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**CITY OF TUKWILA
PUBLIC WORKS DEPARTMENT**

DEVELOPMENT GUIDELINES

AND

DESIGN AND CONSTRUCTION STANDARDS

SECOND EDITION
REVISION 1
2005

AVAILABLE ON-LINE AT:
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Second Edition
Revision 1

Revision 1 to the second edition of the Infrastructure Design and Construction Manual consists of updates to the text provided by Public Works staff and addition of new figures to the surface water, flood, water supply, and sanitary sewer chapters. This revision does not include changes to typical details

Links are
shown in
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DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

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CHAPTER 1 INTRODUCTION

1.0 PURPOSE

These standards are intended to ensure consistent design and construction requirements and adherence to the City's comprehensive plans.

It is this City's policy to maintain a high level of quality in the construction of public facilities. The standards detailed herein have been prepared to foster consistent requirements of quality and value for both public and private construction, and are to be applied to both.

The standards in this document set forth the minimum criteria and specifications for both public and private construction projects. In addition, these standards provide the minimum design and construction requirements for utility and street improvements to be accepted by the City of Tukwila. The Director may substitute more stringent design standards and specifications where special conditions warrant. The Director may relax these standards upon approval of a variance.

These standards shall not substitute for engineering design, nor are these standards intended to limit innovative design where equal performance in value, safety, and maintenance economy can be demonstrated.

1.1 DEPARTMENTS

<u>Public Works Engineering</u> Engineering and Development 6300 Southcenter Boulevard Suite 100 Tukwila, WA 98188 206-433-0179	<u>Public Works Operations and Maintenance</u> Operations and Maintenance 600 Minkler Boulevard Tukwila, WA 98188 206-433-1860
<u>Fire Department</u> Station #51 444 Andover Park East Tukwila, WA 98188 206-433-1859	<u>Community Development</u> Planning/Building/Permit Center 6300 Southcenter Boulevard Suite 100 Tukwila, WA 98188 206-431-3670

1.2 AUTHORITY

Ordinance 1783, filed with the City Clerk, authorizes the Public Works Department to create and to amend these Standards.

1.3 REVISIONS

The City periodically reviews and revises the Standards. Additionally, anyone may submit to the Director a written request for a revision to these standards. The request shall include a brief description of the revision, justification for the revision, and a copy of the proposed text or drawing. If the revision is accepted, the Director revises these standards at the periodic review. Revision request form in Appendix F.

1.4 REFERENCES, STANDARDS, AND CODES

The following lists of references, standards, and codes provide the basis for design and construction requirements for residential, commercial, or industrial development, or construction of public infrastructure within the City. Where conflicts in design and construction requirements arise, these Development Guidelines and Design and Construction Standards (Standards) prevail.

1.4.1 ALL PROJECTS

The City of Tukwila recognizes and uses the most current edition of the following references, standards, and codes.

1. City of Tukwila Standards,
2. City of Tukwila Municipal Code,
3. City of Tukwila Comprehensive Plans, including Sewer, Water, Surface Water, Land Use,
4. Standard Specifications for Road, Bridge, and Municipal Construction, prepared by the Washington State Chapter of the American Public Works Association (APWA) and the Washington State Department of Transportation (WSDOT),
5. Manual on Uniform Traffic Control Devices (MUTCD), U.S. Department of Transportation as amended and approved by Washington State Department of Transportation,
6. King County Surface Water Design Manual (1998),
7. The City's NPDES permit,
8. Sensitive Areas Overlay (TMC 21),
9. State and National Environmental Policy Acts,
10. Shoreline Management Act, State of Washington,
11. Tukwila and King County Shoreline Master Plans,
12. WISHA - Washington Industrial Safety & Health Administration,
13. OSHA - Occupational Safety & Health Administration,
14. All other federal, state and local special requirements.

In cases where the above references, standards, and codes do not cover elements of the project design and construction, the City recognizes and uses the most current edition of the following:

1.4.2 STREETS

1. A Policy on Geometric Design of Highways and Streets, AASHTO English units version,
2. Washington DOT Design Manual, for state highway design,
3. Washington DOT Construction Manual , for state highway construction,
4. Washington DOT Highway Runoff Manual
5. NEC- National Electrical Code,
6. IMSA - International Municipal Signal Association.

1.4.3 SURFACE WATER

1. Washington State Department of Fish and Wildlife Requirements,
2. King County Stormwater Pollution Control Manual,
3. King County Spill Prevention and Control Manual,
4. Stormwater Management Manual for Western Washington, Department of Ecology (for WashDOT projects).

1.4.4 FLOOD ZONE CONTROL

1. Flood Insurance Study, current revision, Federal Emergency Management Agency,
2. King County Flood Hazard Policy,
3. King County Riverbank Stabilization Guidelines,
4. Green River Management (A.G.#85-043),
5. City of Tukwila Allentown Policy #2000-01 Revision 1.

1.4.5 WATER SUPPLY

1. American Water Works Association Standards, Accepted Procedure and Practice, AWWA,
2. Manual of Cross-Connection Control, Foundation for Cross-Connection Control and Hydraulic Research,
3. Backflow Prevention Assemblies Approved for Installation in Washington State, Washington State Department of Health,
4. City of Tukwila Cross Connection Control Program Policy #99-01
5. Standards and specifications of all districts providing service within the City,
6. Uniform Plumbing Code.

1.4.6 SANITARY SEWER

1. Criteria for Sewerage Works Design, Washington State Department of Ecology,
2. Uniform Plumbing Code,
3. Standards and specifications of all sewer districts providing service within the City.

CHAPTER 2 DEVELOPMENT GUIDELINES

2.0 ERRORS AND OMISSIONS

At the Director's discretion, any significant error or omission in the approved plans, or information used as a basis for approval, will constitute grounds for withdrawal of any permit approvals and/or stoppage of any or all of the permitted work. The Permittee shall show cause why such work should continue and make such changes in plans as required by the Director.

2.1 PERMITS

Prior to beginning multifamily-residential, commercial, or industrial development, or development requiring construction of public infrastructure within the City, the Applicant shall submit a permit application, plans, and specifications to the Permit Center for review and approval by the Public Works Department.

Development design and construction shall meet all of the applicable standards, codes, and recommendations in specific reports, such as the geotechnical report, the traffic impact analysis, and the surface water Technical Information Report.

Depending on particular project elements, the Director may require submittals in addition to those described in this chapter.

Any significant changes to the approved plans or specifications of a permitted project require a REVISION submittal to the City for approval.

TYPE A SHORT-TERM NONPROFIT

Issued for 72 hours to nonprofit organizations for assemblies, bike races, block parties, parades, parking, processions, non-motorized vehicle races, street dances, street runs.

TYPE B SHORT-TERM PROFIT

Issued for 72 hours to for-profit entities for fairs, house moves, sales, street closure.

TYPE C CONSTRUCTION

Issued for 180 days for activities in the right-of-way and on private property. These activities include sewer, water, surface water, grading, street improvements, boring, culverts, curb cuts, paving, driveways, fences, landscaping, painting/stripping, sidewalks, trenching, utility installation/repair, traffic signals and illumination.

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TYPE C RIGHT-OF-WAY

Issued for 180 days for activities that will disturb the right-of-way, including boring, installation of culverts, curb cuts, and public facilities, paving, landscaping, and trenching.

TYPE C GRADING

Issued for 180 days for all grading activities occurring within the City limits except the following:

- 1) Excavation for construction of a structure permitted under the International Building Code;
- 2) Cemetery graves;
- 3) Refuse disposal sites controlled by other regulations;
- 4) Excavations for wells, or trenches for utilities;
- 5) Mining, quarrying, excavating, processing or stockpiling rock, sand, gravel, aggregate or clay controlled by other regulations, provided such operations do not affect the lateral support of, or significantly increase stresses in, soil on adjoining properties;
- 6) Exploratory excavations performed under the direction of a registered design professional, as long as this exploratory excavation does not constitute the beginning of construction of a building prior to obtaining a permit.

TYPE D LONG-TERM

Issued for periods greater than 72 hours for activities which do not disturb the right-of-way including: air rights, bus shelters, access to construction sites, loading zones, newspaper sales, recycling facilities, sales structures, sidewalk cafes, awnings, benches etc, underground rights, utility facilities, waste facilities.

TYPE E POTENTIAL DISTURBANCE

Issued for 180 days for activities having a potential to disturb the right-of-way, such as hauling 6 loaded vehicles/hr/8 hr day for 2 or more consecutive days, hauling hazardous waste as defined in the Revised Code of Washington, or surveying (other than for a Tukwila capital improvement project).

TYPE F BLANKET

Issued for 365 days to telecommunications and cable franchisee, and utilities for connections, repairs, and emergencies.

FLOOD ZONE

Any construction or development within any special flood hazard area, including manufactured homes, watercourse alteration, excavation, fill,

requires a Flood Zone Control permit (FZCP). An FZCP grants approval to construct or develop within a special hazard area, a flood-prone area or the shoreline, but does not replace the need for additional permits such as a building permit or a Type C Construction permit.

A permit shall be obtained before construction or development begins within any area of special flood hazard established in TMC 16.52.050. The permit shall be for all structures including manufactured homes, and for all development including fill and other activities.

WATER METER – PERMANENT

Issued for domestic water supply of all new or reestablished services when sewer discharge rates are calculated based on water usage. Each individual building requires a separate water main tap. The fee includes a City-provided water meter.

WATER METER – WATER ONLY

Issued for a separate service from the main for water that will not discharge to the public sewer. The fee includes a City-provided water meter.

WATER METER – DEDUCT

Required to meter water that will not discharge to the public sewer. The Permittee provides, owns, installs, and maintains the meter. This meter is installed downstream of a permanent water meter. An example is landscape irrigation.

WATER METER – TEMPORARY

Required for use of public water, on a short-term basis, where a metered supply does not already exist. The Permittee rents the meter from the City. Examples include dust suppression during construction or water supply during hydroseeding.

2.2 FEES

2.2.1 PERMIT

Public Works establishes and collects fees as set forth in the fee schedule adopted by the City Council. Most of the permit fees are flat rates that are due when the permit is issued. Type C permit fees are based on the estimated construction value of the public works elements in a project. For Type C permits, Public Works collects an *Application and Plan Review Fee* when the application is submitted and a *Permit Issuance and Inspection fee* when the permit is issued.

After the permit is issued, Public Works may assess additional fees for revisions and inspections and may adjust pavement mitigation fees. Any additional fees must be paid before the PUBLIC WORKS Final Inspection occurs.

Public Works charges 25% of the Total Plan Review Fee for each additional review, which is attributable to the Applicant's action or inaction. Each revision to approved plans is charged 25% of the Issuance and Inspection fee. Each reinspection after the first two inspections is charged \$47.00/inspection per inspection item.

Refer to Public Works Bulletin for permit fee estimates.

2.2.2 PAVEMENT MITIGATION

The City calculates the square footage used to determine a mitigation fee according to the following:

- For repairs requiring an overlay, the City uses the total square feet of overlay.
- For pavement repair, the City uses the cut area plus two feet on each side of the cut.

Public Works may adjust this fee when the actual field measurements differ from the proposed measurements shown on the permit application. Any adjustment to the mitigation fees must be completed before the Public Works Final Inspection. Refer to Public Works information Bulletins for a more complete description of Pavement Mitigation fees.

2.2.3 TRAFFIC IMPACT MITIGATION

Traffic impact mitigation fees are based either on the traffic impacts identified in the Traffic Impact Analysis, following SEPA review or during permit plan review.

2.2.4 INDEPENDENT REVIEW

Depending on the site conditions and design complexity, reports submitted to the City may receive independent review. The Applicant pays the review fee.

2.2.5 CONNECTION CHARGES

Some City water and sewer services have special connection charges. When these charges apply, the Applicant shall provide a legal description of the property to aid in calculating the charges.

2.2.6 CAPACITY CHARGES

King County Metro determines the sanitary sewer capacity charge based on the information provided on the Sewer Use Certification form. For new construction within the City's service area and for all tenant improvements within the city limits, the Applicant submits a completed Sewer Use Certification form. This form is available in Public Works. Upon completion of the project work, Public Works forwards the completed form to Metro.

2.2.7 OVERTIME FEES

Inspections that occur during non-regular business hours are subject to “after hours” inspection fees. The Director determines when these inspections are allowed. The fees are charged at the inspector’s overtime-hourly rate and include vehicle, overhead, and expense charges.

2.2.8 SPECIAL BILLING FEES

The City shall charge for any work or services provided by Public Works, such as traffic control or utility relocation, which occurs under an Authorization for Special Billing or provided by Public Works as a response to infrastructure damage during construction.

2.3 SUBMITTALS

2.3.1 PLANS

Plans submitted to Public Works for review and approval, except for single family residences that are not in or adjacent to a sensitive area and that do not trigger surface water drainage review, shall be prepared, signed, stamped, and dated by a Washington State registered Professional Engineer. These plans must be submitted to the City for plan review and approval prior to the commencement of any construction.

Public Works will review all submittals for compliance with these Standards. Plan approval does not relieve the Applicant, the Applicant’s Engineer, or the Contractor from responsibility for ensuring that all facilities are safe and that calculations, plans, specifications, construction drawings, record drawings, and as-built information complies with normal engineering standards, these Standards, and applicable federal, state, and local laws and codes. Refer to Appendix C for a plan completeness checklist.

2.3.2 SPECIFICATIONS

Specifications shall be submitted with the plans, when the plans and notes do not adequately describe the proposed work and materials.

2.3.3 PLAN CHECKLIST

A completed Plan Checklist may be submitted with the plans. The engineer should use the Plan Checklist to ensure the plans meet the specific minimum requirements. A Plan Checklist is included as Appendix C.

2.3.4 EROSION PREVENTION AND SEDIMENT CONTROL PLAN

Any project that will clear, grade, or otherwise disturb a site must provide erosion prevention and sediment controls to prevent, as much as possible, sediment

transportation offsite to downstream drainage facilities and water resources, or onto other properties.

The erosion prevention and sediment control plan shall meet or exceed the standards in the most current edition of the King County Surface Water Design.

2.3.5 POLLUTION PREVENTION PLAN

Any construction project that includes any of the following activities must provide best management practices to prevent pollution:

1. Dewatering
2. Paving
3. Structure construction and painting
4. Material delivery, use, or storage (soil, pesticides, herbicides, fertilizers, detergent, plaster, petroleum products, acids, lime, paints, solvents, curing compounds)
5. Solid waste
6. Hazardous waste
7. Contaminated soils
8. Concrete waste,
9. Sanitary/septic waste
10. Vehicle or equipment cleaning, fueling, or maintenance.

2.3.6 PROJECT SCHEDULE

The project schedule shall include the proposed sequence and expected start and end dates for all major activities. The schedule shall include installation of temporary and permanent erosion prevention and sediment control measures and schedules for monitoring, operation, and maintenance of these measures.

2.3.7 WORK IN RIGHT-OF-WAY

Required permit application submittals when proposing work within City right-of-way include the following (TMC 11.08):

1. Applicant/Owner information
 - Applicant name, address, phone number
 - Owner name, address, phone number (if not the Applicant)
2. Activity Description
 - Cut and fill volumes
 - Location
 - Proposed use
 - Excavation method and areas, surface and subsurface
 - Restoration method
 - Start and end dates and expected duration

3. Plans, profiles, cross sections
4. Copy of franchise agreement, easement, encroachment permit, license or other legal authorization
5. Document from Owner and Applicant saying they are in compliance
6. Hold Harmless Agreement
7. Traffic control plan
8. City of Tukwila business license
9. Copy of the contractor estimate or engineer estimate for the activity being permitted. Public Works will review and may adjust. Any fee adjustment will be made when the permit is issued.
10. Application fee
11. Comprehensive general liability insurance with limits not less than \$2,000,000, naming City of Tukwila as additional insured,
12. Business automobile liability insurance with limits not less than \$1,000,000.
13. Contractor's pollution liability insurance, on an occurrence form, with limits not less than \$1,000,000 each occurrence and deductible not more than \$25,000.
14. Corporate surety bond, cash deposit or letter of credit for 150% of the value of the right-of-way work to be done, in order to guarantee faithful performance of the permitted work.
15. Maintenance Bond - Two years – minimum 10% of construction costs.

2.3.8 TECHNICAL INFORMATION REPORT (SURFACE WATER)

The scope of drainage review varies with the project complexity and potential surface water impacts. Refer to the King County *Surface Water Design Manual* to determine Technical Information Report and design requirements appropriate for the project.

2.3.9 GEOTECHNICAL REPORT

A geotechnical report helps determine if the proposal for a site is appropriate. A geotechnical report contains information used to design retaining walls, foundations, hazardous waste facilities, and infiltration systems, such as trench drains, sand filters and septic drain fields. Geotechnical reports also supply information for settlement analysis, liquefaction, structural fill, and storm water design. The report shall meet the City's current sensitive area, Public Works, and Uniform Building Code requirements.

The City may require a geotechnical investigation and report based on the nature of the proposal. All of the following require a geotechnical investigation and report prepared by a Geotechnical Engineer.

- 1) Unless waived by the Building Official:

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- a) All new buildings except a residential structure that falls under the International Residential Code
 - b) Any structure, including a rockery, that retains a surcharge
 - c) Any retaining structure, including a rockery, that is over four feet above existing grade
 - d) Grease interceptors that are 1000 gallons or larger
 - e) Surface water retention/detention structures
- 2) Unless waived by the Department of Community Development Director:
 - a) Any work on sites containing or adjacent to slopes that are 15% or steeper
 - b) Grading that requires environmental review under the State Environmental Policy Act
 - 3) Unless waived by the Public Works Director
 - a) Surface water infiltration
 - b) Riverbank Stability (Ordinance 2038)
 - c) Hazardous Waste Facility Design

The reporting requirements for single-family permits may be waived, if a report for the site meeting the City of Tukwila's criteria has been filed less than five years before the date of application and the Geotechnical Engineer who signed the report prepares a written letter stating the report is still applicable to the site and currently proposed project. Similarly, reporting requirements may be waived for single-family permits if the applicant can demonstrate, to the City's satisfaction, that soil or groundwater conditions at or near the site pose little or no risk.

2.3.10 TRAFFIC IMPACT ANALYSIS

Traffic impact analysis reports are required for all development or re-development that generates five or more new peak hour trips.

2.3.11 TRAFFIC CONTROL PLAN

Prior to beginning any activity which might affect City right-of-way, the Applicant/Permittee shall provide the City, for review and approval, a traffic control plan that meets MUTCD standards. The traffic control plan shall accurately reflect existing site conditions including accesses, channelization, sidewalks, bike/pedestrian paths, bus stops and such. The Applicant must provide the location, address and description of expected traffic flow during the proposed work.

2.3.12 RIVERBANK STABILITY ANALYSIS

As part of the Flood Control Zone permit application, the Applicant must provide a riverbank stability analysis for projects adjacent to the Green/Duwamish River, whenever the natural riverbank is expected to provide bank protection for the life of the project. A geotechnical engineer must prepare the analysis. The geotechnical engineer must certify that the riverbank is stable for the lifetime of the proposed project.

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The analysis scope will vary with the site conditions. All elevations shall use the same datum as the FZCP submittal. The analysis report shall include assessment of current conditions, conclusions, and construction recommendations. At a minimum, the report shall include:

1. Site map showing location of riverbank cross-sections, structures, roads, drainage, wells, septic tanks, utilities, and other significant features at the project site.
2. Riverbank cross-sections at intervals sufficient to provide accurate detail for analysis. Cross sections should show the top-of-bank, grade-breaks, toe-of-bank, and, whenever feasible, streambed geometry.
3. Soil strength and erodability parameters, current slope stability and expected slope stability during rapid drawdown, including factors of safety. Provide possible failure modes and failure causes.
4. Discussion of risk and possible environmental effects, both locally and downstream.
5. Prevention measures, repair and monitoring requirements.

2.3.13 SANITARY SEWER

Your project may require submittal of any of the following:

1. King County Sewer Use Certification form for new or modified facilities,
2. South King County Health Department septic system approval for construction on a site having a septic tank
3. Copy of King County Industrial Waste Discharge approval for gas stations and some industrial operations that discharge to a sanitary sewer,
4. Septic tank abandonment documentation,
5. Copy of King County Department of Natural Resources approval for direct side sewer connection to interceptor lines.

2.3.14 FINANCIAL GUARANTEE

A. For work in the right-of-way Applicant shall provide:

1. A corporate surety bond, cash deposit or letter of credit for 150% of the value of the proposed right-of-way work, in order to guarantee faithful performance of the permitted work.
2. A corporate surety bond, cash deposit or letter of credit for 10% (minimum) of the value of the right-of-way work, to guarantee workmanship and materials for two years following completion of work.

B. For hauling, the applicant shall provide a \$2,000 financial guarantee to assure clean up and repair of any damage.

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- C. For moving an oversize load, the applicant shall provide a \$5,000 financial guarantee to assure repair of any damage.
- D. For the Public Works part of a subdivision, short plat, or projects containing or abutting sensitive areas, the Owner shall provide a corporate surety bond, cash deposit or letter of credit for 150% of the total cost of the proposed work to guarantee performance of proposed work.
- E. For street lighting as part of subdivision, the Owner shall provide a two-year financial guarantee for 150% of the cost of the illumination for maintenance. (TMC 11.12.110)
- F. The Director may require a financial guarantee for 10% of the project costs for erosion prevention and sediment control on projects which clear more than 6000 square feet or contain or abut sensitive areas such as Class 2 or steeper slopes, wetlands, or critical drainage.

2.3.15 INSURANCE

- A. Permittee performing work within City right-of-way shall provide proof of the following insurance, showing the City as additional insured:
 - 1. Comprehensive general liability insurance with limits not less than \$2,000,000.
 - 2. Business automobile liability insurance with limits not less than \$1,000,000.
 - 3. Contractor's pollution liability insurance, on an occurrence form, with limits not less than \$1,000,000 each occurrence and deductible not more than \$25,000.
- B. If the Director determines the nature of any work is such that it may create a hazard to human life, endanger adjoining property, street, street improvement, or any other public property, the Director may require the applicant to file a certificate of insurance. The Director, based on the nature of the risks involved, shall determine the amount of insurance.

2.3.16 HOLD HARMLESS

The Applicant shall complete a hold harmless agreement for activities in the right-of-way, for activities in or near a sensitive area, and for major deviation from City standards. Hold harmless agreements are available in Public Works.

2.3.17 EASEMENT(S)

The City reviews and approves all easements prior to recording with King County Records.

For easements granted to the City, the legal description(s) and exhibit(s) shall be prepared and stamped by a land surveyor, or professional engineer registered in Washington State. The easement document shall include the easement legal

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description and a site plan showing the easement location, and shall specify maintenance responsibility, when applicable. (TMC 11.12.050)

1. Utility

Water, sewer, drainage facilities, minimum 20 feet wide, generally, ten feet either side of the centerline of the facility. Additional width may be required to accommodate maintenance.

Utility easements adjacent to public right-of-way shall be ten feet wide.

2. Traffic

Where needed for purposes of traffic safety or access to schools, playgrounds, urban trails, shopping facilities, or other community facilities, public easements for bikeways or walkways, not less than ten feet in width, will be provided.

3. Levee access

All proposed development adjacent to the Green River shall, as part of their permit submittal, grant access and maintenance easements for existing or future dikes/levees and riverbanks along the Green River. The City, in cooperation with King County, shall determine these easement locations and widths.

4. Nonmotorized easements

The easement shall be wide enough to include the trail plus at least two feet on each side.

2.3.18 PROPERTY DEDICATION

The City may require right-of-way dedication to incorporate necessary transportation improvements. Property shall be deeded to the City using a statutory warranty deed. The dedication must be accompanied by a Title report less than 6 months old and a completed excise tax affidavit.

2.3.19 MAINTENANCE AGREEMENT(S)

- A. Before Public Works final project approval, the Permittee/Owner/Contractor shall provide Maintenance Agreements, in recordable format, for common improvements such as access, utilities, surface water elements, and cul-de-sac landscape island.
- B. The Owner shall provide a maintenance agreement (and bond) for street lighting in subdivision. (TMC 11.12.110)

2.3.20 PERMITS FROM OTHER AGENCIES

It is the Applicant's responsibility to obtain permits from outside agencies such as WDFW, Department of Natural Resources, Corps of Engineers, Department of Ecology, Department of Health, WSDOT or FEMA. The Director requires proof of other required permits prior to issuing permit approval.

2.3.21 DEVELOPER AGREEMENT

The City and the Developer shall enter a Developer Agreement whenever required by the City. The Developer Agreement shall be written and signed before the permit is issued. The Developer Agreement should contain work descriptions and estimated costs. The Agreement should assign responsibilities for the work performance and shall provide an expiration date.

2.3.22 DEVELOPER REIMBURSEMENT AGREEMENT (LATECOMER AGREEMENT)

The City may enter into agreements with developers who have installed public improvements valued at \$50,000 or more, in order to provide for reimbursement of a fair prorated share by any real estate owners who have not contributed to the original cost of such facilities, and who subsequently connect to, or use the improvement. Such agreements shall be entered into at the time of, or prior to, issuance of a Certificate of Occupancy. The Public Works Department shall approve the prorated share based on construction cost provided by the Developer.

The developer is responsible for initiating, executing, and, after City approval, recording the latecomers agreement with the County. The agreement must include a list of those properties that will benefit from the improvement, a map outlining and designating these properties, legal descriptions as required by the City, backup data supporting the costs submitted, and an expiration date.

There are three acceptable methods for the determination of benefit: 1) gross parcel area, 2) property frontage, or 3) number of connections. The proponent will submit the format most appropriate to the nature of the project, as approved by the City. No credit will be given for open space, recreation areas, or undevelopable portions of the development proposal when calculating gross parcel area. The City will collect the latecomer's fee from property owners, which benefit from the improvements and will meet the Revised Code of Washington when disbursing payment to the developer.

2.4 CONSTRUCTION

Contractor/Permittee shall perform all work in accordance with all federal, state, and local laws and shall be in accordance with approved plans, specifications, and permit conditions. The Permittee/Contractor shall maintain a set of approved plans, specifications, and associated permits on the job site. Permittee shall apply for a revision for any work proposed that is not according to approved plans and specifications, and permit conditions.

2.4.1 MATERIALS

Materials proposed for use in construction of publicly owned or publicly maintained utilities must be in conformance to approved material standards. Unapproved materials cannot be adequately evaluated within the plan review period.

2.4.2 PRECONSTRUCTION CONFERENCE

Prior to beginning any work, Permittee/Contractor shall contact the City's Inspector to arrange a preconstruction conference.

2.4.3 CONSTRUCTION ON EASEMENT

Construction on easement(s) shall be performed strictly in accordance with the easement provisions. The Permittee/Contractor shall make himself aware of all conditions pertaining to the easement agreement. No work shall be permitted in easement areas where City utilities may be located until specifically authorized by the City.

2.4.4 RIGHT-OF-WAY

A. Access

1. During construction and until permanent access is installed and approved, provide pedestrian/ADA and emergency access to any abutting public school, public building, urban trail, transit stop, or business.
2. Provide temporary sidewalk, curb ramp, or bike path, meeting the Director's approval, when construction blocks existing.
3. Maintain access to fire stations, fire hydrants, fire escapes, and fire fighting equipment. Do not place materials or obstructions within 15 feet of fire hydrants.

B. Monuments

1. Locate and protect survey monuments, property corners, bench marks, and other such.
2. All disturbed monuments shall be replaced by a Washington State licensed surveyor at the Owner's expense.

C. Drainage

1. Keep existing drainage features free of dirt and other debris.
2. Reroute flow when it is necessary to block or otherwise interrupt a drainage feature. (TMC11.08.220)

D. Cuts

1. Roadway crossings for utilities shall be by jacking, tunneling, or boring with "windows" or shafts 20 feet or more apart.
2. Crossing under State Highways and crossings involving railroads or other easements and rights-of-way will also require approval from the appropriate agency.
3. Newly constructed or recently overlaid streets shall not be open cut for three years. Open cuts are allowed on an exception basis and only when roadway conditions warrant or in cases of undue hardship.
4. All pavement cuts in right-of-way are subject to a pavement mitigation fee.

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5. All pavement cuts in right-of-way must have a preapproved Street and pavement restoration plan.
- E. Restoration
1. Any disturbance of right-of-way or right-of-way facilities, including sidewalks and vegetation, shall be restored to current City standards. The City shall approve all backfill and pavement base. All damaged or broken pavement and other disturbed pavement shall be replaced with the same type and depth of pavement adjoining the disturbed area.
- F. Restrictions
1. **From the third Thursday in November to the following January 2nd,** the Director restricts lane closures in the Tukwila Urban Center.
 2. Maintain emergency, pedestrian, and vehicular access to buildings, trails, and transit at all times.
 3. Keep all roadways free of dirt and debris using street sweepers. Use of water trucks for cleaning roadways requires preapproval from the Director.
 4. Install and secure non-skid steel plates over any trench, at any time work is stopped and the trench is left open. Place warning signs in locations adequate to warn drivers and bicyclists. Warning signs shall read "Motorcycles Use Extreme Caution" and "Caution Steel Plates Ahead".

2.4.5 TRENCH EXCAVATION

Construct per WS-18 and WISHA/OSHA requirements and meet the erosion prevention and sediment control requirements.

- A. All trench excavation operations shall meet or exceed all applicable shoring laws for trenches.
- B. During excavation, divert any surface water and pump the trench as needed to keep the trench free of water. Store pumping equipment near the trench excavation to ensure that these provisions are carried out.

Completely excavate boulders, rocks, roots, and other obstructions or excavate to the width of the trench, and to a depth of 6 inches below the bottom pipe grade.

- C. Use hand tools to:
 1. Finish the trench bottom in such a manner that the pipe will have a uniform slope along the entire length of the pipe.
 2. Excavate the bell holes enough to make up the joint.
- D. Extend trenching operations a maximum of 100 feet in advance of the pipe laying operation. For excavation greater than 100 feet, the Permittee must obtain written approval from the Director.
- E. Pipe Installation:
 1. **Pipe deflection is not allowed.**

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2. Imbed pipe in 5/8" crushed gravel.
3. According to APWA Standards and the manufacturer's recommendation.
4. Install pipe cover and surface restoration as soon as possible following installation and testing of pipe.

2.4.6 STOP WORK ORDER

- A. Following written notice to the Permittee, the Director may suspend or revoke any permit for any of the following reasons:
 1. Changes in site runoff characteristics upon which the permit is granted.
 2. Construction not in accordance with the approved plans.
 3. Noncompliance with correction notice(s) or stop work order(s) issued for erosion or sediment controls.
 4. Immediate danger to a downstream area or adjacent property as determined by the Director.
- B. The Director may post a site with a "stop work" order directing that all construction activity cease immediately. The issuance of a "stop work" order may include any "discretionary conditions" or "standard requirements" which must be fulfilled before work under the Permit may continue.
- C. No person shall continue or permit the continuance of work in an area covered by a "stop work" order, except work required to correct an imminent safety hazard as prescribed by the Director.
- D. The cost of any corrective measures shall be borne by the Permittee.

2.4.7 INSPECTIONS

- A. All public infrastructure construction is to be done under the control and at the direction of the Public Works Director. Public Works supervises and inspects the design and installation of public improvements.
- B. For private development, Public Works approves permits and inspects the public works elements of the development.
- C. Field Inspections
 1. The Permittee shall schedule Public Works inspections at least 24-hours in advance. The inspections shall occur at completion of significant work segments, at intervals sufficient to confirm all work is performed in accordance with the plans and specifications, and at the project completion.
 2. Work covered prior to inspection will be uncovered at the expense of the Permittee.

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3. At a minimum, the Permittee shall request inspections for the following events:
 - a. Before backfilling, for compliance with all construction standards.
 - b. After placement of rock, for compaction and material quantity and quality verification.
 - c. Prior to the placement of any materials, which would preclude full and complete inspection of construction, which will be buried or covered.
 - d. At completion of sub-grade, for compaction and grade.
 - e. During and after placement of finish course for compaction and material (quantity and quality).
 - f. After placement of forms and before pouring for line, grade, and compaction.
 - g. All pressure testing, including air and water tests.
- D. Sampling and Testing
 1. Tests and material sampling for the purposes of determining compliance with the specifications shall be required at the Director's discretion. All costs incurred for testing or sampling, done at the Director's request, shall be the responsibility of the Permittee.
 2. Determination of field density of compacted earth will be per ASTM D1557: "Modified Proctor."
- E. TV Inspection

Permittee shall inspect new and repaired surface water systems and sanitary sewer mains using a TV camera and an acceptable recording format. The recording shall supply a permanent visual and audio record of the pipeline section being surveyed, and shall become the property of the City upon completion of the project. TV Inspection Reporting Forms are available.

 1. Equipment - The television camera used for the inspection shall be one specifically designed and constructed for such inspections. Lighting and camera quality shall be suitable to allow a clear, in-focus color picture of a minimum of 6 feet of the entire inside periphery of the sewer pipe. Focal distance shall be adjustable through a range of from 6 inches to infinity. To maintain speed and uniformity, devices using relatively non-elastic towing cable will provide satisfactory performance in this regard. The operating technician shall at all times be able to move the camera through the line in either direction without loss of quality when viewing on the monitor. Recording of all sewer line inspections shall be made in color in an approved format. The recording equipment shall have the capability to instantly review both video and audio quality of the recording at all times during the television survey.

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2. Preparation - Before inspection, Permittee shall ensure the storm drains or sewer mains are ready for TV camera inspection and that the sewer lines are thoroughly cleaned so that a clear, definitive picture of the interior of the pipe can be obtained.
3. Testing
 - a. Permittee shall record pipeline in consecutive sections. To ensure peak picture quality throughout all conditions encountered during inspection, locate at the monitoring station a variable intensity control of the camera lights and remote control adjustments for focus and iris. During inspection the travel speed shall be uniform and shall not exceed 30 feet per minute. In no case will the hose of a high-velocity water-cleaning machine be allowed for use as a tow cable.
 - b. At the Permittee's or the Inspector's discretion, the camera may be stopped and/or backed up to view and analyze conditions that appear unusual or uncommon to a good sound system. Such movement reversal shall be accomplished without altering the correct registration of pipe footage.
 - c. Permittee shall record audio reports along with the visual recording. The reports shall include the flow direction, manhole -to-manhole, and a description of the conditions in the lines as they are encountered. In no case will dubbing of the audio portion be allowed after the survey. In addition to video and audio reporting, the Permittee shall complete, during the inspection, written Segment Reports on a form provided by the Director.
 - d. The Permittee shall clearly indicate on the recording and on the written report the location, relative to adjacent manholes/catch basins, of infiltration points, building sewers, joints, unusual conditions, etc.
4. Information recorded shall include:
 - a. Videotape cartridge number
 - b. Precipitation – none, light rain, heavy rain, snow
 - c. Ground condition –dry, damp, wet, standing water
 - d. Surface type – paved or unpaved
 - e. Pipe - diameter in inches
 - f. Depth in feet
 - g. Material – concrete, asbestos cement, PVC, cast/ductile iron, HDPE, other (specify)
 - h. Length between pipe joints in feet
 - i. Manhole/Catch Basin depth and size

5. Quality

- a. The picture at all times shall be free of electrical interference and provide a clear, stable image of the resolutions specified. The replay of the recorded video information, when reviewed on a monitor receiver such as a Sony model CKV1900F, shall be free of electrical interference and provide a clear, stable image. The audio portion of the composite signal shall be sufficiently free from electrical interference and background noise to provide complete intelligibility of the oral report.
- b. The Permittee bears all costs incurred in correcting any deficiencies found during TV inspection, including the cost of any additional TV inspection required to verify the corrections.
- c. Documentation – Permittee/Contractor shall submit the video inspection tapes and written logs to the Director.

2.5 FINAL PROJECT APPROVAL

2.5.1 WORK COMPLETION

Upon completion of all required project elements, the Permittee shall request a final inspection by contacting the Public Works Inspector. The permit process is complete upon sign-off of the issued permit(s) by the Director.

2.5.2 PERMANENT STABILIZATION

All disturbed areas must have permanent stabilization in place and functioning before the temporary erosion prevention and sediment control measures are removed.

2.5.3 FLOOD CERTIFICATE

Upon completion of construction and prior to Final Public Works Inspection, the Permittee shall provide Public Works with a completed Elevation Certificate for residential. For non-residential, Permittee shall provide a completed Flood-proof Certificate or Elevation Certificate

2.5.4 FINANCIAL GUARANTEE

The owner/agent shall provide a two-year guarantee for the faithful performance of the operation and maintenance to improvements in the right-of-way or on City property. The guarantee shall be by a surety approved by the Director.

2.5.5 TURNOVER DOCUMENTS

The City requires Turnover Documents when a developer constructs public infrastructure as part of private development. The owner/agent shall provide a complete set of turnover documents before Final Public Works Inspection. The

Mayor's Office or the City Council must accept constructed infrastructure, when the value exceeds \$25,000. If the City does not accept the constructed infrastructure, the ownership and maintenance of the facilities remains the sole responsibility of the Developer.

2.5.6 RECORD DRAWINGS

All projects, except most single-family residences, require Record Drawings. Projects will not receive final approval from Public Works until a complete set of Record Drawings is submitted and approved. For public facilities and facilities installed in the right-of-way, the owner/agent shall provide record construction drawings at project closeout.

Record drawings shall accurately reflect design revisions that were made to approved plans during construction. The record drawings shall locate all existing and abandoned utilities encountered during construction, but not shown on the approved plans.

A Washington State registered professional engineer of record shall approve the record drawings. As-built survey information provided on a record drawing shall be provided by a Professional Land Surveyor currently licensed in the State of Washington, who certifies that the as-built survey and revisions to the Record Drawings were performed under the surveyor's direction. Information from sources such as the contractor's red-lined drawings, for which the surveyor is not responsible, shall be clearly noted/identified on the face of the Record Drawings.

The owner/agent shall provide record drawings on Mylar (24" by 36") and in AutoCAD format on CD. Each drawing, except for the digital file, shall bear the engineer and the surveyor stamps, signed and dated.

2.5.7 SURVEY DATUM

The drawing and all utility features shall be accurately located in Washington State (grid) Coordinates, North Zone, using NAD 83/91 survey control and tied to any two City of Tukwila Horizontal Control Monuments. Elevations shall be NAVD 88.

CHAPTER 3 PLANS AND SPECIFICATIONS

3.0 GENERAL

- A. Plans, as used herein, means the plans, profiles, and cross-sections showing all work related to a specific project. To ensure completeness and clarity and a timely response from the City, the Engineer should exercise particular care when preparing the plans.
- B. The plans shall clearly indicate the location, nature, and extent of the proposed work and shall provide sufficient detail to show that all provisions of the standards and codes are met. The Engineer/Applicant shall provide specifications along with the plans whenever the plans and notes do not adequately describe the proposed work and materials.
- C. A complete plan set includes:
 - 1. Cover sheet
 - 2. Survey sheet
 - 3. Plans, profiles, cross-sections
 - 4. Typical details
 - 5. Construction notes
 - 6. Specifications
- D. Refer to Appendix C for a [Plan Review Checklist](#) to help ensure completeness.

3.1 RECORD DRAWINGS

Record drawings shall conform to these Standards (Chapter 2) and to the Plan Review Checklist (Appendix C) and shall accurately reflect all design revisions. As-built survey information provided on a record drawing shall be provided by a Washington licensed land-surveyor.

3.2 DRAFTING STANDARDS

- 1. A professional engineer, registered in Washington State, shall prepare the plans, and stamp, date, and sign each sheet, except for a single family residence that is not in or adjacent to a sensitive area and does not trigger a Technical Information Report for the surface water.
- 2. All plans submitted for either design approval or permanent record will be free of photographs, stick-ons, or shading. Hatching may be acceptable, if the pattern is not excessively dense.
- 3. Sheet size:
 - a. Engineering Drawings: 11" X 17" (min), 24" X 36" (max)
 - b. Survey Drawings: 18" x 24"

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4. Text - Prepare plans understanding that each sheet might be microfilmed. Use nominal text size 1/8" as a minimum.
5. Line Style
 1. Provide plans in a clean, legible, blue or black line format.
 2. Produce all existing features with a small pen or half tones.
 3. Distinguish proposed features from existing features by using a larger or bolder line weight.
 4. Use different line types to distinguish different features. For example: centerline and right-of-way will have different line types.
6. Monuments
 1. Show all existing and proposed monuments.
 2. Describe all monuments using current City of Tukwila coordinates.
 3. Reference roadway centerlines, easements (with type and dimensions), and other pertinent data to existing monuments.
 4. Show or describe protection of monuments, including property corners.
7. Datum
 - a. For public facilities, work in the right-of-way, and Capital Improvement Projects:
 - Horizontal - Washington State (grid) Coordinates, North Zone, using NAD 83/91 survey control and tied to any two City of Tukwila Horizontal Control Monuments
 - Vertical - NAVD 1988
 - b. For private property other than a single family residence:
 - Horizontal - Washington State (grid) Coordinates, North Zone, using NAD 83/91 survey control and tied to any two City of Tukwila Horizontal Control Monuments
 - Vertical - NAVD 1988
 - c. For Flood Control Zones provide conversion calculations to NAVD 1929
8. Title block:
 1. Title:
 2. Date:
 3. Design by:
 4. Drawn by:
 5. Checked by:
 6. Signature Approval block
 7. Sheet number of total sheets (e.g., 2 of 5)
 8. Revisions and revisions dates
9. Scale - Scale the drawings using an engineer's scale. No engineering plans will be accepted with architect's scale.

1. For site work:
 - 1" = 40' Horizontal
 - 1" = 4' Vertical
2. For Public Facility:
 - 1" = 20' Horizontal
 - 1" = 2' Vertical
3. For Signal Drawing Sheet:
 - 1" = 10'
4. For Illumination:
 - 1" = 30'

10. Labeled Record Drawing

11. Labeled as-built drawing, (minimum text height ¼")

3.3 DESIGN ELEMENTS

The plans shall show existing and proposed for all elements on and near the site, including the following:

1. Topography - Existing and proposed topography (two-foot contours) for 15 feet outside the property lines. Projects within flood control zones and some storm drainage plans require 1-foot intervals.
2. Easements – existing and proposed, type, and dimensions
3. Clearing limits
4. Construction limits
5. No work zones
6. Sensitive areas – Flood zone, shoreline, steep slopes, wetlands, streams
7. Buffers and set-backs
8. Finished floor elevation
9. Building footprints onsite and within 15' of the property lines
10. Rights-of-way accesses
11. Adjacent property lines and addresses
12. Street names with quadrant prefix or suffix
13. Existing and proposed pedestrian and bicycle facilities
14. Existing and proposed utilities and improvements (above and below ground). Show information and location of all existing and proposed utilities, above and below ground. Include Cable, conduit, telephone, gas, water, sewer, fire hydrants.
15. Landscaping: trees, shrubs, ground cover
16. Onsite and offsite - Fire hydrants, mail boxes, street lights, traffic signals, meters, electrical cabinets, and other such.

3.4 DESIGN CONSIDERATIONS

3.4.1 SENSITIVE AREAS

The plans must show location, type, and rating of all sensitive areas in and near the project site. The plans must show the buffers and building setbacks.

3.4.2 FLOOD ZONE

Show the nature, location, dimensions, and elevations of the area in question, including existing or proposed structures, proposed fill, materials storage, drainage facilities. Specifically, the following information is required:

1. Elevation in relation to mean sea level, of the lowest floor of all structures,
2. Elevation in relation to mean sea level to which any structure has been flood proofed.

3.4.3 SEWER SEPARATION

Install water lines at least 10 feet horizontally, measured edge to edge, from any existing or proposed sewer line. The Director may allow deviation, provided the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer, at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer.

3.4.4 SURFACE WATER

Public Works requires design to the most current King County Surface Water Design Manual. Public Works recommends referring to the City's latest Surface Water Comprehensive plan and contacting the City's Surface Water Engineer during the early design stages of surface water design.

3.4.5 STREAM CROSSING

All stream crossings require written hydraulic project approval from the WDFW. The Applicant shall provide the Director a copy of the WDFW approval prior to permit issuance.

3.4.6 WATER COURSE RELOCATION

If a watercourse will be relocated, provide description of the extent to which the watercourse will be altered or relocated because of proposed development. The Director, acting for FEMA, will require:

1. Notification to adjacent communities and the Department of Ecology (DOE) prior to any alteration or relocation of a watercourse, and evidence that notification was provided to the Federal Insurance Administration.
2. Maintenance within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished.

3.4.7 ESC PLAN

Plans for any activity that disturbs ground shall include an erosion prevention and sediment control plan designed in accordance with the current edition of the King County Surface Water Design Manual. The plan shall provide information for temporary erosion prevention and sediment control during all phases of construction and shall provide permanent stabilization for disturbed areas.

3.4.8 POLLUTION PREVENTION PLAN

Refer to the King County *Storm Water Pollution Prevention Manual (2005)* for best management practices for pollution prevention plan.

CHAPTER 4 STREETS

4.0 GENERAL

4.0.1 TRANSPORTATION ELEMENT

All roadway design in the City shall meet the design guidelines and requirements in the Transportation Element of the Comprehensive Land Use Plan.

4.0.2 MANUFACTURING/INDUSTRIAL CENTER

For projects in the M/IC, provide driveway design and location per RS-30.

4.0.3 DEVELOPMENT SITES

A paved street surface shall serve all development sites. This street surface shall connect to an existing paved street surface. (TMC 11.12.060)

4.0.4 FRONTAGE IMPROVEMENTS

- A. The installation of street frontage improvements is required prior to issuance of a certificate of occupancy for new construction, other than single-family homes, or prior to final approval for subdivisions and 5-9 lot short plats and Planned Residential Developments. For additions and remodels to existing buildings, see TMC 11.12.070.
- B. Complete street frontage improvements shall be installed along the entire frontage of the property at the sole cost of the permittee as directed by the Director. Street frontage improvements may include curb, gutter, sidewalk, storm drainage, street lighting, traffic signal equipment, utility installation or relocation, landscaping strip, street trees and landscaping, irrigation, street widening, and channelization. Beyond the property frontage, the Permittee shall provide ramps from the new sidewalk or walkway to the exiting shoulder, and pavement and channelization tapering back to the existing pavement and channelization as needed for safety.
- C. When (due to site topography, city plans for improvement projects, or other similar reasons) the Director determines that street frontage improvements cannot or should not be constructed at the time of building construction, the property owner shall, prior to issuance of the building permit, at the direction of the Director:
 - 1. Pay to the City an amount equal to the property owner's cost of installing the required improvements prior to issuance of a building permit. The property owner shall provide documentation satisfactory to the Director that establishes the cost of the materials, labor, quantities; or
 - 2. Record an agreement which provides for these improvements to be installed by the property owner by a date acceptable to the Director; or

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3. Record an agreement to not protest a local improvement district to improve the street frontage.
- D. If, at a time subsequent to the issuance of a building permit, a local improvement district is established that includes the property for which the building permit was issued, the property may be considered in the compilation of the local improvement district assessment with the appropriate amount of costs of construction expended by the developer.
- E. The Director under either of the following conditions may waive the requirement for installation of frontage improvements:
 1. If adjacent street frontage improvements are unlikely to be installed in the foreseeable future; or
 2. If the installation of the required improvement would cause significant adverse environmental impacts.
- F. Additions, alterations, repairs adding square footage to existing structure, or new accessory building:
 1. Street improvements shall be constructed and shall be determined by the Director.
 2. Property owner costs shall be 10% or less of the total improvement cost.
 3. Director may waive.
- G. Additional structure(s) on private campus
 1. Street improvements shall be constructed and shall be determined by the Director.
 2. Property owner costs shall be 10% or less of the total improvement cost.
- H. Additional structure(s) on Public campus
 1. Street improvements shall be installed along entire frontage.
 2. Corner lots, etc. when cost does not dictate all frontage be improved, Director will determine which frontage will be improved.
- I. Single Family Residence (TMC 11.12.080)
 1. In all cases install surface water drainage on all frontage.
 2. Abutting unpaved street, not a corner lot, requires a ½ street section of pavement or a No Protest LID for pavement and storm drainage.
 3. Abutting both paved and unpaved requires ½ street pavement and drainage on unpaved right-of-way.
 4. Contiguous to a parcel served by paved street requires ½ street and drainage frontage abutting existing paved right-of-way.
 5. Abutting a paved street surface requires complete minor pavement edge improvements.

J. Landscaping, easement, access tracts (TMC 11.12.100)

The following apply when there are frontage improvements:

1. Retain existing vegetation, and replace and replant existing vegetation that gets disturbed during development.
2. Arterial street landscaping must include installation of ground cover in erosion areas and installation of trees per City standards.
3. Abutting property owners maintain landscaping, unless City specifically accepts the responsibility.
4. City may require removal of landscaping that encroaches on right-of-way.

4.0.5 RIGHTS-OF-WAY, EASEMENTS, AND IMPROVEMENTS.

The developer shall dedicate right-of-way and grant easements for all public streets and non-motorized facilities needed to serve a proposed development. (TMC 11.12.050)

4.0.6 DEAD END STREET

Public and private dead-end streets must terminate with a cul-de-sac and a landscaped island. The maximum cul-de-sac length allowed is 600', measured from the edge of curb or edge of pavement at the connection to the end of the right-of-way at the cul-de-sac.

A hammerhead is allowed when the road is less than 200 feet and serves less than six lots. A temporary dead end can terminate with barricade(s). (TMC 11.12.170)

4.0.7 GRADE

The maximum grade for all roadways and driveways shall be fifteen percent (15%). Grades over 15% require approval of the Director and the Fire Department.

4.0.8 PARKING LOTS

All parking lots shall be paved.

4.0.9 BUS

Provide bus pullouts as required on principal arterials.

4.0.10 UTILITY RELOCATION

The developer shall relocate any utilities that must be relocated to accommodate street or other required improvements.

4.0.11 NON-MOTORIZED FACILITIES

A. Pedestrian Systems

1. Internal pedestrian circulation systems shall be provided within and between existing, new and redeveloping commercial, multifamily and single family developments, activity centers, and existing frontage pedestrian systems. (TMC 11.12.150)
2. Concrete sidewalks

- a. Arterial street - on both sides
 - b. Non-arterial street longer than 200 feet –both sides
 - c. Non-arterial less than 200 feet – one side
 - d. Public streets accessing existing or planned sidewalk, activity centers, parks, schools, neighborhoods, or public transit facilities – both sides
 - e. Director may grant exception
3. Pavement in lieu of concrete is acceptable when:
 - a. The facility is temporary.
 - b. Flexible pavement is required due to soils and topography.
 - c. The neighborhood character does not warrant concrete.
- B. Bikeways and Walkways**
1. Bikeways and walkways will be surfaced with asphalt concrete. Bikeways and walkways will be illuminated in accordance with the specifications set forth in this standard. Install posts or other facilities to prohibit the passage of motor vehicles through pedestrian easements.
- C. Non-motorized easements**
1. Following City approval, record with King County Records, an easement titled “City of Tukwila Non-motorized Public Easement”.
 2. The easement shall be the trail width plus 2 feet on each side (can vary). A designated bicycle route may require additional paved right-of-way.
 3. The easement shall specify the maintenance requirements and designate responsible parties.

4.0.12 NEW STREETS

- A. Where a street is designated by the Land Use Comprehensive Plan and is within the boundaries of a development, the developer shall dedicate the entire right-of-way, and shall construct frontage improvement.
- B. Where a street designated in the Comprehensive Plan is adjacent to a boundary of a development, the developer shall dedicate the necessary right-of-way and shall construct frontage improvement.

4.0.13 HALF STREET

The construction of half-street improvements will be permitted only along the boundaries of a development. Pavement, at least twenty (20) feet in width or as required for that street classification (measured from gutter line) will be provided, and an adequate right-of-way width may be dedicated.

4.0.14 ALLEYS

The Director may allow an alley at the rear of single-family residential, multifamily residential, commercial, or industrial property. An alley not required for fire suppression access, solid waste collection, or other public purposes may be privately owned. A private alley must conform to all improvement standards for public alleys, must be posted as a private alley and must meet all other provisions applicable to private streets. A dead-end on a public alley is prohibited.

4.0.15 SIGHT DISTANCE

Sight distance at intersections and right-of-way access points shall meet the most current edition of *AASHTO Policy on Geometric Design* and shall be clear of sight obstructions.

4.1 PRIVATE STREETS

- A. The City allows private streets when the street:
 - 1. Serves four or fewer lots,
 - 2. Is part of a Planned Residential Development, or
 - 3. Serves commercial or industrial facilities where no circulation continuity is necessary.
- B. Owner(s) must provide:
 - 1. Recorded covenant granting the City the right to fully use the private street for emergency access and public service vehicles,
 - 2. Recorded provision for the ownership and maintenance of the private street by the owners within the development.
 - 3. Final site plans showing private streets must include an unconditional and irrevocable offer of dedication that may be accepted by the City Council at such time as the street is needed for development of contiguous property or for the protection of public health, safety and welfare. The design and improvement of any private street will be subject to all of the requirements prescribed by this document for public streets.
- C. Owner(s) must install and maintain a sign indicating the street is private.

4.2 PUBLIC STREETS

Streets longer than 200 feet or streets that serve more than four lots shall be constructed to public street standards. See RS-01.

4.2.1 GEOMETRIC DESIGN

On the plans, note the sight distance for horizontal and vertical curves, intersections, and access points. Setbacks shall meet the current edition of the *AASHTO Policy on Geometric Design*. (TMC 11.20.090)

4.2.2 ALIGNMENT AND CONNECTIONS

- A. Alignment

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1. Align proposed streets and other primary accesses with existing streets or accesses.
 2. Relate alignments, where practical, to natural topography.
 3. Select alignment to minimize grading and avoid excessive runoff.
- B. Connections
1. Provide street connection to any existing public street or right-of-way "stub" abutting the proposed development.
 2. Provide "stub" roads for connection to any adjacent undeveloped, or partially developed, contiguous land , and to any site officially designated for a public facility.
 3. Locate a stub so that it allows for future block sizes consistent with the Land Use Comprehensive Plan.
 4. Locate "stub" connections to other "stub" roads on adjacent and nearby property.
 5. Install "Dead End" signage and barricades per the current edition of the MUTCD.

4.2.3 STREET INTERSECTIONS

- A. Primary points of access or street intersections with centerline offsets of less than one hundred fifty (150) feet will not be allowed unless the Director finds special conditions requiring a reduction. The intersection spacing requirements will not be used as criteria/justification to close existing streets.
- B. Unless required by street spacing standards, intersections on curves will be avoided.
- C. Right-of-way and curb radii will be provided at all intersections in accordance with the Land Use Comprehensive Plan and the Transportation Element.
- D. Turning lanes and acceleration/deceleration lanes will be provided as required by the current edition of the AASHTO Policy on Geometric Design.

4.2.4 UNDERGROUND UTILITIES

- A. Where several utilities are planned or required in the same right-of-way corridor, joint trenches shall be used whenever possible.
- B. All new electrical and communication facilities shall be underground per TMC 11.28.
- C. Undergrounding requirements for new facilities or rebuild, replacements and additions are described in TMC 11.28.070 and TMC 11.28.080.

4.2.5 ACCESS

- A. Pedestrian/ADA and emergency vehicle access will be provided to any abutting public school, public building, urban trail, or transit stop. (TMC 11.12.150)
- B. Development

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1. All development sites shall be served by a paved street surface that connects to an existing paved street surface. (TMC 11.12.060)
2. Applicant may provide an access lane rather than a private street if the access serves four or fewer lots and is 200' or shorter. The access lane may be on an easement, shall be 20 feet wide and paved the full 20' width and will be owned and maintained by the property owners served by the lane.
3. Provide more than one connection to the existing public street system for any development, or part thereof, of four acres or more. If not otherwise prohibited, each connection will be to a different collector or arterial street. Where the site includes only a single frontage of less than 400 feet, this requirement may be met by provision of one or more stub roads.

4.2.6 RIGHT-OF-WAY VEGETATION

- A. New vegetation must match or complement existing street vegetation or be approved by the Director.
- B. New vegetation in the Central Business District must meet the current district plan.
- C. Notify owners within 100 feet when removing or pruning vegetation that is 4-inch diameter or larger
- D. No maple, Lombardy poplar, cottonwood, gum, or other trees with invasive root system. (TMC 11.20.070)
- E. Vegetation removed from right-of-way or damaged during construction shall be replaced with equivalent number, size, quality, and species. (TMC 11.20.110)
- F. The design shall include a plan for irrigation. Irrigation is required for two years following project acceptance.

4.3 ILLUMINATION

4.3.1 GENERAL

- A. Required along all public streets, including new public streets in subdivisions and short subdivisions. (TMC 11.12.110)
- B. Required at the intersection of a public and a private street.
- C. Not required along a private street. (TMC 11.12.110)
- D. All wiring, conduit and power connections, new or relocated, shall be underground.
- E. For a new subdivision, Developer assumes maintenance and power cost until the development is 50% or more occupied. (TMC 11.12.010.c)

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- F. Developer designs to City standards, installs new lighting, and relocates existing lighting along development frontage.
- G. Provide calculations using ALADAN found under “Roadways” at the General Electric website.

4.3.2 MATERIALS

- A. New installations shall use cut-off optics. Additions to existing street lighting systems shall match the existing fixtures.
- B. Luminaires - Hubbel or General Electric (GE).
- C. Wattage per RS-24.

GE	Cutoff # MDCL	SOAZZFC32F
	Drop Lens # MDRL	SOAZZRMS32F

HUBBEL	Cutoff # RLCD	S38032035FOM53
	Drop Lens # RLGD	S38072035FOM53

- D. Junction Boxes – per WSDOT/APWA Standards with 48” bond straps between the traffic bearing lid and frame, labeled per Labor and Industries standard.
- E. Conduit - 2-inch
 - 1. Most applications - schedule 40 polyvinyl chloride (PVC) with bell ends, unless capped for non-use.
 - 2. Roadway application - schedule 40 polyvinyl chloride (PVC) with bell ends, unless capped for non-use.
- F. Circuit conductors - #6 or #8 type USE 2 stranded copper with green #8 THHN stranded copper ground.
- G. Pole wiring - #10 AWG Rome pole and bracket cable.
- H. Fuse kits - Homac #SLK-M or SEC #1791-SF.
- I. Fuses - FMN-5.
- J. Putty tape - Scotchmast electrical insulation.
- K. Electrical tape - 3M Super 33 or better.
- L. Photocell
- M. Shorting cap

4.3.3 INSTALLATION

- A. J-boxes - Install so the top of the box is at grade and positioned so that all conduits are 4 inches from the inside walls. Fill with clean drainage gravel,

leaving at least 6 inches of free space between the conduit and the top of the box.

- B. Wire splice
 - 1. Two-wire splices - Crimp the butt splice with 4-inch minimum length of thick-walled shrink tube.
 - 2. Three or more wire splices – Use split bolt and cover with one wrap of electrical tape, followed by one wrap of Scotchmast electrical insulation putty tape and two wraps of 3M Super 33 or better electrical tape.
- C. Install one photocell per lighting system and shorting caps on remaining luminaires.

4.4 TRAFFIC SIGNALS

4.4.1 GENERAL

- A. A licensed engineer experienced in traffic signal design shall prepare all traffic signal design and modifications. The Director shall approve all traffic signal system equipment.
- B. When a proposed street or driveway design will interfere with existing traffic signal facilities, the developer shall modify or relocate the signal. (TMC 11.12.160)

4.4.2 MATERIALS

- A. Signal heads – Signal heads shall be painted yellow. The faces of the back plates and the inside of the tunnel risers shall be painted flat black.
 - 1. Pedestrian Signal heads - ICC, Model # 4092 LED with Z crate visors, Type E (clamshell) mounting.
 - 2. Bimodal signal heads - Dialight with a 12-inch LED display capable of alternately displaying a yellow and green arrow.
 - 3. Red and Green signals - DuraLED 12-inch display.
- B. Signal poles - Valmont or Ameron. All poles shall have an aluminum terminal cabinet.
- C. Preemption device
 - 1. Discriminator - Series 700 with 3M #138 detector cable.
 - 2. Preemption detectors - 3M Opticom Model 700 Series.

4.4.3 INSTALLATION

Install detector cable from preemption detector to controller with no splices.

4.5 VEHICLE DETECTOR LOOPS

4.5.1 MATERIALS

- A. Loop wire per APWA Section 9-29.3.

- B. Lead-in cable per APWA Section 9-29.3.
- C. Wire
 - 1. Loop wire - # 12 USE stranded copper conductor Class B, with chemically cross-linked polyethylene type RHH-RHW, thickness of code.
 - 2. Shielded loop lead-in wire - #18 stranded tinned copper, twisted pair, 2 conductor cable with polyethylene insulation, conductor cabled, and shall have aluminum polyester foil shield furnished in 100% coverage, stranded tinned-copper drain wire and an overall chrome-vinyl jacket.
- D. Wire splice kits - 3M vinyl mastic pads Model #2200 (or #2210 rolls) except for Federally funded projects - Scotchmast Model 82 epoxy splice kit.
- E. Loop sealant - Crafcoc, Specialty Asphalt, or Albina Asphalt, meeting ASTM D312 Type 4.
- F. Mastic Pads - 3M 2200
- G. Typical detail J-8.

4.5.2 INSTALLATION

- A. Vehicle Detection Loops
 - 1. Proper installation of vehicle detection loops is vital to performance of the controller. Never install loops during rainy weather or when pavement is wet. Close traffic lane(s) during loop installation. Permittee shall not allow traffic across the work area until the Director approves the work.
 - 2. Make just enough saw cuts and cut only the amount of wire that can be installed before the end of that working day.
 - 3. Install loops after grinding the surface pavement or prior to paving final lift of asphalt.
 - 4. Test loops before filling saw cuts with sealant. See Section 4.3 for testing specifics.
- B. Splices
 - 1. Install a continuous piece of loop wire to the J-box. Shielded loop lead-in wire shall be continuous from the controller to the junction box closet to the loop where it is spliced to the loop wire.
 - 2. Connect all splices and underground induction loop circuits inside the junction boxes. The only splice allowed in the induction circuit shall be the shielded cable to loop wire splice.
 - 3. Splices shall be crimped, soldered and insulated with 3M 2200 Mastic Pads.
 - 4. Tag all loop lead-in wire at the splice point and at the controller with a small permanent band bearing loop designation.

C. Saw Cuts

1. Remove sharp protrusions and clean all saw cuts using a high-pressure washer followed by drying with 100-psi minimum air pressure.
2. Make all saw cuts in the top course of pavement a full 1/4-inch wide and 2 inches deep. Make cuts in the base course a minimum of 1 inch deep. Make the saw cut at least 1-1/2 inches deep for installations having three or more turns of wire. Do not cut through the pavement to the subgrade .
3. For square cuts, hand chisel the corners.
4. Gradually transition the last 12 to 18 inches of the lead-in cut to a full depth cut where conduit stubs out under the curb and gutter.

D. Loops

1. Install the wiring using a blunt-nosed wooden wedge.
2. Do not kink or fold-back the wiring.
3. Lay the detector loop wire in the clockwise direction being careful not to pull the wire. Lay the wire loosely around any corners.
4. Install 3 turns for loops that will be hooked up in series, and 4 turns for loops that will be operating as a single loop.
5. Place a tag on the start end of the wire for later identification.
6. Remove all slack from the wiring prior to sealant application.

E. Sealant

1. Seal saw-cuts with sealant before exposure to traffic.
2. Install loop sealant by pressure injection. During installation, avoid creating air bubbles or foam in the sealant.

4.5.3 TESTING

Perform all four of the following tests on each detector loop. Perform the tests in the presence of a City representative. Record the test results and submit to the Director. Perform all tests at the amplifier location after the loop is completely installed. If any of the installations fail to pass all tests, the Permittee shall repair the loop or lead-in cable and retest (tests A-D).

1. Test A - Measure the DC resistance between the two lead-in cable wires using a volt ohmmeter. The resistance shall be 5 ohms or less.
2. Test B - Prior to connection to grounding, perform a megohm meter test at 500 volts DC between the lead-in cable shield and grounding. The resistance shall equal or exceed 50 megaohms.
3. Test C – Perform a meggar test between the loop circuit and grounding. The resistance shall equal or exceed 50 megaohms.
4. Test D – Perform an induction test on each induction loop. A Type 1 loop passes if the inductance level is equal to or greater than 150

microhenries. A Type 2 loop passes if the inductance level is equal to or greater than 75 microhenries.

4.6 SIGNS

The Director determines the type, size, and location of signs in the right-of-way. Signs shall meet the URBAN AREAS criteria in the MUTCD and meet the criteria in TMC 11.24 Placement of Signs or Banners.

4.6.1 MATERIALS

A. Street Signs

1. Refer to RS-10 for Street Name Signs.

B. Other Signs

1. Posts:
 - a. Round posts are not allowed.
 - b. In areas with frontage improvements, treated wood 4" X 4", using 5/16" x 2-1/2" galvanized or stainless lag screws and flat washers.
 - c. In other areas, galvanized u-channel posts using galvanized or stainless 5/16" x 1-1/2" bolts, nuts, flat and lock washers.
2. Signs:
 - a. Street markers shall have white lettering and border on a green background. The sign shall be six inches high and shall have 4-inch letters.
 - b. Stop and regulatory shall be diamond, high-performance or equivalent.
 - c. Regulatory signs shall have border.

4.6.2 INSTALLATION

A. Street Signs

The Developer shall install all street signs on public right-of-way (including street name signs, warning signs, and regulatory signs).

B. Other Signs

1. Posts:
 - a. Do not backfill holes with concrete.
 - b. In soil, dig hole at least 30" deep. Backfill to the top using 5/8" angular, crushed rock.
 - c. On a raised island or in asphalt or concrete, dig a hole that is at least two feet in diameter, and at least 30 inches deep. Back fill to top of hole using 5/8" angular, crushed rock.
 - d. For street markers, install at intersection.

2. Mount:

- a. Primary signs so there is seven feet from the ground to the bottom of the sign.
- b. Secondary signs on the same post so there is at least six feet from the ground to the bottom of the sign.
- c. Object markers and large single or double arrows so there is at least four to five feet from the ground to the bottom of the sign.
- d. Opposing chevrons or signs for both directions on same post, if they are clearly visible from both directions.
- e. Street markers on top of post using a metal bracket.
- f. On street light posts using stainless bands and mounting hardware.
- g. So that posts do not show above the sign, except when installing a street marker bracket.

FIGURE 1 STREET TYPICAL DETAILS

RS-01	Typical Roadway Section
RS-02	Turn Around – Cul-de-sac and Hammerhead
RS-03	Pavement Restoration
RS-04	Bollard
RS-05	Not Available
RS-06	Mailbox Installation
RS-07	Street Monument w/ Frame and Cover
RS-08-A	Residential Driveway Alternate 1
RS-08-B	Residential Driveway Alternate 2
RS-08-C	Residential Driveway Alternate 3
RS-09	Commercial Driveway
RS-10	Street Name Sign
RS-11	Sidewalk
RS-12	Curb Ramp
RS-13	Raised Pavement Marker
RS-14	Typical Sign Installation
RS-15	Street Opening
RS-16	Left Turn - Noncontinuous
RS-17	Left Turn- Two-way Left
RS-18	Pavement Arrows
RS-19	Crosswalk – Design and Placement
RS-20	Street Light Pole – 30' to 40' Mounting Height
RS-21	Residential Street Light Pole – 30' to 40' Mounting Height
RS-22	Service Cabinet
RS-23	Pedestrian Signals
RS-24	Street Light Design Guidelines
RS-25	Luminaire Foundation – Sidewalk Application
RS-26	Ground Rod Box
RS-27	Curb and Gutter – Catch Basin Surround
RS-28	Induction Loop – Vehicle Detectors
RS-29	Traffic Signal – Controller Cabinet
RS-30	M/IC Driveway Design and Location
RS-31	Utility Adjustment
RS-32	Work Zone Plan - Centerline Work
RS-33	Work Zone Plan - Surveying

CHAPTER 5 SURFACE WATER

5.0. COMPREHENSIVE SURFACE WATER PLAN

The Comprehensive Surface Water Management Plan indicates the general location and description of surface water improvement projects and spells out the intent of the City's surface water management plan. The exact location or configuration of a proposed improvement may be modified or adjusted by the Developer, provided the proposed improvement remains consistent with the overall intent of the Plan. The Director must approve all modifications to the Comprehensive Plan requirements.

If a project is upstream or downstream of an improvement project in the City's Comprehensive Surface Water Plan, the permit application plan submittal shall consider the improvement in the Technical Information Report and, when indicated, shall include it in the project design.

Public Works recommends referring to the City's latest Surface Water Comprehensive plan and contacting the City's Surface Water Engineer during the early stages of surface water design.

5.1 OFFSITE DRAINAGE IMPROVEMENTS

With the City's approval, the Applicant may provide offsite improvements in the same drainage basin or threshold discharge area to mitigate water quality and flow control requirements associated with the project. These offsite improvements shall provide equivalent water quality and flow control.

5.2 STREAMS

Streams should be preserved in their existing channels. Any alteration to a stream channel requires approval by the Director and by DOE.

5.3 STREAM CROSSINGS

All stream crossings require written hydraulic project approval from the WDFW. The Applicant shall provide the Director a copy of the WDFW approval prior to permit issuance. Applicant shall design and install all stream crossing elements to withstand all anticipated loading, erosion impacts, hydraulic forces, and to remain water tight and free from changes in alignment or grade.

5.4 NPDES

- A. All work within the City shall meet the City's NPDES Phase II permit requirements and recommendation.

- B. Any project that clears one or more acres must provide proof of an NPDES permit issued by DOE.

5.5 OUTFALLS

A. Hydraulics Project Approval

A new outfall or a modification to an existing outfall of a designated watercourse may require a Hydraulic Project Approval (HPA) from the Washington Department of Fish and Wildlife (WDFW). When HPA is required, the Applicant must provide proof of HPA to receive a Public Works permit.

B. Maintenance Access

The Applicant must construct a maintenance access and provide the City a maintenance easement for all new or modified outfalls that the City will maintain.

5.6 KING COUNTY SURFACE WATER DESIGN MANUAL

- A. Surface Water design shall meet the 1998 King County Surface Water Design Manual, with the following exceptions:
 - 1. Downstream analysis shall be performed using sensitive areas, wetlands, critical drainage areas, and problem areas defined by the City.
 - 2. Refer to Figure 2 for drainage basin boundaries.
 - 3. Refer to Figure 3 for areas where infiltration is not allowed.
 - 4. Refer to Figure 4 for areas where Level 2 detention is required.
 - 5. Open pond side slopes shall be 3H:1V or flatter.
 - 6. All vaults shall be underground and covered. The City will not approve uncovered, above-ground retention/detention vaults.
 - 7. All surface water runoff created by a private development shall be accounted for by the private development, including surface water from public facilities constructed as part of the private development.
 - 8. All surface water facilities constructed as part of a private development shall be owned by the private developer. All maintenance responsibilities remain with the private developer.
 - 9. The City will not approve installation of private surface water facilities in public right-of-way.
- B. When the soils on site meet the feasibility requirements in the *King County Surface Water Design Manual*, infiltration of roof down spout drains is required. All infiltration design must be accompanied by a feasibility evaluation per the manual. Refer to DS-17 for areas where infiltration is not allowed.

- C. Storm drainpipe materials for systems shall be reinforced concrete, ADS N-12, Hancor Hi-Q with air testable joints, ductile iron class 50, or HDPE.

5.7 EROSION PREVENTION AND SEDIMENT CONTROL

- A. Plans for any activity that disturbs ground shall include an erosion prevention and sediment control plan (ESC) designed in accordance with the King County Surface Water Design Manual. The plan shall provide information for temporary erosion prevention and sediment control during all phases of construction and shall provide permanent stabilization for disturbed areas. During construction, the Director may require additional measures as needed to prevent erosion and retain sediment.
- B. The plan shall emphasize erosion prevention rather than sediment control and shall minimize the extent and duration of soil exposure. In addition, the plan shall minimize runoff velocities and retain sediment on-site.
- C. At a minimum, the ESC plan shall show clearing limits, sensitive area buffers, and shall provide temporary stabilization, sediment retention, and perimeter protection. In addition, some projects will require stabilized traffic areas and surface water controls, which shall be shown on the ESC plan. The plan shall also provide a description of final stabilization methods.
- D. The plan shall provide the seed mix for the temporary and permanent seeding.
- E. The plan shall require cover measures as follows:
 - 1. At all times, any disturbed areas left unworked for more than 30 days shall be seeded.
 - 2. May 1 through September 30, temporary cover measures shall be installed on ALL areas left undisturbed for more than seven days.
 - 3. October 1 through April 30, minimum wet season requirements:
 - a. Install temporary cover measures on all areas that will remain unworked for more than TWO DAYS and on stockpiles and steep cut and fill slopes.
 - b. Retain onsite a quantity of cover measures materials sufficient to cover all disturbed areas.
 - c. By October 8, temporarily seed and mulch all areas that will be unworked during the wet season.
 - d. Mulch all seeded areas.
 - e. Stabilize all construction traffic areas, unless already graveled.

F. ESC Maintenance

1. Failure to maintain ESC measures in accordance with the approved maintenance schedule may result in the work being performed at the direction of the Director and assessed as a lien against the property where such facilities are located.
2. During the life of the project, the Permittee shall maintain in good condition and promptly repair, restore, or replace all grade surfaces; walls, drains, dams, structures, vegetation, erosion and sediment control measures, and other protective devices in accordance with approved plans.
3. The Permittee shall monitor the downstream drainage features, and shall, with the Director's approval, remove all sediment deposition resulting from project-related work.
4. The Director shall assume maintenance and operation responsibilities for all ESC measures located within public easements and rights-of-way, following final acceptance of such facilities by the Director.

5.8 POLLUTION PREVENTION PLAN

Any construction project that includes any of the following activities must provide best management practices to prevent surface water pollution:

1. Dewatering
2. Paving
3. Structure construction and painting
4. Material delivery, use, or storage (soil, pesticides, herbicides, fertilizers, detergent, plaster, petroleum products, acids, lime, paints, solvents, curing compounds)
5. Solid waste
6. Hazardous waste
7. Contaminated soils
8. Concrete waste
9. Sanitary/septic waste
10. Vehicle or equipment cleaning, fueling, or maintenance.

FIGURE 2 TUKWILA DRAINAGE BASINS

FIGURE 3 INFILTRATION RESTRICTIONS

FIGURE 4 LEVEL 2 DETENTION AREAS

FIGURE 5 STORM DRAINAGE TYPICAL DETAILS

DS-01	Catch Basin – Type 1
DS-02	Catch Basin – Type 2 (48”/54”/60”)
DS-03A	Catch Basin – Yard Drain (2 Sheets)
DS-04	Catch Basin – Solid Metal Cover
DS-05	Catch Basin – Curb Inlet
DS-06	Catch Basin and Inlet – Vaned Grate
DS-07	Not Available
DS-08	Inlet – Through Curb
DS-09	Manhole – 24” Frame with Cover
DS-10A	Manhole - Type IV with Monolithic Base
DS-10B	Manhole – Access and Catch
DS-10C	Manhole – Polypropylene Safety Step
DS-11	Manhole - Ladder
DS-12	Pipe Anchor (2 Sheets)
DS-13	Ditch
DS-14A	Trench – Bedding and Backfill
DS-14B	Trench – Bedding and Backfill – Pavement Restoration
DS-15	Curb and Gutter

CHAPTER 6 FLOOD ZONE

6.0 GENERAL

This following applies to all special flood hazard areas within the City of Tukwila jurisdiction.

6.0.1 BASE FLOOD ELEVATION

- A. The basis for special flood hazard areas identified by the Federal Insurance Administration is a scientific and engineering report entitled "The Flood Insurance Study for King County, Washington dated December 6, 2001, and any revisions thereto, with an accompanying Flood Insurance Rate Map (FIRM), and any revisions thereto, hereby adopted by reference and declared to be a part of this ordinance. The Flood Insurance Study and the FIRM are on file at 6300 Southcenter Boulevard, Suite 100.
- B. Where flood elevation data is not available either through the Flood Insurance Study, FIRM, or from another authoritative source, the Director shall review applications for building permits to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness is a local judgment and includes use of historical data, high water marks, photographs of past flooding, etc., where available. Failure to elevate at least two feet above the highest adjacent grade in these zones may result in higher insurance rates.
- C. When base flood elevation data has not been provided in A zones, the Director shall set the base flood elevation by using any base flood elevation and floodway data available from a Federal, State or other source.
- D. For subdivision proposals and other proposed developments that contain at least 50 lots or 5 acres, where base flood elevation data has not been provided or is not available from another authoritative source, the Developer shall generate base flood elevation data.

6.0.2 BOUNDARY INTERPRETATION

The Director shall determine special flood hazard area boundaries when there is a conflict between a mapped boundary and actual field conditions.

6.0.3 FLOOD PRONE AREAS

By Federal and State regulations, the Public Works Director may define flood-prone areas not described in the Flood Insurance Study produced by FEMA. By Policy 2000-1, the Director has designated an area in Allentown as flood prone. Construction or development within the flood prone boundaries shown on Figure 6, requires a Flood Control Zone permit.

6.0.4 WATER COURSE RELOCATION

If a watercourse will be relocated, provide description of the extent to which the watercourse will be altered or relocated because of proposed development. The Director, acting for FEMA, will require:

1. Notification to adjacent communities and the Department of Ecology (DOE) prior to any alteration or relocation of a watercourse, and evidence that notification was provided to the Federal Insurance Administration.
2. Maintenance within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished.

6.0.5 REQUIRED INFORMATION

- A. Elevation in relation to mean sea level, of the lowest floor (including basement) of all structures,
- B. Elevation in relation to mean sea level to which any structure has been flood proofed,
- C. Certification by a registered professional engineer or architect that the flood proofing methods for any nonresidential structure meet the flood proofing criteria in TMC 16.52, and
- D. Description of the extent to which a watercourse will be altered or relocated as a result of proposed development.

6.1 STANDARDS

6.1.1 GENERAL

- A. All plans shall show the nature, location, dimensions, and elevations of the area in question, including existing or proposed structures, fill, materials storage, drainage facilities. Specifically, the following information is required:
 1. Elevation in relation to mean sea level, of the lowest floor of all structures,
 2. Elevation in relation to mean sea level to which any structure has been flood proofed,
- B. In all special flood hazards where flood elevation data is not available, either through the FIRM or from another authoritative source, all new construction and substantial improvements shall be elevated at least two feet above the highest adjacent grade.

6.1.2 ANCHORING

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

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- B. All manufactured homes must likewise be anchored to prevent flotation, collapse, or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (Reference FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebook for additional techniques).

6.1.3 CONSTRUCTION MATERIALS AND METHODS

- A. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.
- B. All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.
- C. All new construction and substantial improvements on slopes shall have drainage paths to guide floodwaters around and away from proposed structures.
- D. Electrical, heating, ventilation, plumbing, and air-conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

6.1.4 UTILITIES

- A. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the systems;
- B. A proposed water well shall be approved by the Department of Ecology (WAC 173-160-171);
- C. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters; and,
- D. Onsite waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

6.1.5 SUBDIVISIONS

- A. All subdivision proposals shall be consistent with the need to minimize flood damage;
- B. All subdivision proposals shall have public utilities and facilities, such as sewer, gas, electrical, and water systems located and constructed to minimize or eliminate flood damage;
- C. All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage; and,

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- D. Where base flood elevation data has not been provided or is not available from another authoritative source, it shall be generated for subdivision proposals and other proposed developments that contain at least 50 lots or 5 acres .

6.1.6 RESIDENTIAL CONSTRUCTION

- A. New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated one foot or more above the base flood elevation.
- B. Fully enclosed areas below the lowest floor that are subject to flooding are prohibited, or shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria:
 - 1. A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.
 - 2. The bottom of all openings shall be no higher than one foot above grade.
 - 3. Openings may be equipped with screens, louvers, or other coverings or devices if they permit the automatic entry and exit of floodwaters.

6.1.7 NONRESIDENTIAL CONSTRUCTION

- A. New construction and substantial improvement of any commercial, industrial or other nonresidential structure shall either have the lowest floor, including basement, elevated one foot or more above the base flood elevation; or, together with attendant utility and sanitary facilities, shall:
 - 1. Be flood proofed so that below one foot or more above the base flood level the structure is watertight with walls substantially impermeable to the passage of water. City shall notify Applicants who propose to flood proof nonresidential buildings that flood insurance premiums will be based on rates that are one foot below the flood proofed level (e.g. a building flood proofed to the base flood level will be rated as one foot below).
 - 2. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;
 - 3. Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this subsection based on her development and/or review of the structural design, specifications, and plans.
- B. Nonresidential structures that are elevated, not flood proofed, must meet the same standards for space below the lowest floor as residential construction.

6.1.8 MANUFACTURED HOMES

- A. All manufactured homes to be placed or substantially improved on sites:
 - 1) outside of a manufactured home park or subdivision, 2) in a new manufactured home park or subdivision, 3) in an expansion to an existing manufactured home park or subdivision, or 4) in an existing manufactured home park or subdivision on which a manufactured home has incurred “substantial damage” as the result of a flood; shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated one foot or more above the base flood elevation and be securely anchored to an adequately designed foundation system to resist flotation, collapse and lateral movement.
- B. Manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision that are not subject to the above manufactured home provisions be elevated so that either:
 - 1. The lowest floor of the manufactured home is elevated one foot or more above the base flood elevation, or
 - 2. The manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade and be securely anchored to an adequately designed foundation system to resist flotation, collapse, and lateral movement.

6.1.9 RECREATIONAL VEHICLES

Recreational vehicles placed on sites are required to either:

- 1. Be on the site for fewer than 180 consecutive days,
- 2. Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or
- 3. Meet the requirements for manufactured homes, including and the elevation and anchoring requirements for manufactured homes.

6.2 FLOODWAYS

- A. Floodways are located within special flood hazard areas. Floodwaters within floodways are extremely hazardous due to high flow velocities. These waters carry debris and potential projectiles, and have a high potential for erosion.
- B. The following provisions apply to floodways within the City:
 - 1. Construction of new residential structures is prohibited.
 - 2. No construction within a designated floodway can increase base flood levels.
 - 3. No encroachment is allowed, including fill, new construction, substantial improvements, or other development, unless a registered professional

engineer certifies through hydrologic and hydraulic analyses, performed in accordance with standard engineering practice, that the proposed encroachment would not result in any increase in flood levels during the occurrence of the base flood discharge.

4. Repair, reconstruction, or improvement to a residential structure is allowed, as long as the structure's ground floor area does not increase and the cost of the work does not exceed 50 percent of the market value of the structure either, (A) before the repair, or reconstruction is started, or (B) before the damage occurred (if the structure has been damaged and is being restored). Any project to correct existing violations of state or local health, sanitary, or safety code specifications identified by the code enforcement official and which are the minimum necessary to assure safe living conditions or to structures identified as historic places shall not be included in the 50 percent.
- C. If approved, all new construction and substantial improvements shall comply with all applicable standards.

6.3 CRITICAL FACILITY

- A. Construction of new critical facilities shall be, to the extent possible, located outside the limits of a special flood hazard area. The Director may permit construction of a new critical facility within a special flood hazard area if no feasible alternative is available.
- B. Critical facilities constructed within a special flood hazard area shall meet the following:
 1. Lowest floor elevated three feet above base flood elevation or elevated to the 500-year flood elevation, whichever is higher.
 2. Flood proofing and sealing measures ensure that toxic substances will not be displaced by or released into floodwaters.
 3. Access to and from the critical facility protected to three feet above base flood elevation or to the 500-year flood elevation.
 4. Access routes elevated to or above the level of the base flood elevation provided to all critical facilities to the extent possible.

FIGURE 6 ALLENTOWN FLOOD CONTROL ZONE

CHAPTER 7 WATER SUPPLY

7.0 GENERAL

7.0.1 COMPREHENSIVE WATER PLAN

The City of Tukwila has adopted a Comprehensive Water Plan to ensure the development of an efficient and adequate water supply system for the City. All extensions, additions, changes, or alterations to the City water system shall be consistent with the Comprehensive Plan.

The Comprehensive Plan indicates the general location and configuration of the proposed system supply mains, interties, and loops. The exact location or configuration of the system may be modified or adjusted by the Developer, provided the proposed system remains consistent with the overall concept of the Plan. All modifications to the Comprehensive Plan design requirements require written approval by the Director.

If the City's Comprehensive Water Plan anticipates or indicates the system may be expanded in the future, the permit application plan submittal shall include the expansion plan into the design.

Refer to Figure 7 for water district boundaries within Tukwila.

7.0.2 SYSTEM PRESSURE

Public or private systems shall be designed to maintain a minimum residual pressure not less than 20 psi at ground level at all points in the system, under maximum instantaneous fire flow demand.

7.0.3 METERING

All water used for any purpose other than fire protection service shall be metered. Each individual building requires a separate water meter and service line main tap.

7.0.4 WELLS

New private wells or sources of water will not be allowed. Existing facilities covered by a current water right permit from the State of Washington will be allowed if they conform to all local, state, and federal laws and regulations. The City does not allow connection between public and private systems. Such connections are unlawful.

7.0.5 COMBINATION SYSTEMS

Domestic water supply shall not be combined with any fire-only supply system for new construction. Existing combination systems are allowed only where the Permittee has City-approved fire line metering and has demonstrated to the Director that the private system complies with the most current cross connection control requirements.

7.0.6 FIRE AND LOOPED SYSTEM

If possible for purposes of meeting fire protection and water quality standards, water systems are to be looped in accordance with the City's *Comprehensive Water Supply Plan* and the Uniform Fire Code. Non-looped systems require the Director's approval.

7.0.7 RECLAIMED WATER

Where available, reclaimed water can be utilized for non-potable uses such as irrigation, cooling, and energy needs. Technical specifications (i.e. blocking, valves, etc.) as provided in these Standards for potable water systems are also applicable to reclaimed water systems. In addition, non-potable, reclaimed water systems must be clearly identified with signs and purple coloring in accordance with the Water Reclamation and Reuse Standards of the Washington DOE manual, *Criteria for Sewage Works Design*.

7.0.8 SYSTEM MODIFICATIONS

Modification to the water supply or plumbing on private property requires upgrade of the meter(s) and the cross connection control to current standards.

7.0.9 MAINTENANCE

The property owner owns and maintains the water service from the meter onto the property.

7.1 METERED SERVICE

7.1.1 GENERAL

- A. All permanent meters for one project shall be located at the property line and within the right-of-way.
 - 1. Residential - Connections shall be a minimum of ¾ inch and shall use one section of copper tubing type K continuous from the main to the meter, without any joints. Materials between the meter and the house must meet the current King County Department of Health standards.
 - 2. Non-residential - Connections shall be a minimum of 1 inch and shall use one section of copper tubing type K continuous from the main to the meter, without any joints. Pipe and fittings shall be rated for pressure of twice the maximum working pressure of the 360-pressure zone.
 - 3. Deduct Meter - The meter shall read in cubic feet and shall have an ECR-WP register that is compatible to the Invensys automatic reading system. Install deduct meter for landscape irrigation next to the permanent water meter or within six feet of the permanent meter when located in a landscaped area. In order to connect the deduct meter to the permanent meter reading system, connect the two boxes using PVC conduit.
 - 4. Permanent Service Disconnection

With approval from the Director, Permittee shall remove the corporation stop at the main and pipes, meters, etc.

7.1.2 3/4" AND 1" SERVICE

Materials

1. Tapping Saddle: Single strap Romac (iron pipe thread).
2. Corporation Stop: Mueller B-25028 or B-20013.
3. Angle stop: Mueller ball valve with tailpiece containing angle check valve.
4. Meter Setter: No setters allowed.
5. Pipe: Type K copper tubing.
6. Meter Box:
 - a. For 3/4" – Inland Foundry #2005/Mid States plastic with D.I. lid
 - b. For 1" - #2 Fogtite/Mid States plastic with D.I. lid
7. Plastic meter boxes allowed in landscape areas only. Solid steel 1/2" diamond plate lid in traffic areas. Boxes used in traffic areas require prior approval.

Installation

Per WS-01.

7.1.3 1-1/2" AND 2" SERVICE

Materials

- A. Tapping Saddle: Double strap Romac (iron pipe thread).
- B. Corporation Stop: Mueller B-25028 or B-2969.
- C. Meter setter: Mueller B2422-2 with a check valve on the downstream side and a built-in bypass assembly with lock wing.
- D. Bypass Assembly: 1" assembly with lockwing.
- E. Pipe Material: Type K copper tubing or high molecular weight black polyethylene pipe, with tracing tape.
- F. Meter Box:
 - a. For 1-1/2" meter - Fogtite #2 with 1/4" diamond-plate, solid, steel lid or Mid States plastic with D.I. lid.
 - b. For 2" meter - Fogtite #3 or a 2' x 4' meter box, with 1/4" diamond plate, solid steel, lid with three 12-inch minimum tiers or approved vault. Lids must have a hinged inspection plate, centered over meter. Plastic #3 in planter area is allowed.

Installation

1. Install bypass assembly.
2. Embed pipe in 5/8" minus crushed rock.

3. Per WS-02 and WS-03.

7.1.4 3", 4", AND 6" SERVICES

Materials

1. Tapping Tee. Refer to Section 7.3.6, under water mains.
2. Tapping Valve: Gate valve. Cast iron valve with cast iron valve box and 18" cast iron valve box top section.
3. Meter Valve: Gate valve with hand wheel.
4. Pipe Material: Ductile iron, Class 52.
5. Concrete thrust blocks.
6. Steel tie rods.
7. Bypass Assembly: 1-1/2" with locking wings on ball valves.
8. Meter vault: Watertight 444-LA or 644-LA with spring assisted, galvanized-diamond plate cover with locking latch and recessed lift handle.

Installation

1. Embed pipe in 5/8" minus crushed rock.
2. For ductile iron pipe, install concrete thrust blocks and/or steel tie rods at any change in service line direction. Field conditions may require installation of restrained joints.
3. Install service with bypass assembly per WS-04.
4. Install one gate valve on each side of and immediately next to the meter.

7.1.5 TEMPORARY WATER METER

Permittee rents the temporary meter from the City for use with one designated project. The temporary water meter is installed on fire hydrants only. The rental is subject to the following conditions:

1. Meter presented to Public Works Operation every 30 days for a meter reading and inspection.
2. Meter promptly returned following project completion or by the permit expiration, whichever comes first. Permittee receives a final bill when the meter is returned to Operations.
3. Meter returned in the same condition as when rented. The Permittee is responsible for meter damage or loss and shall pay all costs related to repair or replacement.
4. Permittee may move the meter(s) from one hydrant to another within the same project providing Permittee:
 - a. Notifies and receives approval from the Water Department before the meter is moved, and
 - b. Uses hydrant wrenches when connecting or disconnecting the meter.

7.2 WATER MAIN

7.2.1 GENERAL

Water/Sewer Separation

Install water mains at least 10 feet horizontally, measured edge to edge, from any existing or proposed sewer. The Director may allow deviation, provided the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer, at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer.

Water/Sewer Crossing

Install water mains crossing sewer lines so that the bottom of the water main is at least 18 inches above the top of the sewer. Locate full section of water pipe so that its midpoint is above the sewer pipe at the crossing. This installation may require special structural support for the water and sewer pipe.

New Water Mains

All new water mains within the City of Tukwila shall comply with the following:

1. Extend water main extensions along the entire property frontage.
2. Design velocities less than or equal to 10 feet per second, under maximum flow conditions,
3. Provide 3 feet to 5 feet deep covering over main.

Pipe Size

- A. In residential zones, water mains shall be 8-inch diameter, unless the Director requires larger pipe.
- B. In non-residential zones, water mains shall be at least 12-inch diameter, or the size specified in the City's Comprehensive Water Plan, whichever is greater.

Loop Systems

Wherever possible, close or loop the systems to avoid non-looped lines. Where non-looped mains are unavoidable, install a standard 2-inch blow-off assembly, for flushing purposes. Blow-off assembly per WS-09. If the Director deems flows and pressure sufficient, a fire hydrant may be required in lieu of the blow-off assembly.

Traffic Areas

Air and vacuum release valves in traffic areas require approval from the Director.

7.2.2 MATERIAL

1. All pipes, fittings, valves, hydrants, joints, and other components shall conform to AWWA, APWA/WSDOT standards, and be acceptable for use by the City of Tukwila.
2. Pipe - Ductile iron pipe, cement lined, standard thickness, Class 52 minimum, conforming to the standards of AWWA C-151.
3. Fittings and Joints - Cast iron or ductile iron, with flanged or mechanical joint connections and the same thickness class as the pipe used. All fittings shall be cement mortar lined in accordance with AWWA C-104.

4. Cast iron fittings - Long body for operating pressure rating of 150 psi, unless otherwise noted. Metal thickness and manufacturing process shall conform to applicable portions of USA Standard A-21.10, A-21.11, B-16.2, and B-16.4.
5. Flanged Joint - Conforming to USA Standard B-16.1. Rubber gaskets for push-on-joint (Tyton) or mechanical joint (MJ) in accordance with AWWA C-1110. Gaskets shall be neoprene, chlorinated butyl, or cloth-inserted rubber. Type of connections shall be specified as push-on-joint (Tyton), mechanical joint (MJ), plain end (P.E.), flanges (FL) not threaded.

7.2.3 VALVES

Material

1. Resilient seat, opening counter-clockwise, non-rising stem type, with double O-ring seal equipped with standard 2-inch square stem nuts. Flanged valves or mechanical joint, suitable for installation with the type and class of pipe being used.
2. Gate Valves conforming to AWWA C-500.
3. Butterfly Valves conforming to AWWA Standard C-504, Class 150, cast iron short body and O ring stem seal. Butterfly valves in chambers shall have a manual crank operation. Buried butterfly valves shall have a standard 2-inch operating nut and suitable valve box. Direct buried valves shall be ground rated.
4. Check Valves - 150 psi working pressure.
5. Air Release Valves per WS-07 and WS-08.

Installation

1. Install valves at intervals sufficient to minimize sanitary hazards during repairs, no farther than 500 feet apart in industrial and commercial zones, and no farther than one block or 800 feet apart in other zones.
2. Install a gate valve for 12-inch and smaller water mains.
3. Install a butterfly valve for water mains larger than 12-inch diameter.
4. Install at least two valves at all tee intersections.
5. Install at least three valves at water supply/sanitary sewer crossings.
6. Install a gate valve at all hydrants and fire line extensions per WS-13.

7.2.4 BLOCKING

Material

1. Cast in place with concrete originating from a commercial batch plant or commercial batch truck. The City does not allow hand mixing.
2. Tie-rods shall be galvanized or painted with a bituminous coating.

Installation

1. Provide reaction blocking at all tees, plugs, bends, and hydrants per WS-11 through WS-12.

2. Cast in place so blocking bears against fittings only.
3. Allow room at joints to allow dismantling.
4. Wrap fittings with plastic sheeting.
5. Do not backfill until the concrete reaches 3000-psi strength.
6. Field conditions may require tie rods and/or restrained joints.

7.2.5 LINE TAPS

General

1. The Permittee shall give the Public Works Department at least five working days notice of intention to disrupt service.
2. Connection to an existing, in-service, water main shall be made by a wet tap. All new connections to the City of Tukwila water system shall be in strict accordance with 7-11.3 (9) A of *Standard Specifications for Road, Bridge, and Municipal Construction*.
3. The Director allows cut-ins as exception and may require the addition of in-line valve(s).

Material

1. Size on Size - Tapping Tee of cast iron or ductile iron, full encirclement mechanical joint style, Mueller
2. Note: Other than size on size - Tapping sleeves of epoxy-coated fabricated steel.
3. Fabricated steel sleeves: ASTM 285 grade C or ASTM A.36 steel, with a fusion bonded epoxy coating to AWWA C213-79. Painted coatings are not acceptable.

Installation

1. Refer to WS-10.
2. A qualified tapping service approved by the Director must install the tap. Swab all fittings with a 5-6% chlorine solution, in accordance with AWWA Standard C-601.
3. For approved cut-ins, assemble pipe, fittings, and gate valves at the site. Complete all assembly and ready it for installation before the water in the main is shut-off. Once the water is shut-off, the cut-in shall proceed until the line is restored to service. Installation, once begun shall not halt until completed.

7.3 FIRE LINE/HYDRANT

Applicant shall make written request for any exception to the following hydrant requirements.

1. Size hydrant supply lines to provide the fire-flow required by; 1) Appendix III-A of the Uniform Fire Code, Fire Flow Requirements for buildings and 2) the City's Water System Comprehensive Plan.

2. Install all fire hydrants, auxiliary gate valves, and supply lines per City WS-13 and WS-14. Install fire hydrant feed lines at right angles to the supply main in conformance with WS-13.
3. Locate hydrants so they are in plain view, for a distance of 50 feet, in the line of vehicular approach. The approach line-of-sight shall be free of shrubs, trees, fences, landscaping, etc.
4. Locate hydrants within 150 feet of the building and no farther than 300 feet from any perimeter point of the building.
5. Locate public fire hydrants at a maximum spacing of 300 feet along City water mains.
6. Leads from the service main to the hydrant shall be at least 6-inch diameter and not over 50 feet long.

7.4 CROSS CONNECTION CONTROL

7.4.1 GENERAL

In accordance with Washington State Department of Health guidelines for Group A Public Water Systems, the Director has implemented a cross-connection control program to protect the public water system from contamination via cross connection. The program requires elimination or control of any cross-connection between the distribution system and a consumer's water system by the installation of an approved backflow device. The owner of these devices must maintain and provide annual test results to the Department.

7.4.2 NEW CONNECTIONS

A. Water Supply

Every new, commercial or multi-family residential connection to the City's water supply requires installation of an approved Reduced Pressure Principle Assembly immediately downstream of the permanent water meter as premises isolation. Installation at another location requires the Director's approval.

B. Fire System

Every new or modified fire line connection to the City's water supply, including single family residences, shall include an approved detector double check valve assembly, installed per WS-15. The City does not require detector double check valve assembly on a private fire system that is downstream of a connection protected by an RPPA.

C. Irrigation System

Unless installed downstream from an RPPA, every new or modified irrigation system shall incorporate a double check valve assembly for cross connection control.

7.4.3 EXISTING CONNECTIONS

When reviewing a Development Permit, including a Tenant Improvement (TI) application, the Director evaluates the existing service connection(s) per the following criteria:

1. If the project includes any alterations to the existing plumbing system, then the entire plumbing system must be brought up to the current standards as set forth in the Uniform Plumbing Code, including the installation of approved backflow prevention on the water supply, fire line and irrigation system.
2. If the project does not include any changes to the existing plumbing system, then such systems lawfully in existence at the time of installation may have their use, maintenance or repair continued if the use, maintenance, or repair is in accordance with the original design and location and no hazard to life, health, or property has been created by such plumbing system. The Department reviews high health cross-connection hazard premises as defined in WAC 246-290-490, Table 9, for premises isolation requiring either an Air Gap (AG) or Reduced Pressure Principal Assembly (RPPA),
3. If any previously unapproved backflow prevention device cannot be upgraded in the same location with an approved backflow prevention device, such limitations must be evaluated by the Director,
4. If a new device is installed at a location downstream from the original device, all pipe must first be approved for potable water use prior to reconnection. The pipe material must be specifically rated for potable water use (no black iron), and the entire length of main to be converted must be thoroughly scoured using a multi-staged pigging process acceptable to the Director.

7.4.3 FIRE PROTECTION SYSTEM

A. Design

The plans must be prepared, stamped, signed and dated by a Level III certificate of competency holder (NICET) or by a professional engineer registered in Washington State.

B. Installation

When the backflow prevention device is installed outside the building and underground, the installer must have Level III certificate of competency or a Level U contractor's certificate of competency (NICET). If the installer is different from the designer, then the installer must stamp, sign and date the plans, in addition to the designer's stamp, signature and date.

7.5 INSPECTION AND APPROVAL

7.5.1 WATER MAIN TESTING

- A. All water mains and appurtenances shall be pressure tested for leakage in accordance with City requirements, after flushing and disinfecting for new and reestablished systems. The water main and appurtenances shall be brought to a hydrostatic pressure of 250 psi, measured at the high point in the line. Water mains require a one-hour test and fire lines require a two-hour test, during which time there cannot be any loss in pressure.
- B. The main shall be tested between valves or at a maximum distance of 500 feet along the main. Any leaks or imperfections shall be corrected before final acceptance. No air will be allowed in the line.
- C. Insofar as possible, no hydrostatic pressure shall be placed against the opposite side of the valve being tested. Test pressure shall be maintained while the entire installation is inspected. The Permittee shall provide all necessary equipment and shall perform all work connected with the tests. Tests shall be made after all connections have been made, including all connections as shown on the plan. Insofar as is practical, tests shall be made with pipe joints, fittings and valves exposed for inspection. The owner shall perform the test to assure that the equipment to be used for the test is adequate and in good operating condition, and the air in the line has been released before requesting the City to witness the test.

7.5.2 FLUSH AND DISINFECT

- A. All new, cleaned or repaired water mains and some backflow preventer installations require disinfecting and flushing per AWWA Standard C-601. The flushing and disinfecting shall include detailed procedures for the adequate flushing, disinfecting, and microbiological testing.
- B. At no time shall chlorinated water from a new main be flushed into a body of fresh water including lakes, rivers, streams, and any and all other waters where fish or other natural water life can be expected.
- C. Sections of pipe to be disinfected shall first be flushed to remove any solids or contaminated material that may have become lodged in the pipe.
- D. At least twelve (12) hours after the flushing procedure, the Permittee shall request that the City Inspector collect water samples from the new system. These samples shall be taken in sterilized bottles and tested by a DOH approved testing lab, as designated by the Water Department. All samples must meet the DOH quality standards prior to placing the lines into service.
- E. The Permittee shall dispose of treated water flushed from the lines. Prior approval from the Director is required for disposal to sanitary sewers or surface water systems.
- F. Bag test fire lines.

FIGURE 7 WATER DISTRICT BOUNDARIES

FIGURE 8 WATER SUPPLY TYPICAL DETAILS

WS-01	Meter – ¾” and 1”
WS-02	Meter – 1-1/2” and 2” Setter
WS-03	Service– 1-1/2” and 2” Domestic
WS-04	Meter - 3” and 6”
WS-05	Not Available
WS-06	Water Main – Valve Box Operating Nut Extension
WS-07	Water Main – Air and Vacuum Release (non-Traffic Areas)
WS-08	Not Available
WS-09	Water Main - Blow Off Assembly
WS-10	Water Main – Tapping Tee
WS-11A	Blocking – Deadman with 45°
WS-11B	Blocking - Deadman with 45° Alternate
WS-12A	Blocking – Horizontal - Concrete (2 Sheets)
WS-12B	Blocking – Vertical - Concrete
WS-13	Fire Hydrant – Assembly and Setting
WS-14	Fire Hydrant – Guard Post
WS-15	Cross Connection Control – Fire (2 Sheets)
WS-16	Encasement – Controlled Density Fill
WS-17	Encasement – Steel
WS-18	Trench – Bedding and Backfill

CHAPTER 8 SANITARY SEWER

8.0 GENERAL

8.0.1 COMPREHENSIVE SEWER PLAN

The City of Tukwila's Comprehensive Sewer Plan ensures orderly and cost effective development of existing and future sewerage facilities. All proposed sewer improvements and extensions shall be consistent with the Comprehensive Sewer Plan. All modifications to the Comprehensive Sewer Plan require written approval from the Director.

The Permittee shall extend the sanitary sewer improvements to the extreme boundary of the property in accordance with the comprehensive plans. If the plan does not require future extension at the Permittee's project, the Permittee shall extend the sewer to service the property.

Refer to Figure 9 for sewer district boundaries within Tukwila.

8.0.2 SANITARY SEWER EXTENSION

If the sewer extension provides benefit to other properties, the Permittee may arrange for partial reimbursement through a Developer Reimbursement agreement

8.0.3 SEPTIC TANKS

The Director may allow a residential septic system, which meets the requirements of South King County Health Department, when there is no sanitary sewer main or lateral within 250 feet of the building.

All septic tank removal or abandonment shall be accomplished in accordance with King County Board of Health Code 13.04.054, within thirty (30) days as follows:

1. Pump the tank dry, bleach, and pump again. The tank may be removed or abandoned in place by punching holes in it and filling it with sand or gravel; and
2. Provide a receipt from a King County approved pumper documenting septage removal; and
3. Remove or destroy lid; and
4. Fill the septic tank with compacted sand or gravel; and
5. Report the removal or abandonment to the King County Health officer.

8.0.4 CONNECTION TO METRO SEWER

Side sewer connections to King County Department of Natural Resources interceptor sewer lines shall be allowed only by written permission from King County. The City will be the agency through which permits will be obtained for such

connections. The Permittee is responsible for all coordination with Metro for necessary inspections and approvals.

8.0.5 INDUSTRIAL SEWER CONNECTION

Special consideration must be given to sanitary sewer design and connection for industrial users. The Designer must consider the potential for pretreatment requirements, excessive sewage flows, special flow metering, or sampling requirements prior to industrial sewer collection/treatment system design.

8.0.6 MATERIALS

All materials shall be new, undamaged, inspected and approved by the Director prior to installation. Acceptance of materials does not release the Permittee from the responsibility to guarantee materials and construction. The type, class and/or thickness shall be legibly and permanently marked on sanitary sewer pipe. The supplier shall provide the City with a certificate for materials, as requested.

8.0.7 SIZING

The sanitary side sewer shall be sized to carry all sanitary sewage and waste fluids of any kind from the buildings served. All toilets, sinks, stationary wash stands, floor drains, or any other piece of equipment having waste fluids shall be connected to the sanitary sewer system. Commercial minimum diameter is 6 inches.

New sewer systems, except one-lot, single family residences, shall be designed based on per capita flows or other methods as approved by the City and Department of Ecology. The City requires detailed design calculations and service area maps, stamped, signed, and dated by a Washington State registered professional engineer, for the system design.

8.0.8 SEWER/WATER SEPARATION

Sewer mains shall be laid at least 10 feet horizontally, measured edge to edge, from any existing or proposed water supply line. The Director may allow a reduction to 5 feet of separation provided the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer. Refer to SS-01.

Install all sanitary sewer crossings under water mains so that the top of the sewer pipe is at least 18 inches below the bottom of the water main. Locate 18 feet of sewer pipe at the crossing so the joints will be as far from the water supply as possible. This installation may require special structural support for the water and sewer pipe.

8.0.9 SEWER/WELL SEPARATION

No sanitary sewer shall be constructed within 100 feet of a well.

8.0.10 MINIMUM SEWER SLOPES

SEWER SIZE (INCHES)	MINIMUM SLOPE (FEET PER 100 FEET)
4	2.00 Side Sewer Only
6	2.00 Side Sewer Only
8	0.40
10	0.28
12	0.22
14	0.17
15	0.15
16	0.14
18	0.12
21	0.10
24	0.08
27	0.07
30	0.06
36	0.05

8.1 SIDE (LATERAL) SEWER

8.1.1 GENERAL

- A. A side sewer connection longer than 150' from the main is considered a sewer main extension and shall meet Section 8.2 Sewer Main. The side sewer connection(s) to building(s) shall be made from the sewer main extension and shall meet section 8.1.
- B. The property owner(s) maintains the sewer connection(s) from the public main to the building.
- C. Permittee shall:
 - 1. Connect:
 - a) Buildings within 250 feet of a sanitary sewer line,
 - b) One building per side sewer unless approved by the Director. More than one connection requires the Director's approval and recording with King County records a completed Joint Side Sewer Easement and Agreement.
 - 2. Verify the location and depth of the stubs shown on as-builts.
 - 3. Assume all cost, including street repairs, tapping charges, and bonds for connection to sewer main.
 - 4. Repair street cuts per these Standards.

5. Provide:

- a) Minimum diameter of 6 inches within the City right-of-way. Residential side sewers may be reduced to a minimum diameter of 4 inches from the right-of-way to the house.
- b) Sewer clean-out and test –tee at property line
- c) Sewer clean-out at building

D. Refer to SS-02 and SS-03.

8.1.2 MATERIAL

- A. Pipe – Ductile iron Class 50 minimum, PVC minimum SDR 35, or welded HDPE where its use is justified due to scouring velocities or soil problems.
- B. Pipe Encasement – CDF, steel sleeve, PVC. Polyethylene for ductile iron pipe placed in peat areas or areas of potential corrosion.

8.1.3 INSTALLATION

- A. Install on not less than 2% grade, nor greater than 1V : 2H.
- B. Install anchors for pipe having slopes over 15%.
- C. Encase ductile iron pipe placed in peat areas or areas of potential corrosion with polyethylene sleeve. See WS-16 and WS-17 for pipe encasement.
- D. Install the side sewer not less than 5 feet from any building, except where the sewer enters the building. If the sewer is below the building foundation, for every one foot of depth the side sewer shall be one foot or greater horizontally from the foundation.
- E. Provide clean outs at 100 foot intervals along the sewer lines, at property lines, at the building, and at all vertical or horizontal bends of ninety degrees (90°) or greater. See SS-03.
- F. Outside rights-of-way, the pipe shall have at least 2 feet of cover.

8.2 SEWER MAIN

8.2.1 MATERIAL

- A. All sewer materials shall conform to the applicable APWA/WSDOT standards. The pipe shall be legibly and permanently marked with type, class and/or thickness. The Permittee shall provide the City with a certificate for materials when requested.
- B. Pipe – Ductile iron Class 50 minimum, PVC minimum SDR 35, or HDPE where its use is justified due to scouring velocities or soil problems.
- C. Pipe Size - at least 8 inch diameter. The Comprehensive Plan or design calculations may indicate larger diameter sewers.

- D. Fittings - same materials as the pipe or as specified by the pipe manufacturer.

8.2.2 INSTALLATION

- A. Refer to SS-09 and SS-10.
- B. Uniform slope between manholes.
- C. Sewers with 20% or greater slope using concrete anchors approved by the Director.
- D. Straight alignment between manholes.
- E. Bury deep enough to provide adequate depth to service the lowest fixtures in the properties served.
- F. Minimum depth of cover for a sewer in street right-of-way is 4 feet.

8.2.3 INSPECTION AND TESTING

TV Inspection per Chapter 2 General Design and Construction Standards.

Channel manholes prior to testing .

- 1. Air Testing

All sanitary sewer pipelines shall be air tested in accordance with APWA/WSDOT standard specifications for air-permeable or non air-permeable pipe, as applicable. The Permittee shall furnish all materials and equipment necessary for conducting the tests and all testing shall be performed under the supervision of the City Inspector. The Permittee may desire to make an air test prior to backfilling for his own purposes. However, the air test for acceptance shall be made after backfilling has been completed and compacted. Allowed on sanitary side sewers.

- 2. Water Testing

Required on every sanitary side sewer installation. The side sewer must be water tight to 6 feet of head from the test-tee.

8.3 MANHOLES

8.3.1 MATERIALS

- 1. Precast meeting typical SS-04 through SS-13.

8.3.2 INSTALLATION

- A. Sanitary sewer manholes are required at the following locations:
 - 1. end of all sewer mains.
 - 2. change in slope or alignment.
 - 3. change in pipe diameter.
 - 4. intersection of sewers 8 inch and larger (including side sewers).

5. intersection of sewer mains.
 6. every 500 feet on sewer mains.
 7. On a side sewer 150' or longer.
- B. Install a spread foundation or other measure, when Director requires, to prevent differential settlement.
 - C. Provide an outside drop connection for invert separation of 24 inches or more, measured at the manhole wall. Refer to SS-09. Inside drop connections require the Director's approval. Refer to SS-09.
 - D. Fully channel to the sewer crown.
 - E. Install manholes so that the invert of the downstream manhole is at least 0.1 foot below all incoming invert elevations. Channelization methods include prefabricated fiberglass/PVC channels.

8.4 GREASE INTERCEPTOR

The City requires grease interceptors on all buildings where food preparation occurs and at locations determined by the Director as necessary for the proper handling of liquid wastes. Grease interceptors shall comply with Appendix H of the Uniform Plumbing Code and the following:

1. Refer to SS-14.
2. Provide a double baffle type interceptor.
3. Grease interceptor, 6" lines, and reference to related plumbing sheets
4. Size the tank per the Uniform Plumbing Code, Appendix H, and minimum 1,000 gallon capacity. For sizing, consider the meals per hour as equal to the restaurant's seating capacity.
5. Locate the vault outside the building, between 5 feet and 25 feet from the building foundation.
6. Install the interceptor so that gray water from sinks, floor drains, drains under garbage compactors, is routed through the interceptor. DO NOT route dishwashers through the grease interceptor. NOTE: Route ONLY gray water through the interceptor.
7. Every three months the Owner shall completely pump out the interceptor. Businesses that generate small amounts of grease may, with the Director's approval, pump the interceptor on a 6-month schedule. At any time, the City may inspect the interceptor and require service that is more frequent.

FIGURE 9 SEWER DISTRICT BOUNDARIES

FIGURE 10 SANITARY SEWER TYPICAL DETAILS

SS-01	Not Available
SS-02	Sanitary Side Sewer - Residential
SS-03	Sanitary Side Sewer – Clean Out
SS-04	Manhole - 48" and 54"
SS-05	Manhole - 48" and 54" (shallow)
SS-06	Manhole – 72" (Type 1A4 and 1B4)
SS-07	Manhole – 72" and 96" (shallow)
SS-08	Manhole – Access and Channelization
SS-09	Manhole – Inside Drop
SS-10	Manhole – Drop Connection
SS-11	Manhole – 24" Frame
SS-12	Manhole – Ladder
SS-13	Manhole – Polypropylene Safety Step
SS-14	Grease Interceptor – Single Vault with Double Baffle

APPENDIX A DEFINITIONS

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

DEFINITIONS AND ACRONYMS

These definitions are for use with these Standards. Unless specifically defined below, words or phrases used in this ordinance shall be interpreted to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

AASHTO – American Association of State Highway and Transportation Officials.

ACCESS – means the safe, adequate, and usable ingress/egress (entrance/exit) to a property or use.

ACTUAL ELEVATION - means the elevation in relationship to mean sea level.

ADVERSE IMPACT - means any deleterious effect on waters or wetlands, including their quality, quantity, surface area, species composition, aesthetics or usefulness for human or natural uses which are or may potentially be harmful or injurious to human health, welfare, safety or property, to biological productivity, diversity, or stability or which unreasonably interferes with the enjoyment of life or property, including outdoor recreation.

AGRICULTURAL LAND MANAGEMENT PRACTICES – means those methods and procedures used in the cultivation of land in order to further crop production and conservation of related soil and water resources.

AIA – American Institute of Architecture.

ANNUAL AVERAGE DAILY TRAFFIC (AADT) – means daily traffic that is averaged over one calendar year.

APPLICANT – means any person, governmental agency, or other entity that executes the necessary forms to procure official approval of a project or a permit to carry out construction of a project.

APWA SPECIFICATIONS - means the current edition of the standard specifications for municipal public works construction prepared by the Washington State Chapter of the American Public Works Association and the State of Washington as adopted by the City of Tukwila.

ASTM - American Standards for Testing Materials.

AVERAGE DAILY TRAFFIC (ADT) – means the average number of vehicles passing a specified point during a 24-hour period.

AWWA - American Water Works Association.

BACKFLOW - means a flow of water or other liquids, gases or solids from any source back into the customer's plumbing system or the water purveyor's distribution system.

BACKFLOW PREVENTION DEVICE - means a device, approved by the State Department of Health and by the American Water Works Association, used to counteract back pressure or prevent back-siphoning into the distribution system of a public water supply.

BASE FLOOD ELEVATION - means the flood having a one-percent chance of being equaled or exceeded in any given year. Also referred to as the 100-year flood.

BASEMENT - means any area of the building having its floor subgrade (below ground) on all sides.

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

BEST AVAILABLE INFORMATION - means in the absence of official flood insurance rate map data, the City can use data from federal, state, or other sources provided this data has either been generated using technically defensible methods or is based on reasonable historical analysis and experience.

BOLLARD – means a post used to prevent vehicle access.

BOND/SURETY – means a surety bond, cash deposit, escrow account, any assignment of funds, irrevocable letter of credit, or other means acceptable to the Director to guarantee acceptable performance, execution, and completion of the work, in accordance with the project's approved plans and in accordance with all applicable governmental requirements.

CBD – Central Business District

CDF – Controlled density fill

CFR –Code of Federal Regulations

CITY – means the City of Tukwila or the City Council of Tukwila.

CLEARING - means the removal of vegetation from a site by physical, mechanical, chemical, or other means. This does not mean landscape maintenance or pruning consistent with accepted horticultural practices that do not impair the health or survival of trees and vegetation.

COMPREHENSIVE PLAN – means a plan adopted by the City Council to guide the physical growth and improvement of the City and urban growth management area, including any future amendments and revision.

CONVEYANCE SYSTEM – means natural and man-made drainage features that collect, contain, and convey surface water. Natural drainage features include swales, streams, rivers, lakes, and wetlands. Man-made features include gutters, ditches, pipes, and detention/retention facilities,

CRITICAL DRAINAGE AREA - means any drainage basin having erosion, flooding or water quality issues as documented in the Comprehensive Surface Water Management Plan or drainage basin studies.

CRITICAL FACILITY - means any structure for which even a slight chance of flooding is too great, such as schools, nursing homes, hospitals, police, fire and emergency response installations, and installations which produce, use, or store hazardous materials or hazardous waste.

CROSS-CONNECTION – means any physical arrangement whereby a public water supply is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture, or other device which contains or may contain contaminated water, sewage, or other wastes or liquids of unknown or unsafe quality, which may be capable of imparting contamination to a public water supply.

DEDICATION – means the deliberate appropriating of land by an owner(s) for any general and public uses, reserving to themselves no other rights than such as are compatible with the full exercise and enjoyment of the public uses to which the property is to be devoted. The intent to dedicate will be evidenced presentation of a deed.

DETENTION STRUCTURE – means a permanent structure designed to store runoff and discharge storage at controlled rates.

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

DEVELOP LAND – means to change the runoff characteristics of a parcel of land.

DEVELOPER – means the applicant for a development permit, his successors, and/or assignees.

DEVELOPER AGREEMENT – means an agreement between the City and the Developer, which contains work descriptions, estimated costs, responsibilities for the work performance and an expiration date.

DEVELOPER REIMBURSEMENT AGREEMENT – means an agreement between the City and a developer, who installed public improvements. The agreement provides for reimbursement of a fair prorated share by any real estate owners who have not contributed to the original cost of such facilities, and who subsequently connect to, or use the improvement.

DEVELOPMENT – means any man-made change of improved or unimproved real estate,; the construction, reconstruction, conversion, structural alteration, relocation, or enlargement of any structure; any mining, excavation, landfill, clearing, or land disturbance; or any use or extension of the use of land.

DIRECTOR - means the Director of the Public Works Department or designee, including the City Engineer and City inspectors.

DNR – Department of Natural Resources

DOE - State Department of Ecology.

DOH - State Department of Health.

EASEMENT – means interest in land which does not include any rights of possession. A right of one owner of land to make lawful and beneficial use of the land of another created by an express or implied agreement.

ELEVATED BUILDING - means for flood insurance purposes, a non-basement building which has its lowest elevated floor raised above ground level by foundation walls, shear walls, post, piers, pilings, or columns.

ENGINEER, GEOTECHNICAL – means a practicing, professional civil engineer registered with the State of Washington, who has knowledge and practice of geotechnical engineering.

ENGINEER, PROFESSIONAL – means an engineer, registered in Washington State.

ENGINEER, SOILS – means Geotechnical Engineer.

ENGINEERING GEOLOGIST – means a geologist certified by the State as experienced and knowledgeable in engineering geology.

ENGINEERING GEOLOGY – means the application of geologic knowledge in the investigation and evaluation of naturally occurring rock and soil for use in the design of civil works.

ENGINEERING, GEOTECHNICAL – means the application of soil mechanics in the investigation, evaluation, and design of civil works involving the use of earth materials and the inspection or testing of the construction thereof.

ESC – Erosion prevention and sediment control

FBFM - Flood boundary/floodway map.

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

FEMA - Federal Emergency Management Agency.

FIRE MAIN – means a water line, at least 6 inch diameter, serving fire hydrants or fire protection systems.

FIRM - Flood Insurance Rate Map.

FLOOD INSURANCE RATE MAP (FIRM) - means the official map on which the Federal Insurance Administration has delineated both the areas of special flood hazards and the risk premium zones applicable to the City.

FLOOD INSURANCE STUDY - means the official report and documents provided by the Federal Insurance Administration that includes flood profiles, the flood boundary-floodway map, and the water surface elevation of the base flood.

FLOOD OR FLOODING - means a general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters, and/or the unusual and rapid accumulation of runoff of surface waters from any source.

FLOOD PLAIN - means any land area susceptible to flooding from any source.

FLOOD PRONE - means any land area susceptible to flooding, not shown on FIRMs, designated as flood-prone by the Director, using best available information.

FLOOD PROOFING - means any combination of structural and non-structural additions, changes, or adjustments to nonresidential structures, which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures, or their contents. For flood proofed nonresidential buildings, FEMA bases flood insurance premiums on rates that are one foot below the flood-protected level. For example, a building flood proofed to the base flood level will be rated as one foot below that level.

FLOOD ZONE - means any area designated as special flood hazard or flood prone, or any area within the shoreline per Tukwila Municipal Code.

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

FLOW ATTENUATION – means detaining or retaining runoff to reduce the peak discharge.

FRONTAGE IMPROVEMENTS – means all of the street pavement, curb, gutter, sidewalk, transit bus shelters, bus pullouts, storm drainage, water and sewer utilities, power and communications cable undergrounding, street trees and street lighting, located within any public right-of-way abutting the property boundary of a development.

FZCP – Flood Zone Control Permit.

GRADING – means any act by which soil is cleared, stripped, stockpiled, excavated, scarified, filled, or any combination thereof.

HALF STREET – means a street constructed utilizing at least half the regular width of the right-of-way and permitted as an interim facility pending construction of the other half.

HDPE – high-density polyethylene.

HEALTH OFFICER – means the Director of the South King County Department of Public Health or his duly authorized representative.

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

HIGH USE SITE - means a commercial or industrial site that (1) has an expected average daily traffic (ADT) count equal to or greater than 100 vehicles per 1,000 square feet of gross building area, (2) is subject to petroleum storage or transfer in excess of 1,500 gallon per year, not including delivered heating oil, or (3) is subject to use, storage, or maintenance of a fleet of 25 or more diesel vehicles that are over 10 tons net weight (trucks, buses, trains, heavy equipment). Also included is any road intersection with a measured ADT count of 25,000 vehicles or more on the main roadway and 15,000 vehicles or more on any intersecting roadway, excluding projects proposing primarily pedestrian or bicycle use improvements.

IMPERVIOUS SURFACE – means any surface that cannot be effectively and easily penetrated by water; a hard surface that either prevents or restricts the entry of water into the soil mantle or causes water to run off the surface in greater quantities or at an increased flow rate compared to natural conditions prior to development. Impervious surfaces include roof tops, paved areas, gravel roads, packed earthen surfaces, oiled surfaces, and macadam. Open, uncovered flood control, or water quality facilities are not considered impervious surfaces.

IMPROVEMENTS – means any improvement to public, real, or personal property, including but not limited to, installation of streets, roads, pedestrian/bike facilities, streetlights; landscape features; sewer and waterlines; bridge structures; storm drainage facilities; and traffic control devices.

INFILTRATION - means the passage or movement of water into the soil subsurface.

INTERCEPTOR - means a sewer that receives flow from a number of main or trunk sewers, force mains, etc.

KCSWDM – means King County Surface Water Design Manual

LEVEE - means a man-made structure, designed and constructed in accordance with sound engineering practices to contain, control, or divert water flow for protection from flooding.

LEVEL III CERTIFICATION – means a National Institute For Certification in Engineering Technologies, fire protection engineering technology certificate of competency, to design and install fire protection systems including underground backflow prevention devices and associated thrust blocking.

LOCAL IMPROVEMENT – means a public improvement provided to a specific area benefiting that area and usually paid for by a special assessment for the benefit of property owners.

LOWEST FLOOR (flood control definition) - means the lowest floor of the lowest enclosed area (including basement). If an unfinished or flood resistant enclosure is used solely for vehicle parking, building access, or storage, if this enclosure is in an area other than a basement, and if this enclosure is built so that the structure meets the applicable non-elevation design requirements for nonresidential construction, the enclosure is not considered the structure's lowest floor.

MANUFACTURED HOME (flood control definition) - means a structure, transportable in one or more sections, built on a permanent chassis and designed for use with or without a permanent foundation when attached to the required utilities. The term "manufactured home" does not include a "recreational vehicle."

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

MANUFACTURED HOME PARK OR SUBDIVISION (flood control definition) - means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

MANUFACTURED HOME PARK OR SUBDIVISION, EXISTING - means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before 1981, the effective date of the Tukwila's original floodplain management regulations.

MANUFACTURED HOME PARK OR SUBDIVISION , EXPANSION TO AN EXISTING - means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed, including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads.

MEAN SEA LEVEL (flood control definition) - means the National Geodetic Vertical Datum (NGVD) of 1929 to which the base flood elevations shown on the Flood Insurance Rate Map are referenced.

METER - means a water measuring device approved by the Director.

METER, DEDUCT – means a meter for water supply that does not discharge to the public sewer. The Permittee provides, owns, installs, and maintains the meter. This meter is installed downstream of a permanent water meter. An example is landscape irrigation.

METER, PERMANENT - means meter for domestic water supply of all new or reestablished services when sewer discharge rates are calculated based on water usage. Each individual building requires a separate water main tap. The Permittee pays for a City-provided water meter.

METER, TEMPORARY – means a water meter rented from the City for use of public water, on a short term basis, where a metered supply does not already exist. The Permittee rents the meter from the City. Examples include dust suppression during construction or water supply during hydroseeding.

METER, WATER ONLY – Required for a separate service from the main that will not discharge to the public sewer. The Permittee pays for a City-provided water meter.

MULTIFAMILY – means, in reference to development, the construction of a building or buildings to house two or more families living independently of each other.

MUTCD - Manual on Uniform Traffic Control Devices.

NAD – means North American Datum, horizontal, of 1983/1991.

NAVD - means North American Vertical Datum.

NEW CONSTRUCTION (flood control definition) - means structures for which the “start of construction” commenced on or after 1981, the effective date of Tukwila's original floodplain management regulations.

NEW MANUFACTURED HOME PARK OR SUBDIVISION - means a manufactured home park or subdivision for which the construction of facilities, including streets, utilities,

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

concrete pads, is completed on or after 1988, the effective date of Tukwila's original floodplain management regulations.

NFIP - National Flood Insurance Program.

NGVD – National Geodetic Vertical Datum of 1929.

NICET - National Institute for Certification in Engineering Fundamentals

NPDES – National Pollutant Discharge Elimination System

OSHA - Occupational Safety and Health Administration.

PERFORMANCE GUARANTEE – means a financial guarantee in a form acceptable to the City Attorney, ensuring all improvements, facilities, or work will be completed in compliance with regulations, and approved plans and specifications.

PERMITTEE – means any person, governmental agency, or other entity that is performing, or plans to perform, permitted work within the City.

PLANS – means the plans, profiles, cross sections, elevations, details, and supplementary specifications, signed by a licensed professional engineer and approved by the Director, showing the location, character, dimensions, and details of the work to be performed.

POLLUTION – means contamination or other alteration of the physical, chemical, or biological properties of waters of the state that will or is likely to create a nuisance or render waters harmful, detrimental, or injurious 1) to public health, safety, or welfare, or 2) to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or 3) to livestock, wild animals, birds, fish, or other aquatic life. Contamination includes discharge of any liquid, gas, or solid, radioactive or other substance. Alteration includes temperature, taste, color, turbidity, or odor.

PROJECT – means activity encompassing all phases of the work to be performed and is synonymous to the term “improvement” or “work.”

PW – means Public Works Department.

RECREATIONAL VEHICLE - means a vehicle which is:

- (a) Built on a single chassis;
- (b) 400 square feet or less when measured at the largest horizontal projections;
- (c) Designed to be self-propelled or permanently towable by a light duty truck; and
- (d) Designed primarily for use as temporary living quarters for recreational, camping, travel, or seasonal use.

REDEVELOPMENT PROJECT – means a project that adds, replaces, or alters exterior impervious surface on a site that already has 35% or impervious surface.

RETENTION STRUCTURE – means a permanent structure that provides for the storage of runoff by means of a permanent pool of water.

RIGHT-OF-WAY – means (1) a strip of land acquired by reservation, dedication, forced dedication, prescription, or condemnation and intended to be occupied by a road, crosswalk, railroad, electric transmission lines, oil or gas pipeline, water line, sanitary sewer, storm sewer, or other similar public accesses or public uses; and (2) the right of one to pass over the property of another.

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

ROAD – means street.

RPPA - Reduced pressure principle assembly (formerly Reduced Pressure Backflow Assembly).

SAO – Sensitive Areas Overlay.

SEDIMENT – means soils or other materials transported or deposited by the action of wind, water, ice, or gravity.

SENSITIVE AREA – means wetland, watercourse, landslide hazard area, or abandoned coal mine as designated or defined by the City's Sensitive Areas Ordinance.

SENSITIVE AREA, CLASS 2 – means an area where landslide potential is moderate, including areas sloping between 20% and 40%, and which are underlain by relatively permeable soils.

SENSITIVE AREA, CLASS 3 – means an area where landslide potential is high, including areas sloping between 20% and 40%, and which are underlain by relatively impermeable soils or by bedrock, and which also include all areas sloping more steeply than 40%.

SENSITIVE AREA, CLASS 4 – means areas, where landslide potential is very high, which include sloping areas with mapable zones of groundwater seepage, and which also include existing mapable landslide deposits regardless of slope.

SEPA – State Environmental Policy Act.

SEWER, LATERAL – means the portion of the sewer line extending from the City's main to the building, having no other common sewers discharging into it. A lateral sewer is operated and maintained by the property owner. Sometimes called a side sewer.

SEWER, MAIN or TRUNK - means a sewer that receives flow from one or more mains.

SEWER, MAIN EXTENSION – means the portion of the sewer line extending for more than 150 feet from the City's main. Lateral sewer connections are made to the sewer main extension.

SEWER, PRIVATE - means that portion of the system located on private property where no easements are granted to the City. Private sewers include gravity laterals, building sewers, and sewer collection systems internal to developments; such as, apartment complexes, condominiums, townhouses, shopping centers, commercial office parks, mobile home parks, etc. A private sewer includes the portion of the lateral between the property line and sewer main. Maintenance of a private sewer will be the responsibility of the property owner(s).

SEWER, PUBLIC - means that portion of the system located within rights-of-way or easements (excluding laterals) and is operated and maintained by the City.

SEWER, STUB – means sewer, lateral.

SHALLOW FLOODING AREA - means a designated AO, or AH zone on the Flood Insurance Rate Map (FIRM). The base flood depths range from one to three feet; a clearly defined channel does not exist; the path of flooding is unpredictable and indeterminate; and, velocity flow may be evident. AO is characterized as sheet flow and AH indicates ponding.

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

SIDEWALK - a paved, surfaced, or leveled area, paralleling and usually separated from the street and normally used as a pedestrian walkway.

SITE – means any tract, lot, or parcel of land, or combination of tracts, lots, or parcels of land which are in one ownership, or are contiguous and in diverse ownership, where development is to be performed as a part of a unit, subdivision, or project.

SITE PLAN – means the development plan for one or more lots on which is shown the existing and proposed conditions of the lot, topography, vegetation, drainage, flood plains, walkways; means of ingress and egress; circulation; utility services; structures and buildings; signs and lighting; berms, buffers, and screening devices; surrounding development; and any other information that reasonably may be required in order that an informed decision can be made by the reviewing authority.

SPECIAL FLOOD HAZARD AREA - means the land in the flood plain subject to a one-percent or greater chance of flooding in any given year. Also called the 100-year flood elevation or the base flood elevation. These areas are designated on Flood Insurance Rate Maps (FIRMs) using the letters A or V. Special flood hazard areas include flood prone areas designated by the City.

STABILIZATION – means the prevention of soil movement by any various vegetative and/or structural means.

STANDARDS – means the City of Tukwila *Development Guidelines and Design and Construction Standards*.

START OF CONSTRUCTION - includes, for flood insurance purposes, substantial improvement, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, placement or other improvement occurred within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

STORM DRAINAGE PLAN – means a set of drawings and documents submitted as a prerequisite to obtaining a development permit. The plan contains all of the information and specifications pertaining to surface water management onsite and offsite.

STREET, ARTERIAL – means a street that connects access streets to higher classifications.

STREET, CUL-DE-SAC – means a street with a single common ingress and egress and with a circular turnaround at the end.

STREET FRONTAGE – means either the area between any lot lines that intersect, and the area of a lot that directly abuts the boundary of a public or private street right-of-way.

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

STREET, PRIVATE – means a street, built to City standards, but is not owned nor maintained by the City. A private street is a street the City or other governmental entity has not accepted for ownership or maintenance. This does not include private access road as defined in the Subdivision code.

STREET, PUBLIC – means a public right-of-way, usually containing improved facilities for transportation and utilities. A public street is a publicly owned and maintained street that serves more than four lots or is longer than 200 feet.

STRUCTURE (flood control definition) – means, for flood plain management, a manufactured home or a walled and roofed building, including a gas or liquid storage tank, that is principally above ground. Structure, for insurance purposes, means a manufactured home, or a walled and roofed building, except a gas or liquid storage tank, that is principally above ground. (CFR 59.1)

SUBSTANTIAL DAMAGE - means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

SUBSTANTIAL IMPROVEMENT (flood control definition) - means any repair, reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the assessed value of the structure either:

1. Before the improvement or repair is started, or
2. Before damage occurred, if the structure is being restored.

For the purposes of this definition, “substantial improvement” occurs when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure.

“Substantial improvement” does not include:

1. Any improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications which is solely necessary to assure safe living conditions, nor
2. Any alteration of a structure listed on the national Registry of Historic Places or a state inventory of historic places.

SURVEYOR – means any Washington State licensed professional land surveyor.

TMC - Tukwila Municipal Code.

TRAFFIC IMPACT ANALYSIS – means a report analyzing anticipated roadway conditions with and without proposed development, including an analysis of mitigation measure and a calculation of fair share financial contributions.

TYPICAL – means the guidelines that shall be followed unless the Director approves a variation.

UTILITY – means a company providing public service including, but not limited to, gas, oil, electric power, street lighting, telephone, telegraph, water, sanitary sewer, storm drainage, solid waste, or cable television, whether or not such company is privately owned or owned by a governmental entity.

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

VACATION – means the process by which public right-of-way becomes private property.

VARIANCE - means a grant of relief by the City for activities that would otherwise be prohibited by the TMC.

WAC - Washington Administrative Code.

WDFW – Washington Department of Fish and Wildlife

WISHA - Washington Industrial Safety and Health Administration.

WSDOT - Washington State Department of Transportation.

ZONE “A” - means a zone on the Flood Insurance Rate Map (FIRM) where flooding is known to occur, but no flood elevation has been determined.

ZONE “AH” - means a zone on the Flood Insurance Rate Map (FIRM) characterized by base flood depths from one to three feet; having no clearly defined channel or having an unpredictable and indeterminate channel, where velocity flow may be evident. AH indicates ponding.

ZONE “AE” - means a zone on the Flood Insurance Rate Map (FIRM) where base flood elevations are determined and are shown on the map.

APPENDIX B STANDARD CONSTRUCTION PLAN NOTES

STANDARD CONSTRUCTION NOTES

Prior to starting construction, contact **ONE-CALL (1-800-424-5555)** for utility locations.

CONTACTS

Project Manager: *Provide Name and Contact Number*
Design Engineer: *Provide Name and Contact Number*
Owner: *Provide Name and Contact Number*
Other: *Provide Name and Contact Number*

GENERAL

1. Locations shown for existing utilities are approximate.
2. At least 48 hours before starting project site work, notify the Utilities Inspector at 206-433-0179.
3. Request a Public Works utility inspection at least 24 hours in advance by calling 206-433-0179.
4. The Contractor assumes sole responsibility for worker safety, and damage to structures and improvements resulting from construction operations.
5. The Contractor shall have the permit(s) and conditions, the approved plans, and a current copy of City of Tukwila *Development Guidelines and Design and Construction Standards* available at the job site.
6. All work shall conform to these approved drawings. Any changes from the approved plans require pre-approval from the owner, the engineer, and the City of Tukwila.
7. All methods and materials shall meet City of Tukwila *Development Guidelines and Design and Construction Standards*, unless otherwise approved by the Public Works Director.
8. Contractor shall maintain a current set of record drawings on-site.
9. Contractor shall provide record drawings prior to project final approval.
10. Provide traffic control and street maintenance plan for Public Works approval before implementation.
11. All surveying for public facilities shall be done under the direction of a Washington licensed land surveyor. Vertical datum shall be NAVD 1988. Horizontal datum shall be Washington State (grid) Coordinates, North Zone, using NAD 83/91 survey control and tied to any two City of Tukwila Horizontal Control Monuments. For projects within a flood control zone, the Permittee shall provide conversion calculations to NGVD 1929.
12. Replace or relocate all signs damaged or removed due to construction.
13. Retain, replace or restore existing vegetation in rights-of-way, easements, and Access Tracts.

CONSTRUCTION

1. All work performed shall be per approved plans and specifications only. The Permittee is required to maintain a set of approved plans, specifications, and associated permits on the job site. Work shall be performed in accordance with all federal, state, and local laws. Permittee shall apply for a Revision for any work not according to the approved plans.
2. Permittee/Contractor shall arrange a preconstruction conference with the City's Inspector(s) prior to beginning any work.
3. Work in Roadways
 - a. All work in roadways shall meet TMC 11 and the following:
 - b. Prior to any activity in City right-of-way, the Permittee shall provide the City a traffic control plan for review and approval. The traffic control plan shall include the location, address and description of traffic flow during the work and shall meet MUTCD requirements.
 - c. All work requiring lane closures must be by permit only. From the third Thursday in November to the following January 2nd, the Director does not allow lane closures in the Tukwila Urban Center.
 - d. Fire, pedestrian, and vehicular access to buildings shall be maintained at all times, except when Permittee has permission from the building owner and the Director to close an access.
 - e. All roadways shall be kept free of dirt and debris using street sweepers. Use of water trucks for cleaning roadways requires preapproval from the Director.
 - f. Install steel plates over any trench, at any time work is stopped and the trench is left open.

GRADING AND EROSION CONTROL NOTES

1. The erosion prevention and sediment control (ESC) measures on the approved plans are minimum requirements.
2. Before beginning any construction activities, establish the clearing limits, install construction entrance, and install erosion prevention and sediment control measures.
3. Before any ground disturbance occurs, all downstream erosion prevention and sediment control measures (ESC) must be constructed and in operation. Install and maintain all ESC measures according to the ESC plan.
4. ESC measures, including all perimeter controls, shall remain in place until final site construction is completed and permanent stabilization is established.
5. From **May 1 through September 30**, provide temporary and permanent cover measures to protect disturbed areas that will remain unworked for **seven days** or more.

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

6. From **October 1 through April 30**, provide temporary and permanent cover measures to protect disturbed areas that will remain unworked for **two days** or more. In addition to cover measures, the Contractor shall:
 - a. Protect stockpiles and steep cut and fill slopes if unworked for more than **12 hours**.
 - b. Stockpile, on site, enough cover materials to cover all disturbed areas.
 - c. By **October 8**, seed all areas that will remain unworked during the wet season (October 1 through April 30). Mulch all seeded areas.
7. Failure to maintain ESC measures in accordance with the approved maintenance schedule may result in the work being performed at the direction of the Director and assessed as a lien against the property where such facilities are located.
8. During the life of the project, the Permittee shall maintain in good condition and promptly repair, restore, or replace all grade surfaces; walls, drains, dams, structures, vegetation, erosion and sediment control measures, and other protective devices in accordance with approved plans.
9. The Permittee shall monitor the downstream drainage features, and shall, with the Director's approval, remove all sediment deposition resulting from project-related work.
10. All work performed shall be per approved plans and specifications only. The Permittee is required to maintain a set of approved plans and specifications and associated permits on the job site. Work shall be performed in accordance with all federal, state, and local laws.
11. As the first order of business, the Permittee shall install erosion prevention and sediment control measures per the ESC and shall install the downstream temporary ESC measures before any site disturbance occurs. Before the temporary measures are removed, install and establish the upstream permanent ESC measures.
12. The Permittee shall at all times protect sensitive areas, their buffers, and adjacent private properties and public rights-of-way or easements from damage during grading operations. The Permittee shall restore, to the standards in effect at the time of the issuance of the permit, sensitive areas, their buffers, and public and private properties and improvements damaged by the Permittee's operations.
13. Permittee shall arrange for and comply with the following:
 - a. Notify the Public Works Department within 48 hours following installation of ESC measures.
 - b. Obtain permission in writing from the Public Works Department prior to modifying the ESC plan.
 - c. Maintain all road drainage systems, storm water drainage systems, control measures and other facilities as identified in the ESC plan.

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

- d. Repair any siltation or erosion damages to adjoining properties and drainage facilities.
- e. Inspect according to the approved ESC inspection schedule and make needed repairs immediately.

UTILITY NOTES

- 1. All trench excavation operations shall meet or exceed all applicable shoring laws for trenches over 4-feet deep. All trench safety systems shall meet WISHA requirements.
- 2. Power, cable, fiber optics, and telephone lines shall be in a trench with a 5' minimum horizontal separation from other underground utilities.
- 3. Adjust all manholes, catch basins, and valves in public rights-of-way or easements after asphalt paving.

STORM DRAINAGE NOTES

- 1. All methods and materials shall meet City of Tukwila *Development Guidelines and Design and Construction Standards*, and the current *King County Surface Water Design Manual*, unless otherwise approved.
- 2. Mark all storm drain inlets with "Dump No Waste" and either "Drains to Streams", "Drains to Wetlands", or "Drains to Groundwater", as applicable.
- 3. Driveway culverts shall be of sufficient length to provide a minimum 3:1 slope from the edge of the driveway to the bottom of the ditch. Culverts shall have beveled end sections that match the side slope.

GEOTECHNICAL NOTE

TO DESIGNER: COMPLETE THE FOLLOWING NOTE or DELETE WHEN NOT APPLICABLE:

I, _____, the architect/structural engineer, reviewed the geotechnical report, titled _____, prepared by _____ and dated _____. I understand the report's recommendations, I explained to the Owner the risks due to slides and I incorporated the recommendations into the design. I established measures to reduce potential risk of injury or damage that might be caused by any earth movement predicted in the report.

Signature _____ Date _____

APPENDIX C PLAN REVIEW CHECKLIST FOR COMPLETENESS

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

**TUKWILA PUBLIC WORKS DEPARTMENT
PLAN REVIEW CHECKLIST**

*This checklist is provided to aid the Engineer's completeness review before submittal to the City and is **not** intended as a full and complete list of requirements for submittals. Refer to the City's Development Guidelines and Design and Construction Manual.*

PROJECT DESCRIPTION

Check All that apply to the Project

<input type="checkbox"/> Development – Private	<input type="checkbox"/> Development – Single Family	<input type="checkbox"/> Public Infrastructure
<input type="checkbox"/> Public road	<input type="checkbox"/> Sensitive Area(s)	<input type="checkbox"/> Flood Zone
Onsite Work Includes:		
<input type="checkbox"/> Clearing, Grading	<input type="checkbox"/> Paving	<input type="checkbox"/> Dead End & Landscape Island
<input type="checkbox"/> Utility Undergrounding	<input type="checkbox"/> Driveway	<input type="checkbox"/> Hammerhead
	<input type="checkbox"/> Private road	
Surface Water Improvements	Water Service	Sewer
<input type="checkbox"/> Infiltration <input type="checkbox"/> Retention <input type="checkbox"/> Detention <input type="checkbox"/> Low Impact Development <input type="checkbox"/> Habitat Improvement <input type="checkbox"/> Other	<input type="checkbox"/> Looped Fire line <input type="checkbox"/> Water Main Extension <input type="checkbox"/> Permanent Meter <input type="checkbox"/> Deduct Meter <input type="checkbox"/> Water Only Meter <input type="checkbox"/> Backflow Prevention <ul style="list-style-type: none"> <input type="checkbox"/> Fire <input type="checkbox"/> Irrigation <input type="checkbox"/> Water Service 	<input type="checkbox"/> Sewer Main Extension <input type="checkbox"/> Sanitary Side Sewer <input type="checkbox"/> Abandon Septic Tank <input type="checkbox"/> Grease Interceptor <input type="checkbox"/> Cap or Remove Utilities
Work in Right-of-way Includes:		
<input type="checkbox"/> Existing Access <input type="checkbox"/> New Access <input type="checkbox"/> Traffic signal <input type="checkbox"/> Channelization <input type="checkbox"/> Curb/gutter <input type="checkbox"/> Sidewalk <input type="checkbox"/> Signs <input type="checkbox"/> Mailboxes <input type="checkbox"/> Cable, conduit or other such <input type="checkbox"/> Dead end <input type="checkbox"/> Utility Undergrounding	<input type="checkbox"/> Trench Excavation <input type="checkbox"/> Boring <input type="checkbox"/> Pavement cut <input type="checkbox"/> Pavement repair <input type="checkbox"/> Pavement overlay <input type="checkbox"/> Landscaping <input type="checkbox"/> Water Supply <input type="checkbox"/> Sewer <input type="checkbox"/> Surface Water <input type="checkbox"/> Sewer <input type="checkbox"/> Traffic Control	

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

PROJECT SUBMITTALS

Check All That Apply to the Project	Required For Work In Right-of-way
<ul style="list-style-type: none"> <input type="checkbox"/> Engineer estimate <input type="checkbox"/> Geotechnical Report <input type="checkbox"/> Traffic Impact Analysis <input type="checkbox"/> Technical Information Report (Storm Drainage) <input type="checkbox"/> King County Sewer Use Certificate <input type="checkbox"/> Water Availability Certificate <input type="checkbox"/> Sewer Availability Certificate <input type="checkbox"/> South King County Department of Health approval if there is a septic tank onsite <input type="checkbox"/> Proof that the Washington State code and the Uniform Plumbing Code were followed when septic tank abandoned <input type="checkbox"/> State of Washington current water right permit for wells <input type="checkbox"/> King County Industrial Waste Discharge approval <input type="checkbox"/> King County DNR approval for connection to interceptor line <input type="checkbox"/> Easement(s) <input type="checkbox"/> Maintenance Agreement(s) <input type="checkbox"/> Hold Harmless – Sensitive Area <input type="checkbox"/> Street lighting calculations <input type="checkbox"/> Waivers <input type="checkbox"/> Recorded Landscape Island Maintenance Agreement <input type="checkbox"/> Other 	<ul style="list-style-type: none"> <input type="checkbox"/> Engineer estimate <input type="checkbox"/> Activity Description <input type="checkbox"/> Plan <input type="checkbox"/> Profile <input type="checkbox"/> Cross-section <input type="checkbox"/> Traffic control plan <input type="checkbox"/> Applicant/Owner information <input type="checkbox"/> Owner and Applicant in compliance statement <input type="checkbox"/> City of Tukwila business license <input type="checkbox"/> Copy of legal authorization <input type="checkbox"/> Hold Harmless Agreement – right-of-way <input type="checkbox"/> Comprehensive general liability insurance <input type="checkbox"/> Business automobile liability insurance <input type="checkbox"/> Contractor's pollution liability insurance <input type="checkbox"/> Security - corporate surety bond, cash deposit or letter of credit <input type="checkbox"/> Maintenance Bond <input type="checkbox"/> Street and pavement restoration plan

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

PLANS - ALL PROJECTS	
Drafting Standards	Plan Elements
<ul style="list-style-type: none"> <input type="checkbox"/> Engineering Drawings: Sheets Max: 24" x 36" Min. 11" X 17" <input type="checkbox"/> Survey Drawings: Sheets 18" x 24" <input type="checkbox"/> Minimum text size 1/8" <input type="checkbox"/> Clean, legible, blue or black line format. <input type="checkbox"/> Existing features with a small pen or half tones. <input type="checkbox"/> Proposed features with a larger or bolder line weight. <input type="checkbox"/> Different line types distinguish different features <input type="checkbox"/> No photographs, stick-ons, or shading. <input type="checkbox"/> NAD 83/91, Washington State grid Coordinates, North Zone, tied to any two City of Tukwila Horizontal Control Monuments NAVD 1988 Vertical <input type="checkbox"/> Conversion calculations to NAVD 1929 for flood zone <input type="checkbox"/> Engineer scale. No engineering plans will be accepted with architect's scale. <ul style="list-style-type: none"> • Site work – 1" = 40' Horizontal, 1" = 4' Vertical • Public Facility – 1" = 20' Horizontal, 1" = 2' Vertical • Signal Drawing Sheet - 1" = 10' • Illumination - 1" = 30' <input type="checkbox"/> Title block: <ul style="list-style-type: none"> • Title: • Date: • Design by: • Drawn by: • Checked by: • Signature Approval block • Sheet number of total sheets (e.g., 2 of 5) <input type="checkbox"/> Revisions and revisions dates <input type="checkbox"/> Existing and proposed monuments. <input type="checkbox"/> Monuments described using current City of Tukwila coordinates. <input type="checkbox"/> Features referenced to monuments 	<ul style="list-style-type: none"> <input type="checkbox"/> North arrow on each sheet <input type="checkbox"/> Labeled Record Drawing <input type="checkbox"/> Labeled as-built drawing, (minimum text height 1/4") <input type="checkbox"/> "Call 1.800.424.5555 Before You Dig" note on sheets showing excavation activity <input type="checkbox"/> Engineer stamped, signed, and dated each sheet <input type="checkbox"/> Project Schedule <input type="checkbox"/> Applicable City's standard details <input type="checkbox"/> Applicable City's standard notes <input type="checkbox"/> Survey monument protection <input type="checkbox"/> Surveyed corner marker protection <input type="checkbox"/> Topography - Existing and proposed topography contours for 15 feet outside the property lines. Projects within flood control zones and some storm drainage plans require 1-foot intervals. <input type="checkbox"/> Easements <input type="checkbox"/> Clearing limits <input type="checkbox"/> Construction limits <input type="checkbox"/> No work zones <input type="checkbox"/> Sensitive areas <input type="checkbox"/> Buffers and set-backs <input type="checkbox"/> Finished floor elevation <input type="checkbox"/> Building footprints onsite and within 15' of the property lines <input type="checkbox"/> Rights-of-way dimensioned and labeled <input type="checkbox"/> Adjacent property lines and addresses <input type="checkbox"/> Street names with quadrant prefix or suffix <input type="checkbox"/> Existing and proposed pedestrian and bicycle facilities <input type="checkbox"/> Existing and proposed utilities and improvements (above and below ground), <input type="checkbox"/> Trees within or adjacent to the public ways – location and dimension <input type="checkbox"/> Tree protection <input type="checkbox"/> Protection of existing structures, fixtures, and facilities within or adjacent to the public ways

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

PLANS - ALL PROJECTS	
<p>ESC Plan</p> <ul style="list-style-type: none"> <input type="checkbox"/> Stockpile locations <input type="checkbox"/> Erosion prevention <input type="checkbox"/> Runoff velocities minimized <input type="checkbox"/> Sediment retention onsite <input type="checkbox"/> Clearing limits <input type="checkbox"/> Sensitive area buffers <input type="checkbox"/> Temporary stabilization <input type="checkbox"/> Perimeter protection <input type="checkbox"/> Stabilized traffic areas <input type="checkbox"/> Surface water controls <input type="checkbox"/> Final stabilization methods <input type="checkbox"/> Wet season requirements (October 1 through April 30) <input type="checkbox"/> ESC Maintenance <input type="checkbox"/> Downstream drainage features monitoring <input type="checkbox"/> Removal of sediment deposition resulting from project-related work <input type="checkbox"/> Post Construction Plans 	<p>Pollution Prevention Plan</p> <p>Does the plan include BMPs for the following activities?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Dewatering <input type="checkbox"/> Paving <input type="checkbox"/> Structure construction and painting <input type="checkbox"/> Material delivery, use, or storage (soil, pesticides, herbicides, fertilizers, detergent, plaster, petroleum products, acids, lime, paints, solvents, curing compounds) <input type="checkbox"/> Solid waste <input type="checkbox"/> Hazardous waste <input type="checkbox"/> Contaminated soils <input type="checkbox"/> Concrete waste, <input type="checkbox"/> Sanitary/septic waste <input type="checkbox"/> Vehicle or equipment cleaning, fueling, or maintenance.
<p>Street and Pavement Restoration Plan</p> <ul style="list-style-type: none"> <input type="checkbox"/> Plan and cross section <input type="checkbox"/> Meets geotechnical recommendations <input type="checkbox"/> Describes materials and thickness <input type="checkbox"/> Matches existing conditions <input type="checkbox"/> Shows channelization and other pavement markings <input type="checkbox"/> Restores vehicle detector loop <input type="checkbox"/> Replaces signs, mailboxes <input type="checkbox"/> Restores Bike/pedestrian paths <input type="checkbox"/> Includes landscape restoration <input type="checkbox"/> Cleaning storm drain system <input type="checkbox"/> ADA amenities 	<p>Traffic Control Plan</p> <ul style="list-style-type: none"> <input type="checkbox"/> Property lines <input type="checkbox"/> Right-of-way lines <input type="checkbox"/> Sidewalks <input type="checkbox"/> Street lights <input type="checkbox"/> Signs <input type="checkbox"/> Mailboxes <input type="checkbox"/> Landscaping and trees <input type="checkbox"/> Channelization <input type="checkbox"/> Cross walks <input type="checkbox"/> Bus stops <input type="checkbox"/> Accesses <input type="checkbox"/> Bike/Pedestrian paths <input type="checkbox"/> Traffic control devices <input type="checkbox"/> Pedestrian and emergency access to any abutting public school, public building, urban trail, or transit stop.

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

PLANS - ALL PROJECTS	
Streets Plan View	Streets Profile View
<ul style="list-style-type: none"> <input type="checkbox"/> Spot elevations on curb returns (PC, PT, $\Delta/2$) <input type="checkbox"/> PI, PC, PT, stationing of horizontal curves <input type="checkbox"/> Curve information delta, radius, and length for all curves <input type="checkbox"/> Horizontal angle points and curb return elevations <input type="checkbox"/> Identify field design situations by notes <input type="checkbox"/> Match existing features by station with elevation <input type="checkbox"/> Typical roadway sections and pavement types <input type="checkbox"/> Pavement markings noted by station and offset <input type="checkbox"/> Sidewalks <input type="checkbox"/> Driveway entrances <input type="checkbox"/> Width, type (AC, PCC) note applicable City standard plan <input type="checkbox"/> Station at center <input type="checkbox"/> Sight distance for horizontal and vertical curves, intersections and access points <input type="checkbox"/> Curb access ramps – per City standard plan <input type="checkbox"/> Intersection detail <input type="checkbox"/> Street trees with stations <input type="checkbox"/> Existing and proposed transit stops and shelters <input type="checkbox"/> Existing and proposed traffic signs <input type="checkbox"/> Existing and proposed mail boxes <input type="checkbox"/> Existing and proposed street lights and vaults <input type="checkbox"/> Pedestrian and emergency access to any abutting public school, public building, urban trail, or transit stop. <input type="checkbox"/> ADA amenities 	<ul style="list-style-type: none"> <input type="checkbox"/> Vertical information PVC, PVI, PVT, AP <input type="checkbox"/> Show grades in decimal (FT/FT) form with (+ and -) slope <input type="checkbox"/> Super elevated roadway segments <input type="checkbox"/> Detail (length of transition in, length of full super, length of transition out) <input type="checkbox"/> New and existing centerline profile <input type="checkbox"/> Pavement cross section supported by pavement design <input type="checkbox"/> New gutter edge of pavement profile* <input type="checkbox"/> Existing edge of pavement profile* <p><small>*Not required for new standard street section construction. Required for Retrofit and Variable Gutter</small></p>
	<p>Street Ends</p> <ul style="list-style-type: none"> <input type="checkbox"/> Cul-de-sac <input type="checkbox"/> Landscape island at dead end <input type="checkbox"/> Hammerhead <input type="checkbox"/> Barricade temporary dead-end. <input type="checkbox"/> Property lines and addresses

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

PLANS - ALL PROJECTS		
Traffic Signals		Illumination
<ul style="list-style-type: none"> <input type="checkbox"/> Signal standard detail chart <input type="checkbox"/> Design by licensed engineer with traffic signal experience. <input type="checkbox"/> Signal Drawing Sheet <input type="checkbox"/> Scale (1"-10') and north arrow <input type="checkbox"/> Service cabinet breaker schedule <input type="checkbox"/> Legend for signal equipment/notes <input type="checkbox"/> One-line diagram for streetlight circuit(s) <input type="checkbox"/> Pole notes <input type="checkbox"/> Construction note <input type="checkbox"/> Wiring schedule table on Record Drawing <input type="checkbox"/> Signal Standard Detail Sheet <input type="checkbox"/> Cabinet wire terminations <input type="checkbox"/> Service Panel <input type="checkbox"/> Pedestrian push buttons <input type="checkbox"/> Pedestrian displays <input type="checkbox"/> Vehicle display <input type="checkbox"/> Emergency vehicle preemption <input type="checkbox"/> Interconnect <input type="checkbox"/> Pedestrian head diagram <input type="checkbox"/> Head numbers <input type="checkbox"/> Type of pedestrian signal head <input type="checkbox"/> Vehicle head diagram <input type="checkbox"/> Head numbers <input type="checkbox"/> Type of vehicle signal head <input type="checkbox"/> Lens configuration <input type="checkbox"/> Back plates 	<ul style="list-style-type: none"> <input type="checkbox"/> Phase sequence diagram <input type="checkbox"/> Loops <input type="checkbox"/> Loop size <input type="checkbox"/> Loop number <input type="checkbox"/> Loop location <input type="checkbox"/> Traffic signal poles <input type="checkbox"/> Pole number <input type="checkbox"/> Vehicle heads with head number <input type="checkbox"/> Pre-empt detector <input type="checkbox"/> Pre-empt indicator <input type="checkbox"/> Spare tenon locations <input type="checkbox"/> Pedestrian heads with head number <input type="checkbox"/> Streetlight poles <input type="checkbox"/> Pedestrian head signal poles <input type="checkbox"/> Junction boxes <input type="checkbox"/> Conduit runs <input type="checkbox"/> Electrical service cabinet <input type="checkbox"/> Power source <input type="checkbox"/> Controller cabinet <input type="checkbox"/> Pavement markings <input type="checkbox"/> Crosswalks <input type="checkbox"/> Stop bars <input type="checkbox"/> Arrows, Onlys <input type="checkbox"/> Mast arm(s) <input type="checkbox"/> Streetlights 	<ul style="list-style-type: none"> <input type="checkbox"/> Street lighting plan and calculations <input type="checkbox"/> J-Boxes <input type="checkbox"/> Conduit runs <input type="checkbox"/> Streetlight pole and number <input type="checkbox"/> Construction notes <input type="checkbox"/> Service panels <input type="checkbox"/> Power source <input type="checkbox"/> Wire notes <input type="checkbox"/> One-line diagram for streetlight circuit(s) <input type="checkbox"/> Legend for streetlight equipment/notes <input type="checkbox"/> Streetlight schedule <input type="checkbox"/> Streetlight number <input type="checkbox"/> Circuit number <input type="checkbox"/> Luminaire type/watts/distribution <input type="checkbox"/> Mounting height <input type="checkbox"/> Mast arm length <input type="checkbox"/> Station and offset <input type="checkbox"/> Sheet number <input type="checkbox"/> Comments

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

PLANS - ALL PROJECTS	
Surface Water	
<p>Plan View</p> <ul style="list-style-type: none"> <input type="checkbox"/> Utility crossings <input type="checkbox"/> Station and offset at each manhole catch basin <input type="checkbox"/> Manholes/catch basins numbered sequentially <input type="checkbox"/> Manholes/catch basin type designation <input type="checkbox"/> Manholes/catch basin rim elevation <input type="checkbox"/> Flow direction (with arrow on pipe) <input type="checkbox"/> Pipe material, sizes and lengths <input type="checkbox"/> Stormwater detention facility (pond dimensions with elevations) <input type="checkbox"/> Stormwater treatment facility (dimensions with elevations) <input type="checkbox"/> Control structure with orifice size and elevation <input type="checkbox"/> Emergency overflow location and elevation <input type="checkbox"/> Design high water elevation <input type="checkbox"/> Outfall locations and treatment 	<p>Profile View</p> <ul style="list-style-type: none"> <input type="checkbox"/> Elevations of each utility at utility crossings <input type="checkbox"/> Station and offset at each manhole/catch basin <input type="checkbox"/> Invert elevations on manholes/catch basins showing direction of flow <input type="checkbox"/> Manhole/catch basin type designation <input type="checkbox"/> Rim elevation <input type="checkbox"/> Pipe materials and sizes <input type="checkbox"/> Length of pipe (shown in L.F.) center structure to center structure <input type="checkbox"/> Grades shown (decimal from FT./FT.) <input type="checkbox"/> Stormwater detention facility <input type="checkbox"/> Stormwater treatment facility <input type="checkbox"/> Control structure <input type="checkbox"/> Outfall locations and elevations

PLANS - ALL PROJECTS	
Water Supply	Sanitary Sewer
<p>Plan View</p> <ul style="list-style-type: none"> <input type="checkbox"/> Elevations of each utility at utility crossings <input type="checkbox"/> Show fixtures with stations <input type="checkbox"/> Fire hydrants <input type="checkbox"/> Blow-off (at dead end of line) <input type="checkbox"/> Vacuum and air release valves <input type="checkbox"/> Tees, crosses, elbows, adapters, and valves, meter station and offset <input type="checkbox"/> Size of pipe <input type="checkbox"/> Type and brand of fixtures <input type="checkbox"/> Length of water main in L.F. between fixtures <input type="checkbox"/> Distance from sanitary or storm sewer <input type="checkbox"/> Meters located in ROW at property line <input type="checkbox"/> Meters grouped <p>Profile View</p> <ul style="list-style-type: none"> <input type="checkbox"/> Elevations of each utility at utility crossings <input type="checkbox"/> Show fixtures with stations and elevations <input type="checkbox"/> Show valves and stations and elevations <input type="checkbox"/> Size and material of water main <input type="checkbox"/> Length of water main in L.F. <input type="checkbox"/> Grades 	<p>Plan View</p> <ul style="list-style-type: none"> <input type="checkbox"/> Elevations of each utility at utility crossings <input type="checkbox"/> Station and offset shown at each proposed manhole <input type="checkbox"/> Manholes numbered sequentially <input type="checkbox"/> Manhole type designation <input type="checkbox"/> Flow direction (with arrow on pipe) <input type="checkbox"/> Invert elevations <input type="checkbox"/> Distance from water lines <input type="checkbox"/> Pipe material and sizes <input type="checkbox"/> Length of pipe from center of manhole to center of manhole <input type="checkbox"/> Depth at property line <input type="checkbox"/> Station for sewer laterals at property line <input type="checkbox"/> Stub (s) for laterals <input type="checkbox"/> On as-builts, laterals will be related to property corners measured along the right-of-way line <input type="checkbox"/> Force main and appurtenances with station and offset <p>Profile View</p> <ul style="list-style-type: none"> <input type="checkbox"/> Elevations of each utility at utility crossings <input type="checkbox"/> Station and offset shown at each manhole <input type="checkbox"/> Manholes numbered sequentially <input type="checkbox"/> Invert elevation showing direction, in and out <input type="checkbox"/> Rim elevation <input type="checkbox"/> Grades shown (decimal form FT./FT.) <input type="checkbox"/> Type of pipe <input type="checkbox"/> Size of pipe <input type="checkbox"/> Length of pipe from center of manhole to center of manhole (in L.F.) <input type="checkbox"/> Existing utilities crossings <input type="checkbox"/> Force main and appurtenances with stations and offsets

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

DEVELOPMENT – Private Property	
<p>Plans</p> <ul style="list-style-type: none"> <input type="checkbox"/> Design meets City's <i>Development Guidelines and Design and Construction Manual</i> <input type="checkbox"/> All applicable requirements under the previous checklists <input type="checkbox"/> Cut and fill volumes <input type="checkbox"/> Impervious surface calculation – existing and proposed <input type="checkbox"/> Access provided to easement(s) or right(s)-of-way <input type="checkbox"/> Access width at property line is 25' to 35' <input type="checkbox"/> Access aligned with accesses opposite <input type="checkbox"/> Access sight distance shown 	<p>Profile</p> <ul style="list-style-type: none"> <input type="checkbox"/> Location, route, and configuration of all facilities to be located underground, including the line and grade proposed for the burial at all points along the route that are within the public ways <input type="checkbox"/> Location of all existing underground utilities, conduits, ducts, pipes, mains, and installations that are within the public ways along the underground route proposed by the applicant <input type="checkbox"/> Cross section showing pavement and subgrade, existing and proposed utilities <input type="checkbox"/> Trench cross-section(s) showing materials, depth, coverage and utilities
<p>Utilities</p> <ul style="list-style-type: none"> <input type="checkbox"/> Location and route of all facilities to be installed on existing utility poles <input type="checkbox"/> Proposed above ground utilities <input type="checkbox"/> Location, route, and configuration of all facilities to be located underground, including the line and grade proposed for the burial <input type="checkbox"/> Existing underground utilities, conduits, ducts, pipes, mains, and installations that are within the public ways t <input type="checkbox"/> Proposed underground utilities, conduits, ducts, pipes, mains, and installations 	<p>Streets</p> <ul style="list-style-type: none"> <input type="checkbox"/> Frontage improvements in right-of-way <input type="checkbox"/> Access – 25' to 35' at right-of-way <input type="checkbox"/> Meets private road standards <input type="checkbox"/> Meets public road standards
<p>Sewer</p> <ul style="list-style-type: none"> <input type="checkbox"/> All applicable requirements under the "Sewer – All Projects" checklist <input type="checkbox"/> Minimum 6" lateral <input type="checkbox"/> Sewer clean-out and test –tee at property line <input type="checkbox"/> Sewer clean-out at building <input type="checkbox"/> Grease interceptor, 6" lines, and reference to related plumbing sheets 	<p>Surface Water</p> <ul style="list-style-type: none"> <input type="checkbox"/> Meets Technical Information Report <input type="checkbox"/> Meets geotechnical report recommendations <input type="checkbox"/> Meets applicable requirements under the "Surface Water – All Projects" checklist
<p>Sewer</p> <ul style="list-style-type: none"> <input type="checkbox"/> All applicable requirements under the "Sewer – All Projects" checklist <input type="checkbox"/> Minimum 6" lateral <input type="checkbox"/> Sewer clean-out and test –tee at property line <input type="checkbox"/> Sewer clean-out at building <input type="checkbox"/> Grease interceptor, 6" lines, and reference to related plumbing sheets 	<p>Water</p> <ul style="list-style-type: none"> <input type="checkbox"/> All applicable requirements under the "Water Supply – All Projects" checklist <input type="checkbox"/> Water meter(s) in right-of-way at the property line <input type="checkbox"/> Looped water system <input type="checkbox"/> Backflow assembly on water supply, include protection from freezing <input type="checkbox"/> Backflow assembly on fire line , make, model, location <input type="checkbox"/> Backflow protection on irrigation line, make, model, location

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

DEVELOPMENT – Single Family Residence

The City may accept non-engineered plans for single-lot, single-family residence. The City requires engineered plans for all public infrastructure, work in the right-of-way, all surface water other than Small Site Drainage Review (KCSWDM), and development in a sensitive area.

DEVELOPMENT – Single Family Residence	
Submittals	Plans
<ul style="list-style-type: none"> <input type="checkbox"/> Water Availability Certificate <input type="checkbox"/> Sewer Availability Certificate <input type="checkbox"/> Utility/Grading/Drainage Plan(s) <input type="checkbox"/> Erosion Prevention and Sediment Control Plan <input type="checkbox"/> Feasibility Evaluation per King County Surface Water Design Manual <input type="checkbox"/> Geotechnical Report <input type="checkbox"/> King County Department of Health approval if there is a septic tank onsite <input type="checkbox"/> Proof that the Washington State code and the Uniform Plumbing Code were followed when septic tank abandoned <input type="checkbox"/> State of Washington current water right permit for wells 	<ul style="list-style-type: none"> <input type="checkbox"/> Drafting standards <input type="checkbox"/> Plan elements <input type="checkbox"/> Scale (usually 1"=20' horizontal) <input type="checkbox"/> Existing and proposed contours at 2' intervals <input type="checkbox"/> Easements - Width, location, purpose - existing and proposed <input type="checkbox"/> Property lines and dimensions <input type="checkbox"/> 100-year flood plain delineation <input type="checkbox"/> Shoreline limits <input type="checkbox"/> Sensitive areas and associated buffers <input type="checkbox"/> Footprints of all existing and proposed structures <input type="checkbox"/> Structures outside the property boundaries and within 15' of the property lines <input type="checkbox"/> Retaining walls, rockeries and other structures of that sort, existing and proposed <input type="checkbox"/> Surface and subsurface utility locations, including power poles, light poles, underground cable. <input type="checkbox"/> Sensitive areas, water courses, lakes, wetlands, etc. within ¼ mile downstream of the property boundaries <input type="checkbox"/> Cross sections for trenches, drainage pits, trench drains, etc. <input type="checkbox"/> Fill material description and quantity <input type="checkbox"/> Proposed location of stockpiles and material description <input type="checkbox"/> Pavement cross-section showing subgrade depth, surfacing material depth, and material descriptions for subgrade and surface. <input type="checkbox"/> Locations, specifications and cross-sections of temporary erosion control. <input type="checkbox"/> Permanent stabilization of exposed ground. <input type="checkbox"/> Abandon or remove existing utilities – capped at the main.

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS

DEVELOPMENT – Single Family Residence	
<p>Access</p> <ul style="list-style-type: none"> <input type="checkbox"/> One access <input type="checkbox"/> 10' to 20' wide at right-of-way <input type="checkbox"/> Turning radii at property line is 5' <input type="checkbox"/> Maximum 15% grade <input type="checkbox"/> Paved connection from access to right-of-way pavement <input type="checkbox"/> Driveway paved from property line onto property for at least 20' <input type="checkbox"/> Access provided to easement(s) or right(s)-of-way 	<p>Surface Water</p> <ul style="list-style-type: none"> <input type="checkbox"/> Existing and proposed onsite drainage <input type="checkbox"/> Roof downspout controls <input type="checkbox"/> Locations, materials, sizes, slopes, and lengths for proposed storm drainage <input type="checkbox"/> Pipes with slopes over 15% must be anchored.
<p>Water</p> <ul style="list-style-type: none"> <input type="checkbox"/> Location of wells within 100' of the site <input type="checkbox"/> Abandoned wells <input type="checkbox"/> Existing water meter and lines, locations, sizes <input type="checkbox"/> Water meter reused <input type="checkbox"/> Water connection reused <input type="checkbox"/> Abandoned water capped at the main <input type="checkbox"/> Size and location of the water main (minimum 8") <input type="checkbox"/> Correct stub location <input type="checkbox"/> Engineered plans for water main extension <input type="checkbox"/> Nearest fire hydrant location <input type="checkbox"/> 1" pipe for sprinkled house <input type="checkbox"/> Pipe locations, sizes, and materials <input type="checkbox"/> Water meter size <input type="checkbox"/> Water meter located at property line within City ROW <input type="checkbox"/> Water meter located on property – easement to City <input type="checkbox"/> Meter in access has reinforced box <input type="checkbox"/> Water and sewer lines 10' horizontal separation <input type="checkbox"/> Water line at least 18" above sanitary sewer line <p>SEWER LINE SLEEVED</p>	<p>Sewer</p> <ul style="list-style-type: none"> <input type="checkbox"/> Existing septic tank location <input type="checkbox"/> Abandon septic system <input type="checkbox"/> Existing lateral <input type="checkbox"/> Existing connection reused <input type="checkbox"/> Abandoned pipes capped at main <input type="checkbox"/> Size and location of the water main <input type="checkbox"/> Correct stub location <input type="checkbox"/> Engineered plans for sewer main extension <input type="checkbox"/> Lateral location, size (minimum 4"), and materials <input type="checkbox"/> Lateral length 150' or shorter <input type="checkbox"/> Lateral length greater than 150 – sewer main extension and manhole <input type="checkbox"/> Slope 2% to 50% <input type="checkbox"/> Anchored pipes on slopes over 15% <input type="checkbox"/> Pipe 5' or more from building, except at entrance to building <input type="checkbox"/> One foot cover <input type="checkbox"/> Clean out at building <input type="checkbox"/> Clean outs at 100' intervals – property line to building <input type="checkbox"/> Test tee at property line <input type="checkbox"/> Water and sewer lines 10' horizontal separation <input type="checkbox"/> Water line at least 18" above sanitary sewer line <input type="checkbox"/> Sewer line sleeved

APPENDIX D EPA FALLING HEAD PROCEDURE

FALLING HEAD PERCOLATION TEST PROCEDURE

Source: EPA, Onsite Wastewater Treatment and Disposal Systems, 1980.

Number and Location of Tests

A minimum of three tests shall be performed within the area proposed for an absorption system. They shall be spaced uniformly throughout the area. If soil conditions are highly variable, more tests may be required.

Preparation of Test Hole

The diameter of each test hole is 6 inches, dug or bored to the proposed depths of the absorption systems or to the most limiting soil horizon. To expose a natural soil surface, the sides of the hole are scratched with a sharp pointed instrument and the loose material is removed from the bottom of the test hole. Two inches of $\frac{1}{2}$ to $\frac{3}{4}$ inch rock are placed in the hole to protect the bottom from scouring when the water is added.

Soaking Period

The hole is carefully filled with at least 12 inches of clear water. The depth of water should be maintained for at least 4 hours and preferably overnight if clay soils are present. A funnel with an attached hose or similar device may be used to prevent water from washing down the sides of the hole. Automatic siphons or float valves may be employed to automatically maintain the water level during the soaking period. It is extremely important that the soil be allowed to soak for a sufficiently long period to allow the soil to swell if accurate results are to be obtained.

In sandy soils with little or no clay, soaking is not necessary. If, after filling the hole twice with 12 inches of water seeps completely away in less than ten minutes, the test can proceed immediately.

Measurement of the Percolation Rate

Except for sandy soils, percolation rate measurements are made 15 hours but no more than 30 hours after the soaking period began. Any soil that sloughed in to the hole during the soaking period is removed and the water level is adjusted to 6 inches above the gravel (or 8 inches above the bottom of the hole). At no time during the test is the water allowed to rise more than 6 inches above the gravel.

Immediately after adjustment, the water level is measured from a fixed reference point to the nearest $\frac{1}{16}$ th inch at 30-minute intervals. The test is continued until two successive water level drops do not vary by more than $\frac{1}{16}$ inch within a 90-minute period.

After each measurement, the water level is readjusted to the 6-inch level. The last water level drop is used to calculate the percolation rate.

In sandy soils or soils in which the first 6-inches of water added after the soaking period seeps away in less than 30 minutes, water level measurements are made at 10-minute intervals for a 1-hour period. The last water level drop is used to calculate the percolation rate.

Calculation of the Percolation Rate

The percolation rate is calculated for each test hole by dividing the time interval used between measurements by the magnitude of the last water level drop. This calculation results in a percolation rate in terms of minutes/inch. To determine the percolation rate for the area, the rates obtained from each hole are averaged. (If tests in the area vary by more than 20 minutes/inch, variations in soil type are indicated. Under these circumstances, percolation rates should not be averaged.)

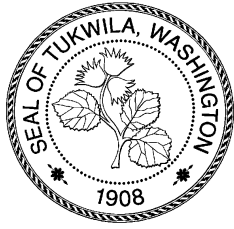
Example: If the last measured drop in water level after 30 minutes is 5/8-inch, then:

$$\text{Percolation rate} = (30 \text{ minutes}) / (5/8 \text{ inch}) = 48 \text{ minutes/inch.}$$

For the permit application, provide 1) a map showing the test locations, 2) the water drop in inches, 3) the time interval and 4) the calculated rate.

APPENDIX E REVISION REQUEST FORM

DEVELOPMENT GUIDELINES AND DESIGN AND CONSTRUCTION STANDARDS



**PUBLIC WORKS DEPARTMENT
DEVELOPMENT GUIDELINES
AND
DESIGN AND CONSTRUCTION STANDARDS
REVISION REQUEST FORM**

DATE		MANUAL VERSION	
DESCRIBE REQUESTED REVISION: Include Chapter, page number, section heading, reason, and, when applicable, supporting documentation. Attach supporting information.			
YOUR NAME			
ADDRESS			
BUSINESS OR FIRM			
PHONE		E-MAIL	
FAX		OTHER	