and out (WSDOT Standard Specification 9-05.4(3)).

21. Any drainage structure, such as a catch basin or a manhole, not receiving surface runoff and not located within a traveled roadway or sidewalk shall have a solid locking lid. Any drainage structure associated with a permanent retention/detention facility, not receiving surface runoff, shall have a solid locking lid.

22. All catch basin grates shall conform to the currently adopted Stormwater Management Manual and the WSDOT Standard Plans when located within the right-of-way, and shall include a combination inlet frame (open curb face frame), when located in a sump condition or before an intersection with a 4% grade or above. A herringbone grate may be used outside the right-of-way. All catch basins within the gutter line shall be installed in accordance with Standard Details as applicable. Maximum catch basin height from finished grade to pipe invert shall be per the applicable detail.
23. For any curb grade less than 0.8% (0.0080 ft/ft), including curb returns, a professional Land Surveyor, currently licensed in the State of Washington, shall verify that the curb forms or string lines are at the grades noted on the approved plans prior to placement of concrete. The contractor is responsible for survey coordination and costs.

24. For any drainage pipe grade less than 0.5% (0.0050 ft/ft), a professional Land Surveyor, currently licensed in the State of Washington, shall verify that the as-built pipe matches the grades noted on the approved plans prior to completion of subgrade. The contractor is responsible for survey coordination and costs.

25. All driveway culverts located within the City of Port Orchard right-of-way shall be of sufficient length to provide a minimum 3:1 slope from the edge of the driveway to the bottom of the ditch. Culverts shall have beveled end sections to match the side slope.

26. Rock for erosion protection of ditches, where required, must be of sound quarry rock, placed to a depth of one foot (1'), and must meet the following specifications: 100% must pass the 8” sieve, 40% maximum can pass the 3” sieve and 10% maximum can pass the 3/4” sieve.

27. Drainage outlets (stub-outs) shall be provided for each individual lot, except for those lots approved for infiltration by the City of Port Orchard. Stub-outs shall conform to the following:

   a. Each outlet shall be suitably located at the lowest elevation on the lot to service all future roof downspouts and footing drains, driveways, yard drains, and any other surface or subsurface drains necessary to render the lots suitable for their intended use. Each outlet shall have free-flowing, positive drainage to an approved stormwater conveyance system or to an approved outfall location.

   b. Outlets on each lot shall be located with a five-foot-high, 2” x 4” stake marked "storm" or "drain". The stub-out shall extend above surface level, be visible, and be secured to the stake.

   c. Pipe material shall be in accordance with Port Orchard Design Standards. If non-metallic, the pipe shall contain a wire or use other acceptable means of detection.

   d. Drainage easements are required for drainage systems designed to convey flows through individual lots.

   e. The Applicant/Contractor is responsible for coordinating the locations of all stub-out conveyance lines with respect to other utilities (e.g., power, gas, telephone, television, etc.).

   f. All individual stub-outs shall be privately owned and maintained by the lot homeowner.
Erosion and Sediment Control Notes (also refer to Chapter 9 Surface Water Drainage):

28. Approval of these Temporary Erosion and Sediment Control (TESC) plans does not constitute an approval of permanent road or drainage design (e.g., size and location of roads, pipes, restrictors, channels, retention facilities, utilities, etc.).

29. The implementation of these TESC plans and the construction, maintenance, replacement, and upgrading of these TESC facilities is the responsibility of the applicant/TESC supervisor until all construction is approved.

30. The boundaries of the clearing limits shown on these plans shall be clearly flagged by a continuous length of survey tape (or fencing, if required) prior to construction. During the construction period, no disturbance beyond the clearing limits shall be permitted. The clearing limits shall be maintained by the applicant/TESC supervisor for the duration of construction.

31. Stabilized construction entrances, in accordance with Standard Details shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures, such as constructed wheel wash systems or wash pads, may be required to ensure that all paved areas are kept clean and track-out to street right-of-way does not occur for the duration of the project.

32. The TESC facilities shown on these plans must be constructed prior to all clearing and grading to ensure that the transport of sediment to surface waters, drainage systems, and adjacent properties is minimized.

33. The TESC facilities shown on these plans are the minimum requirements for anticipated site conditions. During the construction period, these TESC facilities shall be upgraded as needed for unexpected storm events and modified to account for changing site conditions (e.g., additional cover measures, additional sump pumps, relocation of ditches and silt fences, additional perimeter protection, etc.), as directed by the City Engineer.

34. The TESC facilities shall be inspected daily by the applicant/TESC supervisor and maintained to ensure continued proper functioning. Written records shall be kept of weekly reviews of the TESC facilities during the wet season (October 1 to April 30) and of monthly reviews during the dry season (May 1 to September 30).

35. Any areas of exposed soils, including roadway embankments, that will not be disturbed for two days during the wet season or seven days during the dry season shall be immediately stabilized with the approved TESC methods (e.g., seeding, mulching, plastic covering, etc.).

36. Any area needing TESC measures not requiring immediate attention shall be addressed within seven (7) days.

37. The TESC facilities on inactive sites shall be inspected and maintained a minimum of once a month or within twenty-four (24) hours following a storm event.
38. At no time shall more than one (1) foot of sediment be allowed to accumulate within a catch basin. All catch basins and conveyance lines shall be cleaned prior to final inspection. The cleaning operation shall not flush sediment-laden water into a downstream system.

39. Any permanent flow control facility used as a temporary settling basin shall be modified with the necessary erosion control measures and shall provide adequate storage capacity. If the facility is to function ultimately as an infiltration system, the temporary facility must be graded so that the bottom and sides are at least three (3) feet above the final grade of the permanent facility.

40. Where straw mulch for temporary erosion control is required, it shall be applied at a minimum thickness of 2 to 3 inches.

41. Prior to the beginning of the wet season (October 1), all disturbed areas shall be reviewed to identify which areas can be seeded in preparation for the winter rains. Disturbed areas shall be seeded within one week of the beginning of the wet season. A sketch map of those areas to be seeded and those areas to remain uncovered shall be submitted to the City of Port Orchard City Engineer. The Inspector can require seeding of additional areas in order to protect surface waters, adjacent properties, or drainage facilities.

Structural Notes, (also refer to Chapter 8 Structures):

42. These plans are approved for construction of the standard road and drainage improvements only. Plans for structures such as bridges, vaults, and retaining walls require a separate review, approval and building permit by the City of Port Orchard Department of Community Development prior to construction.

43. Rockeries are considered to be a method of bank stabilization and erosion control. Rockeries shall not be constructed to serve as retaining walls. All rockeries shall be constructed in accordance with the rock wall construction guidelines published by the Associated Rockery Contractors.

Recommended Construction Sequence:

44. Conduct a pre-construction meeting with the Public Works Department.

45. Post “Notice of Construction Activity” sign with name and phone number of TESC supervisor.

46. Flag or fence clearing limits and significant trees.

47. Install catch basin protection, if required.

48. Grade and install construction entrance(s).

49. Install perimeter protection (silt fence, brush barrier, etc.).
50. Construct sediment ponds and traps.
51. Grade and stabilize construction roads.
52. Construct surface water controls (interceptor ditches, pipe slope drains, etc.) simultaneously with clearing and grading for project development.
53. Maintain erosion control measures in accordance with the City of Port Orchard standards and manufacturer’s recommendations.
54. Relocate surface water controls and erosion control measures, or install new measures to ensure that as site conditions change the erosion and sediment control is always in accordance with the City of Port Orchard Erosion and Sediment Control Standards.
55. Cover all areas that will be idle for more than seven days during the dry season or two days during the wet season with straw, wood fiber mulch, compost, plastic sheeting, or equivalent.
56. Stabilize all areas that reach final grade within seven days.
57. Seed or sod any areas to remain idle until seed or sod is established.
58. Upon completion of the project, all disturbed areas must be stabilized and best management practices removed, if appropriate.
2.5 BOND REQUIREMENTS

A. General Information

Port Orchard Municipal Code Section 15.32 requires Performance and Maintenance Bonds to be posted for all construction projects to ensure all required site and public improvements are completed prior to final construction approval and subsequent certificate of occupancy. The bond amount shall comply with the currently adopted bonding rates for all required site improvements, including utilities, storm drainage, grading, required landscaping, and sensitive area buffer enhancement and restoration areas. The bond amount is based on the approved civil, landscape, and enhancement/restoration plans. The performance bond must be posted prior to permit issuance. Bond forms are located in Appendix B of this document.

After all site and public improvements are installed and final construction approval is granted, a two year Maintenance Bond must be posted to ensure the improvements will be maintained. The Maintenance bond must be posted prior to the release of the Performance Bond.

B. Types of Bonds

There are two types of “bonds” or financial guarantees that the City accepts for both Performance and Maintenance bonding.

1. Bonding Company Bond. The developer or general contractor obtains a bond from a bonding or insurance company for the total amount of all site improvements plus appropriate contingency as approved by the City Engineer. Only a licensed and bonded company can get a bond from a bonding company. The City has an approved form that may be used by the bonding company (alternate formats will require City approval). A contact person from the bonding company and a phone number must be specified on page two of this form and the bond must be notarized. Individuals cannot obtain a bonding company bond because they do not have the public liability insurance that the bonding company requires.

2. Frozen Fund. This type of bonding allows a developer, owner or general contractor to create a frozen fund account (place money in a special account) at their bank for the total amount of all site improvements plus appropriate contingency as approved by the City Engineer. Like the bonding company form, this is an approved form that must be notarized, and includes the account number, bank contact person and phone number.

Note: Other types of financial guarantees may also be approved by the City Engineer.
C. Performance Bonds

The City will accept a Performance Bond from the developer, owner or general contractor on a project. The maximum bonding period is five years (this corresponds with the life of the permit and the time limit to complete plat and short plat improvements after plat/short plat approval). On large projects, a bond may initially be posted for two years. The City Engineer determines what public and private improvements are required to be bonded for a specific project and establishes the bond amount based on the approved civil plans and the estimate submitted. Typically these include, but are not limited to:

- Storm System (conveyance, infiltration, dispersion, detention, treatment, etc.)
- Paving & Striping
- Grading, Temporary Erosion Control, Rockeries/Retaining Walls
- Landscaping: Required Landscaping is also a bonded site improvement item. The landscaper provides a written estimate based on the approved landscape plan, and the City Engineer approves the amount.
- Right-of-Way Restoration
- Buffer and Sensitive Area Mitigation, Enhancement, and/or Restoration
- Water and Sewer installation

For single family residences and subdivisions (plats and short plats), a performance bond must be posted for all site improvements, both private and public. A separate bond may be obtained for buffer and Sensitive Area Mitigation, Enhancement, and/or Restoration.

D. One-Time Bond Reduction

A one-time bond reduction may be granted upon request of the applicant. Upon request, the City Engineer will conduct an inspection to estimate the percent completion of the project. Percent completion will be based on the approved plans and construction cost estimate. No more than 85% of the original bond amount may be released prior to final construction approval.

E. Maintenance Bonds

Maintenance Bonds are required to ensure the maintenance of the site improvements and to guarantee against defects of workmanship and materials for a period of two years from the date of final project approval. In the case of buffer or sensitive area mitigation, enhancement, and restoration the Maintenance Bond is typically held for either a 3 or 5 year period depending on the permit requirements. The Maintenance Bond must be in place before the City will inspect and accept the work to release the Performance Bond or Frozen Fund.

F. Determining Bond Amount

Performance bond amounts are determined by an engineer’s cost estimate or contractor’s bid for the full cost (including labor, material, equipment, supervision, overhead, profit, etc.)
of all required site and public improvements and landscape work, etc., as shown on the approved civil plans. All estimates or bids shall be itemized and must include material, quantities, units and total unit price. The engineer’s estimate or contractor’s bid must include all site improvements, both public and private. For commercial, multi-family projects, and subdivisions, the estimate or bid must indicate the private and the public improvements separately.

The engineer’s estimate or contractor’s bid submitted by the developer or his/her designee, will be reviewed and verified by the City Engineer. A contingency will be established per the estimate, this additional amount is added to cover mobilization, prevailing wages, oversight, and other such costs to represent the full cost to the City to complete the construction/installation of the required improvement(s) should the developer fail to do so.

Once the engineer’s estimate or contractor’s bid is verified and the bond amount established and approved/accepted by the City Engineer, the bond amount will not be subsequently adjusted for changes in scope of work, materials, methods, quantities, increases or decreases, etc. that may be identified/favored by the developer. However, a one-time bond reduction will be allowed per Section 2.5.D.

G. Bond Release

1. **Performance Bond - Bonding Company.** This type of performance bond, whether for a building permit or short plat/subdivision, cannot be released until all bonded site improvements have been completed and approved. Once all the bonded improvements have been approved by the City’s Inspector, the developer must submit to the Public Works Office Manager, a written request to release the performance bond. Before the performance bond can be released, a 2-year maintenance bond must be secured. Once the maintenance bond has been submitted and approved, the City will provide written authorization to the bonding company to release the performance bond.

   A one-time bond reduction is available upon request. The contractor shall revise the cost estimate, noting the percent completion on each line item. The request shall be sent to the City Engineer for verification. A maximum of 85% of the bond may be released prior to project completion.

2. **Performance Bond-Frozen Fund:** This type of performance bond, whether for a building permit or short plat/subdivision, cannot be released until all bonded site improvements have been completed and approved. Once all the bonded improvements have been approved by the City’s Inspector, the developer must submit to the Public Works Office Manager, a written request to release the performance bond. Before the performance bond can be released, a 2-year maintenance bond must be secured. Once the maintenance bond has been submitted and approved, the City will provide written authorization to the bonding company to release the performance bond.
3. **Maintenance Bond (Bonding Company Bond or Frozen Fund Account):** Maintenance bonds will only be released upon satisfactory completion of the designated maintenance period. The holder of the bond shall send a written request for an inspection at least 30 days prior to bond expiration. The bonded improvements shall be inspected by the City’s representative and written notice will be provided to the applicant that the improvements are either approved and the maintenance bond can be released, or that additional work is necessary before the bond can be released.
Chapter 3

LAND DEVELOPMENT PERMITS

This chapter will address Land Development Permits associated with land development actions as required by City of Port Orchard Public Works. These permits may be managed and implemented by other departments; however, the Public Works Department will work in partnership to ensure compliance. Additional information and guidance is located in the Port Orchard Municipal Code (POMC). This chapter does not address land use and entitlements; these are located with the Department of Community Development (DCD).

Contained in this Chapter is the following information:

3.1 Applications
3.2 Tree Retention
3.3 Critical Areas Regulations
3.4 Shoreline Master Program
3.5 State Environmental Policy Act (SEPA)
3.6 Shoreline Master Program Policies & Regulations
3.7 Building Permits and Codes
3.8 Permits and Forms
3.1 Applications

We encourage all applicants to consider beginning with a Pre-Application Meeting. The purpose of a pre-application meeting is to review specific application requirements and to provide staff an opportunity to comment on a development proposal prior to submittal. Please refer to the City Pre-Application Meeting form for submittal requirements.

A partial listing of land use applications that may trigger associated review and permit activity from the Public Works and Community Development Departments include:

- Subdivisions (Plats)/Short Plats
- Rezones
- Conditional Use Permit
- Variances
- Grading Permits
- Special Use Permits
- Zoning Variances
- Minor Modifications to Conditional Use
- Shoreline Permits

The key to getting these permits reviewed promptly begins with the Applicant making a “Complete Application”. The staff will make a “Complete Application” designation within 28 days of the initial submittal. Many of these permits may require a Public Hearing before the Hearing Examiner; however, some may be processed internally as Administrative Permits. Administrative Permits do not typically require a Public Hearing unless there is an appeal. The process has been consolidated and compressed to enable the potential of reaching a decision within 120 days of a completed application. This goal of an optimal timeline has been established to meet state requirements for processing applications. It is the goal of the City, once the applicant completes the required steps, to issue a notice of final decision on a development permit on a timely basis. We strongly advise that you read the City codes and familiarize yourself with the details of each process.

3.2 Tree Retention

The goal of Port Orchard is to encourage the continuous, systematic planting and care of trees in our community. Retention of significant trees and forests in our community is a priority to our residents. We believe trees are good for our community, bringing many benefits including:

- A strong contribution to a community’s sense of identity and civic pride.
- Increased public awareness of the social, economical, and environmental impacts.
- Education opportunities for improvement to current urban forestry practices.
- Increased cooperation between public and private sectors to effectively manage urban forests.
• Encouraging and strengthening effective urban forestry programs in neighboring communities.

Significant and healthy trees should be retained. Removal of any significant tree with a diameter at breast height (DBH) of 36 inches or greater shall require City Council approval. Trees 18” or greater may require a significant tree retention plan.

Port Orchard Municipal Code 16.50 provides regulations regarding the Landscape standards, including Tree Protection. The purpose of these regulations are to enhance and preserve the aesthetic character of the community, improve the aesthetic quality of the built environment, promote retention and protection of existing native vegetation, reduce the impacts of development on storm drainage systems and natural habitats, and increase privacy for residential zones.

The DCD enforces tree preservation and landscaping ordinances. Staff members will work with developers, contractors, and landowners to protect trees during construction and to ensure new projects have adequate landscaping. The Public Works Department and DCD frequently collaborate on tree preservation and public education projects.

### 3.3 Critical Areas Regulations

The City of Port Orchard greatly values the environmental assets of wetlands, streams, trees and forests, and slopes and bluffs, as well as the shorelines within our community. Consequently, we closely review and regulate all development proposals, which seek to alter the condition of any land, water, or vegetation. Failure to comply with the provisions of POMC Title 18, Environmental Regulations shall be considered a violation and subject to enforcement procedures as provided for in the POMC.

### 3.4 Shoreline Master Program

The City of Port Orchard greatly values the shoreline and aquatic resources of our community. The City’s shoreline is managed via the City’s Shoreline Master Program under the granted authority of the State of Washington’s Shoreline Management Act (SMA). We closely review and regulate all development proposals, which seek to alter the condition of shore, land, water, or vegetation within the Shoreline jurisdiction. Under the SMA, the shoreline jurisdiction includes all water areas of the state, the lands underlying them, and areas that are 200 feet landward of the ordinary high water mark (OHWM) of waters that have been designated as “shorelines of the state.” “Shorelines of the state” are generally described as all marine shorelines and shorelines of all streams or rivers having a mean annual flow of 20 cubic feet per second or greater as well as lakes with a surface area greater than 20 acres.

The City is granted the authority for enactment and administration of the Shoreline Master Program through the Shoreline Management Act of 1971. Failure to comply with the provisions...
granted by the City shall be considered a violation and subject to enforcement procedures as provided for in the POMC.

3.5 State Environmental Policy Act (SEPA)

The City of Port Orchard complies with the state mandated State Environmental Policy Act (SEPA) regulations. Environmental review is required for any proposal, which involves a government “action,” as defined in the SEPA Rules (WAC 197-11-704). Project actions involve an agency decision on a specific project, such as a construction project or timber harvest.

The City of Port Orchard is identified as the “lead agency” under the SEPA Rules, and is responsible for conducting the environmental review for a proposal and documenting that review in the appropriate SEPA documents.

City of Port Orchard Municipal Code Chapter 14.04 SEPA, provides for clarification of the applicant and citizens participation of the application, review, and appeal process. Additional details related to the Environmental Checklist and SEPA Appeal Application Instructions can be found in POMC 14.04 State Environmental Policy Act.

3.6 Shoreline Master Program Policies & Regulations

Development and use proposals may involve a number of uses and shoreline modifications and must comply with the policies and regulations for each. Each project is reviewed for compliance with the applicable “use” policies and regulations in this Chapter and with the applicable policies and regulations in the applicable Chapters of the Development Guidelines. For example, uses associated with a new marina may include boat launches, industrial and port facilities, parking facilities, and recreational facilities. Construction of a marina may involve numerous shoreline modifications, including dredging, dredge spoil disposal, a jetty or breakwater, and possible landfill. All shoreline developments and uses must comply with the policies and standards of the Development Guidelines whether or not a shoreline substantial development permit is required.

The general policies are to be applied to all shoreline areas without regard to environment designation. The provisions are established in WAC 173-26-221. The policies incorporate much of the existing Shoreline Master Program content as well as significant incorporation of the “principles” sections that are listed in the WAC.

Specific conditions that ensure such compliance may be attached as a condition of permit approval. Shoreline uses specifically listed are permitted outright or eligible for consideration as a shoreline variance or shoreline conditional use permit. However, if the use is permitted, deviations from the minimum performance standards may be approved under a shoreline variance unless specifically stated otherwise. The performance standards contained herein augment standards established through other land development regulations. Where conflict arises between these and other applicable controls, the regulations that provide more
protection to the shoreline area shall apply. All provisions of this Shoreline Master Program are enforceable provided no reasonable alternatives exist or when the alternative would result in unreasonable and disproportionate cost to the landowner.

3.7 Building Permits and Codes

The City adopts the International Building Code (IBC) for code compliance. The Building Inspector completes the plan reviews and the compliance inspections. The Community Development Director supervises the Building Inspector.

Building permit applications are obtained at DCD, (360) 874-5533. Incomplete applications will not be processed. Plan Review fees are typically paid prior to formal Plan Review.

Building permits are required for site development features such as, but not limited to:

- Storm Water Detention Vaults,
- Retaining Walls/Rockeries 4 feet and over in height,
- Hard Surfaced Recreational Courts

Once the applicant has completed the application, the Building Inspector may lead the review team, confirming building code compliance. He may also call upon the Public Works Department and DCD to assess for applicable road standards and storm drainage code compliance, as well as zoning and land use compliance. The detail of the review depends on the complexity of the project. Upon completion of the review, the applicant will be contacted and asked to come to City Hall to correct any shortcomings or pay for the permit. Construction can commence as soon as the permit is paid and when the staff has issued the permit.

Water and sewer utility fees shall be paid at the time of building permit issuance.

The telephone number for the inspector is (360) 874-5533, the office hours are 8:00 AM to 4:00 PM, Monday through Friday.

3.8 Permits and Forms

The City has included a few of the most frequent application forms for your review to give you a better sense of the City’s expectations and details of the submittals in Appendix B.
CHAPTER 4

STREET TYPES AND GEOMETRICS

4.1 Streets – FAQ’s
   A. What do I need to know about access and design?
   B. What do I need to know about use of the street during construction?
   C. Where can I find additional information?

4.2 Street Classifications
   A. Function
   B. Terrain

4.3 Street Design Criteria
   A. Public Streets
   B. Private Streets
   C. Half Streets
   D. Cul-de-sacs and Eyebrows
   E. Alleys and Private Access Tracts
   F. Intersections
   G. Maximum Grade and Grade Transitions
   H. Stopping Sight Distance (SSD)
   I. Entering Sight Distance (ESD)
   J. Medians
   K. One-Way Streets
   L. Bus Zones and Turn-Outs
   M. Intersections with State or Federal Highways
   N. Slope, Wall and Drainage Easements
   O. Access and Circulation Requirements
   P. Ingress/Egress and Utility Easements
   Q. Design Variation Request
4.1 Streets – FAQ’s

The City of Port Orchard Review staff wants to work with you and your design consultant on the access and street frontage features of your development application. Design Elements may include site access design, curb design and location, landscape treatments, sidewalk location and width, street lighting, and paving requirements. Staff will offer guidance on the parking lot design to ensure it does not impede traffic on or to the property.

Developments such as short plats, have minimal impact on traffic volumes of the street system. However, larger retail and office proposals may have considerable impacts. The City Engineer and the Development Review staff review the traffic impacts of development proposals according to City Codes and State Environmental Law.

A. What do I need to know about access and design?

Depending on the City’s design standards for your type of project, the access to your development could be a commercial driveway, a private road, a joint-use driveway on an easement, or some other variation.

Review of your access design includes distance from neighboring access points, sight distance for drivers and pedestrians, width of the driveway, lane configurations such as turn lanes and drop-off lanes, and construction elements such as design of the driveway apron and grades.

B. What do I need to know about use of the street during construction?

Our staff will let you know early in the review process what you can expect as to right of way use requirements. If work is to be done on SR 160 or SR 166, the City will coordinate with WSDOT for concurrence of the proposed work. All roadway systems in Port Orchard have functional classifications (FCC Class); this classification will determine the potential to cut into the street fronting your site for utility work and the extent of subsequent restoration requirements. In addition, you may be required to obtain a right of way use permit for hauling during construction and for any requested street closures. The Public Works Staff processes right of way use permit applications and will work with you to determine optimal haul routes and potential lane closure details.

C. Where can I find additional Information?

The Transportation Plan Update - Final Report, dated December 2011, contains the framework for providing a transportation system to support growth of our community. The purpose of the City of Port Orchard Transportation Element is to identify, evaluate and recommend transportation improvements for the City through the planning horizon of 2025. It provides a vision for the City’s transportation system in 2025 and it is intended to guide
the development of that system by the City and other responsible stakeholders. This document is available for free on the City website or in print for a fee from the Public Works Department. Staff can be reached at (360) 876-4991.

4.2 Street Classifications

A. Function

Function is the controlling element for classification and shall govern right-of-way, street width and street geometries. Other given elements, such as access, spacing, ADT, etc. are merely typical. City streets are classified functionally as presented below and as shown in the Standard Details.

1. Principal Arterial

These essential roadways are “Inter community roadways” connecting primary community centers with major facilities. Principal arterials are generally intended to serve through traffic, with limitations for direct access to abutting properties. The principal arterial system frequently carries essential intra-urban and intra-city bus routes.

Under this definition, the City of Port Orchard has designated four principal arterials:

<table>
<thead>
<tr>
<th>Principal Arterials</th>
<th>Route Termini</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay Street</td>
<td>SR 16 to Bethel Avenue</td>
</tr>
<tr>
<td>Bethel Avenue</td>
<td>Bay Street to SE Mile Hill Drive</td>
</tr>
<tr>
<td>Bethel Road SE</td>
<td>SE Mile Hill Drive to SE Sedgwick Road</td>
</tr>
<tr>
<td>SE Sedgwick Road</td>
<td>SR 16 to western city limits</td>
</tr>
</tbody>
</table>

2. Minor Arterial

“Intra community roadways” connecting community centers with principal arterials. In general, minor arterials serve trips of moderate length. Access is partially controlled with infrequent access to abutting properties. Such facilities may carry local bus routes and provide intra-community continuity, but ideally does not penetrate identifiable neighborhoods.

Under this definition, the City of Port Orchard has designated fourteen minor arterials:

<table>
<thead>
<tr>
<th>Minor Arterials</th>
<th>Route Termini</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE Sedgwick Road</td>
<td>SR 16 to eastern UGA boundary</td>
</tr>
<tr>
<td>Bay Street</td>
<td>Bethel Avenue to Olney Avenue</td>
</tr>
<tr>
<td>Beach Drive E</td>
<td>Olney Avenue to eastern UGA boundary</td>
</tr>
<tr>
<td>Bethel Road SE</td>
<td>SE Mile Hill Drive to SR 16</td>
</tr>
<tr>
<td>Sidney Avenue</td>
<td>Bay Street to SR 16</td>
</tr>
<tr>
<td>Sidney Road SW</td>
<td>SW Berry Lake Road to UGA boundary</td>
</tr>
<tr>
<td>Pottery Avenue</td>
<td>Tremont St. SW to SW Berry Lake Road</td>
</tr>
</tbody>
</table>
3. Urban Collector or Rural Minor Arterial

These are streets connecting residential neighborhoods with smaller community centers and facilities as well as access to the minor and principal arterial system. Property access is generally a higher priority for Urban Collectors and through-traffic movements are served as a lower priority. The study area includes Rural Major Collectors that serve rural areas adjacent to the Urban Growth Area.

Under this definition, the City of Port Orchard has designated thirteen collector arterials:

<table>
<thead>
<tr>
<th>Urban Collector or Rural Minor Collector</th>
<th>Route Termini</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olney Avenue</td>
<td>Horstman Drive to SE Mile Hill Drive</td>
</tr>
<tr>
<td>Port Orchard Boulevard</td>
<td>Bay Street to Tremont Street SW</td>
</tr>
<tr>
<td>Old Clifton Road</td>
<td>SR 16 to McCormick Woods Drive SW</td>
</tr>
<tr>
<td>SW Berry Lake Road</td>
<td>Sidney Road SW to western UGA boundary</td>
</tr>
<tr>
<td>Mitchell Avenue</td>
<td>Bay Street to SE Mile Hill Drive</td>
</tr>
<tr>
<td>Mitchell Road SE</td>
<td>SE Mile Hill Drive to Bethel Avenue</td>
</tr>
<tr>
<td>SE Lincoln Avenue</td>
<td>Mitchell Road SE to Karcher Road SE</td>
</tr>
<tr>
<td>SE Salmonberry Road</td>
<td>Bethel Road SE to Eastern City Boundary</td>
</tr>
</tbody>
</table>

These streets are established Urban Collector or Rural Minor Arterials. Improvements may include widening, resurfacing, restoration, addition or relocation of utilities, addition of right-of-way, etc.

4. Local Access Streets

These are Streets providing direct access to individual residential or commercial properties. Local access streets are an integral part of the street network, providing important travel routes for pedestrians and bicyclists. Local access streets include all streets that are not functionally classified as arterials or collectors. The transportation plan addresses the improvement needs of only the functionally classified arterial and collector street system within the study area.

a. Commercial/Industrial – Commercial or industrial local access streets provide circulation and loading sites, and abut retail stores, warehouse facilities, manufacturing facilities, processing plants, dense multi-family dwellings, office and professional buildings.
b. Residential – Residential access streets provide circulation through single-family residential neighborhoods and access to individual lots.

c. Sub-Collector – Sub-collector streets provide circulation within neighborhoods and connections to neighborhood collectors and arterials. They have the potential to serve up to 100 single-family dwelling units.

d. Sub-Access – Sub-access streets provide connection to sub-collector streets, but do not support through-traffic. They include short through streets, cul-de-sacs and loops. Sub-access streets have the potential to serve up to 35 single-family dwelling units.

e. Local Access – Minor access streets include permanent cul-de-sacs and loops. They have the potential to serve up to 16 single-family dwelling units.

5. Private Street – Private streets are privately owned and maintained, with vehicular access routes serving three or more lots, parcels or tracts, which do not have frontage on a public street right-of-way. The City of Port Orchard does not maintain private streets.

B. Terrain

Terrain is a basis for further classification of geometric requirements.

1. Flat terrain is that condition where roadway sight distances, as governed by both horizontal and vertical restrictions, are generally long or could be made to be so without construction difficulty or major expense. The slope of the existing terrain is from 0 to 5%.

2. Rolling terrain is that condition where the natural slopes consistently rise above and fall below the roadway grade line. Occasional steep slopes restrict normal roadway alignment some. The slope of the existing terrain is from 5 to 15%.

3. Mountainous terrain is that condition where longitudinal and traverse changes in ground elevation, with respect to the roadway, are abrupt and where the roadbed is obtained by frequent benching or side hill excavation. The slope of the existing terrain exceeds 15%.

Terrain classification pertains to the general character of the specific route corridor. Streets in valleys or passes of mountainous areas that have all the characteristics of streets traversing flat or rolling terrain should be classified as flat or rolling. In cases where terrain classification is in question, the City Engineer shall make the final decision.

4.3 Street Design Criteria

A. Public Streets

1. Standards for design and construction of new or reconstruction of existing arterial, commercial and industrial streets in the City of Port Orchard shall follow the criteria
shown in the table named “Arterial and Commercial/Industrial Street Design Elements.” Standards for design and construction of new or reconstruction of existing residential access streets shall follow the criteria shown in the table named “Residential Access Street Design Elements.” AASHTO's "A Policy on Geometric Design of Highways and Streets" shall govern all design elements not shown in these standards.

2. The Developer’s Engineer should consider certain factors when specifying the classification of a new public street. These include, but are not limited to, the street function, traffic volume, terrain, density of the proposed or existing development, the surrounding developments, the proposed or existing zoning, the existing roads in the immediate area, the cost relationship of the proposed improvements, and other such factors deemed significant of the proposal being reviewed in light of public health, safety and welfare. In cases where street classification, street width and/or right-of-way width are in question, the City Engineer shall make the final decision.

3. Additional or alternate standards may be required for design and construction of new or reconstruction of existing streets within the downtown zones. Refer to the City of Port Orchard Transportation Element of the Comprehensive Plan.
### Table 4.1: Arterial and Commercial/Industrial Street Design Elements

<table>
<thead>
<tr>
<th>Design Elements</th>
<th>Classification</th>
<th>Principal (A-D)</th>
<th>Minor (A-F)</th>
<th>Collector (A-D)</th>
<th>Local Commercial/Industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADT^{2} (x 1000)</td>
<td></td>
<td>&gt; 30</td>
<td>15 – 30</td>
<td>5 – 15</td>
<td>—</td>
</tr>
<tr>
<td>Max. Design Speed (mph)</td>
<td></td>
<td>50</td>
<td>50</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>Horizontal Curve Radius (ft)</td>
<td>Minimum</td>
<td>1,200</td>
<td>760</td>
<td>465</td>
<td>250</td>
</tr>
<tr>
<td>Superelevation Rate (%)</td>
<td>Maximum</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Centerline Grade (%)</td>
<td>Minimum</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Stopping Sight Distance (ft)^3</td>
<td>Minimum</td>
<td>650</td>
<td>475</td>
<td>325</td>
<td>200</td>
</tr>
<tr>
<td>Entering Sight Distance (ft)^3</td>
<td>Minimum</td>
<td>810</td>
<td>685</td>
<td>555</td>
<td>430</td>
</tr>
<tr>
<td>Passing Sight Distance (ft)^3</td>
<td>Minimum</td>
<td>2,100</td>
<td>1,800</td>
<td>1,500</td>
<td>1,100</td>
</tr>
<tr>
<td>Crest Vertical Curves (K)^3.5</td>
<td>Minimum</td>
<td>150</td>
<td>60</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Sag Vertical Curves (K)^3.5</td>
<td>Minimum</td>
<td>100</td>
<td>60</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>Street Width (ft)^{6,7}</td>
<td>Minimum</td>
<td>94</td>
<td>70</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Intersection Return Radius (ft)^3</td>
<td>Minimum</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Intersection R-O-W Radius (ft)</td>
<td>Minimum</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

**Notes:**

2. Average Daily Traffic (ADT) includes forecasted future development, if future street extension is possible.
3. Design elements based on the assumption that arterial streets will not be designed in areas of steep terrain (> 5%).
4. Maximum centerline grade may be exceeded for short distances, subject to approval by City Engineer. String lines for curb grades less than 0.8% shall be certified by a surveyor prior to curb installation.
5. K-value, length in feet per percent of algebraic grade difference. Vertical curve length, \( L = K \times A.D. \) Grade differences less than 1% do not require a vertical curve. Minimum vertical curve length = 50'.
6. Paved street width includes gutter section, not curb.
7. Street and right-of-way widths will vary if additional paving is necessary for on street parking, turning lanes, bus lanes, etc.
8. Intersection return radius refers to face of curb radius.
### Table 4.2: Residential Access Street Design Elements

<table>
<thead>
<tr>
<th>Design Elements&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Classification</th>
<th>Urban Collector</th>
<th>Local Access</th>
<th>Private Street</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub-Collector</td>
<td>Sub-Access</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of Single-Family Dwelling Units Served&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Over 50</td>
<td>20 – 100</td>
<td>35 max.</td>
<td>16 max.</td>
</tr>
<tr>
<td>Design Speed (mph)</td>
<td>Flat</td>
<td>35</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Rolling</td>
<td>35</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Mountainous</td>
<td>25</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Horizontal Curve Radius (ft) Minimum</td>
<td>Flat</td>
<td>380</td>
<td>275</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Rolling</td>
<td>380</td>
<td>275</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Mountainous</td>
<td>185</td>
<td>185</td>
<td>55</td>
</tr>
<tr>
<td>Superelevation Rate (%)</td>
<td>Maximum</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Centerline Grade (%)&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Minimum</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Stopping Sight Distance (ft) Minimum</td>
<td>Flat</td>
<td>250</td>
<td>200</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>Rolling</td>
<td>250</td>
<td>200</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>Mountainous</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Crest Vertical Curves (K)&lt;sup&gt;4&lt;/sup&gt;</td>
<td>Flat</td>
<td>40</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Rolling</td>
<td>30</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Mountainous</td>
<td>20</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Sag Vertical Curves (K)&lt;sup&gt;4&lt;/sup&gt;</td>
<td>Flat</td>
<td>50</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Rolling</td>
<td>40</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Mountainous</td>
<td>30</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Street Width (ft)&lt;sup&gt;5&lt;/sup&gt;</td>
<td>Minimum</td>
<td>38</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Intersection Return Radius (ft)&lt;sup&gt;5&lt;/sup&gt;</td>
<td>Minimum</td>
<td>35</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Intersection R-O-W Radius (ft)</td>
<td>Minimum</td>
<td>50</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

**Notes:**
2. Number of S.F. dwelling units served includes forecasted future development, if future street extension is possible.
3. Maximum centerline grade may be exceeded for short distances, subject to approval by City Engineer. String lines for curb grades less than 0.8% shall be certified by a surveyor prior to curb installation.
4. K-value, length in feet per percent of algebraic grade difference. Vertical curve length, \( L = K \times A.D. \) Grade differences less than 1% do not require a vertical curve. Minimum vertical curve length = 50’. Maximum K-value (Sag Vertical Curve) = Minimum K-value + 20’.
5. Paved street width includes gutter section, not curb.
6. Intersection return radius refers to face of curb radius.
B. Private Streets

1. While community vehicular access requirements may be served by public streets, owned and maintained by the City, private streets may be more appropriate for some local access streets. Usually these are minor access streets, either residential or commercial.

2. Private streets may be approved only when they are:
   a. Permanently established by right-of-way or tract 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
   b. Built to City of Port Orchard Design and Construction Standards and Specifications, as set forth herein and
   c. Properly signed and are accessible at all times for emergency and public service vehicle use; and
   d. Not obstructing, or part of, the present or future public neighborhood circulation plan developed in processes such as the City of Port Orchard Comprehensive Plan, applicable community plan, or Capital Improvement Program; and
   e. Not going to result in land lock of present or future parcels; and
   f. Not needed as public streets to meet the minimum street spacing requirements of these Standards; and
   g. Designed to serve a minimum potential of two single-family dwelling units when the entire length of the private street system to the nearest public street is considered. The maximum potential is the number of dwelling units that can possibly be served by the street when physical barriers, zoning or other legal constraints are considered; and
   h. Maintained by a capable and legally responsible homeowners’ association or other legal entity made up of all benefited property owners with an escrow account and a road maintenance agreement for all parties involved, under the provisions as established by the City of Port Orchard; and
   i. Clearly described on the face of the short plat, or other development authorization and clearly signed at street location as a private street, for the maintenance of which City of Port Orchard is not responsible; and
   j. A road maintenance agreement shall be established for all parcels benefitting from the access and shall be recorded prior to issuance of first Certificate of Occupancy for a structure in the development.

3. The City of Port Orchard will not accept private streets for maintenance as public streets until such streets are brought into conformance with current City of Port Orchard Design

www.cityofportorchard.us       publicworks@cityofportorchard.us       Updated 7/3/2014
and Construction Standards and Specifications. This requirement will include the design standards for the street classification placed upon the private street.

4. The City of Port Orchard will not accept private streets within short plats when the streets providing access to the plat are private and already have the potential to serve more than the number of lots specified in Section 4.2.A.5 Private Streets. Short plats proposed on properties to which the access is over private streets that do not meet the standards in this section shall be denied.

C. Half Streets

1. A half street may be permitted as an interim facility only when:
   a. Such street shall not serve as primary access to more than 16 dwelling units or tax lots; and
   b. Such alignment is consistent with or will establish a reasonable circulation pattern; and
   c. 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 street.

2. A half street shall meet the following requirements:
   a. Right-of-way width of the half street shall equal at least 33 feet; and
   b. Should be designed to accommodate ultimate section; and
   c. Traveled way shall be surfaced the same as the designated street type to a width not less than 20 feet. Curb, planter strip and sidewalk shall be constructed as required for the designated street type; and
   d. Property line edge of street shall be finished with shoulders, ditches, and/or side slopes so as to assure proper drainage, bank stability, and traffic safety; and
   e. Gravel shoulders shall be provided to a width of 2 feet and adequate drainage provided on the unimproved half of the street; and
   f. Half streets shall not intersect other half streets unless so approved by the City Engineer.

3. When a half street is eventually completed to a whole street, the completing builder shall saw-cut the existing pavement along the center of right of way to establish the final centerline and shall reconstruct the original half street as necessary to produce a proper full-width street of designated section to include grinding and overlaying the original street segment from intersection to intersection.

4. The obtaining of any right-of-way needed to accomplish the above shall be the responsibility of the owning builder or developer.
D. Cul-de-sacs and Eyebrows

1. In general, permanent cul-de-sacs and dead-end streets are discouraged in the design of street systems and should only be used when the presence of natural features; topography and/or vehicular safety factors make a vehicular connection impractical. Where cul-de-sacs or dead-end streets are unavoidable, site or subdivision plans shall incorporate provisions for future vehicular connections to adjacent, undeveloped properties, and to existing adjacent development where existing connections are poor.

2. Whenever a cul-de-sac dead end road extends more than 150 feet measured from the centerline of intersecting road to the farthest extent of surfaced traveled way, a widened “bulb” shall be constructed.

   A minimum public right-of-way diameter across the bulb section shall be 100 feet. The right-of-way may be reduced with approval of the City Engineer.

   Minimum diameter across the bulb shall be per the currently adopted International Fire Code.

   Roads in areas zoned Commercial or Industrial shall have a minimum roadway diameter of 100 feet. When on-street parking is required an additional 16 feet of paving is required.

3. Whenever a non-through (dead end) street serves more than two lots or extends more than 150 feet from centerline of the accessing street to farthest extent of surfaced traveled way a widened “bulb” (cul-de-sac) shall be constructed.

4. The cul-de-sac island is an optional feature for any cul-de-sac, subject to City of Port Orchard approval. If provided, the cul-de-sac island shall have full-depth vertical curb. Minimum radius shall be 10 feet (maximum 15 feet) and shall provide at least 30 feet of paved traveled way in a curb type section around the circumference. The island shall be landscaped and shall have adequate topsoil to support the growth of acceptable vegetation with a slope from the center of the island to the curb edge adequate to allow water runoff. Artificial materials that mimic plants or grass are not acceptable alternatives to living vegetation. The adjoining lot owners shall maintain the vegetation.

5. A permanent cul-de-sac shall not be longer than 450 feet measured from centerline of intersecting street to the center of the bulb section along the centerline of the street. Proposed exceptions to this rule will be considered by the City Engineer based on long-term traffic planning factors such as topography and critical areas. The cul-de-sac length may extend to 600 feet if 30 or fewer potential dwelling units, based upon current land use density, are to be served.

6. The City Engineer may require an off-street walkway and/or an emergency vehicle access to connect the cul-de-sac at its terminus with other streets, parks, schools, bus stops, or other pedestrian traffic generators, if current or future need exists.
7. If a street is temporarily terminated at a plat or phase boundary, and serves more than three parcels or is longer than 150 feet, then a temporary cul-de-sac shall be constructed at the boundary, in accordance with the Standard Details.

A barricade with a sign stating "Street to be Extended in Future" shall be installed at the terminus of the temporary cul-de-sac. Appropriate easements shall be recorded if the temporary cul-de-sac extends into the adjacent property.

Removal of the temporary cul-de-sac, restoration and extension of the sidewalk, landscape strip, storm drainage systems, and street illumination shall be the responsibility of the developer who extends the street. Plat development, as it relates to finished grade, shall allow for the logical extension of said improvements without significantly influencing the existing development and residents.

8. The maximum cross slope in a bulb shall not exceed six (6) percent in any direction.

9. Partial bulbs or eyebrows shall have a minimum paved radius and geometry of a cul-de-sac design as described above. The island shall be offset ten (10) feet from edge of traveled way.

E. Alleys and Private Access Tracts

1. An alley is considered a private street.

   a. Serves a maximum of 20 lots for alleys, with a maximum length of 300 feet, no dead ends or cul-de-sacs will be allowed.

   b. Minimum tract width 20 feet with a pavement surface of 16 feet, based on a ten-foot structure setback. For differing structure setback requirements, alley configuration shall be designated to provide for safe turning access to properties and rear yard fences shall not be placed within the sight triangle for the driveways.

   c. Public streets to which an alley connects or which provide access to the front boundary of the properties served by the alley shall be 24-foot minimum paved width. Alley entry shall be provided by a driveway cut for residential use or commercial use.

      Modifications to existing alleys serving commercial or industrial properties, in accordance with the above, will be determined on a case-by-case basis subject to approval by the City.

2. A Private residential access tracts shall conform to the following:

   a. Serves a maximum of two remote parcels, where the two adjoining lots to the access tract that abut a public way shall also gain access via the access tract.

   b. Minimum tract width of 28 feet with a maximum length of 150 feet, measured from centerline of intersecting street to furthest extent of paved tract along the centerline of the street.
c. Pavement width shall be a minimum of 24 feet.
d. Easements may be required for utilities and/or drainage.

F. Intersections

1. Intersection Geometry
   a. All intersections shall be designed at right angles to the intersecting street, where possible. The skew angle shall not vary by more than 10 degrees from a right angle, measured 20 feet beyond the intersecting right-of-way. At four-legged intersections, opposite legs shall lie on a straight alignment.

   b. Minimum curb radius
      Streets (Classified Collector or higher) 35 Feet
      Local Access Streets 30 Feet
      (highest classification involved is collector)

   c. Minimum right-of-way line radius
      Local Access 30 Feet
      Commercial 35 Feet
      Arterial 50 Feet

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

   When highest classification involved is: Minimum centerline offset shall be:
   Arterial (Principal and Minor) 1,000 Feet
   Collector Arterial 500 Feet
   Local Access 150 Feet
   Alley 100 Feet

3. On sloping approaches at an intersection, landings shall conform to AASHTO standards (Intersection Landing).

G. Maximum Grade and Grade Transitions

1. Maximum centerline grade may be exceeded for short distances of 300 feet or less, upon showing that no practical alternative exists and will require verification by the Fire Marshall that additional fire protection requirements will be met. Grades exceeding 12 percent shall be paved with asphalt concrete (AC) or Portland cement concrete (PCC).

   Acceptable grade to assure proper emergency access, sight distance and stormwater management is an important consideration for the design of a roadway. Maximum grades can vary with road use. A steeper grade may be more acceptable on an urban residential road than on a rural road serving heavy trucks. Intersections on steep grades should be avoided whenever possible, especially in areas with recurring snow and ice problems. Ease of access for an emergency vehicle is also to be considered when
establishing grades. Centerline slopes greater than 12% requires approval of the Fire Marshall. For projects, AASHTO’s “A Policy on Geometric Design of Highways and Streets” includes tables of maximum grades related to design speed and terrain.

The maximum centerline grade on any new or reconstructed road shall not exceed 12 percent (See Tables 4-1 and 4-2).

The maximum grade across a cul-de-sac bulb shall not exceed 6 percent. With curbed roadways, longitudinal grades should be provided to facilitate surface stormwater management. An appropriate minimum grade is typically 0.5 percent. Particular attention should be given to the design of stormwater inlets and their spacing to keep the distance of water on the traveled way within tolerable limits.

2. Grade transitions shall be constructed as smooth vertical curves except in instances where the difference in grade is one percent or less and upon approval of the City Engineer. The minimum vertical curve length shall be determined by multiplying the algebraic grade difference by the minimum K-value for the vertical curve type and applicable street classification. Maximum K-values for sag vertical curves on residential access streets are required for adequate street drainage.

H. Stopping Sight Distance (SSD)

Stopping sight distance (SSD) for streets please refer to the Table 4-1 or 4-2 in Section 4.3.A for specific SSD values based on required design speed.

1. Height of eye is 3.5 feet and height of object is 0.5 feet.

2. Minimum SSD for any downgrade averaging three percent or steeper shall be increased by the values shown below (Source: AASHTO Policy on Geometric Design, Table III-2). Interpolate values for other design speeds and grades.

<table>
<thead>
<tr>
<th>DESIGN SPEED (MPH)</th>
<th>3 Percent</th>
<th>6 Percent</th>
<th>9 Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>30</td>
<td>40</td>
<td>70</td>
</tr>
<tr>
<td>25</td>
<td>70</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>55</td>
<td></td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>40</td>
<td>20</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>15</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>10</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>15</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>0</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

3. Sag vertical curves on local access streets with stopping sight distance less than that called for in the table “Residential Access Street Design Elements” in Section 4.3.A may be approved by the City Engineer under the following circumstances:
a. No practical design exists,
b. Acceptable street lighting is provided throughout the curve, and
c. Street lighting is maintained by a franchised utility.

4. Intersecting Stopping Sight Distance.
   a. Stopping sight distances for the design speeds of proposed commercial access
      streets, neighborhood collector streets and arterials must be met when intersecting
      arterials.
   
   b. The minimum stopping sight distance on proposed intersection approaches for all
      other classifications of intersecting streets shall be reviewed with the City Engineer.

I. Entering Sight Distance (ESD)

Entering sight distance (ESD) applies on driveways and on streets approaching intersections.
Specific ESD values for required design speeds are listed in the table “Arterial and
Commercial/Industrial Street Design Elements” in Section 4.3.A.

1. Entering vehicle eye height is 3.5 feet, measured from 10-foot back from edge of
   traveled way. Approaching vehicle height is 4.25 feet.

2. Requirements in the Standard Details apply to an intersection or driveway approach to a
   typical street under average conditions. In difficult topography, the City Engineer may
   authorize a reduction in the ESD based on factors mitigating the hazard. Such factors
   may include an anticipated posted or average running speed less than the design speed
   or the provision of acceleration lanes and/or a median space allowing an intermediate
   stop by an approaching vehicle making a left turn.

3. Where a significant number of trucks will be using the approach street, the City Engineer
   may increase the entering sight distance requirements by up to 30 percent for single-
   unit trucks and 70 percent for semi-trailer combinations.

J. Medians

1. Median width shall be 10 feet wide between travel lanes and six feet wide between a
   travel and turning lane and be additional to, not part of, the specified width of traveled
   way.

2. Edges shall be similar to outer street edges, formed with vertical Portland cement
   concrete curb.

3. Twenty feet of drive surface (which includes traveled way and paved shoulders) shall be
   provided on either side of the median, or as approved by the City Engineer.

4. Medians shall be designed so as not to limit turning radii or sight distance at
   intersections.
5. No portion of a side street median may extend into the right-of-way for an arterial street.

6. The City Engineer may require revisions to medians as necessary to maintain required sight distance.

7. Street trees shall be planted in median subject to approval by the City Engineer.

K. One-Way Streets

Local access streets, including loops, may be designated one-way upon a finding by the City Engineer and Fire Marshall that topography or other site features make two-way traffic impractical or to improve the flow of traffic and/or pedestrian safety.

L. Bus Zones and Turn-Outs

During the design of arterials and neighborhood collectors, the designers shall contact Kitsap Transit Service Planning, phone (360) 373-2877, and the local school district to determine bus zone (stop) locations and other bus operation needs. The street project shall provide wheel chair accessible landing pads at designated bus zones where required, shall include turn-outs and shelter pads. Pedestrian and handicapped access improvements within the right-of-way to and from the bus-loading zone or turnout from nearby businesses or residences shall also be provided as part of the street improvement. Surfacing requirements may also be affected, particularly on shoulders.

M. Intersections with State or Federal Highways

In the event that the City has jurisdiction on a development that requires the construction or improvement of a residential/commercial/industrial driveway or any classification of street that intersects a state or federal highway, minimum intersection spacing, entering sight distance and landing requirements in accordance with these Standards shall be satisfied in addition to the requirements of all other applicable permits. In the instance State or Federal standards exceed these Standards, State or Federal standards shall govern. Public Works Staff will work with WSDOT for concurrence of the design on State or Federal highways.

N. Slope, Wall and Drainage Easements

Either the functional classification or particular design features of a street may necessitate slope, sight distance, and wall or drainage easements beyond the right-of-way line. Such easements may be required by the City Engineer in conjunction with dedication or acquisition of right-of-way and required to be obtained by the Developer.

O. Access and Circulation Requirements

No residential street shall serve more than a total of 30 lots or dwelling unless, based upon the highest developable density allowed in that zone, the street is connected in at least two locations with another street.
1. The second access requirement may be satisfied through use of connecting a new street to an existing street in an adjacent neighborhood if:
   a. No other practical, excluding financial, alternative exists, or
   b. Existing street was previously stubbed indicating intent for future access, or
   c. An easement has been recorded specifically for said purpose.

2. The second access requirement may not be satisfied through use of an existing street network in the existing adjacent neighborhood if:
   a. A more practical alternative exists, or
   b. Existing street is private, or
   c. Existing street does not meet the minimum design elements for the ultimate classification of the street.

3. The second access requirement may cause the construction of an off-site street connecting the development to a suitable serving street.

4. These provisions are not intended to preclude the state statute on land-locked properties.

5. This section does not preclude a commercial project from gaining access through a residential development or other commercial development. Traffic impacts for such projects will be analyzed and mitigation measures developed prior to the SEPA process.

6. Location of the second access shall have the concurrence of the Fire District.

**P. Ingress/Egress and Utility Easements**

For access to a parcel(s) which must cross a property adjacent to City Right-of-Way, an ingress/egress and utility easement shall be required. The easement shall be a minimum width of 18 feet. The easement shall be recorded and a copy of the recorded document submitted with the Final Plat Application.

**O. Design Variation Request**

If the applicant/developer is unable to meet the standards as adopted in the Development Guidelines, a Design Variation Request Application may be submitted to the City Engineer for review. This application shall be submitted as part of the Site Development Activity Permit (SDAP) Application.
PRINCIPAL ARTERIAL A

FOUR LANES (WITH CENTER LANE OR MEDIAN) & ONE
MULTI-USE PATH
PRINCIPAL ARTERIAL B

FOUR LANES (WITH CENTER LANE OR MEDIAN) & BIKE LANES

City of Port Orchard

FILE NAME: PRINCIPAL ARTERIAL B
DRAWING NUMBER: B 401
SCALE: NTS
REVISION DATE: 04/08/14
DRAWN BY: AAP

City of Port Orchard
Est. 1890
PRINCIPAL ARTERIAL C

TWO LANES (WITH CENTER LANE OR MEDIAN) & ONE
MULTI-USE PATH
PRINCIPAL ARTERIAL D

TWO LANES (WITH CENTER LANE OR MEDIAN) & BIKE Lanes

DRAWN BY: AAP

REVISION DATE: 04/08/14

SCALE: NTS

DRAWING NUMBER: 403
MINOR ARTERIAL A

FOUR LANES (WITH CENTER LANE OR MEDIAN) & ONE MULTI-USE PATH

City of
Port Orchard
Est. 1890
MINOR ARTERIAL B

FOUR LANES (WITH CENTER LANE OR MEDIAN) & BIKE LANE

STREET WIDTH
70'-86' WITH OPTIONAL PARKING

RIGHT-OF-WAY
90'-106' WITH OPTIONAL PARKING

6' MIN. 4' 8' PARKING (OPTIONAL) 5' BIKE 12' TRAVEL LANE 12' TRAVEL LANE 12' MEDIAN OR 2-WAY TURN LANE 12' TRAVEL LANE 12' TRAVEL LANE 5' BIKE 8' PARKING (OPTIONAL) 4' 6' MIN. 5/W

City of Port Orchard
Est. 1890

FILE NAME: 421.DWG
DRAWING NUMBER: 421
SCALE: NTS
REVISION DATE: 04/08/14
DRAWN BY: AAP
DRAWING NUMBER: 421
MINOR ARTERIAL C

TWO LANES (WITH CENTER LANE OR MEDIAN) & ONE MULTI-USE PATH

City of Port Orchard
Est. 1890
MINOR ARTERIAL D

TWO LANES (WITH CENTER LANE OR MEDIAN) & BIKE LANES
MINOR ARTERIAL E

TWO LANES WITH ONE MULTI-USE PATH

RIGHT-OF-WAY
54' - 70' WITH OPTIONAL PARKING

STREET WIDTH
24' - 40' WITH OPTIONAL PARKING

+2' SHOULDER EACH SIDE DESIRABLE

12'
4'
PARKING (OPTIONAL)

8'
12'
TRAVEL LANE

12'
8'
TRAVEL LANE

4'
6'
PARKING (OPTIONAL)

5/W

Revised by:
AAP

Revised Date: 04/08/14

Scale: NTS

Drawing Number: 424

City of Port Orchard
Est. 1890
MINOR ARTERIAL F

TWO LANES WITH BIKE LANES

STREET WIDTH
34' - 50' WITH OPTIONAL PARKING

RIGHT-OF-WAY
54' - 70' WITH OPTIONAL PARKING

- 6' MIN.
- 5' S/W
- 8' BIKE PARKING (OPTIONAL)
- 12' TRAVEL LANE
- 5' TRAVEL LANE
- 5' BIKE PARKING (OPTIONAL)
- 4' 6' MIN.
- 5' S/W

City of Port Orchard
Est. 1890

FILE NAME: DWG 425.DWG
DRAWING NUMBER: 425
SCALE: NTS
REVISION DATE: 04/08/14
DRAWN BY: AAP

Est. 1890
COLLECTOR A

TWO LANES (WITH CENTER LANE OR MEDIAN) & ONE
MULTI-USE PATH
COLLECTOR B

TWO LANES (WITH CENTER LANE OR MEDIAN) & BIKE LANES
COLLECTOR C

TWO LANES WITH ONE MULTI-USE PATH
COLLECTOR D

TWO LANES WITH BIKE LANES
LOCAL A

2 Lanes

City of Port Orchard

Est. 1890

FILE NAME:
DRAWING NUMBER
SCALE
REVISION DATE
DRAWN BY

City of Port Orchard
Est. 1890

FILE NAME: U:\ASST. ENG\DEVELOPER'S HANDBOOK\CAD STANDARDS\CHAPTER 4 STREET TYPES\LOCAL A DWG 460.DWG
DRAWING NUMBER:
SCALE
REVISION DATE
DRAWN BY

LOCAL A

2 LANES

STREET WIDTH

34' - 50' WITH OPTIONAL PARKING

S/W

6' MIN.

7'

PARKING (OPTIONAL)

11' - 12'

TRAVEL LANE

11' - 12'

TRAVEL LANE

PARKING (OPTIONAL)

7'

S/W

6' MIN.

RIGHT-OF-WAY

24' - 40' WITH OPTIONAL PARKING

S/W

7'

PARKING (OPTIONAL)

11' - 12'

TRAVEL LANE

11' - 12'

TRAVEL LANE

PARKING (OPTIONAL)

7'

S/W

6' MIN.
ST. ANDREWS DRIVE SW (PUBLIC)
(FILL SECTION w/ THICKENED EDGE)
NOT TO SCALE

ST. ANDREWS DRIVE SW (PUBLIC)
(FILL SECTION w/ DITCH)
NOT TO SCALE
City of Port Orchard

McCormick Woods B
ST. ANDREWS DR. SW (PUBLIC) (CUT) & HAWKSTONE

NOT TO SCALE

ST. ANDREWS DRIVE SW (PUBLIC) (CUT SECTION w/ DITCH)

HAWKSTONE AVE. SW (PUBLIC)

2" HOT MIX ASPHALT (HMA) PAVEMENT
4" COMPACTED REFINISHED SURFACING TOP COURSE

1.5' THICKENED EDGE

McCormick Woods B
ST. ANDREWS DR. SW (PUBLIC) (CUT) & HAWKSTONE

DRAWN BY: AAP
REVISION DATE: 04/08/14
SCALE: NTS
DRAWING NUMBER: 481
30 FOOT ROAD SECTIONS – PRIVATE AND PUBLIC

McCormick Woods C

TYPICAL 30' ROAD SECTION (PUBLIC)

TYPICAL 30' ROAD SECTION/ACCESS TRACT (PRIVATE)
McCormick Woods D

40 FOOT ROAD SECTION – PUBLIC
McCormick Woods F

MCCORMICK WEST SUB-COLLECTOR DETAILS
MCCORMICK WEST LOCAL ROAD MINOR – LOOP & W/MEDIAN

LOCAL ROAD MINOR w/ MEDIAN
SECTION C

LOCAL ROAD MINOR LOOP
SECTION D
McCormick Woods H

MCCORMICK WEST LOCAL ROAD MINOR & LOCAL MINOR ACCESS LANE

City of Port Orchard
Est. 1890
McCormick Woods I

MCCORMICK WEST PRIVATE ACCESS TRACT
McCormick Woods K

MCCORMICK NORTH PHASE III – ROADS 2 THRU 5

City of Port Orchard
Est. 1890
McCormick Woods M

MCCORMICK NORTH PHASE III — ROAD 6 — 70' RIGHT-OF-WAY
CHAPTER 5

DRIVEWAYS, SIDEWALKS, CURBS, AND TRAILS

5.1 Overview

5.2 General Design Guidelines
   A. Sub-grade
   B. Surfacing Material
   C. Curbs
   D. Replacement

5.3 Driveways
   A. New Driveways Design Details
   B. Existing Driveways
   C. New Commercial Driveways
   D. Prohibited Driveways

5.4 Sidewalks
   A. Design Guidance
   B. Curb Ramps
   C. Concrete Steps
   D. ADA Access Ramps

5.5 Curb and Gutters
   A. Curb Overview
   B. Vertical Curbs and Rolled Curbs

5.6 Expansion Joints
   A. Design Guidance

5.7 Pedestrian, Bicycle, and Equestrian Trails
   A. Separated Pedestrian Trails
   B. Bikeways
   C. Equestrian Trail Facilities
   D. Asphalt Shoulder Trails
5.1 Overview

This chapter addresses details that often may be overlooked. This material will provide for uniform design in the City of Port Orchard. This should be used in conjunction with the Port Orchard Municipal Code and the current adopted Standard Specifications for Public Works.

The attached Standard Plans have been comprehensively updated and supersede all previous Standard Plans. In some cases, Standard Plans previously used have been modified or deleted. In other instances, new Standard Plans have been added.

5.2 General Design Guidance – Driveways, Sidewalks, Curbs, and Gutters

A. Sub-grade

Sub-grade compaction for driveways, sidewalks, curbs, and gutters shall meet a minimum 95 percent of maximum density.

B. Surfacing Material

Concrete for driveways, sidewalks, curbs, and gutters shall be Class 4000, furnished and placed in accordance with Sections 5-05, 6-02, 8-04, 8-06 and 8-14 of the current WSDOT Standard Specifications. Cold weather precautions as set forth in WSDOT Standard Specification 5-05.3(14) and 6-02.3(6) A shall apply.

C. Curbs

1. Extruded cement concrete curb shall be anchored to existing pavement by an epoxy resin in conformance with Section 9-26 of the current WSDOT Standard Specifications.

2. Extruded asphalt curbs shall be anchored by means of a tack coat of asphalt in accordance with Section 8-04 of the current WSDOT Standard Specifications.

3. For any curb grade less than 0.8%, including curb returns, a professional Land Surveyor shall verify that the curb forms or string lines are at the grades noted on the approved plans prior to placement of concrete. The contractor is responsible for survey coordination and costs.

D. Replacement

Replacement of any portion of an existing driveway, sidewalk, or curb shall be from dummy joint to dummy joint, as depicted in the Standard Details.
5.3 Driveways

A. New Driveways Design Details

1. Design Details
   a. Dimensions, slope, and detail shall be as indicated in the Standard Details and as further specified in the following subsections. See Standard Detail 520 (Driveways A – Entering Sight Distance), for entering sight distance requirements on arterials or commercial/industrial streets.

2. Conditions for Approval of New Driveways
   a. Driveways directly giving access onto arterials will be denied if alternate access is available.
   b. All abandoned driveway areas on the same frontage shall be removed and the curbing and sidewalk plus landscape strip installed to these standards shall be properly restored.
   c. Maintenance of driveway approaches shall be the responsibility of the owner(s) whose property they serve. The City is only responsible for removal of sediment as part of the ditch cleaning process.
   d. For driveways crossing an open ditch section, culverts shall be adequately sized to carry anticipated stormwater flows and in no case be less than 12 inches in diameter. The property owner making the installation shall be responsible for obtaining a Right-of-Way Permit. The City Engineer shall require the owner to verify the adequacy of pipe size.
   e. Refer to Standard Detail 521 (Driveways B – Residential Driveway) and 522 (Driveways C – Commercial Driveway) for driveway details.

3. New Driveways
   a. A residential driveway shall serve only one parcel. A driveway serving more than one parcel shall be classified as a commercial driveway or a private street, except as provided below.
   b. No portion of the driveway shall be allowed within 5 feet of side property lines or 9 feet in commercial areas except as follows:
      i. A joint use driveway may be used to serve two to four parcels. The minimum driveway width shall be a 20 foot paved surface, unless the structures are sprinklered, then it will be 15 foot paved surface with an 18 foot minimum easement.
      ii. One cul-de-sac bulb as necessary for proposed residential access.
      iii. Maximum driveway grade: 12% residential, 8% commercial.
      iv. Maximum driveway width serving a single parcel shall be 25-feet, including the flared width of the apron ramps. Placement of storm gratings, utility and access covers, and other appurtenances shall not be located within the width of the driveway.
v. Driveway locations and widths shall be shown on the design plans prior to final approval.

B. Existing Driveways

Existing Driveway’s may be reconstructed as they exist.

C. New Commercial Driveways

1. For commercial or industrial driveways with heavy traffic volumes or significant numbers of trucks, the City Engineer may require construction of the access as a street 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. Otherwise, commercial or industrial driveways shall be designed and constructed in accordance with the Standard Details.

2. In commercial, multi-family, and industrial developments, lane connections shall be provided between adjacent properties and parking areas shall be interconnected to allow traffic to move freely between properties without the need to access public streets.

3. Placement of storm gratings, utility and access covers, and other appurtenances shall not be located within the width of the driveway.

4. Driveway locations and widths shall be shown on the design plans prior to final approval.

5. Please refer to Standard Detail 522 (Driveways C – Commercial Driveway).

D. Prohibited Driveways

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 City Engineer to create a hazard or impede the operation of traffic on the street.

5.4 Sidewalks

A. Design Guidance

1. Sidewalks shall be required on streets as follows:
   a. On both sides of all public streets and private street serving more than 20 lots. Also, on one side of private streets serving 8 to 20 residential lots. Refer to Standard Drawings for Street Sections for further information.
   b. Within multi-family dwelling complexes and commercial and industrial areas, covered walkways shall be permitted.
   c. School access required as part of development approval shall be provided by a concrete sidewalk or asphalt walkway.

2. Sidewalks shall be constructed as follows:
   a. Back of planting strips where planting strips are to be constructed.
b. At least five feet wide on residential and eight feet wide on all Arterial streets and commercial access drives. The full width of sidewalk shall be clear of mailboxes or other obstructions.

c. At least eight feet wide in business/commercial districts.

d. In designated bus zones to provide a landing area for wheelchair access to transit services.

e. With specified width greater than eight feet where City Engineer determines this is warranted by expected pedestrian traffic volume.

f. With Portland cement concrete surfacing as provided in this chapter. See specifications for expansion joints. Refer to Standard Detail 540 (Sidewalks A – Cement Concrete Sidewalk).

3. Utility poles, pedestals or covers shall be prohibited within new sidewalks, unless specifically approved by the City Engineer.

B. Curb Ramps

1. See Standard Detail 541 (Sidewalks B – Wheel Chair Ramps).

2. On all streets with vertical curb, ramped sections to facilitate passage of ADA accessible persons shall be constructed through curb and sidewalk at street intersections and other crosswalk locations.

3. Where a ramp is constructed on one side of the street, a ramp shall also be provided on the opposite side of the street. Curb ramps shall be positioned so that a ramp opening is situated within the marked crosswalk or crossing area if unmarked.

4. Placement of storm gratings, utility and access covers, and other appurtenances shall not be located on curb ramps, landings or gutters within the pedestrian access route.

C. Concrete Steps

Steps shall only be used where acceptable alternative access is available for ADA access and there is a need for a separate stairway. Where used, concrete steps shall be constructed in accordance with Standard Detail 542 (Sidewalks C – Concrete Steps and Metal Handrail), or other design acceptable to the City Engineer and consistent with ADA standards.

D. ADA Access Ramps

Ramps used to provide ADA access shall have a maximum slope of 12:1 with a maximum rise of 30 inches between landings and a maximum 2% cross-slope. Landings shall have a minimum length of four feet and should be of sufficient width to allow wheelchairs to pass, generally four feet minimum width for two-way traffic.
5.5 Curb and Gutters

A. Curb Overview

1. As may be expected, a wide divergence of opinion exists with respect to curb design. The city's standard for vertical curbs does provide for more safety for sidewalk users, as it is harder for a car to jump a vertical curb. The rolled curbs allow a flatter sidewalk with no dips for driveways (better for pedestrians), and homeowners have made use of the resulting design flexibility, relocating driveways without changing the sidewalk. However, to some, the flexibility can be undesirable by letting drivers park their cars on sidewalks and lawns.

2. Advantages of vertical curbs are:
   a. The vertical curb best protects pedestrians, street trees, utilities, and signs.
   b. A positive limit of vehicle encroachment on the border area is established. This minimizes parkway erosion and reduces the probability of vehicles sliding off the roadway under unfavorable pavement and weather conditions.
   c. Depression of curb is required at driveways. Such depression is desirable for clear identification of driveway, which minimizes blockage by curb parkers.
   d. Drainage control may be maintained by either variable height or standard height curb.
   e. Provides improved control of potential parked vehicles when they runaway.

3. Advantages of the roll-type curb are:
   a. It is slightly less expensive than the vertical type.
   b. Some individuals believe that the roll-type curb is the more aesthetically pleasing.
   c. Less expensive driveway construction can be employed without curb depression. This allows the developer certain flexibilities in construction, such that driveway locations are not required to be determined prior to curb installation.
   d. Are only allowed in conjunction with a landscaping strip to ensure sidewalks are not obstructed.

B. Vertical Curbs and Rolled Curbs

1. Please refer to Standard Detail 500 (Curb and Gutter A – Cement Concrete Curb and Gutter).

2. Rolled Curbs are only allowed on residential local access roads.

3. Rolled Curbs are only allowed in conjunction with a landscape strip with a 4 foot minimum width.
5.6 Expansion Joints

A. Design Guidance

1. See Standard Details: 521 (Driveways B – Residential Driveway), 522 (Driveways C – Commercial Driveway), 540 (Sidewalks A – Cement Concrete Sidewalk), and 500 (Curb and Gutter A – Cement Concrete Curb and Gutter).

2. An expansion joint consisting of 3/8" or 1/2" x full depth of pre-molded joint material shall be placed around fire hydrants, poles, posts, and utility castings, and along walls or structures in paved areas. Joint material shall conform to the requirements of ASTM D994 (AASHTO M33-99-UL).

3. A dummy joint consisting of 3/8" or 1/2" x 2" of pre-molded joint material shall be placed in curbs and sidewalks at 10’ intervals. Interval spacing may vary up to 1 ft to create consistent curb and sidewalk section lengths between curb returns, drainage structures, and driveways, and to avoid sections of less than 5 feet.

4. When curbs and/or sidewalks are placed by slip forming, a pre-molded joint strip up to 1/2" thick and up to full depth may be used.

5. Dummy joints in the sidewalk shall align with the joints in the curb, whether sidewalk is adjacent to curb or separated by planting strip.

6. Tool marks consisting of 1/4" V-grooves shall be made in sidewalk at five-foot intervals or equal to width of sidewalk, intermediate to the dummy joints.

7. As an alternative to expansion joints around structures, reinforcing bars may be embedded in concrete on four sides of structures.

5.7 Pedestrian, Bicycle, and Equestrian Trails

A. Separated Pedestrian Trails

1. Separated pedestrian trails shall be provided where designated in community and functional plans or where required by the City Engineer because of anticipated significant public usage.

2. Separated facilities are typically located on an easement or within the right-of-way when separated from the street by a drainage ditch, planter strip, or barrier. Where separate walkways, bikeways, or trails intersect with motorized traffic, sight distance marking and signalization (if warranted) shall be as provided.

3. When grade separated pedestrian trails are provided running parallel to an adjacent roadway, required sidewalks on the same side of the road may be waived at the discretion of the City Engineer.

4. Facilities shall be designed as follows:
a. Separated asphalt walkways are designed primarily for pedestrians and are typically located within the right-of-way or easement. Minimum width shall be eight feet wide with asphalt surfacing. Surfacing shall consist of two inches asphalt concrete (AC) over four inches of crushed surfacing base course compacted to a minimum density of 90%.

b. Neighborhood pathways or soft surface facilities designed for pedestrians. Such pathways shall be a minimum five feet wide with at least two foot clearance to obstructions on both sides and 10-foot vertical clearance.

c. Pathways shall be designed and located to avoid drainage and erosion problems. Pathways shall be constructed of two-and-one-half inches of crushed surfacing top course or wood chips over cleared native material as approved by the City Engineer.

e. See Standard Detail 560 (Pedestrian, Bicycle and Equestrian Trails A – Separated Pedestrian Trail).

f. Multipurpose trails are typically designated for bicycle and pedestrian use and, in general, follow a right-of-way independent from any street. Multipurpose trails shall be designed to bicycle path standards as described in Standard Detail 561 (Pedestrian, Bicycles and Pedestrian Trails B – Bikeways).

B. Bikeways

1. Bikeways are generally shared with other transportation modes, although they may be provided exclusively for bicycle use. 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. Bikeways are categorized as follows:
   a. Bike Lane (Class II): A portion of the street that is designated by pavement striping for exclusive bicycle use. Bicycle lanes may be signed as part of a directional route system. Bicycle lanes are five feet wide on a curbed street and minimum four feet wide as a paved shoulder bike lane.
   b. Wide Curb Lane (Class III): A street that provides a widened paved outer curb lane to accommodate bicycles in the same lane as motor vehicles. Lane width shall be increased at least three feet.
   c. Shared Street: All streets not categorized above where bicycles share the street with motor vehicles.
   d. Please refer to Standard Detail 561 (Pedestrian, Bicycles and Pedestrian Trails B – Bikeways).

2. A bikeway shall be provided:
   a. When called for in the City of Port Orchard Transportation Plan Update.
   b. When substantial bike usage is expected, which would benefit from construction of a bicycle facility.

3. Striping and signing shall be implemented as follows:
   a. Pavement markings shall be used on bike lanes and paths according to the current City of Port Orchard adopted MUTCD.
b. NOTE: Do not use thermoplastic or RPMs in bicycle lane area.
c. The design of all signalized intersections shall consider bicycle usage and the need for bicyclists to actuate the signal.
d. The planning and design of bikeways in any category shall be in accordance with Section 1020 of the WSDOT Design Manual and the AASHTO Guide for the Development of Bicycle Facilities, current edition.

C. Equestrian Trail Facilities

1. Equestrian trail facilities adjacent to the traveled way shall be provided where proposed by the City of Port Orchard or as required by the City Engineer. Facilities shall be provided as follows:
   a. Shoulders adjacent to the traveled way intended for equestrian use shall be surfaced full-width, minimum four feet with eight feet desirable. Surface shall be two-and-one-half inches of crushed surfacing base course and one-and-one-half inches of crushed surfacing top course.

2. A separated equestrian trail shall be constructed with an 18 percent maximum grade, 12-foot vertical clearance and a six-foot wide pathway zone. The trail shall be constructed of native soil or, where drainage or erosion problems are present, a minimum of two-and-one-half inches of crushed surfacing top course on graded and compacted native soil. Native soil, which is not free draining, shall be removed and replaced with free draining soil as necessary to provide a maintainable and well-drained sub-grade. Additional crushed surfacing, cinders or other stabilizing materials shall be required if heavy usage is anticipated or if there is any evidence of instability in the sub-grade; fine-grained or organic soils, slides or uneven trails.

3. Please refer to Standard Detail 562 (Pedestrian, Bicycle and Equestrian Trails C – Equestrian Trail).

D. Asphalt Shoulder Trails

1. Asphalt paved shoulders may be used where approved by the City Engineer on existing streets to provide for bicycle and pedestrian use to provide continuity of design.

2. Where shoulders are paved on one side only, a four-inch white thermoplastic edge line shall delineate them.
NOTES:

1. Construction of curb details shall be in accordance with the currently adopted standard specifications for road, bridge, and municipal construction as published by the Washington State Department of Transportation and the American Public Works Association (WSDOT/APWA Specifications) unless otherwise modified below.

2. All concrete shall be commercial class per WSDOT/APWA specifications.

3. Forms shall be true to line and grade and securely staked. Steel forms only shall be used on tangent sections. Wood forms may be used on curved sections.

4. Full depth expansion joints consisting of 3/8 inch minimum premolded joint material shall be placed adjacent to catch basins, inlets and at points of tangency on streets and driveway returns. Maximum spacing shall be 20 feet.

5. Contraction joints (dummy joints) consisting of 3/8" min. x 2" of premolded joint material shall be constructed at intervals of 10 feet.

6. All joints shall be clean and edged.

7. Finish shall be a light broom finish.

8. Finished curbs and gutters shall be sprayed with a clear curing compound.

9. Subgrade compaction for curbs and gutters shall meet a minimum % of maximum density in accordance with Sec. 2-03.3(14) of the WSDOT/APWA Specifications.
NOTES:
1. CONSTRUCTION OF CURB DETAILS SHALL BE IN ACCORDANCE WITH THE CURRENTLY ADOPTED STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION AS PUBLISHED BY THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND THE AMERICAN PUBLIC WORKS ASSOCIATION (WSDOT/APWA SPECIFICATIONS) UNLESS OTHERWISE MODIFIED BELOW.
2. ALL CONCRETE SHALL BE COMMERCIAL CLASS PER WSDOT/APWA SPECIFICATIONS.
3. FORMS SHALL BE TRUE TO LINE AND GRADE AND SECURELY STAKED. STEEL FORMS ONLY SHALL BE USED ON TANGENT SECTIONS. WOOD FORMS MAY BE USED ON CURVED SECTIONS.
4. FULL DEPTH EXPANSION JOINTS CONSISTING OF 3/8 INCH MINIMUM PREMOLDED JOINT MATERIAL SHALL BE PLACED ADJACENT TO CATCH BASINS, INLETS AND AT POINTS OF TANGENCY ON STREETS AND DRIVEWAY RETURNS. MAXIMUM SPACING SHALL BE 20 FEET.
5. CONTRACTION JOINTS (DUMMY JOINTS) CONSISTING OF 3/8" MIN. X 2" OF PREMOLDED JOINT MATERIAL SHALL BE CONSTRUCTED AT INTERVALS OF 10 FEET.
6. ALL JOINTS SHALL BE CLEAN AND EDGED.
7. FINISH SHALL BE A LIGHT BROOM FINISH.
8. FINISHED CURBS AND GUTTERS SHALL BE SPRAYED WITH A CLEAR CURING COMPOUND.
9. SUBGRADE COMPACTION FOR CURBS AND GUTTERS SHALL MEET A MINIMUM 95% OF MAXIMUM DENSITY IN ACCORDANCE WITH SEC. 2-03.3(14) OF THE WSDOT/APWA SPECIFICATIONS.

CEMENT CONCRETE PEDESTRIAN CURB

CEMENT CONCRETE OR ASPHALT CONCRETE SIDEWALK OR PATH
3/8" PREMOLDED JOINT FILLER (WHEN ADJACENT TO CEMENT CONCRETE SIDEWALK)
CEMENT CONCRETE OR ASPHALT CONCRETE SIDEWALK OR PATH
3/8" PREMOLDED JOINT FILLER (WHEN ADJACENT TO CEMENT CONCRETE SIDEWALK)
NOTES

1. PARKING STRIPS OR LAINES DESIGNATED FOR PARKING ONLY ARE OUTSIDE THIS REFERENCE LINE AND ARE NOT INCLUDED IN THE MAJOR STREET TRAFFIC LANES.

2. ALL STREET ENDS SHALL BE SIGNED PER THE MUTCD.

3. VALUES FOR SIGHT DISTANCE ARE BASED ON DRIVER'S EYE HEIGHT OF 3.5 FEET SET BACK 14.5 FEET FROM THE EDGE OF TRAVELED WAY WITH AN OBJECT 4.25 FEET IN HEIGHT.

<table>
<thead>
<tr>
<th>DESIGN SPEED (MPH)</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEFT TURN (FEET)</td>
<td>225</td>
<td>280</td>
<td>335</td>
<td>390</td>
<td>445</td>
<td>500</td>
<td>555</td>
<td>610</td>
<td>665</td>
<td>720</td>
</tr>
<tr>
<td>CROSSING/RIGHT TURN (FEET)</td>
<td>195</td>
<td>240</td>
<td>290</td>
<td>335</td>
<td>385</td>
<td>430</td>
<td>480</td>
<td>530</td>
<td>575</td>
<td>625</td>
</tr>
</tbody>
</table>
NOTES:

1. FULL DEPTH EXPANSION JOINT, 3/8" MINIMUM THICKNESS.
2. FULL DEPTH EXPANSION JOINT, 3/8" MINIMUM THICKNESS IF WIDTH OF DRIVEWAY IS 15 FEET OR GREATER.
3. DRIVEWAY SECTION WITHIN PUBLIC RIGHT-OF-WAY IS TO BE SURFACED WITH ASPHALT OR CONCRETE.
4. DRIVEWAY CEMENT CONCRETE DEPTH SHALL BE A MINIMUM OF 6" AND PLACED ON COMPACTED GRADE.
5. CONCRETE SHALL BE COMMERCIAL CLASS CONCRETE PER WSDOT/APWA SPECIFICATIONS.
6. CLEAN AND EDGE ALL JOINTS.
NOTES:

1. FULL DEPTH EXPANSION JOINT, 3/8" MINIMUM THICKNESS.
2. DRIVEWAY SECTION WITHIN PUBLIC RIGHT-OF-WAY IS TO BE SURFACED WITH ASPHALT OR CONCRETE.
3. DRIVEWAY CEMENT CONCRETE DEPTH SHALL BE A MINIMUM OF 6" AND PLACED ON COMPACTED GRADE. DEPENDING ON VEHICLE LOADING, A STRUCTURAL DESIGN OF THE DRIVEWAY MAY BE REQUIMED BY THE ENGINEER.
4. CONCRETE SHALL BE COMMERCIAL CLASS CONCRETE PER WSDOT/APWA SPECIFICATIONS.
5. CLEAN AND EDGE ALL JOINTS.
6. COMMERCIAL AND INDUSTRIAL ACCESS WIDTHS SHOWN ARE FOR TWO-WAY ACCESS ON NON-ARTERIALS. MINIMUM WIDTH FOR ACCESS ONTO ARTERIALS IS 35 FEET.
Cement Concrete Sidewalk

- 5'-0" Width
- Broomed Finish (Typ.)
- 4" Wide, Smooth Troweled Perimeter
- 1/8" to 1/4" Expansion Joint
- 1" Min. Joint in Curb and Gutter
- 3/8" to 1/2" R. Joint in Curb and Sidewalk

Details:
- Finished Grade 1" Below Top of Concrete Surface for Planting ~ Flush If Paved
-缓冲带

City of Port Orchard
Est. 1890

Drawn By: AAP
Revision Date: 04/08/14
Scale: N.T.S.
Drawing Number: 540
NOTES:

1. Placement of gratings, access covers and other appurtenances shall not be located on curb ramps, landings and gutters within the pedestrian access route.

2. Ramps shall be textured using truncated dome pattern (see detail this page). Detectable warning pattern shall be yellow in compliance with WSDOT standard specification 8-14.3(3).

3. Ramp center line shall be perpendicular to or radial to curb returns unless otherwise approved by the city engineer.

4. Ramps shall be constructed at corresponding sidewalk locations on opposite side of streets when ramps are constructed on one side of street.

5. Landing shall be minimum 4 x 4'.

6. Curb ramp A must be installed unless otherwise approved.
CONCRETE STEPS

NOTES:
1. CONCRETE: CEMENT CONCRETE CLASS 4000.
2. ALL STEPS: SAME DIMENSIONS, WITHIN 3/8 IN. MAX. DIFFERENCE.
3. RISERS: 7 1/2 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. MAX. VERTICAL DISTANCE BETWEEN LANDINGS IS 12 FT.

GRIPPING HANDRAIL

SECTION A-A

SECTION B-B

SEE DETAIL A

SEE DETAIL B

CONCRETE STEPS SECTION C-C
NOTES

1. All plans must be approved by the City Engineer prior to construction of the trail. Trail centerline to be staked in the field by contractor and approved by the City Engineer.

2. All hazard trees and tree limbs as defined by the Washington State Dept. of Natural Resources Hazard Bulletin shall be felled and removed from the site.

3. Subgrade shall consist of undisturbed native soil compacted to 95% density. Subgrade to be treated with an approved herbicide prior to installation of asphalt. Filter fabric may be required between subgrade and base course.

4. Root barrier shall be required.

5. Maximum trail side slope is 3:1. Grade with compacted topsoil backfill as required. Bottom of sideslope shall be graded to prevent accumulation of run-off.

6. Minimum branch clearance above trail surface is 7 feet. For equestrian trails minimum branch clearance from trail surface is 10 feet.

7. Minimum cross-slope for trail surface is 2%. Maximum cross-slope for trail surface is 5%.

8. Trail shall have thickened asphalt edges for erosion protection: 6" (THICK) x 10" (WIDE) minimum.

9. Asphalt pavement shall be HMA CL 3.5" PG 64-22. Thickness to be specified by the City Engineer. Minimum thickness is 3".

10. Base course shall be 3/8" minus crushed rock compacted to 95% density. Thickness to be specified by the City Engineer. Minimum thickness is 4".
4" WHITE EDGE STRIPE

4" WHITE EDGE STRIPE

11' TRAVEL LANE 5'
BIKE LANE

DELINEATED BIKE LANE – CLASS II

11' TRAVEL LANE 3'
WIDENING

SHARED ROADWAY – CLASS III

PEDESTRIAN, BICYCLE AND EQUESTRIAN TRAILS B
BIKEWAYS
NOTES
1. DITCH SECTION AS REQUIRED BY ROAD CLASSIFICATION.
2. PAVED SHOULDER IF ARTERIAL OR NEIGHBORHOOD COLLECTOR

PEDESTRIAN, BICYCLE AND EQUESTRIAN TRAILS C

EQUESTRIAN TRAIL

City of Port Orchard
Est. 1890
Chapter 6

PAVEMENT SURFACING

6.1 Overview

6.2 Streets
   A. Residential Streets, Pedestrian and Bikeways
   B. Requirements for Residential Streets on Poor Sub-grade
   C. Arterials and Commercial Access Streets
   D. Additional Information

6.3 Materials and Lay-Down Procedures
   A. Requirements

6.4 Pavement Markings, Markers and Pavement Tapers
   A. Types

6.5 Driveway Surfacing
   A. Exceptions

6.6 Street Widening/ Adding Traveled Way to Existing Streets
   A. General Requirements

6.7 Monumentation
   A. Survey Monuments

6.8 Pervious Pavement
   A. Permitted Applications
   B. Essential Components
   C. Options for the Wearing Course
6.1 Overview

The streets of Port Orchard require regular care and maintenance to ensure their safety and longevity. The City of Port Orchard takes street construction and maintenance seriously in order to protect taxpayer interest and investment in the city streets. Port Orchard’s annual street maintenance program involves overlaying and seal coating many miles of City streets each year. This annual maintenance schedule is designed to preserve and protect the pavement, with a goal of reaching a 25 - 40-year life expectancy before a street requires complete reconstruction.

6.2 Streets

A. Residential Streets, Pedestrian and Bikeways

1. The minimum paved section, with alternative combinations of materials, for residential streets, shoulders, sidewalks and bikeways shall be as indicated in the Standard Details. These sections are acceptable only on visually good, well-drained, stable compacted sub-grade. Any proposed exception to these materials will be subject to soils strength testing, traffic loading analysis and subject to review and approval by the City Engineer as outlined below in Section 6.2.B Requirements for Residential Streets on Poor Sub-grade. All expenses for determining revised materials shall be borne by the Developer.

2. When a walkway or bikeway is incorporated into a street shoulder, the required shoulder section, if higher strength, shall govern. Sub-grade compaction for bikeways and paved walkways shall meet a minimum of 90 percent maximum density.

B. Requirements for Residential Streets on Poor Sub-grade

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

C. Arterials and Commercial Access Streets

Any pavement for arterials and commercial access streets shall be designed using currently accepted methodology that considers the load bearing capacity of the soils and the traffic-carrying requirements of the street. Plans shall be accompanied by a pavement thickness design based on soil strength parameters reflecting actual field tests and traffic loading.
analyses. The analysis shall include the traffic volume and axle loading, the type and thickness of street materials and the recommended method of placement.

D. Additional Information

1. Please refer to Standard Details, Typical Street Sections 600-603.

2. For information on porous pavements, please refer to Section 6.8 Pervious Pavement in the Development Guidelines.

6.3 Materials and Lay-Down Procedures

A. Requirements

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

1. Prior to placement of curbing or pavement section, a proof-role shall be performed and observed by the Construction Inspector to confirm the sub-grade is firm and unyielding.

2. Crushed surfacing top and base courses may be substituted for a structurally equivalent thickness of Asphalt Treated Base (ATB). The substitution ratio of crushed surfacing to ATB shall be 1.6:1. Where base or top courses cannot be placed without possible contamination, then these courses shall be substituted by ATB.

3. During surfacing activities, utility covers in streets shall be adjusted in accordance to Finish Grade.

4. ATB may be used over isolated areas of unstable sub-grade, providing the final lift of asphalt shall not be placed for a minimum of six months to allow time for the observation and repair of failures in the sub-grade and ATB.

5. Asphalt pavers shall be self-contained, power-propelled units. Truck mounted type pavers are not considered self-propelled. Truck mounted pavers shall only be used for paving of irregularly shaped or minor areas as approved by the City Engineer, or as follows:
   a. Pavement widths less than eight feet; and
   b. Pavement lengths less than 150 feet.

6. Hot mix asphalt (HMA) for the wearing course shall not be placed on any traveled way between October 1 and April 1, without written approval from the City Engineer. Please refer to WSDOT Construction Manual for further direction. 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 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 City Engineer.
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 Construction 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 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.

7. 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.

6.4 Pavement Markings, Markers, and Pavement Tapers

A. Types

Pavement markings, markers or striping shall be used to delineate channelization, lane endings, crosswalks and longitudinal lines to control or guide traffic, as illustrated in the Standard Details. Channelization plans or crosswalk locations shall be approved by the City Engineer.

1. Channelization shall be required when:
   a. Through traffic is diverted around a lane or obstacle.
   b. Connecting full width streets with different cross sections.
   c. Extending an existing street with a new cross section different from the existing one.

2. For speeds 45 miles per hour (mph) and greater the channelization shall provide tapers equal in length to the posted speed limit times the distance in feet of diversion from the street centerline or the original alignment of travel, or the offset distance, as applicable. Channelization shall also be required to redirect traffic back to their original alignment. For speeds 40 mph or less, taper length shall equal the total of the speed squared times the width being moved divided by 60 (L = (width x speed^2)/60).

3. Left turn channelization shall include a minimum of 150 feet of full width lane storage plus a reverse curve 90 feet in length for posted speeds up to 45 mph. The reverse curve shall be 120 feet in length for posted speeds greater than 45 mph. The reverse curve may be included within the taper distance. A deceleration taper as shown in the WSDOT Standard Plans may be used in place of a reverse curve. Standard left turn lanes shall be 12 feet wide. See Standard Detail, Two-Way Left Turn Lane Marking Details 623.
Additional storage may be required for long vehicles or anticipated left turn queues longer than the minimum storage.

4. Pavement markings for channelization shall be reflectorized hot (Type “A”) applied plastic with the exception of any markings within the bike lane, which shall consist of paint. Extruded or sprayed markings shall be dressed with glass beads for initial reflectance. All materials shall have beads throughout the material to maintain reflectance while the material wears.

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

6. Crosswalks shall be installed at all intersections controlled by traffic signals and other areas approved by the City Engineer in accordance with the Standard Details.

7. All pavement markings shall be laid out with spray paint and approved by the City Engineer or designee before they are installed. Approval may require a three working day advance notice to have field layout approved by the City Engineer or to make arrangements to meet the City Engineer on site during the installation.

8. Please refer to Standard Details, Markings 620 to 631.

6.5 Driveway Surfacing

A. Exceptions

Driveways may be surfaced as desired by the owner, except as allowed in section 6.8 and as follows:

1. On curbed streets with sidewalks, the driveway shall be paved with Portland cement concrete Class 4000 mix from curb to back edge of sidewalk.

2. On shoulder and ditch sections, driveways between the edge of pavement and the right-of-way line shall be surfaced as required in the Standard Details for Driveway Surfacing.

3. On thickened edge streets with underground utilities, Asphalt Concrete Pavement (ACP) is the preferred surfacing, but Portland cement concrete may be used for driveways between the thickened edge and the right-of-way line, if a construction joint is installed at the right-of-way line.

4. On private access tracts, driveways shall be paved with the same surfacing as the access tract or concrete Class 3000 or better.

5. Please refer to Standard Details 640 (Driveway Surfacing A – Concrete Driveway) and 641 (Driveway Surfacing B – Shoulder & Ditch Section).
6.6 Street Widening/Adding Traveled Way to Existing Streets

A. General Requirements

1. When an existing asphalt paved street is to be widened, the edge of pavement shall be saw-cut to provide a clean, vertical edge for joining to the new asphalt. After placement of the new asphalt section, the joint shall be sealed, and a pre-level course installed followed by a minimum one and one half-inch (1-1/2") overlay, full width throughout the widened area. All failures and cracking on road surfaces must be repaired prior to the overlay. Please refer to WSDOT 5-04 for additional guidance and details.

2. When an existing asphalt paved street is to be widened and the requirement to grind and overlay the existing portion is waived by the City Engineer, the widened portion shall be designed to optimize the change in cross-slope between the existing and new asphalt and to optimize the new curb grade.

3. When an existing shoulder is to become part of a proposed traveled way a pavement evaluation shall be performed. This evaluation shall analyze the structural capacity and determine any need for improvement. Designs based on these evaluations are subject to review and approval by the City Engineer. The responsibility for any shoulder material thickness improvement shall be considered part of the requirement for street widening. The shoulder shall be replaced in width as specified in Chapter 4 (Street Types and Geometrics).

4. Any widening of an existing street, either to add traveled way or paved shoulder shall have the same surfacing material as the existing street.

6.7 Monumentation

A. Survey Monuments

1. Survey monuments 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 City Engineer.

2. All existing survey monuments and appurtenances, which are disturbed, lost or destroyed during surveying or construction, shall be replaced by a land surveyor registered in the State of Washington at the expense of the responsible developer, builder or utility, in general accordance with RCW 58.09.130 and 58.04.015.

3. Plat monumentation shall comply with these standards on developments such as residential subdivisions, short plats, commercial site developments, 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 Point of Curvatures...
(PC's) and Point of Tangency (PT'S) of curves. When the Point of Intersection (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. Monument shall be located at center of each cul-de-sac.

4. All lot and block corners shall be set with an iron pipe or steel reinforcing bar at least 24 inches in length prior to submittal of the Final Plat Application. All lot corners shall be identified with the land surveyor's registration number.

5. Street monument cases, in conformance with the Standard Details, shall be installed within 60 days after the final course of surfacing has been placed.

6. Monument pins with cases shall be installed at these locations in accordance with the City's Standard Plan 660 (Monumentation A – Survey Control Monument).

### 6.8 Pervious Pavement

**A. Permitted Applications**

Permeable pavement is a range of sustainable materials and techniques which allows the stormwater to move through the surface of permeable pavements, base and sub-base to infiltrate into the ground. In addition to reducing runoff, this effectively traps suspended solids and filters pollutants from the water. Examples include roads, paths, lots that are subject to light vehicular traffic, such as car/parking lots, cycle-paths, service or emergency access lanes, road and airport shoulders, and residential sidewalks and driveways.

Although some porous paving materials appear nearly indistinguishable from nonporous materials, their environmental effects are qualitatively different. Whether pervious concrete, porous asphalt, paving stones or concrete or plastic-based pavers, all these pervious materials allow stormwater to percolate and infiltrate the surface areas, traditionally impervious to the soil below. The goal is to control stormwater at the source, reduce runoff and improve water quality by filtering pollutants in the substrata layers.

**B. Essential Components**

1. **Wearing Course:** The wearing course is the surface layer of pervious pavement that allows water to percolate into the underlying rock layer and/or into the native soil. The wearing course may be pervious concrete, pervious asphalt, open celled paving grids, or pervious pavers.

2. **Leveling Course:** This layer of bedding material is used to protect drain pipes and provides a uniform surface for paver systems. It must be included when required by the designer or recommended by the manufacturer. It generally consists of fine gravel.

3. **Underdrain (optional):** The underdrain is a slotted drainpipe installed just above the base of the facility. It conveys excess flows to the approved discharge point.
4. **Reservoir course:** This base layer is a layer of crushed rock that provides storage space for stormwater as it gradually infiltrates into the soil below. See the currently adopted Low Impact Development Guidance Manual for additional information.

5. **Native soil/Sub-grade:** This is the native soil directly below the pervious pavement facility. It receives the infiltrating stormwater and provides support for the permeable pavement. The infiltration rate must be at least 0.1 inches per hour to use pervious pavement systems.

6. **Observation Port (optional):** An observation port installed in the furthest down slope area helps the owner see the water level and determine whether the water is soaking in as intended. Refer to currently adopted Department of Ecology Stormwater Management Manual for Western Washington for applicability.

7. **Filter Fabric (optional):** Filter fabric, also called nonwoven geotextile fabric, should be installed if the native soil is loose and finer than coarse sand to prevent the migration of fine soil particles from the native soil into the reservoir course, which can cause clogging. If used, geotextile fabric must be placed between the reservoir course and the sub grade. It must wrap underneath and along the sides of the reservoir course, and pass water at a rate greater than the infiltration rate of the existing sub grade.

C. **Options for the Wearing Course**

You can select one of five main types of pervious pavement surface material, also known as the wearing course:

1. **Pervious asphalt:** Pervious asphalt is an open-graded pavement with reduced fines and stable air pockets encased within the asphalt. This design allows water to drain to the base below. It is produced and mixed at an asphalt plant. Special care is needed to avoid over-consolidation of the asphalt and must be installed by an experienced pervious asphalt installer. Slopes must be less than 5% for pervious asphalt.

2. **Pervious cement concrete:** Pervious cement concrete is an open-graded pavement with reduced fines and stable air pockets encased within the concrete. This design allows water to drain to the base below. It has a rougher appearance than traditional cement concrete. It must be produced AND mixed at a concrete plant. Special care is needed for successful performance. Pervious cement concrete must be installed by a certified pervious cement concrete installer. Slopes must be less than 6% for pervious concrete.

3. **Pervious Paver Systems:** Pervious paver systems typically consist of manufactured interlocking pavers composed of concrete. Infiltration occurs through the gaps between the pavers that allow stormwater to penetrate quickly into the subsurface soil. The gaps are filled with a pervious material, usually small stone, unless the pavers themselves are pervious. Pavers must be installed per the manufacturer’s specifications to qualify as a pervious pavement facility. Manufacturers typically recommend these systems only in low traffic volume areas. Slopes must be less than 10% for pervious paver systems.
4. **Open-celled paving grid with vegetation:** Open-celled paving grids consist of a rigid grid made of concrete or a durable plastic that is filled with a mix of sand, gravel and topsoil for planting vegetation. The cells can be planted with a variety of grasses or low-growing groundcovers. The support base and the grid walls prevent soil compaction and reduce rutting and erosion by dispersing the weight of traffic. Vegetation in the grid openings provides habitat for beneficial microbes, nutrient cycling, pollutant removal through root uptake, and stormwater volume reduction though evaporation and transpiration. These systems are only recommended for use in low traffic volume areas. Slopes must be less than 10% for pervious paver systems.

5. **Open-celled paving grid with gravel:** This structure is similar to the open-celled grid with vegetation, but the openings are filled with a gravel mix to provide greater load bearing support for driveways or areas with longer parking durations. Clean gravel fill must meet the manufacturer’s specifications. These systems are only recommended for use in low traffic volume areas. Slopes must be less than 10% for pervious paver systems.
NOTES:
1. PAVEMENT SECTIONS SHALL BE PLACED ON 12" MINIMUM COMPACTED SUBGRADE (95% MDD).
2. PAVEMENT SECTION DEPTHS NOTED, REFER TO COMPACTED DEPTH.
3. SLOPE EASEMENTS MAY BE REQUIRED FOR GRADING OUTSIDE DEDICATED RIGHT-OF-WAY.
4. PLANTER STRIP SHALL DRAIN TOWARD STREET AT 0% TO 10% CROSS-SLOPE.
NOTES:

1. PAVEMENT SECTIONS SHALL BE PLACED ON 12" MINIMUM COMPACTED SUBGRADE (95% MDD).

2. PAVEMENT SECTION DEPTHS NOTED, REFER TO COMPACTED DEPTH.

3. SLOPE EASEMENTS MAY BE REQUIRED FOR GRADING OUTSIDE DEDICATED RIGHT-OF-WAY.

4. PLANTER STRIP SHALL DRAIN TOWARD STREET AT 0% TO 10% CROSS-SLOPE.

5. ADDITIONAL RIGHT-OF-WAY MAY BE REQUIRED FOR U-TURN LANE AT INTERSECTIONS.
NOTES:

1. PAVEMENT SECTIONS SHALL BE PLACED OF 12" MINIMUM COMPACTED SUBGRADE (95% MDD).
2. PAVEMENT SECTION DEPTHS NOTED REFER TO COMPACTED DEPTH.
3. SLOPE EASEMENTS MAY BE REQUIRED FOR GRADING OUTSIDE DEDICATED RIGHT-OF-WAY.
4. PLANTER STRIP SHALL DRAIN TOWARD STREET AT 0% TO 10% CROSS-SLOPE.

A CONCRETE CURB AND GUTTER, SEE STD DETAIL 500
B CONCRETE SIDEWALK, SEE STD DETAIL 540

STANDARD PAVEMENT SECTION

ALTERNATE PAVEMENT SECTION
NOTES:
1. PAVEMENT SECTIONS SHALL BE PLACED OF 12" MINIMUM COMPACTED SUBGRADE (95% MDD).
2. PAVEMENT SECTION DEPTHS NOTED REFER TO COMPACTED DEPTH.
3. SLOPE EASEMENTS MAY BE REQUIRED FOR GRADING OUTSIDE DEDICATED RIGHT-OF-WAY.
4. PLANTER STRIP SHALL DRAIN TOWARD STREET AT 0% TO 10% CROSS-SLOPE.
MARKINGS A
LANE MARKERS

NOTES
1. TYPE C PAVEMENT MARKERS TO BE USED ONLY UPON APPROVAL BY CITY ENGINEER.
2. NOT TO BE USED ON EDGELINES.
MARKINGS B
RAISED PAVEMENT LANE MARKING DETAILS

TYPE "A"

42' TYP.
30'
12'

TYPE "B"

42' TYP.
30'
12'

TYPE "C"

12'
30'

TYPE "D"

12'
30'

TYPE "E"

12'
30'

NO GAP

GAP

42' TYP.
30'
12'

TYPE "F"

42' TYP.
30'
12'

TYPE "G"

42' TYP.
30'
12'

TYPE "H"

NO GAP

GAP

42' TYP.
30'
12'

TYPE "I"

LEGEND

- TYPE 2YY
- TYPE 2W
- TYPE 1 YELLOW
- TYPE 1 WHITE

ALL MARKERS ARE 3' APART UNLESS OTHERWISE NOTED

3' (TYP) DIRECTION OF TRAFFIC
MARKINGS C

PAVEMENT MARKING DETAILS

NOTE
MATCH EXISTING PAVEMENT PARKING DIMENSIONS.

LANE LINE DETAIL

MEDIAN PATTERN

TWO-WAY LEFT TURN LANE

CENTER LANE SKIP PATTERN

City of
Port Orchard
Est. 1890

48'
96'
24'

4" YELLOW PAINT STRIPE
TYPE 2d LANE MARKER
THRU TRAFFIC

NOTE
MATCH EXISTING PAVEMENT PARKING DIMENSIONS.
### NOTES

1. FIRST TYPE 2L ARROW IS INSTALLED 50' BACK OF STOP BAR OR CROSSWALK. SECOND ARROW IS LOCATED 100' BACK, OR AT LEFT TURN POCKET.

2. "S" = 140' FOR POSTED SPEED < 50 MPH. "S" = 170' FOR POSTED SPEED > 50 MPH.

3. STOP BAR IS TO BE INSTALLED 4' BEHIND THE CROSSWALK (MARKED OR NOT) ONLY WHEN MAINLINE MOVEMENT IS CONTROLLED BY A STOP SIGN OR TRAFFIC SIGNAL.

4. RAISED PAVEMENT MARKERS SHALL BE INSTALLED ONLY WHEN SPECIFIED IN THE CONTRACT PLANS.

5. SEE RAISED PAVEMENT LANE MARKINGS DETAIL 621 FOR MARKER DESIGNATION.

### LEGEND

- \( W_1 \) = APPROACHING THROUGH LANE
- \( W_2 \) = DEPARTING LANE
- \( T_1 \) = WIDTH OF LEFT TURN LANE ON APPROACH SIDE OF \( C \)
- \( T_2 \) = WIDTH OF LEFT TURN LANE ON DEPARTURE SIDE OF \( C \)
- \( W \) = TOTAL WIDTH OF CHANNELIZATION \((W_1 + W_2 + T_1 + T_2)\)

### TABLES

#### TABLE 1

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>TAPER RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>55:1</td>
</tr>
<tr>
<td>50</td>
<td>50:1</td>
</tr>
<tr>
<td>45</td>
<td>45:1</td>
</tr>
<tr>
<td>40</td>
<td>40:1</td>
</tr>
<tr>
<td>35</td>
<td>35:1</td>
</tr>
<tr>
<td>30</td>
<td>30:1</td>
</tr>
<tr>
<td>25</td>
<td>25:1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>TAPER RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>55:1</td>
</tr>
<tr>
<td>50</td>
<td>50:1</td>
</tr>
<tr>
<td>45</td>
<td>45:1</td>
</tr>
<tr>
<td>40</td>
<td>40:1</td>
</tr>
<tr>
<td>35</td>
<td>35:1</td>
</tr>
<tr>
<td>30</td>
<td>30:1</td>
</tr>
<tr>
<td>25</td>
<td>25:1</td>
</tr>
</tbody>
</table>

#### TABLE 2

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>DECEL. TAPER LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>150'</td>
</tr>
<tr>
<td>50</td>
<td>130'</td>
</tr>
<tr>
<td>45</td>
<td>120'</td>
</tr>
<tr>
<td>40</td>
<td>110'</td>
</tr>
<tr>
<td>35</td>
<td>100'</td>
</tr>
<tr>
<td>30</td>
<td>70'</td>
</tr>
<tr>
<td>25</td>
<td>50'</td>
</tr>
</tbody>
</table>

### MARKINGS D

TWO-WAY LEFT TURN LANE MARKING DETAIL
MARKINGS E

PAVEMENT MARKING TYPICAL DETAILS

DETAIL A

DETAIL B

DETAIL C

DETAIL D

DETAIL E

ALTERNATE PAINT STRIPE DETAIL

PAVEMENT MARKINGS MAY BE CURVED HERE AS SHOWN TO ALLOW CONTINUOUS PAINTING BY THE STRIPING MACHINE.

WHEN RPM’S REQUIRED BY CONTRACT, USE TYPE 2YY

SEE “ALTERNATE PAINT STRIPE DETAIL”
**MARKINGS F**

**SYMMETRICAL LEFT TURN POCKET DETAIL**

---

**DETAIL NOTES:**

L.T.S.L. = LEFT TURN STORAGE LENGTH (FEET)

O.L. = OPENING LENGTH (FEET)

C.T.L. = CURVE TRANSITION LENGTH (FEET)

L.O.T. = LENGTH OF TAPER (FEET)

W.T. = WIDTH OF TURNING LANE (FEET)

R = RADIUS OF TRANSITION CURVE (FEET)

S.L. = SPEED LIMIT (M.P.H)

**ADDITIONAL LEFT TURN STORAGE FOR TRUCKS AT UNSIGNALIZED INTERSECTIONS**

<table>
<thead>
<tr>
<th>LEFT TURN STORAGE LENGTH (FEET)</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>102'</td>
<td>24'</td>
<td>24'</td>
<td>51'</td>
<td>51'</td>
<td>51'</td>
</tr>
<tr>
<td>150</td>
<td>24'</td>
<td>51'</td>
<td>51'</td>
<td>75'</td>
<td>75'</td>
</tr>
<tr>
<td>201'</td>
<td>24'</td>
<td>51'</td>
<td>75'</td>
<td>99'</td>
<td>99'</td>
</tr>
</tbody>
</table>

**STORAGE LENGTH TO BE ADDED TO LEFT TURN STORAGE LENGTHS**

**NOTE:**

REFER TO STANDARD DETAILS 620 THRU 624 FOR ADDITIONAL INFORMATION ON LANE MARKINGS.

**MAY BE REDUCED WITH APPROVAL OF THE CITY ENGINEER**

---

**MARKINGS F**

**SYMMETRICAL LEFT TURN POCKET DETAIL**

---

**FILE NAME:**

**DRAWING NUMBER:**

**SCALE:**

**REVISION DATE:** 04/08/14

**DRAWN BY:**

**AAP:**

---

**City of Port Orchard**

Est. 1890
TYPICAL CROSSWALK
SEE STD DETAIL 627

REFERENCE STANDARD DETAIL 621 – RAISED PAVEMENT LANE MARKING DETAILS

MARKINGS G
TWO-WAY LEFT TURN TO LEFT TURN LANE

City of Port Orchard
Est. 1890
Typical Crosswalk Striking

1. Lane line strip: This is located in the line with each lane line and half the strip on each side.
2. Mid line strip: This is located midway between each lane line strip.

Notes:
- Dura stripe materials shall be used unless otherwise directed by the City Engineer.
- All new mid block crosswalks shall be laid out as above and provide supplemental signing consistent with N.U.T.C.D. and as directed by the City Engineer.
MARKINGS I

TYPICAL CROSSWALK ALIGNMENT – ARTERIAL COLLECTOR
MARKINGS J

TYPICAL CROSSWALK ALIGNMENT — ARTERIAL LOCAL ACCESS

Typical Crosswalk Alignment

SEE STD DETAIL 627
MARKINGS K

TYPICAL ARROWS, STOP BAR AND ONLY

THERMOPLASTIC MATERIAL SHALL BE USED, UNLESS OTHERWISE ALLOWED BY THE CITY ENGINEER.
BIKE LANE SYMBOL

BIKE TRAIL SYMBOL

MARKINGS L

BIKE LANE SYMBOLS
NOTES:

1. THE SIDEWALK ADJACENT TO THE DRIVEWAY SHALL DROP 0.2' IN 10' TO MAINTAIN MAXIMUM DRIVEWAY SLOPE OF 8%.

2. COMMERCIAL DRIVEWAY CONCRETE SHALL BE 8" MIN. THICK AND SHALL BE PLACED ON 4" MIN. COMPACTED CSTC.

3. DRIVEWAY SHALL BE CLASS 4000 CEMENT CONCRETE WITH AIR ENTRAINMENT (4% MIN. 8% MAX.).

4. DRIVEWAY CONCRETE FINISH SHALL BE BRUSHED LONGITUDENLy, SIDEWALKS SHALL BE BRUSHED TRANSVERSELY.

5. DRIVEWAY JOINTS SHALL BE TOOLEd WITH 1/4" - R EDGER.

6. MAXIMUM DOWNGRADE BEYOND THE COMMERCIAL DRIVEWAY SHALL BE 5% FOR 10 FEET.

7. FINISHED DRIVEWAY SHALL BE SPRAYED WITH A TRANSPARENT CURING COMPOUND COVERED BY WATERPROOF PAPER OR PLASTIC SHEETING IN THE EVENT OF RAIN FOR A MINIMUM OF 72 HOURS.

PLAN VIEW

SECTION A-A

1. CURB & GUTTER, SEE STANDARD DETAIL 500.
2. 3/8" OR 1/2" X 2" DUMMY JOINT
3. 3/8" OR 1/2" X 2" DUMMY JOINT AT DRIVEWAY MID-WIDTH.
4. CURB AND GUTTER
5. PLANTER
6. SIDEWALK
7. TRANSITION CURB INTO SIDEWALK
8. 8" THICK CONCRETE DRIVEWAY
9. MAINTAIN FLOWLINE ACROSS DRIVEWAY
10. 4" MIN. CSTC
The text provides details on the surfacing and drainage requirements for residential and commercial/industrial driveways, including:

1. **Residential Driveways**:
   - Minimum width: 10' for residential driveways.
   - Maximum width: 30' for residential driveways.
   - Shoulder width: 10' minimum, 30' maximum.

2. **Commercial/Industrial Driveways**: Wider than 35 feet may be approved by the city engineer considering traffic safety and activity being served.
   - All commercial/industrial driveways shall have an expansion joint located mid-width.

3. **Pipe**:
   - Sized to convey computed storm water runoff.
   - Minimum diameter: 12 inches.
   - Equal to or larger than existing pipes within 500 feet upstream.

4. **Exposed Pipe Ends**: Beveled to match the slope face and project no more than 2 inches beyond slope surface. Projecting headwalls are not acceptable.

5. **Concrete Pipe**: Minimum cover of 6 inches to finish grade.

6. **Pipe Installation**: Straight uniform alignment at a minimum 0.5% slope (0.5 ft. per 100 ft.) with the downstream end lower than the upstream end.

7. **Driveway Slopes**: Should match to back edge of shoulder, but shoulder slope and edge of shoulder shall not be altered as a result of driveway construction.

8. **Paved Driveways**: Shall be paved through right-of-way with A.C. or B.S.T., but not P.C.C.

9. **Gravel Driveways**: Shall be paved between the edge of pavement and R/W with A.C. or B.S.T. only with dimensions L=W.

10. **Notes**:
   - Commercial/industrial driveways wider than 35 feet may be approved by the city engineer.
   - All commercial/industrial driveways shall have an expansion joint located mid-width.
   - Shoulder width: 10' minimum, 30' maximum.

The diagram illustrates the surfacing and drainage sections, including the shoulder and ditch area, with specific elevations and slope indications.
MONUMENTATION A

SURVEY CONTROL MONUMENT

1) FRAME AND COVER SHALL NOT REST ON OR BE IN CONTACT WITH CONCRETE MONUMENT.
2) BRASS DISC SHALL BEAR THE LAND SURVEYOR'S REGISTRATION NUMBER AND BE CLEARLY PUNCHED.
3) FRAME AND COVER: SATHER MANUFACTURING COMPANY No. 2022 W/CONCRETE MONUMENT OR APPROVED EQUAL.
ST. ANDREWS DRIVE SW (PUBLIC) – FILL SECTIONS

ST. ANDREWS DRIVE SW (PUBLIC) (FILL SECTION W/ DITCH)

ST. ANDREWS DRIVE SW (PUBLIC) (FILL SECTION W/ THICKENED EDGE)
ST. ANDREWS DR. SW (PUBLIC) (CUT) & HAWKSTONE AVE.

NOTE

SURFACING DEPTHS INDICATED ARE MINIMUM REQUIREMENTS; SOIL CONDITIONS AND GRADES MAY REQUIRE INCREASED DEPTH.

1.5" THICKENED EDGE

HAWKSTONE AVE. SW (PUBLIC)

NDT 2 SCALE

McCormick Woods B

ST. ANDREWS DR. SW (PUBLIC) (CUT) & HAWKSTONE AVE.
McCormick Woods C

30 FOOT ROAD SECTIONS – PRIVATE AND PUBLIC

TYPICAL 30’ ROAD SECTION (PUBLIC)

- 2” CLASS HOT MIX ASPHALT (HMA) PAVING
- 2” COMPT. DEPTH CRUSHED SURFACING TOP COURSE
- 6” COMPT. DEPTH GRAVEL BASE OR AS DIRECTED BY ENGINEER

TYPICAL 30’ ROAD SECTION/ACCESS TRACT (PRIVATE)

- 2” CLASS "B" ASPHALT CONCRETE PAVEMENT
- 2” COMPT. DEPTH CRUSHED SURFACING TOP COURSE
- 6” COMPT. DEPTH CLASS "B" GRAVEL BASE
McCormick Woods D

40 FOOT ROAD SECTION – PUBLIC

City of Port Orchard

Est. 1890
McCormick Woods E

MCCORMICK WEST ENTRY & GLENEAGLE CONNECTOR

2" COMPACTED DEPTH
CLASS "B" GRAVEL BASE

6" COMPACTED DEPTH
CRUSHED SURFACING TOP
COURSE

2" COMPACTED DEPTH
CRUSHED SURFACING TOP
COURSE

2" CLASS "B"
ASPHALT CONCRETE

RIGHT-OF-WAY
130' WIN

VARIES
DITCH

STREET WIDTH
26'

VARIES
DITCH

VARIES
DITCH

26'

60'

26' COMPACTED DEPTH
CRUSHED SURFACING TOP
COURSE

6" COMPACTED DEPTH
CLASS "B" GRAVEL BASE

MAIN ENTRY ROUND-ABOUT
SECTION II

MCCORMICK WEST GLENEAGLE CONNECTOR
SECTION I
McCormick Woods F

MCCORMICK WEST SUB-COLLECTOR DETAILS

1" GRAVEL SHOULDER
VARIES

DITCH

6" COMPACTED DEPTH
CRUSHED SURFACING TOP COURSE

CLASS "B" GRAVEL BASE

COMPACTED SUBGRADE

RIGHT-OF-WAY

100'

STREET WIDTH

50'

McCormick Woods F

MCCORMICK WEST SUB-COLLECTOR ENTRY

SECTION A

2" COMPACTED DEPTH
CRUSHED SURFACING TOP COURSE

COMPACTED SUBGRADE

McCormick Woods F

MCCORMICK WEST SUB-COLLECTOR

SECTION B

2" COMPACTED DEPTH
CRUSHED SURFACING TOP COURSE

COMPACTED SUBGRADE

66'

100'

STREET WIDTH

38'

1' GRAVEL SHOULDER

1' GRAVEL SHOULDER

1' GRAVEL SHOULDER

1' GRAVEL SHOULDER

1' GRAVEL SHOULDER

04/08/14
Chapter 7

ROADSIDE FEATURES

7.1 Overview

7.2 Side Slopes
   A. General

7.3 Street Signage

7.4 Street Trees, Landscaping and Irrigation
   A. Street Trees and Landscaping
   B. Planting Strips
   C. Existing Trees and Landscaping
   D. New Trees

7.5 Mailboxes
   A. City Engineer
   B. Port Orchard Postmaster
   C. Owners or Residents
   D. Builders or Contractors
   E. Installation Methods

7.6 Street Illumination
   A. Requirements
   B. Ownership and Maintenance
   C. General Considerations
   D. Design Standards

7.7 Street Barricades
   A. Type I or Type II
   B. Type III Barricades

7.8 Bollards
   A. General

7.9 Guardrail/Embankment Heights

7.10 Off-Street Parking Spaces

7.11 On-Street Parking Required

7.12 Roadside Obstacles
   A. General
7.1 Overview

The City of Port Orchard places a very high priority on the safety of our streets. We believe our streets should be livable and a positive expression of our communities’ values. Beyond simply acting as streets for cars, streets fill a community need as public spaces. Our streets are places where people walk, shop, meet, and share life with social and recreational activities. In addition, beyond even these quality of life benefits, pedestrian-friendly streets have been increasingly linked to highly desirable social outcomes of economic growth improvements in air quality and increased physical fitness and health. For these reasons, we encourage the design of “livable” streets, or streets that seek to better integrate the needs of the community into the roadway’s design. A real component of our streets is the fact that mobility is also a part of quality of life. In our community only a small number of the streets – arterials, are intended for higher volumes of traffic at higher speeds, while the great majority of the streets are for lower volumes and speeds. This small percentage of arterial streets is essential for our people to rely on to get to their jobs, schools, and shopping without unnecessary and dangerous delays. Safety problems can occur associated with landscaping located in the right-of-way. Drivers pulling out of side streets and driveways encounter landscaping that obstructs their view of oncoming bicyclists, pedestrians and traffic as well as traffic control devices. Roadside features that impede travel on these corridors make travel more dangerous and can adversely affect the quality of life for all people.

As we work together to design the streets for Port Orchard it is essential that you consider and create a safe environment for our community.

7.2 Side Slopes

A. General

1. Side slopes shall generally be constructed no steeper than 3:1 on both fill slopes and cut slopes. Steeper slopes may be approved by the City Engineer upon showing that the steeper slopes, based on soils analyses, will be stable.

2. Side slopes shall be stabilized with grass sod or seeding or by other planting or surfacing materials acceptable to the City Engineer.

7.3 Street Signage

Signage will be provided by the City, and paid for by the Developer, in conformance with the currently adopted Manual on Uniform Traffic Control Devices (MUTCD). Signs shall be installed by the City and the Developer shall pay for the time and materials for the installation.
7.4 Street Trees, Landscaping and Irrigation

A. Street Trees and Landscaping

Street trees and landscaping shall be incorporated into the design of street improvements for all classifications of streets. Such landscaping in the right-of-way shall be coordinated with off-street landscaping required on the developer’s property under the provisions of Port Orchard Municipal Code 16.50.

B. Planting Strips

Planting strips are required along all classifications of streets but may be considered as part of the landscape mitigation requirements established during the SEPA review process. The design of planting strips must be approved by the City Engineer and must include a landscaping plan in which plant maintenance, utilities and traffic safety requirements are discussed.

C. Existing Trees and Landscaping

Existing trees and landscaping shall be preserved where desirable (per POMC 16.50.210) and placement of new trees shall be compatible with other features of the environment. Maximum heights and spacing shall not conflict unduly with overhead utilities, or root development with underground utilities.

D. New Trees

New trees shall not include poplar, cottonwood, soft maples, gum, any fruit bearing trees or any other tree or shrub whose roots are likely to obstruct sanitary or storm sewers or lift sidewalk panels and create a trip hazard.

7.5 Mailboxes

The responsibilities for location and installation of mailboxes in connection with the construction or reconstruction of City streets are as follows:

A. City Engineer

The City Engineer will:

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

2. Require with this information any necessary widening or reconfiguration of sidewalks with suitable knockouts or open strips for mailbox posts or pedestals.
3. Require these plans to bear a statement on the first sheet that "Mailbox Locations as Shown on These Plans Have Been Coordinated with the Post Office in Port Orchard, Washington." This will be a prerequisite to plan approval.

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

5. Ensure the mail boxes are not installed within five feet of a storm drain catch basin.

**B. Port Orchard Postmaster**

Port Orchard Postmaster will:

1. Designate location and manner of grouping of mailboxes when so requested by the design agency. Note on the plans the type of mailbox delivery: CBU (Collection Box Unit), or Rural type box. NDCBU's, Neighborhood Delivery and Collection Box Units have been designated as obsolete delivery equipment by the US Postal Service.

2. Authenticate by stamp or signature when this information has been correctly incorporated into the plans.

3. Do all necessary coordination with owners or residents involved to secure agreement as to mailbox location and to instruct them regarding mailbox installation.

4. Install or relocate CBU's, if these are the type of box to be used in the neighborhood. Replace NDCBU's with new CBU's.

**C. Owners or Residents**

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

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

2. If CBU delivery, rely on Post Office to provide and maintain the CBU's.

**D. Builders or Contractors**

Builders or their contractors shall:

1. Where there are existing mailboxes and no plans to replace them with CBU's: 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 has been completed, reinstall boxes at original locations or at new approved locations, as indicated on the plans or as directed by the City Engineer. Use only existing posts or materials except that any damage caused by the builder or his contractor is to be repaired at the expense of the builder.

2. Where there are existing, NDCBU's or plans to install new CBU's: Call on the Port Orchard Postmaster to install new CBU's and make the necessary installation.
E. Installation Methods

Installation methods are as follows:

1. Mailboxes in general, shall be set in accordance with the Standard Details. Boxes shall be clustered together when practical and when reasonably convenient to the houses served.

2. Materials used shall be crash worthy or shall break-away upon impact.

3. CBU’s will be installed by the United States Postal Service in general accordance to their standard details.

7.6 Street Illumination

A. Requirements

1. Continuous illumination will be required for channelization accommodating additional lanes including the tapers. Illumination will also be required as identifiers where streets intersect arterials or for frequently used pedestrian areas on arterials.

2. Street Illumination shall require LED luminaires.

3. Street lighting systems design shall conform to the Illuminating Engineering Society of North American (IES) Standards Specification for Roadway Lighting as outline in (RP-8-00). Puget Sound Energy (PSE) owns and maintains the street illumination system for the City of Port Orchard.

4. Plats and Short Plats, Commercial, Industrial or Institutional Property Development
   a. Street lighting is required for all public streets. The street lighting design shall be reviewed and approved by the City Engineer prior to final plat approval. The cost of all street lighting shall be paid for by the developer.
   b. The City will accept maintenance and power cost responsibility for the public street light system when a plat is fifty percent (50%) or more occupied. Until the plat is fifty percent (50%) occupied, the developer is responsible for the maintenance and energy charges for the street lighting system.
   c. Street lighting is not required on private streets within a plat. However, a street lighting system is encouraged. The City does not install or maintain private street lighting systems. On private streets, all street light maintenance and power cost shall be paid by the developer, homeowner, or homeowners association.

5. Existing Residential Areas. If a resident or group of residents desires the installation of a new street light they must apply to the Public Works Director.

6. Commercial. Street lighting is required on all public street frontages. The developer is responsible for design, installation or relocation of new or existing lighting. Commercial development shall replace existing lighting systems on power poles with a new lighting
system serviced by underground power if the system will not conflict with essential distribution lines.

7. City of Port Orchard is responsible for designating the street classification.

8. PSE / INTOLIGHT will design, engineer, provide, install, own and maintain the lighting system for the benefit of the City of Port Orchard.

B. Ownership and Maintenance

1. Puget Sound Energy (PSE) under franchise with the City (POMC 5.64) provides, installs, owns and maintains the street illumination system for the City. Maintenance of the completed lighting system is provided by Puget Sound Energy.

2. The property owner or homeowners association shall maintain private lighting systems.

C. General Considerations

1. Existing street light systems that extend along the frontage of a new development project, or within the limits of a roadway improvement project will not be generally required to be brought into conformance with these street lighting standards, unless the project is required to install full frontage improvements. If the City determines that existing street light systems should be brought into conformance with these requirements due to special circumstances the applicant will be notified of this requirement during the City’s development review process.

2. When required, the applicant is responsible for the installation of streetlights and all accessories necessary to energize the street light system consistent with Standards.

3. For all new street light installations, the applicant shall coordinate jointly with Puget Sound Energy and the Public Works Department to prepare a street lighting plan for submittal to and approval by the City Engineer. The type of installation shall be as set forth in PSE (IES) Standard Specifications and these standards. The applicant can request that PSE design the street illumination system.

4. Street lighting plans shall be designed and submitted to the City Engineer for review and approval prior to construction. All lighting plans shall be prepared by a licensed engineer experienced with lighting design or by PSE (INTOLIGHT Lighting Services). Lighting plans shall pursuant to PSE (IES) Standard Specifications and these standards.

5. The applicant shall coordinate with Puget Sound Energy for the availability and location of power sources for new light system

6. All public street light systems shall be accessible for public maintenance by a wheeled vehicle weighing twenty-thousand pounds (20,000 lbs.).

7. All street light installations including wiring, conduit, and power connections shall be located underground. Exception: existing residential areas with existing above ground utilities may have street lighting installed on the existing power poles. The applicant will be responsible for providing or obtaining necessary easements for underground power
for street lighting systems designed and constructed as part of an approved development permit.

8. As-built drawings on 22-inch x 34-inch or 24-inch x 36-inch mylar are required for all new or relocated underground street lighting systems prior to receiving a final occupancy permit.

9. Street light circuitry will be provided with available voltage.

10. The exact location of the power source should be indicated. System continuity and extension should be considered.

11. Particular attention shall be given to locating luminaires near intersections, at all street ends and at pedestrian and/or equestrian crossings.

D. Design Standards

1. Illumination. Calculations should include luminaire spacing, illumination level, uniformity ratio, line loses, power source and other necessary details for the electrical and physical installation of the street lighting system.

2. Illumination Levels utilizing cut-off luminaires.

<table>
<thead>
<tr>
<th>Road Class</th>
<th>Area Class</th>
<th>Maintained Horizontal Illumination (Foot Candles)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Residential</td>
<td>Industrial/Commercial</td>
</tr>
<tr>
<td>Private (Access)</td>
<td>0.4</td>
<td>N/A</td>
</tr>
<tr>
<td>Residential (Local Access)</td>
<td>0.6</td>
<td>0.9 To 1.2</td>
</tr>
<tr>
<td>Residential (Collector)</td>
<td>0.6</td>
<td>0.9 To 1.2</td>
</tr>
<tr>
<td>Arterial*</td>
<td>0.8</td>
<td>1.2 To 1.6</td>
</tr>
</tbody>
</table>

*Intersection lighting is required. Street lights shall be placed in accordance with the Standards listed below.

Uniformity Ratio:

6:1 average to minimum for private (access)

6:1 average to minimum for residential (local access)

4:1 average to minimum for residential (collector)
3:1 average to minimum for arterial

Average illumination levels at intersections shall be 1.5 times the illumination required on the more highly illuminated street. Exception: Local residential streets intersecting other local residential streets shall not require 1.5 times the illumination at other intersections, provided that one luminaire is placed at the intersection.

At signalized intersections, all signal poles shall include a street light. Lighting levels at these locations may be higher than the criteria listed above.

3. Luminaires shall be cut-off:
   a. The following luminaires have been approved for use in the City of Port Orchard:
      i. Arterials:
         c. Poles: Stresscrete 25’ Mounting Height Green Octagonal Concrete.
      ii. Residential:
         b. Poles: Stresscrete 13’, 15’ or 18’ Mounting Height Round Tan & Burgundy Concrete. Based on Design & Location
   b. All luminaires shall be LED color temperature 4000k.
      * NOTE: LED’S WILL BE USED BY THE CITY AS AN ALTERNATIVE TO REDUCE ENERGY AND MAINTENANCE COST.

4. Light Standards
   a. Light standards shall be located on one side of the roadway only or shall be located opposite each other when placed along both sides of the roadway.
   b. Staggered spacing will be allowed upon approval of the City Engineer where there is an established staggered pattern and it is necessary to continue this pattern, or when site or safety conditions prevent locating luminaires on only one side of the roadway.
   c. In areas where the street width differs from the City standard, or there are other factors influencing the location of the street lights, the City Engineer will provide input to the applicant on acceptable options.
   d. Street light poles shall be direct buried as specified by PSE Line loss calculations shall show that no more than a 5 percent voltage drop occurs in any circuits. Branch circuits shall serve a minimum of four luminaires.
5. **Conductors**

Conductor size will be determined by the wattage and circuit lengths provided through the IES design. The minimum wire size for any illumination circuit shall be No. 6 Aluminum. No. 10 wire will be acceptable for the pole and bracket cable within the light standard only.

### 7.7 Street Barricades

Temporary and permanent barricades shall conform to the standards described in the City of Port Orchard currently adopted Manual on Uniform Traffic Control Devices (MUTCD) and the Standard Details.

**A. Type I or Type II**

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

**B. Type III Barricades**

1. Type III barricades may be used when streets and/or proposed future streets are closed to traffic. Type III barricades may extend completely across a street (as a fence). 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 developer/contractor shall assure proper closure at the end of each working day.

2. In general, 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.

3. Type III barricades shall be used at the end of a local access street terminating abruptly without cul-de-sac bulb or on temporarily stubbed off streets. Each such barricade shall be used together with an end-of-street marker. For streets that will be extended in the future, a Type III barricade shall be placed at the end of the right of way with a sign stating “STREET TO BE EXTENDED IN THE FUTURE.”

4. Type III barricades may be required at other locations, as directed by the City Engineer.

### 7.8 Bollards

**A. General**

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.
1. This closure shall include one or more fixed bollards on each side of the traveled way and removable, locking bollards across the traveled way.

2. Spacing shall provide one bollard on the centerline of trail and other bollards spaced at a minimum of 50 inches on center on trails 10 feet wide or less measured from the center post in the center of the trail. Spacing shall be 60 inches on center on trails wider than 10 feet.

3. Bollard design shall be in accordance with the current Washington State Department of Transportation Standard Plans or other design acceptable to the City Engineer. No fire apparatus access streets shall be blocked in this manner without the concurrence of the Fire Marshall.

7.9 Guardrail/Embankment Heights

Guardrail installations shall conform to WSDOT Standard Plan C-1, Beam Guardrail Type 1 and C-2, Guardrail Placement. End anchors shall conform to WSDOT Standard Plan C-6, Beam Guardrail Anchor Type 1.

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

7.10 Off-Street Parking Spaces

The number of off-street parking spaces required and specifications shall conform to Port Orchard Municipal Code, as updated. Please refer to POMC 16.45.100 Off-street parking design standards.

7.11 On-Street Parking Required

On-street parking should be incorporated into all designs of non-arterial streets, both residential and commercial land uses. Said parking should be located on both sides of the street (unless approved by the City Engineer) and the minimum stall width should be eight feet.

Where on-street parking is provided in Downtown Commercial zones, the area will be striped and the individual stalls marked. Intersections and alley connections to these streets shall be bulbied out the depth of the required parking at the intersection and alley points, in accordance with the Standard Details. Please refer to POMC 16.45 Parking Standards for general guidance.
7.12 Roadside Obstacles

A. General

Non-yielding or non-breakaway structures, including retaining walls, rock facings and rockeries, which may be potential hazards to the traveling public, shall be placed with due regard to safety.

1. On streets with a shoulder or mountable curb, hazardous objects shall be placed as close to the right-of-way line as practical and a minimum of 10 feet from the edge of the traveled way or auxiliary lane.

2. On streets with a vertical curb section, hazardous objects shall be placed as far from the edge of the traveled way or auxiliary lane as practical.

3. Roadside obstacles shall not be placed in a sidewalk or less than two feet from the face of the curb.

4. Placement of any utility structures shall be in accordance with requirements of the City Engineer.
6-Inch Blade (Private Road)

6-Inch Blade

8-Inch Blade

Overhead Blade
## NOTES:

1. SIGN SHALL BE SUBMITTED AND APPROVED BY PUBLIC WORKS DIRECTOR OR DESIGNEE PRIOR TO FABRICATION.
2. SIGN SHALL BE MADE FROM 0.125" ALUMINUM AND HAVE AVERY OR 3M HIP (TYPE III/IV) SHEETING.
3. SIGNS SHALL HAVE STANDARD RADIUS CORNERS WITH NO HOLES.
4. SIGNS SHALL BE GREEN BACKGROUND WITH WHITE LETTERS FOR CITY OWNED STREETS.
5. SIGNS SHALL BE BROWN BACKGROUND WITH WHITE LETTERS AND MARKED "PVT" FOR PRIVATE STREETS.
6. SIGNS SHALL NOT HAVE A BORDER UNLESS THEY ARE AN OVERHEAD MOUNTED SIGN.
7. SIGNS SHALL BE DOUBLE SIDED.
8. LETTERING SHALL BE HIGHWAY SERIES C GOTHIC.
9. OVERHEAD MOUNTED SIGNS SHALL HAVE A 1-INCH WHITE BORDER WITH 2" MAX. SPACING TO TEXT FROM BORDER.
10. STREET NAMES SHALL HAVE AN UPPER CASE FIRST LETTER FOLLOWED BY LOWER CASE LETTERS.

### Table

<table>
<thead>
<tr>
<th></th>
<th>6-Inch Blade (Private)</th>
<th>6-Inch Blade</th>
<th>8-Inch Blade</th>
<th>12-Inch Blade</th>
<th>Overhead Blade</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>VARIES 48&quot; MAX.</td>
<td>VARIES 48&quot; MAX.</td>
<td>VARIES 48&quot; MAX.</td>
<td>VARIES</td>
<td>VARIES</td>
</tr>
<tr>
<td>B</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>8&quot;</td>
<td>12&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>C</td>
<td>4&quot;</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>8&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>D</td>
<td>3&quot;</td>
<td>3&quot;</td>
<td>4.5&quot;</td>
<td>6&quot;</td>
<td>9&quot;</td>
</tr>
<tr>
<td>E</td>
<td>3&quot;</td>
<td>3&quot;</td>
<td>3&quot;</td>
<td>6&quot;</td>
<td>9&quot;</td>
</tr>
<tr>
<td>F</td>
<td>2.25&quot;</td>
<td>2.25&quot;</td>
<td>3&quot;</td>
<td>4&quot;</td>
<td>6.75&quot;</td>
</tr>
<tr>
<td>G</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>3&quot;</td>
<td>5&quot;</td>
</tr>
</tbody>
</table>
Chapter 8

STRUCTURES – Culverts, Vaults and Walls

8.1 Port Orchard Goals
   A. Structures
   B. Rockeries

8.2 Culverts
   A. The Culvert Facts
   B. Use of Culvert Types
   C. Culvert Types

8.3 Vaults

8.4 Walls
   A. Terms
   B. General
   C. Retaining Walls
   D. Rockeries or Rock Walls
   E. Segmental Gravity Walls
   F. Requirements for Retaining Walls, Rockeries and Rock Walls Located Within a Public Right of Way
8.1 Port Orchard Goals

A. Structures

1. A Structure is defined as a combination of materials constructed and erected permanently on or under the ground or attached to something having a permanent location on or under the ground. Not included are residential fences, retaining walls less than 30-inches in height, rockeries less than 30-inches in height, and similar improvements of a minor character.

2. Plans for structures such as vaults and retaining walls require a separate review, approval, and building permit by the City of Port Orchard Department of Community Development (DCD) prior to construction.

B. Rockeries

Rockeries are considered a method of bank stabilization and erosion control. Rockeries shall not be constructed to serve as retaining walls. All rockeries shall be constructed in accordance with the City of Port Orchard Standard Details and the rock wall construction guidelines published by the Associated Rockery Contractors.

8.2 Culverts

A. The Culvert Facts

Definition: An opening through an embankment for the conveyance of water by means of pipe or an enclosed channel.

This information is intended to provide a general level of options the City of Port Orchard supports as you develop the site development plans for your project. The Project Engineer will need to calculate the functional requirements, specific needs, and size requirements of the conveyance pipes.

B. Use of Culvert Types

Culverts are used to convey drainage underneath a road, trail, or railway. Culverts begin upstream with head walls and terminate downstream with end walls. These walls protect the embankment from washing away by floodwaters. Culverts can be made of different materials such as steel, polyvinyl chloride, and reinforced concrete. Reinforced Concrete pipes (RCP) are available in a variety of shapes and sizes, including round, elliptical, flat-bottomed, pear shaped, and box. They range from small drainage culverts under trails and driveways to large structures under highways. Culverts are also placed side by side to create a greater width than a single culvert may provide.

A culvert is a structure, similar to a bridge, which allows water to flow beneath a road surface. The purpose of a typical culvert is to convey creeks, streams, and storm runoff; but some are installed to help animals, including livestock and wildlife, cross the road. Culverts
come in a variety of shapes and sizes ranging from 8-inch diameter plastic pipes to 12-foot wide concrete boxes.

Flooding, road failures, property damage, and erosion can occur when a culvert fails to properly convey water. These failures can create dangerous driving conditions, expensive repairs for property owners, costly detours, and damage to the drainage system and to the environment.

### C. Culvert Types

1. **Pipe Single or Multiple**
   
   These are fabricated of smooth steel, corrugated metal, and reinforced concrete materials. The diameter of the pipe culvert ranges from 1-6 feet. The primary purpose is to pass the water under roads, even though some of the wildlife will use them as passageways. For the high stream banks around, this culvert is a good selection.

2. **Arch Pipe Single or Multiple**
   
   These are suitable for large waterways and provide low clearance. At low flow events, they provide a wider and deeper flow path than the alternatives, thereby promoting improved fish movement, and they typically require less road fill.

3. **Box Culvert Single or Multiple**
   
   During brief runoff periods, a box culvert is used to transmit water. They can be used with an open bottom, three sided with gravel bottoms, or four sided. These can provide more room for wildlife migration than the large round pipe culverts. These are often manufactured of reinforced concrete.

4. **Arch Pipe Culvert**
   
   The arch pipe culvert is a round culvert reshaped to allow a lower profile while maintaining the native flow characteristics with an open bottom. These can be installed with shallow cover. Fabrication materials range from reinforced concrete, corrugated metals, or stone masonry.

### 8.3 Vaults

Subsurface vaults are specialized underground structures designed for utility functions as places for meters and valves or as water detention facilities. Underground vaults can be utilized for groundwater recharge by allowing infiltration.

Vaults are usually constructed of either concrete or plastic and must account for potential loading from expected bearing weight of the intended land use above them. Subsurface vaults are used commonly for utilities or as stormwater storage for small parcels where it is not feasible to have adequate surface storage via an open basin. It is also very common to design such facilities for various vehicle loadings, such as parking lots, or for recreational surfaces, such as
tennis and basketball courts. Water quality structures are required to treat stormwater runoff and remove debris before filling a subsurface vault. Subsurface vaults are typically dry systems, primarily used for stormwater quantity control. Less common are wet water quality systems designed to maintain a permanent pool to dissipate energy and settle particulate stormwater pollutants. The City of Port Orchard does not allow for subsurface quantity control vaults to act as water quality control treatment facilities; therefore, wet systems are typically not utilized locally.

Plans for structures, such as vaults, require a separate review, approval, and building permit by the City of Port Orchard DCD prior to construction.

### 8.4 Walls

#### A. Terms

1. **Rockery or Rock Wall:** “Rockery” or “rock wall” means one or more courses of large rocks stacked near vertical in front of an exposed soil face to protect the soil face from erosion and sloughing. Rockeries are considered a method of “bank stabilization and erosion control.” Rockeries are typically constructed of interlocking rows of large, naturally shaped quarry stone or boulders, stacked without mortar or reinforcement. Rockeries are not structural walls and are typically employed for slope stability or erosion control.

2. **Retained Wall Height:** Retained Wall Height is the vertical distance measured from the bottom of the footing to the finished grade at the top of the wall.

3. **Exposed Wall Height:** Exposed Wall Height is the vertical distance measured from the finished grade at the bottom of the wall to the finished grade at the top of the wall (does not include the footing depth below grade).

4. **Segmental Gravity Wall:** Segmental Gravity Walls are typically constructed of manufactured (Allen Block, Keystone, etc.) modular concrete or masonry units, stacked in a running bond pattern without mortar or reinforcement.

5. **Surcharge:** Surcharge is the vertical load imposed on the retained soil that may impose a lateral force in addition to the lateral earth pressure of the retained soil. Examples of surcharge include: sloping retained soil, structure footings supported by the retained soil, adjacent vehicle loads supported by the retained soil, solid fences that are attached to or directly adjacent to the retained soil, etc.

#### B. General

Design and construction of rock walls, retaining walls and rockeries shall conform to the currently adopted International Building Code and the International Residential Code, and shall generally follow the "Rock Wall Construction Guidelines," prepared by the Associated Rockery Contractors.
C. Retaining Walls

1. Retaining walls which are over 48-inches in height or which support a surcharge or impounding Class I, II, and IIIA liquids shall require a City Building Permit. Please consult DCD if you plan to build a retaining wall to determine whether a building permit is required for your project.

2. Retaining walls not supporting a structure that are not laterally supported at the top and that retain in excess of 24-inches of unbalanced fill shall be designed (engineered) to ensure stability against overturning, sliding, excessive foundation pressure and water uplift. Retaining walls shall be designed for a safety factor of 1.5 against lateral sliding and overturning.

D. Rockeries or Rock Walls

1. If the rockery or rock wall is 24-inches high or less, or stepped with no segment exceeding a height of 24-inches, and there is at least 24-inches of separation between segments, it may be located nearly anywhere on your property, subject to limitations established by the Land Use Code. If a rockery or rock wall or any segment of a stepped rockery or rock wall is over 24-inches, engineering is required. If the rockery or rock wall is over 48-inches, it is defined as a structure and must comply with the city’s building code regulations permitting requirements, and the structural setback requirements for the property. For the purpose of applying this rule, the height of a rockery or rock wall shall be the “exposed wall height.”

2. Rockeries or rock walls shall be 12-feet or less in total height.

3. Rockeries or rock walls shall not be used to retain fill.

4. Rock walls or rockeries may not be used for any protection of cut or fill embankments within the public right of way or within the construction limits of said right of way. Engineered retaining walls may be used within the public right-of-way upon approval of the City Engineer and the proper permitting from both Building and Public Works has been secured.

5. Rock Walls and Rockeries shall be constructed of sound, angular ledge rock that is resistant to weathering. The longest dimension of any individual rock should not exceed three times its shortest dimension.

E. Segmental Gravity Walls

1. Segmental Gravity Walls shall be constructed of concrete masonry units (CMU’s), manufactured in general accordance with the Northwest Concrete Masonry Association (NWCMA).

2. If the segmental gravity wall is 24-inches high or less, or stepped with no segment exceeding a height of 24-inches, and there is at least 24-inches of separation between segments, it may be located nearly anywhere on your property, subject to limitations established by the Land Use Code. If a segmental gravity wall is over 24-inches,
engineering is required. If the rockery or rock wall is over 48-inches, it is defined as a structure and must comply with the city's building code regulations permitting requirements, and the structural setback requirements for the property. For the purpose of applying this rule, the height of a segmental gravity wall shall be the “exposed wall height.”

F. Requirements for Retaining Walls, Rockeries, and Rock Walls Located within a Public Right of Way

1. Keyway. A keyway shall be constructed for all rock walls, retaining walls and rockeries, and shall be comprised of a shallow trench (12-inches minimum depth), extending the full length of the wall and as wide as the wall units and the drain rock layer. The competency of the keyway subgrade to support the rock wall shall be verified by the site Geotechnical Engineer or City Inspector. Areas of "soft" subgrade shall be over-excavated and replaced with compacted structural fill.

2. Underdrain. An underdrain shall be installed at the rear of the keyway, consisting of a four-inch minimum diameter perforated or slotted, smooth-walled rigid plastic drain pipe. It shall be bedded on and surrounded by free-draining, 2-inches to 4-inches crushed rock with 5% fines. The underdrain pipe should be installed with sufficient gradient to initiate flow to either one side, both sides or to a low point. Outfall shall be connected by an un-perforated tightline to a positive and permanent discharge.

3. First Course. The first course of rock or wall unit should be placed on firm, unyielding soil or onto a layer of compacted crushed rock. There should be full contact between the rock or wall unit and the soil or crushed rock surface. Due to the angular nature of rock, proper placement may require shaping of the ground surface or slamming or dropping the rocks into place. During construction of rock facings or rockeries, the rocks should be placed so that there are no continuous joint planes in either the vertical or lateral direction. Wherever possible, each rock should bear on at least two rocks below.

4. Drainage. To provide some degree of drainage control behind the rock facing, retaining wall or rockery, and as a means of helping to prevent the potential loss of soil through the face of the wall, a drain rock filter shall be installed between the rear face of the wall and the soil face being protected. This drain rock filter should be a minimum of 12-inches thick and should be composed of two to four inch sized quarry spalls, or equivalent material.

5. Sidewalk. When a sidewalk is to be built over a rock facing, retaining wall or rockery, the top of the facing shall be sealed and leveled with a cap constructed of Class 4000 cement concrete in accordance with Chapter 3 of these Standards, but with reduced water content resulting in slump of not over two inches. See the Standard Details.

6. Pedestrian Protection. For pedestrian protection, a black vinyl coated chain link fence or metal handrail shall be installed when the rock facing, retaining wall or rockery has an exposed wall height of three feet or greater. See the Standard Details. Rock facings,
retaining walls or rockeries constructed adjacent to property lines shall include a minimum 48-inch tall fence along the top of any portion of the wall with an exposed height of three feet or greater. Where applicable, fences should be placed on the property line.
Chapter 9

SURFACE WATER MANAGEMENT

9.1 Overview

9.2 Construction Stormwater General Permit

9.3 Design
   A. Design Standards
   B. Conveyance
   C. Clearing, Grading, and Erosion Control

9.4 Hydraulics
   A. Hydraulic Analysis
   B. What is the HPA Permit?

9.5 Maintenance
   A. Maintenance
   B. Clearing of Permanent Retention/Detention Areas
9.1 Overview

Surface water management is important to the City of Port Orchard. Management of our seasonal stormwater runoff is a long-term priority to the citizens of Port Orchard. The City Staff takes very seriously the responsibility to ensure we are good stewards of our community and our water resources. To protect water quality, we manage our stormwater runoff at a number of levels. This Stormwater Management Program (SWMP) is intended, along with the City’s Comprehensive Stormwater Management Plan, to assist the City in planning, funding, and implementing a comprehensive program for addressing current and future regulatory and policy requirements for managing stormwater runoff, water quality, flooding problems, and the City’s natural resources.

The City of Port Orchard follows industry standards of “Best Management Practices,” (BMP’s), and operates under a National Pollutant Discharge Elimination System Phase II Municipal Stormwater Permit issued by Washington State Department of Ecology. Additionally, in late 2016 all Phase II Municipalities will be required to make Low Impact Development mandatory as part of the designs and vesting will be based on time of complete site development application.

The BMP’s in the permit are collectively referred to as the NPDES Stormwater Management Program. They include actions that educate the public and encourage non-polluting behaviors:

- Identify and report illegal dumping and cross-connections;
- Respond to pollutant spill reports;
- Enforce erosion and sediment control at construction sites;
- Apply new design standards for permanent storm drainage in new development and redevelopment sites;
- Maintain the public storm drainage system and inspect private storm drainage systems;
- Minimize pollution from municipal operations

The City maintains current up to date information regarding Stormwater management at the website: [http://www.cityofportorchard.us/public-works-stormwater](http://www.cityofportorchard.us/public-works-stormwater).

9.2 Construction General Permit

The Department of Ecology implements the Federal Clean Water Act. Because of this federal law, Ecology’s construction stormwater general permit is required for certain construction activities. The goal of the permit is to reduce or eliminate stormwater pollution and other impacts to surface waters from construction sites. Construction site activities disturb the land and, when it rains, can create a lot of muddy, polluted stormwater. When this muddy stormwater runs off-site (also known as a discharge), it often causes sediment increases and alters the water chemistry in
local streams, rivers, wetlands, and lakes. This lowers water quality and often harms the uses that humans, fish, and other wildlife rely upon.

### 9.3 Design

#### A. Design Standards

All design, materials, and work (methods) shall conform to the following list. Unless modified by adopted Development Agreement, all design, materials, and methods not specifically referenced in these City standards and specifications shall comply with all applicable sections of the standards listed below. In the case of differences among the standards and specifications, the most restrictive standards shall apply unless directed otherwise by the City Engineer. The City Engineer retains the authority to modify, revise, or deviate from the approved plans at his/her discretion. Approval of the plans does not warrant the accuracy of the plans.

1. The currently adopted Washington State Department of Ecology Stormwater Management Manual for Western Washington; and

2. The latest edition of the City of Port Orchard Construction Standards and Specifications adopted by the City of Port Orchard, and subsequent revisions; and

3. The latest edition of “Standard Specifications for Road, Bridge, and Municipal Construction” and “Standard Plans For Road, Bridge, and Municipal Construction” prepared by the Washington State Chapter American Public Works Association (APWA) and the Washington State Department of Transportation (WSDOT) and subsequent revisions.

Downstream drainage ways and/or facilities between the subject property and a well-defined creek or drainage channel of adequate capacity may be required to be improved, to the extent necessary to accommodate project impacts.

Sizing of storm water conveyance and retention/detention systems are the responsibility of the professional engineer retained by the developer and is subject to approval by the City Engineer.

Maximum catch basin spacing shall be 30 feet on boulevards, arterials, and collectors; and 300 feet on all other street classifications.

#### B. Conveyance

1. Pipe

The minimum cover for storm drain pipe shall be 2 feet. Where the minimum depth includes the roadway section, structural calculations for the appropriate H-loading shall be submitted along with the plans. All pipe specified where the cover is 2 feet or less shall be ductile iron of a class determined by the structural calculations.
No storm drain pipe between catch basins or manholes in the public right-of-way shall be less than 12 inches in diameter; with the exception that 8-inch pipe may be used between inlets and catch basins in runs of 50 feet or less.

Changes of pipe size are allowed only at junctions.

2. **Swales**

Swales will only be allowed where approved by the City Engineer. If approved, swales shall be protected by curbing and maintained by the abutting property owner(s). Also, in residential developments a homeowners association with covenants shall be formed to ensure enforcement of the maintenance requirements.

Swales designed for transporting, storing and/or infiltrating storm water from public roadways shall not be located on a lot designated for single family occupancy. Easements proposed for such swales will not be allowed. This is necessary due to the complexity of operating and maintaining the integrity of such facilities on private property.

**C. Clearing, Grading, and Erosion Control**

1. A Clearing and/or Grading Permit may be required prior to any land-disturbing activity on the site. The permit may include restrictions as to the limits of any particular area or phase that can be cleared and graded at any one time or during any construction season. Additional restrictions may be placed on the permit in regard to seasonal weather conditions. At any time, the City Engineer may restrict activities or access to portions of the site which would be detrimental to maintaining erosion and sediment control. Per City ordinance, payment of a deposit for erosion control performance and maintenance shall be posted prior to the issuance of a clearing and/or grading permit.

2. The applicant may be required to also provide an analysis by a licensed geotechnical engineer in regard to grading and the design, location, and construction of roads/driveways, parking lots, rockeries/retaining walls, stormwater treatment and detention systems, and buildings on the site. The City Engineer may then hire an independent consultant of his/her choosing to review and comment on the adequacy of the applicant’s proposal and analysis. Acceptance of the proposal and analysis shall be at the discretion of the City Engineer.

3. Per City ordinance, payment of a deposit for erosion control performance and/or maintenance shall be posted prior to the issuance of a clearing and/or grading permit.

4. A Temporary Erosion and Sediment Control Plan shall be submitted to the City Engineer for approval. The plan shall conform to the standards of the Washington State Department of Ecology Stormwater Management Manual for Puget Sound Basin, the Kitsap County Stormwater Management Design Manual, and the City of Port Orchard requirements. Control measures shall be in place prior to any clearing and/or grading
activity. The site work contractor shall be responsible for maintaining all erosion and sedimentation control facilities.

5. The erosion and sedimentation control systems depicted on the plans are intended to be the minimum requirements to meet anticipated site conditions. The permittee should anticipate that more control measures may be necessary to insure complete siltation control on the site. It shall be the obligation and responsibility of the permittee to address any new conditions that may arise or be created by his activities and to provide additional facilities, over and above the minimum requirements shown, as may be needed to protect adjacent properties and the water quality of the receiving drainage system. The City Engineer may require additional measures.

6. Temporary erosion and sediment control shall be maintained on the site at all times. Control measures shall conform to the standards of the Washington State Department of Ecology Stormwater Management Manual for the Puget Sound Basin, the Kitsap County Stormwater Management Design Manual, and the City of Port Orchard requirements. Control measures shall be in place prior to any ground-disturbing activity. The site work contractor shall be responsible for maintaining all erosion and sedimentation control facilities. The property owner is ultimately responsible for compliance.

7. Measures necessary to insure complete siltation control of the site are required at all times. It shall be the obligation and responsibility of the contractor to address any new conditions that may be created by his activities and to provide additional facilities, over and above any existing measures, as may be needed to protect adjacent properties and the water quality of the receiving drainage system. The City Engineer may also require additional measures.

8. Any dirt or mud tracked onto City streets by construction vehicles shall be cleaned up immediately. Dust control shall be maintained at all times.

9. During grading and utility installation, observed site conditions may result in the City Engineer making a determination that the applicant shall direct a geotechnical engineer to complete detailed geotechnical investigations and provide the City Engineer with results and recommendations prior to completion of the work or issuance of subsequent approvals and permits.

10. The Department of Ecology requires project owners to obtain a Construction Stormwater General Permit for certain projects.
   a. Initial guidance on this requirement can be found on the Department of Ecology Focus Sheet titled “Focus on Construction Stormwater General Permit” which is available at the City Public Works counter or online at: www.ecy.wa.gov/biblio/0710044.html.
   b. Permit application forms, also called a “Notice of Intent” or “NOI,” are available at the City Public Works counter or online at: www.ecy.wa.gov/biblio/ecy02085.html.
Construction site operators must apply for the permit 60 days prior to discharging stormwater.

11. On approximately September 15 of any construction year, the City Engineer may schedule a meeting with the developer to discuss winter-season site stabilization/closure requirements. All exposed soils shall be stabilized using Best Management Practices (BMPs) defined by the Department of Ecology and Kitsap County Stormwater Management Manuals and as approved by the City Engineer.

9.4 Hydraulics

A. Hydraulic Analysis

1. A preliminary drainage report and plan shall be submitted with the land use application and include both an upstream analysis and a Level 1 downstream analysis. Further levels of analysis may be required at the discretion of the City Engineer.

2. For Planned Residential Developments (PRDs): The post-developed quantities and calculations/methodologies shall be provided for each pervious and impervious element and be individually listed/presented. Elements include, but are not limited to, roofs, driveways, streets, sidewalks, offsite paved improvements, and storm pond surface area.

3. For long plats: One of the two following methods must be used to determine post-development area:

   a. In addition to the percent impervious area based on dwelling units per acre, as listed in the Modified Curve Number table in Kitsap County Stormwater Management Manual, the post-development area calculations shall add the impervious area attributable to roads, sidewalks, and detention pond surface area. Quantities and calculations/methodologies shall be provided for each pervious and impervious element and be individually listed/presented; OR

   b. The post-development quantities and calculations/methodologies shall be provided for each pervious and impervious element and be clearly listed and presented. Elements include, but are not limited to, roofs, driveways, streets, sidewalks, offsite paved improvements, and storm pond surface area.

4. A final drainage report is required at the time of submittal of construction drawings, unless required earlier at the discretion of the City Engineer. The final drainage report shall include an analysis of the proposed drainage design which satisfies the City Engineer that the design complies with all City requirements and protects downstream properties and the surrounding area from damage and any adverse impacts. An Operations and Maintenance Manual shall be provided with the “as-built”/record drawings.
5. In the case of conflicts among the standards and manuals, the more restrictive shall apply unless determined otherwise at the discretion of the City Engineer. Requirements of the permit/approved plans are a minimum. Other actions may be necessary to comply with State statues for clean water. The applicant is ultimately responsible for compliance.

6. The cover page of the report shall be stamped by the applicant’s engineer and shall include the following statement:

   “I hereby state that this Drainage Report has been prepared by me or under my supervision and meets the standard of care and expertise which is usual and customary in this community of professional engineers. The analysis has been prepared utilizing procedures and practices specified by the City of Port Orchard and within the standard accepted practices of the industry. I understand that the City of Port Orchard does not and will not assume liability for the sufficiency, suitability or performance of drainage facilities prepared by me.”

7. For individual lot infiltration in short or long plats the following shall apply:
   a. Section 5.3.6 and Appendix 5A of the Kitsap County Stormwater Management Manual are only for individual single-family infill lots.
   b. An SBUH analysis for individual lot infiltration in new plats shall use both the 100-year/7-day and 100-year/24-hour events.
   c. Soil logs (geotechnical report) from a geotechnical engineer must be submitted to the City Engineer which has a sufficient number of test pits to determine if infiltration is possible and which includes any recommendations or requirements by the geotechnical engineer. A soil log from every location is not necessarily required. The applicant’s engineer shall submit a “template” design for infiltration at the time of civil construction drawing approval. The template shall be included with each building permit for lots that are utilizing infiltration. At the time of each building permit’s trench excavation, the soils shall be inspected by the geotechnical engineer for conformance with the soil log that the template was based on. If significant differences in soil horizons are encountered, a new design for those specific soil conditions is required.

B. What is the HPA Permit?

Compliance with the Washington Department of Fish and Wildlife Hydraulic Project Approval (HPA) is required. The Washington Department of Fish and Wildlife protects freshwater and marine habitats using the agency’s authority to provide approvals for construction projects that use, divert, obstruct, or change the natural bed or flow of state waters. The Hydraulic Project Approval (HPA) permit is authorized through Chapter 77.55 RCW, and administered through rules in Chapter 220-110 WAC. Please refer to the attached Department of Fish and Wildlife Document for additional guidance.
9.5 Maintenance

A. Maintenance

The City shall maintain all stormwater drainage elements such as catch basins, oil-water separators, and conveyance systems located within the public rights-of-way.

All private stormwater systems are required to have an Operations and Maintenance Manual per Department of Ecology’s requirements. The manual must be submitted to the City for review prior to construction authorization. The development’s owner association shall be responsible for maintaining on-site stormwater facilities including, but not limited to, on-site retention/detention ponds, catch basins, oil-water separators and conveyance system(s).

B. Clearing of Permanent Retention/Detention Areas

Systems shall be cleared of all silt, sand and other material when infiltration rate becomes 60 percent of the initial. No vegetation shall be planted in the infiltration area of the retention/detention area.
Chapter 10

FRANCHISE UTILITIES

10.1 Port Orchard Goals

10.2 Regulations
   A. Permit and Plan Submittal Requirements

10.3 Construction
   A. Construction Schedule Coordination Requirement
   B. Emergency Repair Work
   C. Construction Standards
   D. Erosion Control
   E. Traffic Control
   F. Restoration
   G. Summary
10.1 Port Orchard Goals

A. Franchise Utility Permit Specifications

The City of Port Orchard has jurisdiction and regulatory control over the public right-of-way (ROW) within city limits. All companies wishing to install private utilities within the boundaries of public ROW are required to enter into a Franchise Utility Agreement with the City of Port Orchard. This agreement, required by the Port Orchard Municipal Code, establishes permits, fees, and other requirements that must be completed prior to the commencement of work on any portion of the project. Permit holders are required to notify the Public Works Department at least 48 hours prior to beginning work within the ROW and also to request a final inspection for the work to be performed.

The Contractor shall have a copy of the approved permit including all attachments and a set of approved construction drawings on site at all times.

10.2 Regulations

A. Permit and Plan Submittal Requirements

1. No person shall perform any work within the City right-of-way without first obtaining all required permits. The City shall not issue a permit for the construction, installation, maintenance or repair of utility facilities unless the utility operator of the facilities has a current franchise with the City, is engaging in good faith negotiations with the City to renew an expired franchise, or has other valid authorization from the City to place, repair or maintain utility facilities in the City right-of-way, and all applicable fees have been paid.

2. Utility operators shall not be required to obtain a permit for service drops to customer premises or routine maintenance or repairs where such drops, repairs or maintenance:
   a. Do not require cutting, digging, or breaking of, or damage to, the right-of-way.
   b. Do not result in closing or blocking any portion of the travel lane for vehicular traffic.

3. Applications for permits to construct utility facilities shall be submitted upon forms to be provided by the City and shall be accompanied by drawings, plans, and specifications in sufficient detail to demonstrate the following:
   a. That the facilities will be constructed in accordance with all applicable codes, rules, regulations, and design and construction standards.
   b. The location and route of all utility facilities to be installed aboveground or on existing utility poles.
   c. The location and route of all the applicant’s utility facilities on or in the City right-of-way to be located under the surface of the ground, including the line and grade proposed for the burial at all points along the route that are within the City right-of-way.
d. The utility operator’s existing utility facilities shall be differentiated on the plans from new construction:
   i. A cross section shall be provided showing the applicant’s new and any existing utility facilities in relation to the street, curb, sidewalk or right-of-way.

e. The utility operator shall provide the City with three complete sets of engineered record drawings in a form acceptable to the City. The drawings shall show the location of all its utility facilities in the City right-of-way after construction.

f. All existing utility facilities of other utility operators and other physical features of the applicant’s proposed route shall be shown in sufficient detail to ensure the proposed utility facility can be constructed as shown in the plans.
   i. Include sufficient detail to show:
      a. Measured distance from the curb to the utility. The street, sidewalk, right-of-way and public utility easement drawn and differentiated from one another
      b. Placement of new Franchise utilities diagramed in relation to City owned utilities
      c. New proposed utility install location versus the utility company’s existing utilities locations
      d. Property address and boundaries, with street names
      e. Include documented construction schedule
      f. Detailed Traffic Control Plan

g. The construction methods to be employed for protection of existing structures, fixtures, and facilities within or adjacent to the City right-of-way, and description of any improvements that the applicant proposes to temporarily or permanently remove or relocate.

h. All permit applications shall be accompanied by a written construction schedule, which shall include a deadline for completion of construction.
   i. The construction schedule is subject to approval by the City Engineer.

j. All construction practices and activities shall be in accordance with the permit issued by the City and city-approved final plans and specifications for the utility facilities.

k. The City Engineer and other designated city representatives shall be provided access to the work site and such further information as they may require to ensure compliance with permit requirements.

l. Any material change to the final approved plans and specifications in the course of work requires a modification and a re-submittal of the changed plans associated with this permit.

m. The utility operator shall promptly complete all construction activities so as to minimize disruption of the City right-of-way and other public and private property.

n. All construction work within the right-of-way, including restoration, must be completed within 30 days of the specified completion date on the permit application.
10.3 Construction

A. Construction Schedule Coordination Requirement
1. All utility operators are required to make a good faith effort to both cooperate with and coordinate their construction schedules with those of the City and other users of the right-of-way.
2. Prior to May 31st of each year, utility operators shall provide the City with a schedule of known proposed construction activities for that year which are in, around or may affect the City right-of-way.
3. All construction locations, activities and schedules within the right-of-way shall be coordinated as ordered by the City Engineer to minimize public inconvenience, disruption, or damages.
4. Prior to May 31st of each year, the City shall provide all franchised utility operators with a schedule of proposed construction activities that may impact an area where they have or plan to place utilities.
5. Utility operators shall meet with the City annually, or as determined by the City, to schedule and coordinate construction in the right-of-way.

B. Emergency Repair Work
In the event of an emergency, a utility operator may perform work on its utility facilities without first obtaining a permit from the City, provided that a permit application is submitted to the City and the utility attempts to notify the City prior to commencing the emergency work. In any event the utility shall apply for a permit from the City as soon as reasonably practicable, but not more than 48 hours after commencing the emergency work.

C. Construction Standards
1. All trenches shall be a minimum of 36 inches in depth, backfilled with clean ¾”-0 crushed rock, compacted in 2 foot maximum lifts to 95% AASHTO T-99 test method.
2. Trenches in unimproved roadways (without curbs) must be a minimum of 48” in depth and adhere to the same compaction test (this stipulation also applies to joint trench installation in newly constructed streets).
3. The City of Port Orchard shall be supplied with compaction test results from a certified testing laboratory.
4. All street cuts 9 square feet or greater will require a compaction test on the base and asphalt. In place density tests will be required for first lift 91% compaction and 92% for any others.
5. All street crossings of utilities shall be bored.
6. All asphalt street trenches shall be saw cut.
7. Concrete street trenching shall be accomplished by the removal and replacement of full panels, where doweling will be utilized.
   a. Before the end of the working day, all street trenches and bore pits shall be plated with hot or cold patch transition & warning signs.
   b. Coordinate placement of bore pits with your City Inspector.
8. All locate requests shall be preceded by having the area pre-marked with white paint.

D. Erosion Control
1. All applicable Erosion Control measures shall be in place prior to the start of construction and shall be maintained throughout the entire project.
2. All exposed soils within the project area which will not be disturbed for 2 days between October 1 and April 20 shall be covered.
3. This primarily applies to, but is not limited to, open trenching installation. Soils from bore pit excavation must be covered with plastic at the end of each working day if still on-site.
4. Contact your inspector with any questions.

E. Traffic Control
1. A detailed Traffic Control Plan shall be submitted with the permit application.
2. City streets are not allowed to be closed unless prior approval is granted.
3. Pedestrian and bicycle traffic accommodations shall be made to ensure safe pass through or around work sites.

F. Restoration
1. When a utility operator does any work in or affecting any City right-of-way, it shall, at its own expense, promptly restore such right-of-way or property to at least the same condition that it was in prior to excavation in accordance with applicable federal, state and local laws.
2. The utility operator shall notify the City in writing within 15 days of completing any restoration work that the restoration work is complete.
3. When sidewalk panels must be removed for installation purposes, only full panels are to be replaced to an original or better condition.
4. All new panels are to be edge-shined on all 4 sides or match existing sidewalks.
5. Any water meters in existing panels must be reset to match the elevation of the fresh concrete so as to not create a tripping hazard.
6. The Public Works Department will provide new meter boxes for boxes needing replacement. Contact the Public Works Department for meter box replacements at (360) 876-4991.
7. The new panels must be covered during inclement weather to allow adequate cure time.
8. All disturbed landscaped areas (trees, shrubs, grass, flowers, etc.) damaged during the project shall be restored by the grantee or contractor to original or better condition.
9. When working near street trees, stay outside of its drip line.
10. Directional bores under street trees will not be allowed unless approved by the City Engineer.
11. Pedestal locations must be kept at property lines.
12. A registered professional land surveyor, at the expense of the grantee or contractor, must reset any survey marker or monument that is disturbed or removed during pedestal placement.
13. A professional plumber, at the expense of the grantee or contractor, must repair any damage to existing plumbing lines on private property.

14. It is suggested that the grantee or contractor perform a site inspection prior to commencement of work and any existing defects should be recorded. This procedure will help to prevent any undue damages being lobbied against the contractor or grantee at the time of final inspection.

15. If the utility operator fails to restore right-of-way or property as required in the permit, the City shall give the utility operator written notice and provide the utility operator a reasonable period of time not less than 10 days, unless a threat to public safety is deemed to exist, and not exceeding 30 days to restore the right-of-way or property.

16. If, after said notice, the utility operator fails to restore the right-of-way or property as required in the permit, the City shall complete said restoration at the expense of the utility operator.

G. Summary

1. All work requires a permit to be issued prior to beginning unless the work is an emergency.
2. All plan submittal requirements must be met.
3. Notify your City Inspector 48 hours prior to starting work and for a final inspection.
4. All construction work must be completed within 30 days of the specified completion date on the permit application.
5. Street crossings are to be bored.
6. Compaction test will be required and a copy shall be submitted to the City upon completion.
7. All locate requests shall be preceded by having the area pre-marked with white paint.
8. SCHEDULE AN INSPECTION AT LEAST 48 HOURS IN ADVANCE.
Chapter 11

DESIGN STANDARDS FOR WATER EXTENSIONS

11.1 Introduction

11.2 Water Availability
   A. General
   B. Non-Binding Water Availability
   C. Annexation

11.3 Water Main Extensions
   A. Extension Application
   B. Compliance with SEPA or NEPA
   C. Compliance with Endangered Species Act
   D. Attorney’s Fees in Disputes, Arbitration, or Litigation
   E. Administrative Procedures

11.4 Design Standards for Water Main Extensions
   A. General
   B. Plans
   C. Mechanical (Water)
   D. Cross-Connection Control Regulations

11.5 Standard Specifications for Construction
   A. General
   B. Site Work
   C. Concrete
   D. Special Construction (Pipeline Casings)
11.1 Introduction

It is the desire and objective of the City of Port Orchadr to provide facilities for the distribution of water to our residents in accordance with approved land use plans and policies and the City’s Comprehensive Plans. The City will not extend facilities to service additional customers, properties, tracts, or subdivisions at the expense of existing customers.

An applicant (e.g., developer, homeowners association, citizens group, or individual) for an extension is responsible for financing the entire cost of an extension. This may include adding new facilities or replacing existing system components, when necessary for making the extension or improvement, including over sizing water system components as outlined below.

Water system extensions, improvements, or new facilities will be constructed in accordance with the City’s Policies (POMC 13.04), Design Standards, Standard Specifications, and Schedule of Rates and Fees. Any work not so performed, or installed per approved plans, may be rejected by the City, in which case the City shall have no obligation whatsoever to accept the extension and provide water service to the owner’s property.

All water facilities, except service lines downstream of a water meter, will:

- Be located on public rights-of-way or dedicated easements;
- Will be transferred to the City’s ownership for perpetual operation, maintenance, and service responsibilities;
- Will be subject to initial performance/maintenance bonding requirements.

11.2 Water Availability

A. General

The City will make every attempt to provide sufficient water resources to meet the needs of its current customers and provide for future growth needs. However, development of new water supplies may not keep pace with growth requirements.

During periods when growth demands outstrip available water supply, new service requests will be served on the basis of water availability and time of application for service. New sources will not be considered available to the City until water rights for the sources are granted by the Washington State Department of Ecology.

When the City does not have sufficient water rights to supply all applicants for water availability, non-binding letters of availability will be issued contingent on City acquisition of sufficient water rights to supply proposed development.
B. Non-Binding Water Availability

Non-binding water availability letters will be issued upon application and payment of fees for properties being developed. A legal description of the property to be served must be provided for the water availability application. All fees paid shall be non-refundable.

The non-binding letter will enable a developer to start the platting process; however, it cannot be used to finalize the plat. Non-binding availabilities will list contingencies, which must be fulfilled, by the developer and the City prior to issuance of a binding commitment. Non-binding water availabilities issued with a water rights approval contingency will not be converted to binding commitments without sufficient water rights being approved by the Washington State Department of Ecology.

NONBINDING LETTERS OF WATER AVAILABILITY ARE NOT AN OBLIGATION ON THE PART OF THE CITY TO SUPPLY WATER.

C. Annexation

In the event that the premises to be served are located within the City’s retail service area, but, in whole or in part, are outside the City’s Urban Growth Area, any obligations of the City to provide service are conditioned on the following requirements having first been met:

1. The property may be annexed to the City, subject to approval by the Boundary Review Board, in the manner required by law. The annexation shall include a service area acceptable to the City. At the sole discretion of the City, the City may not require annexation; however, the Developer must agree to pay all surcharges for out of City service.

2. Water and/or sewer service is conditioned upon compliance with Growth Management Act requirements.

3. The Developer shall obtain the signature(s) of the legal owner(s) of the premises for annexation on the City’s standard form. The Developer may also be required to obtain the signatures of owners of any adjoining properties that the City or the Boundary Review Board deem necessary or advisable to be included in such annexation.

4. The Developer shall pay, at its sole expense, all legal, engineering, and City Staff costs incurred in seeking such annexation. The Developer shall pay the filing fee required by the Boundary Review Board for such annexation and costs associated with the State Environmental Protection Act (SEPA).
11.3 Water Main Extensions

A. Extension Application

1. Application Approval

Requests for extension or improvement of the water system to serve newly developed and/or existing properties shall be made by applicants or their agents using the City’s application form (Developer Extension Agreement). To be considered for approval, the applicant must have a valid water availability letter from the City. The water availability letter will list the requirements for providing service to the property.

2. Conditions

The applicant will be notified of the feasibility of the service requested, conditions for construction, and any additional facilities, which will be required to serve the proposed development. The applicant will be required to install all of the necessary infrastructure. Examples of water infrastructure include, but are not limited to distribution mains, fittings, valves, fire hydrants, pressure reducing stations, service lines to property, and other appurtenances necessary to serve the proposed development in accordance with the City’s current planning. If deemed necessary by the City, the developer will be required to provide technical studies such as hydraulic analysis for the developments fire flow demands. Additional special requirements such as pump stations, reservoirs, off-site water main upgrades, cross connection control devices or back flow prevention assemblies may also be specified.

3. City Review

Plans for the proposed water main extension/development must be submitted to the City and approved prior to execution of a Developer Extension Agreement. A plan review fee, as specified in the City resolution adopting service charges and miscellaneous fees will be assessed to compensate for review services.

4. Extension Agreement

Upon approval of plans for the water main extension, the applicant shall execute a Developer Extension Agreement with the City, which will specify the terms and conditions of the extension or system improvement in accordance with the City’s standards. The applicant with the Developer Extension Agreement must submit a legal description of the property to be served. The applicant and City Engineer will sign extension Agreements. Construction inspection charges and local facilities charges are due and payable prior to approval of the Developer Extension Agreement. Plans for necessary water system extensions and improvements will become part of the Agreement.
5. Fees and Charges

When submitted to the City for approval, the Developer Extension Agreement shall be accompanied by construction observation charges and applicable local facilities charges as set forth in the City’s resolutions adopting connection charges and service charges and miscellaneous fees.

Additional charges such as general facility charges, special assessments, and connection charges will be determined by the City and payment will be made in accordance with the terms of the Developer Extension Agreement.

6. Approval of Application

Each application will be considered by the City Engineer and approved or rejected according to the City’s policies. After consideration by the City, the application will be accepted, accepted as modified by Agreement with the applicant, or rejected. Notice of the City Engineer’s action will be mailed to the applicant. If accepted, the applicant will be entitled to proceed with construction of the extension in accordance with the terms of the Agreement and City policies.

7. Time Limit

The Developer Extension Agreement will become void in two years if construction has not been completed, unless extended by the City. Thereafter, a new Agreement must be entered into for the project to proceed and updated fees paid.

8. Permits, Easements, and Approvals

The applicant, at the applicant’s expense, shall obtain all necessary permits, easements, and approvals. These could include, but are not limited to, state and county road, building, health, and planning agency permits.

9. City Responsibilities

In consideration of payment of the Plan Review and Construction Inspection Charges, the City will provide:

a. Design review for compliance with City Standards;
b. City inspection of water and sewer improvements construction;
c. Witnessing of pressure test;
d. Taking and submitting water samples for bacteriological testing for the Department of Health; and
e. Updating City system maps, based on the project’s record drawings.
10. Applicant/Developer/Agreement or Responsibilities

   It is expected that the applicant will extend normal courtesies to the City in giving reasonable notice of the time and place of work to be inspected. In particular, the applicant shall:

   a. Notify the City in writing at least forty eight (48) hours in advance of the time of beginning of construction;

   b. Complete the work, including cleanup, to the point where work complies with the plans and specifications and is ready for acceptance by the City; and

   c. Pay to the City the extra cost of overtime services performed by the City beyond normal working hours, on Saturdays, Sundays, or holidays, with prior approval from the City Engineer, in the event such services are required by the applicant. In the event the developer makes a change in the plat or other plan of the proposed development which requires a change in the design of the water and/or sewer system, the developer shall reimburse the City for any additional expense incurred by the City because of such change.

B. Compliance with the State Environmental Policy Act (SEPA) or National Environmental Policy Act (NEPA)

   If the proposed extension and appurtenances are not exempt from the provisions of RCW 43.21C, the State Environmental Policy Act (SEPA), or the National Environmental Policy Act (NEPA), the Developer, as a condition of performance to the City of its obligations under this Agreement, must prepare and submit an environmental checklist and worksheet. The Developer shall use forms provided by the City in respect to the proposed Developer Extension Project and otherwise comply with the provisions of SEPA or NEPA and procedures of the City for handling projects subject to such acts. The City will then serve as the lead agency in determining the environmental significance of the Proposed Developer Extension Project unless a State or County agency having jurisdiction over the project assumes lead agency status. If an environmental impact statement is required, the Developer shall pay all costs of proceedings before governmental agencies in respect thereto including the costs and fees of the City Engineer and/or Attorney for the City in participating in any such proceedings.

   City assumes no liability or responsibility to Developer for the interruption of the work due to SEPA or NEPA requirements or litigation commenced by third parties against City and/or Developer to delay or stop the proposed project by reason of environmental concerns.

   Developer agrees to defend, indemnify and hold the City harmless from and against any and all claims, demands, liability and/or judgments as may be made or entered against the City by a third party, including any governmental body or agency, arising from the Developer’s project based upon alleged non-compliance with or in violation of SEPA and/or NEPA laws and other regulations in respect to the project. Developer shall reimburse City for all attorneys’ fees and costs and other expenses and fees incurred in connection with any such claims and
demands, and in particular, all attorneys’ fees, costs and expenses incurred if Developer fails to assume the defense of any such claims or demands or fails to assume all costs of negotiations to settle any such claims or demand.

C. Compliance with Endangered Species Act

The listing of Chinook and other species of salmon as endangered or threatened under the Endangered Species Act (ESA) has created the likelihood of future regulations and restrictions that may restrict or even prohibit the City from allowing additional connections or facilities to its water system.

In the event the ESA Restrictions impose conditions on the connections or facilities anticipated under this Agreement, which increase the cost of providing such service, such increases shall be the sole responsibility of the property owner.

The City assumes no liability or responsibility to the Developer for the interruption of the work due to ESA requirements or litigation commenced by third parties against the City and/or Developer to delay or stop the proposed project by reason of environmental concerns.

Developer agrees to defend, indemnify and hold the City harmless from and against any and all claims, demands, liability and/or judgments as may be made or entered against the City by a third party, including any governmental body or agency, arising from Developer’s project based upon alleged non-compliance with or violation of ESA laws and other regulations in respect to the project. Developer shall reimburse the City for all attorneys’ fees and costs and other expenses and fees incurred in connection with any such claims and demands, and in particular, all attorneys’ fees, costs and expenses incurred if Developer fails to assume the defense of any such claims or demands or fails to assume all costs of negotiations to settle any such claims or demands.

D. Attorney’s Fees in Disputes, Arbitration, or Litigation

1. Third Parties

In the event this Agreement is referred by the City to an attorney by reason of any dispute whatsoever which arises with third parties, including governmental agencies, in respect to either the right of a Developer and additional owners to proceed and/or complete the work, and settlement negotiations or arbitration proceedings are commenced, or suit is instituted, with the approval of the Developer, against any such third parties, including governmental agencies and/or suit is instituted against the City by any such third parties, including governmental agencies in respect thereto, the Developer and additional owners shall be responsible for payment of attorneys’ fees and court costs incurred by the City in any such proceedings, and the City may require advance deposits periodically from the Developer and additional owners to cover all such costs and attorneys’ fees.
2. Developer

In the event either party hereto commences legal action, including appeals, against the other to enforce the provisions of this Agreement or for damages for breach hereof, the prevailing party shall be entitled to recover its costs and reasonable attorneys’ fees in the amount determined by the court.

E. Administrative Procedures

1. Financing

Applicants, at their own expense, will install an extension and transfer ownership to the City, under the review and approval provisions stated herein.

2. Fee Deposit

The applicant shall pay the City the applicable plan review fee and developer extension fees as set forth in the schedule of fees and charges.

3. Performance Bond

The Developer may post cash, a letter of credit, or an assignment of funds on deposit with a bank in lieu of a bond, on the same terms and conditions as described above, upon approval of the City.

In no event shall the bond/deposit be waived if the City is requested to approve the extension prior to final plat approval.

See Section 2.5. Bond Requirements.

4. Connection Charges

Per Port Orchard Municipal Code 13.04, or current resolution, each lot or service connection included in a water extension will be assessed a Service Inspection Fee, a Capital Facilities Charge, Fee in Lieu of Assessment, and, the cost of the meter and gaskets required. All fees and charges are due in full, less any credits, before water will be made available.

A Capital Facilities Charge is assessed to compensate for costs the City and its customers have paid for the existing system and for new facilities and system upgrades required to support the addition of new customers. The Capital Facilities Charge is based on each parcel paying its equitable fair share of the City’s capital water facilities in conformance to the applicable RCW.

A Fee in Lieu of Assessment is assessed to compensate for costs the City and its customers have paid for the cost of the water facilities and for new treatment facilities and system upgrades required to support the addition of new customers.
5. Reimbursements

If a new water main, which is constructed as an extension, is capable of serving properties between the existing system and the applicant’s new service(s), the City will enter into a Developer’s Extension Agreement, also known as a latecomer’s agreement, with the applicant in accordance with the requirements set forth in RCW 35.91. The Agreement usually will include a reimbursement for new services on both sides of a road or street as they connect to the extended main section which was paid for by the applicant. An alternative may be a credit toward the Capital Facilities Charges for the development as determined by the City Engineer. The amount of reimbursement normally will be based on the front footage of the property connecting to the extension and the cost per foot to construct the extension.

Reimbursements will normally be paid for a period of fifteen years from the time the extension is accepted by the City and recorded at the Kitsap County Auditor’s Office. In no case will the reimbursement exceed the applicant’s actual construction costs of installing the extension main from the existing system to the nearest point of the applicant’s lot. The City will verify the developer’s study based on actual costs of an extension and apply the costs to the benefitted properties so each pays their equitable fair share of the improvement.

The City will retain a portion of each reimbursement collected for administrative fees.

6. Extension Lengths

In order to facilitate further extension of a system in directions where future development may continue, applicants for extensions/improvements normally will be required to extend water mains along all boundaries of their property which are adjacent to a street or road and/or to the far sides of their property. The City installs water mains where they physically have the minimum required separation from other utilities. In some circumstances, therefore, the applicant will be required to install the water main across the street or road from their property.

7. Over sizing and Replacement

In order to provide capacity for future customers or improve existing service on an economical basis, the City may require over sizing or replacement of existing facilities in conjunction with construction of an extension or improvement. Over sizing requirements will be determined by the City’s approved comprehensive plans.

For extensions that include over sizing for future customers, a separate Agreement between the City and applicant will address possible credit against general facilities charges or City participation as applicable. City participation on over sizing costs will be determined on a case by case basis at the sole discretion of the City.
8. Liability Insurance

Applicants or their Contractor shall provide proof to the City prior to construction and shall maintain during the life of the project, public liability insurance for bodily injury and property damage liability, including, without limitation, coverage for explosion, blasting, collapse, and destruction of underground utilities and blanket Agreement liability. Coverage shall protect the applicant and the City. The applicant and Contractor shall have the City specifically added as additional named insured in the policy at no cost to the City and shall present a policy endorsement to the City as evidence.

The applicant, or Contractor shall further agree to indemnify, defend, and to save the City harmless from any and all claims or liability for damages arising from acts or work due to operations. The Contractor shall furnish the City certificates of comprehensive, general, automobile liability and property damage insurance before commencing work. The Contractor shall carry minimum commercial general liability insurance limits of $1,000,000 bodily injury, including death, and $1,000,000 property damage protecting against all claims for personal injury or property damage arising during the course of the performance of the Agreement with a $2,000,000 annual aggregate. In addition, automobile liability insurance of $1,000,000 per accident shall be carried.

9. Easements and Bill of Sale

The applicant shall obtain all necessary easements and a Bill of Sale transferring ownership of all installed water and/or sewer mains and facilities to the City. The Bill of Sale shall describe lengths and sizes of water and/or sewer mains, and the location in general terms, including the name of the plat if applicable.

The applicant shall furnish the City an affidavit stating that there are no liens filed against the water main construction.

10. City Access

During construction, applicants and their Contractors will provide the City access to the jobsite and all their applicable personnel as necessary, to ensure compliance with City requirements.

11. Final Acceptance

Upon completion of construction, applicants, and/or their Contractors, shall notify the City and request a final inspection for approval of the project. If the water main has been installed according to the approved plans and specifications, pressure and bacteriological tests have been passed, and all extension policy conditions have been fully satisfied, the City will issue a Letter of Final Acceptance of the main extension. The date of the letter will begin the period of warranty. The acceptance of the Agreement work shall not prevent the City from making claims against the applicant for any defective work discovered during the two year period of the Performance Maintenance Bond.
12. Maintenance Bond

A requirement for final acceptance is that the developer (or Contractor) shall furnish a maintenance bond to the City which shall be in force from the date of final acceptance for a period of two years. The bond shall be in a form acceptable to the City and shall require the developer (or Contractor) and/or the bonding company to correct any defects in labor and materials that arise in said system for a period of two years from the date of acceptance of the system and transfer of title. The maintenance bond shall be in an amount equal to the current bonding standards. The City will release the maintenance bond at the end of the two year period following an inspection of said system.

11.4 Design Standards for Water Main Extensions

A. General

All extensions to the water system must conform to the design standards of the City and shall meet the requirements of the latest Kitsap County Fire Protection Ordinances and Uniform Fire Codes. In addition, plans and specifications for system extensions must be approved in accordance with the requirements of the State Department of Health.

The water system must provide adequate domestic and fire flow supply for the fire protection requirements. If fire flow is required, the plan must be approved by the South Kitsap Fire & Rescue Fire Marshall.

In all cases where public road right of way will be used for mains or other improvements, or where water facilities are proposed to be installed in easements, the City Engineer must approve the plan. All easements for water facilities must be on an approved form and the City must be listed as the “Grantee.” The legal description and attached map showing the location and size of the easement must be approved by the City Engineer prior to recording.

In all cases where a County road right of way will be used for mains or other improvements, the County Road Department must also approve the plan in addition to the City.

The system must be capable of future expansion and must be constructed of permanent materials.

Project Datum: The site survey shall use North American Vertical Datum 88 (NAVD 88). Design submittals including water plan and profile and well pump station elevations shall be based on NAVD 88.

B. Plans

1. General

The developer shall submit two copies of plans and specifications for the project for City review. The plan review fee must accompany the initial set of plans. City standards will
normally be adequate to serve as the technical specifications for the project. The City may require additional specifications if project conditions warrant. Plans and specifications for all projects must be prepared and stamped by a professional engineer registered in the state of Washington, with the exception of extensions for single family residences. After the review, the developer shall submit two copies of the final version of the plans that will be stamped as approved and used in construction.

2. Criteria for Plans

The plans shall be prepared in accordance with the following criteria:

a. Title Blocks: Each sheet within the set of drawings shall have a title block showing the sheet title, number, date, scale, and revision block. All plans shall be prepared on standard 22x34 sheets, in the 2009 or earlier version of AutoCAD, with survey grade accuracy and with water improvements highlighted over acceptable screened back base map. Scale shall be 1”-20 ft. to 1”-50 ft. as appropriate.

b. Rights-of-way: Right-of-way lines, the boundaries of lots fronting on the street, drainage easements, utility easements, section lines and corners, and temporary construction easements, existing and proposed, shall be shown on the plans. All rights-of-way and easement lines shall be properly dimensioned.

c. Topography: All pertinent topographic features shall be shown such as street lines, curbs, sidewalks, shoulders, location and size of storm and sanitary sewer lines, water and gas lines, drainage ditches, utility poles, fire hydrants, high water and frequent inundation levels, and all other features of the area which may affect the design requirements for the area.

d. Profiles: Water line profiles shall be provided when the water lines are to be installed over un-graded terrain. In general, the City will not require profiles of water lines to be installed in streets or other graded terrain where specified depth of cover will be adequate to determine the location of the line in the ground. Elevations shall be shown on the plans which are adequate to determine the pressure differential in the lines due to change in elevation and for placement of pressure reducing valves if required. Clearances between sewer lines and water mains shall be shown at all sewer line crossings.

e. Legal Description: The plans shall include a complete legal description of the property to be served.

3. Plan Revisions

The City shall be informed of all plan revisions which affect the design of the water system prior to implementation. The City reserves the right to withdraw approval if in the opinion of the City the changes will cause the design of the extension to be below the City’s standards.
4. Facility Placement

All water mains and other facilities, unless a private system, shall be installed in public rights-of-way or in recorded utility easements dedicated to the City. The developer or his engineer shall check with the City prior to beginning of design of the extension to determine if there is a preferred main location.

5. Public Rights of Way

All locations of City facilities within the City right-of-way must be approved by the City Engineer. Utilities located in the road right-of-way must comply with franchise requirements outlined in ordinances passed by the City Council authorizing such use of the road and right-of-way. Where no ordinance applies, water mains shall be installed so as to be compatible with the existing water system, the terrain, geology, and the location of other utilities.

Where the water line is installed in a public right of way, it shall not be located under curbs or sidewalks. Deviations from approved locations must receive prior written approval by the City Engineer, be documented, and be accompanied by accurate record drawings.

6. Easements

Utility easements will be a minimum of 15 feet in width and piping will be installed no closer than five feet from the easement’s edge. Water line constructed deeper than 15 feet below finished ground surface may require an easement width greater than 15 feet.

7. Private Roads

If it is necessary to install a water main within a private road, the easement shall be the width of the traveled surface plus one foot on either side.

8. Water and Sewer Line Separation Distances

Transmission and distribution water piping shall be separated at least ten feet horizontally from waste disposal piping, drain fields, and/or sanitary sewer gravity or force mains. The bottom of the water main shall be 18 inches above the top of the sewer component. All parallel and crossing installations of water and sewer lines shall be in accordance with provisions of WAC 248-96 (septic systems) and the “Recommended Standards for Water Works” - Ten State Standards. Where local conditions prevent such horizontal and/or vertical separation, closer spacing is permissible where design and construction meet the special requirements of the Department of Ecology criteria for Sewage Works Design.

When a water line crosses a sanitary sewer or force main, it shall be specified that the water main be installed a minimum of two feet above the sewer line with joints a minimum of five feet from the sewer line on each side. Controlled density fill shall be placed over the sewer line.
9. Main Layout and Sizing

The City shall be consulted as to the size of the water main.

In general, the minimum size water main which will be allowed to serve developments is 8 inch inside diameter, unless otherwise approved by the City. Looped six inch diameter mains will be allowed within a development if no fire hydrants are connected to the main. Where dead end mains are allowed in cul-de-sacs, they may be 4-inch diameter from the last fire hydrant to the remaining residences, if approved by the City Engineer.

In general, dead end water mains are not permitted. Wherever possible, all water line extensions shall form a looped system. Mains must be extended to the far side of a property to be served. For commercial and residential developments on corner lots, the mains must be extended to the far side of both sides of property fronting roads.

Commercial developments which are required to upgrade city roads will be required to upgrade the water main in the road to the size indicated in the City’s Water System Plan.

It is the intent of these requirements to ensure that the water pipe sizing will supply the required domestic and fire protection flows while maintaining adequate system pressure under existing and future demand conditions. The City may, at its discretion, require the developer to pay for the City or its Consultant to conduct an analysis and run the hydraulic model developed specifically for the City’s water system. The purpose of this analysis is to confirm the actual flow rate that is available and the size of needed system improvements to provide water service.

10. Fire Hydrants

Water line extensions shall include fire hydrants if required by City Standards and Specifications, or if not, be designed to permit placement of fire hydrants in accordance with South Kitsap Fire and Rescue (SKF&R) standards, unless a modification is authorized by the Fire Marshall. Fire hydrants shall be placed at street intersections wherever possible, and located to minimize damage due to traffic. Fire hydrants installed in residential areas shall have a maximum spacing of 600 feet measured along the street frontage. Hydrants located at intersections shall be installed at the curb return. All others shall be located on property lines between lots. Fire hydrants in commercial, industrial and multifamily areas shall have a maximum spacing of 300 feet and shall be placed not more than 150 feet or less than 50 feet from a building. Variation from hydrant spacing standards will be allowed when it can be demonstrated that alternate spacing will better serve the site layout. The SKF&R may at its option require additional hydrants.

11. Water Pressure Requirements

Water systems shall be designed to maintain a minimum residual pressure of 30 psi at meter outlets under maximum demand flow conditions, excluding fire demand. Unless specifically approved otherwise by the City, water systems shall be hydraulically designed to provide a maximum pressure no greater than 100 psi, with a desired range of 40-90 psi. In
cases where a booster pump station will be required, a bladder tank will be installed. For water systems requiring fire flow capability, the design shall be adequate to maintain, under fire flow conditions, positive pressure throughout the system and a 20 psi residual pressure in mains supplying fire hydrants in use as per WAC 246-290 requirements. The City may require the engineer to submit a hydraulic analysis showing the required flows and pressures can be met. The City may, at its discretion, require that the City’s hydraulic model be used and run by the City or City’s Consultant. Developer shall pay for costs to accomplish this analysis.

12. Pipe Cover

The depth of trenching, installation of pipes, and backfill shall be such as to give a minimum cover of 36 inches over the top of the pipe. This standard applies to transmission, distribution, and service piping. Backfill and compaction will be in accordance with applicable construction standards identified below. Materials capable of damaging the pipe or its coating shall be removed from the backfill material.

13. Isolation Valves

Valves shall be installed at all crosses and tees. The number of valves at each intersection shall at a minimum equal the number of connecting pipes less one. Lengths of pipe between valves should not exceed 500 feet in school, commercial, or multi-family areas, and 800 feet in other residential service areas. Valves shall be located on tees and crosses at street intersections, or at other locations as determined by the City. If it is necessary to install valves between street intersections, they shall be located on property lines between lots and on fire hydrant tees wherever possible.

14. Air and Air-vacuum Relief Valves

In order to minimize problems associated with air entrainment, air or combined air-vacuum relief valves shall be installed at points of high elevation throughout each system. To prevent freezing, the vault lid and vault cavity will be insulated as directed by the City. These valves shall be installed as per standard specifications and detail drawings.

15. Blow-off Valves

A blow-off valve assembly shall be installed on all permanent dead-end runs and at designated points of low elevation within the distribution system. The blow-off valves shall be installed on public rights-of-way except where a written access and construction easement is provided to the City. In no case shall the location be such that there is a possibility of back-siphoning into the distribution system.

16. Fire Protection Systems on Private Property

A double detector check valve installation shall be required on all fire protection systems to private property. The detector check shall be approved for the type of use by Washington
State Department of Health. An OS&Y valve shall be installed on the inlet side along with a 1-inch by-pass. The by-pass shall include a water meter and double check valve assembly. The property owner is responsible for the fire line from the City main to the fire suppression system.

17. Record Plans for the City

Any deviations from originally approved plans and specifications shall be in accordance with Section 11.3.B.2 Plan Revisions. Upon completion of the project, the following will be provided to the City:

a. Electronic Auto CADD files (2009 version or earlier),

b. a digital format such as “pdf” of the record plans on CD (2 copies).

Record drawings must show all new water facilities and related appurtenances which, at a minimum, shall include the locations of all mains, fire mains, valves, hydrants, back flow assemblies, and fittings, giving sizes and types of each. Record drawings for new sewer improvements shall include all mains, manholes, clean-outs and similar appurtenances. The drawings shall show the exact location of water/sewer mains including distances of mains from property lines. The applicant shall make every reasonable effort to assist the City in acquiring all necessary information for record drawings.

C. Mechanical (Water)

1. General

This division covers that work necessary for furnishing and installing mechanical appurtenances and accessories as described in these specifications and as shown on the plans.

All pipe, valves, meters, hydrants, fittings, and special material shall be new, undamaged, and designated for use in potable water systems. All material suppliers shall be bonded sufficiently for the value of material supplied. Material used on water projects shall comply with AWWA Standards, and each project’s detailed plans and specifications.

The developer’s Contractor shall furnish all materials necessary for the installation of the water system facilities including but not limited to meter boxes and service connection materials.

2. Submittals

Submittal information shall be provided to the City for the following items:

a. Ductile Iron Pipe
b. Ductile Iron Fittings
c. Stainless Steel Pipe and Fittings
d. Poly Pipe and Fittings  
e. PVC Pipe and Fittings  
f. Isolation Valves  
g. Control Valves  
h. Fire Hydrants  
i. Double Check Valves  
j. Other Mechanical Components  

3. Pipe and Fittings  
Provide piping, plumbing, fittings and appurtenances necessary to make all piping systems complete, tested, and ready for operation as specified herein and as shown on the plans. All pipe sizes, as shown on the drawings, and as specified herein, are in reference to “nominal” diameter, unless otherwise indicated. All pipe shall meet the City’s standard specifications. One type of pipe shall be used throughout entire projects, except as necessary to match existing piping, or as otherwise specified in writing by the City Engineer. Where relocation of, or replacement of, existing piping is necessary during construction, materials used shall be subject to the written approval of the City Engineer.

4. Ductile Iron Pipe  
Ductile iron pipe shall be thickness Class 52 and shall conform to standards of ANSI Standard A21.51 (AWWA C-151). All pipe shall have mechanical joints or push on joints in accordance with ANSI Standard A21.11 (AWWA C-111). Gaskets shall be chloroprene. Standard thickness cement-mortar lining shall be in accordance with ANSI Standard A21.4 (AWWA C-104).

Restrained joint pipe, where specifically shown on the plans, shall be ductile iron manufactured in accordance with requirements of ANSI A21.51 (AWWA C-151). Push on joints shall be in accordance with ANSI 21.11 (AWWA C-111). Pipe shall be TR Flex or approved equal. Pipe thickness shall be designed in accordance with ANSI A21.50 (AWWA C-150). Standard thickness cement-mortar lining shall be in accordance with ANSI A21.4 (AWWA C-104).

Where Mega-Lug joints are called out on the plans, they shall be Mega-Lug Series 1100, as manufactured by EBAA Iron, or approved equal. Mega-Lugs shall be used on all mechanical joints.

When requested, furnish certification from manufacturer of pipe and gasket being supplied that all of the specified inspections and tests have been made and the results comply with requirements of this standard.
5. Ductile Iron Fittings

All fittings shall be ductile iron where possible. Steel fittings will not be accepted. Ductile iron fittings shall be short body, cement lined, and have a minimum working pressure of 250 psi. Metal thickness and manufacturing processes shall conform to applicable portions of ANSI Standards A21.20, A21.11, B16.2, and B16.4. Standard cement lining shall be in accordance with ANSI Standard A21.4 (AWWA C-104). Mechanical joint (MJ), ductile iron, compact fittings 3 inches through 24 inches shall be in accordance with AWWA C-153.

Ductile iron flange (FL) fittings shall be in accordance with AWWA C-110, with bolt pattern to match adjacent pipe and 250 psi pressure rating. Gasket material for flanges shall be neoprene, bunan, chlorinated butyl, or cloth inserted rubber. Gaskets shall be full face ring type.

Type of ends shall be specified as mechanical joint (MJ), restrained joint (RJ), plain end (PE), or flanged (FL). Mega-Lugs shall be used on all mechanical joints.

6. Polyvinyl Chloride (PVC) Pipe

PVC pipe in excess of 2 inches will not be used for new installations. Larger size PVC piping may be used to replace small sections of existing PVC piping in emergencies only. PVC pipe shall conform to the requirements of AWWA C-900 specifications. PVC pipe for distribution pipelines shall be pressure class 200. The pipe shall bear the seal of the National Sanitation Foundation for potable water pipe. All pipe shall be listed by the Underwriters Laboratories, Inc.

PVC pipe shall be made from Class 12454-A or Class 12454-B virgin compounds, as defined in ASTM D1784. Joints shall conform to ASTM D3139 using a restrained rubber gasket conforming to ASTM 3477. Solvent welded pipe joints will not be permitted.

PVC pipe shall be Johns Manville, or approved equivalent.

7. Galvanized Iron Pipe (GI)

Galvanized iron pipe shall conform to the latest revision of ASTM A-120 or A53; Grade A, Schedule 40, seamless pipe that has been manufactured in the United States. Pipe shall be hot-dip galvanized. Pipe fittings shall be galvanized and threaded.

8. Flexible Couplings

Flexible couplings shall be as manufactured by Smith Blair or Romac, or equal; MJ sleeve couplings shall be as manufactured by Griffen or U.S. Pipe or equal.

9. Bolts in Piping

Bolts shall be zinc or chrome plated cast iron. Stainless steel bolts are not allowed.
10. Valves and Appurtenances

Valves noted on the plans or in other parts of the specifications shall meet the requirements herein. Valves shall be designed for the intended service. Prior to placement in the trench, valves shall be fully opened and closed to check the action and a record made of the number of turns required to fully open or close the valve. For valves 16 inches or larger, a member of the water utility shall be present to check the action and record the number of turns. The inside of all valves shall then be thoroughly cleaned and the valve installed. Install valves in strict accordance with manufacturer’s instructions and as shown on the plans. Buried valves shall have all operators or valve box installed so that wrenches or operators perform freely and without binding or other interference. Bed and backfill buried valves according to the requirements of the pipe to which they are attached. Provide concrete supports for operators where required, as shown on the plans.

a. Resilient Seat Gate Valves: All gate valves for water lines 2” and larger shall be of the resilient, wedge-type, non-rising stem and shall meet or exceed the performance requirements of AWWA C-509 and be suitable for installation with the type and class of pipe being installed. The wedge shall be fully encapsulated with vulcanized SBR rubber. Valves to be equipped with mechanical joints or flange ends of Class 125 in accordance with ANSI B16.1 unless otherwise specified. Valve opening direction shall be counterclockwise. Provide fusion epoxy coating and 2 inch operating nut. Gate valves shall be Dresser, Kennedy, or approved equivalent.

b. Butterfly Valves: Butterfly valves shall be approved for use only where special applications are required. Butterfly valves shall meet or exceed all AWWA C-504 specifications and shall be Class 150-B valves with short body which are suitable for direct bury. When they are installed, they shall have a position indicator which clearly shows the position of the disc. All butterfly valves shall be installed with the operator nut located toward the center line of the street. All valves shall be equipped with an underground manual operator with AWWA 2-inch square nut, shall open with a counterclockwise rotation, and have mechanical joint or flanged ends of Class 125 in accordance with ANSI B16.1 unless otherwise specified. All butterfly valves shall be Dresser, Pratt, or approved equivalent.

c. Check Valves: Check valves, three inches or larger, shall be iron body, iron disc, bronze-mounted, swing type, clearway, quiet closing, lever and spring valves with flanged ends. All valves shall comply with AWWA C-508 specifications.

Check valves, smaller than three inches, shall be bronze body, bronze-mounted, swing type with flanged or threaded ends depending upon installation.

Check valves shall be Dresser, Mueller, or approved equivalent.

d. Pressure Reducing Valves: Pressure reducing valves shall be diaphragm actuated, single seat, hydraulically operated valves with a single operating chamber sealed by a
synthetic rubber diaphragm. Control of the valve shall be from a single direct acting hydraulic pilot valve that is controlled by hydraulic pressure acting on a spring backed diaphragm. The main valve shall have a single removable seat and a resilient disc. The stem shall be guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. No external packing glands are permitted, and there shall be no pistons operating the main valve or any pilot controls. The pilot control shall be a direct-acting, adjustable, spring-loaded, normally open, diaphragm valve, designed to permit flow when controlled pressure is less than the spring setting. The control system shall include a fixed orifice. The diaphragm shall be set to open at any pressure below its preset set point and to close at any pressure above an adjustable dead band, to maintain downstream pressure within 2.5 psi of the pressure set point. Downstream pressure control shall not be based on changing upstream pressures. The valve shall be rated for 250 psi working pressure.

A bypass line of suitable size with isolation valves and pressure reducer will be installed in parallel to the main Pressure Reducing Valve (PRV) to manage low flows and assure continuity of service in event of main PRV failure.

Pressure reducing valves shall be Cla-Val model 90-01 or approved equivalent.

11. Tapping Sleeve and Valve

Provide restrained mechanical joint with flanged outlet tapping sleeve with a minimum 150 psi rating. The sleeve shall be grade 18-8 type 304 stainless steel and SBR rubber gasket, Romac Style SST, Ford Style FAST, or approved equal.

The valve shall be 200 psi pressure rated, resilient seated, non-rising stem, AWWA C-509, with flanged by mechanical joint connection. The valve shall have a cast or ductile iron body with AWWA C-550 epoxy coating. The valves shall be M&H style 3751-NRS, or approved equal.

12. Fire Hydrant Assembly

Fire hydrants shall conform to AWWA Standard C-502 for post-type, dry-barrel, self-draining hydrants suitable for at least a 54-inch depth. Each hydrant shall have a six-inch inlet, a minimum valve opening of 5-1/4 inches, two 2-1/2 inch hose connections, and a 4-1/2 inch pumper port with a 5 inch Storz pumper connection. All ports shall have National Standard Threads or other connection devices consistent with local fire protection authority requirements. All valves and caps shall open counterclockwise and have a 1-1/2-inch flat point pentagon operation and cap nuts. Hydrants shall be break-away traffic models.

The configuration of the fire hydrant assembly shall be as shown on Standard Detail 1181. The assembly shall have a cast iron tee (with mechanical joint connections to the main) a flanged tee, a six-inch flanged by mechanical joint gate valve with valve box, and a six-inch ductile iron pipe extension. All mechanical joints shall be secured with mega-lugs. Push on
pipe joints shall be secured with field lock gaskets. Shackle rods to connect the hydrant to the auxiliary valve at the main are not permitted.

Provide a minimum of seven cubic feet of washed gravel surrounding the 90 degree bend below the hydrant. Gravel shall be 1-1/2 inch minus and be retained on 1/4 inch mesh for drain.

Hydrants added to existing systems will be installed by wet tap.

The hydrant shall have at least an 18 inch clearance between the ground and the lower port, and a 36 inch unobstructed radius around it for operation of a hydrant wrench. The steamer/pumper port shall face the street or the most likely direction of emergency approach.

Hydrants shall be coated with two coats of yellow Rustoleum paint or equal in accordance with coating manufacturer’s recommendations.

Fire hydrants shall be Mueller, M&H, Waterous, or City approved equivalent.

13. Blow off Valve Assembly

Two-inch blow off assemblies shall be provided in accordance with Standard Detail 1180 at locations shown on the plans or prescribed by the City.

14. Miscellaneous Mechanical

a. Air and Air/Vacuum Release Valves: Provide air and air/vacuum release valve’s body and cover fabricated from cast iron. Provide internal parts, including float, seat, needle, linkage, level pins, retaining rings, and screws, fabricated from either stainless steel or bronze. Air release valve shall have 2 inch inlet, 3/32 inch orifice, and shall be designed for operating service to 150 pounds per square inch (psi). Air and air-vacuum relief valve assembly materials shall conform to Standard Detail 1183.

Air release valve shall be equal to APCO Model No. 55. Air and air-vacuum relief valves shall be APCO Model #142 or #143C for one-inch, or #144 or #145C for two-inch, or approved equivalent.

b. Gate Valves: Gate valves 2 inches and smaller for steel pipe shall be Crane No. 1320 or equal, with 250 psi pressure rating having non-rising stem, screwed bonnet, solid wedge disc, bronze construction and threaded ends.

Install valves and fittings in accordance with manufacturer’s recommendations and the plans. Verify alignment and adjustments after installation.

c. Valve Boxes: All valve boxes shall be two-piece cast iron, and equipped with a suitable extension for a 36-inch to 65-inch trench depth. Top sections and lids will be designed for installation in vehicular areas. Lids will be labeled “WATER”, and lid tabs will point in the direction of the water main. The valve boxes shall have a design loading meeting
AASHTO H-20. All valves and valve boxes will be set plumb with the valve box centered on the valve. Valve box installation shall comply with Standard Detail 1184.

Cast iron valve boxes shall be Olympic Foundry, Rich Box No. 920 or approved equivalent and must be compatible with the City’s system.

d. Valve Marker Posts: A fiberglass valve marker post shall be furnished and installed with each single or closely grouped combination of valves. Marker posts shall be located as directed by the City. Size of valve and distance (to the nearest foot) shall be stenciled on the face of the post with a 1 1/2-inch black painted figure.

Valve marker posts shall be blue in color, 4 inches wide (flat), 72 inches high and beveled top. Carsonite Curve-Flex marker or approved equal.

e. Hydrant Guard Posts: At locations specified by the City, reinforced concrete posts six feet long and a minimum of nine inches in diameter shall be installed according to the standard detail for fire hydrant installations. Guard posts are not allowed on city or county rights of way.

Hydrant Guard Posts shall be Fog Tite Meter Seal or approved equivalent. Posts shall be coated with two coats of rustoleum yellow paint.

f. Warning Tape: Locator tape WILL NOT be used as an alternative to wire but will be used in addition to the wire. Continuous metallic tape, brightly colored, 2 inch minimum width, imprinted in 1 inch letters with “Caution Buried Water Line” shall be repeated at not less than 4 foot intervals. Install warning tape above water line approximately 18 in. below the finished grade.

g. Locating Wire: All pipe shall be laid with one piece of 10-gauge or thicker insulated copper wire. The locating wire shall be situated immediately adjacent to the pipe and connected to all valves. Locating wire shall also connect to all service lines and meters.

15. Backflow Prevention

Backflow prevention devices including Double Check Valves and Reduced Pressure Backflow Assemblies shall be installed according to detailed installation plans prepared by the engineer or the Contractor and approved by the City Engineer. Installation shall comply with standards of Accepted Procedure and Practice in Cross Connection Control, AWWA, and Pacific Northwest Section. All backflow assemblies shall be approved on the latest approved list of the Washington State Department of Health.

16. Service Connections

Water service installations shall comply with the City’s Standard Detail 1160 and 1161. The location and type of corporation stop, meter setters, and locating wire on all individual services must be as indicated on Standard Details 1160 and 1161. In addition, if pressure reducing valves are required for individual service connections where static pressure at the
meter exceeds 80 psi, they normally will be installed after the meter. Meter sets and yokes will be specified by the City.

U-branch connections may be connected directly to the meter setters with a union for adjacent meter sets or connected with union adapters to one inch polyethylene pipe leading to non-adjacent meter sets.

a. Service Saddle: Ductile iron body, stainless steel straps, nuts, and bolts, Buna N or SBR O-ring gasket, with iron pipe tap. Saddles 1½ inches and larger shall be double strap. Saddles shall be Romac 101S or 202S, Smith Blair 311, or approved equal.

b. Corporation Stops: Corporation stops for one inch to two inch service saddles shall be bronze body, male iron pipe threaded inlet, pack joint (compression) outlet, Mueller H-10013, Ford FB1100, or approved equivalent conforming to AWWA C-800. Direct taps for services are not allowed.

c. Polyethylene Pipe (Blue Poly): Polyethylene pipe for service connections shall conform to AWWA C-901, PE 3406, SDR 9, copper tubing size, 1-inch diameter. Pipe shall have a cell classification meeting ASTM D3350 and a pressure rating of 160 psi. Joints shall be pack joint with stainless steel insert stiffener.

d. Meter Setter: Meter sets shall be installed using a meter yoke equipped with a locking angle meter valve and an angle check valve. Meter yoke inlets and outlets shall have male iron pipe size threads.

e. Meter yoke assemblies shall be Mueller H-1434-2 or H-1422, Ford VH 72-12W with valve, or approved equal. If meters need to be raised, Mueller H-14118 Meter Relocater, or approved equivalent shall be used.

17. Meter Boxes

Mid State Plastics Model MSBCF 1118 with DI lid, TRPL hole, and hinged inspection lid.

18. Individual Pressure Reducing Valves

Where static water pressure exceeds 80 psi, pressure reducing valves shall normally be installed after the meter as directed by the City. Individual service pressure reducing valves shall be of bronze body construction with a renewable stainless steel seat, stainless steel integral strainer, and temperature resistant diaphragm. Pressure reducing valves 2-inches and smaller for individual water service lines shall be Wilkins 600 Series or equal.

19. Pipe and Fittings Installation

a. General: Use materials and installation methods in accordance with Uniform Plumbing Code, latest edition, and local codes and regulations which are applicable. Install ductile iron water mains in accordance with AWWA C600-93 and manufacturer’s recommendations. Use types and sizes of pipes as specified herein and/or as shown on the approved plans. Where sizes of small pipe are omitted from the plans and not
mentioned in the specifications, use sizes corresponding to code requirements, and as required by equipment and plumbing fixtures and appurtenances. In any event, properly size any un-designated pipe sizes for functions to be performed.

b. Materials Delivery: Pipe and appurtenances shall be handled in such a manner as to ensure delivery to the trench in a sound, undamaged condition. Particular care shall be taken not to injure the pipe, pipe coating, or lining. Before installation, the pipe and appurtenances shall be cleaned of foreign material and inspected for defects. Valves shall be cleaned of all foreign material and operated before installation to ensure proper functioning.

Pipe shall not be strung out along a trench or shoulder of a road in a manner which causes a safety hazard to the public.

Rubber gaskets shall be stored in a cool, dark place to prevent damage from the direct rays of the sun.

c. Alignment: Pipe shall be laid to specified grade and alignment as staked in the field. Alignment deviation shall not exceed 0.5 feet. Replacement of stakes lost or destroyed shall be made at the Developer’s expense and in accordance with Agreement Plans, including modifications specified by the City. All construction staking shall be provided by the Contractor.

d. Grade: Prior to installation of the water line all roadways shall be graded to the finished rough grade. The water line shall be installed three (3) feet below finished grade. Any modification of the main or appurtenances required to adjust to grade changes will be at the expense of the Contractor.

e. Installation: Carefully lay pipe and support at proper lines and grades. Follow piping runs shown on the plans as closely as possible, except for minor adjustment to avoid architectural and structural features. Make minor relocations, if required, in a manner acceptable to the City.

Pipe passing through or under concrete or rock walls or slabs shall be placed in casing. Keep openings in pipes closed during progress of work.

f. Polyethylene Encasement: Where shown on the plans, the Contractor shall lay ductile iron pipe with a polyethylene encasement. Pipe and polyethylene encasement shall be installed in accordance with AWWA C105.

g. Thrust Blocking: All valves, tees, and bends shall be thrust blocked. Only concrete thrust blocking is acceptable for installation of water system facilities. Concrete blocking shall be commercial concrete mix, poured in place against undisturbed soil. All concrete blocking shall have a minimum compressive strength of 3,000 psi. Thrust blocking shall comply with the provisions of Standard Detail 1103. All fittings which may come in contact with poured thrust blocks shall be wrapped in plastic. Form thrust
blocking so that bolts, joints, gaskets, and flanges of adjacent joints are clear of concrete and so that bolts and joints can be dismantled without removing concrete.

The City does not use thrust blocks for fire hydrants. Each fire hydrant shall be secured with mega lugs.

h. Sanitation Requirements: Extreme care should be used in checking and cleaning all pipe and fittings of dirt, debris and foreign matter during installation. All material shall be kept clean. Plugs shall be used to seal installed water mains when they are to be left for any period of time, including lunch breaks, coffee break, overnight, etc. Material contaminated by petroleum products or questionable chemicals will be rejected. No trench water shall be allowed to enter installed water mains.

i. During construction, new water mains must be separated from the existing system (eg. with a gate valve). All new water mains require satisfactory flushing, disinfection, and bacteriological sampling. The final testing shall be performed in the presence of a City inspector.

j. Only City personnel are permitted to operate valves on the potable water side of a system and at wet taps. The City will fine the Contractor for system tampering if unauthorized personnel operate water system valves per Port Orchard Municipal Code 13.04.170 Violation.

20. Water Main Inspection and Testing

Furnish all required personnel and equipment and make all tests required to demonstrate the integrity of finished installation to approval of the City and all agencies having jurisdiction.

a. Water Main Cleaning: Prior to testing, the inside of each completed pipeline shall be thoroughly cleaned of all dirt, loose scale, sand and other foreign material. Cleaning shall be accomplished by flushing with a minimum velocity of 2.5 feet per second.

The Contractor shall install temporary strainers, temporarily disconnect equipment and take other appropriate measures to protect equipment while cleaning. Cleaning shall be completed after any repairs.

Flushing shall allow four complete exchanges of water at flushing velocity.

b. Water Main Disinfection and Flushing: After preliminary purging of the system, chlorinate entire potable water system in accordance with AWWA C-651-92 and any subsequent modifications thereof for flushing and disinfecting water mains, current adopted WSDOT Standard Specifications Section 7-09.3(24), and in accordance with all other pertinent rules and regulations. Upon completion of sterilizing, thoroughly flush entire potable water system at a minimum velocity of 2.5 feet per second, allowing four complete exchanges of contents. Discharge of disinfection water into a storm drain, drainage ditch or natural channel is prohibited without thoroughly neutralizing the
chlorine residual (0.1 parts per million or less) remaining in the water and volumetrically and velocity controlled to prevent re-suspension of sediments in the stormwater system.

After final flushing and before the water pipe is connected to or hydrostatically tested, the Contractor shall request that the City arrange to have a sample or samples collected for bacteriological testing. At least one sample will be collected from each branch of the pipe. A City Inspector must be present when samples for bacteriological testing are taken. The City will supply bottles and submit them for testing to a Washington State certified laboratory. Copies of test results shall be retained by the City. A copy of the test results will be delivered to the Contractor for review. The water pipe will not be charged for hydrostatic testing prior to satisfactory bacteriological testing results.

If test results are not satisfactory, lines shall again be disinfected, flushed, and tested until two consecutive, satisfactory series of samples are obtained. If the new water pipes are exposed to contaminants or pressure drop after acceptance of a successful bacteriological test the Contractor shall be required to repeat the disinfection process at the City’s discretion and the Contractor’s expense.

c. Hydrostatic Pressure Testing: All water mains and appurtenances shall be tested under a hydrostatic pressure equal to 225 psi for 15 minutes. Water service lines will be visually inspected for leakage. All pumps, gauges, plugs, saddles, corporation stops, backflow prevention devices, miscellaneous hose and piping, and other equipment shown on the construction plans and that are necessary for performing the test shall be furnished and operated by the Contractor. The pipeline trench shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and sufficiently cured to reach design strength before testing. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking and remove it after testing.

The mains shall be filled with water and allowed to stand under pressure for a minimum of 24 hours to allow the escape of air and/or allow the lining of the pipe to absorb water. The City will furnish the water necessary to fill the pipelines for testing purposes at a time of day when excess quantities of water are available for normal system operation.

Gauges used in the test may be required to be certified for accuracy at a laboratory chosen by the City.

Any visible leakage detected shall be corrected to the satisfaction of the City regardless of the allowable leakage specified. Should the test section fail to meet the pressure test successfully as specified in the Agreement, the Contractor shall, at his own expense, locate and repair the defects and then retest the pipeline.
After the test has been completed, each valve shall be tested by closing each in turn and relieving the pressure beyond. This test of the valves will be acceptable if there is no immediate loss of pressure on the gauge when the pressure comes against the valve being checked. The Contractor shall verify that the pressure differential across the valve does not exceed the rated working pressure of the valve. All tests shall be made with the hydrant auxiliary valve open and pressure against the hydrant valve.

Prior to calling out the City to witness the pressure test, the Contractor shall have all equipment completely set up and ready for operation and shall have successfully performed the test to assure that the pipe is in satisfactory condition.

Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants.

The test shall be accomplished by pumping the main up to the required pressure, stopping the pump for fifteen minutes and then pumping the main up to the test pressure again. During the test, the section being tested shall be observed to detect any visible leakage. A clean container shall be used for holding water for pumping pressure on the main being tested. This makeup water shall be sterilized by the addition of chlorine to a concentration of 50 mg/l.

Acceptability of the test will be determined in accordance with the current adopted WSDOT Standard Specification Section 7-09.3(23). There shall not be an appreciable or abrupt drop in pressure during the 15 minute test period.

21. Construction Acceptance

Construction Acceptance by the City will not occur until all new mains have been satisfactorily inspected and tested, and all punch list items have been satisfactorily corrected.

22. Generator

Water well, water pump stations, and other appurtenances which require power at all times shall have a generator installed. The generator should have the quiet package enclosure with either Cummins power or be Kohler with John Deere power. The City shall approve the generator prior to installation.

D. Cross-Connection Control Regulations

The City established regulation of cross connections in Port Orchard Municipal Code 13.04.100. No cross connections shall be created, installed, used or maintained within the service boundaries served by City of Port Orchard except in accordance with WAC 246-290-490.

W.A.C. 246-290-490 and the latest adopted edition of the Cross Connection Control Manual as published by the Pacific Northwest Section-AWWA, shall be used to determine installation requirements.
11.5 Standard Specifications for Construction

A. General

This document outlines the general and specific construction requirements for water systems operated and maintained by or for the City of Port Orchard (City). All references to the City Engineer shall mean the City Engineer or his/her authorized representative.

1. Standard Specifications

   In general, all construction activities and material specifications shall conform to the latest City adopted edition of:

   a. City's Design Standards for Water Extensions.

   b. Applicable City of Port Orchard rules, regulations, ordinances and standards.


   d. Standards of the American Water Works Association, latest revision.

   e. Rules and regulations of the State Board of Health regarding the Health aspects of Public Water Systems, WAC 246-290, latest revision.

   f. Recommendations of the manufacturer of materials or equipment.

2. Permits and Licenses

   The applicant/Contractor shall acquire the required permits for construction within public rights of way. The Developer and/or his engineer shall provide and complete all necessary forms and submit to the County/City/State agencies with the applicable fees.

   All construction shall conform to the requirements of the respective permits.

3. Pre-Construction Conference

   The City will schedule a pre-construction conference with the applicant, Contractor, and affected County/City/State agencies prior to start of construction. The Contractor shall submit the following to the City at the pre-construction conference:

   a. Material submittals

   b. Safety and traffic control plan, if needed

   c. Copies of all necessary city, county, and state permits necessary for the conduct of the work. No work will be allowed to proceed without a copy of the necessary permits being provided to the City.
d. Evidence of insurance with the City named as additional insured in accordance with the Developer Extension Policies. An endorsement to the insured’s policy will be considered as evidence of insurance.

4. Submittal and Shop Drawings

In accordance with the City’s Technical and Standard Specifications, applicants or their Contractor shall submit a list of all brands, sizes, types, grades, and standard materials to be used. The City may reject certain brands and will provide approval, disapproval, and/or comment by letter.

a. Submittal data for each item shall contain sufficient information on each item to determine if it is in compliance with the Agreement requirements. Items that are installed in the work that have not been approved through the submittal process shall be removed and an approved product shall be furnished, all at the Developer’s expense. Shop drawing review will be limited to general design requirements only, and shall not relieve the Developer from responsibility for errors or omissions, or responsibility for consequences due to deviations from the Agreement documents. No changes may be made in any submittal after it has been reviewed except with written notice and approval from the City Engineer prior to implementation. Shop drawings shall be submitted on 8½” x 11”, 11” x 17”, or 22” x 34” sheets and shall contain the following information:

i. Project Name

ii. Prime Developer and Applicable Subcontractor

iii. City’s Name

b. Submittals that do not comply with these requirements may be returned to the Developer for re-submittal. Acceptable submittals will be reviewed as promptly as possible, and transmitted to the Developer not later than 10 working days after receipt by the City Engineer. Revise and submit as necessary.

Submittals shall contain the following information for all items:

i. Equipment drawings, dimensions, and weights (pump stations only).

ii. Catalog information.

iii. Manufacturer’s specifications.

iv. Special handling instructions (pump stations and pumps only).

v. Maintenance requirements (pump stations and pumps only).

vi. Wiring and control diagrams (pump stations and pumps only).

Specific submittal requirements are listed in each section of these specifications.
5. Substitutions
   a. The approved Developer Extension Agreement, construction plans, and City technical
      and standard specifications shall be followed. No deviations will be allowed without
      request for change and approval in writing from the City Engineer or designee. The City
      reserves the right to order changes, which conform to the City’s standard specifications;
      in the event conditions or circumstances are discovered during construction, which
      indicate changes are prudent. The applicant shall be notified in writing of any changes.
      Such changes will be mutually accepted.
   b. Deviations from standard locations and/or approved plans must be documented,
      receive prior written approval by the City Engineer, and be accompanied by accurate
      record drawings.

6. Site Control
   a. The Contractor shall be responsible for surveying and staking and will stake out the
      locations of the permanent easements, temporary easements, rights-of way, and all
      major facilities shown on the Plans and permits.
   b. Replace all damaged survey monuments in accordance with RCW 332-120.

7. Waste Material Control
   a. Adhere to all requirements of federal, state, and local statutes and regulations dealing
      with pollution. Permit no public nuisances.
   b. Use only dump sites that are approved by the regulatory agency having jurisdiction and
      present proof of approval upon request. Obtain any and all permits required by
      regulatory agencies.
   c. At all times, keep the construction area clean and orderly and upon completion of the
      work, restore all work or equipment storage areas to their original condition. Remove
      all miscellaneous unused material resulting from the work and dispose of it in a manner
      satisfactory to the City.
   d. The Contractor shall follow all requirements and guidelines of the Puget Sound Air
      Pollution Control Agency and other associated agencies.
   e. Use water sprinkling, temporary enclosures, or other methods to limit dust and dirt
      from rising and scattering in the air. Surface water runoff that is contaminated with site
      debris, silt, or other material that adversely affects water quality shall be collected and
      cleaned prior to discharge.
   f. Do not use water to control dust when it may create hazardous or objectionable
      conditions such as ice formation, flooding, or pollution.
8. Spill Response

   The Contractor shall prepare a spill response plan for the site and provide a copy to the City Engineer. The Contractor shall maintain a current copy of the approved spill response plan on site at all times and provide any updates to the City Engineer as they occur. All necessary materials and equipment necessary to respond to spills shall be kept readily available on site.

9. Erosion Control

   The Contractor shall prepare an erosion control plan for approval by the regulatory agency. The Contractor shall maintain a copy of the approved erosion control plan on site at all times.

10. Construction Notification

    Contractors shall notify the City Engineer, a minimum of 48 hours in advance of construction, to facilitate project coordination and notification of affected property owners.

11. Construction Shutdowns

    a. Construction under this Agreement may involve replacement or modification of the existing water system, which must continue to provide service to all buildings and homes during construction. Connections and service changes must be programmed to provide the least possible interruptions of service.

    b. A Water Main Shutdown Agreement must be completed by the Contractor if a connection to an existing system involves turning off the water. The Contractor shall notify the City Engineer at least five (5) days in advance of any required shutdowns so that affected customers may be notified. City personnel will notify properties affected by the shutoff.

    c. Prior to any shutdown, all traffic control, materials, fittings, supports, equipment, and tools shall be on the site and all necessary labor scheduled prior to starting any connection work. In general, shutdowns shall not exceed four hours in duration unless specifically authorized by the City Engineer.

    d. The Contractor may be required to install and maintain temporary water to all houses and other buildings affected by frequent service disruptions caused by construction activities. Installation and maintenance of temporary facilities will be at the Contractor’s expense. All temporary piping and connections shall be approved by the City Engineer and disinfected as specified herein before being put into service.

    e. All work under this Agreement shall be conducted in a manner that will minimize shutdowns, open roadways, or traffic obstructions caused by construction. Shutdowns causing damage to adjacent public and private property shall be the sole responsibility of the Contractor.
f. Planned utility service shutdowns shall be accomplished during periods of minimum use. In some cases, this will require night or weekend work. In such instances, the Developer/Contractor will be required to pay overtime inspection fees.

g. Coordinate all work so that service will be restored in the minimum possible time, and cooperate with the City in reducing shutdowns of the utility system to a minimum.

h. No utility interruption will be permitted without the prior approval of the City. Any unauthorized tampering with the water system is subject to fines.

12. Connection to Existing Systems
   
a. Connections to existing water mains shall not be made without first completing the necessary arrangements with the City. Work shall not be started until all traffic control, materials, equipment, and labor necessary to properly complete the work are assembled on the site. Once work is started on a connection, it shall proceed continuously, without interruption, and as rapidly as possible until complete. No shut-off of mains will be permitted overnight, over weekends, or during weeks with holidays.

b. Contractors shall acquaint themselves with all aspects of existing systems prior to starting construction on new mains. Pertinent information concerning existing systems may be obtained from City personnel and may be verified from City records. Contractors shall locate existing water mains and service lines prior to beginning work so they may be properly protected and maintained in service during construction.

c. Taps or new extension connections from existing mains must be made in the presence of designated City personnel. No taps or connections are to be made without designated City personnel being present.

d. Only City personnel are permitted to operate valves on the certified, potable waterside of a line, including emergencies unless personnel safety is threatened. Exposing a potable water line during construction without the City Engineer’s concurrence will result in a penalty being imposed.

13. Work on Non-City Rights-of-Way

a. Work on a state highway, county road, street or any other right-of-way not owned by the City, shall conform to the requirements of the authority having jurisdiction over such right-of-way. Contractors are responsible for notifying the proper authorities and acquiring permits before beginning work on a right-of-way. Contractors will ascertain restoration requirements and determine that schedules of operations proposed are satisfactory to applicable authorities. Work will not be permitted to proceed without evidence of having obtained the required permits.

b. When city streets, SR 160 or SR 166 within City Limits, are involved, the Contractor must coordinate all trenching and restoration activities with the City Engineer and WSDOT. Open cuts must be approved by the City Engineer.
c. When county roads are involved, the Contractor must coordinate all trenching and restoration activities with the Kitsap County Department of Public Works and the City. Open cuts must be approved by the Kitsap County Department of Public Works.

14. Traffic Maintenance

Contractors shall conduct work so as to interfere as little as possible with public travel. Required traffic control shall be in place prior to commencement of work. Access for firefighting equipment shall be provided at all times, and Contractors shall keep the local fire protection authorities informed of the location of construction operations and fire lanes. Contractors shall also notify the authorities in charge of any municipal, private, or school transportation system at least 48 hours in advance of road closures that will force a change in the regular routing of the transportation system. Contractors shall also provide and maintain suitable detour routes for the system. Road closures will not be allowed without written permission from the City Engineer, except verbal permission may be used in an emergency. Work which involves State, County road or City Streets rights of way shall be restricted to the hours between 8:00 AM and 4:00 PM and no work shall be allowed in such right of way on Saturdays, Sundays or Holidays unless authorized by the City Engineer.

15. Safety

Contractors will be solely and completely responsible for conditions at job sites, including safety of all persons and property during the performance of work. This requirement will apply continuously and not be limited to normal working hours.

16. Inspection Requirements

a. Unless previously authorized by the City Engineer, work on water mains shall not proceed without a City Inspector being present. The City may refuse acceptance of any water mains installed without a City inspection. To permit scheduling an inspector, the City Engineer must receive a hard copy of the construction schedule at least two full working days before construction activities covered by the schedule begin. The City must be kept advised of changes to the construction schedule. When significant breaks in construction occur, the Contractor must give two working days notice before resuming work. The inspector shall have authority to reject defective material and to suspend any work that is not conducted in accordance with the City’s Technical Standards and Specifications.

b. All mains shall be inspected by the City Inspector before closure of any excavation. Inspectors will have access to work sites as necessary to keep the City informed of the progress of the work and the manner in which it is being done, to keep records, to act as liaison between the Contractor and the City Engineer, and to report any deviations from Plans or Specifications. Failure of the Inspector to call the attention of a
Contractor to faulty work or deviations from the Plans or Specifications shall not constitute acceptance of said work.

c. Any personal assistance, which an Inspector may give a Contractor, will not be understood as the basis of any assumption of responsibility in any manner, financial or otherwise, by the Inspector, the Engineer, or the City.

d. The presence or absence of an Inspector on any job will be at the sole discretion of the City Engineer. Such presence or absence of an Inspector will not relieve a Contractor of responsibility to deliver the construction results specified in the Agreement documents.

e. City Inspectors will not be authorized to issue instructions or to approve or accept any portion of the work, which is contrary to the Plans and Specifications. Approvals, acceptances, or instructions, when given, must be in writing and signed by the City Engineer or his/her designated representative. Inspectors will have authority to reject defective material. The failure of an Inspector to reject defective material or any work which deviates from the Agreement documents will not constitute acceptance of such work.

f. Kitsap County may have an inspector on site when working on County rights-of-way.

17. Overtime and Holiday Work

Should a Contractor elect to work more than eight hours per day, or more than five days per week or on holidays during the course of a project, all costs of resulting City overtime/holiday engineering and inspection will be charged to the Contractor at 2.5 times the normal rates.

18. As-Constructed and Warranty Records

a. Prior to final acceptance of the work by the City, the Developer shall deliver a complete set of acceptable as-constructed records to the City Engineer. Drawings shall be made on clean, unmarked prints of the project, and the final submittal shall include the following:

i. Electronic Auto CADD files, version 2009 of earlier;

ii. a digital format such as “pdf” or “tif” of the record plans on CD (2 Copies)

b. The Developer shall provide as-constructed information on all items and work shown on the plans showing details of the finished product including dimensions, locations, outlines, and changes. The information must be in sufficient detail to allow City personnel to locate, maintain, and operate the finished product and its various components.
B. Site Work

1. General

   This division covers the work that is necessary for providing materials and performing all
site work as called for on the approved plans.

2. General Construction Procedures

   a. Standards

      Construction procedures shall be in full accordance with the City’s Standard
Specifications for Water Main Construction and the most recent edition of the American
Water Works Association (AWWA) Standards.

      Certain other referenced standards used in this specification are from the latest editions
of:

      i. DOE Washington State Department of Ecology
      ii. UBC Uniform Building Code
      iii. UPC Uniform Plumbing Code
      iv. UMC Uniform Mechanical Code
      v. NEC National Electrical Code
      vi. AWWA American Water Works Association
      vii. ANSI American National Standards Institute
      viii. ASA American Standards Association
      ix. ASTM American Society for Testing and Materials

   b. Contractor

      All main extensions shall be installed by a Contractor approved by the City.

3. Submittals

   Submittal information shall be provided to the City for the following items:

   a. Erosion and Sedimentation Control Plan
   b. Erosion Control Fence Fabric
   c. Dewatering Plan
   d. Shoring Plan and Calculations
   e. Dump Site Permits
   f. General Fill
g. Structural Fill  
h. Pipe Bedding  
i. Trench Backfill  
j. Gravel Base Course  
k. Crushed Surfacing  
l. Paving  
m. Compaction Test Results  
n. Hydro-seed  

4. Erosion and Sedimentation Control  
   a. All erosion/sedimentation control systems including fencing, earth berms, grasses, straw, mulch, culverts, drain pipe, outfalls and other items required for this project, are the responsibility of the Developer and fall under the jurisdiction of Kitsap County or the City of Port Orchard (depending on the location of the extension).  
b. All erosion/sedimentation control (ESC) systems specified in the approved erosion control plan must be installed prior to commencing any work that could result in off-site storm water or material flows. Erosion/sedimentation controls must remain in place throughout the duration of the construction activities.  
c. The Contractor shall add additional ESC facilities or processes as necessary to ensure that erosion and sedimentation problems do not occur. The Contractor shall inspect the ESC facilities daily and maintain the systems as necessary to prevent off-site drainage.  

5. Dewatering  
   a. The Developer is to determine the scope, type, size, quantity, method of installation, operation, and removal of the dewatering system necessary to keep all excavations dewatered to an elevation below the base of the excavation. The system shall also be sufficient to stabilize the soils in the excavation and the surrounding areas, and to prevent flotation of partially completed structures.  
b. The Contractor shall control groundwater and surface water to prevent the softening of the bottom of excavations, or formation of quick conditions or boils during excavation. Ground water shall be lowered to 3 feet below the base of the excavation at all times. Determination of unsuitable soil conditions for supporting the improvements shall be determined by the City Engineer. When the dewatering system does not meet the specified requirements, and as a consequence there is a loosening or disturbance of the foundation soils, instability for the slopes, or damage to the foundation or structures occur, the Developer shall at its own expense repair said disturbance. This shall include
supplying all materials, labor, and equipment, and performing all work required for the restoration of foundation soil, slopes, or structure to the satisfaction of the City Engineer.

c. It is solely the Developer’s and the Contractor’s responsibility to meet all regulatory requirements governing the disposal of dewatering flows and to prevent damage to adjacent property. Disposal of these waters into existing City sewer mains or trunk lines is strictly prohibited. Drainage of water through the pipeline under construction is also prohibited.

d. All dewatering wells installed by the Contractor shall be removed and backfilled in accordance with applicable Federal and State regulations.

6. Construction Access

The Contractor shall provide temporary site access for City personnel and shall maintain vehicular site access at all times.

7. Clearing and Grubbing

Clearing and grubbing shall be performed by the Contractor to remove and dispose of unwanted debris, vegetative matter, and other items noted on the construction drawings within the construction limits. This shall conform to Section 2-01 of the WSDOT Standard Specifications.

8. Excavation

a. The Contractor shall excavate as necessary to construct the improvements shown on the construction drawings. Excavation includes utility excavation, structural excavation, and grading excavation.

b. Grading excavation shall be to the finished rough grade of the roadway or easement and shall be completed prior to utility excavation. Grade staking, when required, will be done by the developer’s/owner’s engineer, or surveyor, prior to installation of the mains.

c. Utility excavation shall be performed to the depths necessary to complete the construction work shown. Utility excavation shall be performed in accordance with the WSDOT Standard Specifications, Section 2-09, with a minimum cover of 36 inches.

d. The base of the excavation shall be examined by the City Engineer to determine if it is suitable for backfilling. The City Engineer will evaluate the stability of the base of excavation by determining if all significant organic soils or other unsuitable materials have been removed. The Contractor per direction of the City Engineer shall perform excavation required by the City that is beyond the depth shown at their expense.

e. All excavated material shall be removed from the site unless approved as backfill material by the City Engineer. Weather conditions may make previously excavated
material unsuitable for backfill requiring the material to be removed from the project site. Approval of material as backfill will be made just prior to placement of material as backfill.

f. If the trench soil is unsuitable for trench backfill, as determined by the Inspector, the Contractor shall remove and dispose of unsuitable material and backfill the trench with approved backfill. The Contractor will keep the City Engineer informed of the disposal site of all unusable material removed from the project. New or refuse material must not be dumped on neighboring properties.

g. Excavation within City right of way areas shall be in accordance with the City of Port Orchard Public Works Right of Way Permit.

9. Shoring

Where shoring, sheet piling, sheeting, bracing, lagging, or other supports are necessary to prevent cave-ins or damage to existing structures, it shall be the responsibility of the Contractor to design, furnish, place, maintain, and remove supports in accordance with applicable laws, codes, and safety requirements including Chapter 296-155 of WAC, A Safety Standards for Construction Work, Part N, Excavation, Trenching, and Shoring. Design, planning, installation, and removal of sheeting, shoring, piling, lagging, and bracing shall be accomplished in such a manner as to maintain the undisturbed state of soil below and adjacent to excavation. Failure to maintain shoring in accordance with the submitted shoring plan will result in shut down of the job by the City Engineer until required shoring is in place.

10. Hazardous Content of Fill Material

All imported fill material shall be free of hydrocarbons (e.g., gasoline, diesel oil, etc.), pesticides, herbicides, and other hazardous volatile organic compounds (VOCs) and synthetic organic chemicals (SOCs). If required, the Contractor shall provide certification to the City Engineer that the fill is free of these chemicals.

11. General Fill

a. All fill required for the project that is not specifically defined as another type shall be “General Fill”.

b. General fill shall be free of organics, debris, and other deleterious materials. General fill shall conform to Section 9-03.10 “Aggregate for Gravel Base” of the WSDOT Standard Specifications. The moisture content of the material and weather conditions at the time of placement will be used to determine the suitability of native materials for backfill as general fill. All general fill shall be compacted in uniform layers not to exceed 8 inches in loose thickness and compacted to at least 95 percent maximum dry density based on the ASTM D-1557 test procedure.
12. Structural Fill
   a. All fill placed below and against building components, building structures, vaults, manholes, handholds, slabs, sidewalks, and drives shall be “Structural Fill”.
   b. Structural fill shall be free of organics, debris, and other deleterious and conform to Section 9-03.12 (2), “Gravel Backfill for Walls” of the WSDOT Standard Specifications. The City Engineer shall determine if native on-site materials are suitable for use as structural fill. The moisture content of the material and weather conditions at the time of placement will be used to determine the suitability of native materials for backfill as structural fill. Structural fill shall bear on a firm base and be placed in uniform layers not exceeding 8 inches in loose thickness. The backfill area must be free of standing water and the sub-grade soils must be stable. Each layer of structural fill shall be compacted to at least 95 percent of its maximum dry density based on the ASTM D-1557 test procedure.

13. Pipe Bedding
   a. All fill placed below and around buried utilities shall be “Pipe Bedding”. Pipe bedding shall be placed when the trench base is deemed unsuitable by the City Engineer.
   b. Bedding material shall surround the pipe and conduits to the limits shown on the construction drawings and provide uniform support along the entire length without allowing concentrated loading at joints or bells. Bedding material shall conform to Section 9-03.12(3) of the WSDOT Standard Specifications. All bedding material shall bear on firm sub-grade and be compacted to at least 95 percent of maximum dry density based on the ASTM D-1557 test procedure.

14. Trench Backfill
   a. Unless the trench is backfilled with Control Density Fill, all fill material placed above the pipe bedding in a trench shall be “Trench Backfill.”
   b. Trench backfill shall be placed and compacted above the pipe bedding to finish grade elevations in un-restored areas or to sub-grade elevations in restored areas. Trench backfill shall consist of a well-graded sand or sand and gravel mixture conforming to Section 9-03.12 (2), “Gravel Backfill for Walls” of the WSDOT Standard Specifications and have less than 5 percent passing the U.S. No. 200 sieve based on the fraction passing the 3/4 inch sieve. Trench backfill shall bear on a firm base and be constructed in uniform layers not exceeding 8 inches in thickness. Each lift shall be compacted in uniform layers not to exceed 8 inches in loose thickness and compacted to at least 95 percent maximum dry density based on the ASTM D-1557 test procedure. The City Engineer shall determine if native on-site materials are suitable for use as trench backfill.
   c. Finished backfill shall leave all existing drainage ditches, culverts, and other appurtenances in a useable condition equal to or better than their original condition.
15. Gravel Base Course
   a. All fill placed under paving and next to native material shall be “Gravel Base Course”.
   b. Aggregate for gravel base course shall conform to Section 9-03.10 of the WSDOT Standard Specifications.

16. Gravel Top Course
   a. All fill placed under paving and next to paving material shall be “Gravel Top Course” or crushed surfacing.
   b. Aggregate for gravel top course shall conform to Section 9-03.09(3) of the WSDOT Standard Specifications.

17. Paving
   a. Cement concrete pavement, sidewalks, and curb shall be Class B concrete (3,000 psi) as specified in the concrete section of these specifications. Construction shall comply with Section 5-05 of the WSDOT Standard Specifications.
   b. Asphalt concrete pavement shall comply with Section 5-04 of the WSDOT Standard Specifications and the utility permit for the work. Finish, place, spread, and compact Class B asphalt concrete pavement to the thickness shown on the construction drawings or specified in the utility permit. The minimum compacted thickness of asphalt concrete pavement shall be 2-inches.
   c. All paving shall be inspected and approved by the agency issuing the utility permit.

18. Compaction Testing
   a. The Contractor shall arrange, at his own expense, for in place density testing to be performed at intervals not less than every 500 linear feet of pipe run and where required by the City Engineer. At a minimum, density tests shall be performed at 50% of the trench depth and at the surface of the trench. Other depths of the trench may be required by the City Engineer.
   b. The Contractor shall excavate to the depths required to perform the tests and shall provide sheeting, shoring, and bracing of the trench as necessary. Backfill, in all sections where density requirements are not satisfied, shall be removed from the trench, re-compacted, and re-tested until conforming to specifications.
   c. A certified independent testing laboratory acceptable to the City Engineer shall perform density testing. All test results shall be submitted directly to the City Engineer.
   d. The City shall have the right, but not the obligation, to perform such additional density testing, as the City Engineer deems necessary. If the tests show that the density requirements are not satisfied, the Contractor shall reimburse the City for all costs for
the tests, and shall remove the unsatisfactory backfill from the trench and re-compact and retest it until conformance with the specifications is obtained.

e. All compaction shall meet the approval of the agency issuing the utility permit.

19. Surface Restoration

a. Roads, driveways, shoulders, landscaping and all other areas removed, broken, caved-in, settled, or otherwise damaged as a result of construction work, shall be repaired and/or resurfaced to match the existing surface or landscaped areas.

b. Existing shoulders and gravel surfaces shall be restored with like, crushed rock surfacing. Existing lawns shall be restored with sod after proper backfilling and settling. Existing landscaping, fences, mailboxes, ornamentation, etc. shall be restored as close to original conditions as possible. Private driveways, walks, and other surfaced areas shall be repaired, patched, or resurfaced as required to match the original surface condition.

c. Contractors shall furnish and install new asphalt surface at all locations where the existing asphalt surface or asphalt driveway has been removed or damaged by construction work. Trenches shall be backfilled with select granular material approved by the City Engineer. It shall be mechanically tamped to 95 percent compaction in six-inch lifts. The top four inches shall consist of two inches of crushed surfacing top course and two inches compacted depth of asphaltic concrete, Class B.

C. Concrete

1. General

This division covers that work necessary for furnishing and installing all concrete as described in these specifications and shown on the plans.

2. Submittals

Submittal information shall be provided to the City Engineer for the following items:

a. Concrete design and admixtures

b. Special placement procedures for hot or cold weather

c. Schedule of surface finishes

d. Control Density Fill design mix

Concrete performance mixes shall be submitted to the City Engineer for approval a minimum of two weeks prior to placing any concrete. The performance mix shall include the amounts of cement, fine and coarse aggregate, water and admixtures, as well as the water cement ratio, slump, concrete yield and substantiation strength data in accordance with ACI 318-95, Chapter 5. The use of a performance mix requires batch plant inspection, the cost of which shall be paid by the Contractor. Review of mix submittals by the City
indicates only that information presented conforms generally to Agreement documents. Contractor or supplier maintains full responsibility for special performance.

3. Control Density Fill (CDF)
   a. At least 10 days before placing CDF, the Contractor shall submit a mix design for the material to be used. The mix design shall include trial laboratory and testing data with cylinder breaks performed at 7, 14, and 21 days. The mix design shall be approved by the agency issuing the utility permit.
   b. CDF shall be proportioned to be a non-segregating, free flowing, self-consolidating, low shrink slurry.
   c. The Contractor and its supplier shall determine the materials and proportions used to meet the requirements of these Specifications. The mix design shall be prepared for the range of aggregate gradations that are expected to be used.
   d. The unconfined compressive strength at 28 days shall be 200 psi (+50 psi) as per ASTM D4832.
   e. Contain CDF in trench sections using bulkheads or fill materials to confine the flow of material. Take appropriate precautions to prevent pipe displacement and/or flotation.
   f. CDF shall be placed in lifts not exceeding 6 feet in height, with a time interval of not less than 1 hour between lifts.
   g. Provide steel plates to span trenches and prevent traffic contact if necessary. No traffic or construction equipment shall be allowed on CDF for at least 24 hours after placement or until the material is hard enough to prevent rutting or damage. Work shall not proceed unless plates are on the jobsite.

4. Concrete Materials
   a. Concrete shall be mixed, conveyed, and proportioned in accordance with UBC section 1905. The performance mix shall include the amount of cement, fine and coarse aggregate, water, and admixtures as well as water cement ratio, slump, concrete yield, and sustaining strength data in accordance with these specifications, the minimum requirements of the current adopted Uniform Building Code, Section 1905, and the requirements of ACI 318-99.
   b. Materials shall conform to the following standards:
      i. Cement: ASTM C-105
      ii. Coarse Aggregate: ASTM C-33
      iii. Fine Aggregate: ASTM C-33
      iv. Admixtures: ASTM C-494
v. Air entraining Admixtures: ASTM-260
vi. Water used in concrete shall be potable.
vii. Fly ash may be substituted for up to 15% of the required cement.

5. Thrust Blocking, Driveways, and Sidewalks
   a. Cement: ASTM C-105
   b. Coarse Aggregate ASTM C-33
   c. Fine Aggregate: ASTM C-33
   d. Admixtures: ASTM C-494
   e. 28-day strength: 3,000 psi minimum
   f. Cement content: 5.5 sacks/CY minimum
   g. Water/Cement ratio: 6 gals/95 lb sack maximum
   h. Fine aggregate ratio: 45% max by weight
   i. Coarse aggregate limits: 7/8 inch maximum
   j. Entrained air ratio: 3% minimum to 5% maximum
   k. Slump: 4 inches maximum

   Provide concrete blocking at all fittings, and horizontal and vertical angle points. Conform to Standard Details for General Blocking, Vertical Blocks, and Deadman Blocking. All fittings to be blocked shall be wrapped with 4-mil polyethylene plastic. Concrete blocking shall be properly formed with plywood or other acceptable forming materials and shall not be poured around joints. The forms shall be stripped prior to backfilling. All blocking must be inspected by the City Inspector prior to backfill.

   The City does not use thrust blocks for fire hydrants. Each fire hydrant shall be secured with mega lugs. For mains crossing other pipes, the City will require additional restraints.

D. Special Construction (Pipeline Casings)

1. General
   This division covers the boring and jacking of pipeline casings and the installation of carrier pipe.

2. Submittals
   Submit the following for review:
   a. Casing pipe drawings, details, and thickness calculations
   b. Carrier pipe placement method and equipment
c. Utility crossing permits

3. Quality Assurance
   The boring contractor shall have regularly engaged in work of this nature for at least 5 years.

4. Other Utilities
   No other utilities are allowed to be placed inside the casing without the prior express written consent of the City Engineer and a satisfactory hold harmless Agreement.

5. Casing Pipe
   a. Provide welded steel pipe of the minimum diameter and thickness approved by the City Engineer. The casing ID shall be at least four inches larger than the carrier bell OD. Provide pipe of sufficient wall thickness and axial strength to withstand the forces encountered during the jacking operation, but in no case less than 3/8 inch. The casing shall be designed to withstand all imposed loads plus a corrosion allowance of 1/4 inch.
   b. Fabricate the pipe in conformance with ASTM A 252, Grade 2 except the hydrostatic test is waived. Provide tapped grout holes at the top of the casing at reasonable intervals. Install plugs in the tapped holes.

6. Joints
   Weld sections of casing pipe with a continuous circumferential weld. Provide stress transfer across the joints capable of resisting the jacking forces involved.

7. Casing End Seals
   Seals shall be ¼-inch (minimum) thickness, pull on style end seals fabricated from EPDM synthetic rubber with stainless steel bands and clamps. End seals shall be as manufactured by PSI Industries or approved equal.

8. Carrier Pipe Skids
   Provide custom engineered skids/isolators to isolate the carrier pipe from the casing. The insulator shall consist of a PVC insulating liner (90 mil minimum thickness), 12-inch wide, 12-gauge (minimum) steel bands with steel risers and glass reinforced plastic or ultra-high molecular weight runners. The skids shall be designed to properly support the pipe filled with water. The runners shall be designed so that the carrier pipe joints clear the casing by two inches. The ferrous components of the insulator and steel bands shall be shop coated with a minimum of 10 mills PVC heat fusion coating. All miscellaneous hardware including stud bolts, washers, and nuts shall be 316 stainless steel. Skids shall center the pipe in the casing. Provide skids as manufactured by PSI Industries, Cascade Manufacturing Co., or approved equal.
The minimum number of required skids is 3 per pipe length for the entire length of the casing.

9. Sand

Unless specifically required by the City Engineer, sand shall not be used in a casing for filling between the casing and carrier pipe. In those instances where the City Engineer does require sand, it shall be clean and 90-100 percent will pass the No. 4 sieve. Not more than 5 percent will pass the No. 200 sieve. Sand shall be free from clay and organic material.

10. Casing Excavation and Installation

Prior to installing the casing, thoroughly investigate the locations of existing utilities. The Contractor shall pothole the casing location to verify that there are no interferences.

Equip the leading section of casing pipe with a jacking head securely anchored to prevent any wobble or variation in alignment during jacking operation. Make every effort to avoid loss of ground outside the jacking head. If excessive ground loss occurs, stop excavation and fill void with grout.

The casing shall be installed in such a manner that it is not damaged or deflected to reduce its true circular diameter.

11. Tolerances

A maximum horizontal and vertical tolerance of three inches per 100 linear feet of jacked casing is permitted.

12. Grouting

After jacking is completed, fill voids by pumping grout through grout holes in the casing at any locations of ground loss and elsewhere where voids are suspected. Plug grout holes after grouting. Take care to avoid over-pumping grout and disturbing the improvements the casing was jacked under.

13. Carrier Pipe

a. All pipe installed in casing shall have restrained joints.

b. Protect pipe as necessary during installation to insure against damage. Install the carrier pipe with the skids located not more than two feet from each end of the pipe joints. The skids shall be adequate in number to hold the pipe to grade, and not less than two skids shall be installed on each section of pipe. Provide skids within 6 inches of each end of the casing.

c. After installation and testing of the carrier piping, carefully fill the remaining space in the casing with pneumatically placed sand unless directed by the City Engineer to leave the casing unfilled. Take care to avoid floating the carrier pipe.
d. Install casing end seals and secure in place with stainless steel bands. Make seals watertight.
UTILITY SEPARATION SECTION C1-2
REQUIRED SEPARATION BETWEEN WATER LINES AND SANITARY SEWERS
PARALLEL CONSTRUCTION

UTILITY SEPARATION SECTION C1-3
REQUIRED SEPARATION BETWEEN WATER LINES AND SANITARY SEWERS
UNUSUAL CONDITIONS PARALLEL CONSTRUCTION
RESTORATION, TAPS, AND BLOCKING B
WATER MAIN TRENCH

SAW CUT, CLEAN, AND TACK EDGES. SEAL JOINTS WITH HOT EMULSIFIED ASPHALT, TOP WITH PAVING SAND.

EXIST A.C. PAVEMENT SURFACE

TOP WIDTH OF TRENCH = OD + 36" (MAXIMUM)

PLANE EXISTING ROADWAY AS NECESSARY, OVERLAY TO MAINTAIN EXISTING FREEBOARD AT CURBS.

TOP WIDTH OF TRENCH = OD + 36"

SAW CUT, CLEAN, AND TACK EDGES. SEAL JOINTS WITH HOT EMULSIFIED ASPHALT, TOP WITH PAVING SAND.

EXIST A.C. PAVEMENT SURFACE

TOP WIDTH OF TRENCH = OD + 36" (MAXIMUM)

PLANE EXISTING ROADWAY AS NECESSARY, OVERLAY TO MAINTAIN EXISTING FREEBOARD AT CURBS.

SAW CUT, CLEAN, AND TACK EDGES. SEAL JOINTS WITH HOT EMULSIFIED ASPHALT, TOP WITH PAVING SAND.

EXIST A.C. PAVEMENT SURFACE

TOP WIDTH OF TRENCH = OD + 36" (MAXIMUM)

PLANE EXISTING ROADWAY AS NECESSARY, OVERLAY TO MAINTAIN EXISTING FREEBOARD AT CURBS.

SAW CUT, CLEAN, AND TACK EDGES. SEAL JOINTS WITH HOT EMULSIFIED ASPHALT, TOP WITH PAVING SAND.

EXIST A.C. PAVEMENT SURFACE

TOP WIDTH OF TRENCH = OD + 36" (MAXIMUM)

PLANE EXISTING ROADWAY AS NECESSARY, OVERLAY TO MAINTAIN EXISTING FREEBOARD AT CURBS.

2" GRAVEL BASE COURSE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY THE MODIFIED PROCTOR TEST.

TRENCH BACKFILL MATERIAL, COMPACT TO 95% IN 6" LIFTS

PIPE BEDDING MATERIAL COMPACT TO 95%

CLASS 52 DI WATER LINE OR APPROVED EQUAL

INSTALL 10-GAUGE LOCATOR WIRE AND WARNING TAPE IN BACKFILL FOR ANY NON-FERROUS PIPE

SEE CHAPTER 6 FOR APPROPRIATE RESTORATION DETAIL
**NOTES:**

1. PRIOR TO BORING:
   A. TAPPING SLEEVE AND VALVE SHALL BE PRESSURE TESTED AT 200 PSI FOR A PERIOD OF 15 MINUTES. PRESSURE LOSS DURING TESTING SHALL NOT EXCEED 5 PSI.
   B. TAPPING SLEEVE AND VALVE SHALL BE STERILIZED PER SPECIFICATIONS.

2. PRIOR TO FINAL CONNECTION OF TAPPING VALVE TO NEW PIPING, THE NEW PIPING SHALL BE PRESSURE TESTED AND STERILIZED PER SPECIFICATIONS.
NOTES:
1. ALL CONCRETE BLOCKING SHALL BE Poured AGAINST DRY, UNDISTURBED SUBGRADE. TABLE IS BASED ON 2000 POUNDS PER SQUARE FOOT ALLOWABLE SOIL BEARING. WEAKER SOIL WILL REQUIRE INCREASED BEARING AREA. SEE SOIL BEARING LOAD CHART.
2. KEEP CONCRETE CLEAR OF JOINTS AND ACCESSORIES. USE FORMING AS NECESSARY.
3. HORIZONTAL AND ANCHOR BLOCKING CONFIGURATIONS FOR FITTINGS NOT SHOWN SHALL HAVE PRIOR APPROVAL.
4. THE SQUARE FOOT AREAS REQUIRED FOR BEARING ARE CALCULATED BY THE FOLLOWING FORMULAS:
   - FORMULA AT TEE & CAP OR PLUG:
     \[ T = PA \]
     \[ K = \text{SAFE BEARING LOAD} \]
   - FORMULA AT ALL PIPE BENDS:
     \[ T = 2PA \sin(\theta/2) \]
     WHERE:
     \[ P = \text{TEST PRESSURE IN PSI} \]
     \[ A = \text{LIMITED SECTIONAL AREA OF PIPE IN SQUARE INCHES} \]
     \[ K = \text{ASSUMED 2000 PSF SOIL BEARING PRESSURE} \]
   - 5. WRAP FITTINGS WITH VISQUEEN PRIOR TO BLOCK POUR.

SAFE BEARING LOADS IN LBS/SQ. FT.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>THRUST BLOCK REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>THRUST BLOCK REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

THRUST BLOCK REQUIREMENTS IN SQUARE FEET

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>THRUST BLOCK REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>THRUST BLOCK REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>
IF A RESIDENTIAL FIRE SPRINKLER SYSTEM IS USED:
1. THE WATER METER WILL BE AT LEAST A 1-INCH METER
2. THE SPRINKLER SYSTEM WILL BE PRIVATELY OWNED AND MAINTAINED.
3. THE SPRINKLER SYSTEM WILL BE CONNECTED TO THE OWNER’S SERVICE LINE AND WILL BE A FLOW-THROUGH SYSTEM.
ELEVATION

1. 12" CAST IRON COUPLING ROCKETWELL 431 WITH LONG LENGTH SLEEVE OR APPROVED EQUAL.
2. 12" DI PIPE, LENGTH TO FIT.
3. 12" TO 6" DI REDUCER (TYPICAL).
4. 6" DI SPOOL WITH COLLAR (FL×FL), LENGTH TO FIT.
5. 6" DI Y TEES (FL×FL×FL).
6. ADJUSTABLE PIPE SUPPORT STANDON MODEL S92.
7. 8" RESILIENT SEAT GATE VALVE (FL×FL) WITH HAND WHEEL.
8. 8" FLANGE COUPLING ADAPTER ROCKWELL 913 WITH ANCHOR STUDS OR APPROVED EQUAL.
9. 8" STRAINER (FL×FL) MUESSCO NO. 751 OR APPROVED EQUAL.
10. 2" BRONZE CORPORATION STOP (IPTxFIPT) FORD FB 1700-3 OR APPROVED EQUAL.
11. 3" BRASS 90° BEND (S×S).
12. 3" STRAINER (FL×FL) WITH 1/8" PERFORATIONS BRASS SCREEN MUESSCO NO. 751 OR APPROVED EQUAL.
13. 3" PRESSURE REDUCING VALVE (S×S), CLA-VAL 90G-01ABS WITH TEST COCKS AND VALVE POSITION INDICATOR.
14. 3" Brass Union.
15. 3" BRASS THREADED PIPE, LENGTH TO FIT (TYPICAL).
16. PRESSURE REDUCING VALVE (FL×FL), CLA-VAL 500-FF, WITH TEST COCKS AND VALVE POSITION INDICATOR OR APPROVED EQUAL (CITY TO SIZE FOR EACH PROJECT).
17. 12" DI PIPE. (CITY TO SIZE FOR EACH PROJECT).
18. 8" PRESSURE RELIEF VALVE (FL), CLA-VAL 500-FF.
19. PRESSURE GAUGE (0 TO 200 PSI) WITH BRASS FITTINGS. TAP PIPE FOR CONNECTION, CENTER BETWEEN FLANGE AND VAULT WALL.
20. PRESSURE RELIEF VALVE (FL) CLA-VAL 50G-01 WITH TEST COCKS AND VALVE POSITION INDICATOR OR APPROVED EQUAL. (CITY TO SIZE FOR EACH PROJECT).
21. DI PIPE. (CITY TO SIZE FOR EACH PROJECT).
22. PRESSURE REDUCING STATION (ELEVATION) PROVIDE ALTERNATE SUMP AND SUMP PUMP DETAIL IF A DAY LIGHT DRAIN IS NOT AVAILABLE.
23. PRECAST UTILITY VAULT - SEE SIZING TABLE, OR APPROVED EQUAL. ALL JOINTS TO BE INSTALLED USING NON-SHRINK GROUT AND TESTED TO ACHIEVE WATER TIGHTNESS.
24. 4" FLOOR DRAIN WITH SADDLE AND 3/4" BALL VALVE.
25. NOSE BB WITH VACUUM BREAKER.
26. FLANGE COUPLING ADAPTER (SIZE PER DISCHARGE PIPE).
27. 3" BRASS THREADED PIPE, 3" LONG.

ELEVATION

- ALL JOINTS TO BE INSTALLED USING NON-SHRINK GROUT AND TESTED TO ACHIEVE WATER TIGHTNESS.
- PRESSURE GAUGE (0 TO 200 PSI) WITH BRASS FITTINGS. TAP PIPE FOR CONNECTION, CENTER BETWEEN FLANGE AND VAULT WALL.
- PRESSURE RELIEF VALVE (FL) CLA-VAL 50G-01 WITH TEST COCKS AND VALVE POSITION INDICATOR OR APPROVED EQUAL. (CITY TO SIZE FOR EACH PROJECT).
- DI PIPE. (CITY TO SIZE FOR EACH PROJECT).
- PRESSURE REDUCING STATION (ELEVATION) PROVIDE ALTERNATE SUMP AND SUMP PUMP DETAIL IF A DAY LIGHT DRAIN IS NOT AVAILABLE.
- PRECAST UTILITY VAULT - SEE SIZING TABLE, OR APPROVED EQUAL. ALL JOINTS TO BE INSTALLED USING NON-SHRINK GROUT AND TESTED TO ACHIEVE WATER TIGHTNESS.
- 4" FLOOR DRAIN WITH SADDLE AND 3/4" BALL VALVE.
- NOSE BB WITH VACUUM BREAKER.
- FLANGE COUPLING ADAPTER (SIZE PER DISCHARGE PIPE).
- 3" BRASS THREADED PIPE, 3" LONG.
THE PRESSURE REDUCING VALVE SHALL BE LOCATED ON THE CUSTOMER'S PROPERTY "DOWNSTREAM" OF THE METER BOX. THE FUNCTION OF A PRESSURE REDUCING VALVE IS TO REDUCE HIGH-WATER PRESSURES IN THE SERVICE CONNECTION TO AN ACCEPTABLE RANGE OF 50 TO 75 PSI.

INSTALLATION

THE CUSTOMER IS RESPONSIBLE FOR INSTALLATION AND MAINTENANCE

ADJACENT TO WATER METER

FROM WATER METER

PEA GRAVEL

METER BOX AND RISER AS NECESSARY

CARSON MODEL 1419 OR APPROVED EQUAL

WILKINS 600 SERIES OR APPROVED EQUAL

24" MIN

5"

6"
1. EXISTING WATER MAIN
2. 1" (IP THREAD) SINGLE STRAP SADDLE ROMAC STYLE 101S OR APPROVED EQUAL
3. 1" BRASS NIPPLE, 3" LONG
4. CORP. STOP, FORD FB1100 OR APPROVED EQUAL
5. 1" COPPER TUBING TYPE K OR APPROVED EQUAL, MAINTAIN 36" COVER FROM WATER MAIN TO WITHIN 48" OF METER BOX
6. 1" METER SETTER MUELLER 1434 OR APPROVED EQUAL HORIZONTAL IN, HORIZONTAL OUT, M.I.P. THREAD ENDS.
7. SCHEDULE 40 1" PVC THREADED PLUG. REMOVED WHEN CONNECTION MADE TO CUSTOMER LINE
8. WATER METER - TO BE SUPPLIED BY THE CITY
9. METER BOX SHALL BE FOG TITE # 2 WITH TRAFFIC COVER AND HINGED INSPECTION LID OR APPROVED EQUAL. PROVIDE TOUCH READ PIT LID. PLACE BACK OF METER BOX Flush WITH PROPERTY LINE.

WARNING WIRE AND LOCATOR TAPE ARE REQUIRED FOR ALL SERVICES AND MAINS

SERVICES A

5/8, 3/4 OR 1 INCH WATER SERVICE

City of Port Orchard

Est. 1890
1. EXISTING WATER MAIN
2. 2" (IP THREAD) DOUBLE STRAP SADDLE ROMAC STYLE 202S OR APPROVED EQUAL
3. 2" BRASS NIPPLE, 3" LONG
4. CORP. STOP, FORD FB1100 OR APPROVED EQUAL
5. 2" COPPER TUBING TYPE K OR APPROVED EQUAL, MAINTAIN 36" COVER FROM WATER MAIN TO WITHIN 48" OF METER BOX
6. 2" BRASS STREET ELL
7. 2" BRASS NIPPLE, 6" LONG
8. 2" BRASS UNION
9. 2" BRASS NIPPLE, 3" LONG
10. 2" METER SETTER WITH HIGH BYPASS MUELLER SERIES 1429 OR APPROVED EQUAL. VERTICAL IN, HORIZONTAL OUT. FLANGED BALL VALVE WITH LOCK WINGS, CHECK VALVE AND BY-PASS.
11. SCHEDULE 40 2" PVC THREADED PLUG. REMOVED WHEN CONNECTION MADE TO CUSTOMER LINE
12. WATER METER – TO BE SUPPLIED BY THE CITY
13. METER BOX SHALL BE FOG TITE # 2 WITH TRAFFIC COVER AND HINGED INSPECTION LID OR APPROVED EQUAL. PROVIDE TOUCH READ PIT LID. PLACE BACK OF METER BOX FLUSH WITH PROPERTY LINE.

WARNING WIRE AND LOCATOR TAPE ARE REQUIRED FOR ALL SERVICES AND MAINS

ROADWAY  CURB  PROPERTY LINE  36" MIN. COVER (TYP)  FINISHED GRADE  PROPERTY LINE

6" MINIMUM TO ALLOW FOR TOUCH READ

24" MIN. COVER

SERVICES B
1–1/2 OR 2 INCH WATER SERVICE
## Service Connection Protocol

**For Existing Water Services:**

- Procedure: Provide and install meter box adjacent to existing, coordinate with city for installation of meter. Notify property owner of service interruption (24-hour notice required). Connect city provided meter to existing service, contractor to provide and install all pipe, couplings, and fittings for a complete connection.

**For Vacant or Future Service Lots:**

- Provide and install meter box at property line, stub out of meter setter with 3 feet of PE service pipe and cap.

---

### Service Connection Protocol Table

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Manufacturer and No. and/or Description (or Approved Equal)</th>
<th>Single Service</th>
<th>Double Service</th>
<th>Services Over 1&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Saddle</td>
<td>ROMAC 101S</td>
<td>Single Strap Saddle</td>
<td>1&quot;</td>
<td>Double Strap Saddle</td>
</tr>
<tr>
<td>2</td>
<td>Corp. Stop</td>
<td>FORD FB1100 OR EQUAL</td>
<td>1&quot;</td>
<td>1&quot;</td>
<td>Double Strap Saddle</td>
</tr>
<tr>
<td>3</td>
<td>Service Pipe</td>
<td>COPPER TYPE K ONLY</td>
<td>1&quot;</td>
<td>1&quot;</td>
<td>Double Strap Saddle</td>
</tr>
<tr>
<td>4</td>
<td>Tee</td>
<td>BRASS U-BRANCH</td>
<td>3/4&quot; x 3/4&quot; x 1&quot;</td>
<td>3/4&quot; x 3/4&quot; x 1&quot;</td>
<td>Double Strap Saddle</td>
</tr>
<tr>
<td>5</td>
<td>Pipe</td>
<td>SEE &quot;SERVICE CONNECTION PROTOCOL,&quot;</td>
<td>3/4&quot; x 3/4&quot; x 1&quot;</td>
<td>3/4&quot; x 3/4&quot; x 1&quot;</td>
<td>Double Strap Saddle</td>
</tr>
<tr>
<td>6</td>
<td>Meter Setter</td>
<td>Mueller 1436 with Valve, 12&quot; Rise</td>
<td>3/4&quot; x 5/8&quot;</td>
<td>3/4&quot; x 5/8&quot;</td>
<td>Double Strap Saddle</td>
</tr>
<tr>
<td>7</td>
<td>Meter</td>
<td>TOUCH READ, SUPPLIED BY CITY</td>
<td>3/4&quot; x 5/8&quot;</td>
<td>3/4&quot; x 5/8&quot;</td>
<td>Double Strap Saddle</td>
</tr>
<tr>
<td>8</td>
<td>Coupling</td>
<td>MATCH EXISTING PIPE TYPE</td>
<td>3/4&quot; x 5/8&quot;</td>
<td>3/4&quot; x 5/8&quot;</td>
<td>Double Strap Saddle</td>
</tr>
<tr>
<td>9</td>
<td>Box</td>
<td>MID - STATE PLASTICS MODEL WSBOT 1118</td>
<td>-</td>
<td>-</td>
<td>Double Strap Saddle</td>
</tr>
<tr>
<td>10</td>
<td>Mounting Hole</td>
<td>1-1/2&quot; HD and TRPL HOLE</td>
<td>-</td>
<td>-</td>
<td>Double Strap Saddle</td>
</tr>
</tbody>
</table>

---

**Note:** Provide min. 6" vertical clearance between top of meter and meter box up for touch read device.

Locator wire and warning tape are required for all services and mains.

---

**Services C**

Double Water Service

---

City of Port Orchard

Est. 1890
SERVICES D

3, 4, AND 6 INCH COMPOUND METER SERVICE – PLAN

1. LONG BODY SLEEVE
2. DI SPOOL (FLxPE), 3'-0" LONG
3. DI TEE (FLxFLxFL) WITH BLIND FLANGE WITH 2" IPT TAP
4. RESILIENT SEAT GATE VALVE (FL) WITH HAND WHEEL
5. YCA
6. 6" DI SPOOL (FLxPE), 0'-9" LONG
7. DI SPOOL (FLxPE), 1'-6" LONG
8. DI SPOOL (FLxPE), 1'-11" LONG
9. STRAINER (FLxFL)
10. COMPOUND METER W/TOUCH READ (FLxFL), CITY TO PROVIDE
11. CONCRETE THRUST RESTRAINT WITH TIE RODS PER CITY STANDARDS
12. 2" THREADED BRASS NIPPLES (3" LONG)
13. 2" RESILIENT SEAT GATE VALVE THREADED WITH HAND WHEEL
14. 2" BRASS ST ELL
15. 2" THREADED BRASS PIPE, LENGTH TO FIT
16. 2" FLANGE METER COUPLINGS
17. 2" BYPASS METER W/TOUCH READ, CITY TO PROVIDE
18. ADJUSTABLE PIPE SUPPORT STANDON #592 OR APPROVED EQUAL
19. FREE STANDING GALVANIZED STEEL LADDER, ATTACH TO FLOOR AND SIDE OF HATCH.
20. 4" FLOOR DRAIN W/ SCREEN
21. 4" SCHEDULE 40 PVC PIPE
3, 4, AND 6 INCH COMPOUND METER SERVICE – ELEVATION

1. Long Body Sleeve
2. Di Spool (FLxPE), 3’-0” Long
3. Di Tee (FLxFLxFL) with Blind Flange with 2” PT Tap
4. Resilient Seat Gate Valve (FLxFL) with Hand Wheel
5. FCA
6. 6” Di Spool (FLxPE), 0”-9” Long
7. 4” Di Spool (FLxPE), 1”-6” Long
8. 3” Di Spool (FLxPE), 1’-11” Long
9. Strainer (FLxFL)
10. Compound Meter w/Touch Read (FLxFL), City to Provide
11. Concrete Thrust Restraint with Tie Rods per City Standards
12. 2” Threaded Brass Nipples (3” Long)
13. Resilient Seat Gate Valve Threaded with Hand Wheel
14. 2” Brass ST Ell
15. 2” Threaded Brass Pipe, Length to Fit
16. 2” Flange Meter Couplings
17. 2” Bypass Meter w/Touch Read, City to Provide
18. Adjustable Pipe Support Standon #92 or Approved Equal
19. Free Standing Galvanized Steel Ladder, Attach to Floor and Side of Hatch
20. 4” Floor Drain w/ Screen
21. 4” Schedule 40 PVC Pipe

NO PLASTIC PIPE

12” Depth of Compacted 5/8” Minus Crushed Surfacing. Excavate unsuitable material as determined by City Inspector. Replace with Class A Foundation Material.

IF A DAYLIGHT DRAIN IS NOT AVAILABLE:

4” Floor Drain with Screen

12” DEPTH OF COMPACTED 5/8” MINUS CRUSHED SURFACING. EXCAVATE UNSUITABLE MATERIAL AS DETERMINED BY CITY INSPECTOR. REPLACE WITH CLASS A FOUNDATION MATERIAL.

City of Port Orchard
Est. 1890

SERVICES D

FILE NAME: Services D
DRAWING NUMBER: 1163
SCALE: NTS
REVISION DATE: 04/08/14
DRAWN BY: AAP
SERVICES E

DOUBLE CHECK BACKFLOW ASSEMBLY — BELOW GROUND
NOTE: ALL MATERIALS TO BE BRASS OR COPPER AS SPECIFIED BY CITY.

FEBCO DOUBLE CHECK BACKFLOW PREVENTER MEETING AWWA CROSS-CONNECTION STANDARDS

DOUBLE PURPOSE UNION (TYP. OF 2)

HINGED VANDAL RESISTANT FREEZE PROTECTION ENCLOSURE HOT BOX MODELS HB.75 THROUGH HB.79 OR APPROVED EQUAL.

CONCRETE METER VAULT FOG-TITE #2 OR APPROVED EQUAL

EXIST. GRADE

EDGE OF PAVEMENT

PROPERTY LINE

FLOW

3" MIN.

MIN. 6'

FINISHED SLAB

12" MIN.

HASP AND LOCK

SCHEDULE

SERVICES F

DOUBLE CHECK BACKFLOW ASSEMBLY – ABOVE GROUND
SERVICES G

DOUBLE CHECK BACKFLOW ASSEMBLY – IN BASEMENT

CONCRETE METER VAULT FOG-TITE #2 OR APPROVED EQUAL.
2" BLOW OFF ASSEMBLY

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2&quot; DOUBLE STRAP SADDLE, ROMAC 202 OR APPROVED EQUAL</td>
</tr>
<tr>
<td>2</td>
<td>2&quot; CORP. STOP, FORD FB1100 OR APPROVED EQUAL</td>
</tr>
<tr>
<td>3</td>
<td>2&quot;-45° GALVANIZED IRON ELBOW</td>
</tr>
<tr>
<td>4</td>
<td>2&quot; GATE VALVE, THREADED, NON-RISING STEM WITH SQUARE NUT</td>
</tr>
<tr>
<td>5</td>
<td>VALVE BOX</td>
</tr>
<tr>
<td>6</td>
<td>2&quot; GALVANIZED IRON PIPE</td>
</tr>
<tr>
<td>7</td>
<td>2&quot;-90° GALVANIZED IRON ELBOW</td>
</tr>
<tr>
<td>8</td>
<td>2&quot; CAP WITH BEEHIVE AT OUTLET</td>
</tr>
</tbody>
</table>

MINIMIZE DISTANCE

20' MAXIMUM

TRENCH BACKFILL

CITY OF PORT ORCHARD

SYSTEM APPURTENANCES A

Est. 1890
**Bill of Materials**

<table>
<thead>
<tr>
<th>No.</th>
<th>Nomenclature</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MJ 3 x FL. Tee (cast iron)</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>6&quot; gate valve with flg. x m.j. connections, see note 6</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>2 piece cast iron valve box</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>thrust block</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>reinforced concrete guard post 9&quot; x 9&quot; (private prop. only)</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>fire hydrant with storts adapter (towards road)</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>pipe, 6&quot; cl. 52 d.i. field cut with megalug retainer glands</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>12&quot; x 12&quot; x 4&quot; solid concrete bearing block (if required)</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>1/4 c.y. drain rock. 1 1/2&quot; - 3/4&quot;, no fines, 7 c.f. of 7/8&quot; washed rock wrapped in geotextile fabric</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>6 oz. geotextile fabric</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. All materials and brands must be approved by city.
2. 6-inch megalugs are to be installed at valve and hydrant m.j. outlets.
3. Hydrant shall have city's standard hose threads and operating nuts.
4. Hydrant length and trench depth shall be so as to provide for hydrant setting at correct elevation relative to finish grade.
5. Set hydrant vertical, use level, compact all backfill.
6. Valve shall be AMWA standard gate 0" ring packing, non-rising stem, 2" operation nut, resilient wedge gate.
7. When guard posts are used, the top of the post will be level with the hydrant.
8. For center stem hydrants the concrete block will be below the drain holes and drain rock, take care to not plug drain holes or contaminate drain rock.
9. All hydrants shall be furnished with storz couplings.
10. All hydrants and bends shall be secured with megalugs.
11. Stencil the distance from the foot valve on the hydrant barrel with 1 1/2" letters.

**Note:** Any hydrant run over one full length of pipe, shall have a restrained joint gasket equal to field lok gaskets.
**VALVE OPERATING NUT EXTENSION**

- Extensions are required when the valve nut is more than three (3) feet below finished grade.
- Extensions are to be a minimum of one (1) foot long, only one extension per valve. All extensions are to made of steel sized as noted, and painted with two coats of carbon elastic (ATCO No. 2221) or approved equal.

---

**VALVE MARKER**

- Provide a valve marker post for each valve.
- The fiberglass valve marker post shall be blue in color, 4" wide (flat), 72" long and furnished with a 2"x2" high-intensity white reflector (250 candlepower) and a flexible anchor band.
- The valve marker post shall be a Carsonite Curv-Flex marker or approved equal.
- The post shall be situated in a safe, reasonably conspicuous location, and at a right angle to the roadway from the valve.
- The distance from the marker to the valve shall be written on the back of the marker in 1-1/2" high black letters.
NOTE:
TAP FOR COMBINATION AIR AND VACUUM VALVE ASSEMBLY MUST BE INSTALLED AT HIGHEST POINT OF WATER MAIN. EXACT LOCATION OF ASSEMBLY TO BE DETERMINED BY CITY.

AIR-VAC ASSEMBLY

2" COMBINATION AIR & VACUUM RELEASE VALVE, SCREWED, APCO NO. 143C OR APPROVED EQUAL

2" BALL VALVE FORD #011-444 OR APPROVED EQUAL

NOTE: TAP FOR COMBINATION AIR AND VACUUM VALVE ASSEMBLY MUST BE INSTALLED AT HIGHEST POINT OF WATER MAIN. EXACT LOCATION OF ASSEMBLY TO BE DETERMINED BY CITY.
SYSTEM APPURTENANCES E

VALVE BOX

WATER MAIN

BASE SECTION

EXTENSION PIECE
(IF NECESSARY)

FINISHED PAVEMENT GRADE

TOP SECTION

CAST IRON ONLY

WATER MAIN

WATER MAIN
Chapter 12

DESIGN STANDARDS FOR SANITARY SEWER EXTENSIONS

12.1 Introduction

12.2 Sanitary Sewer Availability
   A. General
   B. Non-Binding Sanitary Sewer Availability
   C. Binding Commitments for Sanitary Sewer Availability
   D. Annexation

12.3 Sanitary Sewer Main Extensions
   A. Extension Application
   B. Compliance with SEPA or NEPA
   C. Compliance with Endangered Species Act
   D. Attorney’s Fees in Disputes, Arbitration, or Litigation
   E. Administrative Procedures

12.4 Design Standards for Sanitary Sewer Main Extensions
   A. General
   B. Plans
   C. Sewer Piping and Fittings
   D. Sewer Pipe and Fittings Installation
   E. Test Equipment
   F. Individual Grinder Pump Equipment
   G. Pretreatment Systems
   H. Generators
   I. Pump Stations

12.5 Standard Specifications for Construction
   A. General
   B. Site Work
   C. Concrete
   D. Special Construction (Pipeline Casings)
12.1 Introduction

All extensions to the sanitary sewer collection system must conform to the design standards of the City. In addition, plans and specifications for system extensions must be in accordance with the requirements of the Department of Ecology. In all cases where a City road right of way or private easement will be used for mains or other improvements, the City Engineer must approve the plans. The system must be capable of future expansion and must be constructed of permanent materials as set forth in these standards.

It is the desire and objective of the City of Port Orchard to provide facilities for the provisions of sanitary sewer service to our residents in accordance with approved land use plans and policies and the City’s Comprehensive Plans. The City will not extend facilities to service additional customers, properties, tracts, or subdivisions at the expense of existing customers.

An applicant (e.g., developer, homeowners association, citizens group, or individual) for an extension is responsible for financing the entire cost of an extension, including adding new facilities or replacing existing system components when necessary for making the extension or improvement, including over sizing sanitary sewer system components as outlined below.

Sanitary sewer system extensions, improvements, or new facilities will be constructed in accordance with the City’s Extension Policies, Design Standards, Standard Specifications, and Schedule of Rates and Fees. Any work not so performed may be rejected by the City, in which case the City shall have no obligation whatsoever to accept the extension and provide sanitary sewer service to the owner’s property.

Public and City maintained sanitary sewer facilities will

- be located on public rights-of-way or dedicated easements;
- be transferred to the City’s ownership for perpetual operation, maintenance, and service responsibilities; and
- be subject to initial performance/maintenance bonding requirements.

12.2 Sanitary Sewer Availability

A. General

The City will make every attempt to provide sufficient sanitary sewer service available to meet the needs of its current customers and provide for future growth needs. However, development of new sanitary sewer services may not keep pace with growth requirements.

During periods when growth demands outstrip available sanitary sewer services, new service requests will be served on the basis of availability and time of application for service.

When the City does not have sufficient service to supply all applicants for sanitary sewer availability, non-binding letters of availability will be issued contingent on City expansion of sufficient services to supply proposed development.
B. Non-Binding Sanitary Sewer Availability

Non-binding sanitary sewer availability letters will be issued upon application and payment of fees for properties being developed. A legal description of the property to be served must be provided for the sanitary sewer availability application. All fees paid shall be non-refundable.

The non-binding letter will enable a developer to start the platting process; however, it cannot be used to finalize the plat. Non-binding availabilities will list contingencies, which must be fulfilled, by the developer and the City prior to issuance of a binding commitment. Non-binding sanitary sewer availabilities issued with a sanitary sewer rights approval contingency will not be converted to binding commitments without sufficient sanitary sewer rights being approved by the Washington State Department of Ecology.

PLEASE NOTE: NONBINDING LETTERS OF SANITARY SEWER AVAILABILITY ARE NOT AN OBLIGATION ON THE PART OF THE CITY TO SUPPLY SANITARY SEWER.

C. Binding Commitments for Sanitary Sewer Availability

Binding commitments will be issued upon removal of contingencies, payment of fees, and in order of sanitary sewer availability application date. All fees paid shall be non-refundable.

During periods of limited sanitary sewer supply availability, binding sanitary sewer commitments will only be issued for the following categories and order of priority, as sanitary sewer is available:

1. Developed properties, which front an existing sanitary sewer main, single residential connection.

2. General letters of availability written with no expiration date for the property, on which they were written, provided the original project has not changed substantially from that described in the letter.

3. Plats with signed developer extension Agreements less than two years old.

4. Properties which are within the annexed boundaries of the City will be given priority over properties outside the annexed boundaries but within the City’s service area.

D. Annexation

In the event that the premises to be served are located within the City’s future sanitary sewer service area, but, in whole or in part, are outside the City’s annexed boundaries, any obligations of the City to provide service are conditioned on the following requirements having first been met:

1. The premises shall be annexed to the City, subject to approval by the Boundary Review Board, in the manner required by law. The annexation shall include a service area acceptable to the City. At the sole discretion of the City, the City may not require annexation; however, the Developer must agree to pay all surcharges for out of City service.
2. Sanitary sewer service is conditioned upon compliance with Growth Management Act requirements.

3. The Developer shall obtain the signature(s) of the legal owner(s) of the premises for annexation on the City’s standard form and obtain the signatures of owners of any adjoining properties that the City or the Boundary Review Board deem necessary or advisable to be included in such annexation.

4. The Developer shall pay, at its sole expense, all legal, engineering, and City Staff costs incurred in seeking such annexation. The Developer shall pay the filing fee required by the Boundary Review Board for such annexation and costs associated with the State Environmental Protection Act (SEPA).

### 12.3 Sanitary Sewer Main Extension

#### A. Extension Application

1. **Application Approval**

   Requests for extension or improvement of the sanitary sewer system to serve newly developed and/or existing properties shall be made by applicants or their agents using the City’s application form (Developer Extension Agreement). To be considered for approval, the applicant must have a valid sanitary sewer availability letter from the City. The sanitary sewer availability letter will list the requirements for providing service to the property.

2. **Conditions**

   The applicant will be notified of the feasibility of the service requested, conditions for construction, and any additional facilities, which will be required to serve the proposed development. The applicant will be required to install all the necessary infrastructure. Examples of sanitary sewer infrastructure include, but are not limited to distribution mains, fittings, valves, manholes, cleanouts, pump stations, side sewers to property, and other appurtenances necessary to serve the proposed development in accordance with the City’s current planning. If deemed necessary by the City, the developer will be required to provide technical studies such as flow analysis for the development’s ultimate build-out. Additional special requirements such as pump stations, off-site sanitary sewer main upgrades, system over-sizing, etc., as shown in the Sewer System Plan for the City may be required.

3. **City Review**

   Plans for the proposed sanitary sewer main extension/development must be submitted to the City and approved prior to execution of a Developer Extension Agreement. A plan review fee, as specified in the City resolution adopting service charges and miscellaneous fees will be assessed to compensate for review services.
4. Extension Agreement

Upon approval of plans for the sanitary sewer main extension, the applicant shall execute a Developer Extension Agreement with the City, which will specify the terms and conditions of the extension or system improvement in accordance with the City’s standards. The applicant with the Developer Extension Agreement must submit a legal description of the property to be served. The applicant and City Engineer will sign extension Agreements. Construction inspection charges and local facilities charges are due and payable prior to approval of the Developer Extension Agreement. Plans for necessary sanitary sewer system extensions and improvements will become part of the Agreement.

5. Fees and Charges

When submitted to the City for approval, the Developer Extension Agreement shall be accompanied by construction observation charges and applicable local facilities charges as set forth in the City’s resolutions adopting connection charges and service charges and miscellaneous fees.

Additional charges such as general facility charges, special assessments, and connection charges will be determined by the City and payment will be made in accordance with the terms of the Developer Extension Agreement.

6. Approval of Application

Each application will be considered by the City Engineer and approved or rejected according to the City’s policies. The developer shall be notified in advance of the meeting at which the application will be considered. After consideration by the City, the application will be accepted, accepted as modified by Agreement with the applicant, or rejected. Notice of the City Engineer’s action will be mailed to the applicant. If accepted, the applicant will be entitled to proceed with construction of the extension in accordance with the terms of the Agreement and City policies.

7. Time Limit

The Developer Extension Agreement will become void in two years if construction has not been completed, unless extended by the City. Thereafter, a new Agreement must be entered into for the project to proceed and updated fees paid.

8. Permits, Easements, and Approvals

The applicant, at the applicant’s expense, shall obtain all necessary permits, easements, and approvals. These could include, but are not limited to, state and county road, building, health, and planning agency permits.

9. City Responsibilities

In consideration of payment of the Plan Review and Construction Inspection Charges, the City will provide:
a. Design review for compliance with City Standards;
b. City inspection of sanitary sewer and sewer improvements construction;
c. Witnessing of pressure test and video inspection;
d. Updating City system maps, based on the project’s record drawings.

10. Applicant/Developer/Agreement or Responsibilities

It is expected that the applicant will extend normal courtesies to the City in giving reasonable notice of the time and place of work to be inspected. In particular, the applicant shall:

a. Notify the City in writing at least forty eight (48) hours in advance of the time of beginning of construction;
b. Complete the work, including cleanup, to the point where work complies with the plans and specifications and is ready for acceptance by the City; and
c. Pay to the City the extra cost of overtime services performed by the City beyond normal working hours, on Saturdays, Sundays, or holidays, with prior approval from the City Engineer. In the event the developer makes a change in the plat or other plan of the proposed development, which requires a change in the design of the sanitary sewer system, the developer shall reimburse the City for any additional expense incurred by the City because of such change.

B. Compliance with the State Environmental Policy Act (SEPA) or National Environmental Policy Act (NEPA)

If the proposed extension and appurtenances are not exempt from the provisions of RCW 43.21C, the State Environmental Policy Act (SEPA), or the National Environmental Policy Act (NEPA), the Developer, as a condition of performance to the City of its obligations under this Agreement, must prepare and submit an environmental checklist and worksheet on forms provided by the City in respect to the proposed Developer Extension Project and otherwise comply with the provisions of SEPA or NEPA and procedures of the City for handling projects subject to such acts. The City will then serve as the lead agency in determining the environmental significance of the Proposed Developer Extension Project unless a State or County agency having jurisdiction over the project assumes lead agency status. If an environmental impact statement is required, the Developer shall pay all costs of proceedings before governmental agencies in respect thereto including the costs and fees of the City Engineer and/or Attorney for the City in participating in any such proceedings.

City assumes no liability or responsibility to Developer for the interruption of the work due to SEPA or NEPA requirements or litigation commenced by third parties against City and/or Developer to delay or stop the proposed project by reason of environmental concerns.

Developer agrees to defend, indemnify and hold the City harmless from and against any and all claims, demands, liability and/or judgments as may be made or entered against the City by a
third party, including any governmental body or agency, arising from the Developer’s project based upon alleged non-compliance with or in violation of SEPA and/or NEPA laws and other regulations in respect to the project. Developer shall reimburse City for all attorneys’ fees and costs and other expenses and fees incurred in connection with any such claims and demands, and in particular, all attorneys’ fees, costs and expenses incurred if Developer fails to assume the defense of any such claims or demands or fails to assume all costs of negotiations to settle any such claims or demand.

C. Compliance with Endangered Species Act

The listing of Chinook and other species of salmon as endangered or threatened under the Endangered Species Act (ESA) has created the likelihood of future regulations and restrictions that may restrict or even prohibit the City from allowing additional connections or facilities to its sanitary sewer system.

In the event the ESA Restrictions impose conditions on the connections or facilities anticipated under this Agreement, which increase the cost of providing such service, such increases shall be the sole responsibility of the property owner.

The City assumes no liability or responsibility to the Developer for the interruption of the work due to ESA requirements or litigation commenced by third parties against the City and/or Developer to delay or stop the proposed project by reason of environmental concerns.

Developer agrees to defend, indemnify and hold the City harmless from and against any and all claims, demands, liability and/or judgments as may be made or entered against the City by a third party, including any governmental body or agency, arising from Developer’s project based upon alleged non-compliance with or violation of ESA laws and other regulations in respect to the project. Developer shall reimburse the City for all attorneys’ fees and costs and other expenses and fees incurred in connection with any such claims and demands, and in particular, all attorneys’ fees, costs and expenses incurred if Developer fails to assume the defense of any such claims or demands or fails to assume all costs of negotiations to settle any such claims or demands.

D. Attorney’s Fees in Disputes, Arbitration, or Litigation

1. Third Parties

In the event this Agreement is referred by the City to an attorney by reason of any dispute whatsoever which arises with third parties, including governmental agencies, in respect to either the right of a Developer and additional owners to proceed and/or complete the work, and settlement negotiations or arbitration proceedings are commenced, or suit is instituted, with the approval of the Developer, against any such third parties, including governmental agencies and/or suit is instituted against the City by any such third parties, including governmental agencies in respect thereto, the Developer and additional owners shall be responsible for payment of attorneys’ fees and court costs incurred by the City in any such proceedings, and the City may require advance deposits periodically from the Developer and additional owners to cover all such costs and attorneys’ fees.
2. Developer

In the event either party hereto commences legal action, including appeals, against the other to enforce the provisions of this Agreement or for damages for breach hereof, the prevailing party shall be entitled to recover its costs and reasonable attorneys’ fees in the amount determined by the court.

E. Administrative Procedures

1. Financing

Applicants, at their own expense, will install an extension and transfer ownership to the City, under the review and approval provisions stated herein.

2. Fee Deposit

The applicant shall pay the City the applicable plan review fee and developer extension fees as set forth in the schedule of fees and charges.

3. Performance Bond

When required by the City, a performance bond (or a cash deposit held in a bank savings account in the name of the City) shall be furnished by the developer or its Contractor upon a form and in an amount (generally 150% of the estimated costs of the extension) approved by the City. The bond, naming the City as obligee, shall be furnished to the City before any construction activity at the work site begins.

The Performance Bond shall obligate the developer or its Contractor to pay all costs of labor performed, and materials and equipment furnished for the work, and shall be for the benefit of all persons furnishing labor, equipment, and materials, whether or not a valid claim exists under Public Works Liens Statutes or the Mechanic Lien Statutes of the State of Washington. The bond shall also guarantee payment to the City of all costs incurred to repair or replace newly installed sanitary sewer facilities, which fail during the first two years of operation. Further, the bond shall guarantee payment for replacement of any or all of the sanitary sewer mains if the City determines the extension’s failure rate is excessive and the sanitary sewer and/or sewer main cannot be reasonably relied upon for long trouble-free life. The City shall be sole judge of the adequate performance.

The bond shall be effective until a period of two years have elapsed from the date of the letter of final acceptance of the sanitary sewer facilities by the City. In some cases, a two-year bond may be required because of City rules on road restoration. The acceptance letter will be issued when the facilities have been fully constructed, inspected, and approved by the City.

The Developer may post cash, a letter of credit, or an assignment of funds on deposit with a bank in lieu of a bond, on the same terms and conditions as described above, upon approval of the City.
In no event shall the bond/deposit be waived if the City is requested to approve the extension prior to final plat approval with respect to the Developer’s property by Port Orchard.

See Section 2.5 Bond Requirements as it applies to performance bonds.

4. Connection Charges

Each lot or service connection included in a sanitary sewer extension will be assessed a Side Sewer Inspection Fee and a Sewer Capital Facilities Charge. All fees and charges are due in full, less any credits, before sanitary sewer will be made available.

The Sewer Capital Facilities Charge is assessed to compensate for costs the City and its customers have paid for the existing system and for new facilities and system upgrades required to support the addition of new customers. The Sewer Capital Facilities Charge consists of two components, the general facility fee and the wastewater treatment facility fee. Please refer to the most recent copy of Port Orchard Municipal Code Chapter 13.04 for additional information.

5. Reimbursements

If a new sewer main, which is constructed as an extension, is capable of serving properties between the existing system and the applicant’s new service(s), the City will enter into a Developers Extension Agreement, also known as a Latecomer’s Agreement, with the applicant in accordance with the requirements set forth in RCW 35.91. The Agreement usually will include a reimbursement for new services on both sides of a road or street as they connect to the extended main section, which was paid for by the applicant. The amount of reimbursement normally will be based on the front footage of the property connecting to the extension and the cost per foot to construct the extension.

Reimbursements will normally be paid for a period of fifteen years from the time the extension is accepted by the City and recorded at the Kitsap County Auditor’s Office. In no case will the reimbursement exceed the applicant’s actual construction costs of installing the extension main from the existing system to the nearest point of the applicant’s lot. The City will verify the developer’s study based on actual costs of an extension and apply the costs to the benefitted properties so each pays their equitable fair share of the improvement.

The City will retain a portion of each reimbursement collected for administrative fees.

6. Extension Lengths

In order to facilitate further extension of a system in directions where future development may continue, applicants for extensions/improvements normally will be required to extend sanitary sewer mains along all boundaries of their property which are adjacent to a street or road and/or to the far sides of their property. The City normally installs sanitary sewer mains on the north and east sides of a road or street. In some circumstances, therefore, the
applicant will be required to install the sanitary sewer main across the street or road from their property.

7. Oversizing and Replacement

In order to provide capacity for future customers or improve existing service on an economical basis, the City may require over sizing or replacement of existing facilities in conjunction with construction of an extension or improvement. Over sizing, requirements will be determined by the City’s approved comprehensive plans.

For extensions that include over sizing for future customers, a separate Agreement between the City and applicant will address possible credit against general facilities charges or City participation as applicable. City participation on over sizing costs will be determined on a case-by-case basis at the sole discretion of the City.

8. Liability Insurance

Applicants or their Contractor shall provide proof to the City prior to construction and shall maintain during the life of the project, public liability insurance for bodily injury and property damage liability, including, without limitation, coverage for explosion, blasting, collapse, and destruction of underground utilities and blanket Agreement liability. Coverage shall protect the applicant and the City. The applicant and Contractor shall have the City specifically added as additional named insured in the policy(s) at no cost to the City and shall present a policy endorsement to the City as evidence.

The applicant, or Contractor shall further agree to indemnify, defend, and to save the City harmless from any and all claims or liability for damages arising from acts or work due to operations. The Contractor shall furnish the City, certificates of comprehensive, general, automobile liability and property damage insurance, before commencing work. The Contractor shall carry minimum commercial general liability insurance limits of $1,000,000 bodily injury, including death, and $1,000,000 property damage protecting against all claims for personal injury or property damage arising during the course of the performance of the Agreement with a $2,000,000 annual aggregate. In addition, automobile liability insurance of $1,000,000 per accident shall be carried.

9. Easements and Bill of Sale

The applicant shall obtain all necessary easements and a Bill of Sale transferring ownership of all installed sanitary sewer and/or sewer mains and facilities to the City. The Bill of Sale shall describe lengths and sizes of sanitary sewer and/or sewer mains, and the location in general terms, including the name of the plat if applicable.

The applicant shall furnish the City an affidavit stating that there are no liens filed against the sanitary sewer main construction.
10. City Access

During construction, applicants and their Contractors will provide the City access to their personnel (including personnel on Agreement to the City) as necessary, to ensure compliance with City requirements.

11. Final Acceptance

Upon completion of construction, applicants, and/or their Contractors, shall notify the City and request a final inspection for approval of the project. If the sanitary sewer main has been installed according to the approved plans and specifications, pressure and bacteriological tests have been passed, and all extension policy conditions have been fully satisfied, the City will issue a Letter of Final Acceptance of the main extension. The date of the letter will begin the period of warranty. The acceptance of the Agreement work shall not prevent the City from making claims against the applicant for any defective work discovered during the two-year period of the Performance/Maintenance Bond.

12. Maintenance Bond

A requirement for final acceptance is that the developer (or Contractor) may furnish a maintenance bond to the City in lieu of keeping in force the performance bond that shall continue in force from the date of final acceptance for a period of two years. The bond shall be in a form acceptable to the City and shall require the developer (or Contractor) and/or the bonding company to correct any defects in labor and materials that arise in said system for a period of two years from the date of acceptance of the system and transfer of title. The maintenance bond shall be in an amount equal to the current bonding standards. The City will release the maintenance bond at the end of the two year period following an inspection of said system.

12.4 Design Standards for Sanitary Sewer Main Extensions

A. General

All extensions to the sewer system must conform to the design standards of the City. In addition, plans and specifications for system extensions must be approved in accordance with the requirements of the State Department of Ecology.

In all cases where public road right of way will be used for mains or other improvements, or where sewer facilities are proposed to be installed in easements, the City Engineer must approve the plan. All easements for sewer facilities must be on an approved form and the City must be listed as the “Grantee.” The legal description and attached map showing the location and size of the easement must be approved by the City Engineer prior to recording.

In all cases where a County road right of way will be used for mains or other improvements, the County Road Department must also approve the plan in addition to the City.
The system must be capable of future expansion and must be constructed of permanent materials.

Project Datum: The site survey shall use North American Vertical Datum 88 (NAVD 88). Design submittals including sewer plan and profile and pump station elevations shall be based on NAVD 88.

B. Plans

1. General

The developer shall submit three copies of plans and specifications for the project for City review. The plan review fee must accompany the initial set of plans. City standards will normally be adequate to serve as the technical specifications for the project. The City may require additional specifications if project conditions warrant. Plans and specifications for all projects must be prepared and stamped by a professional engineer registered in the state of Washington, with the exception of side sewer extensions for single-family residences. After the reviews, the developer shall submit two copies of final version of the plans that will be stamped as approved and used in construction.

2. Criteria for Plans

The plans shall be prepared in accordance with the following criteria:

a. Title Blocks: Each sheet within the set of drawings shall have a title block showing the sheet title, number, date, scale, and revision block. All plans shall be prepared on standard 22x34 sheets, in the 2009 or earlier version of AutoCAD, with survey grade accuracy and with water improvements highlighted over acceptable screened back base map. Scale shall be 1"-20 ft. to 1"-50 ft. as appropriate.

b. Rights-of-way: Right-of-way lines, the boundaries of lots fronting on the street, drainage easements, utility easements, section lines and corners, and temporary construction easements, existing and proposed, shall be shown on the plans. All rights-of-way and easement lines shall be properly dimensioned.

c. Topography: All pertinent topographic features shall be shown such as street lines, curbs, sidewalks, and shoulders, location and size of storm and sanitary sewer lines, power, telephone, and gas lines, drainage ditches, utility poles, fire hydrants, high water and frequent inundation levels, and all other features of the area which may affect the design requirements for this area.

d. Profiles: Sewer line profiles shall be shown and indicate both length and slope of pipe. Sanitary sewer line profiles shall be provided for all sanitary sewer lines. Clearances between storm lines and sanitary sewer mains shall be shown at all crossings.

e. Legal Description: The plans shall include a complete legal description of the property to be served.
3. Plan Revisions
   The City shall be informed of all plan revisions, which affect the design of the sanitary sewer and/or sewer system prior to installation in the field. The City reserves the right to withdraw approval if in the opinion of the City the changes will cause the design of the extension to be below the City’s standards.

4. Facility Placement
   All sewer mains and other facilities, unless a private system, shall be installed in public rights-of-way or in recorded utility easements dedicated to the City. The developer or his engineer shall check with the City prior to beginning the design of the extension to determine if there is a preferred main location.

5. Public Rights of Way
   All locations of City facilities within the City right-of-way must be approved by the City Engineer. Utilities located in the road right-of-way must comply with franchise requirements outlined in ordinances passed by the City Council authorizing such use of the road and right-of-way. Where no ordinance applies, sewer mains shall be installed so as to be compatible with the existing sanitary sewer system, the terrain, geology, and the location of other utilities.

   Where the sewer line is installed in a public right of way, it shall not be located under curbs or sidewalks. Deviations from standard locations must be documented, receive prior written approval by the City Engineer, and be accompanied by accurate record drawings.

6. Easements
   Utility easements will be a minimum of 15 feet in width and piping will be installed no closer than five feet from the easement’s edge. Sewer line constructed deeper than 15 feet below finished ground surface may require an easement width greater than 15 feet.

7. Private Roads
   If it is necessary to install a sewer main within a private road, the easement shall be the width of the traveled surface plus one foot on either side.

8. Water and Sewer Line Separation Distances
   Transmission and distribution water piping shall be separated at least ten feet horizontally from waste disposal piping, drain fields, and/or sanitary sewer gravity or force mains. The bottom of the water main shall be 18 inches above the top of the sewer component. All parallel and crossing installations of sanitary sewer and water lines shall be in accordance with provisions of WAC 248-96 (septic systems) and the “Recommended Standards for Sanitary Sewer Works” - Ten State Standards. Where local conditions prevent such horizontal and/or vertical separation, closer spacing is permissible where design and construction meet the special requirements of the Department of Ecology criteria for Sewage Works Design.
When a water line crosses a sanitary sewer or force main, it shall be specified that the water main be installed a minimum of two feet above the sewer line with joints a minimum of five feet from the sewer line on each side. Controlled density fill shall be placed over the sewer line.

9. Submittals

Submittal information shall be provided to the City for the following items:

a. Provide manufacturer’s certification and test results, as applicable, for all materials in this specification.

b. Submit a certificate of calibration for the laser used for grade control prior to the start of construction. The manufacturer, vendor, or service and repair shop shall issue the certificate. The issuer must be authorized by the manufacturer as qualified to calibrate the laser light device. The certificate shall be issued no more than 60 days prior to start of construction.

c. Color video tape of new sewer.

d. Manhole Coating products and applicator certification.

10. Manholes and Cleanout Materials

a. Minimum Design Criteria

i. Design loadings for manholes shall be designed for a soil unit weight of 150 lb/CF and a live load complying with AASHTO HS 20.

ii. The minimum allowable manhole diameter is 48 inches. Provide larger diameter manholes where required by the City Engineer.

iii. The minimum diameter of force main terminal manholes shall be 54 inches or larger if required by the City Engineer.

iv. The minimum allowable manhole depth is 7 feet from the cover to the top of the manhole channeling unless specifically approved by the City Engineer.

v. Flow entering a manhole shall not turn more than 90° before exiting the manhole.

b. Manholes: Provide manholes conforming to ASTM C478. Portland Cement shall be ASTM C150 Type II or Type IV. Precast bases may be separate or integral with the riser section.

Manholes may be hand-channeled in the field after sewer main installation. Channels shall be made to conform to the sewer grade and shall be brought together with well-rounded junctions. Channel sides shall be carried vertically to the crown elevation of the various pipes. The concrete shelf shall be smoothly finished with slopes to drain. Channels shall not narrow down to less than the inside diameter of the pipe.

If a manhole liner is specified, it shall be a GU Manhole Base Liner as manufactured by Sealcon Liner Systems Ltd, Aldergrove, B.C. (604) 607-7755 with plastic invert and
nonskid landing area embedded in concrete and O-ring gaskets for the sewer connection or approved equal. The liner shall have a 5 mm minimum thickness. The depth of the main through channel shall be equal to or larger than the diameter of the largest pipe. This is typically used in high ground water conditions.

Provide riser heights of not less than one foot. Provide riser sections, which have a preformed opening of a minimum size to accommodate the pipe to be inserted. Heights of base sections shall be such that openings for pipes are not located at joints.

c. Grade Adjustment: Provide concrete grade rings meeting the requirements of ASTM C478. HDPE grade adjustment rings shall be used to adjust minor variations in grade or slope that concrete grade rings cannot accomplish. HDPE grade adjustment rings shall be Ladtech or approved equal. Grade adjustment rings shall be limited to a maximum height of 12 inches. In no case shall the “neck-length” (grade rings plus the manhole frame) exceed 18 inches. Interior and exterior of all grade rings shall be sealed with mortar.

d. Joints: Provide sewage and grease resistant confined rubber gaskets conforming to ASTM C 443. In addition, all joints shall be grout/sealed on all interior surfaces with mortar.

e. Manhole Steps: Provide manholes with steps that meet the following specifications.

i. Installed by the manufacturer conforming to ASTM D4101 polypropylene encased steel manhole steps with non-slip surface. Steel reinforcing shall be ½-inch minimum diameter ASTM A615, Grade 60.

ii. Knurled ¾-inch diameter 316 stainless steel steps. There shall be a 2-inch hook on the embedment end.

f. Frames and Covers

i. Manhole frames and covers shall be ductile iron and shall have the word “SEWER” in 3-inch raised letters. Provide Olympic Foundry or approved equal manhole covers.

ii. In non-pedestrian areas cleanouts shall be brought to finished grade and provided with PVC weld-on fittings that form a female threaded opening and a male threaded plug to be used to seal the cleanout. A fiberglass cleanout box shall be brought to finish grade as shown on Standard Detail 1260.

iii. In sidewalk or vehicle areas, the cleanouts shall be constructed in the same manner as described above but also will be finished at road or walkway grade and furnished with a traffic rated frame and cover from Olympic Foundry or approved equal.

iv. In off-road conditions, the manhole frame and cover shall have a two foot square concrete collar.
g. System A Epoxy Coating: When specified, use hydrogen sulfide/sulfuric acid resistant coating, Tnemec Series 120 Vinester Lining, Aquata Poxy by Raven, Raven 405 or System A epoxy coating approved equal for manhole and wall protection. This will be required in high hydrogen sulfide environments.

h. Pipe Connections to Manholes: PVC pipe connections to manholes and other structures shall be approved by the City Engineer. Provide one of the following methods for the connection.
   i. For NEW manhole bases that require liners, fiberglass (FRP) manhole base by GU Industries or approved equal with sewage and grease resistant O-ring gasket conforming to ASTM C443.
   ii. For NEW and EXISTING manhole bases, sanitary sewer-proof elastomeric boots such as Kor-N Seal I-Wedge Korband by National Pollution Control Systems Inc. or approved equal.

i. Pipe and Fittings for Drop Connections: The type of pipe and fittings for drop connections shall be specified by the City Engineer. When ductile iron pipe is used for a drop connection, the fittings shall be the mechanical joint type, except where flanged fittings are shown on Standard Drawings 1225-1227.

11. Manhole Installation: If material in the bottom of the trench is unsuitable for supporting the manhole, excavate below the base and install foundation stabilization material accepted by an approved geotechnical engineer and the City to obtain a suitable foundation.
   a. Install gravel base material under manhole base and compact to comply with the WSDOT Standard Specifications.
   b. Carefully inspect pre-cast manhole sections to be joined. Sections with chips or cracks in the tongue or groove shall not be used. Clean ends of sections of all foreign material. Provide all special tools, appliances, and lubricants for the jointing assembly. Joints shall be made in strict accordance with the manufacturer’s recommendations.
   c. Install grade rings in conformance with Standard Detail 1222. Lay grade rings in mortar with sides plumb and top level. Seal joints with mortar. Grade rings shall be sanitary sewer-tight.
   d. Construct manhole inverts in conformance with detail shown on Standard Detail 1222, with smooth transitions to ensure an unobstructed flow through the manhole. Remove all sharp edges or rough sections which tend to obstruct flow. Channeling shall be to the springline of the sewer or above. Benches shall be sloped from the manhole wall toward the channel to prevent the accumulation of solids.
   e. Completed manhole shall be straight, plumb, and the joints shall be watertight. All interior joints shall be coated with a fast setting, quick drying mortar prior to backfill.
f. The City Engineer will require additional manhole coatings in situations that indicate potential for infiltration or inflow.

12. Corrosion Resistant Manholes: Provide corrosion resistant manholes at force main terminations, as well as two manholes downstream and one manhole upstream. Provide additional corrosion resistant manholes in areas with steep slopes downstream from force main discharges where directed by the City Engineer. Apply all coatings in strict accordance with the coating manufacturer’s instructions.

Base sections, risers, eccentric reducers, and flat slab tops of new manholes shall be shop coated. Field apply two or more coats of System A Epoxy, per manufacturer’s recommendations to the invert, the finished grade rings, any metallic pipe extending into the manhole, and any damaged shop coated sections. Allow all grout and cement mortar to cure 28 days prior to applying the coating system. Prepare surfaces and apply epoxy in strict accordance with the coating manufacturer’s instructions. Coating shall be pinhole free with a minimum dry film thickness of 60 mils. Maintain required temperature and humidity for duration of curing period.

13. Existing manholes to be coated
   a. High-pressure blast existing manhole surfaces to be coated. Remove all grease, laitance, and deleterious materials from the concrete surfaces. Seal off the flow line as required to maintain flows while keeping debris out of the sewer. Dry the manhole surfaces to meet the coating manufacturer’s requirements. Apply coating in strict conformance with the coating manufacturer’s requirements.
   b. If in the sole opinion of the City Engineer, the existing manhole surfaces are unsuitable for service as corrosion resistant manholes, replace the manhole with new corrosion resistant manholes at no cost to the City.

14. Future Manhole Stubouts
   a. Install stubouts from manholes for future sewer connections as required by the City Engineer. Maximum length shall be 1½ feet outside the manhole wall.
   b. Match the crowns of the pipelines. Provide compacted pipe bedding material around the stubout as specified herein.
   c. Install semi-permanent plugs in the end on stubouts with gasketed joints similar to sewer pipe being used. Plugs shall be capable of withstanding all internal or external pressures without leakage. All plugs to be braced to prevent blowout.

15. Connection to Existing Manholes
   a. Submit proposed connection method to the City Engineer for approval prior to beginning work.
   b. Maintain flows through the manhole during construction without interruption using an approved method.
c. Excavate completely around existing manholes to avoid unbalanced loading of the manhole. Repair all damage to manhole. Verify all existing invert elevations prior to constructing new line.

d. Connections to existing manholes shall be core drilled. Report any discrepancies to the City Engineer. Re-channel the existing manhole base.

C. Sewer Piping and Fittings

1. Minimum Design Criteria

The minimum sewer main size shall be 8-inch diameter. The minimum side sewer (the sewer pipe between the main and the property line) size shall be 6-inch diameter.

Sewer extensions shall incorporate adequate capacity to provide for the future expansion of the system in conformity with the City’s comprehensive planning or future needs as determined by the City Engineer.

It is the policy of the City that the Developer extend any sanitary sewer main improvements to the most distant end of abutting and interior rights-of-way or easements unless it is determined by the City, according to its rules and policies, that extension of the sanitary sewer main will not be necessary. Developers owning corner property shall extend the sanitary sewer system to the far ends of both corners of the property unless it is determined by the City, in its sole discretion, extension of the system is not necessary. The sanitary sewer system shall be extended to the far end of the development at depths, whenever possible, which enable the City to provide gravity service to upstream properties.

a. Sewer Line Depth

i. All lines shall be at a sufficient depth to drain basements. A minimum of 5-feet of cover over the crown of the sewer is required, unless specifically exempted by the City Engineer.

ii. The sewer shall be designed to provide gravity service to upstream properties whenever possible as determined by the City Engineer.

b. Separation between utilities

i. Sanitary sewer: Comply with Department of Ecology criteria.

ii. Storm Sewer: Provide a minimum of 3 feet horizontal clearance. Provide a minimum of 1-foot vertical clearance.

iii. Underground Power, Gas, Telephone, and Cable: Provide a minimum of 3-feet horizontal clearance. Provide a minimum of 1-foot vertical clearance.

c. Sewer grade
   i. Provide no additional drop on straight runs through manholes other than the pipe slope.
   ii. Provide an additional 0.10 foot drop for 90° turns through a manhole.
   iii. Comply with Ecology minimum slope requirements.

2. PVC Pipe and Fittings (PVC pipe, 4-inch and larger)
   a. Pipe and fittings shall meet the requirements of ASTM Specification D3034 for 4”-15” SDR 35 and F679 for 18”-27.” The pipe shall be colored green for in-ground identification as sewer pipe.
   b. Pipe shall be suitable for use as a gravity sewer conduit. Provisions must be made for contraction and expansion at each joint with a rubber ring. The bell shall consist of an integral wall section with a solid cross-section rubber ring, factory assembled, securely locked in place to prevent displacement during assembly.
   c. All fittings and accessories shall be as manufactured by the pipe supplier or approved equal and have bell and/or spigot configurations compatible with that of the pipe.
   d. Provide factory molded wye fittings with elastomeric gasketed bell end joints. Tapped and solvent welded fittings or fittings strapped to the main sewer are not acceptable. Side sewers shall be connected to the main by means of a wye. A gasketed cap or plug shall be furnished with each wye. The plug or cap shall be banded or otherwise secured to withstand the test pressures to which it will be subjected without leakage.

3. High Density Polyethylene (HDPE) Pressure Pipe
   a. High density polyethylene plastic pipe suitable for use as a pressure conduit shall conform to the following specifications and standards:
      i. Base Resin: Conform to all requirements of ASTM D 1248, Type III, Class C, Category 5, Grade P34, with a PPI rating of PE 3408.
      iii. Environmental Stress Crack Resistance: No cracks after 5000 hours as determined by ASTM D 1693, Condition C.
      iv. Rating: Long-term hydrostatic strength of 1,600 psi and hydrostatic design stress of 800 psi as determined by ASTM D 2837.
   b. Pipe shall be butt-fused and internal weld seams removed.
4. Ductile Iron Pipe and Fittings
   a. Pipe shall be centrifugally cast ductile iron, conforming to AWWA C151. Minimum thickness class shall be as determined in accordance with AWWA C150 but in no case less than Class 52.
   b. Fittings shall be cast iron or ductile iron conforming to the requirements of AWWA C110 or AWWA C153 and rated for not less than 250 psi working pressure.
   c. Joints shall be push-on or mechanical joint conforming to AWWA C111. Bolts for mechanical joints shall be ductile iron or Corten tee head bolts.
   d. Gaskets for mechanical or push-on joints shall be sewage and grease resistant rubber (nitrile or neoprene), conforming to AWWA C111.
   e. Provide one of the following lining systems for corrosion resistance:
      i. 40 mil DFT nominal ceramic epoxy lining.
      ii. 40 mil DFT nominal polyurethane lining.
      iii. 30 mil DFT electrostatically applied fusion bonded polymer alloy coating.
   f. Provide U.S. Pipe or Pacific States pipe and fittings, or approved equal.

5. Corrosion Protection for Ductile Iron Pipe and Fittings
   a. Conduct a soil corrosion survey in accordance with AWWA C105 Appendix A where ductile iron pipe is to be used. In areas where the soil is found to be corrosive, the pipe and fittings shall be encased in polyethylene material. The polyethylene material shall be as specified in AWWA C105 and have a minimum nominal thickness of 0.008 inch. Minus tolerance shall not exceed 10 percent of the normal thickness. Material shall be tubes for straight pipe and flat sheets for fittings.
   b. Additional special corrosion protection of the pipe may be required for construction near saltwater or in other locations for the specific construction conditions encountered. Provide protection as required by the City Engineer.

6. Trace Wire: Copper wire, No. 10 is the City standard. Install on all force mains and side sewers between mains and cleanouts at property line. Use waterproof splices where necessary.

7. Warning Tape: Use polyethylene film underground warning tape with a metal core. The tape shall be green with black and white lettering: “CAUTION SEWER LINE BURIED BELOW”
D. Sewer Pipe and Fittings Installation

1. Connection to City Sewers

   a. All sewer extensions shall connect to the City’s system at a manhole or approved location by the City Engineer. Provide a manhole if one is not located at the connection point.

   b. Apartment complexes shall connect to the City’s sewer at a manhole. A side sewer service connection to the City’s sewer is not allowed. The sewer main connection from the apartment complex shall be a minimum of 8-inch diameter. Side sewers from separate buildings shall join the main at manholes to facilitate grease removal. No more than two side sewers shall connect to a manhole.

   c. Side sewers serving commercial/industrial buildings or facilities which have the potential of discharging grease, oil, and/or chemicals to the sewer shall connect to the sewer at a manhole. This includes restaurants, service stations and garages, car washes, photo labs, processing facilities, and any other facility as required by the City.

2. Dewatering

   The Developer is to determine the scope, type, size, quantity, method of installation, operation, and removal of the dewatering system necessary to keep all excavations dewatered to an elevation below the base of the excavation. The system shall also be sufficient to stabilize the soils in the excavation and the surrounding areas, and to prevent flotation of partially completed structures.

   The Contractor shall control groundwater and surface water to prevent the softening of the bottom of excavations, or formation of quick conditions or boils during excavation. Ground water shall be lowered to 3 feet below the base of the excavation at all times. Determination of unsuitable soil conditions for supporting the improvements shall be reviewed by the Contractor’s site engineer and approved or denied by the City Engineer. When the dewatering system does not meet the specified requirements, and as a consequence there is a loosening or disturbance of the foundation soils, instability for the slopes, or damage to the foundation or structures occur, the Developer shall at its own expense repair said disturbance. This shall include supplying all materials, labor, and equipment, and performing all work required for the restoration of foundation soil, slopes, or structure to the satisfaction of the City Engineer.

   It is solely the Developer’s and the Contractor’s responsibility to meet all regulatory requirements governing the disposal of dewatering flows and to prevent damage to adjacent property. Disposal of these waters into existing City sewer mains or trunk lines is strictly prohibited. Drainage of water through the pipeline under construction is also prohibited.

   All dewatering wells installed by the Contractor shall be removed and backfilled in accordance with applicable Federal and State regulations.
3. Bedding
   a. Place and compact bedding in accordance with the specifications. Grade the pipe
      bedding by hand to the line and grade to which the pipe is to be laid, with proper
      allowance of the pipe thickness. Remove hard spots that would prevent a uniform
      thickness of bedding. Before laying each section of the pipe, check the grade with a
      straight edge and correct any irregularities found. The trench bottom shall form a
      continuous and uniform bearing and support for the pipe at every point between bell
      holes. Excavate bell holes at each joint to assure uniform support and permit proper
      assembly of the joint.
   b. Sand and other material that cannot be easily compacted shall not be used for
      bedding.

4. Line and Grade
   a. Allowable deviation from design line and grade shall be ½ inch for line and ¼ inch
      for grade.
   b. Allowable variation in the invert elevation between adjoining ends of pipe, due to
      non-concentricity of bell and spigot shall not exceed 1/64th inch per inch of pipe
      diameter.
   c. Measure for grade at the pipe invert, not the top of the pipe.
   d. Establish line and grade for pipe by the use of lasers or other suitable method so that
      the specified tolerances are not exceeded.

5. Laying and Joining Pipe and Fittings
   a. Pipe laying shall proceed upgrade with spigot ends pointing downgrade.
   b. Inspect all pipe and fittings prior to lowering into the trench to ensure no cracked,
      broken, or otherwise defective materials are being used. PVC pipe with deep
      scratches shall not be installed. Clean the ends of the pipe to be joined, the inside of
      the joint, and the gasket immediately before joining the pipe. Assemble the joint in
      accordance with the instructions and recommendations of the manufacturer of the
      type of joint used.
   c. After the joint has been made, check pipe for alignment and grade. The trench
      bottom shall form a uniform and continuous bearing and support for the pipe at
      every point between joints. Place enough pipe bedding material to secure the pipe
      from movement before the next joint is installed.
   d. When pipe is laid within a movable trench shield, take all necessary precautions to
      prevent pipe joints from pulling apart when moving the shield ahead.
   e. Take the necessary precautions to prevent excavated or other foreign material from
      getting into the pipe during the laying operation. When laying operations are not in
      progress, at the close of the day’s work, or whenever workers are absent from the
job, close and block the open end of the last laid section of pipe to prevent entry of foreign material, or creep of the gasket joints.

f. Take precautions necessary to prevent the “uplift” or floating of the line prior to completion of the backfilling operation.

6. Cutting and Dressing Pipe

a. When cutting or machining of the pipe is necessary, use only tools and methods recommended by the pipe manufacturer.

b. Ductile iron pipe shall be cut with milling type cutter, rolling cutter, or abrasive saw cutter. Do not flame cut.

c. Cut all pipe without damaging the pipe or lining, and so as to leave a smooth end at right angles to the axis of the pipe.

d. Dress cut ends of pipe by beveling, or as recommended by the pipe manufacturer. Remove sharp edges or projections that may damage the gasket.

7. Side Sewer Service Connections

a. Connect side sewer service connections to the City’s existing main by means of a rigid ROMAC fitting or approved equal. Residential side sewers shall not connect to a manhole without written approval from the City Engineer.

b. Connect side sewer service to new mains with a wye fitting. Tees are not allowed for side sewer connections.

c. Side sewer service connections shall extend to the street or alley right-of-way line as directed by the City Engineer and as shown on the Drawings.

d. Provide a minimum 2-foot-wide compacted pipe base under wyes installed in trenches.

e. Side sewer service connections in the right-of-way shall be 6 inch diameter or larger.

f. Install a two-way cleanout on each side sewer at the property line, as shown in Standard Detail 1260. After final grading, the cleanout cap shall be brought to grade and adequately protected for its location.

g. Install 4-inch diameter cleanouts within five feet of building foundation wall. A removable watertight cap shall be placed at the top of the cleanout, which shall extend above finished grade.

h. Pipe and fittings shall be of one type of material throughout.

i. No more than two residential structures shall be connected to the same side sewer.
8. Side Sewer Depth and Slope
   a. Construct side sewers to a minimum invert depth of five feet below the floor being served or five feet below the ground surface at the property line or the easement line.
   b. Comply with minimum clearance requirements for sanitary sewer line crossings.
   c. The minimum slope is 2 percent.

9. Location Markers
   a. Place a new 2" diameter, Schedule 40 PVC service connection marker and a magnetic tape marker at the end of the side sewer service stub.
   b. Markers shall extend from the bottom of the trench to 12 inches above the ground surface.
   c. Stencil the word “sewer” in two-inch high letters and the depth of the side sewer invert below ground.
   d. In traveled areas, cut marker flush with the ground surface.

10. Inspections
    a. Do not backfill any side sewers or building laterals until the City Inspector has visually inspected and approved the installation.
    b. If any work is covered up without the City's approval or consent, it must be uncovered for examination at the Developer’s expense.

11. Sewer Main Cleaning and Testing
    Tests on the completed installation shall be made as specified below.
    a. Scheduling
       i. All tests must be observed by the City. Notify the City of the proposed test date at least 2 days prior to the test.
       ii. Testing of sections of the constructed sanitary sewer for acceptance will not be performed until all service connections, manholes, and backfill of the section are completed.
    b. Cleaning and Flushing
       All gravity sewer pipe shall be cleaned and flushed after backfilling and compaction in accordance with Section 7-17.3(2) A of the WSDOT Standard Specifications. The pipe shall be cleaned and flushed by passing an inflatable rubber ball through the completed section or using a flush truck. Any obstruction such as cemented grout or debris found in the completed section shall be removed. Do not allow flushed water and debris into the existing collection system.
c. Low-Pressure Air Test

All gravity sewers, including all connected side sewers, shall be tested in accordance with the provisions of Section 7 17.3(2)F of the WSDOT Standard Specifications to verify watertight connections. No other test procedures will be allowed except by written approval of the City Engineer.

d. Hydrostatic Testing

All gravity sewers, including all side sewers, shall be hydrostatically tested when low-pressure air testing cannot be used and only with written approval of the City Engineer. The Contractor shall furnish all equipment for testing. Seal off the downstream end of the line and fill with water to a minimum head of 4 feet in a stand pipe at the high end. A period of at least one hour will be allowed for absorption time before making the test. A suitable meter or method of measuring the quantity of water used is necessary. The allowable water loss for sanitary sewers shall not exceed 0.158 gallons per hour per 100 feet of pipe per inch of diameter of pipe under a minimum test head of 4 feet above the top of the pipe at the upper end.

12. Pressure Testing HDPE Pipe Outside the Trench

If specified by the Engineer, pressure testing may be conducted prior to pipe installation. After the pipe has been joined, fill it with water, carefully bleed off any trapped air. Subject the pipe to a hydrostatic test pressure that is 1.5 times the system design pressure for a maximum of 3 hours. During this time, add water periodically to maintain the test pressure; this compensates for the initial stretching of the pipe. The line pressure tightness is determined by visual observation; therefore, it is not necessary to measure the make-up water. Examine every fused joint, any leakage must be repaired and then retested.

NOTE: It shall be the responsibility of the contractor to ensure that appropriate safety precautions are observed during hydrostatic testing above ground.

13. Pressure-testing Sewer Pipe in the Trench (force main)

a. Fill the pipeline with water after it has been laid; bleed off any trapped air. Subject the lowest element in the system to a test pressure that is 1.5 times the design pressure, and check for any leakage. When, in the opinion of the Engineer, local conditions require that the trenches be backfilled immediately after the pipe has been laid, apply the pressure test after backfilling has been completed but not sooner than a time which will allow sufficient curing of any concrete that may have been used. Typical minimum concrete curing times are 36 hours for early strengths and 7 days for normal strengths.

b. The test procedures consist of two steps; the initial expansion and the test phase. When test pressure is applied to a water filled pipe, the pipe expands. During the initial expansion of the pipe under test, sufficient make-up water must be added to
the system at hourly intervals for 3 hours to maintain the test pressure. After about 4 hours, initial expansion should be complete and the actual test can start.

c. When the test is to begin, the pipe is full of water and is subjected to a constant test pressure of 1.5 times the system design pressure. The test phase should not exceed 3 hours, after which any water deficiency must be replaced and measured. Add and measure the amount of make-up water required to return to the test pressure and compare this to the maximum allowance in the table below.

d. An alternate leakage test consists of maintaining the test pressure (described above) over a period of 4 hours and then dropping the pressure by 1.0 psi (0.69 MPa). If the pressure then remains within 5% of the target value for 1 hour, this indicates there is no leakage in the system.

NOTE: Under no circumstances shall the total time under test exceed 8 hours at 1.5 times the system pressure rating. If the test is not complete within this time limit (due to leakage, equipment failure, etc.), the test section shall be permitted to “relax” for 8 hours prior to the next test sequence.

i. Air testing is not recommended. Additional safety precautions may be required. (Reference procedure is from PPI Technical Report TR-31 by the Plastic Pipe Institute.)

<table>
<thead>
<tr>
<th>NOMINAL PIPE SIZE*</th>
<th>U.S. GALS/100 FT. OF PIPE</th>
<th>NOMINAL PIPE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 HOUR</td>
<td>2 HOURS</td>
</tr>
<tr>
<td>2&quot;</td>
<td>0.08</td>
<td>0.12</td>
</tr>
<tr>
<td>3&quot;</td>
<td>0.10</td>
<td>0.15</td>
</tr>
<tr>
<td>4&quot;</td>
<td>0.13</td>
<td>0.25</td>
</tr>
<tr>
<td>5&quot;</td>
<td>0.21</td>
<td>0.41</td>
</tr>
<tr>
<td>6&quot;</td>
<td>0.30</td>
<td>0.60</td>
</tr>
<tr>
<td>8&quot;</td>
<td>0.50</td>
<td>1.00</td>
</tr>
<tr>
<td>10&quot;</td>
<td>0.75</td>
<td>1.30</td>
</tr>
<tr>
<td>12&quot;</td>
<td>1.10</td>
<td>2.30</td>
</tr>
<tr>
<td>14&quot;</td>
<td>1.40</td>
<td>2.80</td>
</tr>
<tr>
<td>16&quot;</td>
<td>1.70</td>
<td>3.30</td>
</tr>
<tr>
<td>18&quot;</td>
<td>2.20</td>
<td>4.30</td>
</tr>
</tbody>
</table>

14. Manhole Vacuum Test

All manholes shall be vacuum tested in accordance with ASTM C-1244. All lift holes and any pipes entering the manhole are to be plugged and a vacuum drawn on the manhole equivalent to 10 inches of Mercury (4.9 psi). The valve on the vacuum line shall then be closed and the time required for a drop in vacuum to 9 inches of Mercury (4.4 psi) shall be
measured. The manhole shall pass if the time for the vacuum reading to drop from 10 inches to 9 inches of mercury meets or exceeds the values shown in the following table:

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Manhole Diameter (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>48</td>
</tr>
<tr>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td>18</td>
<td>45</td>
</tr>
<tr>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>22</td>
<td>55</td>
</tr>
<tr>
<td>24</td>
<td>59</td>
</tr>
<tr>
<td>26</td>
<td>64</td>
</tr>
</tbody>
</table>

15. Video Televising and Taping
   a. The Developer shall hire a reputable firm skilled in conducting television inspection of sewers and shall perform work in conformance with WSDOT Standard Specification 7-17.3(2)H.
   b. Conduct television inspection of all pipelines laid that are 8-inches in diameter or greater. At the City’s discretion, Developer may be required to televis 4” and/or 6” diameter pipe as well. Television inspection shall occur after backfilling, compaction, and deflection testing of the sewer.
   c. Television inspection of the sewer shall be done with a CCTV color camera recorded in digital format. A pivot head camera shall be used to record all side sewer laterals. DVD format may be allowed with approval of the City Engineer.
   d. A copy of the inspection video results from all televising operations shall be provided to the City (digital format is preferred).
   e. Any defects discovered shall be repaired by the Developer prior to issuance of final acceptance.

16. Deflection Test of PVC Pipe
   All PVC gravity sewer pipe shall be tested for deflection at least 30 days after completion of trench backfill and compaction in accordance with the requirements of section 7-17.3(2) G of the WSDOT Standard Specifications.
17. Infiltration Tests

When the natural groundwater table is above the crown of the higher end of the test section, the maximum allowable limit for infiltration shall be four tenths (0.16) gallons per hour per inch of internal diameter per 100 feet of length, with no allowance for external hydrostatic head.

E. Test Equipment

1. Any arrangement of testing equipment that will provide observable and accurate measurements of either air or water leakage under the specified conditions will be permitted. Gauges, air piping manifolds, valves, and graduated containers shall be located aboveground.

2. Air testing apparatus shall be equipped with a pressure release device such as a rupture disc or a pressure relief valve designed to relieve pressure in the pipe under test at 6 psi.

F. Individual Grinder Pump Equipment

1. General
   a. This division covers that work necessary for furnishing and installing grinder pumps, discharge piping and appurtenances to comply with these specifications and the City’s standard details.
   b. The Developer shall furnish and install a complete factory-built and tested grinder pump station, it shall be the Barnes PGPP 2 HP Submersible Grinder Pump or approved equal with level controls, and shall be suitably mounted in a basin constructed of high density polyethylene or fiberglass, and all necessary internal wiring and controls.

2. Submittals
   Submittal information shall be provided to the City for the following items:
   a. Submit shop drawings containing catalog cuts, design of modifications required in this section, complete electrical schematics, and motor data.
   b. Submit details of field jointing of access ways.
   c. Provide a recorded easement for the grinder pump facilities on each property prior to acceptance.

3. Warranty
   Provide the Developer’s standard two year installation warranty.

4. Design Criteria
   a. Provide a minimum of one grinder pump for each lot served.
   b. Each grinder pump shall serve no more than 1 house and a mother-in-law apartment located on the same lot.
c. No more than one duplex shall be served by a simplex grinder pump station. A triplex shall be served by a duplex grinder pump station or two simplex grinder pump stations.

d. Comply with Washington State Labor & Industries requirements regarding intrinsically safe electrical equipment.

5. Grinder Pump and Appurtenances

a. Developer shall furnish a Barnes PHPP 2 HP Submersible grinder pump station.

b. Pressure sewer mains shall be Schedule 40 PVC or HDPE pipe, and shall conform to AWWA C-900. Joints shall be made up as recommended by the pipe manufacturer for pressure pipe, shall be class 160 minimum. HDPE pipe for force mains or special conditions shall be in accordance with the Department of Ecology’s “Criteria for Sewage Works Design”.

6. Valves Associated with Grinder Pumps

a. Plug valves shall be cast iron body, welded nickel or adjustable stainless steel seat, Buna-N coated plug and Buna-N packing. Valves shall be full port opening with drip tight shutoff and mechanical joint or flanged ends.

b. Valve operator shall be a 2-inch square nut with AASHTO H-20 traffic rated cast iron valve box. Worm gear operated for valves 6 inches and larger.

c. Valves shall be coated. Coat interior metal surfaces and exterior surfaces with 12 mils minimum fusion epoxy per AWWA 550 or 20 mils coal tar epoxy.

d. Ball valves shall be bronze body, Teflon seat, stainless steel ball and stem with flanged or threaded ends. Provide ball valves with operating handle and drip-tight shutoff.

e. Ball check valves shall be Schedule 80 PVC with Teflon seats and EPDM O-ring gaskets. Valve shall be rated at 150 psi @75°F. Provide double union type valve with threaded or socket ends.

f. Valve box shall be a concrete meter box, equivalent to Fogtite No. 2, or fiberglass meter box rated for H-20 loading. Valve box lid shall have “SEWER” label.

7. Grinder Pump Installation

a. The Developer shall be responsible for removing ground water to provide a firm, dry subgrade for the structure, and shall guard against flotation or other damage resulting from general water or flooding. The grinder pump station shall not be set into the excavation until the installation procedures and excavation have been reviewed and approved by the City Inspector.
b. The pump station is supplied with a standard 4-inch inlet grommet for inlet piping. Developer shall not insert inlet piping beyond the factory-provided “stop.” The basin may not be dropped, rolled or laid on its side for any reason.

c. Installation shall be accomplished so that 1-inch to 3-inch of access way, below the bottom of the lid, extends above the finished grade line. The finished grade shall slope away from the unit. The diameter of the hole must be large enough to allow for the concrete anchor.

d. A 6-inch minimum layer of naturally rounded aggregate, clean and free flowing, with particle size of not less than 1/8 inch or more than 3/4 inch shall be used as bedding material under each unit. A concrete anti-flotation collar, as detailed on the drawings, and sized according to the manufacturer’s instructions, shall be required and shall be pre-cast to the grinder pump or poured in place. The grinder pump station with its precast anti-flotation collar shall have a minimum of four lifting eyes for loading and unloading purposes. The unit shall be leveled, and filled with sanitary sewer, to the bottom of the inlet, to help prevent the unit from shifting while the concrete is being poured. The concrete must be manually vibrated to ensure there are no voids. If it is necessary to pour the concrete to a level higher than the inlet piping, an 8-inch sleeve is required over the inlet prior to the concrete being poured.

e. Backfill of clean native earth, free of rocks, roots, and foreign objects shall be thoroughly compacted in lifts not exceeding 12 inches to a final Proctor Density of not less than 90% on private property and 95% in the public ROW. Improper backfilling may result in damaged access ways.

f. The electrical control panel shall be installed and wired to the grinder pump station by the Developer using the factory supplied length of 6 conductor, 12 gauge TC type cable as shown on the standard drawings. Type TC cable shall be installed in PVC Schedule 40 continuous conduit and burial depth shall comply with local code requirements.

g. Polyethylene pressure pipe joints shall be flanged, thermal fusion butt welds or made using weld-on compression couplings. Joints in 1¼” and 2” pipe shall be made only at pump basins, valves, fittings and changes in pipe diameter. For pipes larger than 2” in diameter, joints between pipe sections shall be thermal fusion butt welded. All flanges and fittings shall be thermal fusion butt welded to the pipe. Operators of fusion welding equipment shall be trained by the pipe manufacturer, who shall certify that operators are qualified.

h. Install warning tape in the trench approximately one foot below finished grade, directly above the pipe.

i. Install trace wire with all polyethylene pressure or force main and grinder pump discharge piping.
j. Trace wire shall be a minimum of 10 gauge.

8. Startup and Field Testing

All testing and startup operations will be done by City personnel only. Provide City with 24-hour request for inspection and startup testing.

G. Pretreatment Systems

1. General

a. Pretreatment systems may be required to reduce, eliminate or alter the nature of a pollutant’s properties prior to discharging to the public sewer collection system. Pretreatment systems include grease interceptors, oil/water separators and other units to treat metals, solvents, excessive BOD or TSS and other constituents.

b. The City reserves the right to evaluate a waste stream prior to connection and require pretreatment.

2. Grease Interceptors

a. Any business involved in the process, preparation, sale, or packaging of human or animal food requires that an exterior (outside) grease interceptor be installed, on a separate side sewer main. This separate side sewer shall be connected directly, and only to, the food handling areas in the building, with no sanitary connections permitted upstream of the grease interceptor.

b. Comply with the latest versions of the Uniform Plumbing Code and the Uniform Building Code. The design capacity of the grease interceptor shall be determined by the following formula (from Appendix H, Uniform Plumbing Code):

\[
\text{Interceptor Size} = (\# \text{ Meals @ Peak Hour})^1 \times (\text{Waste Flow})^2 \times (\text{Retention Time})^3 \times (\text{Storage Factor})^4
\]

1. Meals Served at Peak Hour
2. Waste Flow Rate
3. Retention Times
4. Storage Factors

Single Service kitchen .......................................................................................................... 2 gallon flow
Food Waste Disposer ............................................................................................................. 1 gallon flow
Commercial Kitchen Waste ...................................................................................................... 2.5 hours
Single service kitchen ........................................................................................................... 1.5 hours
Fully Equipped Kitchen
8-hour operation ..................................................................................................................... 1
16-hour operation ............................................................................................................................ 2
24-hour operation ............................................................................................................................ 3
Single Service Kitchen ................................................................................................................. 1.5

Precast concrete grease interceptors shall be designed for a soil dead load of 150 lb/cf and an AASHTO H-20 live load as manufactured by Utility Vault or equal.

3. Oil/Water Separators
   a. Oil/water separator design and sizing shall conform to the Department of Ecology’s Best Management Practices (BMP) for Stormwater Treatment. The separator shall be an American Petroleum Institute (API) or Coalescing Plate Interceptor (CPI).
   b. Oil/water separators shall be designed for a soil dead load of 150 lb/cf and an AASHTO HS 20 live load.
   c. Provide a forebay to collect floatables and large settleable solids with a surface area not less than 20 SF per 10,000 SF of area draining into the separator.

4. Grease Interceptor & Oil/Water Separator Installation
   a. The building sanitary side sewer shall be connected to the service lateral at least four feet downstream from the interceptor, providing the slope of the lateral is 2 percent or more. For laterals with a slope of less than 2 percent, the connection point shall be a minimum of eight feet downstream from the separator, or directly connected to the City main.
   b. Grease interceptors or oil/water separators may be installed in either planter or vehicle areas. In vehicular areas the unit shall be constructed as to provide H-20 load capabilities. In all cases the installation site shall provide and ensure ease of access, maintenance, and visual inspection and will be provided with a hinged locking hatch.
   c. Install a manhole where the grease interceptor or oil/water separator discharges into the City’s sanitary sewer for monitoring purposes or at an upstream location approved by the City. If physical conditions preclude the installation of a monitoring manhole on the City main, Developer may install, with prior City approval, an Inspection Chamber as manufactured by Pacific North Marketing Ltd., Abbotsford, British Columbia or approved equal.
   d. Provide a cleanout/inspection tee between the building and the grease interceptor. Locate tee 3 to 5 feet from the building in an accessible location for maintenance equipment.
   e. Install in strict conformance with the manufacturer’s instructions. Install unit on a 6-inch layer of compacted gravel base. Grade the base material to provide uniform bearing.
H. Generators

Sewer pump stations and other appurtenances which require power at all times shall have a generator installed. The generator should have the quiet package enclosure with either Cummins power or be Kohler with John Deere power. The City shall approve the generator prior to installation.

I. Pump Stations

1. General

Except where otherwise indicated, the following sections are intended to be consistent with Ecology's "Criteria of Sewage Works Design."

Except where provided otherwise, Submersible Sewerage Pump Station (SSPS) construction details, workmanship, and materials shall be in accordance with the latest edition of "Standard Specifications for Road, Bridge, and Municipal Construction" prepared by the Washington State Chapter of the American Public Works Association.

The SSPS's operational components shall be located at an elevation that is not subjected to the 100-year frequency storm flood, an associated wave action, or shall be otherwise adequately protected as certified by a professional engineer registered in the State of Washington.

Final acceptance of the completed SSPS shall include approval of all construction and testing by the City Inspector, providing the City Engineer with three (3) copies of the SSPS facility’s Operation and Maintenance Manual and providing the following spare parts:

- 2 each – all gaskets and O-rings
- 2 each – all bearings
- 1 each – mechanical seal
- 2 each – oil seals inboard
- 2 each – oil seals outboard
- 1 each – SCADA Modem

Provide one (1) additional pump for a duplex submersible system and two (2) additional pumps for a triplex submersible system. Provide one set of spare parts for each pump of the same model. The set of spare parts shall be as recommended by the manufacturer. The spare parts shall be packed in a hinged wooden box with hasp and clearly labeled for contents.

2. Site Work

The driving area into the SSPS and the area within the SSPS contained within the fencing shall be paved with asphalt and shall support vehicles with a gross vehicle weight of 50,000 pounds.
All SSPS sites shall have a minimum of one (1) manual switch with a minimum of two (2) LED fixtures for night visibility at the control panel. No lighting shall be installed inside the SSPS wet well.

At minimum, a 6-foot chain link fence with locking 16 foot wide double swing access gate and locking single access swing gate shall be provided around the SSPS.

Landscaping shall be on the outside of the fence to screen the site. Any planting shall be low maintenance and approved by the City's Planning Department.

A ¾ inch non-freeze post hydrant shall be provided on site with approved backflow prevention assembly and Hotbox (120V AC with freeze protection and rigid support.)

3. Pump Station
The design capacity of a SSPS shall be computed on the basis of the total area and projected population that can be served by the SSPS (based on the most current zoning projections.) Method of calculation shall be consistent with Criteria for Sewage Works Design.

SSPS design shall include provisions for operating and maintaining the facilities without needing to comply with confined space entry requirements.

At minimum, a duplex submersible sewerage pump system shall be required. Regardless of the number of pumps, one (1) spare pump shall be provided. The pumps shall be designed to fit actual flow conditions and must each be capable of handling the expected maximum peak sewage flow.

Where three (3) or more pump units are provided, they shall have the capacity that with any one unit out of service, the remaining units will have capacity to handle the maximum peak sewage flow.

Submersible pumps shall be readily removable and replaceable without dewatering the wet well or requiring personnel to enter the wet well. Other pump units at the same stations shall continue to be operable while one pump is serviced. Pump unit lifting devices shall be included in the design and shall be fabricated from Grade 316 Stainless Steel.

Pumps shall be capable of passing spheres of at least 3-inches in diameter. Pump suction and discharge openings shall be at least 4-inches in diameter.
Emergency on-site generators (provided with built-in diagnostics) are required at all SSPS facilities. Emergency power equipment shall be provided to ensure continuous operability for a minimum of 48 hours. See Section 12.4.H.

The design of the submersible SSPS shall provide for a “lead pump” cycle time of no more than six cycles per hour during peak wet weather flow design conditions, and no less than one cycle per hour during minimum dry weather flow design conditions.

4. Piping and Control Facilities
   Electrical control equipment shall be housed above ground level, in an enclosed structure. The cabinet door should face away from prevailing winds if possible. Lighting in the control cabinet shall be LED.

   Motor controller cabinet shall be mounted in an outer weather-tight enclosure.

   Each control panel shall have a “Hand-Off-Auto” selector switch to select the modes of station operation.

   For each pump there shall be:
   • Combination circuit breaker/overload unit providing overload protection.
   • Short circuit protection.
   • Reset and disconnect for all phases.
   • Across the line magnetic contactor.
   • 120 volt AC control power transformer.
   • Overload relay to be precalibrated to match motor characteristics.
   • Thermal overtemp relay and thermal overtemp reset pushbutton, each factory sealed to insure trip setting is tamperproof.
   • Elapse time meter that will count the time the pump magnetic starter is engaged. The time shall count in hours and tenth of an hour. Pump cycles shall also be metered.

   Variable frequency, variable-speed drive units for the pumps shall be arranged to control the pumps such that the pumping rate will match the in-flow rate.

   Variable frequency, variable speed drive wet well level indicator shall provide continuous level monitoring throughout the intended operational range of the wet well.

   Discrete level sensors shall only be used for non-variable speed drive and pump station assemblies. Level sensors shall be either ball float or submersible transducer with high and low level float backup.
An alarm system shall be provided for all pumping stations. Alarm system activation shall be required for high water, low water, line loss, pump failure, gas leak, power failure, generator run, generator failure and control panel intrusion. Consideration of telemetry alarm to 24-hour monitoring station alarms to duty personnel should be given when reliability classification or the potential for property damage warrants it.

All SSPS's shall be connected to the City's Sewer SCADA, with one (1) spare modem provided as mentioned above. The City's sole source vendor (TSI) will be required to perform all integration and SCADA programming.

If wet well ventilation is required, the ventilation may be either continuous or intermittent. Continuous ventilation systems shall provide at least 12 complete air changes per hour. Intermittent ventilation systems shall provide at least 30 complete air changes per hour.

Odor control requirements, if any, shall be evaluated by the design engineer, but will be determined by the City Engineer on a case by case basis.

Odor control equipment shall be enclosed in an above grade structure within the pump station site.

Suitable devices for measuring sewage flow should be provided at pumping stations with flow capacity greater than 1.0 mgd. Hour and cycle meters (totalizers) shall be installed on all pumps unless otherwise approved by the City Engineer.

All control valves and check valves on the discharge line for each pump shall be placed in an adjacent accessible location outside the wet well in separate vault and be protected from weather and vandalism.

Control valves and piping shall be designed to prevent backflow through the inactive piping, and to allow isolation and removal of inactive valves or equipment.

The City Engineer may require additional or specialty valves such as air cushion swing check valves, ball check valves, electric check valves, rotary ball valves, and surge relief valves, as needed for special conditions.

5. General – Materials
   The developer shall submit information from the material manufacturer or fabricator showing that the materials meet the requirements of the design and pertinent specifications. The developer shall provide submittals to the City Engineer on all materials to be used.
6. Site Work - Materials
   
   Foundation Material shall meet the requirements of Section 9-30-17, Class B, of the Standard Specifications for Road, Bridge, and Municipal Construction.

   Bedding for Rigid Pipe: unless approved otherwise for special cases, bedding material for rigid pipes shall confirm to Standard Specifications for Road, Bridge, and Municipal Construction Standard Section 9-03.15.

   Bedding for Flexible Pipe: unless approved otherwise for special cases, bedding material for flexible pipes shall conform to Standard Specifications for Road, Bridge, and Municipal Construction Section 9-03.16.

   Crushed Surfacing Top Course: imported crushed surfacing top course shall meet the requirements of Section 9-03.9(3) of the Standard Specifications for Road, Bridge, and Municipal Construction.

   Bank Run Gravel for Trench Backfill: bank run gravel for trench backfill shall conform to Section 9-03.19 of the Standard Specifications for Road, Bridge, and Municipal Construction.

   Control Density Fill: control density fill material (CDF) shall be composed of Portland cement, aggregate, fly ash, and water and shall conform to the following requirements:

   Portland Cement; ASTM C 150, Types I or II.

   Aggregate; sand with or without fine gravel, maximum size 1 inch. Aggregate shall be free of foreign material, roots, clay balls, trash, debris, and organics and shall have less than 15% finer than the No. 200 sieve. Material passing the No. 40 sieve shall be non-plastic.

   Water (potable)

   Fly ash; Class F ASTM C 618, unless otherwise approved.

   Admixture; as necessary to develop flowability without segregation.

   CDF shall be proportioned to be a flowable, nonsegregating, self-consolidating, low shrink slurry with an unconfined compressive strength as specified below. The mix design shall be prepared for a range of aggregate gradations that are expected to be used. The Developer and its supplier shall determine the materials and proportions used to meet the requirements of these Specifications. The CDF mix for each strength class
shall meet the flowability, pumpability, and set time requirements for each design application.

No CDF shall be placed until the City Engineer has approved the mix design. The City Engineer’s approval of the mix design will be understood to indicate conditional acceptance. Final acceptance will be based on tests conducted on field installations for conformance with these Specifications.

With the City Engineer’s approval, the Developer may be allowed the option of processing the native sands for CDF aggregate. If the Developer elects to use onsite sands for producing CDF, Developer shall make its own determination as to the quantity of suitable sands and amount of processing required and shall bear all costs associated with using native materials.

Class 100 CDF shall have an unconfined compressive strength at 28 days of 100 psi, per ASTM D 4832, (+50 psi, -2 psi). Maximum density 125 pcf.

Class 300 CDF shall have an unconfined compressive strength at 28 days of 300 psi, per ASTM D 4832, (+100 psi, -50 psi). Maximum density 125 pcf.

Class 1000 CDF shall have an unconfined compressive strength at 28 days of 1,000 psi, per ASTM D 4832, (+100 psi, -50 psi). Maximum density pcf.

Concrete thrust blocks for pressure force mains shall be Class B concrete poured in place, per City Standard Details.

7. Pump Station
Wet well shall be of precast or cast in place reinforced concrete or stainless steel construction. The wet well floor shall be sloped to the pump suction to minimize grit accumulation. The wet well shall be water tight.

Motors shall be explosion proof and designed for 240/480 volts, 3 phase and single phase protection. Motor shall be nonoverloading at all points of pump curve. Motors shall be specified which allow unsubmerged operation for extended periods of time.

Wear rings shall be provided for both the impeller and the suction of each pump. Wear rings shall be removable.

All bearings shall be rated in accordance with USASI B3.11 for a continuous (24 hours/day) duty life of not less than 50,000 hours at the worst condition of service.
The pump shaft shall be sealed against leakage by a double mechanical seal installed in a bronze seal housing constructed in two sections with registered fit.

Pump shafts shall be stainless steel ANSI 431.

All metal parts in wet well shall be aluminum or stainless steel. Metal outside the wet well shall be aluminum, stainless steel or hot dipped galvanized following fabrication.

Hatches shall be rectangular aluminum, Bilco style or approved equal. Hatches shall work with the pump rails in the wet well to provide unobstructed removal of pumps. Hatches shall have hasp type locking mechanism.

All underground vaults shall be a minimum of 2-inches above finished asphalt grade and paved/tack sealed at vault edge.

8. Piping and Control Facilities

Pump control panel for submersible pump station with no control room shall be a NEMA 4 enclosure mounted on a pedestal above ground and shall have a metal roof supported by its own structural base. Panel door shall face away from prevailing winds to minimize water entering the enclosure and shall be a minimum of 10 feet from the fence to minimize vandalism. There shall be a heater strip to prevent condensation accumulation in the enclosure. All other components of the pump station shall be below ground.

All electrical and control cabinets shall have intrusion alarms on doors with a sixty (60) second delay.

There shall be an outer watertight enclosure to house the motor controller cabinet. Enclosure shall have inside lighting.

All wire shall be copper, and all conduits shall be galvanized and rigid.

All components within the pump station system, including both internally and face-mounted instrumentation and devices, shall be clearly identified with phenolic name plates of black background with white letter.

Valve vaults shall be precast or cast in place concrete with drains.

Ductile iron pressure pipe shall conform AWWA C 151 Class 50 shall be cement mortar lined, push-on joint, or mechanical joint. Joints for ductile iron pipe shall be rubber gasketed conforming to the requirements of AWAA C 111.
Fittings for ductile iron pressure pipe shall meet the requirements of AWWA C 110 or AWWA C 153. Fittings shall also be cement mortar lines, meeting the requirements of AWWA C 104.

Polyvinyl chloride (PVC) pressure sanitary sewer pipes shall meet the requirements of AWWA C900, Class 200, DR14. PVC pipe shall have the same outside dimensions as ductile iron pipe.

Joints for PVC pressure pipe shall be push-on type meeting the requirements of ASTM D 3139 using a restrained rubber gasket conforming to ASTM F 477. Solvent welded pipe joints are not permitted.

Pressure pipe transition couplings, reducing couplings, transition-reducing couplings, and flexible couplings shall be compression type, constructed with ductile iron sleeves and ductile iron followers. Bolts and nuts shall be ductile iron. Factory finish shall be the standard of the manufacturer. Couplings shall be Romac, Smith-Blair or approved equal.

Check valves 2 inches or larger, unless otherwise approved by the City Engineer, shall be iron body, brass trimmed, swing type, balanced, external spring loaded, with a clear opening equal to or greater than the connecting pipe. The spring and lever shall be with extra heavy duty stainless-steel shaft and keys.

Isolation valves shall be eccentric plug resilient seat epoxy coated gate valves with full opening ports and shall have synthetic rubber coated, valve plugs with stainless steel seats and driptight shutoff with pressure in either direction.

Eccentric plug valves 6 inches and smaller shall be lever operated. Larger valves shall have totally enclosed worm gear operates with handwheel, operating nut, or chainwheel as required.

Air release valves shall be for sewage and designed to prevent clogging due to solids in the fluid. The float and ball shall be constructed of stainless steel and attached to a stainless steel lever mechanism with an external shaft. Buna-N, or approved equal, seat shall be attached to the lever mechanism for drop-tight closure.

All new pump stations requiring chlorine odor control shall use hypochlorite odor control systems.

Non-freeze post hydrants shall be Zurn, Model Z-1385 (3/4-inch), or approved equal.
9. **General - Installation**  
   The Developer shall complete the proposed sanitary sewer construction in accordance with the approved construction drawings, details, specifications, state requirements, and local regulatory requirements. The Developer shall implement the runoff and erosion control plan that was approved by the City Engineer.

   The Developer shall provide all materials, labor, and equipment necessary to shore trenches to protect the work, existing property, utilities, pavement, etc., and to provide safe work conditions in the trench. The Developer may elect to any combination of shoring and overbreak, tunneling, boring, sliding trench shield, or other method of accomplishing the work consistent with applicable local, state and federal safety codes.

   The Developer shall furnish, install, and operate all necessary equipment to keep excavation above the foundation level free from water during construction, and shall dewater dispose of the water so as not to cause injury to public or private property or nuisance to the public. Sufficient pumping equipment in good working condition shall be available at all times for emergencies, including power outage, and shall have available at all times competent workers for the operation of the pumping equipment.

   All existing sewer lines shall be kept in service at all times. Provision shall be made for disposal of sewage flow if any existing sewers are damaged. Damage to existing sewers shall be repaired by the Developer to a condition equal to or better than their condition prior to the damage. Water accumulating during construction shall be removed from the new sewers but shall not be permitted to enter the existing system. The Developer shall be responsible for flushing out and cleaning any existing sewers, into which gravel, rocks, or other debris has entered as a result of the work, and shall repair lift stations or other facilities damaged by the work at the Developer’s expense.

   The physical connection to any existing manhole or sewer shall not be made until authorized by the City Engineer. Such authorization will not be given until all upstream lines have been completely cleaned and tested.

   Excavation for a precast concrete wet well shall be sufficient to leave 1 foot clearance between the wet well outer surface and the earth bank. Excavation for a cast in place concrete wet well shall allow enough space for form work.

   The wet well shall be set in place or formed on a prepared foundation material with a minimum thickness of 6 inches, or thicker as per the design engineer. Before the wet well is set in place or formed, the foundation material shall be carefully leveled and compacted to a minimum of 95% compaction to provide full bearing for the entire base section.
Backfill with bank run gravel for trench backfill material shall be placed in loose lifts of 10 inches maximum thickness and compacted to at least the percentage of the maximum dry density as shown on the approved plans (as determined by ASTM D 1557).

For cast in place and precast concrete wet wells, pipes, castings, or conduits shall be placed in the forms before pouring concrete wherever possible. Alternatively, knock-out panels or sleeves shall be designed into the structure. If an unanticipated wall penetration is required, a core drill installation will be acceptable on an exception basis.

PVC pipe connections to the wet well shall be made with a rubber gasketed coupling or sand collar which can be mortared directly into the manhole to provide a watertight seal. Ductile iron pipes shall be mortared directly to the wet well wall, or installed with modular mechanical seal assemblies with stainless steel bolts and nuts, as required to provide a water tight seal.

Bedding of the class or classes of pipes shown on the plans shall be installed in accordance with the City Standards. Bedding shall provide a uniform support along the entire pipe barrel, without load concentration at joint collars or bells. Bedding disturbed by pipe movement or by removal of shoring or movement of the trench shield or box shall be reconsolidated prior to backfill.

Bedding shall be placed in more than one lift, the first lift is to provide at least 4 inches of bedding under any portion of the pipe and shall be placed before the pipe is installed, and shall be spread smoothly so that the pipe is uniformly supported along the barrel. Subsequent lifts of the not more than 6 inches thickness shall be installed to a depth of 6 inches over the crown of the pipe. Each lift shall be compacted to 90% of maximum density as determined by ASTM D 1557. Densities shall be determined by the sand-cone method, ASTM D 1556 or by nuclear methods, ASTM D 2922.

Concrete thrust blocks for pressure mains shall be placed at bends, tees, dead ends, and crosses. Concrete thrust blocks shall bear against solid undisturbed earth at the sides and bottom of the trench.

Pipe zone backfill for rigid pipe shall be imported crushed surface top course or control density fill. However, pipe zone backfill material where depth of trench (pipe invert to finish grade) exceeds 24 feet deep shall be CDF.

Pipe zone backfill for flexible pipe shall be the same as the bedding material.

Upon completion of work, the Developer shall remove all shoring unless indicated otherwise on the approved plans or as directed by the City Engineer. Damages resulting
from improper shoring or failure to shore shall be the sole responsibility of the Developer.

All electrical and controls shall be furnished and installed in accordance with the applicable Federal, State and local codes and standards including but not limited to the following:

- National Electrical Code (NEC)
- Occupational Safety & Health Act (OSHA)
- National Electrical Safety Code (NESC)
- National Electrical Manufactures Association (NEMA)
- Underwriters Laboratory (UL)
- Insulated Power Conductor Engineering Association (IPCEA)
- American National Standards Institute (ANSI)
- Institute of Electrical & Electronic Engineers (IEEE)

10. General - Testing

The completed pump station shall be given an operational test of all equipment for leaks in all piping and seals, and for correct operation of the automatic control system and all auxiliary equipment. Developer shall conduct preliminary tests and be assured that the section to be tested is in an acceptable condition before requesting the City Inspector to witness the test.

The pump suction and discharge shall be coupled to a reservoir, and the pumps shall recirculate water for at least one hour under simulation service conditions.

The hydrostatic pressure test method is required for force mains and fittings.

If any sanitary sewer installation fails to meet the requirements of the test method used, the Developer shall repair or replace all defective materials or workmanship at no expense to the City.

Final testing for City acceptance is required after backfill has been completed and all other utilities have been installed.

Only after final testing and acceptance by the City Engineer is the pump station allowed to pump sanitary sewage into the City System.

11. Hydrostatic Pressure Test

All force mains shall be tested in sections of convenient length to a hydrostatic pressure of 150 PSI in excess of operating pressure but in no case less than 200 PSI.
The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Developer shall furnish and install temporary blocking and remove it after testing.

A positive displacement pump shall be furnished by the Developer for the testing. Feed for the pump shall be from a container wherein the actual amount of “makeup” water can be measured.

The pipe section to be tested shall be filled with water and allowed to stand under pressure to allow venting of air at all high points and the lining of the pipe to absorb water.

The test shall be accomplished by pumping pipe section up the required pressure, stopping the pump for 60 minutes, and then pumping the main up to the test pressure again.

The quantity of water lost from the main shall not exceed the number of gallons per hour as determined by the formula:

\[ L = ND \times P = 7400 \]

\( L \) = Allowable leakage, gallons/hour
\( N \) = Number of joints in the length of pipeline tested
\( D \) = Nominal diameter of the pipe in inches
\( P \) = Average test pressure during the leakage test, PSI

### 12.5 Standard Specifications for Construction

#### A. General

This document outlines the general and specific construction requirements for sanitary sewer systems operated and maintained by or for the City of Port Orchard (City). All references to the City shall mean the City Engineer or his/her authorized representative.

1. **Standard Specifications**

   In general, all construction activities and material specifications shall conform to the latest City adopted edition of:

   a. City’s Design Standards for Sewer Extensions.
   
   b. Applicable City of Port Orchard rules, regulations, ordinances, and standards.

d. Standards of the American Sanitary Sewer Works Association, latest revision.

e. Rules and regulations of the State Board of Health regarding the health aspects of Public Sanitary Sewer Systems, WAC 246-290, latest revision.

f. Recommendations of the manufacturer of materials or equipment.

2. Permits and Licenses

The applicant/contractor shall acquire the required permits for construction within public rights of way. The Developer and/or his engineer shall provide and complete all necessary forms and submit to the County/City/State agencies with the applicable fees. All construction shall conform to the requirements of the right of way permits.

3. Pre-Construction Conference

The City will schedule a pre-construction conference with the applicant, Contractor, and affected County/City/State agencies prior to start of construction. The contractor shall submit the following to the City at the pre-construction conference:

a. Material submittals

b. Safety and traffic control plan, if needed

c. Copies of all necessary city, county, and state permits necessary for the conduct of the work. No work will be allowed to proceed without the necessary permits.

d. Evidence of insurance with the City named as additional insured in accordance with the Developer Extension Policies. An endorsement to the insured’s policy will be considered as evidence of insurance.

4. Submittal and Shop Drawings

In accordance with the City’s Technical and Standard Specifications, applicants or their contractor shall submit a list of all brands, sizes, types, grades, and standard materials to be used. The City may reject certain brands and will provide approval, disapproval, and/or comment by letter.

a. Submittal data for each item shall contain sufficient information on each item to determine if it is in compliance with the Agreement requirements. Items that are installed in the work that have not been approved through the submittal process shall be removed and an approved product shall be furnished, all at the Developer’s expense. Shop drawing review will be limited to general design requirements only, and shall not relieve the Developer from responsibility for errors or omissions, or
responsibility for consequences due to deviations from the Agreement documents. No changes may be made in any submittal after it has been reviewed except with written notice and approval from the City Engineer prior to implementation. Shop drawings shall be submitted on 8½” x 11,” 11” x 17,“ or 22” x 34” sheets and shall contain the following information:

i. Project Name

ii. Prime Developer and Applicable Subcontractor.

iii. City’s Name.

b. Submittals that do not comply with these requirements may be returned to the Developer for re-submittal. Acceptable submittals will be reviewed as promptly as possible, and transmitted to the Developer not later than 10 working days after receipt by the City Engineer. Revise and submit as necessary.

c. Submittals shall contain the following information for all items:

i. Equipment drawings, dimensions, and weights (lift stations only).

ii. Catalog information.

iii. Manufacturer’s specifications.

iv. Special handling instructions (lift stations and pumps only).

v. Maintenance requirements (lift stations and pumps only).

vi. Wiring and control diagrams (lift stations and pumps only).

d. Specific submittal requirements are listed in each section of these specifications.

5. Substitutions

The approved Developer Extension Contract, construction plans, and City technical and standard specifications shall be followed. No deviations will be allowed without request for change and approval in writing from the City Engineer or designee. The City reserves the right to order changes, which conform to the City’s standard specifications; in the event conditions or circumstances are discovered during construction, which indicate changes are prudent. The applicant shall be notified in writing of any changes. Such changes will be mutually accepted.

Deviations from standard locations and/or approved plans must be documented, receive prior written approval by the City Engineer, and be accompanied by accurate record drawings.
6. Site Control
   a. The Contractor shall be responsible for surveying and staking and will stake out the locations of the permanent easements, temporary easements, rights-of-way, and all major facilities shown on the Plans and permits.
   b. Replace all damaged survey monuments in accordance with RCW 332-120.

7. Waste Material Control
   a. Adhere to all requirements of federal, state, and local statutes and regulations dealing with pollution. Permit no public nuisances.
   b. Use only dump sites that are approved by the regulatory agency having jurisdiction and present proof of approval upon request. Obtain any and all permits required by regulatory agencies.
   c. At all times, keep the construction area clean and orderly and upon completion of the work, restore all work or equipment storage areas to their original condition. Remove all miscellaneous unused material resulting from the work and dispose of it in a manner satisfactory to the City.
   d. The Contractor shall follow all requirements and guidelines of the Puget Sound Air Pollution Control Agency and other associated agencies.
   e. Use water sprinkling, temporary enclosures, or other methods to limit dust and dirt from rising and scattering in the air. Surface water runoff that is contaminated with site debris, silt, or other material that adversely affects water quality shall be collected and cleaned prior to discharge.
   f. Do not use water to control dust when it may create hazardous or objectionable conditions such as ice formation, flooding, or pollution.

8. Spill Response
   The contractor shall prepare a spill response plan for the site and provide a copy to the City Engineer. The contractor shall maintain a current copy of the approved spill response plan on site at all times and provide the any updates to the City Engineer as they occur. All necessary materials and equipment necessary to respond to spills shall be kept readily available on site.

9. Erosion Control
   The contractor shall prepare an erosion control plan for approval by the regulatory agency. The contractor shall maintain a copy of the approved erosion control plan on site at all times.

10. Construction Notification
    Contractors shall notify the City Engineer a minimum of 48 hours in advance of construction, to facilitate project coordination and notification of affected property owners.
11. Construction Shutdowns

   a. Construction under this Agreement may involve replacement or modification of the existing sewer system, which must continue to provide service to all buildings and homes during construction. Connections and service changes must be programmed to provide the least possible interruptions of service.

   b. A Sanitary Sewer Shutdown Agreement must be completed by the Contractor if a connection to an existing system involves temporary suspension of the sanitary sewer service. The contractor shall notify the City Engineer at least five (5) days in advance of any required shutdowns so that affected customers may be notified. City personnel will notify properties affected by the shutoff.

   c. Prior to any shutdown, all traffic control, materials, fittings, supports, equipment, and tools shall be on the site and all necessary labor scheduled prior to starting any connection work. In general, shutdowns shall not exceed four hours in duration unless specifically authorized by the City Engineer.

   d. The Contractor may be required to install and maintain temporary water and/or sewer mains and service connections to all houses and other buildings affected by frequent service disruptions caused by construction activities. Installation and maintenance of temporary facilities will be at the Contractor’s expense. All temporary piping and connections shall be approved by the City Engineer and disinfected as specified herein before being put into service.

   e. All work under this Agreement shall be conducted in a manner that will minimize shutdowns, open roadways, or traffic obstructions caused by construction. Shutdowns causing damage to adjacent public and private property shall be the sole responsibility of the Contractor.

   f. Planned utility service shutdowns shall be accomplished during periods of minimum use. In some cases this will require night or weekend work. In such instances, the Developer/Contractor will be required to pay overtime inspection fees.

   g. Coordinate all work so that service will be restored in the minimum possible time, and cooperate with the City in reducing shutdowns of the utility system to a minimum.

   h. No utility interruption will be permitted without the prior approval of the City. Any unauthorized tampering with the sanitary sewer system is subject to fines.

12. Connection to Existing Systems

   a. Connections to existing sewer mains shall not be made without first completing the necessary arrangements with the City. Work shall not be started until all traffic control, materials, equipment, and labor necessary to properly complete the work are assembled on the site. Once work is started on a connection, it shall proceed continuously, without interruption, and as rapidly as possible until complete. No
shut-off of mains will be permitted overnight, over weekends, or during weeks with holidays.

b. Contractors shall acquaint themselves with all aspects of existing systems prior to starting construction on new mains. Pertinent information concerning existing systems may be obtained from City personnel and may be verified from City records. Contractors shall locate existing sewer mains and service lines prior to beginning work so they may be properly protected and maintained in service during construction.

c. Taps or new extension connections from existing mains must be made in the presence of designated City personnel. No taps or connections are to be made without designated City personnel being present.

d. Only City personnel are permitted to operate valves on the certified potable water side of a line, including emergencies, unless personnel safety is threatened. Exposing a potable water line during construction without the City Engineer’s concurrence will result in a penalty being imposed.

13. Work on Non-City Rights-of-Way

a. Work on a state highway, county road, street or any other right-of-way not owned by the City, shall conform to the requirements of the authority having jurisdiction over such right-of-way. Contractors are responsible for notifying the proper authorities and acquiring permits before beginning work on a right-of-way. Contractors will ascertain restoration requirements and determine that schedules of operations proposed are satisfactory to applicable authorities. Work will not be permitted to proceed without evidence of having obtained the required permits.

b. When city streets, SR 160 or SR 166 within City Limits, are involved, the Contractor must coordinate all trenching and restoration activities with the City Engineer and WSDOT. Open cuts must be approved by the City Engineer.

c. When county roads are involved, the Contractor must coordinate all trenching and restoration activities with the Kitsap County Department of Public Works and the City. Open cuts must be approved by the Kitsap County Department of Public Works.

14. Traffic Maintenance

Contractors shall conduct work so as to interfere as little as possible with public travel. Required traffic control shall be in place prior to commencement of work. Access for firefighting equipment shall be provided at all times, and Contractors shall keep the local fire protection authorities informed of the location of construction operations and fire lanes. Contractors shall also notify the authorities in charge of any municipal, private, or school transportation system at least 48 hours in advance of road closures that will force a change in the regular routing of the transportation system. Contractors shall also provide and
maintain suitable detour routes for the system. Road closures will not be allowed without written permission from the City Engineer, except verbal permission may be used in an emergency. Work which involves State, County road or City streets rights of way shall be restricted to the hours between 8:00 AM and 4:00 PM, and no work shall be allowed in such right-of-way on Saturdays, Sundays, or holidays unless authorized by the City Engineer.

15. Safety

Contractors will be solely and completely responsible for conditions at job sites, including safety of all persons and property during the performance of work. This requirement will apply continuously and not be limited to normal working hours.

16. Inspection Requirements

a. Unless previously authorized by the City Engineer, work on sewer mains shall not proceed without a City Inspector being present. The City may refuse acceptance of any sewer mains installed without a City inspection. To permit scheduling an inspector, the City Engineer must receive a hard copy of the construction schedule at least two full working days before construction activities covered by the schedule begin. The City must be kept advised of changes to the construction schedule. When significant breaks in construction occur, the Contractor must give two working days notice before resuming work. The inspector shall have authority to reject defective material and to suspend any work that is not conducted in accordance with the City’s Technical Standards and Specifications.

b. All mains shall be inspected by the City Inspector before closure of any excavation. Inspectors will have access to work sites as necessary to keep the City informed of the progress of the work and the manner in which it is being done, to keep records, to act as liaison between the Contractor and the City Engineer, and to report any deviations from Plans or Specifications. Failure of the Inspector to call the attention of a Contractor to faulty work or deviations from the Plans or Specifications shall not constitute acceptance of said work.

c. Any personal assistance, which an Inspector may give a Contractor, will not be understood as the basis of any assumption of responsibility in any manner, financial or otherwise, by the Inspector, the Engineer, or the City.

d. The presence or absence of an Inspector on any job will be at the sole discretion of the City Engineer. Such presence or absence of an Inspector will not relieve a Contractor of responsibility to deliver the construction results specified in the Agreement documents.

e. City Inspectors will not be authorized to issue instructions or to approve or accept any portion of the work which is contrary to the Plans and Specifications. Approvals, acceptances, or instructions, when given, must be in writing and signed by the City Engineer or his/her designated representative. Inspectors will have authority to reject defective material. The failure of an Inspector to reject defective material or
any work which deviates from the Agreement documents will not constitute acceptance of such work.

f. Kitsap County may have an inspector on site when working on County rights-of-way.

17. Overtime and Holiday Work

Should a Contractor elect to work more than eight hours per day, or more than five days per week or on holidays during the course of a project, all costs of resulting City overtime/holiday engineering and inspection will be charged to the Contractor at 2.5 times the normal rates.

18. As-Constructed and Warranty Records

a. Prior to final acceptance of the work by the City, the Developer shall deliver a complete set of acceptable as-constructed records to the City Engineer. Drawings shall be made on clean, unmarked prints of the project, and the final submittal shall include the following:

i. Electronic AutoCADD files, version 2009 or earlier;

ii. a digital format such as “pdf” or “tif” of the record plans on CD (2 Copies)

b. The Developer shall provide as-constructed information on all items and work shown on the plans showing details of the finished product including dimensions, locations, outlines, and changes. The information must be in sufficient detail to allow City personnel to locate, maintain, and operate the finished product and its various components.

B. Site Work

1. General

This division covers the work that is necessary for providing materials and performing all site work as called for on the approved plans.

2. General Construction Procedures

a. Standards

Construction procedures shall be in full accordance with the City’s Standard Specifications for Sanitary Sewer Main Construction and the most recent edition of Washington State Department of Ecology’s Criteria for Sewage Works Design.

Certain other referenced standards used in this specification are from the latest editions of:

i. DOE    Washington State Department of Ecology

ii. UBC    Uniform Building Code

iii. UPC    Uniform Plumbing Code

iv. UMC    Uniform Mechanical Code
v. NEC National Electrical Code
vi. AWWA American Sanitary sewer Works Association
vii. ANSI American National Standards Institute
viii. ASA American Standards Association
ix. ASTM American Society for Testing and Materials

b. Contractor

All main extensions shall be installed by a Contractor approved by the City.

3. Submittals

Submittal information shall be provided to the City for the following items:

a. Erosion and Sedimentation Control Plan
b. Erosion Control Fence Fabric
c. Dewatering Plan
d. Shoring Plan and Calculations
e. Dump Site Permits
f. General Fill
g. Structural Fill
h. Pipe Bedding
i. Trench Backfill
j. Gravel Base Course
k. Crushed Surfacing
l. Paving
m. Compaction Test Results
n. Hydro-seed

4. Erosion and Sedimentation Control

a. All erosion/sedimentation control systems including fencing, earth berms, grasses, straw, mulch, culverts, drain pipe, outfalls and other items required for this project, are the responsibility of the Developer and fall under the jurisdiction of Kitsap County or the City of Port Orchard (depending on the location of the extension).

b. All erosion/sedimentation control (ESC) systems specified in the approved erosion control plan must be installed prior to commencing any work that could result in off-
site storm water or material flows. Erosion/sedimentation controls must remain in place throughout the duration of the construction activities.

c. The Contractor shall add additional ESC facilities or processes as necessary to ensure that erosion and sedimentation problems do not occur. The Contractor shall inspect the ESC facilities daily and maintain the systems as necessary to prevent off-site drainage.

5. Dewatering

a. The Developer is to determine the scope, type, size, quantity, method of installation, operation, and removal of the dewatering system necessary to keep all excavations dewatered to an elevation below the base of the excavation. The system shall also be sufficient to stabilize the soils in the excavation and the surrounding areas, and to prevent flotation of partially completed structures.

b. The Contractor shall control groundwater and surface water to prevent the softening of the bottom of excavations, or formation of quick conditions or boils during excavation. Groundwater shall be lowered to 3 feet below the base of the excavation at all times. Determination of unsuitable soil conditions for supporting the improvements shall be reviewed by the Contractor’s site engineer and approved or denied by the City Engineer. When the dewatering system does not meet the specified requirements, and as a consequence there is a loosening or disturbance of the foundation soils, instability for the slopes, or damage to the foundation or structures occur, the Developer shall at its own expense repair said disturbance. This shall include supplying all materials, labor, and equipment, and perform all work required for the restoration of foundation soil, slopes, or structure to the satisfaction of the City Engineer.

c. It is solely the Developer’s and the Contractor’s responsibility to meet all regulatory requirements governing the disposal of dewatering flows and to prevent damage to adjacent property. Disposal of these waters into existing City sewer mains or trunk lines is strictly prohibited. Drainage of water through the pipeline under construction is also prohibited.

d. All dewatering wells installed by the Contractor shall be removed and backfilled in accordance with applicable Federal and State regulations.

6. Construction Access

The Contractor shall provide temporary site access for City personnel and shall maintain vehicular site access at all times.

7. Clearing and Grubbing

Clearing and grubbing shall be performed by the Contractor to remove and dispose of unwanted debris, vegetative matter, and other items noted on the construction drawings
8. Excavation

a. The Contractor shall excavate as necessary to construct the improvements shown on the construction drawings. Excavation includes utility excavation, structural excavation, and grading excavation.

b. Grading excavation shall be to the finished rough grade of the roadway or easement and shall be completed prior to utility excavation. Grade staking, when required, will be done by the developer’s/owner’s engineer, or surveyor, prior to installation of the mains.

c. Utility excavation shall be performed to the depths necessary to complete the construction work shown. Utility excavation shall be performed in accordance with the WSDOT Standard Specifications, Section 2-09, with a minimum cover of 36 inches.

d. The base of the excavation shall be examined by the City Engineer to determine if it is suitable for backfilling. The City Engineer will evaluate the stability of the base of excavation by determining if all significant organic soils or other unsuitable materials have been removed. The Contractor per direction of the City Engineer shall perform excavation required by the City that is beyond the depth shown at their expense.

e. All excavated material shall be removed from the site unless approved as backfill material by the City Engineer. Weather conditions may make previously excavated material unsuitable for backfill requiring the material to be removed from the project site. Approval of material as backfill will be made just prior to placement of material as backfill.

f. If the trench soil is unsuitable for trench backfill, as determined by the Inspector, the Contractor shall remove and dispose of unsuitable material and backfill the trench with approved backfill. The Contractor will keep the City Engineer informed of the disposal site of all unusable material removed from the project. New or refuse material must not be dumped on neighboring properties.

g. Excavation within City right of way areas shall be in accordance with the City of Port Orchard Public Works Right of Way Permit.

9. Shoring

Where shoring, sheet piling, sheeting, bracing, lagging, or other supports are necessary to prevent cave-ins or damage to existing structures, it shall be the responsibility of the Contractor to design, furnish, place, maintain, and remove supports in accordance with applicable laws, codes, and safety requirements including Chapter 296-155 of WAC, A Safety Standards for Construction Work, Part N, Excavation, Trenching, and Shoring. Design, planning, installation, and removal of sheeting, shoring, piling, lagging, and bracing
shall be accomplished in such a manner as to maintain the undisturbed state of soil below and adjacent to excavation. Failure to maintain shoring in accordance with the submitted shoring plan will result in shut down of the job by the City Engineer until required shoring is in place.

10. Hazardous Content of Fill Material

All imported fill material shall be free of hydrocarbons (e.g., gasoline, diesel oil, etc.), pesticides, herbicides, and other hazardous volatile organic compounds (VOCs) and synthetic organic chemicals (SOCs). If required, the Contractor shall provide certification to the City Engineer that the fill is free of these chemicals.

11. General Fill

a. All fill required for this project that is not specifically defined as another type shall be “General Fill.”

b. General fill shall be free of organics, debris, and other deleterious materials. General fill shall conform to Section 9-03.10 “Aggregate for Gravel Base” of the WSDOT Standard Specifications. The moisture content of the material and weather conditions at the time of placement will be used to determine the suitability of native materials for backfill as general fill. All general fill shall be compacted in uniform layers not to exceed 8 inches in loose thickness and compacted to at least 95 percent maximum dry density based on the ASTM D-1557 test procedure.

12. Structural Fill

a. All fill placed below and against building components, building structures, vaults, manholes, handholds, slabs, sidewalks, and drives shall be “Structural Fill.”

b. Structural fill shall be free of organics, debris, and other deleterious and conform to Section 9-03.12 (2), “Gravel Backfill for Walls” of the WSDOT Standard Specifications. The City Engineer shall determine if native on-site materials are suitable for use as structural fill. The moisture content of the material and weather conditions at the time of placement will be used to determine the suitability of native materials for backfill as structural fill. Structural fill shall bear on a firm base and be placed in uniform layers not exceeding 8 inches in loose thickness. The backfill area must be free of standing sanitary sewer and the sub-grade soils must be stable. Each layer of structural fill shall be compacted to at least 95 percent of its maximum dry density based on the ASTM D-1557 test procedure.

13. Pipe Bedding

a. All fill placed below and around buried utilities shall be “Pipe Bedding.” Pipe bedding shall be placed when the trench base is deemed unsuitable by the City Engineer.

b. Bedding material shall surround the pipe and conduits to the limits shown on the construction drawings and provide uniform support along the entire length without
allowing concentrated loading at joints or bells. Bedding material shall conform to Section 9-03.12(3) of the WSDOT Standard Specifications. All bedding material shall bear on firm sub-grade and be compacted to at least 95 percent of maximum dry density based on the ASTM D-1557 test procedure.

14. Trench Backfill
   a. Unless the trench is backfilled with Control Density Fill, all fill material placed above the pipe bedding in a trench shall be “Trench Backfill.”
   b. Trench backfill shall be placed and compacted above the pipe bedding to finish grade elevations in un-restored areas or to sub-grade elevations in restored areas. Trench backfill shall consist of a well graded sand or sand and gravel mixture conforming to Section 9-03.12 (2), “Gravel Backfill for Walls” of the WSDOT Standard Specifications and have less than 5 percent passing the U.S. No. 200 sieve based on the fraction passing the ¾-inch sieve. Trench backfill shall bear on a firm base and be constructed in uniform layers not exceeding 8 inches in thickness. Each lift shall be compacted in uniform layers not to exceed 8 inches in loose thickness and compacted to at least 95 percent maximum dry density based on the ASTM D-1557 test procedure. The City Engineer shall determine if native on-site materials are suitable for use as trench backfill.
   c. Finished backfill shall leave all existing drainage ditches, culverts, and other appurtenances in a useable condition equal to or better than their original condition.

15. Gravel Base Course
   a. All fill placed under paving and next to native material shall be “Gravel Base Course.”
   b. Aggregate for gravel base course shall conform to Section 9-03.10 of the WSDOT Standard Specifications.

16. Gravel Top Course
   a. All fill placed under paving and next to paving material shall be “Gravel Top Course” or crushed surfacing.
   b. Aggregate for gravel top course shall conform to Section 9-03.09(3) of the WSDOT Standard Specifications.

17. Paving
   a. Cement concrete pavement, sidewalks, and curb shall be Class B concrete (3,000 psi) as specified in the concrete section of these specifications. Construction shall comply with Section 5-05 of the WSDOT Standard Specifications.
   b. Asphalt concrete pavement shall comply with Section 5-04 of the WSDOT Standard Specifications and the City of Port Orchard utility permit for the work. Finish, place, spread, and compact Class B asphalt concrete pavement to the thickness shown on
the construction drawings or specified in the utility permit. The minimum compacted thickness of asphalt concrete pavement shall be 2 inches.

c. All paving shall be inspected and approved by the agency issuing the utility permit.

18. Compaction Testing

a. The Contractor shall arrange, at his own expense, for in place density testing to be performed at intervals not less than every 500 linear feet of pipe run and where required by the City Engineer. At a minimum, density tests shall be performed at 50% of the trench depth and at the surface of the trench. Other depths of the trench may be required by the City Engineer.

b. The Contractor shall excavate to the depths required to perform the tests and shall provide sheeting, shoring, and bracing of the trench as necessary. Backfill, in all sections where density requirements are not satisfied, shall be removed from the trench, re-compact, and re-tested until conforming to specifications.

c. A certified independent testing laboratory acceptable to the City Engineer shall perform density testing. All test results shall be submitted directly to the City Engineer.

d. The City shall have the right, but not the obligation, to perform such additional density testing, as the City Engineer deems necessary. If the tests show that the density requirements are not satisfied, the Contractor shall reimburse the City for all costs for the tests, and shall remove the unsatisfactory backfill from the trench and re-compact and retest it until conformance with the specifications is obtained.

e. All compaction shall meet the approval of the agency issuing the utility permit.

19. Surface Restoration

a. Roads, driveways, shoulders, landscaping, and all other areas removed, broken, caved-in, settled, or otherwise damaged as a result of construction work, shall be repaired and/or resurfaced to match the existing surface or landscaped areas.

b. Existing shoulders and gravel surfaces shall be restored with like, crushed rock surfacing. Existing lawns shall be restored with sod after proper backfilling and settling. Existing landscaping, fences, mailboxes, ornamentation, etc., shall be restored as close to original conditions as possible. Private driveways, walks, and other surfaced areas shall be repaired, patched, or resurfaced as required to match the original surface condition.

c. Contractors shall furnish and install new asphalt surface at all locations where the existing asphalt surface or asphalt driveway has been removed or damaged by construction work. Trenches shall be backfilled with select granular material approved by the City Engineer. It shall be mechanically tamped to 95 percent compaction in six inch lifts. The top four inches shall consist of two inches of crushed surfacing top course and two inches compacted depth of asphalt concrete, Class B.
C. Concrete

3. General

This division covers that work necessary for furnishing and installing all concrete as described in these specifications and shown on the plans.

4. Submittals

Submittal information shall be provided to the City Engineer for the following items:

a. Concrete design and admixtures
b. Special placement procedures for hot or cold weather
c. Schedule of surface finishes
d. Control Density Fill design mix

Concrete performance mixes shall be submitted to the City Engineer for approval a minimum of two weeks prior to placing any concrete. The performance mix shall include the amounts of cement, fine and coarse aggregate, water and admixtures, as well as the water cement ratio, slump, concrete yield and substantiation strength data in accordance with ACI 318-95, Chapter 5. The use of a performance mix requires batch plant inspection, the cost of which shall be paid by the Contractor. Review of mix submittals by the City indicates only that information presented conforms generally to Agreement documents. Contractor or supplier maintains full responsibility for special performance.

5. Control Density Fill (CDF)

a. At least 10 days before placing CDF, the Contractor shall submit a mix design for the material to be used. The mix design shall include trial laboratory and testing data with cylinder breaks performed at 7, 14, and 21 days. The mix design shall be approved by the agency issuing the utility permit.

b. CDF shall be proportioned to be a non-segregating, free flowing, self-consolidating, low shrink slurry.

c. The Contractor and its supplier shall determine the materials and proportions used to meet the requirements of these Specifications. The mix design shall be prepared for the range of aggregate gradations that are expected to be used.

d. The unconfined compressive strength at 28 days shall be 200 psi (+50 psi) as per ASTM D4832.

e. Contain CDF in trench sections using bulkheads or fill materials to confine the flow of material. Take appropriate precautions to prevent pipe displacement and/or flotation.

f. CDF shall be placed in lifts not exceeding 6 feet in height, with a time interval of not less than 1 hour between lifts.

g. Provide steel plates to span trenches and prevent traffic contact if necessary. No traffic or construction equipment shall be allowed on CDF for at least 24 hours after
placement or until the material is hard enough to prevent rutting or damage. Work shall not proceed unless plates are on the jobsite.

6. Concrete Materials

a. Concrete shall be mixed, conveyed, and proportioned in accordance with UBC Section 1905. The performance mix shall include the amount of cement, fine and coarse aggregate, water, and admixtures as well as water cement ratio, slump, concrete yield, and sustaining strength data in accordance with these specifications, the minimum requirements of the currently adopted Uniform Building Code, Section 1905, and the requirements of ACI 318-99.

b. Materials shall conform to the following standards:

i. Cement: ASTM C-105

ii. Coarse Aggregate: ASTM C-33

iii. Fine Aggregate: ASTM C-33

iv. Admixtures: ASTM C-494

v. Air entraining Admixtures: ASTM-260

vi. Water used in concrete shall be potable.

vii. Fly ash may be substituted for up to 15% of the required cement.

c. Thrust Blocking, Driveways, and Sidewalks

a. Cement: ASTM C-105

b. Coarse Aggregate ASTM C-33

c. Fine Aggregate: ASTM C-33

d. Admixtures: ASTM C-494

e. 28 day strength: 3,000 psi minimum

f. Cement content: 5.5 sacks/CY minimum

g. Water/Cement ratio: 6 gals/95 lb sack maximum

h. Fine aggregate ratio: 45% max by weight

i. Coarse aggregate limits: 7/8 inch maximum

j. Entrained air ratio: 3% minimum to 5% maximum

k. Slump: 4 inches maximum

Provide concrete blocking at all fittings, and horizontal and vertical angle points. Conform to Standard Details for General Blocking, Vertical Blocks, and Deadman Blocking. All fittings
to be blocked shall be wrapped with 4-mil polyethylene plastic. Concrete blocking shall be properly formed with plywood or other acceptable forming materials and shall not be poured around joints. The forms shall be stripped prior to backfilling. All blocking must be inspected by the City Inspector prior to backfill.

The City does not use thrust blocks for fire hydrants. Each fire hydrant shall be secured with mega lugs. For mains crossing other pipes, the City will require additional restraints.

### D. Special Construction (Pipeline Casings)

1. **General**
   This division covers the boring and jacking of pipeline casings and the installation of carrier pipe.

2. **Submittals**
   Submit the following for review:
   a. Casing pipe drawings, details, and thickness calculations
   b. Carrier pipe placement method and equipment
   c. Utility crossing permits

3. **Quality Assurance**
   The boring contractor shall have regularly engaged in work of this nature for at least five years.

4. **Other Utilities**
   No other utilities are allowed to be placed inside the casing without the prior express written consent of the City Engineer and a satisfactory hold harmless Agreement.

5. **Casing Pipe**
   a. Provide welded steel pipe of the minimum diameter and thickness approved by the City Engineer. The casing ID shall be at least four inches larger than the carrier bell OD. Provide pipe of sufficient wall thickness and axial strength to withstand the forces encountered during the jacking operation, but in no case less than 3/8 inch. The casing shall be designed to withstand all imposed loads plus a corrosion allowance of 1/4 inch.
   
   b. Fabricate the pipe in conformance with ASTM A 252, Grade 2 except the hydrostatic test is waived. Provide tapped grout holes at the top of the casing at reasonable intervals. Install plugs in the tapped holes.

6. **Joints**
   Weld sections of casing pipe with a continuous circumferential weld. Provide stress transfer across the joints capable of resisting the jacking forces involved.
7. Casing End Seals
   Seals shall be 1/4-inch (minimum) thickness, pull on style end seals fabricated from EPDM synthetic rubber with stainless steel bands and clamps. End seals shall be as manufactured by PSI Industries or approved equal.

8. Carrier Pipe Skids
   Provide custom engineered skids/isolators to isolate the carrier pipe from the casing. The insulator shall consist of a PVC insulating liner (90 mil minimum thickness), 12-inch wide, 12-gauge (minimum) steel bands with steel risers and glass reinforced plastic or ultra-high molecular weight runners. The skids shall be designed to properly support the pipe filled with sanitary sewer. The runners shall be designed so that the carrier pipe joints clear the casing by two inches. The ferrous components of the insulator and steel bands shall be shop coated with a minimum of 10 mils PVC heat fusion coating. All miscellaneous hardware including stud bolts, washers, and nuts shall be 316 stainless steel. Skids shall center the pipe in the casing. Provide skids as manufactured by PSI Industries, Cascade Manufacturing Co., or approved equal.
   The minimum number of required skids is 3 per pipe length for the entire length of the casing.

9. Sand
   Unless specifically required by the City Engineer, sand shall not be used in a casing for filling between the casing and carrier pipe. In those instances where the City Engineer does require sand, it shall be clean and 90-100 percent will pass the No. 4 sieve. Not more than 5 percent will pass the No. 200 sieve. Sand shall be free from clay and organic material.

10. Casing Excavation and Installation
    Prior to installing the casing, thoroughly investigate the locations of existing utilities. The Contractor shall pothole the casing location to verify that there are no interferences.
    Equip the leading section of casing pipe with a jacking head securely anchored to prevent any wobble or variation in alignment during jacking operation. Make every effort to avoid loss of ground outside the jacking head. If excessive ground loss occurs, stop excavation and fill void with grout.
    The casing shall be installed in such a manner that it is not damaged or deflected to reduce its true circular diameter.

11. Tolerances
    A maximum horizontal and vertical tolerance of three inches per 100 linear feet of jacked casing is permitted.
12. Grouting

After jacking is completed, fill voids by pumping grout through grout holes in the casing at any locations of ground loss and elsewhere where voids are suspected. Plug grout holes after grouting. Take care to avoid over-pumping grout and disturbing the improvements the casing was jacked under.

13. Carrier Pipe

a. All pipe installed in casing shall have restrained joints.

b. Protect pipe as necessary during installation to insure against damage. Install the carrier pipe with the skids located not more than two feet from each end of the pipe joints. The skids shall be adequate in number to hold the pipe to grade, and not less than two skids shall be installed on each section of pipe. Provide skids within 6 inches of each end of the casing.

c. After installation and testing of the carrier piping, carefully fill the remaining space in the casing with pneumatically placed sand unless directed by the City Engineer to leave the casing unfilled. Take care to avoid floating the carrier pipe.

d. Install casing end seals and secure in place with stainless steel bands. Make seals watertight.
TRENCHES AND PIPE CONNECTIONS

SEWER TRENCH DETAIL

NOTES:
1) BED THE ENTIRE WIDTH OF THE TRENCH
2) PAVEMENT RESTORATION SHALL BE PER THE APPROPRIATE SECTION IN CHAPTER 6 (PAVEMENT SURFACING).

FILE NAME: TRENCHES AND PIPE CONNECTIONS A
DRAWING NUMBER: 1200.DWG
SCALE: NTS
REVISION DATE: 04/08/14
DRAWN BY: AAP
NOTE:

1. Use anti-seize compound on all threaded 316 S.S. nuts and bolts.
NOTES:
1. MATCH CROWNS OF SEWERS.
2. FOR CAST IN PLACE BASE, CONSTRUCT IN FIELD CHANNEL AND SHELF TO THE CROWN OF THE PIPE.
3. FOR PRECAST BASE, USE GRAVEL BACKFILL, 6" MIN. COMPACTED DEPTH UNDER THE BASE.
4. ALL RIGID PIPE ENTERING OR LEAVING THE MANHOLE SHALL BE PROVIDED WITH FLEXIBLE JOINTS WITHIN 1 1/2 PIPE DIAMETERS OF THE MANHOLE STRUCTURE.
5. INSTALL DROP MANHOLE CONNECTION IF INVERT OF ANY INCOMING SEWER IS MORE THAN 2'-0" ABOVE THE TOP OF THE MAIN SEWER.
6. IN UNIMPROVED AREAS AND EASEMENTS, MANHOLE SHALL EXTEND A MINIMUM OF 2" AND A MAXIMUM OF 4" ABOVE FINISHED GRADE.
7. MANHOLE RING AND COVER SHALL HAVE A CLEAR OPENING. WORDING ON COVER SHALL BE "SEWER" IN 3" RAISED LETTERS.
8. ALL MANHOLE JOINTS SHALL USE A CONFINED ROUND RUBBER GASKET MEETING ASTM C-443 SPECIFICATIONS.
MANHOLE DETAIL 72"

1. MATCH CROWNS OF SEWERS.
2. FOR CAST IN PLACE BASE, CONSTRUCT IN FIELD CHANNEL AND SHELF TO THE CROWN OF THE PIPE.
3. FOR PRECAST BASE, USE GRAVEL BACKFILL, 6" MIN. COMPACTED DEPTH UNDER THE BASE.
4. ALL RIGID PIPE ENTERING OR LEAVING THE MANHOLE SHALL BE PROVIDED WITH FLEXIBLE JOINTS WITHIN 1 1/2 PIPE DIAMETERS OF THE MANHOLE STRUCTURE.
5. INSTALL DROP MANHOLE CONNECTION IF INVERT OF ANY INCOMING SEWER IS MORE THAN 2'-0" ABOVE THE TOP OF THE MAIN SEWER.
6. IN UNIMPROVED AREAS AND EASEMENTS, MANHOLE SHALL EXTEND A MINIMUM OF 2" AND A MAXIMUM OF 4" ABOVE FINISHED GRADE.
7. MANHOLE RING AND COVER SHALL HAVE A CLEAR OPENING. WORDING ON COVER SHALL BE "SEWER" IN 3" RAISED LETTERS.
8. ALL MANHOLE JOINTS SHALL USE A CONFINED ROUND RUBBER GASKET MEETING ASTM C-443 SPECIFICATIONS.
MANHOLES C

TOP SECTIONS AND CHANNELIZATION

City of Port Orchard
Est. 1890

DRAWN BY: AAP

REVISION DATE: 04/08/14
SCALE: NTS
DRAWING NUMBER: 1222

18" MIN. (TYPE I SEE SPECS)

TOP SECTIONS AND CHANNELIZATION

GENERAL PLAN OF CHANNEL INTERSECTION

TYPICAL TOP SECTION

MANHOLE FRAME COLLAR
UNPAVED AREAS

FRAME AND LID
PER SPECIFICATIONS

FINISH GRADE IN PAVED AND GRAVEL ROADWAY AREAS

PRECAST GRADE RINGS

TOP OF CONE SECTION OR FLAT SLAB

FRAME AND LID
PER SPECIFICATIONS

FINISH GRADE

GROUT LAYER

#4 REBAR

GRADE RINGS

PRECAST ECCENTRIC CONE

FORMATION CONCRETE COLLAR FOR OUT OF PAVEMENT CONDITIONS

6" (MIN.)

3" TO 4"

GROUT

1" (MIN.)

12" (MAX.)

24"

12"
MANHOLES D

MANHOLE DETAIL - SADDLE

EX. SANITARY SEWER

CONCRETE SUPPORT BLOCKS UNDER MANHOLE RISER AND PIPE (TYP)

NEW SANITARY SEWER

PLAN VIEW

CONCRETE SUPPORT BLOCKS

KNOCK-OUT SECTION
(12" MIN. FOR 8" SEWER FILL WITH NON-SHRINK GROUT AFTER CONNECTION)

ROUGHEN SURFACE, APPLY EPOXY ADHESIVE BONDING COMPOUND

8" (MIN.)

CONCRETE CAST IN PLACE ALONG WITH SHELF AND CHANNEL

MANHOLE SECTION

CONCRETE CAST IN PLACE ALONG WITH SHELF AND CHANNEL

GRAVEL BASE

(6" MIN. COMPACTED DEPTH)

CONCRETE SUPPORT BLOCKS

CAST IN PLACE CONCRETE SHELF AND CHANNEL

18" (MIN.)

5'-4" OR 5'-6"

12" (MIN.)

12" (MIN.)
SAFETY STEP

#8 GALV. DEFORMED REBAR

LENGTH AS REQUIRED

12" TYP.

#7 GALV. SMOOTH STEEL

4' MAX AS REQUIRED

2' RADIUS

LADDER TO HANG FROM MANHOLE STEP

#8 GALV. DEFORMED REBAR

9 1/2"

1 3/4"

1 3/8"

1 1/4"

1/8"

1/2"

1/2"

1/2"

3/4"

3/4"

3/4"

3/4"
CONCRETE BLOCK PLAN

SECTION

NOTES:
1. WHEN FLOW TURNS IN TO ENTER THE MANHOLE EXTEND DROP PIPE AND ANGLE IN DIRECTION OF TURN.
2. GROUT OPENING WHERE PIPE ENTERS THE MANHOLE TO SEAL FOR WATER TIGHT.

PVC PIPE
DUCTILE IRON PIPE
TRANSITION COUPLING

3/4" DI FLANGE
WITH 316 SS BOLTS AND NUTS

FIRM BEDDING

DUCTILE IRON PIPE AND FITTINGS AS SPECIFIED (TYPICAL)

BACKFILL MATERIAL AS SPECIFIED

MANHOLE WALL

MANHOLE BASE

CDF BEDDING

NOTES:
1. WHEN FLOW TURNS IN TO ENTER THE MANHOLE EXTEND DROP PIPE AND ANGLE IN DIRECTION OF TURN.
2. GROUT OPENING WHERE PIPE ENTERS THE MANHOLE TO SEAL FOR WATER TIGHT.
MANHOLES G

FORCE MAIN INSIDE DROP/RECEIVING MANHOLE

LOCATION OF FRAME AND COVER

SLOPE TO DRAIN

FORCE MAIN

GRAVITY SEWER

PLAN

ILLUSTRATIVE SECTION

CORROSION RESISTANT MANHOLE STEP (AS SPECIFIED)

TEE (D+2"xD)

FLEXIBLE COUPLING

FABRICATE DROP STRUCTURE PIPING (AS SPECIFIED)

PIPE SUPPORT (SEE DETAIL 1227)

FILL CONCRETE

GRAVEL BASE (6" MIN.)

90° ELBOW
2"x1/4" (MIN.) STAINLESS STEEL STRAPS

STAINLESS STEEL ANCHOR, NUTS AND WASHERS (TYP)

CONCRETE MANHOLE

1/2" SELF DRILLING ANCHORS

PLAN

3/8"∅ (MIN.) STAINLESS STEEL NUTS, BOLTS AND LOCK WASHERS (TYP)

ROUND OR CHAMFERED CORNER (TYP)

SECTION

2" MIN. (TYP.)

FORCE MAIN DROP CLIP SUPPORT
LATERALS AND SERVICE CONNECTIONS

TYPICAL HOUSE SEWER LATERAL

1) ALL CONSTRUCTION REQUIRES A PERMIT AND INSPECTION PRIOR TO COMMENCEMENT AND BEFORE BACKFILL.

2) SEWER LATERALS SHALL BE LAYED IN A STRAIGHT LINE BETWEEN BENDS. CHANGES IN LINE AND GRADE SHALL BE MADE BY BENDS OR WYE FITTING.

3) SEWER LATERALS SHALL BE LAID AT MINIMUM GRADE OF 2% (1/4" PER FOOT) AND MAXIMUM GRADE OF 100% (1' PER FOOT) UNLESS PRIOR APPROVAL IN WRITING IS OBTAINED FROM THE CITY ENGINEER.

4) CONNECTING DOWNSPOUTS AND AREA DRAINS TO THE SEWER SYSTEM IS PROHIBITED AND WILL RESULT IN FINES.

CLEANOUTS ARE REQUIRED FOR LATERALS EXCEEDING 100 FT., AT ANY BEND EXCEEDING 1/8" BEND (45°) AND WITHIN TEN (10) FT. OF A BUILDING FOUNDATION.

6) FROM MAIN TO CLEANOUT AT PROPERTY LINE SHALL BE 6" PIPE FROM PROPERTY LINE CLEANOUT TO BUILDING SHALL BE 4" FOR SINGLE FAMILY RESIDENCE AND 6" FOR DUPLEX.

7) CLEANOUTS ARE REQUIRED EVERY 100 FEET OR PORTION THEREOF AT ALL CHANGE OF DIRECTIONS AND AT THE PROPERTY LINE.

LEGEND:
1. 4" PVC SEWER PIPE, SDR 35, ASTM D3034
2. 2 WAY CLEANOUT
3. 4" 45° BEND
4. 4" PLUG, BRING TO SURFACE
5. SOIL PIPE — MINIMUM OF 2 FT BEYOND BUILDING FOUNDATION
6. RUBBER RING ADAPTER — SOIL PIPE TO SEWER PIPE

PROPERTY LINE

36" MIN. CLEAR
18" MIN. DEPTH

6" CAP

6" TWO-WAY CLEANOUT ASSEMBLY

ADDITIONAL SERVICE (IF NEEDED)

6" SIDE SEWER

BUILDING (SINGLE-FAMILY RESIDENCE OR DUPLEX)

5"

1240.DWG

FILE NAME:
DRAWING NUMBER
SCALE
REVISION DATE
DRAWN BY
City of Port Orchard
Est. 1890
LATERALS AND SERVICE CONNECTIONS B

SINGLE SERVICE CONNECTION

NOTE:
CONNECT ALL SERVICE CONNECTIONS 8" AND LARGER AT MANHOLE.
DETAILS TO BE APPROVED BY CITY ENGINEER.

INSTALL LOCATOR WIRE ON ALL LATERALS TO THE SEWER MAIN
LATERALS AND SERVICE CONNECTIONS C
DOUBLE SERVICE CONNECTION

NOTE:
CONNECT ALL SERVICE CONNECTIONS 8" AND LARGER AT MANHOLE. DETAILS TO BE APPROVED BY CITY ENGINEER.

EXTEND THE LATERAL BEYOND THE PROPERTY LINE AND UTILITIES.
INSTALL LOCATOR WIRE ON ALL LATERALS TO THE SEWER MAIN.

6" SERVICE CONNECTION PIPE, SLOPE AT 1/4" PER FT. (MIN.)

6" WYE FOR SECOND LATERAL FOR DOUBLE SERVICE CONNECTION (IF REQUIRED)

6" TWO-WAY CLEANOUT ASSEMBLY

6"x4" ECCENTRIC REDUCER

4" SEWER LATERAL

PROPERTY LINE

FIRST PIPE LENGTH 3'-0" (MAX.)

GRAVITY SEWER

6" SERVICE CONNECTION LATERAL

PIE ED BY AAP
REVISED DATE: 04/08/14
SCALE: NTS
DRAWING NUMBER: 1242

FIBERGLASS VALVE BOX AND COVER, CARSON INDUSTRIES OR APPROVED EQUAL

PROPERTY LINE

6" CLEANOUT

6" SERVICE CONNECTION PIPE

PIPE BEDDING MATERIAL AS SPECIFIED

6" SERVICE CONNECTION WYE FITTING

4" SEWER LATERAL

WYE FOR LATERAL SERVICE CONNECTION

6" TWO-WAY CLEANOUT ASSEMBLY

6"x4" ECCENTRIC REDUCER
NOTES:
1) PROVIDE SOLID COPPER TRACE WIRE (NO. 10 MIN.) WRAPPED ALONG LENGTH OF SERVICE CONNECTION LATERAL AND MARKER.
2) STENCIL "SEWER" ON LOCATING PIPES AND DEPTH TO INVERT IN 2" HIGH LETTERS.
NOTES:
1. IF NOT PERMANENT END OF SEWER, USE TYLOX GASKET OR APPROVED EQUAL, AND SECURE WITH #8 WIRE PIN THRU HOLES DRILLED IN HUB. IF PERMANENT END OF SEWER USE MORTAR TO SECURE PLUG.
2. IF INSTALLATION OCCURS IN UNPAVED AREA USE CONCRETE ANCHOR AS SHOWN FOR ASPHALT PAVING AND BACKFILL TO TOP OF CAST IRON RING WITH SOIL.
3. RESTORATION SHALL BE IN ACCORDANCE WITH CHAPTER 6.
4. TRENCH BACKFILL SHALL BE COMPACTED AND TESTED IN ACCORDANCE WITH STANDAD SPECIFICATIONS.
CLEANOUTS B
FORCE MAIN CLEANOUT

24" MANHOLE FRAME AND COVER PER SPECIFICATIONS

316 STAINLESS STEEL BLIND FLANGE WITH 3/4" STAINLESS STEEL HALF COUPLING

POLYETHYENE PIPE FLANGE

FLOW

PLUG VALVE WITH SLIP TYPE VALVE BOX (TYP)

45° ELBOW

THRUSt BLOCK

3/4" STAINLESS STEEL BALL VALVE AND CAMLOCK QUICK CONNECT (DIXON OR APPROVED EQUAL)

GRADE RING

2" THICK CONC. COLLAR

3/4" 316 STAINLESS STEEL BALL VALVE AND CAMLOCK QUICK CONNECT (DIXON OR APPROVED EQUAL)

24" CLASS V RCP RISER

24" RCP RISER

CONCRETE ENCASMENT

EPOXY COATED DUCTILE IRON WYE, (NOT NEEDED ON END OF LINE CLEAN OUT), SIZE AS REQUIRED

CONCRETE COLLAR

GRAVEL BASE

6"

THRUST BLOCK

UNDISTURBED NATIVE SOIL

SLIP TYPE VALVE BOX

NON-SHRINK GROUT IN KNOCKOUT

45° ELBOW

FLOW

PLUG VALVE WITH 3/4" 316 STAINLESS STEEL HALF COUPLING

VALVE COVER MARKED "SEWER"

24" MANHOLE FRAME AND COVER PER SPECIFICATIONS

316 STAINLESS STEEL BLIND FLANGE WITH 3/4" STAINLESS STEEL HALF COUPLING

POLYETHYENE PIPE FLANGE

FLOW

PLUG VALVE WITH 3/4" 316 STAINLESS STEEL HALF COUPLING

VALVE COVER MARKED "SEWER"

24" MANHOLE FRAME AND COVER PER SPECIFICATIONS

316 STAINLESS STEEL BLIND FLANGE WITH 3/4" STAINLESS STEEL HALF COUPLING

POLYETHYENE PIPE FLANGE

FLOW

PLUG VALVE WITH 3/4" 316 STAINLESS STEEL HALF COUPLING

VALVE COVER MARKED "SEWER"

24" MANHOLE FRAME AND COVER PER SPECIFICATIONS

316 STAINLESS STEEL BLIND FLANGE WITH 3/4" STAINLESS STEEL HALF COUPLING

POLYETHYENE PIPE FLANGE

FLOW

PLUG VALVE WITH 3/4" 316 STAINLESS STEEL HALF COUPLING

VALVE COVER MARKED "SEWER"

24" MANHOLE FRAME AND COVER PER SPECIFICATIONS

316 STAINLESS STEEL BLIND FLANGE WITH 3/4" STAINLESS STEEL HALF COUPLING

POLYETHYENE PIPE FLANGE

FLOW

PLUG VALVE WITH 3/4" 316 STAINLESS STEEL HALF COUPLING

VALVE COVER MARKED "SEWER"

24" MANHOLE FRAME AND COVER PER SPECIFICATIONS

316 STAINLESS STEEL BLIND FLANGE WITH 3/4" STAINLESS STEEL HALF COUPLING

POLYETHYENE PIPE FLANGE

FLOW

PLUG VALVE WITH 3/4" 316 STAINLESS STEEL HALF COUPLING

VALVE COVER MARKED "SEWER"

24" MANHOLE FRAME AND COVER PER SPECIFICATIONS

316 STAINLESS STEEL BLIND FLANGE WITH 3/4" STAINLESS STEEL HALF COUPLING

POLYETHYENE PIPE FLANGE

FLOW

PLUG VALVE WITH 3/4" 316 STAINLESS STEEL HALF COUPLING

VALVE COVER MARKED "SEWER"

24" MANHOLE FRAME AND COVER PER SPECIFICATIONS

316 STAINLESS STEEL BLIND FLANGE WITH 3/4" STAINLESS STEEL HALF COUPLING

POLYETHYENE PIPE FLANGE

FLOW

PLUG VALVE WITH 3/4" 316 STAINLESS STEEL HALF COUPLING

VALVE COVER MARKED "SEWER"

24" MANHOLE FRAME AND COVER PER SPECIFICATIONS

316 STAINLESS STEEL BLIND FLANGE WITH 3/4" STAINLESS STEEL HALF COUPLING

POLYETHYENE PIPE FLANGE

FLOW

PLUG VALVE WITH 3/4" 316 STAINLESS STEEL HALF COUPLING

VALVE COVER MARKED "SEWER"

24" MANHOLE FRAME AND COVER PER SPECIFICATIONS

316 STAINLESS STEEL BLIND FLANGE WITH 3/4" STAINLESS STEEL HALF COUPLING

POLYETHYENE PIPE FLANGE

FLOW

PLUG VALVE WITH 3/4" 316 STAINLESS STEEL HALF COUPLING

VALVE COVER MARKED "SEWER"

24" MANHOLE FRAME AND COVER PER SPECIFICATIONS

316 STAINLESS STEEL BLIND FLANGE WITH 3/4" STAINLESS STEEL HALF COUPLING

POLYETHYENE PIPE FLANGE

FLOW

PLUG VALVE WITH 3/4" 316 STAINLESS STEEL HALF COUPLING

VALVE COVER MARKED "SEWER"
Chapter 13
CONSTRUCTION CONTROL AND INSPECTIONS

13.1 General
   A. Call Before You Dig
   B. Basis for Control of the Work

13.2 Materials
   A. Control of Materials
   B. Sub-Grade

13.3 Testing
   A. Embankment and Cut Section Compaction
   B. Density Testing

13.4 Traffic Control
   A. Interim Traffic Control
   B. Temporary Street Closures and Detours
   C. Haul Routes

13.5 Inspections
   A. Subdivision, Commercial and Right-of-Way Land Use Inspection
   B. City Forces and City Contract Street Inspection
   C. Penalties for Failure to Notify for Land Use Inspection

13.6 Record/As-Built Drawings
   A. Record Documents
13.1 General

A. 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: (800) 424-5555 should be prominently displayed on the work site.

B. Basis for Control of the Work

Work performed in the construction or improvement of City streets or private property shall be completed in accordance with these Standards and approved plans and specifications. No work may be started until such plans are approved by the City Engineer. Any revision to such plans shall be approved by the City Engineer before being implemented.

The City Engineer is authorized to enforce these Standards, as well as other referenced or pertinent specifications. The City Engineer will appoint project engineers, assistants, and inspectors as necessary to inspect the work and they will exercise such authority as the City Engineer may delegate.

Provisions of Section 1-05 of the WSDOT Standard Specifications shall apply, with the term “Engineer” therein construed to be the City Engineer as defined in Appendix B (Definitions & Glossary of Terms).

1. The developer is ultimately responsible for quality control and the assurance that construction of streets, drainage facilities and appurtenances are in compliance with these Standards, the approved plans and specifications, and the applicable portions of the WSDOT Standard Specifications through independent construction inspection and materials testing.

2. The City’s Construction Inspector, acting on behalf of the City Engineer, may make random visits to the construction site. These random visits are to ensure a quality construction inspection process and do not express nor imply approval or disapproval of the contractor’s work. The City Inspector shall have access to all construction inspection records, mark-ups and reports.

13.2 Materials

A. Control of Materials

All materials provided by the contractor shall be subject to inspection and approval by the City Inspector 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 City Inspector.
The City Inspector has the authority to reject defective material and suspend work that is being done improperly. The City Inspector may advise the Developer/Contractor of any faulty work or materials; however, failure to advise does not constitute acceptance or approval, nor does it shift liability to the City. At the City Inspector's order, the Developer/Contractor shall immediately remedy, remove, replace, or dispose of unauthorized or defective work or materials, and bear all the costs of doing so.

1. **Source of Supply and Quality of Materials:** The Developer/Contractor shall notify the City Engineer of the proposed sources of supply for all materials to be furnished. The City Engineer shall approve the source of supply of each material before delivery. Representative preliminary samples and/or test data of the character and quality prescribed may be required to be submitted for review by the City Engineer.

2. **Only materials conforming to the requirements of the WSDOT Standard Specifications shall be used in the work, unless otherwise approved by the City Engineer.** 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 a source of supply does not furnish a uniform product, the contractor shall furnish approved materials from other approved sources. Any approved materials that become unfit shall not be used.

3. **Samples and Tests:** At the direction of the City Engineer, the Developer 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. Upon request, the Developer/Contractor shall furnish samples of all materials to the City Engineer. Materials shall not be used until approved.

4. **The City Engineer shall be furnished certified copies of the complete test reports, directly from the testing laboratory.**

**B. Sub-Grade**

In preparing the roadbed for surfacing, prior to any paving, the appropriate requirements outlined in Section 2-06 of the WSDOT Standard Specifications shall be met. After the sub-grade preparation has been completed, it shall be thoroughly checked by the Developer/Contractor using a level, string line, crown board, or other means to determine that the sub-grade conforms to the approved street section cross-slope or special plan conditions, prior to placing any base or surfacing material.

### 13.3 Testing

The provisions of Section 2-03 of the WSDOT Standard Specifications apply in all respects to development construction, unless otherwise instructed by the City Engineer. The following elements are mentioned for clarification and emphasis:
A. Embankment and Cut Section Compaction

1. Compaction of the top two feet of fill sub-grade and top six inches of cut sub-grade shall meet a minimum 95 percent of maximum density in accordance with WSDOT Standard Specifications Section 2-03.3. Sub-grade fill below the top two feet shall be compacted to 90 percent of maximum density.

2. Any embankment inaccessible to large compacting equipment shall be compacted with small mechanical or vibratory compactors. Controlled Density Fill (CDF), in accordance with Section 2-09.3 of the WSDOT Standard Specifications, shall be used in areas that are difficult to reach with any type of compaction equipment. The moisture content of the material shall not vary more than 3% above or below optimum, as determined by the tests described in WSDOT Standard Specification Section 2-03.3.

B. Density Testing

1. Prior to placing any surfacing material within the right-of-way, it will be the responsibility of the Developer/Contractor to provide density test reports reviewed and approved by a professional engineer and accepted by the City Inspector. Optimum moisture content and maximum density shall be determined by methods cited in Section 2-03.3 of WSDOT Standard Specifications or by other test procedures approved by the City Engineer.

2. Compaction reports are required for all projects. The reports will include a description of the individual test locations and/or a sketch, when deemed necessary by the City Inspector. Compaction testing shall be accomplished as backfill or embankment construction progresses. At a minimum, compaction tests are required at the following locations and intervals, and where required by the City Inspector:

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

   b. Trench lines: One test shall be performed and one additional test every 100 feet of trench length and at depths up to 50 percent of trench depth. Compaction of laterals or service line trenches shall be tested where directed by the City Engineer.

   c. Street and shoulder sub-grade: At 50 foot intervals.

   d. Curb and gutter (sub-grade and crushed surfacing): At 150 foot intervals.

   e. Crushed surfacing: At 100 foot intervals, and within each lane, as applicable.

   f. Sidewalk, walkways or bikeways (sub-grade and crushed surfacing, as applicable): At 150 foot intervals.

   g. Utility and drainage structures: One test shall be performed for every 2 feet of backfill, unless CDF is used.

   h. Hot Mix Asphalt (HMA): A minimum of five density tests per 400 tons, or portion thereof.
i. Lot grading and embankment: A minimum of one test shall be taken at the approximate half width of every lot and on each lift of embankment.

3. For work to be accepted, compaction tests must show consistent uniform density across the total width of the embankment or backfill, as required by the tests referenced above.

4. Where compaction tests do not meet the minimum standard density, corrective action shall be taken, such as adding water, aerating, replacing material and/or applying more compaction effort, as directed by the Developer’s Engineer. Retests shall show passing densities prior to placing the next lift of material.

13.4 Traffic Control

A. Interim Traffic Control

1. Interim Traffic Control: The Developer/Contractor shall be responsible for interim traffic control during construction on or along traveled City streets. When street or drainage work is to be performed on City streets that are open to traffic, the Developer/Contractor will be required to submit a traffic control plan for approval by the City prior to beginning the work. For work to be performed on or adjacent to SR 166 or SR 160, the traffic control plan will require the additional approval by WSDOT.

2. Traffic control shall follow the guidelines of Section 1-07.23 of the WSDOT Standard Specifications. All barricades, signs and flagging shall conform to the requirements of the currently adopted MUTCD Manual. Signs must be legible and visible and should be removed at the end of each work day if not applicable after construction hours.

B. Temporary Street Closures and Detours

When temporary street closures cannot be avoided, the Developer/Contractor shall post “To Be Closed” signs a minimum of five days prior to the closing. The types and locations of the signs shall be shown on an approved detour plan. A detour plan must be prepared and submitted to the City Engineer at least 10 working days in advance, and approved prior to posting and closing any City street. In addition, the Developer/Contractor must notify, in writing, local fire, school, law enforcement authorities, Metro transit, and any other affected persons as directed by the City Engineer at least five days prior to closing.

C. Haul Routes

1. If the construction of a proposed development is determined by the City Engineer to require special routing of large trucks or heavy construction equipment to prevent impacts to surrounding streets, residences or businesses, the Developer/Contractor shall be required to develop and use an approved haul route.
2. When required, the haul route plan must be prepared and submitted to the City Engineer and approved prior to beginning or continuing construction. The haul route plan shall address routing, hours of operation, approximate number of daily trips and total trips, signage and flagging, and daily maintenance.

3. If the Developer/Contractor’s traffic fails to use the designated haul route, the City Engineer may prohibit or limit further work on the development until such time as the requirements of the haul route are complied with.

4. Haul Route Agreement: When identified as a need by the SEPA review process or by the City Engineer, a Haul Route Agreement shall be obtained by the franchised and non-franchised utility, developer or property owner establishing restoration procedures to be performed upon completion of the haul operation.

### 13.5 Inspections

#### A. Subdivision, Commercial and Right-of-Way Land Use Inspection

1. On all street and drainage facility construction, proposed or in progress, which relates to subdivision, commercial and/or right-of-way development, control and inspection will be monitored by the City Inspector. The Inspector has enforcement authority when standards and requirements of the Site Development Permit are not met.

2. Prior to any critical tasks being started, the Developer/Contractor shall contact the City Inspector, with proper advanced notification, based on the following criteria:
   
   a. Pre-Construction Conference
      
      i. Five working days prior notice
      
      ii. A pre-construction conference shall precede any site construction and shall be attended by the City Engineer, City Inspector, Contractor, design engineer, utilities, and other affected parties. Plan approvals and permits from other agencies must be in hand prior to the conference. With all pre-construction requirements satisfied, the conference will end with the issuance of the SDAP Permit. No site work shall commence prior to issuance of the SDAP Permit.
   
   b. Clearing and Temporary Erosion/Sedimentation Control: One working day prior notice. Initial site work typically involves clearing and/or the installation of temporary erosion and sedimentation control BMP’s. Such work to be in accordance with Chapter 9 (Surface Water Management) and the approved plans.
   
   c. Utility and Storm-Drainage Installation: One working day prior notice. Trenching and placing of storm sewers and underground utilities, such as sanitary sewer, water, gas, power, telephone, and TV lines, shall follow Chapter 10 (Franchise Utilities).
d. Utility and Storm Drainage Backfill and Compaction: One working day prior notice. Backfill and compaction of underground utilities and storm sewers shall follow Section 2-09.3 of the WSDOT Standard Specifications.

e. Sub-grade Completion: One working day prior notice. Inspections shall be scheduled for the stage that underground utility and/or storm drainage installation is complete and inspected, and street grading is complete. Inspections will include compaction tests and certifications, as described in Chapter 10 (Franchise Utilities).

f. Crushed Surfacing Placement: One working day prior notice. Inspections shall be scheduled to check placement and compaction of crushed surfacing top course and/or base course, placed on completed and inspected sub-grade. Inspections will include compaction tests and certifications in accordance with Chapter 3 (Land Development Permits) and the Standard Details.

g. Non-Structural Concrete Forming (curb, gutter, sidewalk, etc.): One working day notice. Inspections shall be scheduled to verify sub-grade compaction, proper forming and preparation prior to pouring concrete, in accordance with Chapter 5 (Driveways, Sidewalks, Curbs, and Trails).

h. Non-Structural Concrete Placement and Finish (curb, gutter, sidewalk, etc.): One working day prior notice. Inspections shall be scheduled to check placement and finish of concrete facilities, as specified in Chapter 5 (Driveways, Sidewalks, Curbs, and Trails) and in the Standard Details.

i. Paving: Three working days prior notice. Inspections shall be scheduled for the stage where placement and completion of the sub-grade, crushed surfaced placement and/or curb and gutter is complete and already inspected. A pre-paving meeting is required a minimum of 24 hours prior to beginning placement of asphalt and shall be attended by the general contractor, paving contractor, and City Inspector. Inspections will include compaction tests and certifications, at the Contractor/Owner’s expense, in accordance with Chapter 6 (Pavement Surfacing) and the Standard Details.

j. Structural: Three working days prior notice. Inspections shall be scheduled at each critical stage, such as placing foundation piling or footings, placement and assembly of major components, and completion of structure and approaches. Tests and certification requirements will be as directed by the Building Official. Call the Department of Community Development at (360) 874-5533 to schedule an inspection.

k. Final Construction Inspection: 2 working days prior notice. A final inspection meeting shall be scheduled between the general contractor and the City Inspector for an overall check of the completed street or drainage facilities, including paving and associated appurtenances and improvements, cleaning of the drainage system, and all necessary clean-up and restoration. Prior to approval of construction work,
acceptance for maintenance and release of construction performance bonds, the developer shall pay any required fees, submit any required maintenance and defect financial guarantees, provide a certificate of monumentation, provide a letter from any other utilities in the project site that installation was completed properly, and receive approval of the record plans.

I. Final Maintenance Inspection: 30 days prior to the end of the maintenance period. The City Inspector will perform the final maintenance inspection and determine if the facility meets the standards in effect at the time of project approval. Prior to release of the maintenance guarantee, there shall be successful completion of the maintenance period as described in Section 2.5 (Bond Requirements), repair of any failed facilities and the payment of any outstanding fees.

B. City Forces and City Contract Street Inspection

Street construction performed by City forces or by contract for the City will be inspected under the supervision of the City Engineer.

C. Penalties for Failure to Notify for Land Use Inspection

Timely notification by the Developer, as noted above, is essential for the City to verify through inspection that the work meets the standards. Failure to notify in time may oblige the City to arrange appropriate sampling and testing after-the-fact, with certification, by a professional engineer. Costs of such testing and certification shall be borne by the Developer.

If the test results conclude that the unauthorized work does not meet the standards, the contractor will be required to remove the unauthorized materials and replace with materials that meet the standards, at the Developer's expense. At the time that such action is directed by the City Engineer, the City Engineer may prohibit or limit further work on the development until all directed tests have been completed and corrections made to the satisfaction of the City Engineer. If necessary, the City may take further action as set forth in the Port Orchard Municipal Code.

13.6 Record/As-Built Drawings

A. Record Documents

Record plans are a final record of what was actually installed, and include all deviations or changes from the approved plans. During construction, the developer, general contractor, design engineer and/or surveyor should record any changes to an approved plans set to assist in preparation of the record documents. Record plans shall exhibit the same degree of detail as the approved construction drawings. Plan criteria shall be:
1. All relevant improvement sizes, diameters, elevations, depths, dimensions, and materials specified on the approved street and drainage plans must be checked by a licensed engineer/surveyor in the field during and/or after construction.

2. All substantive differences shall be added to a set of the approved street and drainage plans for review and approval by the City Engineer.

3. The preferred format for record information is to draw a line through the design elevation, length, slope, etc., then add the record value in a bolder, larger or italicized font. The intent is to emphasize the record information while leaving the original design information for reference.

4. Remove insignificant information, such as clouding, pre-developed contours where post-developed grades are shown, plan view hatching, etc. The intent is to show the record information clearly and concisely, without additional distracting information.

5. All stormwater detention/retention volumes shall be surveyed, calculated and clearly noted as “Calculated Record Volumes” on the record drawings.

6. The following statement shall be added to the record drawings, and stamped and signed by the design engineer or surveyor preparing the documents:

   “I have reviewed the construction and to my knowledge find it to be in substantial conformance with the approved plans and specifications, except as noted.”

7. A spreadsheet shall be prepared providing the state plane coordinates and surface elevations (NAVD 1988) for all drainage structures, sewer manholes, water valves, utility vaults, survey monuments within the right-of-way, all dedicated drainage tracts, and easements.

8. One set of bond (paper) record plans, of the original size (typically 24”x 36”), consisting of the cover sheet and those sheets with record information, shall be submitted to the City Engineer for review. Additional information or supporting documentation may be required by the City Engineer, prior to acceptance of the record documents and release of any applicable performance bonds.

9. The final submittal of the record documents shall include two compact disks containing the relevant AutoCAD files in 2014, PDF files of each record plan sheet and the spreadsheet of all structures and utilities.