Development Guidelines & Improvement Standards

Version 2.0

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(See Appendix 5 for revision history)

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Section 1. Introduction

1-1 Introduction

Implemented: 09/11/2001 Revised: 09/11/201

These development standards have been prepared to assist you in understanding the requirements of the Public Works Department and to provide the basis for consistent design standards and policies. The Public Works Department is responsible for the construction, operation and maintenance of public facilities that include: transportation facilities, domestic water distribution systems, sanitary sewer systems, and stormwater runoff quantity and quality management.

This manual addresses the standards for construction of streets, alleys, water systems, sanitary sewer systems, stormwater facilities, erosion and sediment control and traffic management facilities. These standards are to be incorporated in all designs and proposals for facilities that will be placed in the public right-of-way and owned, operated, and maintained by the City of Bellingham.

Many of the standards, tables, graphs and diagrams contained herein are self-explanatory in their basic presentation. The contents in this manual related to design should not, however, be perceived as a "cookbook approach" to accomplishing engineering designs. The City of Bellingham requires that all construction plans submitted for approval must be certified (stamped and signed) by a Professional Engineer with a current registered license to practice civil engineering in the State of Washington.

Users of this manual should realize that compliance with the requirements and standards herein may not fulfill all of the necessary requirements and conditions to pursue a development project. Applicants are reminded that other city departments, as well as state and federal agencies, have requirements that must be addressed to obtain a development permit. Other common requirements and conditions include, but are not limited to, the following:

- State Environmental Policy Act (SEPA)
- Hydraulic Project Permit
- Corps of Engineers (404 Permit)
- Bellingham Comprehensive Plan
- Bellingham Fill and Grade Permit
- Shorelines Substantial Development Permit
- Washington State Department of Transportation (WSDOT) Permit
- Department of Ecology

The standards and policies presented in this manual are not intended to substitute for innovative or creative efforts or good engineering judgment; however, any deviations from the standards and procedures are subject to the approval of the Director of Public Works. Deviations should be submitted only in the event that unique physical or environmental circumstances don't allow the standards to be implemented.

Private utilities must also conform with the policies and standards of this manual as well as their franchise agreements. The City will not allow the placement of communication cables, conductors, conduits or other facilities within, over, or across the public right-of-way unless the applicant possesses the appropriate franchise(s) with the City.

1-2 Abbreviations

Implemented: 09/11/2001 Revised: 01/01/1998

A.A.S.H.T.O.	American Association of State Highway Transportation Officials
A.C.	Asphalt Concrete
A.P.W.A.	American Public Works Association
A.S.T.M.	American Society of Testing Materials
A.T.B.	Asphalt-Treated Base
A.W.W.A.	American Water Works Association
B.C.	Begin Curb
B.C.R.	Begin Curb Return
C.F.	Cubic Feet
C.M.P.	Corrugated Metal Pipe
E.I.S.	Environmental Impact Statement
F/L	Flow Line
I.T.E.	Institute of Transportation Engineers
L.F.	Linear Feet
LID	Local Improvement District
M.J.	Mechanical Joint
M.U.T.C.D.	Manual on Uniform Traffic Control Devices
P.C.	Point of Curvature
P.C.C.	Portland Cement Concrete
P.I.	Point of Intersection
P.S.I.	Pounds Per Square Inch
P.T.	Point of Tangency
P.V.C.	Poly Vinyl Chloride
R/W	Right-of-Way
S.E.P.A.	State Environmental Policy Act
S.F.	Square Feet
T.S.M.	Transportation System Management
V.C.	Volume to Capacity
WSDOT	Washington State Department of Transportation

1-3 Glossary of Terms

Implemented: 09/11/2001 Revised: 12/12/2014

Access: Driveway or other point of access such as a street, road, or highway that connects to the general street system. Where two public streets intersect, the secondary street will be the access.

Approach: The portion of an intersection leg which is used by traffic approaching the intersection.

Arterial Street: Every public highway, or portion thereof, or major street designated as such by ordinance in accordance with the law of the State of Washington.

Average Design Flow: Average monthly flow of the maximum month, estimated for the design year of the sewage works.

Base Flood: The flood having a 1% chance of being equaled or exceeded in any given year.

Butterfly Valve: A valve wherein the disk, as it opens or closes, rotates about a spindle supported by the frame of the valve. The valve is opened at a stem. At full opening, the disk is in a position parallel to the axis of the conduit.

Capacity: The maximum number of vehicles that have reasonable expectation of passing over a given roadway or section of roadway in one direction during a given time period under prevailing roadway and traffic conditions.

Channelization: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands or other suitable means to facilitate the safe and orderly movement of both vehicles and pedestrians.

Combined Sewer: A sewer intended to receive both wastewater and storm or surface water.

Commercial Driveway: A driveway providing access to an office, retail or institutional building, or to an apartment building having 5 or more dwelling units.

Curb Return-Type Driveway: A driveway which is essentially a T intersection with constant curb cross section from curb-return to curb-return as found at the intersection of two streets.

Delay: Stopped time per approach vehicle.

Depressed-Type Driveway: A driveway in which the curb is depressed along the curb line per City of Bellingham Standard Plans drawing CG-260.

Driveway: A vehicle access between abutting property and a city right-of-way or a city street.

Driveway Width: The driveway throat distance, measured at the property line, for both depressed and curb entry-type driveways. (See Figure 12-1)

Easement: An acquired legal right to the use of land owned by others.

Existing Street: Existing street means a present traveled way with a minimum width of 18 feet of hard surfacing irrespective of whether it has been accepted by the City for maintenance. A hard-surfaced street shall be a street consisting of either portland cement or asphalt concrete as a wearing surface.

Floodway: The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.

Floodway Fringe: The area in the floodplain excluding the floodway.

Flow Line: The position of the water surface in a flowing stream or conduit.

Gate Valve: A valve in which the closing element consists of a disk which slides over the opening or cross-sectional area through which water passes and fits tightly against it.

Geometric Design: The arrangement of the visible elements of a street such as alignment, grade, sight distance, widths and slopes.

Grade: Rate or percent of change in slope, either ascending or descending, from or along the street. It is measured along the centerline of the street.

Hydrant: A device, connected to a water main and provided with the necessary valves and outlets, to which a fire hose may be attached for discharging water at a high rate for the purpose of extinguishing fires, washing down streets, or flushing out the water main. Also called a fireplug.

Industrial Driveway: A driveway directly serving substantial numbers of truck movements to and from loading docks of an industrial facility, warehouse, truck terminal, or community or regional mall loading area.

Industrial Wastes: Liquid or other wastes resulting from any process of industry, manufacture, trade, business, or from the development of any natural resources.

Infiltration: Groundwater that enters the sewer system through sewer joints, cracks, service connections and other sources.

Inflow: Surface water that enters the sewer system through storm drains, roof drains, manhole covers, and other sources.

LID Commitment: An agreement to support a local improvement district to bring the abutting streets to the standards specified in Section 4, such agreement to be a covenant running with the land.

Minimum-Standard Street: A street constructed to line and grade having not less than 20' of paved width with 4' shoulders and adequate provision for storm drainage.

Minor Street: Any city street not designated by competent authority as an arterial street, a state highway, a parkway, an expressway or a freeway.

Monument: An object used to permanently mark a surveyed location. The size, shape and design of the monument is to be in accordance with standards specified by the Washington State Department of Natural Resources as authorized by RCW 58.17 and City of Bellingham Standard Plan ST-170, ST-171, ST-172, ST-173, ST-174.

Parcel: Any piece of real property in a single ownership.

Public Works Department: The Department of Public Works of the City of Bellingham.

Queue: A line of vehicles waiting to perform a movement.

Residential Driveway: A driveway providing access to a single-family residence, duplex, or an apartment building containing not more than 4 dwellings.

Right-of-Way: A right of passage over another person's land.

R-Value: A method of evaluating treated and untreated materials for bases, sub-bases, and subgrades for pavement thickness design.

Sewage: The water-carried human wastes from residences, buildings, industrial establishments, or other places together with such industrial wastes or underground, surface, storm, or other water, as may be present.

Shoulder: That portion of the roadway contiguous with the traveled way for accommodating stopped vehicles, for emergency use, and for lateral support of base and surface courses.

Signal Progression: Progression movement of traffic at a planned rate of speed through signalized locations within a traffic control system without stopping.

Street Sign: A device mounted on a fixed or mountable support, conveying a message or symbol to regulate, warn or guide traffic.

Stopping Sight Distance: The distance traveled by the vehicle from the instant the driver of a vehicle sights an object necessitating a stop, to the instant the brakes are applied, and the distance required to stop the vehicle from the instant brake application begins.

Superelevation: The rotation or banking of the roadway cross section to overcome part of the centrifugal force that acts on a vehicle traversing a horizontal curve.

Surety: Bonds or letters of credit.

Trips: A single or one-direction vehicle or pedestrian movement with either the origin or destination (exiting or entering) a study site or area.

Volume: The number of vehicles passing a given point during a specified period of time.

Warrants: Warrants provide guidance to the engineer in evaluating the potential safety and operational benefits of traffic control devices, and are based on average or normal conditions. (NOTE: Warrants are not a substitute for engineering judgment.)

Section 2. Development Requirements

2-1 Introduction

Implemented: 09/12/2001 Revised: 03/01/1993

Most of the public improvements undertaken by private developers come about as a prerequisite to the completion of the building permit process. In order to build upon a parcel of land, certain basic public facilities are required. If any of these required facilities are missing or inadequate, the developer will be required to construct the required facilities according to the standards and procedures spelled out in these standards prior to completion of a building project.

2-2 Water Service

Implemented: 09/12/2001 Revised: 03/01/1993

In order to obtain water service from the City, the property in question must abut a City-owned water main located within the right-of-way or an approved easement. The main must have adequate flow to meet both domestic and fire suppression requirements.

If the required abutting main does not exist or the abutting main does not have sufficient flow to meet either domestic or fire needs, the developer must construct a water main extension prior to obtaining water service. Extensions shall be constructed to the far property line of the subject property. (Exceptions may be granted by the Director of Public Works in cases where future extension of the main is deemed unnecessary.) The first step in the process is for the developer to retain the services of a licensed civil engineer to design the main extension. The engineer will submit the proposed design to the City Engineer. (See Section 6 for details on Water Design Standards.) The developer will enter into a contract with the City for the construction of said main extension. (See Section 3 for details on Public Facilities Contracts.) Upon completion of the contract requirements, the developer may then apply for a water service and be granted same upon payment of applicable connection fees.

2-3 Sewer Service

Implemented: 09/12/2001 Revised: 03/01/1993

In order to obtain sewer service from the City, the property in question must abut a City-owned sewer main located within the right-of-way or an approved easement. The main must have adequate capacity to handle the anticipated flow from the developer's project.

If the property in question does not abut the required sewer main or if the abutting main does not have the necessary capacity, the developer will be required to construct a sewer main extension prior to obtaining a sewer permit. Extensions shall be constructed to the far property line of the subject property. (Exceptions may be granted by the Director of Public Works in cases where future extension of the main is deemed unnecessary.) The first step in the process is for the developer to retain the services of a licensed civil engineer to design the sewer main extension. The engineer will submit the design to the City Engineer. (See Section 5 for details on Sewer Design Standards.) The developer will enter into a contract with the City for the construction of said sewer main extension. (See Section 3 for details on Public Facilities Contract.) Upon completion of the contract requirements, the developer may then apply for sewer service and be granted same upon payment of applicable connection fees.

2-4 Street Improvements

Implemented: 09/12/2001 Revised: 01/01/1990

Requirements for street improvements depend upon two basic factors: the type of development and the existing level of improvement.

2-4.01 Type of Development

Implemented: 09/12/2001 Revised: 01/01/1990

2-4.01.01 Single-Family Residence

Implemented: 11/08/2001 Revised: 01/01/1990

In order to obtain a building permit for a single-family residence, the property being built upon must abut a street at least 18' in width, paved, and located within a public right-of-way of at least 60' in width.

If the property does not abut upon the above-described street, the developer must construct a 20' minimum-standard street (see Section 4 for minimum street standards). Said minimum-standard street shall be extended from the nearest acceptable street (18' wide, paved) to the far side of the property. The street shall be constructed or bonded for prior to the issuance of a building permit.

If an alley is proposed as access, the property must abut on an existing platted alley built to standard plans ST-100, ST-104 or ST-106. If the current condition does not meet one of these standards, the alley shall be improved to the selected standard of the nearest street or alley meeting construction standards. Gravel alleys are not permitted as part of a newly platted right of way.

The first step in the process is for the developer to retain the services of a licensed civil engineer to design the street extension. The engineer will submit the proposed design to the City Engineer. (See Section 4 for design standards.) The developer will enter into a contract with the City for the construction of the street extension. (See Section 3 for details on public facilities construction agreement.) Upon completion of the contract requirements, the developer may then apply for their building permit.

2-4.01.02 Increased Density Residential

Implemented: 11/08/2001 Revised: 01/01/1990

Increased density residential refers to adding dwelling units to an existing property. In order to obtain a building permit for increased-density residential, the property must abut an existing street, at least 18 feet in width, paved, and be located within a public right-of-way of at least 60 feet in width.

If the property does not abut upon the above-described street, the developer must construct a 20-foot minimum-standard street (see Section 4 for minimum-street standards). Said minimum-standard street shall be extended from the nearest acceptable street (18-feet wide, paved) to the far side of the property.

The Bellingham Municipal Code may require a property abut a standard street or even a modified standard street cross section that includes additional lanes or wider sidewalk. In those cases the developer must or may elect to construct a three-quarter standard street (half of a full-standard street on development side and a 10-foot driving lane with 4-foot shoulder on the other). Said three-quarter street shall extend the entire frontage of the property. If said three-quarter street does not connect to an acceptable street (18-feet wide, paved), then a 20-foot minimum-standard street shall be constructed to connect the three-quarter street to the nearest acceptable street.

If an alley is proposed as access for additional single family units (for example accessory dwelling unit), the property must abut on an existing platted alley built to standard plans ST-100, ST-104 or ST-106. If an alley is proposed or required as access for additional multifamily units (for example multifamily infill type units), the property must abut on an alley built to standard plans ST-100 or ST-104. If the current condition does not meet one of these standards, the alley shall be improved to the selected standard of the nearest street or alley meeting construction standards. Gravel alleys are not permitted as part of a newly platted right of way.

The developer shall retain the services of a licensed civil engineer to design the street extension. The engineer will submit the proposed design to the City Engineer. (See Section 4 for design standards.) The developer shall enter into a contract with the City for the construction of the required street improvements. (See Section 3 for details on public facilities construction agreement.) Upon completion of the contract requirements, the developer may apply for a building permit.

2-4.01.03 Commercial and Industrial Building

Implemented: 11/08/2001 Revised: 01/01/1990

In order to obtain a building permit for a commercial or industrial building, the property must abut an existing paved street at least 18 feet in width and located within a public right-of-way at least 60 feet in width.

If the property does not abut such a street or street improvements are required by zoning or other sections of the Bellingham Municipal Code, the developer must construct a 20-foot minimum standard street (see Section 4 for Minimum Street Standards) or provide street improvements as described in Bellingham Municipal Code.. Street improvements shall extend from the nearest acceptable street (18-feet wide, paved) to the far side of the property.

The Bellingham Municipal Code may require a property abut a standard street or even a modified standard street cross section that includes additional lanes or wider sidewalk. In those cases the developer must or may elect to construct a three-quarter standard street (half of a full-standard street on development side and a 12-foot driving lane with 4-foot shoulder on the other). Said three-quarter street shall extend the entire frontage of the property. If said three-quarter street does not connect to an acceptable street (18-feet wide, paved), then a 20-foot minimum-standard street shall be constructed to connect the three-quarter street to the nearest acceptable street.

If an alley is proposed or required to as access, the property must abut on an alley built to standard palns ST-100 or ST-104.

The developer shall retain the services of a licensed civil engineer to design the street extension. The engineer will submit the proposed design to the City Engineer. (See Section 4 for Design Standards) The developer shall enter into a contract with the City for the construction of the street extension. (See Section 3 or Public Facilities Construction Agreement) Upon completion of the contract requirements, the developer may apply for their building permit.

2-5 Other Permits, Fees

Implemented: 09/12/2001 Revised: 01/01/1990

In addition to the procedures described in this manual, other permits and fees may be applicable as explained below

2-5.01 Street Obstruction Permit

Implemented: 09/12/2001 Revised: 01/01/1990

A street obstruction permit is required for any construction within the public right-of-way. A permit is not required for work performed under contract with the City. This includes, but is not limited to, driveways, sidewalks, sewer or water services, trenches, utility excavations, fences, foundations or other structures. Permits are obtained along with building permits. The person or company undertaking the work shall be covered by a $5,000.00 street obstruction bond acceptable to the City. In lieu of the bond for a one-time-only job, a cash deposit in the amount of 150% of the estimated cost of the work shall be deposited with the City Finance Director. The deposit will be returned upon acceptance of the work.

2-5.02 Water/Sewer Permit

Implemented: 09/12/2001 Revised: 08/01/95

Water/sewer permits are required to connect to the City's water or sewer system. Permits are obtained along with building permits upon payment of applicable connection fees. All permitted construction must be inspected by the Public Works Department's Engineering Division.

2-6 Easements

Implemented: 09/12/2001 Revised: 06/01/97

Public utilities shall be located within the public right-of-way unless field conditions make this impractical. In the event that a public utility must be placed on private property, a maintenance easement 20 feet wide and centered over the utility shall be granted to the City. Where more than one public utility is to be placed in the easement, the utilities must be separated by 10 feet with a 10-foot buffer to the outside of the easement. In other words, two utilities would require a 30-foot easement width, three utilities would require 40 feet, etc.

Section 3. Public Facilities Construction

3-1 Introduction

Implemented: 09/12/2001 Revised: 01/01/1998

The following chapter has been developed to assist an owner, developer, or engineer with the Bellingham Public Works Department's requirements for all improvements being contemplated within City right-of-way. Improvements to public rights-of-way are normally required of an owner or developer as a condition to receiving a building permit or as a condition to subdividing property.

Early in the plan review process, the owner will be asked to sign a Public Facilities Construction Agreement which will bind the owner to the project description, the project schedule, required fees and deposits, bond requirements, and other related items.

3-2 Beginning the Process

Implemented: 09/12/2001 Revised: 01/01/1998

The process begins with submittal of an engineering plan and Public Facilities Agreement to the City Engineer along with a Letter of Intent containing the following:

1. Identification of the property owner.
2. Type of ownership: Corporation, Partnership, Sole Proprietor, or Joint Venture.
3. Name and title of owner's officer with authority to sign.
4. Address of owner.
5. Complete description of the project to be constructed and conveyed to the City.
6. The approximate construction schedule.
7. An estimate of the project cost.
8. The type of financial security the owner intends to use: a standard surety bond, an assignment of funds, cash deposit, or letter of credit.

Upon receipt of the above, the City Engineer will assign a project engineer to act as the project manager on behalf of the City for the purpose of carrying out the terms of the Public Facilities Construction Agreement.

3-3 Plan Check for Completeness

Implemented: 09/12/2001 Revised: 01/01/1998

Upon receipt of a construction plan package, the project manager will check for completeness of the plan using the following guide:

1. Are the drawings signed by a Civil Engineer?
2. Are the plan and profile drawings complete? (See Section 7)
3. Are drainage calculations included? (See Section 9) Do the plans include provisions for erosion control?
4. Does the Letter of Intent contain sufficient information?

If the plan package is determined to be incomplete, the project manager will notify the applicant of any additional materials or information needed for the process to continue. Upon receipt of the needed information, the project manager will request three copies of the plan and will have the Public Facilities Construction Agreement prepared.

3-4 Public Facilities Construction Agreement

Implemented: 09/12/2001 Revised: 01/01/1998

The project manager will use the information supplied in the Letter of Intent to create a document package, which will contain the following:

1. Public Facilities Permit Application
2. Surety Bond
3. Public Works Project Permit
4. Deed of Conveyance of Public Improvements

As soon as available, the project manager will send the applicant a copy of the agreement and the surety bond form for signature. The plans and specifications will not be reviewed by the project manager until he/she receives the signed agreement, the surety bond, and payment of all fees and deposits listed in the agreement. Fees and deposits normally required are as follows:

1. Administration Deposit (percent of estimated cost)
2. Water Connection Deposit (estimated cost by Water Division)
3. Sanitary Sewer Scan Fee ($0.50 per linear foot)
4. Storm Water Permit Fee
5. Hydrant Fund Fee ($3 per linear foot)

3-5 Plan Review Process

Implemented: 09/12/2001 Revised: 01/01/1998

As soon as the project manager receives three copies of the plans, he/she will send one copy to the Operations Division and one copy to the Engineering Division for review by Staff. The third copy will be retained by the project manager for reference and for his/her future review.

Upon receipt of the signed agreement, the financial security, and payment of all fees and deposits, the project manager will carefully review the plans and specifications. Comments will be sent to the applicant regarding the corrections, additions, or deletions that should be made to the plans and specifications before approval can be granted. After final corrections are made to the plans and specifications, the originals shall be delivered to the project manager who will procure the signature of the City Engineer, thereby, approving the plans and specifications.

When the applicant is prepared to begin construction, he/she shall notify the project manager and request that a preconstruction conference be scheduled. The Public Works project permit will be presented to the applicant following the preconstruction conference authorizing the construction to begin.

3-6 Building Permit or Subdivision Approval

Implemented: 09/12/2001 Revised: 01/01/1998

Plans and specifications approval for improvements within the City right-of-way or within a City easement is one of many review processes one must pursue before receiving a building permit or plat approval. The specific requirements for these are described in Section 2 of this manual.

City departments other than Public Works also will be involved in the review process for building permit or subdivision approval. They are as follows:

1. Planning and Economic Development Department
2. Building Services Division
3. Fire Department (Fire Marshal)

The applicant should contact each City department to discuss specific requirements prior to finalizing plans and specifications. The project manager should be contacted as soon as possible if a plan change becomes imminent.

3-7 Project Acceptance

Implemented: 09/12/2001 Revised: 01/27/2006

Upon completion of the construction work, the applicant will notify the project manager and request an inspection. The project manager will schedule the inspection, then provide the applicant with a list of deficiencies (punch list) which must be corrected within 30 calendar days. Upon completion of the punch list, the applicant will again notify the project manager who will then schedule a final inspection.

After all deficiencies have been corrected, the applicant will be asked to provide the following:

1. Certified "as-built" mylars.
2. Certified statement of the full cost of the project using Public Works Cost Statement.
3. A copy of all required easements which have been recorded at the County Courthouse.
4. The Deed of Conveyance for all project improvements which are to be accepted by the City for maintenance.

Upon receipt of all the above, the project manager will accept the project on behalf of the City and authorize the reduction of the financial security to 25% of the actual project cost to protect the City against defects in materials and workmanship in the project for one year.

Prior to one year following project acceptance, the City will conduct an end of maintenance period inspection and develop a list of deficiencies. The applicant will be given 30 days to correct the deficiencies. After all deficiencies are corrected, the financial security will be released.

3-7.01 RECORD DRAWING POLICY

The following is intended to provide necessary guidelines for development of required construction record drawings:

1. Certified record drawings are to be provided by the owner and shall accurately reflect all field revisions made during the construction process. Record drawings shall be submitted on the same number of sheets as the original approved drawings.

2. The owner shall retain a licensed professional engineer to track all relevant field changes to the approved construction drawings. Changes shall be clearly identified in a comprehensive manner on one set of City-approved Xerox black-line,

3. At the time the record drawings are transmitted to the City, each sheet shall include a signature block similar to that shown below located in the bottom right-hand corner of the sheet when possible:

Recording Drawing Certification
This drawing reflects the work as constructed and all modifications meet the performance standards of the original design. By:_____Date:_____

4. The record drawings shall identify all existing or abandoned utilities that were encountered or installed during construction that were not shown on the approved construction drawings.

5. All sanitary sewer, storm sewer, and water service stub locations shall be stationed and marked in accordance with City Standard specifications, SS-790 and WA-897. Stationing for sanitary sewer and water mains shall be independent from the roadway centerline.

6. Substantial changes made to storm drainage shall be reflected in a modified storm drainage report and shall be certified by the professional engineer that the modifications made during construction meet the performance standards of the original design.

7. The final project approval shall not be processed until the City has received and approved the certified record drawings. The City Engineer may accept a deposit of 150% of the cost of preparation of record drawings in lieu of performance. A deposit will require a commitment from the owner to (A) complete the record drawings within 90 days; (B) hold the City harmless from any damages caused by the delay in performance; and (C) require the engineer of record to provide free and timely information to the City and Public.

8. All underground facilities shall be shown on the record drawings to the nearest 1-foot horizontal and the nearest 0.1-foot vertical unless otherwise noted by the engineer. Water services shall be shown to the nearest 5-foot horizontal and the nearest 1-foot vertical. Side sewers shall be shown to the nearest 2-foot horizontal and the nearest 0.1-foot vertical.

3-7.02 RECORD DRAWINGS (SEWER AND WATER)

The purpose of this letter is to inform you that the City of Bellingham will now require the developer's engineer to supply us with a full set of certified record drawings upon completion of the Public Facilities Contract. These as-built drawings will reflect the exact location of all underground and aboveground utilities and will include, but not be limited to, the following:

1. The location of all vertical and horizontal bends in the water system.

2. The location of all water service taps into the water main.

3. The location of all water service boxes and meters with distances to the main tap and to the corresponding property corners.

4. The locations of all water valves, hydrants, hydrant valves, and blow-offs as to distance from the centerline and distances to the nearest property lines or property corners.

5. The location of all utilities within easements. This will include distances to the utilities from the easement lines.

6. The location of all side sewer tees into the sewer main from the back-station manhole.

7. The location of all side sewer ends according to the attached drawings and with the additional stipulations:

    a. The ends must be tied out to the corresponding property corners.

    b. The depth of the end at the location board must be noted.

8. The location of all sanitary manholes, storm sewer manholes, storm sewer catch basins and back-of-walk drains. These locations must include distances from the centerline monuments, easement lines, or property corners.

9. All easements will be staked in advance of utility installations to ensure that the utilities fall within the proper boundaries. Construction offset staking will not fulfill this requirement.

3-8 Latecomers Contracts

Implemented: 08/26/2004 Revised: 02/01/2004

Under the authority of the Bellingham Municipal Code (Ch. 14.02) property owners who construct public improvements may be partially reimbursed by benefiting owners if a contract, facilitated by the City of Bellingham, with other property owners is implemented. Public improvements include streets, water mains, sanitary sewer mains, and storm water facilities. Entering into a "Latecomer Contract" requires a timely request by the project proponent and procedures that must be followed by both the proponent and the City as described below.

3-8.01 Procedures To Be Followed By The Proponent:

1. Prior to the time the project is accepted by the City, the proponent must notify the City of the intent to seek a Latecomer Contract. Notification consists of a letter stating the intention along with a list and map of the property owners who the proponent believes will benefit from the improvement(s). Signature of the “Acknowledgement of Understanding” letter provided to developers with the deed of conveyance information can satisfy this requirement.

2. Once the City receives the request, a pre-application meeting will be scheduled and the proponent will have the opportunity to present the proposal to City staff. This meeting will consist of discussion of the proposal, comments and suggestions from the City, and general preparation for submittal of the formal application.

3. Within 30 days of street and/or utility system improvements being deeded to the city (Deed of Conveyance), the proponent may request a Latecomer Contract by making a formal application. Application shall be made on forms prepared by the Public Works Department and shall be accompanied by the base fee portion of the City Administrative Fees as set forth in BMC 14.02.130. The application shall be prepared and/or approved by a professional licensed engineer and shall contain the following information:

   a. A legal description of the applicant's property.
   b. A legal description of the properties within the applicant's proposed assessment reimbursement area together with the names and addresses of the owners of each property as shown in the records of the Assessor's Office of Whatcom County.
   c. Vicinity map of applicant's property, proposed reimbursement area, and location of all improvements.
   d. Itemized cost data for cost of construction certified by a Professional Engineer.
   e. Cost of construction = direct construction costs + developer administrative costs + construction interest + city latecomer administrative fee. (See Bellingham Municipal Code 14.02 for eligible costs and calculation details.)
   f. The applicant's proposed allocation of cost of construction to the individual properties within the applicant's proposed assessment reimbursement area and the method of such allocation.
   g. Payment of the base fee portion of the City Administrative Fee, which shall be non-refundable. Fee shall be calculated as follows:
   h. Base Fee ($400 for utility project and $590 for street project) + 1% of direct construction cost + $200 for every separate parcel of property within the applicant's proposed assessment reimbursement area. Fees are adjusted annually in accordance with BMC 14.02.130(C) and should be confirmed prior to submitting a latecomers application.

4. Within 30 days of the Public Works Department receiving the application for a Developer Reimbursement Agreement, the Public Works Department will provide the applicant written notice of whether the application is complete and, if incomplete, what must be done for the application to be considered complete. The applicant will have no more than 30 days from the date of the written notice to respond and provide the information required to complete the application or, if the applicant cannot submit the required information within the 30-day period, the applicant shall provide the City with a written explanation of why they cannot provide the information within the designated time period and a date that the requested information will be submitted. In its discretion, the Public Works Department may grant the applicant an extension of not more than 60 days to submit the required information.

5. Sign and return the Application Summary (to be prepared by City Staff) for recording by Staff with the County Auditor’s Office.

6. In the event a hearing is requested by a person owning property within the proposed reimbursement area, the proponent must attend or send a representative to attend the hearing.

7. Sign and return Latecomer Contract to the City.

3-8.02 Procedures to Be Followed By The City:

1. Schedule and conduct pre-application meeting. Make recommendations to applicant for determination of assessment method and area for property benefited by the improvement(s).

2. Review application costs and confirm the potential benefit to properties within the proposed assessment area. Confirm that the method used to calculate the allocation of assessment is equitable and reasonable. If agreement between the developer and City staff cannot be reached, the issue will be addressed by the Public Works Advisory Board and/or the Bellingham Hearing Examiner.

3. Prepare and record the Application Summary with the County Auditor’s office.

4. Send notices by certified mail to all property owners of record within the preliminary assessment reimbursement area. Each property owner will be given the opportunity to protest and to request a public hearing before the Bellingham Hearing Examiner.

5. Prepare Latecomer Contract for applicant's signature.

6. Record signed agreement at the County Auditor's Office together with a map of affected properties.

7. Upon issuance of new connections, the City will collect specified latecomers assessments and reimburse the proponent.

8. City will file a release with the Auditor's Office upon satisfaction of the latecomer’s assessment.

3-8.03 Future Segregation of Properties Within Assessment Area:

1. A property owner who wishes to segregate a latecomer's assessment must hire a professional engineer to prepare the request. The request shall include a map showing the proposed subdivision of property including legal descriptions and proposed cost segregation based on the original method of assessment.

2. The segregation fee is $150 per parcel created by the segregation. The fee shall be submitted with the segregation request.

3. The City will record new parcel assessments together with a map of affected properties at the County's Auditor's

3-9 Turnaround Time

Implemented: 09/12/2001 Revised: 01/01/1998

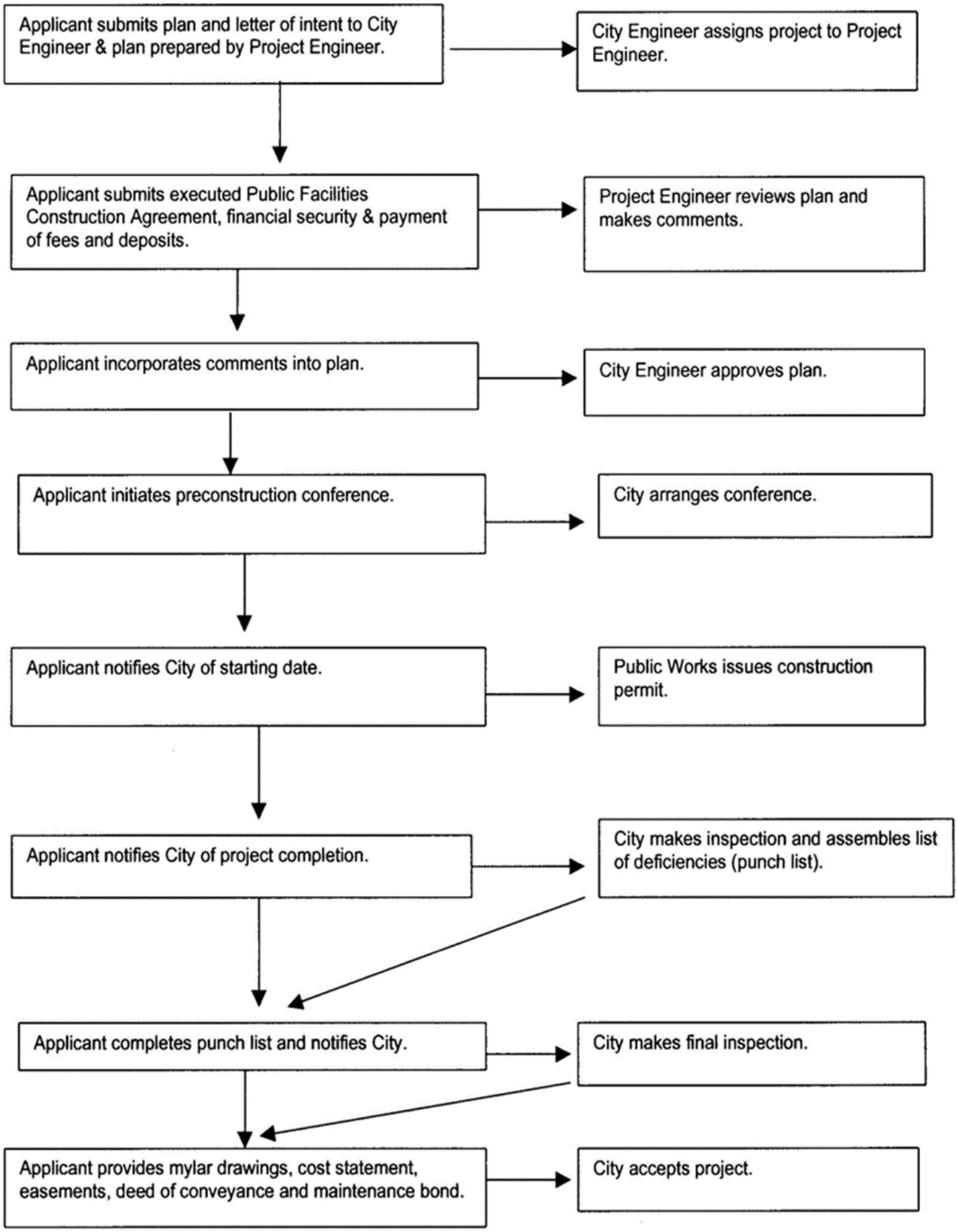
The time required for the public facilities construction process will vary depending on the complexity of the project and the owner's ability to communicate with the City. The following are average time requirements necessary for various tasks:

- City receipt of complete plan package 5 working days. Public Facilities Construction Agreement and related documents are sent to applicant.

- City receipt of executed Public Facilities Construction Agreement, Surety Bond and payment of fees and deposits 5 working days. Project Manager returns comments to Applicant.
- Applicant initiates pre-construction conference 5 working days.
- Pre-construction conference date.
- Applicant notified City of project completion 10 working days. Punch list sent to applicant.

3-10 Flow Chart for Private Implementation of Public Improvements

Implemented: 10/09/2001 Revised: 01/01/1999



Section 4. Street Design Standards

4-1 Introduction

Implemented: 09/14/201 Revised: 08/01/1995

This section has been prepared to reflect City policy, outline a uniformity of methods and procedures, and to communicate vital information to the street design engineer. The contents include maximum and minimum design criteria for street design, as well as specification requirements for various project construction items.

4-1.01 Design Speed

Implemented: 07/01/2007 Revised: 06/15/2007

Design speed for streets shall be 10mph over the existing posted speed or 10mph over the proposed posted speed.

4-2 Street Classifications

Implemented: 09/14/2001 Revised: 08/01/1995

The following street classifications are to be used with the street design standards. Typical sections are provided in Standard Plans ST-108 through ST-132.

4-2.01 Principal Arterial Street

Implemented: 09/14/2001 Revised: 08/01/1995

Standard Plan ST-132

4-2.02 Secondary Arterial Street

Implemented: 09/14/2001 Revised: 08/01/1995

Standard Plan ST-132

4-2.03 Collector Arterial Street

Implemented: 09/14/2001 Revised: 08/01/1995

Standard Plan ST-132

4-2.04 Neighborhood Collector Street

Implemented: 09/14/2001 Revised: 08/01/95

Standard Plan ST-132

4-2.05 Residential Access Street

Implemented: 09/14/2001 Revised: 08/01/1995

1. Standard Asphalt - Gravel or A.T.B. Base (Standard Plan ST-120)
2. Standard Concrete (Standard Plan ST-124)

4-2.06 Minimum-Standard Street

Implemented: 09/14/2001 Revised: 08/01/1995

1. Asphalt (Standard Plan ST-108)
2. Concrete (Standard Plan ST-112)

4-2.07 Alleys

1. Minimum Standard Alley Cross Section I (ST-100)
2. Minimum Standard Alley Cross Section II (ST-104)
3. Minimum Standard Alley Gravel (ST-106)

4-3 Lane Widths

Implemented: 09/14/2001 Revised: 08/01/1995

Lane widths to be used are as follows:

	Standard
Through-Traffic Lane	11’
Curb Lane	14’
Curb Lane/Bike Lane	16’
Left-Turn Only Lane	11’
Parking Lane	8’
Parking Lane on Bus Route	10’
Bus Lane	12’

4-4 Horizontal Street Alignment

Implemented: 09/14/2001 Revised: 08/01/1995

4-4.01 Horizontal Stopping Sight Distance

Implemented: 09/14/2001 Revised: 08/01/1995

Stopping sight distance is where sight obstructions (walls, cut slopes, wooded areas, buildings, etc.) exist on the inside of a curve. (Use Figure 4-1 to determine adequate stopping sight distance.)

4-4.02 Superelevation on Horizontal Curves

Implemented: 09/14/2001 Revised: 01/01/1990

Superelevation is the rotation or banking of the roadway cross section to overcome part of the centrifugal force that acts on a vehicle traversing a horizontal curve. All street designs utilizing superelevation are subject to review and approval by the City Engineer. For design details and methodology, it is recommended that the WSDOT Design Manual or AASHTO be used.

4-4.03 Monumentation

Implemented: 09/14/2001 Revised: 01/01/1990

Monuments are as defined by the City of Bellingham, Subdivision Ordinance No. 8182, under 18.08.290.

"Monument" means an object used to permanently mark a surveyed location. The size, shape and design of the monument is to be in accordance with standards specified by the Washington State Department of Natural Resources as authorized by RCW 58.17, and City of Bellingham Standard Plan ST-170, ST-172, ST-173.

1. All existing survey control monuments which are disturbed, lost, or destroyed during construction or maintenance shall be replaced by the responsible party at his own expense.

2. All existing survey control monuments which are covered over by a street improvement shall be raised to the new finished surface.

3. At un-monumented street intersections, new permanent control monuments shall be established in the centers of all intersecting streets on a street improvement project. Additional monuments shall be installed if requested by the City Engineer.

4. If any of the above conditions occur, a Land Corner Record or Record of Survey shall be filed by a Licensed Land Surveyor in accordance with all federal, state, county, and city laws, regulations, and standards. The City shall be provided with a mylar copy.

4-5 Vertical Street Alignment

Implemented: 09/14/2001 Revised: 01/01/1990

A well-designed vertical street alignment should attempt to reduce undulations and avoid mid-block sag vertical curves. Although the vertical alignment is a product, to some extent, of existing conditions, the City requires that new and rehabilitated streets be designed so as to minimize vertical deflections.

4-5.01 Street Grades

Implemented: 09/14/2001 Revised: 01/01/1990

The minimum grade on any street shall not be less than 0.5%. The maximum gradient on any street shall be as follows:

	Maximum
Primary Arterial	7% maximum
Secondary Arterial	8% maximum
Collector Arterial	9% maximum

Neighborhood Collector	12% maximum
Residential Access	15% maximum

4-5.02 Stopping Sight Distance

Implemented: 09/14/2001 Revised: 08/01/1995

Refer to Figure 4-2 to find the minimum length for a crest vertical curve when given the design speed and algebraic difference in grades. Refer to Figure 4-3 to find the minimum length for a sag vertical curve when given the design speed and the algebraic difference in grades.

4-6 Intersections

Implemented: 09/14/2001 Revised: 08/01/1995

4-6.01 Intersection Angle

Implemented: 09/14/2001 Revised: 08/01/95

Proposed public streets shall intersect as close to 90 degrees as possible, but in no case shall be less than 70 degrees

4-6.02 Corner Radii

Implemented: 09/14/2001 Revised: 08/01/1995

Intersection curb radius standards are as follows: Truck

	Minimum	Desirable	Route
Arterial to Arteria	25’	35’	50’
Arterial to Residential	20’	25’	N/A
High-Volume Truck and/or Bus Turns	30’	50’	N/A
When Vehicular Turn is Illegal	10’	10’	N/A

4-6.03 Sight Distance on Public Streets

Implemented: 09/14/2001 Revised: 01/01/1995

See Figure 4-1, Figure 4-2, Figure 4-3

4-6.04 Sight Distance at Driveways

Implemented: 09/14/2001 Revised: 01/01/1990

See Section 12-13

4-7 Roadway Transitions

Implemented: 09/17/2001 Revised: 08/01/1995

The standard taper length for the narrowing or offsetting of a lane is L = W x S x S/60, where W = the offset distance in feet, L = length of taper in feet, and S = speed limit in miles per hour. (Refer to MUTCD for details.)

4-8 Pavement Thickness

Implemented: 09/17/2001 Revised: 08/01/1995

Standard street thicknesses may be used provided the native soil R-value is at least 30. Standard total asphalt thickness for various types of streets shall be as follows:

	Full Depth Asphalt	Min Class B	ATB	Gran. Base Substitution for ATB
Principal Arterial	11	4	7	14
Secondary Arterial	10	3 ½	6 ½	13
Collector Arterial	9	3	6	12
Neighborhood Collector	8	3	5	10
Residential Access	7 ½	2 ½	5	10

When paving industrial or commercial streets, when the subgrade R-value is less than 30, or when a deviation from the standard thickness is requested; a pavement determination shall be made using the Asphalt Institute Thickness Design Method. Substitution of granular base for ATB will normally be allowed at a 2:1 ratio. Reduction of Class B asphalt thickness will not be allowed. Portland cement concrete pavement as an alternate to full asphalt pavement is acceptable provided a pavement analysis is performed. In all cases, the subgrade shall be certified by a Professional Engineer prior to placement of asphalt or cement concrete pavement.

4-9 Guardrail Placement

Implemented: 09/17/2001 Revised: 01/01/1990

Roadway hazards that may require shielding by a roadside barrier can be placed into two basic categories: fixed objects and embankment hazards. Curb and gutter will not be regarded as an adequate barrier for redirecting vehicles. Design of guardrails shall be in accordance with the WSDOT Design Manual.

4-9.01 Embankment Criteria

Implemented: 09/17/2001 Revised: 01/01/1990

Height and slope of embankments are the basic factors in determining barrier need for a fill section. Criteria for fill sections are shown in Figure 4-4, where embankments with slope and height combinations below the curve do not warrant protection and embankments with slope and height combinations above the curve warrant protection

4-9.02 Fixed-Object Criteria

Date Composed: 09/17/2001 Revised: 01/01/1990

A clear, unobstructed, flat roadside is highly desirable. When these conditions cannot be met, criteria to establish barriers needed for shielding roadside objects are necessary. The removal of fixed objects should be considered as the first alternative. If it is not feasible or possible to remove or relocate a hazard, then a barrier may be necessary. A barrier should be installed only if it is clear that the barrier offers the least hazard potential.

Figure 4-5 shows criteria for determining the clear zone on both cut and fill slopes. Fixed objects located within the clear zone should be removed, relocated, or shielded by a barrier.

4-10 Vertical Clearance

Implemented: 09/17/2001 Revised: 01/01/1990

A minimum vertical clearance of 16.5 feet shall be provided for all overhead obstacles measured from the crown of the street (allowing for future overlays) to the lowest portion of the obstacle. The minimum vertical clearance over sidewalks and bikeways shall be 8 feet.

4-11 Lateral Clearance

Implemented: 09/17/2001 Revised: 01/01/1990

The lateral clearance between the curb face and the closest part of any fixed object (excluding traffic-control sign and parking meter posts) not protected by a guardrail shall be a minimum of 18 inches. If no guardrail exists, use Table 4-1 to determine lateral clearance.

4-12 Illumination and Drainage Design Standards

Implemented: 09/17/2001 Revised: 01/01/1990

Illumination and drainage design criteria is located in Sections 8 and 9, respectively.

4-13 Construction Specifications

Implemented: 09/17/2001 Revised: 01/01/1990

The following specifications list City requirements for materials and workmanship for various items of work. For any item of work not listed below, the current edition of the Standard Specifications for Road, Bridge, and Municipal Construction as published by the WSDOT and the APWA shall apply.

TABLE 4-1 CLEAR-ZONE DISTANCE
(in feet from edge of travel lane)

Posted Speed MPH	Average Daily Traffic	3:1	4:1	5:1	6:1	8:1	10:1	3:1	4:1	5:1	6:1	8:1	10:1
5 or Less	The minimum clear-zone distance is established at 10 feet from the edge of the travel lane in a shoulder section or 18 inches beyond face-of-curb in urban conditions.												

40	Under 250	10	10	10	10	10	10	*	13	11	11	10	10
	250 – 400	11	12	12	12	12	12	*	15	14	13	12	12
	400 – 2000	13	13	13	13	13	13	*	16	15	15	14	13
	2001 – 5000	14	14	14	14	14	14	*	18	17	16	15	14
	Over 5000	15	15	15	15	15	15	*	19	18	17	16	15
45	Under 250	11	11	12	12	12	12	*	16	13	13	12	12
	250 – 400	12	13	14	14	14	14	*	19	16	15	14	14
	400 – 2000	14	14	15	15	15	15	*	21	18	17	15	15
	2001 – 5000	15	16	16	16	16	16	*	23	20	19	17	16
	Over 5000	16	17	17	18	18	18	*	24	21	20	18	18
50	Under 250	11	12	13	13	13	13	*	18	15	14	13	13
	250 – 400	13	14	15	15	15	15	*	22	18	17	15	15
	400 – 2000	14	15	16	16	16	16	*	25	20	19	16	16
	2001 – 5000	16	17	18	18	18	18	*	27	23	21	18	18
	Over 5000	17	18	19	20	20	20	*	29	24	22	20	20
55	Under 250	13	15	16	16	16	17	*	23	20	18	17	17
	250 – 400	14	16	18	18	18	19	*	28	24	21	20	19
	400 – 2000	15	18	20	20	20	21	*	31	26	24	22	21
	2001 – 5000	17	20	22	23	23	23	*	35	29	26	24	23
	Over 5000	18	21	23	24	24	25	*	37	31	28	26	25

4-13.01 Shoring and Cribbing

Implemented: 09/17/2001 Revised: 01/01/1990

All trench excavation over a depth of 4 feet shall be shored and cribbed in accordance with the requirements of the Washington Industrial Safety and Health Act, Chapter 49.17 RCW, and in accordance with Section 2.09 of the Standard Specifications.

4-13.02 Drain Pipe

Implemented: 09/17/2001 Revised: 01/01/1990

Where shown on the plans or designated by the Engineer, the Contractor shall install drain pipe of specified diameters. Included in this item are trench excavation, furnishing and installing the pipe, making all connections, backfilling and compaction of all backfill. Drain pipe shall be in accordance with Section 7-01 of the Standard Specifications.

4-13.03 Underdrain Pipe

Implemented: 09/17/2001 Revised: 01/01/1990

Where shown on the plans or designated by the Engineer, the Contractor shall install underdrain pipe of specified diameters. Included in this item are trench excavation, furnishing and installing the pipe, making all connections, and backfilling with washed rock. Underdrain pipe shall be in accordance with Section 7-01 of the Standard Specifications and City of Bellingham Standard Plan No. DR-525.

4-13.04 Plain Concrete Storm Sewer Pipe

Implemented: 09/17/2001 Revised: 01/01/1990

This item shall consist of constructing storm sewers of specified diameters shown on the plans or designated by the Engineer and shall include trench excavation, furnishing and installing the pipe, making all connections, backfilling, compaction of all backfill, and removal of existing pavement over trenches.

Storm sewer pipe alternates to concrete storm sewer pipe shall be in accordance with City of Bellingham Standard Plan ST-36.

Furnishing and placing Class "B" bank-run gravel trench backfill may be required in locations designated by the Engineer.

Trench excavation, bedding and pipe laying shall be performed in accordance with Section 7-04 of the Standard Specifications. Pipe compaction and backfill shall be in accordance with Standard Plan B-11.

4-13.05 Reinforced Concrete Storm Sewer Pipe

Implemented: 09/17/2001 Revised: 01/01/1990

This item shall consist of constructing storm sewers of specified diameters shown on the plans or designated by the Engineer and shall include trench excavation, furnishing and installing the pipe, making all connections, backfilling, compaction of all backfill, and removal of existing pavement over trenches.

Storm sewer pipe alternates to concrete storm sewer pipe shall be in accordance with City of Bellingham Standards.

Furnishing and placing Class "B" bank-run gravel trench backfill may be required in locations designated by the Engineer.

Trench excavation, bedding and pipe laying shall be performed in accordance with Section 7-04 of the Standard Specifications. Pipe compaction and backfill shall be in accordance with Standard Plan B-11.

4-13.06 Manhole Type

Implemented: 09/17/2001 Revised: 01/01/1990

This item consists of constructing manholes in accordance with the provisions of Section 7-05 of the Standard Specifications and with the City of Bellingham Standard Plan No. SS-700.

4-13.07 Concrete Inlet

Implemented: 09/17/2001 Revised: 07/10/2014

Thru-curb inlets conforming to the requirements of Section 7-05 of the Standard Specifications shall be installed at such locations and to such dimensions and details as shown on the plans or designated by the Engineer and in conformance with City of Bellingham Standard Plans DR-500 and DR-505. Vaned grates shall be used in accordance with B-30.40-01 or B-30.30.01, depending on location.

4-13.08 Catch Basins

Implemented: 09/17/2001 Revised: 02/19/2009

Thru-curb catch basins conforming to the requirements of Section 7-05 of the Standard Specifications shall be constructed at the low points of the curbs and to the locations, dimensions and details as shown on the plans or designated by the Engineer and in conformance with City of Bellingham Standard Plans DR-500 and DR-505. Vaned grates shall be used in accordance with Standard Plan B-2b.

All joint sections in catch basin will be sealed with a layer of grout between sections.

Catch basins Type I-C having 8 inch outfall pipe shall include furnishing and installing Type 60 B-1 outlet traps as per City of Bellingham Standard Plan No. DR-515.

4-13.09 Flared-End Section

Implemented: 09/17/2001 Revised: 01/01/1990

These items consist of installation of flared-end sections in accordance with Standard Plan B-7 at locations shown on the plans

4-13.10 Hand-Placed Riprap

Implemented: 09/17/2001 Revised: 01/01/1990

This item consists of supplying and placing 12-inch minus crushed rock for rock line channel at a location as shown on the plans or designated by the Engineer. All rock shall be dense, angular, sound, and durable. It shall be free from segregation, seams, cracks, and other defects conductive to accelerated weathering.

Bulk specific gravity shall not be less than 2.5 and absorption shall not be more than 2%.

All rock delivered to and incorporated in the project shall meet the following requirements:

- 100% of rock shall be 12" or less
- 10% maximum shall be less than 2"
- 2" to 12" rock shall be well-graded

4-13.11 Rock Wall

Implemented: 09/17/2001 Revised: 01/01/1990

Rock walls shall be constructed to the approximate limits shown on the plans and shall conform to the Standard Plan included herein.

Rock used for rock walls shall be sound-ledge rock of a uniform color, and obtained from a commercial quarry. Rock is to be free from seams or loose stratification. The rock shall have a density of at least 145 pounds per cubic foot.

All rock used in rock walls less than 3 feet in height shall be 12 inches in the least dimension and weigh a minimum of 150 pounds. All rock in rock walls greater than 3 feet, but less than 6 feet high, shall be 18 inches in the least dimension and 500 pounds minimum weight. All rock in rock walls greater than 6 feet high shall be 24 inches in the least dimension and 1,200 pounds minimum weight.

All rock is to be individually placed in rock walls. Each rock is to be placed in such a manner as to interlock with adjoining units to provide a maximum continuity of the finished wall. Rock arrangement is to provide uniform texture, even batter, and match the top of the embankment in a straight line. All rock walls shall be battered uniformly to the slope shown on the Standard Plans.

Voids in the rockery face shall not be greater than 50-square inches for rocks over 3-feet high and 36-square inches under 3-feet high. The maximum thru void area shall not exceed 15-square inches over 3-feet high and 10-square inches under 3-feet high. All openings shall properly retain the backfill material and not allow free spillage from behind the rock walls. All rock walls shall be backfilled in uniform layers as construction proceeds.

A permeable membrane made of cloth woven with synthetic threads shall be placed against the wall prior to backfilling. This filter cloth shall be no coarser than a No. 70 equivalent sieve size and shall have a minimum thickness of 50 mils. A minimum lap distance of 2 feet shall be used and care shall be taken during construction so as not to puncture fabric during installation.

4-13.12 Pedestrian Handrail

Implemented: 09/17/2001 Revised: 01/01/1990

This item shall include the furnishing of all materials for, and the construction of, the steel handrail on the top of the rock retaining walls as shown and detailed in the plans and in the specifications.

All sections of the steel handrail shall be galvanized after fabrication in accordance with the provisions of ASTM designation A123. The handrail shall not be painted, however, all erection marks and stock numbers shall be removed before completion of the project. All welding to galvanized surfaces shall be painted with approved galvanizing repair paint.

4-13.13 Cement Concrete Curb and Gutter

Implemented: 09/17/2001 Revised: 02/20/2008

Cement concrete curb and gutter shall be constructed where shown on the plans or as designated by the Engineer, in accordance with Section 8-04 of the Standard Specifications and City of Bellingham Standard Plan No. DR-500 and CG-200. Where new cement concrete curb and gutter is to be constructed to connect to existing curbed roadway, care shall be taken to assure that no abrupt offsets in line or grade shall be constructed which will be unsightly or impede flow in the gutter line. Depressed curb driveway and alley openings shall be provided at such locations as directed by the Engineer or shown on the plans and shall be paid at the same price per linear foot as cement concrete curbs and gutter Type "A" modified. Wheelchair ramps shall be constructed at such locations as shown on the plans or designated by the Engineer.

Curb drains shall be constructed of 2-inch P.V.C. pipe or other materials subject to approval by the Engineer, cut to length to pass from the back-of-curb through the curb to the face-of-curb at the gutter line. Extreme care shall be taken during subsequent sidewalk placement to ensure that drains are not obstructed. Spacing will be maximum of 60 feet, center-to-center and/or each side of the driveways and at such locations as designated by the Engineer to intercept existing roof drains.

Drains must be level, have their invert at the flow line of the gutter, and be normal to the back surface of the curb.

4-13.13.01 Cement Concrete Rolled Curb

Implemented: 11/16/2001 Revised: 01/01/1990

Cement concrete rolled curb shall be constructed where shown on the plans or as designated by the Engineer in accordance with City of Bellingham Standard Plans CG-204 and DR-510 and shall be allowed as an option under the following conditions:

1. Any street of 100 or more homes per outlet would require standard vertical curbs.

2. All rolled curbing shall have a sidewalk adjacent to it which shall have a minimum thickness of 6 inches.

3. Transition to vertical curbs will take place at intersections with arterial and through streets.

4. Handicapped ramps and vertical curb drainage grates will be utilized on corners where applicable.

4-13.14 Integral Cement Concrete Curb

Implemented: 09/17/2001 Revised: 01/01/1990

Integral cement concrete curb shall be constructed where shown on the plans or as designated by the Engineer in accordance with Section 8-05 of the Standard Specifications. Depressed curb driveway and wheelchair ramp openings shall be provided at such locations as directed by the Engineer or shown on the plans.

4-13.15 Cement Concrete Sidewalk

Implemented: 09/17/2001 Revised: 01/27/2006

Cement concrete sidewalk Type "B" shall be constructed as shown on the plans or as designated by the Engineer, in accordance with City of Bellingham Standard Plan No. CG-230.

GENERAL NOTES: SIDEWALKS

- Minimum sidewalk widths to be 5’ for residential, 8’ for commercial/business with 60’ right-of-way, and 10’ for commercial/business with 80’ right-of-way.

- Minimum radius of curb return to be 15’ on residential access streets and 20’ on arterial, commercial and industrial streets.

- Concrete shall be Class C.

- 3/4“ deep “V” grooves to be placed 5’ C/C.

- 3/8” x 2” minimum dummy joints to be placed 20’ C/C in line with contraction joints in curb.

- 3/8” x 4-1/2” expansion joints to be placed at curb returns, driveway section, cold joints, changes in section, or maximum 80’ C/C. Joints to protrude 1/2” below sidewalk.

- ¼” x 4-1/2” expansion joints to be placed between sidewalk and back-of-curb and around all junction boxes, meter boxes, etc.

- All joints to be cleaned and edged with 1/4 radius.

- Sidewalk to be brush-finished in traverse direction with fiber-hair brush, except at driveways where it shall be bushed longitudinally.
- Concrete shall be cured in accordance with the standard specifications.
- Sidewalks in cut sections shall be drained according to Standard Plan No. CG-230.
- Washed rock shall be 3/4”.

Further requirements shall be as specified in the standard specifications.

4-13.16 Cement Concrete Driveway

Implemented: 09/17/2001 Revised: 08/01/1995

Cement concrete driveways, 6 inches thick, shall be constructed where shown on the plans or designated by the Engineer. A 2-inch layer of 3/4-inch drain rock shall be used for driveway bedding and will receive no additional compensation under a separate pay item but shall be considered incidental to this item

4-13.17 Cobblestone Sidewalk

Implemented: 09/17/2001 Revised: 08/01/1995

This item shall consist of constructing a 4-inch cement concrete sidewalk with a cobblestone texture in accordance with Standard Plan CG-238 and the contract plans. Specifications shall otherwise be in accordance with those of the item, "Cement Concrete Sidewalk."

4-13.18 Asphalt Treated Base

Implemented: 09/17/2001 Revised: 08/01/1995

This item shall consist of supplying, placing and compacting in place asphalt-treated base at such locations as shown on the plans or designated by the Engineer in accordance with Section 4-06 of the Standard Specifications. Placement of asphalt treated base on frozen ground shall not be allowed.

4-13.19 Asphalt Concrete, Class HMA 1/2"

Implemented: 09/17/2001 Revised: 09/15/2009

This item consists of constructing Class HMA 1/2" asphaltic concrete at such locations as shown on the plans or designated by the Engineer.

Materials and construction methods shall conform with the requirements of Section 5-04 of the Standard Specifications except as modified herein. Connections to existing pavement shall be to a straight, neatly-trimmed line.

The grade of asphalt used shall be PGAB conforming with Section 9-2 of the Standard Specifications. Specification designations and AASHTO test methods for asphalt cement to be in accordance to Section 9-2 of the Standard Specifications.

The Contractor shall apply one application of an approved soil residual herbicide on all previously unpaved areas in order to prevent vegetation damage to the asphalt pavement. The soil residual herbicide to be used shall not have a detrimental chemical reaction to the asphalt pavement or damage

the pavement. Application of the herbicide shall be a uniform spray in accordance with the manufacturer's recommendation and in accordance with the Standard Specifications.

4-13.20 Asphalt Concrete Pavement Class "G"

Implemented: 09/17/2001 Revised: 01/01/1990

This item consists of supplying and placing asphalt concrete Class "G" wearing course at such locations as shown on the plans or designated by the Engineer. Materials and construction methods shall conform with the requirements of Section 5-04 of the Standard Specifications.

4-13.21 Cement Concrete Pavement

Implemented: 09/17/2001 Revised: 01/01/1990

All cement concrete pavement shall be constructed in accordance with the details shown on the plans and Section 5-05 of the Standard Specifications. The cement concrete pavement is to be constructed either with equipment utilizing stationary side forms or by the use of slip-form paving equipment at the option of the Contractor.

Transverse construction joints shall be sawed and the longitudinal joints may be formed or sawed at the option of the Contractor.

4-13.22 Illumination System Complete

Implemented: 09/17/2001 Revised: 01/07/2002

This work consists of illumination construction as shown on the plans and as specified herein. The successful Contractor shall submit four copies of shop drawings for Contractor supplied equipment to the Engineer for approval before ordering. All material shall be obtained from a source approved by the Engineer.

The illumination system shall be demonstrated to the Engineer and at an agreed upon time after completion and prior to final approval. The Contractor shall provide manpower and equipment for any necessary final adjustments and/or corrections.

4-13.22.01 Lighting Standard Base

Light standard bases shall be constructed in conformance with the attached Standard Plan No. EL-432 at such locations shown on the plans or designated by the Engineer. The concrete and backfilling used shall conform to the latest edition of the Standard Specifications.

The backfill material shall be controlled density fill (CDF) as per State Specification 2-09.3(1) E. If utilizing an auger for foundation excavation, the concrete must bear against undisturbed earth. The top-of-concrete base shall be flush finish grade.

4-13.22.02 Conduit

PVC conduit shall be furnished and installed between junction boxes and standards as detailed on the plans. Fittings shall be the same material. Conduit shall also be installed to the extents of the project limits to provide for future and/or existing connectivity.

All conduit to be installed in compliance with National Electric Code (NEC) at locations shown on the plans or designated by the Engineer.

When installing conduit in paved areas (either shoulder or the traveled roadway), the installation shall be accomplished by either jacking, use of an air ram, or saw cut trenching.

All trenches shall be constructed as straight and narrow as practicable to provide a minimum of pavement disturbance. The trenches shall be saw cut on both sides of the trench and then the asphalt chipped out. Except for the existing asphalt thickness, backfilling shall be entirely with controlled density fill (CDF) as per State Specification 2-09.3(1)E. The Contractor shall ensure to the satisfaction of the Engineer, that all voids are filled with CDF. The top of the trench shall be patched with compacted asphalt concrete pavement Class "B" equaling the thickness of the existing asphalt. Care shall be taken to provide a smooth driving surface.

4-13.22.03. Junction Boxes

Junction boxes shall conform to Standard Plan EL-452 and/or J-11a (with the exception that the J-11a lids shall be hot-dip galvanized and bear the legend “lighting"). Junction boxes shall be furnished and installed at such locations shown on the plans or as designated by the Engineer. The junction boxes shall sit on patio type concrete blocks which shall be placed on 6-inch compacted crushed gravel. All cover plates and metal surfaces for junction boxes shall be hot-dipped galvanized. Conduit into junction boxes shall be 6 to 8 inches from the top of the box at final grade. Conduit entering through the bottom of a junction box shall be located near the end walls to leave the major portion of the box clear. At all outlets, conduit shall enter from the direction of the run terminating within 3 inches of the box wall nearest its entry location and have bell ends. Care shall be taken to ensure a neat and convenient arrangement of conduit as outlined in Section 8.20.3(5) of the Standard Specifications.

4-13.22.04 Arterial Streetlighting Standards

Streetlighting standards shall be supplied and installed on light standard bases, shall be set plumb, and the base shall be grouted to cover leveling nuts and to fill the void under the base plat with a non-shrinking grout. Top of concrete base shall be flush with finished grade. Unless directed by the Engineer, standards shall match existing standards in the vicinity so long as they meet current standards.

Streetlighting standards shall be provided and installed where shown on the plans and/or as designated by the Engineer. Streetlighting standards shall be in accordance with City of Bellingham Standard Plan Nos. EL-404 and EL-432. Fusing shall be per WSDOT Standard Plan J-1E.

The following streetlight luminaires shall be used with the above poles.

Luminaires shall be the cutoff type with a cobra-head shaped housing. Lens shall be shatterproof, flat, tempered glass and in an extruded-aluminum frame. Reflectors shall be provided and the lamp position selected such that the luminaire produces an IES/ANSI Type III distribution with essentially complete light cutoff above 75 degrees from Nadir when operated with an E-18, high-pressure sodium lamp. If not on a circuit controlled by a service cabinet, each luminaire shall utilize a photo-cell.

The luminaire shall be bracket-arm mounted. The ballast shall be rated at 240 VAC and be of the regulated output or constant-wattage type. The ballast shall be suitable for operating a high-pressure sodium lamp of the specified wattage.

4-13.22.05 Alternate Arterial Streetlighting Standards

Streetlighting standards shall be provided and installed where shown on the plans and/or as designated by the Engineer in accordance with EL-408. The standard shall be square, tapered, pre-stressed concrete, anchor base spun hollow standards machine made in steel molds by the centrifugal process. Pre-stressing wire, caging and other reinforcement shall be placed in a manner that assures no cracking during normal handling. The pole shall have cast-in inserts on the side for attaching of the luminaire. Coordination shall be made with the luminaire manufacturer to ensure that placement of the inserts

matches the attachment centers of the luminaire. The poles shall be Centrecon MBQ-9 meter poles or approved equal with exposed natural aggregate finish #113 and have a 29foot, 6 inch pole height above ground. Fusing shall be per section 4-13.22, Subsection 7, Paragraph 2 below.

The following streetlight luminaires shall be used with the above poles.

Streetlighting luminaires shall be the cutoff type with one piece extruded aluminum rectangular housing. Lens shall be shatterproof glass, flat-tempered in an extruded aluminum frame with a medium bronze finish. Reflectors shall be provided and the lamp position selected such that the fixture produces an IES/ANSI Short Type II distribution with essentially complete light cutoff above 75 degrees from Nadir when operated with a 250-watt E-18, high-pressure sodium lamp. Sterner ST light #EX25-A-10-3-25-5 is claimed to meet these criteria. Each luminaire shall utilize a photo-cell unless controlled by a service cabinet.

The luminaire housing shall be bracket-arm mounted. The ballast shall be rated for 240 VAC and be of the Autoregulator type. The ballast shall be suitable for operating a high-pressure sodium lamp of the specified wattage. The luminaire shall be bolted to the pole by means of cast inserts and this detail shall be coordinated with the pole manufacturer to ensure proper fit. The complete luminaire assembly shall have a medium bronze alkydemelamine baked-enamel finish. No fusing shall be located in the luminaire.

4-13.22.06 Residential Streetlighting Standards

Streetlighting standards shall be in accordance with Standard Plan EL-400 and be the same as noted in Section 4-13.22, Subsection 5 except for the poles shall be Centrecon SEQ-5.7 or prior approved equal with exposed natural aggregate finish #113 and shall have 18 foot 8 inch pole height above ground.

The following streetlight luminaires shall be used with the above-mentioned residential poles.

Luminaires shall be the same type as noted in Section 4-13.22, Subsection 5 except it shall be a Sterner #EX20 70 watt HPS luminaire in medium bronze.

4-13.22.07 Wiring

All wire shall conform to the WSDOT Specifications. Conductors above grade and up the poles shall be copper, No. 12 AWG or larger, and shall be stranded.

Insulation shall be Type THW or better, 600V minimum rated, 75 o C and be color-coded in a consistent manner.

All wiring between j-boxes shall be 1 - #8 green wire 2 - #6 black wires stranded copper. Wiring from the nearest j-box up the pole shall be #12 copper. Fusing will be required in the j-box next to the service and in the j-box next to all concrete poles (see EL-400). Fuse holders shall be Buss #HEB-LW-RLA or prior approved equal. Fusing in all metal poles shall be in accordance with WSDOT Standard Plan J-1e.

The Contractor shall provide a complete grounding system with grounding continuity throughout the system. Ground rods and ground wire shall conform to the latest revision of the NEC.

All splices in underground illumination circuits shall be installed at junction boxes. Underground illumination circuit splices shall employ copper crimped connectors installed with an approved tool designed for the purpose. Shrink-on insulators (heat shrink end-caps), model HSC2-20 or epoxy splices with clear rigid molds shall be required on splices in all underground illumination circuits.

All wiring in metal luminaire poles shall be fused with breakaway fusing per WSDOT Standard Plan J-1e.

All wiring in concrete poles shall have waterproof breakaway fusing installed in the adjacent J-box per City of Bellingham Standard Plan EL-400.

4-13.22.08 Service Cabinet

An illumination service cabinet with panel and photocell control shall be provided and installed where shown on the plans per Bellingham Standard Plan EL-444.

The electric eye shall be Model LC4536LA precision or equal installed in the panel for control of the streetlighting system. An override feature shall also be provided.

Service to the panel shall be provided from the power source noted on the plans. Additional conduit and wire up the power pole shall be provided as required.

Conduit from the panel to the traffic signal controller shall be a minimum of 2-inch P.V.C. for the 120 V.A.C. service with two #6 wires and one #8 green wire for ground. Conduit from the panel to the first hand hole for the streetlighting circuits shall be 3 inch P.V.C. and shall contain the necessary wires as noted on the plans and installation schedule.

The service cabinet shall be bottom fed and installed on a concrete pad. The pad shall be 15 inches deep with 12 inches below grade and 3 inches above grade. The concrete pad shall be 6 inches outside the dimensions of the base of the service cabinet. The service cabinet and controller cabinet may be mounted on the same pad where applicable.

4-13.23 Traffic Signal System Complete

Implemented: 09/17/2001 Revised: 01/07/2002

This work consists of signalization construction as shown on the plans and as specified herein. The successful Contractor shall submit four copies of shop drawings for Contractor-supplied equipment to the Engineer for approval before ordering. All material shall be obtained from a source approved by the Engineer.

The signal system shall be demonstrated to the Engineer at an agreed upon time after completion and prior to final approval. The Contractor shall provide manpower and equipment for any necessary final adjustments and/or corrections.

4-13.23.01 Signal Base

Signal bases shall be constructed in conformance with the attached Standard Plan No. EL-432 at such locations shown on the plans or designated by the Engineer. The concrete used shall conform to APWA Specifications, Class "B", with 5% air entrainment.

4-13.23.02 Conduit

All conduit to be installed in compliance with National Electric Code (NEC) at locations shown on the plans or designated by the Engineer. Fittings shall be the same material.

When installing conduit in paved areas (either shoulder or the traveled roadway), the installation shall be accomplished by either jacking, use of an air ram or sawcut trenching.

If the sawcut trenching method is used, the trenches shall be constructed as detailed in the plans. All trenches shall be as straight and narrow as practicable to provide a minimum of pavement disturbance. The trenches shall be sawcut on both sides of the trench and then the asphalt chipped out. Except for the top existing asphalt thickness, backfilling shall be entirely with a controlled density fill (CDF) as per the State’s Standard Specification 2-09.3(1)E. The Contractor shall ensure to the satisfaction of the Engineer that all voids are filled with CDF. The top of the trench shall be patched with compacted asphalt concrete pavement Class "B" equaling the thickness of existing asphalt. Care shall be taken to provide a smooth driving surface.

4-13.23.03 Junction Boxes (Pull Boxes)

Junction boxes shall conform to Standard Plan EL-452 and/or J-11a. The junction boxes shall sit on patio type concrete blocks which shall be placed on a 6 inch crushed compacted gravel base. All cover plates and metal surfaces for junction boxes shall be hot-dipped galvanized. Conduit into junction boxes shall be 6 to 8 inches from the top of the box. Conduit entering through the bottom of a junction box shall be located near the end walls to leave the major portion of the box clear. At all outlets, conduit shall enter from the direction of the run, terminating within 3 inches of the box wall nearest its entry location and have bell ends. Care shall be taken to ensure a neat and convenient arrangement of conduit as outlined in Section 8-20.3(5) of the Standard Specifications.

4-13.23.04 Conductors

Electrical conductors used on this project shall conform to all pertinent requirements of Section 9-29.3 of the State's Standard Specifications, except as otherwise provided herein or on the plans. Insulated spades shall be used at the end of each conductor at wire terminations, splices or devices. Each conductor shall have a PVC wire marking sleeve bearing the circuit number indicated in the wiring schematic drawings. The terminal strips shall also bear the circuit number consistent with the wiring schematic. No splicing of any traffic signal conductors or detector conductors shall be permitted, including service wires.

The following conductors are exceptions to the Standard Specifications:

1) 20 conductor Signal Cable

    a) The 20 conductor cable shall conform to Bellingham Standard Plan EL-448

2) Loop Wire

    a) Wire for the vehicle detection loops shall be #12 USE.

3) Loop Lead-In Cable

    a) Cable used for lead-in conductor between the encapsulated splice between the loop wire in the junction box closest to the detection loop and the traffic signal controller shall be #14 shielded cable conforming to WSDOT/APWA Specification 9-29.3-7. The outside jacket shall be polyethylene.

4) Emergency Vehicle Preemption

    a) The three conductor cable used for the preemption circuits shall be 3M detector cable #138, or approved equal.

5) Cable Marking and Identification

    a) In addition to the circuit numbers noted above for conductors and wires, all cables shall also be labeled at both ends with a labeling system as follows:

        i) 20-Conductor Cable: Shall be labeled with colored tape by pole numbers at each end and labeled at each J-box they pass thru.
            (1) Pole #1 is on controller corner and remaining poles at the intersection are numbered clockwise around intersection.
            (2) Pole #1 shall have brown tape.
            (3) Pole #2 shall have red tape.
            (4) Pole #3 shall have orange tape.

(5) Pole #4 shall have yellow tape.

ii) 5-Conductor Cable: Shall be labeled with signal head and ped head numbers consistent with the wiring diagram schematic at both signal/ped head and terminal cabinet ends. Both 5-conductor cable and individual wires shall be labeled.

iii) 3-Conductor Cable (Emergency Vehicle Preemption Cable): Shall be numbered 1-6 as follows:

(1) #1 Phase 1 and 6
(2) #2 Phase 2 and 5
(3) #3 Phase 3 and 8
(4) #4 Phase 4 and 7
(5) #5 Extra
(6) #6 Extra

In addition, each cable shall be color-coded according to the pole from which it comes and the individual conductors in each cable shall be numbered according to the supplied wiring diagram.

iv) 2-Conductor Cable (Loop Lead-In Cable): Shall be labeled with phase number, lane number and type of loop as follows:

(1) Phase (1st number)	1 through 8
(2) Lanes for Phase (2nd number)	1 through 4
(3) Type of Loop (3rd number)	A = Advanced
	B = Presence
	C = Intermediate

Cables shall be color-coded at both ends and at all J-boxes they pass thru. In addition, individual conductors within each cable shall be numbered according to supplied diagram at the controller cabinet end.

4-13.23.05 Signal Standards

The signal poles shall be Type II and Type III as shown on WSDOT Standard Plan J-7A and attached Standard Plan EL-404 or the standard may be fabricated from shop drawings that meet the requirements of the latest AASHTO specifications for structural supports for highway signs, luminaires and traffic signals and have been submitted in accordance with said Standard Plan

J-7A and Section 8-20.2(1) of the State's Standard Specifications and have been approved by the Engineer. The mast arm lengths shall be as shown on the plans and hand hole shall be added to the signal standard behind signal arm.

Signal heads on the mast arm shall be mounted using mounting Type "M" or Type "K" (modified) as shown on Standard Plan J-6f and J-6g. Type "K" (modified) shall require hubs welded in the pole prior to galvanizing for nipple connections. The minimum vertical clearance to any portion of the cantilever arms or any mast-arm-mounted signal shall be 16 feet 6 inches from the top of pavement. The maximum vertical clearance shall be 19 feet. All signals shall be rigidly attached to the arm. There shall be approved wireway fixtures installed to facilitate pulling wire from the base to an outlet at each signal head after the structure is erected. The pole base shall accommodate the conduit stubbed up from the foundation. The finished structure shall be raintight.

4-13.23.06 Vehicle Detectors - Induction Loop

The intention of this specification is to describe a detection system consisting of an induction loop embedded in the roadway surface with a lead-in cable connected to a detector amplifier which shall detect the presence or passage of vehicles over the induction loop.

Type I and Type II induction loops shall conform to Bellingham Standard Plans EL-460 and EL-462. The loops shall be a minimum of 3 inches below the final roadway surface and shall utilize #12 USE wire.

After the lead-in and loop sawcuts are completed, the slot shall be thoroughly blown out with 100 psi air pressure so that no rocks and debris remain in the sawcut. If traffic is allowed to travel over the sawcuts before they are sealed, they shall be blown out again before placement of the wire and sealing. The sawcuts shall be sealed with craftco detector-loop sealant, preco sealant, 3M sealant, or prior approved equal.

Any existing loop that is to be replaced shall either be removed or shall have each leg and ends cut with no remaining wire being longer than 3 feet in length.

The conductors that form the induction loop and terminate in the lead-in junction box shall be joined to the cable as follows:

Detector lead-ins shall be spliced at the junction box nearest to the induction loop. Sufficient cable length shall always be provided to permit the preparation of wire splices 2 to 4 feet above ground.

The conductors and detector lead-in shall be twisted together then soldered, conforming to the wiring diagram for loop identification. The soldered connections shall then be trimmed and taped, assuring good electrical insulation of the loop pair. Pigtail splices are permissible.

Each loop pair shall then be sealed in an epoxy resin, Scotchsast size "G" (Sealing Pack #3570) or approved equal, assuring a good seal on the splice and insulated sheaths of the conductors.

Overlap splices, parallel splices, "Y" or "T" splice kits shall not be allowed.

Loops shall be tested as per Section 8-20.3 (14) of the Standard Specifications. Documentation of test results shall be provided to the City.

4-13.23.07 Vehicular Signal Heads

Polycarbonate heads shall not be allowed. All traffic signal heads shall meet the requirements of Sections 9-29.16, and 9-29.16(2), of the State's Standard Specifications. All signal heads shall be 12 inches and shall contain Dialight LED signal faces.

Each conventional signal head shall have a 1/4-inch drain hole at the bottom. Signal heads shall have square doors and shall be equipped with tunnel visors. Signal heads shall be powder coated dark olive green. All conventional signal heads used on the project shall be by one manufacturer. Five-inch backplates shall be provided on all vehicular signal heads.

Overhead-mounted traffic signal heads shall be adjusted in the field such that a person standing on the pavement at a distance four times the numerical value of the speed limit expressed in feet from the stop-bar shall see the brightest image of the red section. All signal heads shall be plumbed as viewed from the direction which they face.

4-13.23.08 Pedestrian Signal Heads

All pedestrian signal heads employed on this project shall be LED. Pedestrian signal heads shall be the "clamshell" type housing with an integral terminal compartment attached to the signal pole and the signal heads affixed to the compartment by a hinge. All pedestrian signal heads used on this project shall be by one manufacturer.

4-13.23.09 Pedestrian Push Buttons

Pedestrian push button assemblies shall be in accordance with Standard Plan J-5 except the push button shall be magnetic and shall be made of ultra-high molecular weight polyethylene (UHMWPE). The "Bumble Bee" pedestrian button is said to meet these specifications. The backplate shall be curved to fit the pole. A drain hole will be drilled in the bottom of the pedestrian push button.

4-13.23.10 Terminal Cabinet

A terminal cabinet with terminals according to City of Bellingham Standard Plan EL-424 shall be recessed in each traffic signal pole.

4-13.23.11 Traffic Signal Controller

The City will supply one eight-phase signal controller with cabinet fully equipped to the Contractor who shall install the cabinet on a new Type P controller cabinet base per Standard Plan EL-436 and seal with silicone. All field wiring shall be connected in the cabinet by the Contractor.

Contractor shall verify controller delivery to City Shop prior to developing their project schedule.

The City will also supply all necessary "Canoga" 4-channel loop-detector amplifiers and two Model 752 Phase Selectors for Contractor installation in accordance with the plans and as directed by the Engineer.

A professionally-drafted sketch of the intersection shall be provided by the Contractor and mounted on the door of the cabinet protected by a clear plastic overlay. The sketch shall conform to the geometrics of the intersection and show the numbered detectors for the particular intersection. In addition, the sketch shall identify each movement by the phase designation used by the controller. The sketch shall include a north arrow and street names. A film reproducible of the sketch shall be provided by the Contractor.

All wires terminated at the terminal strip shall have an insulated open-end, crimp-style solderless terminal. All solderless terminals shall be installed with a tool designed for the installation of this type of terminal and crimping with pliers, wire cutters, etc., will not be allowed. All conductor runs shall terminate at the proper terminal compartment strip with pressure-type binding posts. All wiring inside controller cabinets and at intermediate points shall be trimmed and cabled together with nylon wraps or equivalent. All cables shall be color-coded with tape according to their pole of origin. All individual conductors shall be numbered according to supplied diagram.

4-13.23.12 Service

Electrical service for signal controller will be 120 volts, 60 Hz AC, 50 AMP single-phase, where and as noted in the plans.

4-13.23.13 Emergency Preemption

The emergency preemption optical detectors shall be 3M Company "Opticom" brand.

4-13.24 Beam Guardrail

Implemented: 09/17/2001 Revised: 05/01/1990

Beam guardrail shall be installed as shown on the plans or as designated by the Engineer in accordance with Section 8-11 of the Standard Specifications. Each "run" shall contain one Design "A" or "B" terminal section and one Design "C" terminal section.

4-13.25 Chain-Link Fence

Implemented: 09/17/2001 Revised: 05/01/1990

Chain-link fence shall be installed where shown on the plans or designated by the Engineer in accordance with Section 8-12 of the Standard Specifications and WSDOT Standard Plan L-2.

4-13.26 Brass Cap Placement

Implemented: 09/17/2001 Revised: 05/01/1990

The work performed under this item shall consist of constructing brass cap monuments conforming to the attached standard plan at such locations shown on the plans or designated by the Engineer. The brass caps will be supplied by the City at no cost to the Contractor.

4-13.27 Seeding, Fertilizing, and Mulching

Implemented: 09/17/2001 Revised: 05/01/1990

This work consists of preparing slopes and surfaces, seeding, fertilizing and mulching in accordance with Section 8-01 of the Standard Specifications.

Applications of seed, fertilizer and mulch shall be as follows:

1. Seed
   Grass seed of the following composition proportion and quality shall be applied at the rate of 150 pounds per acre on all areas requiring roadside seeding within the project:

Kind & Variety of Seed in Mixture	% by Weight	Minimum % Pure Seed	Minimum % of Germination
Colonial Bentgrass (Highland or Astoria)	10%	9.80% (min)	85%
Red Fescues (Illahee Rainier or Pennlawn)	45%	44.10% (min)	90%
Perennial Rye	30%	29.40% (min)	
White Clover (pre-inoculate)	15%	14.70% (min)	
Weed Seed		1.00% (max)	
Inert and Other Crop		1.00% þ (max)	
TOTAL	100%		

2. Fertilizer
   The Contractor shall apply sufficient quantities of fertilizer to supply the following amounts of nutrients:

   Total Nitrogen as N-90 pounds per acre.
   Available Phosphoric Acid as P2O5 - 70 pounds per acre. Soluable Potash as K2O - 70 pounds per acre.

   The fertilizer formulation and application rate shall be approved by the Engineer before use.

3. Mulch
   Mulch shall be applied at a rate of 2,000 pounds per acre.

4-13.28 Seeded Lawn Installation

Implemented: 10/04/2001 Revised: 05/01/1990

1. Materials
   A. Topsoil: Topsoil shall be natural, fertile, agricultural soil, capable of sustaining vigorous plant growth. It shall be of uniform composition throughout with a mixture of

subsoil. It shall be free of stones, lumps, live plants and their roots, sticks and other extraneous matter.

B. Fertilizer

i. Fertilizer shall be supplied by the Contractor and incorporated and mixed thoroughly into the soil at the following rate:
10 lb. 12-4-8 per 1,000 square feet.

ii. Requirements
50% of the nitrogen shall be derived from unreaformaldehyde; 50% of the potash shall be derived from sulfate of potashmagnesia.

iii. In addition to the above, the fertilizer shall contain the following additives:
F.T.E. 2.0%
Multritracin 0.5%

iv. Fertilizer shall be packed in new, waterproof, non-overlaid bags clearly labeled as to weight, manufacturer and content.

2. Lawn Installation

All planting strips within the project limits as shown on the plans shall be contoured to the Engineer's satisfaction and seeded as outlined in Section 8-02.3(14) in the Standard Specifications. Three inches of topsoil, Type "A," shall be used in all lawn installation areas.

A. Seed

i. Analysis:

1. 50% improved fine-textured Perennial Ryegrass. Select from following list of any three (3) with no single selection to total over 25% of total mixture.
   a. Manhattan
   b. Pennfine
   c. Loretta
   d. Derby
   e. Citation
   f. Yorktown
2. 50% improved low-growing Kentucky Bluegrass. Select from following list any three (3) with no single selection to total 25% of total mixture.
   a. Baron
   b. Victa
   c. Bonnie Blue
   d. Adelphi
   e. Pennstar
   f. Bristol

B. Seeding Rates

75 lbs. per acre or 4.0 lbs. per 1,000 sq. ft.

C. Certification

Seed shall conform to the standards for "certified" grade seed or better. Seed shall be furnished in standard containers on which shall be shown the following information: seed name, lot number, net weight, percentage of purity, percentage of germination, percentage of weed seed, and inert material.

D. Upon Request

Contractor shall furnish to the Engineer duplicate copies of a statement signed by the vendor certifying that each lot of seed has been tested by a recognized seed testing laboratory within 6 months before the date of delivery on the project. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be accepted. The Contractor shall perform all necessary operations of mowing, fertilizing and watering to fully establish the grass through the second mowing. After the second

mowing, all lawn areas shall be fertilized with 15 pounds of 12-4-8, per 1,000 square feet.

3. Guarantee
   A. Initial Acceptance
   The Contractor may request inspection for initial acceptance 30 days after planting is complete. Upon completion at this time, initial acceptance will be certified in writing by the Engineer.
   The Contractor's guarantee shall extend for one year from the date of the initial acceptance of the work. All lawn must be in vigorous growing condition at the end of the guarantee period. Defective materials, as determined by the Engineer, shall be replaced at the beginning of the first succeeding planting season and shall be in place prior to final acceptance. Failure on the part of the Contractor to comply with this requirement shall constitute grounds for the owner, or another Contractor of his choosing, to replace the necessary lawn on a time-and-materials basis, plus 15% overhead, and to utilize the maintenance bond for payment.
   B. Final Acceptance
   One year after initial acceptance in response to ten days written notice from the Contractor, a final inspection of the work will be completed jointly by the Contractor and the Engineer. Upon completion of the repairs or renewals which the Engineer deems necessary at this inspection, final acceptance shall be certified in writing by the Engineer.

4-13.29 Tree Planting

Implemented: 10/04/2001 Revised: 08/01/1995

This item shall consist of furnishing and planting trees at locations shown on the plans.

Trees shall be planted in pits having diameters at least twice that of the root ball or root system. The outer 6 inches of material shall be removed byhand methods. The wall and bottom of the pits shall be removed by hand methods. The wall and bottom of the pits shall be roughed to allow for root penetration. All planting pockets shall be backfilled by jetting to prevent air pockets in the lower third of the hole. Trees shall be watered generously during and after backfill. Backfill materials shall be sandy loam.

All trees shall be_____inches to_____inches caliper, B & B, unless otherwise noted. Measurements, caliper, branching, grading, quality, balling and burlapping shall follow the Code of Standards of the American Association of Nurserymen in the American Standard for Nursery Stock. All plants shall have natural shape.

Fertilizer for trees shall be Formula 4-2-2 "Transplanter" as manufactured by Pacific Agro Company and shall be applied at the rate of 8 ounces per tree. Four planting tablets, 21 gram size as manufactured by Agriform International Chemicals, Inc., 20-10-5 analysis shall be applied. Tree staking shall be in accordance with details in the plan.

All trees shall be properly protected against harm from wind, unusual weather and the public. The Contractor shall perform all necessary maintenance including watering, pruning and spraying until one year after acceptance. All trees must be in a vigorous growing condition at the end of the one-year guarantee period. Defective materials, as determined by the Engineer, shall be replaced immediately with specimens of the same species and size as the original.

4-13.30 Bicycle Facilities Standards

Implemented: 10/04/2001 Revised: 08/01/1995

1. Referenced Standards, Regulations and Policy
   A. AASHTO Guide for the Development of Bicycle Facilities, 1999
   B. Manual on Uniform Traffic Control Devices (MUTCD) & WSDOT Chapters 840 & 850.
   C. WSDOT Design Manual: Section 1020 1.4; RCW 35.75.060
   D. All arterials are to be designed and constructed under the assumption that they will be used by bicyclists and that sidewalks are not a substitute for bicycle facilities.
   E. All Public Works street projects are to have a bicycle check-off to determine in the early planning and design stages, whether or not there is a bicycle element or bicycling impact. When such conditions exist, the project shall be reviewed by a bicycle transportation specialist to ensure that any negative impacts on bicycle traffic are mitigated in the design process.
   F. Standard Drawing TC-315, Bicycle Lane Standards
   G. Standard Drawing MS-1040, Bicycle Parking Standards
2. Signs, Signals, and Roadway Markings
   A. Signing and marking of bikeways must be uniform and consistent to provide safety to all users and all signing and marking must be warranted by use and need. Care must be taken to avoid oversigning of bikeways which can lessen the impact of warnings and may confuse vehicle operators rather than enhance safety.
   B. Roads with shoulders less than 4 feet wide or that have obstructions with less than 4 feet of clearance to motor vehicle lanes should not be signed as bikeways.
   C. High conflict situations, where bike shoulders or bike lanes end and encroachments, obstructions, or a narrowing shoulder require that bicyclist merge into the motor lanes, may be marked and signed in accordance with the MUTCD.
   D. Raised pavement markers are incompatible with safe bicycle travel and should not be used in the expected path of bicycles on new roadway construction, or replaced when existing roadways are altered or resurfaced. Existing raised pavement markers that present a hazard should be removed and replaced with flat surface markings which are in accordance with MUTCD.
3. Roadway Facilities
   A. Width of Arterials
      i. Arterial streets without delineated bicycle lanes are required to have a minimum clear curb lane width of 14 feet (4.3 m) to provide for safe co-usage of the lane by bicycles and motor vehicles. Re-striping programs on existing multi-lane roads should consider the resizing of inside lanes in order to provide for the minimum curb lane width.
      ii. Bulbed intersections protruding up to the edge of the traffic lanes must not be designed to extend into the minimum curb lane width.
   B. Drainage Grates
      i. It is required that grates and utility covers be adjusted flush to the surface, including when an existing road is resurfaced. New installation of parallel bar (to travel direction) drainage grate inlets is prohibited.
   C. Railroad Crossings
      i. Railroad grade crossings should be at a right angle to the rails and the roadway approach at the same elevation as the top of the rails. If the crossing angle is less than 45 degrees, then widening the outside traffic lane, shoulder, or bicycle lane is required to allow bicyclists adequate room to cross the tracks at a right angle.
      ii. Warning signs and pavement markings are to be installed in accordance with the MUTCD. Abandoned tracks are to be removed.
   D. Shoulders
      i. Where it is intended that bicyclists ride on shoulders, smooth paved shoulder surfaces are to be provided and maintained.

ii. Where intended for bicycle travel, a clear shoulder width of 5 feet (1.5 m) is required.
iii. When existing widths, rights-of-way or other limitations require prioritization of facilities, shoulder improvements or bike lanes on uphill sections are to take precedence to provide slow-moving bicycles more maneuverability and to minimize conflicts with motorized vehicles.

4. Bicycle Lanes
   A. Bicycle lanes delineated and signed for the exclusive use by bicyclists (WSDOT 1020.02 Class II) are to be one-way facilities and carry traffic in the same direction as adjacent motorized traffic. Bicycle lanes on one-way streets are to be on the right side of the street, except in areas where a bicycle lane on the left will decrease the number of conflicts.
5. The minimum width of a bicycle lane is 5 feet (1.5 m) with a 4-inch wide lane strip separating the bike lane from motorized traffic lanes and the parking lane. Gutterless curbs (with vertical drain inlets) will allow for a reduction of the minimum bicycle lane width to 4 feet (1.2 m) because gutter skirts and seams do not encroach on the travel path. Where the minimum width is not possible, marked lanes separating bicyclists from motor-traffic lanes should not be provided; however, signing and/or pavement markings such as the bike symbol can be used to enhance safe co-usage of arterial streets (see bicycle lane standard drawing TC-315).
6. Bicycle Routes
   A. Bicycle routing must not end at a barrier nor require an abrupt entry into other traffic lanes without warning markings and signage in accordance with the MUTCD. Rerouting must be clearly signed to inform bicyclists of the barrier and the re-route destination.
7. Bicycle Parking
   A. Bicycle racks shall be constructed from 2" O.D. schedule 40 pipe in accordance with Bellingham Standard Plan MS-1040. Racks shall be galvanized after construction.

      Racks shall be installed in existing concrete using 3/8" galvanized threaded rod and hardware, epoxied with a mortaring epoxy system. Installation in asphalt areas or areas other than concrete shall use a minimum of 1 cubic foot concrete footing on each end with 3/8" galvanized anchor bolts placed in the concrete.

4-13.31 Traffic Control Signing Standards

Implemented: 10/04/2001 Revised: 01/27/2006

Traffic control signing for new construction within the city right-of-way shall be installed in accordance with the following procedures and specifications:

1. All construction plans and specifications pertaining to traffic signing are to be reviewed by the Transportation Engineering Section of Public Works to verify correct type and approximate location of traffic signing.
2. The contractor shall request the Transportation Engineering Section to locate the signing on all project sites. Transportation Engineering will field locate and inventory all signs required by the project. The contractor will be notified when field locations are complete.
3. The contractor shall be responsible for verifying utility locations thru the one-call system
4. The contractor will contact the project inspector to have the signing inspected and approved immediately upon installation.
5. All signing shall conform to the guidelines specified in the Manual on Uniform Traffic Control Devices. Signs shall be fabricated according to the specifications in WSDOT's Sign Fabrication Manual, be of standard size, and shall have a reflective grade equal to or greater than the following:
   A. Regulatory Signs:
      R1-1, R1-2, R1-3, R1-4, R5-1, R6-1, R3-16, R3-17 - High intensity or better. All other regulatory signing - Engineer grade or better.
   B. Warning Signs:

High intensity or better (all signs including school zone signs).

6. Signs shall be installed on posts described in Standard Plan TC-320 of the Development Guidelines and Improvement Standards.
7. Street Name Signs Shall:
   A. Be reflective (engineer grade).
   B. Have a standard size of 6" tall x 24" or 30" long depending on length of word.
   C. Have white lettering on a green background.
   D. Be made of extruded aluminum.
   E. Have 4" lettering for the street name and 2" lettering for the abbreviated street type (i.e., St, Ln, Rd, Blvd). Only the first letter of the word to be capitalized.
   F. Have a lettering font Highway Gothic Series "C".

<u>4-13.31.01 Traffic Control Within City Right-of-Way</u>

1. GENERAL REQUIREMENTS
   A. All traffic control devices used in the City right-of-way shall conform to the applicable specifications of the Manual on Uniform Traffic Control Devices.

      Traffic control devices shall be installed at the inception of surveying, construction or maintenance operations, and shall be properly maintained and/or operated during the time such special conditions exist. They shall remain in place only as long as they are needed and shall be immediately removed thereafter. Where operations are performed in stages, there shall be in place only those devices that apply to the conditions present. Signs that do not apply to existing conditions shall be removed, covered, or turned so as not to be readable by oncoming traffic. Barricades and sign supports shall be constructed and erected in a workmanlike manner.

      Weeds, shrubbery, construction materials or equipment, spoil, etc., shall not be allowed to obscure any traffic control device.
2. DESIGN OF SIGNS
   A. Signs shall meet the following standards:
      i. They shall conform in size, shape, color and message with those in part VI of the MUTCD and meet minimum dimensions in the State of Washington Sign Fabrication Manual MSS-05.
      ii. The use of stripes (other than the standard border) or other geometric patterns or contrasting colors on or around the sign in an attempt to make it more conspicuous shall not be permitted; however, standard fluorescent red-orange flags or yellow flashing lights may be used for added emphasis so long as they do not interfere with the sign message.
      iii. All signs used shall be properly reflectorized except for parking and pedestrian prohibition signs. Reflectorization of the sign face shall be accomplished using an approved weatherproof, reflectorized sheeting. Paint impregnated with glass beads shall not be used, the source shall be properly shielded to reduce glare. Street or highway lighting shall not be considered adequate for illuminating signs. All reflectorized or illuminated signs shall be checked by the Contractor during the hours of darkness to insure that they are functioning properly.
      iv. Signs shall be constructed from material which will not deteriorate abnormally under normal weather conditions. Sign blanks should be weatherproof plywood or non-corrosive metal. Roll-up signs fabricated from vinyl-coated nylon or vinyl-coated nylon mesh may also be used. If such signs are not reflectorized, they shall not be used at night.
3. FLAGGING
   A. Flagging is provided at work sites either to stop traffic intermittently as necessitated by work progress or to maintain continuous traffic flow past the work site at reduced speeds to help protect the work crew. The flagger must at all times, be clearly visible to approaching traffic for a

sight distance sufficient to permit proper response by the motorist to the flagging instructions and to permit traffic to reduce speed before entering the work site area.

Flaggers and operators of construction and maintenance machinery or trucks should make every reasonable effort to allow the driving public the right-of-way so as to avoid excessive traffic delays.

Thus, the flagger has three basic functions -- all of equal importance:

i. To guide traffic safely through a work area.
ii. To protect the lives of the public and fellow employees working on and near the public right-of-way.
iii. To answer courteously and intelligently reasonable questions.

B. Training: Flaggers shall complete a Washington State approved flagging course, or the equivalent, prior to being assigned duties as a flagger.
C. Equipment: When on duty, flaggers should be appropriately dressed to alert the motorist. The standard orange vest, hat, and other equipment shall be worn. All equipment must be reflectorized except if it will never be used during dusk, or night conditions.
D. Tools: Hand signaling devices, such as red flags, STOP/SLOW paddles and lights are used in controlling traffic through work areas; the STOP/SLOW paddle shall be the primary hand-signaling device.
   i. Sign paddles shall be at least 24 inches wide by 24 inches high. A rigid handle must be provided. This combination sign may be fabricated from sheet metal or other light semi-rigid material and have an octagonal shape. The background of the STOP face shall be red with white letters and borders. The background of the SLOW face shall be orange with black letters and borders. All such paddle signs must be reflectorized, unless the paddle will only be used during daylight hours.

4-13.31.02 Traffic Control Within and Abutting the Project

Any time the Contractor's operation is expected to disrupt the normal flow of traffic, the Contractor shall submit a traffic control plan to the Engineer for approval. As construction progresses, each traffic control plan shall be modified and re-submitted if deemed necessary by the Engineer. All signing and traffic control measures shall conform to the Manual on Uniform Traffic Control Devices as adopted by the State of Washington. Construction shall not be allowed to commence until the traffic control plan is approved.

Streets within the project limits may be closed to traffic only under the following conditions:

1. The Contractor submits a complete signing and traffic control plan for approval by the Traffic Engineer five (5) working days prior to the desired implementation date.
2. Approved traffic controls to be in place and operational before commencement of construction.
3. The Contractor shall have total responsibility for the procurement, installation and maintenance of all traffic control devices required for the duration of the contract.
4. The Contractor shall not close or cause to be closed, any arterial street or portion thereof between 7 a.m. and 9 a.m. or 4 p.m. and 6 p.m., unless otherwise approved by the Traffic Engineer.

All costs encountered in the maintenance of traffic, including the placement of traffic cones, construction signs, detours, etc., and traffic control within the abutting the project as specified above and in the Standard Specifications shall generally be considered incidental to construction and no compensation shall be allowed; any allowance for traffic control labor is, however, an exception.

The Contractor shall an acceptable means of securing signs, cones and barricades to prevent them from being wind-blown or tipped while in service. A penalty of twenty dollars ($20.00) per day will be assessed

for each traffic control device which is not in its proper position because of poor installation techniques or lack of maintenance by the Contractor.

4-13.31.03 Notification of Adjacent Residents and Businesses

The Contractor shall notify residents and business occupants in writing a minimum of 36 hours and a maximum of 72 hours prior to any work affecting access or service. A daily notification record shall be maintained during the life of the contract. A copy of the notification record shall be supplied to the Engineer upon request. Access interruptions shall be minimized whenever possible. Any costs associated with these requirements shall be considered incidental to other items of work.

Section 5. Sanitary Sewer System

5-1 Introduction

Implemented: 10/04/2001 Revised: 06/01/1997

The City of Bellingham requires sanitary sewer construction plan submittal on development projects when improvements are proposed within public right-of-way or an easement. The following chapter has been developed to assist in preparation of sewer construction plans. It includes items pertinent for the City's review and reflects established professional civil engineering practice for preparation of construction plans. Three sets of plans must be submitted to the Public Works Department for initial review.

5-2 Criteria for Sewage Design

Implemented: 10/04/2001 Revised: 06/01/1997

This section serves as a guide for the design of sewage collection systems for the City of Bellingham. The goals are:

1. To ensure that the design of sewage collection systems is consistent with public health and water quality objectives of the State of Washington.
2. To establish a basis for the design and review of plans and specifications for sewage systems.
3. To assist the owner or their authorized engineer in the preparation of plans, specifications, reports, and other data.
4. To guide departments in their determination of whether an approval, permit, and/or a certificate for a sewage system should be issued.

5-2.01 DESIGN

Implemented: 11/09/2001 Revised: 06/01/1997

Sewer systems shall be designed and constructed to achieve total containment of sanitary wastes and maximum exclusion of infiltration and inflow. No new combined storm water and sanitary sewers will be allowed.

In keeping with good engineering practice and with the Uniform Plumbing Code, public sewers shall be designed to provide gravity service to all abutting individual building lots. Installation of sewers or utilization of sewers that cannot provide for gravity service will only be allowed if a gravity system is considered by the City to be impractical to install.

5-2.01.01 Overflows

Implemented: 11/16/2001 Revised: 06/01/1997

No overflows in separate sewers or new overflows in existing combined sewers shall be permitted.

5-2.01.02 Calculations

Implemented: 11/16/2001 Revised: 06/01/1997

Computations and other data used for design of the sewer system shall be submitted to the Department upon request.

5-2.02 DESIGN CONSIDERATION

Implemented: 11/16/2001 Revised: 06/01/1997

5-2.02.01 Design Period

Implemented: 11/16/2001 Revised: 06/01/1997

Collection sewers should be designed for the ultimate development of the tributary areas.

Selection of the design period for trunk and interceptor sewers should be based on evaluation of economic, functional, and other considerations; such as:

1. Possible solids deposition, odor, and pipe corrosion that might occur at initial flows.
2. Population and economic growth projections and the accuracy of the projections.
3. Comparative costs of staged construction alternatives.
4. Effect of sewer sizing on land use and development.

5-2.02.02 Design Basis

Implemented: 11/16/2001 Revised: 06/01/1997

New sewer systems shall be designed on the basis of per capita flows or alternative methods. Documentation of the alternative method shall be provided upon request.

Per Capita Flow: New sewer systems designed on the basis of an average daily per capita flow may be designed for flow equal to that set forth in Table 5-1, with an appropriate peaking factor.

TABLE 5-1 DESIGN BASIS FOR NEW SEWAGE WORKS

Discharge Facility	Design Units	Flow (gpd)
Dwelling	per person	150
Schools (w/showers and cafeteria)	per person	16
Schools (cafeteria but no showers)	per person	10
Boarding Schools	per person	75
Motels, at 65 gal/person (rooms only)	per room	130
Trailer Courts, at 3 persons/trailer	per trailer	300
Restaurants	per seat	50
Service Station	per serviced vehicle	10
Factories, per shift	per person	15-35
Shopping Centers	per 1,000 s.f. area	200-300
Hospitals	per bed	300
Nursing Homes	per bed	200
Retirement Homes	per bed	100
Doctor's Office in Medical Center	per 1,000 s.f. area	500
Laundromats (9 to 12 machines)	per machine	500
Community Colleges	per student-faculty	15
Swimming Pools	per swimmer	10
Theaters (drive-in type)	per car	5
Theaters (auditorium type)	per seat	5
Picnic Areas	per person	5
Resort camps (limited plumbing)	per campsite	50
Luxury Camps (w/flush toilets)	per campsite	100

These figures are assumed to cover normal infiltration, but an additional allowance should be made where conditions are unfavorable. If there is an existing water system in the area, water consumption figures can be used to help substantiate the selected per capita flow.

Generally, the sewers should be designed to carry, when running full, not less than the following:

1. Lateral and Submains:

   "Minimum peak" design flow should be not less than 400 percent of the average. "Lateral" is defined as a sewer that has no other common sewers discharging into it. "Submain" is defined as a sewer that receives flow from one or more lateral sewers.

2. Main, Trunk, and Interceptor Sewers:

   "Minimum peak" design flow should be not less than 250 percent of the average design flow. "Main" or "trunk" is defined as a sewer that receives flow from one or more submains. "Interceptor" is defined as a sewer that receives flow from a number of main or trunk sewers, force mains, etc. An alternate method for trunk sewers is to use 80 gallons per capita, per day, a peaking factor from Figure 5-1 subject to the above limits, and 1,200 gallons per acre, per day, for infiltration and inflow.

   New sewer systems may be designed by alternative methods other than on the basis of per capita flow rates. Alternative methods may include the use of peaking factors for the contributing area, allowances for future commercial and industrial areas, separation of infiltration and inflow from the normal sanitary flow, and modification of per capita flow rates (based on specific data). Documentation of the alternative method used shall be provided upon request.

5-2.02.03 Design Factors

Implemented: 11/16/2001 Revised: 01/01/1990

The following factors must be considered in the design of sanitary sewers:

1. Peak sewage flows from residential, commercial, institutional, and industrial sources
2. Groundwater infiltration
3. Topography and depth of excavation
4. Treatment plant location
5. Soil conditions
6. Pumping requirements
7. Maintenance
8. Existing sewers
9. Existing and future surface improvements
10. Controlling service connection elevations
11. Easements (See Section 2-6)

5-2.03 DESIGN AND CONSTRUCTION DETAILS

Implemented: 10/04/2001 Revised: 08/01/1992

5-2.03.01 Gravity Sewers

Implemented: 11/16/2001 Revised: 08/01/1992

1. Minimum Size: No sewer shall be less than 8 inches in diameter.

2. Depth: In general, sewers should be a minimum of 3 feet deep to prevent freezing and physical damage and should receive sewage from existing dwellings by gravity.

3. Roughness Coefficient: An "n" value of 0.013 shall be used in Manning's formula for the design of all sewer, facilities (regardless of pipe material) except inverted siphons, where an "n" value of up to 0.015 can be used.

4. Slope: All sewers shall be designed and constructed to give mean velocities, when flowing full, of not less than 2.0 feet per second. The following minimum slopes should be provided, however, slopes greater than these are desirable:

Sewer Size	**Minimum Slope**
(inches)	(feet per 100 feet)
8"	0.40
10"	0.28
12"	0.22
15"	0.15

Under special conditions, slopes slightly less than those required for the 2.0 feet per second velocity when flowing full may be permitted. Such decreased slopes will only be considered where the depth of flow will be 0.3 of the diameter or greater for design average flow. Whenever such decreased slopes are proposed, the design engineer shall furnish with their report their computations of the depths of flow in such pipes at minimum, average, and daily or hourly rates of flow. The City must recognize and accept in writing the problems of additional maintenance caused by decreased slopes.

Sewers shall be laid with uniform slope between manholes.

Sewers on 20% slope or greater shall be anchored securely with concrete anchors or equal. Suggested minimum anchorage spacing is as follows:

A. Not over 36 feet center-to-center on grades 20% and up to 35%.

B. Not over 24 feet center-to-center on grades 35% and up to 50%.

C. Not over 16 feet center-to-center on grades 50% and over.

5. Alignment: Gravity sewers 24 inches or less in diameter shall be designed with straight alignment between manholes. Curved sewers may be approved, where circumstances warrant, for sewers greater than 24 inches in diameter.

6. Matching Pipe: Where a smaller sewer joins a larger one, the invert of the larger sewer should be lowered sufficiently to maintain the same energy gradient. An approximate method for securing these results is to place the 0.8 depth point of both sewers at the same elevation.

7. High-Velocity Protection: The use of ductile-iron pipe is required where velocities greater than 15 feet per second are expected.

8. Material: Any generally accepted material for sewers will be given consideration, but the material selected should be adapted to local conditions, such as characteristics of industrial wastes, possibility of septicity, soil characteristics, exceptionally-heavy external loadings, abrasion, and similar problems.

Material and installation specifications for all pipe, except cleanouts, shall conform to the Standard Specifications, current edition. Material and installation specifications for PVC pipe shall conform to Section 9-05.12. Cleanouts shall be according to City of Bellingham Specification SS-720. Unless

otherwise stated, all materials specifications shall conform to the Standard Specifications, current edition.

Requirements shall be set forth in the specifications for the pipe and methods of bedding and backfilling so as not to damage the pipe or its joints, impede cleaning operations and future tapping, nor create excessive side fill pressure or ovalation of the pipe, nor seriously impair flow capacity.

All sewers shall be designed to prevent damage from superimposed loads. Proper allowance for loads on the sewer shall be made based on the width and depth of trench. When standard-strength sewer pipe is not sufficient, the additional strength needed may be obtained by using extra-strength pipe or by special construction, such as improving bedding conditions or encasing the pipe in concrete. When extra-strength pipe is required, the design criteria (loading requirements, soil strengths, etc.) shall be supplied to the City.

9. Specifications for Sewer Pipe: The following specifications are to be used in conjunction with the Standard Specifications for Road, Bridge and Municipal Construction.

   Material to be used for bedding of these flexible conduits shall conform to material listed in City of Bellingham Standard Plan SS-760. No bedding material shall be used unless accepted by the City Engineer. Samples shall be submitted by the Contractor at least 72 hours in advance of its intended use to enable it to be inspected and tested.

   Bedding shall be placed in more than one lift as shown on Standard Plan No.SS-750. The first lift to provide at least 4-inch thickness under any portion of the pipe (6 inches in the case of solid rock excavation) to be placed before the pipe is installed. This bedding layer shall extend the full width of the trench bottom to the specified thickness after being consolidated by the use of a "flat tamper." This lift shall be spread smoothly and bell holes dug where necessary to ensure uniform support along the full length of the pipe barrel.

   Subsequent lifts of not more than 6 inches shall be placed up to the spring line of the pipe. These lifts shall be consolidated first by the use of tamping bars, taking care to work the material under the pipe haunches so that no voids are left, then a flat tamping bar shall be used to compact the bedding material along the side of the pipe to the trench walls to provide lateral support for the pipe. These lifts shall be individually compacted to 90% density, as determined by ASTM D698, Method "D."

   Further lifts of moderately-compacted bedding material shall be placed, not more than 6 inches thickness to a minimum of 8 inches, above the crown of the pipe (a minimum of 12 inches above the crown of pipe where rock is encountered in trench excavation).

10. Bank-Run Gravel for Trench Backfill: Wherever a trench is excavated in the existing or newly-paved roadway, sidewalk or other areas where minor settlement would be detrimental, the entire trench shall be backfilled with Bank-Run Gravel, Class "B," and compacted to a 95% density as defined by ASTM D-1556. Selected native materials may be used for trench backfill in other areas if approved by the City Engineer.

11. Joints and Infiltration: The method of making joints and materials used shall be included in the specifications. Leakage tests shall be according to Standard Specification SE-7-17.3(4)F for non-air-permeable materials and SE-7-17.3(4)D for air-permeable materials.

The use of television camera or other visual methods for inspection prior to placing the sewer in service is required.

5-2.03.02 Pressure Systems

Implemented: 11/16/2001 Revised: 01/01/1990

Pressure sewer systems are considered developmental technology. All pressure systems will be designed by a professional engineer and will be judged on a case-by-case basis.

5-2.03.03 Manholes

Implemented: 11/16/2001 Revised: 10/03/2003

Manholes shall conform to City of Bellingham Standard Plan No. SS-700.

Manholes shall be installed at the end of each line of 8-inch diameter or greater unless the 8-inch line is expected to be extended in the foreseeable future in which case, a cleanout shall be installed at the end of the line; at all changes in grade, size, or alignment; at all intersections; and at distances not greater than 400 feet for sewers 15 inches or less and 500 feet for sewers 18 inches to 30 inches. Cleanouts may be used in lieu of manholes at the end of lines 8 inches in diameter and not more than 150 feet long if they are accessible to the City's maintenance equipment. Cleanouts shall conform to City of Bellingham Standard Plan No. SS-720.

Drop manholes shall conform in all respects to City of Bellingham Standard Plan SS-700 except for the additional drop detail shown on Standard Plan B-18. An outside drop connection should be provided for a sewer entering a manhole at an elevation of 24 inches or more above the manhole invert. Where the difference in elevation between the incoming sewer and the manhole invert is less than 24 inches, the invert should be filleted to prevent solids deposition.

The minimum diameter of manholes should be 48 inches, although larger diameters are preferable. The minimum clear opening in the manhole frame should be 23 inches.

Manholes connecting significant industries to the system should be larger, to provide space for monitoring and sampling equipment.

Flow channels in manholes shall be of such shape and slope to provide a smooth transition between inlet and outlet sewers and to minimize turbulence. Channeling height shall be to the crowns of the sewers. Benches shall be sloped from the manhole wall toward the channel to prevent accumulation of solids.

Watertight manhole covers shall be used wherever the manhole tops may be flooded. Manholes of brick or segmented block should be waterproofed on the exterior with plaster coatings, supplemented by a bituminous waterproof coating where groundwater conditions are unfavorable.

Direct-line connections to the manholes or to short stubs integral with the manholes should be made with flexible joints. Flexible joints are those which permit the manholes to settle without destroying the watertight integrity of the line connections.

Ventilation of gravity sewer systems should be considered where continuous watertight sections greater than 1,000 feet in length are incurred.

Frames and covers shall conform to current City of Bellingham Standard Plan No. SS-700. Frames and covers of aluminum material will be allowed if approved by the City Engineer.

All covers shall be the locking type as per SS-704.

Materials used for manhole steps should be highly corrosion resistant. The use of galvanized steel should be avoided.

5-2.04 SPECIAL DETAILS

Implemented: 10/04/2001 Revised: 01/01/1997

5-2.04.01 Protection of Water Supplies

Implemented: 11/16/2001 Revised: 01/01/1997

There shall be no physical connection between a public or private potable water supply system and a sewer, or appurtenance thereto, which would permit the passage of any sewage or polluted water into the potable supply.

No sewer shall be constructed within 100 feet of a potable water supply well or other potable water source or structure without approval of the City and the Department of Social and Health Services (DSHS).

Relation to water mains shall be as follows:

1. Horizontal Separation: Whenever possible, sewers should be laid at least 10 feet, horizontally, from any existing or proposed water main. Should local conditions prevent a lateral separation of 10 feet, a sewer may be laid closer than 10 feet to a water main if the sewer is constructed of cast-iron or ductile-iron pipe with watertight joints, and:
   A. It is laid in a separate trench; or
   B. It is laid in the same trench with the water mains located at one side on a bench or undisturbed earth.

   In either case, the elevation of the crown of the sewer is at least 18 inches below the invert of the water main and in no case will the sewer be separated horizontally from the water main less than 4 feet.
2. Vertical Separation: Whenever sewers must cross under water mains, the sewer shall be laid at such an elevation that the top of the sewer is at least 18 inches below the bottom of the water main. When the elevation of the sewer cannot be buried to meet the above requirements, the water main shall be relocated to provide this separation or the sewer constructed with slip-on or mechanical-joint cast-iron pipe, or pre-stressed-concrete cylinder pipe for a distance of 10 feet on each side of the water main. One full pipe length of water main should be centered over the sewer so that both joints will be as far from the sewer as possible.

5-2.04.02 Easements

Implemented: 11/16/2001 Revised: 01/01/1997

Easements required for construction of sewer lines or water lines shall be properly dedicated to the City of Bellingham and recorded prior to plan approval. Easements crossing land to be subdivided in conjunction with the main construction can be dedicated on the face of the plat and recorded after the main is accepted by the City.

5-2.04.03 Access Roads

Implemented: 11/16/2001 Revised: 09/08/2008

Access roads to manholes on easements shall be 10-feet wide, 6-inch thick bank-run gravel and 2-inch C.S.T.C. with 15% maximum grade. Access roads from 10% to 15% shall be paved with 2-1/2" of Asphalt Concrete, Class "B". (See Section 2-6 for easement description.)

5-2.04.04 Stream Crossings

Implemented: 11/16/2001 Revised: 01/01/1997

Sewers entering or crossing streams shall be constructed of watertight pipe. The pipe and joints shall be tested in place, shall exhibit "0" infiltration, and shall be designed, constructed, and protected against anticipated hydraulic and physical, longitudinal, vertical, and horizontal loads, erosion, and impact. Sewers laid on piers across ravines or streams shall be allowed only when it can be demonstrated that no other practical alternative exists. Such sewers on piers shall be constructed in accordance with the requirements for sewers entering or crossing under streams. Construction methods and materials of construction shall be such that sewers will remain watertight and free from change in alignment or grade.

Permits from other agencies or departments are required for work in or adjacent to waterways.

Inverted siphons shall have not less than two barrels with a minimum pipe size of 6 inches, and shall be provided with necessary appurtenances for convenient flushing and maintenance. The manholes shall be designed to facilitate cleaning, and, in general, sufficient head shall be provided and pipe size selected to secure velocities of at least 3.0 feet per second for average flows. A rock catcher and coarse screen should be provided to prevent plugging of the siphons. The inlet and outlet details shall be arranged so that normal flow can be diverted to one barrel and so that either barrel may be removed from service for cleaning or other maintenance.

5-2.04.05 Side Sewer Installation

Implemented: 11/16/2001 Revised: 04/08/2009

Four-inch or 6-inch side sewer installations and as-builts shall conform to City of Bellingham Standard Plans No. SS-730 and SS-740. For new sewer main construction, 4- or 6-inch tees shall be placed on sewer mains as shown on plans or as the City Engineer designates.

Section 6. Water Distribution System

6-1 Introduction

Implemented: 10/04/2001 Revised: 01/01/1990

The City of Bellingham requires water distribution system construction plan submittal for development projects when improvements are proposed within public right-of-way or in easements.

The following chapter has been developed to assist in preparation of water distribution system construction plans. It includes items pertinent for the City's review and reflects established professional civil engineering practice for preparation of construction plans.

Three sets of plans must be submitted to the Department of Public Works for initial review.

6-2 Water Distribution System Design Requirements

Implemented: 10/04/2001 Revised: 01/01/1990

When adding to or extending the City's water distribution system, the policies outlined in this section will apply. These are minimum standards, however, and larger mains or other additions may be required where deemed necessary by the Director of Public Works.

6-2.01 Minimum Size Water Main

Implemented: 10/04/2001 Revised: 01/01/1990

6-2.01.01 Residential Zones

Implemented: 11/16/2001 Revised: 01/01/1990

The minimum size water main shall be 6 inches in diameter with an average gridded spacing not to exceed 600 feet. An 8-inch diameter main shall be used where an average grid of 600 feet is not possible, however, the maximum ungridded length may not exceed 1,500 feet. Four-inch diameter pipes may be allowed by the Department when future extension is not anticipated, such as in a cul-de-sac, provided the main does not serve a fire hydrant.

6-2.01.02 Commercial, Industrial, and Institutional Zones

Implemented: 11/16/2001 Revised: 01/01/1990

The minimum size water main shall be 8 inches in diameter with an average gridded spacing not to exceed 600 feet. A 10-inch diameter water main shall be used when the system is not gridded. The maximum ungridded length and size of the water main may be determined by site conditions and requirements for fire flow.

6-2.01.03 Supply Water Mains

Implemented: 11/16/2001 Revised: 01/01/1990

Where required, the minimum size supply main shall be 12 inches in diameter and shall be spaced on approximately 3,000 foot centers. The actual size of the supply main shall be determined by its ability to deliver water based on the peak-daily demand, plus designated fire flow.

6-2.02 Valve Spacing

Implemented: 10/04/2001 Revised: 03/15/2010

Valves shall be placed on each main at a junction point (node) and should be spaced along the water main at intervals not to exceed 500 feet for pipe sizes 10 inches in diameter and above, and not to exceed 800 feet for pipe sizes less than 10 inches in diameter. Gate valves shall be used on all diameter pipes.

6-2.03 Fire Hydrant Spacing

Implemented: 10/04/2001 Revised: 03/01/1993

Fire hydrants shall be spaced as follows:

1. One- and two-family unit developments: no greater than 500-foot intervals along public streets or approved fire routes.
2. All other developments: not greater than 300-foot intervals along public streets or approved fire access routes

6-2.04 Fire Flow Rates

Implemented: 10/04/2001 Revised: 03/01/1993

All water main construction and reconstruction shall be done pursuant to a design that, when fully implemented, will provide the fire flow requirements of the Bellingham Fire Department's fire protection standards.

In any circumstance, when improvements which increase the fire flow requirements are made, the water system must be upgraded to support the changes.

6-2.05 Fire Mains And Hydrants Located On Private Property

Implemented: 10/04/2001 Revised: 09/04/2002

All fire hydrants and water mains serving hydrants ill be publicly owned and maintained. A minimum 20-foot maintenance easement shall be granted to the City and recorded for any public water main on private property. Construction must meet City standards. (See Section 2-6 for easement description.)

Water mains on private property serving building sprinkler systems will be privately owned and maintained as long as the main serves only one property and no hydrants are required. In this cae, the following requirements apply:

1. An approved backflow device must be installed.
2. No domestic or other water service allowed on fire main.
3. Disinfection procedures per AWWA Section C-6-51 following Fire Department pressure test.
4. No maintenance easement is necessary.

6-3 Construction of Water Main Extension

Implemented: 10/04/2001 Revised: 01/27/2006

The petitioner shall contract with a contractor licensed to perform the construction in the State of Washington to install a main extension as approved by the Department of Public Works.

The Department of Public Works shall inspect the installation of the water main to ensure compliance with the specifications. The charges for such inspection, including administrative and overhead charges, shall be withdrawn from the construction inspection fee deposited with the Finance Director. At such time as the Director of Public Works determines the remaining funds are not adequate to provide necessary inspection for the project, the petitioner shall be notified and an estimate of additional inspection fees required will be provided. The additional fees shall be deposited with the Finance Director prior to the depletion of the funds on deposit. The City reserves the right to reject any installation not inspected and approved by the Department of Public Works. Any monies unexpended from the inspection fee upon completion of the project shall be returned to the petitioner.

Upon satisfactory completion of all required tests and acceptance of the main extension, the Department of Public Works shall cause the extension to be connected to the City system. All costs incurred in the connection, including overhead and administrative charges, shall be paid by the petitioner. Any adjustment of the actual cost of installation because of a variance between the estimate and the actual costs shall be refunded upon completion of the job to the petitioner or by payment by the petitioner to the City of any additional expense above the estimate.

When a main extension is to serve a new single-family residential area, individual services shall be installed by the developer to supply each proposed building site. These services shall be installed to City standards. All fees and charges for installation of the services shall be paid at the time a plumbing permit is obtained.

All extensions of water mains shall be subject to the payment of a hydrant fee. Whenever the installation of a hydrant is required by the Director of Public Works during the course of a water main extension, the established value thereof may be applied to reduce any hydrant fees due for that extension.

RECORD DRAWING POLICY

The following is intended to provide necessary guidelines for development of required construction record drawings:

1. Certified record drawings are to be provided by the owner and shall accurately reflect all field revisions made during the construction process. Record drawings shall be submitted on the same number of sheets as the original approved drawings.
2. The owner shall retain a licensed professional engineer to track all relevant field changes to the approved construction drawings. Changes shall be clearly identified in a comprehensive manner on one set of City-approved Xerox black-line.
3. At the time the record drawings are transmitted to the City, each sheet shall include a signature block similar to that shown below located in the bottom right-hand corner of the sheet when possible:

Recording Drawing Certification
This drawing reflects the work as constructed and all modifications meet the performance standards of the original design.
By:_____Date:_____

4. The record drawings shall identify all existing or abandoned utilities that were encountered or installed during construction that were not shown on the approved construction drawings.
5. All sanitary sewer, storm sewer, and water service stub locations shall be stationed and marked in accordance with City Standard specifications, SS-790 and WA-897. Stationing for sanitary sewer and water mains shall be independent from the roadway centerline.

6. Substantial changes made to storm drainage shall be reflected in a modified storm drainage report and shall be certified by the professional engineer that the modifications made during construction meet the performance standards of the original design.
7. The final project approval shall not be processed until the City has received and approved the certified record drawings. The City Engineer may accept a deposit of 150% of the cost of preparation of record drawings in lieu of performance. A deposit will require a commitment from the owner to (A) complete the record drawings within 90 days; (B) hold the City harmless from any damages caused by the delay in performance; and (C) require the engineer of record to provide free and timely information to the City and Public.
8. All underground facilities shall be shown on the record drawings to the nearest 1-foot horizontal and the nearest 0.1-foot vertical unless otherwise noted by the engineer. Water services shall be shown to the nearest 5-foot horizontal and the nearest 1-foot vertical. Side sewers shall be shown to the nearest 2-foot horizontal and the nearest 0.1-foot vertical.

RECORD DRAWINGS (SEWER AND WATER)

The purpose of this letter is to inform you that the City of Bellingham will now require the developer's engineer to supply us with a full set of certified record drawings upon completion of the Public Facilities Contract. These as-built drawings will reflect the exact location of all underground and aboveground utilities and will include, but not be limited to, the following:

1. The location of all vertical and horizontal bends in the water system.
2. The location of all water service taps into the water main.
3. The location of all water service boxes and meters with distances to the main tap and to the corresponding property corners.
4. The locations of all water valves, hydrants, hydrant valves, and blow-offs as to distance from the centerline and distances to the nearest property lines or property corners.
5. The location of all utilities within easements. This will include distances to the utilities from the easement lines.
6. The location of all side sewer tees into the sewer main from the back-station manhole.
7. The location of all side sewer ends according to the attached drawings and with the additional stipulations:
   A. The ends must be tied out to the corresponding property corners.
   B. The depth of the end at the location board must be noted.
8. The location of all sanitary manholes, storm sewer manholes, storm sewer catch basins and back-of-walk drains. These locations must include distances from the centerline monuments, easement lines, or property corners.
9. All easements will be staked in advance of utility installations to ensure that the utilities fall within the proper boundaries. Construction offset staking will not fulfill this requirement.

6-3.01 Energizing Main Extensions

Implemented: 10/04/2001 Revised: 03/01/1993

No main extensions shall be energized other than for test purposes by duly authorized personnel until the main extension has been accepted by the City and all fees and charges have been paid. If energizing a main is necessary to restore service to existing customers, fire hydrants will not be activated until acceptance of the main extension.

6-3.02 Payment For Water Mains

Implemented: 10/04/2001 Revised: 01/01/1990

Water mains placed in public rights-of-way or easements and connected to City mains may be paid for by:

1. The party benefiting from the installation;
2. The City;
3. A local improvement district, as provided by law; or
4. Latecomer Agreements. The City may, in accordance with state law, grant the party constructing a new water main the right to partial reimbursement from other abutting property owners benefited by the improvement. Such reimbursement shall be administered by the City and shall be subject to reasonable overhead and administrative charges by the City.

6-3.03 Standards For Water Main Construction

Implemented: 10/04/2001 Revised: 01/01/1990

6-3.03.01 Pipe For Water Main

Implemented: 11/16/2001 Revised: 03/11/2014

All pipe shall be AWWA Standards H3-71, C151-71 and cement lining C104-71, and shall be ductile cast-iron, Thickness Class 50 push-on joints or M.J. joints. The pipe shall be of 150 psi working pressure, plus 100 psi surge pressure. No PVC or AC pipe will be allowed.

Pipe laying shall meet the requirements of Section 7-09 of the Standard Specifications. All pipe shall have minimum covering of 3.5 feet. Pipe shall be installed with bedding and back fill as specified in City of Bellingham Standard Plan No. WA-820.

6-3.03.02 Fittings

Implemented: 11/16/2001 Revised: 03/15/2010

Material for fittings such as crosses, tees, bends, reducers and sleeves shall be ductile iron. Joints shall be M.J. or push-on joints and shall conform to AWWA Specification C-110-71 and C-104-71. All fittings shall have full bolting holes and no knock outs. Fittings shall be Tyler, Clow or equivalent.

6-3.03.03 Concrete Thrust Blocking

Implemented: 11/16/2001 Revised: 03/15/2010

Concrete blocking shall be as specified in City of Bellingham Standard Plan No. WA-860, or as directed by the Project Engineer. Blocks shall be installed as specified in Section 7-09 of the Standard Specifications. All concrete shall remain a minimum of 6 inches away from all bolts. All concrete thrust blocks shall be formed using forms approved by City Project Engineer. No precast blocks shall be allowed.

6-3.03.04 Connection to Existing Water Mains

Implemented: 11/16/2001 Revised: 01/01/1990

The Contractor must notify the Project Engineer of a proposed connection time at least four working days in advance.

6-3.03.05 Hydrostatic Testing and Disinfection of Water Main

Implemented: 11/16/2001 Revised: 03/15/2010

This section shall replace Sections 7-09 of the Standard Specifications.

All pressure testing and leakage testing shall be conducted in accordance with Section 13 AWWA C-600-99 Standards, with the following exceptions.

All reference to the owner furnishing any equipment used in the testing procedure is hereby deleted. The necessary apparatus, including temporary plugs, required for testing shall be supplied by the Contractor and subject to the Engineer's approval.

The testing shall be conducted after the piping has been completely backfilled and all thrust blocks are in place and cured. The test sections shall be limited to sections between valves or as modified by the Engineer; but in any event no test section shall contain more than 3,500 linear feet of pipe. Several valved sections may be combined but these sections, when combined, shall not be greater than any length specified above. The temporary connection will be to City of Bellingham Standard Plan No. WA-858 with the approved backflow devices. Device shall be tested prior to activation as per WAC246-290-490.7.(b).(IV)

The pressure test and leakage test shall be combined as follows. The test pressure shall be 200 psi, measured at the highest elevation of the section being tested. This pressure plus 5 psi shall be maintained for a period of one hour and the amount of makeup water required to maintain this pressure shall be carefully measured. The allowable leakage shall not exceed the number of gallons per hour as determined by the formula:

$$L = \frac{ND\sqrt{P}}{7,400}$$

in which 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

If the section of pipe being tested does not meet the above requirements, the Contractor shall, at his own expense, locate and repair the defects and retest the section as provided above.

All disinfection and bacteriological tests shall be conducted by the City's testing lab in accordance with AWWA Section C651.

Chlorine powder or a solution of chlorine shall be continuously introduced into the pipe at the water source by means of an adjustable feeder. The initial dose shall indicate a minimum of 50 ppm and shall be measured at nearest blow-off or hydrant and the furthest location or locations from point of application. An approved backflow device per Standard Plan WA-858 shall be installed by the Contractor on the City side of the chlorine-injection device to prevent the backflow of highly-chlorinated water into the existing service system. Before placing the lines into service a satisfactory report shall be received from the City of Bellingham on samples collected from representative points in the new system. Samples will be collected and bacteriological tests obtained by the Engineer or his/her representative. The pipe will not be placed into service until a zero atypical and coliform bacteria count is obtained for two consecutive tests 24 hours apart.

All other provisions of Section 7-09 of the Standard Specifications not in conflict with the above shall remain in effect.

The lump sum bid for hydrostatic testing and disinfection of water main shall be full compensation for furnishing the necessary chlorine feeder and chlorine, making the necessary main taps and all labor and other additional materials that may be required to chlorinate the main as indicated above. No additional and/or extra compensation will be allowed in performing the hydrostatic tests and for disinfection of water mains.

6-3.03.06 Water Service Transfers

Implemented: 11/16/2001 Revised: 11/10/2014

Tap installations shall meet the requirements of City of Bellingham Standard Plan No.WA-824 and WA-826.

1. WATER SERVICE INSTALLATION - Standard 1" to 2" Water Services:
   A. Both direct tap or tapping with tapping clamp and saddle must use C-C-Threaded corporations. If the dry-tap method is used, a hole the same diameter as the service tap shall be used. Caution, care and prudence is necessary in aligning the clamp and saddle to assure full- flow capability. Single-strap saddles are not aceptable. Double-strap wide band stainless steel saddles equivalent to Romac Saddle #201S shall be used.
   B. Corporation taps shall make as nearly as possible a 45 angle off the vertical center line of the main. No tap is to be made on the top of a water main.
   C. Type "K" copper shall be used on water services within the public right-of-way.
   D. Curb stops shall be flare by female type and located no closer than three (3) feet or farther than five (5) feet from the property line. Any other location requires specific written approval of the Project Engineer. Stop-and-waste curb stops are not allowed. Curb stops shall be Ford brass or equal, flare by female type. Teflon ball type curb stops are not allowed. WA-824.
   E. Cast-iron curb boxes shall be required on all services unless the City requires a meter, then see meter box requirements.
   F. All underground fittings shall be Ford Brass or equal and flared within the public right-of- way. No sweat or compression connections are to be used. The use of Teflon tape as a sealant is acceptable, the use of pipe dope is not acceptable.
   G. The water service pipe shall have a minimum of 22" depth and a maximum of 24" depth, including under ditch sections. To facilitate water meter installations, there shall be 24" cover to finished grade at the curb stop location. All meters will be purchased from the City and will be installed by the City Water Division.
   H. No service is to be covered until the City Project Inspector has inspected the initial installation. Note that all corporations must be in an ON position and all curb stops must be in the OFF position.
   I. Service testing shall be done in conjunction with water main testing. Any air relief and flushing shall be the responsibility of the developer. City crews will operate existing valves to aid the developer.
   J. An acceptance inspection will be made by the City upon completion of all project work. During the inspection, every service shall be turned on to its full capacity to check flow and guarantee that each service line has been flushed. In no case shall the acceptance inspection be made until all project work is complete. Damage incurred during other construction work on the project shall be corrected by the developer or his agent prior to acceptance by the City.
   K. The bond release inspection shall be made prior to the end of the 1-year maintenance bond period. Any problems noted at this time shall be corrected by the developer and/or bonding company prior to releasing the bond.
   L. Staking of lots and/or property lines to assure correct water service locations is the responsibility of the developer. Locations are to be as shown on the approved drawings. Errors due to failure to provide a property survey or due to changing lot locations during final plat approval shall be corrected by the developer at the time of such change or when the error is detected by the City. If mains have been accepted the City will correct and the costs shall be the responsibility of the developer.
   M. Tools, materials and work area shall be maintained in a sanitary condition at all times. All excavations shall be backfilled at the end of the day.
2. WATER METER BOX INSTALLATION - Requirement for Type "K" Copper Standard Sized 1" Water Services will be installed by the City:

A. A minimum of 22", a maximum of 24" cover from finished grade to the service pipe shall be maintained, except where a variance is approved by the City Engineer. There shall be 24" cover from finish grade in the meter installation area. Note that the top of the box shall be flush with the finished grade and that this includes the expansion material when required.
B. The curb stop shall be located within the meter box.
   i. Minimum clearance of 1" from inside surface.
   ii. Maximum clearance of 2" from inside surface shall be maintained from the stop.
   iii. Stops shall be a minimum of 3' or a maximum of 5' from the property line within the public right-of-way or as approved by the City, except when this places the stop in the sidewalk - in this case the stop will be located in the planting strip. Stops shall be located outside of back of walk drain.
C. Concrete meter box shall be standard or better. See attached standard plan. P.V.C. boxes are not to be used.
D. Location of meter boxes.
   i. If a meter box for a 1" service is to be located within the street or sidewalk area, a #3 skagit meter traffic-type box must be used with a heavy-duty 1/4" deck plate lid or better.
   ii. An expansion material must be used around the lid section to enable removal for maintenance. The material shall be flush with the lid section to avoid any cracks or protrusions.
   iii. For 1 + 1/2" and 2" services a #2 concrete box with a steel lid must be used.
E. Caution must be exercised when setting the bottom section of a meter box to assure that the copper has clearance in the notch area. The weight of the meter box must not be on the service pipe.

3. PROJECT REQUIREMENTS
   A. The City of Bellingham shall make the final connection of all water mains to the existing system.
   B. A deposit to cover the cost of connection by the City shall be made to the City Finance Director. The Operations Division shall supply the necessary estimate upon request by the developer or his agent.
   C. All costs, fees, or deposits relative to the total project must be paid prior to water system acceptance. Proof of payment shall be by copies of receipts from the Finance Director specifying for what payment was received.
   D. Final cost accounting must be supplied for the entire project including separate costs for:
      i. Water main and appurtenances;
      ii. Fire hydrant assembly - including the tee at the main;
      iii. Water services, including curb box and/or meter box when required;
      iv. Sewer main trunks;
      v. Side sewer connection; and/or
      vi. Street construction.
   E. The final project shall not be accepted until all requirements are met.
   F. The Operations Division shall determine that the project has been accepted by the City prior to connection of the water main to the City system.

<u>6-3.03.07 Gate Valves 2" and Above</u>

Implemented: 11/16/2001 Revised: 03/15/2010

Gate valves shall be installed with cast-iron valve boxes. Short-body valves suitable for a nonshock shut-off pressure of 130 psi. Valves shall conform to the latest revision of AWWA Standards C-515 covering resilient seated wedge gate valves equivalent to MH, CLOW and Kennedy valves and suitable for direct burial as specified. Gate valves shall have bronze center stem with bronze stem nut. All valves shall be furnished with MJ kits manufactured by Tyler, Romac or equivalent.

All valves shall have nonrising stems and shall open counterclockwise and shall be equipped with a 2-inch square operating nut. Valves will be flange or M.J. joints.

All valves shall be AWWA approved.

6-3.03.08 Gate Valves 12" and Above

Implemented: 11/16/2001 Revised: 03/30/2010

This Section has been deleted

6-3.03.09 Hydrant Installation

Implemented: 10/04/2001 Revised: 03/15/2010

Hydrants shall be supplied and installed according to City of Bellingham Standard Plan No. WA-802 and as of January 1, 1990, shall include a Storz-type fire hose adapter fitting. Hydrants shall be M&H 929, Clow Madalion, Waterous Pacer or equivalent.

CITY OF BELLINGHAM HYDRANT SPECIFICATIONS

1. Fire hydrants shall be for common Bellingham water works service and shall be in compliance with the latest edition of AWWA C 502 "Standard for Dry-Barrel Fire Hydrants."
2. Each hydrant shall be 5-1/4" main valve opening with "O" ring seals and traffic-type breakaway design.
3. Hydrant operating nut shall open counter-clockwise with the direction of "open" clearly marked at top of hydrant. Operating and cap nuts shall be pentagon in shape and the dimension shall be 1- 1/4" point to flat (National Standard).
4. Hydrant shall be 6" inlet mechanical joint (with accessories) or as specified. Hydrant shall have two hose and one pumper nozzle made of brass. Nozzles shall be screw type, threaded counter clockwise into hydrant barrel and sealed to a 200 psi working pressure. Hydrants to be acceptable for a 3-1/2' depth of bury. Hydrant to have rust-proof automatic drain.
5. Hydrant to be capable of rotating through 360 degrees.
6. Thread Specifications: Hose nozzles to be 2-1/2" inside diameter with National Standard Threads. Pumper nozzle to be 4" inside diameter with Pacific Coast Threads as follows: 60 degree - 6 threads per inch, pitch diameter - 4.7018", outside diameter - 4.798".
7. Each hydrant pumper port shall be equipped with a non-locking Snap-Tite Storz #FSAF/MF, 5" fitting and blind cap (Stortz or equal). The blind cap shall be attached to the fitting with a section of aircraft cable.
8. Hydrant to be painted red with white dome and caps. Paint shall be Rustoleum #2766 for white and #1210 for red or equal.
9. Only hydrants of the "Corey Type" or center-stem hydrants with APWA approved rating of 200 psi working pressure will be accepted.
10. Acceptance of any hydrant, other than a type currently in service on the City system, will be allowed only if all necessary special repair tools and a training session for maintenance and repair is provided at no cost to the City. Any hydrant that deviates from the specifications must be approved by the operations engineer and/or the water superintendent.

Section 7. Plan Preparation

7-1 General Requirements

Implemented: 10/05/2001 Revised: 01/01/1990

1. All work shall be in accordance with the current Standard Specifications for Road, Bridge, and Municipal Construction.
2. Plans must be drawn on mylar plan sheets or plan and profile sheets 24 inches vertical by 36 inches horizontal.
3. Each sheet must have a title block located in the lower right-hand corner of the working area of the sheet placed adjacent to the marginal lines.
4. The project title, as renamed by the City's project engineer, shall appear in the title block along with the City's project number.
5. The elevation datum shall be "City" on all construction plans.
6. All storm sewer pipe shall have a minimum of 2 feet of cover.
7. All storm sewer pipe slopes shall be 2% or greater unless otherwise shown on the plans.
8. All trench backfill below the street, sidewalk, or driveways shall be bank-run gravel.

7-2 Plan and Profile Sheets - Profile Layout

Implemented: 10/05/2001 Revised: 01/01/1990

1. The profile grid must be at the bottom of the sheet.
2. Scales must be as follows:
   A. The horizontal scale must be 1 inch = 20 feet or larger.
   B. Where there is 10 feet or less of vertical differential in the street design profile on any sheet, the vertical scale must be 1 inch = 2 feet.
   C. Where there is more than 20 feet of vertical differential in the street design profile on any sheet, the vertical scale must be 1 inch = 5 feet.
3. Stationing must advance from left to right on the sheet, regardless of compass direction, or where north points in reference to the sheet top.
4. Stations in the profile must line up vertically with the same stations in the plan as closely as practical.
5. Show profiles of the existing ground lines along the center line of construction.
6. Provide profile of the design crown line of the new street.
7. Provide grades at 25-foot intervals and at vertical P.I.'s and at angle points.
8. The lengths of vertical curves and the gradients of each tangent should be clearly labeled.
9. A profile of each storm drain, catch basin, manhole, or culvert must be shown in its entirety.
10. Sanitary sewer profiles may be shown.
11. Water main profiles may be shown.

7-3 Plan and Profile Sheets - Plan Layout

Implemented: 10/05/2001 Revised: 01/01/1990

The following data must be included in the plan section of the plan and profile sheets:

1. North arrow.
2. Centerline of construction as the major line in the plans.
3. Tics for each even 100-foot station along the centerline of construction with the adjacent stations enumerated.
4. Stationing must:

   A. Increase in magnitude from left to right on the sheet, regardless of where north points in relation to the top of the sheet.
   B. Increase from west to east and from south to north, except where stationing has previously been established contrary to this rule.
5. Name or names of all streets shown on sheet.
6. Right-of-way and improvement widths.
7. Curb return data (radius and elevations at quarter points).
8. Centerline horizontal curve data.
9. Show lot lines and numbers.
10. Show improvements to be constructed with solid lines.
11. Show future improvements with dotted lines.
12. Show existing improvements with dashed lines.
13. Show locations of all existing underground and surface installations in relation to the centerline of construction stationing and its offsets.
14. Show storm drain installations, including all structures and types.
15. Show the street section to be constructed and the location.
16. Show streetlight, conduit, junction boxes, and location of streetlight service.
17. Show all street signs and pavement markings normally required by MUTCD.

Section 8. Illumination Plan Requirements And Design Criteria

8-1 When Streetlighting is Required

Implemented: 10/05/2001 Revised: 06/01/2001

1. On all principle and secondary arterial streets.
2. In a Central Business District (CBD) or in a commercial zone with high traffic volumes greater than 3,000 VPD.
3. On a residential street being constructed with a plat.

8-2 Streetlighting Design Requirements

Implemented: 10/05/2001 Revised: 06/01/2001

1. Lighting plans shall be submitted to the City Engineer by a person qualified to do illumination design.
2. Illumination specifications to be used are shown in City of Bellingham Standard Plans EL-400, EL-404, EL-408, EL-444, EL-432 and WSDOT Standard Plan J-11a, unless otherwise approved by the City Engineer.
3. Table 8-3 lists acceptable pole spacing for various roadway classifications, lamp sizes and pavement widths. Also shown in Table 8-3 is the required design criteria for any illumination system.
4. All new illumination systems shall be multi-light circuits with a new controller service panel cabinet per EL-444.
5. All lighting plans shall include, but not limited to, the following:
   A. Location of each light standard and the junction box "feeding" each luminaire.
   B. Location of all conduit connecting the J-11a junction boxes.
   C. Conduit installed to the extents of the project limits and terminating in a Type I J-box.
   D. Location of the service cabinet and the Puget Power transformer being used as a power source.
   E. Plan notations showing the conduit and wire size for each conduit run.
      i. Two-inch conduit shall be used for all runs.
      ii. Wire size shall be #6. Ground wire shall be #8.
   F. A wiring schedule shall be shown if more than one circuit is being designed. The maximum number of lights on one circuit shall be fourteen.
6. Construction shall be in accordance with Standard Specifications for Road and Bridge Construction as prepared by the WSDOT and the APWA.

TABLE 8-3 ILLUMINATION DESIGN CRITERIA

Roadway Classification	Average Footcandle	Lamp Size	Pavement Width*	Pole Spacing
Secondary	1.0	150 W	28	133
Arterial			34	122
			40	111
		200 W	28	187
			34	171
			40	156
Primary	1.4	200 W	40	108
Arterial			48	93
		250 W	40	131
			48	115
			>48	**
Central Business District	2.0		All	**

*Horizontal distance between luminaire and far curb (spacing should be adjusted for luminaire overhang)

**Special two-side design necessary (staggered design is not acceptable without approval of the City Engineer)

Design parameters used above:
Mounting Height = 30 feet
Lamp Type = High-Pressure Sodium
= Flat-Lens Cobrahead
= Type II, Medium, Cutoff Maintenance
Factor = 0.70 Maximum Uniformity Ratio = 4:1 One-Sided Layout
Overhang = 0 feet

8-3 Collector and Residential Streets

Implemented: 10/05/2001 Revised: 06/01/2001

The City has no requirement for a minimum lighting level on collector and residential streets. Streetlights on new residential streets being constructed with a plat shall be shown on the lighting plan at intersections, in cul-de-sacs, and at specified locations requiring added safety.

Section 9. Drainage

9-1 Culvert Installation Guidelines and Specifications

Implemented: 03/03/2006 Revised: 06/12/2014

GENERAL GUIDELINES

Roadside ditches are an integral part of the design of minimum-standard streets. In the absence of a full-standard street with its engineered drainage pipe system, it is considered in the best interest of the public to keep these ditches in an open state to the maximum extent possible. These ditches can provide a valuable benefit to the public by improving water quality and lowering peak run-off rates.

The primary purpose of culvert installations is to provide driveway access to developed property and, as such, they are to be limited to the amount necessary for this purpose (generally 30 feet). While installation of culvert pipe in excess of that necessary for a driveway is not prohibited, it is allowed at Departmental discretion.

Culvert installations in excess of the minimum needed for property access shall be judged by the following criteria:

1. The effect of the enclosure on fish passage, water quality and quantity concerns.
   For instance, ditches that are steep and subject to erosive velocities are higher candidates for enclosure than ditches that have the ability to act effectively as a water-quality swale.
2. Abnormal safety considerations.
   Ditches that present traffic risks will be given higher consideration for enclosure.
3. Street drainage and protection of adjacent properties.
   The ability of the system to adequately drain the pavement and its subgrade while protecting adjacent property from run-off should not be compromised.
4. Compatibility with the development of the street to full standard.
   Installation of culverts is not a substitute for a property designed and installed full-standard street drainage system. Whenever possible, culvert installations should not interfere with future street construction.
5. Aesthetics.
   Aesthetic considerations for an enclosure will be taken into account when not in conflict with other criteria.

SPECIFICATIONS

1. Material
   A. Concrete tongue and groove or bell and spigot, Class C-14-3.
   B. PVC plastic or double wall corrugated polyethylene (ADS N-12), with engineer's approval.
   C. Precast concrete box or bottomless culvert
   D. No metal
2. Size
   A. Within 300' of crest of hill - 8" minimum or larger as required by engineer.
   B. Over 300' of crest of hill - 12" minimum or larger as required by the engineer.
3. Inlet Structures
   A. To ensure access for maintenance purposes and to maintain adequate storm water management, inlets shall be provided as follows:
      i. Every 200' of continuous tile or as determined by engineer’s analysis.
      ii. At all intersections.

iii. At junctions of dissimilar materials (PVC, concrete, metal) Alternate joining methods must be submitted to and approved by the City Engineer or a designee. An asbuilt of the pipe change shall be provided.
iv. At junctions of dissimilar pipe sizes.
v. At changes in horizontal or vertical alignment.
vi. As required by the engineer.

B. Inlet Design
i. WSDOT Type 1 or 2 as specified by the City Engineer.
ii. Equivalent alternative structure as approved by the City Engineer.

4. Installation
A. Bedding
i. Remove sod.
ii. Bedding material and installation shall be per City of Bellingham or the pipe manufacturer's specifications.

B. Alignment
i. Straight horizontal.
ii. Vertical - on grade with flow line of existing ditch or upstream and downstream tile where properly installed.
iii. Install and align as not to create ponding at either end.
iv. Where substantial ditch realignment is necessary to properly accommodate a new installation, said realignment in front of applicant's property shall be accomplished by the applicant at the time of the tile installation. All other realignment will be scheduled to be accomplished by City forces.

C. Length
i. Minimum of 18 feet for driveway. Maximum of 30 feet without specific approval by Public Works (see General Guidelines).
ii. Any ditch gap of 10 inches or less to be tiled.
iii. Culvert installations in excess of 100 feet in length (when allowed) may require submission of a plan and profile.

D. Backfill
i. Minimum of 12 inches of granular material over the pipe meeting the City of Bellingham's and WSDOT materials and compaction standards.
ii. Areas around exposed pipe ends to be covered with riprap mortared in place. The ditch end slope at the pipe ends shall not exceed 2 horizontal to 1 vertical unless a cemented headwall is provided.
iii. It is desirable to obtain 2 feet of pipe coverage with backfill. Any culvert subject to vehicular traffic shall have a minimum of 12 inches of cover.
iv. Backfill shall be placed so that a minimum of 2% slope will be maintained away from the edge of pavement.

E. Permits and Inspection
i. Public Works permit required prior to installation.
ii. Call for inspection prior to backfilling and when installation is complete (360 778-7900).
iii. Installation of culverts shall be by a licensed contractor bonded with the City of Bellingham for performing work within the right-of-way. At departmental discretion, small installations may be performed by the proponent with a Guarantee Deposit with the City's Finance Department.

Silt Fence Installation

- Maximum sheet or overland flow path length to the fence of 100 feet.
- No flows greater than 0.5 cfs.

- The geotextile used shall meet the following standards. All geotextile properties listed below are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in Table 4.10):

	Geotextile Standards
Polymeric Mesh AOS (ASTM D4751)	0.60 mm maximum for slit film wovens (#30 sieve). 0.30 mm maximum for all other geotextile types (#50) sieve). 0.15 mm minimum for all fabric types (#100 sieve).
Water Permittivity (ASTM D4491)	0.02 sec minimum
Grab Tensile Strength (ASTM D4632)	180 lbs. minimum for extra strength fabric. 100 lbs. minimum for standard strength fabric.
Grab Tensile Strength (ASTM D4632)	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

- Standard strength fabrics shall be supported by wire mesh, chicken wire, 2-inch x2-inch wire, safety fence, or jute mesh to increase the strength of the fabric. Silt fence materials are available that have synthetic mesh backing attached.
- Filter fabric material shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature of 0°F. to 120°F.

Maintenance Standards	Any damage shall be repaired immediately. If concentrated flows are evident uphill of the fence, they must be intercepted and conveyed to a sediment pond.

- It is important to check the uphill side of the fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence or remove the trapped sediment.
- Sediment deposits shall either be removed when the deposit reaches approximately one-third the height of the silt fence. Or a second silt fence shall be installed.

Standard Notes for construction plans and specifications

The contractor shall install and maintain temporary silt fences at the locations shown in the Plans. The silt fences shall be constructed in the areas of clearing, grading, or drainage prior to starting those-activities. A silt fence shall not be considered temporary if the silt fence must function beyond the life of the contract. The silt fence shall prevent soil carried by runoff water from going beneath, through, or over the top of the silt fence, but shall allow the water to pass through the fence.

The minimum height of the top of silt fence shall be 2 feet and the maximum height shall be 2% feet above the original ground surface.

The geotextile shall be sewn together at the point of manufacture, or at an approved location as determined by the Engineer, to form geotextile lengths as required. All sewn seams shall be located at a support post. Alternatively, two sections of silt fence can be overlapped, provided the Contractor can demonstrate, to the satisfaction of the Engineer, that the overlap is long enough and that the adjacent fence sections are close enough together to prevent silt laden water from escaping through the fence at the overlap.

The geotextile shall be attached on the up-slope side of the posts and support system with staples, wire, or in accordance with the manufacturer's recommendations. The geotextile shall be attached to the posts in a manner that reduces the potential for geotextile tearing at the staples, wire, or other connection device. Silt fence back-up support for the geotextile in the form of a wire or plastic mesh is dependent on the properties of the geotextile selected for use. If wire or plastic back-up mesh is used, the mesh shall be fastened securely to the up-slope of the posts with the geotextile being up-slope of the mesh back-up support.

The geotextile at the bottom of the fence shall be buried in a trench to a minimum depth of 4 inches below the ground surface. The trench shall he backfilled and the soil tamped in place over the buried portion of the geotextile, such that no flow can pass beneath the fence and scouring cannot occur. When wire or polymeric back-up support mesh is used, the wire or polymeric mesh shall extend into the trench a minimum of 3 inches.

The fence posts shall be placed or driven a minimum of 18 inches. A minimum depth of 12 inches is allowed if topsoil or other soft subgrade soil is not present and a minimum depth of 18 inches cannot be reached. Fence post depths shall he increased by 6 inches if the fence is located on slopes of 3:l or steeper and the slope is perpendicular to the fence. If required post depths cannot he obtained, the posts shall be adequately secured by bracing or guying to prevent overturning of the fence due to sediment loading.

Silt fences shall be located on contour as much as possible, except at the ends of the fence, where the fence shall be turned uphill such that the silt fence captures the runoff water and prevents water from flowing around the end of the fence.

If the fence must cross contours, with the exception of the ends of the fence, gravel check dams placed perpendicular to the back of the fence shall be used to minimize concentrated flow and erosion along the back of the fence. The gravel check dams shall be approximately 1-foot deep at the back of the fence. It shall be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence. The gravel check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast. The gravel check dams shall be located every 10 feet along the fence where the fence must cross contours. The slope of the fence line where contours must be crossed shall not he steeper than 3:1.

9-2 Floodplain Development

Implemented: 10/05/2001 Revised: 01/01/1990

City of Bellingham Ordinances 9136 and 9740 establish the floodplain management standards upon which this section is based. Floodplains and designated floodways are as indicated on the Federal Emergency Management Agency (FEMA) generated flood boundary maps which are available for inspection in the Engineering Division office.

The following definitions apply:

"Base Flood" means the flood having a one percent chance of being equaled or exceeded in any given year.

"Floodway" means the channel of a river or other water course and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.

"Floodway Fringe" means the area in the floodplain excluding the floodway.

Land alteration within a designated floodway is prohibited unless certified by a registered professional engineer that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge. To assure the City's continued participation in the National Flood Insurance Program, the express written approval of the certified plans by FEMA is required for issuance of permits.

Construction and substantial improvement within the floodway fringe shall meet the requirements of the floodplain ordinances. A floodplain supplement to the building permit is required in which a registered engineer or architect certifies that the ordinance provisions have been met. The provisions are as follows.

9-2.01 General Standards

Implemented: 10/05/2001 Revised: 01/01/1990

In all areas of special flood hazards the following standards are required

9-2.01.01 Anchoring

Implemented: 11/16/2001 Revised: 01/01/1990

All new construction and substantial improvement shall be anchored to prevent flotation, collapse, or lateral movement of the structure.

All occupied manufactured homes shall be anchored to resist flotation, collapse, or lateral movement by providing over-the-top and frame ties to ground anchors. Specific requirements shall be that:

Over-the-top ties be provided at each of the four corners of the manufactured home, with two additional ties per side at intermediate locations, with manufactured homes less than 50 feet long requiring one additional tie per side;

Frame ties be provided at each corner of the home with five additional ties per side at intermediate points, with manufactured homes less than 50 feet long requiring four additional ties per side;

All components of the anchoring system be capable of carrying a force of 4,800 pounds; and,

Any additions to the manufactured home be similarly anchored.

An alternative method of anchoring may utilize a system designed to withstand a wind force of 90 miles per hour or greater. Certification must be provided to the Public Works Director that this standard has been met.

9-2.01.02 Construction Materials and Methods

Implemented: 11/16/2001 Revised: 01/01/1990

All new construction and substantial improvements shall be completed with materials and utility equipment resistant to flood damage.

All new construction and substantial improvements shall be completed using methods and practices that minimize flood damage.

Electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

9-2.01.03 Utilities

Implemented: 11/16/2001 Revised: 01/01/1990

All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

9-2.01.04 Subdivision Proposals

Implemented: 11/16/2001 Revised: 01/01/1990

All subdivision proposals shall be consistent with the need to minimize flood damage, and shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage. All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage, and base flood elevation data shall be provided for subdivision proposals and other proposed development which contain at least 50 lots or 5 acres (whichever is less).

9-2.01.05 Encroachments

Implemented: 11/16/2001 Revised: 01/01/1990

Any proposed development shall be analyzed to determine effects on the flood-carrying capacity of the area of special flood hazard.

9-2.02 Specific Standards

Implemented: 10/05/2001 Revised: 01/01/1990

In all areas of special flood hazard where base flood elevation data has been provided, the following standards are required.

9-2.02.01 Residential Construction

Implemented: 11/16/2001 Revised: 01/01/1990

New construction and substantial improvement of any residential structure shall have the lowest habitable floor, including basement, elevated to at least one foot above the base flood elevation. The long axis of the foundation must be aligned with the flood flow.

Fully-enclosed areas below the lowest floor that are subject to flooding are prohibited, or shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria:

A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.

The bottom of all openings shall be no higher than one foot above grade.

Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

9-2.02.02 Nonresidential Construction

Implemented: 11/16/2001 Revised: 01/01/1990

New construction and substantial improvement of any commercial, industrial or other nonresidential structure shall either have the lowest habitable floor, including basement, elevated to at least one foot above the base flood elevation, or, together with attendant utility and sanitary facilities, shall:

Have the long axis of the foundation aligned with the flood flow;

Be floodproofed so that below the base flood level, the structure is watertight with walls substantially impermeable to the passage of water;

Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and

Be certified by a registered professional engineer or architect that the standards of this subsection are satisfied.

Additionally, nonresidential structures that are elevated, not floodproofed, must meet the same standards for space below the lowest floor as for residential structures.

9-2.02.03 Manufactured Homes

Implemented: 11/16/2001 Revised: 01/01/1995

Manufactured homes shall be anchored in accordance with the previous Section 9-2.01.1.

For new manufactured homes in appropriately-approved residential-multi planned areas and manufactured home subdivisions, for expansions to existing manufactured home subdivisions, for existing residential-multi planned areas which include manufactured homes not placed in a manufactured home subdivision, it is required that:

Stands or lots are elevated on compacted fill or on pilings so that the lowest floor of the manufactured home will be at least one foot above the base flood level;

Adequate surface drainage and access for a hauler are provided; and,

In the instance of elevation on pilings, that lots are large enough to permit steps, piling foundations are placed in stable soil no more than ten feet apart, and reinforcement is provided for pilings more than 6 feet above the ground level.

No manufactured home shall be placed in a floodway, except in an existing manufactured home park or existing manufactured home subdivision.

Section 10. Local Improvement District Process

10-1 Introduction

Implemented: 10/05/2001 Revised: 01/01/1990

The Local Improvement District (LID) is a method by which property owners within a defined geographical area can make an improvement benefiting their property. Improvements financed by the LID can include street and sidewalk construction, water mains, sanitary sewer and storm drains. Assessments are usually determined by the size and location of each property in relation to the improvement and the benefit to the property.

10-2 Procedure

Implemented: 10/05/2001 Revised: 01/01/1990

The LID may be initiated by City Council resolution or by petition of the majority of property owners along the frontage of the improvement within the proposed boundaries of the district.

City Engineering Staff will assist the property owners interested in creating an LID in preparing the petition and will be available to answer questions or meet with neighborhood groups.

10-3 Steps

Implemented: 10/05/2001 Revised: 01/01/1990

The following steps will outline the procedure that will be followed after the petition has been accepted or the resolution has been passed.

1. The City Council will call for a public hearing and instruct the City Engineer to:
   A. Estimate the cost of the improvement.
   B. Prepare a drawing defining the boundaries of the LID.
   C. Determine the preliminary assessment (to be a viable project, the sum of the preliminary assessments cannot exceed the true value of the property to be assessed, plus one quarter of the value of the improvements located on that property).
2. The City Council will:
   A. Determine the assessment formula (rate per square foot, rate per front foot, zone and termini, etc.) which considers the benefit to each property.
   B. Direct Staff to mail to each affected property owner a notice of the date for public hearing and the amount of preliminary assessment, and advertise the notice in two consecutive issues of the newspaper at least fifteen days before the hearing.
3. The project is explained by Staff at the public hearing and testimony is heard by the Council. If a majority of the Council votes to accept the LID ordinance, Staff is directed to publish the ordinance.
4. Once published, a 30-day protest period begins (an improvement judged necessary for public health and safety may not be challenged but requires the unanimous vote of all Councilmembers present). Property owners that comprise sixty percent or more of the total preliminary assessments may stop the LID by filing a written protest with the City Clerk within the thirty day period.
5. The LID project surviving the protest period is:
   A. Designed by the City's Engineering Division.
   B. Advertised for competitive bidding. The construction contract is awarded to the lowest responsible bidder after Engineering Staff review. If final costs are projected to exceed the preliminary estimate by more than ten percent, the project is reconsidered.

C. Finalized by compiling all costs associated with the project and preparing a final assessment roll. Costs will include administration, design, construction, appraisal services, right-of-way and interest on warrants issued by the City to provide payment for work in progress until bonds are sold.

6. The notice of the hearing on the final assessment is:
   A. Mailed to all property owners within the LID district at least 15 days before the hearing. Advertised five times in a daily newspaper or twice in a weekly publication at least 15 days before the hearing.
7. The City Council holds the assessment roll hearing. Modifications to the assessment roll may only be made at this time, unless a mistake or omission is discovered later. Once passed and published, appeals may only be directed to the Superior Court within ten days of the LID ordinance publication.
8. The City Clerk publishes notice of the assessment in the official newspaper once a week for two weeks and mails collection notices to all property owners. Interest-free payment may be made within 30 days of published notice (the prepayment period). Payment installments are due one year from the expiration date of the 30-day prepayment period.
9. Minimum time needed to complete a project utilizing the LID process is approximately 10 months from the time the petition is accepted and the resolution is adopted.

Section 11. Traffic Studies

11-1 Responsibilities for Traffic Studies

Implemented: 10/05/2001 Revised: 01/01/1990

Traffic studies may be required by the City in order to adequately assess the impacts of a development proposal on the existing and/or planned street system. This would typically be provided in the traffic circulation section of an EIS. The primary responsibility for assessing the traffic impacts associated with a proposed development will rest with the developer, with the City serving in a review capacity and, upon approval, accepting the assessments made as its own.

Unless waived by the City, a written study meeting the City criteria will be required for a development proposal when trip generation during any peak hour is expected to exceed 50 vehicles or the criteria provided in Appendix 1.

Developments within 10% of these criteria may, at the discretion of the Public Works Department, be required to provide a traffic study. If they are more than 10% below the criteria, a traffic study should not be required unless there are special extenuating circumstances such as safety concerns over access, neighborhood opposition to the project or existing levels of service on area roads are at "D", "E", or "F." Levels of service are defined in Subsection 11-2.06.

An applicant must submit a traffic study as part of any environmental review process, as part of any application as listed below, or obtain a determination from the City that a traffic study will not be required. Such a study may be required prior to deeming a project complete for processing.

This study will be the responsibility of the applicant and must be prepared by a registered professional traffic or civil engineer with adequate experience in transportation engineering.

Upon submittal of a draft traffic study, the Public Works Department and the Planning and Economic Development Department will review the study data sources, methods, and findings.

Comments will be provided in a written form to the Planning and Economic Development Department. The developer and the private engineer will then have an opportunity to incorporate necessary revisions prior to submitting a final report.

Due to the time lines involved in processing an application, a report may be required prior to deeming a project submitted as complete. Generally, draft reports should be completed for review and comment within 40 calendar days after notice to proceed.

Final reports should be completed and submitted within 14 days after Staff comments on the draft are returned to the consultant.

The findings of all approved traffic studies will be summarized and forwarded to the Planning and Economic Development Department by the Public Works Department.

The following applications will require traffic studies prepared in the format required by the Public Works Department as part of the submittal materials for a development project submitted to be deemed complete unless waived by the City:

1. Any application for which the proposed development exceeds the criteria for requiring traffic studies provided in Appendix 1.
2. Additional access off a state highway or a city road to an existing project which exceeds the criteria in Appendix 1.

3. A change of use affecting access from a state highway or a city road for a project exceeding the criteria in Appendix 1.
4. Any application, which is located in an area where existing levels of service on area roads, are "D", "E" or "F."

The applicant will be required to submit a new traffic study if, after submitting an original traffic study for any of the above applications, the land use intensity is increased or the land use is changed so that trip generation is increased and existing levels of service on area roads are at "D", "E", or "F."

All previous traffic studies relating to the development that are more than 2 years old will have to be updated unless the Planning and Economic Development Department and Public Works Department determines that conditions have not changed significantly.

Where access points are not defined at the time the traffic study is prepared, additional traffic work may be required when the access points are defined.

Transportation consultants are required to discuss projects with the Engineering Division of the Public Works Department and the Division of Environmental Review of the Planning and Economic Development Department prior to starting the study.

As a minimum, topics for possible discussion will include trip generation, directional distribution of traffic, trip assignment, definition of the study area, intersections requiring critical lane analysis, and methods of projecting build-out volume of cumulative projects. This will provide a firm base of cooperation and communication between the City, the owner or developer, and the project's consultants in forecasting future traffic characteristics, which realistically define traffic movement associated with the proposed development.

Specific requirements will vary depending on the site location.

No traffic study will be accepted unless the traffic study requirements form provided in Appendix 4 is filled out by the consultant and approved by the Public Works Department, prior to the consultant preparing the traffic study.

All completed traffic studies that have been reviewed and approved by the Public Works Department will become the joint property of the project and the City of Bellingham.

11-2 Traffic Study Format

Implemented: 10/05/2001 Revised: 06/01/1996

In order to provide consistency and to facilitate Staff review of traffic studies, the following format must be followed in the preparation of such studies by transportation consultants.

A summary outline is provided in Appendix 2.

11-2.01 Introduction

Implemented: 10/05/2001 Revised: 06/01/1996

The introduction portion of the report must contain the following:

1. Land Use, Site and Study Area Boundaries

   A brief description of the size of the land parcel, general terrain features, the location within the jurisdiction, and the region must be included in this section. In addition, the roadways that afford access to the site and are included in the study area must be identified.

The exact limits of the study area should be based on engineering judgment, and an understanding of existing traffic conditions surrounding the site. In all instances, however, the study area limits must be mutually agreed upon by the developer, their engineer, the Planning and Economic Development Department, the Public Works Department, and justified in the report. These limits will usually result from initial discussions with the City. A vicinity map that shows the site and the study area boundaries, in relation to the surrounding transportation system, must be included.

2. Existing and Proposed Site Uses

   The existing and proposed uses of the site must be identified in terms of the various zoning categories of the City. In addition, the specific use for which the request is being made must be identified, if known, since a number of uses may be permitted under the existing ordinances. This information should include the square footage of the various uses or the number and size of the units proposed.

   It will be the intent of the traffic study to evaluate the worst-case traffic impacts for the proposed development allowed by the zoning. If several different uses are permitted by the zoning, the land use with the greatest overall traffic impact must be assumed for the study.

3. Existing and Proposed Uses in Vicinity of Site

   A complete description of all unbuilt but approved projects, projects in process, and projects with pre-applications within the study area, and their approved future uses must be provided.

   If approved uses are not available, a City-approved estimate of the probable future uses based on zoning designations should be provided. This latter item is especially important where large tracts of undeveloped land are in the vicinity of the site and within the prescribed study area.

   A list of unbuilt but approved projects, projects in process and projects with pre-applications submitted must be obtained from the Planning and Economic Development Department. One hundred percent occupancy must be assumed for all developments in the cumulative analysis.

4. Existing and Proposed Roadways and Intersections

   Within the study area, the applicant must describe and provide volumes for existing roadways and intersections including geometric and traffic signal control as well as improvements that have been funded by government agencies and other development projects. An official list of funded projects must be obtained from the City. This would include the nature of the improvement project, its extent, implementation schedule, and the agency or funding source responsible. A map must be provided showing the location of such facilities.

11-2.02 Project Trip Generation and Design -Hour Volumes

Implemented: 10/05/2001 Revised: 01/01/1990

A summary table listing each type of land use, the size involved, the average trip-generation rates used (total daily traffic and AM/PM peak hours of the street), and the resultant total trips generated must be provided for the project site and all unbuilt but approved projects, projects in process, and projects with pre-applications within the study area.

A current list of projects to be included in the cumulative analysis must be obtained from the Division of Environmental Review, Planning and Economic Development Department.

Trip generation must be calculated for the maximum uses allowed under the existing and proposed zoning based on the latest data contained within the latest edition of the Institute of Transportation Engineer's (ITE) Trip Generation Manual or more appropriate local data as approved by the Public Works Department.

In the event that data is not available for the proposed land use, the Public Works Department must approve estimated rates prior to acceptance of the draft traffic study report.

The calculation of design-hour volumes used to determine study area impacts must be based on:

1. Peak-hour trip generation rates as published in the ITE Trip Generation Summary.
2. Recent traffic volume counts for an acceptable number of similar existing uses if no published rates are available. Counts of this nature must be acceptable to the Public Works Department.
3. Additional sources from other jurisdictions, or W.S.D.O.T. if acceptable to the Public Works Department. A list of trip generation publications has been included in the bibliography.
4. For mixed-use developments, ITE rates must be used to estimate average daily traffic. The PM peak hour of the street may be estimated by using 9% of total daily traffic.

Use of the percentage rates (as shown in Table 11-2 in Subsection 11-2.13) to account for passerby traffic may be considered upon approval of the Public Works Department.

Internal trip reductions and modal-split assumptions will require analytical support to demonstrate how the figures were derived and will require approval by the Public Works Department.

See Technical Requirements in Subsection 11-2.13.

11-2.03 Trip Distribution

Implemented: 10/05/2001 Revised: 01/01/1990

The estimates of percentage distribution of trips from the proposed development to destinations, both within and outside the City, must be clearly stated in the report using the north, south, east, and west compass points.

Market studies, planning data, driveway counts at adjacent uses or other information concerning origin of trip attractions to the proposed development may be used to support these assumptions where available.

A map showing the percentage of site traffic on each street based on average-daily volumes must be provided as part of the traffic study graphic material. Where microcomputer modeling is used, such a map need not be provided, but the model's distribution methodology must be discussed.

11-2.04 Trip Assignment

Implemented: 10/05/2001 Revised: 01/01/1990

The direction of approach of site-generated traffic via the area's street system will be presented in this section. The technical analysis steps, basic methods, and assumptions used in this work must be clearly stated and agreed to by the Public Works Department.

The assumed trip distribution and assignment must represent the most logically traveled route for drivers accessing the proposed development. These routes can be determined by observation of travel patterns to existing land uses in the study area.

11-2.05 Existing and Projected Traffic Volumes

Implemented: 10/05/2001 Revised: 01/01/1990

Graphics must be provided which show the following traffic impacts for private access points, intersections and streets specified in the traffic study requirements form.

1. PM peak-hour site traffic (in and out) including turning movements.
2. PM peak-hour traffic total including site-generated traffic (in and out). These volumes must include through- and turning-movement volumes for current conditions and a separate set of numbers that also include all projects to be included in the cumulative analysis.
3. Any other peak hour which is determined by the City to be critical to site traffic and the road system in the study area should be included in the graphics and show the same information as is provided for the AM/PM peak hours (i.e., recreational and seasonal traffic).
4. Actual counts of existing total daily traffic for the road system in the study area at the time the study is being prepared.
5. Projected total daily traffic for the road in the study area based on traffic from the proposed development and counts of existing daily traffic obtained in Item 6. The component of the existing daily traffic attributable to the existing uses must be identified and the increases in total daily traffic from the proposed uses.
6. Projected total daily traffic for the street system in the study area based on traffic from the proposed development, counts of existing daily traffic obtained in Item 4 above, and traffic projections based on all projects to be included in the cumulative analysis. The projects to be included in the cumulative analysis must be those specified by the Planning and Economic Development Department.

A list of current projects to be included in the cumulative analysis must be obtained from the Division of Environmental Review.

Peak hours referred to in this section are for the street and not the generator or project.

Where necessary, volume projections for background traffic growth will be provided by the Public Works Department, or alternatively, a method for determining the volume will be recommended.

All total daily traffic counts must be actual machine count and not based on factored peak-hour sampling. Latest available machine counts from WSDOT, the Public Works Department, or other agencies may be acceptable if not more than one year old.

11-2.06 Capacity Analysis

Implemented: 10/05/2001 Revised: 01/01/1990

A capacity analysis will be conducted for all public road intersections impacted by the proposed development and for all private property access points to street adjacent to the proposed development as specified in the traffic study requirements form and within the limits of the previously defined study area.

The PM, and any other peak period specified by the Public Works Department, will be tested to determine which peak hours need to be analyzed.

Capacity calculations should also include an analysis for cumulative impacts.

At 4-way stop sign intersections, estimates of the delay per vehicle and queue lengths on critical approaches must be provided.

At 2-way stop intersections, the unsignalized intersection analysis contained in the Highway Capacity Manual must be used.

11-2.07 Level of Service

Implemented: 10/05/2001 Revised: 01/01/1990

Level of service "C" will be the peak-hour design objective for all movements, and under no circumstances will less than level of service "D" be accepted for site- and non-site traffic including existing traffic at build out of the study area.

The traffic study must recommend feasible mitigation measures to bring the intersection level of service within acceptable standards.

The following interpretations of "level of service" have been provided:

Level of Service A	A condition of free flow with low traffic density, where no vehicle waits longer than one signal cycle.
Level of Service B	A stable flow of traffic where occasionally drivers wait through more than one signal cycle.
Level of Service C	Still in the zone of stable flow, but intermittently drivers must wait through more than one signal cycle and back-ups may develop behind left-turning vehicles.
Level of Service D	Approaching instability, drivers are restricted in their freedom to change lanes and delays for approaching vehicles may be substantial during peak hours.
Level of Service E	Traffic volumes are near or at the capacity of the arterial, and long queues of vehicles may create lengthy delays especially for left-turning vehicles.
Level of Service F	Congested condition of forced traffic flow, where queued backups from locations downstream restrict or prevent movement of vehicles out of the approach, creating a storage area during part or all of the peak hour.

For existing conditions, levels of service should be calculated either by the operational analysis method from the new Highway Capacity Manual or the TRB Circular 212 Method. Where available, existing levels of service will be certified and supplied by the City.

For future conditions, levels of service should be calculated by the TRB Circular 212 Method or by any other method satisfactorily documented by the consultant and approved by the City.

Maximum sums of critical lane volumes for determining levels of service using the Critical Lane Planning Analysis Technique are provided in Appendix 3.

All levels of service must be provided with corresponding volume to capacity ratios.

11-2.08 Traffic Signals

Implemented: 10/05/2001 Revised: 01/01/1990

The need for new traffic signals will be based on warrants contained in the Manual on Uniform Traffic Control Devices.

In determining the location of a new signal, traffic progression is of paramount importance.

Pedestrian movements must be considered in the evaluation, and adequate pedestrian clearance provided in the signal cycle-split assumptions.

To provide flexibility for existing conditions and ensure optimum 2-way signal progression, an approved traffic engineering analysis must be made to properly locate all proposed access that may require signalization.

The section of roadway to be analyzed for signal progression will be determined by the Public Works Department and will include all existing and possible future signalized intersections.

The progression pattern calculations must use a cycle consistent with current signal timing policies of the City. A desirable bandwidth of 50% of the signal cycle must be used where existing conditions allow.

Where intersections have no signals presently, but are expected to have signals, typically a 60% main line, 40% cross-street cycle-split should be assumed.

Cycle-split assumptions must relate to volume assumptions in the capacity analysis of individual intersections; and where computerized progression analysis techniques are used, they must be of the type that utilize turning movement volume data and pedestrian clearance times in the development of time/space diagrams.

The green time allocated to the cross street will be considered no less than the time which is required for a pedestrian to clear the main street using the Manual on Uniform Traffic Control Devices standards.

Those intersections, which would reduce the optimum bandwidth if a traffic signal were installed, may be required to remain unsignalized and have turning movements limited by access design or median islands.

11-2.09 Traffic Accidents

Implemented: 10/05/2001 Revised: 01/01/1990

Traffic accident data for affected street corridors may be required for the study. The study period will normally be three years. Such locations will be specified by the Public Works Department and data provided by the City.

Where account data is required, estimates of increased or decreased accident potential must be evaluated for the development, particularly if the proposed development might impact existing traffic safety problems in the study area. Safety improvements shall be recommended where necessary.

11-2.10 Recommendations

Implemented: 10/05/2001 Revised: 01/01/1990

In the event that analysis indicates unsatisfactory levels of service ("D" or below) on study area roadways, a description of proposed improvements to return intersections to level of service "C" must be included.

Proposals could include projects by the City or State for which funds have been appropriated and obligated.

The assumptions regarding all future roads and lanes in an analysis will require approval from the City. In general, the recommendation section should include:

1. Proposed Recommended Improvement

   This section must describe the location, nature, and extent of proposed improvements to ensure sufficient roadway capacity.

A sketch of each improvement should be provided showing the length, width, and other pertinent geometric features of the proposed improvements. (Sketches are only necessary for major improvements that would result in significant changes in circulation patterns.)

2. Volume/Capacity Analysis at Critical Point

   A table must be provided clearly showing levels of service at critical intersections for the following scenarios:
   A. Existing conditions.
   B. Existing plus project traffic.
   C. Existing plus project traffic with mitigation.
   D. Existing plus project plus cumulative traffic.

   A list can be obtained from the City of funded and unfunded projects. New mitigation measures not on this list will be considered unfunded unless a funding source is identified in the text of the study. No levels of service can be shown that included unfunded projects as part of the mitigation measures.

   Tables should show mitigation with funded projects. Footnotes could be included, or narrative discussion that discuss unfunded recommendations.

3. Traffic Volume Proportions

4. Percentages based on the traffic impact analysis may be required to determine the proportion of traffic using various public improvements (both existing and proposed) from several developments within the study area. This apportionment will not apply to traffic impact fees but to the construction of improvements adjacent to the project, which may be shared by other new developments.

5. Significant Adverse Impacts

6. A project has significant adverse traffic impacts when:
   A. The addition of project traffic to an intersection increases the volume to capacity (V/C) ratio by the values provided in Table 11-1. At level of service "D", "E" or "F," the addition of 5 or more additional peak-hour trips will be considered significant.

TABLE 11-1: SIGNIFICANT CHANES IN LEVELS OF SERVICE	
Level of Service (including project)	Increase in V/C Greater Thank
A	0.20
B	0.15
C	0.10
D	5 trips
E or F	5 trips

   B. The project's access to a major road or arterial road would require an access that would create an unsafe situation or a new traffic signal or major revisions to an existing traffic signal.
   C. The project adds traffic to a roadway that has design features (e.g., narrow width, roadside ditches, sharp curves, poor sight distance, inadequate pavement structure) that will become potential safety problems with the addition of project traffic.
   If the above thresholds are exceeded, construction of improvements or other methods to reduce the level of significance to insignificance by the Developer are required.

11-2.11 Revisions to Traffic Study

Implemented: 10/08/2001 Revised: 01/01/1990

Revisions to the traffic study must be provided as required by the City. The City will determine whether revisions are necessary.

The need for revisions will be based on the completeness of the traffic study, the thoroughness of the impact evaluation, and the compatibility of the study with the proposed access and development plan.

11-2.12 Executive Summary

Implemented: 10/08/2001 Revised: 01/01/1990

The executive summary of the report must be a clear, concise description of the study findings. It is anticipated that the report's final chapter will serve as an executive summary.

It must include a general description of all data, project scope and purpose, findings, conclusions, and mitigation measures and recommendations.

Technical publications and calculations, documentation, data reporting and detail design must not be included in this section.

The executive summary should be short, complete in itself, and not dependent on supplementary data included by reference.

11-2.13 Technical Requirements of Final Report

Implemented: 10/08/2001 Revised: 01/01/1990

The final report must also meet the following requirements:

1. Transportation System Management (TSM) concepts must be fully explored and discussed. An updated generalized statement offered as a solution to a specific problem is not acceptable. The solutions offered must be backed by data to confirm practicability of successful implementation.
2. All computerized analysis output sheets and supporting raw-count data, both ADT, turning movement, and intersection-delay data should be submitted with draft reports for review.
   All assumptions used in the calculations must be referenced to the appropriate table, chart or page in approved publication (e.g. V/C ratios, operating speeds, etc). Calculations must be comprehensive and clear.
3. All maps and graphics involving improvements must be drawn to scale with roadway geometrics appropriately dimensioned (e.g. road width, lane widths, etc). Intersection geometrics must include bus stops, parking areas, pedestrian crossings, driveway restrictions, etc.
4. For employee-intensive uses, such as office buildings, trip rates may be reduced to account for the effects of ride sharing. The text of the report must fully justify the use of any ride sharing percentage adjustments.
5. Normally, ride-sharing reductions will not be applied to such uses as hotels, restaurants, retail, financial, or medical related uses.
6. Daily-trip rates may be reduced for those land uses potentially served by transit. The effects of van pooling would not be considered as a portion of "ride sharing." The use of any transit percentage adjustments must be justified in the text of the report. The current maximum allowable transit use assumption is 5%.
7. Normally, transit reductions would only apply to employee-intensive uses and residential uses. Uses not expected to have transit reductions would include hotels, restaurants, retail and financial uses.

8. After the daily-trip adjustment factors have been applied to produce daily trips, the peak-hour trips are to be calculated. Where fully justified, peak hour percentages may be adjusted by up to 25% to account for flex time, staggered work hours and other measures that result in the use of non-traditional peak-hour periods.
9. Peak hours are 7:30 AM to 8:30 AM and 4:30 PM to 5:30 PM. The use of any flex time, staggered work hours, etc., must be justified in the text of the report. Enforcement of such measures must be guaranteed over the long term and be fully documented in the report.
10. The use of peak-hour adjustment factors does not eliminate any traffic. It merely assumes less peaking in a single hour and a spreading of peaking tendencies.
11. Peak-hour adjustment factors are typically only applied to employee-intensive projects, which are candidates for improvements through TSM measures.
12. Where build-out intersection configurations are different from those currently existing, they must be based on approved and guaranteed construction projects as certified by the City.
13. Passerby factors are to be used to reduce the estimated additional total-daily traffic to street(s) serving a proposed development. They are not to be applied directly to reduce trip generation and turning-movement volumes at driveways serving the proposed development.

TABLE 11-2 PASSERBY FACTORS

Land Use	Passerby Component
Banks	14.0%
Regional Shopping Center	9.0%
Supermarkets	28.0%
Hardware Stores	8.0%
Auxiliary Commercial Uses	16.0%
Neighborhood Convenience Centers	40.0%
Drive-In Restaurants	50.0%
Service Stations	50.0%

Section 12. Access And Site Access Design

12-1 Introduction

Implemented: 10/08/2001 Revised: 01/15/1990

This section pertains to the access of private properties from the arterial street system of the City as contained in Ordinance 8760. This is considered a summary of the ordinance and if a conflict arises, the ordinance shall take precedence.

12-2 Definitions

Implemented: 10/08/2001 Revised: 01/15/1990

"Arterial Street" means every public highway, or portion thereof, or a major street designated as such by ordinance, in accordance with the law of the State of Washington.

"Minor Street" means any city street not designated by competent authority as an arterial street, a state highway, a parkway, an expressway, or a freeway.

"Driveway" means a vehicle access between abutting property and a city right-of-way or a city street.

"Residential Driveway" means one providing access to a single-family residence, to a duplex, or to an apartment building containing not more than 4 dwellings.

"Commercial Driveway" means one providing access to an office, retail or institutional building, or to an apartment building having 5 or more dwelling units.

"Industrial Driveway" means one directly serving substantial numbers of truck movements to and from loading docks of an industrial facility, warehouse, truck terminal, or community or regional mall loading area.

"Curb Return-Type Driveway" means one which is essentially a "T" intersection with constant curb cross section from curb-return to curb-return as found at the intersection of two streets.

"Depressed-Type Driveway" means one in which the curb is depressed along the curb line per City of Bellingham standard plans ST-9 and CG-260.

"Driveway Width" means the driveway throat distance, measured at the property line, for both depressed- and curb-entry type driveways (see Figure 12-1).

"Parcel" means any piece of real property in a single ownership.

12-3 Permit Required

Implemented: 10/08/2001 Revised: 01/15/1990

A permit, issued by the Public Works Department on written application, is required for the construction or reconstruction of any driveway giving access from a parcel to a street or alley.

No other permit for driveway construction or reconstruction shall be required when such a permit is obtained. The Public Works Department shall only issue permits for driveways after that Department has ensured that the requirements of the ordinance are complied with, that the proposed construction or reconstruction is in accordance with standard plans and specifications, and that the proposed construction or reconstruction is in accordance with good and accepted engineering practice.

12-4 Number of Driveways Permitted

Implemented: 10/08/2001 Revised: 01/01/1990

Each parcel shall be permitted one driveway giving access to an abutting arterial street, either permitting direct access to the parcel, or jointly with an adjoining parcel. Additional driveways giving access to one or more arterial streets shall be permitted only under the following conditions:

1. When the owner of the parcel can demonstrate that the daily volume of traffic using a single driveway would be in excess of 5,000 one-way vehicle trips per day; or,
2. When the owner of the parcel can demonstrate that the vehicle traffic using a single driveway would exceed the capacity of a stop sign-controlled intersection during one peak-street traffic hour, or the peak-site traffic hour, as capacity is determined by a qualified professional engineer, and approved by the Director of Public Works; or,
3. When the owner of the parcel can demonstrate, by a traffic engineering study, that the addition of another driveway will benefit the flow of traffic on the abutting arterial street.

12-5 When Traffic Signals May Be Required

Implemented: 10/08/2001 Revised: 01/01/1990

The Public Works Department may require the installation of an electronic traffic signal at the cost of the owner of a parcel to control the ingress and egress of traffic from the driveway when the parcel would normally be allowed two or more driveways and a traffic signal(s) is warranted. A signal may be required either at the time a driveway permit is applied for or after a traffic study demonstrates its need.

12-6 Driveway Spacing

Implemented: 10/08/2001 Revised: 01/01/1990

Driveways providing access to arterial streets shall be spaced a minimum of 200 feet apart; however, the Public Works Department may issue a permit, which will result in lesser spacing when all of the following factors are present:

1. The parcel does not have adequate frontage on the arterial street to provide the 200 foot spacing;
2. After good faith attempts, the owner of the parcel is unable to secure joint access through an adjoining parcel;
3. The parcel to be served cannot be served from another street; and,
4. The resultant driveway provides maximum spacing from adjacent driveways giving access to the arterial street, and proper corner clearance is provided. When measuring distances to or between driveways, distance shall be measured from the edge-of-throat to edge-of-throat as shown in Figure 12-3.

12-7 Joint-Access Driveways

Implemented: 10/08/2001 Revised: 01/15/1990

The Public Works Department shall encourage and facilitate use of joint-access driveways serving two or more adjoining parcels. Where joint-access driveways are feasible and not objected to by the owners of the affected parcels, the Public Works Department may require:

1. Owners of parcels using the joint-access driveway to share the cost of construction or reconstruction of the driveway;

2. Owners of parcels using the joint-access driveway to share the cost of electric or electronic traffic signals at the driveway; and,
3. Location of the joint-access driveway in order to more conveniently serve all parcels using it.

12-8 Driveway Cuts on Existing Lots

Implemented: 10/08/2001 Revised: 01/15/1990

Driveways installed on streets of non-standard paving width and design shall be constructed as if the street improvements were constructed to full City standards, except where construction to full standards would create substantial additional expense or hardship to the property owner. In such a case, the owner for himself, his successors, and assigns must agree to release and indemnify the City against any expense for the driveway adjustment arising from the future improvements of the roadway to full City standards.

12-9 Corner Clearance

Implemented: 10/08/2001 Revised: 01/15/1990

The minimum-tangent curb length between a driveway giving access to an arterial street shall be at least 50 feet as measured from the beginning of curb return (BCR) to the nearest edge of driveway throat as shown in Figure 12-2. If there is no curb, the distance shall be 80 feet measured from the edge of pavement of the intersecting street to the beginning of a driveway opening.

12-10 Regulation of Turns

Implemented: 10/08/2001 Revised: 01/15/90

The Public Works Department, through its Traffic Engineer or other responsible official, may in accordance with the City's traffic code or as otherwise permitted by law, limit or prohibit turns to or from driveways giving access to arterial streets by requiring the placement of official traffic-control devices when it appears that there is inadequate corner clearance, sight distance or driveway spacing, or when traffic capacity, delay or safety conditions require such prohibitions. The cost of the traffic-control devices shall be borne by the owner of the parcel.

12-11 Standards For All Driveway Construction

Implemented: 10/08/2001 Revised: 01/01/1990

All driveways providing access to arterial streets shall be constructed in such a manner that:

1. The minimum driveway width is 15 feet for all types of driveways.
2. The maximum driveway width for a commercial driveway is 15 feet for one-way and 40 feet for two-way.
3. The maximum driveway width for an industrial driveway is 20 feet for one-way and 45 feet for two-way.
4. Driveways shall have one lane in and one lane out unless the owner of the parcel can demonstrate, through an analytical traffic engineering analysis, the need for an additional lane.
5. Depressed-curb driveways shall range in width between 15 and 30 feet. Width is measured at the throat (see Figure 12-1).
6. Curb-return driveways shall range in width between 30 and 45 feet. Width is measured at the throat (see Figure 12-1). The curb-return radius shall be 15 feet and shall include provisions for wheelchair

ramps. The driving surface through the limits of the right-of-way shall be smooth, at a grade less than 8% and free of stormwater, vaults or any structures, which may impede traffic flow.

12-12 Standards for Driveway Installation

Implemented: 10/08/2001 Revised: 01/01/1990

Driveway installations shall be in accordance with the volume of the arterial street and the daily volume of traffic through the driveway.

1. Commercial and industrial driveways abutting an arterial street with a traffic volume of 15,000 vehicles per day or greater shall be of the curb-return type (regardless of the volume of the driveway) unless the driveway serves "egress only" traffic.
2. Driveways through which the daily-traffic volume is less than 2,500 one-way vehicle trips shall be the depressed-curb type.
3. Driveways through which the daily-traffic volume is in excess of 2,500 one-way vehicle trips may be either the depressed-curb or curb-return type, at the option of the owner of the parcel.

12-13 Sight Distance

Implemented: 10/08/2001 Revised: 01/01/90

All driveways giving access to arterial streets shall be constructed in such a manner that the following minimum sight distances are available along the arterial in each direction from the driveway:

Street Design Speed	**Minimum Sight Distance**
20 m.p.h.	175 feet
25 m.p.h.	220 feet
30 m.p.h.	265 feet
35 m.p.h.	310 feet
greater than 35 m.p.h.	as determined by Public Works Dept.

NOTE: Sight distance shall be measured in accordance with good engineering practices.

12-14 Driveway Maintenance and Alignment

Implemented: 10/08/2001 Revised: 01/01/1990

Maintenance of driveway approaches or intersection openings shall be the responsibility of the owner whose property they serve. Driveways shall be aligned wherever possible with existing driveways on the opposite side of the street: first come, first served.

12-15 Arterial Access Denied Variances

Implemented: 10/08/2001 Revised: 01/01/1990

The Public Works Department may when required or permitted by traffic conditions and the maintenance of safety on any arterial street:

1. Deny an application for a driveway permit, when a parcel abuts on both an arterial street and a minor street, and adequate access is available via the minor street, regardless of the degree of improvement of the minor street; and,
2. Grant variances from the requirements of the driveway ordinance where:
   A. The use of the parcel is either single-family, or duplex residential; or,

B. The owner of a parcel provides a traffic study acceptable to the Department of Public Works showing that the variance is feasible and desirable and in accordance with the intent of the driveway ordinance.

12-16 Changes in Driveway Access When Arterial Improves

Implemented: 10/08/2001 Revised: 01/01/1990

When the City undertakes to improve an arterial street, including improvements to curbing, gutters, drainage, widening, or major changes in traffic flow controls, the Department of Public Works may, as part of the improvement project, present a plan for improving driveway access to the City Council, which shall hold a public hearing on the plan, after providing no less than 15 days notice to owners of parcels abutting the arterial to be improved.

12-17 City Council Hearing on Driveway Improvements

Implemented: 10/08/2001 Revised: 01/01/1990

The City Council, after hearing on the driveway access plan, shall declare its findings, and thereupon may approve the plan, and direct it to be carried out, modify the plan or require its modification, or, reject the plan.

12-18 Duty of Owner of Parcel on Finalization of Driveway Improvement Plan

Implemented: 10/08/2001 Revised: 01/01/1990

Owners of driveways affected by a driveway improvement plan finalized by the City Council shall bear such costs of improvements as the City Council shall direct; and shall do such other things to improve driveway access to their parcels as shall be required by the City Council; and shall ensure that such work is inspected by, and approved by, the Public Works Department.

12-19 Unsafe Driveway Traffic Study

Implemented: 10/08/2001 Revised: 01/01/1990

When, in the judgment of the Public Works Department, a driveway access to an arterial street is unsafe, the Public Works Department may conduct a traffic study of the driveway access and prepare a plan improving the same or requiring its elimination.

12-20 City Council Hearing on Unsafe Driveway

Implemented: 10/08/2001 Revised: 01/01/1990

After at least 15 days notice to the owner of the parcel served by the driveway access deemed by the Public Works Department to be unsafe, the City Council shall hold a public hearing thereon. After public hearing, the City Council shall declare its findings, and as a result thereof, may:

1. Direct improvement of the driveway in accordance with the standards set forth in the driveway ordinance including signalization as appropriate pursuant to Section 12-5; or
2. Direct that the driveway be closed or barricaded in accordance with the provisions of the driveway ordinance; and

3. Declare who shall bear the cost of such barricading, closing, signalization or other improvement.

12-21 Public Works Department to Inspect Improvements to Unsafe Driveway

Implemented: 10/08/2001 Revised: 01/01/1990

The Public Works Department shall be responsible for inspection and approval of all improvements to driveways found by the City Council to be unsafe, and no driveway improvements undertaken after a declaration that they are unsafe shall be deemed completed until the Public Works Department approves the work.

12-22 Unused Driveways on Arterial Streets

Implemented: 10/08/2001 Revised: 01/01/1990

Whenever an established driveway providing access to an arterial street is abandoned, or ceases to be used as a driveway, the owner of the parcel to which the driveway provides access shall take such measures, including the reconstruction of curbing and sidewalks or the provision of barriers, and shall close the driveway to vehicular traffic.

12-23 Enforcement

Implemented: 10/08/2001 Revised: 01/01/1990

The City's Public Works Department shall be responsible for the enforcement and administration of the driveway ordinance, except that regularly appointed inspectors and law enforcement officers of the following departments of the City shall have authority to issue citations for violations of the driveway ordinance:

1. Public Works Department
2. Police Department
3. Legal Department
4. Department of Planning and Economic Development and Building Services Division
5. Any governmental agency having authority to enforce the Building Codes.

12-24 Fees for Permits and Inspection

Implemented: 10/08/2001 Revised: 01/15/1990

The Public Works Department shall be authorized to charge a fee of $25.00 for examining plans and issuing a driveway permit.

12-25 Prohibited Acts

Implemented: 10/08/2001 Revised: 01/15/1990

It is a misdemeanor:

1. For any person to construct, reconstruct, or cause to be constructed a driveway providing access to an arterial street without first obtaining a permit therefor;

2. For any person who is the owner of a parcel abutting on an arterial street, to occupy the parcel while it is served by a driveway that was constructed or reconstructed after the effective date of the ordinance without first obtaining a permit required by the driveway ordinance;
3. For any person who is the owner of a parcel abutting on an arterial street to allow the existence of an abandoned or unused driveway that provides access to the arterial street; or,
4. To fail to comply with the directions of the City Council relating to the improvement, barricading, or closing of any driveway.

12-26 Nuisances Declared - Abatement

Implemented: 10/08/2001 Revised: 01/15/1990

The City may undertake an action to abate nuisance driveways in accordance with the procedures for abatement of nuisances provided by the City's criminal code or otherwise by law. Nuisance driveways are those driveways providing access from a parcel to an arterial street that have been constructed or reconstructed after the effective date of the driveway ordinance without first having obtained a permit, or that have been abandoned or have fallen into disuse but are still passable to vehicular traffic, or that have been allowed by the parcel's owner to continue to exist unchanged for more than 120 days after the City Council has directed that the driveway be improved, closed, or barricaded.

12-27 Safe Access to Public Streets

Implemented: 10/08/2001 Revised: 01/15/1990

Access to public streets and alleys shall be located to minimize safety hazards. The Public Works Director may deny access to a street or alley where physical conditions create a safety hazard. The criteria for evaluating locations shall be based on the Manual on Uniform Traffic Control Devices, Washington State Department of Transportation Standards, Institute of Traffic Engineers Standards, and AASHTO Standards.

Section 13. Subdivisions

13-1 Introduction

Implemented: 10/08/2001 Revised: 01/01/1990

This section pertains to the subdivision of land within the corporate limits of the City of Bellingham, which is regulated by the Subdivision Ordinance (No. 8192). This section is intended to summarize the ordinance, and if a conflict is perceived, the ordinance shall take precedence.

The Director of Planning and Economic Development is designated and assigned the administrative and coordinating responsibility for approval or disapproval of plats and subdivisions within the City.

13-1.01 Compliance - Division into Nine or Fewer Lots (Ordinance 9390)

Implemented: 10/08/2001 Revised: 01/01/1990

Division of land into nine or fewer lots shall be in compliance with the regulations and standards of this section governing "short subdivision" as set forth in Section 13-4. Division of land into ten or more lots shall comply with regulations and standards dealing with subdivision and must follow the preliminary and final platting procedures.

13-1.02 Sale Restrictions

Implemented: 10/08/2001 Revised: 01/01/1990

Sale of land is prohibited unless it is a duly platted parcel of land or lot, or is a tract of record at time of passage of the ordinance (February 5, 1973) or is a parcel of land approved under short subdivisions, Section 13-4.

13-1.03 Exceptions

Implemented: 10/08/2001 Revised: 01/01/1990

This section shall not apply to the following:

1. Cemeteries and other burial plots while used for that purpose.

2. Division of land into lots or tracts where the smallest lot is 20 acres or more and not containing a dedication of a public right-of-way.

3. Divisions made by testamentary provisions or the laws of descent.

4. Divisions of land into lots or tracts classified for industrial or commercial use when the City of Bellingham has approved a binding site plan for the use of the land pursuant to Section 13-7.

13-2 Definitions

Implemented: 10/08/2001 Revised: 01/01/90

For the purpose of this section, unless it is clearly evident from the context that a different meaning is intended, certain words and terms are defined as follows.

"Alley" means a public right-of-way, not greater than 30 feet in width, which affords a secondary access to abutting property.

"Binding Site Plan" means a drawing to a scale which: (a) identifies and shows the areas and locations of all streets, roads, improvements, utilities, open spaces, and any other matters specified by local regulations; (b) contains inscriptions or attachments setting forth such appropriate limitations and conditions for the use of the land as are established pursuant to Section 13-7.

"Block" means a group of lots, tracts, or parcels within well-defined and fixed boundaries.

"Building Setback Line" means a line parallel to the front property line in front of which no structure shall be erected. The location of such line is determined from the regulations of Title 20.

"Cluster Subdivision" means a subdivision in which minimum lot size requirements may be diminished so as to provide desirable open space with-out increasing the overall density of dwelling units per acre as provided in Title 20.

"Commission" means the Bellingham City Land Use Commission.

"Controlling Corner" means all angle points of the perimeter of a subdivision or separate divisions of a subdivision.

"Covenant" means a binding and solemn agreement made by two or more individuals, parties, etc., to do or keep from doing a specified thing or things.

"Dedication" means the deliberate appropriation of land by an owner for any general and public uses reserving to himself no other rights such as are compatible with the full exercise and enjoyment of the public use to which the property has been devoted. The intention to dedicate shall be evidenced by the owner by presenting the final plat or a short plat for filing by showing the dedication thereon; and the acceptance by the public is evidenced by the approval of such plat for filing by the appropriate governmental unit.

"Existing Street" means a presently traveled way with a minimum width of 18 feet of hard surfacing irrespective of whether it has been accepted by the City for maintenance. A "hard-surfaced street" is a street consisting of either portland cement or asphaltic concrete as a wearing surface.

"Greenbelt" means a parcel of land usually of strip or ribbon shape left in an undeveloped and natural state, excluding all development except recreation.

"Lot Line Adjustment" means a division made for the purpose of adjusting boundary lines which does not create any additional lot, tract, parcel, site or division nor create any lot, tract, parcel, site or division which contains insufficient area and dimension to meet minimum requirements for width and area for a building site.

"Through Lot" means a lot other than a corner lot abutting more than one street. "Pipe-Stem Lot" (sometimes called a flag or panhandle lot) means a parcel of land which resembles a rectangle with a lot taken out of a corner or corners leaving the remainder with considerably less width on the front lot line than the width at the rear of the parcel.

"Metes and Bounds" means a description of real property which starts at a known point and describes the bearings and distances of the line forming the boundaries of the property and is completed when the description returns to the point of beginning.

"Monument" means an object used to permanently mark a surveyed location. The size, shape and design of the monument is to be in accordance with standards specified by the Washington State Department of Natural Resources as authorized by RCW 58.17.

"Neighborhood Standards" means the street standards specified in the applicable neighborhood of the Comprehensive Plan of Bellingham.

"Open Space" means a parcel of land excluding building sites, parking areas, and access routes which is designated and maintained as an area for leisure, recreation and other activities normally carried on outdoors. Open space includes greenbelt and recreational areas.

"Plat" means a map or representation of a subdivision, showing thereon the division of a tract or parcel of land into lots, blocks, streets and alleys or other division and dedications.

"Plat Certificate" means a title report by a title insurance company certifying the ownership, deed restrictions, covenants, etc., of the land being subdivided.

"Final Plat" is the final drawing of the subdivision and dedication prepared for filing for record with the County Auditor and containing all elements and requirements set forth in the ordinance.

"Preliminary Plat" is a neat and approximate drawing of a proposed subdivision showing the general layout of streets and alleys, lots, blocks, and restrictive covenants applicable to the subdivision, and other elements of a plat or subdivision which furnish a basis for the approval or disapproval of the general layout of a subdivision.

"Short Plat" is the map of representation of a short subdivision.

"Accepted Street" means a street that has been accepted for maintenance. Usually any street that has or had been improved to the prevailing minimum City standard is regarded as an accepted street. The City has pledged that the accepted streets will be kept in repair and maintained at no expense to the abutting property owners.

"Arterial Street" means an existing or proposed roadway designated an arterial by City ordinances, or a roadway carrying more than 1,500 vehicles per day.

"Collector Street" means a roadway designed to carry medium volumes of vehicular traffic, provide access to the major street system, and collect the vehicular traffic from the intersecting minor streets.

"Cul-de-sac" means a street intersecting another street at one end and permanently terminated by a vehicular turnaround at the other end.

"Local or Minor-Access Street" means a street providing vehicular access to abutting properties.

"Marginal-Access Street" means a street parallel to and adjacent to a major arterial which provides access to the properties abutting it and which separates the abutting properties from high-speed vehicular traffic.

"Subdivision" means a division or resubdivision of land into 5 or more lots, tracts, parcels, sites or divisions.

"Short Subdivision" means a division or redivision of land into 9 or fewer lots, tracts, parcels, sites or subdivisions for the purpose of sale, lease or transfer of ownership.

13-3 Lot Line Adjustments

Implemented: 10/08/2001 Revised: 01/01/1990

Ordinance 9135

13-3.01 Approval Required

Implemented: 10/08/2001 Revised: 01/01/1990

Any action which will result in a lot line adjustment as defined in this section shall be submitted to the Planning and Economic Development Department for approval prior to recording.

13-3.02 Procedure

Implemented: 10/08/2001 Revised: 01/01/1990

The proposal shall be submitted to the Department of Planning and Economic Development for review on forms provided by that department. A pencil drawing showing the existing and proposed lot line shall accompany the application together with a $25.00 review fee. A filing fee of $25.00 per lot shall be collected prior to recording with the County Auditor. (Ordinance 9630)

The Department of Planning and Economic Development shall give preliminary approval to the request if it finds that:

1. No new lots are created;
2. Each parcel as proposed meets minimum lot standards as specified in Section 13-10, or that each parcel, if already less than the required minimum, is not further reduced as a result of the proposed lot line adjustment;
3. The lot line adjustment does not further infringe on any applicable section of the City Land Use Development Ordinance.
   Upon receiving preliminary approval, the applicant(s) shall have prepared a mylar as described in Section 13-3.03 to be recorded in the County Auditor's office at the expense of the applicant after receiving final City approval.

13-3.03 Mylar

Implemented: 10/08/2001 Revised: 01/01/1990

A document of mylar quality or better shall be prepared by a State of Washington licensed land surveyor based upon a record survey. The mylar shall be 18 inches by 18 inches in size and shall clearly indicate the previous and new lot lines and shall be signed by all property owners in whom title is vested and shall be notarized. A space shall be reserved for legal descriptions, and authorized signatures of the land surveyor, Planning and Economic Development Department and Auditor's office. A reproducible copy of the recorded mylar shall be submitted to the City for their records on the day of recording. (Ordinance 9550)

13-4 Short Subdivisions

Implemented: 10/08/2001 Revised: 01/01/1990

Any action which will result in a short subdivision of any lot, tract, parcel, or plot of land for any reason whatsoever shall be subject to approval by the Department of Planning and Economic Development. Approval shall be based on standards and conditions set forth in this section.

13-4.01 Approval Procedure

Implemented: 10/08/2001 Revised: 01/01/1990

1. All short subdivisions shall be submitted to the Department of Planning and Economic Development for review and approval. Approving, with specified alterations, or disapproving action will be taken by the Director of Planning and Economic Development within 30 days of the submission date unless the applicant consents to a time extension.
2. An application for approval of a short subdivision shall be accompanied by an accurately-scaled and -dimensioned drawing of the proposed subdivision prepared by a registered land surveyor. Such drawing shall be on 11-inch by 17-inch paper. Four copies shall be submitted if the property is residential, 5 copies if it is commercial or industrial. (Ordinance 9550)
3. An environmental checklist shall be completed and submitted with any application for short subdivision of property within shoreline jurisdiction. (Ordinance 9550)
4. The application shall contain an accurate legal description of the area involved in the subdivision. In the event the boundaries are described by metes and bounds, the accuracy of the description shall be attested to and signed by a registered land surveyor. Basis of bearings shall be stated.
5. The total property owned by the applicant which is contiguous to the parcel being subdivided shall be accurately indicated on the drawing. All existing buildings on the property being subdivided must be accurately illustrated on the drawing. In addition, all adjacent property and owners must be clearly shown on the drawing.
6. In the event the proposed subdivision is not sewered, a recommendation for approval from the Health Department shall be obtained prior to approval by the Planning and Economic Development Director.
7. In the event the proposed subdivision results in lots smaller than required in Title 20, the Planning and Economic Development Director has the authority to approve the short subdivision if the resulting new lots are larger than those previously existing.
8. All short subdivisions shall comply with the provisions of the ordinances of the City relating to drainage, and development of land within the flood plains of the City. (Ordinance 8827)
9. In the event the land to be subdivided has a slope or slopes of more than 20% and/or has rock or unstable soil conditions, the subdivider shall furnish soils data to the City Engineer. If conditions warrant control measures to correct slide, erosion or other similar problems, the subdivider shall be responsible for the design, installation and expense of any device or corrective measure, subject to approval of the City Engineer.
10. After preliminary approval is received from the City, the applicant shall provide a document of mylar quality or better which has been prepared by a State of Washington licensed land surveyor based upon a record of survey. Said mylar shall be 18 inches square, clearly indicate the new lot lines, be signed by all property owners in whom title is vested and shall be notarized. A space shall be reserved for legal descriptions, and authorized signatures of the land surveyor, Public Works Department, Planning and Economic Development Department, Whatcom County Health Department, if necessary, and Auditor's office. A reproducible copy of the recorded mylar shall be submitted to the City for their records on the day of recording. (Ordinance 9390 and 9550)
11. A plat certificate shall be required to be submitted with the checkprints of the mylar. (Ordinance 9550)
12. Permanent control monuments shall be established at each and every controlling corner on the boundaries of the parcel of land being subdivided, and in the centers of all intersecting streets. Additional monuments shall be installed if requested. (Ordinance 9390)
13. For short subdivisions consisting of 5 or more lots, the application shall be accompanied by a notarized list of all property owners and their mailing address who own land within 300 feet of the boundaries of the property being proposed to be subdivided. The list of all such property owners shall be obtained from the latest available records of the Whatcom County Assessor's Office. No responsibility will be assumed by the applicant in the event the County Assessor's records contain inaccurate or incomplete information. (Ordinance 9390)
    The Planning and Economic Development Department shall send notice to all persons on the list informing them of the proposed short subdivision and invite comments to be made in writing within 20 calendar days of said notice. (Ordinance 9390)
14. For short subdivision and preliminary plats adjacent to the right-of-way of a State highway or within 2 miles of the boundary of a state or municipal airport, written notice including a legal description of the

short subdivision and a location map shall be sent to the Secretary of Transportation. The Secretary shall respond within 15 days of said notice as to the effect that the proposed subdivision will have on the state highway or the state or municipal airport. Notice of intent to short subdivide shall also be sent to the local airport authority.

13-4.02 Lot Requirements - Design Standards

Implemented: 10/08/2001 Revised: 01/01/1990

All lots created by a short subdivision shall abut upon a dedicated or deeded street and such street to have no less than 60 feet of right-of-way width if a through street, or 50 feet of width if a cul-de-sac; in the event the abutting street does not meet these minimum width standards, additional right-of-way shall be required prior to approval of a short subdivision provided that this requirement may be waived if, in the opinion of the Planning and Economic Development Director and City Engineer, such additional

right-of-way will not be necessary for the future traffic circulation of the City.

Short subdivisions that contain a dedication of land to the public shall be surveyed, monumented and recorded with the County Auditor. The monumentation requirement may be waived, if the centerline of the right-of-way is already monumented.

All lots created by a short subdivision shall meet the design standards specified in Section 13-10; however, the Planning and Economic Development Director may approve a division of land less than the required standards, provided such division of property results in better lot design than previously existed. Better lot design is defined as meaning such items as larger in area, more practical site because of topography or nearer to conformance to required standards.

For short subdivisions consisting of 5 or more lots, the cluster provision of Section 13-9 shall not be utilized. (Ordinance 9390)

13-4.03 Required Improvements

Implemented: 10/08/2001 Revised: 01/01/1990

1. Prior to granting approval for any short subdivision, the Planning and Economic Development Director shall ascertain the following improvements have been made or installed for each parcel created by the division of land:
   A. City water.
   B. Sanitary sewer or Health Department approval of septic tanks.
   C. Appropriate dedications or easements made, if required.
2. All improvements shall be constructed in accordance with a contract between the subdivider and the City, providing at least:
   A. Terms and conditions satisfactory to the City, including design and construction standards;
   B. Requiring a permit to be issued before commencement of construction; and
   C. In the discretion of the Director of Public Works, appropriate security may be required, covering construction performance and guaranteeing the construction after completion for a period of one year.
3. Streets, Curbs, Gutter, Sidewalks (Ordinance 9390)
   A. For short subdivisions consisting of 4 or fewer lots:
      i. When the principal frontage street providing access to a newly-created lot is below the standard for an existing street, the installation of a street is required prior to approval of a short subdivision. The newly-installed street shall have a minimum traveled way brought to line and grade of not less than 20 feet of width with 4-foot shoulders on each side. The

surface shall be at least of asphaltic concrete quality and there shall be adequate provision for storm drainage.

ii. In the event the principal frontage street is not currently improved and is being created by full-width dedication by the short division then a street constructed to full-neighborhood standards shall be required.

B. For short subdivisions consisting of 5 to 9 lots:

i. All abutting street rights-of-way shall be constructed to neighborhood standards or 3/4 full City standards, whichever is the lesser standard.

ii. All interior streets shall be constructed to neighborhood standards.

iii. At least one street providing access to the short subdivision shall be improved to minimum City standards.

iv. Appropriate security to ensure completion may be accepted in lieu of actual installation of the required improvements, if acceptable to the Director of Public Works. (Ordinance 8827)

v. For all short subdivisions, when an extension to electric power and communication facilities is necessary all such extensions shall be placed underground. (Ordinance 9390)

vi. For all short subdivisions, Staff shall have the authority to impose reasonable improvements to control storm drainage runoff and to address any prerequisite consideration and special conditions identified in the applicable section of the Comprehensive Plan. (Ordinance 9390)

13-4.04 Building Permit Issuance Restrictions

Implemented: 10/08/2001 Revised: 01/01/1990

No Building Permit shall be issued for construction of any kind unless:

1. Such lot was of record prior to August 17, 1964; or
2. Such lot is a division of a recorded subdivision; or
3. Such lot was created with approval of the City in accordance with Ordinance 7483 and/or 7995; or
4. Such lot was created in compliance with the provisions of this section.

It shall be the responsibility of the property owner to establish the status of the lot as it pertains to this section.

13-4.05 Resubdivision Restricted

Implemented: 10/08/2001 Revised: 01/01/1990

Any short subdivision or land involved in a short subdivision shall not be resubdivided for a period of 5 years from the date of approval of the short subdivision without the submission and approval of a final plat done in accordance with Section 13-6.

13-4.06 Inspection Fee

Implemented: 10/08/2001 Revised: 01/01/1990

(Ordinance 8724, amended by Ordinance 9630)

Any person making application for a short subdivision permit, shall at the time of application pay a base fee of $100.00. The filing fee of $25.00 per lot shall be collected prior to recording with the County Auditor. Such fees shall be nonrefundable, unless such obligation is specifically waived by the City Council.

13-5 Preliminary Plats

Implemented: 10/08/2001 Revised: 01/01/1990

Any property owner who wishes to divide land into 10 or more lots shall conform to the regulations hereafter stated as they pertain to preliminary plats, subdivision design, improvements and final plats. These regulations also pertain to land that has had an approved short subdivision during the previous 5 years and also to lots being replatted due to street vacations.

13-5.01 Contents

Implemented: 10/08/2001 Revised: 01/01/1990

A preliminary plat submitted for approval shall contain the following items and information:

1. Name of plat;
2. Name, address and phone number of subdivider (owner) and the land surveyor;
3. All lots, rights-of-way, open space, existing easements, and other features affecting the design of the plat;
4. Topography lines at 5-foot intervals;
5. All parcels of land intended to be dedicated or temporarily reserved for public use and the conditions attached thereto accurately indicated.
6. A vicinity sketch at a scale of not more than 800 feet to the inch showing the proposed plat in relation to surrounding land; all platted rights-of-way for a distance of at least a quarter of a mile, and additional area, if necessary, to show connecting streets or arterials.
7. An accurate and complete legal description of the area being platted;
8. Source of water supply, method of sewage disposal and method of surface water disposal;
9. The land use classification, both present and proposed;
10. All existing conditions shall be delineated. The location, width and names of all existing or prior platted streets or other public ways, railroad and utility rights-of-way, parks and other public open spaces, permanent buildings and structures, and section and municipal corporation lines within or adjacent to the tract shall be shown. In the case of a replat, the lots, blocks, streets, alleys, easements, and parks, of the original plat being vacated, shall be shown by dotted lines in their proper position in relation to the new arrangement of the plat; the new plat being clearly shown in solid lines so as to avoid ambiguity. Existing sewers and water lines, culverts or other underground facilities within the tract indicating pipe sizes, grades and exact location as obtained from public records shall be shown. Boundary lines of adjacent tracts of unsubdivided and subdivided land showing owners shall be indicated by dotted lines for a distance of three hundred feet. Existing zoning of the proposed subdivision and adjacent tracts shall be shown.
11. An environmental checklist shall be required in accordance with RCW 43.21C upon the submittal of a preliminary plat.

13-5.02 Preparation of Specifications

Implemented: 10/08/2001 Revised: 01/01/1990

The plat shall be prepared, drawn and certified by a land surveyor registered by the State of Washington. The horizontal scale shall be no less than 100 feet to the inch. The plat shall conform with the design standards governing plats as required by this ordinance. Sixteen copies of the plat shall accompany the application for plat approval to permit distribution to the necessary persons, agencies, and organizations. Any person making application for a preliminary plat approval shall at the time application is made pay a base fee of $500.00, plus $25.00 for each lot proposed to be created. The fee shall be nonrefundable, unless such obligation is specifically waived by the City Council. (Ordinance 8724)

13-5.03 Submission Time Limitation

Implemented: 10/08/2001 Revised: 01/01/1990

(Ordinance 8633)

Preliminary plats containing all of the information required by Sections 13-5.01 and 13-5.02 must be submitted to the Planning and Economic Development Department no less than 4 weeks prior to the Planning Commission meeting at which consideration is sought.

13-5.04 Public Hearing

Implemented: 10/08/2001 Revised: 01/01/1990

Upon receipt of a proposed preliminary plat, a public hearing before the Commission shall be scheduled. Notice of such hearing shall be given by publication of at least one notice not less than 10 days prior to the hearing in a newspaper in general circulation in the City. Three copies of the notice of hearing shall be posted in at least 3 conspicuous places on the boundaries of the proposed plat at least one week prior to the date of hearing. Individual notice shall be mailed to all property owners within 300 feet of any portion of the proposed plat or any other land owned by the applicant that is adjacent to the proposed plat not less than 10 days prior to the hearing. The actual cost of public notice, mailing and publication shall be borne by the applicant.

13-5.05 Notification of Affected Agencies

Implemented: 10/08/2001 Revised: 01/01/1990

Upon receipt of a preliminary plat for approval, the following agencies and organizations shall be notified of the date, place and hour of the public hearing and such notifications shall be accompanied by a copy of the proposed plat:

1. Department of Public Works
2. Fire Department
3. The electrical distribution company
4. The telephone company
5. The gas company
6. County Council (if plat adjoins City limits)
7. The Washington State Department of Transportation (if plat adjoins State right-of-way)
8. The television cable company

13-5.06 Technical Review Committee

Implemented: 10/08/2001 Revised: 01/01/1990

Upon receipt of a preliminary plat, the Technical Review Committee consisting of the Planning and Economic Development Director as Chairman, Public Works Director, Fire Chief, Traffic Superintendent, or an authorized representative of each, shall, within 2 weeks of receipt of the preliminary plat, conduct an informal meeting with the developer(s) for the purpose of reviewing and pointing out what, if any, corrections, additions, deletions, etc., should be made to the preliminary plat prior to the Commission public hearing. The recommendation of the Technical Review Committee shall be forwarded to the Commission, City Council, and developer(s).

13-5.07 Commission Action

Implemented: 10/08/2001 Revised: 01/01/1990

The Commission shall hold a public hearing on each preliminary plat and shall review such plat to ensure conformance with the policies as reflected by the Comprehensive Plan and with the planning standards and specification of the City, including the Comprehensive Utility Plan. The Commission shall make a recommendation to the City Council as to their findings with regard to determining if appropriate provisions have been made for drainage, streets, alleys, other public ways, water, sewer, parks, playgrounds, sites for schools, and any other relevant features necessary to serve the public interest.

Such recommendation shall be advisory only.

The recommendation of the Commission on a preliminary plat shall be submitted to the Council not later than 14 days following the recommending action.

13-5.08 Council Review and Approval

Implemented: 10/08/2001 Revised: 01/01/1990

Upon the receipt of the preliminary plat, the Council shall at its next regular public meeting set the date for a public meeting to be held to adopt or reject the recommendation of the Commission.

After considering the preliminary plat at the public meeting, the Council may adopt, change or reject the recommendation of the Commission. If the Council adopts the recommendation of the Commission, no further action is required of the Council or Commission relative to the Preliminary Plat. However, if the Council deems it necessary to change or reject the Commission's recommendation, a duly-advertised public hearing shall be held to consider the matter and thereafter the Council may adopt its own recommendations and approve or disapprove the preliminary plat.

Acting on the recommendations of the Commission, the Council shall determine if appropriate provisions have been made for drainage, streets, alleys and other public ways, water, sewer, parks, playgrounds, sites for schools and any other relevant features necessary to serve the public interest. They shall determine that the plat makes adequate provisions for the public health, safety and general welfare. After making the above determinations the Council may then approve the plat.

13-5.09 Time Limits

Implemented: 10/08/2001 Revised: 01/01/1990

(Ordinance 8860, amended by Ordinance 9550)

Approval of a preliminary plat shall expire 3 years from the date of Council approval. Upon application by the subdivider, the Commission with approval of the City Council, shall have the authority to grant an extension for one additional year. The applicant must file a written request with the Planning Commission at least 30 days before the expiration of the 3-year period. A one-year extension shall be granted upon a showing that the applicant has attempted in good faith to submit the final plat within the 3-year period.

The subdivider may apply for subsequent one-year extensions. In approving subsequent one-year extension requests, the City shall find that the proposed plat is still in conformance with the City's Comprehensive Plan. The extension shall be conditional upon the plat meeting all subdivision requirements which are in effect at the time the extension is granted.

In the event a portion of an approved preliminary plat is developed and recorded as a final plat and the remainder of the overall plat is left undeveloped for a period of 3 years from the date of the recording of

the divisions, then the approval of the preliminary plat shall expire. The time limit may be extended as provided for in this section.

13-5.10 Modification of Standards

Implemented: 10/08/2001 Revised: 01/01/1990

(Ordinance 8492)

Circumstances may exist so as to justify modification of established subdivision development standards. (See Ordinance 8192, Section 18.16 for requirements, procedure, and limitations.)

13-6 Final Plat

Implemented: 10/08/2001 Revised: 01/01/1990

13-6.01 Conformance with Ordinance Required

Implemented: 10/08/2001 Revised: 01/01/1990

Prior to submission of a final plat for approval, the plat shall conform in all respects to the design standards and improvements requirements specified in the ordinance. Submission of the final plat, together with all required data shall be submitted to the Planning and Economic Development Director at least one month prior to the date of consideration by the City Council.

13-6.02 Conformance With Preliminary Plat

Implemented: 10/08/2001 Revised: 01/01/1990

The final plat shall conform to the preliminary plat design; however, slight deviations may be allowed by the Technical Review Committee if they determine such deviations are necessary because of unforeseen technical problems and that the change will result in a better plat.

13-6.03 Legal Description

Implemented: 10/08/2001 Revised: 01/01/1990

A complete legal description shall be shown in its entirety on the face of the plat. The plat shall be accompanied by a complete survey of the section or sections in which the plat or replat is located, or as much thereof as may be necessary to properly orient the plat within such section or sections, and showing relationship to abutting plats and properties. The plat and section survey shall be submitted with descriptions of the same and the actual traverse showing errors of closure and method of balancing. A work sheet showing all distances, bearings, and other related calculations required to determine corners and distances of the plat shall accompany this data. The allowable plat map error of closure shall not exceed one foot in 10,000 feet. Basis of bearing shall be shown based upon a line between two found monuments, and they shall be shown on the plat, together with description of found monuments and bearing distance between them. Bearings shall be listed to nearest second (01") and distances to be listed to nearest hundredth of a foot.

For every existing monument used in control for plat boundary, and new plat monuments on existing street rights-of-way, there shall be a minimum of 3 direct measurement distances to substantial reference points (nail and shiner, iron pipe, etc.) These measurements may be submitted on 3 by 5 inch tie cards furnished by the City.

13-6.04 Covenants

Implemented: 10/08/2001 Revised: 01/01/1990

A copy of any covenants which are drafted in conjunction with, or as a result of a plat, shall accompany the final plat and shall become a part of it. Said covenants shall be recorded with the final plat

13-6.05 Plat Certificate

Implemented: 10/08/2001 Revised: 01/01/1990

A current plat certificate by a recognized title company shall accompany the final plat upon submission to the City Council for approval. Current shall be construed as no older than 7 days.

13-6.06 Dedication of Public Lands

Implemented: 10/08/2001 Revised: 01/01/1990

The face of the plat shall contain a dedication of all lands to be conveyed to the public, which shall be signed by the legal property owners. The signatures of the owners shall be acknowledged by a notary public.

13-6.07 Land Surveyor Seal

Implemented: 10/08/2001 Revised: 01/01/1990

The survey of the proposed subdivision and preparation of the plat shall be made by or under the supervision of a registered land surveyor who shall certify on the plat that it is a true and correct representation of the lands actually surveyed.

13-6.08 Health Department Approval

Implemented: 10/08/2001 Revised: 01/01/1990

The plat shall be accompanied by a recommendation from the local Health Department and/or the City Public Works Department as to the adequacy of the proposed means of sewage disposal and water supply.

13-6.09 City Engineer Approval

Implemented: 10/08/2001 Revised: 01/01/1990

Each final plat shall be checked and approved by the City Engineer. If the final plat contains more than one sheet, there shall be a City Engineer's certificate on each sheet.

13-6.10 Inspection Fee

Implemented: 10/08/2001 Revised: 01/01/1990

(Ordinance 8724)

A basic fee of $50.00, plus $110.00 per lot, is hereby imposed to defray the City's costs of field checking, plan review, and public service inspection of sewer mains, water mains, street installation, and other required public work improvements.

13-6.11 Finance Director Approval

Implemented: 10/08/2001 Revised: 01/01/1990

Each plat shall contain the certification of the City Finance Director that all filing fees, City taxes, and assessments and other fees for which the property may be liable have been paid. Also, in order to keep the capital improvements costs of the City's utility systems current, the following estimated or actual costs will be submitted to the City's Accounting Division before the City Treasurer shall approve the final plat:

1. Water Mains - total costs, labor, equipment, materials with size and number of feet.
2. Hydrants - give number put in, size and cost.
3. Storm Sewer - total cost with size and number of feet.
4. Sanitary Sewer - total cost with size and number of feet.
5. Streets - total cost and number of feet put in.
6. Sidewalks and Curbs - total cost.

13-6.12 Director of Planning and Economic Development Action

Implemented: 10/08/2001 Revised: 01/01/1990

The Planning and Economic Development Director shall review the final plat for conformance with the approved preliminary plat, for completion of all the requirements contained in the subdivision ordinance, and for conformance with other standards or codes which pertain to the plat. Upon determination that platting requirements have been satisfied, the Planning and Economic Development Director shall approve the plat by signature and forward the plat to the City Council for action.

13-6.13 Council Review and Approval

Implemented: 10/08/2001 Revised: 01/01/1990

The City Council shall review the final plat and if the Council finds that the public use and interest will be served by the proposed plat, and that said plat meets the requirements of the subdivision ordinance and any other state or local ordinances pertaining thereto, it shall suitably inscribe and execute its approval on the face of the plat.

13-6.14 Filing With County Auditor

Implemented: 10/08/2001 Revised: 01/01/1990

The final approved plat shall be filed for record with the County Auditor in compliance with state and county laws and regulations.

13-6.15 Copy Furnished by Subdivider

Implemented: 10/08/2001 Revised: 01/01/1990

In accordance with the state law and with regulations of the subdivision ordinance the subdivider shall, without cost to the City, furnish copy, mylar or better quality, of the final plat as filed.

13-7 Site Plan for Land Divisions for Lease

Implemented: 10/08/2001 Revised: 01/01/1990

Binding Site Plan, Ordinance 8512

13-7.01 Applicability

Implemented: 10/08/2001 Revised: 01/01/1990

This section applies to divisions of land for the purpose of lease when no trailers or accessory, security, or managerial quarters are permitted to be placed upon the land.

13-7.02 Submission Requirements

Implemented: 10/08/2001 Revised: 01/01/1990

1. The following information shall be used in mandatory preliminary design discussions with the Department of Planning and Economic Development. Such information shall be prepared by the applicant.
   A. Map of the topography of the site at 5-foot contour intervals (based on City datum) and identification of the existing drainage pattern.
   B. All existing rights-of-way, easements, utilities, and other existing public improvements.
   C. All parcels of land intended to be dedicated or reserved for public use, proposed public and/or private streets and open spaces.
2. Submission requirements listed in Subsections 1 A-C of this section shall be included on a single map which shall be prepared by a registered architect, civil engineer, or land surveyor.
3. The horizontal scale ratio of the preliminary site plan shall be no more than 1:2400 (1" = 200'). The map shall include the property included in the proposed plan and adjacent lands for a distance of 300 feet.

13-7.03 Preliminary Plan Approval

Implemented: 10/08/2001 Revised: 01/01/1990

The applicant shall submit 10 copies of the preliminary plan which clearly shows all items set forth in Section 13-7.02. In addition, the following information shall be submitted:

1. An accurate and complete legal description with area in acres together with a plat certificate dated within 7 days of the preliminary plat submittal. Copies of all deeds and easements referred to in the plat certificate shall be furnished with the submittal.
2. The name, addresses, and telephones number of the owner and the professional preparing the plan.
3. Calculations of cumulative pre-development and post-development storm water runoff volumes and proposed methods of controlling post-development runoff rates.
4. At least one map at a scale of 1" = 200' depicting items listed above.
5. A completed environmental checklist as supplied by the Department of Planning and Economic Development.

Following receipt of a properly-prepared preliminary plan, the Planning and Economic Development Department shall schedule a meeting of the Technical Review Committee. Such meeting shall be scheduled no less than 10 days nor more than 30 days from the date of receipt of said preliminary plan. The applicant and the professional preparing the plan shall be notified of the date, time, and location of said meeting.

All conditions, requirements, or alterations in the proposed site plan resulting from review of the Technical Review Committee shall be transmitted, in writing to the applicant and/or their representative.

13-7.04 Required Improvements

Implemented: 10/08/2001 Revised: 01/01/1990

Prior to granting approval for any binding site plan, the Department of Public Works shall ascertain that City water and sanitary sewer improvements, plus appropriate dedications or easements, have been provided or will be provided. Performance bonds may be accepted in lieu of installation of the required improvements subject to approval of the Department of Public Works. If the development of the site is to be done in phases, the applicant shall submit a schedule of installation of required improvements to coincide with development phasing. Such improvement schedule is subject to approval of the Director of Public Works.

13-7.05 Street Installations

Implemented: 10/08/2001 Revised: 01/01/1990

In the event the principal frontage street providing access to the binding site plan is below the standard for an existing street, the installation of a street may be required prior to approval. If required, the street shall have a minimum traveled way brought to line and grade of not less than 20 feet of width with 4-foot shoulders on each side. The surface shall be at least of asphalt concrete quality and there shall be adequate provision for storm drainage. In addition, the applicant shall be required to sign a commitment to support a local improvement district (LID) for the future installation of a full-standard street.

All streets providing access to the binding site plan shall have a right-of-way width of no less than 60 feet, if a through street, or 50 feet if a cul-de-sac. In the event the abutting street does not meet these minimum standards, additional right-of-way shall be required. This requirement may be waived if, in the opinion of the Planning and Economic Development Director and the City Engineer, such additional right-of-way is not necessary for the future traffic circulation of the City.

13-7.06 Contents and Specifications

Implemented: 10/08/2001 Revised: 01/01/1990

The applicant shall submit to the Planning and Economic Development Department the final binding site plan, in reproducible form, depicting all improvements required by the Technical Review Committee. The final plan shall conform to the following technical standards, and shall be prepared by a registered land surveyor.

1. It shall be a plan legibly drawn, printed, or reproduced by a process guaranteeing a permanent record on polyester-base film and shall include all required certificates.
2. The size of each sheet shall be 18 inches by 18 inches. A border line shall be drawn around each sheet, with a blank margin of 1 inch on each edge. The scale of the plan shall be at least 1:1200 (1" = 100') but not larger than 1:240 (1" = 20') and shall show all details accurately and clearly. Sufficient sheets shall be used to accomplish this. The particular number of the sheet and the total number of sheets comprising the plan shall be stated on each of the sheets, and its relation to each adjoining sheet shall be clearly shown.
3. The exterior boundary of the binding site plan shall be indicated by a heavy border.
4. The following shall be shown: North Arrows, plat drawing scale, i.e., 1:600 (1" = 50') (graphically and feet per inch); included, if any with original block and lot numbers.
5. Each binding site plan shall have a distinct name, and a number assigned by the City.
6. Proper street names, and right-of-way widths and adjacent block lines shall be shown. If street dedications, or additional right-of-way purchases have been made after the original plat filing date, the Auditor's file number or deed number shall be shown in the area of the affected street right-of-way. If the binding site plan includes a portion of a vacated street, the City vacation ordinance number shall be shown within the vacated portion of the street.
7. A complete and accurate legal description of the total parcel included within the binding site plan shall be shown. If a metes and bounds description is used, the basis of bearings shall be shown with

bearing and distance between them. The area of the total site and of each lot or parcel shall be shown to nearest square foot on the plan.

8. All easements, whether public or exclusive, which affect the binding site plan shall be shown graphically on the plan.

13-7.07 Attachment of Covenants, Limitations and Conditions

Implemented: 10/08/2001 Revised: 01/01/1990

A copy of any and all covenants, limitations and conditions which are drafted in conjunction with, or as a result of a binding site plan, shall accompany the binding site plan and shall become part of it. Said covenants, limitations and conditions shall either be shown on the face of the plan, or shall be recorded at the County Auditor's office with the binding site plan.

13-7.08 Certifications and Dedications

Implemented: 10/08/2001 Revised: 01/01/1990

The following certifications shall appear on every binding site plan:

1. Land Surveyor Certification
2. Director of Public Works
3. Department of Planning and Economic Development
4. Covenants, Limitations and Conditions
5. County Auditor's Certificate

In accordance with state statutes, and regulations of this ordinance the land surveyor shall, at no cost to the City, furnish the Department of Planning and Economic Development with one permanent mylar original of the recorded binding site plan the same day as recording. The land surveyor shall also furnish one reduced vellum or mylar copy of the binding site plan at a scale ratio of 1:2400 (1" = 200').

13-7.09 Restrictions Upon Issuance of Building Permits

Implemented: 10/08/2001 Revised: 01/01/1990

No building permit shall be issued for construction of any kind upon the property in question unless such parcel, tract, or lot was created under the provisions of the chapter such building permit application is accompanied by a detailed plot plan clearly showing relationship of proposed structure, parking facilities, landscaping and drainage to the parcel lease boundary.

It is the responsibility of the building permit applicant to furnish the required information, and to establish the status of the parcel, tract or lot as it pertains to this chapter.

13-8 General Improvement Standards

Implemented: 10/08/2001 Revised: 01/01/1990

13-8.01 Drawings Required

Implemented: 10/08/2001 Revised: 01/01/1990

The developer shall submit to the City Engineer profiles of the proposed streets, drainage plans, and right-of-way section drawings, including utility line placement, for approval before any ground work is begun. All design drawings shall be prepared by a State of Washington registered professional engineer.

Because "as built" underground utility locations sometimes differ significantly from original designs, the developer shall submit to the City Engineer "as built" drawings of all underground utility placements upon completed installations of said utilities.

13-8.02 Installations Prior to Final Plat Approval

Implemented: 10/08/2001 Revised: 01/01/1990

Prior to the submission of a final plat for approval, all streets, alleys, sidewalks, storm drainage, utilities, monumentation, streetlights, street trees, and any other improvements specified hereunder shall be installed and completed by the subdivider to the satisfaction of the Public Works Director. Such improvements shall meet the standards specified in the ordinance; provided that a performance bond in the amount of 150% of the value of the incomplete required improvements may be posted in lieu of installation of improvements, and further provided that such bond is recommended by the Public Works Director and approved by the City Council. The performance bond shall specify exactly what improvements are covered and a time schedule for completion; however, at no time should the bond be for more than a one-year period.

13-8.03 Contact Required for Dedicated Improvements

Implemented: 10/08/2001 Revised: 01/01/1990

(Ordinance 8792, amended)

All improvements constructed by a subdivider, which are to be dedicated to the City, shall be constructed in accordance with a contract between the subdivider and the City. The contract shall provide terms and conditions satisfactory to the City and a permit is required to be issued before commencement of construction. At the discretion of the Director of Public Works, appropriate security may be required, covering construction performance and guaranteeing the construction after completion for a period of one year. The security requirement cannot be waived, however, if lots are to be sold before the construction is completed.

13-8.04 Street and Roadway Standards

Implemented: 10/08/2001 Revised: 01/01/1990

All existing streets adjacent to a subdivision shall be brought to no less than the 3/4 standard specified in Ordinance 8027 and 8040, as amended. All new streets and alleys within the subdivision shall be of the width and quality to meet the full standards of the City.

13-8.05 Sidewalks

Implemented: 10/08/2001 Revised: 01/01/1990

Sidewalks shall be installed on both sides of each street. The minimum sidewalk width shall be 5 feet. Sidewalks shall be required in dead end and cul-de-sac.

13-8.06 Pedestrian Ways

Implemented: 10/08/2001 Revised: 01/01/1990

Pedestrian ways may be required where blocks are exceptionally large or where there is a need for pedestrian access in areas other than along streets. Such ways shall be at least 3 feet in width and shall be surfaced with hard, dust-free, level material acceptable for walking.

13-8.07 Driveway Entrances

Implemented: 10/08/2001 Revised: 01/01/1990

The subdivider and/or developer shall predetermine the location of all driveway entrances prior to approval of construction plans and driveway indentations shall be made at the same time the sidewalks are constructed.

13-8.08 General Utility Installation

Implemented: 10/08/2001 Revised: 01/01/1990

All utilities (water, sewer, electrical, gas, and cable) shall be installed to the property line prior to acceptance of public improvements.

13-8.09 Easements

Implemented: 10/08/2001 Revised: 01/01/1990

The subdivider shall reserve a strip of land 5 feet in width lying adjacent to each exterior side of all dedicated public rights-of-way included in any plat. Said lands shall be recorded as public easements and shall be used primarily for the installation of required service utilities. Any and all franchised utilities, including City utilities, shall rightfully have access to and may use easements. Exclusive use rights cannot be granted to any single or combination of utilities.

13-8.10 Water System

Implemented: 10/08/2001 Revised: 01/01/1990

A complete water distribution system shall be installed. Such system shall be adequate to serve the area being platted. Each lot shall be connected to the water main by a service pipe extending at right angles from the main to the property line and including a stopcock placed on the street side 5 feet out from the property line. The connection to each lot shall be maintained by and kept within the exclusive control of the City.

All water lines and services shall be placed prior to improvement of the streets and shall be constructed in accordance with the appropriate codes and standards of the City of Bellingham. The developer shall pay the flat-rate charge for water services at the time the completed services are installed.

13-8.11 Sanitary Sewer

Implemented: 10/08/2001 Revised: 06/01/1996

A sanitary sewer system shall be installed in such a manner where each and every building in which people live, congregate, or are employed shall have a separate connection to the public sewer. Each connection and each fixture emptying into and through the connection shall be installed in the manner prescribed in the Plumbing Code of the City of Bellingham. All sewer mains in the subdivision shall be constructed in conformance with all appropriate codes and standards.

13-8.12 Storm Drainage and Surface Water Runoff

Implemented: 10/08/2001 Revised: 06/01/1996

(Ordinance 10633)

Drainage facilities for controlling storm drainage and surface water runoff shall comply with the ordinances of the City relating to drainage, including but not limited to, the submission and approval of plans, and the construction of drainage facilities.

13-8.13 Electrical and Communication Facilities

Implemented: 10/08/2001 Revised: 06/01/1996

In all subdivisions, adequate and satisfactory installation of electric power and communication facilities shall be required. All such facilities shall be installed underground except for the following:

1. Electric utility substations, pad-mounted transformers and switching facilities.
2. Electric transmission systems of a voltage of 55 KV or more.
3. TV cable amplifiers.
4. Telephone pedestals, cross-connect terminals, repeaters and cable warning signs.
5. Streetlighting standards.
6. Traffic-control equipment.
7. Temporary services for construction.

13-8.14 Streetlights and Name Signs

Implemented: 10/08/2001 Revised: 01/01/1990

The subdivider shall install at his expense streetlights and street name signs to the satisfaction of the Technical Review Committee, and such facilities shall conform to the standards of the City of Bellingham.

13-8.15 Street Naming

Implemented: 10/08/2001 Revised: 01/01/1990

All street names shall be subject to approval of the Planning Commission. The Planning Commission reserves the right to name or rename any street in any subdivision.

13-8.16 Flood Control

Implemented: 10/08/2001 Revised: 01/01/1990

Land which the Planning Commission has found to be unsuitable due to flooding, bad drainage or swamp conditions likely to be harmful to the safety, welfare and general health of future residents, and the Planning Commission considers inappropriate for development, shall not be subdivided unless adequate means of control have been formulated by the subdivider and approved by the City Engineer.

13-8.17 Erosion and Slide-Corrective Measures

Implemented: 10/08/2001 Revised: 01/01/1990

In the event the land to be subdivided has a slope or slopes of more than 20% and/or has rock or unstable soil conditions, the subdivider shall furnish soils data to the City Engineer. If conditions warrant control measures to correct slide, erosion or other similar problems, the subdivider shall be responsible for the design, installation and expense of any device or corrective measure subject to approval of the City Engineer.

13-8.18 Monumentation

Implemented: 10/08/2001 Revised: 01/01/1990

Permanent-control monuments shall be established at each and every controlling corner on the boundaries of the parcel of land being subdivided, and in the centers of all intersecting streets. Additional monuments shall be installed if requested by the City Engineer.

13-8.19 Connection to Accepted Street

Implemented: 10/08/2001 Revised: 01/01/1990

All subdivisions shall be required to be connected to an accepted City street.

13-8.20 Street Trees

Implemented: 10/08/2001 Revised: 01/01/1990

Street trees shall be provided by the subdivider in all subdivisions within the dedicated public utility easements adjacent to the street. There shall be a minimum of 2 trees per lot and street trees shall be selected, installed and maintained in accordance with the standard engineering specifications.

13-8.21 Preservation of Existing Vegetation

Implemented: 10/08/2001 Revised: 01/01/1990

The subdivision shall be so designed as to preserve the greatest amount of existing on-site vegetation, including trees with trunk diameter of 6 inches or greater, and other natural ground cover. Tree removal shall be replaced where practical.

13-9 Cluster Subdivisions

Implemented: 10/08/2001 Revised: 01/01/1990

This section is applicable and can be utilized at the subdivider's option in residential-single areas which have a "cluster," "cluster detached," or "cluster attached," use qualifier as part of the land use classification of the City's Comprehensive Plan.

The purpose of this chapter is to allow variation in the required minimum lot size, provided the same overall density is maintained, so as to preserve open space, tree cover, recreation areas or scenic vistas or to reduce the amount of streets and utilities where appropriate.

13-9.01 Maximum Number of Lots

Implemented: 10/08/2001 Revised: 01/01/1990

The maximum number of lots which can be created utilizing this procedure can be determined by dividing the total property size by the specified density found in the land use classification within the Neighborhood Plan.

13-9.02 Reduction of Lot Size and Frontage

Implemented: 10/08/2001 Revised: 01/01/1990

Pursuant to this chapter, the minimum lot size and frontage requirements may be reduced provided that at least 15% of the property's total property size is set aside for common open space.

13-9.03 Findings Prior to Approval

Implemented: 10/08/2001 Revised: 01/01/1990

Prior to cluster subdivision approval, the City must find that continued orderly development of adjacent property will not be unduly jeopardized from the concentration of streets and utilities within the proposed cluster subdivision, or cannot be reasonably serviced from the proposed cluster subdivision due to extreme environmental conditions.

13-9.04 Open Space

Implemented: 10/08/2001 Revised: 01/01/1990

The area designated as open space shall either be held in common among owners of the lots within the subdivision or dedicated to the City if appropriate. However, if held in private ownership, all development rights other than recreational in nature, shall be extinguished in the form of a recorded agreement. The common private open space shall be clearly identified on the final plat. A homeowner's association agreement shall be recorded after review by the Planning and Economic Development Department. Said agreement shall clearly set out the rights, obligations and responsibilities of the owners of property designated as common open space.

13-10 Lots and Blocks

Implemented: 10/08/2001 Revised: 01/01/1990

13-10.01 Through Lots

Implemented: 10/08/2001 Revised: 01/01/1990

Through lots shall not be allowed; however, if the subdivision abuts an arterial street, the lots on such streets may be through lots provided the Planning Commission determines such a layout to be in the best interests of safety and general welfare.

13-10.02 Lot Design

Implemented: 10/08/2001 Revised: 01/01/1990

All lots shall be of sufficient size to meet the site area requirements specified within the area's land use designation under "density" found within the applicable Neighborhood Plan in which the property is located; provided, however, that this minimum shall not be required in the following instances:

1. When there exists no specified minimum lot size in the subject area land use designation, in which case the lot size shall be determined by the subdivider subject to any other applicable codes or requirements;
2. Cluster lots which meet the requirements specified in Section 13-9;
3. Lot line adjustments pursuant to Section 13-3.01 for lots presently having less site area than the required minimum lot size;
4. For existing lots of record under single ownership having a total site area in excess of the required neighborhood density in which the case the number of possible lots shall be determined by dividing the total amount of site area by the specified neighborhood density and rounding to the nearest whole

number. One-half shall be rounded to the higher whole number. All lots proposed under this provision shall be as equal in site area as is practical.

Each lot shall have not less than 30 feet of frontage on a deeded or dedicated right-of-way. This width shall be a consistent 30 feet or more from the right-of-way to the building setback line. The minimum lot width at the building setback line shall be not less than 60 feet for interior lots and 70 feet for corner lots. Lots utilizing less than a 40-foot frontage standard, with the exception of pipe-stem lots, shall have the front yard setback line increased to 30 feet from the property line. (Ordinance 9550)

Pipe-stem lots shall only be permitted in a residential subdivision and short subdivision if the following are met:

1. The minimum width of the minor or access portion of the lot shall be 30 feet; the lot width standard is 60 feet;
2. The access portion of the lot shall not be included in computations for meeting minimum density requirements of the Neighborhood Plans;
3. A 5-foot setback from property lines for driveways in the access portion of the lot shall be recorded on the face of the plat unless, in the judgment of the Planning and Economic Development Director, such a requirement would be unfeasible due to topographical conditions;
4. No pipe-stem lot shall be permitted in short subdivisions where the ownership is common with adjacent property;
5. Side-by-side pipe-stems in short subdivisions and subdivisions shall not be permitted unless, in the judgment of the Planning and Economic Development Director in consultation with the City Engineer, the design is necessary due to site conditions. Joint access may be required.
6. Joint access for pipe-stem and adjacent lots under common ownership at the time of division of property shall be required. An access easement shall be recorded on the face of the plat. (Ordinance 9550)

Pipe-stem lots in commercial and industrial subdivisions shall be permitted only if the following are met:

1. The minimum width of the minor or access portion of the lot shall be 40 feet; the lot width standard is 60 feet. Minimum width of the minor or access portion may be decreased to 30 feet if joint access with adjacent property is maintained and in the judgment of the City Engineer, no adverse traffic impacts will result.
2. The access portion of the lot shall not abut property with a residential land use designation.
3. No pipe-stem lot shall be permitted in short subdivisions where the ownership is common with adjacent property.
4. Side-by-side pipe-stems are permitted only if joint access is granted. Joint access for pipe-stem and adjacent lots under common ownership at the time of division of property shall be required. An access easement shall be recorded on the face of the plat. (Ordinance 9550)

13-10.03 Block Design

Implemented: 10/08/2001 Revised: 01/01/1990

The maximum length of a block is 1,320 feet. The maximum width is 500 feet. Where blocks exceed 500 feet in length, pedestrian easements may be required if deemed necessary.

13-11 Parks, Open Space, and Public Areas

Implemented: 10/08/2001 Revised: 01/01/1990

13-11.01 Provisions for Parklands

Implemented: 10/08/2001 Revised: 01/01/1990

In each subdivision, appropriate provisions shall be made for parks, playgrounds, open space and other public areas. Provision of such areas may be made in one of the two following ways:

1. A minimum of 100 square feet of ground area per lot shall be provided in a location predetermined by the City Park Plan.
2. In the event no proposed park or planned expansion of an existing park is located within the boundaries of a subdivision, then the developer shall pay into a Special Park Site Acquisition Fund the sum of $50.00 per lot. Such fund is to be used to acquire land for parks, playgrounds, open space or greenbelts in areas deemed appropriate by the City Council.

13-11.02 Substitution of Greenbelts for Required Park Lands

Implemented: 10/08/2001 Revised: 01/01/1990

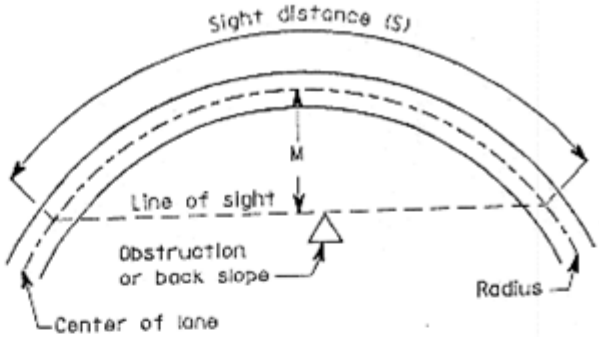
The developer may substitute open space or greenbelts for the above required park lands if, in the opinion of the City Council, such areas are necessary for public welfare or safety. Open spaces or greenbelts need not be dedicated to and maintained by the public and any substituted in lieu of park lands shall be a continuing obligation of the owners of the subdivision.

Section 14. Figures

Figure 4-1 Horizontal Stopping Sight Distance

Implemented: 10/10/2001 Revised: 01/01/1990

Height of eye: 3.50 feet
Height of object: 0.50 feet.
Line of sight is normally 2.00 feet above C.L. of inside lane at point of obstruction provided no vertical curve is present in the horizontal curve.



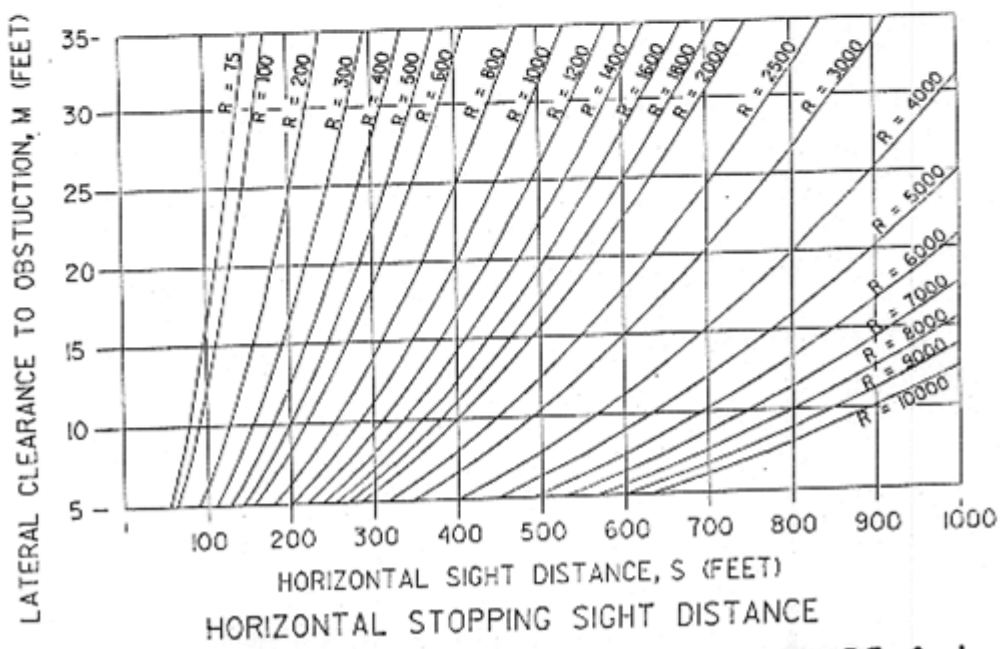
$$M = R\left[\text{VERS}\left(\frac{28.65S}{R}\right)\right] = R\left(1 - \cos\frac{28.65S}{R}\right)$$

$$S = \frac{R}{28.65}\left[\cos^{-1}\left(\frac{R-M}{R}\right)\right]$$

S ≤ Length of curve
Angle is expressed in degrees

DESIGN SPEED (MPH)	STOPPING SIGHT DISTANCE (FT)	
	DESIRABLE MIN	MINIMUM **
25	150	—
30	200	—
35	250	225
40	325	275
50	475	400
60	650	525
70	850	625

** Headquarters approval required



HORIZONTAL STOPPING SIGHT DISTANCE

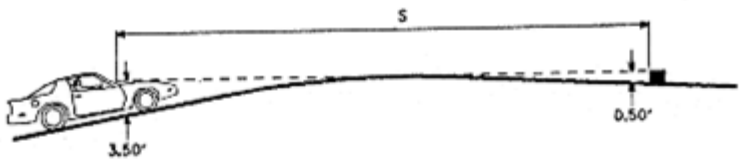
FIGURE 4-1

JAN. 1990

F-1

Figure 4-2 Stopping Sight Distance for Crest Vertical Curves

Implemented: 10/10/2001 Revised: 01/01/1990

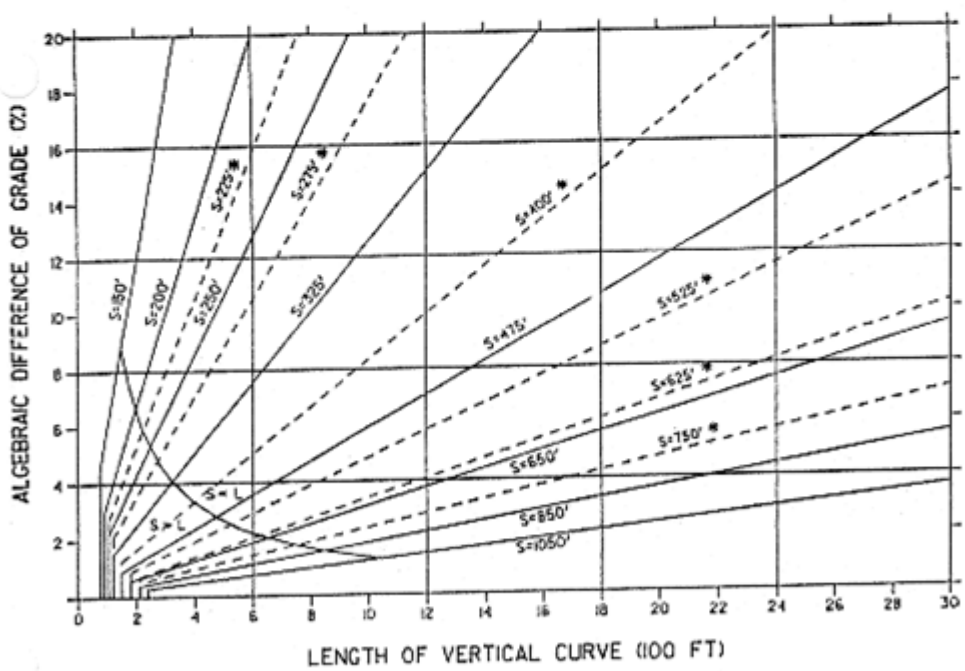


WHEN S < L	WHEN S > L
$L = 2S - \frac{1329}{A}$	$L = \frac{AS^2}{1329}$

L = Curve Length (Feet)
A = Algebraic Grade Difference (Percent)
S = Sight Distance (Feet)

DESIGN SPEED (MPH)	DESIRABLE MINIMUM STOPPING DISTANCE (FEET)	MIN. STOPPING DISTANCE (FEET) *	MIN. L (FEET)
25	150	-	75
30	200	-	90
35	250	225	105
40	325	275	120
50	475	400	150
60	650	525	180
70	850	625	210
80	1050	750	240

* Headquarters approval required.



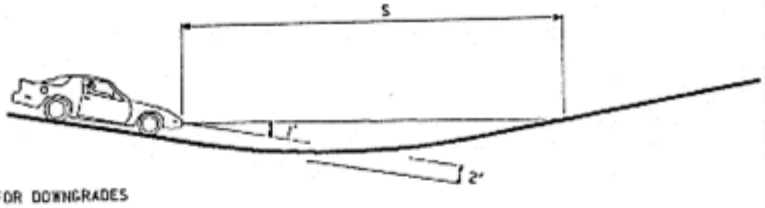
STOPPING SIGHT DISTANCE FOR CREST VERTICAL CURVES

FIGURE 4-2

JAN. 1990 F-2

Figure 4-3 Stopping Sight Distance for Sag Vertical Curves

Implemented: 10/10/2001 Revised: 01/01/1990



INCREASE FOR DOWNGRADES

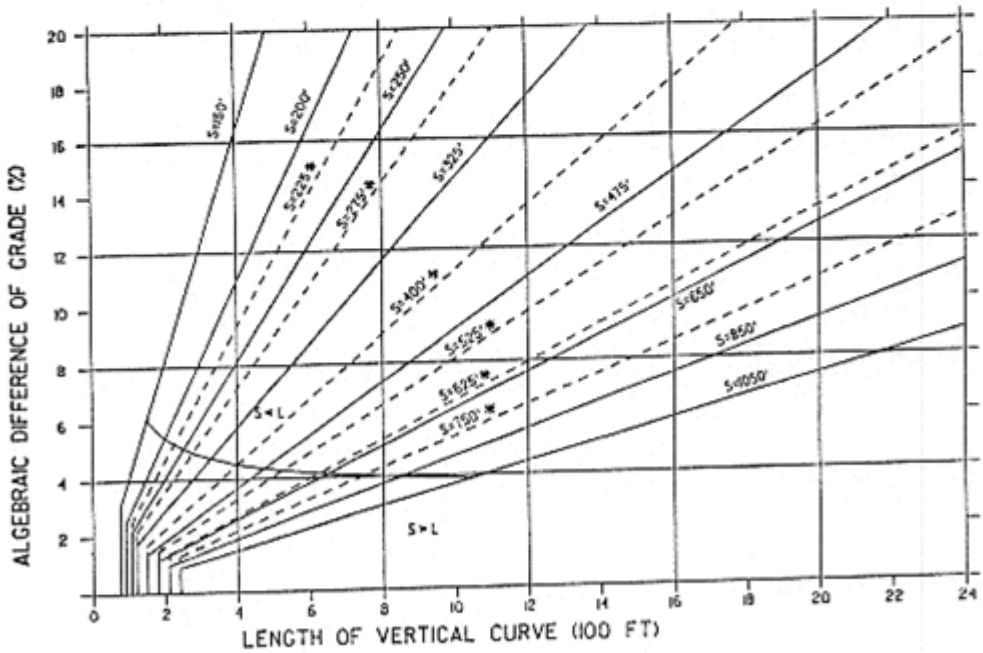
DESIGN SPEED (MPH)	CORRECTION DISTANCE (FT)		
	3%	6%	9%
30	10	20	30
40	20	40	70
50	30	70	—
60	50	110	—
70	70	160	—

DESIGN SPEED (MPH)	DESIRABLE MINIMUM STOPPING DISTANCE (FEET)	MIN. STOPPING DISTANCE (FEET) *	MIN. L (FEET)
25	150	-	75
30	200	-	90
35	250	225	105
40	325	275	120
50	475	400	150
60	650	525	180
70	850	625	210
80	1050	750	240

* Headquarters approval required

WHEN S < L	WHEN S > L
$L = 2S - \frac{400 + 3.5S}{A}$	$L = \frac{AS^2}{400 + 3.5S}$

L = Curve Length (Feet)
A = Algebraic Grade Difference (Percent)
S = Sight Distance (Feet)



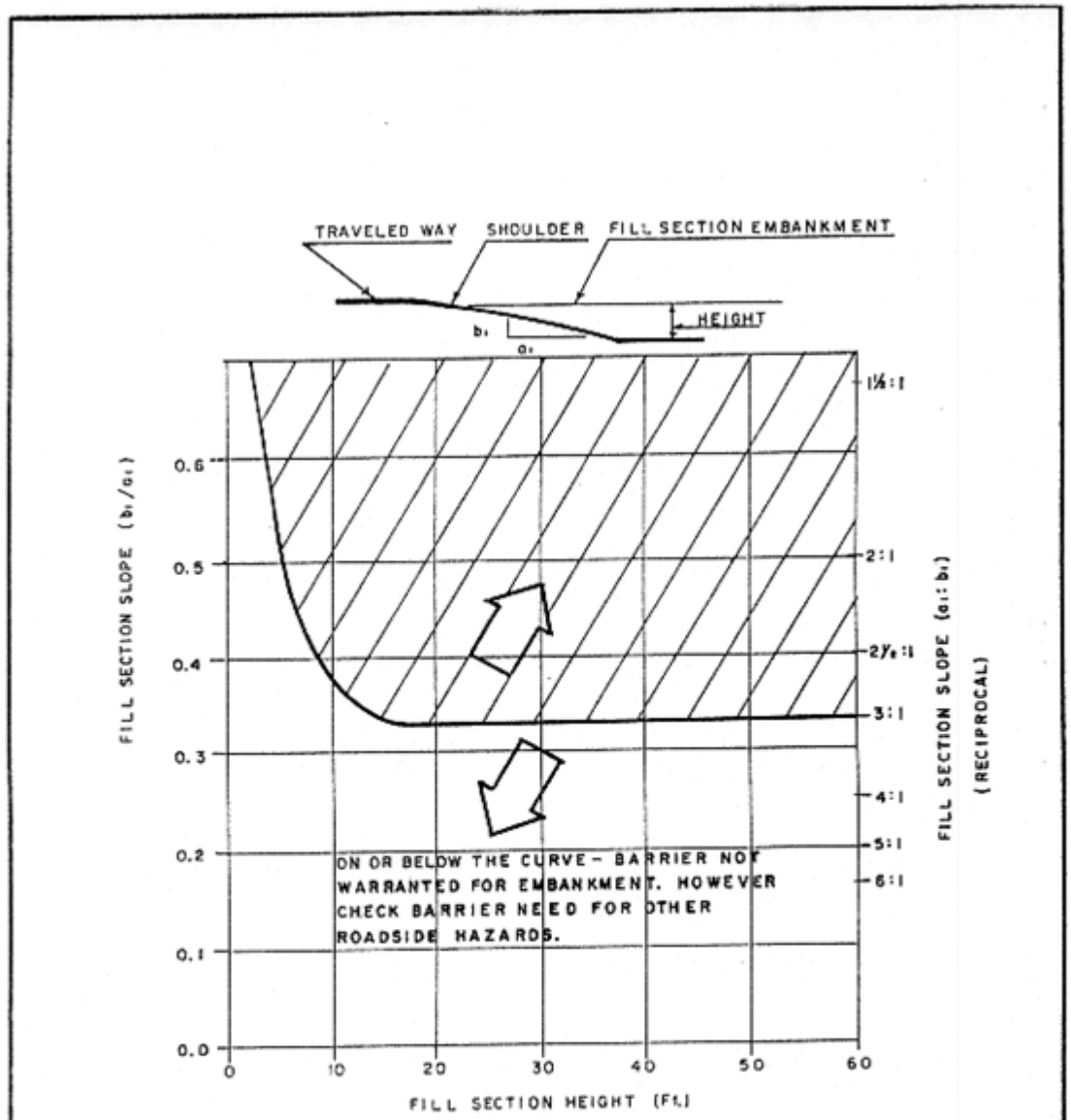
STOPPING SIGHT DISTANCE FOR SAG VERTICAL CURVES

FIGURE 4-3

JAN. 1990 F-3

Figure 4-4 Guard Rail Warrant Chart for Fill Section Embankments

Implemented: 10/10/2001 Revised: 01/01/1990



CITY OF BELLINGHAM
GUARD RAIL WARRANT CHART
FOR FILL SECTION EMBANKMENTS

FIGURE
4-4

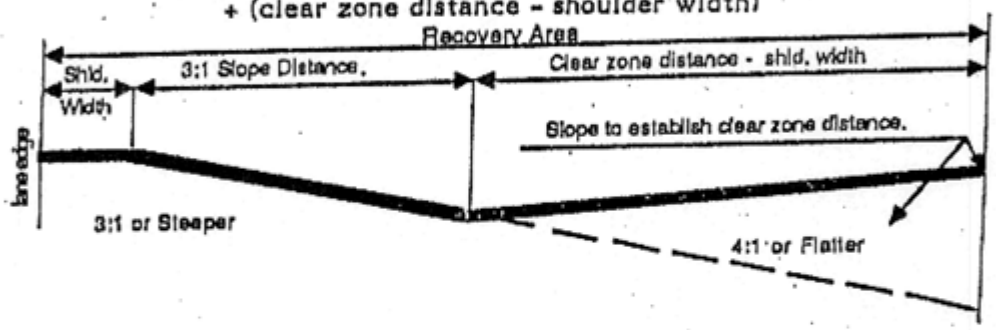
JAN. 1990 F-4

Figure 4-5 Recovery Area

Implemented: 10/10/2001 Revised: 01/01/1990

*When the fill section slope is 3:1 or steeper, the clear zone distance is called a recovery area and is calculated using the recovery area formula. The basic philosophy behind the recovery area formula is that a vehicle can transverse a 3:1 slope but cannot recover (control steering) and, therefore, the formula does not allow a credit toward the recovery area for the 3:1 horizontal slope distance. The diagram below is intended to clarify the use of the recovery area formula.

RECOVERY AREA = (shoulder width) + (3:1 slope distance) + (clear zone distance - shoulder width)



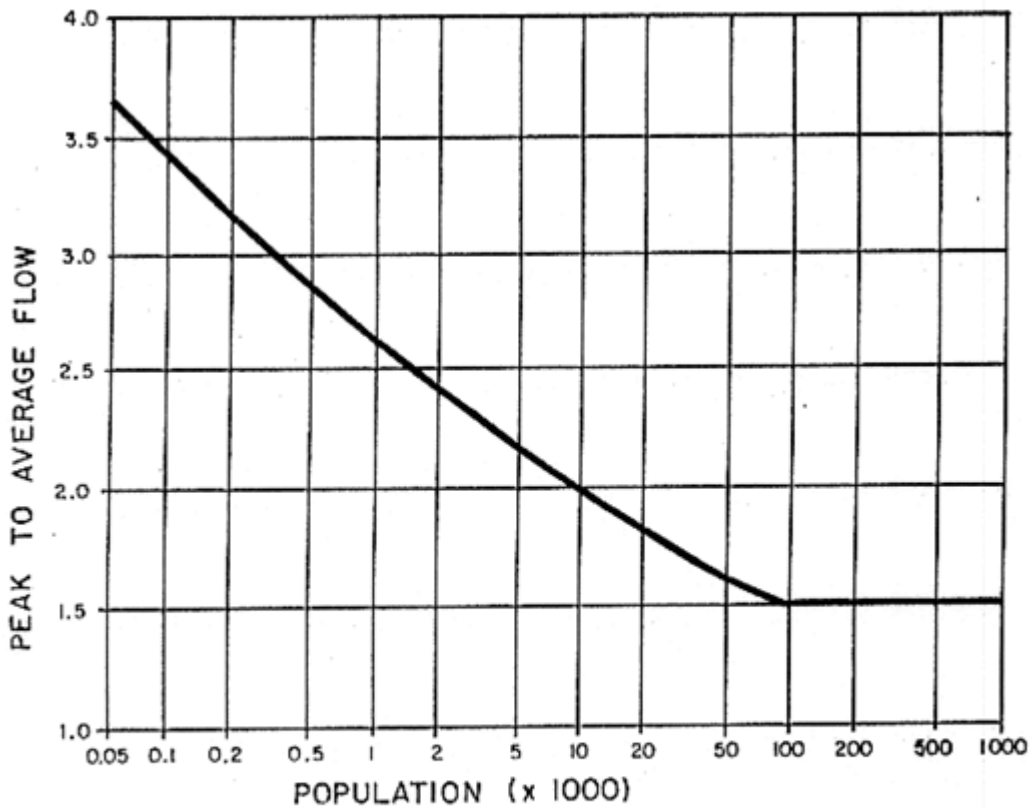
RECOVERY AREA

FIGURE 4-5

JAN. 1990 F-5

Figure 5-1 Peaking Factor Versus Population

Implemented: 10/10/2001 Revised: 03/01/1993



PEAKING FACTOR VERSUS POPULATION

FIGURE
5-1

Figure 12-1 Driveway Width

Implemented: 10/10/2001 Revised: 03/01/1993

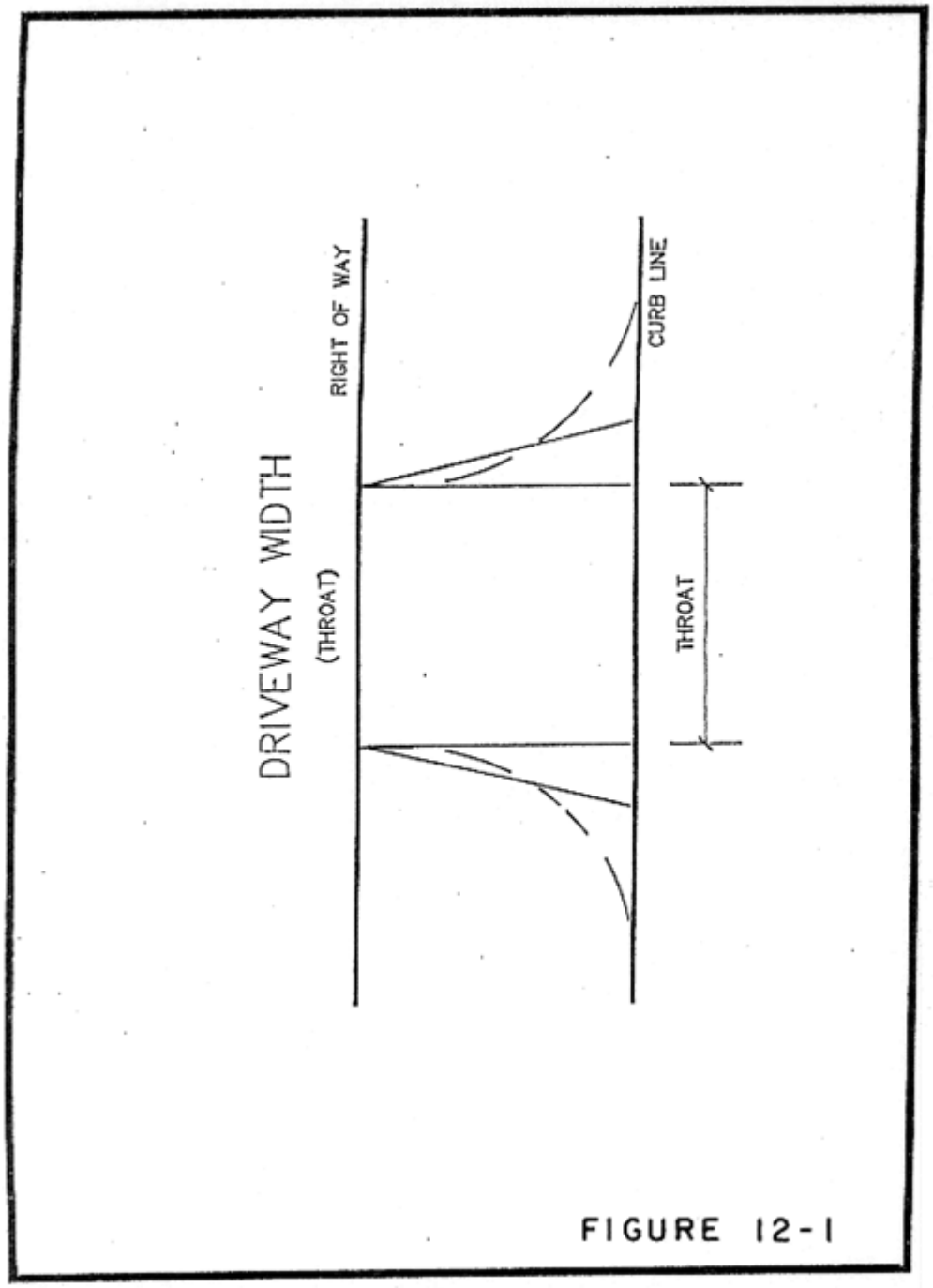


Figure 12-2 Distance from Intersections

Implemented: 10/10/2001 Revised: 03/01/1993

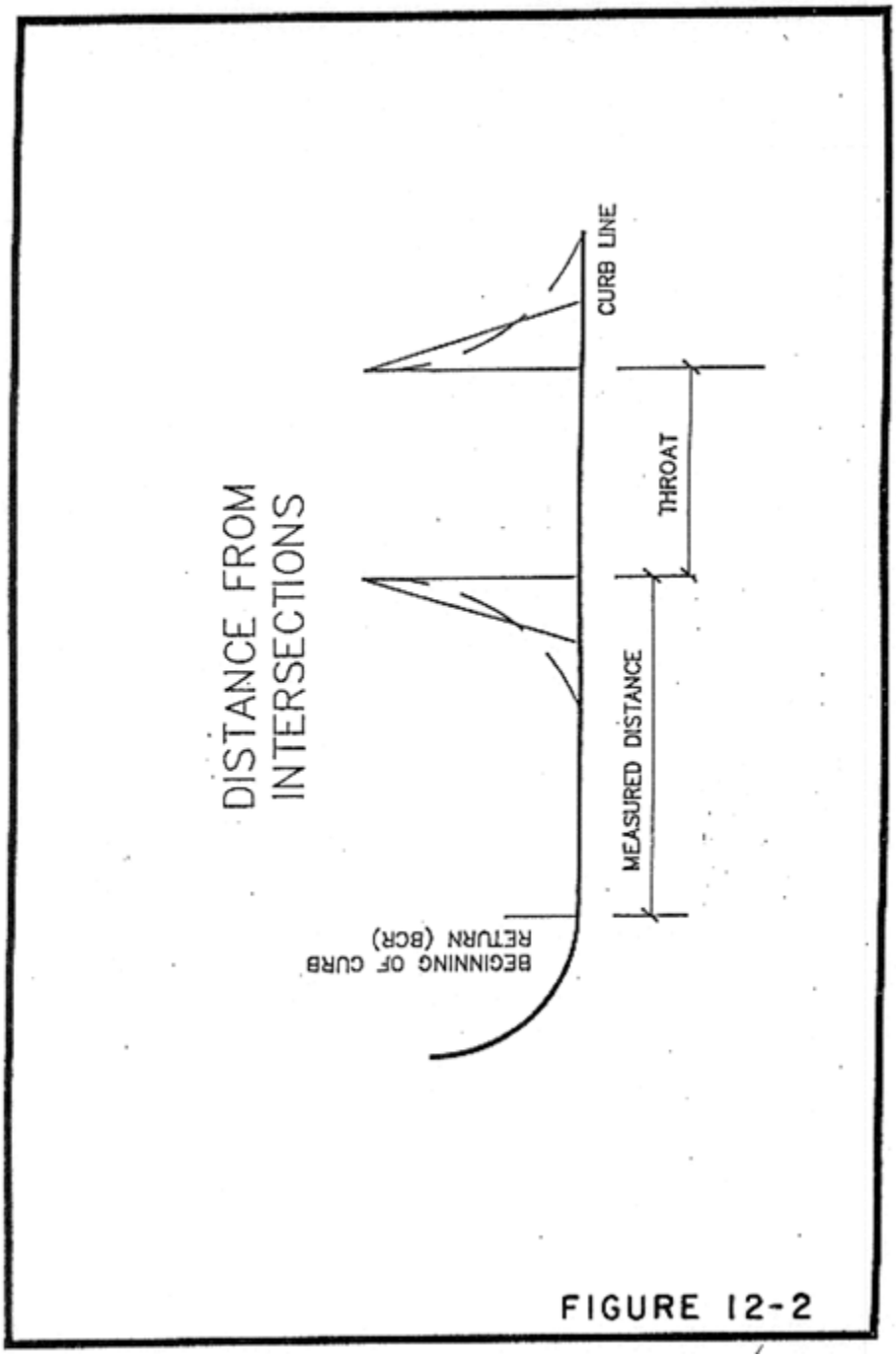
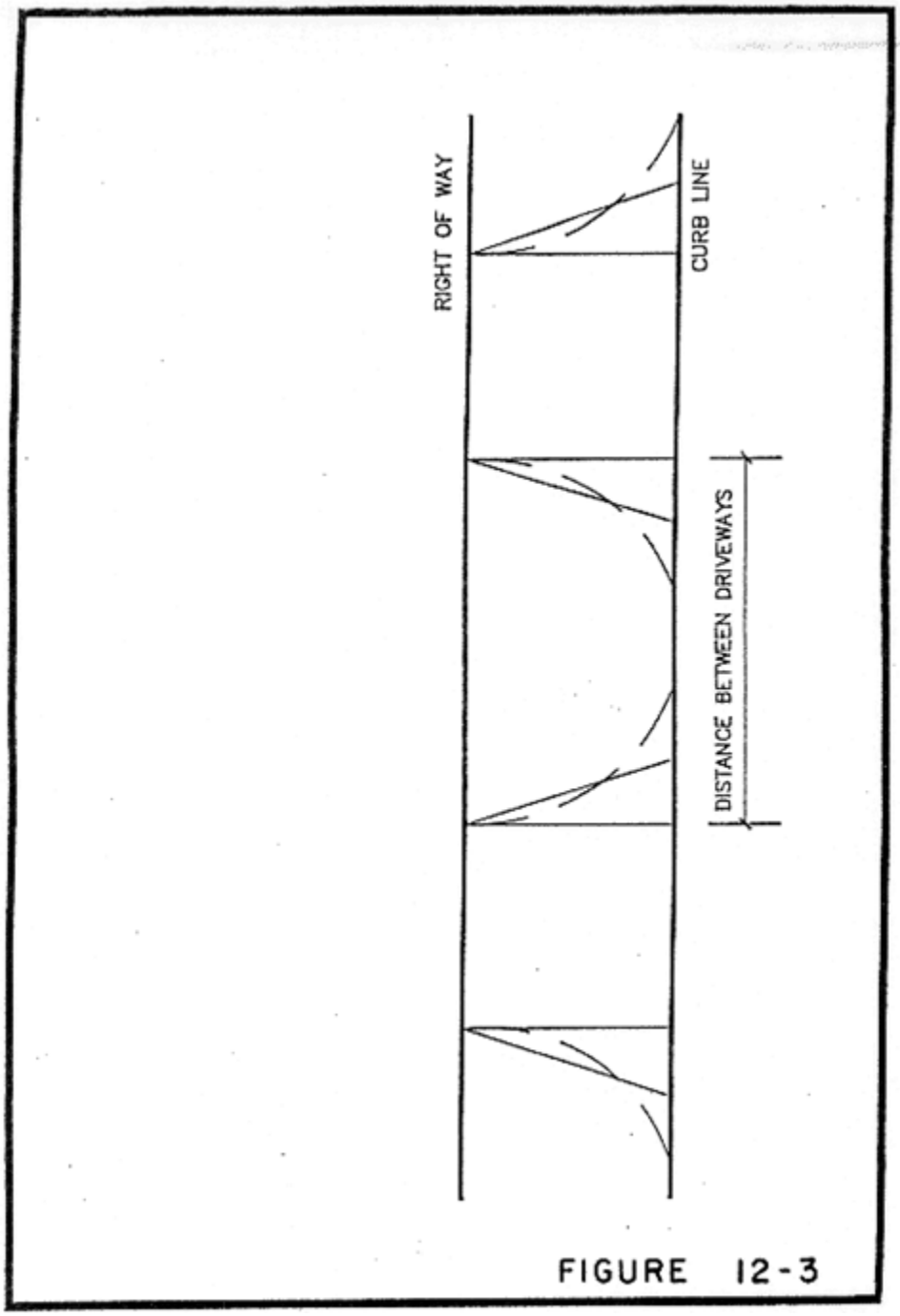


Figure 12-3 Distance Between Driveways

Implemented: 10/10/2001 Revised: 03/01/1993



Appendices

Appendix 1: Thresholds for requiring traffic studies

Implemented: 10/10/2001 Revised: 11/10/1997

LAND USE	UNIT OF MEASUREMENT	THRESHOLD
Residential		
Single-Family Detached Housing	D.U.	50 Units
Apartment, General	D.U.	50 Units
Low-Rise Apartment (1-2 stories)	D.U.	50 Units
High-Rise Apartment (3-plus stories)	D.U.	50 Units
Mobile Home	D.U.	50 Units
Retirement Community	D.U.	50 Units
Townhouse	D.U.	50 Units
Condominium	D.U.	50 Units
Lodging		
Hotel (convention oriented)	Room	75 Rooms
Motel	Room	75 Rooms
Resort Hotel	Room	75 Rooms
Recreational		
Golf Course	Parking Space	100 spaces
Racquet Clubs	1,000 Sq. Ft.	15,000 Sq. Ft.
Athletic Club	1,000 Sq. Ft.	10,000 Sq. Ft.
Institutional		
Elementary-Intermediate	Student	150 Students
High School	Student	150 Students
Junior/Community College	Student	150 Students
University	Student	200 Students
Library	1,000 GSF	7,500 Sq. Ft.
Day Care Center	Children	50 Children
Nursing Home	Bed	100 Beds
Medical		
Hospital	Bed	100 Beds
Clinic (Diagnostic/Out Patient)	1,000 Sq. Ft.	5,000 Sq. Ft.
Drug Store	1,000 Sq. Ft.	5,000 Sq. Ft.
Medical Office	1,000 Sq. Ft.	5,000 Sq. Ft.
Dental Lab	Employee	50 Employees
Office		
Office Buildings	1,000 Sq. Ft.	50,000 Sq. Ft.
Office Park	1,000 Sq. Ft.	50,000 Sq. Ft.
Research Center	1,000 Sq. Ft.	50,000 Sq. Ft.
Post Office	1,000 Sq. Ft.	2,500 Sq. Ft.
Retail		
Specialty Retail Center	1,000 Sq. Ft.	10,000 Sq. Ft.
Discount Stores	1,000 Sq. Ft.	7,500 Sq. Ft.
Hardware/Paint Stores	1,000 Sq. Ft.	7,500 Sq. Ft.
Barber Shop	Chair	10 Chairs
Cleaners	1,000 Sq. Ft.	5,000 Sq. Ft.
Shopping Center	1,000 Sq. Ft.	5,000 Sq. Ft.
New/Used Car Sales	1,000 Sq. Ft.	10,000 Sq. Ft.
Supermarket	1,000 GSF	10,000 Sq. Ft.
Convenience Market - 24 Hour	1,000 GSF	3,000 Sq. Ft.
Convenience Market- 15 - 16 Hour	1,000 GSF	3,000 Sq. Ft.
Delicatessen Market	1,000 Sq. Ft.	5,000 Sq. Ft.

LAND USE	UNIT OF MEASUREMENT	THRESHOLD
Services		
Bank - Walk-In	1,000 GSF	5,000 Sq. Ft.
Bank - Drive-In	1,000 Sq. Ft. (Lobby)	2,000 Sq. Ft.
Savings & Loan - Walk-In	1,000 GSF	5,000 Sq. Ft.
Savings & Loan - Drive-In	1,000 GSF	4,000 Sq. Ft.
Restaurant		
Quality Restaurant	Seat	100 Seats
	1,000 Sq. Ft	5,000 Sq. Ft.
High-Turnover, Sit-Down	Seat	75 Seats
	1,000 Sq. Ft.	2,000 Sq. Ft.
Fast-Food Restaurant	Seat	50 Seats
With Drive-Through Service	1,000 Sq. Ft.	1,000 Sq. Ft.
Automotive Services		
Service Station	Pump	10 Pumps
Auto Upholstery Shop	1,000 Sq. Ft.	25,000 Sq. Ft.
Auto Parts	1,000 Sq. Ft.	5,000 Sq. Ft.
Auto Repair & Body Parts	1,000 Sq. Ft.	50,000 Sq. Ft.
Transmission Shop	1,000 Sq. Ft.	50,000 Sq. Ft.
Car Wash	Bays	5 Bays
Wholesale Stores		
Wholesale	1,000 GSF	50,000 Sq. Ft.
Produce Market	1,000 Sq. Ft.	10,000 Sq. Ft.
Churches		
Church	Member	250 Members
Warehouse		
Industrial - Warehouse - Manufacturer	1,000 Sq. Ft.	25,000 Sq. Ft.
Mini Warehouse	Units	200 Units
Industrial Park	1,000 Sq. Ft.	25,000 Sq. Ft.
Entertainment		
Movie Theaters	Screen	2 Screens

Appendix 2: Traffic study requirements and study outline

Implemented: 10/10/2001 Revised: 01/01/1990

Typical Study Contents:

1. Introduction
    1. Land Use, Site and Study Area Boundaries (provide map)
    2. Existing and Proposed Site Uses
    3. Existing and Proposed Uses in Vicinity of Site (provide map)
    4. Existing and Proposed Roadways and Intersections (provide map)
2. Trip Generation and Design-Hour Volumes (provide table)
3. Trip Distribution (provide figure)
4. Trip Assignment (provide figure)
5. Existing and Projected Traffic Volumes (provide figure for each item)
    1. AM Peak-Hour Site Traffic (including turning movements)
    2. PM Peak-Hour Site Traffic (including turning movements)
    3. AM Peak-Hour Total Traffic (including site-generated traffic and projected traffic)
    4. PM Peak-Hour Total Traffic (including site-generated traffic and projected traffic)
    5. Any Other Peak Hour Necessary for Complete Analysis
    6. Total Daily Existing Traffic for Street System in Study Area
    7. Total Daily Existing Traffic for Street System in Study Area and New Site Traffic
    8. Total Daily Existing Traffic for Street System in Study Area Plus New Site Traffic and Projected Traffic from Build-Out of Study Area Land Uses
6. Capacity Analysis (provide analysis sheets in appendices)
7. Traffic Signals (provide analysis sheets in appendices)
8. Traffic Accidents (optional) (provide collision diagrams and accident rate)
9. Conclusions
10. Recommendations
    1. Proposed Recommended Improvements (provide sketches of improvements)
    2. Volume/Capacity Analysis at Critical Points (provide analysis sheets in appendices)
    3. Traffic Volume Proportions

NOTE: Information required on figures may be combined, provided that the information is clearly legible.

Appendix 3: Level of service ranges for planning applications for signalized intersections

Implemented: 10/10/2001 Revised: 01/01/1990

Maximum Sum of Critical Volumes (VPH)

Level of Service	Two Phase	Three Phase	Four or More Phases	V/C Ratio
A	900	855	835	0.00 – 0.60
B	1050	1000	965	0.61 – 0.70
C	1200	1140	1100	0.71 – 0.80
D	1350	1275	1225	0.81 – 0.90
E	1500	1425	1375	0.91 – 1.00
F	N/A	N/A	N/A	Variable

NOTE: To determine level of service, first complete the planning analysis form to obtain the critical volume sum. Then use this number to enter the table under the appropriate signal-phase column. The next higher number is then used to determine the level of service on the left.

As an example, if the planning analysis for a three-phase intersection yielded a critical volume sum of 1280, then the next higher number of the three-phase column, or 1425, would be used for level of service. In this example, the resultant level of service would be "E."

Appendix 4: Traffic Study Requirements Form

Implemented: 10/10/2001 Revised: 11/10/1997

APPENDIX 4

TRAFFIC STUDY REQUIREMENTS FORM

DATE: _____

SUBJECT NAME _____ LOCATION _____

	DEVELOPER	TRAFFIC CONSULTANT	CITY	APPROVAL PROCESS	
COMPANY				CITY	
CONTACT		P.E.	P.P.	W.S.D.O.T.	
PHONE				OTHER	

TRAFFIC STUDY FOR:		CONTENT OF REPORT TO INCLUDE			METHOD
Zoning		Land Use Description	Study Area Impacts	Site Impacts	
Annexation		Trip Gen. (+Reduct Factor)			
Tentative Map		Trip Dist./Trip Assignmnt			
Access Permit		Parking Anal. +Shrd Parkng			
		Accident Analysis			
		Traffic Signal Progressn.			

Intersection Capacities to be Analyzed *	Peak Periods				Street A.T.D.S. to be Provided		Projection	
	A.M.	Noon	P.M.	Other		Exist	Build Out	20 Yr.

* On existing and build out conditions:
Traffic Consultants must meet with City staff to complete form.
Traffic studies submitted without form being completed prior to study may not be accepted. All studies must conform to City Ordinance.
Study Area Definition: _____

JAN. 1990 A-6

Appendix 5: Document Revision History

Date	Changes
10/10/2014	Converted existing guidelines from Lotus Notes to Microsoft Word and Adobe PDF for public access
11/10/2014	Add Standard Drawing WA-826 Optional Dual Water Service Detail Add WA-826 to Standard Drawing Table of Contents Add reference to WA-826 to Section 6-3.03.6 Water Service Transfers
12/12/2014	Update Drawings: • ST-170 Monument in Pavement New or Existing • ST-173 Concrete Monument Outside Pavement Add Drawings: • ST-171 Monument in Concrete (PCC) Street • ST-172 PVC Monument in Pavement for Overlay • ST-174 Core Monument in Pavement New or Existing Update Standard Drawing references for 'Monument' in Section 1 - Glossary of Terms
04/30/2015	Add Standard Drawing TC-316 - Shared Lane Marking Standard Update Standard Drawing Table of Contents for TC-316
05/05/2015	Update Standard Drawing TC-315 - Bicycle Lane Standards Add Standard Drawing TC-317 - Bicycle Detector Pavement Marking Standard Update Standard Drawing Table of Contents for TC-315 & TC-317
05/15/2015	Add Standard Drawing EL-464 - Bicycle Detector Pavement Marking Locations on Detector Loops Update Standard Drawing Table of Contents for EL-464
06/13/2016	Update Standard Drawing ST-155 - Bus Turnout Detail
06/15/2016	Update Standard Drawings: • CG-218 Pavement Repair (Curb Replacement) • WA-865 Reverse Thrust Blocking for Cross with Valves • MS-1050 Mailbox Standards Plat/Commercial
08/11/2016	Add Standard Drawing WA-803 Sample Tap Installation
08/30/2016	Update Standard Drawing WA-830 1" Single Water Service in Meter Box
09/12/2016	Update Standard Drawings: • CG-208 Type "E" Barrier Curb • CG-232 City Center / Urban Village Sidewalk • CG-235 Porous Concrete Sidewalk • CG-246 Sidewalk Ramp Types 1A, 1B, 1C, & 1D • WA-820 Water Pipe Bedding Details Remove Standard Drawings: • CG-248 Sidewalk Ramp Types 2A, 2B • CG-250 Sidewalk Ramp Type 4B
4/26/2017	Add Standard Drawings: • WA-872 Water Tap Excavation 4” and Larger • WA-874 Water Tap Excavation Under 4” Modify Standard Drawings: • WA-817 Typical Vacuum / Air Release Valve – Above Ground • WA-818 Typical Vacuum / Air Release Valve – Below Ground • WA-802 Hydrant Installation • WA-844 5/8”-3/4” Meter Assembly • CG-200 Type ‘A’ Modified Curb and Gutter
5/26/2017	Modify Standard Drawings: • ST-170; ST-171; ST-173; ST-174
6/13/2018	Add Standard Drawing: • ST-106 Minimum Standard Alley, Gravel Modify Standard Drawings: • ST-100; ST-104; MS-1040

Forms

Public Facilities Construction Application

LINK – PREVIEW

Public Works

Permit Center
210 Lottie Street
Bellingham, WA 98225
phone: 360-778-8300
fax: 360-778-8301
www.cob.org

PUBLIC FACILITIES CONSTRUCTION APPLICATION

TO BE COMPLETED BY STAFF

Project Identifier & Name: _____

Date Application Received: _____ Date Application Accepted: _____

Assigned Project Manager: _____

The following items **must be included with this completed form** to constitute a complete application:

- ☐ Electronic Civil Design Plans prepared in conformance with the City's Development Guidelines and Improvement Standards.
  Stormwater Pollution Plan, Stormwater Site Plan, and/or Stormwater Report, see Stormwater Submittal Requirements for more information.
  Application deposit for 1.5% of the stamped engineer cost estimate.

LATECOMER AGREEMENT

IMPORTANT NOTICE OF CHANGE IN THE LAW

Per BMC 14.02.040 any developer using private funds to construct street improvements and/or utility system improvements in the city may apply to the city for a latecomer agreement in order obtain partial cost recovery from other property owners that will later connect to or use the street and/or utility system improvements made by the developer. However, then the assessment reimbursement area and amount must be determined, a latecomer agreement executed and recorded against the benefited properties, **prior to commencement of construction of the improvements**. Failure to timely file a Latecomer Application results in waiver of the latecomer process. To avoid inadvertent waiver and/or unnecessary delay, applicant is strongly encouraged to file his or her latecomer application simultaneously with the filing of this Application for Public Facilities Construction. The latecomer process takes time, so applicant should planaccordingly.

I intend to pursue a latecomer agreement: YES, Separate Application is Required NO

Revised 7/18/2017

Web Sites

WSDOT Standards Website Link

http://www.wsdot.wa.gov/Design/Standards/default.htm

Standard Plans Table of Contents

Plan No.	Plan Title	Approval Date	Ref No.
Section ST - 100 Streets			
ST-100	Minimum Standard Alley, Cross Section 1	5/29/2018	ST-1
ST-104	Minimum Standard Alley, Cross Section 2	5/29/2018	ST-2
ST-106	Minimum Standard Alley, Gravel	5/29/2018	
ST-108	Minimum Standard ACC Street Section	11/29/2004	ST-18
ST-112	Minimum Standard Residential Concrete Street	01/11/2005	ST-19
ST-116	Minimum Residential Street, Lake Whatcom Watershed Very Low Volume	01/11/2005	ST-19A
ST-120	Standard ACC Section Residential Access Street	11/06/2008	ST-20
ST-124	Standard Residential Concrete Street	11/06/2008	ST-21
ST-128	Standard Residential Street, Lake Whatcom Watershed Very Low Volume	01/11/2005	ST-20A
ST-132	Standard Street Section Collector, Secondary or Principal Arterial	11/06/2008	ST-22
ST-150	Pocket Parking Detail	11/06/2008	ST-52
ST-155	Bus Turnout Detail	06/13/2016	ST-40
ST-157	Speed Hump Detail	05/20/2009	
ST-160	70' Diameter Cul-De-Sac	11/06/2008	
ST-165	Railroad Crossing Improvement	11/29/2004	ST-34
ST-170	Monument In Pavement New or Existing	05/26/2017	
ST-171	Monument in Concrete (PCC) Street	05/09/2017	
ST-172	PVC Monument in Pavement for Overlay	12/12/2014	
ST-173	Concrete Monument Outside of Pavement	05/26/2017	
ST-174	Core Monument in Pavement New or Existing	05/26/2017	
ST-180	Horizontal Pavement Repair (Street Crossing)	12/10/2009	ST-3
ST-182	Longitudinal Pavement Repair	12/10/2009	
ST-183	Adjusting Castings To Finish Grade	03/19/2009	
ST-184	Tree Planting Detail Planting Strip	01/28/2013	
ST-185	Tree Planting Detail Behind Sidewalk	11/07/2007	
Section CG - 200 Curbs, Gutters, and Sidewalk			
CG-200	Type "A" Modified Curb and Gutter	04/26/2017	ST-6
CG-202	Type "C" Traffic Curb	05/28/2009	
CG-204	Rolled Curb and Gutter	11/06/2008	ST-46
CG-208	Type "E" Barrier Curb	11/29/2004	ST-7
CG-212	Extruded Cement Concrete Curb	11/29/2004	ST-6-A

Plan No.		Plan Title	Approval Date	Ref No.
	CG-216	Extruded Asphalt Concrete Sections	11/29/2004	ST-39
	CG-218	Pavement Repair (Curb Replacement)	06/15/2016	
	CG-220	Gutter Treatment at Catch Basin	01/11/2011	ST-13
	CG-230	Sidewalk	10/19/2009	ST-14
	CG-232	Down Town Art's District / Urban Village Sidewalk	11/11/2011	
	CG-235	Porous Concrete Sidewalk	01/06/2009	
	CG-238	Parkway Sidewalk	10/19/2009	ST-15
	CG-242	Brick Paving Enlargement	12/28/2004	ST-33
	CG-246	Sidewalk Ramps Type 1A, 1B, 1C, & 1D	09/12/2016	WSDOT
	CG-260	Driveway Sections	02/22/2013	ST-10
	CG-265	Typical Driveway Examples	02/22/2013	ST-10
	CG-270	Driveway Restoration	11/29/2004	ST-11
Section TC - 300 Traffic Channelization and Controls				
	TC-300	Abatement Sight Clearance Distances	09/27/2006	
	TC-305	Pavement Marking Details	11/29/2004	ST-50
	TC-310	Continental Crosswalk Detail	05/26/2009	ST-53
	TC-315	Bicycle Lane Standards	05/05/2015	
	TC-316	Shared Lane Marking Standard	04/30/2015	
	TC-317	Bicycle Detector Pavement Marking Standard	05/05/2015	
	TC-320	Street Sign Post Detail	11/09/2005	ST-51
	TC-325	Type 3 Barricade	11/29/2004	ST-48
	TC-330	Flagger Control for Lane Closure	01/11/2005	ST-24
	TC-340	Street Closure for Community Events	06/07/2010	
Section EL - 400 Electrical, Lighting, and Signals				
	EL-400	Residential Street Light and System Fusing	11/29/2004	ST-42
	EL-404	Arterial Signal and Luminaire Pole	11/29/2004	ST-43
	EL-408	Arterial Alternate Luminaire Pole	11/29/2004	ST-43A
	EL-420	Signal Head Mounting Detail	11/29/2004	TR-7
	EL-424	Recessed Terminal Compartment	11/29/2004	TR-6
	EL-428	Terminal Block	01/11/2005	TR-6
	EL-432	Foundation Detail	09/15/2010	TR-3
	EL-436	Type "P" Signal Cabinet Base Detail	11/29/2004	TR-4A
	EL-440	Type "K" Signal Cabinet Base Detail	11/29/2004	TR-4B
	EL-444	Contactor & Service Cabinet	11/29/2004	ST-45

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EL-448	20 Conductor Signal Cable	11/29/2004	TR-5
EL-452	Quazite Service Box	11/29/2004	TR-8
EL-460	Type 1 Induction Loop	08/06/2010	TR-2
EL-462	Type 2 Induction Loop	08/06/2010	TR-2A
EL-464	Bicycle Detector Pavement Marking Locations on Detector Loops	05/15/2015	
Section DR - 500 Drainage, Storm and Surface Water			
DR-500	Thru-Curb Inlet Frame and Grate with Vertical Curb Installation	05/29/2014	ST-12
DR-502	Herringbone Gate for Catch Basins and Inlets	05/29/2014	
DR-505	Thru-Curb Inlet Frame	05/29/2014	ST-13A
DR-510	Rolled Curb Frame and Grate	02/26/2009	ST-47
DR-515	Type 60A and 60B Outlet Trap	11/29/2004	ST-12A
DR-520	Cut Section Sidewalk Drain	11/29/2004	ST-16
DR-525	Residential Sidewalk Drain	11/29/2004	ST-17
DR-530	Storm Drain Side Service	04/28/2005	
DR-538	PVC Pipe Bedding Details	11/08/2007	
DR-539	Pipe Bedding Details for 2' or Less of Cover	11/08/2007	
DR-540	Storm Pipe End Section	11/29/2004	ST-27
DR-542	Restrictor Catch Basin Viewpoint Detail	10/26/2006	
Section EC - 600 Erosion Control			
EC-600	Temporary Construction Exit - Plat/Commercial	11/29/2004	EC-1
EC-605	Temporary Construction Exit - Single Family	11/29/2004	EC-2
EC-610	Tire and Concrete Wash - Plat/Commercial	11/29/2004	EC-3
EC-612	Tire Wash Sump Details	12/28/2004	
EC-615	Reinforced Silt Fence	11/29/2004	EC-4
EC-620	Catch Basin Insert	11/29/2004	EC-5
EC-625	Temporary Sediment Pond - Type A	11/29/2004	EC-6
EC-630	Temporary Sediment Pond - Type B	11/29/2004	EC-7
EC-635	Rock Check Dam	11/29/2004	EC-8
EC-640	Semi-pervious Check Dam	11/29/2004	EC-9
EC-645	Erosion Control Check Dam Detail	11/29/2004	EC-12
EC-650	Plastic Covering for Slopes and Stockpiles	11/29/2004	EC-10
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SS-700	Manhole Standard	03/11/2010	SE-6

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	SS-704	Manhole Standard Ring and Cover	09/08/2011	SE-6A
	SS-715	Inside Drop Sewer Manhole Connection	11/29/2004	SE-5
	SS-716	Ductile Iron Outside Drop Sewer Manhole Connection	03/11/2010	
	SS-717	Concrete Encased Outside Drop Sewer Manhole Connection	03/17/2010	
	SS-720	8" Clean Out	05/29/2014	SE-1
	SS-730	Sanitary Side Sewer	05/29/2014	
	SS-735	Side Sewer Clean-Out Lid	05/29/2014	
	SS-740	Sanitary Banded Tapping Tee	04/15/2009	SE-2
	SS-750	PVC Pipe Bedding Detail	04/22/2010	SE-4
	SS-760	Pipe Anchor	11/29/2004	SE-7
	SS-790	Typical Sewer Drawing of Record (Including Services)	01/11/2005	SE-3
Section WA - 800 Water Distribution				
	WA-802	Hydrant Installation	04/20/2017	WA-1
	WA-803	Sample Tap Installation	08/11/2016	
	WA-804	Fire Hydrant Bollard Detail	12/28/2004	
	WA-810	Blow-Off for Future Water Main Extensions	02/03/2010	WA-3
	WA-814	2" Blow-Off, No Further Extension	02/03/2010	WA-4
	WA-817	Typical Vacuum/Air Release Valve - Above Ground	11/30/2011	
	WA-818	Typical Vacuum/Air Release Valve - Below Ground	11/30/2011	
	WA-820	Water Pipe Bedding Details	03/01/2011	
	WA-824	1" Single Water Service Detail	02/07/2014	WA-9
	WA-826	Optional Dual Water Service Detail	11/10/2014	
	WA-828	Typical Water Service on Private Property	12/28/2004	WA-7
	WA-830	3/4" and 1" Single Water Service In Meter Box	02/03/2010	
	WA-834	Temporary Construction Water With Yard Hydrant	05/26/2009	
	WA-836	Temporary Construction Water With Hose Bibb	05/26/2009	
	WA-840	1 1/2" Meter Assembly	12/28/2004	WA-10
	WA-842	2" Meter Assembly	12/28/2004	WA-11
	WA-844	5/8" - 3/4" Meter Assembly	04/20/2017	
	WA-846	Number 2 Meter Box	05/17/2005	WA-12
	WA-848	Number 2 Meter Box Modifications	09/17/2007	WA-12
	WA-850	Number 3 Flat Top Meter Box	07/19/2012	WA-9
	WA-858	Pressure Test Charge Manifold	03/19/2012	WA-2
	WA-860	Thrust Block - Elbow	01/11/2005	WA-5

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	WA-862	Thrust Block - Tee	01/11/2005	WA-5
	WA-865	Thrust Blocking For Cross With Valves	06/15/2016	
	WA-870	Existing Water Service Transfer Detail	02/03/2010	
	WA-872	Water Tap Excavation 4” and Larger	04/26/2017	
	WA-874	Water Tap Excavation Under 4”	04/26/2017	
	WA-880	Approved Restraints	09/17/2007	
	WA-882	Approved Restraints	09/17/2007	
	WA-883	Fireline Restraints at Foundation	05/26/2009	
	WA-884	Approved Restraints	09/17/2007	
	WA-885	Fireline Restraints at Property Line	06/25/2008	
	WA-890	3" 4" 6" 8" Meter Vault	11/30/2011	
	WA-897	Typical Water Main Drawing of Record (including services)	12/28/2004	WA-8
Section MS - 1000 Miscellaneous Construction				
	MS-1000	Rock Wall Details	11/12/2008	ST-44
	MS-1005	Low Retaining Wall	11/29/2004	ST-8
	MS-1010	Barrier Wall with Rail	11/29/2004	ST-30-1
	MS-1012	Barrier Wall with Rail	11/29/2004	ST-30-2
	MS-1014	Barrier Wall with Rail	11/29/2004	ST-30-3
	MS-1020	Pedestrian Handrail	11/29/2004	
	MS-1025	Barrier Rail	11/29/2004	ST-31
	MS-1040	Bicycle Parking Standards	06/07/2018	ST-54
	MS-1050	Mailbox Standards, Plat/Commercial	06/15/2016	ST-26
	MS-1060	Direct Burial Meter Post Installation Detail	05/01/2007	