Infrastructure Design and Construction Standards

City of Tukwila - Department of Public Works

6300 Southcenter Blvd, Suite #100 • Tukwila, Washington 98188 • www.ci.tukwila.wa.us • Phone: (206)433-0179

CITY OF TUKWILA

PUBLIC WORKS DEPARTMENT

INFRASTRUCTURE DESIGN AND CONSTRUCTION STANDARDS

FOURTH EDITION

2010

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CHAPTER 1 INTRODUCTION

SECTION 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.

SECTION 1.1 DEPARTMENTS

1) Public Works Engineering Engineering and Development 6300 Southcenter Blvd, Suite 100 Tukwila, WA 98188 206-433-0179	2) Public Works Operations and Maintenance Operations and Maintenance 600 Minkler Boulevard Tukwila, WA 98188 206-433-1860
3) Fire Department Station #51 444 Andover Park East Tukwila, WA 98188 206-433-1859	4) Community Development Planning/Building/Permit Center 6300 Southcenter Boulevard Suite 100 Tukwila, WA 98188 206-431-3670

SECTION 1.2 AUTHORITY

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

SECTION 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. The revision request form is in Appendix E.

SECTION 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 and the Washington State Department of Transportation (Standard Specifications)
5. Standard Plans for Road, Bridge and Municipal Construction, prepared by the Washington State Department of Transportation
6. Manual on Uniform Traffic Control Devices (MUTCD), U.S. Department of Transportation as amended and approved by Washington State Department of Transportation
7. King County Surface Water Design Manual (2009)
8. The City's NPDES permit
9. Sensitive Areas Overlay (TMC 21)
10. State and National Environmental Policy Acts
11. Shoreline Management Act, State of Washington

12. Tukwila and King County Shoreline Master Plans
13. WISHA - Washington Industrial Safety & Health Administration
14. OSHA - Occupational Safety & Health Administration
15. 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. AASHTO, A Policy on Geometric Design of Highways and Streets
2. AASHTO Guide for the Development of Bicycle Facilities
3. WSDOT Design Manual
4. WSDOT Construction Manual
5. WSDOT Highway Runoff Manual
6. WSDOT Pedestrian Facilities Guidebook
7. WSDOT Local Agency Guidelines
8. NEC- National Electrical Code
9. IMSA - International Municipal Signal Association
10. City of Tukwila Walk and Roll Plan

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

SECTION 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.

SECTION 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/striping, sidewalks, trenching, utility installation/repair, traffic signals and illumination.

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.

SECTION 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 re-inspection after the first two inspections is charged $60.00/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:

A. For repairs requiring an overlay, the City uses the total square feet of overlay.

B. 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 Customer Assistance Bulletins for a more complete description of Pavement Mitigation fees.

2.2.3 TRANSPORTATION IMPACT FEES

Consistent with the Comprehensive Plan, the Six-year Transportation Plan and the Capital Improvement Plan, transportation impact fees help ensure that new development bears its proportionate fair share of

transportation facilities necessitated by the new development. The fee applies to any construction, reconstruction, conversion, structural alteration, relocation or enlargement of any structure that requires a building permit and generates any new PM peak hour trips. The transportation impact fee is charged to each development according to an impact fee schedule based on defined zones. The fees are assessed as part of the building permit and are due and payable when the permit is issued (TMC 9.48 and Ordinance 211).

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.

SECTION 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 adopted *King County Surface Water Design Manual*.

2.3.5 POLLUTION PREVENTION PLAN

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

A. Dewatering
B. Paving
C. Structure construction and painting
D. Material delivery, use, or storage (soil, pesticides, herbicides, fertilizers, detergent, plaster, petroleum products, acids, lime, paints, solvents, curing compounds)
E. Solid waste
F. Hazardous waste
G. Contaminated soils
H. Concrete waste
I. Sanitary/septic waste
J. 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):

A. Applicant/Owner information
    1. Applicant name, address, phone number, email address
    2. Owner name, address, phone number (if not the Applicant)
B. Activity Description
    1. Cut and fill volumes
    2. Location
    3. Proposed use
    4. Excavation method and areas, surface and subsurface
    5. Restoration method
    6. Start and end dates and expected duration
C. Plans, profiles, cross sections
D. Copy of franchise agreement, easement, encroachment permit, license or other legal authorization

E. Document from Owner and Applicant saying they are in compliance

F. Hold Harmless Agreement

G. Traffic control plan

H. City of Tukwila business license

I. 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

J. Application fee

K. Comprehensive general liability insurance with limits not less than $2,000,000, naming City of Tukwila as additional insured

L. Business automobile liability insurance with limits not less than $1,000,000

M. 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

N. 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

O. 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 adopted *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.

A. Unless waived by the Building Official:
   1. All new buildings except a residential structure that falls under the International Residential Code
   2. Any structure, including a rockery, that retains a surcharge
   3. Any retaining structure, including a rockery, that is over four feet above existing grade
   4. Grease interceptors that are 1000 gallons or larger
   5. Surface water retention/detention structures

B. Unless waived by the Department of Community Development Director:
   1. Any work on sites containing or adjacent to slopes that are 15% or steeper
   2. Grading that requires environmental review under the State Environmental Policy Act

C. Unless waived by the Public Works Director
   1. Surface water infiltration
   2. Riverbank Stability (Ordinance 2038)
   3. 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 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.

2.3.11 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.

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:

A. Site map showing location of riverbank cross-sections, structures, roads, drainage, wells, septic tanks, utilities, and other significant features at the project site.

B. 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.

C. 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.

D. Discussion of risk and possible environmental effects, both locally and downstream.

E. Prevention measures, repair and monitoring requirements.

2.3.12 SANITARY SEWER

Your project may require submittal of any of the following:

A. King County Sewer Use Certification form for new or modified facilities,

B. South King County Health Department septic system approval for construction on a site having a septic tank,

C. Copy of King County Industrial Waste Discharge approval for gas stations and some industrial operations that discharge to a sanitary sewer,

D. Septic tank abandonment documentation,

E. Copy of King County Department of Natural Resources approval for direct side sewer connection to interceptor lines.

2.3.13 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.

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.

2.3.14 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.

2.3.15 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.

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

A. 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.

B. 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.

C. 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.

D. Non-motorized easements

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

2.3.17 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.

2.3.18 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)

2.3.19 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.

2.3.20 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.

2.3.21 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.

SECTION 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.
5. All pavement cuts in right-of-way must have a preapproved street and pavement restoration plan.

E. Restoration

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 has 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 City of Tukwila standard detail 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**.
2. Imbed pipe in 5/8" crushed gravel.
3. According to Standard Specifications and the manufacturer's recommendation.
4. Install pipe cover and surface restoration as soon as possible following installation and testing of pipe.
5. Mark all new pipes with 3M EMS 4" Extended Range Marker Balls (Model No. 140X-XR-ID). Use appropriate colors to match APWA utility locate color codes (http://www.callbeforeyoudig.org/color.htm).

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.
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. Video Pipe Inspection

1. Prior to inspection and acceptance of any sanitary sewer and storm drainage pipes, all pipes and structures shall be cleaned and flushed. Any obstructions to flow within the system, (such as rubble, mortar and wedged debris), shall be removed at the nearest structure.

2. Cleaning and flushing of the pipes and structures shall be at the sole cost of the permittee.

3. Video Inspection: The permittee shall perform a complete video inspection of all 8-inch and larger pipes and associated appurtenances. The contractor shall provide to the City a digital video disk (DVD) audio-visual recording of these inspections. The DVD shall be formatted to allow real time fast forward and reverse review of the inspections. Individual structure-to-structure pipe runs shall be saved as separate files on DVD with file names relating to structures identifications numbers and plan set, or as approved by the City. All equipment and materials shall be compatible with existing City-owned equipment. It shall be the permittee's responsibility to confirm equipment compatibility and DVD file formats with the City prior to inspection. A Pan-And-Tilt Camera with the proper sized light head for the size of pipe being inspected shall be utilized by the Contractor at all times for televised inspection. The finished product shall be clear and have the proper amount of lighting to see any and all defects encountered during the inspection. Camera shall be equipped with a 1" reference ball at all times to aid with inspection of 8-inch diameter pipe. Pipe of 12-inch diameter or larger will require a 2" reference ball to aid with the inspection

At all times during the video inspection process, the City shall be present. The City shall be notified forty-eight (48) hours prior to any video inspection.

The Permittee shall bear all costs of video inspection and all costs incurred in correcting any deficiencies found during video inspection including the cost of additional television inspection that may be required by the City to verify the correction of said deficiency.

SECTION 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 the 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 4.0 mil double matte mylar drafting film (**24" by 36")** and in AutoCAD format and PDF on CD (or DVD). 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 Plane (grid) Coordinates, North Zone, using NAD 83/91 survey control and tied to at least two City of Tukwila Horizontal Control Monuments. Elevations shall be NAVD 88.

CHAPTER 3 PLANS AND SPECIFICATIONS

SECTION 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.

SECTION 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.

SECTION 3.2 DRAFTING STANDARDS

3.2.1 PROFESSIONAL ENGINEER

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.

3.2.2 SUBMITTAL OF PLANS

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.

3.2.3 SHEET SIZE

A. Engineering Drawings: 11" X 17" (min), 24" X 36" (max)
B. Survey Drawings: 18" x 24"

3.2.4 TEXT

Text - Prepare plans understanding that each sheet might be microfilmed. Use nominal text size 1/8" as a minimum.

3.2.5 LINE STYLE

A. Provide plans in a clean, legible, blue or black line format.
B. Produce all existing features with a small pen or half tones.
C. Distinguish proposed features from existing features by using a larger or bolder line weight.
D. Use different line types to distinguish different features. For example: centerline and right-of-way will have different line types.

3.2.6 MONUMENTS

A. Show all existing and proposed monuments.
B. Describe all monuments using current City of Tukwila coordinates.
C. Reference roadway centerlines, easements (with type and dimensions), and other pertinent data to existing monuments.
D. Show or describe protection of monuments, including property corners.

3.2.7 DATUM

A. For public facilities, work in the right-of-way, and Capital Improvement Projects:
   1. Horizontal - Washington State Plane (grid) Coordinates, North Zone, using NAD 83/91 survey control and tied to any two City of Tukwila Horizontal Control Monuments
   2. Vertical - NAVD 1988
B. For private property other than a single family residence:

1. Horizontal - Washington State Plane (grid) Coordinates, North Zone, using NAD 83/91 survey control and tied to any two City of Tukwila Horizontal Control Monuments
2. Vertical - NAVD 1988

C. For Flood Control Zones provide conversion calculations to NAVD 1929

3.2.8 TITLE BLOCK

A. Title:
B. Date:
C. Design by:
D. Drawn by:
E. Checked by:
F. Signature Approval block
G. Sheet number of total sheets (e.g., 2 of 5)
H. Revisions and revisions dates

3.2.9 SCALE

Scale - Scale the drawings using an engineer's scale. No engineering plans will be accepted with architect's scale.

A. For site work:
   1" = 40' Horizontal
   1" = 4' Vertical
B. For Public Facility:
   1" = 20' Horizontal
   1" = 2' Vertical
C. For Signal Drawing Sheet:
   1" = 10'
D. For Illumination:
   1" = 30'

3.2.10 LABELED RECORD DRAWING

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

SECTION 3.3 DESIGN ELEMENTS

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

A. 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.
B. Easements – existing and proposed, type, and dimensions.
C. Clearing limits.
D. Construction limits.
E. No work zones.
F. Sensitive areas – Flood zone, shoreline, steep slopes, wetlands, streams.
G. Buffers and set-backs.
H. Finished floor elevation.
I. Building footprints onsite and within 15' of the property lines.
J. Rights-of-way accesses.
K. Adjacent property lines and addresses.
L. Street names with quadrant prefix or suffix.
M. Existing and proposed pedestrian and bicycle facilities.
N. 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.
O. Landscaping: trees, shrubs, ground cover.
P. Onsite and offsite - Fire hydrants, mail boxes, street lights, traffic signals, meters, electrical cabinets, and other such.

SECTION 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:

A. Elevation in relation to mean sea level, of the lowest floor of all structures,

B. 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:

A. 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.

B. Maintenance within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished.

3.4.7 EROSION AND SEDIMENT CONTROL (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 (2009)* for best management practices for pollution prevention plan.

CHAPTER 4 STREETS

SECTION 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, other applicable subarea plans, and the Subdivision Code (TMC 17.20).

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
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 the exact location of the adjacent street frontage improvements cannot be determined at this time; 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 (TMC 17.20.030)

New public and private dead-end streets are not allowed, unless justification can be provided for their necessity. If new or necessary, they 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 permanent parking lots shall be paved. Temporary lots can be gravel with paved driveway aprons if lot is paved within three (3) years of operating temporary lot.

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 (TMC 11.12.150)

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.
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 curb face) 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.

SECTION 4.1 PRIVATE STREETS (TMC 17.20.030.C(5))

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.

SECTION 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 City of Tukwila standard detail 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

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, trail, or transit stop. (TMC 11.12.150)

B. Development

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 Tukwila Urban Center must meet the adopted plan (refer to Ordinance No. 1276).

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.

SECTION 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)

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 City of Tukwila standard detail RS-24.

GE	Cutoff # MDCL	SOAZZFC32F
	Drop Lens # MDRL	SOAZZRMS32F

HUBBEL	Cutoff # RLCD	S38032035FOM53
	Drop Lens # RLGD	S38072035FOM53

D. Junction Boxes – per Standard Specifications and Standard Plans; (see J-40.30-00 and J-40.10-00), with galvanized lids and frames and 48" bond straps between the traffic bearing lid and frame.

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 – all conductors shall be stranded copper sized per current NEC. All grounds will be green #8 AWG stranded copper.

G. Pole wiring - #10 AWG pole and bracket cable.

H. Fuse kits - Homac #SLK-M or SEC #1791-SF.

I. Fuses - FMN-5.

J. Putty tape - Scotchcast 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 Scotchcast 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.

SECTION 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 or designee shall approve all traffic signal system equipment submittals. The City shall be the sole judge of any materials to be considered equal or better.

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. All new or revised traffic signal systems shall include, but not be limited to the following minimum requirements:

1. Current Tukwila design ITS signal cabinet, controller and all peripherals.
2. Controller foundation shall be a modified Standard Plan J-6C.
3. PTZ traffic monitoring camera.
4. Battery backup power system.
5. System interconnection to the City's traffic operations fiber-optic network.
6. All signal heads and visors shall be powder-coated green. Back plates shall be louvered and powder coated black.
7. All vehicular signal indications will be 12" tinted LED modules meeting the current ITE specifications and be manufactured by either Dialight, GE or pre-approved equivalent.
8. All pedestrian signal indications will be countdown type LED modules meeting the current ITE specifications and be manufactured by Dialight, GE or pre-approved equivalent.
9. All vehicle detection shall be performed by use of an induction loop system unless approved by the Director.

10. All pedestrian push buttons shall comply with Standard Plan J-5 until the City of Tukwila standard detail RS-23 is revised.
11. All emergency preemption devices and cabling will be current model "Opticom" brand.
12. All new or modified signal poles shall have aluminum terminal cabinets installed.
13. Meet current ADA requirements.
14. Meet current Tukwila signing and marking standards.

B. Submit catalog cuts and material data sheets to the City for review and approval. The City will be the sole judge of a product being approved as equal or better.

4.4.3 INSTALLATION

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

SECTION 4.5 VEHICLE DETECTOR LOOPS

4.5.1 MATERIALS

A. Loop wire per Standard Specification Section 9-29.3.

B. Lead-in cable per Standard Specification 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 - Scotchcast Model 82 epoxy splice kit.

E. Loop sealant - Crafco, Specialty Asphalt, or Albina Asphalt, meeting ASTM D312 Type 4.

F. Mastic Pads - 3M 2200.

G. Use Standard Plan J-8b, c & d for guidance.

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.

SECTION 4.6 SIGNS AND MARKINGS

The Director determines the type, size, and location of signs and markings 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. Markings

1. All pavement markings shall comply with the MUTCD , Standard Plans and the Standard Specifications, unless otherwise specified herein, or if waived by the City Engineer.
2. All arrows shall be per Standard Plan Numbers M-24.20-01 for high speed roadways (over 45 mph) and M-24.40-01 for low speed roadways (under 40 mph).
3. All traffic signalized intersections that include bicycle lanes must include the bicycle detector pavement marking per the Guide for the Development of Bicycle Facilities, AASHTO, 1999. (http://www.wsdot.wa.gov/bike/pdf/bikebook.pdf)
4. All bike lanes shall include markings per Standard Plan M-9.50-01.
5. Profiled and embossed plastic lines per Standard Plan M-20.20-01 may be used in place of type 1 traffic buttons per Tukwila standard detail RS-13, provided that both ends are marked by type 2 reflectors.

B. Street Signs

Refer to City of Tukwila standard detail RS-10 for Street Name Signs.

C. 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 signs shall be High Intensity Prismatic reflective sheeting, or City Engineer approved equivalent.

   c. Regulatory signs shall have a border.

   d. Other Signs.

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 that there are 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 poles using stainless bands and mounting hardware.

g. So that posts do not show above the sign, except when installing a street marker bracket.

SECTION 4.7 STREET STANDARD DETAILS

CHAPTER 5 SURFACE WATER

SECTION 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.

SECTION 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.

SECTION 5.2 STREAMS (TMC 18.45.100)

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

SECTION 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.

SECTION 5.4 NPDES

A. All work within the City shall meet the City's NPDES (National Pollution Discharge and Elimination System) Phase II permit requirements.

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

SECTION 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.

SECTION 5.6 KING COUNTY SURFACE WATER DESIGN MANUAL

Surface Water design shall meet the 2009 King County Surface Water Design Manual (KCSWDM). Exceptions, modifications, and additions to the items contained in the KCSWDM are listed below.

A. Exceptions and modifications

1. Drainage Reviews and Requirements

All references to requirements that apply the "date stamp" of 1/08/01 do not apply. This affects required drainage reviews and requirements for both flow control and water quality treatment.

2. Threshold Areas

a. Projects may not consider the "Impervious Surface Percent Exemption" from KCSWDM's Core Requirement #3.

b. The following criteria is not allowed to determine if a project can fall within the Small Project Drainage review: the project results in no more than 4% total impervious surface and no more than 15% new previous surface on a single parcel site zoned RA or F, or on a single or multiple parcel site zoned as A, AND all impervious surface area, except 10,000 square feet of it, will be set back from its natural location of discharge from the site at

least 100 feet for every 10,000 square feet of total impervious area.

3. Flow Control

   a. Flow control standards within the City of Tukwila are basin specific and shown on Map 5.9.1. In addition to the flow control standards used in the KCSWDM, the City of Tukwila adds two additional flow control standards, referred to as a Level 2 – Conservation to Existing Conditions and Basic Peak Rate to Existing. These flow control standards are defined below.

Table 5.1 –Flow Control Standard by Drainage Basin

Drainage Basin Name	Flow Control Standard
Duwamish River Basin	Level 2 – Conservation to Existing[1]
Riverton Creek Basin	Level 2 – Conservation to Forested[2]
Southgate Creek Basin	Level 2 – Conservation to Forested[2]
Gilliam Creek Basin – West of Interstate 5	Level 2 – Conservation to Forested[2]
Gilliam Creek Basin – East of Interstate 5	Level 2 – Conservation to Existing
Nelson Place Long Acres Basin	Basic – Peak Rate to Existing
Strander Pump Station Basin	Level 2 – Conservation to Existing
Southeast CBD Basin	Level 2 – Conservation to Existing
P17 Basin	Level 2 – Conservation to Existing[3]
Lower Mill Creek Basin	Level 2 – Conservation to Existing[4]
Tukwila South Basin	Basin Specific Standard[5]

Notes:
(1) For the Duwamish River Basin projects that drain to the Duwamish River below River Mile 6 may be eligible for a lesser standard as follows:
   a) Projects that discharge directly to the Duwamish River via a manmade system having adequate capacity per Section 1.2.3.1 (under direct discharge exemption) of the KCSWDM may be exempt from flow control if all requirements are met.
   b) Projects that drain directly to the Duwamish River that do not have adequate capacity per Section 1.2.3.1 of the KCSWDM should provide flow control to the Basic – Peak Rate to Existing standard.
(2) Areas within this basin that drain via a pipe system all of the way to a Level 2-Conservation to Existing may be allowed to apply the Level 2 – Conservation to Existing if there is no possibility of erosion of natural systems.
(3) A portion of this basin is within the "Tukwila South Project" and shall have flow control standards as approved by Dept. of Ecology.
(4) The majority of this basin is within the City of Kent and Kent is also applying the Level 2 – Conservation to Existing in this area.
(5) Through project permitting for the "Tukwila South Project", the applicant obtained a basin specific standard which was approved by the Dept. of Ecology and the City.

Level 2 Conservation to Existing Conditions:

Runoff from the developed site will be controlled and released at a rate that matches the flow duration for the existing site conditions before the development (pre-project). The flow control duration standard requires runoff from developments to be detained and released at a rate that matches the flow duration over the range of flows extending from ½ of the 2-year up to the 50-year flow. Also match developed peak discharge rates to existing (pre-project) peak discharge rates for the 2- and 10-year return periods.

Background: These are areas that have been developed for years and drain to stream channels that have become stabilized to a new hydrologic regime. Ecology has proposed that the existing land cover can be used in basins that have had at least 40% total impervious surface area for the 20 years preceding Ecology's adoption of the 2005 Stormwater Management Manual for Western Washington (called the 40/20 criterion) and the stream channels receiving the runoff are considered stable from the standpoint of excessive erosion or sedimentation. In developing the areas for "40/20 criterion", the City of Tukwila conducted GIS analysis to confirm impervious percentages in 1985.

Flow control facilities designed to the 40/20 criterion will only have to mitigate for the added impervious surface. As a result, these flow control facilities will be smaller than those required to be designed to match runoff from a fully forested site.

The exception to requiring flow control in this area shall be as follows: The facility requirement in the Level 2 Conservation to Existing Conditions is waived for any threshold discharge area in which there is no more than a 0.1-cfs difference in the sum of developed 100-year peak flows for those target surfaces subject to this requirement and the sum of existing site conditions 100-year peak flows for the same surface areas. Note: for the purposes of this calculation, target surfaces served by flow control BMPs per KCSWDM Appendix C may be modeled in accordance with the flow control BMP facility sizing credits in Table 1.2.3.C (p. 1-47).

Basic Peak Rate to Existing: This standard matches existing site conditions for areas that drain to constructed (man-made) drainage systems that drain directly to either a direct discharge exempt water body or to a receiving water body such that there is not a possibility of creating an erosion problem of natural stream system. The standard calls for matching the 2-, 10- and 100-year peak rate runoff for existing site

conditions using the King County Continuous Time Series (KCTRS) model. Currently this standard only applies to those portions of the Nelson Place/Long Acres Basin that drain to Springbrook Creek in the City of Renton1.

The exception to requiring flow control in this area shall be as follows: The facility requirement in the Basic – Peak Rate to Existing is waived for any threshold discharge area in which there is no more than a 0.1-cfs difference in the sum of developed 100-year peak flows for those target surfaces subject to this requirement and the sum of existing site conditions 100-year peak flows for the same surface areas. Note: for the purposes of this calculation, target surfaces served by flow control BMPs per KCSWDM Appendix C may be modeled in accordance with the flow control BMP facility sizing credits in Table 1.2.3.C (p. 1-47).

b. Refer to Map in Section 5.9.2 for areas where infiltration is prohibited.

c. Note that the City is applying to the Department of Ecology to allow a direct discharge exemption for the Duwamish/Green River above RM 6.0 and this exemption may be permitted upon Ecology approval.

d. All design must be in compliance with the City of Tukwila floodplain regulations and standards as presented respectively in TMC 16.52 Floodplain Management and Chapter 6 – Flood Zone of these Standards.

4. Water Quality Treatment

a. 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.

b. Currently, the City is not requiring mitigation targeted to address a specific downstream water quality problem (i.e., listing as a 303d water quality problem), but mitigation requirements may be added in future modifications to these standards.

c. Projects subject to Core Requirement #8 must provide a water quality treatment facility selected from a menu of treatment facility options identified in the land-use-specific facility requirements and exceptions for the WQ treatment area in which the proposed project or threshold discharge area of the

[1] The City of Renton conducted analyses with input from the Department of Ecology and determined that a peak rate standard was appropriate for the lower valley Springbrook system.

proposed project is located. Note that the Basic Water Quality Treatment and Enhanced Basic Water Quality Treatment are required based on the proposed land use of the project and that references to the Water Quality Applications Map is not applicable.

5. Stormwater Facility Design and Construction

   a. 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.

   b. The City will not approve installation of private surface water facilities in public right-of-way.

   c. When the soils on site meet the feasibility requirements in the adopted *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 map 5.9.2 for areas where infiltration is prohibited**.**

   d. Storm drainpipe materials for systems shall be reinforced concrete, ADS N-12, Hancor Hi-Q with air testable joints, ductile iron class 50, solid wall HDPE, or City Engineer approved equivalent. Open pond side slopes shall be 3H:1V or flatter.

   e. All vaults shall be underground and covered. The City will not approve uncovered, above-ground retention/detention vaults.

6. Maps

   Downstream analysis shall be performed using sensitive areas, wetlands, critical drainage areas, and problem areas defined by the City. Geological Hazard Maps and Wetland, Watercourse and Buffer Maps are available at the City of Tukwila Permit Center.

B. Additional Requirements to KCSWDM

Apply the following soil quality and depth requirements for the protection of new pervious surfaces:

1. The duff layer and native topsoil shall be retained in an undisturbed state to the maximum extent practicable. Any duff layer or topsoil removed during grading shall be stockpiled on-site in a designated, controlled area not adjacent to public resources and critical areas. The material shall be reapplied to other portions of the site where feasible. Except as otherwise noted below, areas that have been cleared and graded shall have the soil moisture holding capacity restored to that of the original undisturbed soil native to the site to

the maximum extent practicable. The soil in any area that has been compacted or that has had some or all of the duff layer or underlying topsoil removed shall be amended to mitigate for lost moisture-holding capacity. The amendment shall take place between May 1 and October 1. Replaced topsoil shall be a minimum of eight inches thick, unless the applicant demonstrates that a different thickness will provide conditions equivalent to the soil moisture-holding capacity native to the site.

2. Replaced topsoil shall have an organic matter content of between eight to thirteen percent dry weight and a pH suitable for the proposed landscape plants.

SECTION 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 adopted *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. All projects 1 acre or more require ESC supervisors to have a turbidity meter on site. Projects less than 1 acre will require ESC supervisors to have a turbidity meter on site on a case-by-case basis.

SECTION 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:

A. Dewatering

B. Paving

C. Structure construction and painting

D. Material delivery, use, or storage (soil, pesticides, herbicides, fertilizers, detergent, plaster, petroleum products, acids, lime, paints, solvents, curing compounds)

E. Solid waste

F. Hazardous waste

G. Contaminated soils

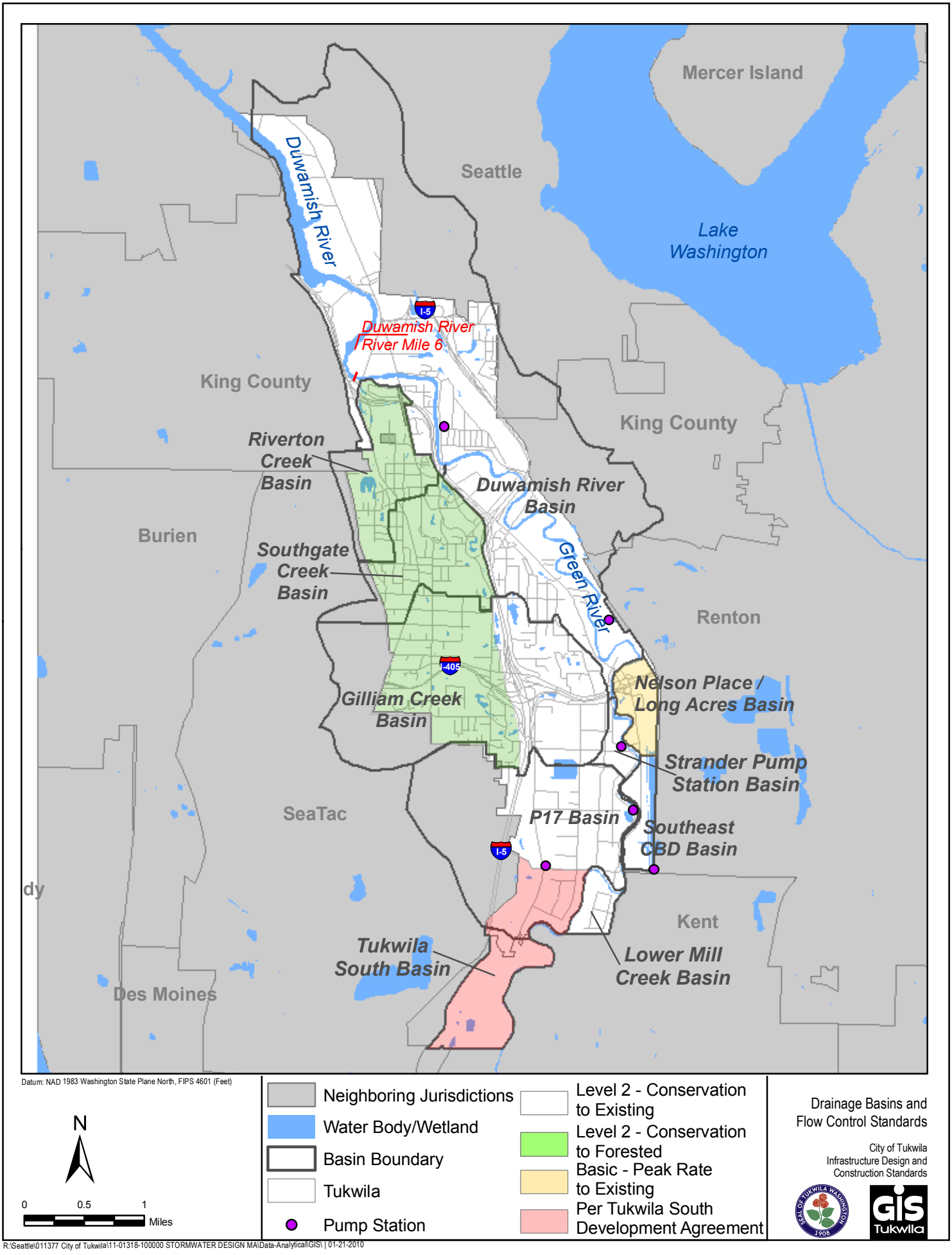
H. Concrete waste

I. Sanitary/septic waste

J. Vehicle or equipment cleaning, fueling, or maintenance

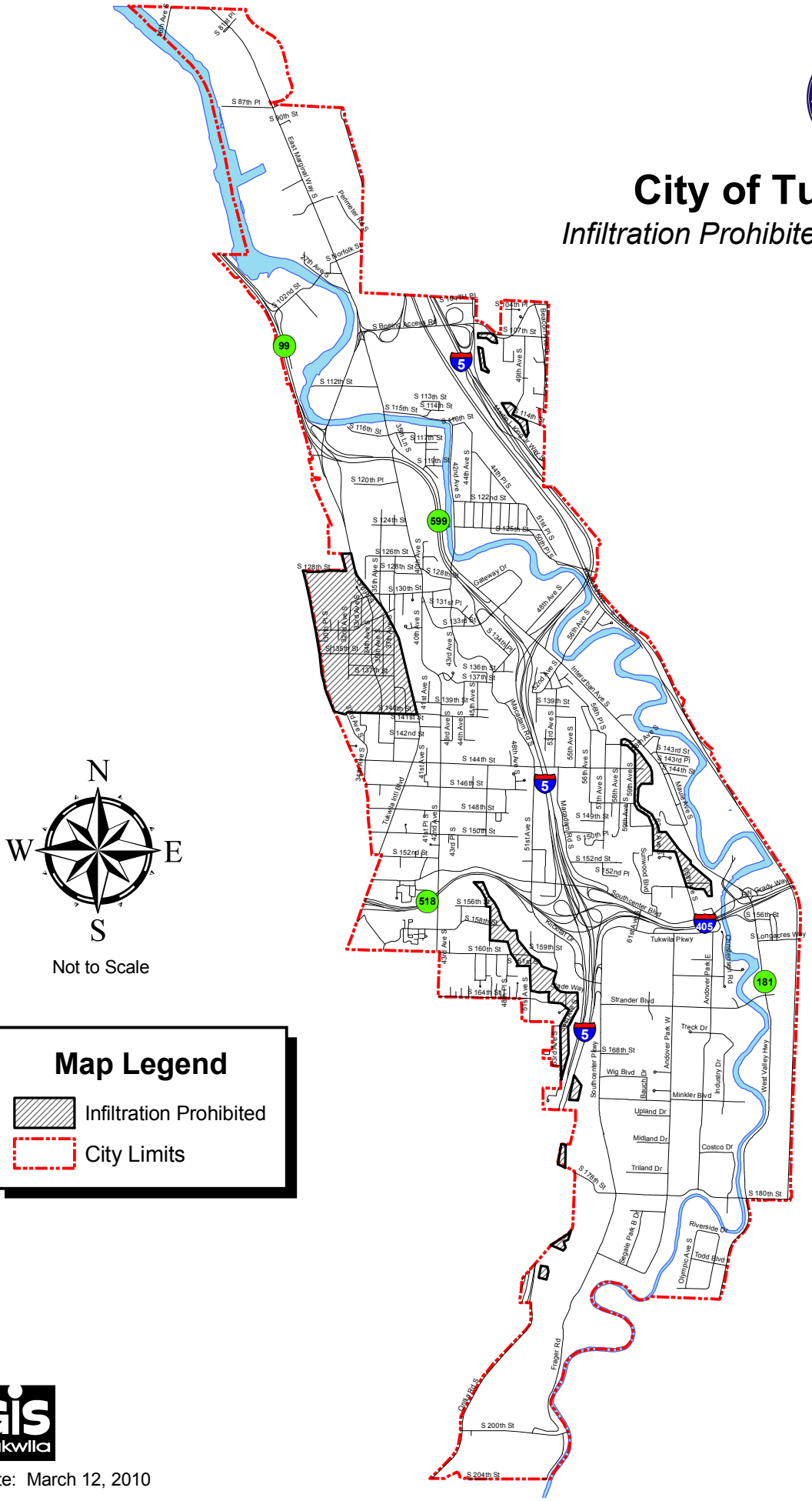
SECTION 5.9 SURFACE WATER MAPS

5.9.1 Drainage Basins and Flow Control Standards



City of Tukwila

Infiltration Prohibited Areas



Date: March 12, 2010

SECTION 5.10 SURFACE WATER STANDARD 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

SECTION 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 6.4.1 (Allentown Flood Control Zone), 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:

A. 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.

B. 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.

SECTION 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.

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,

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:

A. Be on the site for fewer than 180 consecutive days,

B. 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

C. Meet the requirements for manufactured homes, including the elevation and anchoring requirements for manufactured homes.

SECTION 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.

SECTION 6.3 CRITICAL FACILITY

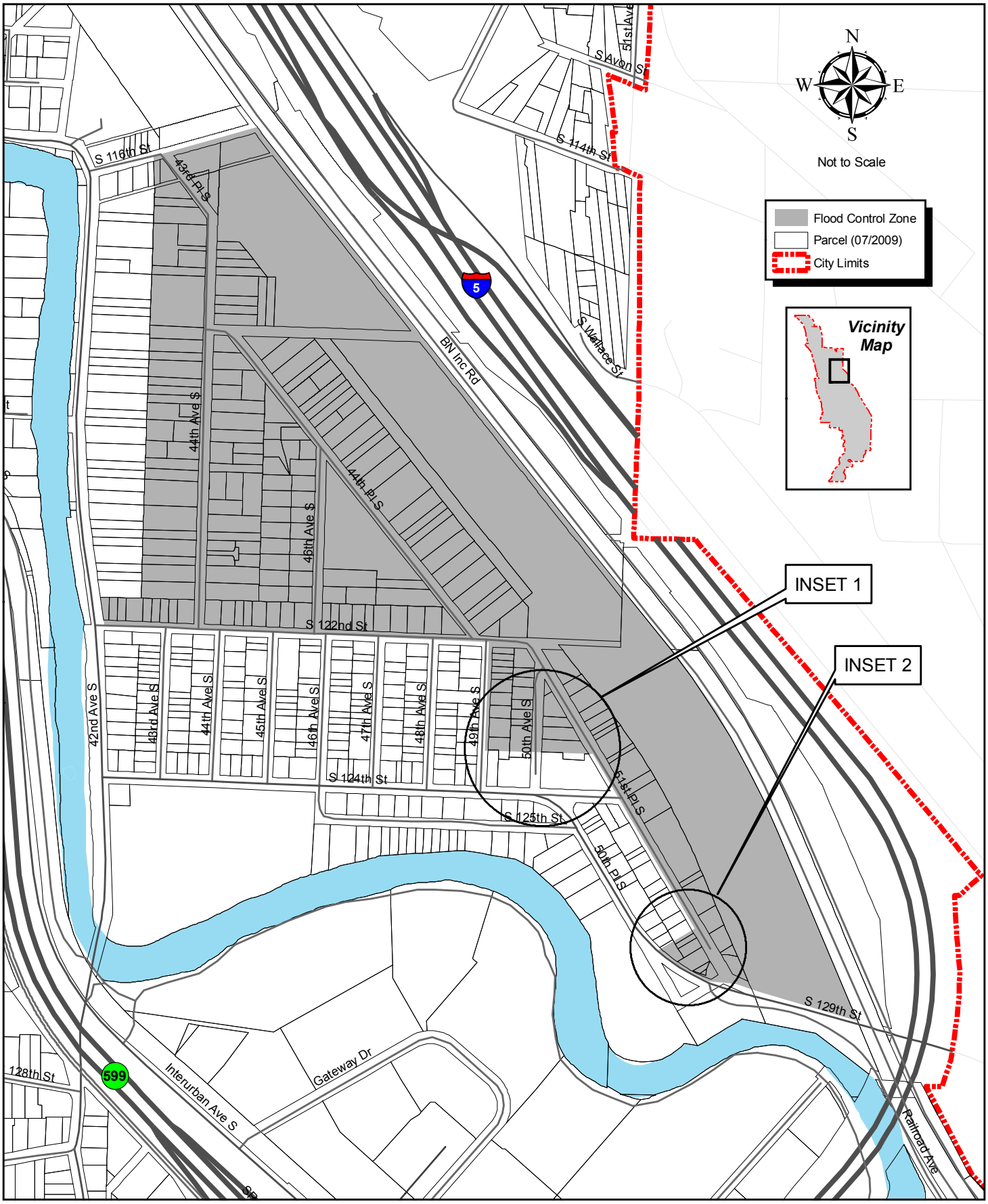
A. Construction of new critical facilities shall be, to the extent possible, located outside the limits of a special flood hazard area. The Director may permit construction of a new critical facility within a special flood hazard area if no feasible alternative is available.

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.

SECTION 6.4 ALLENTOWN FLOOD MAPS

6.4.1 Allentown Flood Control Zone

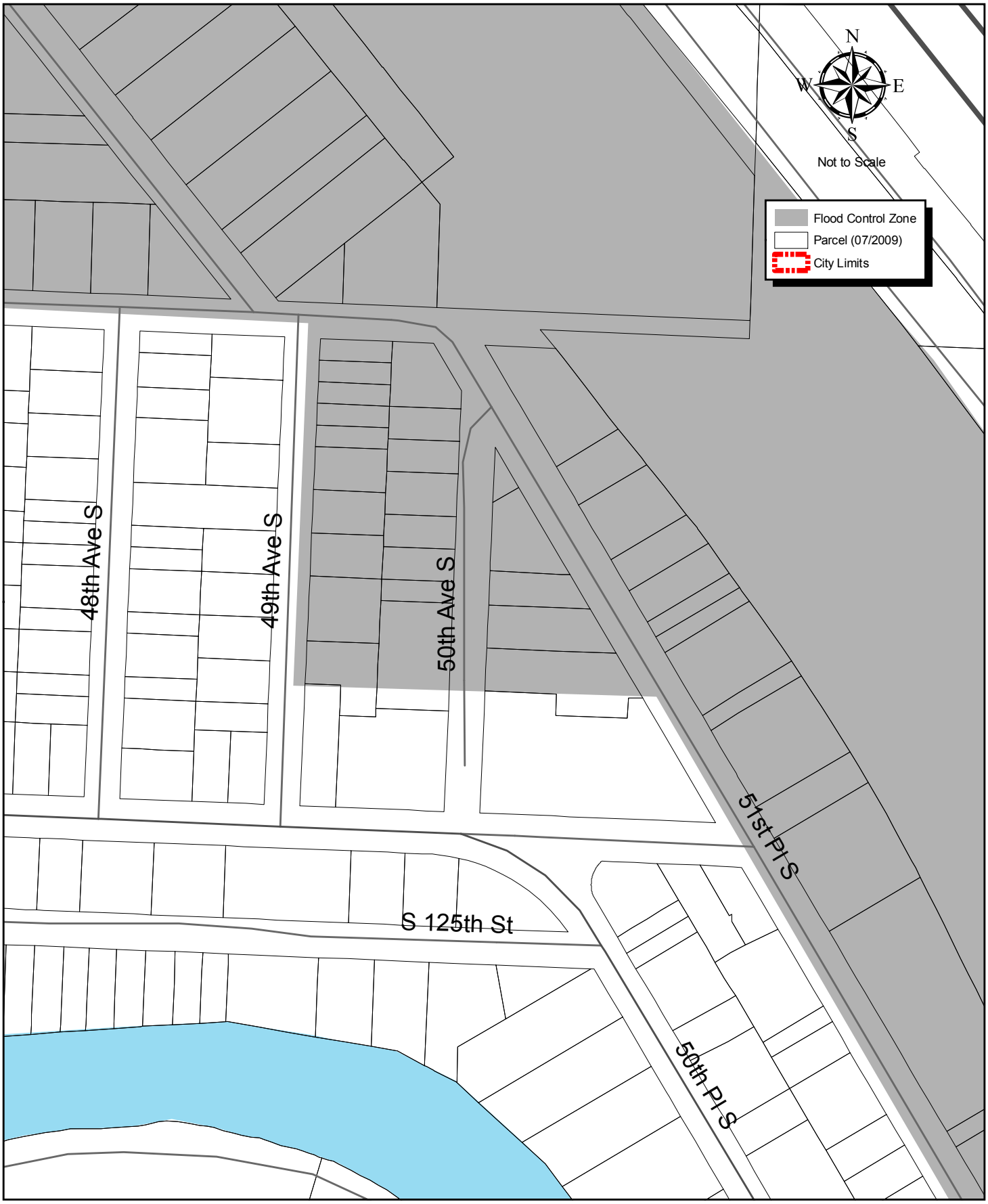


Allentown Flood Control Zone

Policy 2000-01

Date: March 23, 2010

6.4.2 Allentown Flood Control Zone - Inset 1

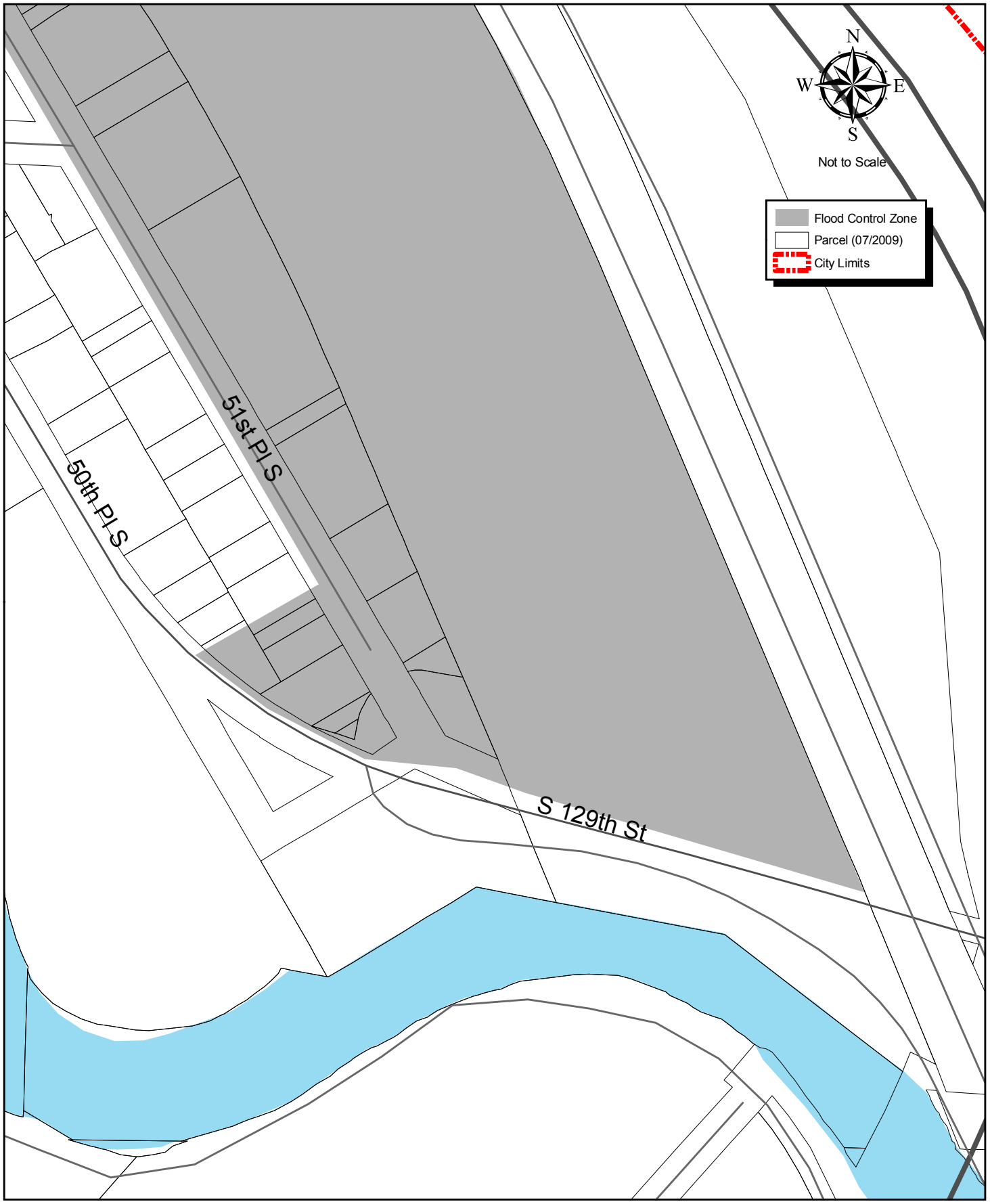


Allentown Flood Control Zone - Inset 1

Policy 2000-01
NTS

Date: March 23, 2010

6.4.3 Allentown Flood Control Zone - Inset 2



Allentown Flood Control Zone - Inset 2

Policy 2000-01
NTS

Date: March 23, 2010

CHAPTER 7 WATER SUPPLY

SECTION 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.

SECTION 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. No pack joints will be allowed.

   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 a TRPL register that is compatible to the Sensus 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 - When determined by the Director, Permittee shall remove the corporation stop at the main and pipes, meters, etc.

7.1.2 3/4" AND 1" SERVICE

Materials

A. Tapping Saddle: Single strap Romac (iron pipe thread).
B. Corporation Stop: Mueller B-25028 or B-20013.
C. Angle stop: Mueller ball valve with tailpiece containing angle check valve.
D. Meter Setter: No setters allowed.
E. Pipe: Type K copper tubing.
F. Meter Box:
   1. For ¾" – Inland Foundry #2005/Mid States plastic with D.I. lid.
   2. For 1" - #2 Fogtite/Mid States plastic with D.I. lid.
   3. 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 B2423, or City-approved equal.
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:
   1. For 1-1/2" meter - Fogtite #2 with 1/4" diamond-plate, solid, steel lid or Mid States plastic with D.I. lid.
   2. 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

A. Install bypass assembly.
B. Embed pipe in 5/8" minus crushed rock.
C. Per WS-02 and WS-03.

7.1.4 3", 4", AND 6" SERVICES

Materials

A. Tapping Tee. Refer to Section 7.2.5, under water mains.
B. Tapping Valve: Gate valve. Cast iron valve with cast iron valve box and 18" cast iron valve box top section.
C. Meter Valve: Gate valve with hand wheel.
D. Pipe Material: Ductile iron, Class 52.
E. Concrete thrust blocks.
F. Steel tie rods.
G. Bypass Assembly: 1-1/2" with locking wings on ball valves.
H. Meter vault: Watertight 444-LA or 644-LA with spring assisted, galvanized-diamond plate cover with locking latch and recessed lift handle.

Installation

A. Embed pipe in 5/8" minus crushed rock.
B. 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.
C. Install service with bypass assembly per WS-04.

D. 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:

A. Meter presented to Public Works Operation every 30 days for a meter reading and inspection.

B. 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.

C. 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.

D. Permittee may move the meter(s) from one hydrant to another within the same project providing Permittee:

1. Notifies and receives approval from the Water Department before the meter is moved, and,
2. Uses hydrant wrenches when connecting or disconnecting the meter.

SECTION 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:

A. Water mains shall extend along the entire property frontage.
B. Design velocities less than or equal to 10 feet per second, under maximum flow conditions.
C. Provide 3 feet to 5 feet deep covering over main.
D. Comply with Section 2.4.5, including no pipe deflection.

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

A. All pipes, fittings, valves, hydrants, joints, and other components shall conform to AWWA, the Standard Specifications, and be acceptable for use by the City of Tukwila.
B. Pipe - Ductile iron pipe, cement lined, standard thickness, Class 52 minimum, conforming to the standards of AWWA C-151.
C. 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.
D. 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.

Revision date: 04/12/2010

E. 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

A. 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.

B. Gate Valves conforming to AWWA C-500.

C. 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.

D. Check Valves - 150 psi working pressure

E. Air Release Valves per WS-07 and WS-08.

Installation

A. 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.

B. Install a gate valve for 12-inch and smaller water mains.

C. Install a butterfly valve for water mains larger than 12-inch diameter.

D. Install at least two valves at all tee intersections.

E. Install at least three valves at water supply/sanitary sewer crossings.

F. Install a gate valve at all hydrants and fire line extensions per WS-13.

7.2.4 BLOCKING

Material

A. Cast in place with concrete originating from a commercial batch plant or commercial batch truck. The City does not allow hand mixing.

B. Tie-rods shall be galvanized or painted with a bituminous coating.

Installation

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

B. Cast in place so blocking bears against fittings only.

C. Allow room at joints to allow dismantling.

D. Wrap fittings with plastic sheeting.

E. Do not backfill until the concrete reaches 3000-psi strength.

F. Field conditions may require tie rods and/or restrained joints in addition to concrete thrust restraint blocking.

7.2.5 LINE TAPS

General

A. The Permittee shall give the Public Works Department at least five working days notice of intention to disrupt service.

B. 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*.

C. The Director allows cut-ins as exception and may require the addition of in-line valve(s).

Material

A. Size on Size - Tapping Tee of cast iron or ductile iron, full encirclement mechanical joint style, Mueller.

B. Note: Other than size on size - Tapping sleeves of epoxy-coated fabricated steel.

C. 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

A. Refer to WS-10.

B. 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.

C. 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.

SECTION 7.3 FIRE LINE/HYDRANT

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

A. 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.

B. 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.

C. 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. All hydrants shall be painted per the NFPA 291 color codes. For Class AA, rated at 1500 gpm or greater, the tops and nozzle caps shall be painted with Farwest Paint Color Number 257 (Delphinium Blue) and all hydrant barrels shall be painted Farwest Paint Color Number X-3472 (case yellow – safety). For other capacity ratings of hydrants, refer to NFPA 291, or consult with the City.

D. Locate hydrants within 150 feet of the building and no farther than 300 feet from any perimeter point of the building.

E. Locate public fire hydrants at a maximum spacing of 300 feet along City water mains.

F. Leads from the service main to the hydrant shall be at least 6-inch diameter and not over 50 feet long.

SECTION 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:

A. 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.

B. 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).

C. 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.

D. 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.

7.4.4 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.

SECTION 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.

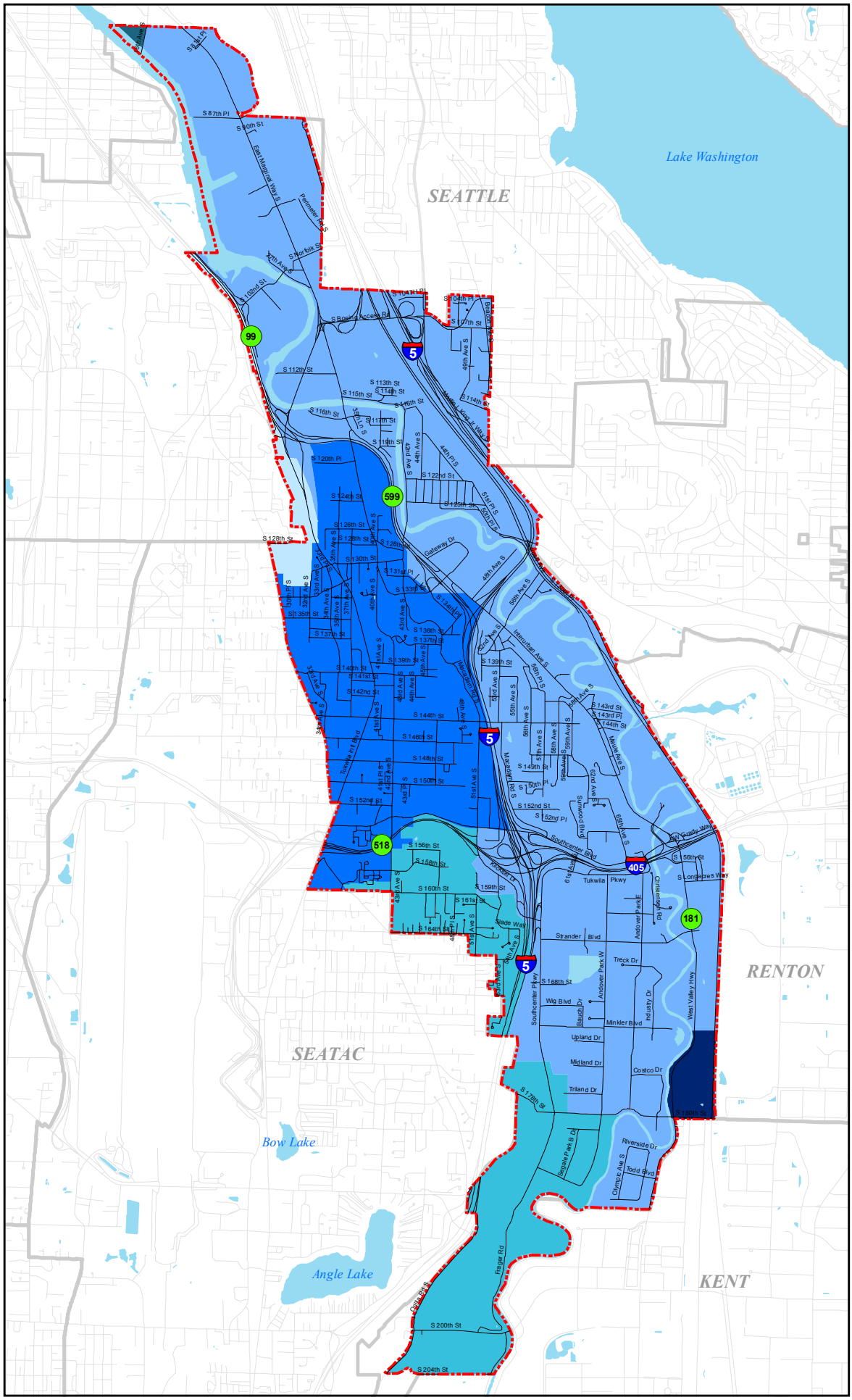
D. At least twelve (12) hours after the flushing procedure, the Permittee shall request that the City Inspector collect water samples from the new system. These samples shall be taken in sterilized bottles and tested by a DOH approved testing lab, as designated by the Water Department. All samples must 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 using two new burlap bags.

SECTION 7.6 WATER SUPPLY MAPS

7.6.1 Water Districts



City of Tukwila

Water Districts

Date: March 23, 2010

SECTION 7.7 WATER SUPPLY STANDARD DETAILS

CHAPTER 8 SANITARY SEWER

SECTION 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 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 the bottom 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

SECTION 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 with required bends totaling no more than 90^{o}.

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.

SECTION 8.2 SEWER MAIN

8.2.1 MATERIAL

A. All sewer materials shall conform to the applicable Standard Specifications. 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 use 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.

A. Air Testing

All sanitary sewer pipelines shall be air tested in accordance with the 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.

B. 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.

SECTION 8.3 MANHOLES

8.3.1 MATERIALS

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. Approved manhole channels shall be a prefabricated fiberglass/PVC channel insert (GU Liner available from PREDL GU Liner Systems, 26020 31B Avenue, Aldergrove, B.C., Canada, V4W2Z6; Tel: 604-609-7755).

F. All grout shall be "Fast Patch" as manufactured by Basalite.

SECTION 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:

A. Refer to SS-14.

B. Provide a double baffle type interceptor.

C. Grease interceptor, 6" lines, and reference to related plumbing sheets.

D. 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.

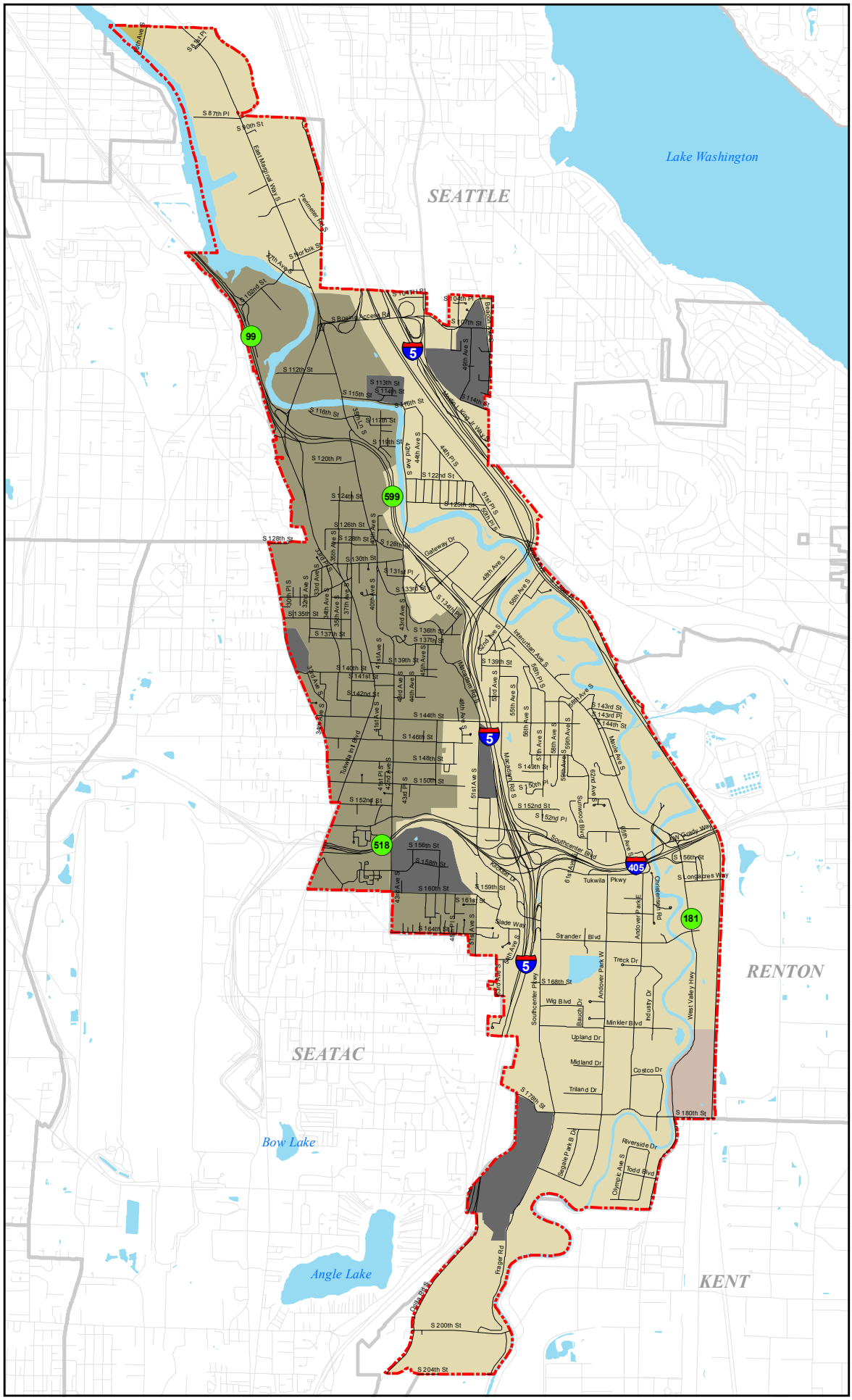
E. Locate the vault outside the building, between 5 feet and 25 feet from the building foundation.

F. 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.

G. 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.

SECTION 8.5 SANITARY SEWER MAPS

8.5.1 Sewer Districts



City of Tukwila

Sewer Districts

GIS Tukwila

Date: March 23, 2010

SECTION 8.6 SANITARY SEWER STANDARD 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

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.

STANDARD 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 Washington State Department of Transportation, 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.

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.

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.

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-proofed 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.

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 - the adopted 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."

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, 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.

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.

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.

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 it's 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.

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) , or 811,** 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.
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.
    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 adopted *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

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

☐ Development – Private	☐ Development – Single Family	☐ Public Infrastructure
☐ Public road	☐ Sensitive Area(s)	☐ Flood Zone
Onsite Work Includes:		
☐ Clearing, Grading	☐ Paving	☐ Dead End & Landscape Island
☐ Utility Undergrounding	☐ Driveway	☐ Hammerhead
	☐ Private road	
☐ Infiltration ☐ Retention ☐ Detention ☐ Low Impact Development ☐ Habitat Improvement ☐ Other	☐ Looped Fire line ☐ Water Main Extension ☐ Permanent Meter ☐ Deduct Meter ☐ Water Only Meter ☐ Backflow Prevention ☐ Fire ☐ Irrigation ☐ Water Service	☐ Sewer Main Extension ☐ Sanitary Side Sewer ☐ Abandon Septic Tank ☐ Grease Interceptor ☐ Cap or Remove Utilities
Work in Right-of-way Includes:		
☐ Existing Access ☐ New Access ☐ Traffic signal ☐ Channelization ☐ Curb/gutter ☐ Sidewalk ☐ Signs ☐ Mailboxes ☐ Cable, conduit or other such ☐ Dead end ☐ Utility Undergrounding	☐ Trench Excavation ☐ Boring ☐ Pavement cut ☐ Pavement repair ☐ Pavement overlay ☐ Landscaping ☐ Water Supply ☐ Sewer ☐ Surface Water ☐ Sewer ☐ Traffic Control	

PROJECT SUBMITTALS

Check All That Apply to the Project	Required For Work In Right-of-way
☐ Engineer estimate ☐ Geotechnical Report ☐ Traffic Impact Analysis ☐ Technical Information Report (Storm Drainage) ☐ King County Sewer Use Certificate ☐ Water Availability Certificate ☐ Sewer Availability Certificate ☐ South King County Department of Health approval if there is a septic tank onsite ☐ Proof that the Washington State code and the Uniform Plumbing Code were followed when septic tank abandoned ☐ State of Washington current water right permit for wells ☐ King County Industrial Waste Discharge approval ☐ King County DNR approval for connection to interceptor line ☐ Easement(s) ☐ Maintenance Agreement(s) ☐ Hold Harmless – Sensitive Area ☐ Street lighting calculations ☐ Waivers ☐ Recorded Landscape Island Maintenance Agreement ☐ Other	☐ Engineer estimate ☐ Activity Description ☐ Plan ☐ Profile ☐ Cross-section ☐ Traffic control plan ☐ Applicant/Owner information ☐ Owner and Applicant in compliance statement ☐ City of Tukwila business license ☐ Copy of legal authorization ☐ Hold Harmless Agreement – right-of-way ☐ Comprehensive general liability insurance ☐ Business automobile liability insurance ☐ Contractor's pollution liability insurance ☐ Security - corporate surety bond, cash deposit or letter of credit ☐ Maintenance Bond ☐ Street and pavement restoration plan

PLANS - ALL PROJECTS

Drafting Standards

- ☐ Engineering Drawings:
  Sheets Max: 24" x 36" Min. 11" X 17"
- ☐ Survey Drawings: Sheets 18" x 24"
- ☐ Minimum text size 1/8"
- ☐ Clean, legible, blue or black line format.
- ☐ Existing features with a small pen or half tones.
- ☐ Proposed features with a larger or bolder line weight.
- ☐ Different line types distinguish different features
- ☐ No photographs, stick-ons, or shading.
- ☐ NAD 83/91, Washington State grid Coordinates, North Zone, tied to any two City of Tukwila Horizontal Control Monuments NAVD 1988 Vertical
- ☐ Conversion calculations to NAVD 1929 for flood zone
- ☐ Engineer scale. **No engineering plans will be accepted with architect's scale.**
  - Site work –
    1" = 40' Horizontal,
    1" = 4' Vertical
  - Public Facility –
    1" = 20' Horizontal,
    1" = 2' Vertical
  - Signal Drawing Sheet - 1" = 10'
  - Illumination - 1" = 30'
- ☐ Title block:
  - Title:
  - Date:
  - Design by:
  - Drawn by:
  - Checked by:
  - Signature Approval block
  - Sheet number of total sheets (e.g., 2 of 5)
- ☐ Revisions and revisions dates
- ☐ Existing and proposed monuments.
- ☐ Monuments described using current City of Tukwila coordinates.
- ☐ Features referenced to monuments

Plan Elements

- ☐ North arrow on each sheet
- ☐ Labeled Record Drawing
- ☐ Labeled as-built drawing, (minimum text height ¼")
- ☐ "Call 1.800.424.5555 Before You Dig" note on sheets showing excavation activity
- ☐ Engineer stamped, signed, and dated each sheet

- ☐ Project Schedule
- ☐ Applicable City's standard details
- ☐ Applicable City's standard notes
- ☐ Survey monument protection
- ☐ Surveyed corner marker protection

- ☐ 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.
- ☐ Easements
- ☐ Clearing limits
- ☐ Construction limits
- ☐ No work zones
- ☐ Sensitive areas
- ☐ Buffers and set-backs
- ☐ Finished floor elevation
- ☐ Building footprints onsite and within 15' of the property lines
- ☐ Rights-of-way dimensioned and labeled
- ☐ Adjacent property lines and addresses
- ☐ Street names with quadrant prefix or suffix
- ☐ Existing and proposed pedestrian and bicycle facilities
- ☐ Existing and proposed utilities and improvements (above and below ground),
- ☐ Trees within or adjacent to the public ways – location and dimension
- ☐ Tree protection
- ☐ Protection of existing structures, fixtures, and facilities within or adjacent to the public ways

PLANS - ALL PROJECTS

ESC Plan

- ☐ Stockpile locations
- ☐ Erosion prevention
- ☐ Runoff velocities minimized
- ☐ Sediment retention onsite
- ☐ Clearing limits
- ☐ Sensitive area buffers
- ☐ Temporary stabilization
- ☐ Perimeter protection
- ☐ Stabilized traffic areas
- ☐ Surface water controls
- ☐ Final stabilization methods
- ☐ Wet season requirements (October 1 through April 30)
- ☐ ESC Maintenance
- ☐ Downstream drainage features monitoring
- ☐ Removal of sediment deposition resulting from project-related work
- ☐ Post Construction Plans

Pollution Prevention Plan

Does the plan include BMPs for the following activities?

- ☐ Dewatering
- ☐ Paving
- ☐ Structure construction and painting
- ☐ Material delivery, use, or storage (soil, pesticides, herbicides, fertilizers, detergent, plaster, petroleum products, acids, lime, paints, solvents, curing compounds)
- ☐ Solid waste
- ☐ Hazardous waste
- ☐ Contaminated soils
- ☐ Concrete waste
- ☐ Sanitary/septic waste
- ☐ Vehicle or equipment cleaning, fueling, or maintenance

Street and Pavement Restoration Plan

- ☐ Plan and cross section
- ☐ Meets geotechnical recommendations
- ☐ Describes materials and thickness
- ☐ Matches existing conditions
- ☐ Shows channelization and other pavement markings
- ☐ Restores vehicle detector loop
- ☐ Replaces signs, mailboxes
- ☐ Restores Bike/pedestrian paths
- ☐ Includes landscape restoration
- ☐ Cleaning storm drain system
- ☐ ADA amenities

Traffic Control Plan

- ☐ Property lines
- ☐ Right-of-way lines
- ☐ Sidewalks
- ☐ Street lights
- ☐ Signs
- ☐ Mailboxes
- ☐ Landscaping and trees
- ☐ Channelization
- ☐ Cross walks
- ☐ Bus stops
- ☐ Accesses
- ☐ Bike/Pedestrian paths
- ☐ Traffic control devices
- ☐ Pedestrian and emergency access to any abutting public school, public building, urban trail, or transit stop

PLANS - ALL PROJECTS

Streets Plan View

- ☐ Spot elevations on curb returns (PC, PT, ▲/2)
- ☐ PI, PC, PT, stationing of horizontal curves
- ☐ Curve information delta, radius, and length for all curves
- ☐ Horizontal angle points and curb return elevations
- ☐ Identify field design situations by notes
- ☐ Match existing features by station with elevation
- ☐ Typical roadway sections and pavement types
- ☐ Pavement markings noted by station and offset
- ☐ Sidewalks
- ☐ Driveway entrances
- ☐ Width, type (AC, PCC) note applicable City standard plan
- ☐ Station at center
- ☐ Sight distance for horizontal and vertical curves, intersections and access points
- ☐ Curb access ramps – per City standard plan
- ☐ Intersection detail
- ☐ Street trees with stations
- ☐ Existing and proposed transit stops and shelters
- ☐ Existing and proposed traffic signs
- ☐ Existing and proposed mail boxes
- ☐ Existing and proposed street lights and vaults
- ☐ Pedestrian and emergency access to any abutting public school, public building, urban trail, or transit stop
- ☐ ADA amenities

Streets Profile View

- ☐ Vertical information PVC, PVI, PVT, AP
- ☐ Show grades in decimal (FT/FT) form with (+ and -) slope
- ☐ Super elevated roadway segments
- ☐ Detail (length of transition in, length of full super, length of transition out)
- ☐ New and existing centerline profile
- ☐ Pavement cross section supported by pavement design
- ☐ New gutter edge of pavement profile*
- ☐ Existing edge of pavement profile*

*Not required for new standard street section construction. Required for Retrofit and Variable Gutter

Street Ends

- ☐ Cul-de-sac
- ☐ Landscape island at dead end
- ☐ Hammerhead
- ☐ Barricade temporary dead-end
- ☐ Property lines and addresses

PLANS - ALL PROJECTS

Traffic Signals

- ☐ Signal standard detail chart
- ☐ Design by licensed engineer with traffic signal experience
- ☐ Signal Drawing Sheet
- ☐ Scale (1"-10') and north arrow
- ☐ Service cabinet breaker schedule
- ☐ Legend for signal equipment/notes
- ☐ One-line diagram for streetlight circuit(s)
- ☐ Pole notes
- ☐ Construction note
- ☐ Wiring schedule table on Record Drawing
- ☐ Signal Standard Detail Sheet
- ☐ Cabinet wire terminations
- ☐ Service Panel
- ☐ Pedestrian push buttons
- ☐ Pedestrian displays
- ☐ Vehicle display
- ☐ Emergency vehicle preemption
- ☐ Interconnect
- ☐ Pedestrian head diagram
- ☐ Head numbers
- ☐ Type of pedestrian signal head
- ☐ Vehicle head diagram
- ☐ Head numbers
- ☐ Type of vehicle signal head
- ☐ Lens configuration
- ☐ Back plates
- ☐ Phase sequence diagram
- ☐ Loops
- ☐ Loop size
- ☐ Loop number
- ☐ Loop location
- ☐ Traffic signal poles
- ☐ Pole number
- ☐ Vehicle heads with head number
- ☐ Pre-empt detector
- ☐ Pre-empt indicator
- ☐ Spare tenon locations
- ☐ Pedestrian heads with head number
- ☐ Streetlight poles
- ☐ Pedestrian head signal poles
- ☐ Junction boxes
- ☐ Conduit runs
- ☐ Electrical service cabinet
- ☐ Power source
- ☐ Controller cabinet
- ☐ Pavement markings
- ☐ Crosswalks
- ☐ Stop bars
- ☐ Arrows, Onlys
- ☐ Mast arm(s)
- ☐ Streetlights

Illumination

- ☐ Street lighting plan and calculations
- ☐ J-Boxes
- ☐ Conduit runs
- ☐ Streetlight pole and number
- ☐ Construction notes
- ☐ Service panels
- ☐ Power source
- ☐ Wire notes
- ☐ One-line diagram for streetlight circuit(s)
- ☐ Legend for streetlight equipment/notes
- ☐ Streetlight schedule
- ☐ Streetlight number
- ☐ Circuit number
- ☐ Luminaire type/watts/distribution
- ☐ Mounting height
- ☐ Mast arm length
- ☐ Station and offset
- ☐ Sheet number
- ☐ Comments

PLANS - ALL PROJECTS	
Surface Water	
Plan View ☐ Utility crossings ☐ Station and offset at each manhole catch basin ☐ Manholes/catch basins numbered sequentially ☐ Manholes/catch basin type designation ☐ Manholes/catch basin rim elevation ☐ Flow direction (with arrow on pipe) ☐ Pipe material, sizes and lengths ☐ Stormwater detention facility (pond dimensions with elevations) ☐ Stormwater treatment facility (dimensions with elevations) ☐ Control structure with orifice size and elevation ☐ Emergency overflow location and elevation ☐ Design high water elevation ☐ Outfall locations and treatment	**Profile View** ☐ Elevations of each utility at utility crossings ☐ Station and offset at each manhole/catch basin ☐ Invert elevations on manholes/catch basins showing direction of flow ☐ Manhole/catch basin type designation ☐ Rim elevation ☐ Pipe materials and sizes ☐ Length of pipe (shown in L.F.) center structure to center structure ☐ Grades shown (decimal from FT./FT.) ☐ Stormwater detention facility ☐ Stormwater treatment facility ☐ Control structure ☐ Outfall locations and elevations

PLANS - ALL PROJECTS

Water Supply

Plan View

- ☐ Elevations of each utility at utility crossings
- ☐ Show fixtures with stations
- ☐ Fire hydrants
- ☐ Blow-off (at dead end of line)
- ☐ Vacuum and air release valves
- ☐ Tees, crosses, elbows, adapters, and valves, meter station and offset
- ☐ Size of pipe
- ☐ Type and brand of fixtures
- ☐ Length of water main in L.F. between fixtures
- ☐ Distance from sanitary or storm sewer
- ☐ Meters located in ROW at property line
- ☐ Meters grouped

Profile View

- ☐ Elevations of each utility at utility crossings
- ☐ Show fixtures with stations and elevations
- ☐ Show valves and stations and elevations
- ☐ Size and material of water main
- ☐ Length of water main in L.F.
- ☐ Grades

Sanitary Sewer

Plan View

- ☐ Elevations of each utility at utility crossings
- ☐ Station and offset shown at each proposed manhole
- ☐ Manholes numbered sequentially
- ☐ Manhole type designation
- ☐ Flow direction (with arrow on pipe)
- ☐ Invert elevations
- ☐ Distance from water lines
- ☐ Pipe material and sizes
- ☐ Length of pipe from center of manhole to center of manhole
- ☐ Depth at property line
- ☐ Station for sewer laterals at property line
- ☐ Stub (s) for laterals
- ☐ On as-builts, laterals will be related to property corners measured along the right-of-way line
- ☐ Force main and appurtenances with station and offset

Profile View

- ☐ Elevations of each utility at utility crossings
- ☐ Station and offset shown at each manhole
- ☐ Manholes numbered sequentially
- ☐ Invert elevation showing direction, in and out
- ☐ Rim elevation
- ☐ Grades shown (decimal form FT./FT.)
- ☐ Type of pipe
- ☐ Size of pipe
- ☐ Length of pipe from center of manhole to center of manhole (in L.F.)
- ☐ Existing utilities crossings
- ☐ Force main and appurtenances with stations and offsets

DEVELOPMENT – Private Property

Plans

- ☐ Design meets City's *Development Guidelines and Design and Construction Manual*
- ☐ All applicable requirements under the previous checklists
- ☐ Cut and fill volumes
- ☐ Impervious surface calculation – existing and proposed
- ☐ Access provided to easement(s) or right(s)-of-way
- ☐ Access width at property line is 25' to 35'
- ☐ Access aligned with accesses opposite
- ☐ Access sight distance shown

Profile

- ☐ 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
- ☐ 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
- ☐ Cross section showing pavement and subgrade, existing and proposed utilities
- ☐ Trench cross-section(s) showing materials, depth, coverage and utilities

Utilities

- ☐ Location and route of all facilities to be installed on existing utility poles
- ☐ Proposed above ground utilities
- ☐ Location, route, and configuration of all facilities to be located underground, including the line and grade proposed for the burial
- ☐ Existing underground utilities, conduits, ducts, pipes, mains, and installations that are within the public right of ways
- ☐ Proposed underground utilities, conduits, ducts, pipes, mains, and installations

Streets

- ☐ Frontage improvements in right-of-way
- ☐ Access – 25' to 35' at right-of-way
- ☐ Meets private road standards
- ☐ Meets public road standards

Surface Water

- ☐ Meets Technical Information Report
- ☐ Meets geotechnical report recommendations
- ☐ Meets applicable requirements under the "Surface Water – All Projects" checklist

Sewer

- ☐ All applicable requirements under the "Sewer – All Projects" checklist
- ☐ Minimum 6" lateral
- ☐ Sewer clean-out and test –tee at property line
- ☐ Sewer clean-out at building
- ☐ Grease interceptor, 6" lines, and reference to related plumbing sheets

Water

- ☐ All applicable requirements under the "Water Supply – All Projects" checklist
- ☐ Water meter(s) in right-of-way at the property line
- ☐ Looped water system
- ☐ Backflow assembly on water supply, include protection from freezing
- ☐ Backflow assembly on fire line, make, model, location
- ☐ Backflow protection on irrigation line, make, model, location

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**
☐ Water Availability Certificate ☐ Sewer Availability Certificate ☐ Utility/Grading/Drainage Plan(s) ☐ Erosion Prevention and Sediment Control Plan ☐ Feasibility Evaluation per King County Surface Water Design Manual ☐ Geotechnical Report ☐ King County Department of Health approval if there is a septic tank onsite ☐ Proof that the Washington State code and the Uniform Plumbing Code were followed when septic tank abandoned ☐ State of Washington current water right permit for wells	☐ Drafting standards ☐ Plan elements ☐ Scale (usually 1"=20' horizontal) ☐ Existing and proposed contours at 2' intervals ☐ Easements - Width, location, purpose - existing and proposed ☐ Property lines and dimensions ☐ 100-year flood plain delineation ☐ Shoreline limits ☐ Sensitive areas and associated buffers ☐ Footprints of all existing and proposed structures ☐ Structures outside the property boundaries and within 15' of the property lines ☐ Retaining walls, rockeries and other structures of that sort, existing and proposed ☐ Surface and subsurface utility locations, including power poles, light poles, underground cable ☐ Sensitive areas, water courses, lakes, wetlands, etc. within ¼ mile downstream of the property boundaries ☐ Cross sections for trenches, drainage pits, trench drains, etc. ☐ Fill material description and quantity ☐ Proposed location of stockpiles and material description ☐ Pavement cross-section showing subgrade depth, surfacing material depth, and material descriptions for subgrade and surface ☐ Locations, specifications and cross-sections of temporary erosion control ☐ Permanent stabilization of exposed ground ☐ Abandon or remove existing utilities – capped at the main

DEVELOPMENT – Single Family Residence

Access

- ☐ One access
- ☐ 10' to 20' wide at right-of-way
- ☐ Turning radii at property line is 5'
- ☐ Maximum 15% grade
- ☐ Paved connection from access to right-of-way pavement
- ☐ Driveway paved from property line onto property for at least 20'
- ☐ Access provided to easement(s) or right(s)-of-way

Surface Water

- ☐ Existing and proposed onsite drainage
- ☐ Roof downspout controls
- ☐ Locations, materials, sizes, slopes, and lengths for proposed storm drainage
- ☐ Pipes with slopes over 15% must be anchored

Water

- ☐ Location of wells within 100' of the site
- ☐ Abandoned wells
- ☐ Existing water meter and lines, locations, sizes
- ☐ Water meter reused
- ☐ Water connection reused
- ☐ Abandoned water capped at the main
- ☐ Size and location of the water main (minimum 8")
- ☐ Correct stub location
- ☐ Engineered plans for water main extension
- ☐ Nearest fire hydrant location
- ☐ 1" pipe for sprinkled house
- ☐ Pipe locations, sizes, and materials
- ☐ Water meter size
- ☐ Water meter located at property line within City ROW
- ☐ Water meter located on property – easement to City
- ☐ Meter in access has reinforced box
- ☐ Water and sewer lines 10' horizontal separation
- ☐ Water line at least 18" above sanitary sewer line

Sewer

- ☐ Existing septic tank location
- ☐ Abandon septic system
- ☐ Existing lateral
- ☐ Existing connection reused
- ☐ Abandoned pipes capped at main
- ☐ Size and location of the water main
- ☐ Correct stub location
- ☐ Engineered plans for sewer main extension
- ☐ Lateral location, size (minimum 4"), and materials
- ☐ Lateral length 150' or shorter
- ☐ Lateral length greater than 150 – sewer main extension and manhole
- ☐ Slope 2% to 50%
- ☐ Anchored pipes on slopes over 15%
- ☐ Pipe 5' or more from building, except at entrance to building
- ☐ One foot cover
- ☐ Clean out at building
- ☐ Clean outs at 100' intervals – property line to building
- ☐ Test tee at property line
- ☐ Water and sewer lines 10' horizontal separation
- ☐ Water line at least 18" above sanitary sewer line
- ☐ Sewer line sleeved

APPENDIX D EPA FALLING HEAD PROCEDURE

FALLING HEAD PERCOLATION TEST PROCEDURE

Source: Environmental Protection Agency (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 ½ to ¾-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 1/16th inch at 30-minute intervals. The test is continued until two successive water level drops do not vary by more than 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:

Percolation rate = (30 minutes)/(5/8 inch) = 48 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

PUBLIC WORKS DEPARTMENT

DEVELOPMENT GUIDELINES

AND

DESIGN AND CONSTRUCTION STANDARDS

REVISION REQUEST FORM

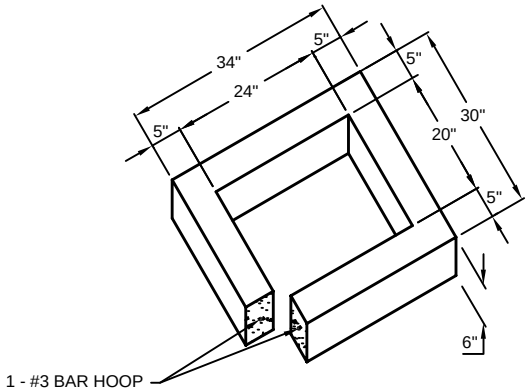
DATE		MANUAL VERSION	

DESCRIBE REQUESTED REVISION:

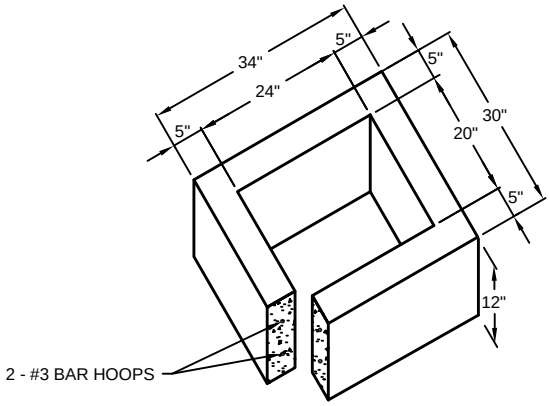
Include Chapter, page number, section heading, reason, and, when applicable, supporting documentation. Attach supporting information.

YOUR NAME	
ADDRESS	
BUSINESS OR FIRM	

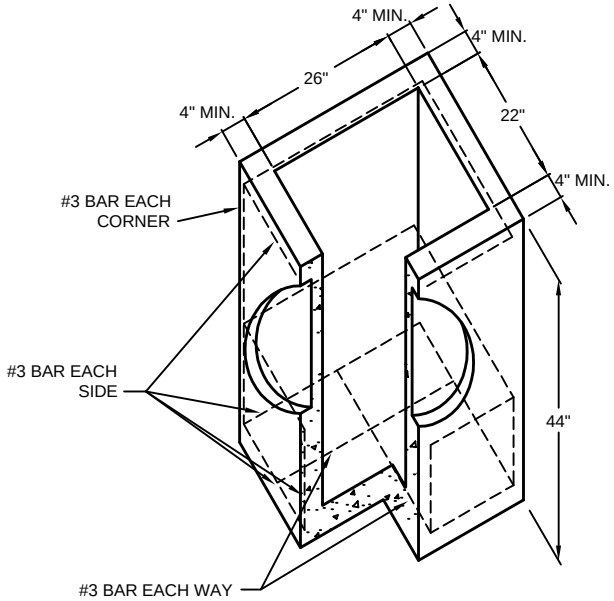
PHONE		E-MAIL	
FAX		OTHER	



6" RISER SECTION



12" RISER SECTION



PRECAST BASE SECTION

(MEASUREMENT AT TOP OF THE BASE)

NOTES:

1. MAXIMUM DEPTH FROM FINISHED GRADE TO PIPE INVERT SHALL BE 5'-0".

2. CATCH BASINS TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C 478 (AASHTO M 1991) & ASTM C 890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.

3. REBAR WELDED WIRE FABRIC HAVING A MINIMUM AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A 497 (AASHTO M 221). DO NOT PLACE WIRE FABRIC IN THE KNOCKOUTS.

4. THE BOTTOM OF THE PRECAST BASE SECTION MAY BE ROUNDED. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MINIMUM.

5. KNOCKOUTS MAY BE ON ALL 4 SIDES WITH MAXIMUM DIAMETER OF 20". KNOCKOUTS MAY BE EITHER ROUND OR 'D' SHAPE. PIPE TO BE INSTALLED IN FACTORY SUPPLIED KNOCKOUTS.

6. KNOCKOUT OF CUTOUT HOLE SIZE SHALL BE EQUAL TO PIPE OUTER DIAMETER PLUS CATCH BASIN WALL THICKNESS.

7. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED 1/2" PER FOOT.

8. CATCH BASIN FRAME AND GRATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATION RR-F-621D. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT.

9. FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.

10. VANED GRATE, REFER TO DS-06.

11. REFER TO DS-06 FOR CATCH BASIN MARKINGS.

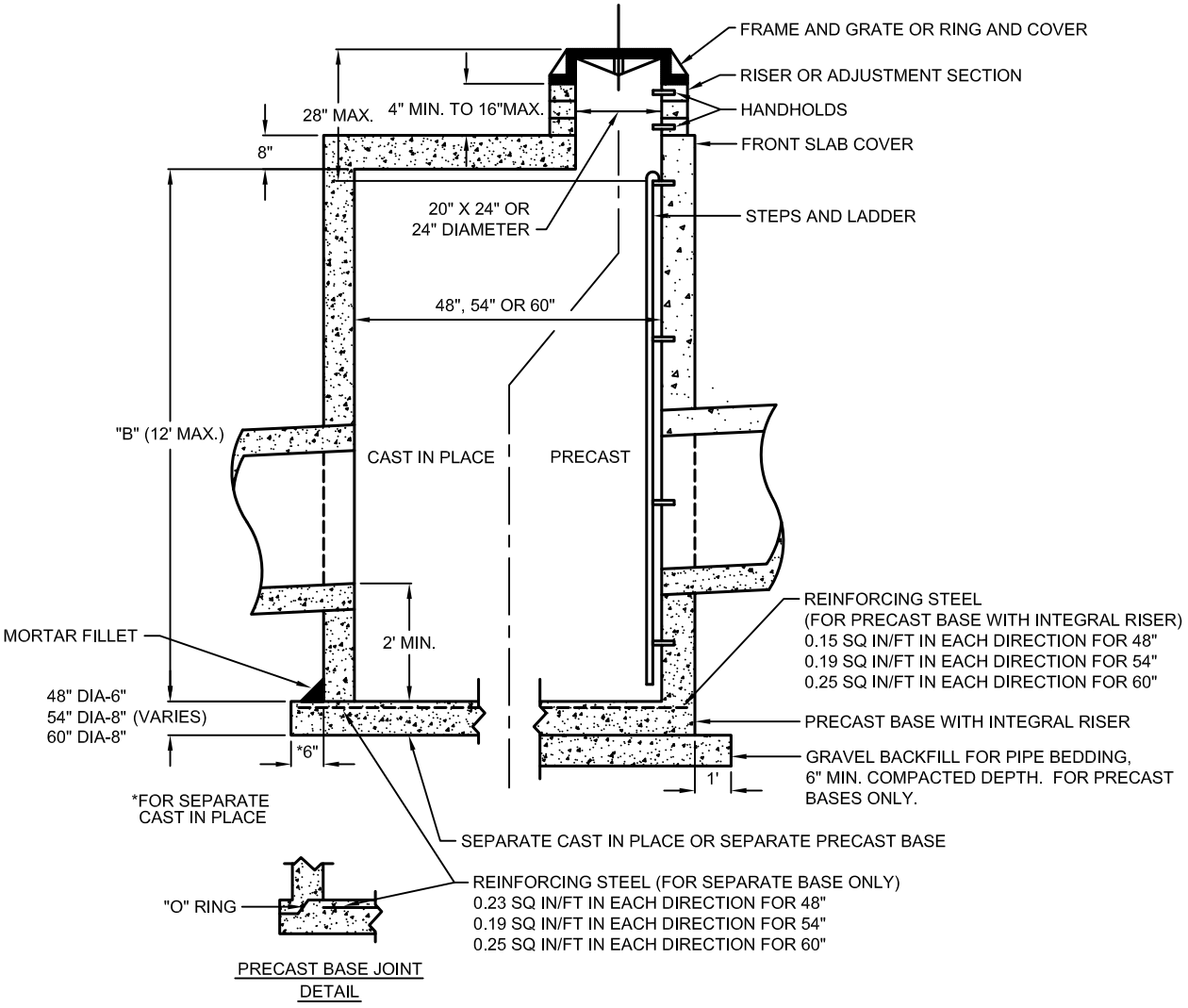
NOT TO SCALE

City of Tukwila

CATCH BASIN

TYPE 1

SHEET:	DS-01
REVISION #1:	08.03
APPROVAL:	B. SHELTON



NOTES:

1. HANDHOLDS IN RISER OR ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN CATCH BASIN SHALL HAVE 6" MIN. CLEARANCE. NO STEPS ARE REQUIRED WHEN "B" IS 4' OR LESS. REFER TO DS-10C AND DS-11 FOR STEPS AND LADDERS.

2. PRECAST BASES SHALL HAVE CUTOUTS OR KNOCKOUTS WITH A WALL THICKNESS OF 2" MIN. HOLE SIZE SHALL BE EQUAL TO PIPE OUTER DIAMETER PLUS CATCH BASIN WALL THICKNESS. MAXIMUM HOLE SIZE IS 36" FOR 48" CATCH BASIN, 42" FOR 54" CATCH BASIN, AND 48" FOR 60" CATCH BASIN. MINIMUM DISTANCE BETWEEN HOLES IS 8".

3. ALL BASE REINFORCING STEEL SHALL BE PLACED IN THE TOP HALF OF THE BASE, 1" MIN. CLEARANCE.

4. THE BOTTOM OF THE PRECAST CATCH BASIN MAY BE ROUNDED.

5. FRAME AND GRATE MAY BE INSTALLED WITH FLANGE DOWN OR CAST INTO RISER.

6. LOCATE STEPS AND LADDERS AWAY FROM OPENINGS AND CENTERED OVER THE MANHOLE. REFER TO DS-06 FOR VANED GRATE AND CATCH BASIN MARKINGS.

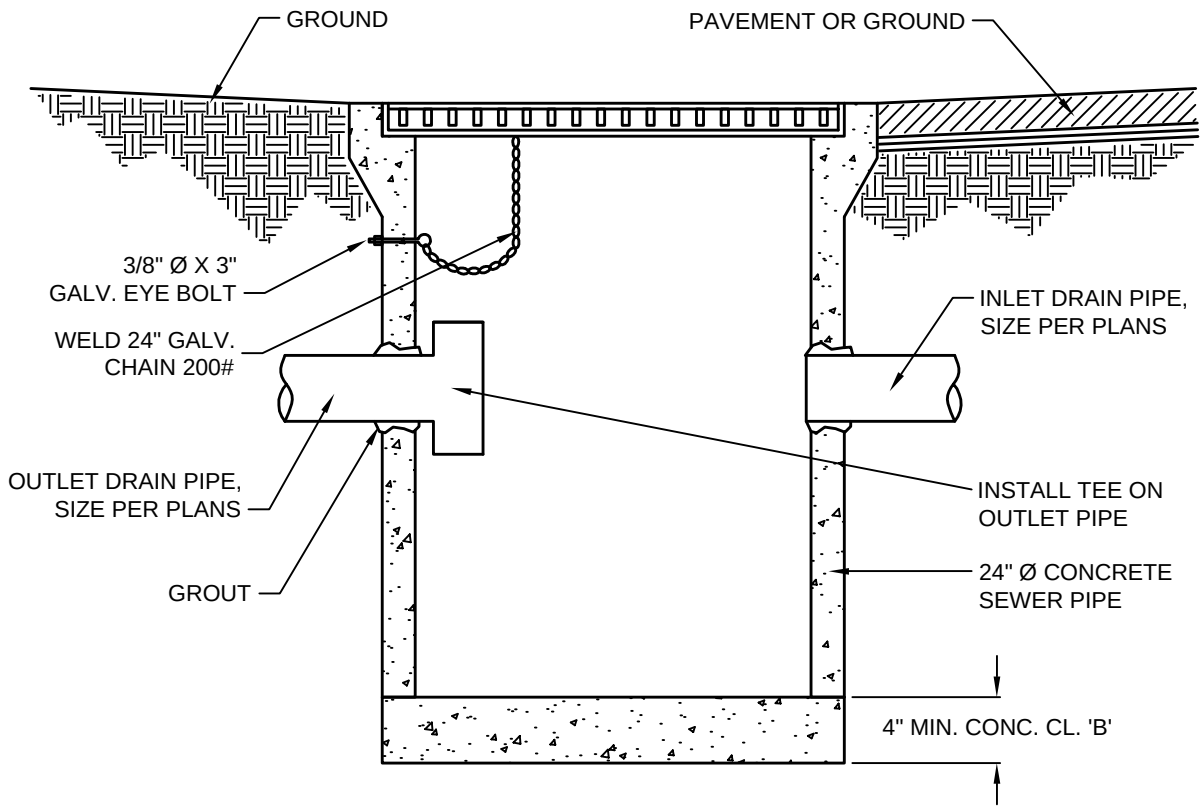
NOT TO SCALE

City of Tukwila

CATCH BASIN

TYPE 2 (48"/54"/60")

SHEET:	DS-02		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		



ELEVATION

NOTES:

1. FOR USE AS SMALL CATCH BASIN OR DISTRIBUTION BOX.
2. FOR USE IN NON-TRAFFIC AREA ON PRIVATE PROPERTY.
3. SOLID CONCRETE COVER WHEN USED AS A DISTRIBUTION BOX.
4. COMPACT SUBGRADE TO 90 % MODIFIED PROCTOR.
5. REFER TO DS-03 2 OF 2 FOR MATERIAL DIMENSION.

NOT TO SCALE

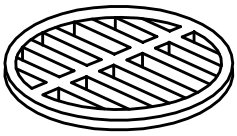
City of Tukwila

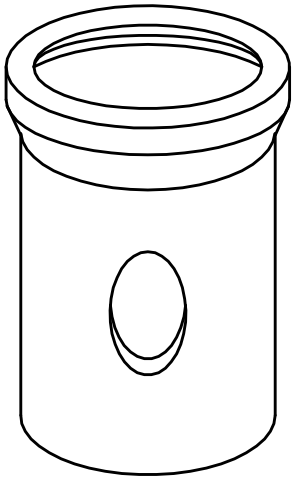
CATCH BASIN	
YARD DRAIN	
SHEET:	DS-03 1 OF 2
REVISION #1:	08.03
APPROVAL:	B. SHELTON

MATERIAL DIMENSIONS

WITH OR WITHOUT PERFORATION

INSIDE DIAMETER	12" T & G	18"	24"	24" T & G
DEPTH	36"	36"	36"	36" OR 48"
WALL THICKNESS	2"	2-1/2"	3-1/4"	3"
BELL O.D.	16"	27"	33"	30"
BELL I.D.	14"	22"	27-7/8"	27-1/2"
BELL DEPTH	1-3/8"	3-1/2"	3-1/2"	2"
GRATE DIAMETER	13-7/8"	21-7/8"	27-3/4"	27"
GRATE THICKNESS	1-7/16"	3-1/2"	3-1/2"	2"
APPROX. WEIGHT	300#	400#	975#	825#, 1100#





NOTES:

1. SET GRATE INTO BELL RECESS.

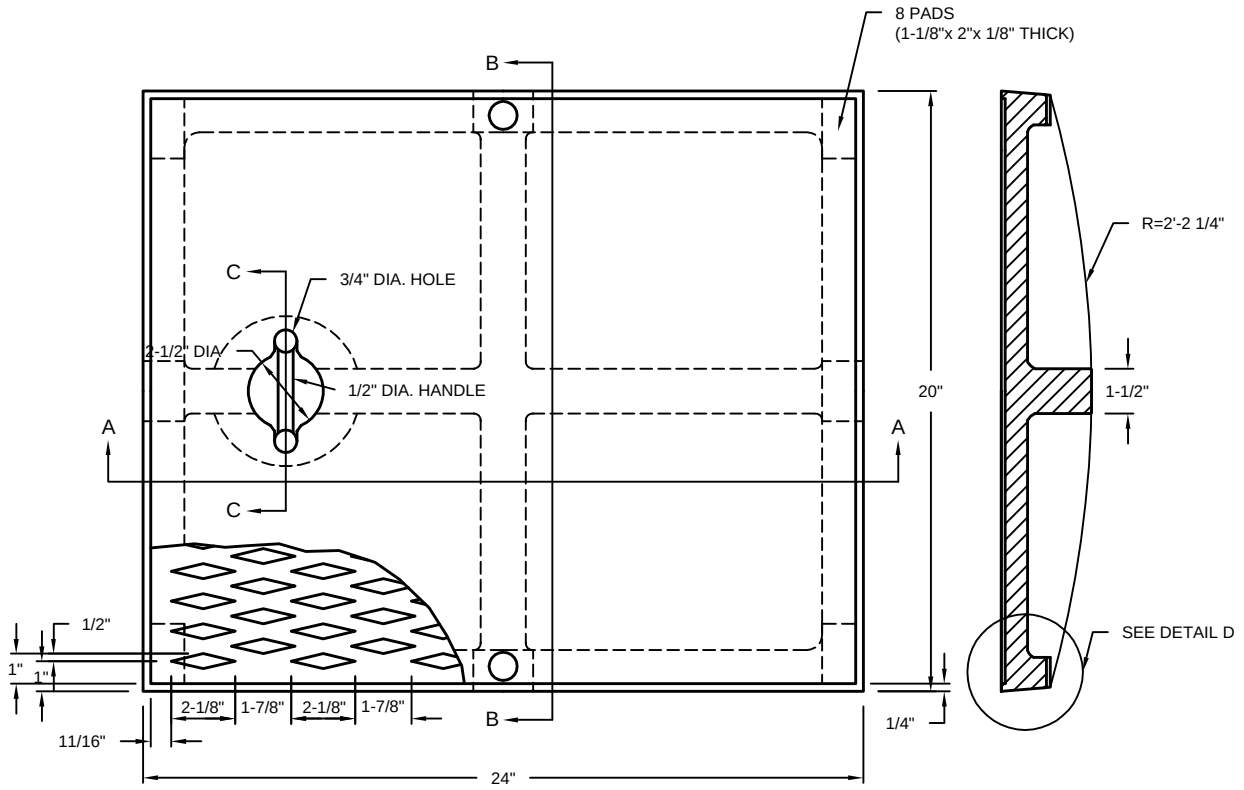
2. MAY REQUIRE A BASE SLAB.

3. FOR USE IN NON-TRAFFIC AREAS ON PRIVATE PROPERTY.

NOT TO SCALE

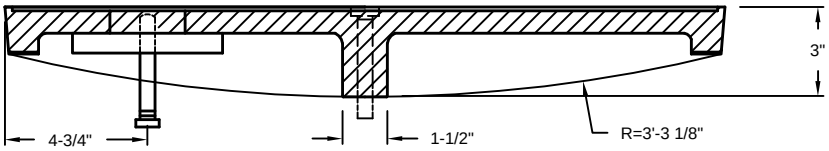
City of Tukwila

CATCH BASIN	
YARD DRAIN	
SHEET:	**DS-03 2 OF 2**
REVISION #1:	**08.03**
APPROVAL:	**B. SHELTON**

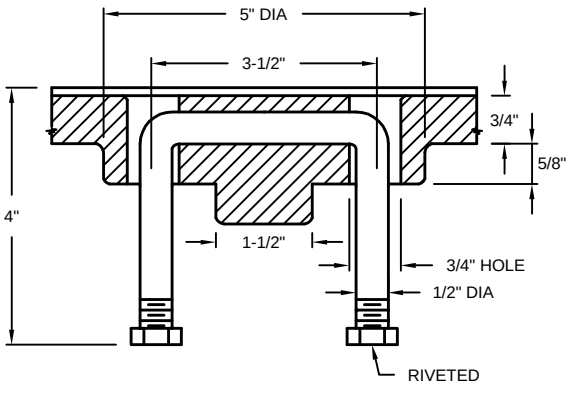


PLAN

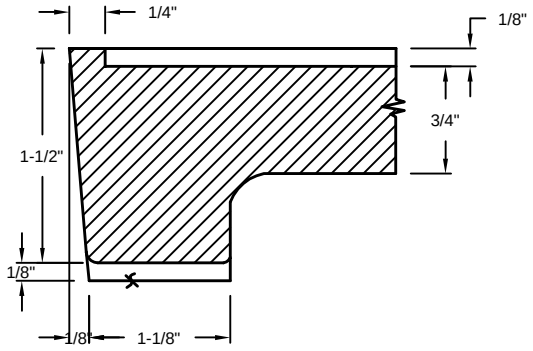
SECTION B-B



SECTION A-A



DETAIL OF HANDLE
SECTION C-C



DETAIL D

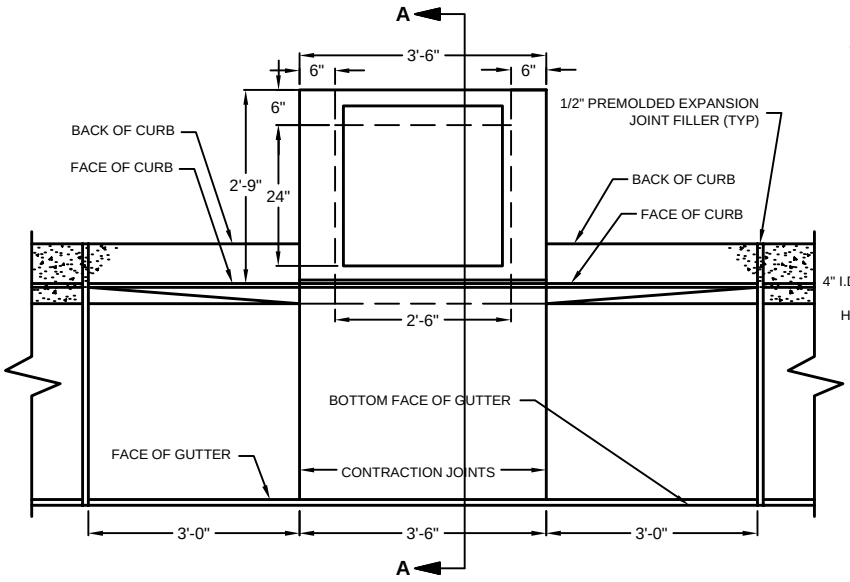
NOT TO SCALE

City of Tukwila

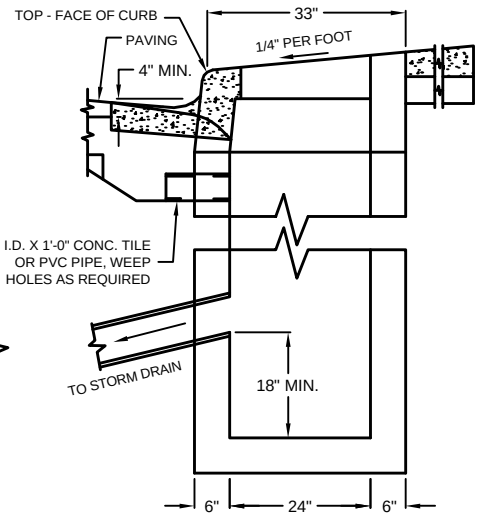
CATCH BASIN

SOLID METAL COVER

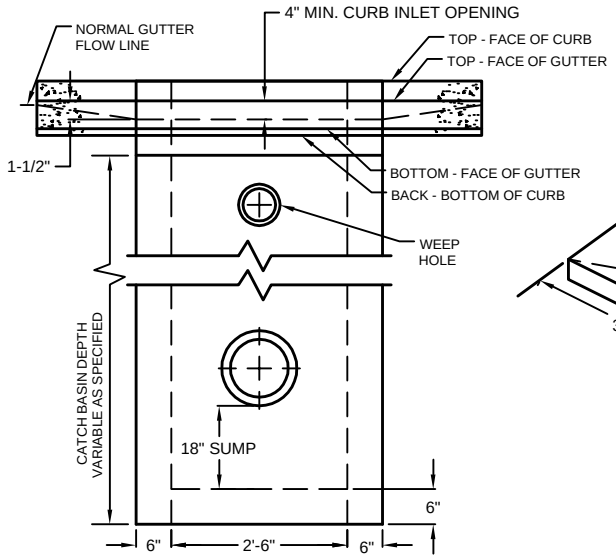
SHEET:	DS-04
REVISION #1:	08.03
APPROVAL:	B. SHELTON



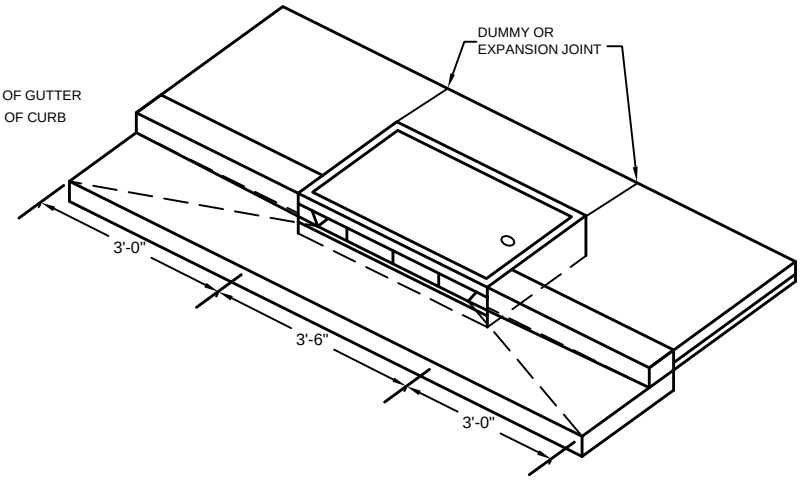
PLAN VIEW



SECTION A-A



FRONT VIEW



PERSPECTIVE VIEW SHOWING DEPRESSED GUTTER AT CURB INLET

NOTES:

1. USE FOR GRADES GREATER THAN 10 % WITH PREAPPROVAL BY THE DIRECTOR.
2. ALL FABRICATED METAL PARTS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION.
3. CONCRETE SHALL ATTAIN A MIN. COMPRESSIVE STRENGTH OF 3000 PSI IN 28 DAYS.
4. INSTALL STEPS WHEN DISTANCE FROM TOP OF GRATE TO FLOWLINE OF PIPE IS GREATER THAN 3.5 FEET.
5. PRECAST CURB INLET IS PATTERNED AFTER WALT'S CONCRETE SPRINGFIELD, OR CONCRETE CURB INLET PAT. NO. 4000953.
6. REFER TO DS-06 FOR CATCH BASIN MARKING.

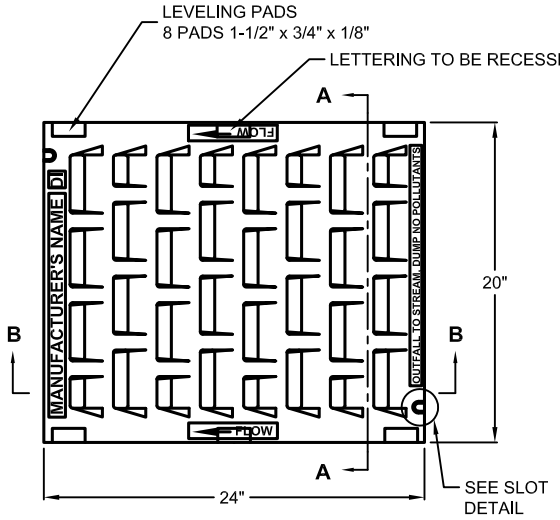
NOT TO SCALE

City of Tukwila

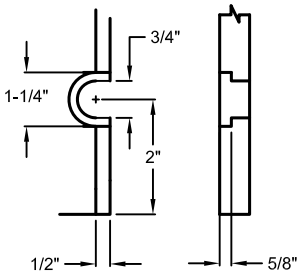
CATCH BASIN

CURB INLET

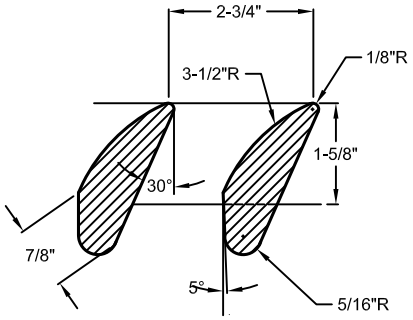
SHEET:	DS-05
REVISION #1:	08.03
APPROVAL:	B. SHELTON



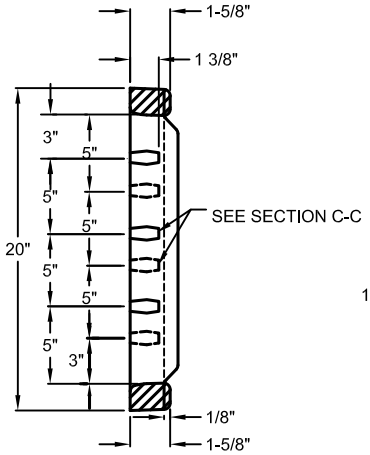
TOP VIEW



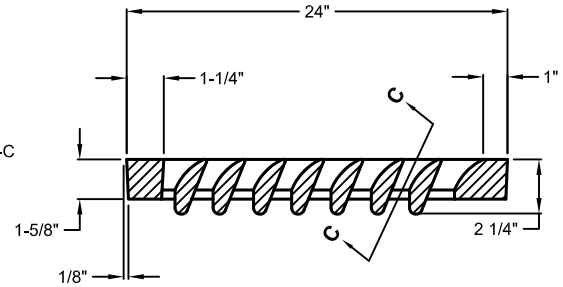
SLOT DETAIL
LOCKING LID



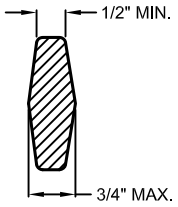
VANE DETAIL



SECTION A-A



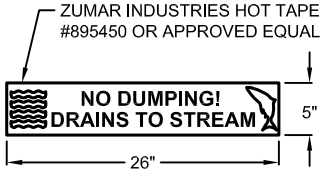
SECTION B-B



SECTION C-C

NOTES:

1. WELDING IS NOT PERMITTED.
2. DIMENSIONS SHALL HAVE A ±1/16" TOLERANCE.
3. EDGES SHALL HAVE 1/8" RADIUS AND 1/8" CHAMFER OR COMPLETE DEBURRING.
4. THE NAME OF THE MANUFACTURER AND DIRECTION OF FLOW SHALL BE EMBOSSED ON THE TOP SURFACE OF EACH GRATE. LETTERING TO BE RECESSED 1/16".
5. EMBOSS GRATE WITH MATERIAL TYPE, DI (FOR DUCTILE IRON) OR CS (FOR CAST STEEL), NEAR THE NAME OF THE MANUFACTURER.
6. THERMOPLASTIC CATCH BASIN MARKING TO BE INSTALLED WITH ALL NEW OR ADJUSTED CATCH BASINS, EXCEPT THOSE WITH SOLID LIDS.
7. PLACE CATCH BASIN MARKING, "OUTFALL TO STREAM, DUMP NO POLLUTANTS", ON THE SURFACE OF EACH GRATE, PREFERABLY LOCATED IN THE BORDER AREA.
8. LOCKING LID REQUIRED.



CATCH BASIN MARKING

NOT TO SCALE

City of Tukwila

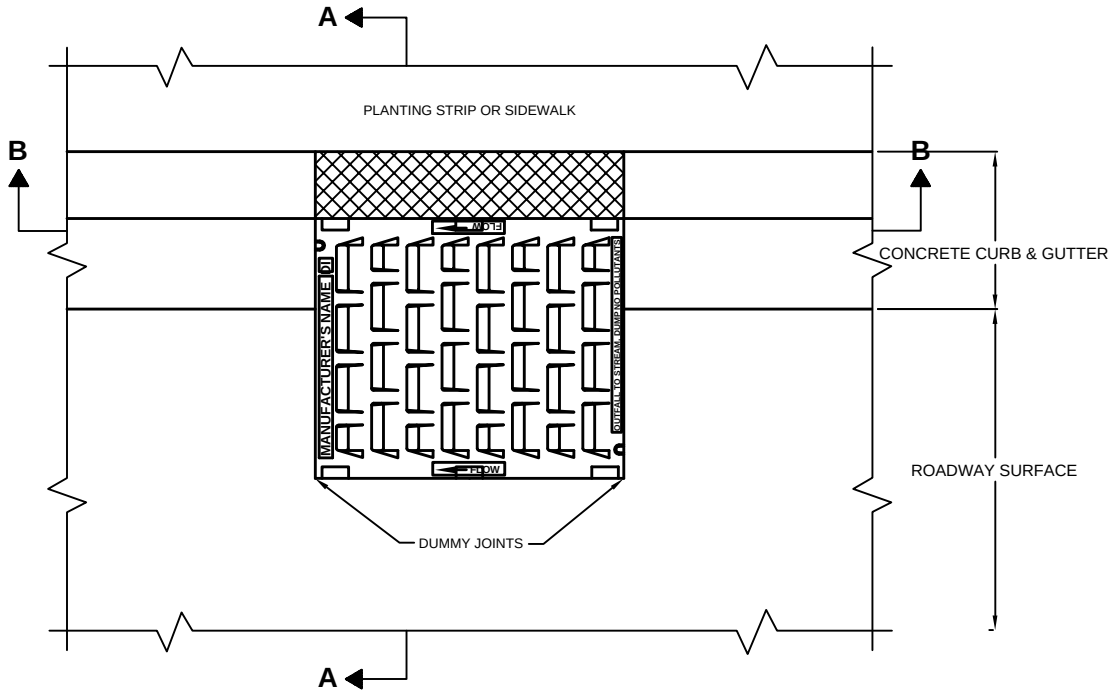
CATCH BASIN & INLET			
VANED GRATE			
SHEET:	DS-06		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		

NOT AVAILABLE

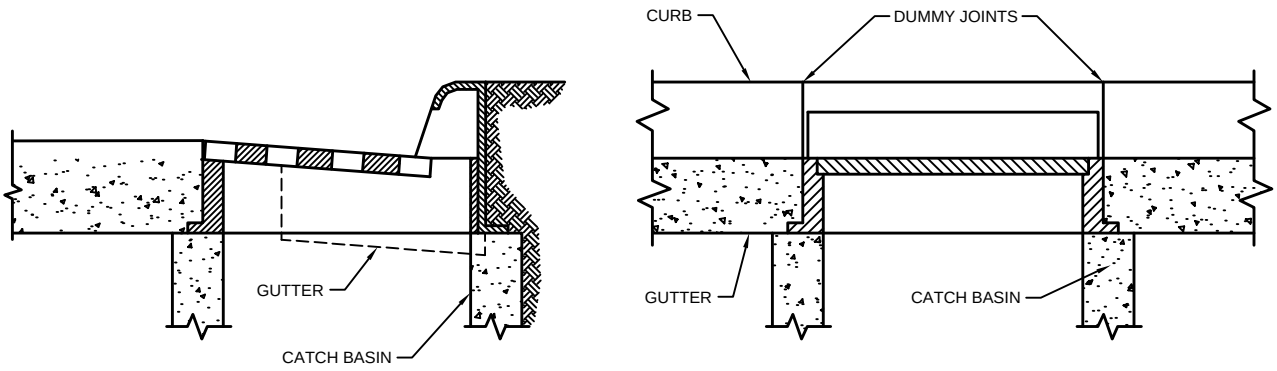
NOT TO SCALE

City of Tukwila

SHEET:	DS-07
REVISION #1:	
APPROVAL:	



PLAN



SECTION A-A **SECTION B-B**

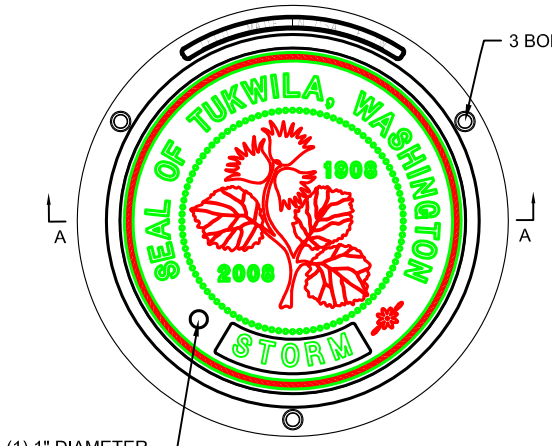
NOTES:

1. SET TO GRADE AND CONSTRUCT ROAD AND GUTTER FLUSH WITH FRAME.
2. INSTALL VANED GRATE PER DS-06.
3. USE CATCH BASIN MARKING PER DS-06.

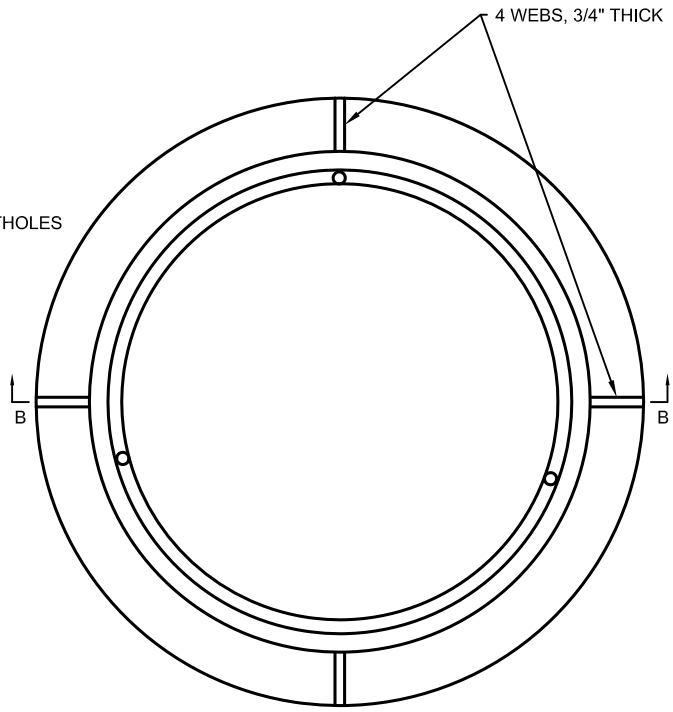
NOT TO SCALE

City of Tukwila

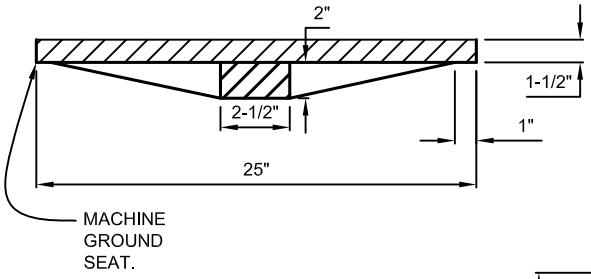
INLET	
THROUGH CURB	
SHEET:	DS-08
REVISION #1:	08.03
APPROVAL:	B. SHELTON



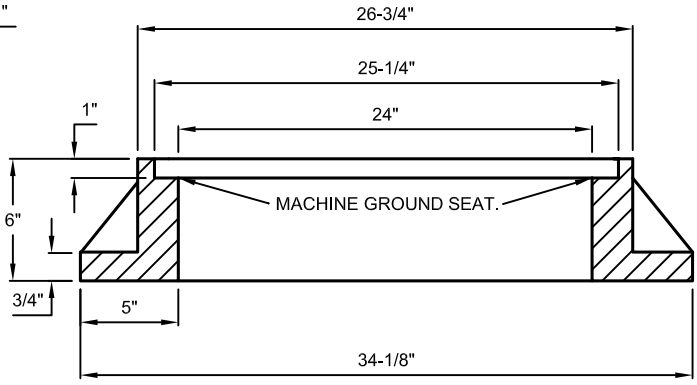
COVER PLAN



FRAME PLAN



SECTION A-A
GRAY IRON LOCKING COVER



SECTION B-B
GRAY IRON FRAME

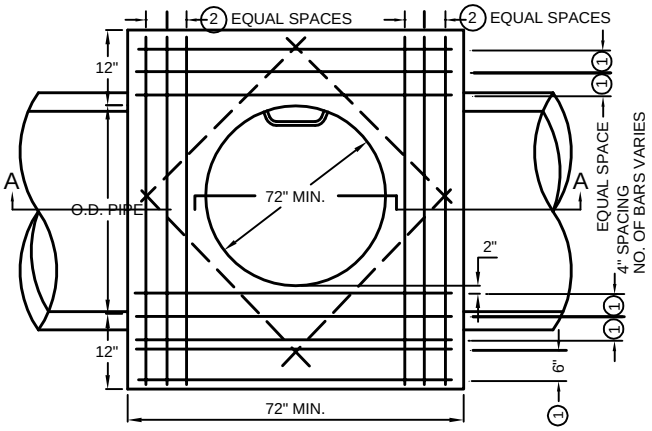
NOTES:

1. FRAME TO BE GROUTED
2. COVER TO BE EJIW CATALOG NUMBER 3717C1PT, AND PRODUCT NUMBER NCR07-2775A, WITH THE SEAL OF TUKWILA, AND LEGENDS 1908, 2008, AND STORM.
3. FRAME TO BE EJIW CATALOG NUMBER 3705CPT, OR EQUAL.
4. INSTALL SO THAT BOLT HOLES ALIGN WITH CENTER OF LADDER.

NOT TO SCALE

City of Tukwila

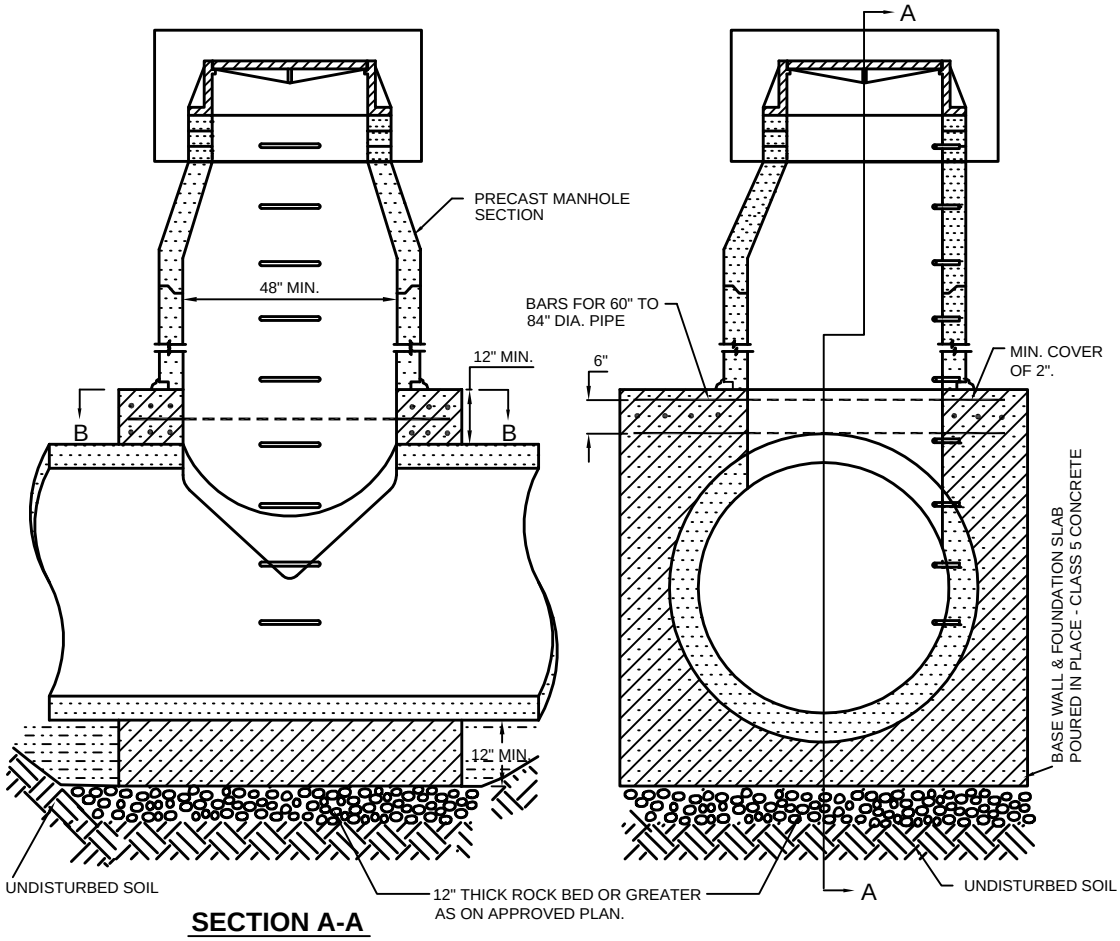
STORM MANHOLE		
24" FRAME WITH COVER		
SHEET:	DS-09	
REVISION #1: 08.03		LAST REVISION: 03.08
APPROVAL:	B. GIBERSON	



SECTION B-B

BAR LIST

	PIPE DIA.	NO.	SIZE	LENGTH
1	LONGITUDINAL BARS			
	42"	6	5	4'-8"
	48"	7	"	"
	54"	8	"	"
	60"	10	"	"
	66"	11	"	"
	72"	12	"	"
	78"	14	"	"
	84"	16	"	"
2	TRANSVERSE BARS			
	42"	6	5	2'-8"+O.D.
	48"	6	6	"
	54"	6	6	"
	60"	12	5	"
	66"	12	5	"
	72"	12	6	"
	78"	12	6	"
	84"	12	6	"
3	DIAGONAL BARS			
	42"-84"	4	5	3'-8"



SECTION A-A

NOTES:

1. REFER TO TYPICAL DETAIL DS-10B FOR ACCESS AND CATCH.
2. REFER TO TYPICAL DETAIL DS-10C FOR STEP DETAIL.
3. REFER TO TYPICAL DETAIL DS-11 FOR LADDER DETAIL.

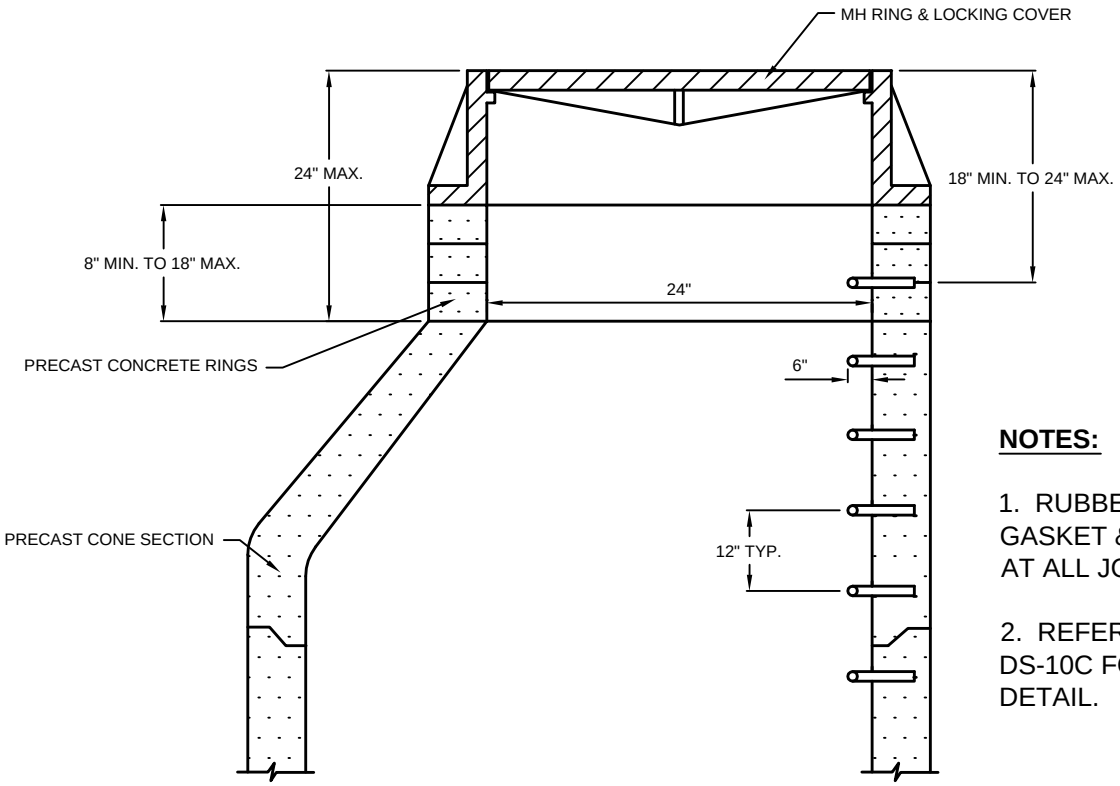
NOT TO SCALE

City of Tukwila

MANHOLE

TYPE IV WITH MONOLITHIC BASE

SHEET:	DS-10A
REVISION #1:	08.03
APPROVAL:	B. SHELTON

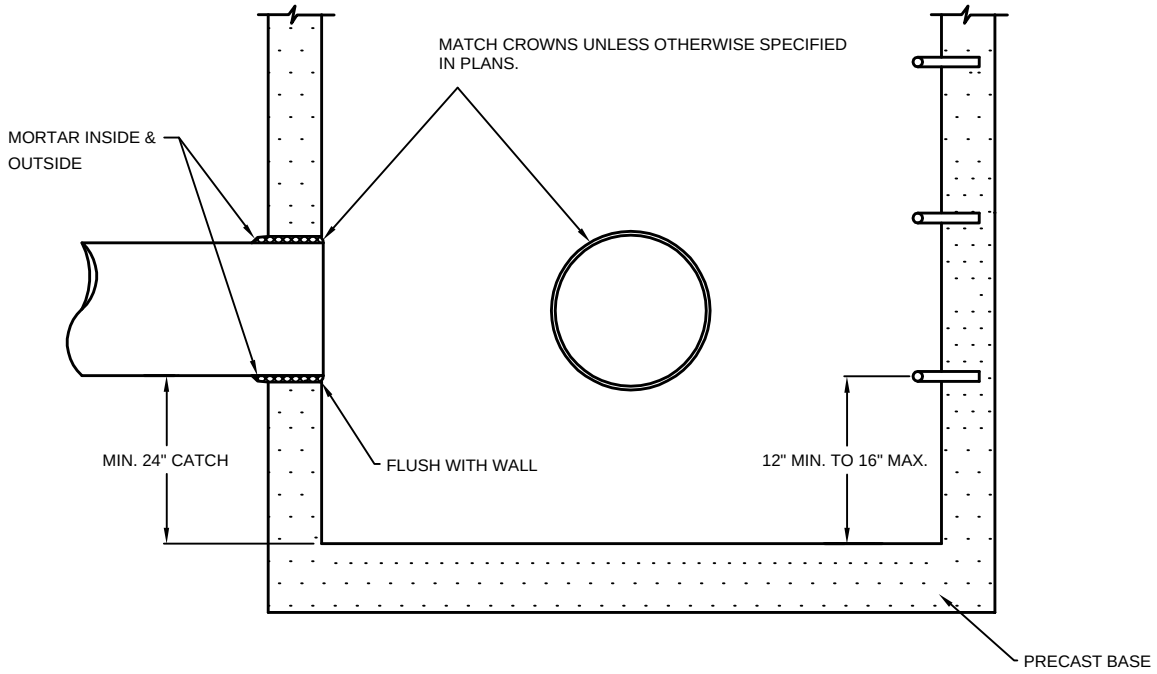


NOTES:

1. RUBBER GASKET & GROUT AT ALL JOINTS.

2. REFER TO DS-10C FOR STEP DETAIL.

ACCESS DETAIL



CATCH DETAIL

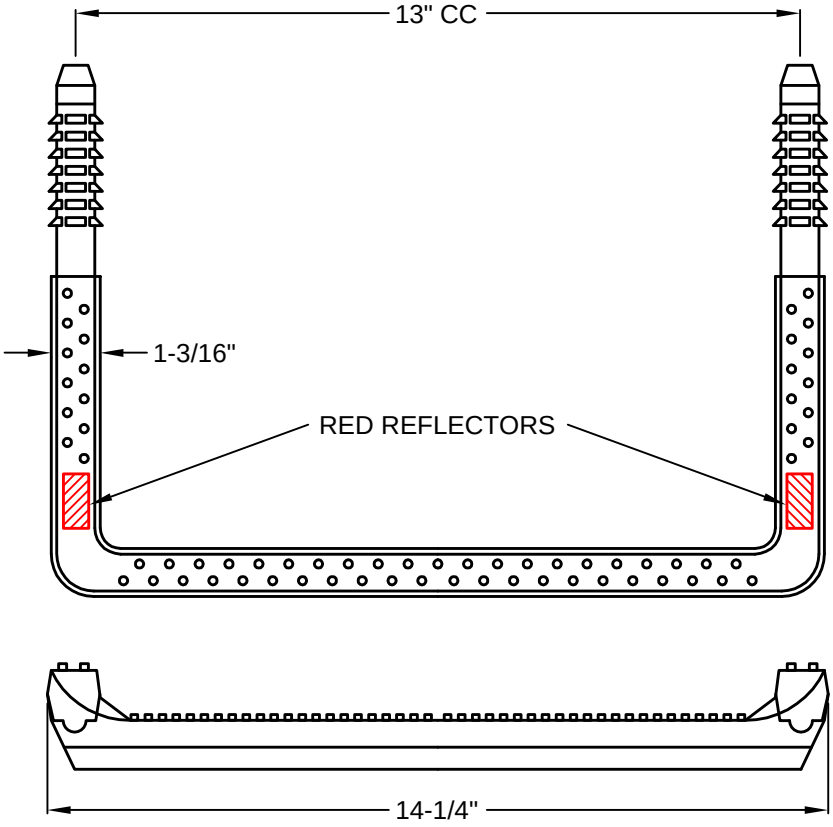
NOT TO SCALE

City of Tukwila

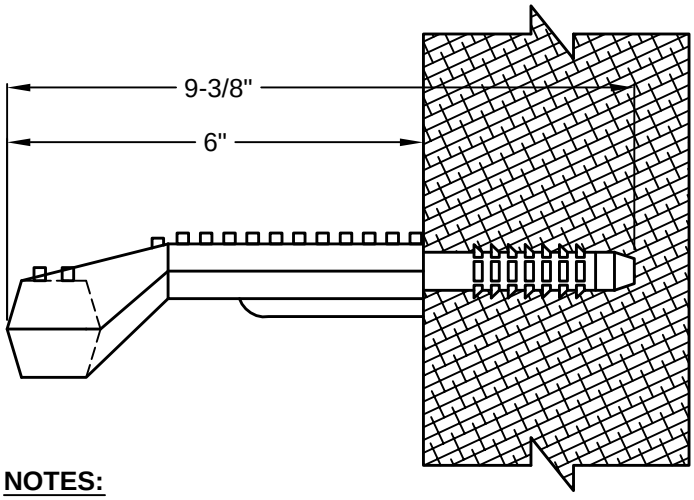
MANHOLE

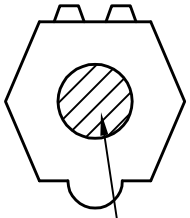
ACCESS AND CATCH

SHEET:	DS-10B
REVISION #1:	08.03
APPROVAL:	B. SHELTON



PLAN





CUT OUT

NOTES:

1. LANE P-13938 OR APPROVED EQUAL.

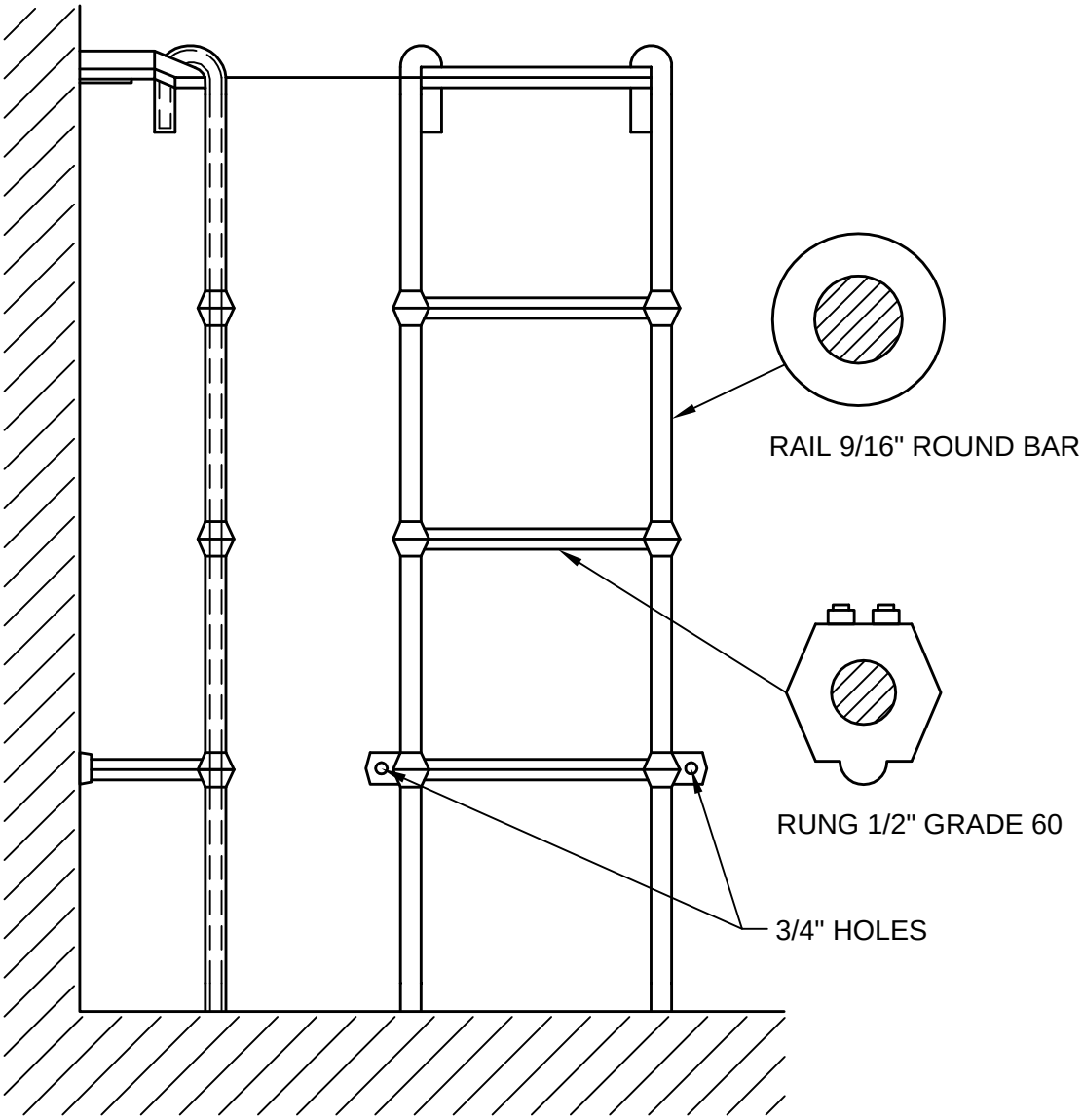
NOT TO SCALE

City of Tukwila

MANHOLE

POLYPROPYLENE SAFETY STEP

SHEET:	DS-10C
REVISION #1:	08.03
APPROVAL:	B. SHELTON



POLYPROPYLENE HANGING LADDER

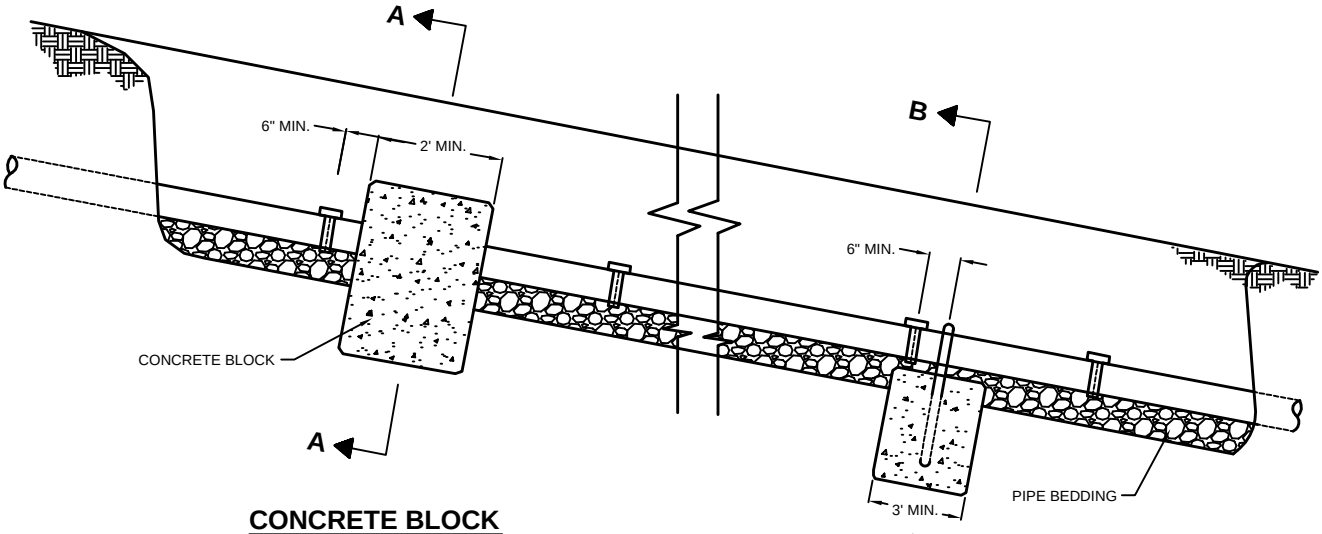
NOTES:

1. POLYPROPYLENE ASTM D4101
2. 1/2" GRADE 60 REINFORCING BAR A615
3. 9/16" COLD DRAWN BAR C1018
4. PATENT PENDING - LANE POLY STEPS
5. 3/8" DIA. BOLT 316-SS, 3-1/2" LONG
6. 316-SS TYP AT LADDER MOUNTS
6. REFER TO DS-10C FOR STEP DETAIL

NOT TO SCALE

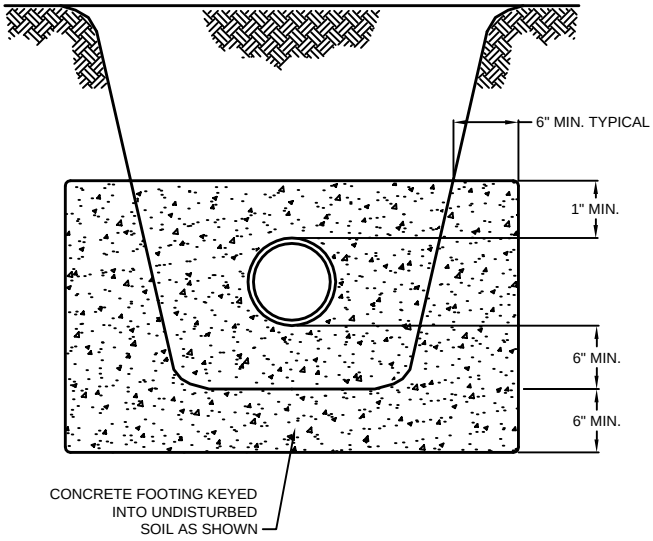
City of Tukwila

MANHOLE	
LADDER	
SHEET:	DS-11
REVISION #1:	08.03
APPROVAL:	B. SHELTON

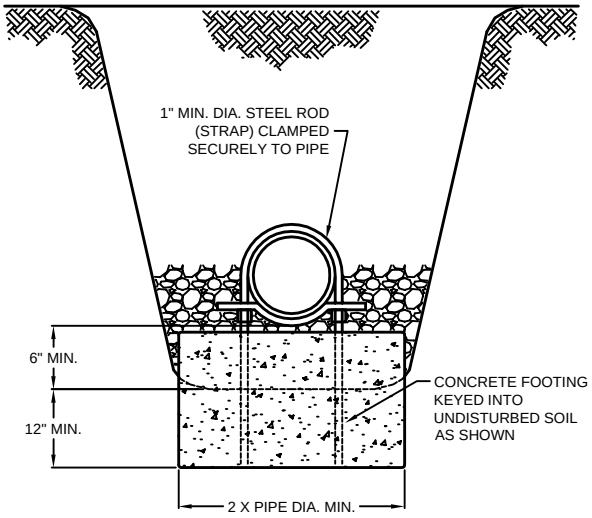


CONCRETE BLOCK ANCHOR

STRAP-FOOTING ANCHOR



SECTION A-A
NTS



SECTION B-B
NTS

NOTES:

1. FOR HDPE (AKA SOLID WALL POLYETHYLENE PIPE), PIPE MUST BE FREE TO SLIDE INSIDE A 4' LONG SECTION OF PIPE ONE SIZE DIAMETER LARGER.

2. FOR APPLICATIONS OTHER THAN DETENTION TANKS, CHANGE PIPE SIZE ONLY AT JUNCTIONS AND STRUCTURES.

3. USE CLASS 3000 CONCRETE.

NOT TO SCALE

City of Tukwila

PIPE ANCHOR

SHEET:	DS-12 1 OF 2
REVISION #1:	08.03
APPROVAL:	B. SHELTON

MAXIMUM PIPE SLOPES AND VELOCITIES

PIPE MATERIAL	PIPE SLOPE (ABOVE WHICH PIPE ANCHORS REQUIRED AND MINIMUM ANCHOR SPACING	MAXIMUM SLOPE ALLOWED	MAXIMUM VELOCITY AT FULL FLOW
CMP, SPIRAL RIB, PVC, CPE (*1)	20 % (1 ANCHOR PER 100 LF OF PIPE)	30 % (*3)	30 FPS
CONCRETE OR LCPE (*1)	10 % (1 ANCHOR PER 50 LF OF PIPE)	20 % (*3)	30 FPS
DUCTILE IRON (*2)	20 % (1 ANCHOR PER PIPE SECTION)	N/A	N/A
SWPE (*2) (HDPE)	20 % (1 ANCHOR PER 100 LF OF PIPE, CROSS-SLOPE INSTALLATIONS ONLY)	N/A	N/A

NOTES:

*1. THESE MATERIALS ARE NOT ALLOWED IN LANDSLIDE HAZARD AREAS.

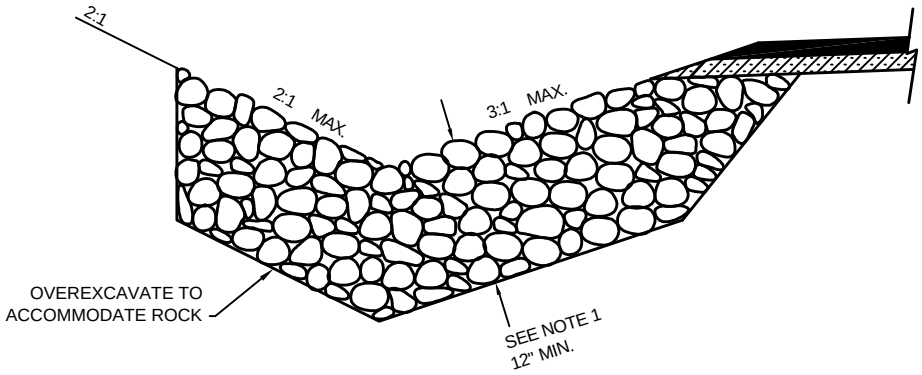
*2. BUTT FUSED OR FLANGED PIPE JOINTS ARE REQUIRED; ABOVE GROUND INSTALLATION IS RECOMMENDED ON SLOPES.

*3. A MAXIMUM SLOPE OF 200 % IS ALLOWED FOR THESE PIPE MATERIALS WITH NO JOINTS (ONE SECTION), WITH STRUCTURES AT EACH END, AND WITH PROPER GROUTING.

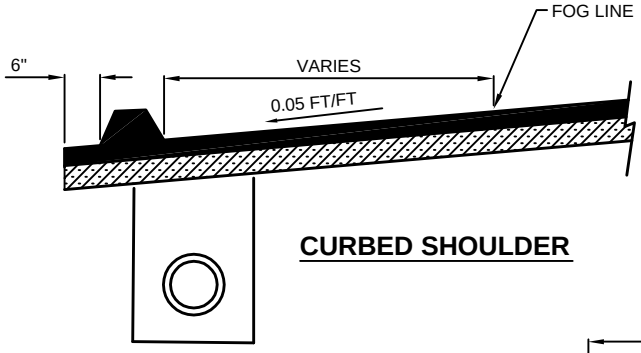
NOT TO SCALE

City of Tukwila

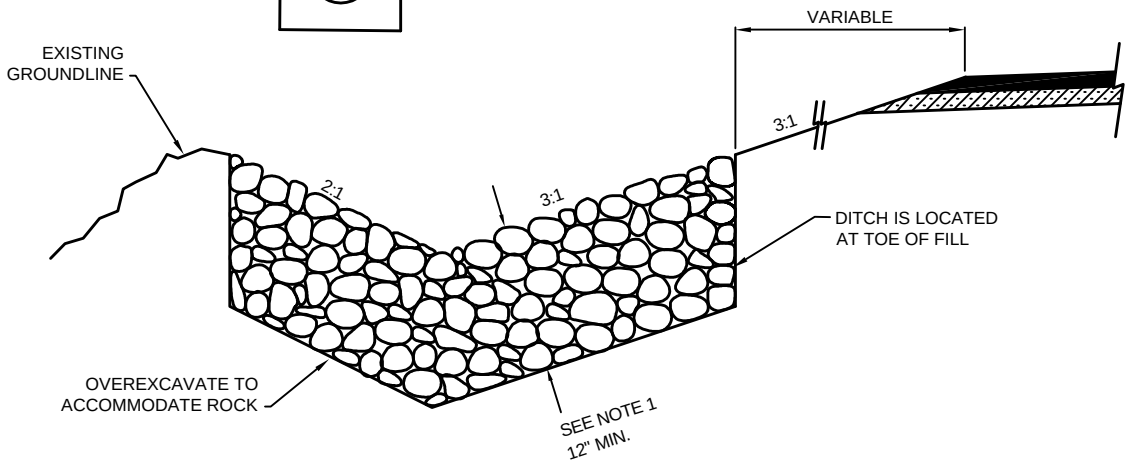
PIPE ANCHOR	
SHEET:	DS-12 2 OF 2
REVISION #1:	08.03
APPROVAL:	B. SHELTON



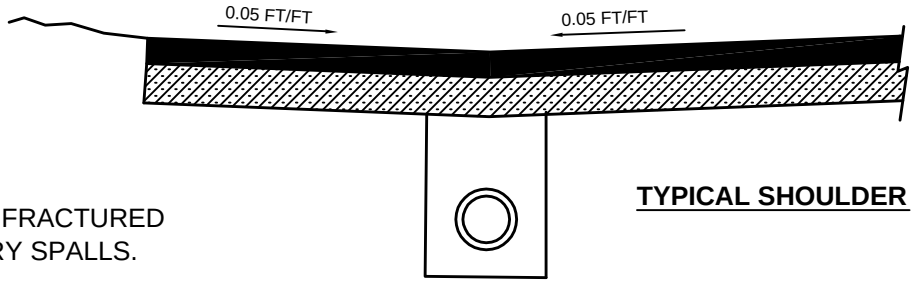
ROCK-LINED SHOULDER DITCH IN CUT SECTION



CURBED SHOULDER



ROCK-LINED SHOULDER DITCH IN FILL SECTION



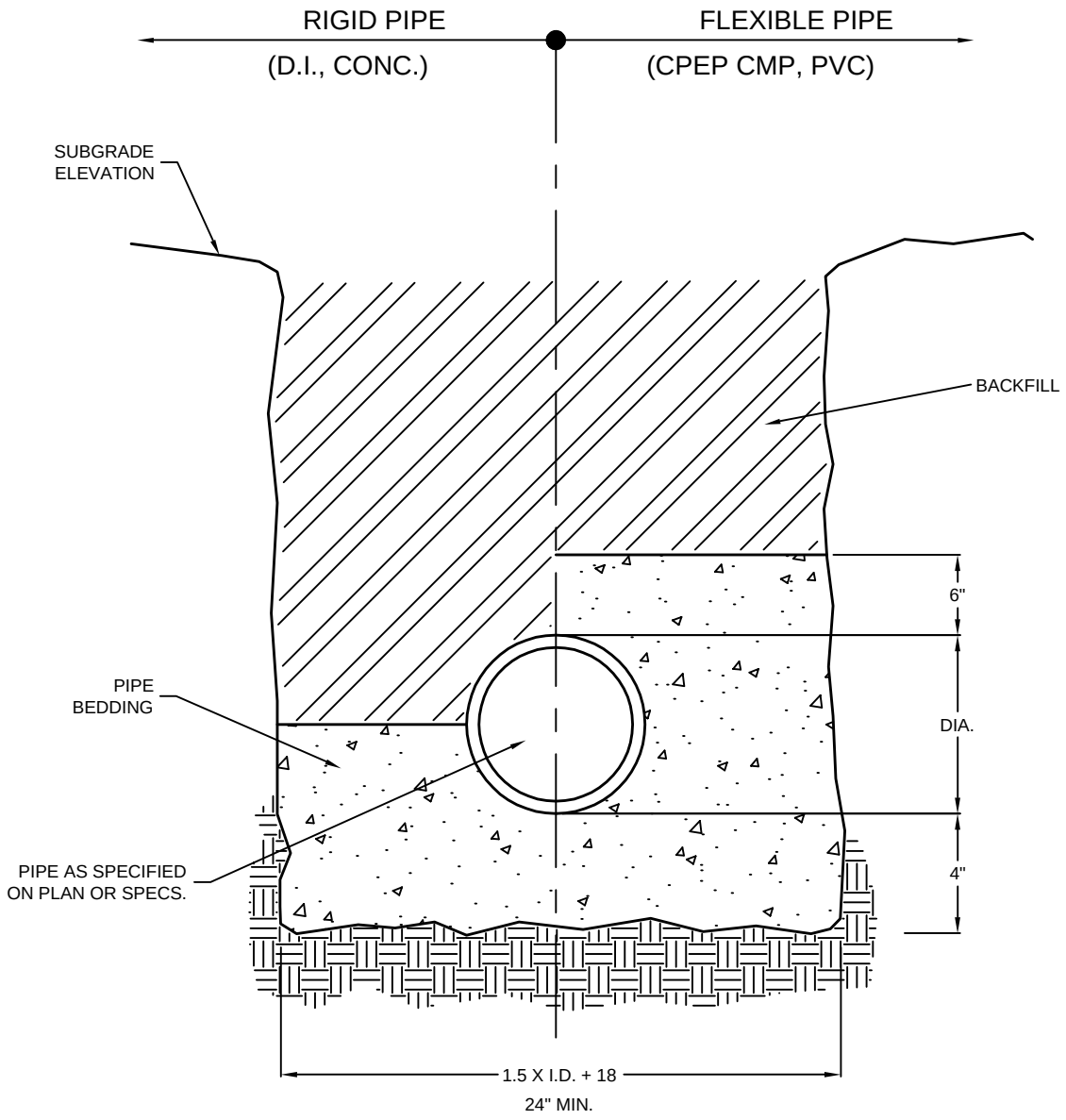
TYPICAL SHOULDER

1. 4"-6" FRACTURED QUARRY SPALLS.

NOT TO SCALE

City of Tukwila

DITCH	
SHOULDERS	
SHEET:	DS-13
REVISION #1:	08.03
APPROVAL:	B. SHELTON



NOTES:

1. IN PAVED AREAS AND RIGHTS-OF-WAY, BACKFILL WITH ⅝" MINUS CRUSHED ROCK TOP COURSE, COMPACTED IN MAXIMUM 6" LIFTS, TO 90 % MODIFIED PROCTOR PER ASTM D-1557.

2. IN UNPAVED AREAS BACKFILL WITH NATIVE MATERIALS OR GRAVEL AND COMPACT IN MAXIMUM 12" LIFTS TO 90 % PER ASTM D-1557.

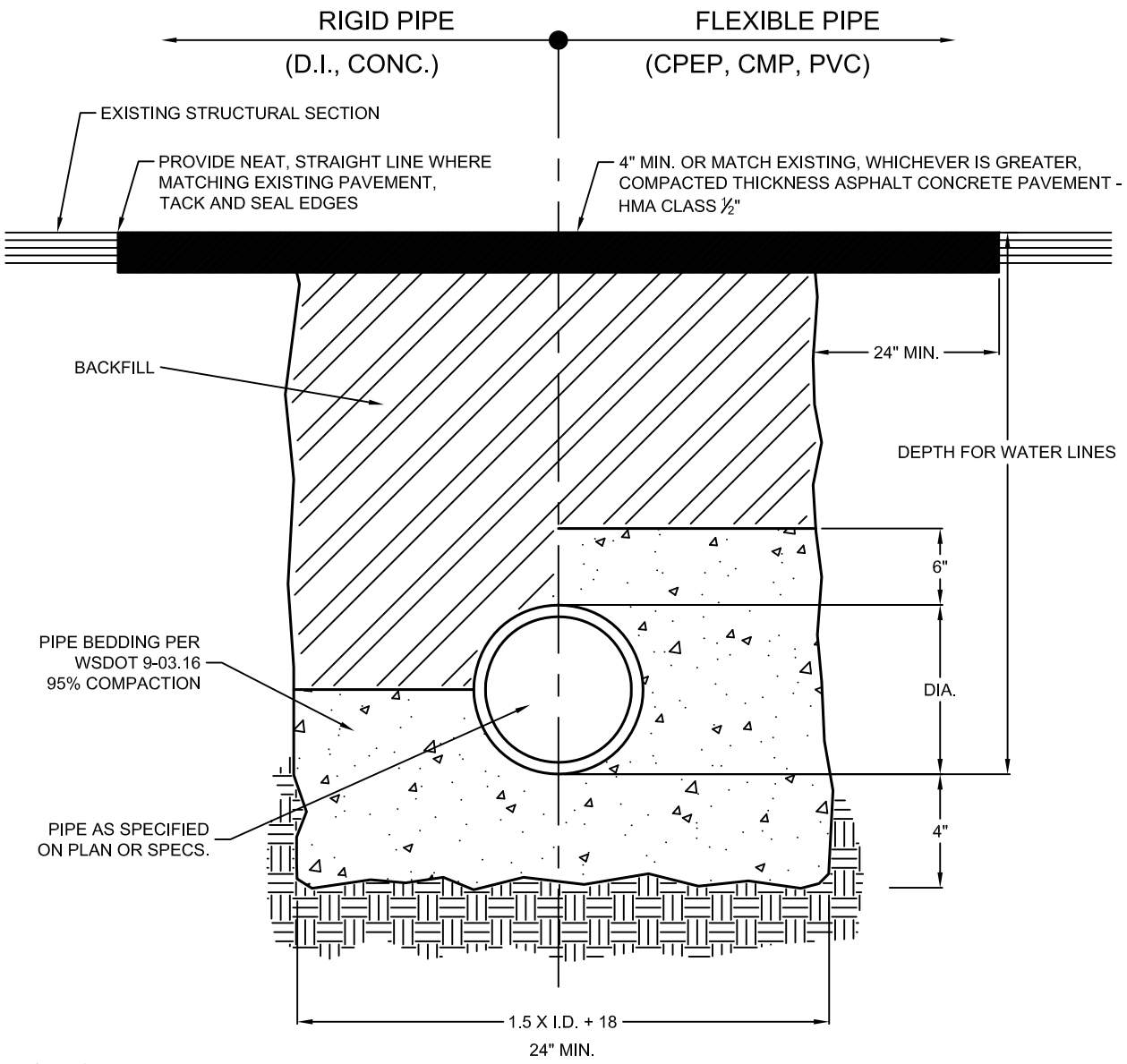
3. NATIVE BACKFILL MATERIAL AT UNPAVED AREAS SHALL NOT HAVE PARTICLE SIZE GREATER THAN 1" WITHIN 6" OF THE PIPE EXTERIOR.

4. COMPACT PIPE ⅝" CRUSHED ROCK BEDDING TO 90 % MODIFED PROCTOR PER ASTM D-1557.

NOT TO SCALE

City of Tukwila

TRENCH	
BEDDING AND BACKFILL	
SHEET:	**DS-14A**
REVISION #1:	**08.03**
APPROVAL:	**B. SHELTON**



NOTES:

1. IN PAVED AREAS AND RIGHTS-OF-WAY, BACKFILL WITH ⅝" MINUS CRUSHED ROCK TOP COURSE, COMPACTED IN MAXIMUM 6" LIFTS, TO 90% MODIFIED PROCTOR PER ASTM D-1557.

2. IN UNPAVED AREAS BACKFILL WITH NATIVE MATERIALS OR GRAVEL AND COMPACT IN MAXIMUM 12" LIFTS TO 90% PER ASTM D-1557.

3. NATIVE BACKFILL MATERIAL AT UNPAVED AREAS SHALL NOT HAVE PARTICLE SIZE GREATER THAN 1" WITHIN 6" OF THE PIPE EXTERIOR.

4. COMPACT PIPE ⅝" CRUSHED ROCK BEDDING TO 90% MODIFED PROCTOR PER ASTM D-1557.

5. WRAP FITTING IN PLASTIC BEFORE USING CONTROLLED DENSITY FILL (CDF).

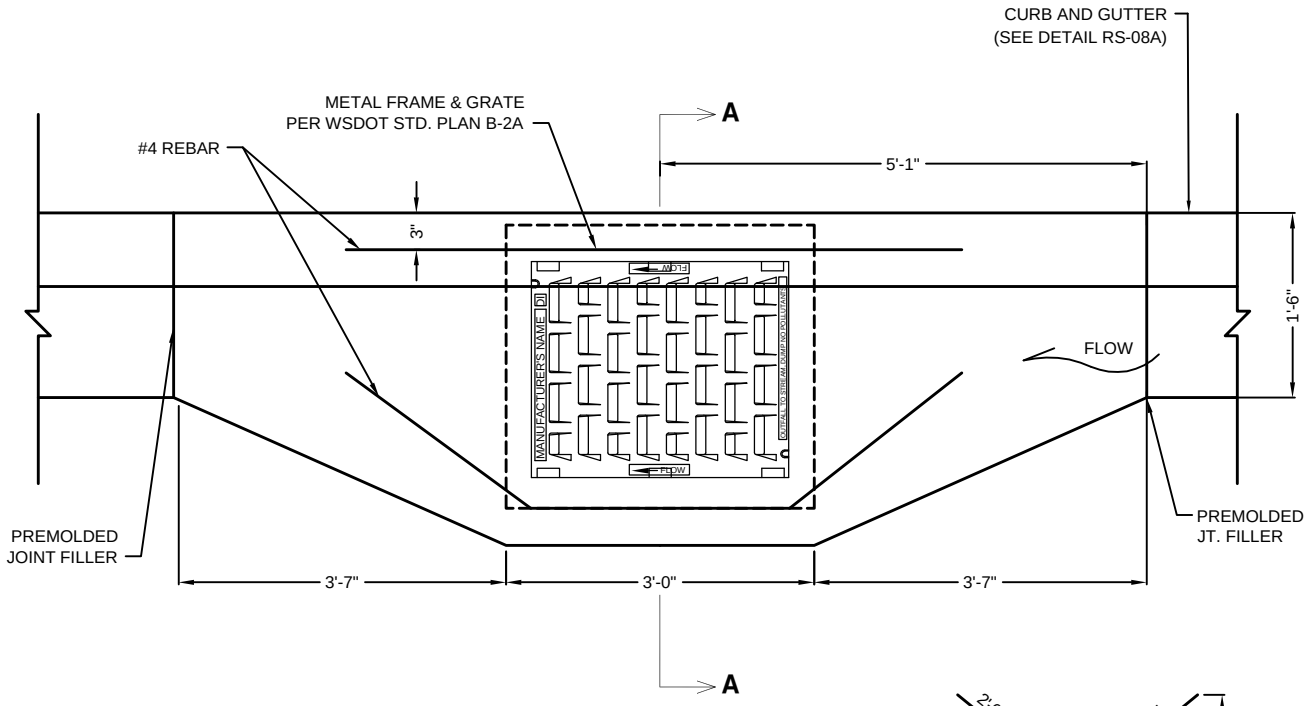
NOT TO SCALE

City of Tukwila

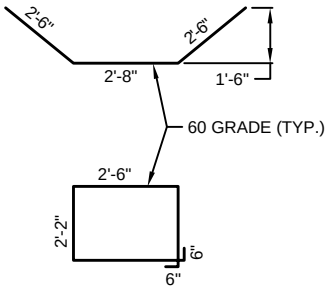
TRENCH

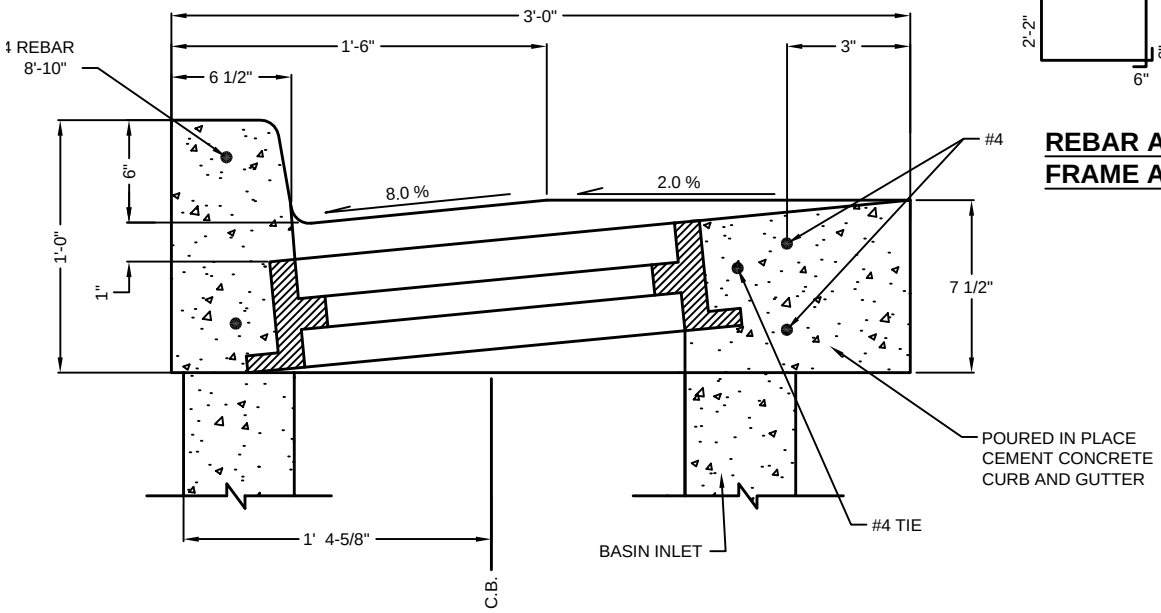
BEDDING AND BACKFILL - PAVEMENT RESTORATION

SHEET:	DS-14B		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		



INLET DETAIL





REBAR AROUND FRAME AND GRATE

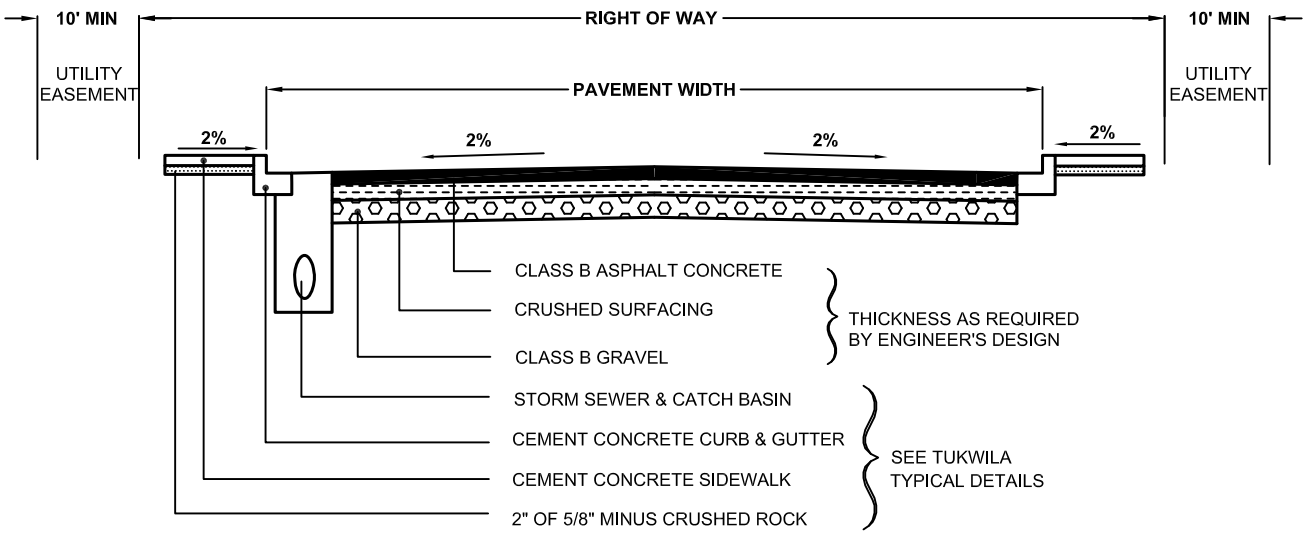
SECTION A-A

1. REFER TO DS-06 FOR CATCH BASIN MARKING.

NOT TO SCALE

City of Tukwila

CURB AND GUTTER	
CATCH BASIN SURROUND	
SHEET:	DS-15
REVISION #1:	08.03
APPROVAL:	B. SHELTON



TYPE 0F STREET	RIGHT-OF-WAY (FEET)	PAVEMENT WIDTH (FEET)
PUBLIC		
ARTERIAL		
PRINCIPAL	80-100	48-84
MINOR	60-80	36-64
COLLECTOR		
COMMERCIAL	60	48
RESIDENTIAL	60	28-36
ACCESS		
COMMERCIAL	60	36
RESIDENTIAL	50	28
ALLEY	20	15
CUL-DE-SAC		
ROADWAY	40	28
TURNAROUND	92 (DIA)	81 (DIA)
PRIVATE		
COMMERCIAL	40	28
RESIDENTIAL	20	20

NOTES:

1. ALL SPECIFICATIONS SHALL MEET CURRENT WSDOT/APWA "STANDARD SPECIFICATIONS FOR ROADS, BRIDGE, AND MUNICIPAL CONSTRUCTION".

2. SEE DETAIL RS-11 FOR THE SIDEWALK WIDTH.

3. STREET CLASSIFICATIONS ARE DESIGNATED BY ORDINANCE.

4. PAVEMENT SECTION MUST BE DESIGNED PER AASHTO FOR A MINIMUM OF HS20 LOADING.

NOT TO SCALE

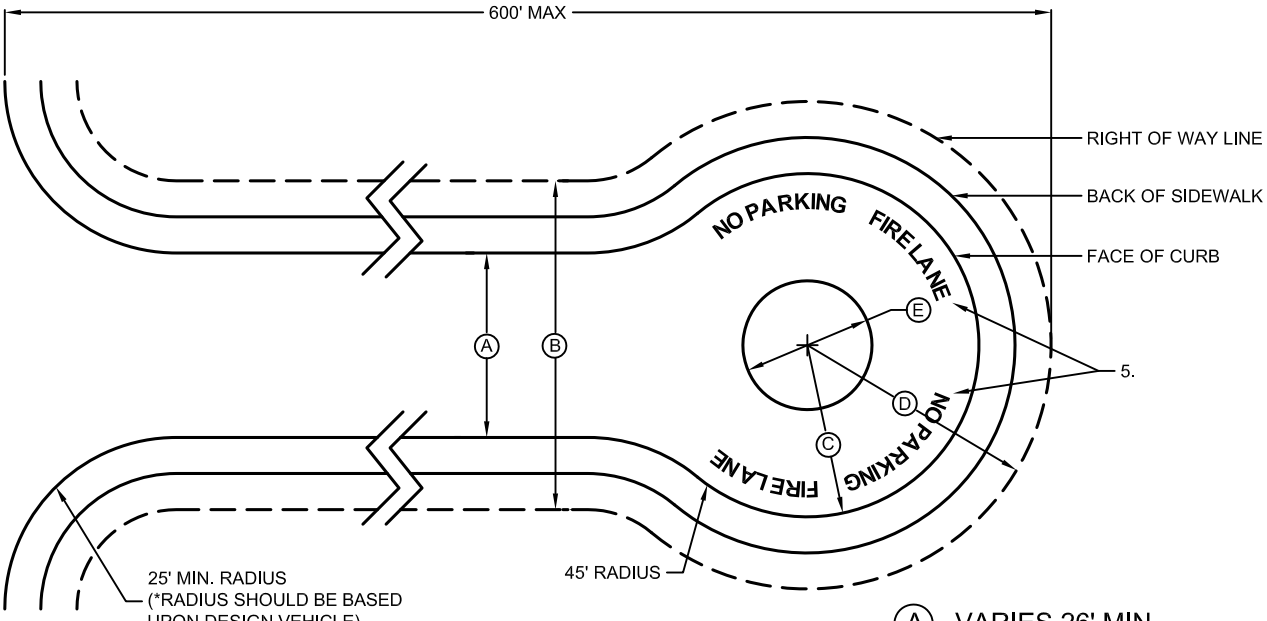
City of Tukwila

TYPICAL ROADWAY SECTION

SHEET: RS-01

REVISION #1: 08.03 LAST REVISION: 04.08

APPROVAL: BOB GIBERSON, CITY ENGINEER



CUL-DE-SAC

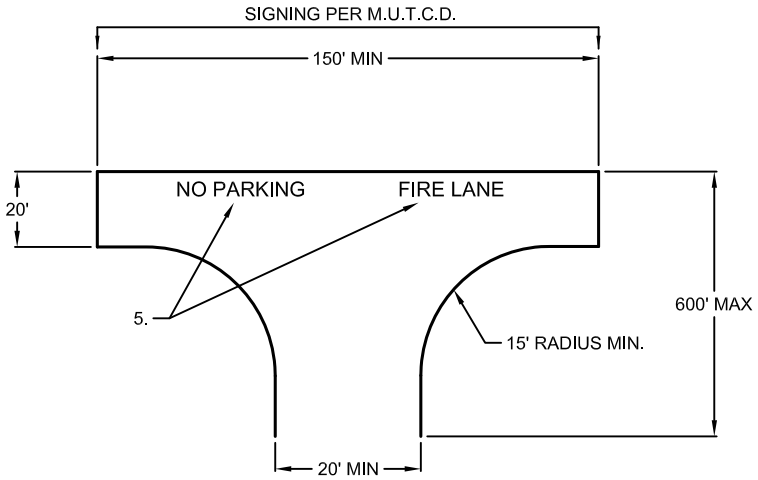
Ⓐ - VARIES 26' MIN.

Ⓑ - VARIES 40' MIN.

Ⓒ - 40.5' MIN.

Ⓓ - 46' MIN.

Ⓔ - 10' MAXIMUM



HAMMERHEAD

NOTES:

1. A CUL-DE-SAC IS REQUIRED FOR ALL DEAD END STREETS LONGER THAN 150' IN LENGTH.

2. CUL-DE-SAC LANDSCAPE ISLAND TO BE MAINTAINED BY PROPERTY OWNERS.

3. ALL SIGNS SHALL MEET CURRENT WSDOT/APWA "STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION", AND CURRENT MUTCD.

4. A HAMMERHEAD REQUIRES PRIOR APPROVAL BY THE FIRE DEPARTMENT AND CITY ENGINEER.

5. NO PARKING STENCILS

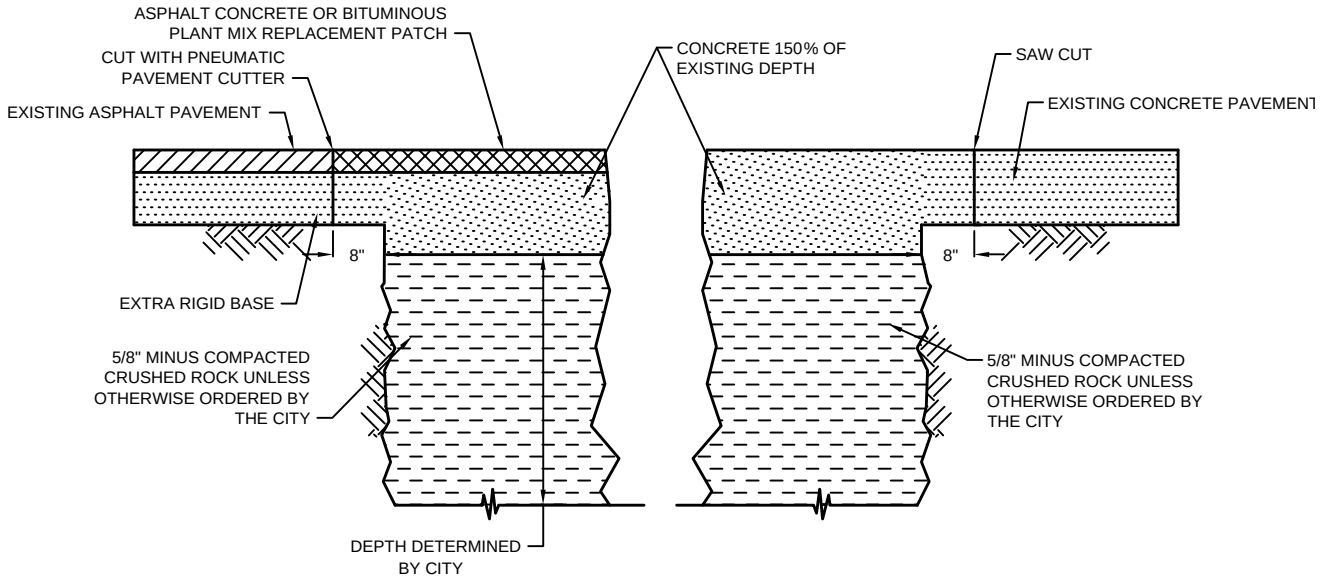
NOT TO SCALE

City of Tukwila

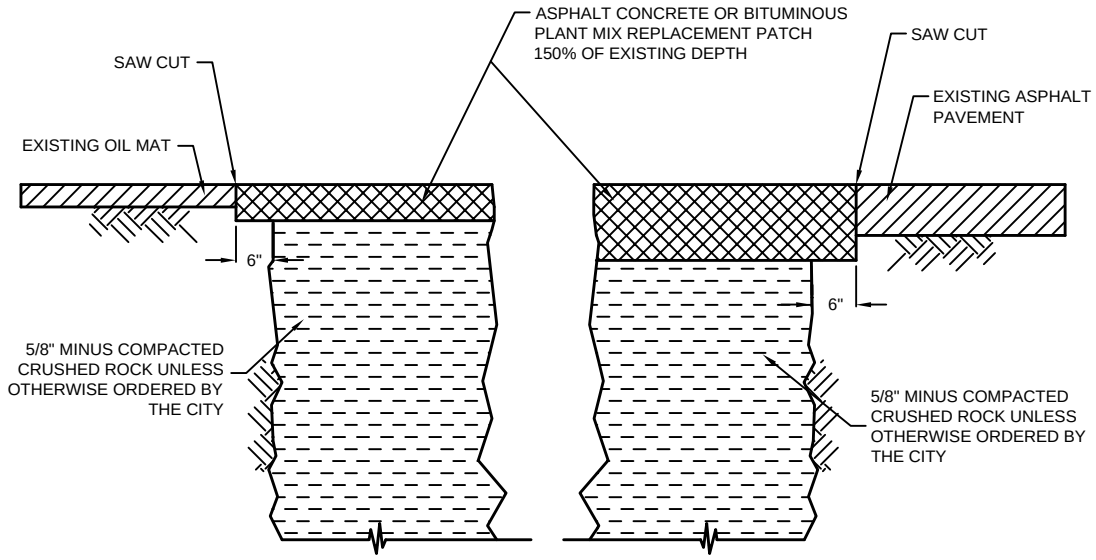
TURN AROUND

CUL DE SAC & HAMMERHEAD

SHEET:	RS-02		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		



TYPICAL PATCH FOR RIGID PAVEMENT



TYPICAL PATCH FOR FLEXIBLE PAVEMENT

NOTES:

1. ALL WORK TO CONFORM TO THE CURRENT WSDOT/APWA STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION.

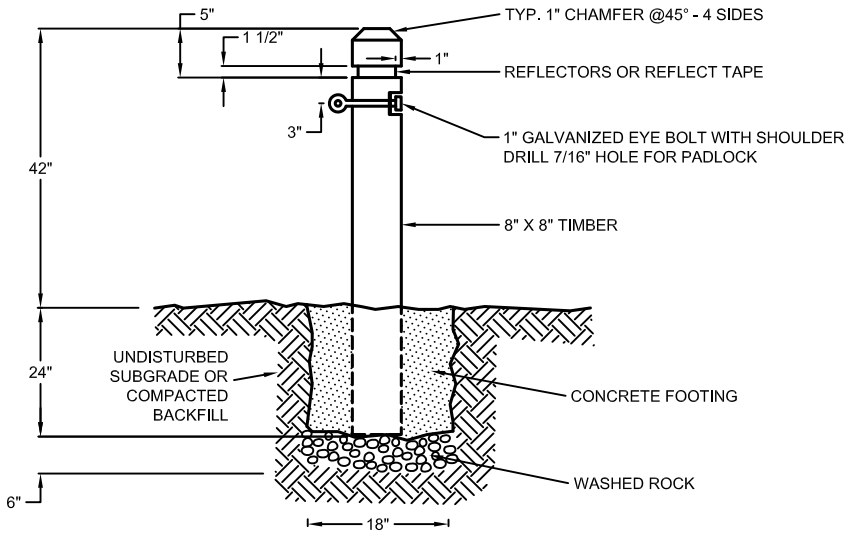
2. A MINIMUM OF A ONE YEAR GUARANTEE IS REQUIRED ON ALL PAVEMENT PATCHING AND OVERLAYS.

3. CONTROLLED DENSITY FILL IN PLACE OF CRUSHED ROCK MATERIAL MAY BE REQUIRED IN CASES OF RECENT PAVEMENT OVERLAY, OR AS DIRECTED BY CITY ENGINEER.

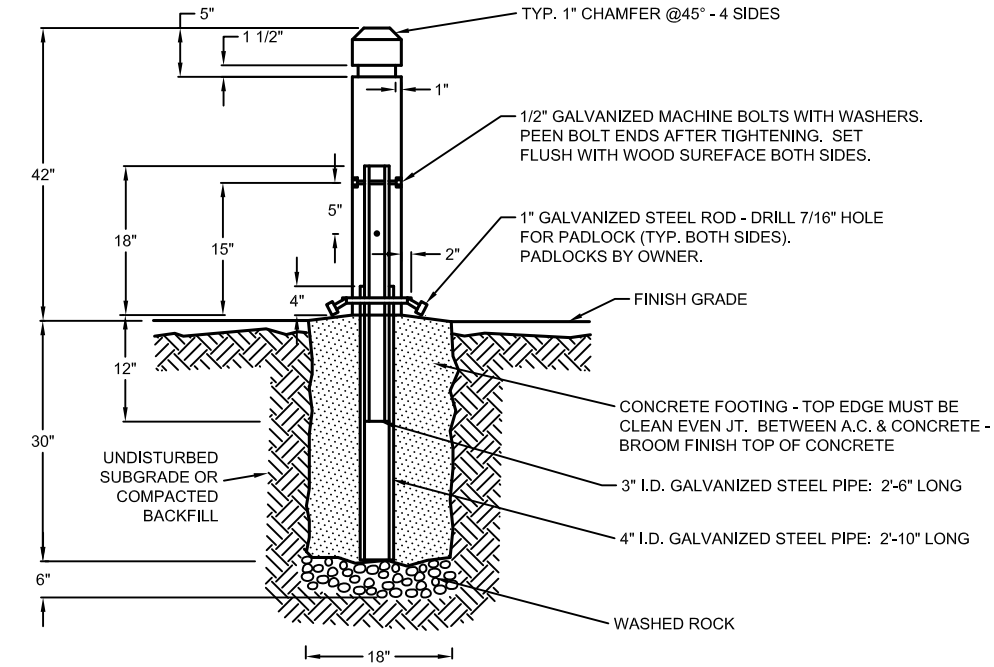
NOT TO SCALE

City of Tukwila

PAVEMENT RESTORATION	
SHEET:	RS-03
REVISION #1:	08.03
APPROVAL:	B. SHELTON



PERMANENT BOLLARD



REMOVABLE BOLLARD

NOTES:

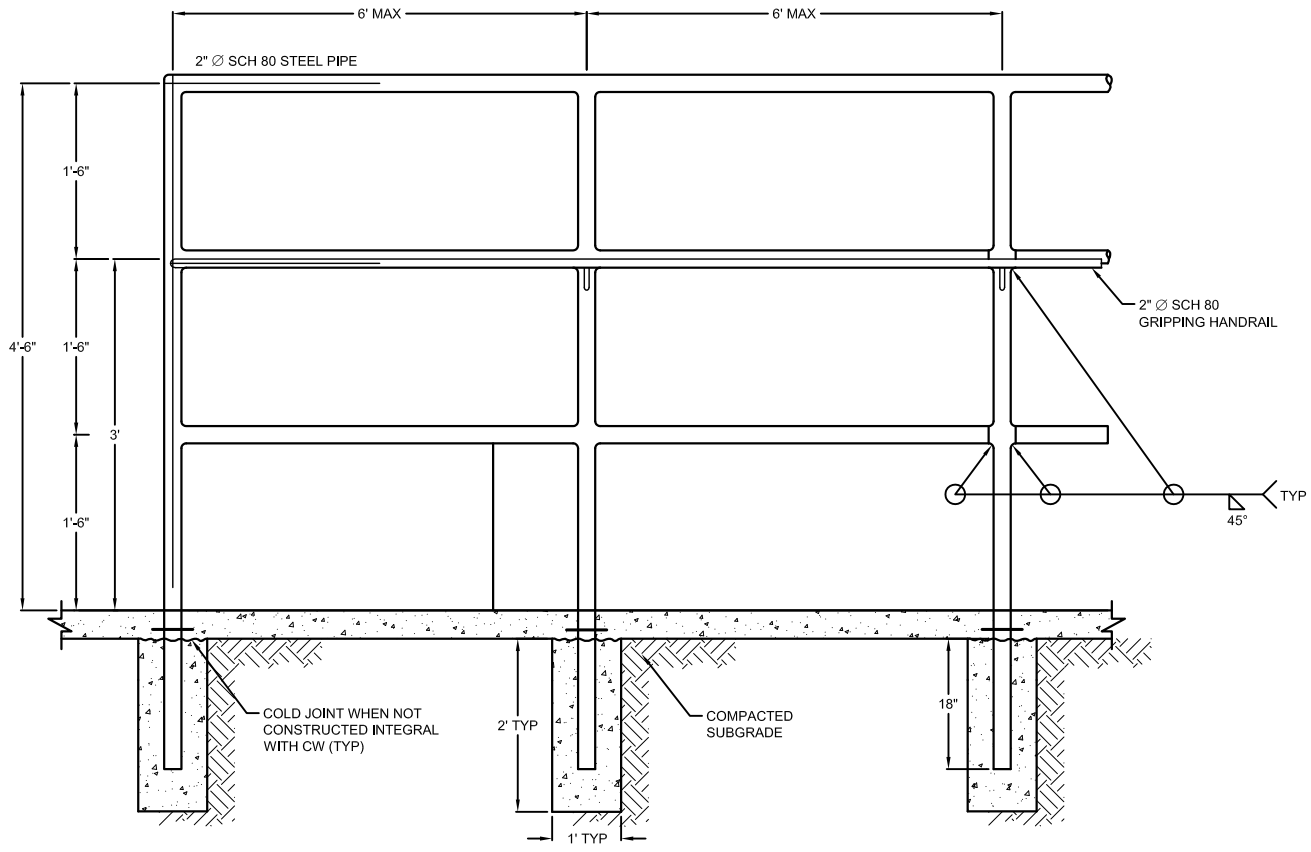
1. TIMBER SHALL BE DOUGLAS FIR, DENSE CONSTRUCTION GRADE AND SHALL BE PRESSURE TREATED.
2. STEEL TUBE SHALL CONFORM TO ASTM A53 OR ASTM A53 GRADE A.
3. NUTS, BOLTS, & WASHERS SHALL CONFORM TO ASTM A307.
4. ALL STEEL PARTS SHALL BE GALVANIZED.
5. CONCRETE SHALL BE 3000 psi.
6. REMOVABLE BOLLARDS ARE REQUIRED FOR RESTRICTED ACCESS ROADWAYS SUCH AS MAINTENANCE EASEMENTS.
7. ACCEPTABLE ALTERNATES: WSDOT TYPE 1 (REM) & TYPE 2 (FIXED), STD PLANS H-60.10-00 & H-60.20-00.

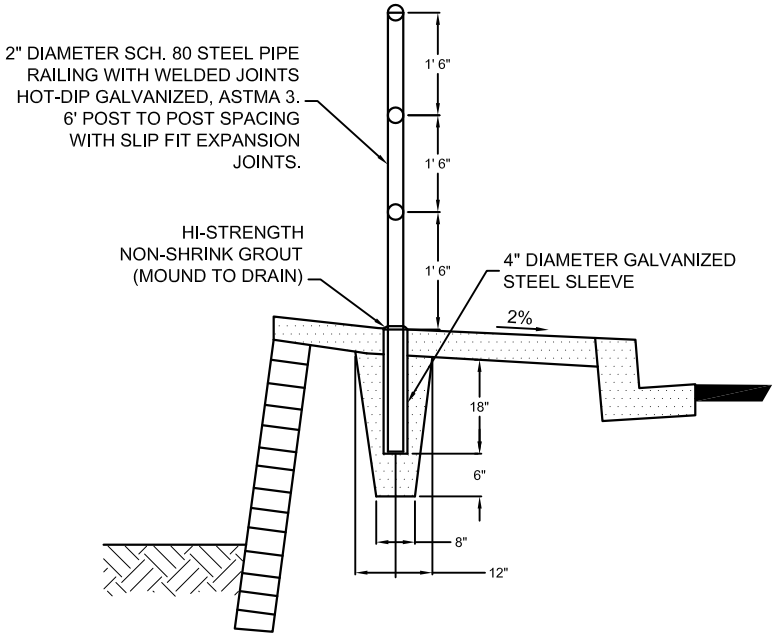
NOT TO SCALE

City of Tukwila

BOLLARD

SHEET:	RS-04		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		





NOTES:

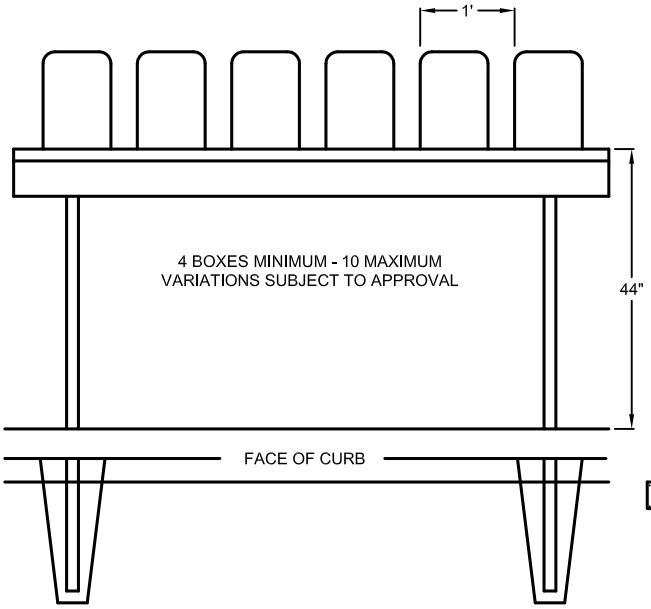
1. SHOP DRAWING FOR ALL RAILING MUST BE CITY APPROVED PRIOR TO FABRICATION.

NOT TO SCALE

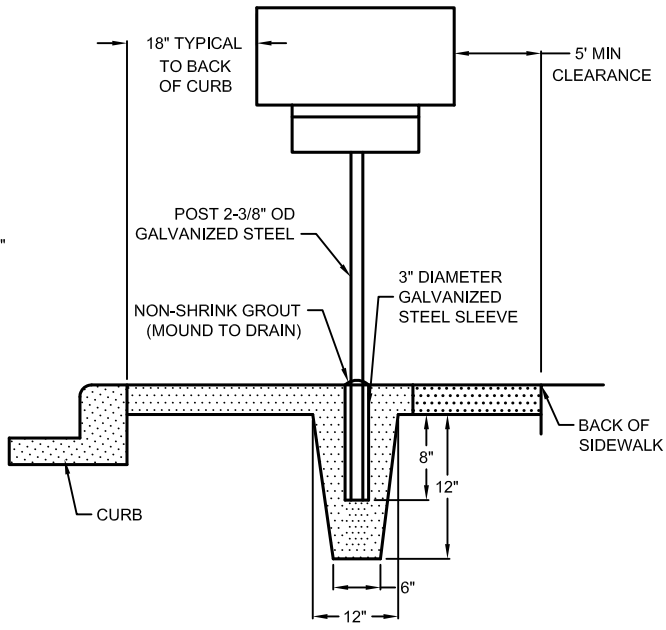
City of Tukwila

STEEL PIPE RAILING

SHEET:	**RS-05**		
REVISION #1:	08.03	**LAST REVISION:**	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		



ELEVATION (FROM STREET)
TYPICAL



SIDE VIEW

NOTES:

1. MAILBOX MUST BE TYPE "APPROVED BY THE POSTMASTER GENERAL" WITH A UNIFORM BOX STYLE AND METHOD OF ADDRESS IDENTIFICATION PER EACH STANDARD.

2. LOCATION IS SUBJECT TO APPROVAL BY THE CITY FOR PROTECTION OF VIEWS AND ACCESS AND IS TO BE SHOWN ON THE STREET IMPROVEMENT PLANS.

3. THIS SKETCH DEPICTS A MINIMUM STRUCTURAL AND DIMENSIONAL STANDARD. INNOVATIVE DESIGNS MEETING THESE MINIMUMS MAY BE ACCEPTED.

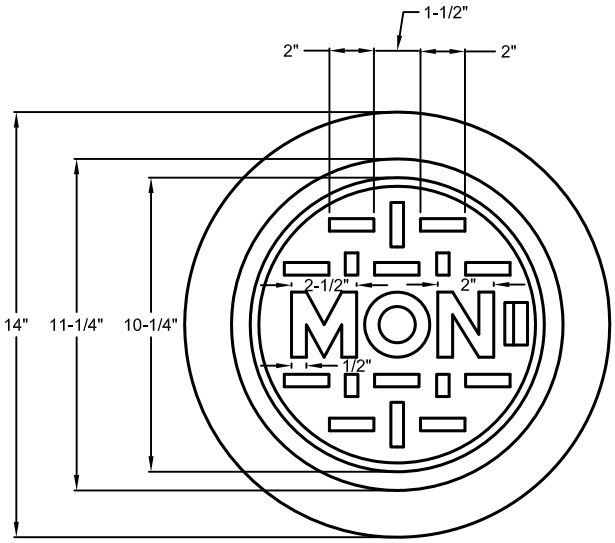
4. CONSULT POSTMASTER FOR MINIMUM/MAXIMUM HEIGHT OF BOX AND OFFSET TO CURB.

NOT TO SCALE

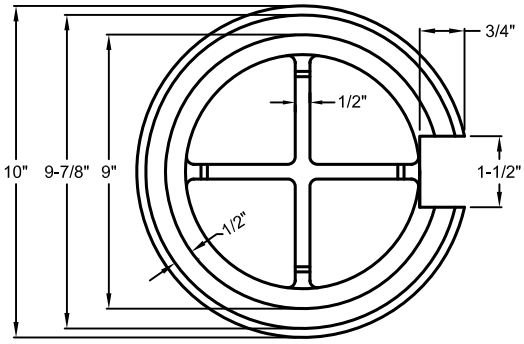
City of Tukwila

MAILBOX INSTALLATION

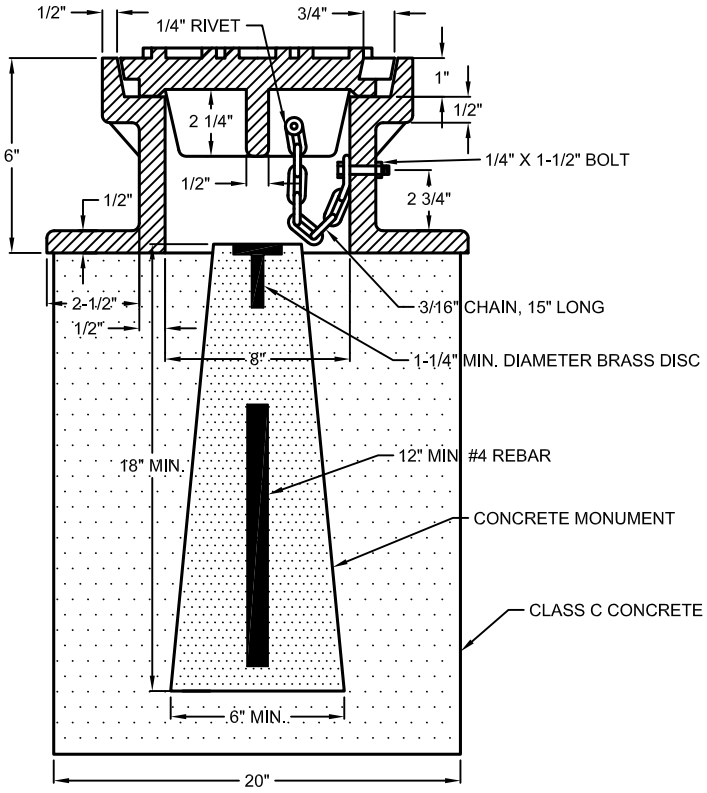
SHEET:	RS-06		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		



PLAN - FRAME & COVER



BOTTOM VIEW OF COVER



SECTION - FRAME & COVER

NOTES:

1. MACHINE BEARING FACES OF COVER AND CASE TO INSURE POSITIVE FIT.

2. CASTINGS SHALL BE GRAY IRON, A.S.T.M. DESIGNATION A-48, CLASS 40, AND SHALL CONFORM FURTHER TO APPLICABLE SECTION OF THESE SPECIFICATIONS.

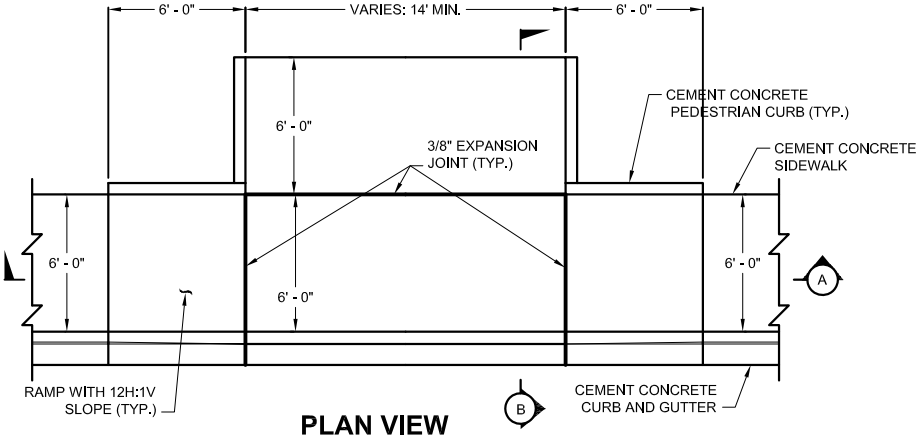
3. MONUMENTS ARE REQUIRED AT STREET INTERSECTIONS AND MUST BE SET BY A SURVEYOR LICENSED TO PRACTICE AS SUCH BY THE STATE OF WASHINGTON.

4. FOR ADJUSTING EXISTING, SEE RS-31.

NOT TO SCALE

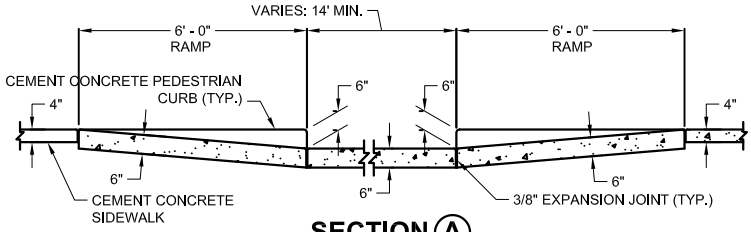
City of Tukwila

STREET MONUMENT			
W/ FRAME & COVER			
SHEET:	RS-07		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		

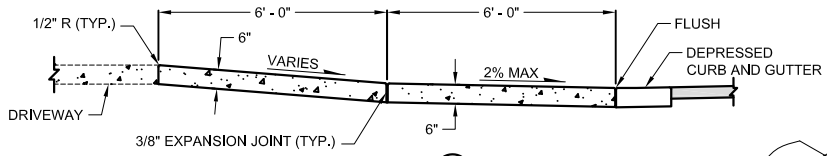


PLAN VIEW

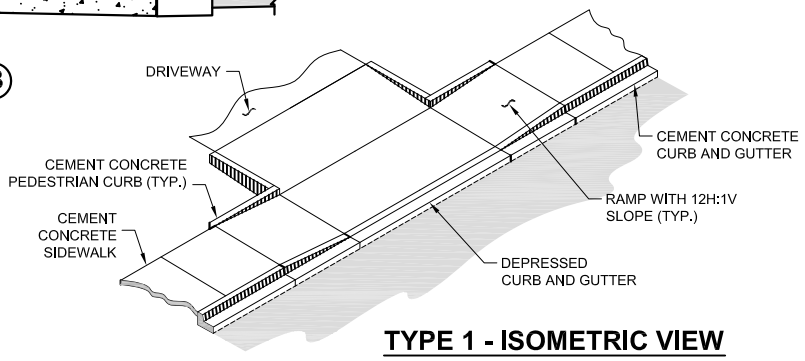
CEMENT CONCRETE DRIVEWAY ENTRANCE TYPE 1



SECTION (A)



SECTION (B)



TYPE 1 - ISOMETRIC VIEW

NOTES:

1. THIS ALTERNATE SHOULD BE USED ONLY AFTER STUDYING CLOSENESS OF DRIVEWAYS, DRAINAGE, TOPOGRAPHY, DRIVEWAY GRADES, ETC.
2. CONCRETE SHALL BE CLASS 4000.
3. INSPECTION REQURED BEFORE PLACING CONCRETE. AT LEAST 24 HOUR NOTICE MUST BE GIVEN TO TUKWILA PUBLIC WORKS DEPARTMENT.
4. ALL DRIVEWAY APRONS SHALL BE A MINIMUM OF 6" THICK.
5. WHERE DRIVEWAY WIDTHS EXCEED 15', A 3/8" X 5-1/2" EXPANSION JOINT SHALL BE PLACED LONGITUDINALLY ALONG THE CENTERLINE.
6. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH APWA/WSDOT PLANS AND SPECIFICATIONS OR AS DIRECTED BY THE CITY OF TUKWILA.
7. AN ASPHALT APRON MAY BE USED IN AREAS WHERE NO CURB EXISTS.
8. REMOVAL OF EXISTING CONCRETE CURB, GUTTER OR SIDEWALK SHALL BE SAW CUT TO THE NEXT CONSTRUCTION JOINT.

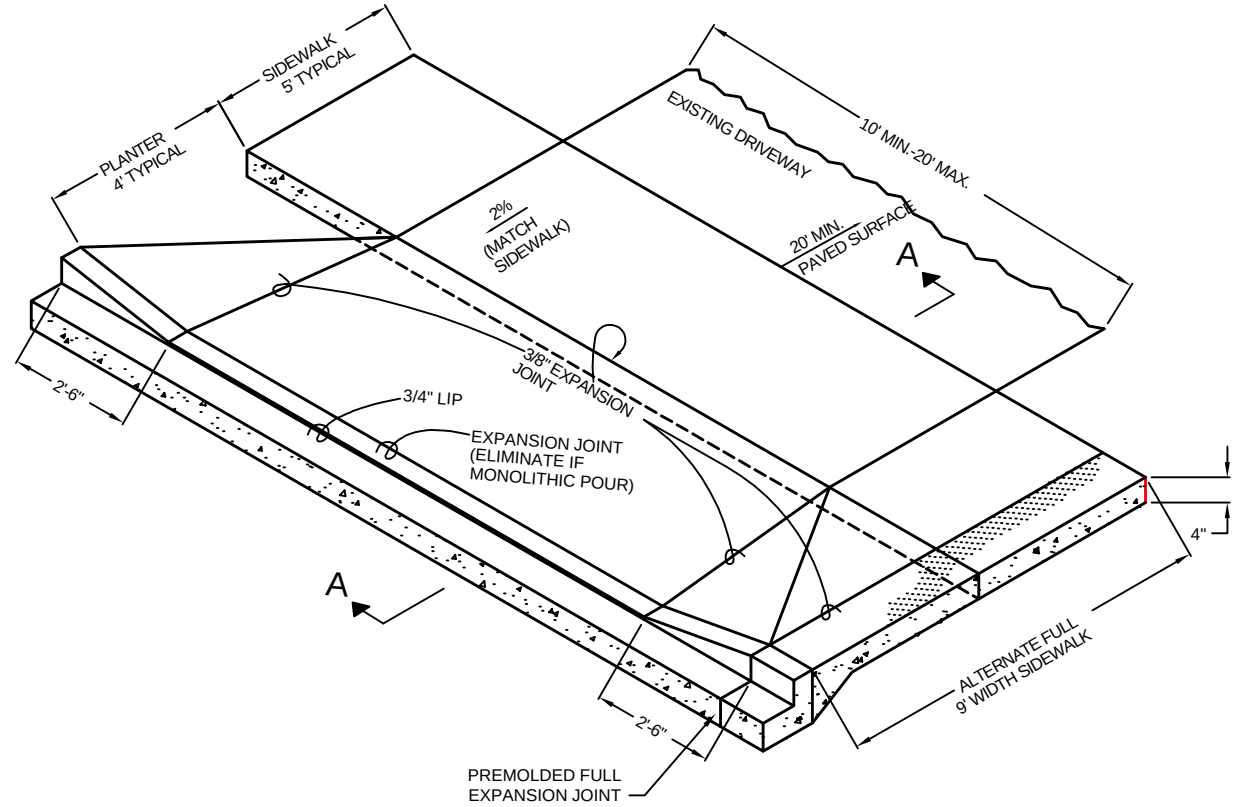
NOT TO SCALE

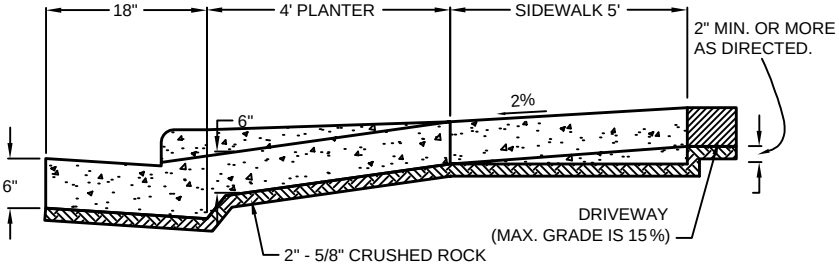
City of Tukwila

RESIDENTIAL DRIVEWAY

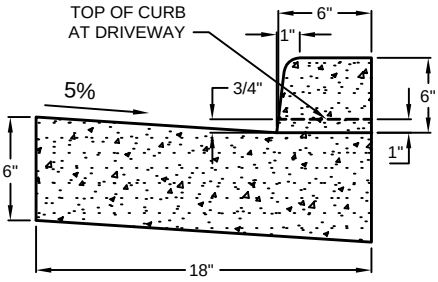
ALTERNATE 1 OF 3

SHEET:	**RS-08A**		
REVISION #1:	08.03	**LAST REVISION:**	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		





SECTION A-A



CURB DETAIL

NOTES:

1. THIS ALTERNATE SHOULD BE USED ONLY AFTER STUDYING CLOSENESS OF DRIVEWAYS, DRAINAGE, TOPOGRAPHY, DRIVEWAY GRADES, RIGHT OF WAY, ETC.
2. CONCRETE SHALL BE CLASS B OR BETTER THAN 5-1/2 SACK, 3000 PSI.
3. INSPECTION REQUIRED BEFORE PLACING CONCRETE. AT LEAST 24 HOUR NOTICE MUST BE GIVEN TO TUKWILA PUBLIC WORKS DEPARTMENT.
4. ALL DRIVEWAY APRONS SHALL BE A MINIMUM OF 6" THICK.
5. WHERE DRIVEWAY WIDTHS EXCEED 15', A 3/8" X 5-1/2" EXPANSION JOINT SHALL BE PLACED LONGITUDINALLY ALONG THE CENTERLINE.
6. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH APWA/WSDOT PLANS AND SPECIFICATIONS OR AS DIRECTED BY THE CITY OF TUKWILA.
7. AN ASPHALT APRON MAY BE USED IN AREAS WHERE NO CURB EXISTS.
8. REMOVAL OF EXISTING CONCRETE CURB, GUTTER OR SIDEWALK SHALL BE SAW CUT TO THE NEXT JOINT.

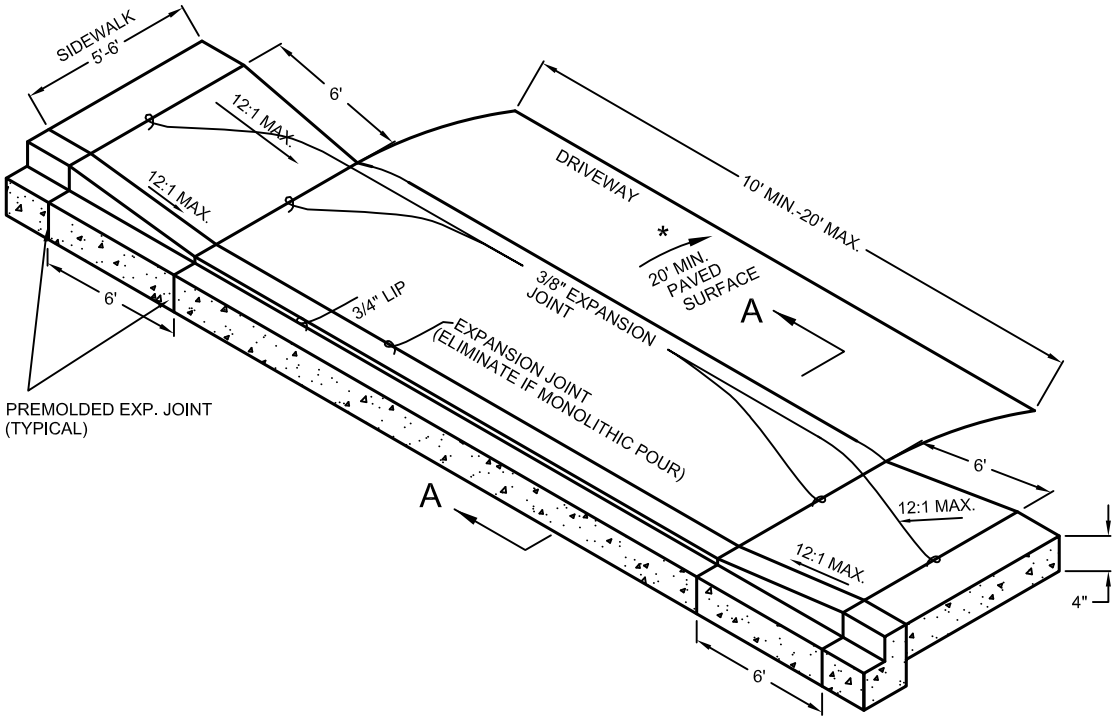
NOT TO SCALE

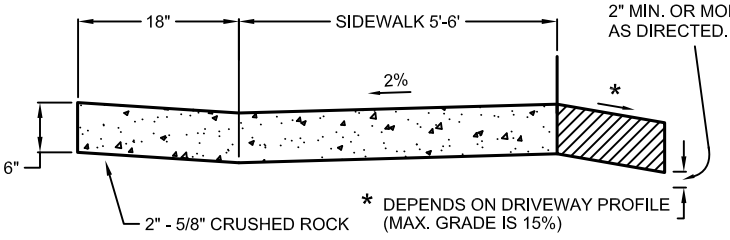
City of Tukwila

RESIDENTIAL DRIVEWAY

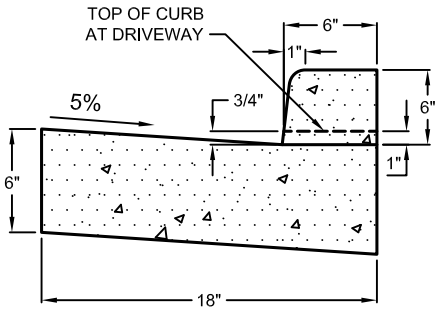
ALTERNATE 2 OF 3

SHEET:	RS-08B
REVISION #1:	08.03
APPROVAL:	B. SHELTON





SECTION A-A



CURB DETAIL

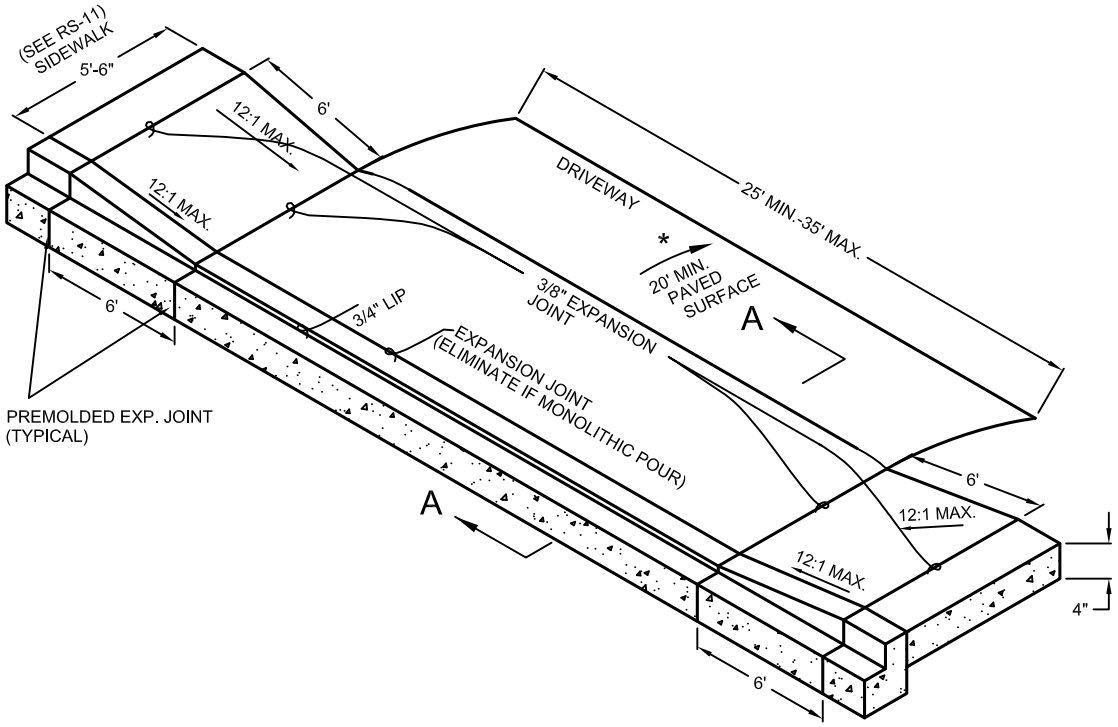
NOTES:

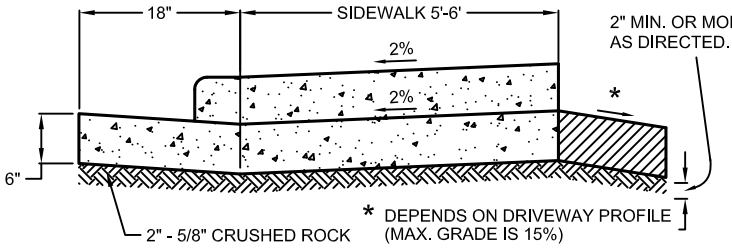
1. THIS ALTERNATE SHOULD BE USED ONLY AFTER STUDYING CLOSENESS OF DRIVEWAYS, DRAINAGE, TOPOGRAPHY, DRIVEWAY GRADES, RIGHT OF WAY, ETC.
2. CONCRETE SHALL BE CLASS 4000.
3. INSPECTION REQUIRED BEFORE PLACING CONCRETE. AT LEAST 24 HOUR NOTICE MUST BE GIVEN TO TUKWILA PUBLIC WORKS DEPARTMENT.
4. ALL DRIVEWAY APRONS SHALL BE A MINIMUM OF 6" THICK.
5. WHERE DRIVEWAY WIDTHS EXCEED 15', A 3/8" X 5-1/2" EXPANSION JOINT SHALL BE PLACED LONGITUDINALLY ALONG THE CENTERLINE.
6. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH APWA/WSDOT PLANS AND SPECIFICATIONS OR AS DIRECTED BY THE CITY OF TUKWILA.
7. AN ASPHALT APRON MAY BE USED IN AREAS WHERE NO CURB EXISTS.
8. REMOVAL OF EXISTING CONCRETE CURB, GUTTER OR SIDEWALK SHALL BE SAW CUT TO THE NEXT CONSTRUCTION JOINT.

NOT TO SCALE

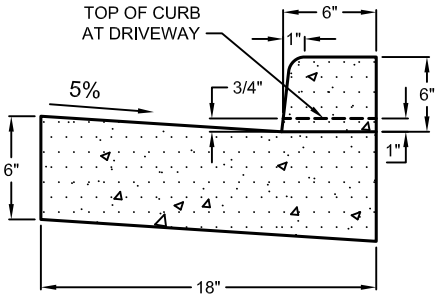
City of Tukwila

RESIDENTIAL DRIVEWAY	
ALTERNATE 3 OF 3	
SHEET:	**RS-08C**
REVISION #1: 08.03	**LAST REVISION:** 04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER





SECTION A-A



CURB DETAIL

NOTES:

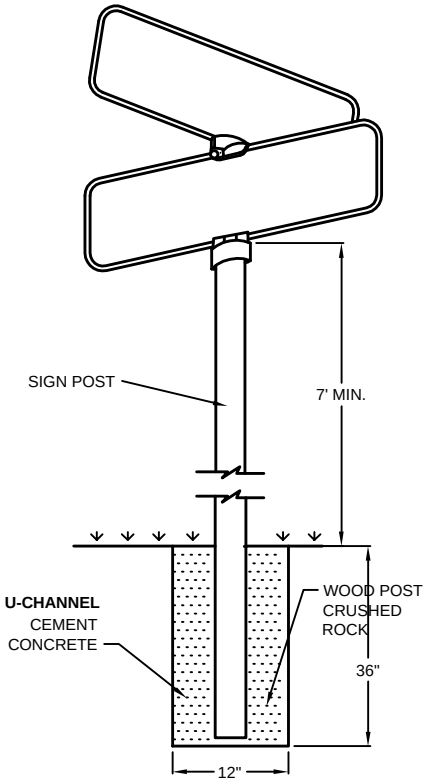
1. THIS ALTERNATE SHOULD BE USED ONLY AFTER STUDYING CLOSENESS OF DRIVEWAYS, DRAINAGE, TOPOGRAPHY, DRIVEWAY GRADES, RIGHT OF WAY, ETC.
2. DRIVEWAYS WITH HIGH VOLUME (AS NOTED BY CITY ENGINEER) MAY BE APPROVED FOR INTERSECTION TYPE ACCESS.
3. TURNING RESTRICTIONS MAY BE APPLIED BY THE CITY ENGINEER.
4. CONCRETE SHALL BE CLASS 4000.
5. INSPECTION REQUIRED BEFORE PLACING CONCRETE. AT LEAST 24 HOUR NOTICE MUST BE GIVEN TO TUKWILA PUBLIC WORKS DEPARTMENT FOR INSPECTION.
6. ALL DRIVEWAY APRONS SHALL BE A MINIMUM OF 6" THICK.
7. WHERE DRIVEWAY WIDTHS EXCEED 15', A 3/8" X 5-1/2" EXPANSION JOINT SHALL BE PLACED LONGITUDINALLY ALONG THE CENTERLINE.
8. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH APWA/WSDOT PLANS AND SPECIFICATIONS OR AS DIRECTED BY THE CITY OF TUKWILA.
9. AN ASPHALT APRON MAY BE USED IN AREAS WHERE NO CURB EXISTS.
10. REMOVAL OF EXISTING CONCRETE CURB, GUTTER OR SIDEWALK SHALL BE TO THE NEXT EXPANSION JOINT; SCORE JOINTS MUST BE SAW CUT AND REPLACED WITH AN EXPANSION JOINT.

NOT TO SCALE

City of Tukwila

COMMERCIAL DRIVEWAY

SHEET:	**RS-09**		
REVISION #1:	08.03	**LAST REVISION:**	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		



ELEVATION

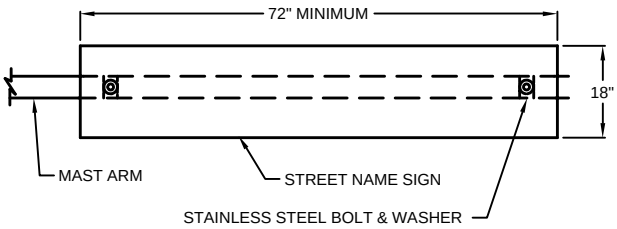
SIGN:
SHEET ALUMINUM, .080 GAUGE, SIZED AS NEEDED WITH ROUNDED CORNERS.

BACKGROUND:
GREEN, ENGINEER GRADE

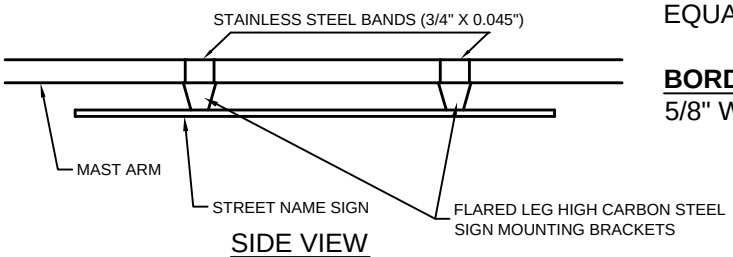
LETTERS:
LOCAL ACCESS INTERSECTION -
4" UC C SERIES WITH 2" UC C SERIES
ARTERIAL INTERSECTION -
6" UC D SERIES WITH 3" UC C SERIES

BORDER - SCREEN PRINT
5/16" WIDE WITH 3/4" RADIUS ON CORNERS.

POST MOUNT



FRONT VIEW



SIDE VIEW

SIGN:
SHEET ALUMINUM, 0.100, SIZED AS NEEDED WITH ROUNDED CORNERS.

BACKGROUND:
GREEN, ENGINEERING GRADE 3M OR APPROVED EQUAL.

LETTERS:
WHITE, DIAMOND GRADE 3M OR APPROVED EQUAL. 8" SERIES D, OR AS APPROVED.

BORDER - SCREEN PRINT
5/8" WIDE WITH 3/4" RADIUS ON CORNERS.

MAST ARM MOUNT

NOT TO SCALE

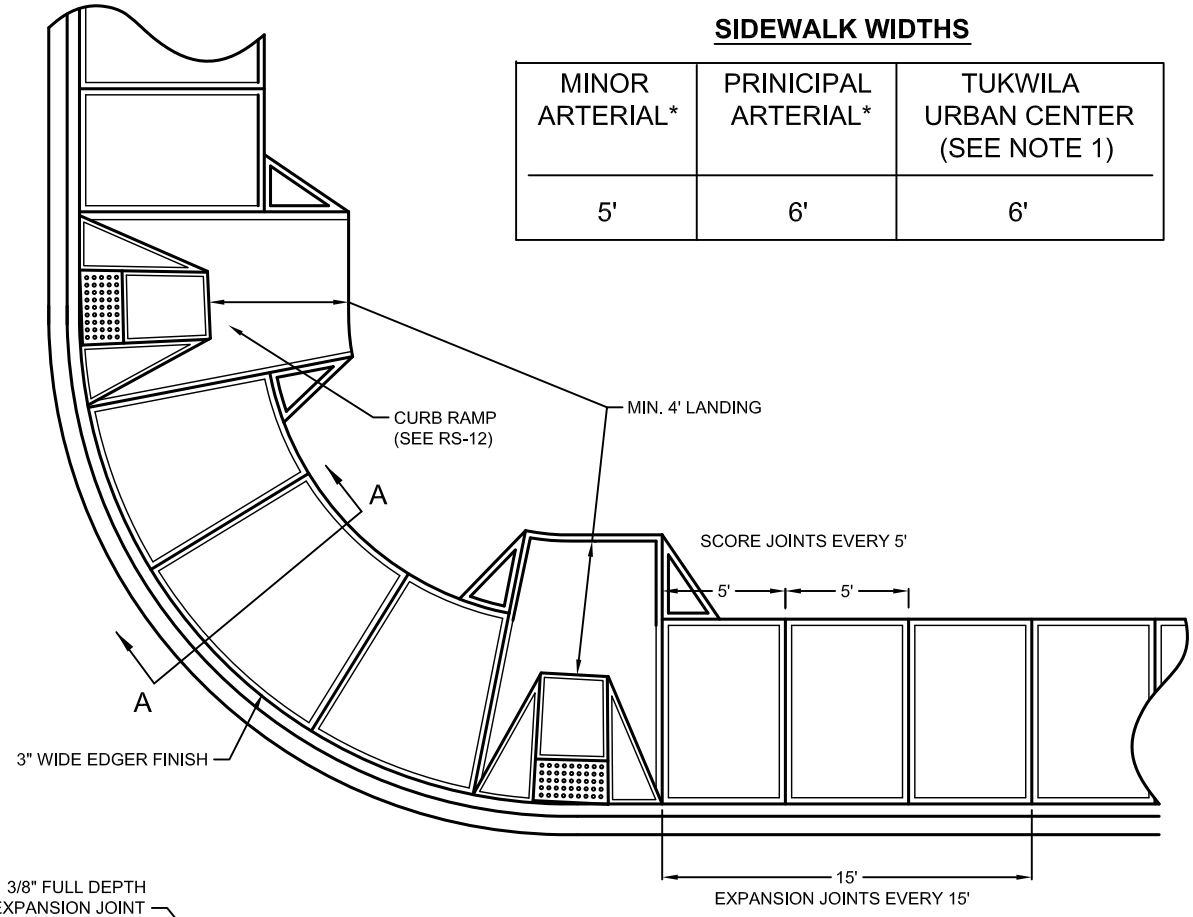
City of Tukwila

STREET NAME SIGN

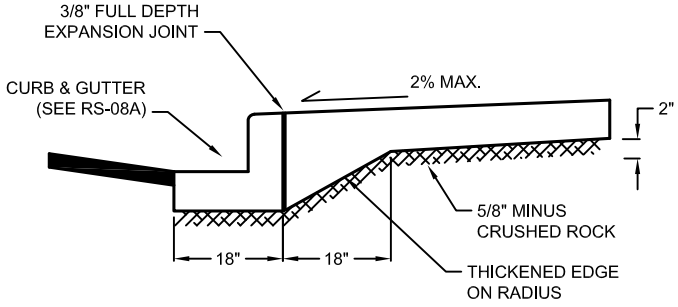
SHEET:	**RS-10**
REVISION #1:	08.03
APPROVAL:	B. SHELTON

SIDEWALK WIDTHS

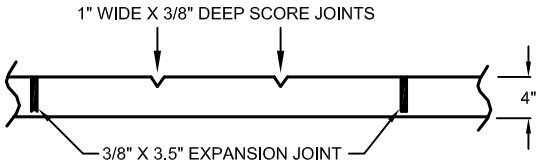
MINOR ARTERIAL*	PRINICIPAL ARTERIAL*	TUKWILA URBAN CENTER (SEE NOTE 1)
5'	6'	6'



PLAN VIEW



SECTION A-A



ELEVATION

NOTES:

1. SIDEWALKS SHALL BE A MINIMUM OF 8 FEET WIDE AT BUS STOPS AND PULLOUTS, OR WHERE THE SPEED LIMIT IS OVER 35 MPH, OR WHERE A TRAIL AND SIDEWALK ARE COMBINED.

2. PLACE CEMENT CONCRETE OVER 2" OF 5/8" MINUS CRUSHED ROCK OR AS SPECIFIED IN THE CURRENT APWA/WSDOT STANDARD SPECIFICATIONS.

3. REMOVE EXISTING CONCRETE CURB, GUTTER OR SIDEWALK TO THE NEAREST JOINT; SCORE JOINTS MUST BE SAW CUT AND REPLACED WITH NEW.

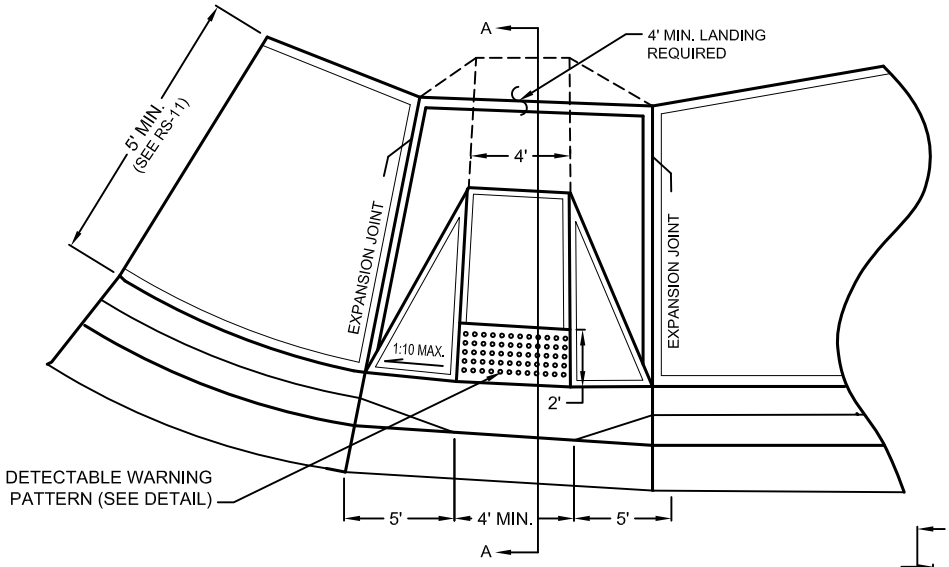
* SEE TMC 9.48.040

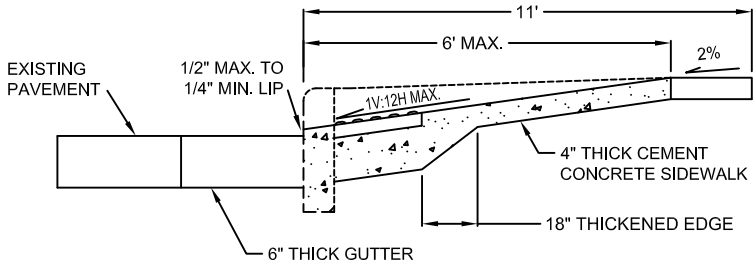
NOT TO SCALE

City of Tukwila

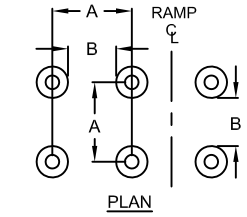
SIDEWALK

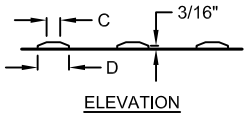
SHEET:	RS-11		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		





	MIN	MAX
A	1-5/8"	2-3/8"
B	5/8"	1-1/2"
C	7/16"	3/4"
D	7/8"	1-7/16"





SECTION A-A

DETECTABLE WARNING PATTERN (SEE NOTE 5)

NOTES:

1. RAMP AND APPROACHES SHALL BE CLEAR OF OBSTACLES INCLUDING HYDRANTS, POLES AND INLETS.
2. RAMP CENTERLINE SHALL BE PERPENDICULAR TO OR RADIAL TO CURB RETURNS UNLESS OTHERWISE SPECIFIED BY THE ENGINEER. MAXIMUM SLOPE SHALL BE 12:1.
3. FULL DEPTH EXPANSION JOINTS ARE REQUIRED ON EACH SIDE OF RAMP AND SHALL BE PLACED AT 15' SPACING IN GENERAL SIDEWALK PORTION.
4. CURB RAMPS SHALL BE PLACED TWO PER RADIUS ON ARTERIAL STREETS OR AS DIRECTED BY THE ENGINEER.
5. DETECTABLE WARNING PATTERNS (TRUNCATED DOMES) MUST BE PRECAST PAVERS MEETING ASTM C902 CLASS SX TYPE 1 OR C736 OR C1272 TYPE R. ACCEPTABLE MANUFACTURERS AND PRODUCTS ARE :
   a) ADA PAVERS AS MANUFACTURED BY WHITACRE-GREER, AS DESCRIBED ON THEIR WEBSITE: *http://www.wgpaver.com/ada_brochure.pdf* (BRICK RED)
   b) ARMORTILE AS MANUFACTURED BY ARMOR-TILE TACTILE SYSTEMS, AS DESCRIBED ON THEIR WEBSITE: *http://www.armor-tile.com/truncateddomes/cast-in-place.htm#Cast%20In%20Place%20Colors* (BRICK RED)
   c) CASTINTACT WARNING PANELS AS MANUFACTURED BY MASON SUPPLY CO. OF PORTLAND, OR, AS DESCRIBED ON THEIR WEBSITE: *http://www.masco.net/castintact/* (BRICK RED)
   d) STEP-SAFE AS MANUFACTURED BY TRANSPO INDUSTRIES, INC. OF NEW ROCHELLE, NY, AS DESCRIBED ON THEIR WEBSITE: *http://www.transpo.com/Step-Safe.htm* (BRICK RED)

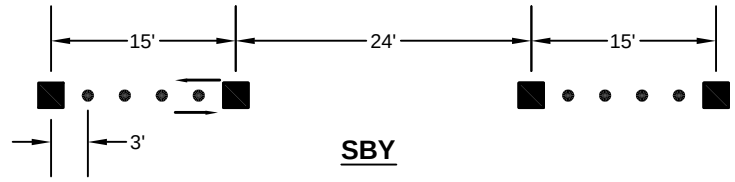
   ON A CASE BY CASE BASIS FOR RETROFITTING EXISTING RAMPS, THE FOLLOWING PRODUCTS MAY BE APPROVED, ONLY WHEN 'BRICK RED' COLOR BECOMES AVAILABLE:
   e) TOP MARK, AS MANUFACTURED BY FLINT TRADING, AS DESCRIBED ON THEIR WEBSITE: *http://www.flinttrading.com/topmark.htm*
   f) VANGUARD DETECTABLE WARNING SYSTEMS AS MANUFACTURED BY VANGUARD ADA SYSTEMS OF AMERICA, SNOHOMISH, WA, AS DESCRIBED ON THEIR WEBSITE: *http://www.vanguardonline.com/*
6. PAVERS WILL LAY ON TOP OF A 4" UNREINFORCED CONCRETE BASE. SETTING BED AND JOINTS TO BE MORTARED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTION OR WITH A MAXIMUM 1/2" THICK BED OF LATEX MODIFIED CEMENT MORTAR. MORTAR JOINTS TO A WIDTH NOT GREATER THAN 5/32" AND NOT LESS THAN 1/16". PAVERS SHALL NOT BE DIRECTLY TOUCHING EACH OTHER UNLESS THEY HAVE SPACING BARS. MORTARED JOINTS ARE TO BE FLUSH WITH TOP SURFACE AND STRUCK SO AS TO GIVE A SMOOTH SURFACE. PAVERS SHALL BE LAID SUCH THAT JOINTS ARE LEVEL WITH ADJOINING JOINTS SO AS TO PROVIDE A SMOOTH TRANSITION FROM BRICK TO BRICK AND BRICK TO CONCRETE SURFACE.
7. SEE WSDOT STANDARD PLAN F-40.10-01 FOR DIMENSION OF DETECTABLE WARNING SURFACE.
8. SEE WSDOT STANDARD PLANS F-40.10-01, F-40.12-00, F-40.15-00, F-40.16-00, F-40.18-00, F-40.20-00, & F-42.10-00 FOR ACCEPTABLE ALTERNATE RAMP LAYOUTS.

NOT TO SCALE

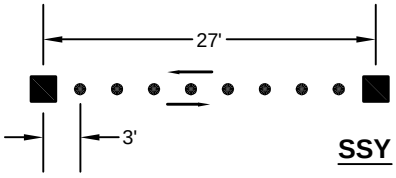
City of Tukwila

CURB RAMP

SHEET:	**RS-12**		
REVISION #1:	08.03	**LAST REVISION:**	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		



SBY



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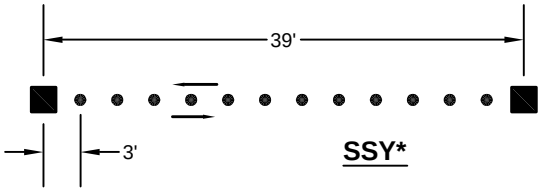
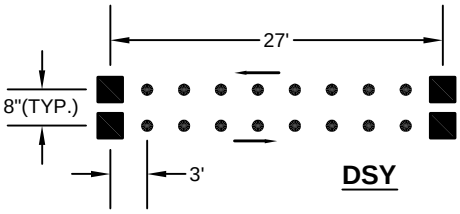
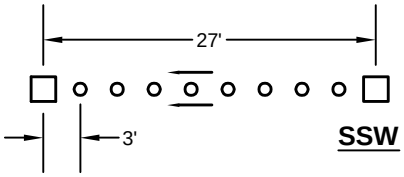


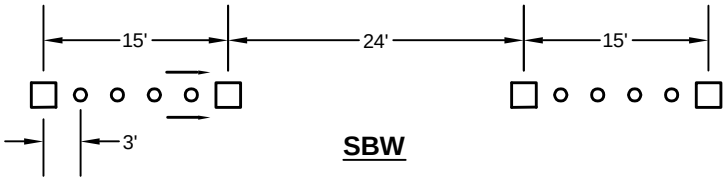
SSY*



DSY



SSW



SBW

LEGEND

DSY - DOUBLE SOLID YELLOW
SSY - SINGLE SOLID YELLOW
SSW - SINGLE SOLID WHITE
SBW - SINGLE BROKEN WHITE
SBY - SINGLE BROKEN YELLOW

- TYPE 2YY REFLECTOR
- TYPE #1 YELLOW TRAFFIC BUTTON
- TYPE #1 WHITE TRAFFIC BUTTON
- TYPE 2WW REFLECTOR
- DIRECTION OF TRAVEL

* THIS SPACING SHALL BE USED ONLY WHEN THE (SSY) IS USED IN CONJUNCTION WITH THE (SBY)

NOTES:

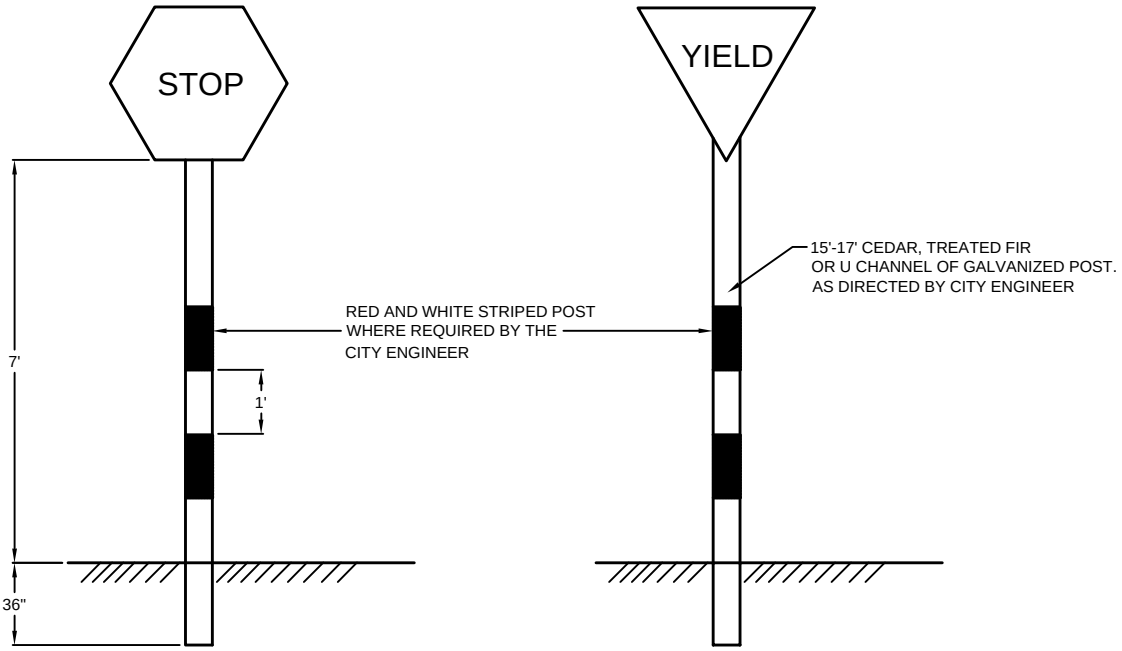
1. ALL PAVEMENT MARKINGS TYPE 1 AND TYPE 2 SHALL MEET THE REQUIREMENTS OF THE APWA/WSDOT STANDARD SPECIFICATIONS AND DETAILS.

NOT TO SCALE

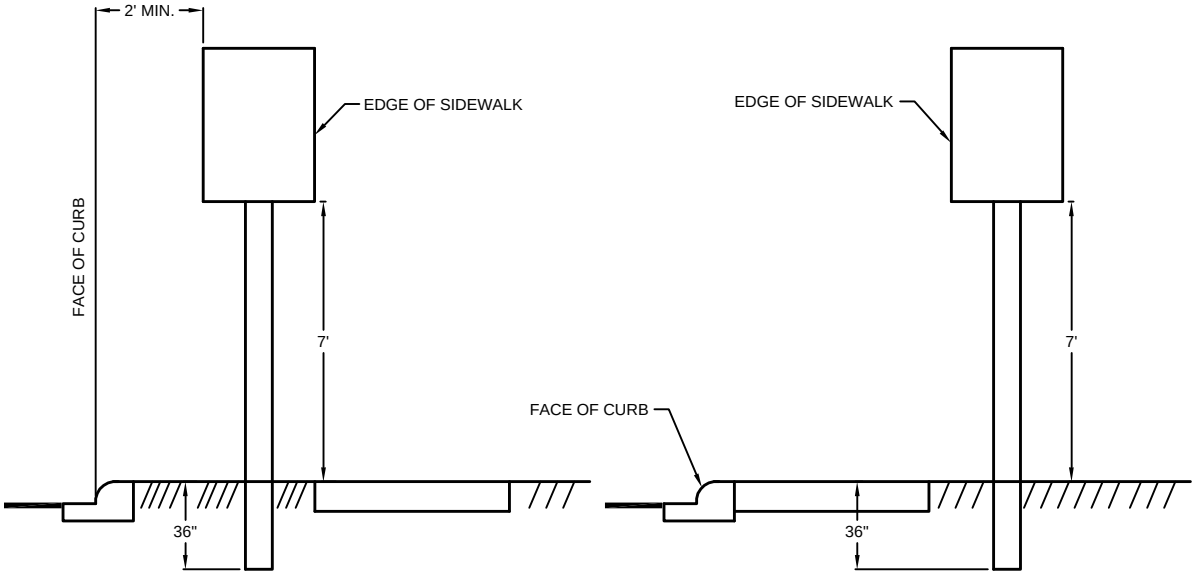
City of Tukwila

RAISED PAVEMENT MARKER

SHEET:	RS-13
REVISION #1:	08.03
APPROVAL:	B. SHELTON



STOP & YIELD INSTALLATION



CURB W/ PARKWAY & SIDEWALK

CURB W/ SIDEWALK W/O PARKWAY

NOTES:

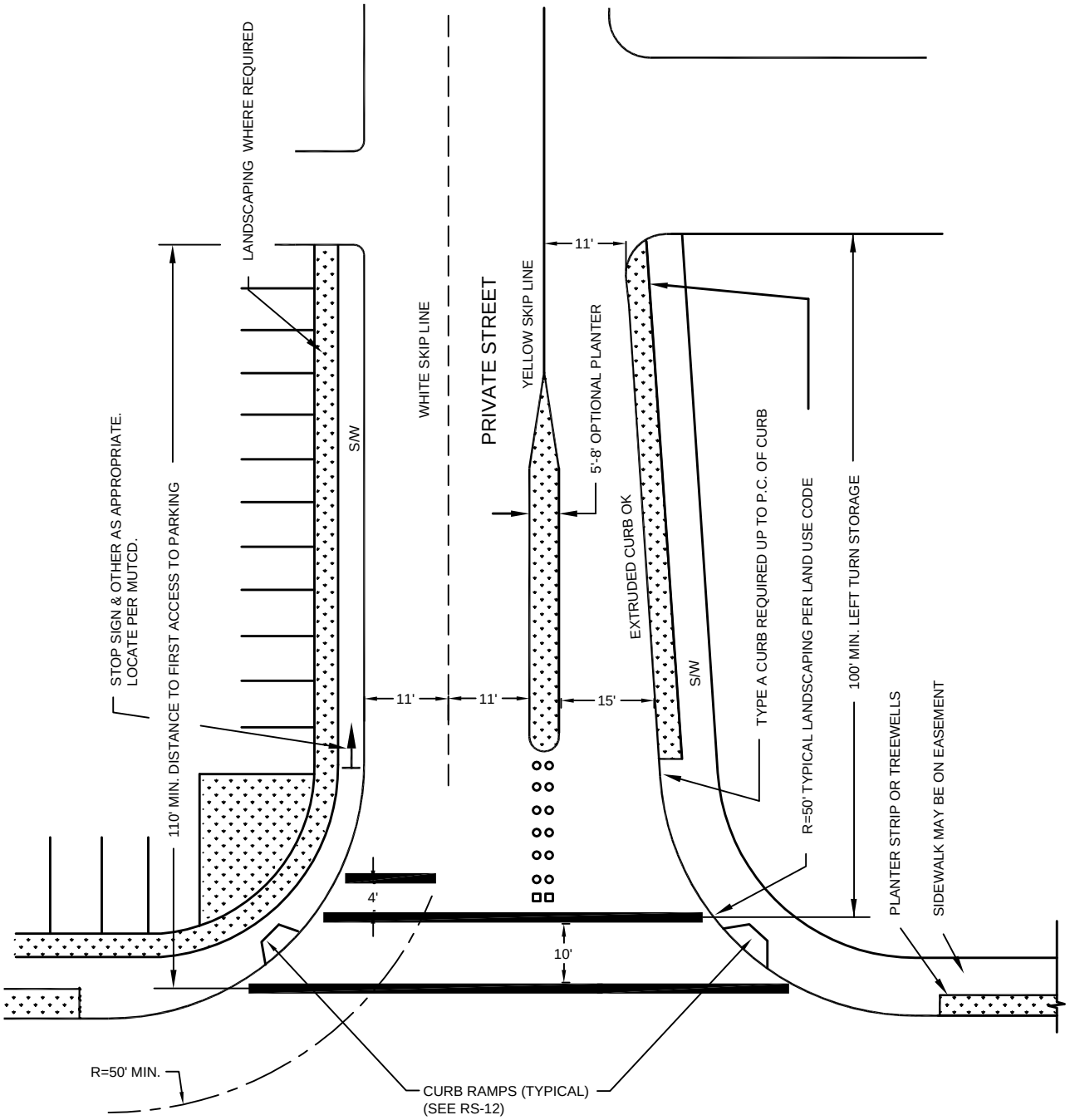
1. REFER TO MUTCD FOR ADDITIONAL INFORMATION.
2. INSTALL PER CHAPTER 4 OF THESE STANDARDS.
3. USE U-CHANNEL POSTS WHERE NO CURB AND GUTTER.

NOT TO SCALE

City of Tukwila

TRAFFIC SIGN INSTALLATION

SHEET:	**RS-14**
REVISION #1:	08.03
APPROVAL:	B. SHELTON



NOTES:

1. CROSSWALKS AND TURN ARROWS ARE PLASTIC.

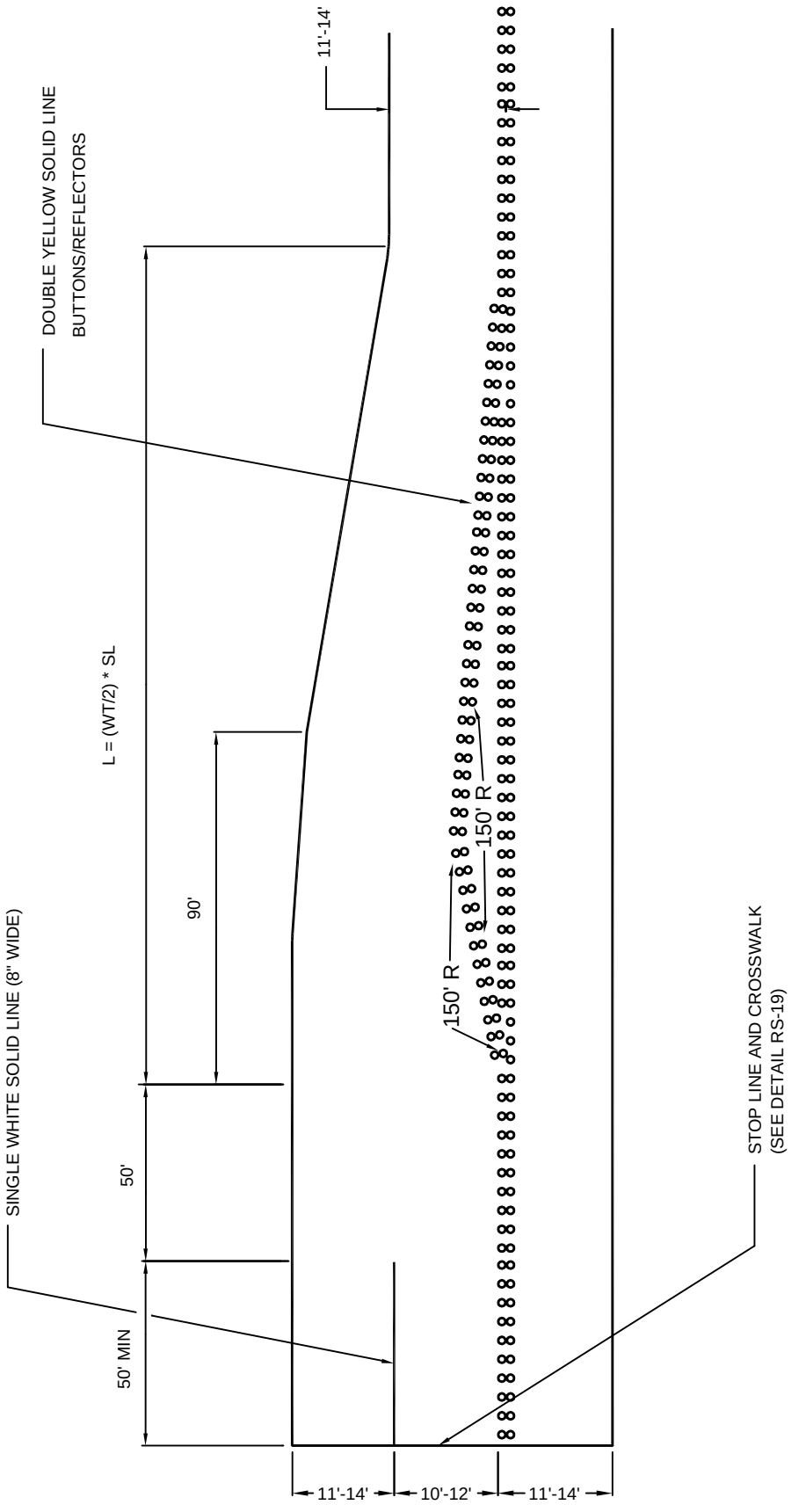
NOT TO SCALE

City of Tukwila

STREET OPENING

PRIVATE/COMMERCIAL

SHEET:	RS-15
REVISION #1:	08.03
APPROVAL:	B. SHELTON



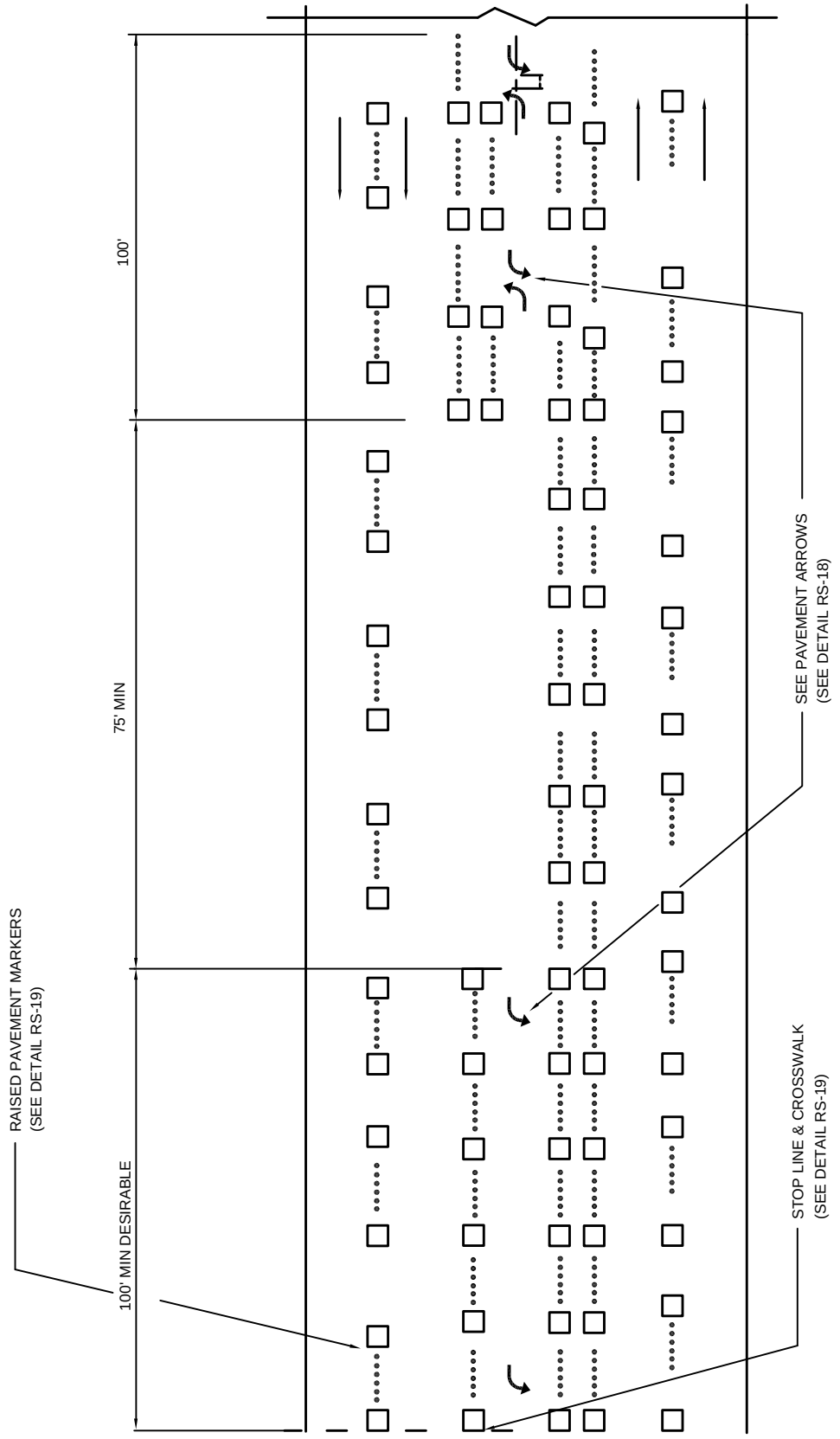
NOT TO SCALE

City of Tukwila

LEFT TURN

NONCONTINUOUS

SHEET:	RS-16
REVISION #1:	08.03
APPROVAL:	B. SHELTON



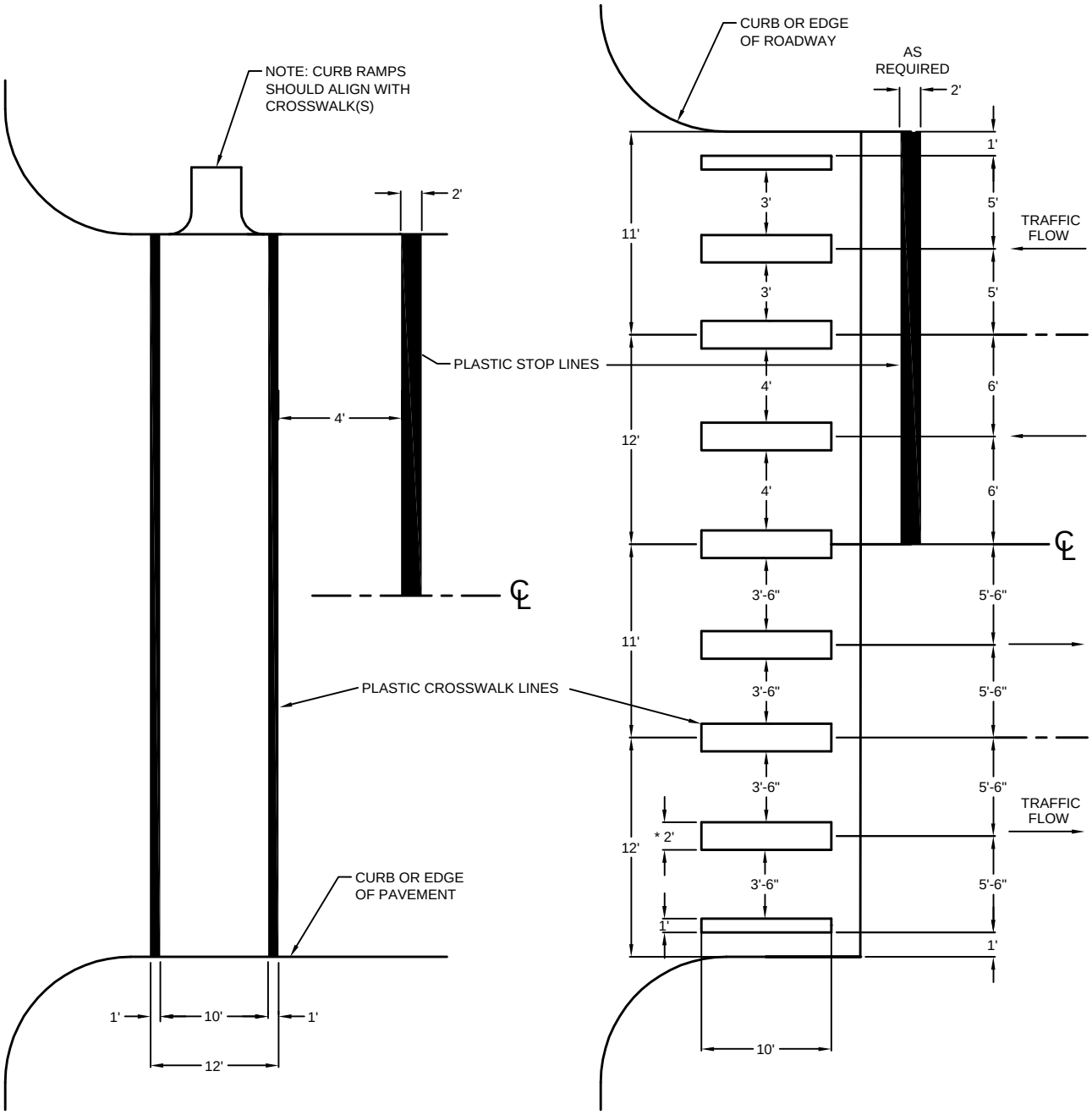
NOT TO SCALE

City of Tukwila

LEFT TURN

2-WAY LANE TYPICAL

SHEET:	RS-17
REVISION #1:	08.03
APPROVAL:	B. SHELTON



SIGNALIZED OR STOP SIGN CONTROLLED

SCHOOL OR UNPROTECTED CROSSWALKS

NOTES:

1. CROSSWALK BARS NOT TO BE PLACED ON THE WHEEL PATHS AND EVENLY DISTRIBUTED.
2. USE 12" BAR IF SPEED LESS THAN 35 MPH.
3. USE 24" BAR IF SPEED IS GREATER OR EQUAL TO 35 MPH.

*4. 2' CROSSWALK BARS TO BE CENTERED ON CENTERLINE, LANE LINES, AND TRAVEL LANES.

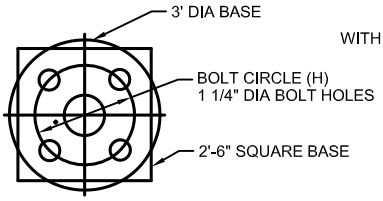
NOT TO SCALE

City of Tukwila

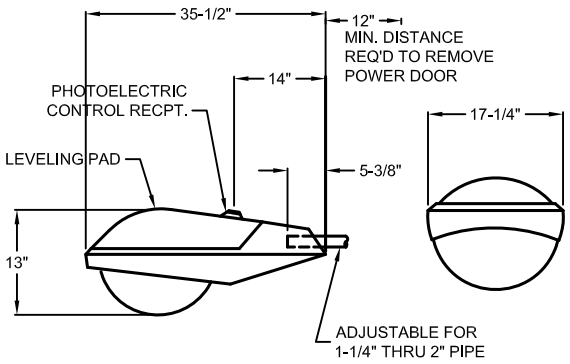
CROSSWALK

DESIGN AND PLACEMENT

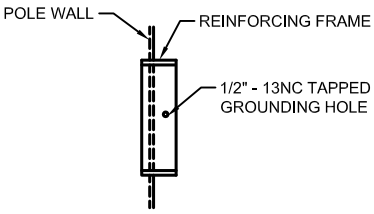
SHEET:	RS-19
REVISION #1:	08.03
APPROVAL:	B. SHELTON



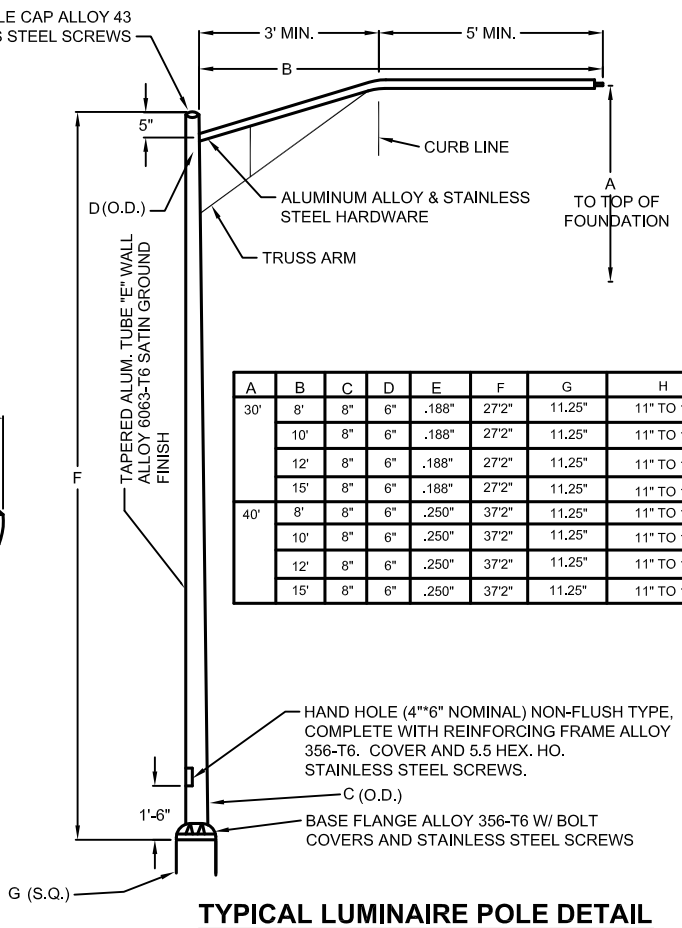
ANCHOR BOLT LAYOUT



LUMINAIRE DETAIL



SECTION THRU HANDHOLE

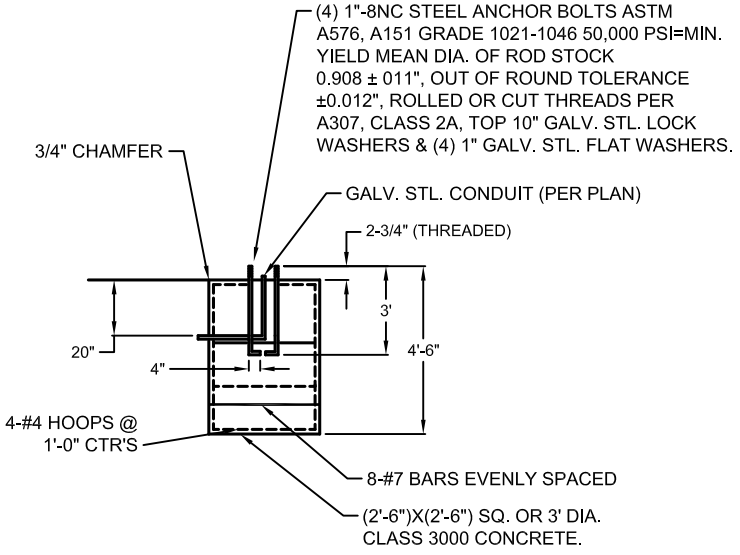


A	B	C	D	E	F	G	H
30'	8'	8"	6"	.188"	27'2"	11.25"	11" TO 12"
	10'	8"	6"	.188"	27'2"	11.25"	11" TO 12"
	12'	8"	6"	.188"	27'2"	11.25"	11" TO 12"
	15'	8"	6"	.188"	27'2"	11.25"	11" TO 12"
40'	8'	8"	6"	.250"	37'2"	11.25"	11" TO 12"
	10'	8"	6"	.250"	37'2"	11.25"	11" TO 12"
	12'	8"	6"	.250"	37'2"	11.25"	11" TO 12"
	15'	8"	6"	.250"	37'2"	11.25"	11" TO 12"

TYPICAL LUMINAIRE POLE DETAIL

NOTES:

1. BRACKETS SUPPLIED WITH 2" N.P.S. SLIPFITTER. SPECIFY MOD. 140 FOR 1.25" N.P.S. SLIPFITTER.
2. TWIN BRACKETS ARE LOCATED 180 O.C.
3. 10" BASE DIA. POLES REQUIRE 1"-8 UNC * 36" LONG ANCHOR BOLTS WITH A 3-1/4" PROJECTION.
4. INSTALL STREET LIGHTS BEHIND SIDEWALK.
5. INSTALL JUNCTION BOX 6" INTO SIDEWALK.
6. SECURE ANCHOR BOLTS IN PLACE BEFORE POURING CONCRETE.
7. INSTALL BOLTS WITH A MINIMUM OF TWO (2) THREADS EXPOSED.
8. SEE RS-22 AND RS-26.
9. INSTALL POLE - SAFE MODEL #4100 BREAKAWAY SUPPORTS ON TOP OF ANCHOR BOLTS.



FOUNDATION DETAIL

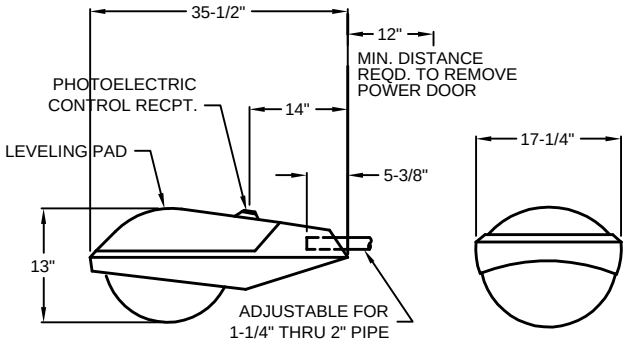
NOT TO SCALE

City of Tukwila

STREET LIGHT POLE

30' & 40' MOUNTING HEIGHT

SHEET:	RS-20		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		

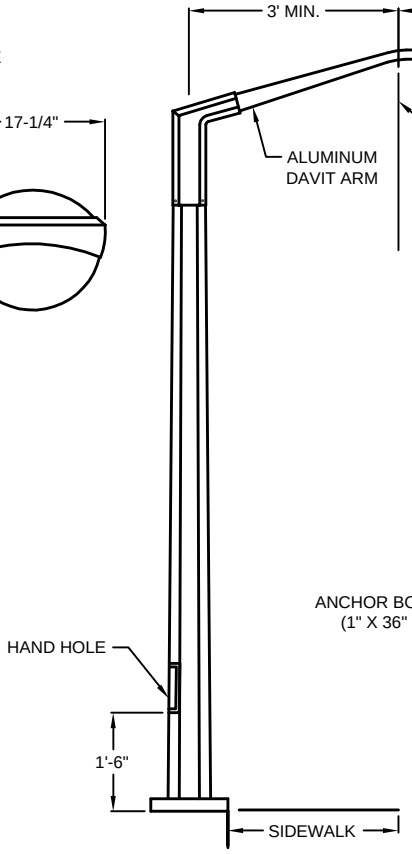


LUMINAIRE DETAIL
(SEE STREET LIGHT DESIGN GUIDELINES STANDARD PLAN)

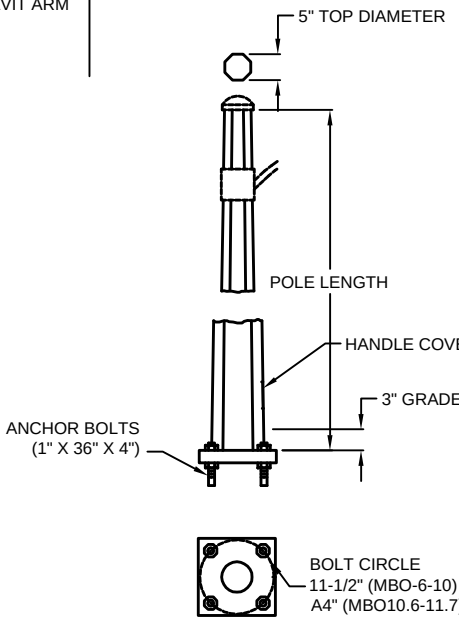
PRESTRESSED CONCRETE LIGHTING

MBO ANCHOR BASE	
POLE NUMBER	LENGTH / WEIGHT
MBO-6	19'7" / 600
MBO-7	23'0" / 740
MBO-7.5	24'7" / 790
MBO-8	26'3" / 900
MBO-8.5	27'11" / 960
MBO-9	29'6" / 1000
MBO-10	32'10" / 1300
MBO-10.6	34'9" / 1380
MBO-11.7	38'5" / 1600

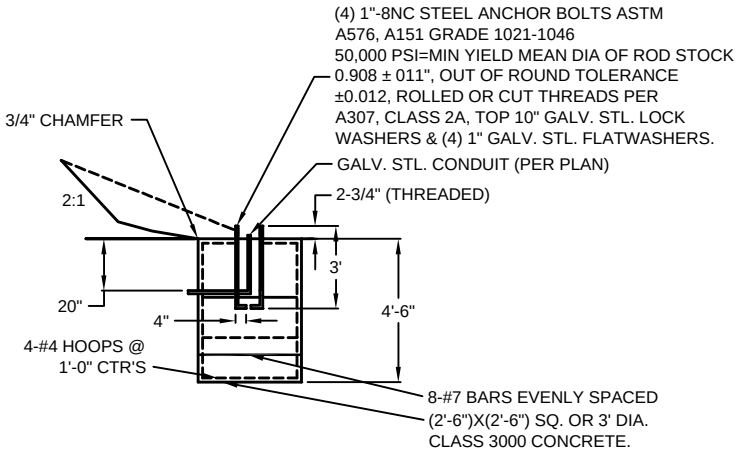
NOTE: APPEARANCE CODE #213



TYPICAL LUMINAIRE POLE DETAIL



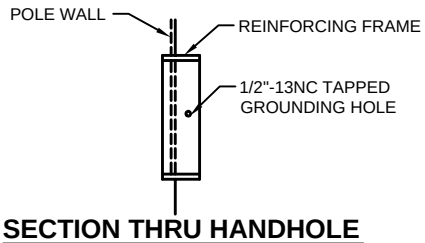
ANCHOR BOLT LAYOUT



FOUNDATION DETAIL

NOTE:

ANCHOR BOLTS SHALL BE ACCURATELY LOCATED AND SECURED IN PLACE PRIOR TO POURING CONCRETE. GROUND ROD SHALL BE INSTALLED PER STANDARD SPECIFICATIONS.



SECTION THRU HANDHOLE

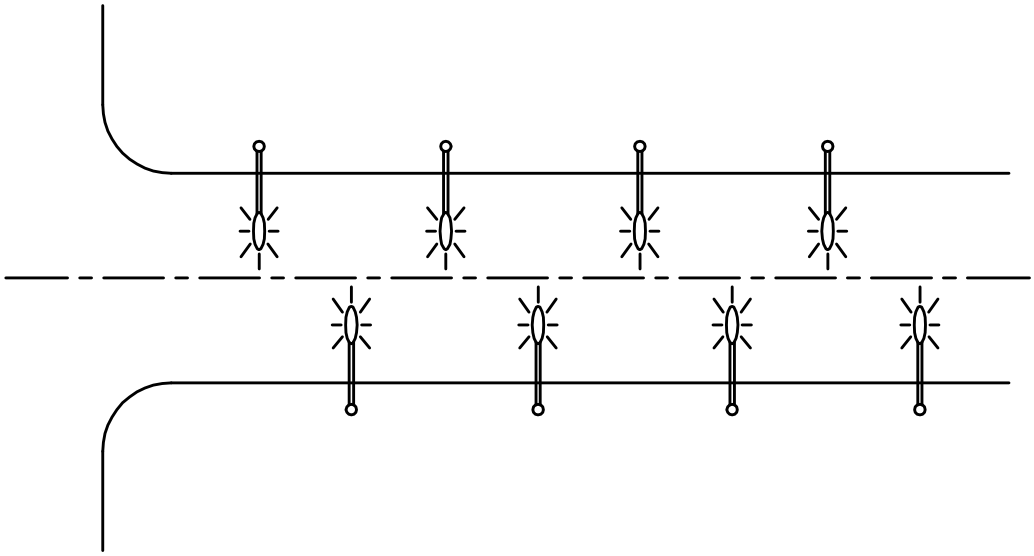
NOTES:

1. BRACKETS SUPPLIED WITH 2" N.P.S. SLIPFITTER. SPECIFY MOD. 140 FOR 1.25 N.P.S. SLIPFITTER.
2. TWIN BRACKETS ARE LOCATED 180 O.C.
3. 10" BASE DIA. POLES REQUIRE 1"-8NC * 48" LONG ANCHOR BOLTS WITH A 3-1/4" PROJECTION.
4. STREET LIGHTS BEHIND SIDEWALK.
5. JUNCTION BOX 6" INTO SIDEWALK.
6. SEE RS-22.

NOT TO SCALE

City of Tukwila

ALTERNATE RESIDENTIAL STREET LIGHT POLE	
30' & 40' MOUNTING HEIGHT	
SHEET:	**RS-21**
REVISION #1:	**08.03**
APPROVAL:	**B. SHELTON**



NOTES:

1. LUMINAIRES SHALL BE HIGH PRESSURE SODIUM VAPOR G.E.

2. DEVELOPER PROVIDES LIGHTING DESIGN FOR SUBDIVISION, INDUSTRIAL OR COMMERCIAL DEVELOPMENT FOR CITY APPROVAL.

3. LAYOUT PLAN SHALL BE PROVIDED BY THE DEVELOPER AND APPROVED BY THE CITY ENGINEER.

4. INSTALLATION OF STREET LIGHTS SHALL CONFORM TO WSDOT/APWA STANDARDS.

TYPE OF ROADWAY	STREET WIDTH	LAMP WATTAGE	AVERAGE MAINTAINED FOOTCANDLE	REQUIRED UNIFORMITY RATIO	LUMINAIRE MOUNTING HEIGHT	LIGHT DISTRIBUTION PATTERN
MAJOR ARTERIAL	OVER 44'	400	1.5	3 TO 1	40'	M-C-III
MAJOR ARTERIAL	44'	400	1.5	3 TO 1	35'	M-C-III
COMMERCIAL/INDUST.	44'	250	0.8	3 TO 1	35'	M-C-III
RESIDENTIAL ART.	44'	150	0.6	4 TO 1	35'	M-C-III
RESIDENTIAL LOCAL	34'	100	0.4	6 TO 1	30'	M-C-III

NOT TO SCALE

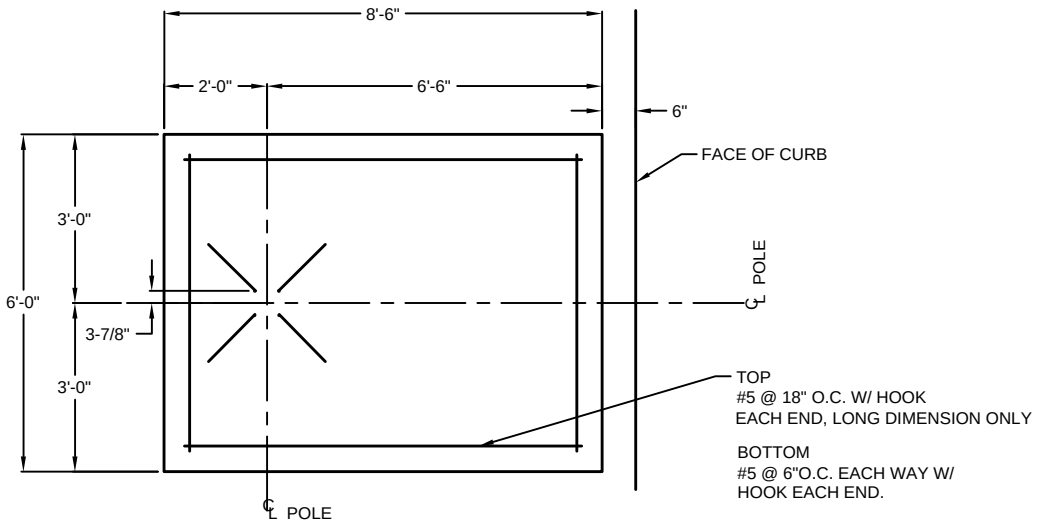
City of Tukwila

STREET LIGHT DESIGN GUIDELINES

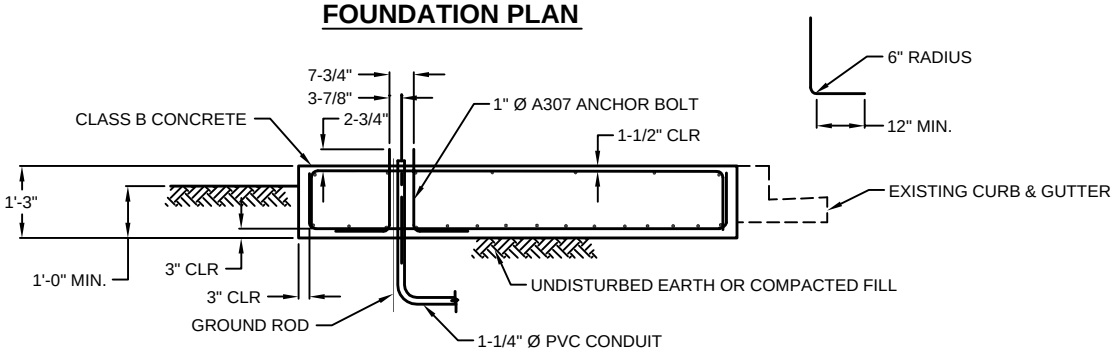
SHEET: RS-24

REVISION #1: 08.03

APPROVAL: B. SHELTON



FOUNDATION PLAN



FOUNDATION SECTION

NOTES:

1. THE FOUNDATION SHOWN IS SPECIFICALLY DESIGNED FOR A "HAPCO TYPE" ALUMINUM POLE UP TO 30' MOUNTING HEIGHT AND 8' MAST ARM.
2. CONCRETE FOR FOUNDATION SHALL BE CLASS B, 3000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
3. REINFORCING STEEL SHALL CONFORM TO MINIMUM REQUIREMENTS OF ASTM A615 GRADE 60.
4. CONTACT CITY OF TUKWILA FOR SECONDARY VOLTAGE AND GROUND WIRE CONNECTION.
5. FOR SERVICE CONNECTION, CONTACT PROVIDER AT LEAST TWO WORKING DAYS IN ADVANCE.
6. ALL PERMANENT CONDUCTORS SHALL BE COPPER. ALL ELECTRICAL WORKMANSHIP AND MATERIALS SHALL CONFORM TO NATIONAL ELECTRICAL CODE REQUIREMENTS.

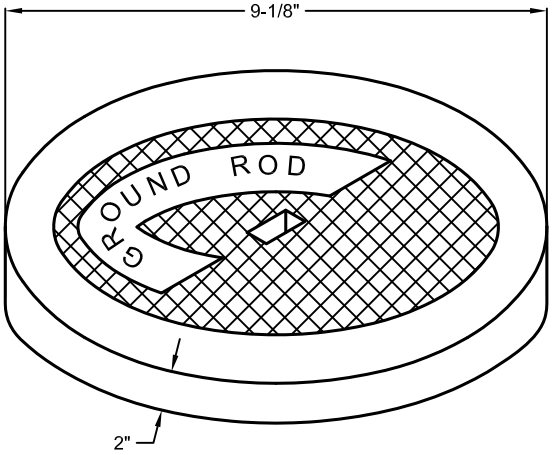
NOT TO SCALE

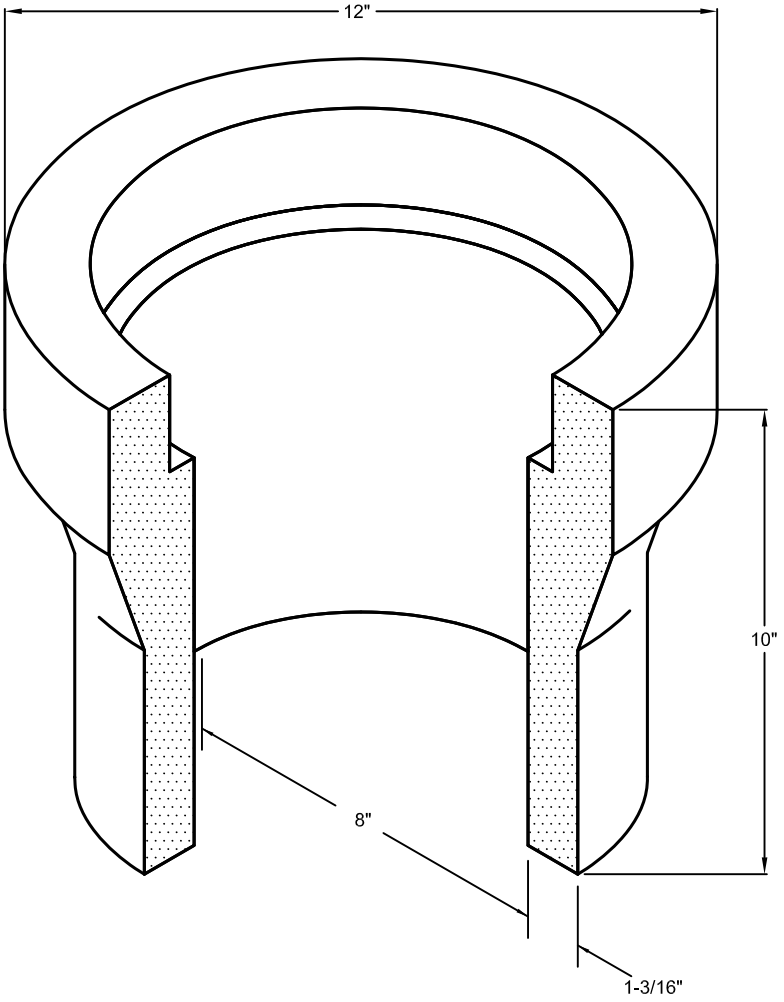
City of Tukwila

LUMINAIRE FOUNDATION

SIDEWALK APPLICATION

SHEET:	RS-25
REVISION #1:	08.03
APPROVAL:	B. SHELTON





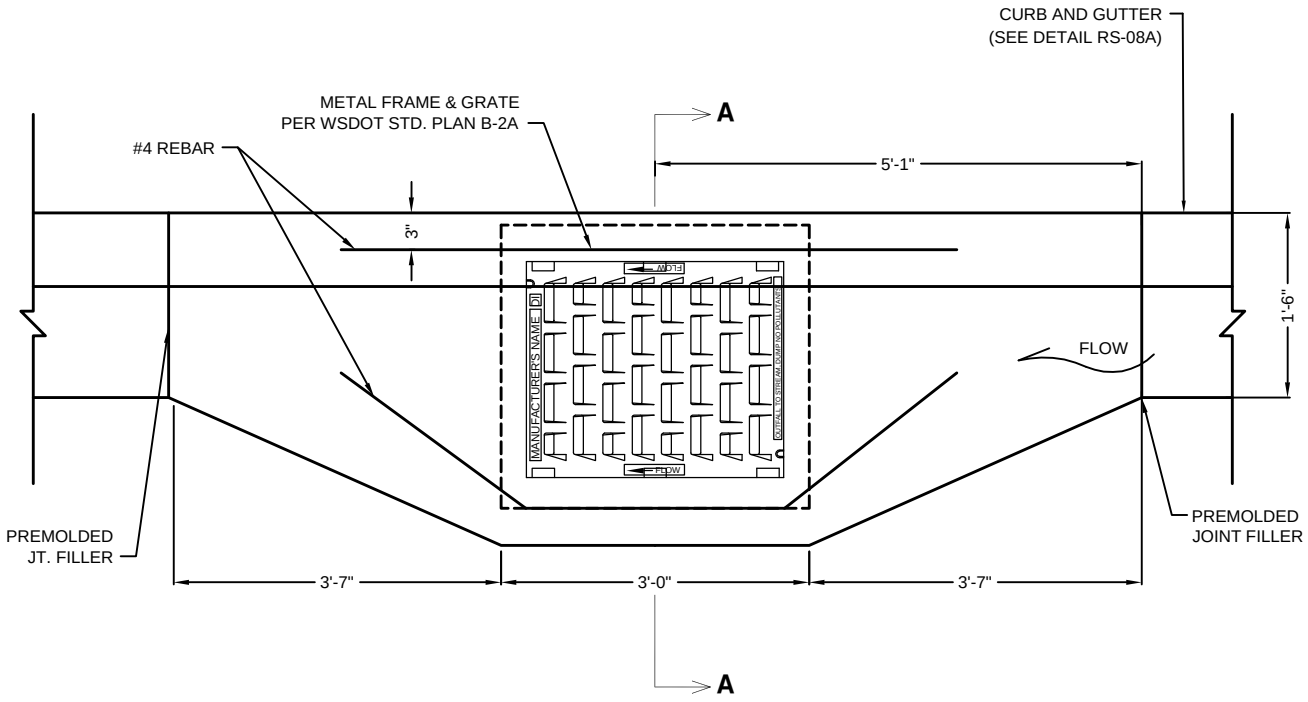
FOGTITE NO. 1-SP BODY
WT. - 37# OR EQUAL
SEE WWW.FOGTITEINC.COM

NOT TO SCALE

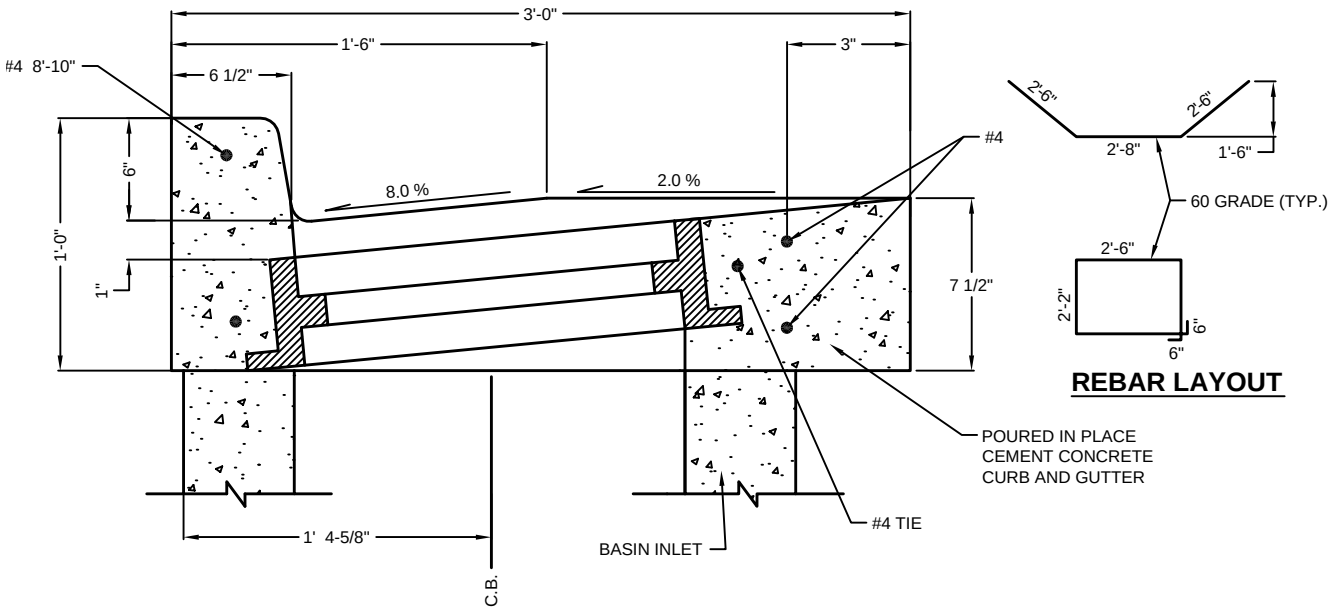
City of Tukwila

GROUND ROD BOX

SHEET:	RS-26		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		



INLET DETAIL



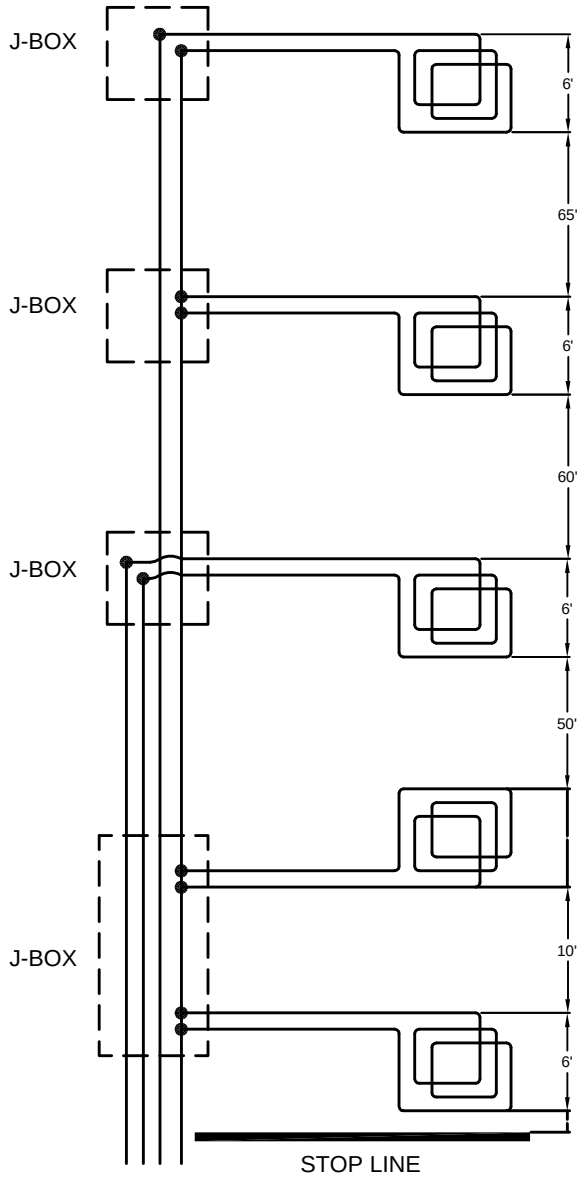
SECTION A-A

REBAR LAYOUT

NOT TO SCALE

City of Tukwila

CURB AND GUTTER	
CATCH BASIN SURROUND	
SHEET:	RS-27
REVISION #1:	08.03
APPROVAL:	B. SHELTON



LOOP SCHEMATIC
SINGLE LANE

NOTES:

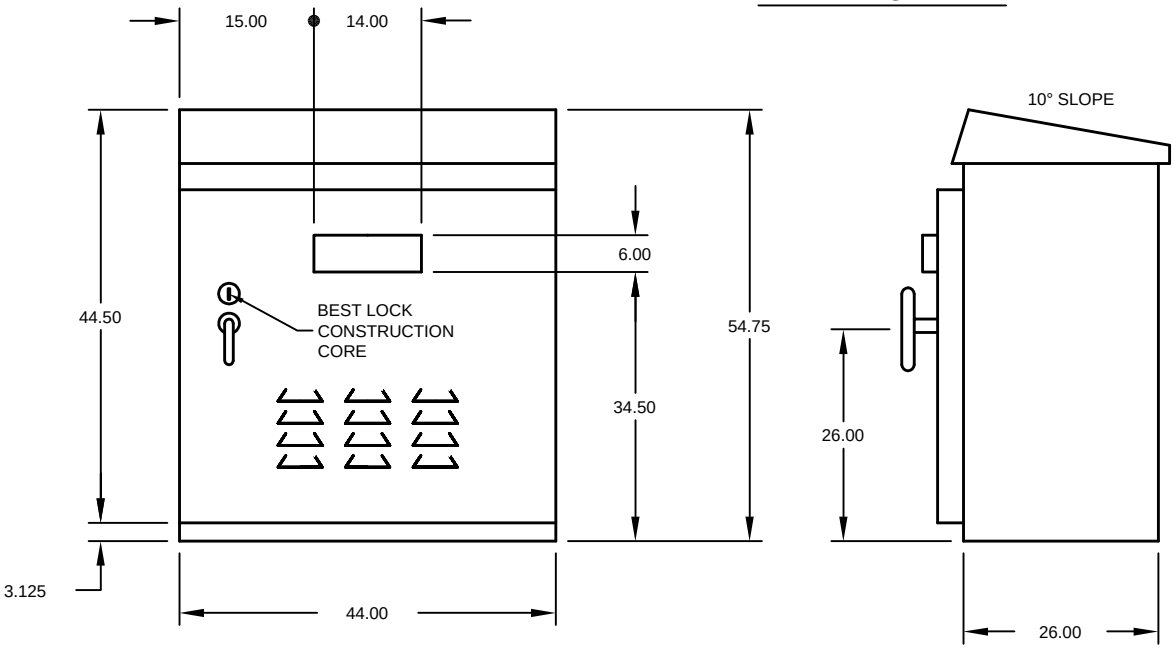
1. INSTALL PER THESE STANDARDS.
2. DESIGNER SHALL MODIFY LOOP SPACING FOR LOOPS IN PARALLEL OR IN SERIES.
3. SEE APWA 9-29.3 AND THESE STANDARDS.
4. SEE WSDOT STD SPECS 8-20.3(14)D FOR MEGGER TEST.

NOT TO SCALE

City of Tukwila

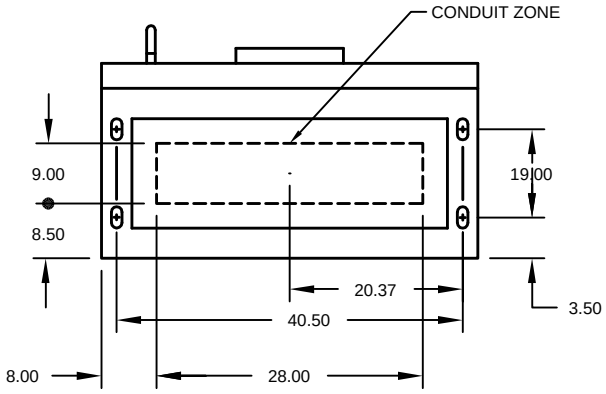
INDUCTION LOOP	
VEHICLE DETECTORS	
SHEET:	RS-28
REVISION #1:	08.03
APPROVAL:	B. SHELTON

TYPE "P" CABINET



FRONT VIEW

SIDE VIEW



CONDUIT ZONE & ANCHOR BOLT LOCATION

NOTES:

1. ALL DIMENSIONS IN INCHES

2. CITY PROVIDES 8 PHASE NEMA CONTROLLER, UNLESS OTHERWISE DIRECTED.

3. FOUNDATION SHALL MEET OR EXCEED FOUNDATION DETAIL ON WSDOT STANDARD PLAN J-3B.

4. CABINET SHALL BE ANODIZED ALUMINUM, 0.125" THICK, 5052 SERIES, NEMA 3R.

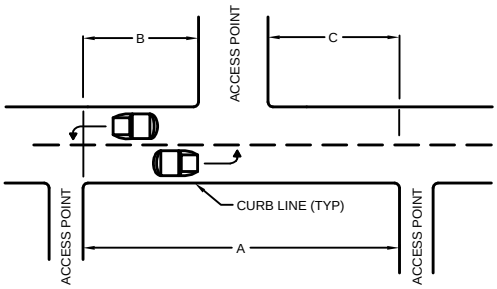
NOT TO SCALE

City of Tukwila

TRAFFIC SIGNAL	
CONTROLLER CABINET	
SHEET:	RS-29
REVISION #1:	08.03
APPROVAL:	B. SHELTON

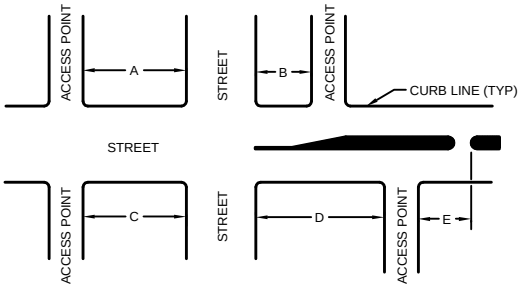
MINIMUM ACCESS POINT SPACING WHEN DIRECTLY OPPOSING DRIVEWAYS ARE NOT POSSIBLE

STREET SPEED [2] (MPH)	DIMENSIONS		
	A [3]	B [4]	C [4]
25	105	105	105
30	125	125	125
35	150	150	150
40	185	185	185
45	230	230	230



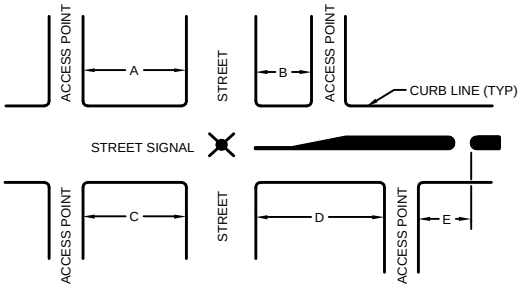
MINIMUM CORNER CLEARANCES FOR STOP SIGN INTERSECTION CONTROL (FEET)

DIM	OPERATION SPEED			
	30	35	40	45
A	115	135	150	180
B	85	105	120	140
C	115	135	160	180
D	115	135	160	180
E	105/0	135/0	160/0	180/0



MINIMUM CORNER CLEARANCES FOR SIGNALIZED INTERSECTION CONTROL (FEET)

DIM	OPERATION SPEED			
	30	35	40	45
A	230	275	320	365
B	115	135	160	180
C	230	275	320	365
D	230	275	320	365
E	115/0	135/0	160/0	180/0



NOTES:

1. ACCESS POINT SPACING ONLY FOR PUBLIC STREETS. THIS SHALL BE A GUIDELINE FOR PRIVATE STREETS.
2. REFERS TO POSTED SPEED OR OPERATING SPEED, WHICHEVER IS GREATEST.
3. BETWEEN THE NEAREST EDGES OF TWO-WAY ACCESS POINTS. DISTANCES BETWEEN ADJACENT, ONE-WAY ACCESS POINTS (WITH THE INBOUND ACCESS UPSTREAM) CAN BE ONE-HALF THE DISTANCES.
4. ACCESS POINTS DIRECTLY OPPOSITE FROM EACH OTHER WHEN POSSIBLE. WHERE IT IS NOT POSSIBLE, THESE DIMENSIONS WILL APPLY.
5. WHERE ACCESS POINTS ARE TO BE SIGNALIZED, A MINIMUM SPACING OF 600 FEET TO ANY OTHER SIGNALIZED INTERSECTION SHOULD BE MAINTAINED.
6. ACCESS POINT NEAR STOP OR SIGNAL CONTROLLED INTERSECTIONS SHOULD BE CHECKED TO DETERMINE WHETHER STOPPING QUEUES WILL BLOCK THE ACCESS POINT.
7. IN CASES WHERE ACCESS SPACING IS NOT ATTAINABLE BECAUSE EXISTING FRONTAGES ARE NARROW OR HAVE PHYSICAL CONSTRAINTS, ACCESS POINTS SHOULD BE LOCATED AS CLOSE TO THE TABULATED VALUES SHOWN ABOVE AS POSSIBLE. THE CITY ENGINEER SHALL BASE ALL SUCH DECISIONS ON MAINTAINING NEEDED CORRIDOR CAPACITY AND SAFETY.

NOT TO SCALE

City of Tukwila

MIC DRIVEWAY DESIGN & LOCATION

ACCESS SPACING & CORNER CLEARANCES

SHEET:	RS-30
REVISION #1:	08.03
APPROVAL:	B. SHELTON

NOT TO SCALE

City of Tukwila

UTILITY ADJUSTMENT

CATCH BASINS AND MANHOLES

SHEET:	RS-31		
REVISION #1:	08.04	LAST REVISION:	
APPROVAL:	B. SHELTON		

City of Tukwila

WORK ZONE PLAN

LOW VOLUME ROAD - CENTERLINE WORK

SHEET: RS-32

REVISION #1: 08.03

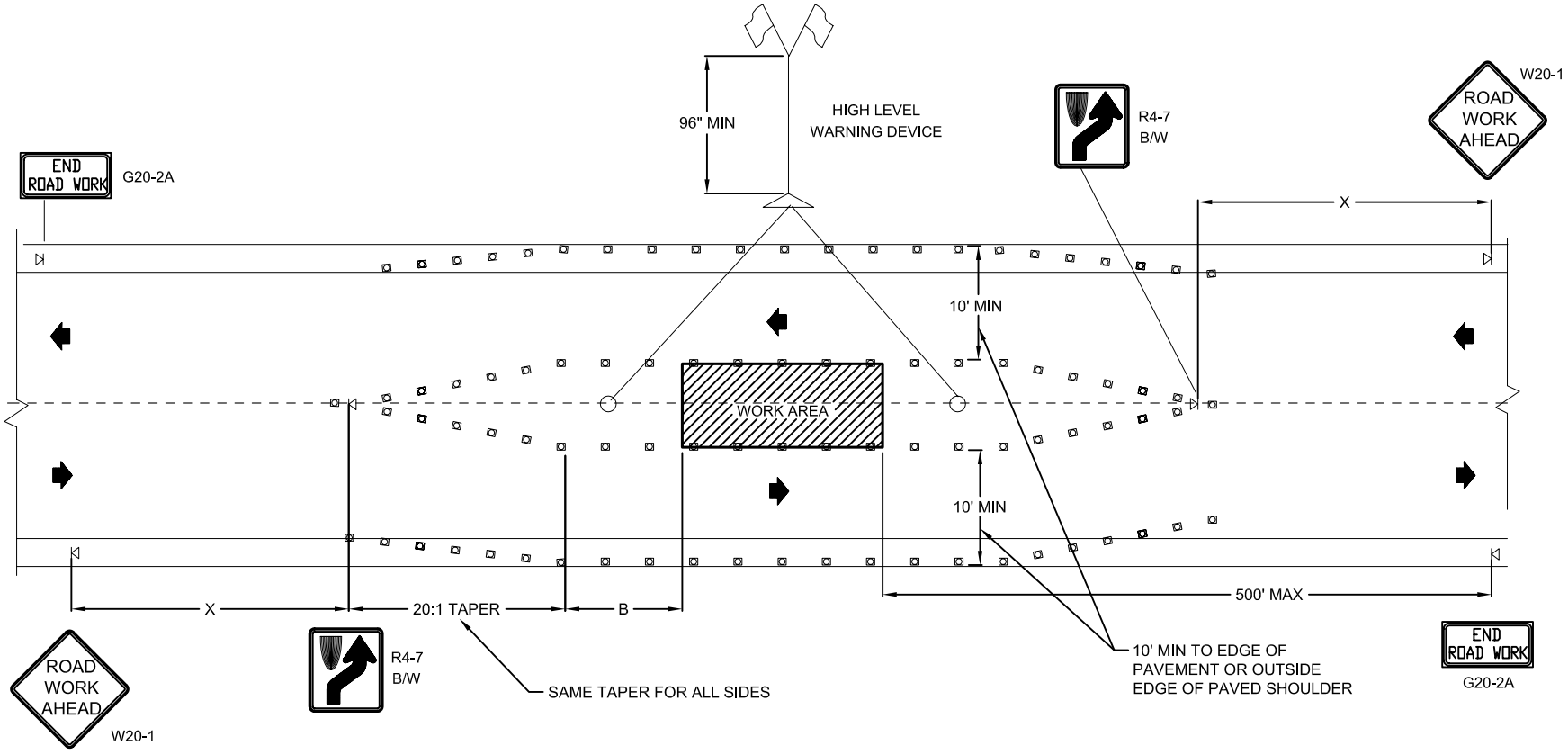
LAST REVISION: 08.04

APPROVAL: B. SHELTON

SIGN SPACING = X (FEET)		
ARTERIALS	35/40 MPH	350'+-
RESIDENTIAL AREAS & BUSINESS DISTRICTS	25/30 MPH	200'+-
ALL SIGNS ARE BLACK ON ORANGE UNLESS OTHERWISE DESIGNATED.		

CHANNELIZING DEVICE SPACING (FEET)		
MPH	TAPER	TANGENT
35/45	30	60
25/30	20	40

BUFFER DATA						
BUFFER SPACE = B						
SPEED (MPH)	25	30	35	40	45	
LENGTH (FEET)	55	85	120	170	220	



NOT TO SCALE

LEGEND

SIGN LOCATION - TRIPOD MOUNT

TEMPORARY TRAFFIC CONTROL DEVICES

City of Tukwila

WORK ZONE PLAN

LOW VOLUME ROAD - SURVEYING

SHEET: RS-33

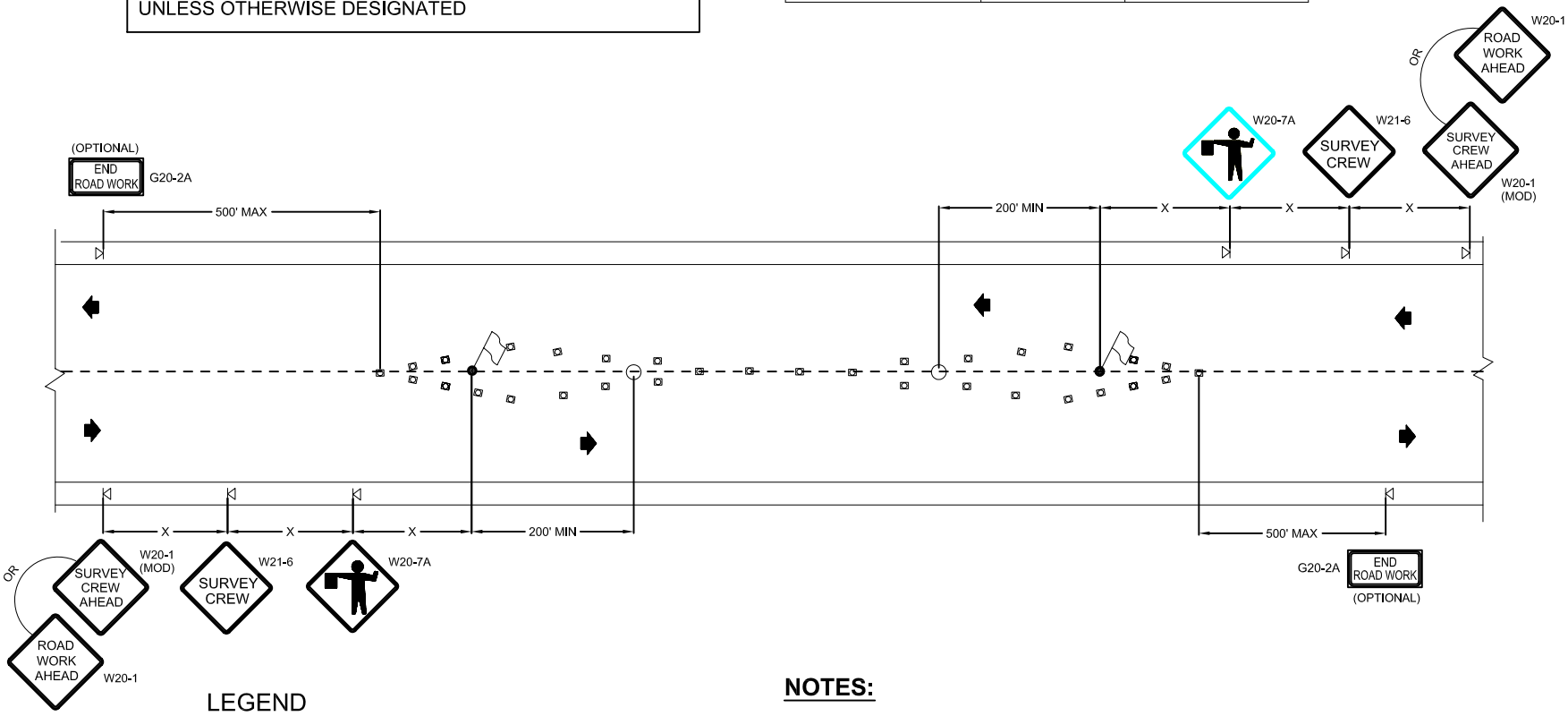
REVISION #1: 08.03

LAST REVISION: 08.04

APPROVAL: B. SHELTON

SIGN SPACING = X (FEET)		
ARTERIALS	35/40 MPH	350'+-
RESIDENTIAL AREAS & BUSINESS DISTRICTS	25/30 MPH	200'+-
ALL SIGNS ARE BLACK ON ORANGE UNLESS OTHERWISE DESIGNATED		

CHANNELIZING DEVICE SPACING (FEET)		
MPH	TAPER	TANGENT
35/45	30	60
25/30	20	40



LEGEND

- SIGN LOCATION - TRIPOD MOUNT
- TEMPORARY TRAFFIC CONTROL DEVICES
- FLAGGING STATION
- SURVEYOR

NOTES:

1. FOR USE WITH SPEEDS OF 45 MPH AND UNDER.
2. (3) ADVANCED WARNING SIGNS ARE REQUIRED FOR FLAGGING OPERATIONS. (L&I REQUIREMENTS)

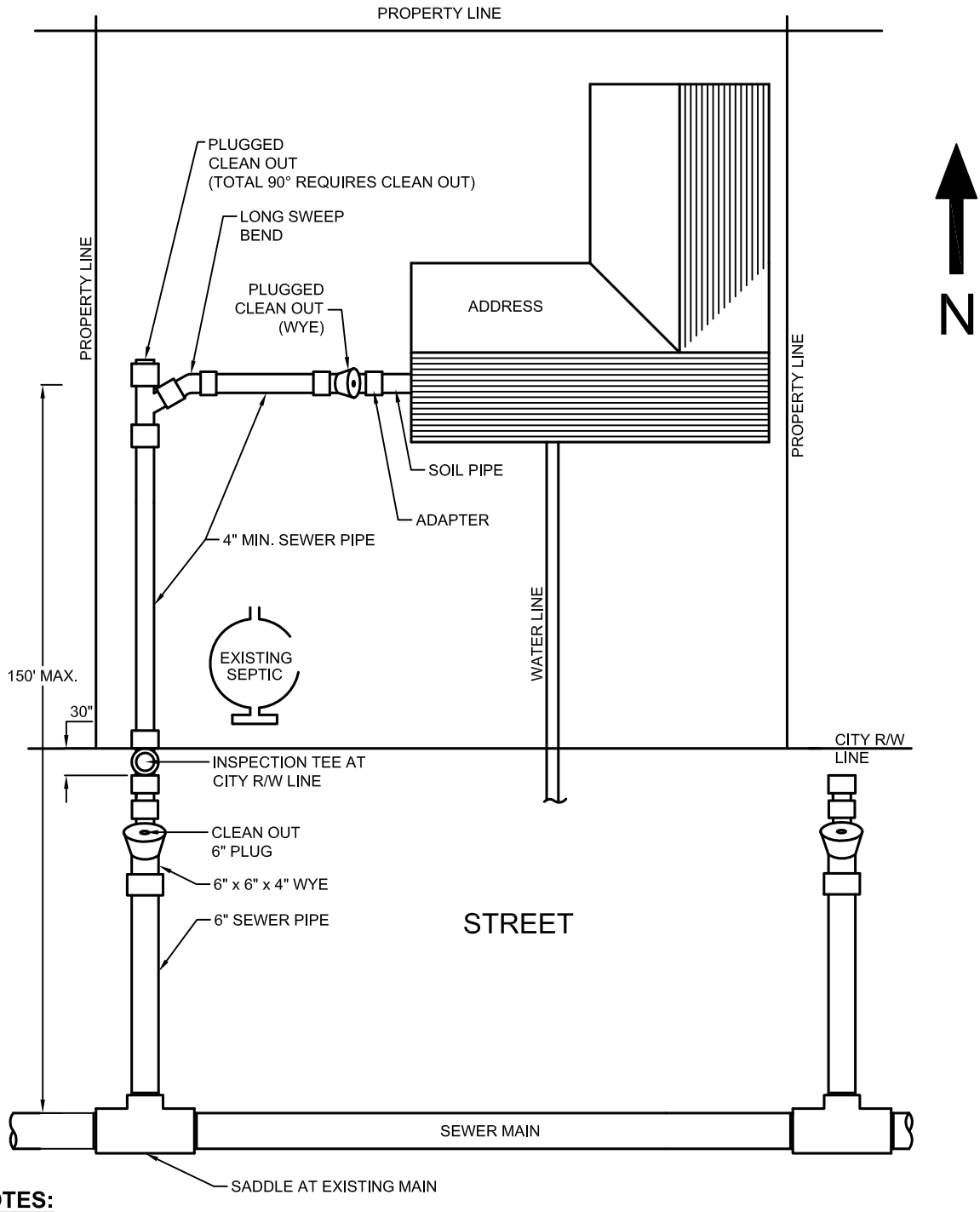
NOT TO SCALE

NOT AVAILABLE

NOT TO SCALE

City of Tukwila

SHEET:	SS-01
REVISION #1:	
APPROVAL:	



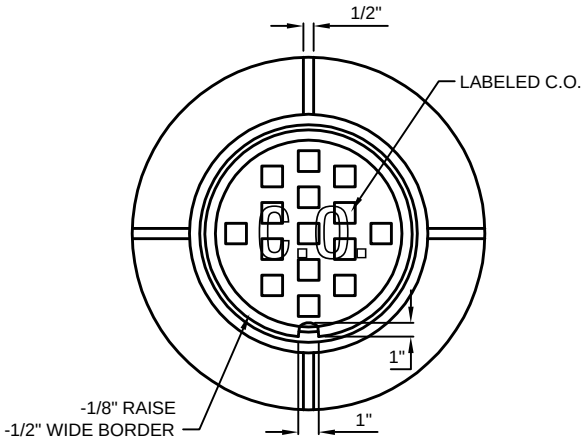
NOTES:

1. MATERIALS AND INSTALLATION CHAPTER 8 OF THESE STANDARDS.
2. DECOMMISSION SEPTIC TANK PER CHAPTER 8 OF THESE STANDARDS AND KING COUNTY HEALTH DEPARTMENT.
3. WATER AND SEWER LINE SEPARATION 10' HORIZONTALLY. IF WATER AND SEWER LINES CROSS, SEWER SHALL BE AT LEAST 18" BELOW THE WATER LINE.
4. STANDARDS FOR SEWER MAIN APPLY TO CONNECTIONS LONGER THAN 150' FROM THE MAIN. SEE CHAPTER 8.

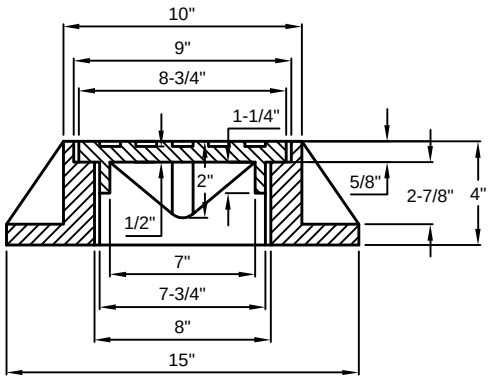
NOT TO SCALE

City of Tukwila

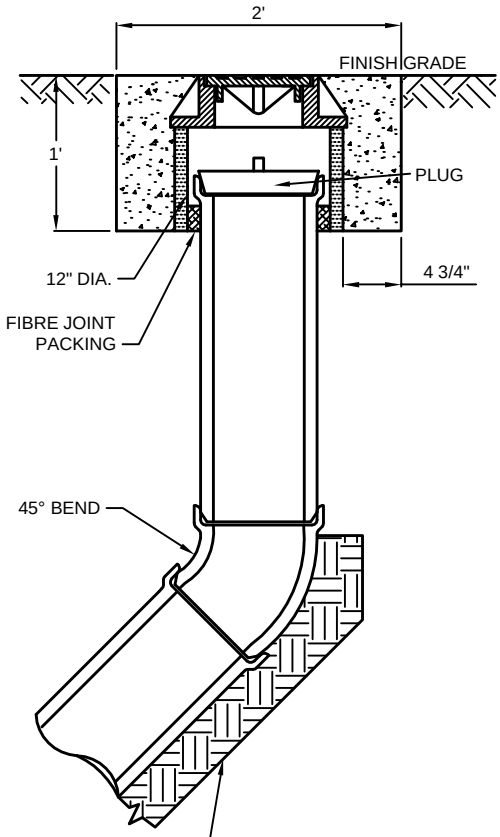
SANITARY SIDE SEWER			
RESIDENTIAL			
SHEET:	SS-02		
REVISION #1:	08.03	LAST REVISION:	12.04
APPROVAL:	B. SHELTON		



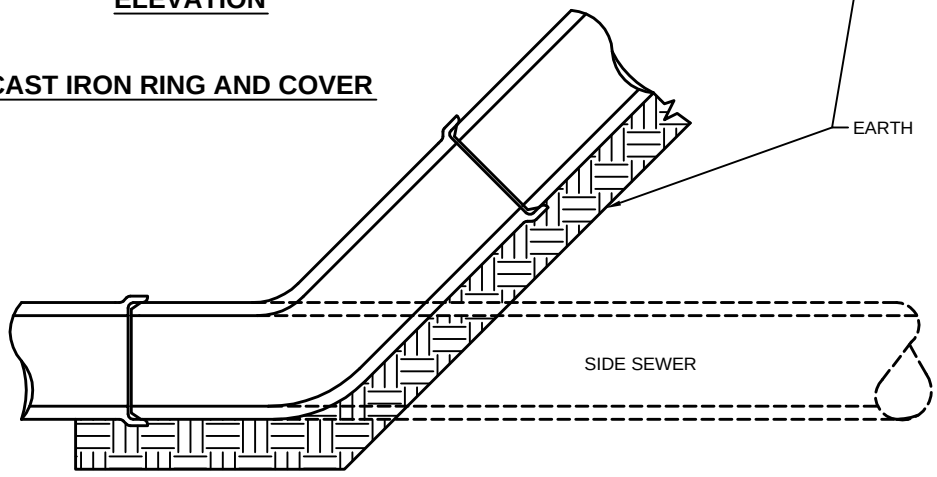
PLAN VIEW



ELEVATION



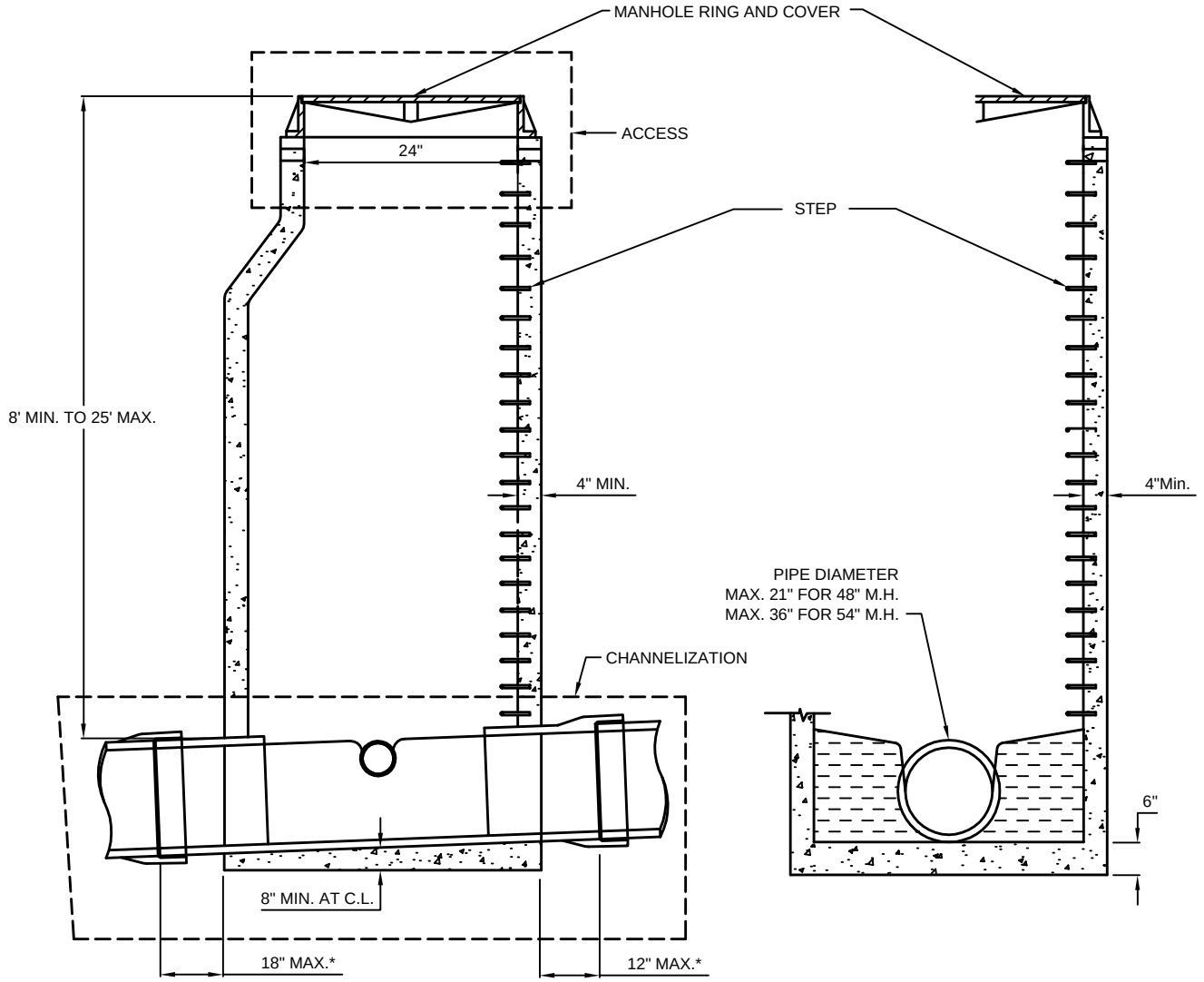
CAST IRON RING AND COVER



NOT TO SCALE

City of Tukwila

SANITARY SIDE SEWER	
CLEAN-OUT	
SHEET:	SS-03
REVISION #1:	08.03
APPROVAL:	B. SHELTON



NOTES:

1. MAX. PIPE DIAMETER MAY BE LIMITED BY PIPE CONFIGURATION OR AS DETERMINED BY ENGINEER.

2. RUBBER GASKET AND GROUT AT ALL JOINTS.

3. GROUT ALL LIFTING EYE HOLES.

4. SEE SS-08 FOR ACCESS AND CHANNELIZATION.

5. SEE SS-13 FOR STEP DETAIL.

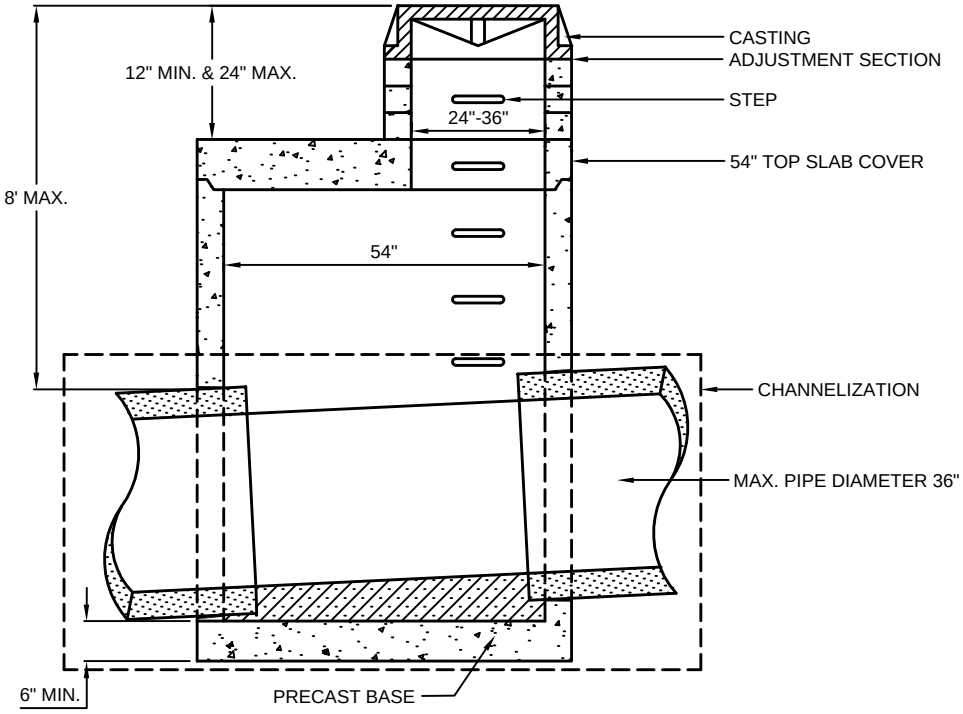
6. INSTALL PER CHAPTER 8 OF THESE STANDARDS.

* APPLIES TO 24" OR SMALLER DIAMETER PIPES.

NOT TO SCALE

City of Tukwila

MANHOLE	
48" AND 54"	
SHEET:	**SS-04**
REVISION #1:	**08.03**
APPROVAL:	**B. SHELTON**



54" MANHOLE

NOTES:

1. 36" ACCESS OPENING REQUIRED WHEN INVERT ELEVATION TO RIM IS LESS THAN 4'.

2. MAX. PIPE DIAMETER MAY BE LIMITED BY PIPE CONFIGURATION.

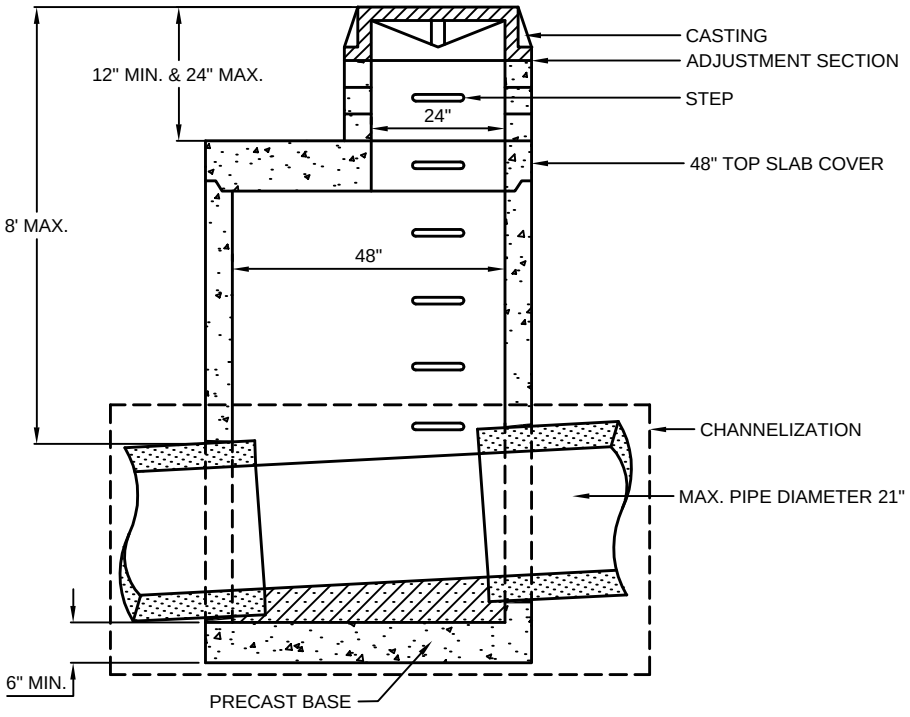
3. RUBBER GASKET AND GROUT ALL JOINTS.

4. SEE SS-08 FOR ACCESS AND CHANNELIZATION.

5. SEE SS-13 FOR STEP DETAIL.

6. SEE SS-11 FOR CASTING.

7. INSTALL PER CHAPTER 8 OF THESE STANDARDS.



48" MANHOLE

NOT TO SCALE

City of Tukwila

MANHOLE

48" AND 54" (SHALLOW)

SHEET:	SS-05
REVISION #1:	08.03
APPROVAL:	B. SHELTON

NOTES:

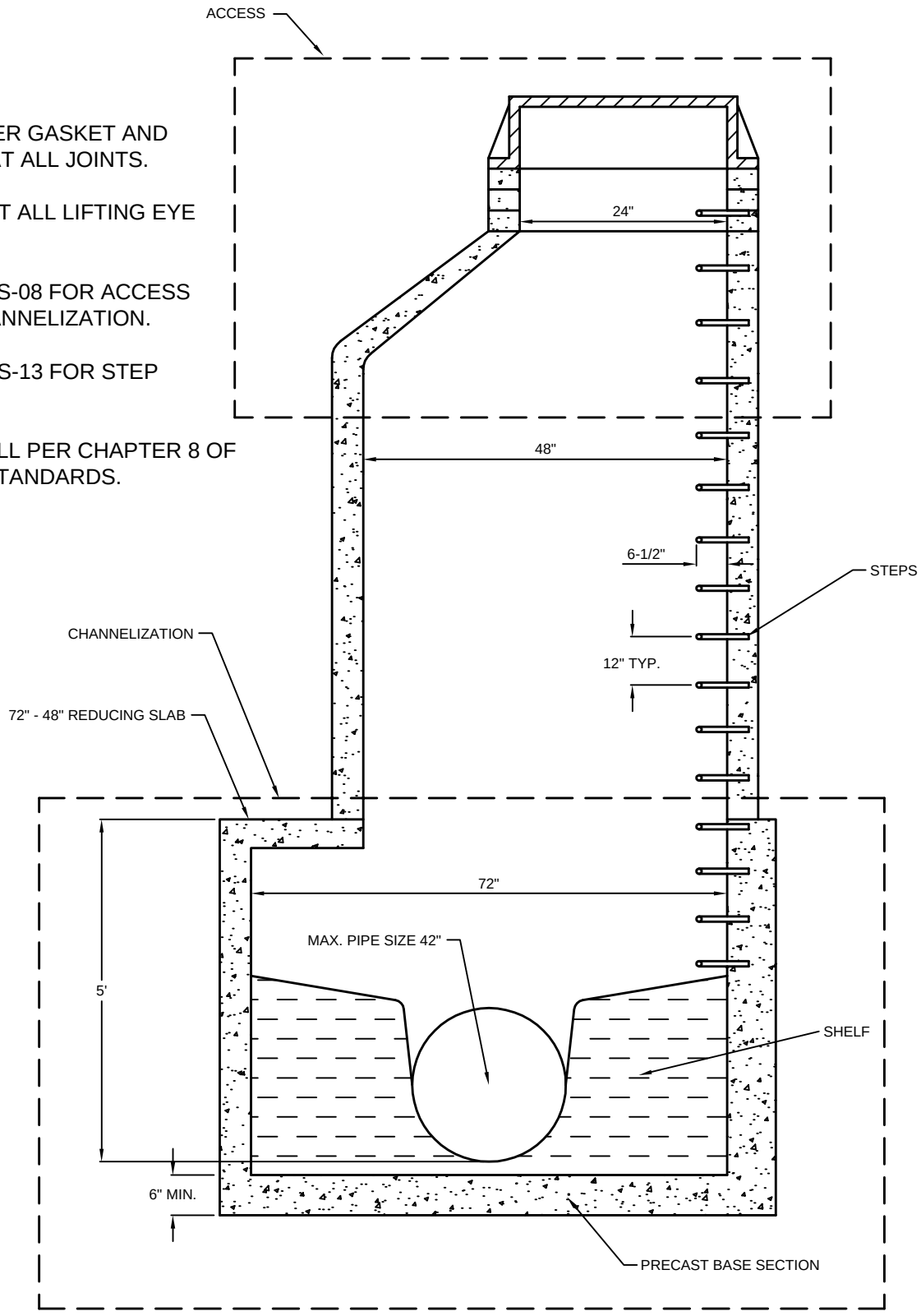
1. RUBBER GASKET AND GROUT AT ALL JOINTS.

2. GROUT ALL LIFTING EYE HOLES.

3. SEE SS-08 FOR ACCESS AND CHANNELIZATION.

4. SEE SS-13 FOR STEP DETAIL.

5. INSTALL PER CHAPTER 8 OF THESE STANDARDS.



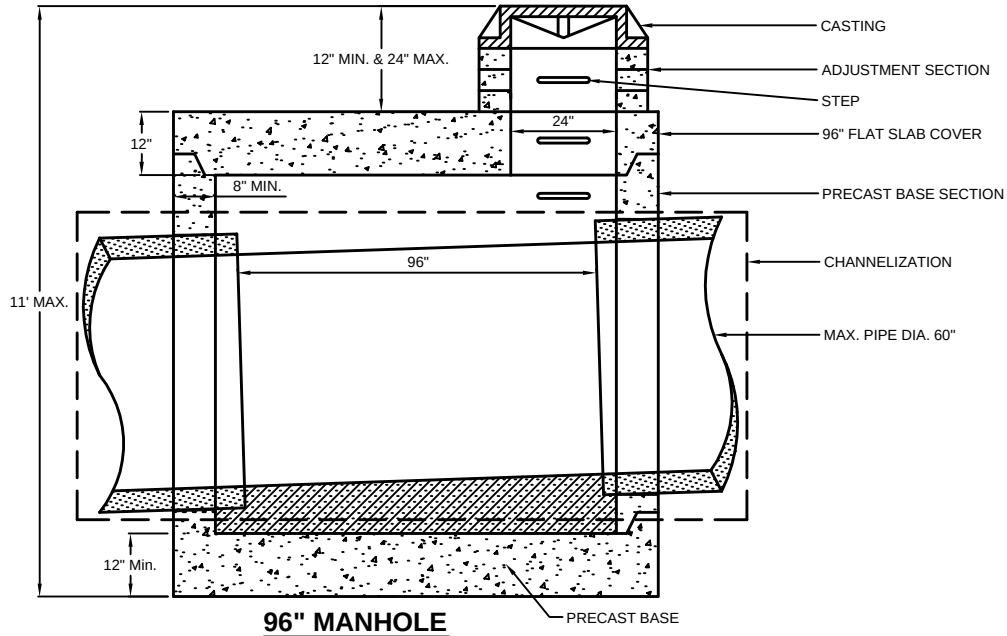
NOT TO SCALE

City of Tukwila

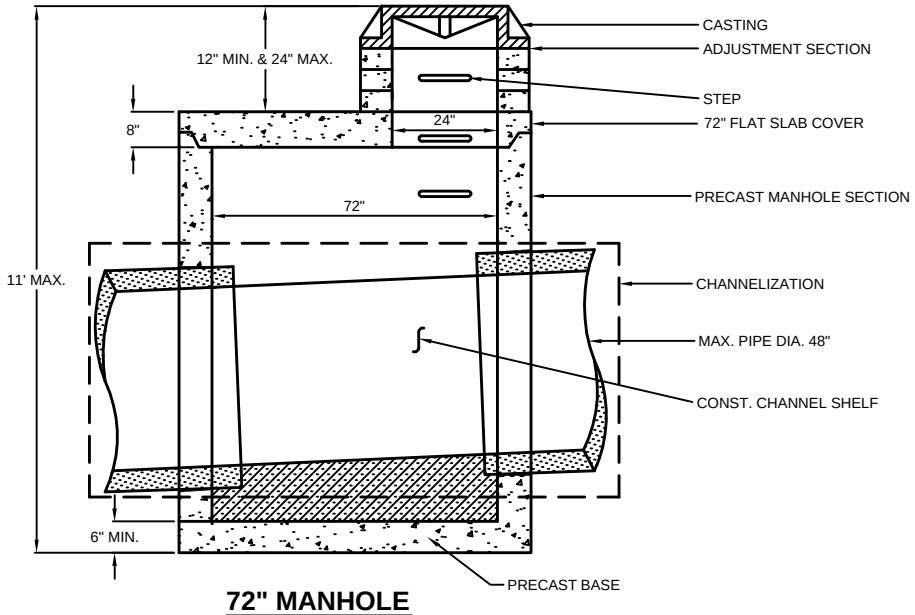
MANHOLE

72" (TYPE IA4 AND IB4)

SHEET:	SS-06
REVISION #1:	08.03
APPROVAL:	B. SHELTON



96" MANHOLE



72" MANHOLE

NOTES:

1. LOCATE ACCESS OVER CHANNEL ON TYPE III MANHOLE.
2. FOR PIPES > 48", PROVIDE ACCESS LADDER.
3. MAX. PIPE DIAMETER MAY BE LIMITED BY PIPE CONFIGURATION OR AS DETERMINED BY ENGINEER.
4. RUBBER GASKET AND GROUT AT ALL JOINTS.
5. GROUT ALL LIFTING EYE HOLES.
6. SEE SS-08 FOR ACCESS AND CHANNELIZATION.
7. SEE SS-13 FOR STEP DETAIL.
8. INSTALL PER CHAPTER 8 OF THESE STANDARDS.

NOT TO SCALE

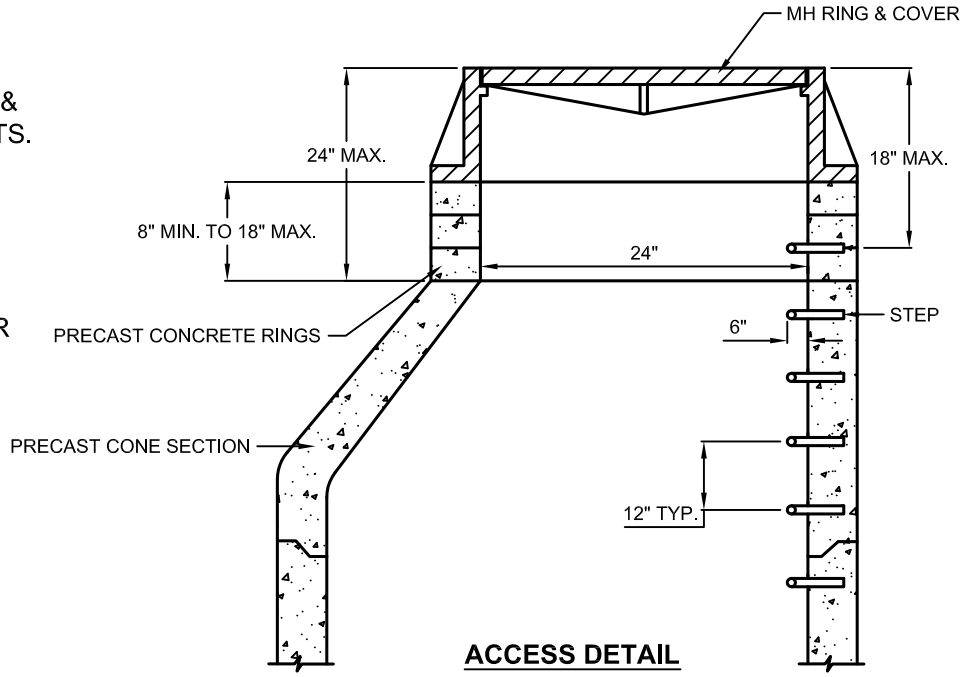
City of Tukwila

MANHOLE	
72" AND 96" (SHALLOW)	
SHEET:	**SS-07**
REVISION #1:	**08.03**
APPROVAL:	**B. SHELTON**

NOTES:

1. RUBBER GASKET & GROUT AT ALL JOINTS. GROUT ALL LIFTING EYE HOLES.

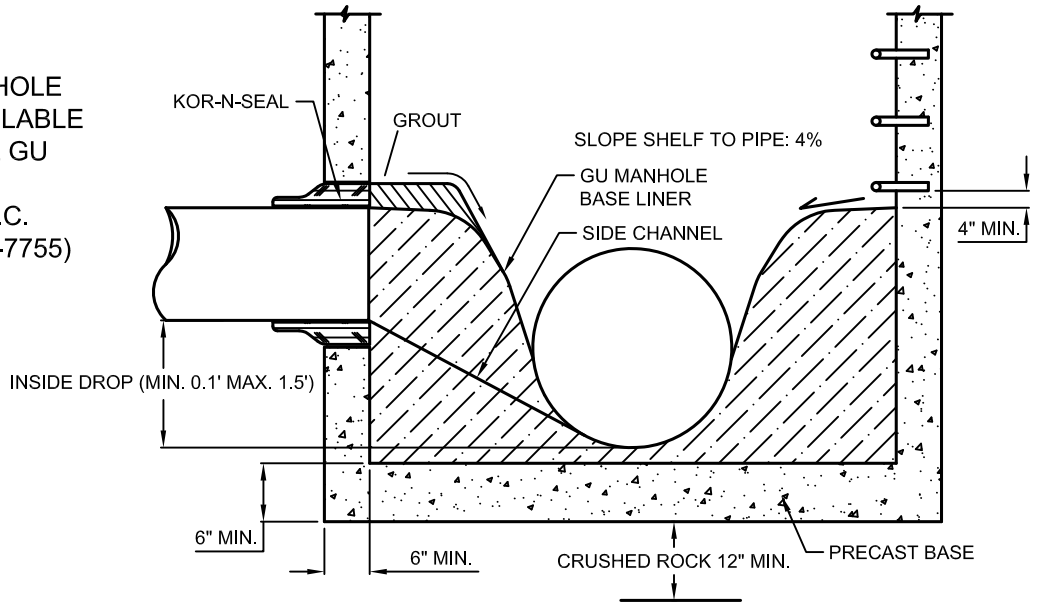
2. STEPS SHALL BE LANE #P-13938. REFER TO SS-13 FOR STEP DETAIL.



ACCESS DETAIL

NOTES:

INSTALL GU MANHOLE BASE LINER, AVAILABLE THROUGH PREDL GU LINER SYSTEMS (ALDERGROVE, B.C. CANADA (604)607-7755)



CHANNELIZATION

NOT TO SCALE

City of Tukwila

MANHOLE

ACCESS AND CHANNELIZATION

SHEET:	SS-08		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		

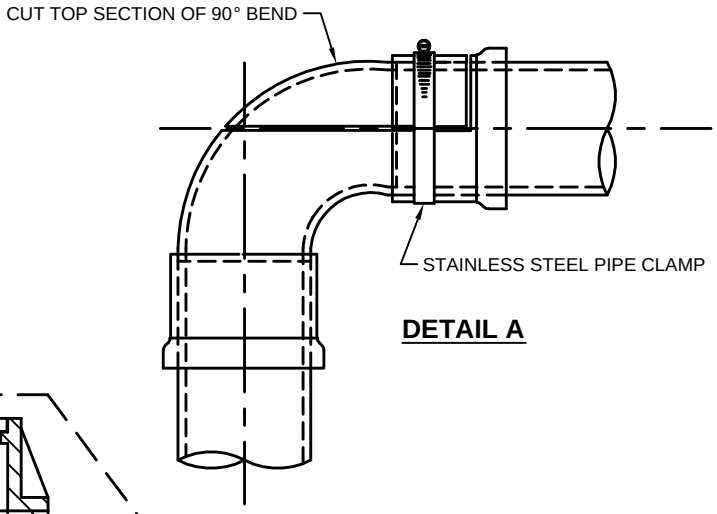
NOTES:

1. INSIDE DROPS REQUIRES DIRECTOR'S APPROVAL.

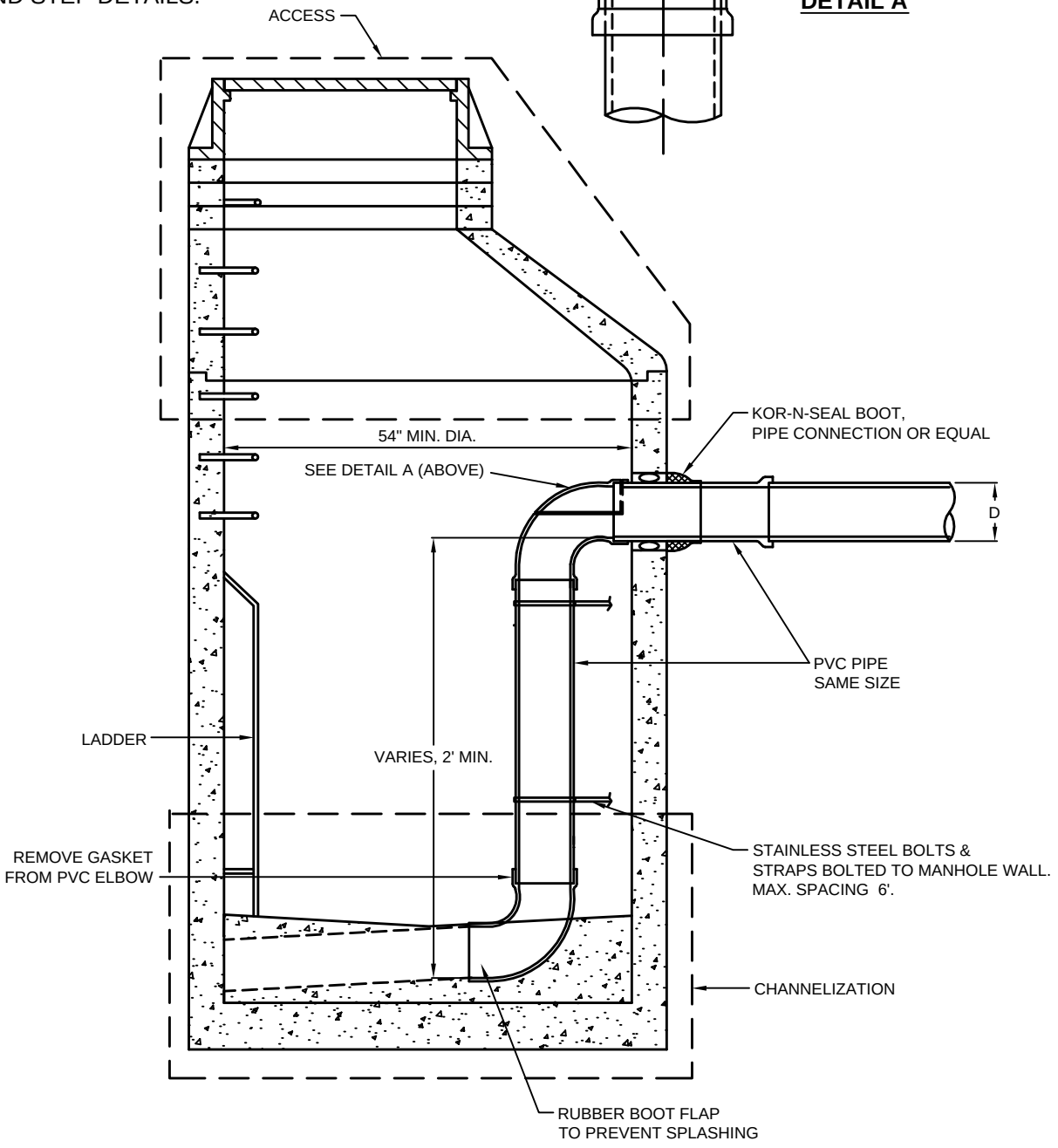
2. USE INSIDE DROP ONLY ON PVC SYSTEM.

3. SEE SS-08 FOR ACCESS AND CHANNELIZATION.

4. SEE SS-12 AND SS-13 FOR LADDER AND STEP DETAILS.



DETAIL A



NOT TO SCALE

City of Tukwila

MANHOLE

INSIDE DROP

SHEET:	SS-09
REVISION #1:	08.03
APPROVAL:	B. SHELTON

NOTES:

1. DROP PIPING TO BE SAME SIZE AS INTERCEPTED SEWER.

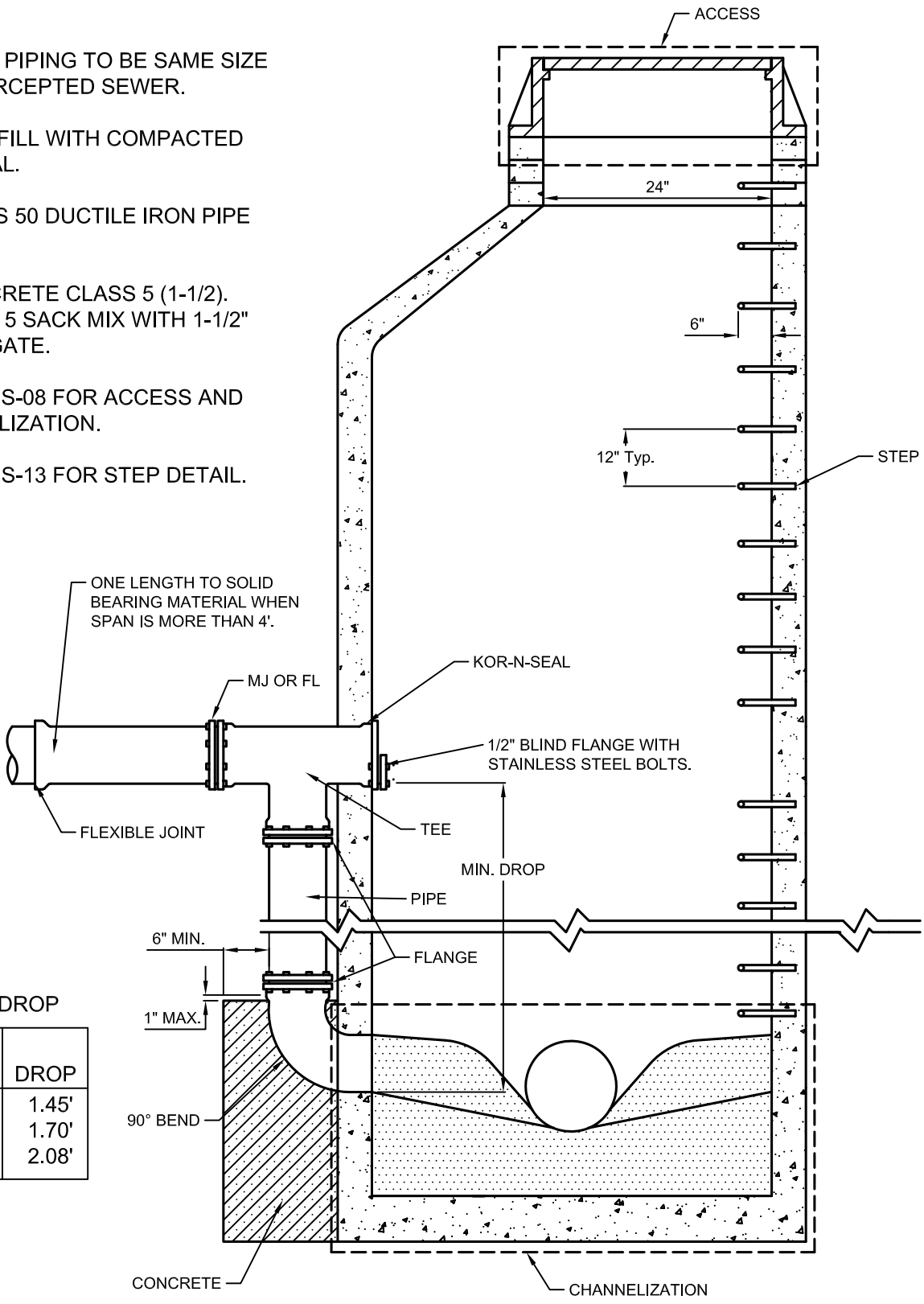
2. BACKFILL WITH COMPACTED MATERIAL.

3. CLASS 50 DUCTILE IRON PIPE ONLY.

4. CONCRETE CLASS 5 (1-1/2). CEMENT 5 SACK MIX WITH 1-1/2" AGGREGATE.

5. SEE SS-08 FOR ACCESS AND CHANNELIZATION.

6. SEE SS-13 FOR STEP DETAIL.



MIN DROP

PIPE SIZE	DROP
8"	1.45'
10"	1.70'
12"	2.08'

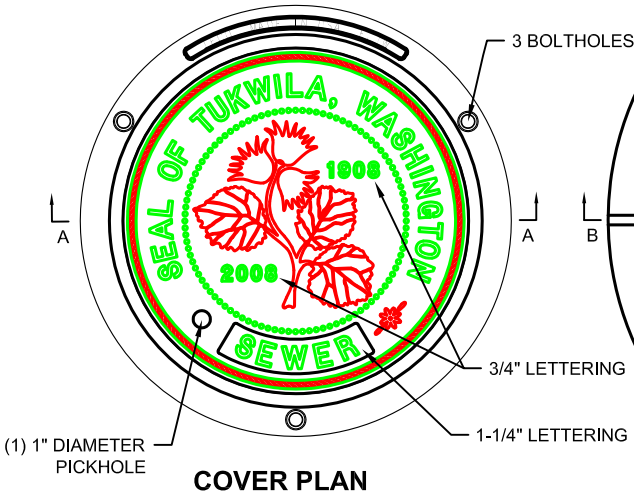
NOT TO SCALE

City of Tukwila

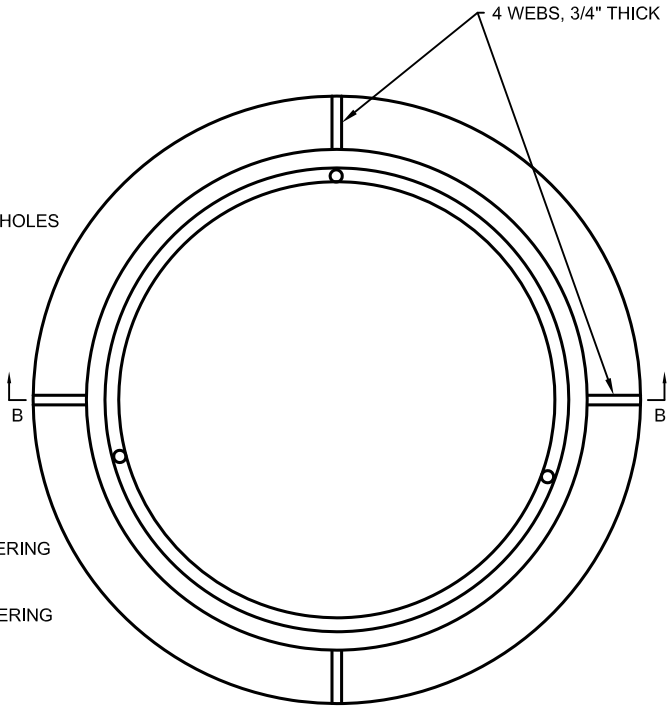
MANHOLE

DROP CONNECTION

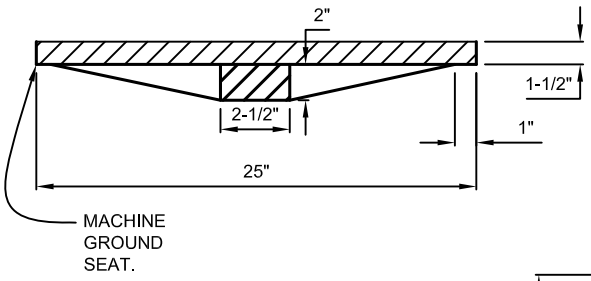
SHEET:	SS-10		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		



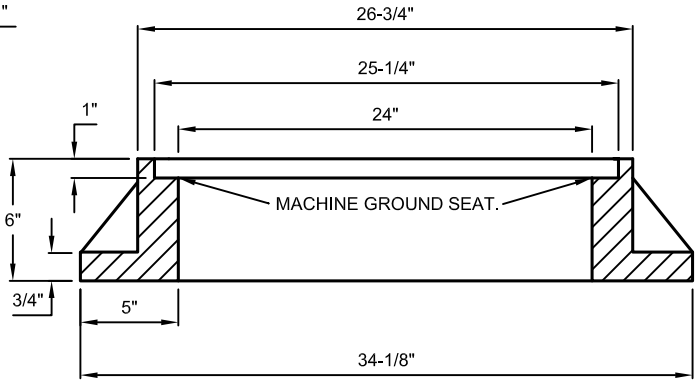
COVER PLAN



FRAME PLAN



SECTION A-A
GRAY IRON LOCKING COVER



SECTION B-B
GRAY IRON FRAME

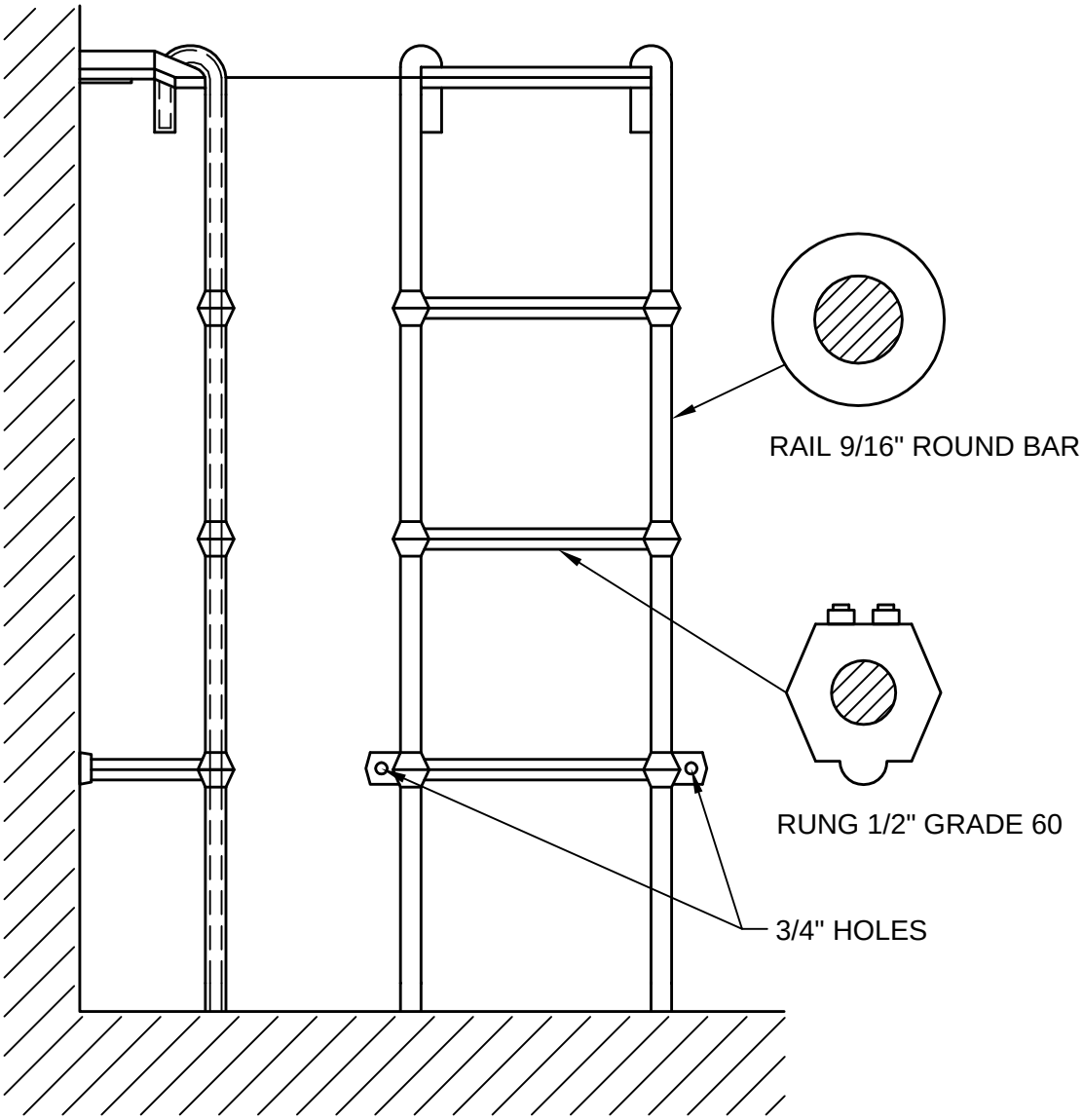
NOTES:

1. FRAME TO BE GROUTED
2. COVER TO BE EJIW CATALOG NUMBER 3717C1PT, AND PRODUCT NUMBER NCR07-2775B, WITH THE SEAL OF TUKWILA, AND LEGENDS 1908, 2008, AND SEWER.
3. FRAME TO BE EJIW CATALOG NUMBER 3705CPT, OR EQUAL.
4. INSTALL SO THAT BOLT HOLES ALIGN WITH CENTER OF LADDER.

NOT TO SCALE

City of Tukwila

SEWER MANHOLE	
24" FRAME WITH COVER	
SHEET:	SS-11
REVISION #1: 08.03	LAST REVISION: 03.08
APPROVAL:	B. GIBERSON



POLYPROPYLENE HANGING LADDER

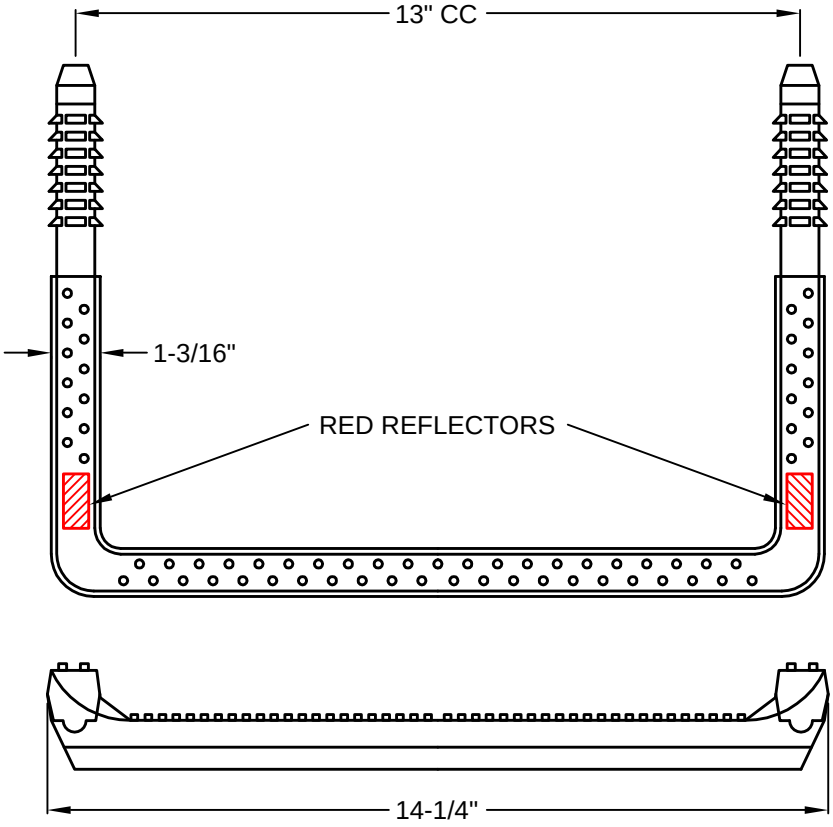
NOTES:

1. POLYPROPYLENE ASTM D4101
2. 1/2" GRADE 60 REINFORCING BAR A615
3. 9/16" COLD DRAWN BAR C1018
4. PATENT PENDING - LANE POLY STEPS
5. 3/8" DIA. BOLT 316-SS, 3-1/2" LONG
6. 316-SS TYP AT LADDER MOUNTS
6. REFER TO DS-10C FOR STEP DETAIL

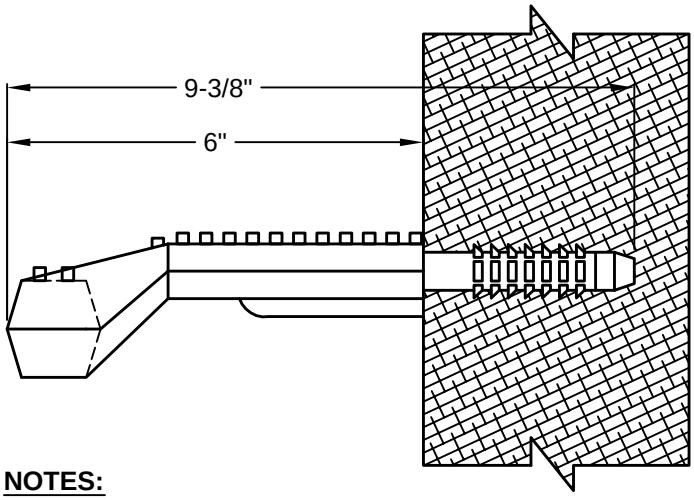
NOT TO SCALE

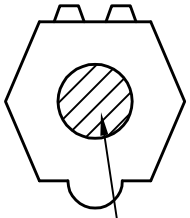
City of Tukwila

MANHOLE	
LADDER	
SHEET:	SS-12
REVISION #1:	08.03
APPROVAL:	B. SHELTON



PLAN





CUT OUT

NOTES:

1. LANE P-13938 OR APPROVED EQUAL.

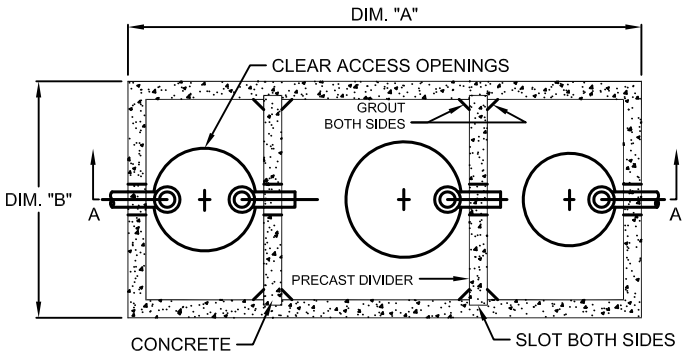
NOT TO SCALE

City of Tukwila

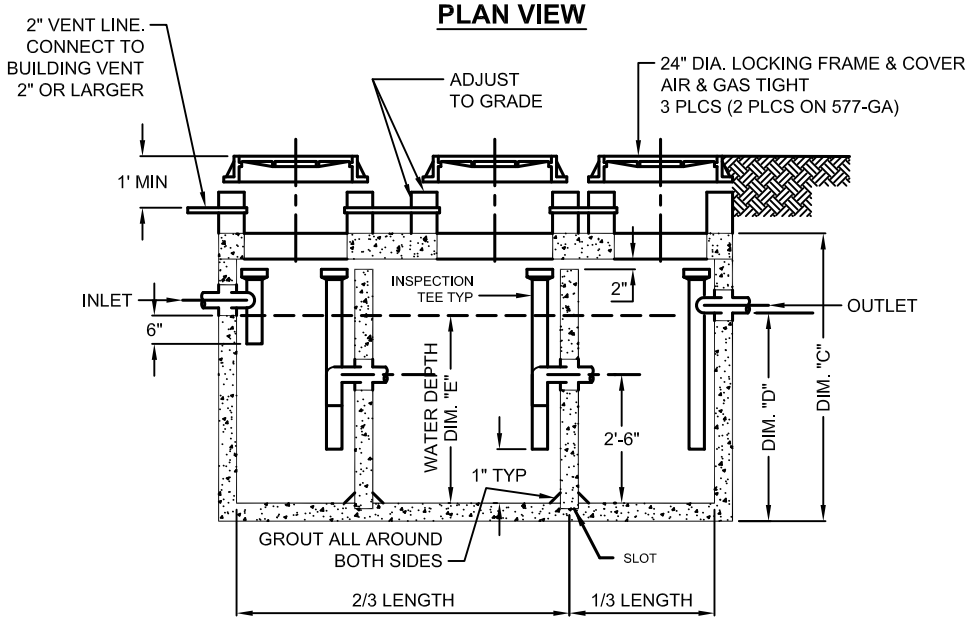
MANHOLE

POLYPROPYLENE SAFETY STEP

SHEET:	SS-13
REVISION #1:	08.03
APPROVAL:	B. SHELTON



PLAN VIEW



SECTION A-A

NOTES:

1. REFER TO CHAPTER 8 OF THESE STANDARDS.
2. CONCRETE: 28 DAY COMPRESSIVE STRENGTH f'c = 4500 PSI
3. REBAR: ASTM A-615 GRADE 60.
4. MESH: ASTM A-185 GRADE 65.
4. DESIGN: ACI-318-83 BUIILDING CODE
   ASTM C-857 "MINIMUM STRUCTURAL DESIGN LOADING FOR MONOLITHIC OR SECTIONAL PRECAST CONCRETE WATER AND WASTEWATER STRUCTURES".
5. LOADS: H-20 TRUCK WHEEL WITH 30% IMPACT PER AASHTO.
6. FILL WITH CLEAN WATER PRIOR TO START UP OF SYSTEM.
7. CONTRACTOR TO SUPPLY & INSTALL ALL PIPING & SAMPLING TEES.
8. ONLY GRAY WATER, EXCEPT DISHWASHERS. BLACK WATER SHALL BE CARRIED BY SEPARATE SIDE SEWER.

SIZING CHART

DESIGN FORMULA: Number Of Meals Per Peak Hours X Waste Flow Rate X Retention Time X Storage Factor = Capacity In Gallons

GALLON CAPACITY	1000	1250	1500	1750	2000	2500	2750	3000	4000	5000	6000
UV CO. MODEL #	4484-GA	4484-GA	5106-GA	5106-GA	612-GA	612-GA	612-GA	712-GA	712-GA	818-GA	818-GA
DIM "A"	9'-0"	9'-0"	11'-2"	11'-2"	12'-8"	12'-8"	12'-8"	13'-1"	13'-1"	19'-11"	19'-11"
DIM "B"	5'-0"	5'-0"	5'-8"	5'-8"	6'-8"	6'-8"	6'-8"	8'-0"	8'-0"	9'-11"	9'-11"
DIM "C"	7'-2"	7'-2"	7'-2"	7'-2"	8'-0"	8'-0"	8'-0"	8'-7"	8'-7"	8'-11"	10'-5"
DIM "D"	4'-2"	5'-2"	4'-4"	4'-11"	4'-7"	5'-6"	6'-0"	5'-0"	6'-6"	6'-2"	7'-2"
WATER DEPTH DIM "E"	3'-10"	4'-10"	4'-0"	4'-7"	3'-10"	4'-9"	5'-3"	4'-7"	6'-1"	4'-9"	5'-9"

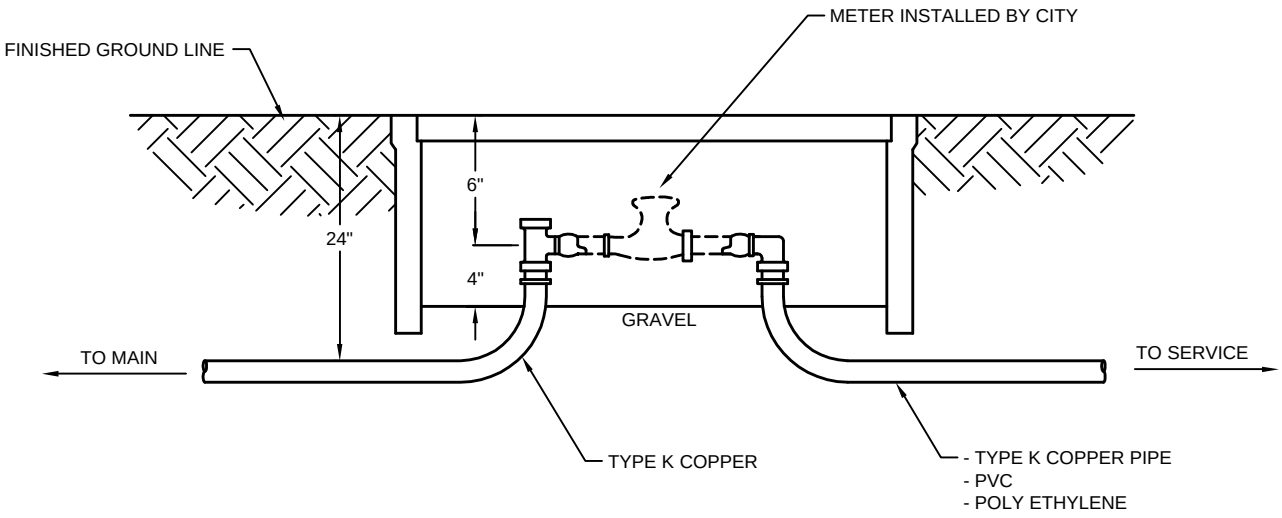
NOT TO SCALE

City of Tukwila

GREASE INTERCEPTOR

SINGLE VAULT WITH DOUBLE BAFFLE

SHEET:	SS-14		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		



3/4" OR 1" PARTS LIST:

1 - 1" COUPLINGS MUELLER 110 X ANGLE STOP - BALL
1 - 1" OR 3/4" CORP STOP - BALL
1 - TAILPIECE WITH FEMALE IRON PIPE THREAD

NOTES:

1. NO METER BOXES IN SIDEWALKS AND DRIVEWAYS WHERE POSSIBLE.

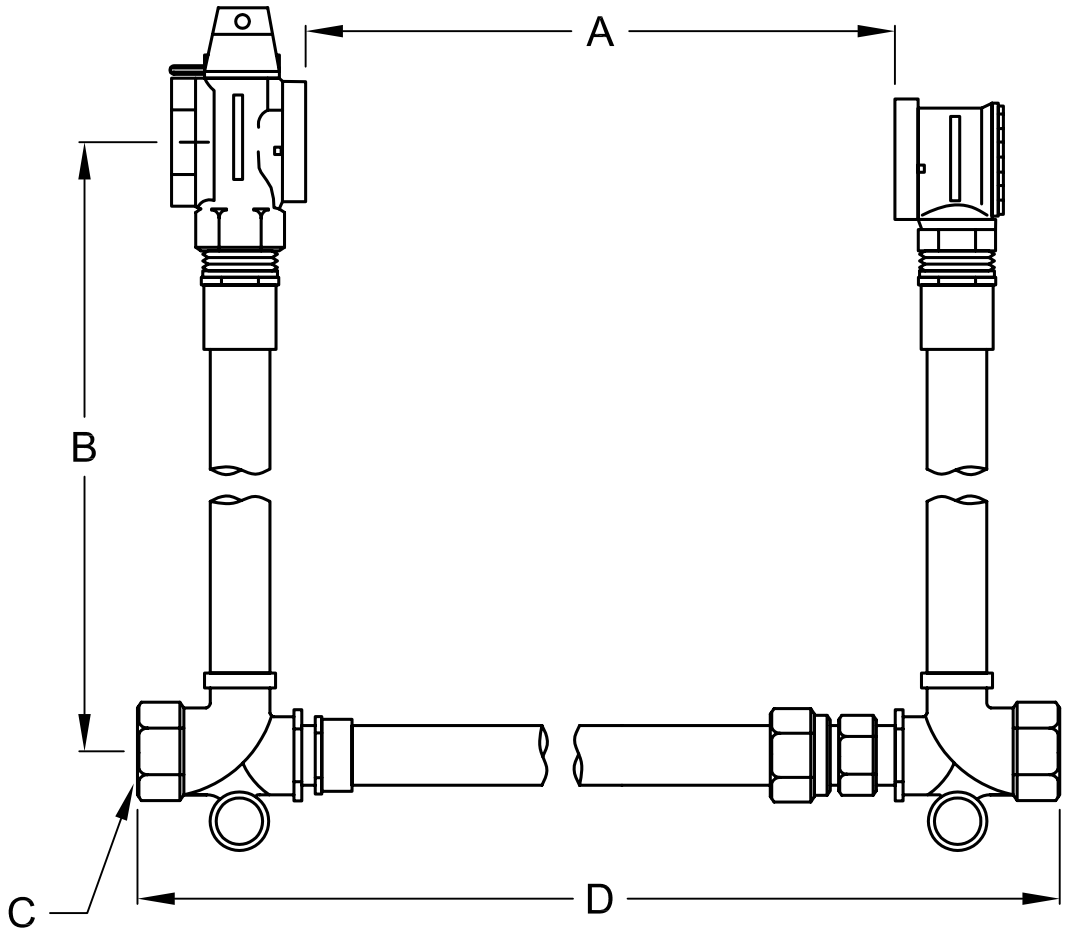
2. USE CLEAN 5/8" MINUS CRUSHED ROCK TO BACKFILL AROUND CORP STOP AND SERVICE LINE.

3. REFER TO CHAPTER 7 OF THESE STANDARDS.

NOT TO SCALE

City of Tukwila

METER	
3/4" OR 1"	
SHEET:	WS-01
REVISION #1:	08.03
APPROVAL:	B. SHELTON



DIMENSIONS

METER SIZE	1-1/2"	2"
Dimension A*	13.25"	17.25"
Dimension B - Riser Height	12", 15", 18", 21", 24", 27"	12", 15", 18", 21", 24", 27"
Dimension C - Nominal pipe size of inlet and outlet	1-1/2"	2"
Dimension D*	21.50"	26.63"

NOTES:

1. COMPOUND METER SUPPLIED AND SET BY THE CITY. 2" SINGLE REGISTER METER REQUIRES PRE-APPROVAL.

2. METER BOX SUPPLIED BY PERMITEE.

3. METER SETTER TO BE APPROVED BY THE CITY INSPECTOR PRIOR TO BACKFILL.

4. REFER TO CHAPTER 7 OF THE STANDARDS.

*CONTACT PUBLIC WORKS OPERATIONS FOR PREFERRED SPACING.

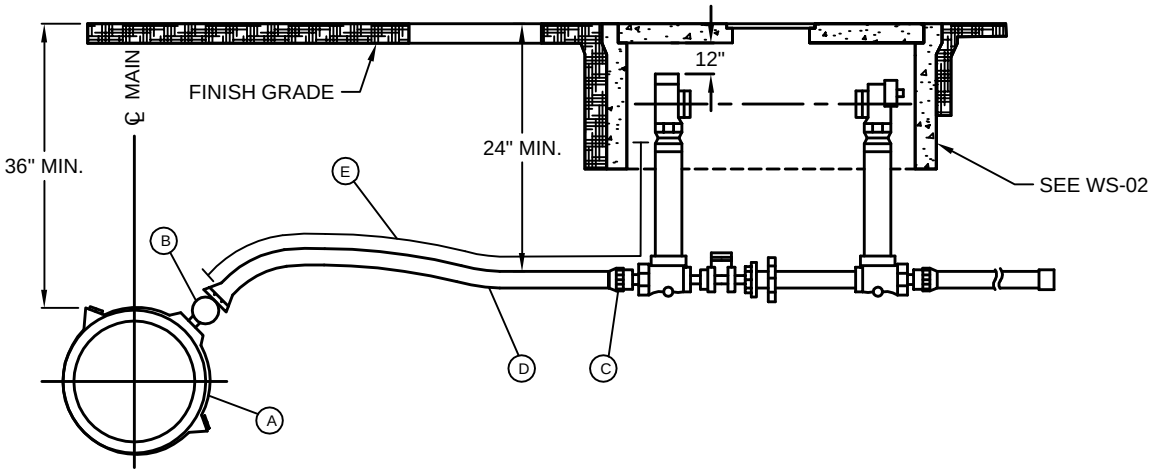
NOT TO SCALE

City of Tukwila

METER

1-1/2" AND 2" SETTER

SHEET:	WS-02		
REVISION #1:	08.03	LAST REVISION:	08.04
APPROVAL:	B. SHELTON		



Ⓐ PAINTED HIGH TENSILE D.I. SERVICE SADDLE WITH DOUBLE STRAP, AWWA I.P. THREAD TAP, ROMAC 202S OR EQUAL SIZE AS REQUIRED.
Ⓑ CORPORATION STOP, AWWA I.P. INLET BY MALE IRON PIPE THREAD OUTLET, MUELLER BALL NO. B-2969 OR EQUAL AS NEEDED.
Ⓒ COUPLING MALE IRON PIPE THREAD BY MUELLER 110 FITTING, MUELLER NO. H-15451 OR EQUAL.
Ⓓ COPPER TUBING, TYPE K OR HIGH MOLECULAR DENSITY POLYETHYLENE.
Ⓔ TRACING TAPE FOR POLYETHYLENE PIPE.

NOTES:

1. SERVICE LINE SHALL BE PERPENDICULAR TO THE WATERMAIN UNLESS OTHERWISE APPROVED BY THE ENGINEER.

2. BYPASS WILL BE LOCKED OFF BY CONSTRUCTION INSPECTOR WHEN METER SPREADER IS INSTALLED.

3. METER WILL BE SUPPLIED AND INSTALLED BY THE CITY OF TUKWILA.

4. SETTER SHALL BE POSITIONED TO CENTER RIGID SPREADER UNDER INSPECTION LID AND PROVIDE ADEQUATE CLEARANCE BETWEEN BYPASS AND BOX WALL FOR OPERATING AND LOCKING BYPASS VALVE.

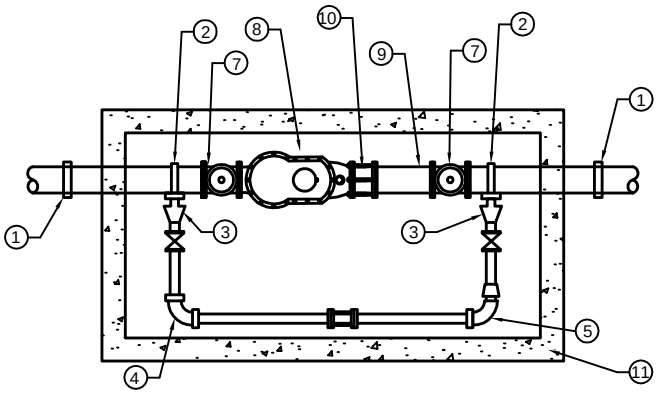
NOT TO SCALE

City of Tukwila

SERVICE	
1-1/2" & 2" DOMESTIC	
SHEET:	WS-03
REVISION #1:	08.03
APPROVAL:	B. SHELTON

MATERIAL LIST - COPPER BYPASS

1. 2 - FLEX. CPLG. TO FIT, EQUAL TO ROCKWELL 441 (REDUCE AT TAP).
2. 2 - SINGLE STRAP SERVICE CLAMPS EQUAL TO ROMAC 101 WITH IPS TAP. ROCKWELL 313.
3. 3 - STRAIGHT CPLG., COPPER TO OUTSIDE I.P. THREAD EQUAL TO MUELLER H-15428 110 COMP.
4. 1-1/4 BEND CPLG. COPPER TO COPPER, EQUAL TO MUELLER H-15526.
5. 1-1/4 BEND CPLG. COPPER TO OUTSIDE I.P. THREAD EQUAL TO MUELLER H-15530.
6. 2 - BALL VALVES WITH PADLOCK WINGS OR LOCK CAPS (MUELLER).
7. 2 - G.V. FL. EQUAL TO MUELLER A-2307-6.
8. 3" TO 6" COMPOUND METER SUPPLIED BY CITY.
9. 1 - C.I. ADPT., FL. X PE LENGTH TO FIT.
10. 1 - CPLG. ADPT., FL. EQUAL TO ROCKWELL 912.

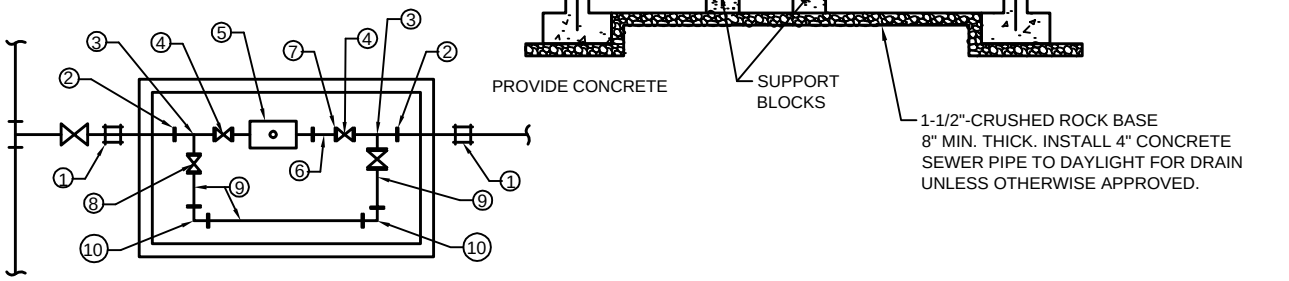


GENERAL NOTES:

1. METERS 3"-6" SUPPLIED BY CITY.
2. VAULT SHALL BE PRECAST CONCRETE VAULT.
3. ALL PIPE & FITTINGS 4" AND LARGER SHALL BE CEMENT LINED, CL52.
4. PIPING FROM MAIN TO VAULT SHALL BE 4" ON 3" METER INSTALLATION, TEE WITH VALVE ON EXISTING MAIN REQUIRED.
5. REFER TO SECTION 7.3.2.

MATERIAL LIST - D.I. BYPASS

1. 2 - FLEX CPLG. TO FIT.
2. 2 - D.I. FL. X P.E., LENGTH AS REQUIRED.
3. 2 - TEE, FL.
4. 2 - G.V., FL. MUELLER A-2370-6 OR EQUAL.
5. 1 - 3" TO 6" METER, AS SPECIFIED.
6. 1 - ADPT. FL. X P.E. 12" LONG.
7. 1 - CPLG. ADPT., FL. EQUAL TO ROCKWELL.
8. 2 - G.V. FL. EQUAL TO MUELLER A-2370-6 (G.V. SATISFACTORY LOCKING DEVICE MUST BE FURNISHED).
9. 3 - D.I. PIPE FL. EACH END, LENGTH TO FIT.
10. 2 - 90° BENDS, FLANGE.



WITH DUCTILE IRON BY-PASS

NOT TO SCALE

City of Tukwila

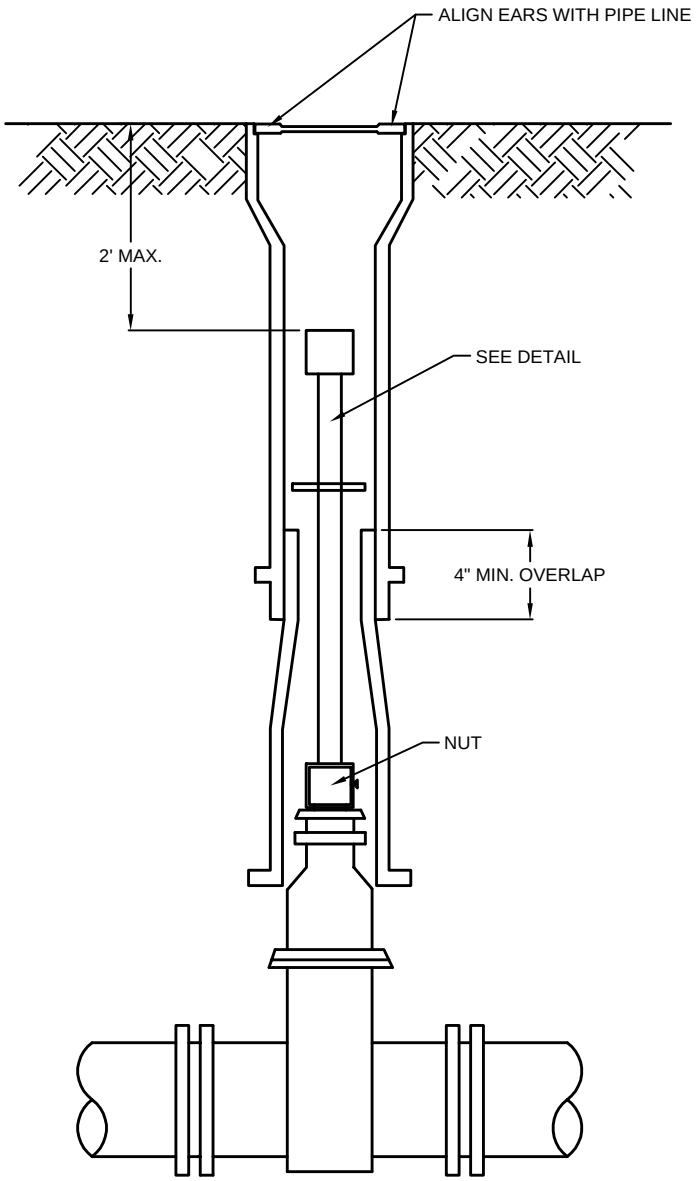
METER	
3" TO 6"	
SHEET:	**WS-04**
REVISION #1:	**08.03**
APPROVAL:	**B. SHELTON**

NOT AVAILABLE

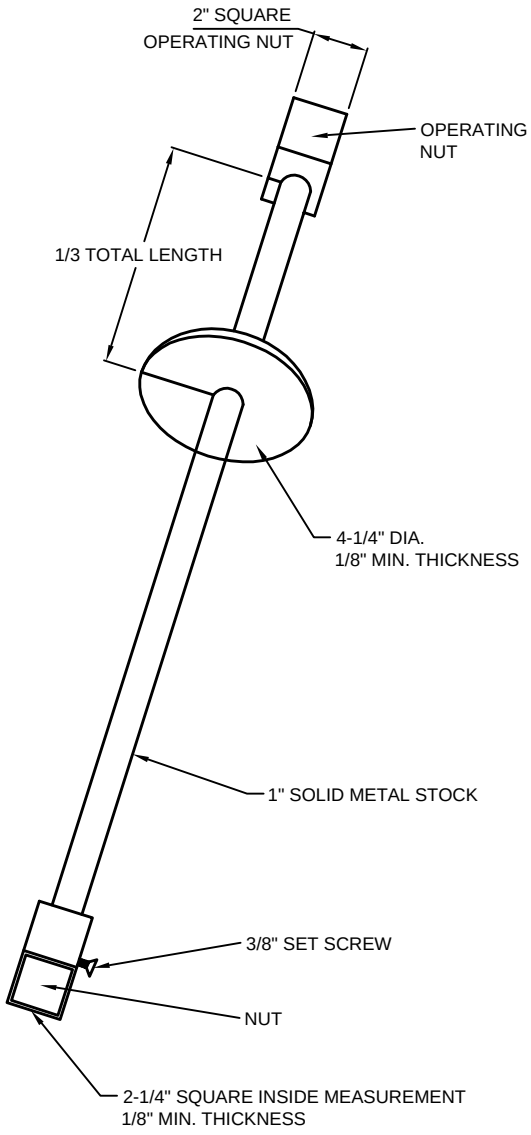
NOT TO SCALE

City of Tukwila

SHEET:	WS-05
REVISION #1:	
APPROVAL:	



ASSEMBLY



DETAIL

NOTES:

1. EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN 5 FEET BELOW FINISHED GRADE.

2. ONLY ONE EXTENSION, MINIMUM OF 3 FEET LONG, TO BE USED PER VALVE.

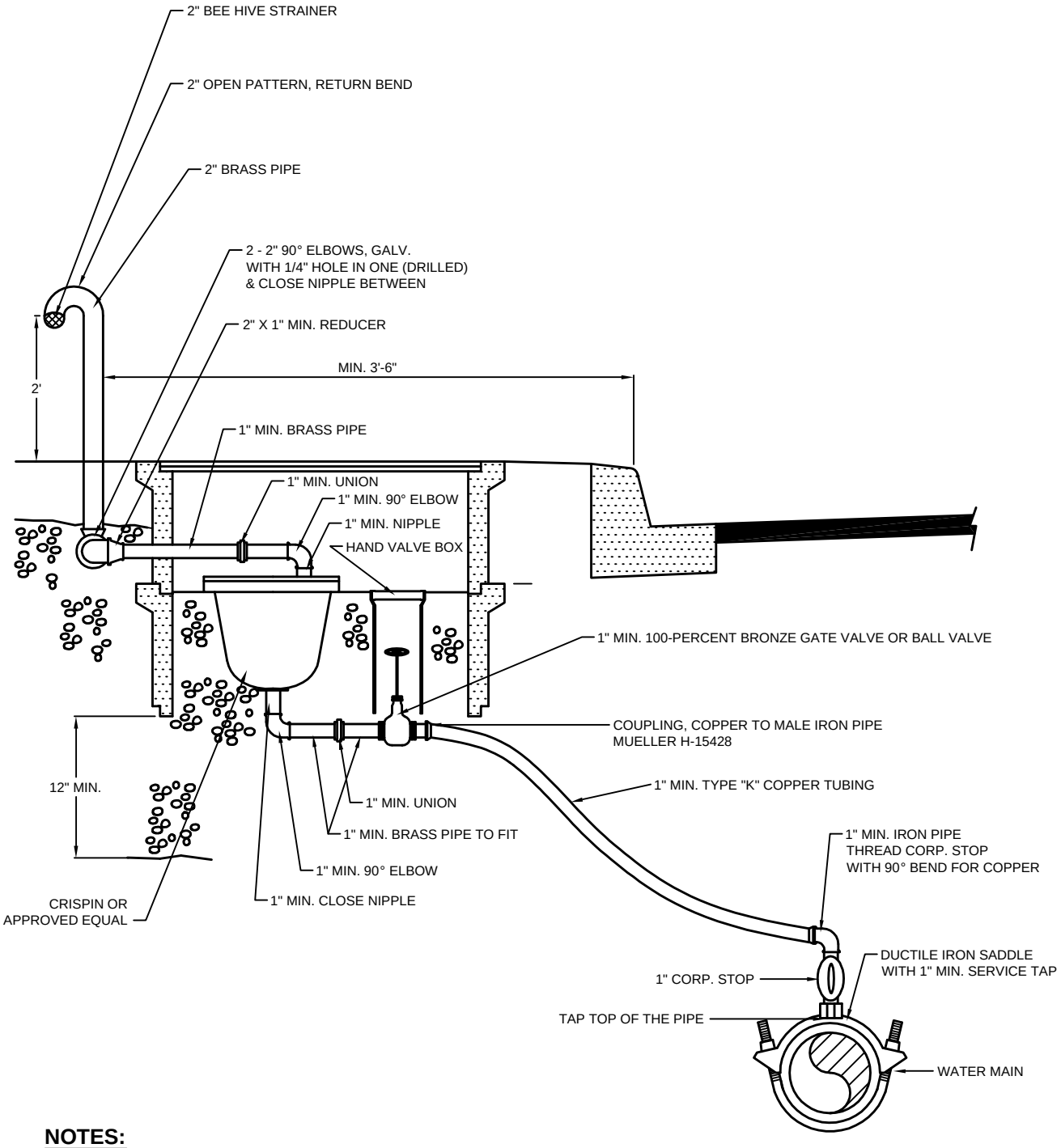
3. ALL EXTENSIONS ARE TO BE MADE OF STEEL AND PAINTED WITH TWO COATS OF METAL PAINT. NO FIELD-FABRICATED EXTENSIONS.

4. VALVE BOX COVER SHALL BE LABELED "WATER".

NOT TO SCALE

City of Tukwila

WATER MAIN	
VALVE BOX (OPERATING NUT EXTENSION)	
SHEET:	WS-06
REVISION #1:	08.03
APPROVAL:	B. SHELTON



NOTES:

1. INSTALL AIR VALVE IN 17" X 28" CONCRETE METER BOX WITH 3/8" STEEL DIAMOND PLATE COVER, FOG-TITE METER SEAL CO. NO. 2 METER BOX OR EQUAL.

2. BED WITH WASHED GRAVEL, PASSING 1-1/2" AND RETAINED ON 1/4" MESH.

3. INSTALL 10' MIN. DISTANCE FROM ANY VEHICULAR ACCESS.

4. REFER TO CHAPTER 7 OF THE STANDARDS.

NOT TO SCALE

City of Tukwila

WATER MAIN

AIR AND VACUUM RELEASE (NON-TRAFFIC AREAS)

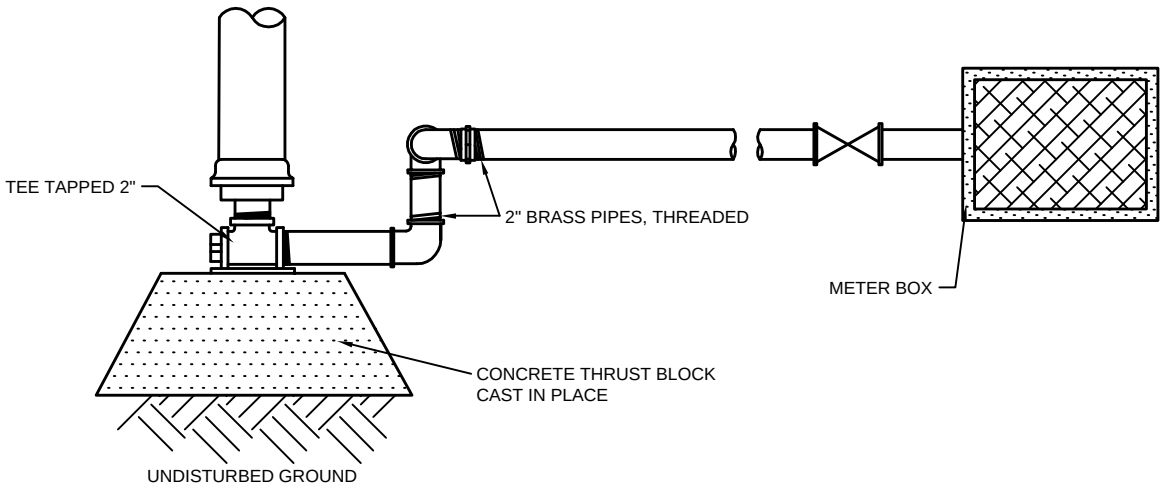
SHEET:	WS-07
REVISION #1:	08.03
APPROVAL:	B. SHELTON

NOT AVAILABLE

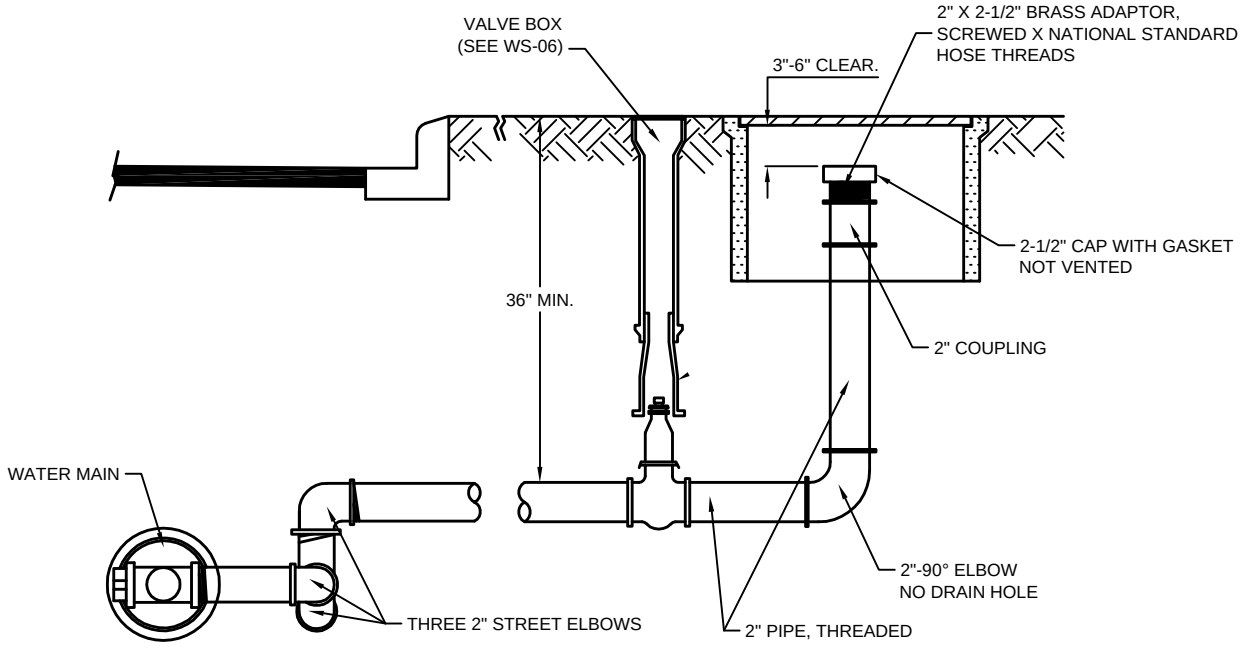
NOT TO SCALE

City of Tukwila

SHEET:	WS-08
REVISION #1:	
APPROVAL:	



PLAN VIEW



ELEVATION VIEW

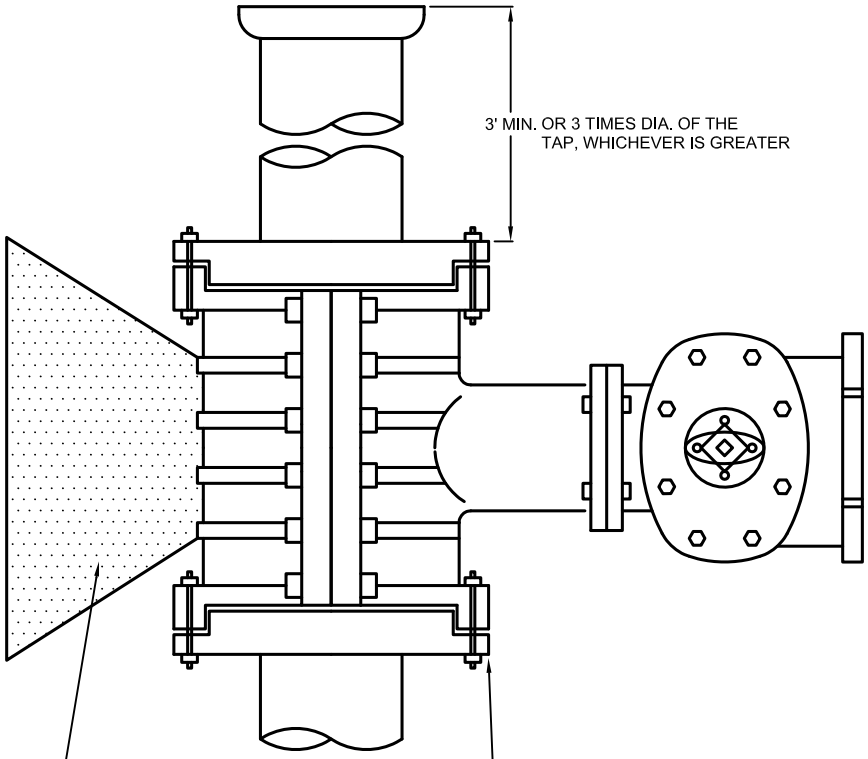
NOTES:

1. ALL PIPE BEYOND MAIN SHALL BE PAINTED BRASS
2. INSTALL CAST METAL VALVE MARKER POST AND EXTENSION PIPE ADJACENT TO METER BOX. PAINT WITH TWO COATS OF NON-CORROSIVE PROTECTIVE PAINT, PER A.W.W.A. STANDARDS.
3. TWO PIECE CAST IRON VALVE BOX WITH STANDARD 24" BASE AND 18" TOP WITH 2" OVERLAP, RICH VALVE BOX OR EQUAL LIDS TO HAVE TABS.
4. REFER TO CHAPTER 7 OF THESE STANDARDS.
5. REFER TO WS-12A & WS-12B FOR BLOCKING, WS-06 FOR VALVE BOX.

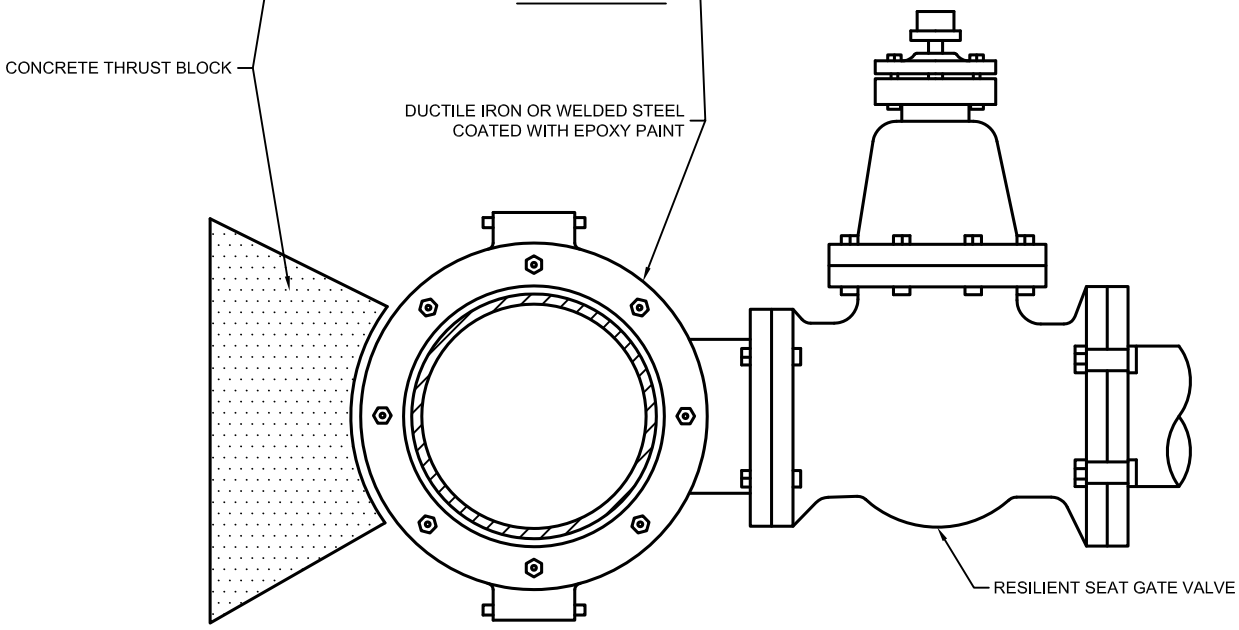
NOT TO SCALE

City of Tukwila

WATER MAIN	
BLOW-OFF ASSEMBLY	
SHEET:	**WS-09**
REVISION #1:	**08.03**
APPROVAL:	**B. SHELTON**



PLAN VIEW



ELEVATION VIEW

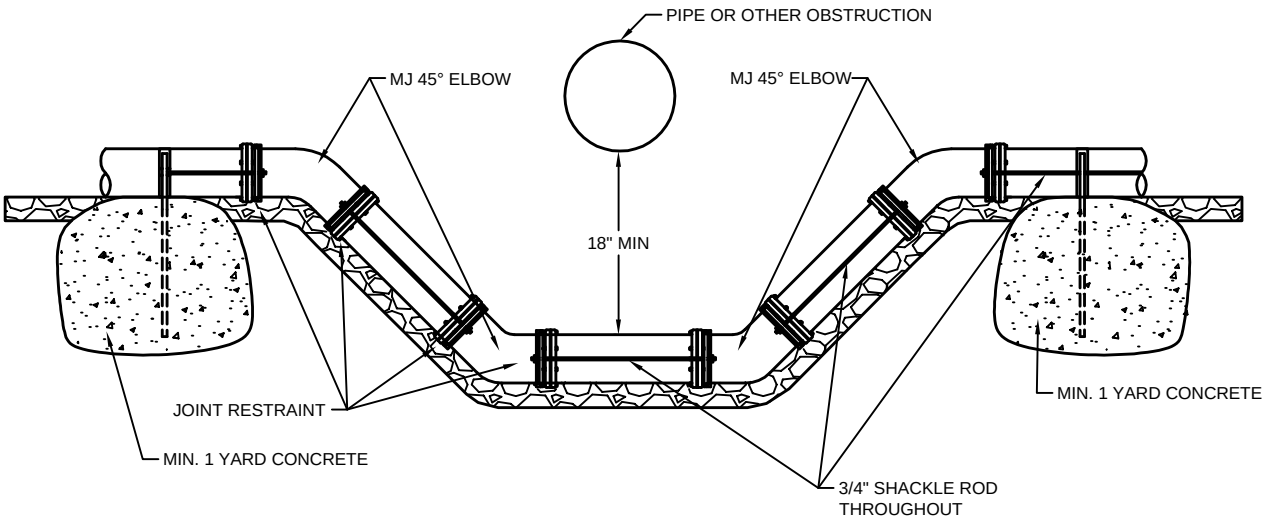
NOTES:

1. USE FOR TAPS ON CEMENT LINED DUCTILE PIPE.
2. PRE-TEST ASSEMBLY BEFORE DRILLING.
3. REFER TO CHAPTER 7 OF THESE STANDARDS.
4. REFER TO WS-13 & WS-14.

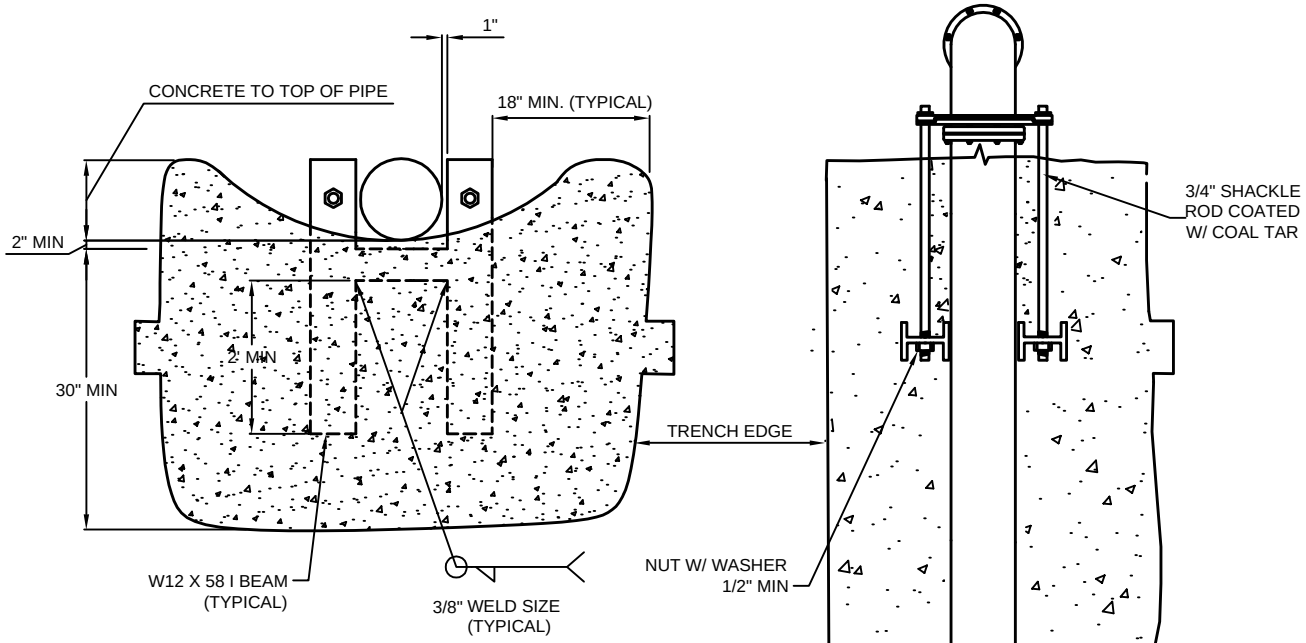
NOT TO SCALE

City of Tukwila

WATER MAIN		
TAPPING TEE		
SHEET:	WS-10	
REVISION #1: 08.03	LAST REVISION: 07.08	
APPROVAL:	BOB GIBERSON, CITY ENGINEER	



ELEVATION VIEW



END VIEW

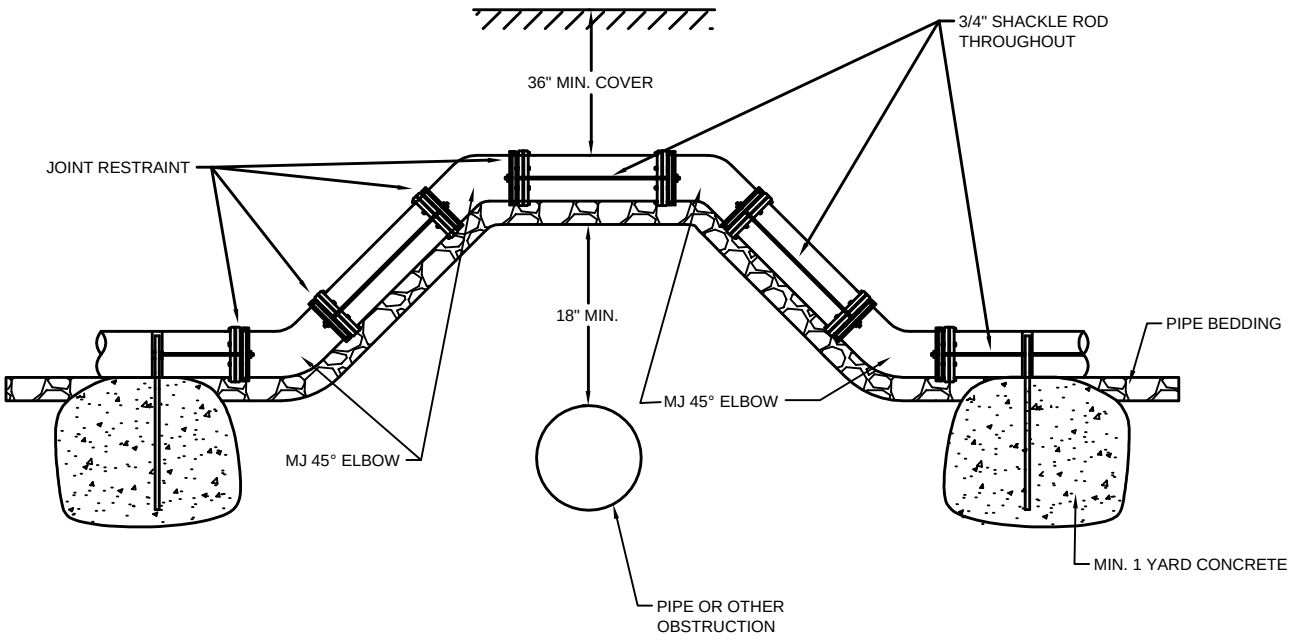
PLAN VIEW

NOTE:
1. SHACKLE RODS SHALL BE ASPHALT-COATED STEEL OR CORTEN STEEL.

NOT TO SCALE

City of Tukwila

BLOCKING	
DEADMAN W/ 45° BENDS	
SHEET:	**WS-11A**
REVISION #1:	**08.03**
APPROVAL:	**B. SHELTON**



ELEVATION VIEW
ALTERNATE

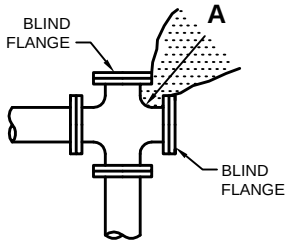
NOT TO SCALE

City of Tukwila

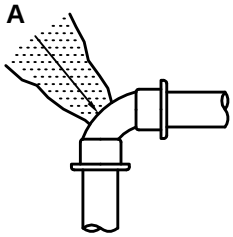
BLOCKING

DEADMAN W/ 45° BENDS (ALTERNATE)

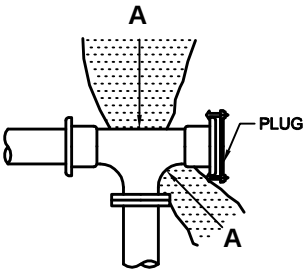
SHEET:	WS-11B
REVISION #1:	08.03
APPROVAL:	B. SHELTON



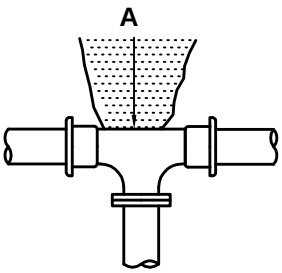
CAPPED CROSS



90° BEND



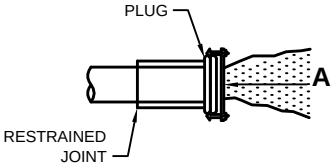
TEE W/ PLUG

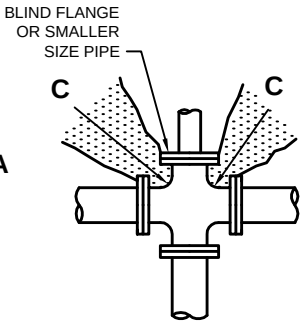


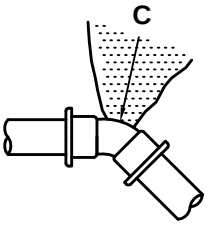
TEE W/O PLUG

THRUST BLOCKING SIZE

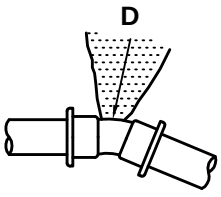
PIPE SIZE DIA	A (ft^2)	C (ft^2)	D (ft^2)	E (ft^2)
4"	4	2	1	1
6"	10	5	3	1
8"	18	10	5	2
10"	28	15	8	4
12"	40	22	11	6
14"	55	30	15	8
16"	71	39	20	10
18"	90	49	25	13
20"	111	60	31	15
22"	135	73	37	19
24"	160	87	44	22
28"	218	118	60	30
30"	251	136	69	35
36"	361	195	100	50
42"	491	266	135	68
48"	641	347	177	89



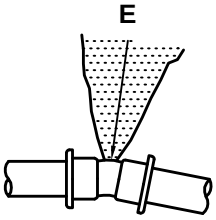




45° BEND



22-1/2° BEND



11-1/4° BEND

NOTES:

1. BEARING AREA OF CONCRETE THRUST-BLOCK BASED ON 250 PSI PRESSURE AND SAFE SOIL BEARING LOAD OF 1000 POUNDS PER SQUARE FOOT.
2. ADJUST BEARING AREA FOR OTHER PIPE SIZES, PRESSURES, AND SOIL CONDITIONS.
3. CONCRETE BLOCKING SHALL BE CAST IN PLACE AND HAVE A MINIMUM AREA OF 1/4 SQUARE FOOT BEARING AGAINST THE FITTING.
4. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATION PRESSURE UNDER ALL CONDITIONS OF SERVICE.
5. HEIGHT OF THRUST BLOCK MUST BE EQUAL TO OR LESS THAN 1/2 THE DEPTH FROM THE GROUND SURFACE TO THE BLOCK'S BASE.
6. USE GALVANIZED OR ASPHALT-COATED SHEEL, THREADED RODS AND PIPE CLAMPS.
7. REFER TO CHAPTER 7 OF THESE STANDARDS.

NOT TO SCALE

City of Tukwila

BLOCKING (HORIZONTAL)

CONCRETE

SHEET:	WS-12A 1 OF 2
REVISION #1:	08.03
APPROVAL:	B. SHELTON

City of Tukwila

BLOCKING

CONCRETE

SHEET: WS-12A 2 OF 2

REVISION #1: 08.03

APPROVAL: B. SHELTON

-THRUST BLOCKING SIZE
-ASSUME 1000 SOIL PRESSURE
-DESIGN PRESSURE 250 PSI

PIPE SIZE DIA	PIPE AREA SQ FT	PRESSURE (PSI)	HEAD (FT)	A 90° LOAD (LB)	A 90° AREA (SF)	C 45° LOAD (LD)	C 45° AREA (SF)	D 22.5° LOAD (LD)	D 22.5° AREA (SF)	E 11.25° LOAD (LD)	E 11.25° AREA (SF)
4	0.08727	250	577.5	4,454.46	4	2,410.74	2	1,228.96	1	617.62	1
6	0.19635	250	577.5	10,022.54	10	5,424.16	5	2,765.17	3	1,389.65	1
8	0.34907	250	577.5	17,817.85	18	9,642.95	10	4,915.86	5	2,470.49	2
10	0.54542	250	577.5	27,840.39	28	15,067.11	15	7,681.03	8	3,860.15	4
12	0.78540	250	577.5	40,090.16	40	21,696.64	22	11,060.68	11	5,558.61	6
14	1.06902	250	577.5	54,567.17	55	29,531.54	30	15,054.82	15	7,565.89	8
16	1.39627	250	577.5	71,271.40	71	38,571.80	39	19,663.44	20	9,881.97	10
18	1.76715	250	577.5	90,202.87	90	48,817.44	49	24,886.54	25	12,506.87	13
20	2.18167	250	577.5	111,361.57	111	60,268.44	60	30,724.12	31	15,440.58	15
22	2.63982	250	577.5	134,747.49	135	72,924.82	73	37,176.19	37	18,683.10	19
24	3.14160	250	577.5	160,360.65	160	86,786.56	87	44,242.74	44	22,234.44	22
28	4.27607	250	577.5	218,268.67	218	118,126.15	118	60,219.28	60	30,263.54	30
30	4.90875	250	577.5	250,563.52	251	135,604.00	136	69,129.27	69	34,741.31	35
36	7.06860	250	577.5	360,811.47	361	195,269.76	195	99,546.16	100	50,027.48	50
42	9.62115	250	577.5	491,104.51	491	265,783.83	266	135,493.38	135	68,092.97	68
48	12.56640	250	577.5	641,442.62	641	347,146.23	347	176,970.94	177	88,937.75	89

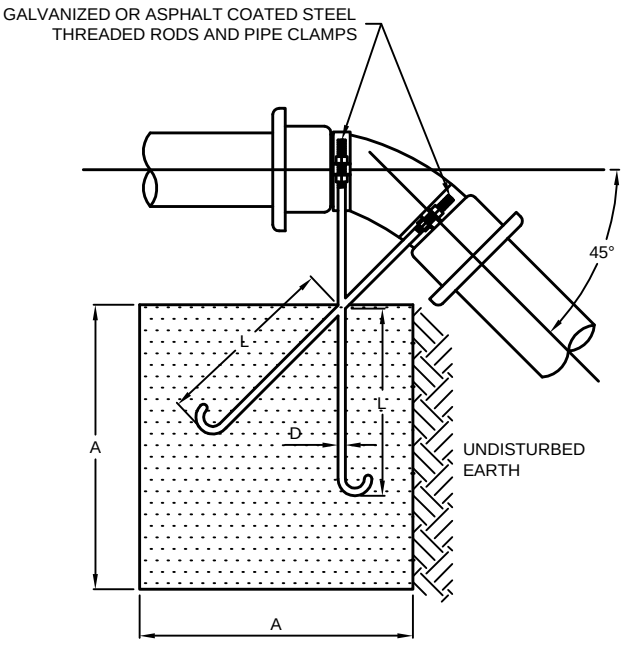
NOT TO SCALE

VERTICAL BLOCKING FOR 11 1/4° - 22 1/2° - 30° BENDS

PIPE SIZE (INCHES)	V.B. (DEGREES)	CU. FT.	A (FEET)	D (INCHES)	L (FEET)
4	11 1/4	8	2.0	3/4	1.5
	22 1/2	11	2.2		2.0
	30	17	2.6		
6	11 1/4	11	2.2	3/4	2.0
	22 1/2	25	2.9		
	30	41	3.5		
8	11 1/4	16	2.5	3/4	2.0
	22 1/2	47	3.6		
	30	70	4.1	3/4	2.5
10-12	11 1/4	32	3.2	3/4	2.0
	22 1/2	88	4.5	7/8	3.0
	30	132	5.1		
16	11 1/4	70	4.1	7/8	3.0
	22 1/2	184	5.7	1 1/8	4.0
	30	275	6.5	1 1/4	
18-20	11 1/4	91	4.5	7/8	3.0
	22 1/2	225	6.1	1 1/4	4.0
	30	330	6.9	1 3/8	4.5
24	11 1/4	128	5.0	1	3.5
	22 1/2	320	6.8	1 3/8	4.5
	30	480	7.9	1 5/8	5.5

VERTICAL BLOCKING FOR 45° BENDS

4	45	30	3.1	3/4	2.0
6		68	4.1		
8		123	5.0		
12		232	6.1	3/4	2.5
16		478	7.8	1 1/8	4.0
20		560	8.2	1 1/4	
24		820	9.4	1 3/8	4.5



VERTICAL BLOCKING FOR 11 1/4°, 22 1/2°, 30°, 45°, AND 90° BENDS

NOT TO SCALE

City of Tukwila

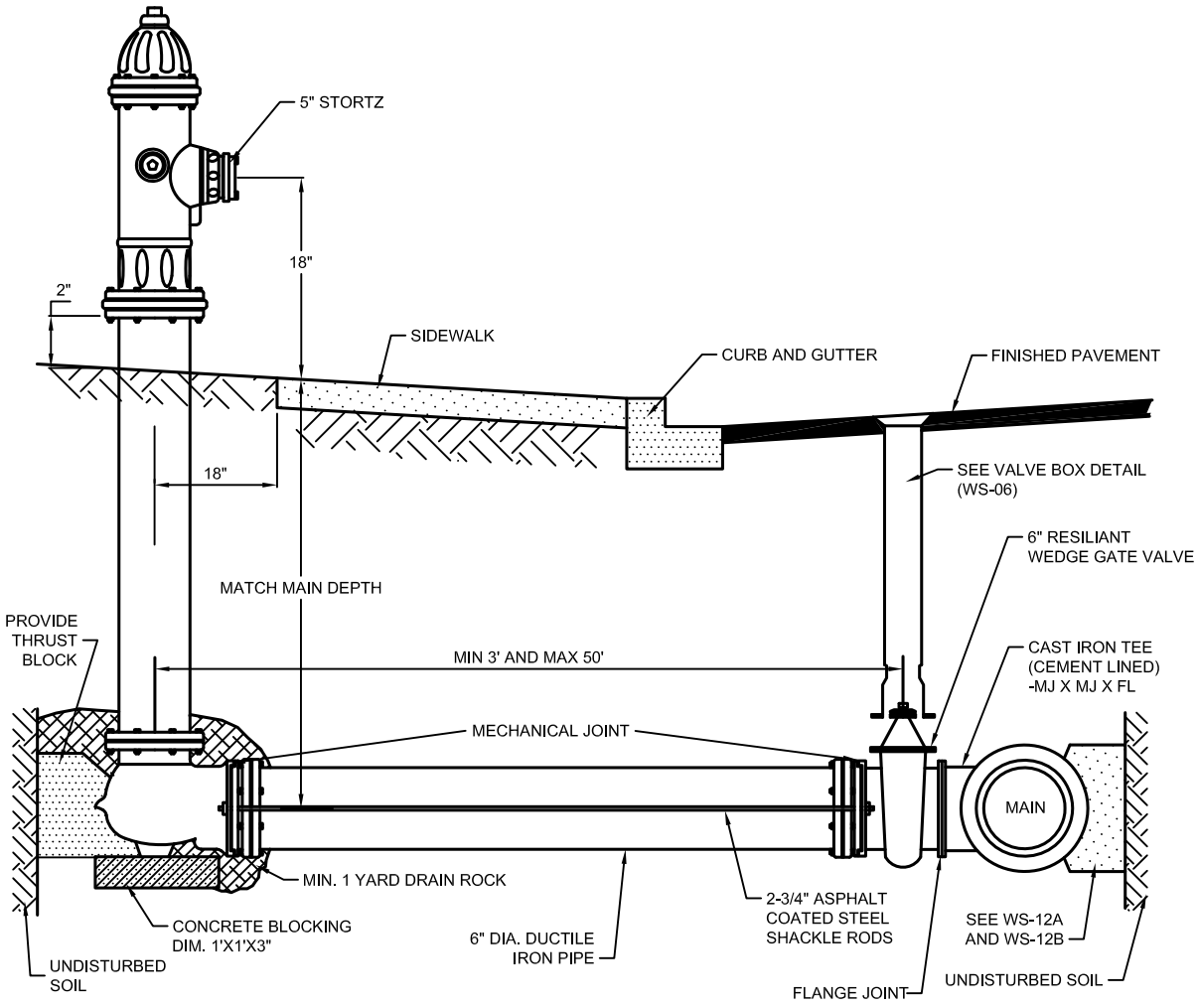
BLOCKING (VERTICAL)

CONCRETE

SHEET: WS-12B

REVISION #1: 08.03

APPROVAL: B. SHELTON



NOTES:

1. REFER TO CHAPTER 7 OF THESE STANDARDS.

2. HYDRANTS EQUAL TO MUELLER #A-423 OR CLOW MEDALLION #F-2545, M & H 929.

3. HYDRANTS SHALL BE EQUIPPED WITH TWO 2-1/2" N.S.T. HOSE PORTS AND ONE 5" STORTZ PUMPER DISCHARGE PORT AND SHALL HAVE A 1-1/4" PENTAGON OPEN LIFT OPERATING NUT. HYDRANTS SHALL HAVE A 6" M.J. BOTTOM CONNECTION AND 5-1/4" MAIN VALVE OPENING, AND SHALL HAVE 18" ABOVE GRADE LEVEL TO THE CENTER OF THE PUMPER DISCHARGE PORT.

4. HYDRANTS SHALL CONFORM TO A.W.W.A. SPECIFICATIONS C 502-54; SHALL BE COMPRESSION TYPE AND SHALL HAVE A TWO PIECE BREAKING FLANGE WITH BREAKING THIMBLE AT THE GROUND LINE OR STEM; SHALL HAVE A SELF-OILING DRY BONNET WITH FACTORY FILLED RESERVOIR HOLDING APPROXIMATELY 8 OUNCES OF OIL. OIL RESERVOIR SHALL BE SO DESIGNED AS TO GIVE A COMPLETE LUBRICATION OF STEMS EACH TIME THE HYDRANT IS OPERATED. THE UPPER STEM SHALL HAVE A BRASS SLEEVE.

5. SHACKLE RODS SHALL BE ASPHALT-COATED STEEL OR CORTEN STEEL.

6. CITY HYDRANTS BONNET AND PORT CAPS SHALL BE FARWEST DELPHINIUM BLUE SAFETY 257. BARREL SHALL BE FARWEST CASE YELLOW SAFETY X-3472.

7. PRIVATE HYDRANTS SHALL BE PAINTED WITH TWO COATS OF FARWEST CASE YELLOW (# X-3472).

8. WHERE NO CURB AND GUTTER IS INSTALLED, FIRE HYDRANT SHALL BE LOCATED CLOSE TO THE PROPERTY LINE AND INSIDE THE RIGHT OF WAY OR EASEMENT. INSTALL BOLLARD GUARD POST PER WS-14.

9. HYDRANTS INSTALLED, RELOCATED OR OTHERWISE WORKED UPON AS A RESULT OF A PROJECT SHALL BE FRESHLY PAINTED.

10. HYDRANT SHALL NOT BE CLOSER THAN 4' TO ANY FIXED OBJECT, WITH THE EXCEPTION OF HYDRANT GUARD POSTS, PER TMC 14.24.03.

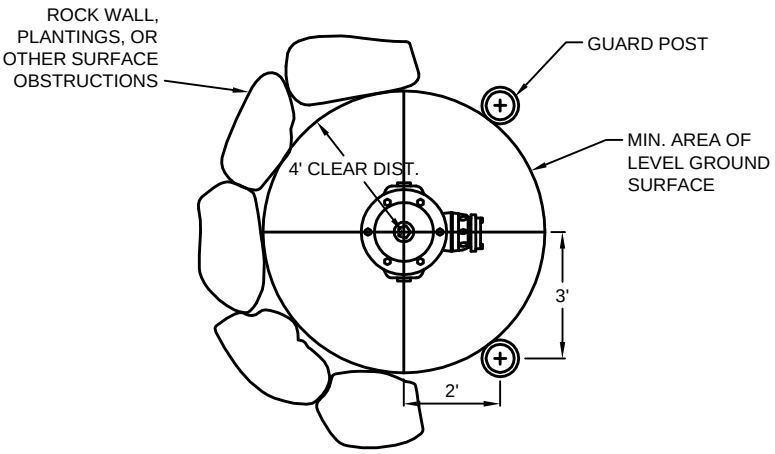
NOT TO SCALE

City of Tukwila

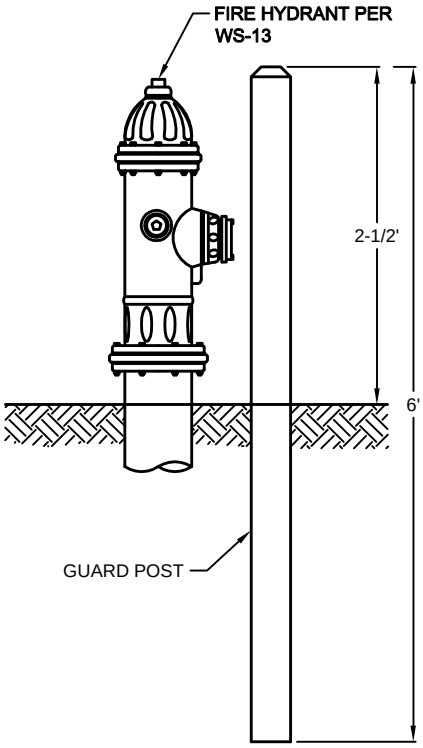
FIRE HYDRANT

ASSEMBLY AND SETTING

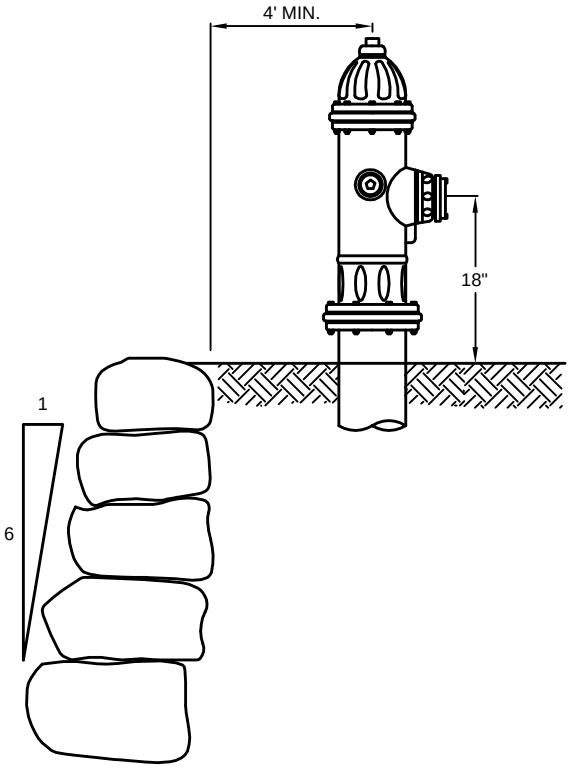
SHEET:	WS-13		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		



PLAN



GUARD POST ELEVATION



NOTES:

1. GUARD POST SHALL BE EITHER CONCRETE FILLED STEEL PIPE (MIN. 4" DIA.) OR CONCRETE POST (MIN. 8" DIA.).

2. POSTS SHALL BE AT LEAST 3 FEET FROM THE CENTER OF THE HYDRANT AND SHALL NOT BE IN DIRECT LINE WITH ANY DISCHARGE PORTS.

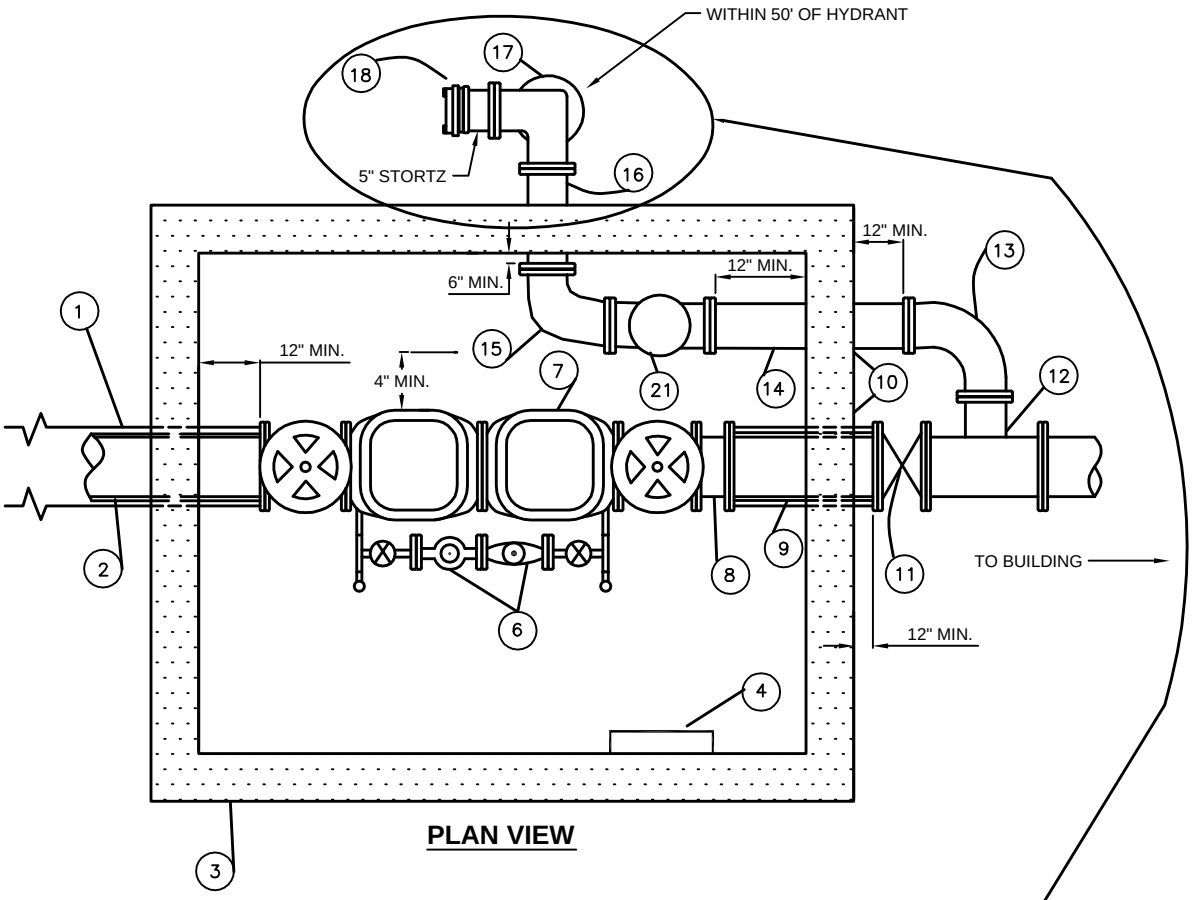
3. POSTS SHALL BE 6 FEET LONG; 3-1/2 FEET SHALL BE BURIED.

4. PAINTED FINISH SHALL BE FARWEST CASE YELLOW #3472.

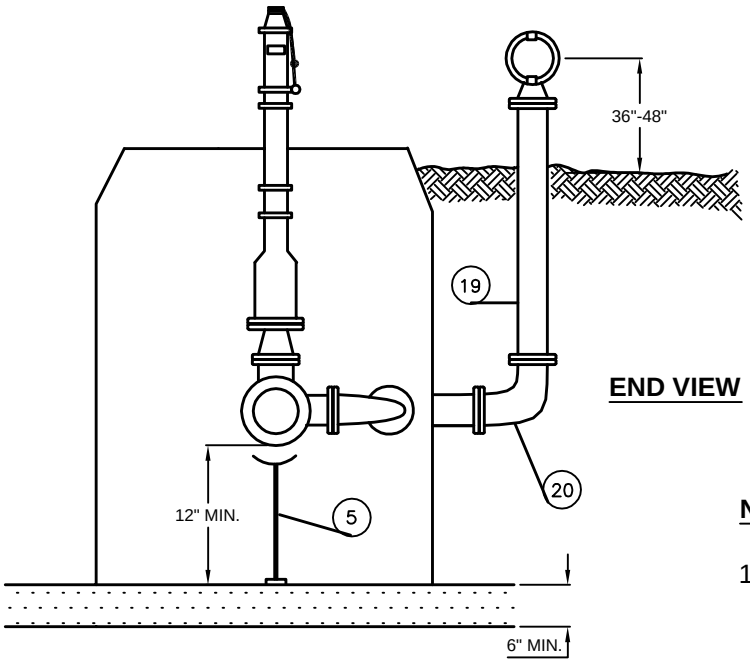
NOT TO SCALE

City of Tukwila

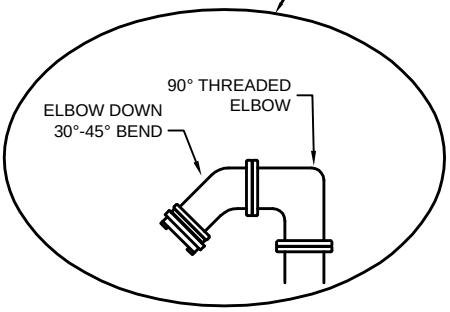
FIRE HYDRANT	
GUARD POST	
SHEET:	WS-14
REVISION #1:	08.03
APPROVAL:	B. SHELTON



PLAN VIEW



END VIEW



SIDE VIEW

COMPACTED FOUNDATION
GRAVEL UNDER VAULT

NOTES:

1. DESIGN FOR 4" THRU 10" DDCV.

NOT TO SCALE

City of Tukwila

CROSS CONNECTION CONTROL

DETECTOR DOUBLE CHECK VALVE & VAULT

SHEET:	WS-15 1 OF 2
REVISION #1:	08.03
APPROVAL:	B. SHELTON

MATERIAL LISTING:

1. 3/4" SHACKLE RODS WITH STAR BOLTS AND ASPHALT EMULSION COATING.
2. 4" MIN. D.I. CLASS 52 PIPE.
3. PRECAST CONCRETE VAULT WITH HINGED STEEL PLATE COVER, DIMENSION TO VARY WITH SIZE OF ASSEMBLY.
4. O.S.H.A. APPROVED LADDER IF OVER 30" DEEP.
5. PIPE SUPPORT STAND UNDER EACH CHECK VALVE.
6. COPPER OR BRONZE BYPASS WITH AN APPROVED DCVA AND 3/4" WATER METER.
7. APPROVED DCVA IN MAIN LINE WITH TWO RESILIENT SEATED SHUTOFF VALVES AND TEST COCKS.
8. 10", 8", 6" OR 4" COUPLING ADAPTER, FL.
9. 10", 8", 6" OR 4" FL*PE D.I. CLASS 52 PIPE LENGTH TO FIT.
10. GROUT INTERIOR AND EXTERIOR ALL AROUND PIPE USING NON-SHRINK GROUT.
11. 10", 8", 6" OR 4" GATE VALVE FL*MJ WITH POST INDICATOR VALVE.
12. FLANGE TEE ASSEMBLY SIZED ACCORDINGLY.
13. FLANGED 90° BEND.
14. 4" OR 6" D.I. CLASS 52 PIPE FL*FL.
15. 4" OR 6" 90° BEND FL.
16. 4" OR 6" D.I. CLASS 52 PIPE, FL*FL.
17. 6" 90° BEND, FL.
18. UL LISTED 5" STORTZ CONNECTION WITH 30° OR 45° ELBOW.
19. 6" D.I. CLASS 52 PIPE LENGTH AS REQUIRED FLANGE * THREADED P.E.
20. 6" 90° BEND FL.
21. SWING TYPE GRAVITY OPERATED CHECK VALVE WITH BALL DRIP VALVE TO BE INSTALLED HORIZONTALLY.

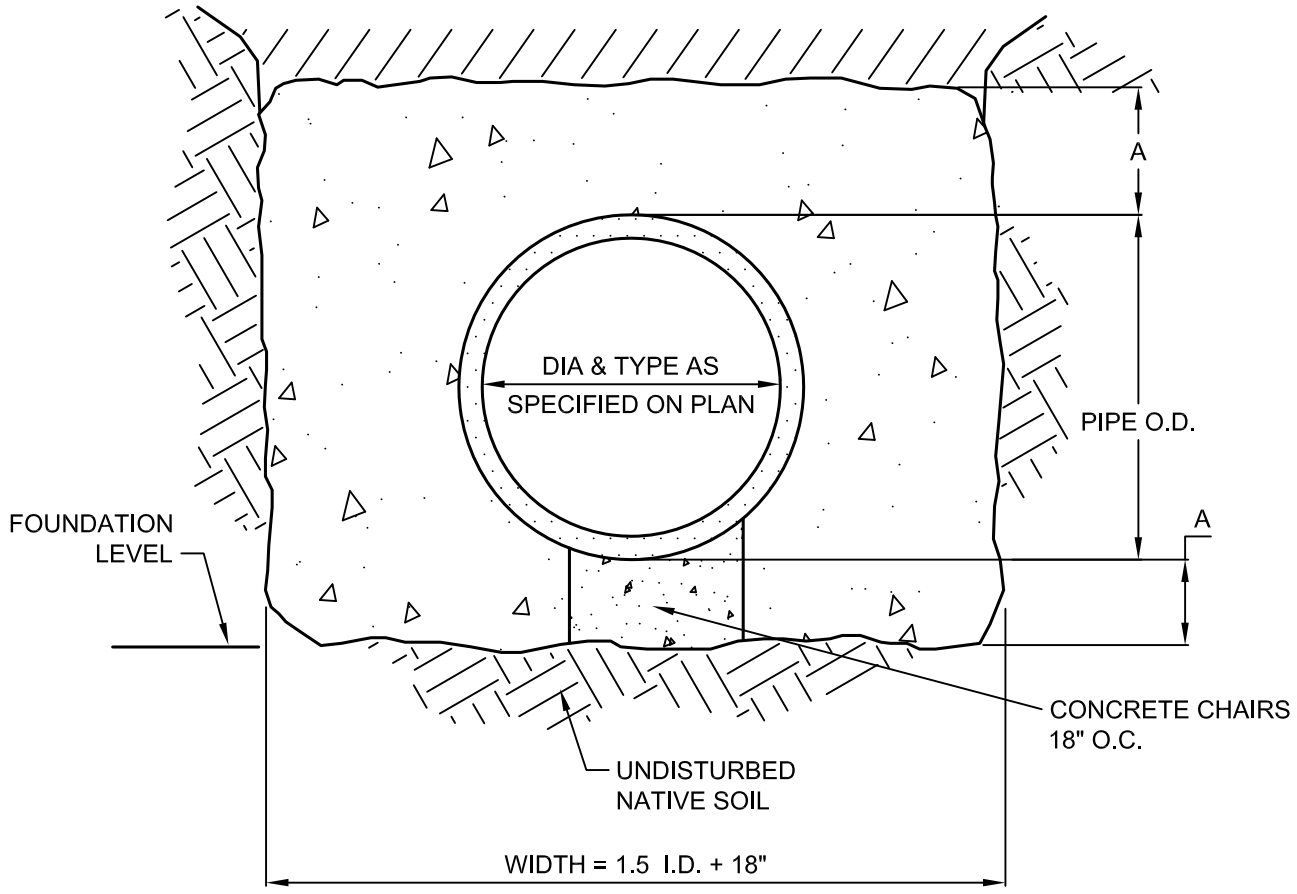
DETECTOR DOUBLE CHECK AND VAULT ASSEMBLY GENERAL NOTES:

1. BACKFLOW PREVENTORS SHALL BE APPROVED BY DEPARTMENT OF HEALTH.
2. SIZE VAULT BASED ON SIZE OF APPARATUS AND MEETING MINIMUM CLEARANCES.
3. A SEPARATE DETAIL PLAN FOR VAULT INSTALLATION AND SPRINKLER LINE MUST BE SUBMITTED AND APPROVED BY THE FIRE MARSHALL PRIOR TO INSTALLATION.
4. MINIMUM APPARATUS SIZE SHALL BE 4".
5. VAULT SHALL BE SEALED TO PREVENT WATER LEAKAGE.
6. LADDERS SHALL BE REQUIRED WHEN DEPTH FROM TOP OF LID TO FLOOR OF VAULT EXCEEDS 30". INSTALLATION OF ALL LADDERS SHALL BE IN COMPLIANCE TO O.S.H.A.
7. LOCATE VAULT IN PLANTING AREA AND NOT IN PAVING AREA, UNLESS APPROVED BY THE ENGINEER.
8. FITTINGS SHALL BE IN ACCORDANCE WITH ALL APPLICABLE REQUIREMENTS OF ANSI/AWWA C110/A21.10 AND CEMENT LINED (SEE APWA & AWWA).
9. PIPE SHALL BE DUCTILE IRON MEETING ANSI A21.51, CL52 & CEMENT LINED.
10. TEMPORARY SUPPORT SHALL BE PROVIDED UNDER VALVES AT THE TIME OF INSTALLATION. AFTER COMPLETE INSTALLATION INSTALL PERMANENT PIPE SUPPORT STAND.
11. PROVIDE BALL DRIP VALVES ON F.D.C. CHECK VALVE ASSEMBLY OR AT BOTTOM OF F.D.C. RISER.
12. FIRE DEPARTMENT CONNECTION TO BE PROVIDED WITH ONE (1) 5" STORTZ CONNECTIONS AND TWO 30° OR 45° ELBOWS.
13. ALL UNDERGROUND PIPING TO BE INSPECTED, FLUSHED, AND PRESSURE TESTED IN THE PRESENCE OF AN INSPECTOR PRIOR TO COVER AND CONNECTION TO THE OVERHEAD SYSTEM.
14. UPON INSTALLATION, BACKFLOW PREVENTION ASSEMBLIES ARE TO BE TESTED BY A CERTIFIED TESTER AND ALL TEST-COCKS ARE TO BE PLUGGED AFTER THE TEST. THEREAFTER, ANNUAL TESTS SHALL BE PERFORMED AT OWNER'S EXPENSE, AND COPIES OF TEST RESULTS SHALL BE PROVIDED.
15. CONCRETE VAULT SHALL HAVE ONE 4' X 4' OR TWO 3' X 3' STEEL HINGED DOORS.
16. BACKFLOW PREVENTION VALVES AND POST OR WALL INDICATING VALVES SHALL BE PROVIDED WITH UL CENTRAL STATION TAMPER SUPERVISION.

NOT TO SCALE

City of Tukwila

CROSS CONNECTION CONTROL			
DETECTOR DOUBLE CHECK VALVE AND VAULT			
SHEET:	WS-15 2 OF 2		
REVISION #1:	08.03	LAST REVISION:	08.04
APPROVAL:	B. SHELTON		



NOTES:

1. A = 1/4 I.D. (6" MIN. - 12" MAX.)

2. ENCASE IN CONTROLLED DENSITY FILL (CDF), PER WSDOT/APWA STANDARD SPECIFICATIONS SECTION 2-09.3(1)E.

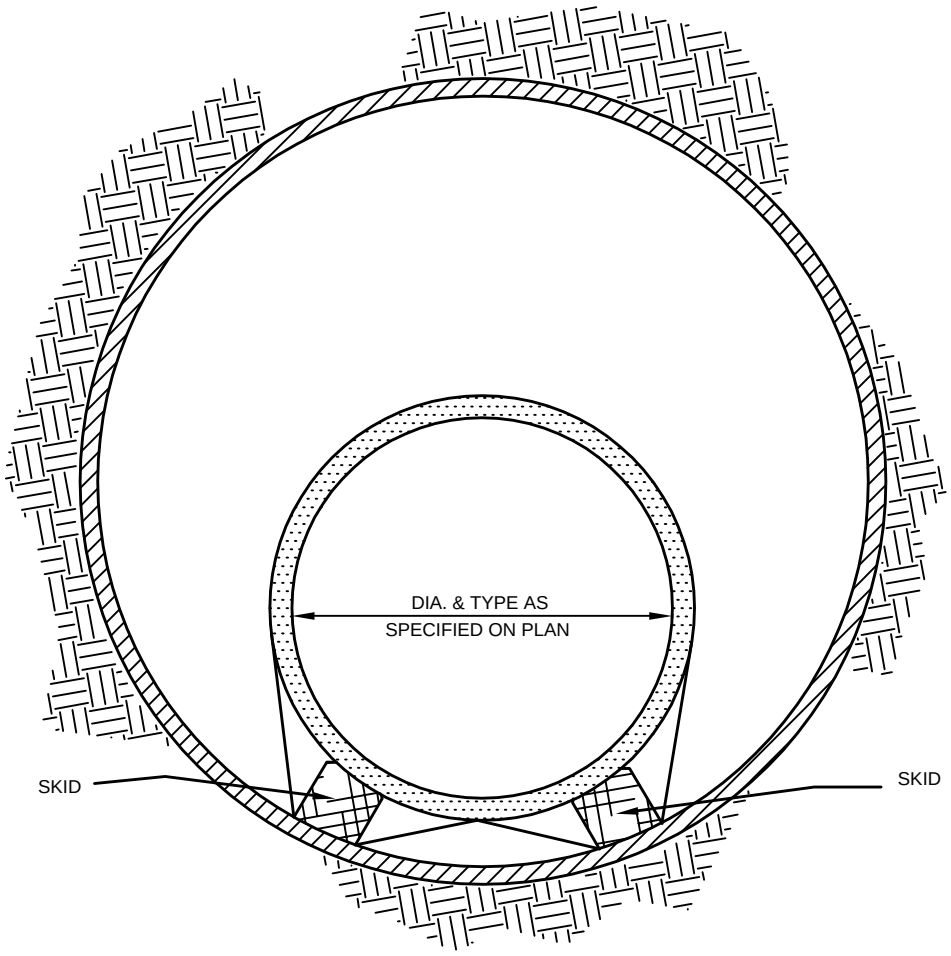
3. CONCRETE STRENGTH 3000 psi.

4. COVERS SHALL BE LABELED WITH 2" RAISED LETTERS SAYING "SEWER" FOR SANITARY SEWER, "STORM" FOR STORM DRAIN IN THE RIGHT-OF-WAY, "DRAIN" FOR STORM DRAIN ON PRIVATE PROPERTY, "WATER" WHEN INSTALLED ON POTABLE WATER, OR "RECLAIMED" WHEN INSTALLED ON RECLAIMED WATER.

NOT TO SCALE

City of Tukwila

ENCASEMENT			
CONTROLLED DENSITY FILL			
SHEET:	WS-16		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		



NOTES;

1. STEEL CASING PIPE SHALL BE ASTM A-36 PIPE MANUFACTURED IN ACCORDANCE WITH AWWA C-201. FIELD JOINTS SHALL BE BUTT WELDED IN ACCORDANCE WITH AWWA C-206 UNLESS OTHERWISE SPECIFIED ON PLANS OR DIRECTED BY ENGINEER.

2. PLACE CASING BY BORING OR BY JACKING.

3. SKIDS SHALL SUPPORT THE FULL LENGTH OF EACH PIECE OF PIPE, EXCEPT FOR JOINT AREA. SKIDS SHALL BE SECURELY STRAPPED TO THE CARRIER PIPE. THE NUMBER, SIZE AND PLACEMENT OF SKIDS SHALL BE SUFFICIENT TO SUPPORT THE CARRIER PIPE, INCLUDING JOINT SECTIONS, ABOVE THE STEEL CASING.

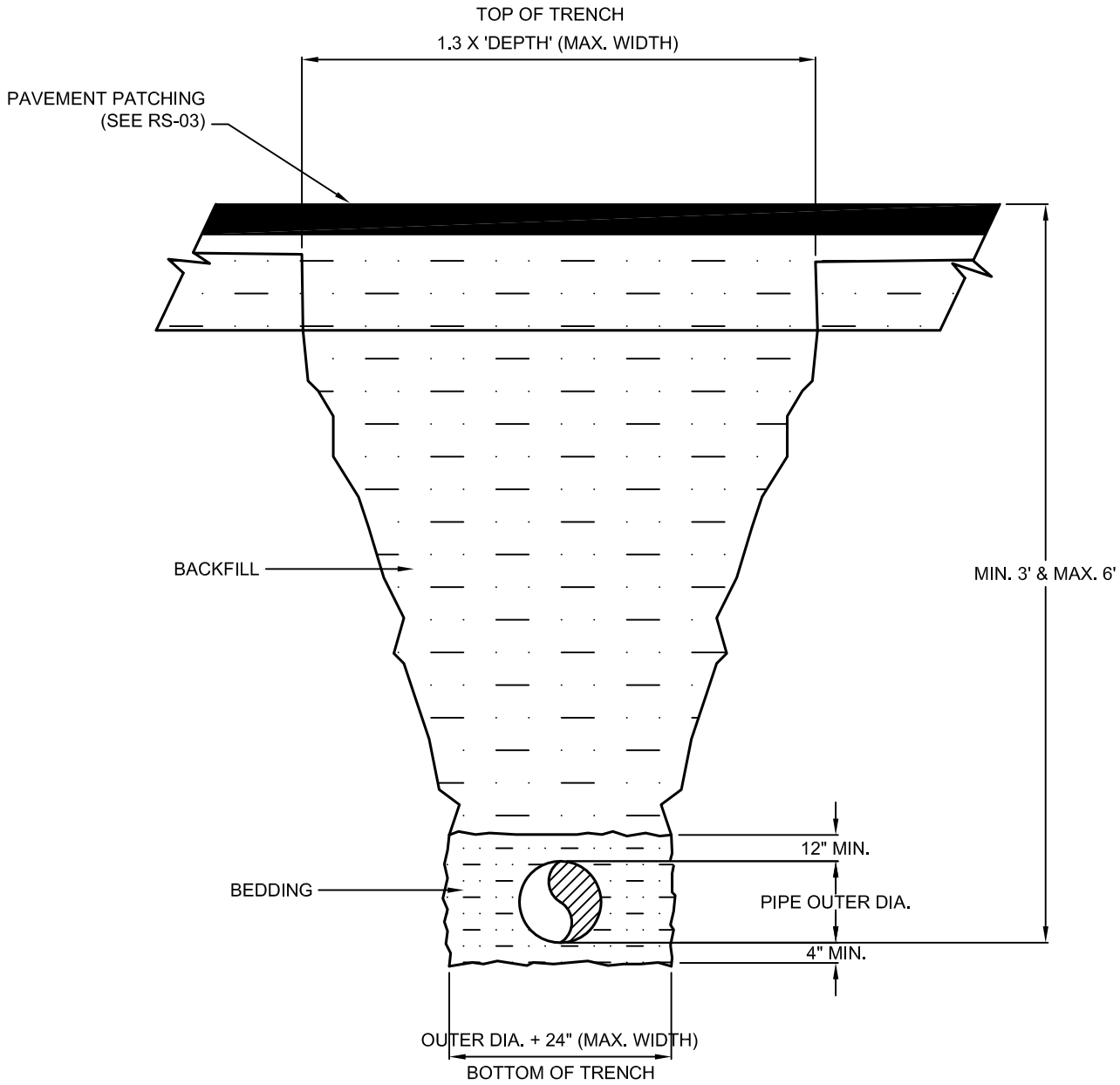
4. FILL CASING VOID WITH SAND. GROUT CASING ENDS WITH CONCRETE OR CONTROLLED DENSITY FILL AT LEAST 12" THICK.

5. COVERS SHALL BE LABELED WITH 2" RAISED LETTERS SAYING "SEWER" FOR SANITARY SEWER, "STORM" FOR STORM DRAIN IN THE RIGHT-OF-WAY, "DRAIN" FOR STORM DRAIN ON PRIVATE PROPERTY, "WATER" WHEN INSTALLED ON POTABLE WATER, OR "RECLAIMED" WHEN INSTALLED ON RECLAIMED WATER.

NOT TO SCALE

City of Tukwila

ENCASEMENT	
STEEL	
SHEET:	WS-17
REVISION #1:	08.03
APPROVAL:	B. SHELTON



NOTE:

1. ALL BACKFILL SHALL BE 5/8" CRUSHED ROCK COMPACTED TO 90% MODIFIED PROCTOR OPTIMUM DENSITY.

2. REFER TO RS-03 FOR PAVEMENT PATCHING.

3. PAVED AREAS: BACKFILL WITH CRUSHED ROCK.

4. UNPAVED AREAS: BACKFILL WITH NATIVE MATERIAL OR CRUSHED ROCK.

NOT TO SCALE

City of Tukwila

TRENCH			
BEDDING AND BACKFILL			
SHEET:	WS-18		
REVISION #1:	08.03	LAST REVISION:	04.08
APPROVAL:	BOB GIBERSON, CITY ENGINEER		