ENGINEERING DESIGN STANDARDS

February 26th, 2018

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Community Development & Public Works Department
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Chapter 1 General Information

1.00 Preface

The City of Auburn has adopted this Engineering Design Standards manual to require the standardization of design elements for consistency and to assure that public safety needs are met. This manual contains engineering standards for use by professional civil engineers when designing facilities within the City of Auburn. The information contained in this manual cannot provide for all situations and conditions that may be encountered. Specific provisions contained within this manual may not be appropriate for all locations and existing conditions. These standards are intended to assist, but not substitute for, competent work by professional civil engineers.

The design requirements contained within this manual do not set legal standards of care, but provide guidance for possible engineering treatment under some circumstances.

Compliance with these standards does not alleviate the design engineer from using sound professional engineering practices and meeting the requirements of the specific utility in question. The design criteria contained herein are the minimum acceptable under standard conditions. Special conditions may require more stringent requirements that will be addressed during the plan review process.

This chapter contains general information on this manual and the City of Auburn.

1.01 Definitions

Note that additional definitions are included in the documents referenced in Section 1.03.

AASHTO - American Association of State Highway and Transportation Officials.

Access Point - A driveway or private street that connects to the general public street system. A public street is not considered an access point.

ACP - Asphalt Concrete Pavement.

Activity Centers - Locations such as schools, parks, retail areas and shopping centers, places of employment, or public service areas that attract people.

ADT - Average Daily Traffic. The total two-directional volume of traffic passing through a given point during a given time period, divided by the number of days in that time period.

Aggregate - A mixture of various soil components (e.g. sand, gravel, and silt).

Alley - Right-of-way, usually narrower than a street with an all-weather surface, which provides access to the rear boundary of two (2) or more residential or non-residential properties and is not intended for general traffic circulation.

Applicant - The owner or their agent seeking approval from the city for any land use or other related permit or approval referenced in City of Auburn Code and which requires utilization of these Standards. References: See Developer.

Appurtenance - Equipment and/or accessories that are a necessary part of an operating utility system or subsystem.

APWA - American Public Works Association.

ASTM - American Society for Testing and Materials.

Backfill - Replacement of excavated material with suitable material compacted as specified.

Backwater - Water held back by some obstruction, natural or artificial.

Backwater Curve - A plot of depth versus location along the channel containing backwater.

Bicycle Facilities - A general term referring to improvements that accommodate or encourage bicycling, including parking facilities, bike racks, bicycle route mapping and bicycle route development.

Boring/Jacking - Grade and alignment-controlled mechanical or other method of installing a pipe or casing under a street without disturbing the surrounding medium.

Breakaway Structure or Breakaway Design - A structure or installation that has been crash tested in accordance with National Cooperative Highway Research Program procedures. (NCHRP 230).

Capacity – (1) The maximum number of vehicles that have a 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. (2) The volume of liquid or gas that can be transported by a pipe. (3) The load-carrying limit of a structure.

Carrier - Pipe directly enclosing a transmitted fluid or gas.

Casing - A larger pipe enclosing a carrier for the purpose of providing structural or other protection to the carrier and/or to allow for carrier replacement without re-excavation, jacking or boring.

CF - Cubic Feet.

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.

Check - A short section of built-up channel placed in a canal or irrigation ditch and provided with gates or flashboards to control flow or raise upstream level for diversion.

Check Dam – Short berm used as erosion protection on steep drainage ditches.

City - The City Engineer or any designee thereof. References: See City Engineer.

City Council - The City legislative authority.

City Engineer - The City Engineer for the City of Auburn. References: See Engineer.

Clean-Out - A pipe through which plumbing snakes can be pushed to unplug a sewer.

Clear Zone - The total streetside border area, starting at the edge of traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope, and/or a clear run-out area. The desired width is dependent upon the traffic volumes, speeds, and the streetside geometry.

CMP - Corrugated Metal Pipe.

Coating - Protective material applied to the exterior of a pipe or conduit to prevent or reduce abrasion and/or corrosion damage.

CY - Cubic Yard.

Dedication - The transfer of land or the interest of land by the owner of such land to the City for public uses, reserving no other rights than such are compatible with the full exercise and enjoyment of the uses the property has been dedicated.

Conduit - An enclosed tubular runway for protecting wires or cables.

Contractor - The individual, partnership, firm, corporation or joint venture, contracting with the Developer to do prescribed work.

Commercial Property Use - Property with residential developments with four or more dwelling units per parcel or commercial developments. This is consistent with building permit administration in City of Auburn.

Concrete Plain - Concrete that is not reinforced with steel.

Concrete Thrust Blocking – Concrete that is used to support fittings in water mains.

Control Zone - That Streetside area defined by the "Control Zone Distance Table"; found in Appendix 5 of the WSDOT Utilities Manual, within the street right-of-way in which placement of utility objects is controlled.

Corporation Stop – A brass fitting used to connect service lines to a water main.

Cover - Depth to top of pipe, conduit, casing or gallery below the grade of a street or ditch.

Cross Connection - Connecting fire, irrigation and drinking water supplies together, or connecting storm and sanitary sewers together.

Cul-de-sac - A street closed at one (1) end by widened pavement of sufficient width for vehicles to turn around.

CSBC - Crushed Surfacing Base Course.

CSTC - Crushed Surfacing Top Course.

Dead End Street - Street that accesses the roadway system only at one end. Dead end streets are permanent conditions and should end in a cul-de-sac where appropriate. See Also Stub End Street.

Design Speed - Design speed is the maximum safe speed that can be maintained when conditions are so favorable that the design features of the highway govern.

Detention Tanks and Vaults - Detention tanks and vaults are underground facilities for the storage of surface water. Tanks are typically constructed from corrugated metal pipe. Vaults are constructed from reinforced concrete.

Detention Time - The average time spent by water in a basin or structure.

Developer - The Owner and any agent of the Owner authorized to represent the Owner. References see Applicant.

Development - All structures and other modifications of the natural site above and below ground on a particular site.

DHV - Design Hour Volume. Hourly traffic volume used for street design and capacity analysis, usually one or more peak hours during a 24-hour period.

Director - The Director of the City of Auburn Community Development & Public Works Department or his/her authorized representative.

Drain - Appurtenances to discharge accumulated liquids from casings or other enclosures.

Driveway Approach - See Access Point.

Easement - A right to use or control the property of another for designated purposes.

Edge of Traveled Way - The face of curb for streets that are, or will be constructed to urban standards and the edge of pavement (not shoulder) for streets that are, or will be constructed to rural standards.

Embankment - A raised structure constructed of natural soil from an excavation or borrow source.

Encroachment - Occupancy of City right-of-way by non-roadway structures or other objects of any kind.

Engineer - The City Engineer for City of Auburn or any designee thereof.

Force Main - A sewer line that is pressurized.

Franchise - Occupancy and use document granted by the City required for occupancy of street rights of way.

Geometrics - 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 roadway. It is measured along the centerline of the roadway or access point.

Gravity Distribution - A water supply that uses natural flow from an elevated tank or mountain reservoir to supply pressure.

Hazard - A side slope, an object, water, or a drainage device that, if impacted, would apply unacceptable impact forces on the vehicle occupants or place the occupants in a hazardous position. It may be either natural or man-made.

Headwall - Entrance to a culvert or sluiceway.

Hydraulic Jump - The rapid change in the depth of flow from a low stage to a high stage resulting in an abrupt rise of water surface.

Impervious Layer - A geologic layer through which no water can pass.

Infiltration – (1) The act of stormwater permeating into the ground. (2) Groundwater that enters sewer pipe through cracks and joints, or the movement of water through the upper soil.

Interception - Rain that falls on vegetation and other impervious objects, which evaporates without contributing to the runoff.

Intersection Sight Distance - The distance required for a vehicle, traveling at or near the posted speed on a major street, to reduce speed to avoid overtaking a vehicle, which has entered the intersection from the minor street. The entering vehicle can be making right, left-turning movements or crossings.

Island - A defined area between traffic lanes for control of vehicle movements and/or for pedestrian refuge.

Joint Use Driveway Tract - A jointly owned and maintained tract or easement serving two (2) properties.

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

Lateral - A sewer line that goes off at right angles to another.

LF - Linear Feet.

Manhole - An opening in an underground utility system into which workers or others may enter for the purpose of making installations, inspections, repairs, connections, cleaning, and testing.

Median - That portion of a divided roadway separating the traveled ways for traffic in opposite directions.

Mode Split - The percentage of overall trips made by different means of transportation.

MPH - Miles per hour.

MSE Walls - Mechanically Stabilized Earth Walls.

MUTCD - The Manual on Uniform Traffic Control Devices.

MVO – Minimum valve opening.

NDCBU - Neighborhood Delivery and Collection Box Unit.

Outfall - The pipe that discharges completely treated wastewater into a lake, stream or river.

Passing Sight Distance - The minimum sight distance required for the driver of one vehicle to pass another vehicle safely and comfortably.

Pavement - The combination of gravel base, crushed rock, and asphalt concrete pavement placed on a subgrade to support the traffic load and distribute it to the subgrade.

Pavement Width - The distance measured from face of curb to face of curb for curbed sections of roadway or the distance measured from outside edge of shoulder to outside edge of shoulder for shouldered sections of roadway.

PC - Point of Curvature.

PCC - Portland Cement Concrete.

Peak-Hour - That period experiencing the highest volume of traffic.

Peak Period - Two hours during any a.m. or p.m. period when vehicle arrival and departure from the site or corridor is the highest.

Perimeter Streets – Public streets comprising the perimeter of a particular commercial/industrial development.

Permit - A document including any license, permit or franchise authorizing specified use of City right-of-way and granted under the authorization of the regulating agency.

Pipe - A structural tubular product designed, tested, and produced for the transmittance of specific liquids and gases under specific conditions.

PI - Point of Intersection.

Plowing - Direct burial of utility lines by means of a `plow' type mechanism, which breaks the ground, places the utility line at a predetermined depth, and closes the break in the ground.

Posted Speed - Is the signed speed limit along a street.

Potable – Drinkable.

PRC - Point of reverse curvature.

Pressure - Internal gage pressure in a pipe in pounds per square inch, gage (psig).

Private Street - A privately owned and maintained access provided for by a tract, easement or other legal means.

Professional Engineer - An engineer licensed to practice in the State of Washington.

Professional Land Surveyor - A surveyor licensed to practice in the State of Washington.

Public Street – A publicly owned facility that provides access, including the roadway and all other improvements.

PT - Point of Tangency

Relocation - Planned change of location of an existing facility to a more advantageous place without changing the character or general physical nature of the facility.

Replacement - Installation of a like element of a utility system or subsystem in the same or near-same physical location normally due to damage, wear or obsolescence of the element.

Restoration - All work necessary to replace, repair or otherwise restore the right-of-way and all features contained within to the same or equal condition as before any change or construction thereto.

Retention Period - See "Detention Time."

Reviewing Agency - City of Auburn.

Restricted Access Point - A driveway or private street that connects to the general public street system, that turning movements are restricted to right in and out only.

Right-of-way (R/W) - All property in which the City has any form of ownership or title and which is held for public street purposes, regardless of whether or not any street exists thereon or whether or not it is used, improved, or maintained for public travel.

Riprap - Pieces of broken stone used to protect the sides of waterways from erosion.

Rural - All lands regardless of current comprehensive plan designation not meeting the definition of Urban.

Sand Trap - A section constructed deeper than the rest of the channel to allow sediment to settle out.

Separate Turn Lane - An auxiliary lane for traffic in one direction which has been physically separated from the intersection area by a traffic island or stripe. Separate turn lanes may be included within intersections or separated from intersection areas by traffic islands.

SF - Square Feet.

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.

Single Main System - One main supplies both drinking water and firefighting water.

Single Occupancy Vehicle (SOV) - Automobiles transporting the driver only.

Slab - A cast concrete member of uniform thickness.

Standards – The City of Auburn Design Standards.

Stopping Sight Distance - The distance needed for a vehicle traveling at or near design speed to stop before reaching a stationary object in its path.

Street or Roadway - A public way, open for the passage of vehicles, persons and animals. Limits include the outside edge of sidewalks, or curbs and gutters, or side ditches, including the appertaining shoulder and all slopes, ditches, channels, waterways, and other features necessary for proper drainage and protection within the right-of-way.

Street Frontage - Any part of private or public property that borders a public street.

Street Tree - A tree placed within the public right-of-way.

Stub End Street - A dead end street that is planned to be extended and connected to future streets in an adjacent development. Depending on its length, it may or may not require a temporary cul-de-sac.

Substantial – In the sole opinion of the City Engineer, of ample or considerable amount, quantity, or size.

Subtended – To be opposite to and delimit <In a triangle, the hypotenuse *subtends* a right angle>.

Surface Retention - That part of a storm that does not immediately appear as infiltration or surface runoff. Retention is made up of depression storage, interception and evaporation.

Time of Concentration - The time required for water to flow from the most distant point on a runoff area to the measurement or collection point.

Traffic Control - Those activities necessary to safeguard the general public, as well as all workers, during the construction and maintenance of roadway and other facilities within the right-of-way.

Traveled Way - That portion of the roadway intended for the movement of vehicles, exclusive of shoulders.

Trenched - Installation of a utility in an open excavation.

Trip - A one-direction movement that begins at the origin and ends at the destination. For example, a trip movement from a residence to a work place is a trip from home to work.

Trip Generation - A general term describing the analysis and application of the relationships that exist between the trip makers, the traffic study area, and the trip making. It relates to the number of trip ends in any part of the traffic study area.

Uniform Flow - Flow that has a constant depth, volume, and shape along its course.

Unopened Right-of-way - A City right-of-way that exists by dedication or deed, but for which no vehicular roadway has been constructed by the City or other parties, and the street is not maintained by the City.

Unrestricted Access Point - A driveway or private street that connects to the general public street system, that has no limitations on turning movements. Left, right turns in and out are permissible.

Untrenched - Installation of a utility without breaking the ground or pavement surface such as by jacking or boring.

Utility - A company providing such public services as gas, electric power, telephone, water, sewer, or cable television, whether or not such company is privately owned or owned by a governmental entity.

Vent - Appurtenance to discharge gaseous contaminants from casings or other enclosures.

Wetpond – A stormwater pond that has been designed to retain a permanent pool of water "wetpool" to provide treatment of storm runoff.

Wetpool – The permanent pool of water retained in a wetpond or wetvault.

Wetvault – A stormwater vault that has been designed to retain a permanent pool of water "wetpool" to provide treatment of storm runoff.

1.02 Contact Information

Permit Center
Physical address:
Auburn Professional Plaza (2nd Floor)
One East Main Street
Mailing Address:
25 West Main Street
Auburn, Washington 98001-4998

Engineering Services:
Phone: (253) 931-3010
Fax: (253) 931-3053

Community Development:
Building Phone: (253) 931-3020
Planning Phone: (253) 931-3090
Fax: (253) 804-3114

Valley Regional Fire Authority
North Fire Station
1101 "D" Street NE
Auburn, Washington 98002-4016
Phone: (253) 288-5800
Fax: (253) 288-5900

1.03 Reference Material

1.03.1 City Reference Material

Unless noted otherwise, the reference material referred to herein may be obtained from the City of Auburn's website at:

http://www.auburnwa.gov/doing_business/public_works/publications_forms.htm

1.03.1.1 City of Auburn Surface Water Management Manual (SWMM)

The City of Auburn Surface Water Management Manual (SWMM) is the 2014 Department of Ecology Stormwater Management Manual for Western Washington (DOE SWMMWW) and City of Auburn Supplemental Manual. The SWMM is a manual of specific requirements related to storm drainage management.

1.03.1.2 City of Auburn Engineering Construction Standards Manual

The Engineering Construction Standards manual sets forth the standards used during the construction of all civil projects within the City's jurisdiction including the extension of public water, sanitary sewer, storm drainage, and transportation facilities by private developments. The manual is comprised of two parts: Part 1 contains the City's Special Provisions that supplement and modify the "Washington State Department of Transportation (WSDOT/APWA) Standard Specifications for Road, Bridge and Municipal Construction". Part 2 contains the City's Standard Details, comprised of the City's construction and design detail drawings for temporary erosion control, grading, water, sanitary sewer, storm drainage, and street work within the City that are supplemented by the "Washington State Department of Transportation's (WSDOT) Standard Plans."

Standard Details as referenced herein refer to the current City of Auburn Standard Details included in the City of Auburn Engineering Construction Standards – Part 2, Standard Details. WSDOT Standard Plans as referenced herein refer to current WSDOT Standard Plans. The referenced details and plans shall be the standard except as modified by Part

1 (Special Provisions) of the Engineering Construction Standards and by this document (City of Auburn Engineering Design Standards).

1.03.1.3 Planning Documents

Auburn Comprehensive Plan

Transportation Improvement Program

Comprehensive Transportation Plan

Comprehensive Sewer Plan

Comprehensive Water Plan

Volume I Report

Volume II Appendices

Comprehensive Storm Drainage Plan

1.03.1.4 Informational Handouts

The following Handouts are currently available from the City to aid the public in planning and constructing development projects within the City of Auburn. Contact the Permit Center for the most current list available.

Deviation Process

Downtown Auburn Sidewalk Design Guidelines

Civil Site Improvement Submittal Packet (FAC and GRA)

Half-Street Requirements Summary

Hydrant Meter Permit Regulations

Median Design and Maintenance Guidelines

Park Impact Fees

Payback Requirements

Public Facilities Extension (FAC) Summary

Handout for Single Family Residential Drainage Systems

School Impact Fees

Site Access Requirements

Temporary Erosion & Sediment Control (TESC) for Small Sites

Transportation Impact Fees

Truck Impact Fees

Utility Connection Fees

1.03.1.5 Technical Memos

These handouts contain information that are subject to change or are too specific to be included in this manual:

- Sanitary Sewer Pump Station Requirements and Standards.

1.03.2 Other Reference Material

The following publications are to be used as additional reference material for design applications not covered by the City's publications and can typically be found on the publishing agency's website:

A. City of Auburn Code related to development requirements.

B. Washington State Department of Transportation (WSDOT) "Standard Specifications for Street, Bridge and Municipal Construction" as amended by the City's Special Provisions (Part 1 of the Construction Standards). These will be referred to in City publications as the "WSDOT Standard Specifications."

C. Washington State Department of Transportation (WSDOT) "Design Manual" (latest edition).

D. American Association of State Highway and Transportation Officials' (AASHTO) "A Policy on Geometric Design of Highways and Streets" (latest edition).

E. State of Washington Department of Ecology's "Criteria for Sewage Works Design" (latest edition).

F. State of Washington Department of Health (DOH) "Water Systems Design Manual" (latest edition).

G. American Water Works Association (AWWA) Standard Specifications (latest edition).

H. "IES Lighting Handbook" (Illuminating Engineering Society of North America) (latest edition).

I. American National Standard for Roadway Lighting ANSI/IESNA RP-8-00 (latest edition).

1.04 Deviation from Standards

The engineering design standards contained herein shall be used when designing a development project within the City of Auburn. In special cases, City standards may not best address a particular engineering application. In these instances, a design deviation from the City's standards may be requested from the City Engineer. All such requests shall be made using the City's Deviation Request Application and include applicable engineering justification for the deviation. Deviation requests and supporting justification must be sealed by a licensed professional civil engineer. The City Engineer will evaluate the request and notify the applicant of his/her decision within fifteen (15) working days of the receipt of a complete deviation request or with the completion of the first review of the development review plans or plats (for Short Plats, Plats, FAC's and Grading Permits), whichever is later. For deviation applications that are associated with a preliminary plat application submitted in compliance with Chapter 17.10 ACC, the deviation application and a recommendation from the City Engineer must accompany the preliminary plat to the hearing examiner. The hearing examiner must obtain the concurrence of the City Engineer for any requests to modify any City of Auburn design or construction standard. Approved deviations must be shown on the final civil site improvement plans as specified in Chapter 3. The following deviations may be obtained from the City of Auburn.

1.04.1 General Deviations

General deviations apply to all engineering design standards except for the Surface Water Management Manual's Minimum Requirement deviations.

The engineering design deviation when compelling supporting justification shall clearly demonstrate that the proposed deviation will meet or exceed the corresponding City standard for the following applicable criteria:

A. The functional intent of the design element.

B. Safety factors associated with the design element.

C. Operational concerns associated with the design element.

D. Maintenance concerns associated with the design element.

E. Liability concerns associated with the design element.

F. The capacity and/or efficiency of the design element.

G. The design life, historical performance, and durability of the design element.

H. The aesthetic and visual impacts of the design element.

I. The cost effectiveness and availability of any replacement components or materials.

J. Consistency with the spirit and purpose of the corresponding City design standard.

K. Demonstration that the environment will not be adversely affected.

L. Supported by published industry standards.

M. The effect on buildable lands within the City of Auburn.

1.04.2 Surface Water Management Manual (SWMM) Deviations

1.04.2.1 The Ten Minimum Requirements

A deviation request from any of the ten minimum requirements in the SWMM goes through a different process which includes a public notice requirement. This is to insure that the Department of Ecology mandated surface water regulations are complied with. The ten Minimum Requirements of the SWMM are as follows:

1. Stormwater Site Plan
2. Construction Stormwater Pollution Prevention Plan
3. Source Control of Pollution
4. Preservation of Natural Drainage Systems
5. On-site Stormwater Management/ Low Impact Development
6. Runoff Treatment
7. Flow Control
8. Wetlands Protection
9. Operation and Maintenance
10. Off-site Analysis and Mitigation

1.04.2.2 Deviation Process

Requests for deviations from the ten Minimum Requirements of the SWMM shall be in accordance with ACC 13.48.226 and these standards.

1.05 Appeal of City Engineer's Decision

Appeal of the City Engineer's decision shall follow the following procedure:

The applicant shall have 15working days from the date of receipt of the City Engineer's decision in which to submit a written notice to the Community Development & Public Works Director contesting the written decision of the City Engineer. The Director shall then have 15working days to notify the applicant of his/her decision to uphold or modify the City Engineer's decision. For engineering deviations requests, the City Engineer's determination shall be final.

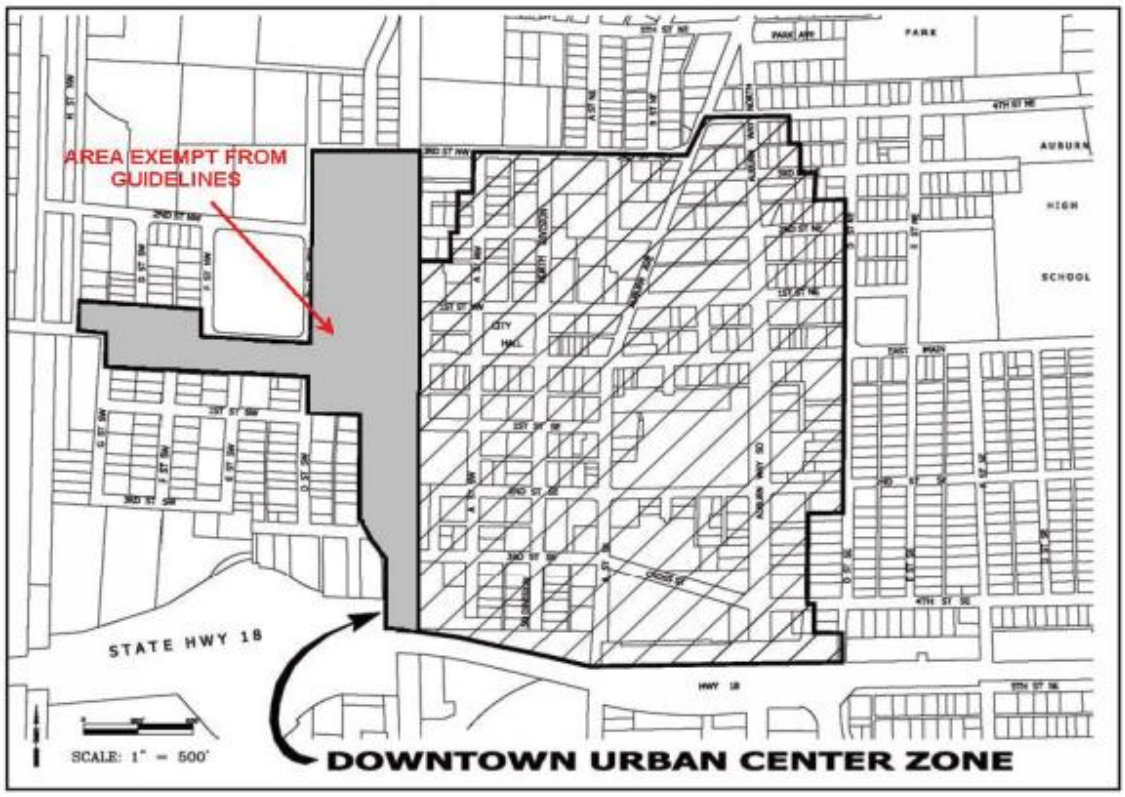
If the Community Development & Public Works Director determines the nature of the deviation requires a non-engineering policy decision by the Auburn City Council, the Community Development & Public Works Director shall seek such decision from the Auburn City Council at the next available meeting. The Community Development & Public Works Director shall notify the applicant within 5 working days after the Auburn City Council's decision.

1.06 Changes to Standards

The City of Auburn's City Engineer is authorized to make any additions, deletions, or modifications stated in these Standards. (ACC 12.04.010)

1.07 Downtown Urban Corridor Standards

In addition to the standards included herein, the City has implemented standards specific for the Downtown Urban Center (DUC) Zone. For additional design requirements in the DUC Zone, see Resolution 4271. The DUC Zone is shown in the exhibit below (for exact boundaries please contact the City of Auburn):



Chapter 2 Plan Approval Process

2.00 Preface

This chapter contains standards and procedures that apply to the review and approval process for civil engineering plans. Development or redevelopment of property within the City of Auburn, and/or within the limits of Auburn's Utility Service Area, that require civil engineered plans to support a development action must follow the processes outlined below.

2.01 Types of Plans

This section contains information regarding the types of civil engineering plans submitted to the City. Specific plan requirements are described in detail in Chapter 3.

Civil engineering plans submitted to the City for review fall within the following four categories.

2.02 Grading Plans

Grading plans are required prior to the issuance of a Grading Permit and before commencement of construction in the following situations:

A. Any application made for a Grading Permit that includes excavations and/or fills exceeding 500 CY of material.

B. An application made for a Building Permit for all new non-residential developments and residential construction of three units or more per lot.

C. An application made for a Land Clearing Permit when the proposed work involves temporary roads and leveling of the site.

D. An application made for construction of a parking lot.

E. An application made for a plat or a short plat that requires grading on the site resulting in the movement of over 500 CY of material.

F. An application made for a plat, short plat or new non-residential development that adds or replaces 2,000 SF or more of hard surfaces or disturbs more than 7,000 SF of land disturbance.

2.02.1 Building Site Plans

A Building Site Plan includes all civil site development requirements including site layout, site access, parking, utility service, and storm drainage control. An approved Site Plan is required prior to the issuance of a Building Permit and before commencement of construction.

Building Site Plans are required for the following situations:

A. A Building Site Plan along with a Grading Plan is required in association with a Building Permit application for all new non-residential developments and residential construction of 3 units or more per lot.

B. Where an existing site is redeveloped such that new buildings and additions and/or alterations to existing buildings increase the assessed value of the improvements on the property by greater than 50%, and the new plus replaced hard surface is 2000 SF or more.

C. Alteration of site access requirements, and/or connect to and impact City streets and utilities.

D. Convert ¾ acres or more of native vegetation to lawn/landscaped area or convert 2.5 acres or more of native vegetation to pasture.

E. The Change of Use of an existing site requires one or more of the following.

1. The installation of onsite parking resulting in the addition of over 2000 SF of hard surface area.

2. The alteration of the access to and from City streets including adding or removing driveways.

3. The installation of a new storm system to serve hard surface area of over 2000 SF of hard surface area.

4. The installation of code-required landscaping. (This will require the submittal of a landscape plan for review and approval by the City of Auburn Planning Department).

One example is the conversion of a residential property to a commercial use.
The work covered by the Building Site Plan may include the building and grading work; however, the applicant must make separate applications for a Building Permit and a Grading Permit.

2.02.2 Public Facility Extension (FAC) Plans

An approved Public Facilities Extension Plan (FAC Plan) is required prior to installing new or improving existing public sanitary sewer, water, storm drainage, and/or transportation facilities.

FAC Plans are required in the following situations:

A. With a Building Site Plan when construction of the building requires the extension of a City water, sanitary sewer, or storm drainage facility.

B. With a Building Site Plan when construction of the building requires improvements to the City transportation facility.

C. With a Grading Plan for public utility improvements within Plat and Short Plats.

D. For county projects where water and sanitary sewer mains within Auburn's Utility Service Area are extended.

Prior to preparing plans for submittal, the applicant should obtain a "Developer Public Facility Extension Process Summary" from the City. This summary explains some of the basic requirements and steps of the FAC process.

2.02.3 Other Plans

Some projects may also require other types of plans. The requirements for these additional plans will usually be addressed early in the submittal process. These plans could include, but are not limited to, the following:

A. Landscape plans.

B. Land clearing plans.

C. Irrigation plans.

D. Wetland plans.

2.03 Review and Approval Process

2.03.1 Submittals

When submitting civil engineering plans to the City for review, the following steps are required to insure a complete submittal and timely approval of civil engineering plans:

A. Applicants are encouraged to meet with City staff prior to plan submittal. (Pre-application information is available through the City of Auburn) All plans and associated documents submitted to the City will be assigned a permit number and receive a preliminary review to make sure that they adequately address the minimum requirements of a complete application. Any such plans and associated documents not meeting these requirements will be returned to the applicant or his designee as unacceptable for review, with a written explanation of necessary corrections required prior to the subsequent resubmission.

B. Prior to preparing civil engineering plans for submittal, the applicant should obtain a Civil Site Improvement Submittal Packet from the City, for the appropriate type of plans. This packet contains information necessary to prepare plans in conformance with City guidelines. The checklists within the Civil Site Improvement Submittal Packet shall be completed and submitted along with the civil engineering plans.

C. Civil Engineering plans and associated documents are to be submitted to the City for processing. All submittal documents in stand-alone pdf format (Reports & Plans must be single .pdfs and not require collating and may be submitted on CD or USB drive). If you have any questions regarding the required items or would like to setup a submittal appointment, please contact Development Engineering at development@auburnwa.gov, (253) 876-1969 or (253) 804-5056, or in person at the City of Auburn Permit Center on the Second Floor of the Auburn Professional Plaza, One East Main Street

D. After the receipt of a completed Civil Site Improvement Application and application fees, the City will make a preliminary review of the plans and supporting data to verify the scope of the proposed extension(s) and check for completeness of the application. The City requires a minimum of 10 working days from the date of initial submittal to determine if the application is complete. Once the City is satisfied with the completeness of the application and has verified the length of the extension(s), a letter will be sent requesting that the following be submitted before any detailed FAC Plan review work will be performed:

   1. An executed Facility Extension Agreement.
   2. 40% of the total calculated Facility Extension fee. (The remaining 60% will be due prior to construction.)

E. All proposed public right-of-way dedications and easements not under the ownership of the applicant shall be dedicated to the City prior to final plan approval with the exception of plats and short plats. A title report will be required to confirm property ownership.

F. The following applicable information may be required along with the plan submittal:

   1. Title report (required if right-of-way is being dedicated).
   2. The final biologist report, including the wetland mitigation plan when appropriate.
   3. Traffic reports.

4. A copy of the final SEPA determination (for projects where the City isn't the lead agency).
5. A copy of other applicable applications (Short Subdivisions, Subdivisions, etc.).
6. Letter indicating how SEPA and/or other applicable application conditions have been accounted for in the development/plan process.

G. All final plans, calculations, or reports submitted for review shall be stamped by a Washington State licensed professional civil engineer (PE). Final approved plans, calculations, and reports submitted for final approval need to have the PE stamp wet signed and dated in permanent ink.

H. Where the plan review process is running concurrent with other applications (SEPA, Subdivisions, etc.), the above-referenced information may not be available at time of plan submittal. In such instances, other required applications shall be provided prior to final plan approval.

I. All Plan submittals shall include the associated electronic AutoCAD files.

J. If the project is to be phased, phasing plans must be submitted per the requirements specified herein.

2.03.2 City Review

The City will review plans and associated calculations, reports, and AutoCAD files for conformance with City development requirements, standards, and policies. Marked up construction drawings, calculations, reports, and written plan review comments will be returned to the applicant's designated contact person for revisions. The applicant's engineer shall revise construction drawings, calculations, or reports to address City plan review comments and provide comprehensive comment responses with the updated documents. The revised drawings (the required number will be determined by the City) and associated calculations and reports along with the redline comments shall be resubmitted to the City for additional review.

2.03.3 Plan Approval

Once the plan review process is completed and all City review comments have been addressed, the City will request that one hardcopy of the sealed plans and reports be submitted for approval.

A. Final reproducible plans shall be produced on unbound paper/bond, signed and stamped by a registered professional engineer, licensed in the State of Washington, and provided to the City for approval signatures, along with the final AutoCAD files. Electronically signed seals will only be accepted if they meet the requirements of WAC 196-23-070. The City will return the signed and approved plans to the Applicant. The applicant shall make copies of the signed originals and shall provide the required number of copies to the City (5 to 13 hardcopy sets and 1 electronic set) and return the unbound paper/bond originals to the City prior to the issuance of construction permits and/or Notice to Proceed.

B. All applicable AutoCAD files shall be submitted to the City on a compact disk or flash drive for integration into the City's Geographic Information System (GIS). For more information on AutoCAD file submittal, please obtain a copy of the City's "Record Construction Document Packet."

C. If after plan approval, but prior to construction the applicant chooses to make changes to the approved plan(s), a revised plan(s) reflecting such changes may be required if the City determines the changes will impact the City's ability to insure construction is completed in conformance with City regulations. In such cases, the revised plan(s) shall be submitted to the City for review, comment, and approval by the City. Inquiries regarding plan updates during construction should be made to the Development Review Engineer assigned to the project or to development@auburnwa.gov.

2.03.4 Project Close Out

The following is the basic process required for accepting construction completion on a project:

The following is the basic process required for accepting construction completion on a project:

A. Construction Redline Drawings refer to the hardcopy paper/bond set of the final approved plans that the Applicant retains throughout construction process and marks with changes and as-built information, in accordance with the requirements specified in the Construction Standards.

B. Throughout construction, the Applicant's Contractor and Surveyor shall clearly mark all changes to the approved plans on the Construction Redline Drawings.

A. After completion of construction, the Applicant shall submit the Construction Redline Drawings to the City for review and comment. After the City has concurred that the Construction Redline Drawings reflect the as-built conditions and meet City record drawing standards as described in the City Construction Standards, the City will return the approved Construction Redline Drawings to the Applicant and the Applicant shall utilize them to prepare as-built record drawings. A copy of the "Record Construction Document Packet" which outlines the complete record drawing process in detail can be obtained from the City.

C. The Applicant shall update the AutoCAD drawing files to reflect the changes shown on the approved Construction Redline Drawings and submit an electronic PDF set (Draft Record Drawings) to the City for review and comment.

D. After City approval of the electronic PDF Draft Record Drawings, the Applicant shall produce a Final Record Drawing set on minimum 8-mil water resistant matte polypropylene (Polypro).

E. The "Record Drawing Certification" block on all sheets of the Final Record Drawing set shall be signed and dated by the Applicant's Engineer or Surveyor certifying that the drawing accurately reflects the as-built field conditions.

F. The Polypro Final Record Drawings with all applicable signatures and the updated AutoCAD files shall be submitted to the City on a compact disk or flash drive for archiving and intake into the City's GIS database.

G. A final stormwater site plan with letter shall be submitted by the Engineer of Record to the City verifying that the storm facilities were installed as designed.

H. Electronic copy of the Stormwater Site Plan and Geotechnical Report if there have been changes during construction.

The following documents shall also be completed for projects prior to project close out.

A. All legal documents, including but not limited to a Bill of Sale and Utility Easements, shall be updated as needed and executed.

B. A “Developers Contribution Document” shall be obtained from the City and completed, if applicable.

C. All Maintenance Bonds or Assignments of Funds for the one-year maintenance period shall be in place.

Chapter 3 Plan Preparation Requirements

3.00 Preface

This chapter describes City requirements for plans submitted to the City for review and approval. Civil engineering plans must meet these standards in order to move through the review process in an efficient manner and in order to receive approval.

3.01 General Requirements

The following general requirements apply to civil engineering plans submitted for review and approval by the City:

A. The general construction requirements for the City of Auburn shall be those contained in the City of Auburn's current Engineering Construction Standards Manual which supplements or modifies the "Washington State Department of Transportation (WSDOT) Standard Specifications for Road, Bridge and Municipal Construction," except where supplemented or modified by the City in this manual.

B. The civil engineering plans shall reference City Standard Specifications, Standard Details, and WSDOT Standard Plans as necessary. The City's Standard Specifications and Standard Details are contained in the Engineering Construction Standards, a copy of which shall be on-site during construction.

C. All civil engineering plans and reports shall be prepared and sealed by a Washington State licensed professional civil engineer.

D. Property surveys shall be performed and sealed by a Washington State licensed professional land surveyor and be tied to the current City datum (NAVD 88) and horizontal control datum shall be NAD83 (1991) as officially adjusted and published by the National Geodetic Survey. (WAC 332-160-060 and RCW 58.20). A list of City Benchmarks is available upon request.

E. All civil engineering plans and calculations shall be neat, uncluttered, legible, and in conformance with the requirements herein.

F. All plans shall be prepared utilizing AutoCAD software in accordance with the standards specified herein.

G. Where applicable, shop drawings shall be submitted for review and approval prior to construction.

H. All deviations from City's Engineering Design and Construction Standards must be shown on the plans with a note call-out and description that references the City assigned deviation number and deviation approval date. The format of these call-outs and note descriptions shall be as shown in Appendix C of this Chapter.

3.02 Plan Format

The City requires that plan sets be submitted in an order consistent with this section. Depending on the complexity or simplicity of the project, the amount of detail and content required will be subject to change. Depending on the scope of the project the civil site improvement plans may be comprised of a combination of the grading, building site and facility extension (FAC) plan elements outlined below.

3.02.1 Grading Plans

Grading plans shall consist of the following sheets:

A. Cover sheet (See 3.04.1).

B. Temporary Erosion and Sediment Control (TESC)/Demo Sheet (Land Clearing when applicable) (See 3.04.2).

C. Grading Plan (See 3.04.3).

D. Cross-Sections (See 3.04.4).

E. Details (See 3.04.5).

3.02.2 Building Site Plans

Building Site Plans shall consist of the following sheets:

A. Cover Sheet (See 3.04.1).

B. Temporary Erosion and Sediment Control (TESC)/Demo Sheet (Land Clearing when applicable) (See 3.04.2).

C. Public Storm Drainage Plan (See 3.04.6).

D. Utility Plan (See 3.04.7).

E. Cross-Sections (See 3.04.8).

F. Details (See 3.04.5).

G. Site and Landscape Plan (See 3.04.10).

H. Irrigation Plan (See 3.04.11).

If a separate associated grading plan has been submitted and approved, those areas covered under the grading plans will not need to be readdressed in the building site plans.

3.02.3 Facility Extension (FAC) Plans

These plans will be required whenever public streets, sanitary sewer, storm drainage, and/or water lines are being extended or modified. The FAC portion of a plan set could consist of the following sheets:

A. Cover Sheet (See 3.04.1).

B. Temporary Erosion and Sediment Control (TESC)/Demo Sheet (Land Clearing when applicable) (See 3.04.2).

C. Utility Plan and Profiles (See 3.04.7 & 3.04.8).

D. Street and/or Storm Plan and Profiles (See 3.04.8 & 3.04.9).

E. Street Cross-Sections and Additional Street Elements (See 3.04.9).

F. Details (See 3.04.5).

G. Street and/or Site Landscape Plans (See 3.04.10).

3.03 General Plan Requirements

3.03.1 Standard Plan Format

Applicable information in this section shall be shown on the plan set.

A. Each sheet of the plan set shall be stamped by a professional engineer licensed in the State of Washington. The stamp/seal on the final plans and as-built Polypros, to be submitted for approval, shall be either wet signed and dated or electronically signed sealed in accordance with the requirements of WAC 196-23-070.

B. North arrow and plan alignment shall be to the top, right, or left.

C. A title block shall be provided along the right-hand edge on each plan sheet. The title block shall include the development title (in bold print), the name, address and phone number of the firm preparing the plan and the owner/developer, a revision block (showing the date of the latest revision), page of pages numbering, and sheet title (e.g., road and storm drainage, grading, erosion/sedimentation control, water and sanitary sewer).

D. Indicate units of measurement for all slope callouts as either percent (%) or feet per foot (ft./ft.). Do not mix units of measurement on a plan set.

E. Provide all match lines with matched sheet numbers (stationing).

F. The street classification shall be provided under the street name on all plan views.

G. A City of Auburn approval block (4"x2") on each plan sheet shall be provided in lower right corner of each plan sheet. Show project reference numbers (BLD for Building Permit, FAC for Public Facility Extension Plan, LND for Land Clearing Permit, STM for Storm Permit and/or GRA for Grading/Erosion Control Permit) in the approval block area. A blank Auburn Engineering approval block is shown as block B-1 in Appendix A of this chapter.

H. A sign-off block (4”x2”) on each plan sheet shall be provided for Record Drawing certification, located directly to the left or directly above the approval block. A blank Record Drawing Certification block is shown as block B-4 in Appendix A of this chapter.

The locations of the title blocks, approval blocks, and engineering stamp shall remain consistent throughout all the plan sheets.

3.03.2 Drafting Standards

Drafting requirements are as follows:

A. Plan sheets shall be printed on 24"x36" size paper. Any variation must be approved by the City prior to plan submittal. Approved plans shall be produced per Section 2.02.3 of the Engineering Design Standards. Margins shall be set to provide for ½ size drawings to fit on 11”x 17“ sheet size.

B. Lettering size shall be no smaller than one tenth (1/10) of an inch in height and shall be uppercase. Callouts and other information shall be printed horizontally in most cases.

C. Existing features shall be shown with dashed lines and/or toned back (screening 45%).

D. Proposed features shall be shown with solid lines. The intent is to clearly distinguish existing features from proposed improvements.

E. Minimum scale shall be:

1. Site work: 1" = 40' horizontal.
2. Public facility work: 1" = 20' horizontal.

Vertical scales are to be 1/10th the horizontal scale except for public facility work in areas with steep slopes, 1" = 5' may be used in place of 1" = 2'.

Use a scale that best utilizes paper space and gives the best overall view of the site.

F. Use APWA AutoCAD symbols in the legend to identify both existing and proposed improvements and utilities.

G. Electronic AutoCAD files shall be prepared in accordance with the Layers Standard included in the appendix to this section.

H. Electronic AutoCAD files shall be geo-rectified per the standards specified herein.

3.04 Plan Sheet Elements

The following section covers the basic elements that are required to be shown on the different plan sheets. While all plan sets will have a cover sheet, there are other sheets covered here that may or may not be included in a particular projects plan set.

3.04.1 Cover Sheet

The Title sheet(s) shall incorporate all the requirements listed in Section 3.02, plus the following applicable items:

A. A general scaled site plan covering an area approximately ten inches (10") square.

B. Vicinity map (approximate scale) with north arrow covering an area approximately five inches (5") square.

C. Site address.

D. Owner/Applicant, address, contact, phone number, and e-mail address.

E. Engineer/Surveyor/Architect address, contact, phone number, and e-mail address.

F. Elevations with City datum (NAVD 88) tied to City benchmarks with reference to the benchmarks' numbers and locations indicated. Horizontal control information (NAD83)

G. Monuments used for horizontal control per the City's horizontal control datum NAD83 (1991) with a description of the monument and northing and easting.

H. The permit number in one-inch (1") bold lettering shall be above the title block (located on the right side of the sheet) on the cover sheet only.

I. Sheet Index with reference to all civil plan sheets.

J. Legend.

K. Full legal description(s) including quarter section, section, township, and range.

L. Parcel number(s).

M. Site zoning and adjacent zoning (may be shown on a separate vicinity map sheet).

N. Applicable plat name and lot numbers.

O. Applicable site information including the number of parking spaces required and the number of parking spaces provided.

P. Type of building construction as defined by the adopted Building Code.

Q. Site access including adjacent driveways, roadways, and intersections that may have an impact on the location and type of site access.

R. An overall site plan key map shall be shown if the plan set includes more than five (5) plan sheets, unless otherwise directed by the city.

S. Construction Sequence outlining a basic construction schedule. (See Section 5.05) In addition, depending upon the nature of the project, the construction of some public facilities may also dictate separate construction sequencing requirements that will also need to be indicated on the plans.

T. The City of Auburn General Notes as shown in Appendix B of this chapter.

U. Provide a list of the additional non-building permits required for this project.

V. Indicate approximate fill and excavation quantities in cubic yards.

W. Storm drainage related quantities and information required to support calculation of System Development Charges (SDC).

3.04.2 Temporary Erosion and Sediment Control (TESC) Plan Sheet

TESC design shall be in accordance with Chapter 5 – TESC, Clearing, and Grading, and include the following applicable items:

A. Marked clearing work limits, environmentally sensitive areas and their buffers, and trees that are to remain.

B. Indicate the location of the construction entrance

C. Provide the onsite stormwater facilities during construction.

D. Indicate the minimum temporary erosion control measures to be used on the site during construction, this may include, silt fencing, interceptor ditches, detention or retention facilities, flow control structures, etc.

E. Show containment locations for storing pollutants, including waste materials and demolition debris, prior to their removal from site.

F. In the construction sequence, provide a phasing schedule for installing and removing TESC BMPs, including the transition from the temporary storm drainage system to the permanent storm drainage system.

G. All existing site features and conditions shall be shown on this sheet including the existing topography.

H. This sheet may also function as a demolition site plan and indicate all existing features and structures to be removed/demolished and those that will remain.

I. Provide the Auburn Grading and Erosion Control Notes as shown in Appendix B of this chapter.

3.04.3 Grading and Private Storm Drainage Plan Sheet

The Grading design shall be in accordance with Chapter 5 – TESC, Clearing, and Grading, and include the following applicable items:

A. Indicate slope of any fill or cut slopes.

B. Show type of fill material and associated compaction requirements.

C. Show existing significant trees (six inches (6”) in diameter and larger for evergreens and four inches (4”) in diameter or larger for deciduous). Indicate if tree is to either be retained or removed. Note that a land-clearing permit may be required.

D. Provide temporary storm drainage retention or detention facilities including City control structure, water surface (W.S.) elevations, seasonal high groundwater elevation, orifice sizes, design storms for the W.S. elevations, and release rates.

E. Show horizontal setback between the bottom of any fill placement and the top of the bank of a defined drainage channel per requirements noted in section 5.03.3.

F. Show typical ditch sections.

G. Show connections of building roof and foundation drains to the site drainage system.

H. Show the existing topography shaded back and overlaid by the proposed grades.

I. Show existing and finished elevations and contours. Spot elevations may be required for relatively flat sites to supplement the contour elevations as necessary to adequately reflect existing and finish grades. Provide spot elevations along property line and a minimum of thirty feet (30’) beyond property line (at least fifty foot (50’) intervals).

J. Reference standard City of Auburn Detail Numbers appropriately. If a project specifies modification to a Standard Detail a new detail must be shown on the plans.

K. Provide notes to protect and maintain erosion control facilities during grading operations.

L. Provide arrows to indicate drainage flow direction on paved surfaces.

M. Show layout of the entire storm drainage pipe with length, slope, and material type labeled and direction of flow indicated.

N. Provide site specific details and cross-section sheets for storm drainage detention or retention facilities.

O. Indicate the emergency overflow to the public storm system.

P. Show berm dimensions, materials, compaction requirements for ditches and detention ponds where applicable.

Q. Show locations of manholes and catch basins, indicating type, stationing, offset, lid type, rim and invert elevations. Number manholes and catch basins consecutively.

R. Show existing and proposed sanitary sewers and water mains (use ghost lines), identifying crossing and minimum vertical distance between utilities.

S. Provide type of material and size of energy dissipaters (riprap, etc.).

T. Provide details of all low impact development and storm water quality control facilities.

U. Provide limits of surface water ponding in parking lots.

V. Show trash racks, if applicable.

W. Show locations, widths and types of easements.

X. Show locations and types of pumps, if applicable.

Y. Show water quality facilities locations, lengths, widths, slopes, and cross-sections.

Z. Provide planting and seeding requirements with establishment procedure in construction sequence for water quantity and quality systems.

AA. Show finish floor elevations.

BB. Show the controlling downstream storm drainage elevations including the associated design conditions.

CC. Address other agency permit requirements, as necessary.

DD. For ponds, provide: aesthetics, fencing, power (if applicable), maintenance access, control structure, critical water surface elevations, and other items, such as walls and liners.

EE. Address bypass surface flows.

FF. Address subsurface flows and indicate water surface elevations.

GG. Clearly indicate private drainage facilities on the plans. Justification is needed for any facility proposed to be a joint public and private facility, for City consideration.

Some projects may be able to combine the grading sheet with the erosion control and demo plan depending on the complexity of the project.

3.04.4 Cross-Section Sheet

The Cross-Section plan sheet(s) shall have the following applicable items:

A. Cross-sections for fill and grading shall be shown through all properties to at least 30 feet beyond the property lines. Adequate cross-sections shall be shown to represent the site. At a minimum this shall include one shown in the north direction (west-east from left to right) and one shown in the east direction (south-north from left to right) cross-section.

B. This sheet may also contain cross-sections for the temporary storm drainage pond.

C. The scale used for the site cross-sections on this sheet should match the scale on the other sheets.

Some projects may be able to combine the cross-section sheet with the grading sheet depending on the complexity of the project.

3.04.5 Detail Sheet

The Detail sheet(s) shall have the following applicable items:

A. Any detail that is specific to this project.

B. City Standard Details are not to be shown on this sheet unless they need to be modified for a project specific application, in which case the detail would be shown with the modifications explicitly called out/labeled and shall not include the City Engineer's signature from the original detail.

C. Storm control manholes are normally shown on this sheet.

D. This sheet may also contain cross-sections for the temporary storm pond.

City Standard Details and WSDOT Standard Plans are to called out on the applicable plan sheet using the detail or standard plan number.

3.04.6 Public Storm Drainage Plan Sheet

Grading and Storm Drainage system design shall be in accordance with Chapter 5 – TESC, Clearing, and Grading, and Chapter 6 – Storm Drainage Facilities (which incorporates by reference the SWMM), and include the following applicable items:

A. The layout of all the storm drainage pipes with the length, slope, and material type indicated in the labeling of the storm drainage pipes. Provide arrows to indicate the direction of flow into the structures.

B. Typical ditch section.

C. Location of manholes and catch basins. Indicate type, stationing, offset, rim and invert elevations, and number manholes and catch basins consecutively.

D. Existing and proposed sanitary sewers and water mains (use ghost lines). Identify crossings and minimum distance between utilities.

E. Building downspouts or footing drain locations, inverts and connections to the storm drain system.

F. For single-family home sites, indicate means for collection and discharge of water from roof, foundation drains, and driveways.

G. Provide arrows to indicate drainage direction in parking lots, roadway intersections and cul-de-sacs.

H. Reference to the detail/BMP and/or cross-section sheets for storm drainage detention or retention facilities such as the control discharge structure and pond cross-sections. Indicate water surface elevations, allowable discharge rates, and design storms.

I. Show an emergency overflow to the public storm drainage system.

J. Berm dimensions, material, and compaction requirements for ditches and detention ponds where applicable.

K. Indicate type of material and size of energy dissipaters (riprap, etc.).

L. Provide details of the storm drainage water quality facility.

M. Limits of surface water ponding within parking lots.

N. Trash racks as applicable.

O. Location and widths of easements.

P. Location and type of pumps, if applicable.

Q. Stormwater treatment/quality control facility location, length, width, slopes, and cross-section.

R. Planting and seeding requirements with establishment procedure (construction sequence) for water quantity or quality systems.

S. Finish floor elevations of all buildings.

T. Indicate separation from any pipe, infiltration trench, open ditch, and bioswale to any property line or obstruction.

U. Address other agency permit requirements, as necessary.

V. For ponds, provide: landscaping, fencing, aeration, maintenance access, critical water surface elevations, and other items, such as walls and liners.

W. Number the storm drain structures. (Numbers will be provided by the City prior to final plan approval.)

X. Indicate any required easements including their dimensions.

Y. Low Impact Development (LID) facility location, length, width, slopes, and cross-section.

3.04.7 Utility Plan Sheet

The plan set shall include an overall utility plan sheet that shows the private connections to the public water and sanitary sewer systems, together with the storm drainage system and proposed landscaping, and any required extensions of the public water and sanitary sewer systems. The overall utility plan shall be clearly visible on one to two plan sheets, with a maximum scale of 1"=100'.

Callouts shall be shown at the location of each feature rather than in a table, where feasible. The scale of the plans may need to be increased to improve visibility. Callouts shall be shown in both the plan and profile views (e.g., manholes, catch basins, etc.).

The more detailed Utility sheet(s) shall have the following applicable items:

3.04.7.1 Water

Water system design shall be in accordance with Chapter 7 – Water Facilities, and include the following items:

A. Water pipe and fitting size, location, and type of material.

B. Details of connections to existing water mains.

C. Valve size, locations and type.

D. Fire hydrants locations.

E. Air/vacuum relief valve and blow-off locations.

F. Pressure reducing stations and associated valves, vaults and by-pass piping as required.

G. Concrete blocking, mechanical, or restrained joint pipe support.

H. Watermain, water meter, and fire hydrant easements.

I. Meter size and service line size and location.

J. Irrigation meter size and service line size location.

K. Proposed fire line, FDC line and PIV locations.

L. Backflow prevention assembly and detector check meter size, type and location.

M. For buildings requiring fire sprinklers, the fire sprinkler notes shall be shown on the plan, as shown in Appendix B of this chapter.

N. Table showing physical separation in feet between water lines and other utilities at crossings, when a profile is not required.

O. Cross connection control notes included in Appendix B of this Chapter 3.

P. For plat or road projects provide unique stationing down the center of the road with the appropriate off-set at all water main appurtenances. For all other projects provide unique stationing down the center of the water main.

3.04.7.2 Sanitary Sewer

Sanitary sewer system design shall be in accordance with Chapter 8 – Sanitary Sewer Facilities, and include the following items:

A. Sanitary sewer pipe size, locations, type of material, and stationing.

B. Location of manholes. Indicate type of manhole, stationing, offset, and number manholes consecutively. During the City review process, manhole numbers shall be assigned by the City to be incorporated into the next submittal.

C. Indicate knockouts in manholes for future connections.

D. The direction of sewage flow shall be indicated with an arrow at the manhole. Proposed sewer shall have solid arrowheads while existing pipe and manholes shall be shown in ghost or screened lines with the arrowhead and manhole not filled. The location of the frame and cover on the manhole, positioned over the widest part of the shelf and not over a flow channel, shall be shown.

E. Drop manholes, if approved, are to be detailed on the plans.

F. Length, slope, type and class of material, and inverts for side sewers.

G. Stationing for side sewers from downstream manholes.

H. Connection of a side sewer to the City's sanitary sewer pipe shall be indicated with a tee.

I. Locations of sanitary sewer cleanouts.

J. Locations of sanitary sewer easements.

K. Clearly define right-of-way and adjacent property lines. Parcel numbers for all lots adjacent to the improvements shall be indicated, with existing or proposed finished floor elevations.

L. Floor drains, drains from other covered areas potentially subject to pollutants, and wash areas within parking lots shall be connected to the sanitary sewer through an approved oil/water separator.

3.04.8 Utility Profile Sheet

The Utility Profiles are to be included on the associated utility plan sheet with plan view above the profile view and corresponding unique stationing. All existing and proposed parallel and crossing utilities shall be shown on the profile.

3.04.8.1 Storm Drainage

For complex private storm systems and all public storm lines, a profile will be required. These profiles are to include the following items where applicable:

A. Public storm drainage located within the street right-of-way shall be shown on the street profile. See Section 3.04.9.2

B. Public storm drainage located in an easement shall have separate profiles.

C. Structure size, location, type, station, invert elevation, type of lid or grate, and rim elevation.

D. Pipe size, type of material, slope (ft./ft.), and lineal footage.

E. Utility crossings shall identify size and type of utilities involved.

F. Ditches where applicable, size, type and slope.

G. Existing and finished grade along pipe centerline.

H. Connections to existing structures.

3.04.8.2 Water

Profiles shall be provided for all public water systems, including on-site systems and systems within the street/City right of way and easements, These profiles shall include the following items:

A. Water line located within the street right-of-way shall be shown on the street profile. See Section 3.04.9.2.

B. Pipe size, type of material, lineal footage, cover and stationing.

C. Utility crossings shall identify size and type of utility involved.

D. Existing and finished grade along pipe centerline.

E. Connections to existing mains and fittings.

F. Label fittings and valves include blocking.

3.04.8.3 Sanitary Sewer

A profile will be required for all public sanitary sewer mains. These profiles are to include the following items where applicable.

A. Sanitary sewer located within the street right-of-way shall be shown on the street profile. See Section 3.04.9.2

C. Structure size, location, type, station, invert elevations, type of lid, and rim elevation.

D. Pipe size, type of material, slope (ft./ft.), and lineal footage.

E. Utility crossings shall identify size and type of utility involved.

F. Existing and finished grade along pipe centerline.

G. Connections to existing structures.

H. Side sewer locations and stationing.

3.04.9 Public Street Plan and Profile Sheet

Whenever a project includes construction within a public street excluding utility connections, both a plan and a profile shall be included in the plan set. The Public Street Plan and Profile sheet(s), when required, shall have the following applicable items:

3.04.9.1 Plan View

The plan view shall include the following items where applicable:

A. Plan views shall be drawn at a 1" = 20' scale.

B. Existing and proposed rights-of-way.

C. Existing and proposed contours and elevations.

D. Existing and proposed street names.

E. Existing and proposed centerline bearings.

F. Existing and proposed signs and traffic control devices.

G. Existing and proposed storm drainage systems.

H. Existing and proposed sewers and water mains (use ghost lines). Identify crossings and minimum distances between utilities.

I. Horizontal curves.

J. Horizontal stationing.

K. Location of curbs, sidewalks, wheelchair ramps, and driveways (by station).

L. Locations of monuments at all centerline intersections, cul-de-sacs, PCs, and PTs by station.

M. Street luminaires, conduit for streetlights, traffic signals, and traffic signal loop detectors located within the vicinity of the project.

N. Mailbox types and locations. Submit to postmaster for approval.

O. Address any horizontal utility conflicts in plan.

P. Street landscaping, if required.

Q. Construction limits.

R. Slope excavation and/or embankment limits.

3.04.9.2 Profile

The profile shall include the following items where applicable:

A. Profiles shall be drawn using 1" = 20' horizontal and 1" = 2' vertical scales.

B. Existing and proposed centerline road grade.

C. Existing and proposed storm drainage systems.

D. Existing and proposed sewers and water mains (use ghost lines). Identify crossings and minimum distances between utilities.

C. Finish grade elevations every fifty feet (50') and every twenty-five feet (25') for vertical curves along design centerlines.

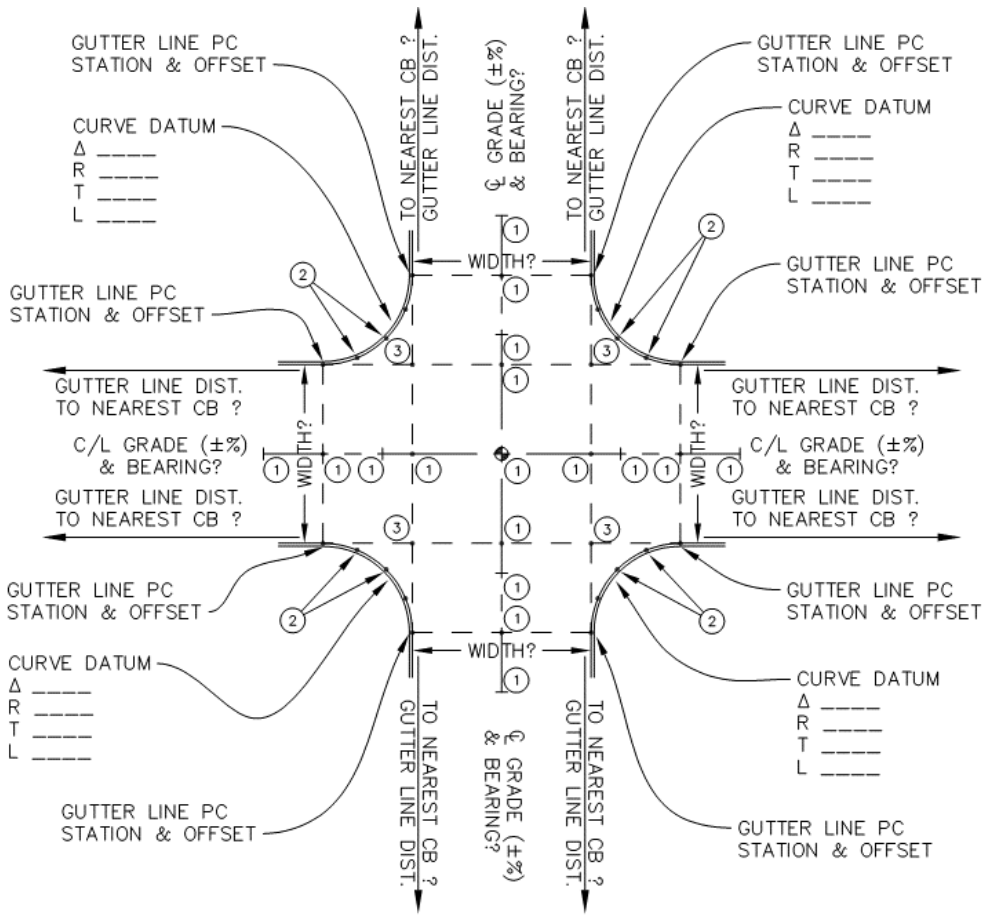
D. Vertical curve information in profile section.

E. Address vertical utility conflicts in profile.

3.04.9.3 Intersections

Intersection plans shall be 20 scale drawings in conformance with the following figure:

Figure 3-1 Intersection Plan Sheet Requirements



NOTES:

A. LABEL INTERSECTION & STATIONING. SHOW FINISH ELEVATIONS AT:

(1) CENTER LINES, AS SHOWN.

(2) GUTTER LINE RADII: PC'S, PT'S, ¼ POINTS, & HIGH/LOW POINTS.

(3) GUTTER LINE PI'S.

B. IF RADIUS POINT FOR R.O.W. & GUTTER LINE DIFFER, PROVIDE DATA OF R.O.W. CURVE.

C. LABEL CENTERLINE INTERSECTION EQUATION STATIONS (IF APPLICABLE).

3.04.9.4 Typical Roadway Sections

Typical roadway sections shall show pavement depths, widths and materials, cross-slopes of pavement (%), centerline, dimensioned right-of-way lines, curb and gutter, ditches, embankment and excavation slopes (1:1), walls, etc. Typical sections will be labeled within identified station ranges.

3.04.9.5 Striping and Signing

Provide 40 scale plans per these Standards and MUTCD, including lane markers, pavement markings, and signing.

3.04.9.6 Signalization

Provide 20 scale separate detailed signalization plan per City of Auburn Standards, including poles, bases, conduits, and traffic loops.

A. Signal Plan Sheet

1. The plan sheet shall conform to the following requirements:
   a. For areas that require greater detail (such as the corner that has the controller), a blown-up detail may be necessary at a 1″=10′ scale.
   b. All proposed signal equipment, including signal poles, mast arms, heads, signs, junction boxes, conduit, loops, controller, and service cabinet shall be shown as bold.
   c. All existing and proposed right-of-way information shall be shown and labeled on the plan, including easements needed for signal equipment. The line type shall be different for easements and right-of-way.
   d. All proposed curb, sidewalk, proposed striping, and existing curb/striping (to remain) information shall be shown on the plan in gray scale (screened back).
   e. Sight triangle lines shall be shown on plans in gray scale.
   f. All proposed and existing underground and overhead utilities shall be shown and labeled on the plan in gray scale.
   g. Provide on the plan signal construction notes as shown in Appendix B of this chapter.

2. Construction notes shall contain, but not be limited to:
   a. Signal pole and foundation installation (including pole type, mast arm length, and installation of items on the pole).
   b. Controller cabinet and foundation installation.
   d. Coordination of utility removal/relocation.
   e. Coordination of connection of power, and power source type.
   f. Interconnect connection to other signals.
   g. Removal of existing signal and/or street light equipment.
3. Displays: The plan sheet shall include the following displays:
   a. Phase diagram display.

b. Signal display showing signal layout of all vehicle signal heads and pedestrian heads.

4. Detection: The plan sheet shall include:

   a. Stop bar, intermediate and advanced loop location and numbering.

   b. Pedestrian push button location.

   c. Preemption detection location and numbering.

5. Signal Poles and Associated Equipment: The plan sheet shall contain, but not be limited to:

   a. Signal Pole Locations and Numbering: The locations shall be called out by the major arterial station and offset.

   b. Signal head location and numbering.

   c. Pedestrian head location and numbering.

6. Controller and Service Location:

   At least one corner of the controller/service foundation shall be called out by the major arterial station and offset. The footprint of the foundation shall be shown on the plans with the controller and service cabinets oriented on the foundation as they would be placed in the field. If the information required to show all the controller/service conduit connections and foundation footprint makes the plan too cluttered, a blown-up detail of the corner containing this information is needed at a 1″=10′ scale.

7. Power Source Location:

   The location of the power source shall be identified on the plans.

8. Wire Schedule:

   a. A wire schedule table shall include run numbers, conduit size, wire type, and comments.

   b. Comments shall include, but not be limited to, number of twisted loop pairs for runs between the detection loops and adjacent junction box, identification of spare conduits, conduits utilized only by interconnect or illumination, and power cables.

   c. For designs that include modifications to an existing signal, all existing wire runs affected by the design shall be shown on the wire schedule.

9. Junction box type and approximate location.

10. Signing:

    a. Signs shall be shown on all mast arms. Signs that are post mounted but are signal related (such as a “signal ahead” sign) shall be shown on the signal plan.

    b. A sign display shall be shown on the plan with the MUTCD sign designation, dimensions, and lettering type for all signs.

    c. Indicate removal of existing stop signs after signal is in operation.

    d. Installation of “New Signal Ahead” or “Signal Revision Ahead” signs.

11. Other Illumination:

    a. Proposed illumination that will use the signal service cabinet, but is located outside the four quadrants of the intersection, shall be shown as proposed on a

separate illumination plan sheet. On the signal plan sheet, the illumination shall be shown as gray scale and labeled as “proposed illumination, see illumination plans.” However, once the illumination enters the quadrants of the intersection (i.e., when it is using the same junction box as the signal equipment), it shall be shown as proposed on the signal plan and gray scale on the illumination plan.

b. Indicate the circuit that street lights are on.

B. Wire Diagram Plan

In general, the wire diagram shall include the following:

1. All signal heads, pedestrian heads, pedestrian push buttons, luminaires, preemption detectors, loops, and junction boxes drawn in schematic forms.

2. All termination points in the controller cabinet. The wire diagram shall include every termination point the controller will have, including those that may not be used for this particular signal design.

3. All wiring associated with the items above, as well as the wiring for interconnect. The wire diagram shall show how these items are connected to the controller.

4. Location of wire splices.

5. All termination numbering at each end of each wire. For example, the 5-conductor cable connecting a signal head to the controller shall have the termination numbering called out at the signal head and in the termination points in the controller.

6. All wire colors at each end of the wire.

7. A call out to each wire run noting the number and type of each wire.

8. Intersection schematic with a north arrow showing approach phase.

9. Pole, signal head, pedestrian head, preemption detection, and loops shall be numbered on the wire diagram.

C. Pole Schedule Plan

The pole schedule shall include the following:

1. The pole schedule shall include a signal standard detail chart.

3. The pole schedule shall include pole orientation attachment and base detail, pole foundation detail, and signal standard detail.

3.04.9.7 Illumination

Street Light Plans shall be labeled as Street Light Plans, and shall be prepared, stamped, signed and dated by a professional engineer licensed by the State of Washington.

Street Light Plans will include references to all applicable City of Auburn Standard Details and/or Washington State Department of Transportation (WSDOT) Standard Plans, or copies of other specific details applicable to the project shall be shown on the plans.

Street Light Plans shall be provided on separate and uncluttered sheets that do not show unrelated street, utilities, or on-site improvements. Street Light Plans shall be drawn to an engineer's scale of 1" = 40'.

Street Light Plans shall at a minimum include the following applicable items for new or existing street lighting system:

A. Lighting schedule with the following information in a table format:
   1. Luminaire make and model
   2. Lamp/Ballast type
   3. Lamp wattage
   4. Uniformity Ratio
   5. Veiling Luminance Ratio
   6. Average Maintained Light Level
   7. Light standard type
   8. Mounting height (ft.)
   9. Bracket or davit arm length (ft.)
   10. Light distribution pattern
   11. Luminaire spacing distance (ft.)
   12. Light standard locations by station and offset from the centerline of the street to the center of the light standard. Show all existing street lights for a distance of 500 feet in both directions from the limits of the project site, including both sides of the street(s) and in medians.

B. Wiring/Conduit schedule with the following information in a table format:
   1. Circuit number
   2. Conduit size, material, and purpose (street lighting, traffic signal interconnect, spares, etc.).

C. Location of points of service (the PSE connection or service location and the new or existing City Electrical Service Cabinet(s).

D. Location of junction boxes. Indicate junction box type and purpose (lighting, traffic signal, etc.).

F. Existing topography, including but not limited to the location of driveways, street trees (including species), street intersections, overhead utilities (including maximum and minimum heights), underground utilities (including sizes), medians, curb, and lane widths (pavement markings).

3.04.9.8 Streetscape

Provide information on planting of the public landscape strips along the street frontage. Information shall include the following:

A. Type and size of trees.

B. Tree spacing.
C. Type of ground cover.
D. Root control/barrier.
E. Irrigation if applicable.
F. Show all proposed and existing surface features and underground utilities.

3.04.9.9 Other Features

Include locations of any other feature including mailboxes and bus stops. Any mailbox placement that requires approval from the postmaster shall include the Postmaster approval block B-6 as shown in Appendix A of this chapter.

3.04.10 Site and Landscape Plan Sheet

The site and landscape sheets (separate plans may be more appropriate), when required, shall have the following applicable items:

A. Demonstrate conformance with Chapters 18.50, “LANDSCAPING AND SCREENING” and 18.52 “OFF-STREET PARKING AND LOADING” of ACC.

B. Label name, classification, and boundary of adjacent streets both public and private.

C. Pavement types with unique hatching.

D. Site signage and striping

E. The boundaries and dimensions of site.

F. Show and label any easements.

G. Show and label any critical areas and buffers affecting the site.

H. The location of on-site buildings and their eaves or protrusions (decks, porches, covered entries, etc.) and other site features (generators, compressors, retaining walls, fuel tanks, etc.).

I. The location of on-site parking stalls, drive aisles, and loading/unloading areas and required fire lanes with dimensions.

J. The location and size of landscape areas (measured to the inside of curbs).

K. Landscape area calculations as required by ACC 18.50.040, “Landscape development standards”

L. The species (common and scientific name), condition (bare root, balled & bur lapped) or containerized) and size of planting materials (shown within a “planting schedule”).

M. .Notation of which species are native to, or adapted to the Pacific Northwest (minimum 50%)

N. Site preparation specifications (removal of construction debris, soil amendment, fertilizer etc.)

O. The location and type of non-vegetated groundcovers such as rock, mulch, etc.

P. The location, size, and proposed screening of outdoor storage areas and dumpster/refuse areas.

Q. The location, species, and size (diameter at DBH) of all existing trees and measures to protect them.

R. Show all proposed and existing surface features and underground and above-ground utilities affecting the site.

S. Planning Approval Block B-2 as shown in Appendix A of this chapter.

T. Landscaping notes, including:

   i. Plant materials list substitution requiring city approval and possibly “as-built plans”.

   ii. Planting notes (e.g. when to remove tree stakes)

   iii. Soil quality and installation

   iv. Maintenance after installation

U. Site furnishings such as light posts, bike racks, benches, trash cans, shopping cart racks.

3.04.11 Site Irrigation Plan sheet

The site irrigation sheets, when required, shall have the following applicable items:

A. The connection point to the City system, together with the water meter size.

B. The size, location, and type of the backflow prevention.

C. The proposed layout of the irrigation system.

D. Be consistent with the site’s building and landscaping plans.

E. Show the existing and/or proposed location of all parcel lines.

3.04.12 Critical Area Restoration/Mitigation

A critical area restoration or mitigation sheet, when required, shall include the items as required by the City pursuant to chapter 16.10 and 15.68 of the Auburn City Code, and have the Critical Area approval block B-3 as shown in Appendix A of this chapter.

3.04.13 City Parks and Open Spaces

Any plan sheet that includes a park or open space that is to be dedicated to the City shall include the Auburn Parks approval block B-5 as shown in Appendix A of this chapter.

3.04.14 Phasing Plans

Applications that propose to complete projects in phases shall submit a phasing plan which incorporates all required conditions of approval and details infrastructure improvements and sequencing of the phases. Prior to occupancy of any buildings within a project phase, complete construction, inspection, acceptance, and transfer of ownership to the City via Bill of Sale as well as recorded easements are required for all public utilities (water, sewer, & storm) serving the building and public road improvements/right of way dedications must be complete. If the utilities are proposed to be constructed in phases, the points of connection between phases and how the future phases will be constructed without affecting the operation of the previous phases must be shown.

Phasing plans shall include the following information:

1. Illustrative maps for each proposed phase which clearly mark in heavy lines the boundaries of the subject phase, label the phase alphabetically (to avoid confusion with lot numbers), and depict roads, lots, infrastructure, easements, dedications and open space which are included within the subject phase. The plan shall also illustrate those proposed improvements which mitigate impacts associated with the unbuilt portions of the project which are not located within the boundaries of the

subject phase. Previously established phases, including roads, lots, infrastructure, easements, dedications, and open space, should be shown on the map shaded or gray-scaled. All phasing maps shall be drawn at the same scale.

2. A narrative description or table which describes each phase and its associated improvements. In addition, the narrative or table shall demonstrate that each phase would comprise a “stand-alone” development which, should no subsequent phases be constructed, would meet or exceed City standards and all other conditions of approval. The narrative should also describe the proposed timeline for completion of the entire project. The narrative must address emergency access, street improvements, and alternative construction access.

Appendix A – Approval Blocks

Sample Engineering Approval Block (B-1):

PROJECT REF: _____

THESE PLANS ARE APPROVED FOR CONFORMANCE WITH THE CITY OF AUBURN'S ENGINEERING REQUIREMENTS.

DEV. REVIEW ENGINEER: _____

APPROVED BY: _____

DATE APPROVED: _____

Sample Planning Approval Block (B-2):

PROJECT REF: _____

THESE PLANS ARE APPROVED FOR CONFORMANCE WITH THE CITY OF AUBURN'S PLANNING DEPARTMENT REQUIREMENTS.

APPROVED BY: _____

DATE APPROVED: _____

Sample Critical Area Approval Block (B-3):

PROJECT REF: _____

THESE PLANS ARE APPROVED FOR CONFORMANCE WITH THE CITY OF AUBURN'S CRITICAL AREA REQUIREMENTS.

APPROVED BY: _____

DATE APPROVED: _____

Appendix A (continued)

Sample Record Drawing Certification Block (B-4):

RECORD DRAWING CERTIFICATION
THESE DRAWINGS CONFORM TO THE
CONTRACTOR'S CONSTRUCTION RECORDS.

BY _____ DATE _____

TITLE/POSITION _____

CONFIRMED BY CITY _____ DATE _____

Sample Parks Department Approval Block (B-5):

PROJECT REF: _____

THIS PLAN SHEET REFLECTS THE CITY OF AUBURN PARKS DEPARTMENT MINIMUM REQUIREMENTS

APPROVED BY: _____
PARKS DIRECTOR

DATE APPROVED: _____

Sample Postmaster Approval Block (B-6):

CITY OF AUBURN POSTMASTER APPROVAL

APPROVED BY: _____

TITLE/POSITION: _____

DATE APPROVED: _____

Appendix B – Standard Notes

GENERAL NOTES

1. THIS DEVELOPMENT PROJECT SHALL CONFORM TO THE CITY OF AUBURN'S REQUIREMENTS AND BE IN ACCORDANCE WITH THE APPROVED PLANS. ANY CHANGES FROM THE APPROVED PLAN WILL REQUIRE APPROVAL FROM THE OWNER, ENGINEER, AND THE CITY.

2. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE "WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (CURRENT EDITION)," EXCEPT WHERE SUPPLEMENTED OR MODIFIED BY THE CITY'S CONSTRUCTION STANDARDS MANUAL. COPIES OF THE ABOVE DOCUMENTS SHALL BE AVAILABLE AT THE JOB SITE DURING CONSTRUCTION.

3. A PRE-CONSTRUCTION MEETING SHALL BE REQUIRED PRIOR TO THE START OF ALL CONSTRUCTION. CONTACT THE COMMUNITY DEVELOPMENT & PUBLIC WORKS DEPARTMENT AT 253-931-3010, TO SCHEDULE A MEETING.

4. LOCATIONS SHOWN FOR EXISTING UTILITIES ARE APPROXIMATE. THE CONTRACTOR IS CAUTIONED THAT OVERHEAD UTILITY LINES MAY NOT BE SHOWN ON THE DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE TRUE ELEVATIONS AND LOCATIONS OF ALL UNDERGROUND UTILITIES AND THE EXTENT OF ANY HAZARD CREATED BY OVERHEAD UTILITY LINES. IDENTIFICATION, LOCATION, MARKING, AND RESPONSIBILITY FOR UNDERGROUND FACILITIES OR UTILITIES, IS GOVERNED BY THE PROVISIONS OF CHAPTER 19.122 REVISED CODE OF WASHINGTON (RCW). PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL CALL ONE-CALL (811) FOR UTILITY LOCATIONS (WATER, SANITARY SEWER, STORM SEWER, GAS, POWER, TELEPHONE, AND CABLE).

5. IF A PROPOSED ROUTE IS NOT INCLUDED ON THESE PLANS, A PROPOSED ROUTE AND SCHEDULE FOR HAULING MATERIAL TO THE SITE SHALL BE SUBMITTED TO THE CITY FOR APPROVAL PRIOR TO THE START OF CONSTRUCTION. IF THE CITY BELIEVES THAT THE PROPOSED HAUL ROUTE WILL ADVERSELY IMPACT THE STREET NETWORK, A SEPA AMENDMENT MAY BE REQUIRED TO EVALUATE THE IMPACTS AND DETERMINE MITIGATION REQUIREMENTS BEFORE BEGINNING WORK. HAULING MAY BE LIMITED TO APPROPRIATE OFF-PEAK HOURS OR ALTERNATIVE ROUTES, AS DETERMINED BY THE CITY.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PUBLIC SAFETY ON AND AROUND THE PROJECT. PRIOR TO THE START OF WORK, ALL METHODS AND EQUIPMENT USED FOR TRAFFIC CONTROL AND STREET MAINTENANCE SHALL BE SUBMITTED TO THE CITY FOR APPROVAL. CONTRACTORS AND THEIR SURETY SHALL BE LIABLE FOR INJURIES AND DAMAGES TO PERSONS AND PROPERTY SUFFERED BECAUSE OF CONTRACTORS OPERATIONS OR NEGLIGENCE CONNECTED WITH THEM.

7. ALL CONSTRUCTION SURVEYING FOR EXTENSIONS OF PUBLIC FACILITIES SHALL BE DONE UNDER THE DIRECTION OF A WASHINGTON LICENSED LAND SURVEYOR OR A WASHINGTON LICENSED PROFESSIONAL CIVIL ENGINEER.

8. CERTIFIED DRAWINGS ARE REQUIRED PRIOR TO PROJECT ACCEPTANCE. REFER TO THE CITY'S "RECORD CONSTRUCTION DOCUMENT" HANDOUT.

Appendix B (continued)

GRADING AND EROSION CONTROL NOTES

1. WITHIN THE CITY OF AUBURN, ALL REQUIRED SEDIMENTATION AND EROSION CONTROL FACILITIES INDICATED ON THE PLANS MUST BE CONSTRUCTED AND IN OPERATION PRIOR TO LAND CLEARING AND/OR OTHER CONSTRUCTION ACTIVITIES. THESE FACILITIES SHALL BE MAINTAINED AND UPGRADED, IF NECESSARY, TO INSURE THAT SEDIMENT-LADEN WATER AND STORM DRAINAGE RUNOFF DOES NOT IMPACT THE ADJACENT PROPERTIES, NATURAL DRAINAGE WAYS, OR THE EXISTING CITY STORM DRAINAGE SYSTEM.
2. THE SOURCES FOR ALL MATERIAL IMPORTED TO THE SITE SHALL BE APPROVED BY THE CITY.
3. THE STORM DRAINAGE DETENTION (RETENTION IF INFILTRATION SYSTEM IS USED), SEDIMENTATION AND EROSION CONTROL FACILITIES DEPICTED ON THE APPROVED DRAWINGS ARE INTENDED TO BE MINIMUM REQUIREMENTS TO MEET ANTICIPATED SITE CONDITIONS. ADDITIONAL DRAINAGE AND EROSION CONTROL FACILITIES MAY BE REQUIRED AS SITUATIONS WARRANT DURING CONSTRUCTION. THE IMPLEMENTATION, MAINTENANCE, REPLACEMENT AND ADDITIONS TO THESE CONTROL SYSTEMS SHALL BE THE RESPONSIBILITY OF THE PERMITEE.
4. THE TEMPORARY EROSION CONTROL FACILITIES, INCLUDING ALL PERIMETER CONTROLS AND THE DETENTION (RETENTION IF INFILTRATION SYSTEM IS USED), CONTROL PONDS, SHALL REMAIN IN PLACE UNTIL FINAL SITE CONSTRUCTION IS COMPLETED. AFTER CITY APPROVAL, THE CONTRACTOR WILL BE RESPONSIBLE FOR REMOVING ALL TEMPORARY FACILITIES.
5. THE CONTRACTOR WILL BE REQUIRED TO WATER THE SITE, AS NECESSARY, TO REDUCE DUST EMISSIONS AS A RESULT OF CONSTRUCTION ACTIVITY.
6. NO TRACKING IN THE ROADWAY IS ALLOWED. IF SEDIMENT IS TRACKED ONTO THE ROAD, THE ROAD SHALL BE THOROUGHLY AND IMMEDIATELY CLEANED BY SHOVELING OR PICKUP SWEEPING. TRANSPORT SEDIMENT TO A CONTROLLED SEDIMENT DISPOSAL AREA. KEEP STREETS CLEAN AT ALL TIMES.
7. ALL AREAS OF ACTIVE EARTHWORK WHICH HAVE THE POTENTIAL FOR EROSION AND SEDIMENTATION IMPACTS ON ADJACENT PROPERTIES, NATURAL DRAINAGE WAYS, OR THE EXISTING CITY STORM DRAINAGE SYSTEM MUST BE STABILIZED ACCORDING TO THE FOLLOWING SCHEDULE: FROM MAY 1 TO SEPTEMBER 30, AREAS AT FINAL GRADE AND THOSE THAT ARE SCHEDULE TO REMAIN UN-WORKED FOR MORE THAN SEVEN (7) DAYS SHALL BE STABILIZED. FROM OCTOBER 1 TO APRIL 30 EARTHWORK ACTIVITIES SHALL BE CONDUCTED IN STAGES IN ORDER TO MINIMIZE SOIL EXPOSURE. EXPOSED SOILS THAT WILL REMAIN UN-WORKED FOR MORE THAN TWO (2) DAYS SHALL BE STABILIZED IMMEDIATELY.

Appendix B (continued)

FIRE SPRINKLER SYSTEMS NOTES

SPRINKLER SYSTEMS SHALL MEET CITY OF AUBURN STANDARD 7.01.6.2 AND THE FOLLOWING REQUIREMENTS:

1. PROPOSED FIRE LINE TO BE SIZED BY A FIRE PROTECTION ENGINEER.

2. BACKFLOW PROTECTION IS REQUIRED ON FIRE SPRINKLER LINES

3. A SEPARATE DETAILED PLAN OF THE UNDERGROUND FIRE SPRINKLER SUPPLY LINE SHALL BE APPROVED BY THE FIRE MARSHAL AND INSTALLED BY A WASHINGTON STATE CERTIFIED LEVEL “U” CONTRACTOR IN ACCORDANCE WITH WAC 212-80-010.

4. A POST INDICATOR VALVE SHALL BE INSTALLED ON THE FIRE SPRINKLER SUPPLY LINE TO ISOLATE THE SYSTEM FROM THE CITY’S WATER SYSTEM WHEN REQUIRED FOR REPAIR.

5. BLOCKING, PIPING, AND RODDING DETAILS SHALL BE PROVIDED WITHIN THE SUBMITTAL.

6. APPROVAL OF THE CIVIL PLANS DOES NOT APPROVE THE INSTALLATION OF THE SPRINKLER SYSTEM SUPPLY PIPING.

CROSS CONNECTION CONTROL NOTES

CROSS CONNECTION CONTROL SHALL MEET THE FOLLOWING REQUIREMENTS:

1. ALL BACKFLOW PREVENTION ASSEMBLIES SHALL BE INSTALLED IN A MANNER THAT WILL ALLOW PROPER OPERATION, AND IN-LINE TESTING AND MAINTENANCE.

2. A BACKFLOW ASSEMBLY PERMIT IS REQUIRED FOR ALL ASSEMBLIES INSTALLED WITHIN THE CITY OF AUBURN, AND/OR THE CITY’S WATER DISTRIBUTION SYSTEM.

3. BACKFLOW ASSEMBLIES MUST BE ON THE CURRENT WASHINGTON STATE DEPARTMENT OF HEALTH – BACKFLOW ASSEMBLIES APPROVED FOR INSTALLATION LIST.

4. BACKFLOW ASSEMBLIES MUST BE TESTED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER, AND INSPECTED AND APPROVED BY A CITY OF AUBURN CROSS CONNECTION CONTROL SPECIALIST.

5. UPON RECEIVING APPROPRIATE FEE PAYMENTS AND VERIFYING THAT REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) HAS BEEN INSTALLED (NOT BY CITY), THE CITY WILL INSTALL THE DOMESTIC METER INSIDE THE DOMESTIC METER BOX. THE PASSING TEST REPORT FOR THE RPBA MUST BE RECEIVED BY THE CITY WITHIN 24 HOURS OF THE INSTALLATION OF THE DOMESTIC METER.

6. UPON RECEIVING APPROPRIATE FEE PAYMENTS AND VERIFYING THAT DOUBLE CHECK VAULT ASSEMBLY (DCVA) HAS BEEN INSTALLED (NOT BY CITY), THE CITY WILL INSTALL THE IRRIGATION METER INSIDE THE IRRIGATION METER BOX. THE PASSING TEST REPORT FOR THE DCVA MUST BE RECEIVED BY THE CITY WITHIN 24 HOURS OF THE INSTALLATION OF THE IRRIGATION METER.

SIGNAL CONSTRUCTION NOTES

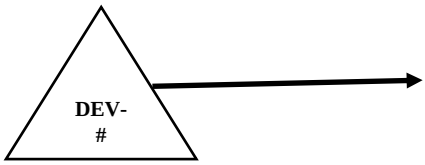
1. THE LOCATION OF ALL CONDUIT, JUNCTION BOXES, AND CABINETS SHOWN ON THIS PLAN ARE FOR GRAPHIC PRESENTATION ONLY AND FINAL LOCATION SHALL BE DETERMINED BY THE ENGINEER.

2. ALL TRAFFIC SIGNAL AND PEDESTRIAN HEADS AND PUSH BUTTONS SHALL BE SECURELY AND COMPLETELY COVERED WHILE SIGNAL IS NOT IN OPERATION.

3. ALL CONDUCTORS FOR SIGNAL HEADS, LOOPS, PEDESTRIAN HEADS, PUSH BUTTONS AND STREETLIGHTS SHALL BE LABELED IN EACH JUNCTION BOX.

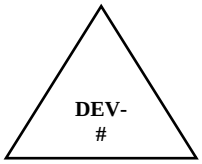
Appendix C – Deviations

Plan Sheet Deviation Call-Out:



- Leader arrow points to deviation location.
- DEV-# is the City assigned deviation number

Plan Sheet Deviation Description:



SECTION X.X.X OF THE _____, APPROVED _____.

- Description is included with the construction notes on the plan sheet where the deviation is located.
- Description references the Chapter, Section, and Subsection Number (where applicable) of the Engineering Design or Construction Standards where the standard that is being deviated from is
- Includes approval date in mm/dd/yyyy format.
- Includes a brief description why the deviation allowed as provided by the City.

Appendix D – Layer Standards

Proposed Feature	AutoCAD Layer Name
Buildings - Polygon	C-SITE-BLDG-OTLN
Commercial Fiber - Polyline	C-COMM-FIBR
Conduit: Polyline	C-COMM-CDNT
Curbs - TBC - Polyline	C-ROAD-TBCV
Curbs - Gutter - Polyline	C-ROAD-GTTR
Curbs - Flow (TFC) - Polyline	C-ROAD-FLOW
Driveways - Polyline	C-PVMT-CONC-DRWY
Easements - Polygon	C-PROP-ESMT
Fences - Polyline	C-SITE-FENC
Power Service Cabinets - Point	C-POWR-VALT
Sewer Cleanouts - Point	C-SSWR-SSCO
Sewer Laterals – Polyline	C-SSWR-LATR
Sewer Mains: Polyline	C-SSWR-PIPE
Sewer Manholes - Point	C-SSWR-MHOL
Sidewalks - Polygon	C-PVMT-CONC-SDWK
Storm Catch Basins - Point	C-STRM-STRC
Storm Culverts - Polyline	C-STRM-CULV
Storm Manholes - Point	C-STRM-MHOL
Storm Pipes – Polyline	C-STRM-PIPE
Street Lights - Point	C-POWR-LITE
Street Painted Lines - Polyline	C-ROAD-MRKG
Traffic Signal Cabinets - Point	T-POWR-SGNL-CBNT
Traffic Signal Poles - Point	T-POWR-SGNL-POLE
Traffic Signs - Point	C-SITE-SIGN
Traffic Vaults	T-POWR-VALT
Vegetation - Polygon	C-SITE-VEGE
Trees - Point	C-SITE-TREE
Utility Poles - Point	C-POWR-POLE
Water Auxiliary Equipment - Point	C-WATR-FTTG
Water Hydrants - Point	C-WATR-FHYD
Water Laterals - Polyline	C-WATR-LATR
Water Mains – Polyline	C-WATR-PIPE
Water Meters - Point	C-WATR-METR
Water Valves - Point	C-WATR-VALV
Wetlands - Polygon	C-WETL-DELN

Chapter 4 Report Preparation Requirements

4.00 Preface

This chapter describes how technical engineering reports are to be laid out to meet City requirements and provide a format that is easy to follow and understand. Reports need to meet these basic standards in order to move through the review process in an efficient manner.

4.01 General Requirements

The following general requirements shall be met for all technical engineering reports being submitted for review and approval:

A. All reports and calculations shall be prepared, stamped, signed, and dated by a Washington State licensed professional civil engineer.

B. All reports and calculations shall be neat, uncluttered, legible, and in conformance with the requirements herein.

C. All engineering reports shall be bound with the civil engineer's stamp clearly visible.

D. Reports shall reference City Standards as necessary.

E. All reports shall be provided in both hardcopy (upon City approval) and electronic format (PDF).

4.02 Report Types

The following are basic types of reports submitted as supporting project information. Depending on the complexity or simplicity of the project and its location, the amount of detail, and the number and types of reports required will be subject to change. The examples given are the typical reports required for a standard project, there may be other reports required that are specific to a particular project.

A. Geotechnical Reports	See Section 4.03.1
B. Stormwater Site Plans	See SWMM Volume 1 Ch. 4
C. Critical Area Report	See Section 4.03.3
D. Traffic Impact Analysis	See Section 4.03.4

4.03 Report Requirements

4.03.1 Geotechnical Reports

Geotechnical reports are required to support the design and construction of various facilities as specified in the Auburn City Code, these design standards, the SWMM, the Engineering Construction Standards, and other documents. The geotechnical report format shall include (at a minimum) the following applicable items:

A. Title page including project name and address.

B. General information, which includes existing site conditions.

C. Site history including any prior grading.

D. Subsurface soil information and conditions including seasonal high groundwater elevations. Seasonal groundwater levels shall be determined using groundwater monitoring well(s) and shall be required where consideration of groundwater levels is a design consideration.

E. Soil log information and locations of explorations.

F. Soil characteristics including suitability for fill and compaction requirements.

G. Slope stability analysis.

H. Seismic hazards.

I. Geological harzard areas as defined in the City's Code (ACC 16.10)

J. Site plan showing the topography and proposed structures and paving.

K. Grading information including depth of cuts and recommended slopes.

L. Recommendations on temporary erosion and sediment control.

M. Conclusions and recommendations for foundations.

N. Appendix with test pit and boring logs.

O. Information on infiltration rates for use in designing low impact design facilities, retention ponds and infiltration trenches.

P. California Bearing Ratio (CBR) information for pavement design.

Q. Additional requirements for geotechnical reports are included in Volume 1 of the SWMM.

4.03.2 Stormwater Site Plan Report

The Stormwater Site Plan Report shall contain the information as noted in Appendix J of Volume I of the SWMM

4.03.3 Critical Area Report

A. Title Page including project name; contact information for property owner, applicant, and preparer, description of the proposal; site address; parcel number.

B. Identify all local, state, and other critical area related permits/approvals required for the proposal.

C. Indicate accuracy of the report.

D. Documentation of field work (such as field data sheets and rating worksheets in the case of wetlands).

E. Description of methodologies used in study.

F. Identify and characterize, all critical areas including, wetlands, streams, water bodies, buffers, regulatory floodplain, wildlife habitat, groundwater protection areas, critical erosion hazard areas, landslide hazard areas, seismic hazard and volcanic hazard areas, on or adjacent (within 300 feet of the project boundaries) to the proposed project area.

G. Provide location and critical area rating/classification (if applicable) and required buffers based on a professional survey. Provide the classification according to ACC 16.10.080, "Classification and rating of critical areas" and identify the

classification according to other agency standards for which permits/approvals are required.

H. A description of proposed actions including estimate area of impacts to the critical area(s) and separately, the impact to buffer(s).

I. An assessment of probable temporary, permanent, and cumulative impacts to the critical area(s) and buffer(s).

J. Mitigation measures proposed and relationship to applicable mitigation standards.

K. Scaled site plan.

L. Qualifications of person(s) preparing the report.

4.03.4 Traffic Impact Analysis

A. Title Page including project name and address.

B. Executive Summary.

C. Table of Contents.

D. Introduction consisting of a description of the project, location, site plans with access to city streets, circulation network, land use and zoning, phasing plan, project developer and contact person, reference other studies.

E. Traffic Analysis to include assumptions, existing and projected traffic volumes, project trip generations, trip distribution, level of service (LOS), and warrant analysis.

F. Appendix with all calculations.

G. Information as specified in Section 10.16 of these design standards.

4.03.5 Construction Stormwater Pollution Prevention Plan (SWPPP)

See Section 5.01.3 of these design standards and Chapter 2 of Volume 2 of the SWMM.

4.03.6 Other Reports

Other reports may be required on a site-specific basis. The specific information required in these reports shall be determined during the SEPA process or by the department requiring the report. These reports shall include the following basic items:

A. Title page including project name and address.

B. General information, which includes existing site conditions.

C. Site plan showing the topography and proposed structures and paving.

D. Conclusions and recommendations.

E. Appendix with collected field information.

Chapter 5 TESC, Clearing and Grading

5.00 Preface

The design of temporary erosion and sediment control (TESC) clearing and grading plans shall conform to the requirements herein.

Compliance with these standards does not alleviate the design engineer from using sound professional engineering practices. The design criteria contained herein are the minimum acceptable under standard conditions. Special conditions may require more stringent requirements that will be addressed during the plan review process.

The purpose of these requirements is to provide the design criteria necessary to preserve the City of Auburn's water courses; minimize surface and ground water quality degradation; control sedimentation in creeks, streams, rivers, ponds, lakes, and other water bodies; protect adjacent and downstream property owners from increased runoff rates which could cause erosion and flooding; and ensure the safety and stability of City of Auburn's roads and rights-of-way.

5.01 TESC Design Criteria

5.01.1 Temporary Erosion and Sediment Control (TESC)

TESC design requirements shall meet design criteria requirements as identified in Volume II of the City of Auburn Surface Water Management Manual (SWMM), and follow City of Auburn grading requirements.

All TESC measures regardless of design and implementation must meet the latest Nephelometric Turbidity Units (NTU) test requirements. The City may conduct tests and if the applicable limits are not met, the project will be halted until such time as it is brought into compliance.

5.01.2 Temporary Detention Systems

The detention shall be defined as the active storage available a minimum of one foot (1') above the seasonal high ground water.

5.01.3 Construction SWPPP

Any project with exposed soil meeting the requirements of the Chapter 2 of Volume 2 of the SWMM shall prepare a Stormwater Pollution Prevention Plan (SWPPP). The plan shall follow the SWPPP Template (available at the Dept. of Ecology's website) or City of Auburn Short Form (where approved by the City) from the SWMM, and contain the following information:

A. Purpose is to be clearly stated.

B. Property location.

C. Property description.

D. Contacts – including name, title, organization, and phone number of person or persons responsible for maintaining the project site.

E. Temporary Erosion and Sediment Control (TESC) plan covering all seasons of the year.

F. Inspection and monitoring schedule including the contact information for the third party monitor to be used to complete all required inspections and reports.

G. Maintenance and repair responsibility clearly identified.

H. Identification of stockpile(s) of TESC materials and their location(s).

I. An Exhibit A – legal description.

J. An Exhibit B – vicinity map.

K. Inspection Report Form.

L. BMPs (Best Management Practices) to be employed (site specific).

5.02 Land Clearing

For land clearing requirements see ACC 15.74. Plans for Land Clearing shall following the requirements for Grading.

5.03 Grading

5.03.1 Purpose

The following section establishes the requirements for grading. These requirements do not supersede nor are they intended to be inconsistent with any landscaping requirement established by the Zoning Ordinance or other City action. A grading permit shall be required except for the situations described in ACC 15.74.050 or as listed below:

A. Upon approval of the city engineer or his/her designee, the broadcasting of less than 500 cubic yards of topsoil, peat, sawdust, mulch, bark, chips, or solid nutrients used for landscaping or soil conditioning on a lot, tract or parcel of land during any 24-month period, provided the finished depth does not increase the grade from the existing grade by more than eight inches.

5.03.2 Excavations

A. Cut slopes shall generally be constructed no steeper than two horizontal to one vertical (2:1). The City may approve steeper slopes after a geotechnical analysis is performed justifying a steeper slope.

   Upon City approval, a steeper slope may also be used in the following cases:

   a. A slope of one-and-a-half horizontal to one vertical (1.5:1) may be used if no structure is to be supported, the slope is less than eight feet (8') in height, and the slope can be adequately protected against erosion.

   b. A slope of one horizontal to one vertical (1:1) may be used for cuts into stable bedrock.

B. Cut slopes shall be stabilized by terracing, cat tracking, jute mat, grass sod, hydro-seeding, or by other planting or surfacing materials acceptable to the City.

C. The City may also require geotechnical analysis for the following:

   a. Slopes with sub-surface or surface water flows.

   b. In areas of questionable soils conditions.

   c. Where the length of the slope requires terracing.

d. In other situations where slope stability could be in question.

5.03.3 Fills

A. Fill slopes shall generally be constructed no steeper than two horizontal to one vertical (2:1). The City may approve steeper slopes after a geotechnical analysis is performed justifying a steeper slope. Temporary fills for preloading of building pads may use a slope one and one half horizontal to one vertical (1.5:1).

B. Fill slopes shall be stabilized by terracing, cat tracking, jute mat, grass sod, hydroseeding, or by other planting or surfacing materials acceptable to the City.

C. The City may also require geotechnical analysis for the following:

   a. Slopes with surface water flows.

   b. In areas of questionable soils conditions.

   c. Where the length of the slope requires terracing.

   d. In other situations where slope stability could be in question.

D. A minimum horizontal setback of five feet (5') shall be provided between the bottom of any fill placement and the top of the bank of any defined drainage channel.

E. When filling a site, particular care shallbe taken to prevent impeding the existing upstream surface drainage flow.

5.03.3.1 Preparation for Fill

Prior to any fill being placed, all vegetation, topsoil and other unsuitable material shall be removed unless dictated otherwise by the geotechnical engineer. Where fill is being placed on existing slopes of greater than five horizontal to one vertical (5:1), a geotechnical analysis shall be performed.

5.03.3.2 Compaction

Fill material shall be placed in lifts of no more than 12 inches and compacted to 90% or greater of the maximum dry density as determined by ASTM D1557 Modified Proctor or as directed by the geotechnical engineer.

5.03.3.3 Slope Easement

Slope easements adjacent to the right-of-way for maintenance of cut or fill slopes and drainage facilities may be required. Easement shall be from the catch point plus a minimum of five feet (5’), as determined by the City.

5.04 Retaining Walls

Retaining walls can vary with design and must be approved by the City. Retaining walls in locations where the possibility exists for pedestrians to walk near the top edge of the wall shall require protective fencing. Retaining walls with a vertical difference of 30-inches or greater along pedestrian corridors and areas where maintenance personnel will be required to access will require a handrail for safety of pedestrian traffic.

Retaining walls shall require dedication of easement(s) of sufficient terms and area to allow for maintenance, repair, removal, and reconstruction of the wall. The minimum easement width

for this purpose shall be 10 feet centered on the wall. and a minimum of 5 feet beyond any and all structural elements behind the wall.

5.04.1 Rockeries

Rockeries may be used for containment of cut slopes or fill embankment up to a maximum height of 8feet. Rockeries over 4 feet in height, surcharged, or in areas of questionable soil stability will require an engineered design. The engineered design shall include a soils investigation and report by a geotechnical engineer and structural calculations to support the rockery design.

5.04.1.1 Size

Size Categories include:

Two-man rocks (200 - 600 pounds) 18" - 28" average diameter.

Three-man rocks (600 - 2000 pounds) 28" - 36" average diameter.

Four man rocks (2001 - 4000 pounds) 36" - 48" average diameter.

5.04.1.2 Material

The rock material shall be as rectangular as possible. No stone shall be used that does not extend through the wall. The quarried rock shall be hard, sound, durable, and free from weathered portions, seams, cracks, and other defects. The rock density shall be a minimum of 160 pounds per cubic foot, measured accordingly to WSDOT test method 107 (Bulk Specific Gravity - S.S.D. basis).

5.04.1.3 Underdrains

Underdrains are required for all retaining walls over four feet (4') in height (i.e., concrete walls, MSE walls, soil nail walls, block retaining walls, etc.).

A minimum six-inch (6") diameter perforated or slotted drainpipe shall be placed in a shallow excavated trench located along the inside edge of the keyway. The pipe shall be bedded on and surrounded by "Gravel Backfill for Drains" (WSDOT/APWA 9-03.12(4)) to a minimum height of eighteen inches (18") above the bottom of the pipe. A filter fabric shall surround the gravel backfill and shall have a minimum of one foot (1') overlap along the top surface of the gravel. The perforated pipe shall be connected to a storm drain system or to an acceptable outfall.

5.04.2 Block Retaining Walls

Block retaining walls, (e.g., Keystone, Allan Block, Ecology Block) may be used for containment of cut slopes or fill embankment. Block retaining walls over four feet (4') in height, surcharged, or in areas of questionable soil stability will require an engineered design. The engineered design shall include a soils investigation and report by a geotechnical engineer and structural calculations to support the block wall design.

5.04.2.1 Material

Blocks used for retaining walls shall be in good condition and structurally sound; cracked and/or broken blocks are not acceptable. Unless designed as a gravity wall

(ecology blocks), block walls over four feet (4') in height shall employ geo-grid type material to increase the structural stability of the wall.

5.04.2.2 Underdrains

(See Section 5.04.1.3)

5.04.3 Reinforced Concrete Walls

Reinforced concrete walls or cast-in-place concrete walls may be used for containment of cut slopes or fill embankment. Concrete retaining walls over four feet (4') in height, surcharged, or in areas of questionable soil stability will require an engineered design. The engineered design shall include a soils investigation and report by a geotechnical engineer and structural calculations to support the concrete wall design.

5.04.3.1 Material

A minimum 3,000-psi structural reinforced concrete shall be used in the design of concrete retaining walls.

5.04.3.2 Underdrains

(See Section 5.01.4.3)

5.04.4 Mechanically Stabilized Earth Walls (MSE Walls)

MSE walls may be used in conjunction with other retaining walls or as a stand-alone application when constructing fill slopes. MSE walls will require an engineered design. The engineered design shall include a soils investigation and report by a geotechnical engineer and structural calculations to support the MSE wall design.

5.04.4.1 Material

MSE walls shall employ well-draining structural soil compacted to the geotechnical engineer's specifications.

5.04.4.2 Underdrains

(See Section 5.01.4.3)

5.05 Construction Sequence

5.05.1 Requirements

A construction sequence is intended to ensure that the timing and installation of storm drainage and erosion control measures are in place prior to activities that may cause erosion to occur. The following elements are to be included in a construction sequence:

A. Attendance at a pre-construction meeting with City of Auburn officials.

B. Establishment of clearing and grading limits.

C. Construction of temporary construction entrance.

D. Construction of perimeter ditches, filter fabric fences, and other erosion control devices as shown.

E. Construction of storm drainage control (applicant to be specific) facilities including emergency overflow as applicable.

F. Construction of ditches and swales as necessary to direct all surface water to the storm drainage control (be specific) facilities as clearing and grading progress. Prevention of uncontrolled surface water being allowed to leave the site at any time during the grading operations.

G. Establishment of at what point grading activities can begin, which is usually only after all perimeter drainage and erosion control measures are in place.

H. For sites with a final development plan, the following shall also be addressed when applicable:
   1. Installation of on-site permanent storm drainage, sanitary sewer, and water facilities.
   2. Site paving.
   3. Indicate at what point building construction may begin.
   4. A description of how to transition from the temporary to permanent storm facilities.
   5. The possibilities of any phased construction.
   6. Any off-site public or private improvements including the general timing and duration.
   7. The removal of all TESC measures at project completion upon City approval.

I. The TESC plan sheet shall also include a construction sequence element which clearly identifies the timing and methodology required to:
   1. Contain areas of active earthwork to prevent uncontrolled discharge of storm drainage
   2. Minimize erosion and the extent and time soils are exposed on-site.
   3. Prevent tracking of sediment onto City streets.
   4. Protect permanent on-site and off-site storm drainage systems.

Chapter 6 - Storm Drainage Facilities

6.00 Preface

The purpose of these requirements is to provide the design criteria necessary to preserve the City of Auburn's water courses; to minimize surface and ground water quality degradation; to control the sedimentation in creeks, streams, rivers, ponds, lakes, and other water bodies; to protect adjacent and downstream property owners from increased runoff rates which could cause erosion and flooding; to ensure the safety of City of Auburn's roads and rights-of-way; and to decrease drainage-related damage to both public and private property. The standards also are required to control runoff from development, redevelopment and construction sites to comply with the Western Washington Phase II Municipal Stormwater Permit issued by the State of Washington Department of Ecology.

Compliance with these standards does not alleviate the design engineer from using sound professional engineering practices. The design criteria contained herein are the minimum acceptable under standard conditions. Special conditions may require more stringent requirements that will be addressed during the plan review process.

The City's Comprehensive Storm Drainage Plan establishes drainage basins and design parameters used to estimate future line hydraulic capacities. Anyone proposing to extend or modify the City's storm drainage system should contact the Community Development & Public Works Department for information on line sizes and locations. Developer-constructed public storm drainage improvements shall be installed by means of a Facility Extension Agreement (FAC) between the developer and the City. The Community Development & Public Works Department can provide information on this agreement as well as applicable permit and connection fee estimates.

6.01 SWMM Requirements

All requests for developing a storm drainage system must comply with the City of Auburn Surface Water Management Manual (SWMM). The City has adopted the 2014 Department of Ecology Stormwater Management Manual for Western Washington and the City of Auburn Supplemental Manual as the SWMM. The Supplemental Manual provides guidance for applying specific sections of the Ecology document within the City of Auburn. All references to the City's SWMM include both documents.

City of Auburn SWMM

Storm drainage system design is guided by the 10 Minimum Requirements for Stormwater Management, listed below. The applicability of the Minimum Requirements (MR) is based on project size and the total new and/or replaced hard surfaces created by the project. It is recommended that the Minimum Requirements are considered at the beginning of project design to insure that the required elements can be included in the project. The SWMM also addresses modeling standards and design criteria for conveyance, storage, treatment facilities, and other drainage system structures.

The SWMM is divided into five volumes that address different aspects of storm drainage system design. These volumes and the key components for design and application submittal are:

- **Volume I – Minimum Technical Requirements and Site Planning**
    - Project thresholds for application of the 10 Minimum Requirements for Stormwater Management on new development and redevelopment projects.
    - The 10 Minimum Requirements for Stormwater Management
        - MR #1: Preparation of Stormwater Site Plans

        - MR #2: Construction Stormwater Pollution Prevention
        - MR #3: Source Control of Pollution
        - MR #4: Preservation of Natural Drainage Systems and Outfalls
        - MR #5: On-Site Stormwater Management
        - MR #6: Runoff Treatment
        - MR #7: Flow Control
        - MR #8: Wetlands Protection
        - MR #9: Operations and Maintenance
        - MR #10: Off-Site Analysis and Mitigation (Supplemental Manual)
    - Guidance for developing Stormwater Site Plan (SSP) reports to satisfy MR #1.
    - SSP report submittal requirements checklist (Supplemental Manual).
    - Glossary of terms used throughout the SWMM.
    - Summary of infeasibility criteria for MR #5 List Option BMPs (Supplemental Manual).
    - City of Auburn access requirements for stormwater facilities (Supplemental Manual).
    - Information on areas within the City that have special development requirements (Supplemental Manual).
- **Volume II – Construction Stormwater Pollution Prevention**
    - Information on the 13 Elements of Construction Stormwater Pollution Prevention required by MR #2.
    - Guidance on developing a Construction Stormwater Pollution Prevention Plan (SWPPP) that satisfies MR #2 and meets the City's submittal requirements.
    - Best Management Practices (BMPs) for controlling construction runoff and preventing construction related stormwater pollution.
    - A SWPPP Short Form that may be used on projects meeting the size requirements provided (Supplemental Manual).
- **Volume III – Hydrologic Analysis and Flow Control BMPs**
    - Minimum computational standards and modeling requirements for hydraulic and hydrologic design and submittal.
    - Design requirements for flow control facilities, including detention ponds and control structures, to comply with MR #7.
    - Additional City of Auburn design requirements for flow control facilities (Supplemental Manual).
    - Conventional conveyance system design requirements for pipes, catch basins, channels, and other conveyance structures.
    - Information on the City of Auburn Design Storm (Supplemental Manual).
    - Site design criteria for infiltration facilities, including procedures for conducting a Pilot Infiltration Test to determine soil infiltration rates.
- **Volume IV – Source Control BMPs**

- Operational and Source Control BMPs for activities that will be performed on the site after completion of construction. These BMPs are required where applicable for projects that must meet MR #3.
- Additional City of Auburn source control BMPs (Supplemental Manual).

- **Volume V – Runoff Treatment BMPs**
  - Guidance on selecting treatment facilities to comply with MR #6.
  - Maintenance standards for storm drainage facilities.
  - Design criteria for treatment facilities and on-site stormwater management facilities that are used to meet MR #5, MR #6, and MR #7.
  - Additional City of Auburn design requirements for treatment facilities, including bioretention and permeable pavement facilities (Supplemental Manual).

6.02 Additional Requirements

The following additional requirements supersede and replace any conflicting requirements specified in the SWMM.

6.02.1 Storm Drainage Pipes and Structures

Storm drainage pipes and manholes shall meet the requirements specified in Chapter 8, Sanitary Sewer Facilities, and Volume III, Chapter 3 of the SWMM, with the following additions:

A. Catch basins and inlets shall be constructed per the following:

Catch Basin Type I	WSDOT Standard Plan B-5.20	15-inch diameter max. pipe size, 5-foot max. depth to invert.
Catch Basin Type II	WSDOT Standard Plan B-10.20	See Standard Detail.
Concrete Inlet	WSDOT Standard Plan B-25.60	15-inch diameter max. pipe size, 5-foot max. depth to invert., only utilized for single pipe and where a full depth catch basin is not feasible.
Cement Concrete Curb and Gutter Pan	WSDOT Standard Plan F-10.16	Utilized along curb and gutter sections.
Rectangular Vaned Grate	WSDOT Standard Plan B-30.30	Utilized for all catch basins along curb and gutter sections unless in a sag condition.
Rectangular Frame (Reversible)	WSDOT Standard Plan B-30.10	Utilized for all catch basins.
Combination Inlet	WSDOT Standard Plan B-25.20	Utilized in sag conditions along curb and gutter.

B. Allowable storm sewer pipes shall be as listed in Chapter 8 with the following additional type allowed:

Polypropylene Culvert and Storm Sewer Pipe	Section 9-05.24(1) of the WSDOT Standard Specifications	Allowed for full range of depths and sizes

Chapter 7 Water Facilities

7.00 Preface

The design and construction of Public Water Facilities shall conform to the State of Washington Department of Health (DOH) Design Standards for Group A Public Water Systems, Standard Specifications of the American Water Works Association (AWWA), and the most recent published and adopted edition of the Uniform Plumbing Code (UPC), unless modified herein.

Compliance with these standards does not alleviate the design engineer from using sound professional engineering practices. The design criteria contained herein are the minimum acceptable under standard conditions. Special conditions may require more stringent requirements that will be addressed during the plan review process. Contact the City of Auburn Engineering Services for specific requirements for the design of pump stations, wells, reservoirs, treatment systems, and other special facilities.

The design criteria used to estimate future line capacities are established in the City's Comprehensive Water Plan. Anyone proposing to extend or modify the City's water system should contact the Community Development & Public Works Department for information. Applicants needing to construct public water improvements shall enter into a Developer Public Facility Extension Agreement (FAC) with the City. The City's Permit Center can provide information on this agreement as well as applicable permit and connection fee estimates.

7.01 Design Criteria

7.01.1 Water Mains

The design of water mains shall meet the following requirements:

7.01.1.1 Water Main Sizing

Public water mains shall be sized using the following criteria:

A. New water mains shall be sized as indicated in the City's current Comprehensive Water Plan. For lines not specified in the plan, the mains shall be sized as described in this section.

B. Water mains in single-family residential areas shall be a minimum of eight inches 8 inches in diameter.

C. Water mains in multi-family residential and non-residential areas shall be a minimum of 12 inches in diameter. Onsite water main loops, with no possibility of future extension as determined by the City Engineer, serving two or less fire hydrants may be reduced to a minimum diameter of 8 inches.

D. Water mains shall be looped to provide a minimum of two separate connection points to the existing water system, with sufficient valves so that water can be delivered through either connection point independent of the other. Such looping will provide more reliable service and water movement through the distribution system, except where determined to be not feasible by the City Engineer.

E. Water mains shall be sized under fire flow conditions, so that the flow velocity shall not exceed eight feet per second (8 fps) in distribution mains or five feet per second (5 fps) in transmission mains.

F. Exceptions to the minimum diameter allowed may be made in small cul-de-sacs and in areas where looping of a main is not feasible. In these cases, the main may be a minimum of four inches (4") in diameter after the last fire hydrant connection.

If a conflict arises between two or more of these criteria, the water main shall be designed using the largest pipe diameter required.

7.01.1.2 Water Main Location

A. Water mains shall be installed with no less than 42 inches and no more than 72 inchesof finished cover.

B. Water mains shall be located in the public right-of-way or within a public water utility easement. Water mains located in the public right-of-way shall meet the requirements of Section 9.03.

C. Water mains shall be located a minimum horizontal distance of 10 feet from buildings and sanitary sewer mains and a minimum horizontal distance of 5 feet from all other utilities. The minimum separation distance is measured from the outside wall of each pipe.

D. At crossings between utilities, water mains shall be located a minimum vertical distance of 18 inches above sanitary sewer mains and a minimum vertical distance of 12 inches from all other underground utilities, and shall be in conformance with the applicable sections of the State of Washington Department of Ecology's "Criteria for Sewage Works Design" manual (DOE Manual) unless modified herein.

E. Water mains shall be extended through the full width of the property to be served. Where deemed appropriate by the City Engineer, provisions shall be made for looping all existing and new dead-end mains associated with the project. If at the time of project approval this is not feasible, an easement shall be provided and the main extended to the adjacent property line or right-of-way for future looping of the dead-end main.

F. The placement of new water mains shall be done in a manner that allows such lines to be readily repaired and/or replaced without impacting other adjacent facilities or structures.

7.01.1.3 Water Main Fittings

A. Blowoffs (**See Standard Detail W-03 or W-04**) are required on dead-end water mains with a diameter of 6 inches or less; hydrants are required for dead-end mains over 6 inches in diameter. Blowoffs shall also be installed at the low point of a depressed "sag" section of a water main, except where a fire hydrant is installed within 50 feet of said area. Blowoffs shall be placed in a level clear area within the right-of-way or easement, be located as close to the main as possible, and be easily accessible to the City.

B. Combination air release valves (**See Standard Detail W-02**) are required at high points in water mains when an abrupt vertical change in pipe elevation exceeds one pipe diameter, except where fire hydrants are installed within 50 feet of said

area. Combination air release valves shall be placed within a level clear area within the right-of-way or easement and be easily accessible to the City.

C. All bends shall have mechanical or flanged joints and concrete thrust blocking (**See Standard Detail W-01**). The City may require restrained joints in lieu of thrust blocking in special conditions.

D. Tees shall have flanged joints unless there is no valve against the Tee, in which case the Tee may be flanged or mechanical. Tees shall include concrete thrust blocking (**See Standard Detail W-01**). When connecting to an existing public water main, a tapping tee and valve may be used if only a single valve is needed at the tee or unless otherwise approved or required by the City.

E. Tapping tees are not allowed on commercial fire lines or other water taps needing uninterruptible service; a cut-in tee or installed tee is required.

F. Size-on-size taps are not allowed unless authorized in writing by the City Engineer or his/her designee.

G. The maximum allowable deflection per joint for ductile iron water mains shall be 4 degrees.

7.01.2 Water Services

See Standard Details W-06, W-13 through W-16a, and W-20.

The City owns and shall maintain the water service line to the meter, the meter and setter, the meter radio, the meter tailpiece, and the meter box. The property owner owns and shall maintain the tailpiece connection fitting, shut-off valve, service line, and other facilities such as pressure reducing valves, pumps, or backflow prevention assemblies behind the meter. For fire sprinkler connections, City ownership and maintenance responsibilities include and cease at the valve installed at the point of connection between the main and the fire service.

7.01.2.1 Domestic Services

Domestic Water Services are defined as any service that connects directly to plumbing within a structure and is used for drinking, cooking, washing, and other standard uses of potable water. Domestic water services shall meet the following requirements:

A. Each parcel receiving water service shall have its own meter. Non-single family developments with multiple buildings on a single parcel should have a meter for each building.

B. Installation of corporation stops, water services, and meters shall be per City of Auburn Standard Details. The City may, at the City's option, install services from public water mains to the meter in existing right-of-ways and easements. The developer/contractor will install and/or replace all applicable services when installing new water mains required for the project. The City will furnish and install the meter for services of 2 inches and smaller.

C. Water meters of 3 inches and larger will be purchased from the City and installed by the developer/contractor under City observation. Where vaults are required, the vault roof shall contain a 2-inch port for remote read device.

D. Water meters shall be located in a level unobstructed area not subject to vehicular parking or travel, and as close to the City main as possible with the distance not to exceed 50 feet.

E. Residential sites shall have water meters placed in landscape strips within the right-of-way, set 2 inches above the finished grade including landscaping and mulch. If no unpaved areas exist in the right-of-way, water meters may be placed outside the right-of-way in unpaved areas within a public water utility easement.

F. Commercial and industrial sites shall have meters located near driveway entrances within the right-of-way or within public water utility easements in landscape islands located near access driveways when placement in right-of-way is not practical.

G. Meters may not be placed within sidewalks or pedestrian travel pathways except in cases where obstructions or other design standard requirements prevent the meter box from being placed behind the sidewalk or in a landscape strip (where a landscape strip is present). In such conditions, the meter box shall be placed in the sidewalk such that the edge of the meter box closest to the roadway is no closer than 6-inches to the adjacent edge of sidewalk. A minimum of 2-inches shall be maintained between meters boxes. Domestic water meter sizing calculations shall be per the most recent adopted Uniform Plumbing Code and will be provided by the Developer when requested.

H. The length of the service between the meter and the structure shall not exceed 150 feet.

I. When installing multiple services to a public main, a minimum spacing of 2 shall be used between corporation stops, a minimum spacing of 5 feet shall be used between corporation stops and tapping tees, and a minimum spacing of 10 feet shall be used between tapping tees.

J. Domestic water services shall be connected to a looped distribution main unless otherwise approved by the City.

K. No more than 2 water service lines shall be allowed within a private access road/shared driveway between the water meters connected to the water main in the public right of way. Where more than 2 services are needed, an extension of the water main from the public right of way into the access road/shared driveway shall be required.

7.01.2.2 Other Services

Irrigation and other non-domestic water services shall meet all the above requirements as well as the following:

A. An Irrigation meter shall be installed in cases where water is used for landscape purposes by non-single family customers and does not enter the sanitary sewer system.

B. Upon City approval of a water permit application, a sewer deduct meter may be installed between the domestic water meter and the point of connection for an approved industrial/commercial use where the water does not enter the sanitary sewer system.

C. For fire sprinkler service line requirements, see Section 7.01.6.2.

D. Cross connection control devices shall be installed per Section 7.01.4.

7.01.3 Water Valves

Water valves shall be as specified in the Construction Standards and meet the following requirements:

See Standard Details W-17 through W-19 for valve box and extensions

7.01.3.1 Water Valve Sizing

Water valves shall be of the resilient wedge gate variety. Valves larger than 12 inches require the valve to be turned with a gear to maintain minimum cover.

7.01.3.2 Water Valve Location

A. Water valves shall be installed along the water mains at a maximum spacing of 400 feet and at the intersection of lateral lines. A maximum of 20 service connections between valves shall be maintained except on dead end residential streets where up to 30 service connections between valves are allowed.

B. Water valves shall be located in clusters at tees and crosses when possible and shall be located so that each leg of the main line system can be isolated separately.

C. When extending public water mains, a water valve may be required near the end of lines where future extensions are projected.

D. Water valves shall not be placed within the wheel path of vehicle traffic.

E. An all-weather maintenance road shall be provided within the public water utility easement to allow access to valves and other appurtenances located outside of the paved roadway.

F. Valves shall be adjusted to final grade in accordance with **Standard Detail T-05.**

7.01.4 Cross Connection Control

See Standard Details W-22 through W25.

Water Systems shall be designed to protect the City water system from contamination via cross connection control in accordance with Washington State Law (WAC 246-290-490), Auburn City Code (ACC), the City's Cross Connection Control Program manual, and these design standards. Premises isolation shall be provided on service connections in accordance with these standards.

7.01.4.1 Domestic Services

A. A Reduced Pressure Backflow Assembly (RPBA) shall be installed on all non-single family service connections.

B. The RPBA assembly shall be installed adjacent to the meter or at an alternate location where the service line enters the building. RPBA assemblies installed at an alternate location require the approval of the City, shall have no connections between the meter and the assembly, and shall be installed with adequate drainage to accommodate discharges from the RPBA.

7.01.4.2 Irrigation Services

A. A backflow prevention assembly shall be installed on all irrigation service connections. The layout of the backflow prevention assembly shall be per **Standard Detail W-06** for single family residential services up to 2-inches and per **Standard Detail W-20** for non-single family residential services. The minimum level of backflow prevention required shall be provided by a Double Check Valve Assembly (DCVA) per **Standard Detail W-24**. A higher degree of protection may be required if deemed necessary by the City Engineer, which may include a Reduced Pressure Backflow Assembly (RPBA) per **Standard Detail W-22**.

B. The backflow prevention assembly shall be installed adjacent to the meter.

7.01.4.3 Fire Line Connections

A. A backflow prevention assembly shall be installed on all fire service connections. The layout of the backflow prevention assembly shall be per **Standard Detail W-09** for single family residential services up to 2-inches and per **Standard Detail W-20** for non-single family residential services. The minimum level of backflow prevention required shall be provided by a Double Check Valve Assembly (DCVA) per **Standard Detail W-24**. A higher degree of protection may be required if deemed necessary by the City, which may include a Reduced Pressure Backflow Assembly (RPBA) per **Standard Detail W-22**.

B. The assembly shall be located on the service line between the main and the building or within the building riser room.

7.01.4.4 General

A. A DCVA shall be installed to provide adequate access for inspection, testing and maintenance.

B. A DCVA located outside the building shall be installed in a vault, as described on **Standard Detail W-24.**

C. A DCVA located inside the building shall be installed per **Standard Detail W-25**.

D. An RPBA shall be installed in an above ground enclosure or at alternate location with no connections between the meter and assembly (**see Standard Detail W-23**). An RPBA is required for all services utilizing chemicals.

E. Prior to installation, two (2) sets of backflow prevention assembly plans, including the connection point to the City main, shall be submitted for review and approval by the City.

F. Only assemblies listed on the current list of Backflow Prevention Assemblies Approved for Installation in Washington State shall be allowed. This list is maintained by the State of Washington and is available from the City.

7.01.5 Pressure Reducing Stations

See Standard Details W-10. Through W-12b.

A Pressure Reducing Station shall be installed as required between pressure zones to maintain adequate pressure in the water system. Isolation valves are required upstream and downstream of the station. Contact the City Water Utility Engineer for specific

requirements when applicable. Water system design shall be done so as to minimize the number of pressure reducing stations necessary.

7.01.6 Fire Systems

7.01.6.1 Fire Hydrant Assemblies

See Standard Details W-07 & W-08.

Fire Hydrant Assemblies shall meet the following requirements:

A. Fire hydrant assemblies shall conform to the standard details listed above.

B. Fire hydrant service lines shall be installed at right angles to eight-inch (8") minimum diameter supply mains.

C. Fire hydrants shall stand plumb, be set to meet manufacturer's specification for ground bury line, and have a clear, level area around the hydrant with a radius of no less than 60 inches.

D. Fire hydrants shall be located no closer than fifty feet (50') to the surrounding structures, or at a distance as determined by the Fire Marshal and approved by the City Engineer Fire hydrants shall be located such that no portion of the fire hydrant is within 5 feet of any portion of a driveway (including throat, apron, and wings). .

E. Fire hydrants shall be provided with two 2-1/2 inch National Standard Thread (NST) hose ports and one 4-1/2 inch NST by 5 inch hose port with a Storz adapter and cap.

F. The pumper port shall face the street or fire access road and be readily accessible to any fire vehicle for firefighting and pumping operations. There shall be at least 18 inches clear from the face of the pumper port to the edge of pedestrian or traveled ways.

G. The service line from the supply main to the fire hydrant shall be six inches (6") in diameter unless the service line extends over 50 feet in length, in which case the service line shall be 8 inches in diameter.

H. Fire hydrants shall be installed with a maximum spacing of 600 feet along streets in single-family zones and 300 feet in all other zones.

I. The maximum distance allowed from any part of a single-family residential structure to the closest fire hydrant is 450 feet.

J. Buildings, other than single-family residences, located with portions of the building more than 150 feet in vehicular travel from a fire hydrant assembly or with building fire flow over 2500 gpm shall require on-site fire hydrant assemblies. These hydrants shall be served by a public water main that loops around the building, or complex of buildings, and reconnects back to a distribution supply main.

7.01.6.2 Fire Sprinkler Systems

Fire Sprinkler Systems shall meet the following requirements:

A. Any contractor offering to design, installation, testing, and/or maintenance of fire sprinkler systems in Washington must be licensed with the State Fire Marshal's Office, Licensing Section.

B. Fire sprinkler systems shall be required in commercial/industrial and multifamily buildings according to the adopted fire code regulations. Sprinkler systems may be required in single-family residences when determined by the City and the Fire Authority.

C. Fire sprinkler supply lines for commercial buildings, unless designed by a Fire Protection Engineer, shall be the same diameter as the supplying water main.

D. Fire sprinkler supply lines shall be separated from the public water main by a valve located at the point of connection.

E. The design of fire sprinkler supply lines for single-family/duplex shall be in accordance with **Standard Detail No. W-09.**

F. A Washington State Certified Level "U" contractor shall install underground fire sprinkler supply lines in accordance with WAC 212-80-010. Prior to installation, 3 sets of underground fire sprinkler supply line plans shall be submitted to the City for approval by the Fire Marshal. Both a State Certified Level "U" contractor and a Fire Protection Engineer shall stamp these plans. A letter from a state certified sprinkler system designer stating "FOR DESIGN PURPOSES ONLY" may be attached in lieu of a stamp from the Fire Protection Engineer.

G. A post indicator valve (PIV) shall be installed on the fire sprinkler supply line between the public water main and the building. PIV's shall be located in such a manner as to be easily visible to Fire Department personnel. A wall-mounted PIV may be installed when the exterior wall of the building is of non-combustible construction. A detail containing this information shall be included with the submitted plans.

H. Fire Department Connections (FDC's) shall be placed within 50 feet of a fire hydrant or as directed by the Fire Marshal. FDC's must be identified and approved by the Fire Marshal.

I. New water mains shall be constructed with valves on each side of fire line taps.

J. Fire sprinkler systems shall have backflow prevention in accordance with Section 7.01.4.

7.01.6.3 Fire Flows

New developments or redevelopment of existing sites are required to meet the minimum City fire flow requirements listed below. The developer shall provide information to the City to define the building specific fire flow requirements. If the building specific fire flow requirements are greater than the minimums listed below, facilities shall be designed to meet the greater requirement.

The minimum fire flow requirements within Auburn Water Service areas are:

1) Single Family Residential: 1,500 GPM @ 2 Hours

2) Industrial/Commercial/Multi-Family: 2,500 GPM @ 3 Hours

Minimum fire flows outside Auburn Water Service areas shall be determined by the water service provider and the Fire Marshal.

Developers are responsible for installing all facilities necessary to serve their property, complying with development standards, and providing the required fire flow established by the Fire Marshal. If off-site water system improvements are necessary to meet these requirements, the Developer shall be responsible for said improvements. The change of use of existing structures or areas may also require the installation of new facilities.

7.01.6.4 Fire Authority and Hydrant Access

Fire Authority and hydrant access shall meet the following requirements:

A. Access shall be a minimum of twenty feet (20') wide with a minimum vertical clearance of thirteen and a half feet (13½').

B. Turns in the access shall be designed using a minimum inside radius of twenty-eight feet (28') and a minimum outside radius of forty-eight feet (48').

C. Access that exceeds one hundred fifty feet (150') in length and does not return to a public road shall be provided with a turnaround. If a hammerhead configuration is utilized for the turnaround, it shall be designed per Figure D103.1 in Appendix D of the International Fire Code. If a cul-de-sac is utilized for the turnaround, it shall be designed per the City of Auburn Design Standards.

D. On sites where the primary access may become blocked, a secondary access road that is for emergency vehicles only may be required.

7.02 Public Water Utility Easements

Public Water Utility Easements are required for the placement, operation, and maintenance of water facilities upon private property.

Public Water Utility Easements shall meet the following requirements:

A. Public Water Utility Easements shall extend a minimum of f 7 ½ feet to each side of the centerline of the main, water meters 3 inches (3") and larger, and all fire hydrants. Public Water Utility Easements shall extend a minimum of 2 ½ feet to each side of the centerline of water meters 2-inches and smaller. Easements shall extend a minimum of 7 1/2 feet either side of the vault walls of pressure reducing stations. Additional easement area may be required for facilities constructed in areas of steep terrain or at greater depths.

B. Public Water Utility Easements shall be provided on the City's standard easement form. Legal description of the easement and the property that the easement encumbers, along with a sketch showing both, shall be stamped and signed by a licensed land surveyor and incorporated into the easement form as exhibits. The legal descriptions and sketch shall be on plain bond paper with margins acceptable to the County of recording.

C. Public Water Utility Easements shall be reviewed by the City and then recorded in the appropriate County prior to acceptance of the public water main.

7.03 Material Requirements for Water Systems

Unless otherwise approved by the City, all water mains shall be constructed using Special Class 52 Cement Lined Ductile Iron Pipe having standard asphaltic coating on the exterior and cement–mortar lining on the interior. The list of acceptable valves, fittings, and other appurtenances for water facility construction is subject to change as new and improved components become available. Please refer to the City of Auburn's Construction Standards manual (latest edition) for the most current information on these requirements.

Chapter 8 Sanitary Sewer Facilities

8.00 Preface

The design of sanitary sewer facilities shall be in conformance with the applicable sections of the State of Washington Department of Ecology's "Criteria for Sewage Works Design" manual (DOE Manual) unless modified herein. These standards are set forth as a minimum requirement for the planning and design of gravity sanitary sewer facilities. Sewage pump stations and special facilities are not included within this design manual due to the complexity of these facilities. When designing pump stations and special facilities, please contact the City of Auburn Engineering Services for specific requirements.

Compliance with these standards does not alleviate the design engineer from using sound professional engineering practices. The design criteria contained herein are the minimum acceptable under standard conditions. Special conditions may require more stringent requirements that will be addressed during the plan review process.

The City's Comprehensive Sanitary Sewer Plan establishes drainage basins and design parameters used to estimate future line capacities. Anyone proposing to extend or modify the City's sanitary sewer system should contact the Community Development & Public Works Department for information on proposed line sizes and locations. Sanitary sewer improvements shall be constructed by means of a Facility Extension Agreement (FAC) between the developer and the City. The Community Development & Public Works Department can provide information on this agreement as well as applicable permit and connection fee estimates.

8.01 Sanitary Sewer Mains

8.01.1 Sanitary Sewer Main Sizing/Slope

Public sanitary sewer mains shall be designed using the following criteria:

A. All sanitary sewer mains shall be a minimum of eight inches (8") in diameter.

B. All new lines shall be sized as indicated in the City's current Comprehensive Sewer Plan. For lines not specified in the plan, the applicant must design the line with sufficient capacity to convey any future upstream flows (based on current land use designations).

C. Sanitary sewer mains shall be designed and constructed to provide a minimum cleaning velocity of 2 ft./s when flowing at 80% full. If at final build out the planned contributing area will not achieve this capacity, additional provisions may be required.

D. The following are the minimum slopes for the corresponding pipe sizes:

Pipe Diameter	Minimum Slope
8 inch	0.50%
10 inch	0.30%
12 inch	0.25%
18 inch	0.15%

8.01.2 Sanitary Sewer Main Location

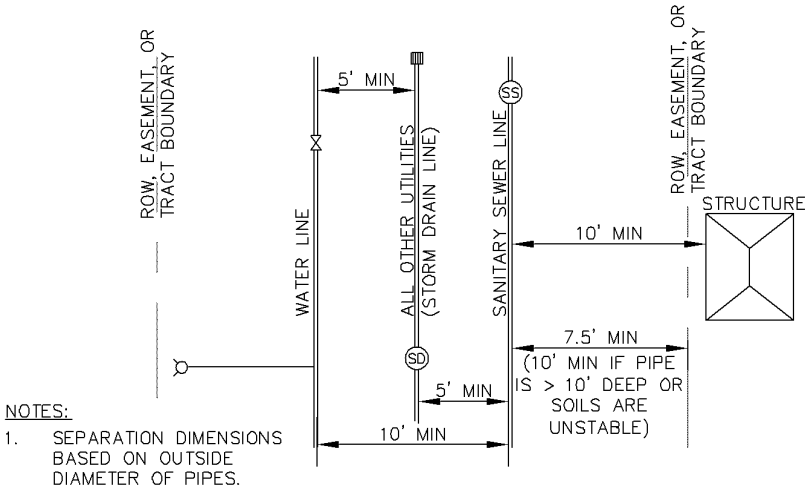
A. The desired installation depth for sanitary sewer mains is between 6 feet and 15feet below the finished surface elevation. For mains less than 6 feet deep and over 15 feet deep, additional provisions may be required by the City.

B. Sanitary sewer mains shall be located in the public right-of-way or within a public sanitary sewer utility easement. Sanitary sewer mains located in the public right-of-way shall meet the requirements of Section 9.03.

C. When the potential exists to serve upstream properties, sanitary sewer mains shall extend through the property being served or across the entire length of the lot frontage.

D. The placement of new sanitary sewer mains shall be done in a manner that allows such lines to be readily repaired and/or replaced without impacting other adjacent facilities or structures in the vicinity. Sanitary sewer mains shall be located a minimum horizontal distance of 10 feet from structures and water mains and a minimum horizontal distance of 5 feet from all other underground utilities. The minimum separation distance is measured from the outside wall of each pipe. **(See Figure 8-01)**

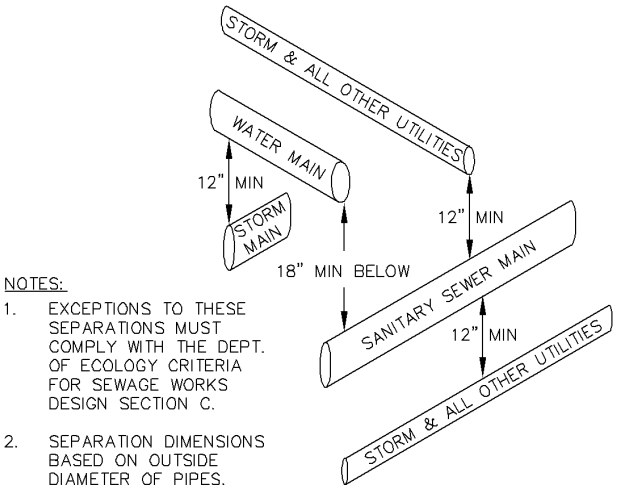
Figure 8-01 Horizontal Pipe Separation



E. If soil conditions are poor and/or the sanitary sewer main is deeper than 10 feet, the horizontal distance from structures may be increased. Minimum pipe clearances shall be measured from the outside wall of the pipe(s).

F. At crossings between utilities, sanitary sewer mains shall be located a minimum vertical distance of 18 inches below water mains, and a minimum vertical distance of 12inchesfrom all other underground utilities. The minimum separation distance is measured from the outside wall of each pipe/conduit. **(See Figure 8-02).** If the minimum vertical separation cannot be achieved, additional design provisions may be required by the City.

Figure 8-02 Vertical Pipe Separation



8.01.3 Material Requirements for Sanitary Sewer Systems

The following is the City's list of required sanitary sewer pipe materials and depth criteria. Please refer to the City of Auburn's Construction Standards manual (latest edition) for the most current information on these requirements.

Pipe Type	Minimum Pipe Cover***	Maximum Pipe Depth
Solid Wall Polyvinyl Chloride (PVC) Pipe, SDR-21	18 inches	22 feet
Solid Wall Polyvinyl Chloride (PVC) Pipe, SDR-35 (Requires 13.5 foot lengths.	3 feet	18 feet
Solid Wall Polyvinyl Chloride (PVC) Pipe, C900	12 inches	30 feet*
Sewer Safe Ductile Iron Pipe (Protecto 401 Ceramic Epoxy Lined)	6 inches	30 feet*

***** Sanitary sewers deeper than 30' feet will require pre-approval of the City.

** Minimum cover is depth of cover excluding cover depth provided by flexible pavements.

*** No portion of any pipe shall be allowed within 6 inches of the bottom of pavement.

8.02 Sanitary Sewer Manholes

8.02.1 Sanitary Sewer Manhole Type and Size

A. Manholes shall be constructed per the following:

Sewer Manhole (48-inch to 60-inch)	WSDOT Standard Plan B-15.20 with an eccentric cone
Sewer Manhole (72-inch to 96-inch)	WSDOT Standard Plan B-15.40 with a flat top instead of riser

B. Shallow sanitary sewer manholes (32”-48” deep) shall conform to City of Auburn Standard Detail S-066 and may only be used upon approval of the City Engineer.

C. The City may consider sanitary sewer manholes over twenty (20’) deep and/or greater than sixty inches (60”) in diameter on a case-by-case basis, and additional design provisions may be required by the City.

D. Sanitary sewer manhole diameters shall meet the following requirements based on the manhole depth and the size, number, and configuration of pipes entering:

Manhole Diameter	Number & Diameter of pipes/ Connections Allowed	Depth of Manhole
48” Diameter	1 Pipe, 21” 2 Pipes, 12” – 18” 3 Pipes, 8” – 10”	4’ Minimum 12’ Maximum
54” Diameter	1 Pipe, 36” 2 Pipes, 21” – 30” 3 Pipes, 12” – 18” 4 Pipes, 8” – 10”	6’ Minimum 15’ Maximum
60” Diameter	1 Pipe, 42” 2 Pipes, 24” – 36” 3 Pipes, 15” – 21” 4 Pipes, 10” – 12” 5 Pipes, 8”	8’ Minimum 20’ Maximum
72” Diameter	1 Pipe, 48” – 54” 2 Pipes, 36” – 42” 3 Pipes, 18” – 24” 4 Pipes, 12” – 15” 5 Pipes, 8” – 10”	8’ Minimum 25’ Maximum

Pipes entering manholes must have a minimum of 8 inches between their penetrations on the inside of the manhole. (See Detail S-08)

E. The angle between inlet pipes and the outlet pipe shall not be less than 90-degrees.

F. Drop manholes are discouraged. When necessary, drop manholes shall be inside drops conforming to City of Auburn Standard Detail S-05.

8.02.2 Sanitary Sewer Manhole Locations

The design of new sanitary sewer conveyance systems shall be done in a manner that minimizes the total number of manholes using the following criteria:

A. Sanitary sewer manholes shall be installed at a maximum spacing of 400 feet apart along the main.

B. Sanitary sewer manholes shall be installed at all junctions of two or more sanitary sewer mains.

C. Sanitary sewer manholes are required whenever connecting to a sanitary sewer main with an 8-inch or larger diameter pipe.

D. Sanitary sewer manholes shall be installed at all changes in vertical slope, horizontal direction, and/or pipe size.

E. Where the slope of a pipe entering or exiting a manhole is greater than 5%, the slope shall be continued through the manhole and the invert elevations indicated on the plans.

F. In cases where a sewer main steeper than 5% must turn 90-degrees through a manhole, install a transition manhole at least 20 feet upstream to reduce the pipe slope to a maximum of 2% and/or to change the angle to 45-degrees.

G. All public sanitary sewer lines shall end with a manhole. All end of the line sanitary sewer manholes with no side sewers connected directly to them shall conform to City of Auburn Standard Detail S-07.

H. Sanitary sewer manholes are not to be located within the limits of surface water ponding or flow lines associated with stormwater runoff.

I. Sanitary sewer manholes shall be located outside the wheel paths of roadways and driveway approaches. .

J. Sanitary sewer manholes shall not be located within sidewalks, trails, or curb and gutters.

K. Sanitary sewer cleanouts are not an acceptable alternative for sanitary sewer manholes except they may be used with City approval at the end of a sanitary sewer main when the future extension of the sanitary sewer main is planned and the current end point is not a practical location for a manhole. When approved by the City, public cleanouts shall conform to City of Auburn Standard Detail S-03.

L. Sanitary sewer manholes shall not be located on portions of streets or access roads with a slope greater than 6%.

8.02.3 Sanitary Sewer Manhole Parameters

A. Sanitary sewer manholes shall provide a minimum of one-tenth of a foot (0.10') of drop between the inlet pipe and the outlet pipe. Pipes of differing diameters shall be aligned so that the crowns of the pipes match.

B. Manholes are to be channeled from the entering pipe to the outlet pipe, with the sidewalls of the channel extended above the top of the largest connected pipe. See Standard Detail S-08 When making a new connection to an existing

manhole, the manhole shall be rechanneled to match the new pipe configuration..

C. Sewer systems shall be designed so that there will be a minimum of 8-inches between pipe penetrations on the inside diameter of each manhole.

D. Manholes set in gravel areas shall be set at the center of a 6-foot concrete apron flush with the finished grade.

E. Manholes set in landscaped or unimproved areas shall be set 6 inches to twelve 12 inches higher than the surrounding terrain and provided with a 6-foot diameter concrete apron around the manhole lid.

F. Sanitary sewer manhole frames and covers shall conform to **Standard Detail S-04**.

G. Sanitary sewer manholes shall be adjusted to grade per **Standard Detail T-05**.

8.03 Side Sewers

See Standard Details S-01, S-02 & S-03.

Side sewers are defined as that portion of the sewer system that extends from 2 feet outside of the outer foundation wall of the structure to the public sanitary sewer main. The City owns and maintains the portion of the side sewer located within the right-of-way. The property owner owns and maintains the portion of the side sewer located outside of the public right-of-way. Side sewers located within easements are the property owners responsibility to maintain.

Side sewers shall meet the following requirements (See Figure 8-03):

A. A separate and independent side sewer from the public main shall be provided for each and every parcel. A separate and independent side sewer from the public main shall be provided for each non-single family building on a parcel.

B. Side sewers within the public right-of-way shall be a minimum of 6-inches in diameter. The private portion of side sewers serving single family residences may be 4-inches in diameter within the parcel that it serves.

C. 6-inch diameter side sewers shall be connected to the public sanitary sewer main by the use of a tee (Standard Detail S-01) or connected directly to a manhole located along the public main. All side sewer manhole connections shall incorporate a channeled or rechanneled manhole.

D. Side sewers with a diameter of 8-inches or greater shall be connected to the sanitary sewer system by use of a sanitary sewer manhole which shall be channeled or rechanneled in conformance.

E. When constructing sanitary sewer mains in new developments, side sewer installation shall extend from the connection on the main line to the edge of any utility easements or the public right-of-way, whichever is further.

F. When installing new sanitary sewer mains or replacing existing mains in developed areas, side sewers shall be installed for all existing occupied structures and any buildable lots. Side sewers shall extend to the property lines and their location shall be clearly marked in conformance with City Standard Detail S-01.

G. The maximum length of side sewer from the sanitary sewer main to the building shall not exceed 150 feet.

H. Side sewers shall be designed and constructed with a minimum 2% slope from the building to the tee or manhole connection. Where site constraints require that the slope be less than 2%, the City may require larger diameter pipe and/or additional cleanouts.

I. When an immediate connection to a building is not being made, side sewers shall be designed to provide a minimum depth at the property line of 5 feet below the floor to be served or 6 feet below the street, whichever is deeper. In cases of vacant properties with no anticipated building elevation, the side sewer shall be constructed at a 2% slope from the tee.

J. Side Sewers shall not have horizontal or vertical bends located within the right-of-way.

K. Side sewers shall have a minimum cover of 5 feet at the edge of right-of-way.

L. Side sewer cleanouts shall be installed within 3 feet of the building foundation providing an access point into said line for future maintenance.

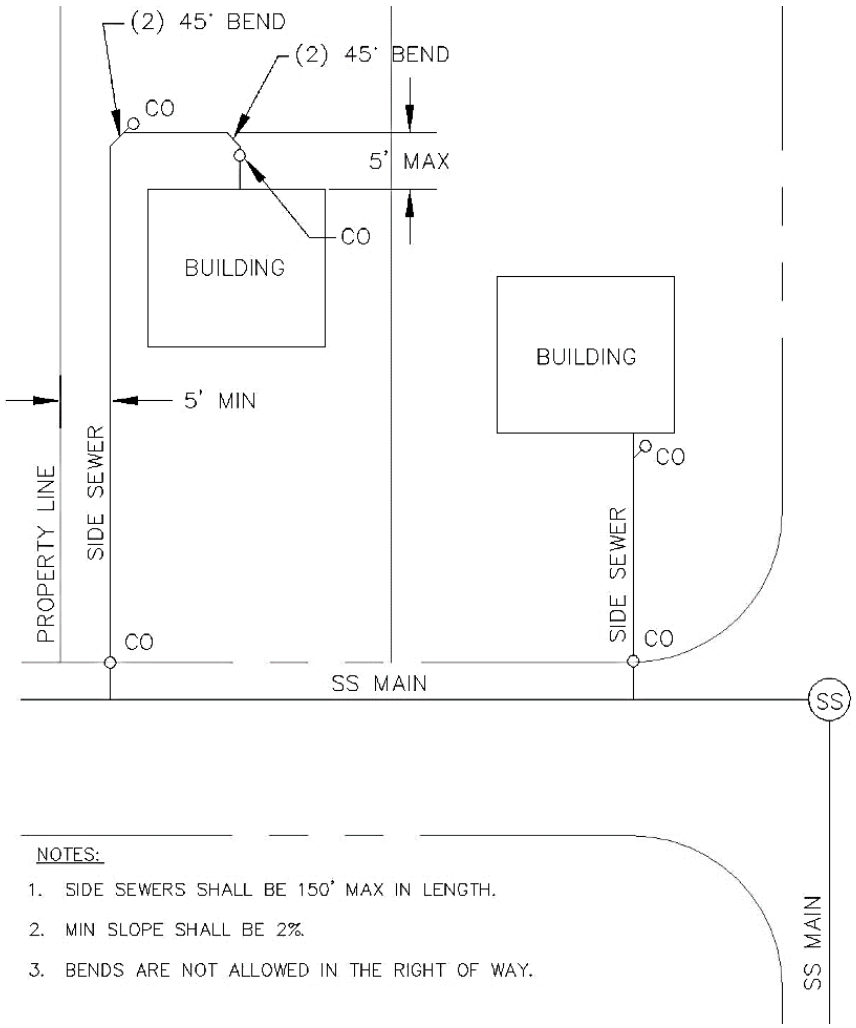
M. Side sewer cleanouts shall be installed at the edge of the property owner's side of the public right-of-way line or utility easement where the ownership of the side sewer changes from private to public.

N. Sanitary sewer cleanouts shall be installed in side sewers every 100 feet and for each change in direction totaling 90 degrees. **See Figure 8-03**.

O. If the private portion of the side sewer crosses another private property other than the property being served, a minimum of a 10 foot wide private sewer easement (5 feet on either side of the pipe centerline) must be obtained granting the property owner being served permission to cross said property.

P. All side sewers must use push on gasketed joints. Glued joints are not allowed outside the building footprint.

Figure 8-03 Side Sewer Layout



8.04 Oil/Water Separators

Prior to discharging into the sanitary sewer system oil separation facilities shall be used in pre-treating drainage flows from fuel islands, wash pads, and floor drains where (in the sole opinion of the City Engineer) heavy concentrations of oil may occur.

Wash pads intended for washing the exterior surfaces of vehicles shall drain to a catch basin with a downturned 90-degree elbow prior to discharge to the sanitary sewer. Oil/water separators for other applications shall meet the following design criteria:

A. A forebay to collect floatable and the larger settleable solids.

B. A surface accessible inspection T inside the first chamber at the inflow pipe and a sample T at the last chamber at the outflow pipe.

C. Access to the separator shall be maintained free for inspection at all times.

D. A maximum of 200 SF of uncovered area open to rainfall may discharge to the separator. Refer to BMP S441 in the SWMM for applications were this may apply.

E. If a pump mechanism is required to convey the discharge from the site to the sanitary sewer system, the pump must be designed for discharge to a controlled gravity outlet flow into the City system.

F. The separator shall have a valve on the discharge pipe that can be closed during cleaning and in the event of a spill.

G. All piping entering and leaving the separator must be 6 inches minimum diameter.

H. Access points in the top of the separator vault must be provided to allow a minimum twelve-inch diameter access for observation and maintenance to all chambers of the separator.

I. Access doors shall be galvanized spring-assisted diamond plate with a penta-head bolt-locking latch and recessed lift handle.

J. Access doors must open a full 180 degrees.

8.05 Sanitary Sewer Pumps

Low pressure force main sanitary sewer systems serving multiple parcels are not permitted within the City.

Individual sanitary sewer grinder pumps which serve one parcel may be allowed if the elevation of the sewer line and the building being served make service via a gravity line impossible. In these cases, sewage from the pressurized line from the pump must be discharged into a 6 inch diameter gravity side sewer prior to connecting to the public portion of the side sewer.

All other proposed pumping facilities require the City Engineer's approval and will be evaluated on case by case basis for conformance with the City's most recent Comprehensive Sewer Plan.

8.06 Sanitary Sewer Meters

The use of sewer meters shall only be allowed if it is determined by the City Engineer that a sewer meter is the appropriate device for the accurate measurement of wastewater being sent into the public sewer system.

8.07 Public Sanitary Sewer Utility Easements

Public Sanitary Sewer Utility Easements are required for the placement, operation, and maintenance of public sanitary sewers located within private property. Public Sanitary Sewer Utility Easements shall meet the following requirements:

A. Public Sanitary Sewer Utility Easements shall extend a minimum of 7½ feet to each side of the centerline of the sanitary sewer main. Easements shall extend 10 feet to either side when the sanitary sewer main is over 10 feet deep or soil conditions are unstable. The width of the easement is intended to allow adequate space for performing maintenance, repair, and open cut replacements. In unusual circumstances (e.g., steep slopes) the City may require wider easements on a case-by-case basis.

B. Public Sanitary Sewer Utility Easements shall be provided on the City's standard easement form. Legal description of the easement and the property that the easement encumbers, along with a sketch showing both, shall be stamped and signed by a licensed land surveyor and incorporated into the easement form as

exhibits. The legal descriptions and sketch shall be on plain bond paper with margins acceptable to the County of recording. The easements may also be described and recorded on a final plat document.

C. The City will record approved Public Sanitary Sewer Utility Easements in the appropriate County prior to acceptance of the public sanitary sewer facilities unless part of a final plat document.

Chapter 9 Facilities in the Right of Way

9.00 Preface

The design of public and private facilities located within City right-of-way shall be in conformance with these standards. For the purposes of these standards, “facilities” shall include City owned and non-City owned potable water, irrigation water, sanitary sewer, storm drain, gas, communications, electrical, illumination, and any other utility facility and their appurtenances.

When a non-City sponsored project requires the relocation of private utilities due to public utility extensions or other City required improvements, the cost of relocation of the private utility shall be borne by the developer.

9.01 Franchise/Public Way Agreement Requirement

Private facilities within the City right-of-way require prior approval from the City. Except as allowed otherwise by Auburn City Code, owners of private facilities in the right-of-way shall have a current franchise, public way agreement, or Right-of-Way Use Permit consistent with Title 20 and/or Title 13 and/or Title 12, if applicable, of the Auburn City Code.

9.02 Construction Permit Requirement

Any non-City entity intending to construct, repair, or replace any facility in City right-of-way shall contact the City of Auburn Community Development & Public Works Department and obtain a construction permit. A City permit must be obtained prior to any work within the City right-of-way.

9.03 Underground Facilities

Unless otherwise provided in a public way agreement, franchise, or lease, all facilities must be located underground. Exceptions to this standard are as follows:

- Fire Hydrants, Blow-offs, Air/Pressure Relief,
- Pipe and cable crossings of rivers and freeways
- High voltage electrical facilities (transmission lines and substations)
- Illumination and signal facilities
- Telephone pedestals
- Aerial cables hung on existing utility poles (with approval of City Engineer)
- Other facilities, that in the opinion of the City Engineer, cannot be reasonably constructed underground.

9.03.1 Design Criteria

The City has established the following minimum requirements to ensure the efficient construction of facilities with the least impact to City transportation and public utility infrastructure:

A. Private utilities shall be installed with no less than 36 inches of finished cover.

B. Private utilities shall be located a minimum horizontal distance of 5 feet from buildings and public utilities.

C. When crossing public utilities, private utilities shall be located a minimum vertical distance of 12 inches from the public utility.

D. Manholes, valve boxes, power vaults, etc., that are located in the paved area of a street shall be located outside of the wheel paths of vehicles and flush with the pavement surface.

E. The design of underground utilities shall seek to minimize the number of required structures and redundant pipes/conduits.

F. Structures located within parking lots, sidewalks, and paths/trails shall also be flush with the surface. In areas where traffic will pass over the structure, load-bearing lids shall be incorporated in the design.

G. Trenching, backfill, and restoration shall, within paved areas, be per **Standard Details T-01 and T-02.**

H. Repair of existing cement concrete roadway panels shall be per **Standard Detail T-27.**

I. Manhole covers, valve covers, vault lids, and other utility appurtenances within pavement restoration areas, including areas of grind and overlay, shall be first lowered beneath the final wear course, paved over, and then raised to final grade per **Standard Detail T-05** and per the Construction Standards Section 7-05.3(1). This requirement may be waived when the total area of the final wear course paving area is less than 100 SF.

9.03.2 Perpendicular Asphalt Trenching and Restoration Requirements

A. Perpendicular trenching shall be in accordance to **Standard Detail T-01.**

B. Pavement restoration shall match existing pavement type and thickness with a minimum thickness of 4-inches.

C. After trenching, the pavement on each side of the trench shall be sawcut and removed (full depth) a minimum of 12 inches from the edges of trench to reveal a clean pavement edge to patch against. This is referred to as the “T-cut”

D. In the process of perpendicular trenching, if the remaining section of pavement between the edge of T-cut and the edge of the pavement/gutter is less than 4 feet wide, the restoration/overlay will extend to the edge of the road pavement.

E. In the process of perpendicular trenching, remaining sections of pavement between the edge of T-cut and lane line/lane edges less than 4 feet wide, shall be included in the restoration/overlay area.

F. Perpendicular trenching to roadways may not be allowed on newer roads or streets that have been constructed or overlaid within the last five years.

G. Perpendicular trenching may not be allowed or may be limited to off-peak hours and/or weekends on principal arterials or where the construction activity will seriously impede large volume traffic patterns. Utility connections that have to be made within the roadway will be allowed after approval from the City.

H. Jacking/boring alternatives may be required as substitute methods for perpendicular trenching.

I. The minimum pavement patch width and overlay restoration for perpendicular/transverse trenches shall be per **Standard Detail T-02.**

J. When multiple trenches are required in close proximity, the asphalt patch shall encompass all the trenches.

K. The longitudinal edge of the perpendicular asphalt patch shall not lie within the wheel paths of vehicles.

L. Requirements for curb ramp installation, replacement, and/or upgrade associated with the utility trench work shall be in accordance with Section 10.05.4.

9.03.3 Longitudinal Trenching in Asphalt Pavement

A. Longitudinal trenching shall be in accordance with **Standard Detail T-01**.

B. Pavement restoration shall match existing pavement type and thickness with a minimum thickness of 4-inches.

C. After trenching, the pavement on each side of the trench shall be sawcut and removed (full depth) a minimum of 12 inches from the edges of trench to reveal a clean pavement edge to patch against. This is referred to as the "T-cut"

D. In the process of longitudinal trenching, if the remaining section of pavement between the edge of T-cut and the edge of the pavement/gutter is less than 4 feet wide, the restoration/overlay will extend from the trench to the edge of the road pavement.

E. In the process of longitudinal trenching, remaining sections of pavement between the edge of T-cut and adjacent lane line/lane limits less than 4 feet wide, shall be included in the restoration/overlay area.

F. The longitudinal edges of the asphalt patch shall not lie within the wheel paths of vehicles.

G. The minimum pavement patch width and overlay restoration for longitudinal trenches shall be per **Standard Detail T-02**.

H. For streets that have been constructed or overlaid within the last 5 five years, principal arterials, or where open trenching will impede large volume traffic patterns, the City may require that trenching be limited to off peak hours and/or weekends or may require that jacking/boring be researched as an alternative.

I. Requirements for curb ramp installation, replacement, and/or upgrade associated with the utility trench work shall be in accordance with Section 10.05.4.

9.03.4 Trenching in Cement Concrete Pavement

Trenching in concrete pavements shall conform, where applicable, to the previous sections and the following:

A. The edges of trenches in concrete pavement shall be sawcut prior to excavation to avoid damaging the slab. Concrete slabs 6 inches and over shall be drilled for the installation of dowels. Dowels shall be one and 1¼ inches in diameter, 18 inches long, and spaced 12 inches center to center.

B. The minimum pavement patch width for concrete trenches shall be 4 feet.

C. In the process of trenching concrete, if the section of pavement between the trench and the edge of the existing concrete panel is less than 4 feet, the section shall be removed and replaced.

D. Longitudinal trenches in concrete may be repaved with an asphalt pavement thickness of equivalent strength upon City approval.

9.03.5 Trenching in Other Right-of-Way Surfaces

Trenching in other right-of-way surfaces, including sidewalks, gravel shoulders, and landscape strips, shall conform, where applicable, to the previous sections and replace the disturbed material in kind or as directed by the City. Utility trench bedding and backfill shall conform to **Standard Detail T-01** and to the Construction Standards.

9.04 Aboveground Facilities

Where underground requirements do not apply, the following parameters will need to be addressed in locating or relocating aboveground utilities:

A. Clear Zone Requirements: Non-breakaway utility poles and other fixed aboveground utility structures shall meet the clear zone requirements of these design standards (See Section 10.17). Respective utility owners shall be responsible for securing easements from adjacent property where clear zone requirements cannot be met within the public right of way.

B. ADA Requirements: Utility poles and other aboveground utility structures shall not be located within the sidewalk. This requirement may be waived by the City Engineer if pole location in the sidewalk allows a minimum of 48 inches of unobstructed pedestrian travel way and the pole/structure meets clear zone/lateral separation requirements described in Chapter 10.

C. Utility poles and other aboveground utility structures shall be compatible with driveways, intersections, and all other road features. They shall not interfere with sight distance, road signing, traffic signals, culverts, etc. This may require that existing poles be relocated at the developer's expense.

D. No utility pole or other aboveground utility structures shall be located in such a way as to pose a hazard to the general public. Utility companies shall locate and replace poles and other structures with primary consideration given to public safety and roadway functionality.

Chapter 10 Streets

10.00 Preface

The intent of this chapter is to encourage the uniform development of an integrated and accessible public street system that will support present and future multimodal transportation. Through the implementation of these standards, streets are built as transportation facilities as well as public space, contributing positively to the character of an area. These standards help create an efficient multimodal transportation system with minimal environmental impact to the community.

The design of Streets within the City of Auburn shall conform to the standards provided herein The latest additions of the American Association of State Highway and Transportation Officials (AASHTO) and the State of Washington Department of Transportation (WSDOT) standards shall be utilized by the City Engineer when the design standards, standard specifications, or standard drawings are not covered by the scope of the City's standards.

The design criteria used to estimate future street usage are established in the City's Transportation Plan. Anyone proposing to extend or modify the City's street system should contact the City of Auburn for information. Developers needing to construct street improvements shall enter into a Public Facility Extension Agreement (FAC). The City's Permit Center can provide the information on this agreement as well as applicable permit fee estimates.

It is provided, however, that notwithstanding any provisions to the contrary, all streets located within the Downtown Urban Center Zone boundaries as depicted on the Comprehensive Zoning Map, other than that area west of the BNSF Railroad right-of-way, shall be subject to the "Downtown Auburn Sidewalk Design Guidelines" (Guidelines). Should any conflict exist between the Guidelines and the design criteria, Chapter 10, of this document, the Guidelines shall control in those portions of the Downtown Urban Center Zone described above.

All streets shall be designed and constructed to comply with Federal Americans with Disabilities Act (ADA) laws. Additional guidelines and information can be found at WSDOT's ADA web page at: http://www.wsdot.wa.gov/design/roadside/roadsideada.htm .

10.01 Street Classification

All streets in the City of Auburn have been classified using the Federal Functional Classification system. A complete listing of all roads by classification is available from the Department of Community Development & Public Works.

The following section contains descriptions of the street classifications used in the City. **Table 10-1 (included at the end of Chapter 10)** contains information relating to each streets design requirements for widths, radii, typical speed limits, and other information. This section also contains typical cross-sections for each street classification. These cross-sections contain information on street layouts and widths of various street elements. Note that in the cross sections, the maximum slope of the bench area between the back of the sidewalk and any cut/fill slope shall be 3%. Roadway pavement sections shall conform to Section 10.07 of these design standards.

10.01.1 Arterials

Arterials are the highest level of City Street classification. They fall under the following two categories: Principal Arterial and Minor Arterial.

10.01.1.1 Principal Arterial

Arterials are the highest level of City Street classification. They fall under the following two categories: Principal Arterial and Minor Arterial

See Figure 10-01 below.

Principal Arterials are designed to move traffic between locations within the region and to access the freeways. Design emphasis should be placed on providing movement of inter-city through-traffic rather than intra-city traffic. Direct access to commercial and industrial land uses is permitted.

Principal Arterials are typically constructed to accommodate five (5) lanes of traffic with an operating speed of thirty-five to forty-five miles per hour (35-45 mph). The design year ADT is greater than 15,000 vehicles per day.

Figure 10-01 Principal Arterial Typical Cross Section (82' ROW)

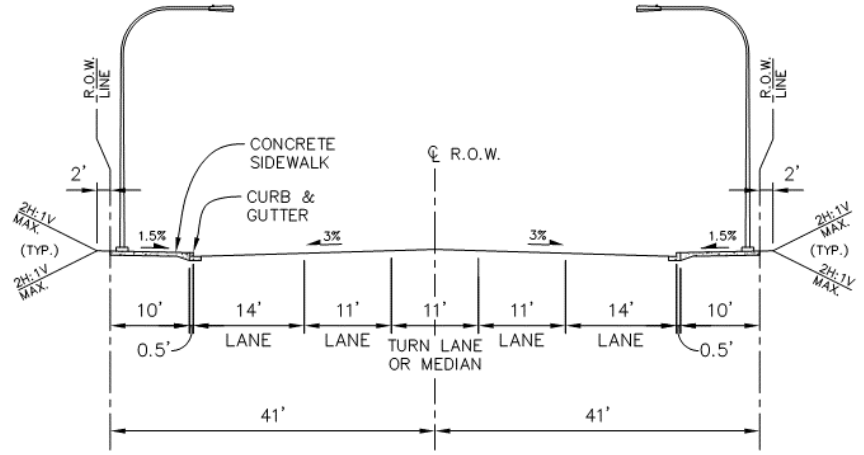
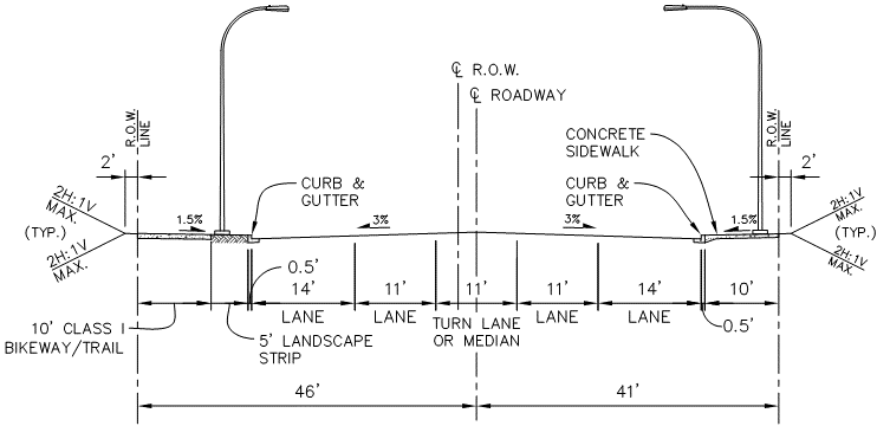


Figure 10-01 Principal Arterial Typical Cross Section w/Trail (87' ROW)



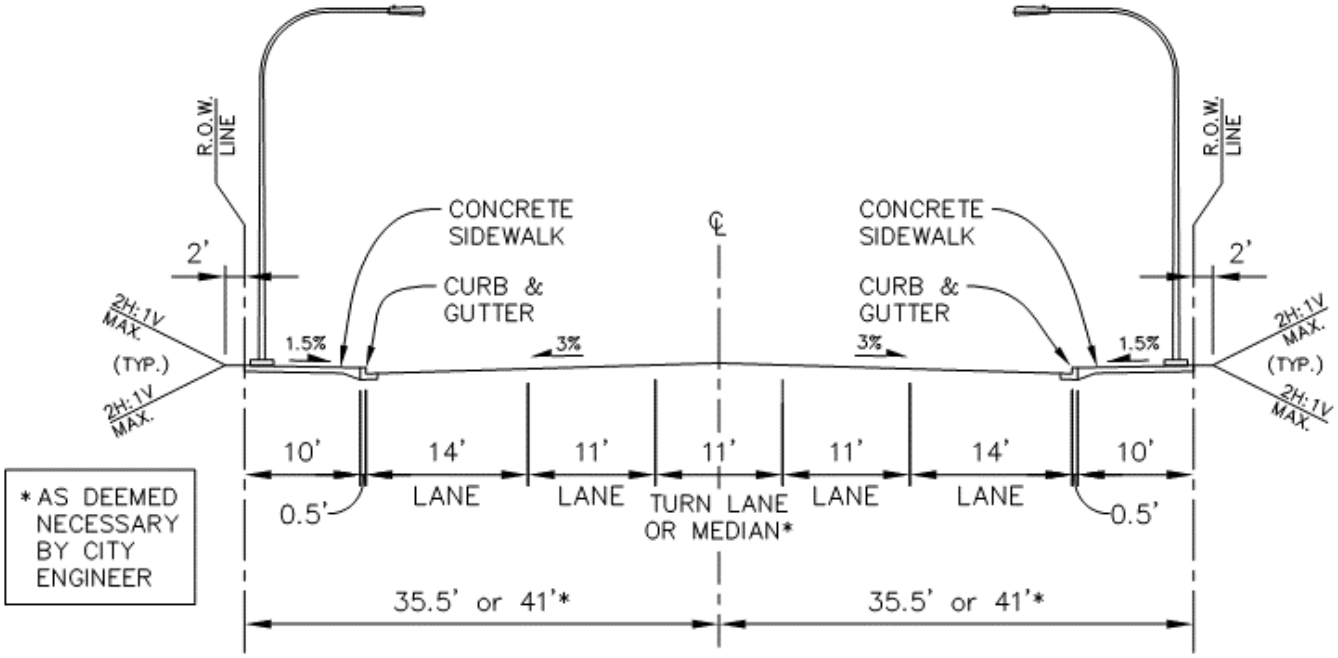
10.01.1.2 Minor Arterial

See Figure 10-02 below.

Minor Arterials should interconnect with and augment principal arterials and provide service to trips of moderate length at a somewhat lower level of travel mobility than principal arterials. The minor arterial street system includes all arterials not classified as a principal or collector and consists of facilities that place more emphasis on land access than the higher system and offers a lower level of traffic mobility.

Minor Arterials are typically constructed to accommodate four to five (4-5) lanes of traffic with an operating speed of thirty to thirty-five miles per hour (30-35 mph). They may serve secondary traffic generators such as community business centers, athletic fields, neighborhood shopping centers, major parks, multifamily residential areas, medical centers, large church complexes, hospitals, and traffic from neighborhood to neighborhood within the City. The design year ADT is 10,000 to 15,000 vehicles per day.

Figure 10-02 Minor Arterial Typical Cross Section



10.01.2 Collectors

Collectors are a step below Arterials in the City classification system. They fall under the following three categories:

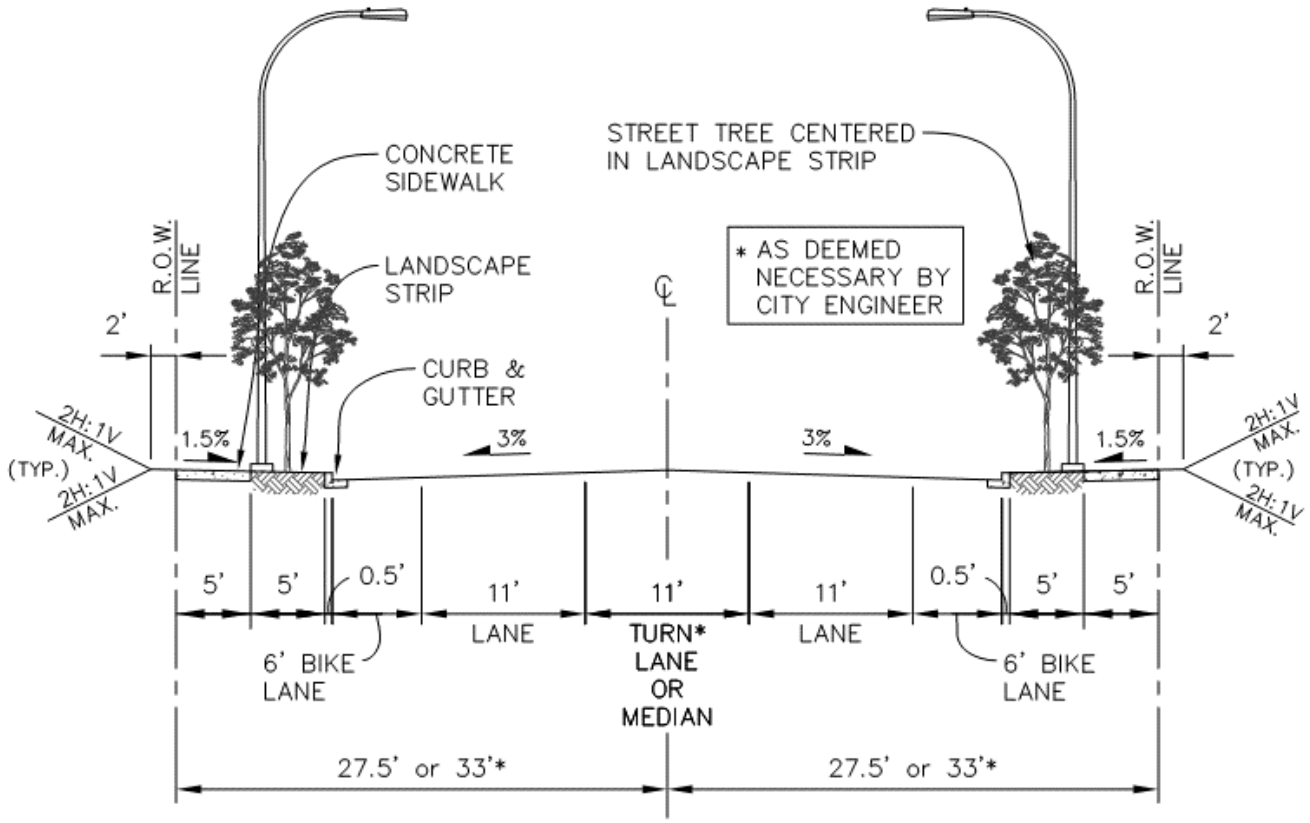
10.01.2.1 Residential Collector

See Figure 10-03 below.

Residential Collectors are used to connect intra-community streets, residential neighborhoods, commercial areas, industrial areas, and community centers to minor and principal arterials.

Residential Collectors are typically constructed to accommodate two (2) travel lanes and a two-way left-turn lane or two (2) travel lanes and bike lanes with an operating speed of thirty miles per hour (30 mph). The design year ADT is 2,500 to 10,000 vehicles per day.

Figure 10-03 Residential Collector Cross Section

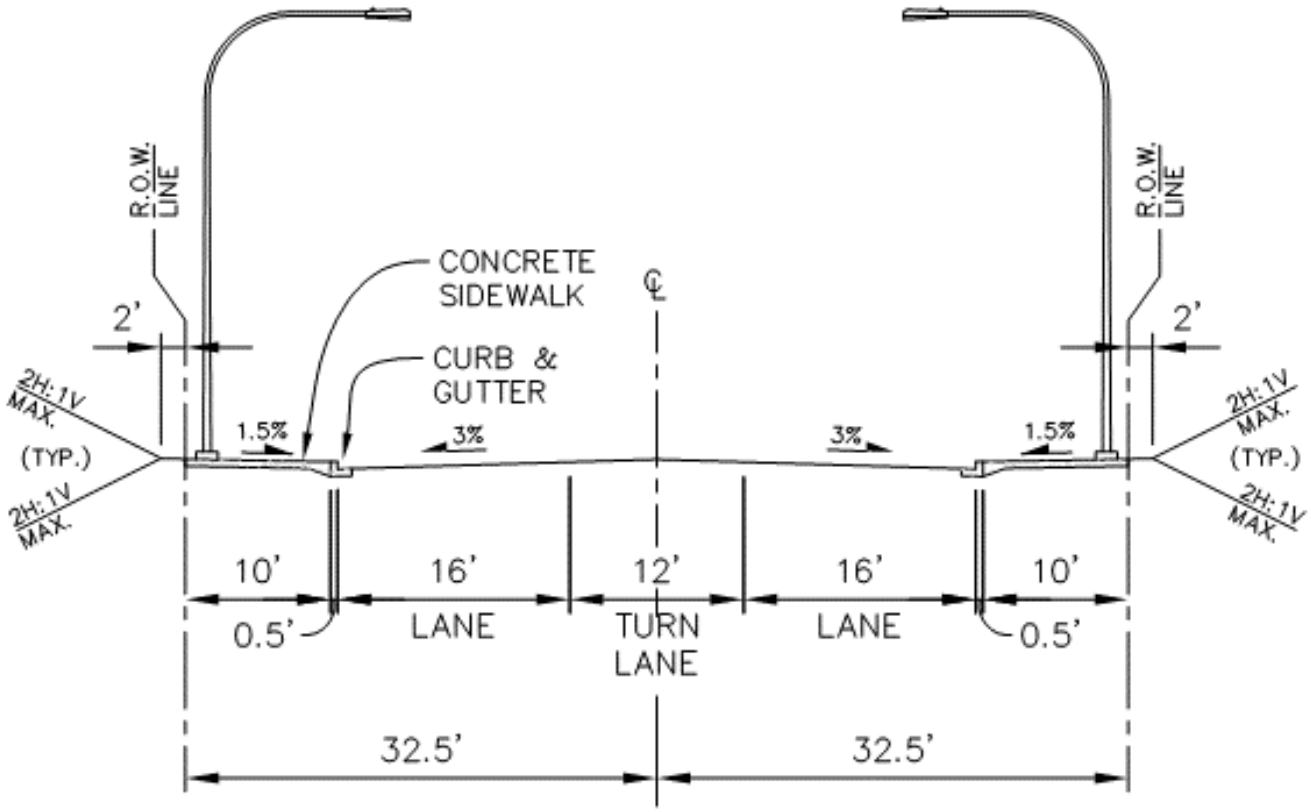


10.01.2.2 Non-Residential Collector

See Figure 10-04 below.

Non-Residential Connectors provide intra-community access connecting non-residential properties with activity centers and recreational facilities. Non-Residential Collectors are typically constructed to accommodate two (2) lanes and a center two-way left-turn lane, with an operating speed of thirty miles per hour (30 mph). They may serve neighborhood traffic generators such as one store or a small group of stores, elementary schools, churches, clubhouses, small hospitals or clinics, areas of small multifamily developments, as well as other commercial/industrial parcels. The design year ADT is 2,500 to 5,000 vehicles per day.

Figure 10-04 Non-Residential Collector Cross Section



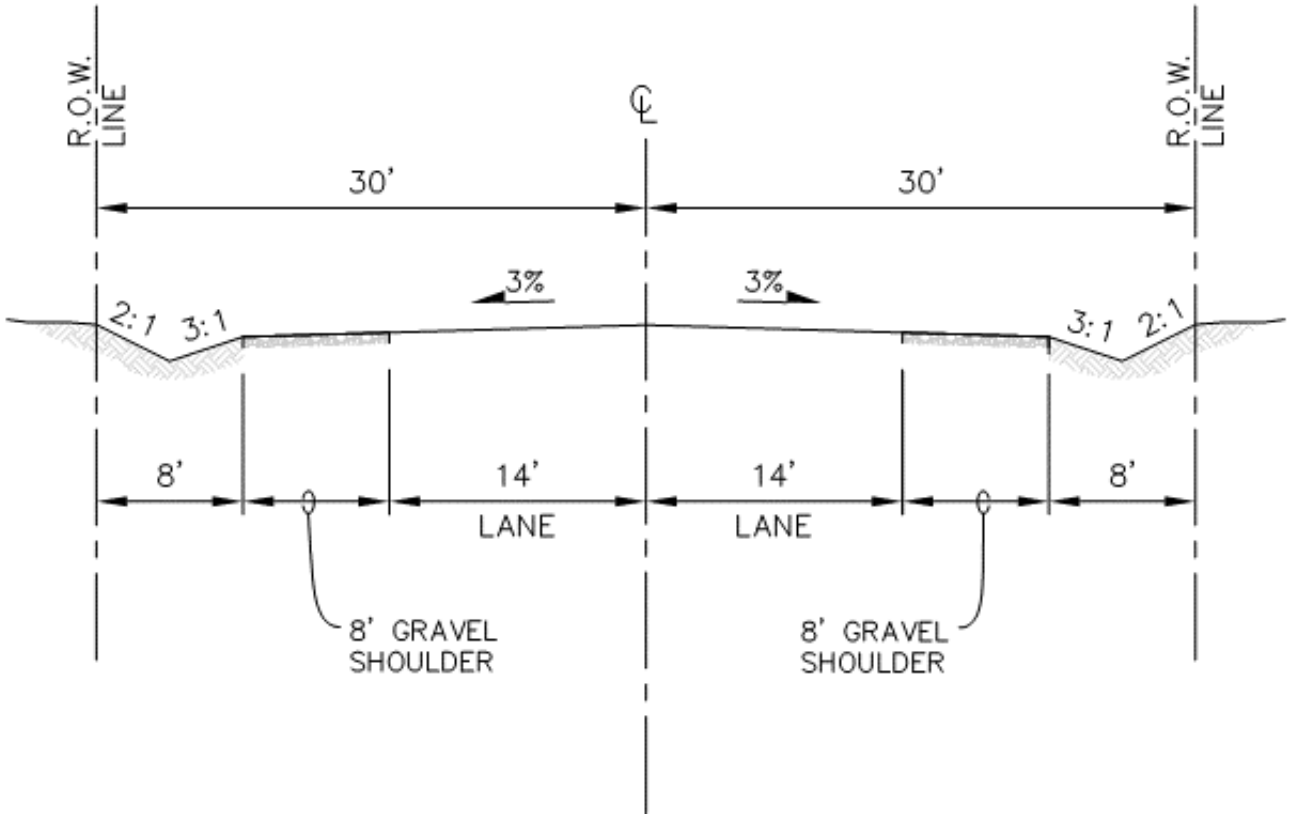
10.01.2.3 Rustic Collector

See Figure 10-05 below.

Rustic Collectors are routes that (regardless of traffic volume) the majority of travel distances are shorter than on arterial routes and residential neighborhoods to activity centers.

Rustic Collectors provide access to all levels of arterials, are typically constructed to accommodate two (2) lanes with gravel shoulders on both sides, and provide an operating speed of thirty to forty miles per hour (30-40 mph). The gravel shoulder may be reduced on one side to provide a wider shoulder on the other for equestrian access, with permission from the City Engineer. The design year ADT is 1,000 to 5,000 vehicles per day.

Figure 10-05 Rustic Collector Cross Section



10.01.3 Local Streets

Local Streets are the most common streets classified in the City. This classification can be broken up into four categories as follows:

10.01.3.1 Local Residential

See Figures 10-06, 10-06A, and 10-06B below.

Local Residential streets provide access to abutting residential parcels. They offer the lowest level of mobility among all street classifications. The street is designed to conduct traffic between dwelling units and higher order streets. As the lowest order street in the hierarchy, the access street usually carries no through traffic and includes short streets, cul-de-sacs, and courts. Service to through traffic movement is discouraged and the street usually contains no transit bus routes.

Local Residential streets are typically constructed to accommodate two (2) lanes of traffic, on-street parking (one side only, the other side shall be signed “No Parking”), and an operating speed of twenty-five miles per hour (25 mph). The design ADT is up to 1,200 vehicles per day.

Figure 10-06 Local Residential Cross Section

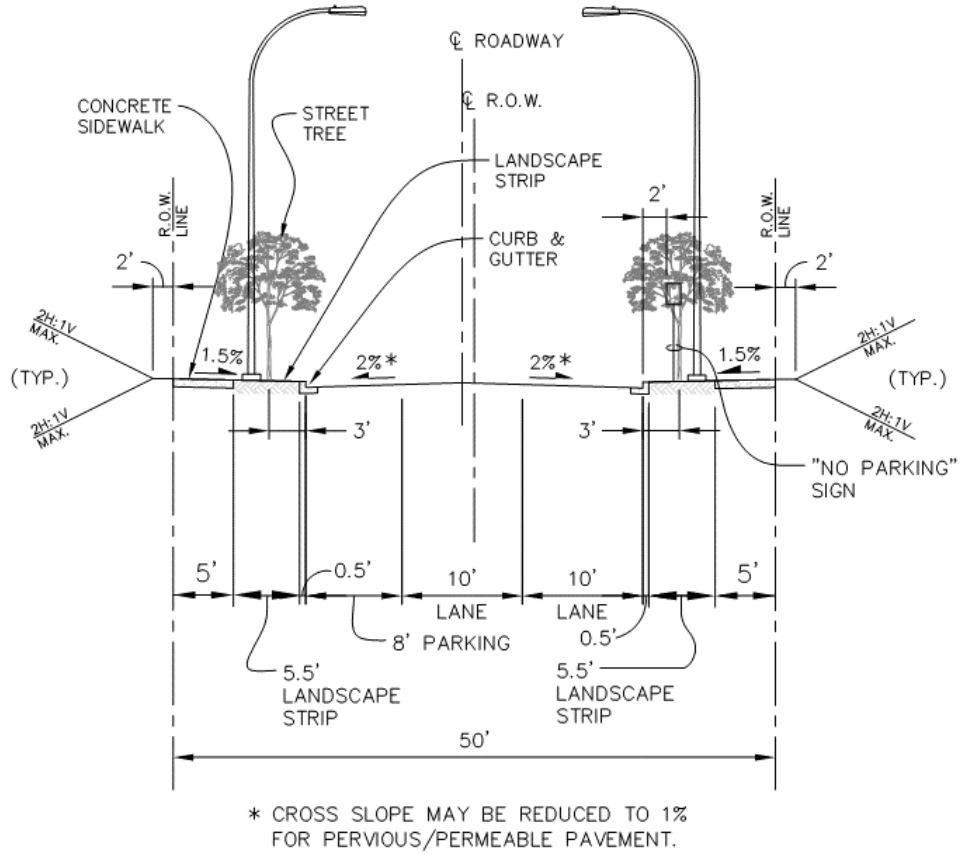
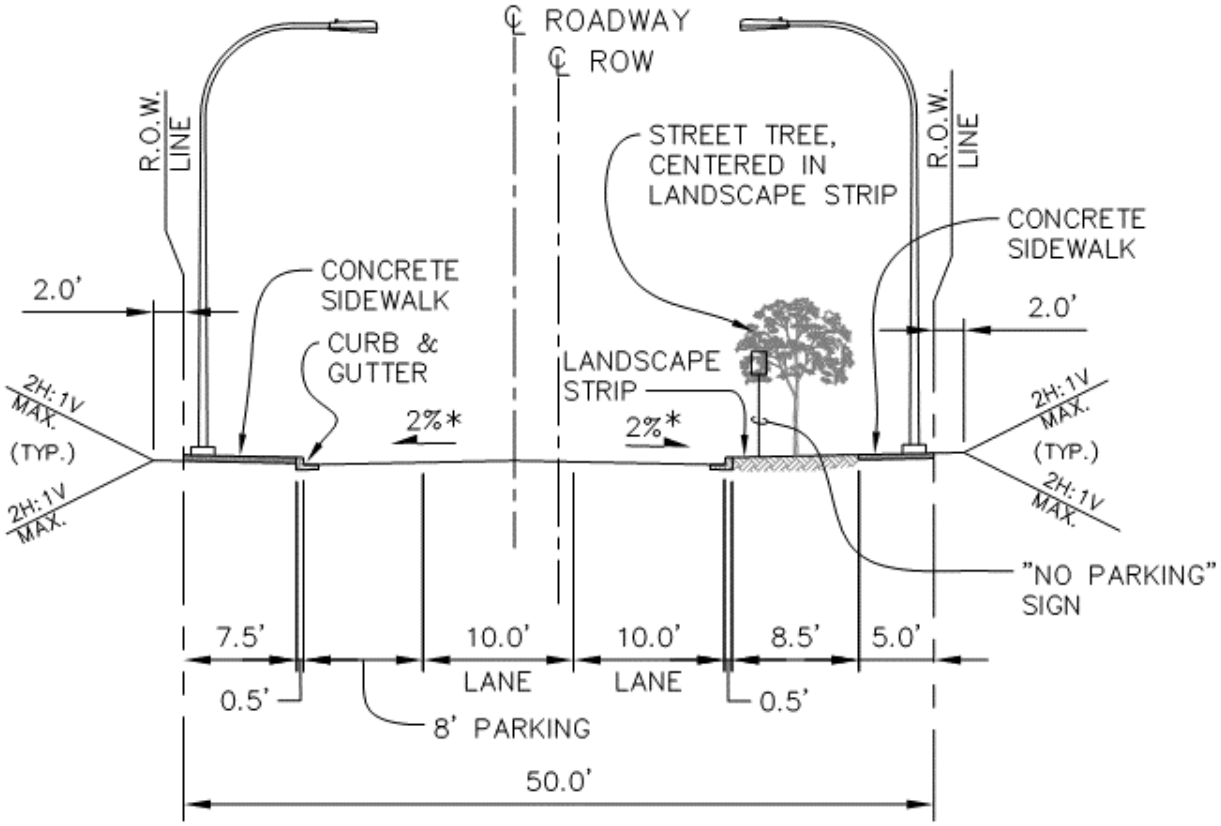
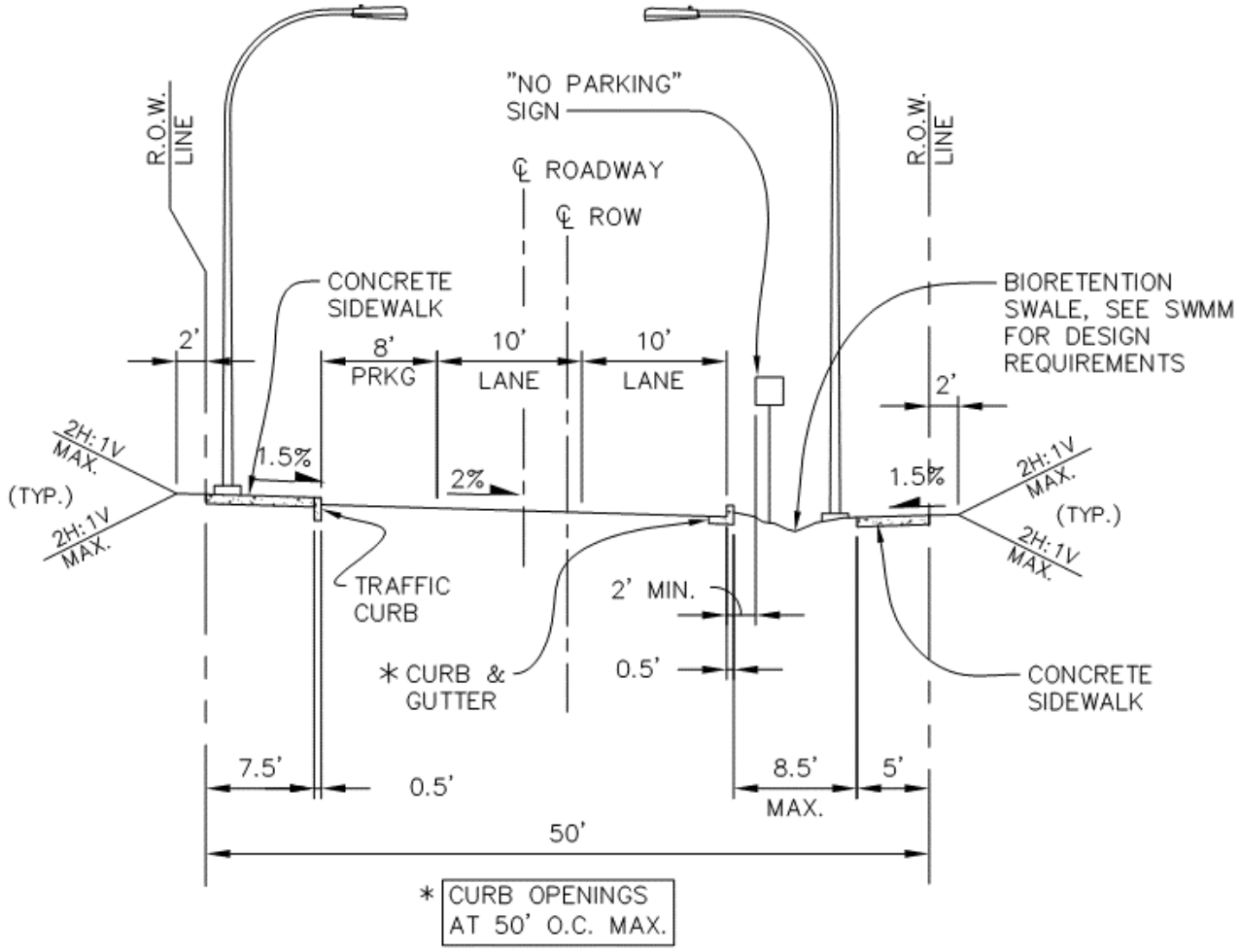


Figure 10-06A Local Residential Cross Section – Alternate



* CROSS SLOPE MAY BE REDUCED TO 1% FOR PERVIOUS/PERMEABLE PAVEMENT.

Figure 10-06B Local Residential Cross Section – Alternate w/Bioretention Swale



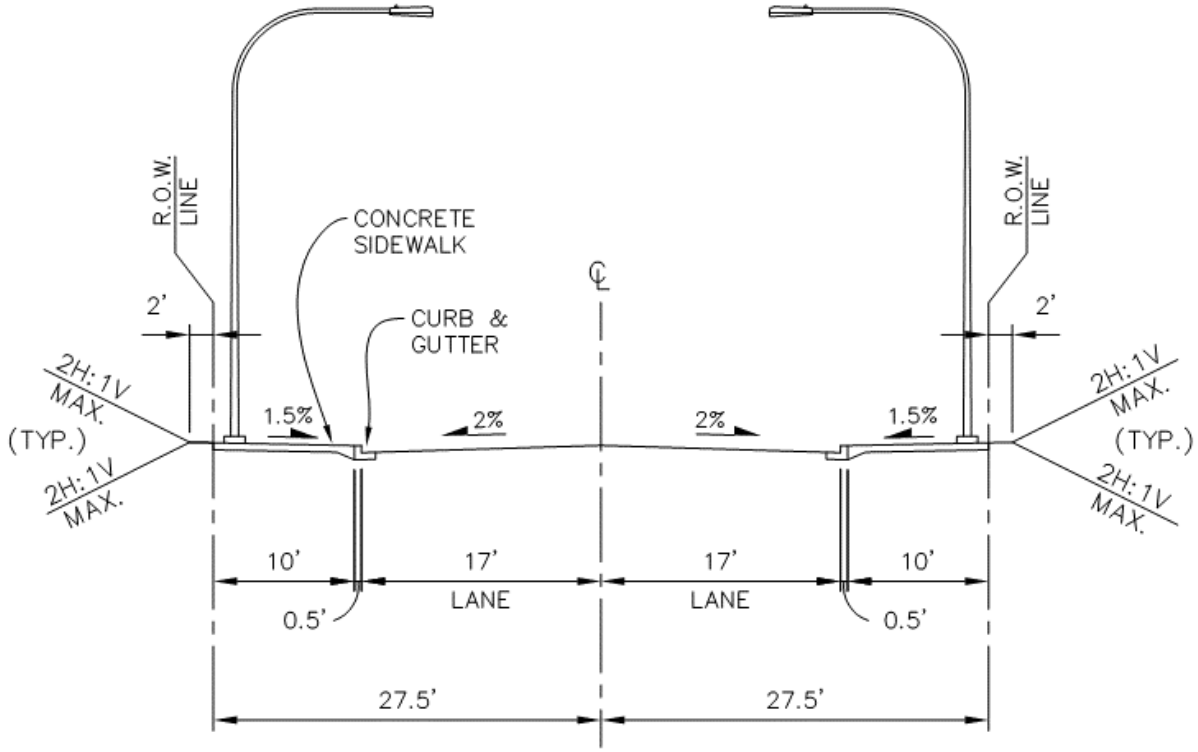
10.01.3.2 Local Non-Residential

See Figure 10-07 below.

Local Non-Residential streets provide direct access to higher order classification streets and serve primarily industrial/manufacturing land uses. They offer lower level of mobility and accommodate heavy vehicle traffic. Service to through movement is discouraged.

Local Non-Residential streets are typically constructed to accommodate two (2) lanes of traffic with an operating speed of twenty-five miles per hours (25 mph). The design year ADT is up to 1,200 vehicles per day.

Figure 10-07 Local Non-Residential Cross Section



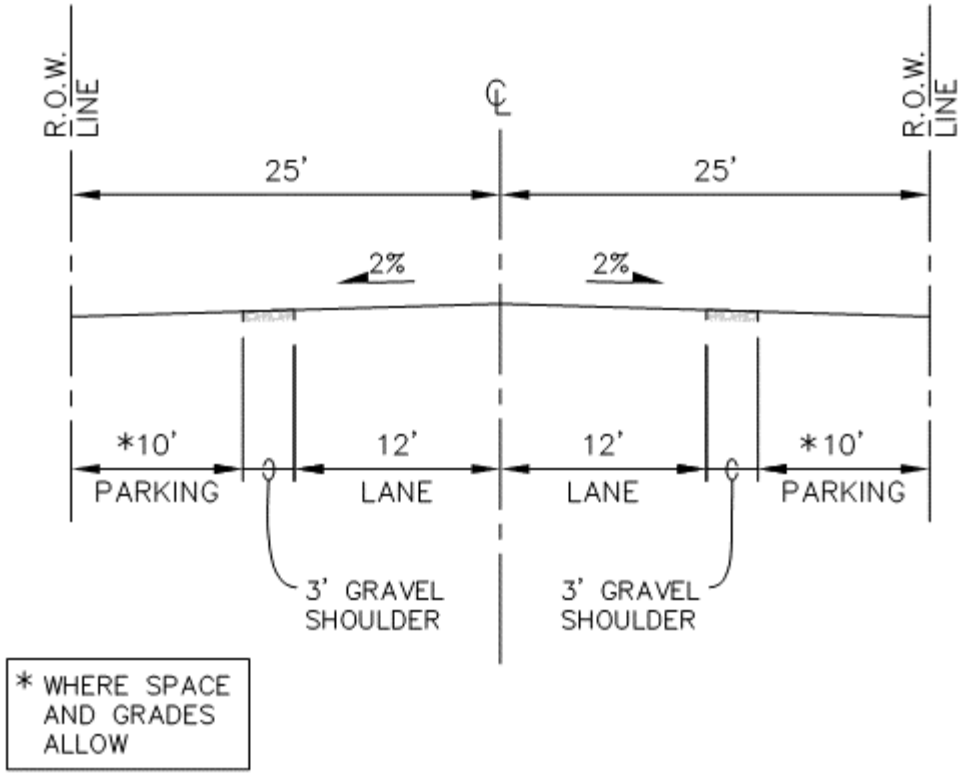
10.01.3.3 Rustic Residential

See Figure 10-08 below.

The Rustic Residential streets primarily provide access to the adjacent land and distribute traffic to and from the principal or minor arterials and local access streets. The travel distance is relatively shorter as compared to Rustic Collectors.

Rustic Residential streets are typically constructed to accommodate two (2) lanes of traffic with gravel shoulders on both sides and an operating speed of twenty-five miles per hour (25 mph). The design year ADT is up to 1,000 vehicles per day.

Figure 10-08 Rustic Residential Cross Section



10.01.4 Alleys

Alleys afford a secondary means of vehicular access to abutting property and are not intended for general traffic circulation. Dead-end alleys are generally unacceptable; however, where dead-end alleys are determined suitable by the City Engineer, for short term or temporary applications, they shall be provided with adequate turnaround facilities at the dead-end. All new alleys shall be private.

Alleys shall incorporate the design criteria used in designing local streets with the following exceptions:

A. All new alleys shall have a minimum width of 20 feet of asphalt pavement.

B. Developments that generate 4 or greater PM peak hour trips and have direct access to existing alleys are required to pave the alley to a width of 20 feet along the frontage of

the property and between the nearest property line and the public street that provides the City preferred travel path. If adequate right-of-way does not exist to provide the required 20 feet of pavement adjacent to the property, the appropriate dedication of right-of-way shall be required. Such dedication shall be equally apportioned from both sides of the alley, when feasible, as determined by the City Engineer. If adequate right-of-way does not exist to provide the required 20 feet of pavement along the alley between the nearest property line and public street, the alley shall be paved to the width of the existing right-of-way.

C. The pavement section for alleys located in non-single family zones shall be consistent with a local non-residential street standard.

D. Curb and gutter, sidewalk, lighting, and landscaping are not required along alleys.

E. Alleys may be paved with either a crown at centerline with asphalt wedge curbs on both sides to control drainage or be sloped to one side with an asphalt wedge curb on one side to control drainage. When necessary, storm drainage conveyance systems shall be installed along the alley to address storm drainage runoff from the paved surface.

F. Alleys shall connect to City streets via a commercial driveway apron.
Alleys serving alley loaded lots shall include provisions for unimpeded vehicular circulation along the alley, and provisions for adequate sight distances along both the alley at driveways and at intersections with public streets.

10.01.5 Half Streets

A Half-Street could be comprised of any one of the above mentioned street classifications. Half-Streets require, at a minimum, the construction from one side of the street, including the curb and gutter, storm drainage, sidewalk, lighting, conduits, and landscape strip, to the street centerline. Half-Streets will need to be constructed when a proposed new development or redevelopment of a property is located on a public street that is not currently built to City standards. Half-Street construction may also be required for property that abuts future streets proposed in the City's Comprehensive Plan.

When Half-Street construction is required on an existing paved street, the design of the Half-Street shall be consistent with the existing street conditions. This could require construction of more than half the street for safety and drainage reasons.

When Half-Street construction is required on unpaved streets or unimproved areas, a minimum of 24 feet of pavement will be required. In these cases, the street shall be designed to provide drainage for the constructed portion of the street. Provisions shall be made to allow for extension of the storm drainage system to the undeveloped portion of the street for future construction.

The construction of a Half-Street may require the dedication of additional right-of-way. If a Half-Street does not connect at both ends to other streets, construction of a cul-de-sac will be required.

Where Half-Streets are connected to existing streets, transition tapers will be required when edges of pavement do not match. The following formula provides the information necessary to determine the length of the tapers for a specific situation:

For street design speeds of less than forty miles per hour (40 mph)

$$\frac{WS^2}{60} = L$$

W = the width of the pavement offset

S = the design speed in mph

L = the length of the taper

For street design speeds of greater than or equal to forty miles per hour (40 mph)

$$\frac{WS}{} = L$$

W = the width of the pavement offset

S = the design speed in mph

L = the length of the taper

All required utilities located within the portion of the street being built, shall be installed during construction. Half-Street construction may also require the upgrading of existing utilities if said upgrading was necessary for the proposed development.

The unfinished side of the Half-Street shall be finished with temporary curbing, shoulders, clear zones, guardrail, slope treatments, and drainage accommodations to assure proper drainage, bank stability, and traffic safety.

When Half-Streets connect to an intersection, the nearest corner of the intersection on the side being improved shall be designed and constructed for the full build-out of the street. The intersection design and construction shall include adequate improvements to insure safe use by pedestrians, bicycles, and vehicles.

10.01.6 Private Access Roads on Access Tracts or Easements (Shared Driveways)

See Standard Detail T-31.

Access roads provided on access tracts or easements, also known as shared driveways, provide access for up to 6 residential units on panhandle/flag lots and rear lots that do not have direct access to public street frontage. They will be private roads that shall be maintained by the property owners who use them to access their property.

All access roads shall meet the following general standards:

1. Access roads shall be limited to 600 feet in length.
2. The width of the access tract/easement shall be a minimum of 25 feet for residential, 34 feet for commercial, and 40 feet for industrial. If the access is also acting as a joint utility easement or tract, the width must accommodate the public utility requirements.
3. Minimum pavement width for vehicle egress/ingress shall be 20 feet for residential, 24 feet wide for commercial, and 30 feet for industrial and shall be identified as a fire lane with pavement markings or signage.
4. Access roads shall meet the geometric design standards for local residential streets.
5. Access roads that serve 2 or less residential units do not require sidewalk along the access road. Access roads serving 3 or more residential units require sidewalk, curb and gutter along one side of the access road. Access roads serving commercial or industrial properties require sidewalk, curb and gutter along both sides of the access road. The minimum sidewalk width shall be 5 feet and shall be separated from the vehicular egress/ingress with curb and gutter.
6. Driveway connections to the access tract shall be configured such that vehicles backing out of the driveways complete their maneuvers within the access tract without entering another property.
7. The connection of an access road to the public street shall be by a commercial driveway apron. The connection of individual lots to the access road shall be by either a residential or commercial driveway apron commensurate with the use of the property.
8. Access roads shall be signed as private drives inclusive of all addresses being served off the access road.

9. Access roads exceeding 150 feet in length shall include a turnaround at the end of the road. If a hammerhead configuration is utilized for the turnaround, it shall be designed per Figure D103.1 in Appendix D of the International Fire Code. If a cul-de-sac is utilized for the turnaround, it shall be designed per the City of Auburn Design Standards. The turnaround area must be paved and lie entirely within the access tract or easement.
10. Access roads shall include storm drainage facilities in accordance with Chapter 6 of these standards.

10.01.7 Private Street

Community street requirements are usually best served by public streets, owned and maintained by the City. Private streets may be appropriate for some local accesses in very limited usage. Private streets shall provide a direct access to City streets and shall be limited to those streets accessing properties within a planned area or properties immediately adjacent. Private streets shall not be used by residents to travel from one public street to another. The design of a private street shall be such that it will discourage any through traffic of non-residents. A private street will not be allowed if it will result in land locking present or planned parcels.

Private streets shall be in conformance with the street standards that most closely reflects their intended use, with a minimum of 34 feet of pavement width or 28 feet of pavement width with a marked fire lane on one side. Private street networks shall be configured to deter speeding. Traffic calming measures may also be required to deter speeding.

Private streets shall be located within permanently established tracts or easements. A capable, legally responsible owner or homeowners' association shall be established to maintain private streets. A plat or short plat with private streets requires an executed recorded Private Street Maintenance Agreement and a Storm Water Easement and Maintenance Agreement that obligate the future property owners to maintain the infrastructure indefinitely.

10.02 Street Geometry

For in-depth design information on the following criteria, please reference the AASHTO Manual "A Policy on Geometric Design of Highways & Streets," latest adopted edition.

10.02.1 Minimum Horizontal Curve Radius

Horizontal curves shall be designed to provide the minimum radii required for vehicles to safely negotiate a turn without leaving their driving lane and shall in no case violate minimum sight distance requirements. Minimum radii are established by the design speed of the street on which the curve is located and are listed in **Table 10-1.** On arterials and rustic collectors these radii may be reduced by superelevating the road cross-section.

10.02.2 Tangents Between Reverse Curves

Sections of straight roadway must be designed between curves to avoid quick left-right transitions that could potentially lead to loss of vehicular control. The length of these straight sections shall be a minimum of 150 feet for arterials and collectors and 100 feet for local residential streets. Where reversing curves are superelevated, tangents between curves shall be of sufficient length to accommodate transitions into and out of the superelevated sections.

10.02.3 Superelevations

The process of superelevating a street provides a constant cross slope from one edge of the roadway to the other. This allows vehicles to travel around a turn at a higher speed than would be possible if the road were a normal crown cross section. Superelevations are allowed only on arterials and rustic collectors. The maximum superelevation rate allowed for these streets is 8% and requires a design speed of 35 MPH or greater.

10.02.4 Vertical Grades

Vertical Grades, the amount of slope of a street in the direction of travel, is limited to a maximum of 6% for Arterials and 8% for all other streets. All street sections shall maintain a minimum 0.5% vertical grade. Vertical grades may be increased up to 10% for non-arterials upon approval of the City Engineer. The City Engineer shall consider the public benefit of any deviation request including the classification of the roadway, traffic circulations, traffic congestion, emergency access, adjacent property access, length of grade, impact to public utilities, or any operational or safety factors. Deviations to the vertical street grade of a classified roadway shall generally not be granted unless it can be demonstrated that, and the City Engineer concurs that, the public benefits significantly outweigh any potential detriments. If approved, grades between 8% and 10% may trigger the additional following design considerations:

- Increased travel lane widths
- Enhanced Paving Section
- Incorporation of Separated Multi-use trail
- Incorporation of Median Islands
- Enhanced Intersection/Signal Improvements

10.02.5 Vertical Curves

Vertical curves are required where a change in vertical alignment equals or exceeds a 1% algebraic grade difference. Crest vertical curves shall be designed to provide the required minimum stopping sight distance for the streets design speed as listed in **Table 10-2 of Section 10-03.** Sag vertical curve lengths shall be designed to provide headlight sight distance equal to or greater than the design speed stopping sight distance. All vertical curves must be symmetrical, parabolic, and meet AASHTO standards. The following formula provides the information necessary to calculate minimum lengths for sag vertical curves.

$$L = 2S - \left(\frac{400 + 3.5S}{A} \right)$$

A = algebraic grade difference, %;

S = stopping sight distance, ft.;

L = length of sag vertical curve, ft.

10.02.6 Cross Slopes

City streets shall be crowned in the middle to provide drainage to the gutter line or roadside ditches. The cross slopes created by this crown shall be 2% for local streets and 3% for collectors, arterials, and roads with vertical grades of greater than 6%. The cross slopes of roadways constructed with pervious/permeable pavement may be reduced to 1%. Collectors and arterials shall have steeper

cross slopes since the higher speeds associated with these roads require that water drain more quickly from the roadway to avoid hydroplaning.

10.02.7 Posted and Design Speed

For design purposes, the “Posted Speed” for any given street segment shall be as designated in **Table 10-1** or the existing signed speed limit, whichever is greater.

For design purposes, the “Design Speed” for any given street segment shall be 10 mph greater than the Posted Speed for arterials and 5 mph greater than Posted Speed for non-arterials as designated in **Table 10-1.**

10.02.8 Right of Way

The required right-of-way will depend upon the width of the street and other improvements. Excluding cul-de-sacs, the typical requirement is for the right-of-way to extend a minimum of 10 feet behind the curb line on each side of the street. Additional right-of-way may be required for bike/pedestrian trails and/or storm facilities, for example. Right-of-way requirements may be variable within a street corridor due to intersections, turn lanes, bus loading zones, and other street features.

Right-of-way shall be conveyed to the City on a recorded plat or by a right-of-way dedication or separate instrument.

The minimum right-of-way requirements for the various street classifications are listed in **Table 10-1.**

10.02.9 Roadway Width (Travel Way)

The roadway width or travel way consists of inside through lanes and/or curb lanes, center turn lanes and/or bike lanes (where required), and curb and gutter. Special cases may also require acceleration and deceleration lanes and right and left turn pockets. Total roadway width is measured from the face of curb to the face of curb.

10.02.9.1 Inside Through Lanes and Curb Lanes

The street classification and the amount of existing and projected traffic will determine the number of lanes required for a street.

Curb lanes or outside lanes on all streets excluding residential collectors and local and rustic residential streets shall be a minimum of 14 feet wide. Streets will be widened to include inside through lanes based on street classifications and/or projected traffic volumes. The minimum width for inside through lanes shall be 11 feet.

10.02.9.2 Center Turn Lanes

Center turn lanes will be required on principal and minor arterials. They may also be required on collectors depending upon the nature of the roadway and the number of left turn movement opportunities along the corridor. Center turn lanes shall be a minimum of 11 feet wide.

10.02.9.3 Other Lanes

Acceleration and deceleration lanes may be required for sites located on arterials where heavy volumes and/or heavy truck movements into and out of the site would impact the speed and safety of the arterial.

Left turn and right turn pockets may be required at intersections with large numbers of left and/or right turns. Left turn pockets shall be a minimum of 11 feet wide with right turn pockets a minimum of 14 feet wide.

10.02.9.4 Road Edge

All urban roads within the City of Auburn shall be designed using concrete curb and gutter per **WSDOT Standard Plan F-10.12, Traffic Curb & Gutter** at the roadway flowlines/flowpaths. Curbs that are not along flowlines/flowpaths may be constructed as cement concrete traffic curb per **WSDOT Standard Plan F-10.12, Traffic Curb & Gutter** Rustic roads within the City may be designed with a gravel shoulder (minimum of 3 inches Crushed Surfacing Top Coarse (CSTC) over 8 inches of Gravel Base; eight 8 feet wide for rustic collectors and 3 feet wide for rustic residential and a ditch for drainage. Rustic roads shall also meet AASHTO standards for a clear zone between the edge of pavement and any obstructions. Drainage inlets and grates along curbs shall be constructed per **WSDOT Standard Plan F-10.16**.

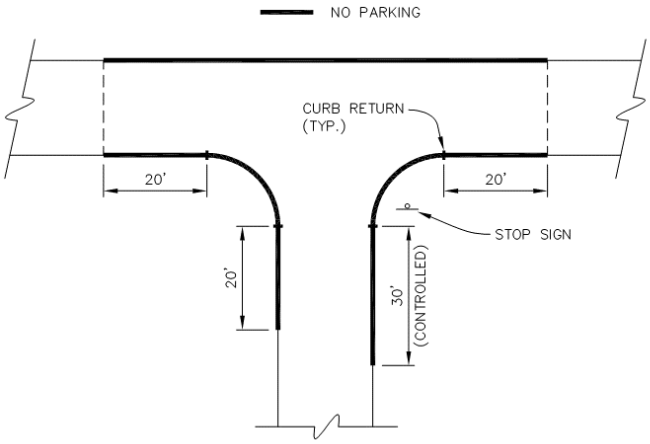
10.02.9.5 On-Street Parking

On-Street parking requirements shall be as designated in **Table 10-1.** For Local Residential streets where parking is allowed on one side only and there are landscape strips present on both sides of the road, the parking shall be placed on the side of the street that can accommodate the most parking. For Local Residential streets where parking is allowed on one side only and there is a landscape strip and/or bioretention swale on only one side of the roadway in accordance with **Figures 10-6A and/or 10-6B**, the parking shall be placed on the opposite side of the street from the landscape strip or bioretention swale.

Parking is not allowed at any of the following locations:

1. Within 20 feet of an uncontrolled intersection measured from the point of tangency on the entering curb radius.
2. Within 30 feet of a stop, yield or signal controlled intersection measured from the point of tangency on the entering curb radius.
3. Within any intersection. For "T" intersections, the no parking limits shall apply to both sides of the through street (top of the "T"). See **Figure 10-09 below**.

Figure 10-09 - T-Intersection Parking Restrictions



4. In front of or within 15 feet of each side of a fire hydrant.
5. In front of or within 5 feet of each side of a driveway.
6. Where mid-block crosswalks are installed, no parking shall be allowed on either side of the street within 50 feet in advance of the nearest edge of the crosswalk and within 20 feet past the furthest edge of the crosswalk. In no case shall the advance parking restriction for crosswalks be less than the minimum stopping sight distance of the roadway.

Additional parking restriction may be required depending upon roadway geometrics, adjacent land use, and the proximity to bridges and railroads.

10.02.9.6 Intersection Curb Radii

The minimum right-of-way requirements for the various curb radii shall be as designated in **Table 10-1**. At intersections with two different street classifications, the highest classification for curb radii shall be used except at intersections with residential streets where the lowest order street shall be used.

10.02.10 Street Layout

An efficient transportation system seeks to spread vehicle movements over a series of planned streets. The goal of the system is to encourage connectivity while preventing unacceptably high traffic volumes on any one street. Ample alternatives should exist to accommodate access for emergency vehicles. For these reasons the City will continue to plan a series of arterials and collectors designed to national standards to provide efficient service to the community. Ample

alternatives should also exist to accommodate non-motorized transportation on arterials, collectors and local roads within and between subdivisions.

10.02.10.1 Local Residential Streets

The internal local residential street network for a subdivision shall be designed to discourage regional through traffic and non-residential traffic from penetrating the subdivision or adjacent subdivisions. Local residential streets shall not exceed one 1,300 feet in length between intersections and shall not serve more than 100 dwelling units.

Residential subdivisions shall be planned in a manner that minimizes the number of local street accesses to arterials and collectors. Residential subdivisions with greater than 100 lots shall have a minimum of two accesses to either an arterial or collector. Residential subdivisions developments with less than 100 lots shall have at least one access to an arterial or collector. Residential subdivisions with between 31 and 100 lots shall also provide a second emergency vehicle access route to an arterial or collector. Residential development shall provide for additional non-motorized access to adjacent developments and roadways when the residential subdivision exceeds 50 units to maintain connectivity.

10.02.10.2 Other Streets

New streets and/or new street systems, other than local residential streets serving residential subdivisions, shall be configured in conformance with the City's comprehensive plan guidelines and policies. Where the comprehensive plan lacks clear guidance to address a particular situation, the City may require traffic studies and other supporting analysis to help define the configuration and nature of the planned street system.

10.02.10.3 Cul-de-sacs

Where possible, streets shall be planned, designed and constructed to connect to future developments. All dead-end streets shall end in either a temporary or permanent cul-de-sac. Permanent dead-end streets or cul-de-sacs will only be allowed where a through street to connect adjacent properties and/or other streets is not needed or possible. Dead-end streets shall not be more than 800 feet in length as measured from the center of the nearest intersection to the center of the cul-de-sac, unless the city determines that due to topography or existing development patterns there are no feasible alternatives and emergency services can be effectively provided. Dead end streets ending in permanent cul-de-sacs shall serve a maximum of 30 dwelling units. When applicable, non-motorized paths shall be provided at the end of the street to shorten walking distances to an adjacent arterial or public facilities including, but not limited to, schools or parks. Existing stub-end streets that are greater than 800 feet in length shall be linked to other streets whenever the opportunity arises, unless it can be demonstrated that such connections would lead to a substantial rerouting of through traffic onto the street.

Dead-end streets longer than 800 feet as measured from the center of the nearest intersection shall not be allowed to serve substantial new development.

10.2.10.3.1 Temporary Cul-de-sacs

Temporary cul-de-sacs may be provided only when there is a plan for extending the street.

Temporary cul-de-sacs shall have a paved surface with a diameter of 65 feet.

A sign shall be posted at the back of the temporary cul-de-sac stating that the road is planned to be extended in the future and to contact the City of Auburn Community Development & Public Works Department for further information.

10.2.10.3.2 Permanent Cul-de-Sacs

Permanent cul-de-sacs shall have a paved surface with a diameter of 75 feet unless otherwise directed by the City.

Permanent cul-de-sacs right-of-way shall have diameter of 90 feet unless otherwise directed by the City.

10.2.10.4 Traffic Volumes

Projected trip generation shall be calculated based on the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.

Stub end streets shall not be linked to a new street if the connection is likely to result in traffic volumes that will exceed acceptable volumes for the road's classification. These volumes are defined in **Table 10-1** of these standards. Consideration may also be given to the character and nature of the neighborhoods proposed to be connected.

10.03 Sight Distance

Sight distance is defined as the length of roadway ahead that is visible to the driver. All roads, intersections, and access points shall be designed to provide sight distance of sufficient length that drivers can control the operation of their vehicles to avoid striking an unexpected object in the traveled way.

The requirements for stopping sight distance and intersection sight distance listed in this section were taken from AASHTO's "A Policy on Geometric Design of Highways and Streets" manual as a quick reference guide and are for passenger cars on level roadways. Deviations from City design standards may require additional sight distance study and documentation. Sight distance design calculations will also be required for design grades not listed in the tables included herein.

10.03.1 Stopping Sight Distance

Stopping sight distance is the distance required at every point along a roadway for a vehicle traveling at or near the road's design speed to come to a stop before reaching a stationary object in its path. **Table 10-2** contains the minimum design values that shall be used for stopping sight distance.

In calculating stopping sight distance, the driver's eye is assumed to be three and a half 3.5 feet above the roadway and the height of the object to be seen by the driver is assumed to be 2 feet above the roadway.

Table 10-2 Stopping Sight Distance

Design Speed (MPH)	Stopping Sight Distance (ft.)								
	Level Roads (Equation 10-1)	Downgrades* (Equation 10-2)				Upgrades* (Equation 10-2)			
		3%	6%	8%	10%	3%	6%	8%	10%
15	80	80	82	84	86	75	74	73	72
20	115	116	120	124	128	109	107	105	104
25	155	158	165	170	176	147	143	141	139
30	200	205	215	223	232	190	184	181	178
35	250	258	271	282	294	237	229	225	220
40	305	315	333	347	363	289	278	272	267
45	360	378	400	418	438	344	331	324	317
50	425	446	474	495	521	405	389	379	370
55	495	520	553	579	609	469	450	438	428
60	570	599	638	669	705	539	515	501	489

Equation 10-1: (Grades < 3%)

$$d = 1.47Vt + 1.075\frac{V^2}{a}$$

Equation 10-2 (Grades ≥ 3%)

$$d = 1.47Vt + \frac{V^2}{30\left(\left(\frac{a}{32.2}\right) \pm G\right)}$$

d = stopping sight distance, ft.

V = design speed, mph

a = deceleration rate of 11.2ft/s^2

t = brake reaction time, 2.5s

G = percent grade divided by 100

Data for this table was taken from the 5th edition of AASHTO's "A Policy on Geometric Design of Highways and Streets" manual, Exhibit 3-1 Stopping Sight Distance and Exhibit 3-2 Stopping Sight Distance on Grades.

*Use Equation 10-2 above to calculate appropriate stopping sight distances for grades not shown.

10.03.2 Intersection Sight Distance

Intersection sight distance is the clear sight distance necessary for a driver entering a controlled or uncontrolled intersection to proceed safely without impeding traffic. **Table 10-2A** contains the minimum design values that shall be used for intersection and driveway sight distance. The City Engineer may require the use of single unit of combination trucks as the design vehicle for minor road approaches with 5% or greater heavy vehicle volumes.

Table 10-2A Intersection Sight Distance

	Intersection Sight Distance, (ft.)		
	Uncontrolled Intersections* Use **Figure 10-10**	Two Way Stop Controlled Intersections** Use **Figure 10-11** (Equation 10-3)	
Design Speed (mph)	Dimensions "a" and "b"	Dimension "a" for Left Turns (Table10-2C)	Dimension "a" for Right Turns (Table 10-2D)
15	70	170	145
20	90	225	195
25	115	280	240
30	140	335	290
35	165	390	335
40	195	445	385
45	220	500	430
50	245	555	480
55	285	610	530
60	325	665	575

Equation 10-3:

$$ISD = 1.47 V_{major} t_g$$

ISD = intersection sight distance (length of the leg of sight distance triangle along the major road) (ft.)

V_{major} = design speed of major road (mph)

t_g = time gap for minor road vehicle to enter the major road(s)

Data for this table was taken from the 5th edition of AASHTO's "A Policy on Geometric Design of Highways and Streets" manual's Exhibit 9-51 Length of Sight Triangle Leg-No Intersection Control, Exhibit 9-55 Design Intersection Sight Distance-Left Turn from Stop, and Exhibit 9-58 Design Intersection Sight Distance-Right Turn from Stop and Crossing Maneuver.

* Where grade along an uncontrolled intersection approach exceeds 3%, the leg of the clear sight triangle along that approach shall be adjusted by multiplying the sight distance listed in this table by the appropriate adjustment factor in Table 10-2B.

** Intersection sight distance shown is for a stopped passenger car to turn onto a two-lane road with no median and grades of 3% or less. For other conditions, the time gap (t_g) will need to be adjusted per Tables 10-2C /10-2D and the sight distance recalculated.

*** Refer to the latest edition of the AASHTO manual for sight distance requirements on major street left turns and at yield controlled intersections.

Table 10-2B Uncontrolled Intersection Sight Distance Adjustment Factors

Approach Grade (%)	Adjustment Factors									
	Design Speed (mph)									
	15	20	25	30	35	40	45	50	55	60
-10	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
-8	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2
-6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2
-5	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
-4	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1
-3 to 3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
5	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
6	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
8	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
10	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9

Note: Apply adjustment factor to sight distance measurement for each approach.
Data for this table was taken from AASHTO Exhibit 9-53.

Table 10-2C Time Gap for Left Turns

Design Vehicle	**Time gap(t_g) (seconds) at design speed of major road**
Passenger Car	7.5
Single Unit Truck	9.5
Combination Truck	11.5

Note: Time gaps are for a stopped vehicle to turn left onto a two-lane roadway with no median and grades 3% or less. Table 10-2A values require adjustments as follows:

For Multilane roads:

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

For minor road approach grades:

If the approach grade is an upgrade that exceed 3%; add 0.2 seconds for each percent grade for left turns

Table 10-2D Time Gap for Right Turns

Design Vehicle	Time gap(t_g) (seconds) at design speed of major road
Passenger Car	6.5
Single Unit Truck	8.5
Combination Truck	10.5

Note: Time gaps are for a stopped vehicle to turn right onto or cross a two-lane roadway with no median and grades 3% or less. Table 10-2A values require adjustments as follows:

For Multilane roads:

For crossing a major road with more than two lanes add 0.5 seconds for passenger cars and 0.7 seconds for trucks for each additional lane to be crossed and for narrow medians that cannot store the design vehicle.

For minor road approach grades:

If the approach grade is an upgrade that exceed 3%; add 0.1 seconds for each percent grade for left turns

10.03.3 Major Road and Minor Road

For the purposes of intersection sight distance analysis, the Minor Road shall be defined by any of the following criteria:

1. The controlled approaches of a Two-Way Stop Controlled Intersection.
2. The roadway with lower classification, lower design speed of lower traffic volumes.
3. For uncontrolled intersections of similar classification, design speed and volume roadways, the City Engineer shall designate the minor roadway.
4. Minor Roads include driveways, alleys, access tracts or any other location accessing a public road.

10.03.4 Sight Triangles

Intersection, driveway, and access point sight distances are analyzed using the applicable sight triangles per **Figures 10-10** and **10-11**. These sight triangles shall be provided on site plans including landscaping and other potential sight obstructions for all projects where intersections, driveways or access points are being installed or modified. Additionally, the City Engineer may require supporting documentation for vertical sight distance profile analysis on street grades over 3%.

10.03.4.1 Measurements

Horizontal: Horizontal legs of the sight distance triangles on the major road are measured along the roadway centerline. Major road vertex points are placed at the midpoint of the traveled lane closest to the approach being analyzed. Minor road vertex points are placed in accordance with following applicable sections for uncontrolled and controlled intersections.

Vertical: In calculating vertical sight distance at intersections the driver's eye is assumed to be 3.5 feet above the roadway surface and the object to be seen is 3.5 feet above the surface of the intersecting road.

10.03.4.2 Restrictions

The area within the sight distance triangle must be free from any sight-obscuring objects from between 3 feet and 8 feet above the ground. Sight-obscuring objects include but are not limited to: buildings, parked vehicles, signs, fences, and landscaping.

10.03.4.3 Right-of-Way Requirements

The sight distance triangle shall be located completely within the City right-of-way. The City will require a right-of-way dedication as a condition of development approval to ensure the sight distance triangle is contained completely within the City right-of-way. If the City Engineer determines that this is not practical a "Sight Distance Easement" shall be required.

10.03.4.4 Uncontrolled Intersections

For uncontrolled intersections (intersections without signals, stop signs or yield signs) the sight distance triangle dimensions are determined by applying the applicable distances listed in **Table 10-2A** to the respective legs of the sight distance triangle as shown on **Figure 10-10**.

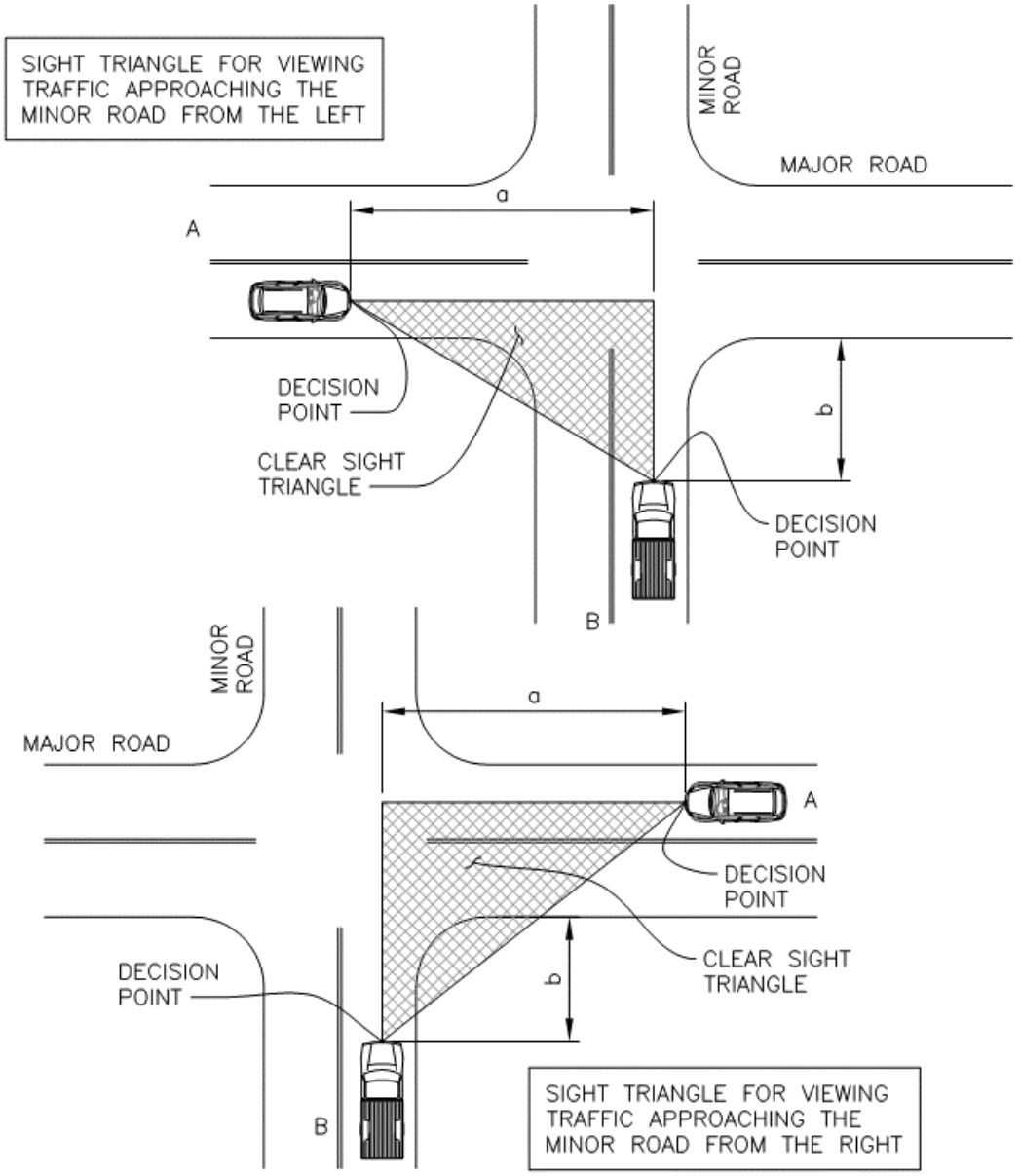
10.03.4.5 Two Way Stop Controlled Intersections

In calculating intersection and driveway sight distance for Two Way Stop Controlled intersections the vertex (decision point) of the sight triangle on the minor road shall be measured 14.5 feet back from the nearest edge of the traveled roadway. Where parking is allowed on the major road this distance shall be measured from the far edge of the parking lane.

Left turns from the minor road: Using **Figure 10-11** sight triangles for traffic approaching from both the left and right shall be provided using the value in **Table 10-2A** that corresponds to the major road design speed.

Right turns from the minor road: Using **Figure 10-11** a sight distance triangle for traffic approaching from the left shall be provided using the value in **Table 10-2A** that corresponds to the major street design speed.

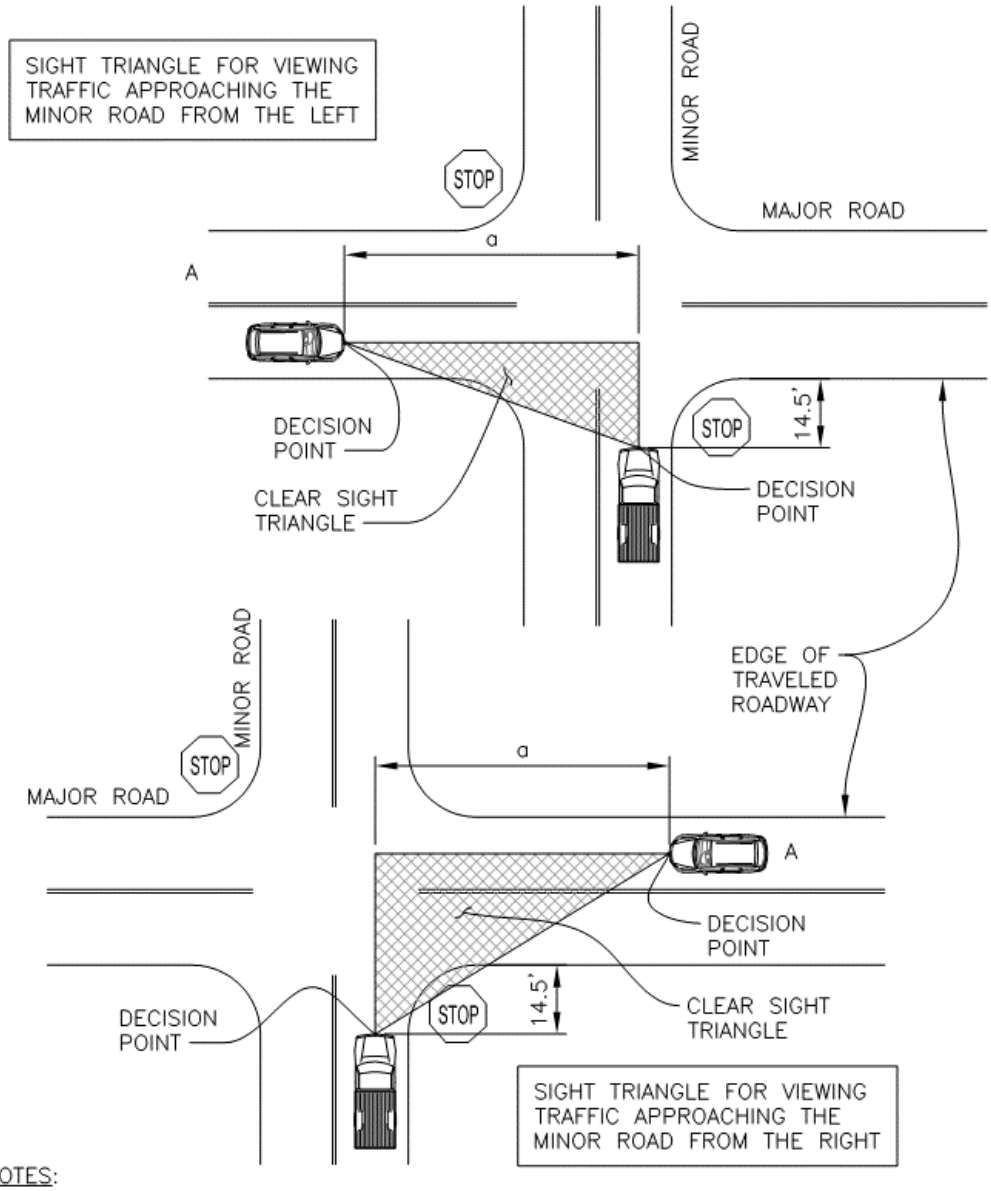
Figure 10-10 Intersection Sight Triangles for Uncontrolled Intersections



NOTES:

1. LEG "a" OF SIGHT TRIANGLE IS THE DISTANCE CORRESPONDING TO THE DESIGN SPEED OF ROAD "A" FROM THE UNCONTROLLED INTERSECTION COLUMN OF TABLE 10–2A.
2. LEG "b" OF SIGHT TRIANGLE IS THE DISTANCE CORRESPONDING TO THE DESIGN SPEED OF ROAD "B" FROM THE UNCONTROLLED INTERSECTION COLUMN OF TABLE 10–2A.
3. SIGHT TRIANGLE LEGS ARE MEASURED ALONG THE CENTERLINE OF EACH ROADWAY.
4. DECISION POINTS ARE PLACED AT THE CENTERLINE OF THE TRAVELED LANE BEING ANALYZED.

Figure 10-11 Intersection Sight Triangles for Two-Way Stop Controlled Intersections



NOTES:

1. LEG "a" OF SIGHT TRIANGLE IS THE DISTANCE CORRESPONDING TO THE DESIGN SPEED OF ROAD "A" FROM THE TWO-WAY STOP CONTROLLED INTERSECTION COLUMN OF TABLE 10-2A.
2. WHERE PARKING IS ALLOWED ON THE MAJOR STREET, SIGHT DISTANCE IS MEASURED FROM A POINT 14.5' BACK FROM THE FAR EDGE OF THE PARKING LANE TO THE CENTER OF THE LANE BEING ANALYZED.
3. SIGHT TRIANGLE LEGS ARE MEASURED ALONG THE CENTERLINE OF EACH ROADWAY.
4. DECISION POINTS ARE PLACED AT THE CENTERLINE OF THE TRAVELED LANE BEING ANALYZED.

10.03.4.6 All Way Stop Controlled Intersections

At All Way Stop Controlled intersections, the first stopped vehicle on one approach shall be visible to the drivers of the first stopped vehicles on each of the other approaches.

10.03.4.7 Signalized Intersections

At signalized intersections the first stopped vehicle on one approach shall be visible to the drivers of the first stopped vehicles on each of the other approaches. Left-turning vehicles shall have sufficient sight distance to complete left turns. Additionally, if right turns on a red signal are permitted from any approach then the appropriate sight triangle shall be provided to accommodate right turns on that approach.

10.03.2 Decision Sight Distance

Decision sight distance is used in cases where the driver is required to detect unexpected or confusing situations and then make appropriate changes in their driving style or method. This could mean changing lanes, slowing down, or coming to a complete stop. Decision sight distance will need to be addressed when designing roads with tight turns and unexpected driveway and street connections. When decision sight distance requirements are applicable, the guidelines presented in the latest edition of AASHTO shall be used.

10.03.3 Passing Sight Distance

Passing sight distance shall be addressed when designing 2 lane roads where vehicle speeds can differ by a considerable amount depending on the driver. When passing sight distance requirements are applicable, the guidelines presented in the latest edition of AASHTO shall be used.

10.04 Street Access Points

All access points to and from City streets, including intersections and driveways, shall be approved by the City prior to construction. These access points shall meet all the requirements contained throughout this chapter for sight distance, spacing, and other safety considerations.

The following section contains design criteria on all access points including street intersections and driveways. These criteria are minimum values and may need to be modified according to safety factors, traffic volumes (existing and/or projected), topography, design speed, design vehicle requirements, drainage, and other conditions, both existing and projected.

10.04.1 Public Street Intersections

Public Street Intersections are intersections where 2 or more City streets intersect. These intersections shall be designed using the following criteria:

10.04.1.1 Intersection Spacing

Public street intersections shall meet the minimum centerline spacing requirements as shown in **Table 10-3 below.**

Table 10-3 Minimum Intersection Spacing from Centerline to Centerline

Minimum Intersection Spacing from Centerline to Centerline (ft.)					
PRINCIPAL ARTERIAL	MINOR ARTERIAL	RESIDENTIAL & NON-RESIDENTIAL COLLECTORS	RUSTIC COLLECTOR	LOCAL STREETS	
500[1]	500[1]	250	250	125	LOCAL STREETS
1320	1320	500	500	250	RUSTIC COLLECTOR
2640	1320	500	500	250	RESIDENTIAL& NON-RESIDENTIAL COLLECTORS
2640	2640	1320	1320	500[1]	MINOR ARTERIAL
2640	2640	2640	1320	500[1]	PRINCIPAL ARTERIAL

Notes:

1. Local streets shall generally not be allowed to access directly onto arterials.
2. Refer to section 10.03 for intersection sight distance requirements.
3. Refer to section 10.05 for intersection pedestrian accessibility requirements.

10.04.1.2 Horizontal Approach Angle

The horizontal approach angle of public street intersections shall be between 85° and 95° at the centerlines of intersecting streets.

10.04.1.3 Intersection Approach Offsets

Public Street intersections shall be aligned so that opposing single left turn lanes and through lanes are not offset more than 4 feet as measured from the lane centerline approach tangent.

10.04.1.4 Curb and Right-of-Way Radius

A minimum curb radius is required at intersection corners for vehicles to safely execute a right turn at a reasonable rate of speed without crossing lanes or encroaching onto the adjacent curb. At intersections of differing street classification, the higher classification street curb radius requirements shall be used. The exception to this rule is for local residential streets where the minimum radii listed in **Table 10-1** shall be used. The right-of-way radius is the additional radius required to install sidewalks, landscape strips, and other roadway appurtenances. Additional right-of-way may be required near intersections to accommodate auxiliary traffic lanes and equipment for existing or future traffic signals and street lights. These minimum values and listed in **Table 10-1.**

10.04.1.5 Landing Approach

The landing approach is a defined segment of the street before the intersection and is measured back from the point of tangency of the curb radius on each approach to the intersection. The requirements for minimum landing approach length and maximum landing approach grade are listed in **Table 10-1 Street Crowns.**

Public street intersections shall be designed to drain away from the higher classification street. Grades shall match at the center of intersections for equal classification streets. At intersections of differing classification streets, the crown shall be carried through the intersection for the higher classification.

10.04.2 Private Street Intersections

Private street intersections are those intersections where a private street intersects a City street. These intersections shall be designed in the same manner as public street intersections.

10.04.3 Driveways

Driveways shall be sized and spaced per Standard Detail T-04 and as specified herein.

Driveway aprons shall be constructed per City of Auburn Standard Detail T-34 or T-35. Selection of the appropriate driveway apron type requires consideration of existing conditions adjacent to the driveway and grades of the driveway connection behind the apron. Separating the driveway apron from the pedestrian path is the City's preferred approach (Standard Detail T-34) and shall be implemented unless existing conditions present constraints that, in the opinion of the City Engineer, warrant the use of a drop driveway (Standard Detail T-35).

10.04.3.1 Driveway Classifications

Driveways can be broken into the following classifications:

A. Residential Driveways – Driveways to single family residences. Residential driveways shall be used when serving one single family residence (not connected via an access tract, which requires a commercial driveway).

B. Commercial/Industrial Driveways – Driveways to all properties except single family residential. The three categories of Commercial/Industrial driveways described below will be determined based on the vehicles expected to use the site.

1. **Light Commercial/Industrial** - Used for sites where the average vehicle use will range from passenger vehicles to small size delivery trucks. Examples include mini marts, strip malls, fast-food restaurants, triplexes, and small apartment buildings.
2. **Medium Commercial/Industrial** - Used for sites where the average vehicle use will range from medium to high volumes of passenger vehicles to multiple medium delivery trucks per day and the occasional large tractor/trailer delivery truck. Examples included supermarkets, large outlet stores, shopping malls, large apartment buildings, and busy retail stores located on arterials.
3. **Heavy Commercial/Industrial** - Used for sites where high volumes of medium to large tractor/trailer trucks enter and exit every day. Examples include manufacturing and storage warehouses.

Driveway uses discussed above may be subject to change based on the street classification on which they are located. For example: a site use that may normally fall under the light commercial/industrial classification may be upgraded to a medium commercial/industrial classification if it is located on a principal or minor arterial to facilitate moving vehicles off the right-of-way in a more efficient manner.

C. Temporary Driveways – Driveways to property allowed prior to and during construction only.

D. Emergency Driveways – Driveways required by the fire department to provide an alternative emergency-only access to the property.

E. Signalized Driveways – For special circumstances when no other option is available, the City may allow signalized access to a public street from a private access. In such situations, dedication to the City of any right-of-way necessary for maintaining and operating the intersection will be required. Additional mitigation measures may be required to ensure safe and efficient access to the public street. The private leg of the intersection within the right-of-way shall be designed to the applicable public street standard as determined by the City.

10.04.3.2 Driveway Locations

Properties/parcels, or a development project that incorporates multiple adjacent parcels, shall be limited to one driveway access to a City street (or alley). Multiple driveway accesses to a street (or alley) shall only be allowed when the City determines that the additional access does not create a safety concern, impede traffic flow, or is required.

To address safety or to mitigate impacts of traffic flow, the City may require two or more contiguous non-single family properties to share a single driveway, and/or require the driveway to be located on the lowest classification of street (or alley) when a property has frontage on two or more streets (or alleys).

Driveway accesses within the "Functional Intersection Boundary" shall be either prohibited or restricted. **See Table 10-4 and Figure 10-12.**

The functional intersection boundary is the portion of the street leading up to the intersection required to allow vehicle movements and storage. This is the area within which drivers identify the situation, change lanes, come to a stop, and wait before proceeding through the intersection. Driveways shall be either prohibited or restricted within the functional intersection boundary in accordance with **Table 10-4** and **Figure 10-13.** The functional length of an intersection is measured from the point of curvature/point of tangency (PC/PT) of the curb return. Driveway restrictions include prohibiting either all left turn movements, left turns out of, or left turns into the subject driveway.

The City may also impose driveway restrictions at other locations when a safety hazard is identified or to mitigate impacts of traffic flow along a classified street. Such restrictions shall be incorporated into the design of the driveway in conformance with the provisions of **Section 10.0.3.6** in a manner that strives to maintain existing access turning movements to other properties in the vicinity.

Redeveloped properties are not guaranteed that their existing driveways will be retained. Redeveloped properties that meet the requirements for half street improvements, have more than one access point, or do not meet current City standards may be required to eliminate, relocate or modify existing driveway access/accesses.

Except for Local Residential Streets the spacing of driveways and their separation from intersections shall meet the minimum "Functional Intersection Boundary" distances of this Chapter.

Table 10-4 Distance Requirements for Functional Intersection Boundaries

Posted Speed mph	Speed ft./sec	Reaction Time (sec)	Decision Distance (ft.) "d_1"	Lane Change Distance (ft.) "d_2"	Braking Distance (ft.) "d_3"	Storage Length (ft.) "d_4"
25 mph	37	1	37	25	60	50
30 mph	44	1	44	40	86	50
35 mph	51	1	51	60	118	100
40 mph	59	1	59	85	154	100
45 mph	66	1	66	105	194	100
50 mph	73	1	73	140	240	100

Figure 10-12 Functional Length Diagram of an Intersection with Right and/or Left-Turn Lane

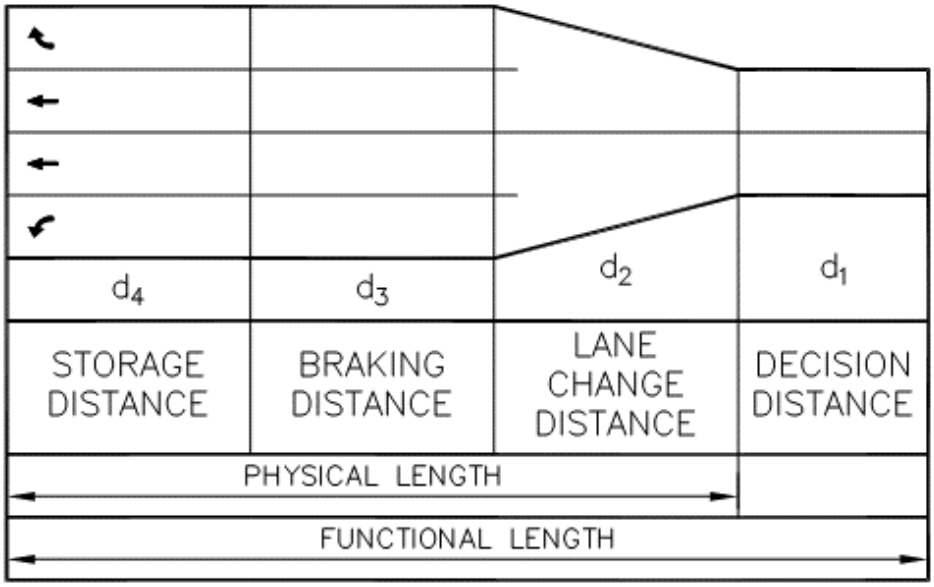
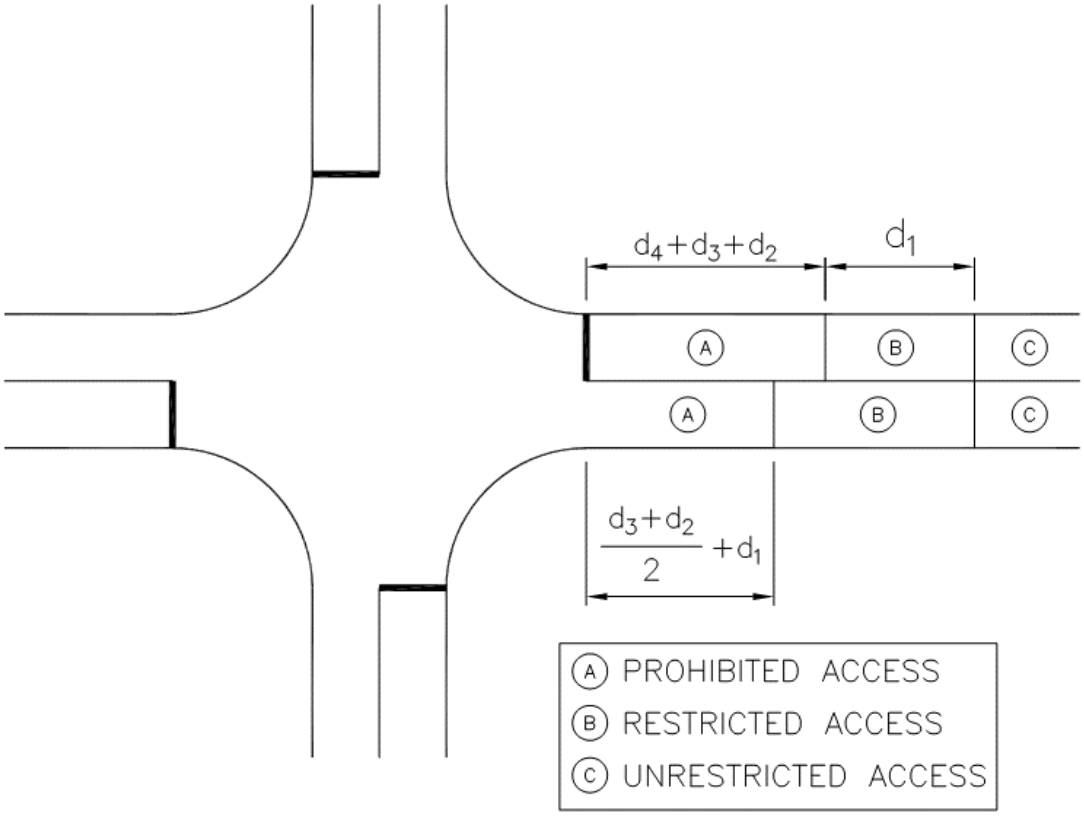


Figure 10-13 Functional Intersection Boundary Restricted Access Diagram



10.4.3.3 Driveway Lay Out

See Standard Detail T-04.

Driveways shall be designed in such a manner as to allow for efficient and safe ingress and egress from the City streets. Driveways and on-site parking, other than that for single-family residences on unclassified roads or alleys, shall be designed such that vehicle-backing maneuvers will not occur onto the street. A properly designed driveway shall allow the largest typical vehicle that will use the driveway (i.e. tractor-trailers at large warehouses, delivery trucks at mini marts) to enter and exit the site without encroaching into opposing traffic.

Driveway aprons for adjacent properties shall be separated by a minimum of 10 feet for residential and 50 feet for commercial/industrial. This distance is to be measured from the outside edge of the driveway apron. When this separation is not obtainable, a single driveway centered on the property line may be required.

When designing site layout and driveway access, internal circulation shall be such that on-site traffic will not backup the driveway impeding vehicles in the public street. The City may require sites with internal traffic congestion to design driveways with long throat lengths to provide extra storage to avoid impacting City streets.

Per ACC 18.52.050, commercial and industrial driveways shall have at least a 40 foot throat from the street (not be intersected by parking aisle, parking space, or another access driveway for a minimum distance of 40 feet from the street right-of-way). The City Engineer may require

additional throat distance or may allow less throat distance with the consideration of the following: classification and volumes of street from which access is being taken, total number of parking stalls, design vehicle for parking lot, size of parcel and parking area to which the driveway is providing access, and queueing analysis.

10.4.3.4 Driveway Alignment (Horizontal and Vertical)

The angle of driveway throats to the City streets shall not be less than 85 degrees unless a "pork chop" or other access control device is allowed to be utilized per **Section 10.15**.

The vertical grade behind the driveway shall not exceed 5% for a distance of 12 feet beyond back of sidewalk or right of way line. Driveways shall be designed to preclude vehicles from dragging when entering or exiting the site. Driveways shall meet all sight distance requirements per **Section 10.03**.

10.04.3.5 Driveway Widths

See Standard Detail T-04.

Driveway widths are measured across the driveway throat and do not include driveway wings/ramps. Residential driveway widths shall be a minimum of 11 feet and a maximum of 18 feet. The allowed width of Commercial and industrial driveways shall be based on the number of lanes used on the driveway and the type of use. Light commercial/industrial driveways shall have one entering lane and up to two exiting lanes with the lane widths restricted to a maximum of 12 feet. Medium commercial/industrial driveways shall have one entering lane and up to two exiting lanes with the lane widths restricted to a maximum of 14 feet. Heavy commercial/industrial driveways shall have one entering lane and one exiting lane with the lane widths restricted to a maximum of 16 feet.

10.04.3.6 Restricted Access Driveways

Restricted Access Driveways are used to restrict turning movements out of or into driveways. Turning restrictions at driveway locations shall be by one or more of the following methods as deemed appropriate by the City.

A. Median Islands (Per **Section 10.15.1**)

B. Mountable Curbs (Per **Section 10.15.2**)

C. Pork Chops (Per **Section 10.15.3**)

D. Signing (Per **Section 10.15.4**)

E. Pavement Markings (Per **Section 10.15.5**)

10.05 Sidewalks

Sidewalk requirements vary by street classification and corridor/area specific standards as determined by the City. Sidewalks are required along both sides of all street classifications except for rustic streets.

See Standard Details T-13 & T-15. Pervious sidewalks (where authorized for use by the City Engineer) shall be per **Standard Detail T-14.**

10.05.1 Sidewalk Widths

Sidewalks shall be a minimum of 5 feet in width for all local residential and residential collector streets. Sidewalks shall be a minimum of 10 feet in width for all principal arterials, minor arterials, non-residential collectors, and local non-residential streets. Non-standard widths of sidewalk greater than the standards identified above may be required to maintain continuity on existing corridors. Sidewalk widths in the Downtown Urban Center (DUC) Zone shall be a minimum of 10 feet in width as measured from face of curb to face of building or Right-of-way.

10.05.2 Meandering Sidewalks

The City Engineer may approve meandering sidewalks along a corridor when the sidewalk, landscaping, lighting, signing, right-of-way, and other surface features are integrated into the design of the improvements. Additional right-of-way (or an easement) may be required to accommodate the meander of the sidewalk and other surface features.

10.05.3 Accessibility

All sidewalk cross slopes shall not exceed two 2%. Sidewalk grade shall not exceed the grade of the adjacent street centerline, except at driveways and curb ramps. All sidewalks shall maintain a minimum walking zone of 5 feet in width, free of all obstructions including utilities, signage, street trees, furniture or other elements, permanent or temporary.

10.05.4 Curb Ramps

See WSDOT Standard Plans F-40.12, F-40.15 & F-40.16.

Curb ramps shall be provided at all intersections and pedestrian crossings having vertical curb sections. Every curb ramp shall have at least one receiving ramp. In special conditions, curb ramps shall also be provided to enable passage across curbed radius return access points. All curb ramps shall have detectable warning patterns formed with manufactured truncated domes in accordance with **WSDOT Standard Plan F-45.10**. Truncated dome color shall be yellow except in the downtown urban core area where truncated dome color shall be brick red. Pervious cement concrete ramps and landings shall not be allowed.

For any deficient element that does not meet ADA requirements, designers shall document the deficiency via a Maximum Extent Feasible (MEF) document stamped and signed by a professional engineer licensed in the State of Washington. The MEF document will be reviewed for acceptance by the City.

Trenching for utility work and the associated patching and surface restoration that traverse crosswalks/pedestrian pathways (crossings) shall not trigger the requirement to replace curb ramps that do not meet current ADA standards at the crossing, unless, the cumulative width of surface restoration at the crossing for all work associated with the project equals or exceeds half of the crossing width, as measured from curb face or pavement edge at the pedestrian pathway entry into the vehicle travel way to curb face or pavement edge at the pedestrian pathway departure from the vehicle travel way. This distance is measured through medians, islands, and other pedestrian refuge areas. If the cumulative width of all surface restoration at a crossing equals or exceeds half the crossing width, then the curb ramp(s) that intercept the impacted crosswalk that do not meet current ADA standards upgraded/replaced, including signal push-button replacement/relocation where applicable.

Whenever a curb ramp is replaced or upgraded for any reason, if on the receiving ends of the associated crossings there is a curb without a ramp, then a curb ramp must be installed on the receiving end.

10.06 Bikeways

The City of Auburn bikeway standards are designed to ensure that bikeways are constructed in a manner that provides a safe and convenient network of interconnected routes for bicycling.

Bikeways are any road, street path or way which in some manner is specifically designated for the exclusive use of bicycles or are to be shared with other transportation modes. Bikeway facilities shall be incorporated into development and transportation projects in accordance with the Future Trail and Bicycle Network plan adopted by the City of Auburn Comprehensive Transportation Plan.

Bikeways shall be designed in accordance with AASHTO's "Guide for the Development of Bicycle Facilities 1999," the latest adopted edition of FHWA's Manual on Uniform Traffic Control Devices (MUTCD), this section, and applicable City of Auburn standard details.

The City of Auburn's Future Trail and Bicycle Network consists of various classification 0bikeways. Typically, these bikeways are shared with other transportation modes, although they may be provided exclusively for bicycle use. Bikeways are categorized as follows:

10.06.1 Class I Bikeway

Class I Bikeways are facilities shared with other non-motorized modes and are physically separated from motorized vehicle roadways. For the purposes of this section, Class I Bikeway design standards are for bicycle facilities that generally parallel a roadway with minimal crossflow by motor vehicles. It is designed and built primarily for use by bicycles, but may also be used by pedestrians, joggers, skaters, wheelchair users (both non-motorized and motorized), equestrians, and other non-motorized users. When required, Class I Bikeways shall be designed for two-way traffic. Class I Bikeways that are part of the City's Future Trails and Bicycle Network shall be public and shall be located within the public right-of-way, tracts or easements

Class I Bikeways separated from the roadway pavement section (Class I) shall have a minimum pavement section of 2 inch thick CL ½" asphalt concrete pavement over 6 inches of Crushed Surfacing Base Course (CSBC). When the California Bearing Ratio (CBR) of the existing soil is less than 5, an additional 6 inches of gravel base shall be required. When the trail is also utilized as a vehicular service road, the pavement design shall be the Access Road classification on **Table 10-5**. Class I Bikeways shall be separated from the vehicular travel way by a landscape strip/buffer with a minimum 5 foot width.

Where Class I Bikeways are intersected by driveways appropriate signing and pavement markings shall be provided consistent with requirements for midblock crossings.

Class I bikeways shall have a minimum width of 10 feet.

10.06.2 Class II Bikeway

Class II Bikeways, or "Bike Lanes," are incorporated within the street right-of-way. Bike lanes are established on streets in corridors where there is a current of anticipated bicycle demand and where it would be unsafe for bicyclists to ride in travel lanes. Bike lanes shall be provided in accordance with the Future Trail and Bicycle Network plan pursuant to the City of Auburn Comprehensive Transportation Plan. Bike lanes are exclusive one-way bicycle facilities delineated by pavement markings and signing. Bicycle traffic is carried in the same direction as the adjacent motorized vehicle traffic.

Bike lanes shall have a minimum width of 6 feet as measured from nearest edge of the travel way to face of curb, edge of pavement, or edge of parking lane. Bike lanes shall have the same pavement section as the adjacent roadway.

10.06.3 Class III Bikeway

Class III Bikeways, or "Shared Lane," are facilities shared by bicyclists and motorized vehicles. Class III Bikeways will be utilized, in accordance with the Future Trail and Bicycle Network plan, on existing streets as interim bike corridors until a Class I or Class II facility can be provided. Class III Bikeways may or may not be delineated with shared use pavement markings and signage. Generally, lower-speed/lower-volume streets are adequate for bicycle travel, so additional signing and pavement markings for bicycle use are unnecessary.

Vehicular lanes being utilized as a Class III Bikeway shall have a minimum width of 14 feet as measured from lane line to face of curb, edge of pavement, or edge of parking lane.

10.06.4 Class IV Bikeway

Class IV Bikeways consist of all improved roadways unless otherwise designated as Class I, Class II, or Class III Bikeways.

10.06.5 Bikeways at Railroad Crossings

Railroad-Bikeway grade crossings shall be designed as near perpendicular as possible. If rail crossing is less than 45 degrees, an additional paved shoulder of sufficient width shall be provided to permit the bicyclist to cross the track at a safer angle. Where this is not possible and train speeds are low, compressible flangeway fillers will be required. When not under City control the railroad owner shall be responsible for bicycle crossings.

10.06.6 Bikeways at Roundabouts

Class I Bikeways at roundabouts shall be combined with the adjacent sidewalk, if applicable; to create a single shared use crossing through the roundabout zone.

Class II and Class III Bikeways shall be terminated a minimum of 65 feet in advance of roundabouts using appropriate signing and striping with transitions to the adjacent pedestrian facilities which shall be enhanced through the roundabout zone, consistent with a Class I Bikeway, to accommodate the shared use with bicycles.

10.06.7 Bikeways at Signalized Intersections

Class I Bikeway crossings at signalized intersections shall be combined with the adjacent sidewalk, if applicable, to create a single shared facility utilizing the protected pedestrian crossing at traffic signals.

Class II and Class III Bikeways shall be provided an optional transition to the adjacent pedestrian facilities a minimum of 50 feet in advance of traffic signals using appropriate signing and striping. The adjacent pedestrian facility shall be enhanced to Class I Bikeway standards in advance of the transition point to accommodate the shared use through the intersection.

10.06.8 Bikeways at Un-signalized Intersections

Class I Bikeway crossings at un-signalized intersections shall be combined with the adjacent sidewalk, if applicable, to create a single shared use crossing. Class II Bikeways shall be delineated in accordance with City of Auburn standard details and MUTCD bike lane requirements for intersections.

10.06.9 Bikeway Pavement Markings, Signing, and Striping

See Standard Detail T-17 and WSDOT Standard Plan M-9.50

Pavement markings, signing, and striping for bikeways shall be designed in accordance with City of Auburn standard details and Manual of Uniform Traffic Control Devices (MUTCD) requirements.

10.07 Pavement Design

This section of the Standards has been prepared for engineers to use in the design of pavement sections for City streets. The use of the following information will ensure that paved transportation corridors are adequately built or improved in a uniform and consistent manner. Except where indicated otherwise herein, all references to pavement refer to standard pavement sections and not to permeable pavement.

The simplified pavement design approach described in Section 10.07.1 may be utilized as a simplified approach to determine the required pavement section except for the following streets for which pavement sections must be designed per the current AASHTO design procedure by a Professional Engineer licensed in Washington State:

- Principal arterials
- Streets where the daily average traffic count is expected to exceed 15,000 vehicles per day
- Streets where truck and bus traffic is expected or encountered, such as freight routes and bus routes
- Freight routes
- Streets where subgrade California Bearing Ratio (CBR) values are less than 3

Freight routes are defined in the “City of Auburn Comprehensive Transportation Plan”. Studies shall be performed along the freight route to determine the vehicle mix and volumes.

10.07.1 Simplified Pavement Design

The simplified pavement design approach may be utilized to determine pavement sections for City streets except for the streets listed in Section 10-07. This simplified approach has been developed so that extensive data and computer analysis is not necessary for developing pavement designs for most projects. The approach requires determination of the street’s subgrade conditions and street classification which are then utilized with Table 10-5 to determine the required pavement design section.

10.07.1.1 Simplified Pavement Design - Street Classification

The classification of a particular street, (i.e. Residential Collector), can be obtained from the City of Auburn. The classification of a street will be required to determine the volume and mix of vehicles for which it is designed.

In some cases, where a street has yet to be designated a specific classification, street pavement shall be designed based on the anticipated traffic volume. An anticipated daily traffic count can be obtained from the City of Auburn for the street in question or a similar street that functions in the same manner. The City may, however, require the applicant to obtain additional traffic information, as warranted.

10.07.1.2 Simplified Pavement Design - Street Subgrade

For the purpose of the simplified pavement design, the California Bearing Ratio (CBR) shall be used to classify the type of existing subgrade soils. The scope of this section does not cover existing subgrade with a CBR less than "3". When the CBR is less than "3", a the simplified pavement design approach is not allowed.

The subgrade under the proposed street shall have its CBR evaluated by an independent testing laboratory or geotechnical firm. The proposed roadway shall have a minimum of one CBR test for every 1,000 feet of road and/or for every obvious change in subgrade material (minimum of 2 tests per street).

Table 10-5 Simplified Pavement Section Design Chart

	Poor Soils (CBR 3-5)	Medium Soils (CBR 6-10)	Good Soils (CBR 11-20)	Excellent Soils (CBR >20)
Private Streets Alleys Access Roads Rustic Residential	2" CL 1/2" 4" CL 1" 11.5" CSBC Geotextile Fabric	2" CL 1/2" 4" CL 1" 7.5" CSBC	2" CL 1/2" 4" CL 1" 4" CSBC	2" CL 1/2" 3" CL 1" 4" CSBC
Local Streets	2" CL 1/2" 4" CL 1" 11.5" CSBC Geotextile Fabric	2" CL 1/2" 4" CL 1" 7.5" CSBC	2" CL 1/2" 4" CL 1" 4" CSBC	2" CL 1/2" 3" CL 1" 4" CSBC
Residential Collectors Rustic Collectors	3 " CL 1/2" 4" CL 1" 14.5" CSBC Geotextile Fabric	3" CL 1/2" 4" CL 1" 9" CSBC	3" CL 1/2" 4" CL 1" 5.5" CSBC	3" CL 1/2" 3.5" CL 1" 4" CSBC
Non-Residential Collectors	3" CL 1/2" 4" CL 1" 14.5" CSBC Geotextile Fabric	3" CL 1/2" 4" CL 1" 9" CSBC	3" CL 1/2" 4" CL 1" 5.5" CSBC	3" CL 1/2" 3.5" CL 1" 4" CSBC
Minor Arterials	2" CL 1/2" 6 CL 1" 18.5" CSBC Geotextile Fabric	2" CL 1/2" 6" CL 1" 11" CSBC	3" CL 1/2" 4" CL 1" 9.5" CSBC	3" CL 1/2" 4" CL 1" 6" CSBC

10.07.2 AASHTO Pavement Design

Engineered pavement designs shall follow the latest “AASHTO Guide for Design of Pavement Structures” for flexible pavements.

For projects where a traffic analysis report was not required, to determine the amount of traffic for which a street is to be designed, contact the City to obtain the most recent street classification and traffic counts. Traffic counts are done assuming there is a 50/50 split in the direction of traffic. 100% of the 50/50 split must be assumed in the design lane, regardless of the number of lanes in each direction. (Additional traffic information may be required.)

The existing traffic levels shall then be inflated to match the projected traffic at the end of the roadways design life (in most cases a twenty-year design life will be used). The annual rate of growth is 1.5% for residential streets and three and 3.5% for commercial/industrial streets and arterials streets. The growth rate may be waived in closed subdivisions with City approval. The minimum pavement section shall be as determined by the pavement design using the AASHTO pavement design approach with a 20-year service life.

The Reliability Level factors used in pavement design shall be in accordance with the following table:

Table 10-6 Pavement Design – Reliability Factors

Functional Classification	Required Level of Reliability	
	Urban	Rural
Principal Arterials	95	90
Minor Arterials	90	
Collectors	90	
Local	85	

No pavement section with an asphalt thickness of less than 6 inches shall be allowed for arterial streets.

10.07.3 Pavement Design Report

All pavement designs (whether per the AASHTO method or per the simplified approach) shall be documented in a Pavement Design Memorandum stamped and signed by a Professional Engineer licensed in Washington State and may be included in the project Geotechnical Report where applicable.

The report shall include a narrative of the site conditions, geotechnical boring logs, testing results, calculations, the pavement analysis, and applicable background information for review and approval. The report must contain all calculations regarding the pavement design including, spreadsheets, all variables and assumptions, as well as geotechnical engineering information on the subgrade soils.

10.07.4 Permeable Pavements for Roads, Access Tracts, and Driveways

Pervious Cement and Porous Asphalt Concrete Pavement within roads, access tracts, and driveways must be designed by a Washington State licensed professional engineer. The design shall be documented by a report that includes relevant calculations, data collection, and assumptions. The report must provide evidence that the permeable surfaces are designed to have at least a 30-year service life given the anticipated vehicle counts and classifications. The minimum pavement design section shall be as follows:

- 6-inch thick wearing course of porous asphalt or pervious concrete; over
- 6-inch to 36-inch thick reservoir course (Permeable Ballast per Section 9-03.9(2) of the Construction Standards); over
- Geotextile (Non-Woven, Moderate Survivability per Section 9-33.2(1) of the Construction Standards); over
- Where treatment is required and native subsoils do not meet water quality design criteria per the SWMM: 18-inch to 24-inch runoff treatment layer with specifications per the SWMM.

Permeable pavements shall be designed and constructed per the SWMM and the Construction Standards. Maximum allowed longitudinal slopes for pervious pavements shall be 5%. Longitudinal slopes exceeding 2% shall require check dams or other methods to maximize ponding in the subsurface to allow adequate treatment and infiltration. Underdrains shall not be allowed.

Pervious cement and porous asphalt concrete pavement within the public right-of-way shall not be utilized for storm water management of runoff from areas outside the public right-of-way.

10.07.5 Pavement Surface Restoration and Preservation

Where existing asphalt roadway surfaces are to be removed and replaced, the existing surface shall be ground/planed to a depth of at least 2 inches and then replaced with at least 2 inches of HMA Class 1/2-inch PG 64-22. When the total surface restoration area exceeds 1,000 SF feet, pavement core sample(s) shall be collected in the required restoration area to determine the existing pavement thickness. In these cases, one core shall be required for every 1,000 SF of surface restoration. Where the existing pavement to be removed and replaced does not meet current City standards, full depth pavement replacement may be required as directed by the City Engineer.

10.08 Street Landscaping

An area devoted to landscaping is included within the right-of-way of various street classifications. This landscaping is an integral part of the roadway cross-section. It can serve several important functions, including improving pedestrian safety by providing a buffer between traffic and the sidewalk; providing the perception of a narrower travel corridor, thereby slowing traffic; improving air quality; and improving the aesthetic appearance of the street. Street landscaping strips may also be constructed as bioretention swales to provide storm water collection, treatment, and infiltration.

10.08.1 Landscape Strips

Landscape strips are required for local residential streets and residential collector streets. Landscape strips shall be located between the back of the curb and the sidewalk. Landscape strips contain several components including soil, vegetation such as sod, groundcover, and shrubs, irrigation, street trees and root barriers, utility appurtenances, luminaires, traffic signs, bus stops, and mail boxes. Landscape strips requirements:

- The minimum allowed landscape strip width is 5 feet.
- Landscape strips shall be planted with sod or shrubs, vegetation groundcover, and street trees. Shrubs and vegetative groundcover must be low maintenance, minimal debris dropping, and not present a tripping hazard to pedestrians. Landscape strips shall not include gravel, rocks, or other aggregate.

- Roadways, driveways, lighting, fire hydrants, junction boxes, water meters and other appurtenances shall be configured such that no landscape strip has a net landscaped surface area (landscape strip area minus areas occupied by non-landscape features) of less than 50 SF and no portion of a landscaped surface within a landscape strip has a width less than 2 feet. To satisfy these size requirements, landscape strip areas may not be "filled in" with sidewalk, driveway, or other non-landscaped surfaces. Instead, the alternate roadway sections shown in **Figure 10-06A and 10-06B** shall be utilized to ensure that the minimum landscape size requirements are met. These minimum size Requirements shall also apply to bio-retention swales.
- In order to meet the minimum size and width requirements listed above, landscape strips/areas may be omitted from one side of the roadway and widened to 8.5 feet wide on the other side of the roadway. The width of the sidewalk on the side of the omitted landscape strip is required to be increased to 7.5 feet. No parking shall be signed on the side of the widened landscape area. See **Figure 10-06A**. The configuration shall be alternated (the side with the landscape strip/area switched from one side to the other) to support traffic calming and drainage.
- Widened landscape strips/areas may be constructed as bioretention swales as shown in **Figure 10-06B**. Bioretention swales in the public right-of-way shall be designed to collect, treat, and infiltrate runoff from the public right-of-way. If, after runoff from the public right-of-way has been accounted for, additional capacity remains in the bioretention swale, the bioretention swale may be utilized to treat and infiltrate runoff from adjacent private single family residential property(s) with a maintenance agreement between the City and property(s) draining to the swale that requires those property(s) to maintain the swale in perpetuity. The bioretention swale shall be designed and constructed in accordance with the SWMM.
- Landscape strips shall generally be graded towards the curb at approximately 1.5%. Other grades may be allowed where it can be demonstrated to not cause drainage or maintenance issues.

10.08.2 Street Trees

Street trees are required for local residential streets, residential collector streets, and streets within the DUC zone. Street trees shall be placed either within the sidewalk in tree pits with tree grates, or in landscape strips. Where landscape strips are constructed as bio-retention swales, street trees shall not be placed in the bio-retention swale and may be required elsewhere depending on the extent of landscape strips constructed as swales. Potential alternative locations include on the private property(s) and/or tract(s) adjacent to bio-retention swale(s).

10.08.2.1 Placement and Spacing

Trees shall be placed so that they do not obstruct the view of any street intersection, driveway, or visibility of any traffic control device or sign. Sight distance triangles shall be used to analyze visibility at street intersections. Trees shall be located in the landscape strip as shown on the typical roadway sections included in these standards. When the roadway section does not include a landscape strip, but street trees are required, trees shall be placed in tree wells with tree grates within the sidewalk per **Standard Detail T-30.**

Nearby features such as street lighting, in-ground utilities, buildings or overhead wires will also affect where trees should be located. Minimum size for street trees shall be a 2-inch caliper, measured 2 feet above the root ball.

Minimum spacing for street trees should be 1-1/2 times the mature diameter of the tree canopy as identified in **Table 10-7A.**

Planting Next to a Building: Where a building is placed close to the sidewalk, the mature size of a tree should be considered when selecting species. Trees with a pyramidal, columnar, or oval shaped canopy are preferable; a tree with a round head is generally unsuitable in this situation.

Overhead Wires: When trees must be planted directly under or when the mature canopy is within 12 feet of overhead utility lines, species with a mature maximum height of 25 feet must be selected.

Street Lighting: Trees need to be located at least half their mature canopy width or 20 feet from street lights, whichever is greater. Planting locations should be coordinated with locations of street lights.

Street Signage: Trees shall be planted to avoid blocking the view of street signage.

Underground Utilities: Trees shall be planted so as to avoid impacts on underground utilities.

Clearance: Trees shall be pruned as they grow to provide at least 8 feet vertical clearance above sidewalks and 14 feet of vertical clearance above roadway surfaces.

10.08.2.2 Root Direction Devices

All street trees shall use a root direction device to deflect tree roots downward into the soil. Any tree planted on public or private property within 10 feet or less of a sidewalk or curb shall be planted with a root directional device. These devices are used to eliminate damage to sidewalks as the tree roots extend beyond the original planting pit.

The root barrier shall be placed along two sides of the tree, parallel to the sidewalk and to the curb line. Under specific circumstances, wider strips that contain utilities may also need root barriers to reduce conflicts. Plan submissions shall indicate the location of root barriers and provide a specification sheet on the product to be used.

10.08.2.3 Tree Planting Wells and Grates

See Standard Detail T-06.

Street trees planted in wells with grated covers are required along streets in the Downtown Urban Corridor Zone (DUC Zone) and as designated by the City Engineer.

10.08.2.4 Tree Selection

Table 10-7A provides several acceptable species of trees. Many other trees are appropriate and alternative selections may be proposed if desired. Alternative plant choices must be evaluated and approved by the City. Needled evergreens shall not be allowed in landscape strips. Trees with mature heights of over 35 feet shall not be allowed.

Selection of street trees should consider the following:

- **Size** of the landscape strip
- **Canopy shape**

The guidance offered below includes information about which tree canopy shapes work best under different conditions. **Table 10-7A** offers information about tree species and their canopy shapes:

V-Shaped Trees: (sometimes also called “vase shaped”) have canopies that are narrow toward the bottom and broad at the top. The American Elm is a classic street tree with this shape. V-shaped trees may have arching branches that form a canopy over both street and sidewalk. They generally do not cause problems with overhead power lines or traffic.

Pyramidal Trees: or cone-shaped are typically broad at the base of the canopy and are somewhat pointed at the top. Planted close together, pyramidal trees can screen unwanted views or create vistas. Lower branches sometimes droop with age and may have to be limbed up in later years to provide the needed clearance.

Round Trees: These are generally wide spreading trees that need more space than other shapes.

Oval Trees: taller than they are wide and cause less interference with traffic.

Columnar Trees: useful in locations where there is little available room between the street and buildings, awnings, or other features. Branches of columnar trees tend to grow up rather than out. Many branch lower than other types of trees without causing problems with traffic or pedestrians.

- **Size and type** of leaves
- **Root shape**
- **Site environmental conditions**, such as the amount of sunlight available or moisture in the soil.
- **Aesthetic** qualities desired.

Table 10-7A Street Trees

Botanical Name	Common Name	Mature Height (ft.)	Mature Canopy Width (ft.)	Landscape Strips/ Grates	Medians	Canopy Shape	H20 Req	Sun	Remarks
Acer campestre	Queen Elizabeth Maple 'Evelyn'	35	30	x		Oval	Mod	Sun/ part. sun	Hardy tree
Acer ginnala	Amur Maple 'Flame'	20	20	x		Round	Mod	Sun/ part. sun	Good power line tree.
Acer grandidentatum	Rocky Mt Glow Maple 'Schmidt'	25+	15	x	x	Round	Mod	Sun/ part. sun	Requires pruning for clearance
Acer truncatum x A. platanoides	Pacific Sunset Maple 'Warrens Red'	30	25	x	x	Round	Mod	Sun	Good fall colors
Amelanchier x grandiflora	Serviceberry 'Princess Diana'	20	15	x		Upright/ round	Mod	Sun/ part. sun	Small tree, red in fall
Amelanchier x grandiflora	Serviceberry 'Autumn brilliance'	20	15	x		Upright/ round	Mod	Sun/ part. sun	Resistance to ice breakage
Carpinus betulus	Frans Fontain Hornbeam	35	15	x	x	Col	Mod	Sun	
Cercidiphyllum japonicum "Rotfuchs"	Red Fox Katsura	30	16	x	x	Oval	Mod	Sun	
Fagus sylvatica	Red Obelisk	35	12	x	x	Col	Mod	Sun	
Malus	"Marilee"	24	10	x	x	Cone	Mod	Sun	No fruit. Good power line tree.
Prunus	Mt. St. Helens Plum 'Frankthrees'	20	20	x	x	Round	Mod	Sun	Hardy tree. Good power line tree.
Prunus	Snow Goose Cherry 'Snowgoose'	20	20	x		Upright spreading	Mod	Sun	Disease resistant. Good power line tree.
Prunus cerasifera	Flowering Plum 'Krauter Vesuvius'	30	15	x	x	Round	Mod	Sun	
Prunus sargentii	Cherry 'Columnarus'	35	15	x	x	Col	Mod	Sun	Fast grower.
Prunus serrulata	Flowering Cherry 'Amanogowa'	20	6	x	x	Vase	Mod	Sun/ part. sun	Short lived. Good power line tree.
Prunus x hillieri	Cherry 'Spire'	30	10	x	x	Col	Mod	Sun/ part. sun	Good fall colors.
Prunus x yedoensis	Flowering Cherry 'Akebono'	25	25	x		Round/ vase	Mod	Sun	Best pick for region. Good power line tree.
Pyrus calleryana	Pear 'Redspire'	35	25	x	x	Pyramid	Mod	Sun	Susceptible to fire blight
Pyrus calleryana	Pear 'Autumn Blaze'	30	25	x		Round	Mod	Sun	Susceptible to fire blight
Tilia americana	Linden 'Redmond'	35	20	x	x	Pyramid	Mod	Sun/ part. sun	tolerant to wet soil
Tilia cordata	Linden 'DeGroot'	30	20	x	x	Pyramid	Mod	Sun/ part. sun	
Tilia cordata	Chancelor Linden 'Chancole'	35	20	x	x	Pyramid	Mod	Sun/ part. sun	Good street tree
Carpinus betulus	Pyramidal European Hornbeam 'Fastigiata'	35	25	x	x	Col	Low	Sun/ part. sun	Very urban tolerant, good street tree

10.08.3 Ground Cover Planting

Table 10-7B provides several acceptable species of ground covers and, shrubs less than 3 feet high. Many other types of plants may be appropriate and alternative selections may be proposed if desired. Alternative plant choices must be evaluated and approved by the City. The SWMM (Ecology Stormwater Management Manual, Volume 5, Table V-9.4.5) shall be utilized to select groundcover plantings within the wet areas of bio-retention facilities.

Groundcover shall be planted from either four-inch pot with 12-inch spacing or one-gallon pot with 18-inch spacing. Alternative spacing of particular species may be approved by the City if documentation concerning the effectiveness of the groundcover is submitted with the landscape plan.

Table 10-7B Ground Cover

Botanical Name	Common Name	Mature Height (ft.)	Can be utilized in: M (Medians), L (Landscape Strips)	Minimum Planting Area Width (ft.)	Sun/ Moisture	Obvious Flowers
Arctostaphylos Una-Ursi	Kinnikinnick Bearberry	0.5 to 1	M, L	5 to 6'	Full sun to partial shade	Yes
Ceanothus Gloriosus	California Wild Lilac	1.5	M	6' to 8'	Full sun	Yes
Cotoneaster Dammeri	Bearberry Cotoneaster	< 2	M	5 to 6 '		Yes
Euonymus Fortunei Coloratus	Purple Leaf Winter Creeper	1.5	M	6' to 8'	Full sun to light shade	Yes
Juniperus Horizontalis	Blue Chip Juniper/Hughes Juniper	1	M	6' to 8'	Full sun	No
Microbiota Decussata	Siberian Carpet Cypress	1.5	M	7' to 8'	Full sun to light shade	No
Rubus Calycinoides	Evergreen Bramble	1	M	6'	Full sun	Yes
Vinca Minor	Periwinkle	0.5	M	1.5'	Full sun to partial shade	Yes

Table 10-7B Ground Cover (Continued)						
Botanical Name	**Common Name**	**Mature Height (ft.)**	**Can be utilized in: M (Medians), L (Landscape Strips)**	**Minimum Planting Area Width (ft.)**	**Sun/ Moisture**	**Obvious Flowers**
Aucuba	Mr. Goldstrike	8	M	7	Part to Full Sun, Moderate Moister	Yes
Thymus Serpyllum	Mother of Thyme	0.25	M	1	Full Sun, Drought Tolerant	Yes
Prunus Lavrocerasus	Otto Lyuken	3	M	6	Full to Part Shade, Needs well drained soil	No
Berberus Thungerii	Japanese Barberry	4	M	5	Full Sun, Low Water	N
Phorium	Wings of Gold	3 – 4	M	3	Sun or Shade	N

10.08.4 Planting Methods and Maintenance

Good horticultural practice shall be employed in the preparation of the soil and planting pits. This will include:

1. Conserving topsoil and replacing it on the site.
2. Performing soil tests.
3. Providing corrective soil preparation as necessary.
4. Ensuring landscaping has adequate bedding and base material (minimum 8 inch deep amended soils over minimum 4 inch layer of scarified/tilled base soils all free of rocks, construction debris, slurry, and other construction material)

10.08.5 Establishment Period

The applicant shall be responsible for maintaining the trees and plants in the public landscape strip, medians and entry features in a healthy condition for one (1) year after acceptance of the project. For landscape strips that do not include irrigation, maintenance will include providing water during dry periods. Weeds, diseases, and insect pests must also be controlled.

10.08.6 Irrigation Systems

Irrigation systems in the public right of way shall conform to Auburn City Code and shall adhere to the standards specified in the City of Auburn Construction Standards.

10.09 Mailboxes

See Standard Details T-07 thru T-09.

Locating and installing mailboxes in connection with the construction or reconstruction of a City street shall follow AASHTO and Post Office guidelines.

10.09.1 Mailbox Locations

Mailboxes shall be located a minimum of 2 feet back from the face of curb on streets which have a curb. For streets without a curb, setbacks shall be determined using ASSHTO standards. When locating mailboxes, access, sight distance, and landscaping requirements shall be taken into account. Final locations shall be detailed on the civil plans and approved by the serving Post Office and the City.

When mailboxes are located in the sidewalk, individually or in clusters, sidewalks shall be widened to provide a minimum 5 feet of clearance around the mailboxes. Widening of the sidewalk may require the dedication of additional right-of way.

10.09.2 Mailbox Installation

The owners or residents served by mailboxes will install and thereafter maintain their own individual, clustered, or separated mailboxes as instructed by the U.S. Postal Service.

10.10 Illumination

10.10.1 General

Roadway lighting is required along all City owned streets except classified Rustic Collectors and Rustic Residential Collectors where only the intersections require lighting. Street lighting design shall be in conformance with the design criteria in the most recent edition of the IES Lighting Handbook (Illuminating Engineering Society of North America) and applicable WSDOT and City of Auburn Design and Construction Standards.

10.10.2 Design

All City street light luminaires shall be LED per Standard Detail T-37.

Table 10-8 has been included as a general guideline for determining illumination sizing and location requirements. Street light standards shall be staggered from one side of the roadway to the other, except where site constraints make single sided lighting more feasible and equally effective. The Applicant shall provide project specific lighting calculations that demonstrate minimum illumination levels will be met. Light level calculations shall be done ignoring any existing substandard luminaires (PSE lights on wood poles, etc.).

Special consideration shall be given for light levels at crosswalks, curves, conflict points and street ends. Roadway lighting levels also are impacted by the type of pavement surfacing and special consideration shall be given for surfaces like concrete roadways. The locations of street lights shall take into consideration any obstacles which may screen or impede lighting levels such as street trees and awnings. Minimum separation between street trees and street lights shall be 20 feet or ½ the mature tree canopy width, whichever is greater.

Marked crosswalks at traffic signal controlled intersections and sidewalks in the Downtown Urban Corridor (DUC) zone shall be lit to a minimum of 2-foot candles.

10.10.3 Lighting Design Schedule

Table 10-8 provides minimum lighting design criteria, lamp attachment types, heights, davit arm lengths, and typical spacing for various roadway classifications in the City. The schedule is based on typical straight roadway sections with a staggered lighting configuration. Wider road sections, curves, intersections, cul-de-sacs, single sided lighting configurations require additional analysis to determine the spacing, height, and davit arm lengths required to achieve the required lighting levels.

10.10.4 Luminaries

See Standard Detail T-37 for LED lamp attachment part schedule.

Luminaires shall meet the general requirements City of Auburn Engineering Construction Standards. Street and Pedestrian Luminaires shall operate on 240 Volt AC and all luminaires shall be full cutoff. All luminaires shall be provided with markers for positive identification of Lamp Attachment Type (**See Table 10-8**). A maximum of 5% voltage drop across each circuit will be permitted.

Table 10-8 Lighting Design Criteria

Street Classification	Lamp Attachment Type (See Standard Detail T-37)	Avg. Light Level (ft-candle)	Uniformity Ratio	Min. Light Level (ft-candle)	Luminaire Mounting Height (ft)	Spacing* (ft)	Davit Arm Length (ft)
Principal Arterial	Type A	1.4	3 To 1	0.2	35**	190	12
Minor Arterial	Type B	0.9	3 To 1	0.2	35	190	12
Minor Arterial w/Center Turn Lane or Median	Type C	0.9	3 To 1	0.2	35	190	12
Non-Residential Collector	Type B	0.9	3 To 1	0.2	35	200	12
Residential Collector	Type D	0.6	3 To 1	0.2	30	175	14
Residential Collector w/Center Turn Lane or Median	Type E	0.6	3 To 1	0.2	30	175	14
Local Non-Residential	Type D	0.6	3 To 1	0.2	35	160	12
Rustic Roads**		N/A	N/A	N/A	N/A	N/A	N/A
Local Residential and Local Residential Alternate	Type F	0.4	6 To 1	0.1	30	185	8

* Standard spacing is for staggered arrangement on flat, straight, roadway with the City standard cross section. Spacing where these conditions do not apply shall be determined using analytical methods in accordance with the most recent edition of the IES Lighting Handbook (Illuminating Engineering Society of North America). All design inputs besides spacing shall be held to the specifications listed in Table 10-8.

** Lighting for rustic roads shall be at intersections only.

10.10.5 Light Standards

City street light poles shall be “cobra head” style per **Standard Detail T-19** except for streets within the DUC zone that shall be per **Standard Detail T-28**. An alternate street light may be utilized along local residential streets per **Standard Detail T-29**.

Street light poles with double davit arms may be allowed in medians as long as lateral offset/clear zone and other applicable design criteria are met.

Light Standards handholes shall be four inches by six inches nominal non-flush type in accordance with **Standard Detail T-19 with tamper resistant screws**.

10.10.6 Light Standards Foundations

All light poles shall be placed on a foundation. Foundations for light standards shall conform to **Standard Details T-19, T-28, or T-29.**

Luminaire wiring, conduit, and pole placement within street cross sections that have curb, gutter, and sidewalks shall be per **Standard Detail T-18.**

10.10.7 Service Cabinet, Photocell, Foundation, Conduit

See Standard Detail T-21.

All new luminaires shall be connected on an electrical circuit that is connected to a power source through a service cabinet. The service cabinet shall be within 50 feet of the Puget Sound Energy (PSE) point of service connection.

Service cabinets shall be installed behind the sidewalk and at locations that do not impede maintenance access. The cabinet shall be located in the center of the system so there are a near equal number of lights being served on separate circuits from each side of the cabinet. The cabinet shall be labeled with “COA Lighting” and service site address.

The number of luminaires per service will be based upon the type of luminaire and the capacity of the service. Testing may be required to determine if additional luminaires may be added to an existing service.

Service cabinets shall include “SST” Series model “SST-IES” or approved equal in conformance with the City of Auburn Engineering Construction Standards. A bypass switch shall be required inside the service cabinet, clearly marked “PE Bypass”. One photocell will be required per service cabinet.

Street light conduit shall be per the City of Auburn Construction Standards.

10.10.8 Junction Boxes

See Standard Detail T-20.

A. Street Junction boxes shall conform to **Standard Detail T-20.** Junction boxes shall be of the type specified on the plans and shall conform to the requirements of **WSDOT Standard Plan J-40.10.** All junction boxes shall be locking.

B. Type 1 junction boxes shall be located adjacent to the sidewalk within the landscaping strip, if provided, or adjacent to the back of sidewalk if a landscape strip does not exist, or within the shoulder of a non-curbed roadway.

10.11 Survey Monuments

See Standard Details T-11

Survey monuments shall be placed or replaced in accordance with WAC 332-120 (Survey Monuments – Removal or Destruction), and RCW 58-09.120 and good practice in land surveying. Monuments are required along the centerline of improvement of all new or reconstructed streets. Monuments shall be placed at intersections, P.C. (points of curvature), and P.T. (points of tangency).

All existing survey monuments that are disturbed, lost, or destroyed during construction shall be replaced by a registered land surveyor registered in the State of Washington at the expense of the responsible builder or applicant. Any monument set shall be permanently marked with the certificate number of the Professional Land Surveyor setting it (which shall be the same Professional Land Surveyor that prepares and certifies the associated monument recording information).

10.12 Guardrail

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

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

10.13 Bollards

See Standard Detail T-03.

When necessary to deny vehicle access to an easement, tract, or trail (except for maintenance or emergency vehicles) the point of access shall be closed by a line of bollards. These shall include one or more fixed bollards on each side of the traveled way and removable, locking bollards across the traveled way. Spacing shall provide one bollard on centerline of the trail and other bollards at a maximum spacing of 3 feet to preclude vehicular access. Bollard design shall be in conformance with **Standard Detail T-03.** Fire access roads shall not be blocked in this manner without the concurrence of the Fire Marshal. Bollards are considered fixed roadside objects and shall meet separation requirements described in Section 10.17.

10.14 Bus Transit Facilities

This section provides the minimum design standards to be used in the design of bus transit facilities in the City of Auburn. Bus facilities shall be designed, located and installed in cooperation with appropriate operating transit agency.

When determined appropriate by the City Engineer, or requested by a transit service agency, an applicant for new or expanded development is required to consult with King County METRO, Pierce Transit, and/or the Muckleshoot Indian Tribal Transit to determine the practicality of how the site can be served by transit oriented improvements such as bus pullout lanes, bus stops, or other appurtenances.

10.14.1 Transit Stop Requirements

Bus stops are located, designed and installed as part of a cooperative effort between the City and the operating transit agency. Bus stops are managed as part of a right of way use permit granted by the City to the operating transit agency. In general bus stop location and design decisions should follow the facility design guidelines of the operating transit agency. The King County Metro Transit Planning Office or Pierce County Transit should be contacted for specific design questions.

10.14.1.1 Locations for Bus Stops

In general bus stop location and design decisions should follow the facility design guidelines of the operating transit agency. The following are guidelines that indicate where bus stops are appropriate:

A. Projected or existing passenger boarding and debarking demand warrant a stop.

B. Traffic characteristics and street design make the location safe to stop a transit vehicle.

C. The location meets the facility guidelines and fleet specifications of the operating transit agency.

D. The stop is required to be accessible to the physically challenged (Americans with Disabilities Act).

10.14.1.2 Bus Stops Features

In general bus stop location and design decisions should follow the facility design guidelines of the operating transit agency. The following are some guidelines that would indicate what type of treatment would be appropriate by type of bus stop.

A. Shelters should be installed at bus stops with an existing or estimated 25 or more boarding per day.

B. Benches should be installed at bus stops with an existing or estimated 15 or more boarding per day.

C. Trash receptacles should be installed and maintained by the operating transit agency at all bus shelters. A sign should be placed indicating that the shelter stop is maintained by the operating transit agency and giving specific contact information to report problems with the stop including a phone number.

D. At all bus stops experiencing 15 or more boarding per day trash receptacles may be placed by the City or adopt a spot group and should be maintained by the City or the adopt a stop group.

E. Information schedules and schedule holders shall be placed at all inbound stops (stops where buses are headed toward a major Central Business District), at all transfer points and at heavily used outbound stops.

F. Additional bus stop lighting should be provided at locations where lighting levels are determined to be less than 3 foot candles.

G. The stop should be accessible to the physically challenged (meeting the requirements of the Americans with Disabilities Act).

H. Bus pullout lanes may be required where bus queuing or staging is required by the transit agencies operations and at the discretion of the City Engineer. The following are guidelines that would indicate pullouts would be appropriate:

    i. Traffic and passenger boarding and debarking conditions warrant.

    ii. Traffic flow would be greatly hindered due to in lane stopping.

    iii. The posted speed limit is in excess of 30 mph.

10.14.2 Bus Pullout Lanes

Bus pullout locations shall meet the following requirements:

A. Placement of bus pullouts shall be on the far side of signalized intersections and non-signalized intersections immediately following the intersection. Distance between pullouts should not be less than 1,000 feet.

B. If far side pullouts are not possible, nearside pullouts will be evaluated. Mid-block pullouts are discouraged. If a situation arises where a mid-block bus pullout is the only option, pullouts should be constructed on both sides of a two-way street in a complementary pair.

C. Maintaining adequate separation between access points, intersections, and bus pullouts can increase the safety and efficiency of both the roadway and the transit service.

D. When locating a bus pullout consideration shall be given to existing access points and where passengers have safe and direct access to sidewalks, crosswalks, ramps, or other pedestrian facilities. Consideration shall also be given to trip attractors, and activity centers.

E. Bus pullouts must meet sight distance requirements.

F. Shall be designed in accordance with the applicable operating transit agency's guidelines.

G. Designs must follow applicable guidelines of the Americans with Disabilities Act.

10.15 Traffic Control Devices

Traffic Control devices are all signs, signals, markings and other devices used to regulate, warn, or guide traffic. All traffic control devices shall meet the requirements of FHWA's latest adopted version of the Manual on Uniform Traffic Control Devices (MUTCD) and the standards herein.

10.15.1 Median Islands

Median Islands are raised barriers constructed between opposing lanes of travel. Median Islands are generally restricted to classified roadways and may be required in order to:

1. Control access along a corridor, or
2. Provide a traffic calming element.

Median Islands shall be designed using the same geometric criteria as the street on which they will be constructed. Medians shall also meet the following requirements:

A. **Median Ends:** Median ends shall be flared at intersections and at breaks to allow for transitioning traffic, ease of street sweeping and shall include signage in accordance with MUTCD requirements.

B. **Width:** Median islands shall be a minimum curb to curb width of 8 feet when landscaped and a minimum of 4 feet in width when paved.

C. **Shy Distance**: 1 foot minimum shy distance shall be maintained from face of median curbs to edge of travel lanes.

D. **Landscaping/Paving:** Landscaping in medians shall conform to the requirements of **Section 10.08**. Median paving shall be stamped asphalt with colors and patterns approved by the City.

E. **Irrigation:** Landscaped medians shall include irrigation systems.

F. **Illumination:** Street lights on streets with median islands 8 feet in width and greater shall be located in the medians using dual arm posts and shall meet the minimum light level requirements of **Section 10.10**.

G. **Maintenance Access:** Median islands 8 feet in width and greater shall provide a paved maintenance staging area 50 feet in length with mountable curbs. Median islands smaller than 8 feet in width shall include one 50 foot break in the median per block.

10.15.2 Mountable Curbs

Mountable (also referred to as "C" Curbs), are curbs used for the restriction of turning movements and to aid in the channelizing of traffic. Mountable curbs may be required in order to control access along a corridor within the restricted zones of any functional intersection boundary as defined in **Section 10.04**.

Mountable Curbs constructed to retrofit existing roadways shall be constructed per **Standard Detail T-32**. Mountable Curbs constructed on new roadway surfaces shall be cast-in-place curb per WSDOT Standard Plan F-10.12 (Mountable Cement Concrete Traffic Curb – Dual Faced). All Mountable Curb shall be painted to match the adjacent roadway striping (yellow or white) and shall be marked with raised pavement markers and flexible tubular delineators at the beginning and end sections as shown on **Standard Detail T-32**. Mountable curbs shall be designed to account for roadway drainage.

10.15.3 "Pork Chop" Islands

"Pork Chop" Islands are barrier islands used to restrict turning movements at driveways. They may be required at any driveway where left turns are restricted and Median Islands or Traffic "C" Curb installation is not feasible. When required, Pork Chops shall be accompanied by appropriate turn restriction signing and pavement markings.

10.15.4 Signing

All signing shall be per the "Manual on Uniform Traffic Control Devices" (MUTCD) and City of Auburn Engineering Construction Standards.

Developments shall be responsible for providing and installing all traffic control signs, including but not limited to street name signs, regulatory signs, warning signs, barricades, and bicycle/pedestrian signs as required.

Sign posts shall be installed per **Standard Detail T-24.**

Mast arm mounted street name signs shall be per **Standard Detail T-25.**

Post mounted street name signs shall be per **Standard Detail T-26.**

10.15.5 Pavement Markings

Pavement markings, raised markers, or striping shall be used to delineate channelization, lane endings, crosswalks, and longitudinal lines to regulate, warn or guide traffic. The City shall approve all channelization plans and crosswalk locations.

10.15.5.1 Crosswalks

See WSDOT Standard Plan M-15.10.

Crosswalks shall be installed at all intersections controlled by traffic signals and other areas approved by the City. Crosswalks shall be a piano key design consisting of white thermoplastic material. The position of the crossbars should be spaced in such a way as to allow the majority of wheel traffic to pass in the unpainted space.

10.15.5.2 Left-turn Channelization

See WSDOT Standard Plans M-3.20 & M-3.40.

Left-turn channelization shall include a minimum of 150 feet of full-width lane to include storage and a reverse curve 90 feet in length for posted speed up to 45 mph. The reverse curve may be included in the taper distance. The standard width of a left-turn lane will be 11 feet. Left-turn arrows per **WSDOT Standard Plan M-24.40** shall be installed 25 feet behind the stop bar. Additional storage may be required for long vehicles or anticipated left-turn queues longer than the minimum storage. If storage length exceeds one hundred 150 feet, auxiliary turn arrows will be installed at 100 foot intervals. Deviation requests from the minimum left turn lane storage requirements will need a traffic study submittal and approval by the City Engineer.

Left-turn Lane at End of Two-way Left-turn Lane

See WSDOT Standard Plan M-3.40.

Left-turn lane at the end of two-way left-turn lanes shall conform to **WSDOT Standard Plan M-3.40**.

Dual Left Turn

See WSDOT Standard Plan M-3.50.

10.15.5.3 Lane Division

See WSDOT Standard Plan M-20.10 and Standard Detail T-12.

All pavement markings used to separate or channelize traffic shall conform to the referenced Standard Plans and to the City of Auburn Construction Standards.

10.15.5.4 Painted Islands

Painted islands will be allowed on a case-by-case basis with approval from the City Engineer. Pavement markings for painted islands shall meet the MUTCD requirements.

10.15.5.5 Two-way Left-turn Lanes

See WSDOT Standard Plans M-3.20 & M-3.40

The installation of two-way left-turn lanes on City streets will be determined by the City based on street classifications and left turn requirements. The minimum width of a two-way left-turn lane shall be eleven feet (11'). The delineation lines shall be SBY (Single Broken Yellow) and a SSY (Single Solid Yellow) along the opposing lanes per the MUTCD. Two-way traffic arrows shall be spaced every one hundred fifty feet (150') along this lane. The designer should pay special attention to the beginning and endings of this type of lane and use clearly defined tapers or islands to maintain traffic safety.

10.15.5.5 Other Pavement Markings

Railroad crossing marking shall be per **WSDOT Standard Plan M-11.10.**

Right turn lanes shall be marked per **WSDOT Standard Plan M-5.10**.

10.15.6 Construction Area Temporary Traffic Control

The contractor shall be responsible to provide and maintain all signs, barriers, warning lights, striping, and flag control required for maintaining public safety in construction areas. Traffic control shall be maintained at all times when construction is in progress on all streets, and access points in the construction area.

Construction activities will not be allowed in the public right of way without an approved traffic control plan.

10.15.7 Roadway Barricades

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

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

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

C. In the general case, Type III barricades shall be installed to close arterials or other through streets hazardous to traffic. They shall also be used to close off lanes where tapers are not sufficiently delineated.

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

10.15.8 Traffic Signals

Traffic signals shall be designed and constructed in accordance with **Sections 8-20, 9-29**, and other applicable sections of the Construction Standards. WSDOT Standard Plans shall be utilized except the following elements that shall be per City of Auburn Standard Details:

Traffic Signal Controller and Foundation **Standard Detail T-22**

Telecommunication and Luminaire Electrical Trench **Standard Detail T-23**

10.16 Traffic Impact Analysis

The City of Auburn has established guidelines for Traffic Impact Analysis that are herein adopted by reference. These guidelines are used to identify capacity and safety concerns, to assist in the evaluation of site design as it relates to traffic engineering issues, and to identify appropriate solutions and mitigation.

To adequately assess a development's traffic impact, the City Engineer may require a Traffic Impact Analysis. The requirement for a Traffic Impact Analysis will be based on the size of the development proposed, existing street and intersection conditions, traffic volumes, accident history, safety considerations, community concerns, and other pertinent factors relating to traffic impacts attributable to the development.

10.16.1 When Traffic Impact Analyses are Required

The following is a list of some specific conditions that may dictate the requirement for preparing a Traffic Impact Analysis.

- The development generates more than 30 PM peak hour trips on a corridor.
- The development may potentially affect the implementation of the street system as outlined in the Comprehensive Transportation Plan and Six Year Transportation Improvement Program (TIP), or of any other documented transportation project.
- The development proposes a rezone of the subject property.
- The original Traffic Impact Analysis for a future development is outdated due to changes in traffic volumes in the vicinity of the proposed project or approved pipeline projects or a change in the proposed land use's trip generation and/or distribution.
- The development could potentially affect safety or requires an analysis to assist in designing appropriate access.

10.16.2 Elements of a Traffic Impact Analysis

Each development traffic review is different and, as such, each traffic study should be cooperatively designed to address the city's specific concerns. Traffic impact analyses are therefore required to be scoped by and with the City Engineer. They may include all or some of the following elements:

- Corridor Level of Service analyses,
- Intersection Level of Service analyses,
- Access point level of service analyses,
- Critical gap analyses,
- Horizontal and vertical sight distance analyses,
- Roundabout analyses,
- Traffic signal warrant analyses,
- Stop control warrant analyses,
- Turn lane warrant analyses,
- Access management design,
- Other analyses and information as required by the City Engineer.

10.16.3 Special Uses

Special event land uses which do not exhibit typical trip generation characteristics may require unique analysis, including but not limited to weekend and off-peak scenarios, and AM versus PM time frames. Examples of such uses would be concert stadiums, racetracks or uses which exhibit substantial traffic peaking associated with special events that are scheduled on a periodic basis.

The traffic analysis for such uses may include a traffic management plan to control traffic impacts associated with the special events.

10.16.4 Mitigation Identification

In order to protect the public from potentially adverse impacts of the proposal, to fulfill an identified need for public services within the impacted area related to the development, or both, the Traffic Impact Analysis shall identify methods of mitigating on-site and off-site deficiencies for present and proposed phases of the development. The analysis shall make recommendations for improvements necessary for safe and efficient traffic flow and bicycle, pedestrian, and transit movement and access proportional to the identified impacts. Build-out Year, Long-Range Forecast Year, and project phasing impacts shall be considered. All or some of the following items are to be included in the mitigation identification:

- Methods for mitigating on-site impacts and mitigation recommendations,
- Methods for mitigating off-site impacts and mitigation recommendations,
- Discussion of whether on-site and off-site improvements are justified, reasonably related to, and proportional to the impacts of the proposed development,
- Any requirements or mitigation measures associated with the Area Circulation Plan.

10.16.5 Recommendations

The Traffic Impact Analysis report shall clearly state the mitigation measures recommended by the analysis and shall summarize how the recommended mitigations are proportional to the identified impacts. The recommended street and highway mitigation measures shall be explained in sufficient detail in the analysis to allow them to be understood and evaluated. The recommendation shall also include the following:

- Clear statements of the applicant's recommended mitigation measures.
- Scaled drawings depicting recommended mitigation improvements and their relationship to existing and proposed conditions if drawings are needed.

10.16.6 Area Circulation Plan

Area Circulation Plans are plans which support the development of a multi-modal transportation network with safe, efficient and pleasant routes for pedestrians, bicyclists, transit users, and motor vehicle occupants. The plan recognizes the link between land use and transportation planning and promotes land use and development patterns that encourage walking, bicycling, and transit use.

The goal of an Area Circulation Plan is to "provide a transportation system that will facilitate the safe and efficient movement of people and goods throughout the community while supporting the designated Land Uses in the Comprehensive Plan." This goal applies to all aspects of circulation including: vehicular, mass transit, bicycle, and pedestrian. In order for the City of Auburn to successfully meet the vision set forth in the Comprehensive Plan, the Area Circulation Plan will need to address a variety of transportation modes to facilitate the convenient and efficient movement of people in and near new development.

Area Circulation Plans are required for all new development of general commercial and industrial property. They also may be required for land uses which do not exhibit typical trip generation characteristics that require unique analysis, including but not limited to weekend and off-peak scenarios, and AM versus PM time frames.

The Area Circulation Plan shall include sufficient information to adequately assess the functionality of the proposed development and its impact on surrounding properties and circulation systems, including but not limited to:

- Mapping details, such as site boundaries and dimensions, site acreage, vicinity map, north arrow, scale, title block, etc.;
- Access to the site and interior site circulation;
- Proposed lot layout;
- Other items which may impact adjacent property, such as general parking arrangement, delivery truck/dock locations, medians or traffic control devices, median breaks, and other information as deemed necessary by the City Engineer and Planning Director.

Any development or subdivision of the property shall generally be consistent with the Area Circulation Plan as approved or amended. No plat, building permit, or certificate of occupancy shall be issued for the property unless all construction and development generally conforms to the Area Circulation Plan.

10.17 Clear Zone – Lateral Separation

The following standards apply to all new or replaced facilities and do not obligate the City to retrofit or replace existing facilities for the sole purpose of meeting the standards below.

The City has adopted 4 feet as the minimum lateral separation from the face of curb to fixed objects for streets with vertical curbs within the urban environment. **Utility poles along streets with vertical curbs within the urban environment require minimum 6 feet lateral separation from edge of vehicular travel way.** Under many conditions, additional lateral separation shall be required to provide adequate clear zone per the AASHTO Roadside Design Guide. These conditions include, but are not limited to: streets without vertical curbs, horizontal curves, proximity to driveways, high design speeds (in excess of 45mph), merge locations, accident history, roadways that are not built per existing City standards, and other conditions as deemed applicable by the City Engineer. Reduced minimum lateral separation along roadways with design speeds of 35 mph or less is allowed for street trees centered within landscape strips and for mailboxes. Minimum separation from the face of curb to any non-fixed roadside object is 2 feet.

Table 10-1 Summary Matrix of Minimum Street Design Requirements

CLASSIFICATION	SECTION	PRINCIPAL ARTERIAL	MINOR* ARTERIAL	RESIDENTIAL* COLLECTOR	NON-RESIDENTIAL COLLECTOR	RUSTIC COLLECTOR	LOCAL RESIDENTIAL**	LOCAL NON-RESIDENTIAL	RUSTIC RESIDENTIAL
Average Daily Traffic (ADT)	1.00	Over 15,000	10,000 – 15,000	2,500 – 10,000	2,500 – 5,000	1,000 – 5,000	Up to 1,200	Up to 1,200	Up to 1,000
RIGHT-OF-WAY									
Width (ft.) [6]	10.02.8	82/87	71/82	55/66	65	60	50	55	50
Intersection Radii- Min. (ft.)	10.02.9.6	29.5	24.5	14.5	19.5	17	9	19.5	7
TRAVELWAY									
Roadway Width (ft.) [6]	10.02.9	61	50/61	34/45	44	28	28	34	24
Curb and/or Curb and Gutter	10.02.9.4	Y	Y	Y	Y	N	Y	Y	N
Number Of Lanes	10.01	5	4/5	2/3	3	2	2	2	2
Inside Through Lane Width (ft.)	10.02.9.1	11	11	N/A	N/A	N/A	10	N/A	N/A
Curb Lane Width (ft.)	10.02.9.1	14	14	11	16	14	10	17	12
Center Turn Lane Width (ft.)	10.02.9.2	11	11	11	12	N/A	N/A	N/A	N/A
Bikeway Class/Width (ft.) [5]	10.06	Cl. 1 / 10	Cl. 1 / 10	Cl. 2 / 6	N/A	Cl. 3	N/A	N/A	N/A
Intersection Curb Radii (ft.)[1]	10.02.9.6	40***	35***	25***	30***	30	20	30***	20
Parking Allowed/Width (ft.)	10.02.9.5	N	N	N	N	N	Y, one side	N	Y/ two-sides[4]
ROADSIDE									
Shoulder Width (ft.)	10.02.9.4	N/A	N/A	N/A	N/A	8	N/A	N/A	3
Sidewalk Width (ft.)	10.05.1	10	10	5	10	0	5/7.5	10	0
Street Trees with Grates[9]	10.08	N[9]	N[9]	N	N[9]	N	N	N[9]	N/A
Landscape Strip Width (ft.)	10.08.1	5 w/ Cl. 1 trail[5]	5 w/ Cl. 1 trail [5]	5	N/A	N/A	5.5/8.5	N/A	N/A
Illumination	10.10	Y	Y	Y	Y	Only at Intersections	Y	Y	Only at Intersections
INTERSECTION									
Min/Max Horizontal Approach Angle	10.04.1.2	90° ± 5°	90° ± 5°	90° ± 5°	90° ± 5°	90° ± 5°	90° ± 5°	90° ± 5°	90° ± 5°
Minimum Landing Approach Length (ft.)	10.04.1.5	30	30	20	20	20	20	20	20
Maximum Landing Approach Grade (%)	10.04.1.5	3	3	5	5	5	5	5	5
GEOMETRIC DESIGN CRITERIA									
Posted Speed (mph) [2]	10.02.7	45 / 40 / 35	35 / 30	30	30	40 / 35 / 30	25	30	25
Design Speed (mph) [2]	10.02.7	55 / 50 / 45	45 / 40	35	35	45 / 40 / 35	30	35	30
Min. Horizontal Curve Radius (ft.)[2, 8] (For Standard Cross Section)	10.02.1	9720 / 8150 / 4930	1121 / 821	544	544	1125 / 821 / 544	333	510	333
Min. Tangent Between Reverse Curves (ft.) [2]	10.02.2	150	150	150	150	150	100	150	100
Maximum Rate of Superelevation, e (%)	10.02.3	8	8	0	0	8	0	0	0
Max. Vertical Grade (%)[2, 3,7]	10.02.4	6	6	8	8	8	8	8	8
Cross Slope (%)	10.02.6	3	3	3	3	3	2	2	2
DRAINAGE									
Closed System	6.00	Y	Y	Y	Y	Only at Driveways	Y	Y	Only at Driveways
Open System	6.00					Y			Y

* May require center turn lane and/or medians as determined by the City Engineer in consideration of adjacent land use.

** Alternate section may be utilized to address Low Impact Development, Minimum Landscape Area, Traffic Calming, and other design standard requirements.

*** Intersection Curb Radii reduction may be permitted by City Engineer with approved documentation of design vehicle turning accommodation without impacting opposing traffic lanes

1 At intersections with two different street classifications, use the highest classification for curb radii except at intersections with residential streets where the lowest order street shall be used

2 Table values are for standard cross sections with a relatively level grade and are for reference only. For accurate design values reference the AASHTO Manual "A Policy on Geometric Design of Highways & Streets."

3 Vertical curves will be required when the algebraic grade difference is more than 1%.

4 Parking shall be located where space is available, outside of the required three-foot (3') shoulder.

5 The construction of separated bikeways shall be required in conjunction with street projects when designated by the Comprehensive Plan.

6 Required pavement and right-of-way widths may be greater than that shown to accommodate medians and/or bike lanes as required to meet Comprehensive Plan designations or to address traffic calming. See Section 10.06.

7 Vertical grades may be increased to 10% for non-arterial streets upon approval of the City Engineer.

8 Minimum radii are for streets designed using the recommended cross slopes listed above. Minimum street radii for Arterials and Rustic Collectors may be reduced by superelevating the street section per the requirements above. Horizontal curve radius for local Residential roads may be reduced to 100 feet with approval of the City Engineer where speeds of 20mph or less are justified or approaching cul-de-sac's

9 Street trees in grates are required for this street classification only where the street lies within the limits of the Downtown Urban Corridor (DUC Zone)

Chapter 11 City Telecommunication Utility

11.00 Preface

The design of City Telecommunications facilities located within City right-of-way shall be in conformance with these standards.

Compliance with these standards does not alleviate the design engineer from using sound professional engineering practices. The design criteria contained herein are the minimum acceptable under standard conditions. Special conditions may require more stringent requirements that will be addressed during the plan review process.

City telecommunications facilities shall be included in the Public Facility Extension Agreement (FAC) between the developer and the City when the Agreement includes street improvements per ACC 12.64.

11.01 Design Criteria

The City has established the following minimum requirements to ensure the efficient construction of City telecommunication utilities with the least impact to City transportation and other utility infrastructure. The design of City telecommunications facilities shall also meet the requirements of **Section 9.01.2**, Public and Private Utilities Located Underground Within City Right-of-Way with the exception that a construction permit is not required if this work is completed as part of a Facility Extension Agreement.

City telecommunications facilities may be required in conjunction with street improvements on all roadways classified as Arterial or Collector. Such facilities, when required, shall be extended the full length of the street improvement. When feasible, placement of the facilities shall accommodate connection with other existing or future telecommunication facilities within the corridor.

11.01.1 Conduits

City telecommunication conduits shall be 3-inch PVC Schedule 40 and shall have a minimum of 24 inches of cover and, except for street crossings, shall be located under the sidewalk per **Standard Detail T-23.** If no sidewalk is included in the scope of the required street improvements, the conduit will be installed in the most feasible location within the street construction limits as directed by the City. Roadway crossings shall be minimized and sweeps shall be long sweep 90-degree bends. Trace wire shall be placed within the conduit. Conduits shall be placed a minimum of 5 feet from other utilities.

11.01.2 Splice Vaults and Pull Boxes

When required, splice vaults and pull boxes shall be per **WSDOT Standard Plans J-90.21 and J-90.10,** respectively, except that lid marking lettering shall be as specified in the Construction Standards and lids shall not be marked with WSDOT logos or text indicating WSDOT. Splice vaults shall be placed every 1,500 feet. Pull boxes shall be placed every 500 feet and at all arterial and collector intersections.