

# 2025 Pre-Approved Plans



- Water System
- Sanitary Sewer
- Storm Drainage
- LID Storm
- Roadway
- Erosion Control
- Traffic Signals



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*Caring for your infrastructure to keep Kirkland healthy, safe and vibrant.*

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# Public Works Policies

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### DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

#### Policy G-1: EASEMENT WIDTH POLICY

When easements must be established for public utilities, the following table of minimum widths must be met unless otherwise approved by the Public Works Department:

<u><i>Utility</i></u>	<u><i>Minimum Easement Width</i></u>
Sanitary Sewer Main- 8" or greater	
less than 12' deep	20'
between 12' and 20' deep	30'
greater than 20' deep	50'
Private Side Sewer - 6"	10'
Water Main	15'
Private Water Service	5'
Storm Drain Main Line 8" or greater	15'
Private Storm Line - 6" or less	10'
Detention Tank	10' from the OD of tank <sup>(3)</sup>
Detention Vault	10' from edge of vault <sup>(3)</sup>

Note:

- 1) Refer to Policy R-16 for gate requirements to publicly maintained systems installed in public utility easements.
- 2) Installation of trees, structures, or reinforced concrete within public utility easements is prohibited without approval from the Public Works Department.
- 3) For vaults and tanks deeper than 10' measured from finished grade to bottom of facility, a 1:1 easement width to facility depth ratio is required (e.g., a 13' deep tank measured from finished grade to bottom of pipe would require a 13' easement).

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy G-2: NON-SLIP COVERS FOR ALL UTILITIES IN PEDESTRIAN AREAS**

Catch basin and j-box solid covers shall have non-slip covers when placed in sidewalks, pathways, crosswalks, or other pedestrian use areas. The non-slip surface shall be a non-grit, metallic alloy surface with a hardness of up to 62 on the Rockwell "C" scale, SlipNOT or equal. Diamond or checker plate surfaces are not considered equal.

Manhole covers shall have non-slip low profile tread when placed in sidewalks, pathways, crosswalks, or other pedestrian use areas.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy G-3: CONSTRUCTION RECORD DOCUMENT REQUIREMENTS**

**"CONSTRUCTION RECORD" DRAWINGS**

1. Do not erase, but cross out numeric data on plans such as structure tops, inverts, slopes, material, etc. then add "Construction Record" data with a CR in parenthesis following the revised entries.
2. Do not erase, but cross out and re-draw the "Construction Record" graphical changes in their revised locations.
3. Include the approved King County Datum with benchmark elevation and location. All "Construction Record" elevations must be based on the approved King County Datum (NAVD 88 vertical, NAD 83/91 horizontal) unless the project was allowed to be submitted based on the old City of Kirkland Datum.
4. Drawings must display the word "RECORD DRAWING" near the title block in readily recognizable print with the corresponding date and surveyor's or project engineer's signature.
5. Submit one set of record drawing bluelines to the Construction Inspector for review before preparing digital copies.
6. Prepare and submit one set of D sized (24"x36" media size, 21"x33" max. plot size) blueline copies of the "Construction Record" documents. Include appropriate permit number in bold lettering on all pages.
7. In addition to the requirements listed above (#6), record drawings shall also be submitted on USB thumb drive in the following formats: TIF and PDF. Both shall have a minimum resolution of 300dpi. Each page shall have a corresponding file name. The proper format for naming files shall be: ProjectName## (## being the page number). For example: ThomasShortPlat1.tif...ThomasShortPlat4.tif / ThomasShortPlat1.pdf...ThomasShortPlat4.pdf.
8. Record Drawing PDF files shall not be restricted or password protected in any way.

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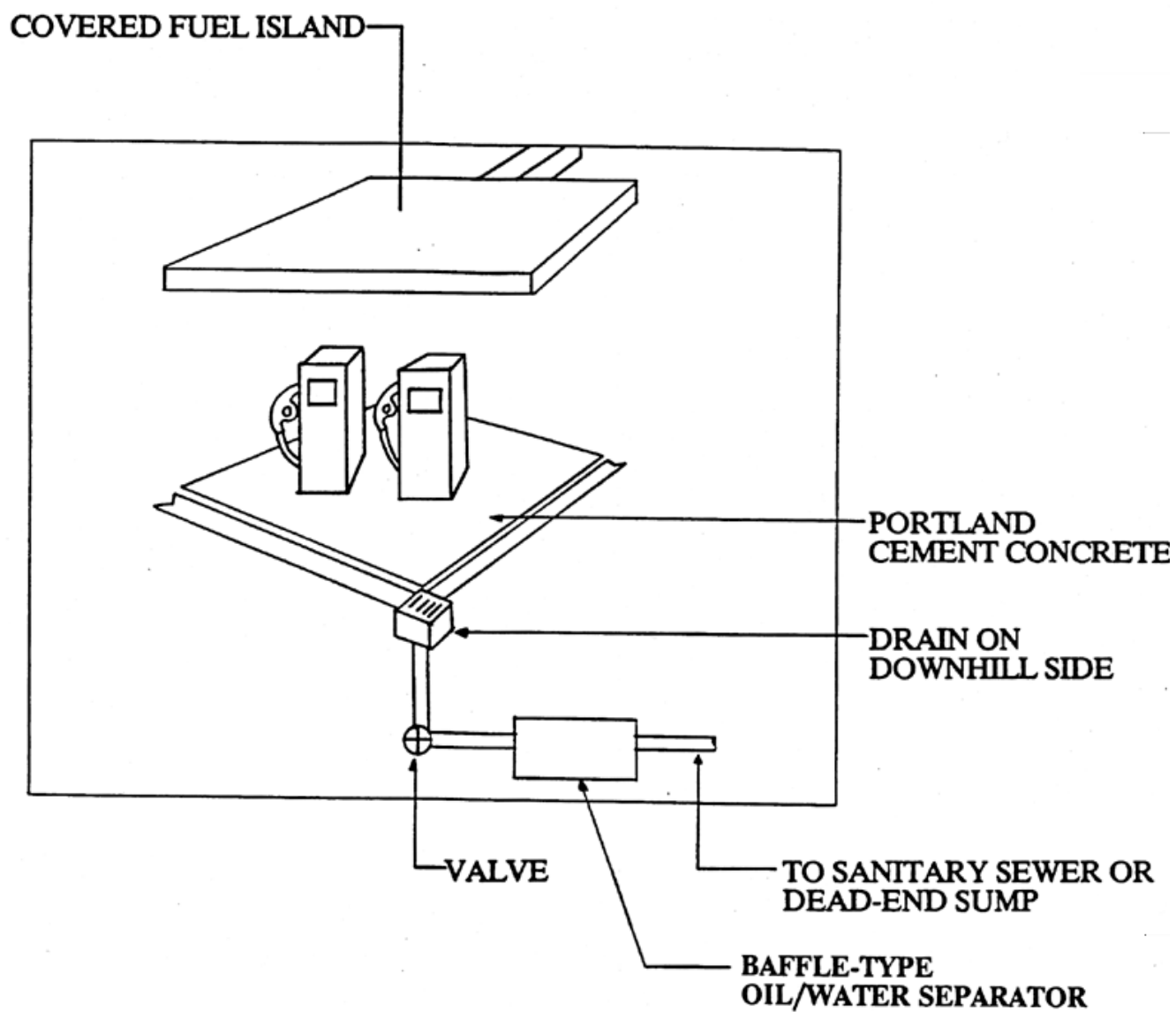
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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy G-4: FUELING STATION BEST MANAGEMENT PRACTICES**

The following Best Management Practices (BMPs) are required for all new gas stations, fueling areas or underground tank replacement permits:

1. The fuel island shall be paved using Portland cement concrete, not asphalt and be designed to contain fuel spills. The fuel island shall be designed as a spill containment pad and sized to prevent the runoff of spilled fuel and the run-on of stormwater from surrounding pavement. Parking lot stormwater shall be discharged to the stormwater drainage system, not the sanitary sewer system.
2. Liquids spilled on the fuel island shall be collected in drains, either trench drains or catch basins. The pad shall be sloped towards the drains. The drain(s) shall be connected to the sanitary sewer or process treatment. The drain shall have a valve to allow shutoff in the event of a large fuel spill and a baffled oil/water separator vault to minimize the flow of fuels into the sewer.
3. The fuel island shall be covered to prevent the direct entry of precipitation onto the spill containment pad (see Figure 1 on attached sheet). The roof/canopy shall, at a minimum, cover the spill containment pad and preferably extend several additional feet to prevent windblown rain from entering.



**FIG. 1 - FUEL ISLAND DETAIL**



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## DEPARTMENT OF PUBLIC WORKS PREAPPROVED PLANS POLICY

### Policy G-5: ADEQUATE LEGAL DESCRIPTIONS

All documents containing legal descriptions submitted to the City of Kirkland must contain legal descriptions which conform to the following examples. In addition, all legal descriptions must be accompanied by a sketch which highlights the area identified by the legal description.

A legal description is more than a mere identification or location of property but is a precise description of that portion of the face of the earth to the exclusion of the balance of the face of the earth.

Neither a map, street number, nor a King County tax account number constitutes a legal description, although they may be included as a part of a legal description to assist in location or identification.

The following are examples of adequate legal descriptions:

- A. Previously platted property: Lot 6, Block 3, Town of Kirkland according to plat thereof recorded in Vol. 7 of plats, page 32, records of King County, Washington.

*Acceptable alternative*: Lot 6, Block 3, Town of Kirkland according to plat thereof, records of King County, Washington.

- B. Short plat or short subdivision: Lot B of Jones, Short subdivision as recorded under King County, recording No. 780906541.

- C. Unplatted property: "*metes and bounds description*": That portion of the northwest quarter of the northeast quarter of Section 7, Township 25 north, Range 5 E.W.M., described as follows: Commencing at the northwest corner of said section 7, thence north 89 degrees 30'30" east 30 feet thence north 7 degrees 29'37" west 640 feet thence west 89 degrees 30'30" south 30 feet to the true point of beginning, all situate in King County, Washington.

*Acceptable alternative*: The south half of the northwest quarter of the northwest quarter of northwest quarter of Section 6, Township 24 north Range 6, east W.M., situate in King County, Washington.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy G-6: UTILITY POLICY**

The attached policy is established to describe the means and methods by which any contractor or franchised or legislatively empowered utility companies will be permitted to work within the public right-of-way of the City of Kirkland.

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**CITY OF KIRKLAND  
DEPARTMENT OF PUBLIC WORKS  
UTILITY POLICY**

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**Purpose**

This policy is established to describe the means and methods by which any contractor or franchised or legislatively empowered utility companies will be permitted to work within the right-of-way of the City of Kirkland.

**Background**

The placement of utilities in the City's rights-of-way is at the discretion of the Public Works Department under Chapter 19.12 of the Municipal Code. Section 19.12.020 of the Code states that "...no person, firm or corporation shall disrupt a street, sidewalk or curb or place a utility in a right-of-way without obtaining a separate right-of-way permit for each disruption from the Public Works department."

It is recognized that there is a need to accommodate utility companies in their provision of public services; however, the City must ensure that the primary purpose of the roadway, passage of vehicular, bicycle and pedestrian traffic, is maintained to the greatest extent possible. The use of the roadway corridors by utility companies is secondary to the movement of traffic. This policy strikes a balance between the public need for efficient, safe transportation routes and utility services within these routes.

**Policy Objectives**

Based on the Municipal Code requirement, this utility policy has three primary objectives.

1. Ensure Public Safety / Minimize Public Inconvenience:  
First, the City must ensure that the public safety is maintained and that public inconvenience is minimized by establishing time constraints for utility work, response time for utility repairs to the pavement, and standards for work zone safety.
2. Protect Public Infrastructure:  
The second objective is to protect the public's infrastructure investment by establishing repair standards for the pavement when utility cuts are made, and by specifying the inspection requirements for street repairs.
3. Facilitate Right of Way:  
The third objective is to facilitate utility work within the right-of-way through the standardization of utility placements and the maintenance of an efficient permit process.

To guide the staff, utility companies, and contractors in achieving the above stated objectives, the following policy has been prepared. The policy is intended to provide general guidance only. Specific requirements will be developed based on site-specific conditions. Also, as with any policy, exception may be granted as deemed necessary by the Director of Public Works or their designee. The City will conduct periodic reviews of the policy and invite utility companies' input

in order to make this document an effective tool for the conduct of our mutual responsibilities to serve our respective "customers".

## **I. ENSURE PUBLIC SAFETY/MINIMIZE PUBLIC INCONVENIENCE**

Public Works Engineering is charged with managing and coordinating all construction in City rights-of-way and easements. A major objective is to ensure the public safety and to minimize inconvenience during the course of construction activities within the City. Accordingly, the constraints specified below vary according to the classification of the work area.

### **A. *Work Within the Pavement:***

#### **1. Arterial Streets:**

Arterial streets are those in the City designated as principal or minor arterials in the Kirkland Municipal Code, Section 19.08 (see attached listing). Being essential to the safe movement of the majority of citizens, these streets require stricter regulation to maintain the orderly and safe flow of traffic. Therefore, at minimum, no work will be performed on arterial streets during the peak traffic hours of 7:00 - 9:00 a.m. and 3:00-6:00 p.m., except emergency work to restore services. Because of higher traffic volumes, no new (i.e. open cuts) major work will be started on Fridays, and no road plates are to be in place over the weekend or holidays. Lane closures will be restricted to the working lane only and two-way traffic will be maintained at all times. Arterials shall be opened to traffic each night with all openings covered by a road plate with cold mix "ramps" or an asphalt patch. CDF backfill is required. The permanent asphalt patch shall be placed within 3 business days after the work is completed. When notified by the City of an unsafe or unsatisfactory opening, the responsible utility company shall respond and repair said patch within twenty-four (24) hours.

#### **2. Collector Streets:**

These are all streets which connect local streets to arterial streets. Note: restrictions such as those for arterial Streets may apply depending on peak traffic hour activity. Generally, there will be no restrictions on work hour or work days; construction shall be limited to 7 a.m. - 8 p.m. Monday through Friday (emergency work excluded). Two-way traffic shall be maintained at all times during peak traffic times; one lane closure will be allowed between 9 a.m. and 3:00 p.m. with flaggers.

All patches in collector streets shall be closed each night and covered by a road plate with cold mix "ramps" or be surfaced with a temporary asphalt patch. The repair shall receive a permanent asphalt patch no later

than 3 business days after work is completed. When notified by the City of an unsafe or unsatisfactory opening, the responsible utility company shall respond and repair said patch within twenty-four (24) hours.

3. Local Streets:

These are those streets and cul-de-sacs which provide direct access to adjacent property or individual homes. Generally, there will be no restriction on work hours or workdays. Construction hours shall be limited to 7 a.m. - 8 p.m. Monday through Friday (emergency work excluded). At least a single lane shall be provided for two-way traffic with a flagman available for control. Excavations in residential streets shall be protected each night; this may be achieved by using a temporary asphalt patch or a steel plate with cold mix "ramps", both with lighted barricades. The permanent asphalt patch shall be made no later than 3 business days after work completion. When notified by the City of an unsafe or unsatisfactory opening, the responsible utility company shall respond and repair said patch within twenty-four (24) hours.

***B. Work Outside the Pavement:***

All work areas outside the pavement shall be restored to their original condition or better after work completion. No pits/trenches shall remain open overnight. In no case shall any work area outside of the pavement be left in a disturbed state longer than (five) 5 days. When notified of a failure in the work area (i.e. pothole, patch failure, or cave-in), the responsible utility company shall respond and repair said work within twenty-four (24) hours.

***C. Work Areas Generally:***

Disturbed areas shall be limited to no more than 100 linear feet of open trench before temporary repairs are initiated.

Care should be taken in job site parking to avoid damage to sidewalks and landscaping. Any curb, gutter, sidewalk or landscaping damaged by the utility shall be removed and replaced within thirty (30) days after the damage has occurred. Parked vehicles and equipment shall not restrict private property access for both pedestrians and traffic, nor hinder sight distances for traffic.

All traffic control around construction sites shall be in accordance with the Manual for Uniform Traffic Control Devices (MUTCD) and the City of Kirkland Pre-Approved Plans, subject to modification for specific locations by the Kirkland City Traffic Engineer

Erosion and sediment control around work sites shall be in accordance with City of Kirkland Pre-Approved Plans. Inlet protection shall be provided at curb inlets and yard drains. Under no circumstances shall material be washed into storm drains. Excess material/sediment shall be allowed to dry and then be removed by vacuum sweeper or shovel and hauled away. Street washing shall be allowed only after sediment is removed in this manner. Effluent from dewatering operations shall be filtered or passed through an approved sediment-trapping device, or both, and discharged in a manner that does not adversely affect adjacent property. Saw cutting effluent and waste shall not enter the storm system and the contractor conducting the saw cutting shall be prepared to collect the effluent and waste before starting the work. Upon notification of excessive erosion or sediment around work sites, the responsible utility must take corrective action within 12 hours.

Contractor is responsible for keeping streets clean and free of contaminants at all times and for preventing an illicit discharge (KMC 15.52) into the municipal storm drain system. If your construction project causes an illicit discharge to the municipal storm drain system, the City of Kirkland Storm Maintenance Division will be called to clean the public storm system, and other affected public infrastructure. The contractor(s), property owner, and any other responsible party may be charged all costs associated with the clean-up and may also be assessed monetary penalties (KMC 1.12.200). The minimum penalty is \$500. A fine for a repeat violation shall be a multiplied by the number of violations. A fine may be reduced or waived for persons who immediately self-report violation to the city at 425-587-3900. A Final Inspection of your Project will not be granted until all costs associated with the clean-up, and penalties, are paid to the City of Kirkland.

## **II. PROTECT THE PUBLIC INFRASTRUCTURE**

The inspection process is the primary instrument by which the City seeks to protect the public investment in its infrastructure. Through a uniform and responsive inspection process, the public can be assured that work has been completed in accordance with current standards for reconstruction and site restoration. The objective of the City's inspection effort is to ensure that the City infrastructure attains its maximum useful life and utility restoration callbacks are minimized.

### **A. *Quality Assurance/Quality Control/Inspection***

The City's quality assurance effort complements the utility companies' quality control efforts. Quality assurance is provided through the Public Works Department staff, who are responsible for the inspection of all right-of-way work. The staff serves as liaison with utility companies and contractors to advise on construction standards, to coordinate activities between the City and other utility companies and to advise on the extent of restoration.



Quality control is the responsibility of the utility companies. The utility companies and contractors are expected to be familiar with the applicable standards referenced herein and to employ qualified subcontractors who utilize these standards in the restoration of the right-of-way. Utility companies and contractors who fail to comply with these standards risk exclusion from performing future right-of-way work.

Inspection services will be provided by the City as necessary and upon request by the utility companies or their subcontractors. In some cases, due to scope, location, or duration of the work, it is necessary to notify the inspector 48 hours before beginning the work. These cases will be noted at the time of issuance of the Right-of-Way permit as a condition of the permit.

The inspector's concern shall be focused on restoration of the right-of-way including backfilling, compaction, hazard protection, and repaving. Some inspections will be ongoing throughout the course of a job whereas other inspections will be made only after completion of the work. Considerations which would dictate the need for ongoing inspection are: location of work, duration of work, size of area being disturbed, and public infrastructure being removed and replaced.

## ***B. Reconstruction/Restoration Standards***

All restoration shall result in a work site condition equal to or better than that which existed prior to construction. The following provisions will serve as guidelines for work in the City of Kirkland:

### **1. Pavement:**

Before any digging commences in pavement, the pavement shall be sawcut or jackhammered around the perimeter of the proposed trench. An exception to this would be wheel trenching.

Pavement cuts shall be filled with compacted select material. Either concrete or asphalt patches will be placed to match at a minimum the existing street cross section. Select material shall include gravel borrow, 5/8-inch minus gravel, or controlled density (flowable) fill (CDF).

Select material (except CDF) shall be placed in an excavation in eight-inch lifts and compacted with a vibratory plate compactor (for small openings), "jumping jack" (alongside pipelines) or with a static roller (for larger openings). Compaction must be 95% by modified proctor. Compaction by backhoe bucket is never acceptable.

In cases where it is impossible to achieve required compaction on select fill, or when achieving required compaction is critical (such as on an arterial), the City encourages and may require the use of controlled

density fill material (CDF). Where CDF is required, CDF must be placed no later than noon on Wednesday so that a permanent asphalt patch may be placed by Friday afternoon. When CDF material is used, a steel plate with cold mix "ramps" will be placed to cover the opening for the time required to allow the material to set, but, in any case, for no longer than 24 hours. CDF materials must meet the most current WSDOT design and mixture standards.

Once the compacted backfill has been placed, the asphalt cutback shall be made. The cutback will extend 1 foot minimum on each side of the opening and will be over undisturbed existing base. All edges of the opening shall be neatly cut with an asphalt saw and uniformly tacked.

The new asphalt will be placed in lifts (three-inch max) and compacted upon placement. Asphalt depths will be governed by the existing cross section of the street; new asphalt must be 1" thicker than the existing cross-section from a minimum of 3" to a maximum of 12". The joints must be sealed after the patch is installed. Concrete shall be used to replace concrete pavement wherever it occurs. The Inspector may modify the asphalt patch thickness when CDF is used.

Concrete edges shall be sawcut and new concrete placed with adequate protection during its curing.

For concrete pavement underlying asphalt, the concrete pavement may be replaced by base asphalt with two inches of asphalt for every one inch of existing concrete.

For permeable or porous pavement, replace per City low impact development (LID) standard details, unless otherwise approved by a City development or surface water utility engineer.

When it is necessary to use cold patch in an opening due to the unavailability of plant mix materials, the cold patch will be applied in lifts no greater than two inches thick.

Patches will be approved based on their general appearance as well as their "rideability." Rideability is defined as a leveling tolerance to within one-quarter inch (1/4") at any point across the patch as it relates to the surrounding asphalt street surface.

In all cases, site clean-up is necessary and required.

## 2. Overlay Requirements:

See Public Works Policy R-7 for Overlay Requirements.

3. Signalized Intersections:

In no case shall a utility company or their contractor cut into the pavement of a signalized intersection without having contacted Public Works Maintenance and Operations Signal Shop at (425)587-3920 forty-eight (48) hours prior. Signal Shop will locate buried loop detection devices so as to protect them from damage. Any contractor who damages a loop detector will have the loop repaired or be charged for the repair or reinstallation of the device.

4. Pavement Marking:

Lane striping or other painted and affixed delineators which are removed by utility companies shall be replaced by the utility company before restoration will be considered complete. The inspector will notify the utility company of the product (traffic paint, thermoplastic, raised pavement markers, lane tape) and applications, and the City Traffic Engineer will approve all traffic delineation materials.

5. Sidewalk:

Sidewalks damaged by utility companies shall be removed and replaced in full sections. A section's size will be determined by the adjacent sections or the City inspector, but in any case no section shall be less than 5' in length.

All edges of concrete to be removed shall be sawcut and then formed from construction (or dummy) joint to joint. Any sections of sidewalk which have been undermined as work progressed will also be cut out and replaced with suitable backfill prior to replacement. See Sidewalk Section Pre-Approved Plan detail.

Should damage to the City sidewalks be observed after the work has been completed, the utility company shall be notified to perform the repairs within 5 days. Where sidewalk sections are removed at street corners, the sidewalk and adjacent curb shall be restored as a curb cut handicapped ramp. Construction of the ramp shall be in accordance with City of Kirkland standards.

For permeable or porous sidewalk, replace per City LID standard details, unless otherwise approved by a City development or surface water utility engineer.

6. Aprons:

Driveway aprons will not be "patched" following utility work. The utility company will notify the inspector when a concrete apron is to be disturbed; they will agree on the extent and restoration method. In any event, all edges of concrete restoration shall be sawcut and the property owner's access to their property shall not be unreasonably denied. In the event of a repair being necessary, an apron will be repaired with the same material from which it was made (i.e. exposed aggregate aprons will be repaired with exposed aggregate concrete).

7. Curb and Gutter:

When curb and gutter is replaced, it will be restored in full ten-foot (10') sections. Match existing curb elevations and ensure constant grade and positive drainage. Expansion material will be used at joints. Should the work include removal of a section which was finished with a dummy joint, the Contractor will saw cut the joint prior to forming and pouring the new section.

8. Street/Road Crossings:

The approved method of crossing a street in the City of Kirkland will be by jacking or boring the new pipe, service line or system extension under the street crossed. In some cases, it may be determined that a street can be crossed with an open cut to the pavement. However, in these cases, specific restoration standards and time constraints may be imposed.

These standards may include the use of road plating and a controlled density fill material to ensure uniform compaction as well as the ability to reopen the street to traffic at the earliest possible time. At no time should it be assumed that the City will permit an open pavement cut; these may be permitted but only as considered on a case-by-case basis.

9. Utility Marking:

The overly-large paint marks left after utility marking is a source of concern to the City of Kirkland. Marks made on curbs as well as beyond the location which will not be removed during construction have a tendency to remain in place for an indefinite time. Therefore, the City's policy will be that marks shall be large enough and frequent enough so as to be seen by the contractor but not so as to become graffiti on the pavements, curbs, and sidewalks. Marking of valve box and service locations shall be made neatly and be less than four inches square. As the use of concrete pavers and specialty concrete finishes increases, the utility companies are specifically cautioned to be discrete with marks on

these surfaces, whether on City-owned or private property. The utility company and their subcontractors are reminded that the Washington Utilities Coordinating Council recommends that proposed construction be marked in white paint, never in color.

10. Grass Areas and Trees:

Any work around trees or any new tree plantings shall be accordance with Policy R-10, Street Tree Selection List and Planting Procedures, in the Roadway section of this book.

All areas that have been landscaped prior to construction shall be restored to original or better condition. Un-landscaped areas that were otherwise covered with vegetation shall be reseeded with grass seed after construction. In areas that have been previously sodded, sod will be considered the appropriate restoration.

Trees will not be removed or heavily pruned in the course of programmed utility work without prior review by the City's arborist.

In the event that construction may impact a tree root zone area (that area underneath the drip line of the tree), the City may require boring the utility instead of an open trench.

11. Landscaped Areas Generally:

The City of Kirkland has done extensive landscaping in areas of the city, principally in medians of arterials. When work is planned in one of these planted areas, it is the utility company's responsibility to contact the Street Department at (425)587-3911 two (2) days prior to the start of work for consultation and possible removal/replacement of plantings. The Street Department will determine procedures to be followed for the maintenance of the plants and their policies will govern.

In cases where above-ground work needs to be screened or where existing plant materials must be replaced, the utility company will install landscaping materials in accordance with the Approved Landscaping List available at the City.

12. Lakeshore Plaza/Park Lane:

These areas consist of exposed aggregate sidewalks and pavement. These finishes are difficult to match and may require replacement of entire slabs instead of patching. Extreme care is required when working in these areas. All work under the pavements in these areas will require prior coordination with the Public Works Department.

13. Environmentally Sensitive Areas:

Proposed utility work in environmentally sensitive areas, which include wetlands, streams, unstable slopes, and areas of differential settlement (i.e. peaty soils) may require a review by the City of Kirkland Planning Department for possible mitigation requirements. It is the utility company's responsibility to educate itself on the location of sensitive areas. The Planning Department has maps available showing these areas within the city limits, and can be reached at (425)587-3225.

**III. FACILITATE RIGHT-OF-WAY WORK**

The City recognizes that work within its rights-of-way by utility companies is necessary in order to provide our citizens with essential services. Accordingly, an efficient and responsive right-of-way permitting process has been established to avoid delays in allowing utility companies to maintain service to their customers. Also, by establishing uniform placements for utilities, conflicts between utilities may be minimized, benefiting all parties.

**A. *Standards for Various Utility Elements***

The following information provides location and configuration standards for utilities for new subdivisions and site plans, existing streets, easements, and on City capital projects. The goal is to standardize and document City requirements regarding the placement of utility systems in accordance with applicable City Pre-Approved Plans, Codes, and Comprehensive Plans.

Utility Element:

1. Meters:

Water meters are to be located within two feet of the back of curb or sidewalk or at the property line where there is no curb or sidewalk. Where new driveway aprons are to be built over existing water meters, the City shall notify the utility and advise the homeowner of conflict consequences.

2. Valves:

All valves are to be installed with valve boxes set flush (1/8" + tolerance) with adjacent surfaces and located out of the pavement, if possible. Gas valves for private services shall be located at or near the property line,

outside of concrete sidewalks. When notified by the City of the settlement of a valve box, the utility company shall raise the box within one week.

3. Vaults:

Locations of all vaults (telephone and electric) shall be coordinated with the City on a case-by-case basis. Access to vaults shall be through standard maintenance hole castings. Vault lids in sidewalks, paths, cross walks, or other pedestrian areas shall be coated with "slip-not" coating or equal; see Pre-approved Plan Policy G-2 Non-slip Covers for all Utilities in Pedestrian Areas.

4. Poles:

New utility poles will not be allowed. Replacement or relocated utility poles shall be placed behind the sidewalk or, if no sidewalks are present, as close to the property line as possible. Downguys shall be minimized and provided with covers. Unused or abandoned guy anchors shall be completely removed (not cut flush). In specified areas (e.g. downtown Kirkland) and in any new development (i.e. capital projects, site plans and subdivisions) the City reserves the right to require underground services. Any proposed overhead facilities will be subject to review by the Development Engineering Manager. The Development Engineering Manager shall also review any proposed changes to existing overhead utilities in existing developed areas.

Pole replacement notice, schedule, and work site requirements:

- a. At least 30 days before construction commences, a notice must be placed on the pole that is scheduled to be replaced. The notice must state that the pole is going to be replaced, the schedule of replacement, the permit number, and the owner/contact info of the pole.
- b. Before construction commences, provide the City with a schedule of the installation of the new pole and the removal of the old pole. Please email the schedule, along with the permit number, to the City contact noted on the permit.
- c. The work area must be kept tidy throughout the entire replacement process.

5. Storm and Sewer Cleanouts:

Sewer cleanouts will be provided on all laterals at the property line, per City of Kirkland Pre-Approved Plan detail CK-S.17. Storm cleanouts may be requested by the City of Kirkland for storm laterals based on site conditions, per City of Kirkland Pre-Approved Plan detail CK-D.05B. Cleanouts or riser pipes will be capped and marked prior to backfilling.

6. Panel Boxes, Distribution Boxes, Transformers, Pedestals, Switches, etc.:



Ground level elements shall be painted, either green, black or brown (unless aluminum or stainless), and/or screened from view by plantings as approved by the Landscaping list. When installed alongside open drainage ditches such above-ground items shall be placed 10 feet away from the top of the ditch to allow for access by slope mowing equipment.

7. Underground Cables and Pipelines:

In new developments, the City reserves the right to review the location of all underground facilities prior to their construction. In general, the City prefers that franchise utilities be located behind the sidewalk and/or outside of the traveled portion of the street. These locations maximize utility separation and remove "active" utilities from the major travel portion of the roadways.

8. Hydrants:

Hydrants shall be placed within the landscape strip behind the curb or behind the sidewalk. The riser pipe shall be centered in the landscape strip, or shall be at least 2' away from the sidewalk, and a 36"-radius clearance shall be provided around the hydrant.

**B. Right-of-way Permits**

The City monitors utility work through the utility permitting process. This process allows the City to coordinate activities between City forces and other utilities, to maintain a record of street cuts and patches and to identify specific City requirements.

1. When Permits Required:

Any work within the right-of-way which disturbs the pavement, curb and gutter, driveway entrances, sidewalk, landscaping or grassed areas, requires a permit.

This work may include, but is not limited to: utility main and/or lateral replacement and repair; valve replacement and repair; installation of new underground mains or laterals, structures or accessories; splices, buried drops (under pavement or sidewalks); pole changes for height, accident, etc.; cathodic protection; boxes and vault installations and jacking or boring under the right-of-way where disturbance within the right-of-way may occur. Any utility work that does not disturb the right-of-way is exempt from the permitting requirement except to the extent that traffic detours, lane closures, or sidewalk closures must be approved by the City.

2. Obtaining Permits:

Before work within the right-of-way is started the necessary permit shall be obtained from Public Works Engineering. Unless otherwise agreed, emergency work requires that a permit be obtained as soon as possible but not later than 48 hours after the onset of work. Permits are usually issued for the time period requested by the utility company. However, when situations warrant, the permit expiration date may be extended when prior notification is received. If work on an existing permit has not been started by the expiration date, the permit will be cancelled and a new permit will be required to initiate the work.

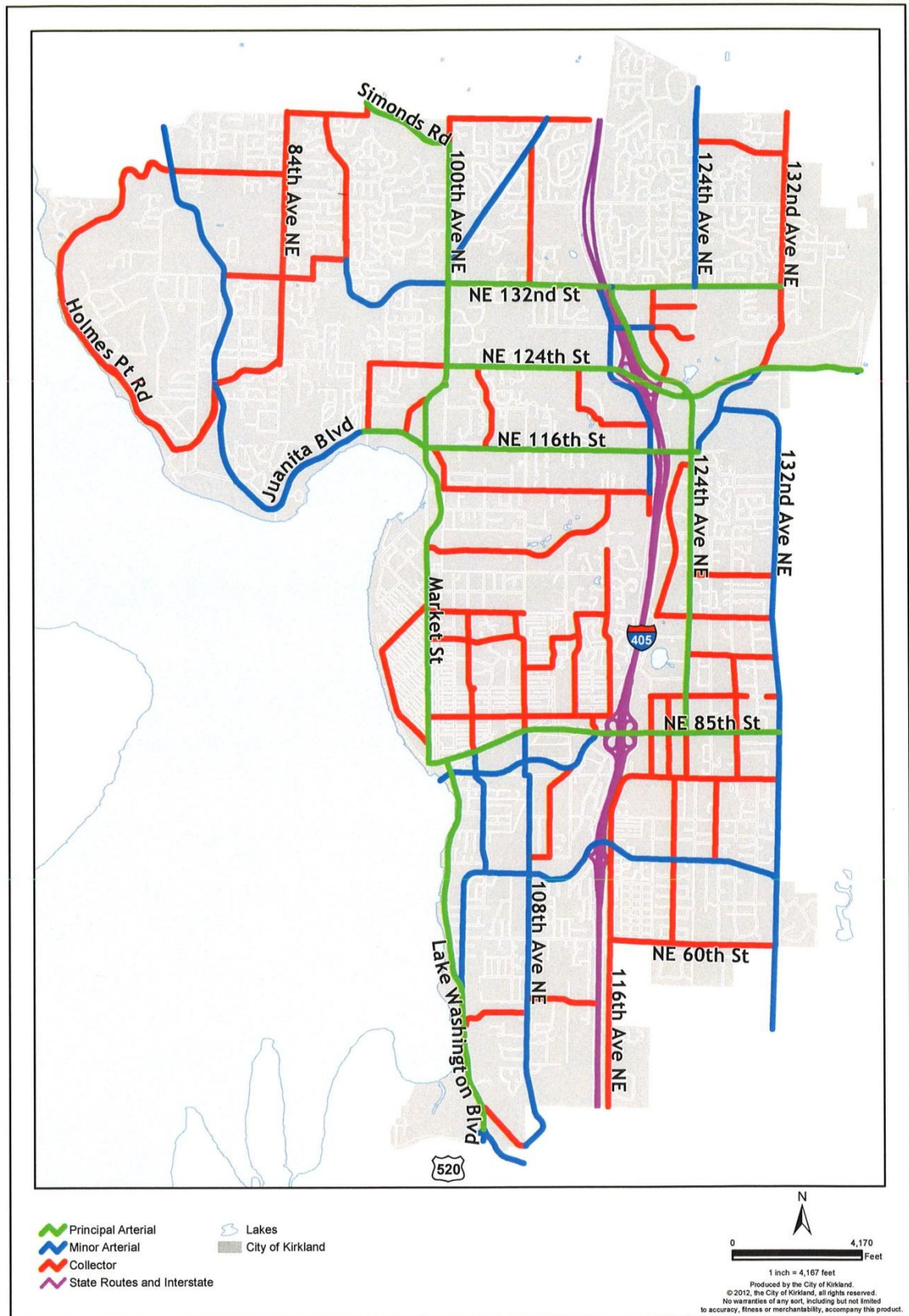
3. Responsibility:

The utility company, or contractor (Permit Holder) receiving the permit is held responsible for the work performed and the City will contact the Permit Holder for required adjustments or corrections regardless of whether the Permit Holder performed the work itself or subcontracted and assigned the work. The permit is issued to the utility company or contractor and that company is solely responsible for the work performed. The utility company or contractor shall have a copy of the permit on the job site at all times.

Utility companies shall be responsible for the condition of any right-of-way repairs. Pavement repairs shall be warranted until such time as the City shall overlay or reconstruct the pavement. Should the condition of the patch become such that additional pavement is in jeopardy of failure, then the utility may be held responsible for an area larger than the original repair. Other repairs (sidewalk, curb and gutter, trenches, etc.) shall be warranted for the reasonable life of such structures.

Future Development:

The City reserves the right to require service extensions to vacant parcels of property for future development, in order to preclude future disruption to the right-of-way.



**Figure T-1: Street Classifications and State Routes**

### **CITY OF KIRKLAND - PRINCIPAL AND MINOR ARTERIAL STREETS**

	<u>Street</u>	<u>From</u>	<u>To</u>
1.	Central Way/NE 85th Street	Market St	E. City limits (132nd Ave NE)
2.	Lake Street/Lake Washington Blvd.	Central Way	S. City limits (SR 520)
3.	Market St./98th Ave. NE/100th Ave. NE	Central Way	Simonds Rd
4.	Simonds Rd	92 <sup>nd</sup> Ave NE	100 <sup>th</sup> Ave NE
5.	Juanita/Woodinville Wy NE	100 <sup>th</sup> Ave NE	N. City limits (NE 145 <sup>th</sup> St)
6.	Juanita Drive	98 <sup>th</sup> Ave NE	N. City limits (approx. NE 143 <sup>rd</sup> St)
7.	NE 116th Street	98th Ave NE	124th Ave NE
8.	NE 124th Street	100th Ave NE	E. City limits (Willows Rd)
9.	120 <sup>th</sup> Avenue NE	NE 112 <sup>th</sup> St	NE 124 <sup>th</sup> St
10.	116 <sup>th</sup> Ave/Wy NE	NE 124 <sup>th</sup> St	NE 132 <sup>nd</sup> St
11.	NE 128 <sup>th</sup> St	116 <sup>th</sup> Ave NE	120 <sup>th</sup> Ave NE
12.	124th Avenue NE	NE 85th St	NE 124th St
13.	124 <sup>th</sup> Avenue NE	NE 132 <sup>nd</sup> St	N. City limits (approx. NE 145 <sup>th</sup> Pl)
14.	NE 131st Way/NE 132nd Street	90 <sup>th</sup> Ave NE/NE 134th	132nd Ave NE
15.	Totem Lake Boulevard	NE 132nd St	124th Ave NE
16.	Slater Avenue NE	NE 116 <sup>th</sup> St	NE 124 <sup>th</sup> St
17.	NE 120 <sup>th</sup> St	Slater Ave NE	132 <sup>nd</sup> Ave NE
18.	132nd Avenue NE	NE 60 <sup>th</sup> St	NE 120th St
19.	6th Street S/108th Avenue NE	Central Way	S. City limits (NE 41 <sup>st</sup> Dr)
20.	Northup Way	Lake WA Blvd	City limit (Burgermaster)
21.	Lakeview Dr.	Lake Wash. Blvd.	NE 68 <sup>th</sup> St
22.	NE 68 <sup>th</sup> St	Lakeview Dr	I405
23.	NE 70 <sup>th</sup> Pl/St	116 <sup>th</sup> Ave NE	132 <sup>nd</sup> Ave NE
24.	State Street	Central Way	NE 68 <sup>th</sup> St.
25.	Kirkland Ave	Lake St S	Kirkland Way
26.	Kirkland Way	Kirkland Ave	NE 85 <sup>th</sup> St

### **CITY OF KIRKLAND - COLLECTOR STREETS**

	<u>Street</u>	<u>From</u>	<u>To</u>
1.	NE 124th Street	93rd Avenue NE	100th Avenue NE
2.	93 <sup>rd</sup> Ave NE	Juanita Dr	NE 124 <sup>th</sup> St
3.	97 <sup>th</sup> Avenue NE	Juanita Dr	100 <sup>th</sup> Ave NE
4.	Holmes Pt Dr	s. end (Juanita Dr)	n. end (Juanita Dr)
5.	NE 141 <sup>st</sup> St	Juanita Dr	84 <sup>th</sup> Ave NE
6.	NE 132 <sup>nd</sup> St	Juanita Dr	87 <sup>th</sup> Ave NE
7.	NE 134 <sup>th</sup> St	87 <sup>th</sup> Ave NE	90 <sup>th</sup> Ave NE
8.	90 <sup>th</sup> Ave NE/88 <sup>th</sup> Ave NE	NE 134th	NE 145 <sup>th</sup> St
9.	NE 122nd Pl/NE 123 <sup>rd</sup> St	Juanita Dr	84 <sup>th</sup> Ave NE
10.	84 <sup>th</sup> Avenue NE	NE 123 <sup>rd</sup>	NE 145 <sup>th</sup> St
11.	NE 145 <sup>th</sup> St	84 <sup>th</sup> Ave NE	Simonds Rd
12.	100 <sup>th</sup> Ave NE	Simonds Rd	NE 145 <sup>th</sup> St
13.	NE 145 <sup>th</sup> St	100 <sup>th</sup> Ave NE	Juanita/Woodinville Wy
14.	108 <sup>th</sup> Ave NE	NE 132 <sup>nd</sup> St	Juanita/Woodinville Wy
15.	NE 144 <sup>th</sup> St	124 <sup>th</sup> Ave NE	132 <sup>nd</sup> Ave NE
16.	132nd Pl/Ave NE	NE 124 <sup>th</sup> St	NE 144 <sup>th</sup> St
17.	120th Avenue NE	Totem Lake Blvd	NE 132 <sup>nd</sup> St
18.	NE 130 <sup>th</sup> Ln	120 <sup>th</sup> Ave NE	124 <sup>th</sup> Ave NE
19.	NE 128 <sup>th</sup> St	120 <sup>th</sup> Ave NE	124 <sup>th</sup> Ave NE
20.	113th Ave NE	NE 120 <sup>th</sup> St	NE 124 <sup>th</sup> St
21.	NE 120 <sup>th</sup> St/NE 118 <sup>th</sup> St	113 <sup>th</sup> Ave NE	120 <sup>th</sup> Ave NE
22.	NE 112th Street	100th Avenue NE	120th Avenue NE
23.	100 <sup>th</sup> Ave NE/99 <sup>th</sup> Pl NE	NE 112 <sup>th</sup> St	NE 116 <sup>th</sup> St
24.	104 <sup>th</sup> Ave NE	NE 116 <sup>th</sup> St	NE 124 <sup>th</sup> St
25.	Forbes Creek Dr	Market Street	NE 112th Street
26.	18th Avenue	Market Street	Crestwoods Park
27.	3rd Street	Central Wy	18 <sup>th</sup> Ave
28.	15th Avenue	Market St	6 <sup>th</sup> St
29.	6 <sup>th</sup> Street	Kirkland Wy	15 <sup>th</sup> Ave
30.	5 <sup>th</sup> Place	15 <sup>th</sup> Ave	18 <sup>th</sup> Ave
31.	12 <sup>th</sup> Ave	6 <sup>th</sup> Street	110 <sup>th</sup> Ave NE
32.	110 <sup>th</sup> Ave NE	12 <sup>th</sup> Ave	NE 97 <sup>th</sup> St
33.	NE 97 <sup>th</sup> St	110 <sup>th</sup> Ave NE	112 <sup>th</sup> Ave NE
34.	116th Avenue NE	NE 87 <sup>th</sup> St	NE 107 <sup>th</sup> Pl
35.	7th Avenue/NE 87th Street	Market Street	116th Avenue NE
36.	114th Avenue NE	Central Wy	NE 87 <sup>th</sup> St
37.	112 <sup>th</sup> Avenue NE	NE 87 <sup>th</sup> Street	NE 100 <sup>th</sup> St
38.	NE 100 <sup>th</sup> St	112 <sup>th</sup> Ave NE	116 <sup>th</sup> Ave NE

39.	Waverly Wy	Market St	10 <sup>th</sup> St W
40.	10 <sup>th</sup> Street W	Waverly Wy	Market St
41.	120 <sup>th</sup> Avenue NE	NE 80 <sup>th</sup> St	NE 90 <sup>th</sup> St
42.	122 <sup>nd</sup> Avenue NE	NE 80 <sup>th</sup> St	NE 90 <sup>th</sup> St
43.	124 <sup>th</sup> Avenue NE	NE 80 <sup>th</sup> St	NE 85 <sup>th</sup> St
44.	128 <sup>th</sup> Avenue NE	NE 80 <sup>th</sup> St	NE 95 <sup>th</sup> St
45.	Slater Avenue NE	NE 97 <sup>th</sup> St	124 <sup>th</sup> Ave NE
46.	NE 104 <sup>th</sup> Street	124 <sup>th</sup> Ave NE	132 <sup>nd</sup> Ave NE
48.	NE 100 <sup>th</sup> Street	Slater Avenue NE	132 <sup>nd</sup> Ave NE
49.	NE 95 <sup>th</sup> Street	124 <sup>th</sup> Avenue NE	132 <sup>nd</sup> Ave NE
50.	NE 90 <sup>th</sup> Street	120 <sup>th</sup> Avenue NE	128 <sup>th</sup> Ave NE
51.	NE 80 <sup>th</sup> Street	116 <sup>th</sup> Avenue NE	132 <sup>nd</sup> Ave NE
52.	116 <sup>th</sup> Avenue NE	S. City limits (NE 41 <sup>st</sup> )	NE 80 <sup>th</sup> St
53.	122 <sup>nd</sup> Avenue NE	NE 60 <sup>th</sup> St	NE 80 <sup>th</sup> Street
54.	124 <sup>th</sup> Avenue NE	NE 70 <sup>th</sup> Street	NE 80 <sup>th</sup> Street
55.	126 <sup>th</sup> Avenue NE	NE 70 <sup>th</sup> Street	NE 80 <sup>th</sup> Street
56.	NE 73 <sup>rd</sup> Street	126 <sup>th</sup> Avenue NE	132 <sup>nd</sup> Avenue NE
57.	NE 60 <sup>th</sup> Street	116 <sup>th</sup> Ave NE	132 <sup>nd</sup> Ave NE
58.	NE 52 <sup>nd</sup> Street	Lake Wash. Blvd.	108 <sup>th</sup> Avenue NE
59.	NE 53 <sup>rd</sup> Street	108 <sup>th</sup> Ave NE	114 <sup>th</sup> Ave NE
60.	NE 38 <sup>th</sup> Place	Lake Wash. Blvd.	108 <sup>th</sup> Avenue NE
61.	8 <sup>th</sup> Street S	9 <sup>th</sup> Avenue S	Kirkland Way
62.	9 <sup>th</sup> Avenue S	8 <sup>th</sup> Street S	10 <sup>th</sup> Street S

## **CITY OF KIRKLAND - PARK FACILITIES**

	<u>City Parks</u>	<u>Address</u>
1.	Brookhaven Park	9911 NE 128 <sup>th</sup> St
2.	Carillon Woods	5429 106 <sup>th</sup> Ave NE
3.	Cedar View Park	11401 NE 90 <sup>th</sup> St
4.	Cotton Hill Park	110 <sup>th</sup> Ave NE/NE 98 <sup>th</sup> St
5.	Crestwoods Park	1818 Sixth Street
6.	David E. Brink Park	555 Lake Street S
7.	Edith Moulton Park	108 <sup>th</sup> Ave NE/NE 137 <sup>th</sup> St
8.	Everest Park	500 Eighth Street S
9.	Forbes Creek Park	11615 NE 106th Lane
10.	Forbes Lake Park (undeveloped)	9501 124th Avenue NE
11.	Heritage Park	111 Waverly Way
12.	Heronfield Wetlands	NE 124th and 108th Place NE
13.	Highlands Park	11210 NE 102nd Street
14.	Doris Cooper Houghton Beach Park	5811 Lake Washington Boulevard
15.	Juanita Bay Park	2201 Market Street
16.	Juanita Beach Park	9703 Juanita Dr NE
17.	Juanita Heights	89 <sup>th</sup> Pl NE/NE 124 <sup>th</sup> St
18.	Kingsgate	116 <sup>th</sup> Ave NE/NE 140 <sup>th</sup> St
19.	Kirkland Cemetery	12036 NE 80th
20.	Kiwanis Park	1405 10th Street W
21.	Lake Avenue West Street End Park	297 Lake Avenue W
22.	Marina Park	25 Lake Shore Plaza
23.	Mark Twain Park	10625 132nd Avenue NE
24.	Marsh Park	6605 Lake Washington Boulevard
25.	McAuliffe Park	10824 NE 116 <sup>th</sup> Street
26.	North Kirkland Community Ctr./Park	12421 103rd Avenue NE
27.	North Rose Hill Woodlands Park	NE 100th and 124th Avenue NE
28.	Norway Hill Park	119 <sup>th</sup> Pl NE/NE 145 <sup>th</sup> St
29.	Ohde Avenue Pea Patch	11425 Ohde Avenue
30.	Peter Kirk Park	202 Third Street
31.	Phyllis A. Needy Neighborhood Park	10811 NE 47 <sup>th</sup> St
32.	Reservoir Park	1501 Third Street
33.	Rose Hill Meadows Park	8324 124 <sup>th</sup> Avenue NE
34.	Snyders Corner Park (undeveloped)	NE 70th and 132nd Avenue NE
35.	South Rose Hill Park	12730 NE 72nd Street
36.	Spinney Homestead Park	11710 NE 100th Street
37.	Street End Park	501 Lake Street S
38.	Settler's Landing	1001 Lake Street S
39.	Terrace Park	10333 NE 67th Street



40.	Van Aalst Park	335 13th Avenue
41.	Tot Lot Park	111 Ninth Avenue
42.	Watershed Park	4500 110th Avenue NE
30.	Waverly Beach Park	633 Waverly Park Way
43.	Windor Vista	NE 141 <sup>st</sup> St/111 <sup>th</sup> Ave NE
44.	Yarrow Bay Wetlands	Lake Washington Blvd. & NE Points Dr
45.	132 <sup>nd</sup> Square Park	13159 132 <sup>nd</sup> Ave NE

### **STATE, COUNTY, AND RECREATION DISTRICT PARKS**

1.	Big Finn Hill Park (County)	NE 138 <sup>th</sup> St/Juanita Dr NE
2.	Bridle Trails State Park	116th NE & NE 53 <sup>rd</sup>
3.	Juanita Woodlands (County)	NE 118 <sup>th</sup> St/Juanita Dr NE
4.	OO Denny (Recreation District)	12032 Holmes Pt Dr NE
5.	St. Edwards State Park	14445 Juanita Dr NE (Kenmore)
6.	Taylor Fields (County)	11724 NE 60 <sup>th</sup> St
7.	Totem Lake Park (Conservation District)	12207 NE Totem Lake Wy

### **SPECIAL LANDSCAPED AREAS IN KIRKLAND**

1. Gateway sign at Lake Washington Boulevard north of Points Drive
2. Gateway sign at NE 85th/114th Avenue NE
3. Gateway sign NE 124th/124th NE
4. Kirkland Avenue/3rd Street
5. Lakeview Drive/Lake Washington Boulevard
6. NE 52nd Street/Lake Washington Boulevard
7. 108th Avenue NE from NE 41st Drive to NE 68th Street
8. Central Way from Market Street to 3rd Street
9. Market Street from Central Way to Forbes Creek Drive
10. NE 70th Street from 116th Avenue NE to 132nd Avenue NE
11. NE 116th Street from 98th Avenue NE to 120th Avenue NE
12. NE 124th Street from 100th Avenue NE to 113th Avenue NE

## **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

### **Policy G-7: ENGINEERING PLAN REQUIREMENTS**

All subdivision, multi-family, commercial, and single family residential projects, as directed by Public Works, which submit for grading or building permit must include engineering drawings which have been stamped, signed and dated by a professional engineer licensed in the State of Washington. The plans must also include all of the applicable requirements outlined below:

#### **GENERAL PLAN FORMAT:**

1. Plan sheets and profile sheets or combined plan and profile sheets, specifications and detail sheets shall be on sheet size 22" x 34" or 24" x 36".
2. The detail sheet(s) shall include all standard details which are applicable to the project plus any details which are unique to the project. The detail sheet(s) shall provide sufficient information to construct complex elements of the project. Details may be provided on the plan and profile sheets if space allows.
3. Each submittal shall contain a project information/cover sheet with the following information:
  - a. Title: Project name and City of Kirkland file number.
  - b. Table of contents (if more than three pages).
  - c. Vicinity map.
  - d. Legal description.
  - e. Name and phone number of utility field contacts and One-Call number, 1-800-424-5555.
  - f. Name and phone number of surveyor.
  - g. Name and phone number of owner/agent.
  - h. Name and phone number of applicant.
  - i. Name and phone number of engineering firm preparing plans (company logos acceptable).
  - j. City of Kirkland's pre-construction notification requirements.
  - k. City of Kirkland Public Works inspection request line phone number, 425-587-3805.
  - l. City of Kirkland Public Works Maintenance spill hotline number, 425-587-3900.
4. A title block shall be provided on each plan sheet. The title block shall list at a minimum the development title, the name, address, and phone number of the firm or individual preparing the plan, a revision block, date, page (of pages) numbering, and sheet title (e.g. Road and Drainage, Grading, Erosion/Sedimentation Control).
5. All plan sheets must have a NORTH arrow and must indicate the drawing scale. Acceptable plan scales are 1"=10' and 1"=20'. For profiles, the vertical scale shall be 1"=5'.
6. All plans shall use the King County Datum...(NAVD 1988 vertical, NAD 83(91) horizontal) and shall indicate the temporary or permanent benchmark used in the survey.
7. Wetlands and Native Growth Protection Easements shall be indicated on the plans as required by the Department of Planning and Community Development.

8. Existing features shall be shown with dashed lines, and/or half-toned (screened), in order to clearly distinguish existing features from proposed improvements.
9. Plan sheets shall indicate all property lines, right-of-way lines and easements.
10. Existing and proposed contours must be shown on all plan views. Contours shall be shown at 2-foot intervals (5-foot intervals for slopes > 15%; 10-foot intervals for slopes > 40%). Contours shall be field verified for roadway and stream centerlines, floodplains and for conveyance systems. Contours shall extend 50 feet beyond property lines to resolve questions of setback, cut and fill slopes, drainage swales, ditches, and access or drainage to adjacent property.
11. All existing utilities, structures, pavement, etc. to be removed shall be clearly labeled as "Existing to be removed".

### **WATER SYSTEM IMPROVEMENTS**

1. Show all existing and proposed water system features including, but not limited to:
  - a. Water mains.
  - b. Water valves.
  - c. Water meters.
  - d. Fire hydrants.
  - e. Blow-offs.
  - f. Air and vacuum release valve assemblies.
  - g. Pressure reducing valves.
  - h. Fire sprinkler lines.
  - i. Double check-valves.
  - j. Post indicator valves.
  - k. Siamese connections.
  - l. Thrust blocking.
2. Indicate all easements required for water main extensions.
3. Length, size and pipe type shall be shown for all main extensions, sprinkler services and domestic services.
4. Show the water system and the sanitary sewer system on the same plan view for verification of minimum separation requirements.

### **SANITARY SEWER SYSTEM IMPROVEMENTS**

1. Show all existing and proposed sanitary sewer system features including, but not limited to:
  - a. Sewer mains (gravity and force mains).
  - b. Side sewers (laterals).
  - c. Manholes.
  - d. Clean outs.
  - e. Backflow preventers.
  - f. Existing septic tanks and drain fields.
  - g. Pump stations.
2. Indicate all easements required for sanitary sewer main extensions and joint-use laterals.

3. Show the sanitary sewer system and the water system on the same plan view for verification of minimum separation requirements.
4. Slope, length, size and pipe material shall be indicated for all mains and laterals.
5. Each manhole shall be uniquely numbered and shall be stationed off of the right-of-way centerline. Indicate rim and invert elevations at all manholes. Also indicate invert elevations for all laterals stubbed to the property line and the centerline stationing for each lateral.
6. Provide a profile of all sewer main extensions. Clearly indicate the vertical and horizontal scale and also show the profile on the same sheet with, and aligned underneath, the plan view.
7. The profile must show the location of all existing and proposed gas, water and storm drain crossings.

### **STORM DRAIN SYSTEM IMPROVEMENTS**

1. Show all existing and proposed storm drain system features including, but not limited to:
  - a. Storm drain mains.
  - b. Catch basins.
  - c. Curb inlets.
  - d. Yard drains.
  - e. Detention systems.
  - f. Biofiltration swales.
  - g. Lot drain stubouts.
  - h. Culverts.
  - i. Streams.
  - j. Ditches.
  - k. Headwalls.
  - l. Trench drains.
  - m. Infiltration pits.
  - n. French drains.
  - o. Oil/water separator vaults.
  - p. Cleanouts
2. Slope, length, size and pipe material shall be indicated for all storm drain mains and stubouts.
3. All catch basins shall be uniquely numbered and shall be clearly labeled with the type of CB (e.g. Type I, Type IL, Type II).
4. Indicate all grate, lid and invert elevations for all drainage structures in plan or profile view. Also, indicate the invert elevation of all lot drain stubs at the property line.
5. Provide a profile of all storm drain detention systems and all R.O.W. storm drainage. Clearly indicate the vertical and horizontal scale.
6. Indicate all easements required for storm drain main extensions, biofiltration swales, storm drain detention facilities and other drainage features.
7. Indicate the centerline stationing for all catch basins, curb inlets and storm drain laterals.

8. (Recommended) Provide a summary table of project site surface areas that pertain to surface water calculations (if applicable). Examples include but are not limited to: new impervious surface, replaced, impervious surface, pervious, surface, and target surfaces.

### **ROADWAY IMPROVEMENTS**

1. Show all existing and proposed roadway improvements including, but not limited to:
  - a. Pavement.
  - b. Concrete curb & gutter.
  - c. Thickened asphalt edges.
  - d. Edge of pavement.
  - c. Sidewalk (incl. safety railings, when applicable).
  - d. Planter strips.
  - e. Street trees.
  - f. Utility structures (e.g. manhole lids, catch basins, electrical boxes, power poles)
  - g. Handicap ramps.
  - h. Street lights.
  - i. Barricades.
  - j. Signage and striping.
  - k. Driveways.
  - l. Rockery walls.
  - m. Mailboxes.
  - n. Monuments.
2. Show all right-of-way lines, centerlines and roadway widths for all R.O.W.'s.
3. Clearly differentiate between areas of existing pavement, areas of new pavement and areas to be overlaid. Also indicate location of all saw cut lines.
4. Provide a cross section of all right-of-ways indicating R.O.W. width, roadway width, sidewalks, planter strips, curb & gutter, pavement thicknesses and edge of existing pavement.
5. Provide a profile of all new roadways or extensions of existing roadways. Indicate all vertical curve data, roadway slopes, centerline stationing and existing ground profiles.
6. Clearly label all profiles with respective street names and plan sheet reference numbers if drawn on separate sheets.
7. Indicate all easements and/or R.O.W. dedications required.

### **CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN (CSWPP) Plan**

The CSWPP contains two parts; the Erosion and Sediment Control (ESC) Plan (required for all projects) and the Stormwater Pollution Prevention and Spill (SWPPS) Plan. Both plans include drawings and reports. Details regarding the full CSWPP can be found in Drainage Policy D-12. For simplified drainage reviews, a simplified TIR template that includes a small site CSWPP template is available on the City of Kirkland website and may be requested for submittal by the City of Kirkland. Listed below are minimum items to include in plan drawings.

#### **EROSION SEDIMENT CONTROL (ESC) PLAN DRAWING – required for all projects**

1. Provide details for all ESC BMPs used on site (from COK Pre-Approved Plans).
2. Include ESC Plan Notes (from COK Pre-Approved Plans).
3. Indicate clearing limits.
4. Specify the type and location of temporary cover measures.
5. Specify the type and location of permanent cover measures (this can be shown in the landscaping plan, if prepared).
6. Specify the location and type of perimeter protection.
7. Indicate the location for tree protection fencing.
8. Specify the location of the construction entrance(s); include length, width, thickness, rock size, etc.
9. Specify the locations of all sediment ponds and traps, provide all dimensions, and provide typical section views through pond and outlet structures. Provide typical details of the control structure and dewatering mechanism.
10. Indicate catch basins that are to be protected, and indicate type of protection to be used.
11. Locate all pipes, ditches, dikes, and swales that will be used to convey stormwater. Show grades, dimensions, location and direction of flow. Show all temporary pipe inverts.
12. Indicate locations and outlets of any possible dewatering systems. Indicate locations of outlet protection.
13. Indicate the location of any level spreaders.
14. Provide location and specifications for the interception of runoff from disturbed areas and the conveyance of the runoff to a non-erosive discharge point.
15. Provide locations of all check dams.

16. Indicate drainage sub-basins before and after proposed construction, indicating flow direction to structural control measures with arrows. Use a bold dashed line showing developed condition.
17. Show all cut and fill slopes, indicating top/bottom of slope catch lines.
18. Indicate hazard areas (and applicable buffers) that are on or adjacent to the project site such as flood, erosion, landslide, and steep slope hazard areas.
19. Indicate drainage features and critical areas (and applicable buffers) that are on or adjacent to the project site such as streams, lakes, wetlands, roads, bogs, depressions, springs, seeps, swales, ditches, existing pipe, and seasonal water locations.

#### STORMWATER POLLUTION PREVENTION AND SPILL (SWPPS) PLAN DRAWING –

The SWPPS plan includes the location and description of BMPs required to prevent pollution and control spills from construction activities and from chemicals and other materials used and stored on the construction site. The site plan drawing element of the SWPPS plan shall include all of the information required for the base map, as well as:

1. Existing and proposed roads, driveways, parking areas, buildings, drainage facilities, utility corridors not associated with roadways, relevant critical areas and associated buffers, and proposed final topography.
2. Identify locations where liquids will be stored and delineate secondary containment areas that will be provided.
3. Identify locations where construction materials and wastes will be generated and stockpiled.
4. Identify location of fueling for vehicles and equipment if stationary tanks will be used.
5. Delineate containment areas for fuel spills.
6. Show locations of lighting and signage for fueling during evening hours.
7. Delineate maintenance and repair areas and clearly note that drip pans or plastic shall be used beneath vehicles. Also clearly note that signs must be posted that state no vehicle washing may occur in the area.
8. Delineate truck washout areas and identify the location of slurry/washwater sumps and rinsing areas for tools.
9. Delineate where chemicals will be applied and identify where they will be stored.
10. Identify where the spill response materials will be stored.

**CITY OF KIRKLAND**

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy G-8: PUBLIC WORKS DEVELOPMENT REVIEW CHECKLIST**

The Development Review Checklist was developed to help applicants submit more complete plans which should help to reduce permit review times. The checklist covers a wide range of issues reviewed and inspected by the Public Works Department.

The Development Review Checklist can be provided at the Pre-Application Meeting to developers and engineers of Commercial, Multi-family or 5 Lot and larger Land Surface Modification permits; and is also available at the Public Works front counter and the City's web site as a resource for developers and engineers.



# DEVELOPMENT REVIEW

# CHECKLIST

Revised: 07/2022

CITY OF KIRKLAND  
PUBLIC WORKS DEPARTMENT



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# **General Requirements**

## **PLAN FORMAT**

Are your plan, profile and detail on 24" x 36" sheets and contain the follow information:

- Yes
- No
- N/A

- a. Title: Project name and City of Kirkland file number.
- b. Table of contents (if more than three pages).
- c. Vicinity map.
- d. Legal description.
- e. Name and phone number of utility field contacts and One-Call number (811).
- f. Name and phone number of surveyor.
- g. Name and phone number of owner/agent.
- h. Name and phone number of applicant.
- i. Name and phone number of engineering firm preparing plans (company logos acceptable).
- j. City of Kirkland's pre-construction notification requirements.
- k. City of Kirkland Public Works inspection request line phone number, 425-587-3805.
- l. A title block shall be provided on each plan sheet. The title block shall list at a minimum the development title, the name, address, and phone number of the firm or individual preparing the plan, a revision block, date, page (of pages) numbering, and sheet title (e.g. Road and Drainage, Grading, Erosion/Sedimentation Control).
- m. All plan sheets must have a NORTH arrow and must indicate the drawing scale. Acceptable plan scales are 1"=10' and 1"=20'. For profiles, the vertical scale shall be 1'=5'.
- n. All plans shall use the King County Datum (NAVD 88 vertical, NAD 83/91 horizontal) and shall indicate the temporary or permanent benchmark used in the survey.
- o. Wetlands and Native Growth Protection Easements shall be indicated on the plans as required by the Department of Planning and Community Development.
- p. Existing features shall be shown with dashed lines, and/or half-toned (screened), in order to clearly distinguish existing features from proposed improvements.
- q. Plan sheets shall indicate all property lines, right-of-way lines and easements.
- r. Existing and proposed contours must be shown on all plan views. Contours shall be shown at 2-foot intervals (5-foot intervals for slopes >15%; 10-foot intervals for slopes > 40%). Contours shall be field verified for roadway and stream centerlines, floodplains and for conveyance systems. Contours shall extend 50 feet beyond property lines to resolve questions of setback, cut and fill slopes, drainage swales, ditches, and access or drainage to adjacent property.

*For City Use*

- Yes
- No
- N/A

### **PRE-APPROVED PLANS AND NOTES**

Are all the pre-approved details, which apply to this design, shown on the plans? *Referencing the pre-approved details is not enough. Pre-approved details may be obtained at the City of Kirkland, Public Works front desk or downloaded from the City of Kirkland web site, <http://www.ci.kirkland.wa.us/depart/pw/gis/standard.htm>.*

*For City Use*

- Yes
- No
- N/A

### **SEATTLE CITY LIGHT EASEMENT**

Properties in for development which have a Seattle City Light (SCL) easement must provide a letter of approval from SCL if development requires construction of structures (e.g. rock wall, parking lot, etc.) in the easement.

## **Water System**

*For City Use*

- Yes
- No
- N/A

### **PLUMBING FIXTURE COUNT**

Have you included all existing and new fixtures on the Building Permit application? *The Public Works Department requires the Building Permit application fixture count be completed for not only the additional new fixtures, but the existing fixtures count as well. The total fixture count helps determine if the water service needs to be upgraded or a larger size installed.*

*For City Use*

- Yes
- No
- N/A

### **WATER PRESSURE**

The static pressure in the street, at the nearest fire hydrant from uphill which the project will be served, must be on the application and plans. *Pressure information is available from the Public Works Department.*

*For City Use*

- Yes
- No
- N/A

### **METERS & SERVICES**

1. Does your project require a new domestic service and/or meter? If yes, what is the quantity and size(s) of the meter(s)? *All water services require a minimum 1" service line from the main to the meter. Most single family homes can be serviced by a 5/8" x 3/4" meter; however, length of service, pressure zones, and number of plumbing fixtures can affect the meter size required. The latest version of the UPC or the Building Department can answer questions on sizing the meter.*

*For City Use*

- Yes
- No
- N/A

2. Is your project a mixed use with both commercial and residential? A separate meter for each use is required.

*For City Use*

- Yes
- No
- N/A

3. Does your project need an irrigation meter? If yes, how many and what meter size(s)? *All domestic and irrigation water meters must be located within the public right-of-way per Pre-Approved Plan CK-W.17. Single family residences can not have irrigation meters.*

*For City Use*

- Yes
- No
- N/A

4. Will you be abandoning an existing water service? If yes, provide note on plans.  
*All abandoned water services need to be disconnected at the water main.*

*For City Use*

- Yes
- No
- N/A

### **EXISTING WATER SYSTEM**

Do the plans reflect the following information about the existing water system:

1. Pipe size and type?

*For City Use*

- Yes
- No
- N/A

2. Location of existing hydrants and water services?

*For City Use*

- Yes
- No
- N/A

3. Location of the existing water main in relation to the center of the right-of-way and any possible conflicts with the construction of new utilities?

*For City Use*

- Yes
- No
- N/A

4. Is there an existing hydrant near the project? *If yes, it shall have 3 ports with one 5-1/4" storz fitting or shall be required to be up graded.*

*For City Use*

- Yes
- No
- N/A

#### **WATER EASEMENTS**

1. Is a water main easement required? *A 15' easement is required for water facilities maintained by the City of Kirkland and must be shown on the plans.*

*For City Use*

- Yes
- No
- N/A

2. Are there existing water easements and, if so, are they shown on the plans?

*For City Use*

- Yes
- No
- N/A

#### **NORTHSHORE UTILITY DISTRICT**

1. Northshore Utility District (NUD) provides water service to the area of Kirkland generally north of NE 116<sup>th</sup> Street. If your project is in this area, have you obtained and enclosed a copy of your Water Availability Certificate from NUD?

*For City Use*

- Yes
- No
- N/A

2. If you are within NUD boundaries, do your plans show the planned water system improvements? *A letter of approval must be submitted to the City prior to issuance of the permit.*

*For City Use*

- Yes
- No
- N/A

#### **WATER LATECOMER REIMBURSEMENT AGREEMENTS**

Are you planning to file a Water Latecomer Agreement for your water main extension? *If yes, your agreement and construction estimate must be filed with the City prior to construction.*

*For City Use*

- Yes
- No
- N/A

## **NEW WATER MAIN**

1. Is there an existing main which runs the entire length of the right-of-way abutting your project? *If not, a new water main shall be required.*

*For City Use*

- Yes
- No
- N/A

2. If the project has gone through a Land Use permit process, does the water system design reflect all of the requirements of the Land Use permit?

*For City Use*

- Yes
- No
- N/A

3. If the water main is to be extended, what is the size, type of pipe, and distance from centerline?

*For City Use*

- Yes
- No
- N/A

4. Is blocking shown? *Blocking is required at all vertical and horizontal bends.*

*For City Use*

- Yes
- No
- N/A

5. Is there a 5' horizontal separation between proposed water main and other utilities running parallel? Is there a 10' horizontal separation between the proposed water main and existing or proposed sanitary sewer?

*For City Use*

- Yes
- No
- N/A

6. Are all fittings and valves shown and listed for the contractor?

*For City Use*

- Yes
- No
- N/A

7. How is the connection to the existing system made (i.e. wet tap or cut in tee)?



*For City Use*

- Yes
- No
- N/A

8. Is a blow-off assembly necessary? *A blow-off is required at the end of any water main to prevent water from becoming stagnant. A fire hydrant may be utilized as a blow-off if it is at the end of the main (please see City of Kirkland Pre-Approved Plan No. CK-W.11).*

*For City Use*

- Yes
- No
- N/A

9. Is an air and vacuum release valve necessary? *An air and vacuum release valve is necessary when a high point occurs in the water main and serves two purposes: to release air and to prevent the pipe from collapsing when negative pressures occur. Air accumulates at the high point in a pipe, and the trapped air impedes the water flow. With an air and vacuum release valve, the trapped air is automatically released, thus allowing the water to flow more efficiently.*

*For City Use*

- Yes
- No
- N/A

10. Are additional fire hydrants required to provide fire protection? *Contact Fire/Building Department for requirements.*

*For City Use*

- Yes
- No
- N/A

11. Is a water main profile shown on the plans? *The water main should have a minimum 36" cover or a 60" maximum cover.*

*For City Use*

- Yes
- No
- N/A

## **FIRE SYSTEMS**

*For City Use*

- Yes
- No
- N/A

2. Are 5-1/4" storz fittings shown for hydrants (new and existing)? *Existing hydrants must be upgraded.*

For City Use

- Yes
- No
- N/A

3. Are the following located on private property?
  - a. Double check valve?
  - b. PIV?
  - c. Siamese connection?

## **Sewer System**

For City Use

- Yes
- No
- N/A

### **SIDE SEWER**

1. Given the design finished floor elevation, can the side sewer pipe slope requirements be met? *The Public Works Department requires the side sewer slope be a minimum of 2% for 4" pipe and 1% for 6" pipe and have 18" of \_\_\_\_\_ foundation.*

For City Use

- Yes
- No
- N/A

2. Does the side sewer have an adequate amount of cover? *There must be a minimum 6' of cover at the property line (unless the sewer main is less than 6' deep) and a minimum 18" of cover within the property.*

For City Use

- Yes
- No
- N/A

3. Does the side sewer lie too close to a structure? *The sewer lateral cannot lie within the load-bearing zone of a foundation wall, pier blocks, or rockery. A 3' distance must be maintained between the bottom of the rockery or wall and the crown of the sewer pipe, otherwise, ductile iron pipe will be required.*

For City Use

- Yes
- No
- N/A

4. Are adequate clean-outs provided in the design? *Clean-outs must be located at every 100' of pipe and/or at every bend greater than 22½ degrees for a 6" and at every accumulated 90-degree bend for a 4".*

For City Use

- Yes
- No
- N/A

### **SEPTIC AND WELL ABANDONMENT**

Does your site contain a septic tank or well? If it does, the plans must note that they be abandoned. *Abandonment of septic tanks is inspected by the City. Abandonment of wells is inspected by the Department of Ecology (DOE). Please contact DOE at 425.649.7278 for well abandonment permitting and inspection requirements.*

*For City Use*

- Yes
- No
- N/A

### **MULTI-FAMILY & COMMERCIAL PROJECTS - CAR WASH AREAS**

Is your car wash area covered, drained to the sanitary sewer, and the hose bib supplied by the domestic water meter (not the irrigation meter)? Does the catch basin draining the wash area include an oil/water separator, include sizing calculations?

*For City Use*

- Yes
- No
- N/A

### **PARKING GARAGE DRAINAGE**

Are the floor drains in the parking garage connected to the sanitary sewer, and do the catch basins include an oil/water separator, include sizing?

*For City Use*

- Yes
- No
- N/A

### **EASEMENTS**

Are sewer easements required? If yes, are they shown, and do they meet the minimum requirements outlined in the Pre-Approved Plans, General Policy G-1 Easement Width Policy?

*For City Use*

- Yes
- No
- N/A

### **SANITARY SEWER IN NORTSHORE UTILITY DISTRICT (NUD)**

1. If the project is in the NUD, have you obtained and enclosed a copy of your Sewer Availability certificate from NUD?

*For City Use*

- Yes
- No
- N/A

2. Do your plans include a copy of the proposed sewer system? *Please note, a NUD approved copy of the sewer plan must be submitted to the City prior to issuance of your permit.*

*For City Use*

- Yes
- No
- N/A

### **SEWER MAIN EXTENSIONS-KING COUNTY DEPARTMENT OF NATURAL RESOURCES REVIEW (FORMERLY METRO)**

Has the applicant sent the sewer extension design to King County Department of Natural Resources (DNR) (formally Metro) for review? If not, add a condition to the permit. *All sewer main extensions must be submitted to DNR for review prior to issuance of the permit. The contact person is:*

*Todd Keithahn, Wastewater Treatment Capital Improvement Programs  
King County Department of Natural Resources,  
821 Second Avenue, MS 117  
Seattle, Washington 98104-1598.*

*For City Use*

- Yes
- No
- N/A

### **EXISTING SEWER MAIN**

Do the plans reflect the following information about the existing sewer system:

- Pipe size, type, and slope, including any existing sewer stubs to the property?
- Location of existing manholes and/or clean-outs?
- Location of the existing sewer main in relation to the center of the right of way and any possible conflicts with the construction of new utilities, including street improvements?

*For City Use*

- Yes
- No
- N/A

### **NEW SEWER MAIN**

1. Is there an existing main which runs the entire length of the right-of-way abutting your project? *If not, a new sewer main may be required.*

*For City Use*

- Yes
- No
- N/A

2. If the project has gone through a Land Use Permit process, does this project address all of the requirements of the permit with respect to the sewer system? What is the Land Use Permit No.?

*For City Use*

- Yes
- No
- N/A

3. If the sewer main is to be extended, does the plan view show the size, type of pipe, slope, and distance from centerline?

*For City Use*

- Yes
- No
- N/A

4. Is there a 0.1' drop from invert of the inlet and laterals out of each manhole? *Drop manholes are not allowed.*

*For City Use*

- Yes
- No
- N/A

5. Is there a 5' horizontal separation between proposed sewer main & other utilities running parallel to the main? Is there a 10' horizontal separation between the proposed sanitary sewer and the water main?

<p><i>For City Use</i></p> <ul style="list-style-type: none"> <li>▪ Yes</li> <li>▪ No</li> <li>▪ N/A</li> </ul>	<p>6. Is the type of pipe-manhole connection called out on the plans? <i>Pipe connections into new &amp; existing concrete manholes shall be made using Kor-n-seal boots or approved equal.</i></p>
<p><i>For City Use</i></p> <ul style="list-style-type: none"> <li>▪ Yes</li> <li>▪ No</li> <li>▪ N/A</li> </ul>	<p>7. Is the connection for all side sewers shown with a wye and 6" stub to the property line?</p>
<p><i>For City Use</i></p> <ul style="list-style-type: none"> <li>▪ Yes</li> <li>▪ No</li> <li>▪ N/A</li> </ul>	<p>8. Is a manhole shown at the end of the main? <i>A manhole is required at the end of any sewer main. A clean-out may be installed at the end of the main, if the main to be extended is 200' or less and the design to the next manhole is submitted for review and approval.</i></p>
<p><i>For City Use</i></p> <ul style="list-style-type: none"> <li>▪ Yes</li> <li>▪ No</li> <li>▪ N/A</li> </ul>	<p>9. Is the sanitary sewer main profile shown on the plans?</p>
<p><i>For City Use</i></p> <ul style="list-style-type: none"> <li>▪ Yes</li> <li>▪ No</li> <li>▪ N/A</li> </ul>	<p>10. Are the manholes spaced 400' or less? <i>Maximum allowed distance between manholes is 400'.</i></p>
<p><i>For City Use</i></p> <ul style="list-style-type: none"> <li>▪ Yes</li> <li>▪ No</li> <li>▪ N/A</li> </ul>	<p><b>SEWER LATECOMER REIMBURSEMENT AGREEMENTS</b>  Are you planning to file a Sewer Latecomer Reimbursement Agreement for the sewer extension? <i>If so, an executed Agreement with a construction estimate and a drawing with the benefit area detailed must be submitted prior to issuance of the permit. The estimated costs can not be exceeded for reimbursement.</i></p>

# **Street Improvements**

*For City Use*

- Yes
- No
- N/A

## **CROSS SECTION**

1. Are all ROW widths denoted on the plans?

*For City Use*

- Yes
- No
- N/A

2. Are all street widths denoted on the plans?

*For City Use*

- Yes
- No
- N/A

3. All new or replaced curb in the ROW must match City of Kirkland plan no. CK-R.17.

*For City Use*

- Yes
- No
- N/A

4. All new or replaced sidewalk in the ROW must match City of Kirkland plan no. CK-R.23 unless otherwise noted by Development Engineer.

*For City Use*

- Yes
- No
- N/A

5. Do your plans show the existing sidewalk that will need to be replaced?

*For City Use*

- Yes
- No
- N/A

6. A 4.5' wide planter strip is required between the back of curb and the sidewalk, unless otherwise directed by the Development Engineer.

*For City Use*

- Yes
- No
- N/A

7. All pavement in the ROW must have 2" of Class B asphalt on top of 4" of ATB and a minimum of 4" of crushed rock.

*For City Use*

- Yes
- No
- N/A

8. All saw cut lines parallel to the centerline must be outside the wheel path. Otherwise, a half-street overlay shall be required.

*For City Use*

- Yes
- No
- N/A

9. Are all the patching and paving widths shown on the plans?

*For City Use*

- Yes
- No
- N/A

### **HORIZONTAL, VERTICAL, SLOPE, AND RADII DESIGN**

1. Has the road been designed in such a manner that it can be staked in the field? Are all stationing, initial point of horizontal curves (PCs), final point of horizontal curves (PTs), point of tangent intersections (PIs) and curve data included?

*For City Use*

- Yes
- No
- N/A

2. Are all initial point of vertical curves (PVCs), final point of vertical curves (PVTs), point of tangent intersections (PVIs), curve lengths, and tangent lengths included? Is the existing grade at the proposed profile accurately represented?

*For City Use*

- Yes
- No
- N/A

3. Are all geometric features for the construction of roads and driveways depicted with dimensions and numerical data?

*For City Use*

- Yes
- No
- N/A

4. Are the proposed cut and fill slopes accurately depicted on the plans?

*For City Use*

- Yes
- No
- N/A

5. All proposed radii for intersections must be depicted on the plans.

*For City Use*

- Yes
- No
- N/A

## **DRIVEWAYS**

Do your plans show the location of driveways including the width?  
(Commercial – 20' wide for one-way, 24' wide for two-way)  
(Single Family – 10' minimum width, 20' maximum width)

*For City Use*

- Yes
- No
- N/A

## **STREET LIGHTS**

Are street lights required for your project and have you shown the location of new lights to be installed per Puget Sound Energy's design and City of Kirkland approval?

*For City Use*

- Yes
- No
- N/A

## **TEMPORARILY DEAD-ENDED STREETS**

If your project has a dead-ended street have you shown the proper signage and/or barricades per the Manual on Uniform Traffic Control Devices?

*For City Use*

- Yes
- No
- N/A

## **UTILITY POLES**

1. Do the plans show all existing utility poles within the project limits?

*For City Use*

- Yes
- No
- N/A

2. Do the plans show all utility pole relocations? *Utility poles must be relocated if they conflict with street or utility improvements.*

*For City Use*

- Yes
- No
- N/A

## **STREET WIDENING TAPERS**

Do the plans depict a minimum 5:1 approach taper and a 10:1 exit taper at the end points of any street widening? *The City may require additional taper length per the Manual on Uniform Traffic Control Devices.*

*For City Use*

- Yes
- No
- N/A

## **ASPHALT RAMPS AT THE END OF SIDEWALKS**

Do the plans depict an asphalt ramp at the temporary end of a sidewalk? *An asphalt ramp is necessary to allow for pedestrians to travel back to the street or shoulder.*



*For City Use*

- Yes
- No
- N/A

## **WHEELCHAIR RAMPS**

Are the wheelchair ramps shown on the plans? *Wheelchair ramps are required at an intersection or at a pedestrian crossing.*

*For City Use*

- Yes
- No
- N/A

## **STREET TREES**

Are street trees shown 30' on-center in the planter strip? *Street trees must be located 50' from an intersection.*

*For City Use*

- Yes
- No
- N/A

## **SIDE SLOPES, ROCKERIES, AND HANDRAILS**

1. Are 3:1 side slopes shown from the improvements to the existing ground, or are rockeries needed? *A separate Building Permit is required for rockeries over 4' in height.*

*For City Use*

- Yes
- No
- N/A

2. Is a handrail needed along the sidewalk? *See Pre-approved Detail CK-R.50.*

*For City Use*

- Yes
- No
- N/A

## **SIGNING**

Do the plans show No Parking, Dead-end, Stop, or Street Designation signs?

*For City Use*

- Yes
- No
- N/A

## **MISC DESIGN**

1. Are all existing and new survey monuments shown? *New monuments are required at all street centerline intersections, permanent street ends (cul-de-sacs and hammerheads), and points of tangency along centerline radii.*

*For City Use*

- Yes
- No
- N/A

2. Is new street stripping/markings required and if so, do the plans depict the new stripping?

*For City Use*

- Yes
- No
- N/A

3. Are street improvement easements required and have they been shown on the plans? *Also, any existing easements should be depicted including the recording number.*

*For City Use*

- Yes
- No
- N/A

4. Do the plans show the proposed mailbox location(s) and has the location been approved by the Kirkland Postmaster? *Postmaster approval is required prior to issuance of the Building or Grading Permit.*

## **Storm System**

*For City  
Use*

- Yes
- No
- N/A

### **PROJECT CHARACTERISTICS**

1. What is the area of your site in acres? *If the project site is 1 acre or larger, then the applicant is required to obtain a Construction Stormwater Permit from the Dept. of Ecology.*

*For City  
Use*

- Yes
- No
- N/A

2. What is the area of existing and new impervious and pervious surfaces? *Impervious surface means a hard surface area which either prevents or retards the entry of water into the soil mantle under natural conditions, and/or a hard surface area which causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions. Common impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, and oiled, macadam or other surfaces which similarly impede the natural infiltration of surface and storm water runoff. Use the 2021 King County Surface Water Design Manual and Policy D-10, COK Addendum to determine Flow Control and Water Quality Treatment requirements to include in your Storm Water Technical Information Report (TIR)/Drainage Report. The TIR is to be submitted to the City for review during the permitting process.*

*For City  
Use*

- Yes
- No
- N/A

## **STORMWATER LOW IMPACT DEVELOPMENT (LID)**

Applicant is required to design LID to the maximum extent feasible per Core Requirement 9 in the 2021 King County Surface Water Design Manual. *Has a geotechnical report been completed per Policy D-8? Is LID feasible? What LID elements are proposed?*

*For City  
Use*

- Yes
- No
- N/A

## **FLOW CONTROL**

1. Which Flow Control Area is the project in – Level 1/Potential Discharge or Level 2 (Conservation Flow Control)? *Look at the Flow Control Map to determine level.*

2. How is detention provided? What is the volume required, and the volume provided? *Typical methods are tank, vault, or infiltration. All vaults will require a separate Building Permit.*

*For City  
Use*

- Yes
- No
- N/A

*For City  
Use*

- Yes
- No
- N/A

## **WATER QUALITY**

1. Is this project subject to Basic or Enhanced Treatment? *Commercial & Multi-family projects, residential subdivisions with a density of single family units equal to or greater than 8 units per acre of developed area, and a road with an expected ADT count of 2,000 or more vehicles is required to provide enhanced treatment.*

*For City  
Use*

- Yes
- No
- N/A

2. How is treatment provided, and what is the volume treated? *Some options are biofiltration swale, wetpond, wetvault, filterterra, rain gardens, or other approved method. Biofiltration swales are discouraged in locations where plant establishment and survival may be problematic or where excessive ground water, erosion potential, or other conditions may reduce the effectiveness of these facilities.*

*For City  
Use*

- Yes
- No
- N/A

## **STRUCTURE SPECIFICS**

1. Provide profile for the control structure showing orifice sizes and elevations. *Orifice sizes and elevations should match the TIR. Orifice sizes less than 1/4" in diameter are not allowed. 12" minimum clearance over the top of the control structure is required from the bottom of the flattop, and 80% of the overflow pipe must be visible from the access opening.*

*For City Use*

- Yes
- No
- N/A

2. Has the required access into the detention and/or water quality structure been met? *An opening must be provided at a distance every 50' minus the depth of the structure. The opening must be 48" in diameter continuous from top to bottom for all riser sections greater than 18" in height, otherwise a 24" opening is satisfactory.*

*For City Use*

- Yes
- No
- N/A

3. Is a paved road provided to each point of access? *Whether the structure is maintained privately or by the City a paved access with a minimum of 4" of ATB and 2" of Class B is required.*

*For City Use*

- Yes
- No
- N/A

4. All concrete detention and/or water quality structures shall have a V-bottom with 1% longitudinal slope and 5% side slopes? *The V-bottom should drain to a 2'x2' sump, 18" deep with a recessed fiberglass reinforced grating (FRP) and removable with a stainless steel chain at an access directly above.*

*For City Use*

- Yes
- No
- N/A

5. No galvanized materials are allowed in direct contact with the storm water. *Material of construction may include stainless steel, fiberglass reinforced plastic, aluminum or galvanized materials with treatment 1 or better.*

*For City Use*

- Yes
- No
- N/A

## **RIGHT OF WAY STORM DRAINAGE**

1. Are the storm main lines shown with a minimum pipe size of 12"?

*For City Use*

- Yes
- No
- N/A

2. Do the plans show the discharge location?

For City Use

- Yes
- No
- N/A

3. Do the plans include a profile of the storm system?

For City Use

- Yes
- No
- N/A

4. Does your design allow capacity for future development? *Check depth and pipe size to ensure capacity for conveyance of storm water from upstream drainage basin, identify basin to be served.*

For City Use

- Yes
- No
- N/A

5. Are all catch basins accessible by a paved access? *Where paved access cannot be provided, the catch basin shall be channeled and pedestrian access must be maintained, i.e., fences shall have gates, etc.*

For City Use

- Yes
- No
- N/A

6. Are any catch basins greater than 14' from a paved access and/or otherwise inaccessible? *If so, the basin shall not have a sump and shall be channeled, Type I basins only. In cases where a channeled catch basin is utilized there must be a standard catch basin with paved access at least 200 ft. upstream, and the pipe slope downstream of the of the standard catch basin shall be 2% minimum to aide in cleaning.*

For City Use

- Yes
- No
- N/A

### **PRIVATE STORM DRAINAGE**

1. Is there a discharge or connection point available for the drainage? *The Public Works Department requires all storm drainage be connected to the City's storm drainage system, if available, on all new buildings or remodels with a net increase of 400 S.F. and greater unless handling storm drainage through approved LID BMPs with no overflow. If not, the system shall be extended where feasible.*

For City Use

- Yes
- No
- N/A

2. If the City's storm drainage system or natural drainage course is not available, has an infiltration system been designed for the site? *In cases where connection to the City's storm drainage system is not possible, an infiltration system can be installed if the proper soil conditions exist, and the type and size of trench has been designed by an engineer or drywell designer. Refer to Policy D-8 for geotechnical requirements.*

*For City Use*

- Yes
- No
- N/A

3. Will more than one dwelling share the same storm drainage stub? Have private easements and joint maintenance agreements been provided? *Multiple houses will be allowed to share the same line and must meet or exceed the pipe material specifications. The City will require the sizing of pipe based upon the area contributing to the drainage system.*

*For City Use*

- Yes
- No
- N/A

4. Do the storm lines have the minimum required slope? *The Public Works Department requires 2% for 4" and 6", 1% for 8" and 0.5% for 12" and greater.*

*For City Use*

- Yes
- No
- N/A

5. Do the storm lines have an adequate amount of cover? *Minimum cover over storm drainage pipes in ROW or vehicular path shall be subject to Pre-Approved Plan CK-D.01, unless other design is approved.*

*For City Use*

- Yes
- No
- N/A

6. Do the storm lines lie too close to a structure? *The sewer lateral cannot lie within the load-bearing zone of a foundation wall, pier blocks, or rockery. A 3' distance must be maintained between the bottom of the rockery or wall and the crown of the storm pipe, otherwise, ductile iron pipe will be required.*

*For City Use*

- Yes
- No
- N/A

7. Are adequate clean-outs provided in the design? *Clean-outs must be located at every 100' of pipe and/or at every bend greater than a 22½ degrees for a 6" and at every accumulated 90-degree bend for a 4".*

*For City Use*

- Yes
- No
- N/A

## **FUEL ISLANDS**

1. Are fuel islands covered?

*For City Use*

- Yes
- No
- N/A

2. Does the drainage for the fuel islands drain to the sanitary sewer?

*For City Use*

- Yes
- No
- N/A

3. Is an oil/water separator vault shown?

*For City Use*

- Yes
- No
- N/A

4. Is the location for the emergency shutoff valve and valve key shown?

*For City Use*

- Yes
- No
- N/A

### **MISCELLANEOUS INFORMATION**

1. Are storm easements required? If yes, are they shown, and do they meet the minimum requirements outlined in (Pre-Approved Plan, policy section no. 2, Easement Width Policy)?

*For City Use*

- Yes
- No
- N/A

2. Have you shown all required Pre-Approved standard details?

*For City Use*

- Yes
- No
- N/A

3. Have the set back requirements been met? *Five feet from easements, tracts or property lines, ten feet from any structures.*

*For City Use*

- Yes
- No
- N/A

### **DRAINAGE FROM IMPERVIOUS AND PERVIOUS AREAS**

Is the surface runoff from paved areas conveyed to an appropriate collection point, catch basin, yard drain, strip drain, etc.? Is the drainage for areas that are graded, or landscaped, collected and conveyed off-site? *Any runoff or ground water that would normally leave the site must be conveyed to the City storm system in an approved method. The method of collection and conveyance may include structures, drains, exfiltration trenches, or other structures so designed for such purposes. The Public Works Department must approve all methods.*

## **CITY OF KIRKLAND**

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy G-9: GARBAGE AND RECYCLING RECEPTACLES AND ENCLOSURES**

Applicant must submit plans for garbage storage and service to City of Kirkland Public Works and Waste Management. WM must review and approve plans for serviceability once plans are approved by the City.

##### **SINGLE FAMILY**

One- or two-unit developments (single family homes and duplexes) will have single family cart-based garbage service. Single family homes that are adding one or two Accessory Dwelling Units (ADUs), are still considered single family for garbage service. Single family homes should plan for storage space for three carts – garbage, recycle, and compost. Carts must be placed at the curb for service and returned to private property for storage per the placement requirements in KMC 16.08.070.

##### **3+ UNITS**

Kirkland Zoning Code Chapter 115.45 requires all new multifamily, mixed use, and commercial structures to provide adequate and convenient space for the collection, storage, loading, and pickup of garbage, recyclable, and compostable materials. KMC 16.08.012 (F) indicates that adequate space means space for equal capacity of garbage and recycling collection, and space for food and yard waste compost carts. Container placement requirements are described in KMC 16.08.075. All garbage, recycling, and compost containers must be stored on private property and collection must occur on private property, when feasible.

Each Commercial/Multifamily development must submit a letter with permit submittal with a plan for garbage and recycling containers and enclosure(s)/garbage room(s) detailing:

- How garbage, recycling, and compost will be stored and managed for building's tenants.
- Drawings with illustration / reference to garbage, recycling, compost storage and handling areas. Show the storage areas internal and external to the building, compactors, enclosures, roof cover if any, and sewer drain connections if any.
- Calculations for storage area space and number of containers for each waste type relative to occupants served (see standards below).
- Collection truck access route on the property.
- Serviceability letter from Waste Management.

##### **Cottages/Townhomes (3+ units)**

Cottages, Townhomes or other small multi-unit developments that have three or more units are considered multifamily for garbage service. Multifamily service requires one HOA or main account that will be billed for shared garbage service. Multifamily garbage service can be provided in carts or dumpsters and includes recycling service at no cost. Plans must provide space for equal size garbage and recycling containers, and must include space for a compost cart. The account holder may choose to subscribe to food/yard waste cart-based service.

All garbage, recycling, and compost containers must be stored on private property and collection must occur on private property, when feasible. Private access roads must be built in



accordance with Pre-Approved Plan CK-D.37 (Utility Access Road Cross Section), to allow for service from Waste Management trucks. If on-site collection is not possible, containers may be brought to the Right-of-Way curb for service.

### **Commercial/Multifamily Developments (3+ units)**

When constructing new garbage and recycling enclosures and garbage rooms, the Storage Space Area and Volume Requirements criteria stated below shall be met.

While not required, it is strongly recommended that detachable containers (dumpsters) be used for the collection of both garbage and recyclables.

Discharges from garbage, recycling, and composting containers are prohibited from entering the storm drainage system per KMC 15.52.090 and may be prohibited from entering the sewer system per KMC 15.36.030.

For standard enclosure design plan examples, see CK-G.01. Enclosures shall substantially comply with the referenced plan diagrams, but alternative configurations may be approved by the City when site constraints exist. Waste truck accessibility to enclosures is limited by the turning radius templates shown in CK-G.02.

### **Storage Space Area Design Standards and Capacity Requirements**

- (1) The total weekly capacity of all recycling dumpsters and/or carts shall be equal to or greater than the total weekly capacity of the garbage dumpsters and/or carts. Total weekly capacity equals the size of all garbage or recycling containers expressed in cubic yards x number of service days per week.
- (2) Each enclosure shall provide space for at least two (2) 64-gallon compost collection carts and cooking oil recycling containers, if applicable.
- (3) The minimum required area for the collection and storage of refuse and recyclable materials shall be at least 150% the sum of the dumpster and/or cart footprints to be contained within.

*Example 1: A property has a 3-cubic yard (4' x 6') garbage dumpster serviced once per week and a 4-cubic yard (5' 6" x 6') recycling dumpster serviced once per week. The enclosure area required is calculated as follows:*

$$(4 \times 6) + (5.5 \times 6) + (2 \times 4.5) = 66 \text{ square feet}$$

$$66 \text{ square feet} \times 150\% = 99 \text{ square feet minimum required enclosure area}$$

*Example 2: A property has a 6-cubic yard (6' x 6') garbage dumpster serviced once per week and six 96 gallon recycling carts serviced twice per week. The required enclosure area is calculated as follows:*

$$(6 \times 6) + (6 \times 6.3) + (2 \times 4.5) = 82.8 \text{ square feet}$$

$$82.8 \text{ square feet} \times 150\% = 124.2 \text{ square feet minimum required enclosure area}$$

- (4) Containers for refuse and recyclable materials shall be located adjacent to one another within the same enclosure.

- (5) Multifamily properties utilizing chutes must provide separate garbage and recycling chutes, in addition to space for a food waste compost collection container. Combined diverter chutes are not allowed. It is recommended that garbage rooms include space for a cart or carts for broken down cardboard boxes. If chutes are designed, ongoing maintenance and operations should be considered. Property managers should be prepared to dedicate staff time and budget for regular chute maintenance and cleaning. Many properties also recommend annual or semi-annual pressure washing.
- (6) Enclosures shall be designed to provide adequate, safe, and efficient accessibility for service vehicles. All service vehicle access openings shall be at least 10' 6" wide.
- (7) Enclosures shall be equipped with lockable gate doors that open with a minimum 90 degree swing. Enclosure doors must have gate stops in the ground for wind. Any roofed structure over enclosures for stationary dumpsters shall have a vertical clearance of 14'.
- (8) Enclosures shall be designed to allow walk-in access without having to open the main enclosure service gate(s).
- (9) Enclosures should be convenient for residents and businesses. In general, enclosures or garbage rooms should be provided within 200'-300' of each resident/business.
- (10) Enclosure areas shall be constructed on a level concrete or suitable equivalent hard-surfaced pad. The grade of the pad shall not exceed three (3) percent.
- (11) Enclosure areas shall include a precast wheel stop or other approved barrier. Storage areas shall be designed to be easily accessible to collection trucks and equipment, considering paving, grade and vehicle access. Where direct truck access to a storage area is not possible, the grade and ramp design shall consider the weights and size of containers that can reasonably and safely be managed for roll-out to an accessible truck loading location. Containers must be 4 yards or less to be rolled out for service. Compacted containers must be staged for service by property maintenance or motorized pushcarts/jacks must be provided for moving containers.
- (12) The enclosure space shall not be used for purposes other than for the storage and collection of refuse and recyclable materials.
- (13) Garbage and Recycling Receptacles and Enclosures Serving Commercial Restaurants & Food Services Establishments

All food compactor and garbage enclosure areas should drain to sanitary sewer. The enclosure area should be graded to a drainage structure(s) with a tee-pipe on the outlet pipe with a removable cap, followed by a running trap and cleanout for maintenance and prevent sewer gases from escaping.

  - Enclosure areas less than (<) 200 sq ft should be bermed or enclosed to contain spills and leaks and prevent stormwater run-on contamination.
  - Enclosure areas more than (>) 200 sq ft should be covered and bermed or enclosed to contain spills and leaks and prevent stormwater run-on contamination. Any roofed structure over enclosures for stationary dumpsters shall have a vertical clearance of at least 14'. Depending on the location of the enclosure area in relation to a building, the covered area may need to be equipped with fire sprinklers (see 2012 IFC 304.3.3

& 304.3.4).

In the absence of sanitary sewer access the area must be covered and drain to a regularly-maintained dead-end sump. The enclosure area should be graded to the drainage structure(s) with a tee-pipe on the outlet pipe and a removable cap, followed by a running trap and cleanout for maintenance and prevent sewer gases from escaping.

#### **NOTE**

**Liquid wastes should have secondary containment sufficient to hold a volume of either ten (10) percent of the total enclosed container volume or 110 percent of the volume contained in the largest container.**

#### **Available Cart Specifications:**

	<u>Dimensions (w x d)</u>	<u>Footprint (sq ft)</u>	<u>Cubic Yard Equivalent</u>
20-gal cart	19" x 24"	3.2 sq ft	.10 cy <sup>3</sup>
35-gal cart	19" x 24"	3.2 sq ft	.17 cy <sup>3</sup>
64-gal cart	24" x 27"	4.5 sq ft	.30 cy <sup>3</sup>
96-gal cart	26" x 35"	6.3 sq ft	.50 cy <sup>3</sup>

#### **Available Dumpster Specifications:**

	<u>Dimensions (w x d)</u>	<u>Footprint (sq ft)</u>	<u>Configuration</u>
1 cubic yard	6' x 2' 5"	14.5 sq ft	Casters or no casters
1.5 cubic yard	6' x 2' 6"	15 sq ft	Casters or no casters
2 cubic yard	6' x 3'	18 sq ft	Casters or no casters
3 cubic yard	6' x 4'	24 sq ft	Casters or no casters
4 cubic yard	6' x 5' 6"	33 sq ft	Casters or no casters
6 cubic yard (flat top)	5' x 6'	30 sq ft	No casters
6 cubic yard (slant)	6' x 6'	36 sq ft	No casters
8 cubic yard (flat top)	5' 6" x 6'	33 sq ft	No casters
8 cubic yard (slant)	5' 6" x 6'	33 sq ft	No casters

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY****Policy G-10: GUIDELINES FOR TEMPORARY USE OF RIGHT-OF-WAY**

Before allowing use of the right-of-way, consider the following factors:

1. Is it at all possible to find a way to do the activity outside the right-of-way? All options should be pursued. Consider times when parking is not regulated.
2. Is parking regulated (time limits) in the area and during the time where the activity is taking place? If so, coordinate with the Public Works Transportation Group before permitting any activities.
3. Is the work part of a permitted development review project? If it is, then it should be handled as part of that permitted project. Coordinate with project inspectors or others.
4. The City does not provide any barricades or other traffic control devices.
5. Make sure that use of the right-of-way does not interfere with any Special Events.

<b>Type of Activity</b>	<b>Action</b>
Moving vehicles	Can be permitted in areas with hourly regulated parking stalls. Three days maximum stay. Fee is charged. If parking is regulated where the moving vehicle is to be located, spots may be reserved with permission of PW Transportation Group and coordinated with the Police Department as needed.
<ul style="list-style-type: none"> <li>• PODS or other storage containers</li> <li>• Job Shacks</li> <li>• Portable toilets</li> <li>• Piling of materials (bark, gravel, etc.)</li> </ul>	Not allowed in right-of-way
Parking for construction workers	Can be permitted for small construction jobs in areas with hourly regulated parking stalls. One month maximum stay. Fee is charged. If parking is regulated where the vehicle is to be located, spots may be reserved with permission of PW Transportation Group and coordinated with the Police Department as needed. Otherwise, follow existing parking regulations.
Special Events that do not qualify for a Special Event Permit	Can be permitted in areas with hourly regulated parking stalls. One day maximum stay. Fee is charged. If parking is regulated where the vehicle is to be located, spots may be reserved with permission of PW Transportation Group and coordinated with the Police Department as needed.
Dumpster	Can be permitted. Activity must be construction related. One week maximum stay. Permits are issued through the Public Works Development Engineering Group.

<p>Maintenance of building, loading/unloading of construction materials. Painting, crane needed to unload objects, etc.</p>	<p>Can be permitted. Fee may be charged.</p> <p>In the CBD, parking stalls are usually available only in front of the site where work is occurring. However, the parking stalls used for the Argosy Cruises may be available during certain times of the year.</p> <p>Work should be short term (the maximum stay time in a regulated stall or 4 hours – whichever is less) and no lane or sidewalk is blocked. Coordinate with Public Works Transportation Group as needed.</p> <p>If work is not in the CBD or short term:  Applicant must submit sketch and traffic control plan.  Approval by Public Works Transportation Group.  Coordinate with Police Department as needed.</p>
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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy G-11: PARKING GUIDELINES FOR DOWNTOWN KIRKLAND**

Attached are parking guidelines for downtown Kirkland, and are to be used by the City in making parking decisions.

## **Introduction**

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This document sets forth a series of Parking Guidelines that will be used by the City in making parking decisions. The Guidelines will serve to establish policy direction and priorities in implementing a successful parking management system, facilitating decision-making for the parking system over time. The Guidelines are not regulatory in nature. Rather, they are intended to provide guidance in making the difficult decisions associated with managing a high-demand parking system.

The objective of these Parking Guidelines is to implement a Parking Management and Access Plan for downtown Kirkland that supports the development of a vibrant, accessible, 24-hour city serving commercial, retail, recreational and residential uses and the customers, visitors, employees and residents of those uses. The access components of that plan need to be simple and intuitive for the user, providing an understandable system for use that is safe, secure and well integrated into the traffic system (land and water based) and other access modes.

The Guidelines are divided into two sections. Section 1 establishes Guiding Principles for Access and Section 2 establishes the Parking Management Plan. The Guiding Principles serve as a foundation for near- and long-term decision-making and implementation of parking management and access strategies in the downtown. These strategies are intended to support the on-going economic development and vitality of downtown. The Parking Management Plan establishes parking zones and operating principles for those zones. The Plan intends to:

- Clearly define the intended use and purpose of the parking system,
- Manage the supply and enforce the parking policies and regulations,
- Monitor use and respond to changes in demand, and
- Maintain the intended function of the overall system.

## Section 1: Guiding Principles for Access

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The Guiding Principles are based on the premise that development of the downtown will require an integrated and comprehensive package of strategies that will stimulate economic development and redevelopment. The access component of that overall plan is but one critical element of a larger coordinated economic development package.

The following section establishes nine Guiding Principles. Each Guiding Principle is followed by a listing of some of the important consensus challenges and opportunity themes from October 2003 Downtown Kirkland Parking Study and Plan. These challenges and opportunities provide a context and rationale for the Guiding Principles

### GUIDING PRINCIPLE FOR ACCESS

1. ***Make the downtown accessible to all users. Kirkland will seek to develop the most cost-effective mix of transportation modes for access to downtown, including both parking and transportation demand management strategies.*** Access should be provided to all users of the downtown, which includes automobile, transit, boat and bike/walk users. The City should strive to create and implement as many access options as possible. Parking management strategies and programs should support and compliment other access modes as a way to maximize total access capacity in the downtown.

#### Challenges addressed:

- Parking supply is not managed to its maximum potential
- Perception that Kirkland lacks access and capacity
- Need for better connectivity
- Lack of transportation options and off-peak transit service
- Competition with other shopping areas
- Traffic and circulation and need for better directional and information systems

#### Opportunity themes supported:

- Commitment to downtown by the city, business community and citizenry



- Willingness to test innovative programs
- Great business environment downtown
- Downtown is a unique destination and shopping experience
- Safe community/streets
- Transit center in downtown

## **GUIDING PRINCIPLES FOR PRIORITY PARKING**

2. ***Make the downtown core conveniently accessible to priority users.*** The *core zone* of downtown should provide an access system that supports its priority role as the central point from which customers and visitors are connected to all the districts of the downtown. The priority user of the downtown is the short-term patron.

### Challenges addressed:

- Parking supply is not managed to its maximum potential
- Perception that Kirkland lacks access and capacity
- Need for better connectivity
- Need to expand waterfront opportunities
- Public expectation of free and proximate parking
- Linking physical assets to commercial opportunity
- Competition with other shopping areas
- Lack of a marketing strategy
- Pedestrian safety
- Disconnect between downtown and Park Place
- Perception of access/capacity
- Traffic and circulation and need for better directional and information systems

### Opportunity themes supported:

- Commitment to downtown by the city, business community and citizenry.
- Willingness to test innovative programs.
- Waterfront/physical beauty/boat moorage

3. ***Provide sufficient and convenient parking.*** Sufficient parking should be provided to support desired and priority economic activities in each downtown district. Publicly owned parking should be preserved for, and actively managed to, assure patron access to the area. The City should anticipate future patron needs in the context of its Downtown Strategic Plan and seek to acquire or develop parking as is appropriate.

### Challenges addressed:

- Need a consensus plan to prepare for future economic viability and growth

- Public expectation of free and proximate parking
- Perception that Kirkland has no capacity to grow
- Perception of access/capacity
- Proximity of parking to land uses
- Attracting a more diverse mix of businesses
- Cost of building parking

Opportunity themes supported:

- Free public parking
- Demonstrable commitment to downtown by City, business community and citizenry
- Great business environment downtown
- Downtown is a unique destination and shopping experience
- Attractive streetscape
- Transit center in downtown

4. ***Provide adequate employee parking.*** *Adequate* parking should be provided to meet employee demand, in conjunction with a transportation system that provides multiple travel mode options. All parking strategies should be coordinated with transportation demand management goals and objectives to ensure that employees and customers have reasonable options available for access. Access management strategies should move larger numbers of employees into alternative modes over time.

Challenges addressed:

- Parking supply is not managed to its maximum potential
- Required parking ratios
- Perception of access/capacity
- Lack of transportation options and off-peak transit service
- Cost of building parking

- Lack of available commercial and physical space necessary to accommodate growth

Opportunity themes supported:

- Demonstrable commitment to downtown by City, business community and citizenry
- City's willingness to test innovative programs
- Transit center in downtown

5. ***Promote strategic development of off-street facilities.*** Off-street parking facilities should be developed to serve a diverse mix of uses and facilitate continued access activity throughout the day and into the evenings and weekends. Publicly owned parking facilities should be strategically located to assure that such a mix of uses, particularly customer/visitor access is conveniently and economically served. Facilities should be sited in a manner that supports connectivity within the downtown. Employee parking should not be the long-term, primary intent of publicly located parking facilities in the downtown. Park and ride parking should be prohibited in the downtown.

Challenges addressed:

- Need a consensus plan to prepare for future economic viability and growth
- Lack of transportation options and off-peak transit service
- Parking supply is not managed to its maximum potential
- Need to expand waterfront opportunities
- Need for better connectivity in the downtown between destinations
- Disconnect between downtown and Park Place
- Proximity of parking to land uses
- Traffic and congestion
- Perception of access/capacity
- Cost of building parking

Opportunity themes supported:

- Downtown is a unique destination and shopping experience
- Great business environment downtown
- Attractive streetscape
- Traffic volume through downtown

6. ***Preserve and expand on-street parking wherever possible.*** On-street parking should be preserved along strategic corridors to improve customer/visitor accessibility and to facilitate revitalization of street level activities. On-street access should, in some cases, take priority over street capacity and vehicle speeds.

Challenges addressed:

- Attracting a more diverse mix of businesses
- Parking availability
- Need a consensus plan to prepare for future economic viability and growth
- Traffic and circulation
- Pedestrian safety

Opportunity themes supported:

- Downtown is a unique destination and shopping experience
- Great business environment downtown
- Attractive streetscape

## **GUIDING PRINCIPLE FOR UNDERSTANDABILITY**

7. ***Improve access linkages between districts and the downtown core.*** Access linkages within the core and between districts should be clearly identified through signage, way finding measures and other communication strategies to increase customer understanding of the downtown. Access linkages include parking, transit, and pedestrian/bicycle systems.

Challenges addressed:

- Need a plan to prepare for future economic viability and growth
- Lack of a marketing strategy
- Public expectation of free and proximate parking
- Need to expand waterfront opportunities
- Need for better connectivity in the downtown between destinations
- Disconnect between downtown and Park Place
- Proximity of parking to land uses
- Traffic and congestion
- Perception of access/capacity
- Pedestrian safety

Opportunity themes supported:

- Downtown is a unique destination and shopping experience
- Great business environment downtown
- Attractive streetscape
- Waterfront/physical beauty/boat moorage
- Safe community/streets

**GUIDING PRINCIPLE FOR COORDINATION**

8. ***Coordinate access strategies with desired development.*** All access strategies should be coordinated with and highly and mutually supportive of residential, retail, and commercial office developments in the downtown.

Challenges addressed:

- Need a plan to prepare for future economic viability and growth
- Need to attract a more diverse mix of businesses downtown
- Lack of a commercial anchor(s)
- Need for better connectivity in the downtown between destinations
- Lack of transportation options and off-peak transit service
- Perception of access/capacity
- Proximity of parking to land use(s)

Opportunity themes supported:

- Downtown is a unique destination and shopping experience
- Increased residential development – potential to grow the market.
- City's willingness to test innovative programs.
- Great business environment downtown

**GUIDING PRINCIPLE – ROLES AND RESPONSIBILITIES**

9. ***The City should lead in the development of access options for customers and visitors (patrons) of the downtown and actively partner with the business community to incent additional access and growth.***

The City's primary role in the use of public resources for parking should be prioritized to meet patron access demand. The City should use its resources to promote alternative modes for commuter access as well as creating incentives, partnerships and programs to attract private investment in parking and desired development.

Challenges addressed:

- Need a plan to prepare for future economic viability and growth
- Lack of available commercial and physical space necessary to

accommodate growth

- Need to attract a more diverse mix of businesses downtown
- Lack of a commercial anchor(s)
- Affordable lease space for existing and new businesses
- Required parking ratios
- Lack of a marketing strategy
- Perception that business is flat
- Perception that Kirkland has no capacity to grow
- Lack of transportation options and off-peak transit service

Opportunity themes supported:

- Downtown is a unique destination and shopping experience
- Demonstrable commitment to downtown by the City, business community and citizenry
- Increased residential development – potential to grow the market.
- City's willingness to test innovative programs.
- Great business environment downtown

## **Section 2: Parking Management Plan - Operating Principles, Implementation Framework, and Parking Management Zones**

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The following section sets forth the parking management plan for Downtown Kirkland. The proposed plan strives to remain consistent with the Guiding Principles and give direction to future decision-making for the implementation of parking management strategies. These strategies are designed to assure priority access is maintained in each parking management zone. Overall, the plan is intended to provide a flexible system of parking management that is triggered by demand and implemented within the context of consensus goals and vision for the downtown.

The purpose of the parking management plan is to:

- Clearly define the intended use and purpose of the parking system,
- Manage the supply and enforce the parking policies and regulations,
- Monitor use and respond to changes in demand, and
- Maintain the intended function of the overall system.

### **1. PARKING MANAGEMENT PLAN**

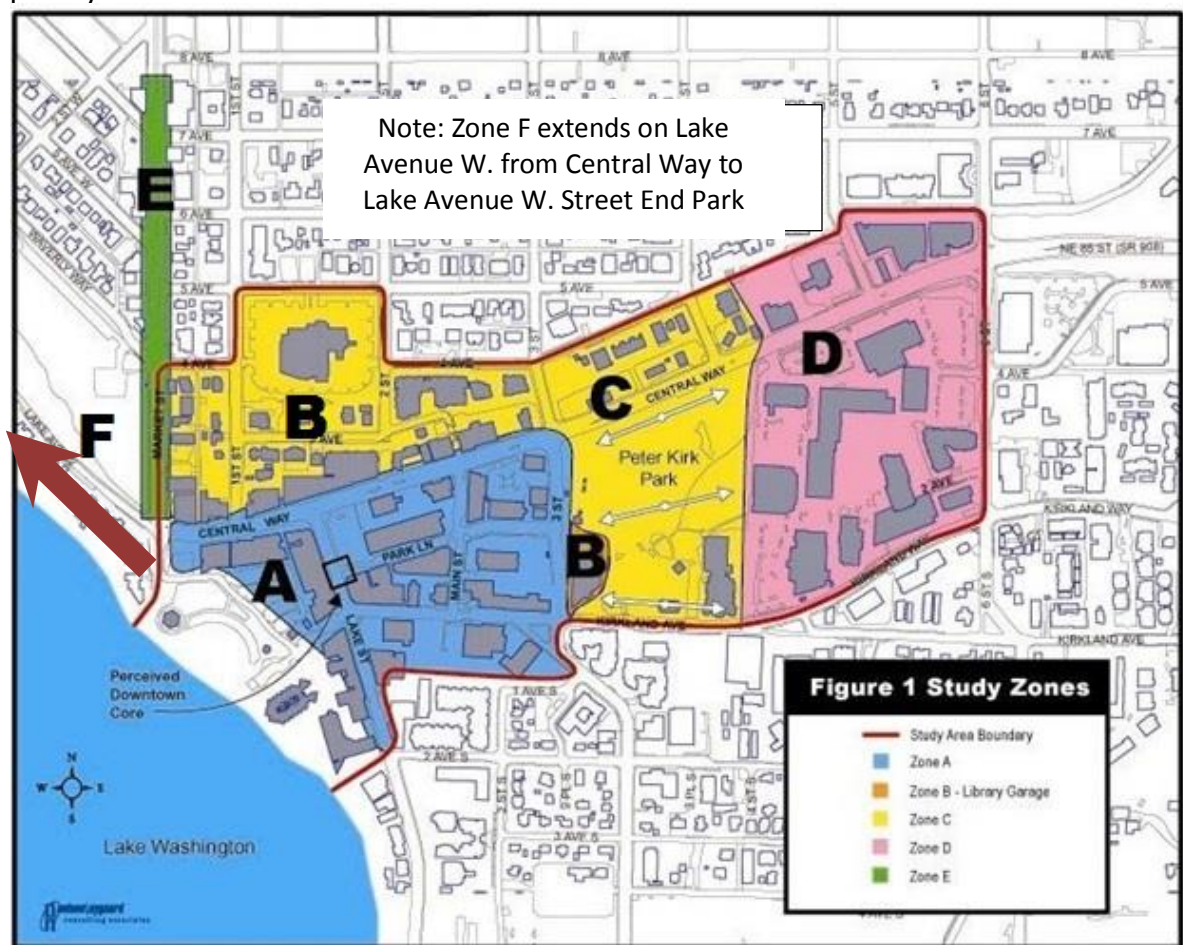
#### **A. Parking Management Zones**

Different segments of the downtown have different economic uses and represent different points of access into the downtown. The Guiding Principles emphasize the

heart or central core of downtown represents the area in which the highest density of economic activity and access is intended to occur. There are also distinct areas of the downtown with differing levels/types of desired economic activity. The desired uses in a particular area of downtown should drive the decision making for the type of parking required. Parking, then, becomes a management tool that supports specific economic uses. Implementation of parking management strategies in publicly controlled parking supply is supportive of the economic development plan for the City of Kirkland and its downtown.

Figure 1 shows six parking management zones for Downtown Kirkland. All parking outside the recommended zones will be “peripheral parking.” Zone boundaries were established based on the existing economic and transportation characteristics, as well as desired uses for the area. Each zone is summarized and its primary purpose and priority stated in this section below.

In short, these six zones represent “economic activity zones” in the downtown that are both reflective of existing land uses in addition to areas where future growth of specific economic development is anticipated and desired. From an access perspective, each zone will need to be managed in a manner that supports priority economic uses and users identified for that zone.



Parking Management Zones for Downtown Kirkland.

## **A. Operating Principles**

Operating principles define the purpose and priority for parking in each of the Parking Management Zones. Operating Principles complement and reinforce the Guiding Principles established for the downtown. Within the context of the operating principles for each zone is a specific implementation framework through which decision making for that zone can occur. The implementation framework provides an on-going foundation for strategic decision making grounded in the operating priorities established for the zone and for the downtown as a whole.

With adoption of a parking management plan the City commits to implement parking management strategies in publicly controlled parking areas to assure the purpose and priority for parking established in the Operating Principles are consistently attained.

Operating principles and an implementation framework have been developed for each parking management zone. It is important to recognize the operating principles and the implementation framework for each zone are intended to serve as neutral reference points from which discussions of parking decision making and strategy implementation are based over time. As 85 percent occupancy triggers are activated, these principles and framework guidelines will help future decision-makers through strategy development. Strategies will then be implemented to address specific demand and capacity issues in a manner appropriate to that particular point in time. In this manner, the parking management plan remains fluid and adaptable to changing conditions as the downtown develops and grows.

### **ZONE A - Core Zone**

The core zone of downtown includes the highest density of development and has a high concentration of retail, restaurant, and entertainment opportunities.

#### ***1. Operating Principles (Zone A)***

The primary purpose of parking in Zone A is to serve customer and other short-term visitor needs and support desired economic uses in the zone.

- The purpose of, and priority for, public parking in Zone A is to support and enhance the vitality of the retail core.
- Parking for short-term users is the priority for on-street and off-street spaces in Zone A.
- Employees should be discouraged from parking in Zone A. Strategies to implement this policy include time-restrictions, demand-based pricing, and other similar methods to prioritize the primary users for Zone A parking.
- Parking will be provided to ensure convenient, economical, and user- friendly access for customers, clients, and visitors to downtown at all hours of the operating day (i.e., weekdays, evenings and weekends).
- All on-street parking in Zone A will be regulated (i.e., time stay and enforced).



## 2. ***Implementation Framework (Zone A)***

- A. All on-street parking will be 2 hour parking based on the principle that:
1. The 2 hour time stay allows adequate customer, visitor and client access to the retail core; and
  2. Uniform time stays foster a parking environment that is easy for the customer, visitor and client to understand.
- B. The long-term priority for on-street parking in Zone A will be 2 hour parking. As strategies within this plan are implemented, any on-street spaces of longer duration will be transitioned to off-street locations within the core and immediately adjacent to it.
- C. The priority for off-street parking in Zone A will be stays of less than 4 hours to accommodate customers, visitors and clients. These facilities are intended to provide for a reasonably longer time stay than allowed on-street. Employee parking off-street in the core is to be discouraged and, over time, eliminated from the zone entirely.
- D. The city should monitor, identify, and discourage customers, visitors, and clients who are parking longer than time-stay limits by moving to different stalls within the Zone. Employees with permits visiting downtown while not working should be afforded the same consideration as other daily visitors when using on-street parking.
- E. The City will conduct regular utilization and capacity studies to ascertain the actual peak hour utilization and average turnover of parking resources in the core area. If utilization of on and off-street parking in Zone A exceeds 85 percent and turnover meets desired rates, the City will evaluate and implement one, or a combination of, the following implementation steps "triggered" by the 85 percent threshold:<sup>1</sup>
- Increase level and/or duration of enforcement to assure desired rate of turnover and minimize/eliminate abuse (i.e., exceeding time stay, moving to evade).
  - Transition overall mix of 2- and 4-hour stalls to higher percentage of 2 hour stalls.
  - Reduce on-street time stays to increase turnover (e.g., 2- hours to 90 minutes) as appropriate.
  - Transition employee parking in Zone A into other parking zones through attrition and/or elimination of monthly permits issued for long-term parking in the zone.
  - Pursue shared-use agreements with private lots to provide for additional short-term parking in Zone A.

- Pursue implementation of valet programs (e.g., in partnership with restaurants) to enhance customer/visitor access by shuttling cars to areas with available capacity.
- Convert some signed time limits to metered time limits to create greater efficiency in actual rate of turnover and to create a potential revenue source for new supply.
- Expand the boundaries of the Core management zone to increase the number of on-street visitor spaces.
- Increase non-SOV use (i.e., programs for shuttles, transit, ridesharing, etc.)
- Create new public supply in Zone A.

F. The City will establish policy guidelines for exceptions to the short-term parking requirements in Zone A.

1. Handicapped/disabled access
2. 15 - 30 minute zones
  - a. Specific criteria for approval (i.e., by specific business type).
  - b. Specific locations (i.e., end of block versus mid block).
  - c. Number per geographic area (i.e., shared by users in a particular area).
3. Loading zones
  - a. Maximum number per block face(s).
  - b. Limitation on number per geographic area (e.g., no more than two for every three continuous block faces).
  - c. Evaluation of opportunities for shared loading and customer parking.<sup>2</sup>

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<sup>1</sup> It should be noted that at the time of this 2003 report, public stalls in Zone A had already exceeded the 85% threshold.

### **ZONE B – Library Garage & Wester Lot on 3<sup>rd</sup> Avenue**

The Wester Lot on 3<sup>rd</sup> Avenue and the Library Garage are located in an area that straddles two distinct parking management areas (Zones A and C). They also function to provide access to visitors of the downtown and employee parking. The nature of demand around the garage varies widely by time of day and day of week.

#### **1. *Operating Principles (Zone B)***

*Parking in Zone B is intended to serve a balanced mix of long- term and short-term parking needs. It is the City's goal to actively manage Zone B to meet a fluid user demand that changes by time of day and day of week. Over time, Zone B may serve*

*as transitional facilities for increased employee parking as new supply is added in Zone A to accommodate growing and concentrated visitor demand.*

- The upper level of the garage is intended to serve customer demand for stays of less than four hours.
- The lower level of the garage is intended to serve employee parking during the main workday (i.e., 5:00 a.m. to 5:00 p.m.).
- The Wester Lot on 3<sup>rd</sup> Avenue will serve employee parking Monday through Friday, 8:00 a.m. to 5:00 p.m..
- On evenings and weekends, the Wester Lot will serve customer demand with no time limits.
- As the area around Zone B develops, the mix of parking will be manipulated to best serve the overall demand requirements of Zones A and C.

## **2. Implementation Framework (Zone B)**

A. All parking on the upper level of the garage will be 4-hour parking based on the principle that:

1. The 4-hour time stay allows adequate customer, visitor and client access to users of Zone A and C while providing for a longer time stay opportunity not allowed on street.

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<sup>2</sup> "Combination Loading Zones" have been used in other jurisdictions allowing loading during specific periods of the day (e.g., 6:30 a.m. - 10:00 a.m.), then convert to short-term parking during all other time periods. Such zones, if successfully managed, can increase overall short-term supply.

2. During a typical operating day, the upper level of the facility is more conducive to, and convenient for, transient customer trips.
3. Uniform time stays within this area of the garage foster a parking environment that is easy for the customer, visitor and client to understand.

B. All parking on the lower level of the garage will be permit parking during the general workday (i.e., 5:00 a.m. – 5:00 p.m., Monday – Friday) based on the principle that:

- Providing adequate employee parking near the Core Zone supports the larger goal of preserving on and off-street stalls in Zones A and C for customer, visitor and client parking.

C. The lower level of the garage will be made available to other uses (i.e., short-term) evenings and weekends as long as employee use remains low during such periods and/or increased enforcement results in higher employee use. This will occur following an evaluation of the impact that enhanced enforcement in the downtown has on employee

occupancies in the lower level of the garage, particularly after 5:00 p.m. (see Near-Term Implementation Strategies, below).

- The use of this parking area outside of general workday hours for short-term parking assures that this parking area be operated/utilized to maximize use of the total supply of parking.
- D. All parking in the Wester Lot on 3<sup>rd</sup> Avenue will be permit parking during the general workday (i.e., 8:00 a.m. – 5:00 p.m., Monday – Friday) based on the principle that:
- Providing adequate employee parking near the Core Zone supports the larger goal of preserving on and off-street stalls in Zones A and C for customer, visitor and client parking.
- E. The Wester Lot will be made available to other uses (i.e., short-term) evenings and weekends.
- The use of this parking area outside of general workday hours for short-term parking assures that this parking area be operated/utilized to maximize use of the total supply of parking.
- F. The City will conduct regular utilization and capacity studies to ascertain the actual peak hour utilization and average turnover of parking resources in the Library Garage. If utilization of parking in the garage exceeds 85 percent and turnover meets desired rates, the City will evaluate and implement one, or a combination of, the following implementation steps “triggered” by the 85 percent threshold:
- Develop clear and understandable informational signage directing use in the facility by time of day and day of week.
  - Increase level and/or duration of enforcement to assure desired rate of turnover and minimize/eliminate abuse.
  - Transition overall mix of parking in Zone B (short to long-term) to the most efficient configuration of parking uses to meet daily demand over a 12 – 16 hour operating day.
  - Pursue shared-use agreements with private lots adjacent to Zone A as possible locations for future employee parking if visitor demand begins to exceed 85 percent in the upper level of the facility. At such time, transition employee parking into another parking zone or facility through attrition and/or elimination of monthly permits issued for long-term parking in Zone B.
  - Convert signed time limits to metered time limits to create greater efficiency in actual rate of turnover and to create a potential revenue source for new supply.
  - Increase non-SOV use for employees (i.e., programs for shuttles,

transit, ridesharing, etc.) to mitigate demand for employee parking.

- Implement a monthly pass rate for employee parking in the Zone B to manage supply and demand and to facilitate alternative mode choices.

## **ZONE C – Emerging Core Zone**

Zone C, the Emerging Core Zone, includes a mix of development types, but at lower densities than in the core and with a relatively higher proportion of office, civic, residential and professional services (i.e., City Hall area). Expansions of the economic land use characteristics of Zone A are expected to occur in the Emerging Core Zone.

### ***1. Operating Principles (Zone C)***

The City's goal is to continue to encourage the mixed-use development of this zone, particularly as it supports the retail core. As such, on street parking in Zone C is intended to transition over time to serve short-term parking needs and the desired land uses in this zone. In the interim, surplus parking in the zone can be effectively utilized to meet unmet long-term demand.

- Most (if not all) on-street parking in this zone will be transitioned to serve short-term, visitor parking. Off-street parking will continue to provide a mix of short and long-term stay opportunities.
- Underutilized on-street parking in this zone will be made available to employee parking.
- Over time, on-street parking will reflect a balanced mix of short and long-term stay opportunities. Long-term parking may eventually require transition into off-street supply.
- Off-street parking in this zone is intended to provide convenient and cost-effective employee parking supply as a measure to preserve higher access opportunities for customer and patron use in the core zones.
- Parking in this zone will be managed in a manner that minimizes and mitigates spillover of commercial parking demand into residential areas immediately adjacent to the central business district.

### ***2. Implementation Framework (Zone C)***

- A. The majority of on-street parking will be 10 hour parking, with an appropriate mix of short-term parking based on capacity considerations (i.e., 85% Rule). This is based on the principle that:
  1. This mix of parking is conducive to both customers and employees and longer term visitor parking for the downtown;
  2. There is adequate on-street capacity in the zone to meet both short and long-term parking demand.
  3. The current economic uses in the zone do not as yet require the type of turnover ratios necessary in Zone A.

- B. The long-term priority for on street parking in Zone C will be 2 hour parking. As strategies within this plan are implemented, long-term parking (time stays and permits) will be transitioned to off-street locations within the Emerging Core Zone and immediately adjacent to it.
- C. The priority for off-street parking in Zone C will be mixed-use parking to accommodate the full range of users, including employees, customers, visitors and clients. These facilities are intended to provide for a range of time stay opportunities.
- D. The City will conduct regular utilization and capacity studies to ascertain the actual peak hour utilization and average turnover of parking resources in Zone C. If utilization of on and off- street parking in the Emerging Core Zone exceeds 85 percent and turnover meets desired rates, the City will evaluate and implement one, or a combination of, the following implementation steps "triggered" by the 85 percent threshold:
- Increase level and duration of enforcement to assure desired rate of turnover and minimize/eliminate abuse (i.e., exceeding time stay, moving to evade).
  - Increase mix of short-term time stays (2 and 4-hour) to increase turnover.
  - Pursue shared-use agreements with private lots to provide for additional parking in Zone C or adjacent areas.
  - Transition on-street employee parking in Zone C into available off-street locations within the parking zone or "satellite locations."
  - Transition off-street employee parking into Zone C or into "satellite locations" accessed by shuttle. This would be accomplished through reduction/elimination or pricing of monthly permits issued for parking in off-street locations.
  - Expand the boundaries of the Emerging Core Zone to increase the number of on-street, long-term spaces (i.e., to Fifth Avenue between Second Street and Fourth Street).
  - Increase non-SOV use by employees (i.e., programs for shuttles, transit, and ridesharing).
  - Meter/charge for parking (on and/or off-street) to create greater efficiency in actual rate of turnover and to create a potential revenue source for new supply.
  - Create new mixed-use public parking supply within or adjacent to the zone.
- E. The City will establish policy guidelines for exceptions to the parking requirements in the Emerging Core Zone.
1. Disabled access

## 2. 15 - 30 minute zones

- a. Specific criteria for approval (i.e., by specific business type)
- b. Specific locations (i.e., end of block vs. mid-block)
- c. Number per geographic area (i.e., should be shared by users in a particular area)

## 3. Loading zones

- a. Maximum number per block face(s).
- b. Limitation on number per geographic area (e.g., no more than two for every three continuous block faces).
- c. Evaluation of opportunities for shared loading and customer parking.

### **ZONE D – Accessory Parking Zone**

Zone D, the Accessory Parking Zone, is primarily comprised of uses whose parking supply is not generally available to general public use. Accessory parking operates to serve demand generated from within a specific site as opposed to parking serving a wider mixed-use area (as represented by Zone A).

#### ***1. Operating Principles (Zone D)***

The primary purpose of parking in Zone D is to support the privately developed land uses within the zone. The City's goal is to manage the on- street supply of parking in the zone within the objectives of the 85 percent occupancy standard. The City will strive to encourage the private development of parking in this zone that results in an increased supply of publicly available parking.

- Off-street parking developed in this zone will likely be privately provided and managed to meet demand of the specific land uses for which the parking is associated.
- On-street public parking should be managed to provide access opportunities for any type of demand (i.e. short-term or long-term parking).
- Determination of appropriate time stay designations in on-street locations should be based on the 85% Rule.

#### ***2. Implementation Framework (Zone D)***

- A. The majority of on-street parking will be 10 hour parking, with an appropriate mix of short-term parking based on capacity considerations (i.e., 85% Rule). This is based on the principle that:

1. The majority of parking in the Zone is private accessory parking developed to accommodate (off-street) parking demand generated by specific development sites.

2. There is adequate on-street capacity in the zone to meet both short and long-term parking demand.
  3. Providing long-term parking in this zone creates employee parking options that could mitigate parking conflicts between visitors and employees in other zones (particularly Zones A, B and C).
- B. The long-term priority for on-street parking in the Accessory Parking Zone will be 4 hour parking. As strategies within this plan are implemented, longer time stays will be transitioned to off-street satellite locations.
- C. The priority for off-street parking in Zone D will be private mixed-use parking to accommodate the full range of site generated users (i.e., accessory demand), including employees, customers, visitors and clients.
- D. The City will conduct regular utilization and capacity studies to ascertain the actual peak hour utilization and average turnover of parking resources in Zone D. If utilization of on-street parking in the Accessory Parking Zone exceeds 85 percent and turnover meets desired rates, the City will evaluate and implement one, or a combination of, the following implementation steps "triggered" by the 85 percent threshold:
- Increase level and duration of enforcement to assure desired rate of turnover and minimize/eliminate abuse (i.e., exceeding time stay, moving to evade).
  - Increase mix of short-term time stays (10- hours to 4-hours) to increase turnover.
  - Pursue shared-use agreements with private lots to provide for additional parking in the Accessory Parking Zone or adjacent areas.
  - Transition on-street employee parking in Zone D into available private off-street locations (shared use locations) within the parking Zone or "satellite locations."
  - Transition off-street employee parking into "satellite locations" accessed by shuttle. This would be accomplished through reduction/elimination or pricing of monthly permits issued for parking in off-street locations.
  - Increase non-SOV use by employees (i.e., programs for shuttles, transit, ridesharing)
  - Meter/charge for parking (on-street) to create greater efficiency in the actual rate of turnover and to create a potential revenue source for new supply.

## **ZONE E – Transitional Parking Zone**



This area is currently unregulated and represents mixed-use development of a scale that is both complementary of the downtown, yet less intense. Over time, the City would like to see this zone develop additional retail and service opportunities.

### ***1. Operating Principles (Zone E)***

Parking Zone E is intended to support growth in Zones A and C as well as to provide low-cost parking opportunities for employees and longer-term parking stays.

- With the addition of new supply in Zone A, it is intended that parking in this zone transition to short-term parking to support and attract future retail, office and service-oriented businesses.
- Time stay designations in this zone will be phased with the addition of new supply in the core.
- Determination of appropriate time stay designations in on-street locations should be based on the 85% Rule.

### ***2. Implementation Framework (Zone E)***

- A. On-street parking will be unregulated until such time as new supply is created in Zone A.
- B. With the addition of new supply in Zone A, parking in this Zone E, the Transitional Parking Zone, will be transitioned to short-term parking to support and attract future retail and service oriented businesses along Market Street.
- C. The transition to time stay designations will begin with a mix of 4 hour and 10 hour stalls. Determination of appropriate time stay designations in on-street locations will be based on the 85% Rule.
- D. The City will conduct regular utilization and capacity studies in this zone once new parking supply is added to Zone A to ascertain the actual peak hour utilization and average turnover of parking resources in the Transitional Parking Zone. If utilization of on-street parking in Zone E exceeds 85 percent and turnover meets desired rates, the City will evaluate and implement one, or a combination of, the following implementation steps "triggered" by the 85 percent threshold:
  - Increase level and duration of enforcement to assure desired rate of turnover and minimize/eliminate abuse (i.e., exceeding time stay, moving to evade).
  - Increase mix of short-term time stays (4 hours then 2 hours) to increase turnover.
  - Transition on-street employee parking in Zone E into new supply developed in off-street locations (shared-use and new public supply) within Zone A or "satellite locations."

- Transition employee parking into “satellite locations” accessed by shuttle. This would be accomplished through reduction/elimination or pricing of monthly permits issued for employee parking throughout the downtown.
- Increase non-SOV use by employees (i.e., programs for shuttles, transit, ridesharing, etc.)
- Meter/charge for parking (on-street) to create greater efficiency in actual rate of turnover and to create a potential revenue source for new supply.

E. The City will establish policy guidelines for exceptions to the short-term/long-term parking requirements in Zone A.

1. Disabled access.
2. 15 - 30 minute zones.
  - a. Specific criteria for approval (i.e., by specific business type)
  - b. Specific locations (i.e., end of block versus mid-block)
  - c. Number per geographic area (i.e., should be shared by users in a particular area)
3. Loading zones.
  - a. Maximum number per block face(s)
  - b. Limitation on number per geographic area (e.g., no more than two for every three continuous block faces)
  - c. Evaluation of opportunities for shared loading and customer parking

### **ZONE F – Lake Avenue W.**

Parking Zone F is intended to support residential demand as well as provide parking opportunities for employees of downtown businesses.

#### ***1. Operating Principles Zone F)***

Parking in Zone F is intended to serve residential demand and employee parking from the CBD.

- Parking in Zone F is intended to meet demand generated by residents within this parking area and by employees of the CBD.
- Parking in this area is by permit for both residents and employees. No time stay restrictions are in effect. Future management strategies assumed for this area would be contingent on the parking activity, capacity, and utilization of all other parking zones.

**CITY OF KIRKLAND**123 FIFTH AVENUE • KIRKLAND, WASHINGTON 98033-6189 • (425) 587-3800

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY****Policy G-12: GOAT HILL – SPECIAL CONSTRUCTION REQUIREMENTS**

The Goat Hill area ("Goat Hill") poses some unique challenges for construction activity because of its topography, narrow roadways, and limited access. This policy establishes special guidelines and procedures for development and construction activity in Goat Hill to address those conditions.

Frontage Improvements:

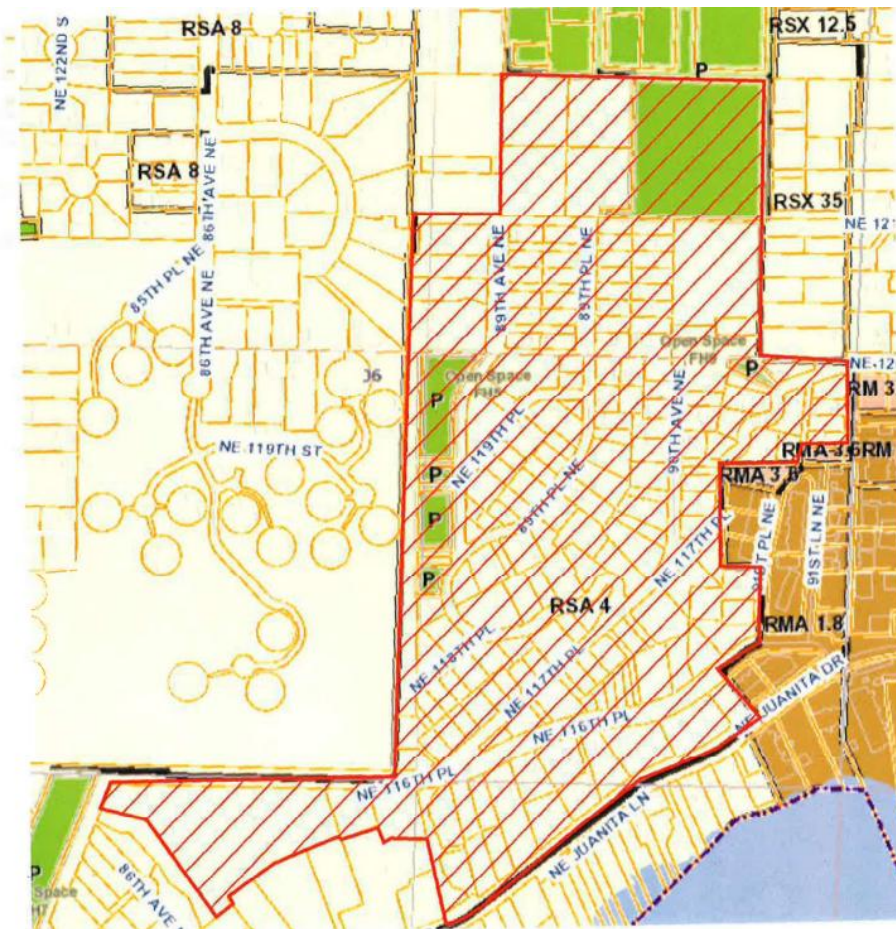
The Zoning Code (KZC 110) requires new single-family home projects to construct frontage improvements along the abutting right-of-way: Type A curb, 4.5 ft. planter with street trees 30 ft. on-center, 5 ft. sidewalk, and widening the pavement width to 20 ft. But in Goat Hill, its steep topography coupled with narrow street widths makes the construction of these code-required improvements infeasible. Further, KZC 110.70 allows the City to grant a modification to the improvements if unusual topographic or physical conditions preclude the construction of the improvements as required. Therefore, in Goat Hill, frontage improvements shall consist of widening the abutting street to 20 ft. in width only.

Projects on Goat Hill shall comply with the following Construction Requirements:

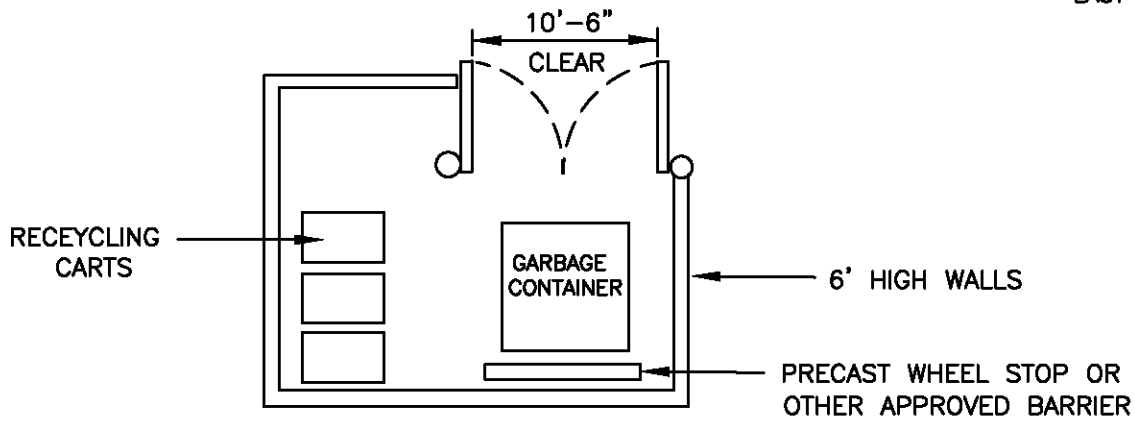
- **Pre-Construction Meeting:** The Owner/General Contractor (O/GC) for the project shall set up a pre-construction meeting prior to start of any work. Public Works staff will meet with the O/GC and their Utility Contractor to review the construction requirements of this policy: project sequencing, traffic control, work hours, and erosion control for the site.
- **Project Sequence:** Frontage improvements (street widening) shall be completed prior to start of the foundation work for the new home. The final lift of pavement may be placed at the end of the project after all utilities are installed to ensure a smooth mat of pavement free of utility patches.
- **Traffic Control:** The O/GC and/or Utility Contractor shall provide a Traffic Control Plan for each phase of work: frontage improvements, utility work, construction material deliveries, and other work as may be needed. Emphasis: Do not block / impede the movement of traffic unless the activity is sanctioned by a traffic control plan. Be mindful of garbage collection day and of morning / evening commute hours.
- **Work Hours:** Generally, standard work hours per the KZC apply to projects in Goat Hill. However, different work hours apply to the following activities: work related to the right-of-way, construction equipment delivery, construction material delivery, or any activity that might impede traffic or access to or within Goat Hill. For the aforementioned, work hours shall be limited to 9:00 a.m. to 3:00 p.m. Monday through Friday, and prohibited on weekends and federal holidays.
- **Erosion Control:** Erosion control for the site shall comply with all established City of Kirkland policies and procedures. In addition, the O/GC shall appoint a site CECSL as a single point of contact for addressing erosion control issues with City staff. Any area to remain unworked for more than 30 days shall be revegetated using a seed mix containing native groundcover and wildflower to stabilize the exposed area unless the Public Works Inspector determines that winter weather makes vegetation establishment infeasible. If infeasible, then plastic covering may be used, but the plastic must be

removed and replaced with seed or sod at the end of winter (April) or as instructed by the Public Works Inspector.

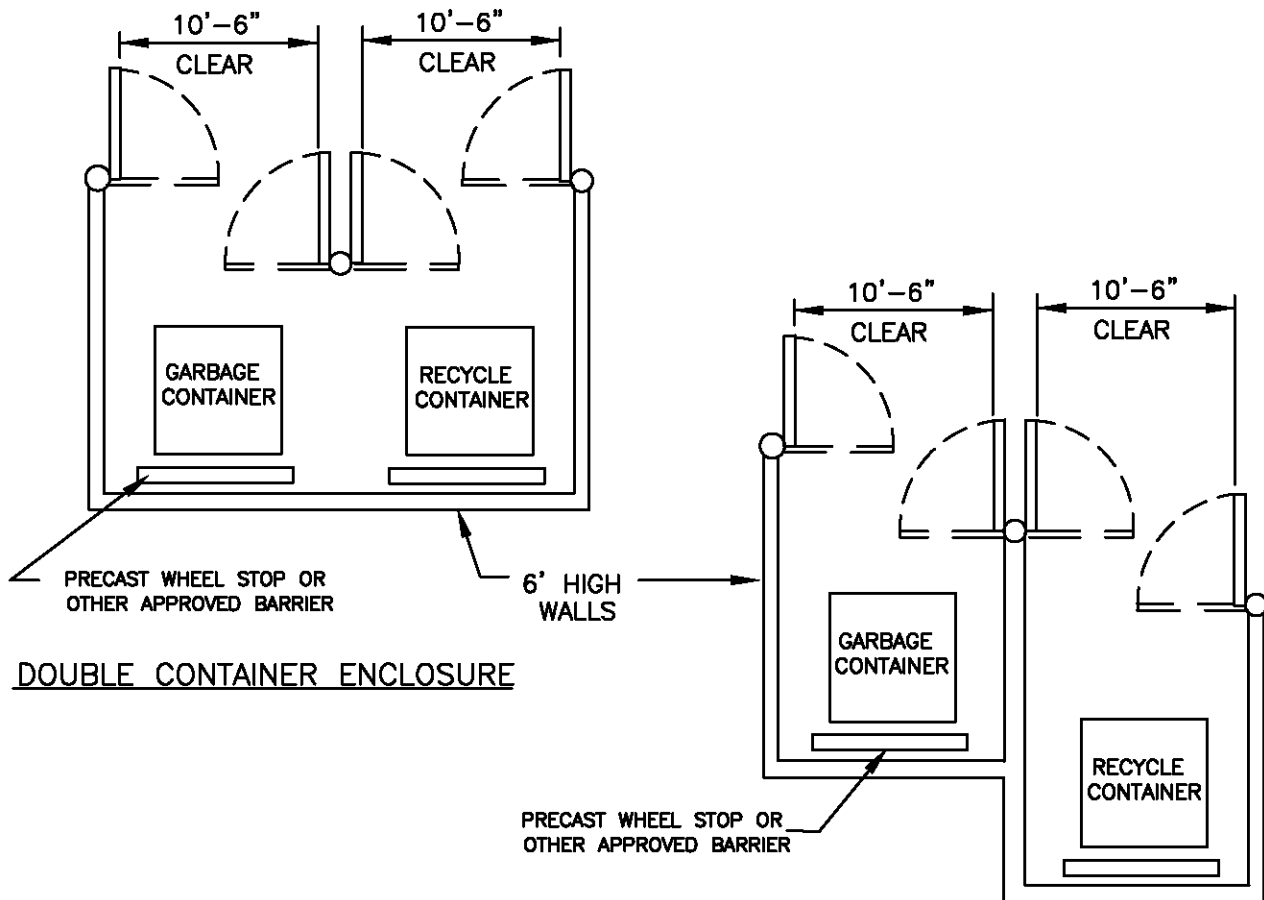
- **Geotechnical Consultant:** The O/GC shall retain a geotechnical consultant to provide monthly reports to the City's Construction Inspector addressing erosion control and site stability. Any recommendations by the geotechnical engineer shall be implemented. If constructing a retaining wall in the right-of-way, the geotechnical consultant or P.E. shall inspect the construction process and final product and provide a written assessment to the Public Works Inspector.
- **Special Goat Hill Performance Bond:** Due to the high-risk nature of building on Goat Hill, the O/GC shall post a performance bond in the amount specified by the Public Works Department (\$50,000 minimum) to remedy any unforeseen issues associated with (but not limited to) site stabilization, stormwater management, and/or erosion control. The bond amount will be added to the standard right-of-way restoration performance bond. Public Works reserves the right to call the bond to remedy any/all onsite and offsite issues in connection with the project. The performance bond shall remain in effect until the project is complete and given a Final Inspection by all Departments.



Goat Hill Area



TYPICAL MULTIFAMILY AND COMMERCIAL ENCLOSURE



DOUBLE CONTAINER ENCLOSURE

PRECAST WHEEL STOP OR OTHER APPROVED BARRIER

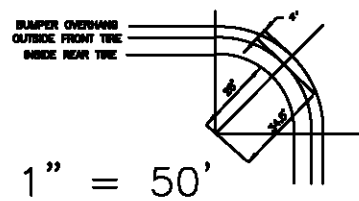
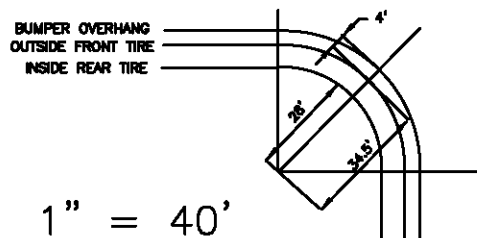
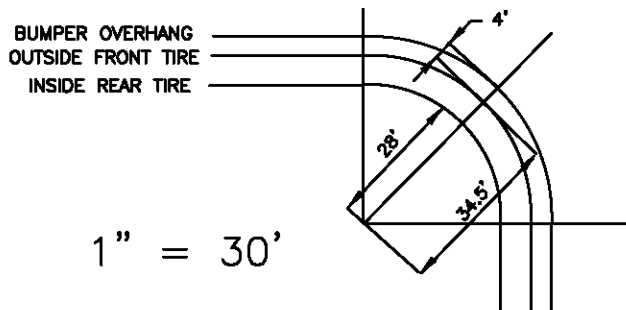
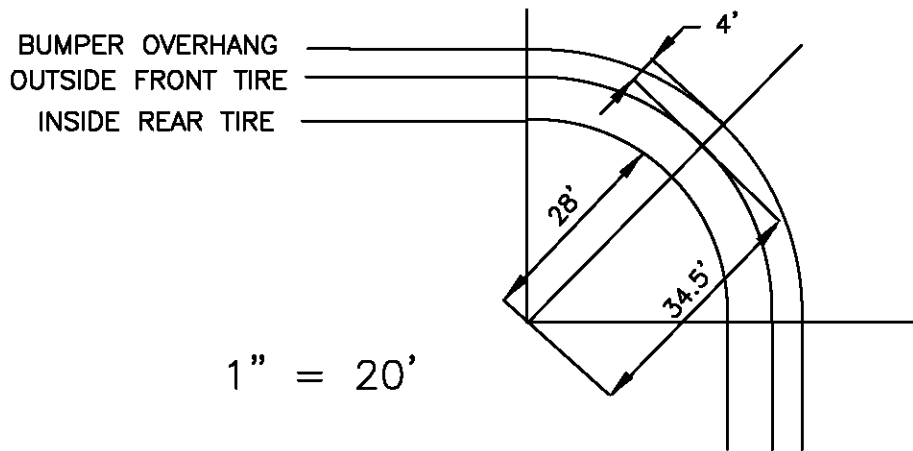
DOUBLE CONTAINER OFFSET ENCLOSURE

CITY OF KIRKLAND

PLAN NO. CK-G.01



CONTAINER  
ENCLOSURES



WASTE MANAGEMENT TRUCK TURNING RADIUS TEMPLATE

CITY OF KIRKLAND

PLAN NO. CK-G.02



WMI  
TRUCK TURNING  
RADIUS TEMPLATE

# Water System

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### **WATER - PLAN NOTES**

1. A pre-construction conference shall be held prior to the start of construction. The Contractor shall be responsible for securing all necessary permits prior to construction.
2. All water main work and material shall be in accordance with current AWWA, WSDOT, and APWA standard specifications, as amended by the City of Kirkland. All material utilized shall be new, no parts shall be reused. Any part removed from the system for any reason may not be reused and shall be replaced with a new part. (e.g. a Romac with a bad gasket must be replaced with an entirely new Romac assembly).
3. The water main shall be Class 52 ductile iron pipe conforming to ANSI/AWWA C151/A21.51-86 or the most recent revision. The pipe shall be 1/16" cement lined and sealed in accordance with ANSI/AWWA C104/A21.4-90. The cast iron or ductile iron pipe fittings shall be Class 250 as per ANSI/AWWA C110/A21.10-82. Pipe bedding shall be compacted to 95 percent of its maximum density at optimum moisture content. Unless it is necessary to clear existing utilities, the water main should be installed with under 60" of over but never less than 36" of cover to the top of the pipe. Any deviations from this shall be approved by the City of Kirkland approving authority prior to start of construction activities.
4. Concrete blocking for water mains shall be designed and installed in accordance with AWWA and City of Kirkland specifications and shall be installed at all vertical and horizontal bends and fittings. Prior to blocking, the fittings shall be wrapped with visqueen.
5. All connections to existing mains and all testing and disinfection shall be performed under the supervision of the City of Kirkland Department of Public Works Inspector.
6. Approximate locations of existing utilities have been obtained from available records and are shown for convenience. The Contractor shall be responsible for verification of the locations shown and for discovery of possible additional utilities not shown so as to avoid damage or disturbance. The underground utility location service shall be contacted for field location prior to any construction. The owner or their representative shall be contacted if a utility conflict exists. For utility location in King County, call 1-800-424-5555. The Contractor is responsible to ensure that utility locates are maintained throughout the life of the project.
7. All contractors working with AC pipe must be state-certified. The Contractor shall provide protective clothing and equipment (coveralls, gloves, boots, head covering, goggles, respirators, etc.) to crews working with asbestos cement pipe in order to assure the worker's exposure to asbestos material is at or below the limits prescribed in WAC 296-62-07705.
8. An approved copy of the water plan must be on site whenever construction is in progress.
9. A 5' minimum horizontal separation shall be maintained between all water facilities and underground power and telephone facilities, unless otherwise approved by the City of Kirkland.
10. For water main and sewer main separation requirements, see Item VIII.C of the Sanitary Sewer - Design Criteria Section and Detail W.01.
11. Pressure and purity testing shall be done in the presence of, and under the supervision of, a City of Kirkland Department of Public Works Inspector. The Contractor shall provide all plugs and temporary blowout assemblies for pressure testing and disinfection prior to final tie-in. No connection shall be made between the new main and the existing mains until the new piping has been disinfected, flushed, and passed both pressure and purity testing. Temporary plugs and blocking shall be installed at the points of connection to the existing system. For construction of new water main, the services, hydrants etc., will be tested with

the main. Pressure testing will require a minimum of 200 psi for 15 minutes with no pressure drop. Upon satisfactory completion of the pressure test, the line shall be disinfected, flushed, and then a sample shall be taken for purity testing by the Public Works Inspector.

12. It shall be the Contractor's responsibility to notify the City of Kirkland Inspector 24 hours in advance of backfilling all water main construction. The Contractor shall be responsible for keeping as-built drawings of all construction not installed according to the approved plans. (This does not give approval for as-built construction.)
13. The Contractor shall contact the City of Kirkland Department of Public Works five (5) days prior to any work requiring the shutdown of existing water mains. The Contractor is required to give two (2) working days notice to all customers affected by a water main shutdown (notices and maps for the shutdown will be provided by the Water Division). Shutdowns shall be scheduled for Mondays, Tuesdays, Wednesdays, and Thursdays between 8:30 am and 2 pm. Shutdowns affecting institutions shall be scheduled at night. Only Water Division personnel or a designate of the Water Division Manager may operate valves, and/or hydrants, blow-offs, etc., for fills, shut downs, flushing, or recharging of water lines. Two (2) working days notice to the Water Division is required to schedule fills.
14. There shall be no water main construction on a Saturday, Sunday, or holidays observed by the City of Kirkland.
15. Should the water main work necessitate the closing of certain gate valves within the existing system, the City of Kirkland Maintenance Department shall be responsible for the operation of such valves.
16. The fire flow system shall be installed, tested, and approved prior to above-ground combustible construction.
17. All trench backfill shall be compacted to 95 percent density in roadways, roadway shoulders, roadway prism and driveways, and 85 percent density in unpaved areas. All pipe zone compaction shall be 95 percent.
18. Mega-lugs (or similar product) shall be required on all fittings and valves for tie-ins, or build-outs for tie-ins prior to a final connection to the existing water main. Appropriate concrete blocking is also required in addition to Mega-Lugs.
19. For the duration of any water main installation project, all existing and newly installed valve cans are to remain accessible to Water Division personnel.
20. When it becomes necessary to re-plumb the customer's side of an existing water meter as the result of the relocation of the existing service or to comply with other City of Kirkland Public Works specifications, the customer's side shall be reconnected with the appropriate plumbing materials (and related fittings) such as brass, copper, polyethylene with a 200 p.s.i. rating, or PVC. All parts, pipe, and/or fittings shall be new from the back side of the meter to the connection point of the customer's service.
21. No tie-in will be allowed into the existing tailpiece on the customer's side of the meter. If the existing meter does not have a check valve installed on the back side of the meter (customer's side) a check valve cannot be installed when doing the tie-in.
22. If a fitting, either during installation or after, is found to be defective in any way as determined by the City, the contractor shall replace the entire fitting and not just the defective component.

23. Beginning January 1, 2014, all pipes, pipe fittings, plumbing fittings, and plumbing fixtures used for potable water, must have a maximum lead content not to exceed 0.25%, per "Lead Free" standards as defined in Section 9 of NSF/ANSI Standard 61.

### **WATER- CONSTRUCTION CRITERIA**

1. Unless otherwise specified, the minimum new water service size shall be 1" poly with a 1" angle stop. Crimping will not be allowed on any new or existing service.
2. The Water Department will install water meters after the services have been installed according to the following guidelines:
  - A. When services are installed off a new main in a plat they are to be set at finished grade. The Public Works Construction Inspector may allow the services to be left above grade and capped if there are extenuating circumstances that prevent the services from being set at finished grade. After finished grade is set, the main may be shut off, the services lowered and the angle stops installed. In either case, the angle stops shall be set 6-10" below the top of the meter box at finished grade.
  - B. When services are installed off an existing main, the angle stop is to be set at a grade between 6 and 10" below the top of the meter box. The meter box is to be set at finished grade. If it is determined that the service has been installed at the wrong elevation (grade), the contractor shall schedule a shut down with the Water Department before adjusting the service. If the Water Department determines the shut down area is too large, the contractor will need to excavate to the corporation stop and turn it off before adjusting the service.
3. When providing water service to a mixed-use building such as retail use on the ground floor and office or residential use on the upper floors, each use in the building shall have its own separate water service and meter. As an example, a new building with ground-floor retail and upper-floor residential would have a minimum of two water services and meters; one for each of the separate uses. In addition, because deduct meters are not allowed for newly constructed multifamily and commercial buildings, it is suggested a separate irrigation service and meter be installed so monthly sewer charges are not charged against water being used for irrigation purposes (irrigation meters are not allowed on single-family residential lots).
4. A manifold system may be an option for new construction when a project needs 4 or more services. Manifold systems are typically only allowed in Arterial streets when the water main is on the opposite side of the street from the property being served. This option will be determined during the review process. For 4-6 services, a 2" manifold shall be used.
5. Developments served by an existing substandard water main (2" typ.) may be required to upsize the main depending on fire flow and capacity requirements. This will be determined by the Public Works Department on a case-by-case basis.
6. Size-on-size wet taps are allowed as long as the existing pipe is of an acceptable condition. If it is determined by City staff that the pipe cannot accept a wet tap, the new valve will need to be cut in.
7. New Main Installations: All new water mains shall be laid starting at the existing main. All valves shall be cut in first, (depending on the requirements for the new installation) allowing for a gap from the valve, (no less than 3' long and no more than 10' long) with temporary blocking per CK-W.10. Typically a three-way valve cluster is required at the cut-in tee. Do not use a wet tap valve

without prior authorization by Public Works (discuss with the Development Engineer). The new main shall be laid starting at this point. After inspection of the new main and appurtenances (services, hydrants, air/vacs and blow-offs, etc.), the main shall be filled per CK-W.10, pressure tested, flushed and a "satisfactory" purity sample taken prior to tie-in. The contractor will be required to rent a 2" hydrant meter from the City per CK-W.10 for filling and flushing of the new main.

8. All fire lines are to be constructed completely from the valve to the mechanical room per both Public Works and Fire Department specifications. All fire lines will require both a Public Works permit and a Fire department underground permit. The valve may be wet tapped or cut in depending on the conditions of the installation (to be determined at review of Public Works permit). Shut downs for cut ins are to be coordinated with the Water Division. All fire lines shall be swabbed with chlorine. Once the installation is complete, a "bag flush" is required. At that time, a "purity" sample will also be taken (operation of the valve at the main will be controlled by the Water Division). After a "satisfactory purity" sample is received, the line may then be pressure tested per approved specifications. After these steps are completed, the Water Division is to be notified to re-open the valve at the main. Re-opening of the valve must be within 7 days of taking the purity sample. Minimum fire line size thru the R.O.W. shall be 4" if approved by the Fire Department reduction to 2" (material to be approved by Fire Department). Will be allowed on private property. Fire lines 4" or larger shall be Class 52 DI with gate valve at main.

A separate pre-construction meeting will be required for projects that must abandon existing water mains and fire services.

9. Hydrants installed with new main extensions shall be tested with the foot valve open and the main valve (hydrant) closed. Hydrant will then be inspected and operated during flush.
10. Hydrants installed on existing mains shall be swabbed with chlorine, flushed and pressure tested with the foot valve closed and the main valve (hydrant) open.
11. All new buildings shall have a water service that meets the current standards. Any existing services that need to be abandoned because of size, material, location or other conditions, must be cut and capped at the main per current Public Work's specifications. If it is determined that the existing corporation stop is a Hayes or B-machine, the corporation stop shall be removed from the main and a repair band installed (shall use ROMAC SS-1 (or equal) 12" long repair band if required).  
**Note:** Galvanized, "blue-poly", copper and PVC are the most common types of existing services that are found in the City and required to be upgraded.
12. Water services and meters shall not be located in driveways. If an existing water meter is located in an existing driveway and the service needs to be upgraded, or the driveway is removed and replaced, the existing water service shall be abandoned at the water main and a new water service shall be installed outside of the driveway.
13. If an existing water valve needs to be abandoned, a shut down shall be scheduled with the Water Department. The valve must be removed and a blind flange installed on the tee.
14. When an AC water main is tunneled under to install another utility, the section of the AC main within the trench and for 5 feet on either side of the trench shall be replaced with Class 52 DI pipe. It may require one full stick of pipe or more to include replacing any exposed couplings and

mills. All connections shall be made with Romac couplings. AC water main cannot be left exposed overnight unless day prior to tie-in.

15. The contractor shall coordinate shut downs, fills and flushes with the City of Kirkland Inspector who will then coordinate dates and times with the Water Division. All valves, including hydrants, blow-offs, etc., shall be operated by City of Kirkland Water Department personnel. A minimum of two (2) working days notice to all affected property owners is required before a shut down can occur. A minimum of two (2) working days notice is required to schedule fills.

**Note:** Scheduling of shut downs will not be allowed to occur for days immediately following holidays observed by the City of Kirkland.

16. In general, flushes are scheduled for the next working day after the new water system is filled. It is assumed that the pressure test will also be performed on the day of the fill. To adhere to this schedule, the Water Division must be notified by the City Inspector or Project Manager by 1PM on the day of the fill confirming that the pressure test was successful in order to receive the flush on the following working day.

Last revised 01/2013

### Water Installation Procedures Checklist

#### General Notes:

- ☐ ONLY CITY WATER DEPARTMENT PERSONNEL ARE PERMITTED TO OPERATE VALVES ON LIVE IN-SERVICE MAINS INCLUDING HYDRANTS, BLOW-OFFS AND OTHER APPURTENCES OF THE EXISTING SYSTEM.
- ☐ All operating valves are to be accessible throughout the duration of the project.
- ☐ For multi-phased/scheduled projects, the City's construction inspector shall keep the water department personnel updated as to the timing and scope of the various phases.
- ☐ The City's construction inspector shall keep complete and accurate red-lined as-built construction information for transfer and creation of post-project construction record drawings.
- ☐ Field changes to the approved plans should be approved by the Project Engineer and Water Division.
- ☐ Water Division personnel will be available to the inspector if requested, to answer any installation questions.

#### CONSTRUCTION

##### Tying New Water Main to the Existing System:

- ☐ Connections to existing AC mains need to be made on rough barrel section of the main and not at milled joints using Romac brand couplers with the proper transition gaskets.
- ☐ New water main shall be filled, flushed and pressure tested with the City's construction inspector/ observer being present.
- ☐ Water shall not sit in a new main for more than 7-days after achieving purity prior to new system tie-in.
- ☐ Acceptable purity test results shall be obtained prior to scheduling any system tie-in.
- ☐ System tie-in's shall be scheduled for Monday thru Thursday only.
- ☐ A minimum of two working days notice to the water department is required for all system tie-in's.
- ☐ A maximum of one system tie-in will be scheduled per day unless multiple tie-ins are advantageous to the water system and have been approved by the Water Division.

- ☐ All service area turn-off notices must be distributed to affected parties two working days prior to any scheduled shut-off. (Water department personnel will provide door hanger notices and a shut-off area map – contractor shall be required to fill in the required information on the door hangers and for distribution of all door hanger notices.)
- ☐ Tie-ins using a bell and/or a wedding band are not allowed.

#### **Water Main Bends:**

- ☐ All fittings & valves at tie-ins or build outs for tie-ins shall have Mega-Lugs (or similar product) and concrete thrust blocks.
  - If concrete thrust blocks will not be fully cured at the time the new main is pressurized all the bends must have temporary "kickers" in place before the main will be re-charged.
  - All concrete blocks are to be hand mixed (with water) or delivered by ready mix truck before placed.

#### **Old Water Main Valve Boxes:**

- ☐ Shall be totally removed, the holes backfilled and the existing surface restored in-kind after the old water main is abandoned.

#### **New Water Main Valves:**

- ☐ Shall have resilient seats for all valves, no matter which type (gate or butterfly).
- ☐ Shall have the valve nut centered in the valve box with a nut depth no greater than 60" below grade.
- ☐ Shall have boxes that are free of debris.
- ☐ Shall be checked for proper operation before and after the new line is pressurized.
- ☐ Shall have the valve box lid painted blue enamel (Kelly Moore 5880 or equal).
- ☐ Shall have the valve box ears lined up in the direction of flow (parallel to the direction of the pipe.)
- ☐ Butterfly valves are required on all water mains larger than 12".
- ☐ For water mains 12" and smaller, a butterfly valve is required if adequate cover or the required valve box criteria cannot be achieved (see Valve Box Detail CK-W.35).

#### **Fire Hydrants:**

- ☐ Shall be replaced with new in all cases even if an existing hydrant is to be relocated.
- ☐ Shall utilize shackle rods and blocks -- no exceptions.
- ☐ Shall be set to proper grade.
- ☐ Shall be tested for proper function.
- ☐ Shall have two coats of safety yellow enamel paint.
- ☐ Shall have one Storz adapter installed – 5 ¼ Female Thread.
- ☐ Shall have a minimum 3' surrounding clearance for proper operation.
- ☐ Hydrant runs greater than 40' shall be 8".

#### **Water Meters and Boxes:**

- ☐ Shall be replaced with new approved meter box per Standard Detail W.17, unless noted otherwise.
- ☐ Shall be set to grade – raised or lowered to the surrounding grade regardless of prior condition.
- ☐ Shall have the meter set at between 6" and 10" below meter box lid.
- ☐ Shall have new service tracer wire visible and wrapped around angle stop with the first 6" stripped.

- ☐ Shall have the customer side of meter re-plumbed with appropriate materials and related fittings (i.e., brass, copper, polyethylene or PVC (rated at 200 p.s.i.) where existing meter setters were used or if a service is being relocated. No tie-ins will be allowed to any existing meter-setter tailpieces on the customer's side of the meter.
- ☐ If the existing meter does not have a check valve installed on the customer side of the meter a check valve shall not be installed when doing the tie in.
- ☐ If existing meter appears damaged, the inspector shall note the address and notify the Project Engineer and or Water Department for replacement.

**FDC's and PIV's:**

- ☐ Shall be located on private property unless approved by the Public Works Department.

**Air-Reliefs and Blow-offs:**

- ☐ Shall be checked for proper function.
- ☐ Shall have all above ground piping painted with blue enamel and shall be identified with a blue enamel painted marker post.
- ☐ Air-Reliefs shall have 6 – 10" clearance from top of device to the finished grade of lid and the box grouted both inside and out.

**PROJECT CLOSE-OUT**

**General Construction:**

- ☐ The construction inspector shall perform a project walk-through with water department personnel prior to final curb and gutter, sidewalk and asphalt replacement.
- ☐ All items identified during the inspector/water department personnel walk-through will be incorporated into the original (first) punchlist given to the contractor.



# **CITY OF KIRKLAND**

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## **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

### **Policy W-1: ADDITIONAL WATER SERVICE REQUIREMENTS ACCESSORY DWELLING UNITS (ADU)**

ADUs are subject to the same general utility requirements as single family residential permits, and when ADUs create additional demand on water services for residences, upgrades to larger services are required under the following conditions:

1. Water meter and service shall be sized per the Uniform Plumbing Code.
2. Only one water meter will be allowed for an attached ADU.
3. Water services for detached ADUs will be handled as follows:
  - The owner may choose one primary larger meter, or two separate smaller meters to serve the buildings.
  - For new single family residences, if the primary larger service is chosen, a Water Capital Facility Charge (WCFC) and a Regional Capital Facility Charge (RCFC) will be assessed against the primary residence Building Permit.
  - If the detached ADU is constructed on property with an existing primary residence, and the owner wants to serve both buildings with one primary larger meter, the WFC and RCFC water service assessments will be based upon the difference between the existing water meter size and the new water size.
  - If the owner chooses two separate smaller services, an additional Water Capital Facility Charge (WCFC) and a Regional Capital Facility Charge (RCFC) will be assessed against any new water meters. Both the existing/new house and the ADU will have separate water meters.
4. When new meters are installed, a water meter installation fee will be charged.
5. Fees for new water meters, WCFC, and RCFC will be based on the City's most current fee schedule. Because these fees do change annually, the applicant/owner should check the fee schedule before applying for a permit.
6. All special water connection fees associated with Local Improvement Districts or Latecomers Agreements shall be paid accordingly.
7. All ADUs with separate water services will be subject to separate monthly sewer, water, and garbage disposal fees (this is currently about \$150 for a two month billing period).

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### DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

#### **Policy W-2: IRRIGATION SPECIFICATIONS FOR CITY MAINTAINED SYSTEMS**

When an irrigation system is to be installed in the public right of way, whether in conjunction with a Capital Improvement Project or by Private Development, and that system is to be maintained by the City of Kirkland, the following specifications will need to be incorporated into the design of the system:

- *Pipe, Tubing and fitting* – All pipe and tubing shall be  $\frac{3}{4}$ " to 1" schedule 40 PVC or approved equal (all piping in median islands to be 1"). All fittings shall be schedule 80 PVC. All sleeving shall be 2" schedule 40 PVC. 1" water service lines shall use  $\frac{3}{4}$ " meter unless otherwise approved.
- *Polyvinyl Chloride Pipe and Fittings* – Pipe shall be schedule 40 PVC pipe for the main, laterals and sleeves.
- *Automatic Controller* – Battery operated controller shall be Hunter Battery Operated Node Controller. If using a fixed controller with a designated power source supply, a Hunter iCore Controller with wireless rain sensor shall be used. When possible, a Wireless Solar Sync sensor should also be installed. Controller shall be operable and fully functioning prior to final inspection.
- *Sprinkler Heads* – Pop-up spray heads, impact heads and bubblers shall be Hunter or approved equal. If installed along curbing, heads shall be flush and adjacent to top of curb. Nozzles shall be MP rotators.
- *Valve Boxes and Protective Sleeves* – Valve boxes for control valves shall be Carson 1419 Box, with locking lid or approved equal. Valve boxes for double check valve assembly shall be Carson 1324 with locking lid, or approved equal.
- *Automatic Control Valves* – Automatic control valves shall be Hunter PGV series (1"-2").
- *Quick Coupling Equipment* – Quick coupling equipment shall be Rainbird #44DLRC or approved equal.
- *Irrigation Service* – The Contractor shall install the appropriate size water service to meet the design of the system. The service shall be installed per specifications outlined in the current edition of the Public Works Department Pre-Approved Plans Manual. The Contractor shall coordinate with the City of Kirkland Public Works Department for the installation of the water meter (fees may apply).
- *Coverage* – There shall be full, uniform, and complete coverage of irrigation area and coverage test shall be performed under automatic operation.
- Appropriate backflow devices and or Pressure Reducing valves will be installed according to the latest version of the *Uniform Plumbing Code* as adopted by the City of Kirkland Building Department.

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy W-3:**

THIS POLICY WAS REMOVED IN NOVEMBER 2023. A FUTURE WATER POLICY WILL TAKE THE PLACE OF THIS.

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy W-4: DEPARTMENT OF HEALTH CONSTRUCTION COMPLETION REPORT FORM**

Attached is a copy of the Department of Health's **Construction Completion Report Form for Distribution Main Projects**.

This form is to be filed by the City with new water main extensions.

An electronic copy of this form is located at:

H:\Pw\Water Comp Plan Update\Water Comprehensive Plan 2007 Update\DOH  
Construction Completion Report Form.doc

## CONSTRUCTION COMPLETION REPORT FORM FOR DISTRIBUTION MAIN PROJECTS

In accordance with WAC 246-290-120(5), a **Construction Completion Report** is required for all construction projects. Under the submittal exception process for distribution main projects, designed by a professional engineer but not submitted to DOH for approval, the report does not need to be submitted. **However, the purveyor must keep the Construction Completion Report on file and make it available for review upon request by DOH in accordance with WAC 246-290-125 (2)(b).** Furthermore:

- (1) The report form **must** bear the seal, date and signature of a professional engineer (PE) licensed in the state of Washington; and
- (2) Per WAC 246-290-120(5)(c), the amount of change in the physical capacity of a system must be documented, if the project results in a change in physical capacity.

\_\_\_\_\_  
Name of Water System

DOH System ID No.: \_\_\_\_\_

\_\_\_\_\_  
Name of Purveyor (Owner or System Contact)

\_\_\_\_\_  
Date Water System Plan that includes

Standard Construction Specifications

\_\_\_\_\_  
Mailing Address

\_\_\_\_\_  
Date Standard Specifications

Approved by DOH: \_\_\_\_\_

\_\_\_\_\_  
City

\_\_\_\_\_  
State

\_\_\_\_\_  
Zip

### PROJECT NAME AND DESCRIPTIVE TITLE:

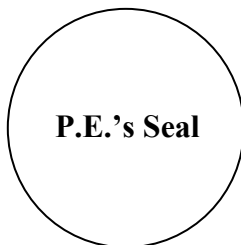
(Include the name of any development project and number of services.) \_\_\_\_\_

\_\_\_\_\_  
Date Project or Portions Thereof Completed

### PROFESSIONAL ENGINEER'S ACKNOWLEDGMENT

The undersigned professional engineer (PE), or his/her authorized agent, has inspected the above-described project that, as to layout, size and type of pipe, valves and materials, and other designed physical facilities, has been constructed and is substantially completed in accordance with construction documents reviewed by the purveyor's engineer. In the opinion of the undersigned engineer, the installation, physical testing procedures, water quality tests, and disinfection practices were carried out in accordance with state regulations and principles of standard engineering practice.

I have reviewed the disinfection procedures, pressure test results, and results of the bacteriological test(s) for this project and certify that they comply with the requirements of the construction standards/specifications approved by DOH.



\_\_\_\_\_  
Date Signed

\_\_\_\_\_  
Name of Engineering Firm

\_\_\_\_\_  
Name of PE Acknowledging Construction

\_\_\_\_\_  
Mailing Address

\_\_\_\_\_  
City

\_\_\_\_\_  
State

\_\_\_\_\_  
Zip

\_\_\_\_\_  
Engineer's Signature

\_\_\_\_\_  
State/Federal Funding Type (if any)

*Please keep a completed, signed, and stamped copy on file.*

☐ NWRO Drinking Water  
Department of Health  
20435 72<sup>nd</sup> Ave. S, Ste 200  
Kent, WA 98032-2358  
(253) 395-6750

☐ SWRO Drinking Water  
Department of Health  
PO Box 47823  
Olympia, WA 98504-7823  
(360) 236-3030

☐ ERO Drinking Water  
Department of Health  
1500 W. Fourth Ave, Suite 305  
Spokane, WA 99201  
(509) 456-3115

For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

## **CITY OF KIRKLAND**

123 FIFTH AVENUE · KIRKLAND, WASHINGTON 98033-6189 · (425) 587-3800

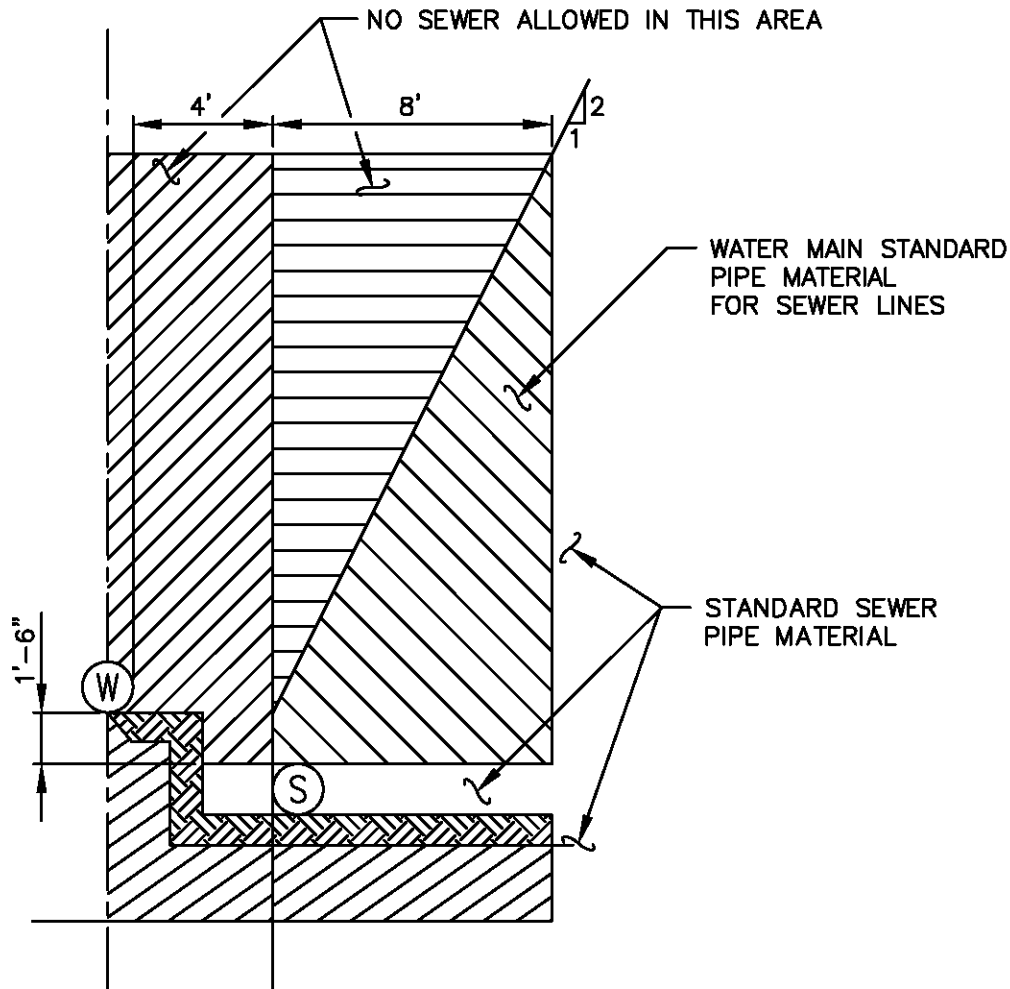
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### **PRE-APPROVED PLANS POLICY**

#### **Policy W-5: NEW WATER SYSTEM DOCUMENTATION**

Developers or Contractors shall submit a preliminary blueline copy of the water construction Record Drawings showing any changes to the design made during construction. These drawing must be provided immediately after the new water system is tied in to the existing water system.

1. Drawings to show all changes to the system design (valves, lengths, size, tie-in method, additions, deletions, etc.).
2. Preliminary drawings do not have to bear the stamp of a licensed professional surveyor or engineer.



# PARALLEL CONSTRUCTION

TABLE 1  
WATER MAIN STANDARD PIPE MATERIAL

AWWA STANDARD			
TYPE OF PIPE	PIPE	JOINT	FITTINGS
DUCTILE IRON	C 1.52	C 111	C 110
CONCRETE CYLINDER	C 303		

## NOTES

1. TO BE USED WHEN 10' MINIMUM SEPARATION CANNOT BE OBTAINED.

CITY OF KIRKLAND

PLAN NO. CK-W.01



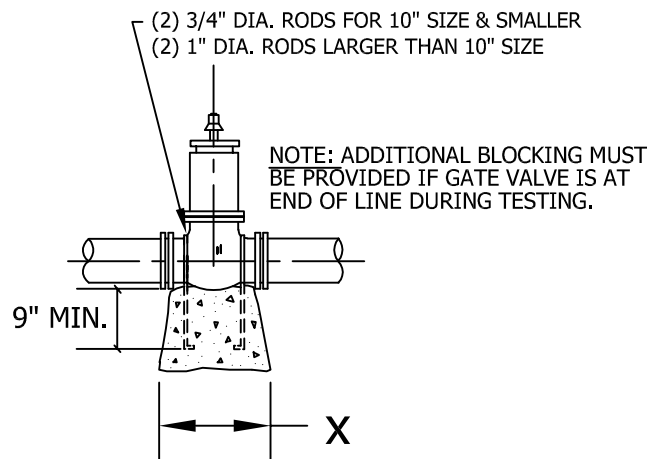
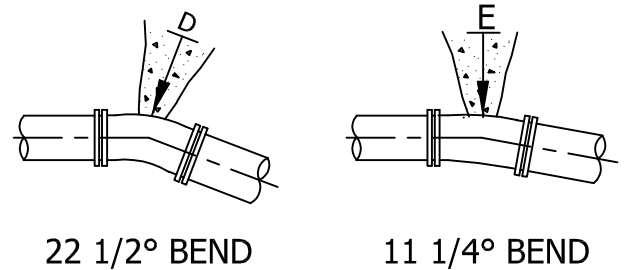
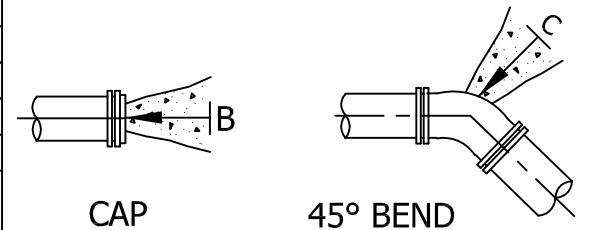
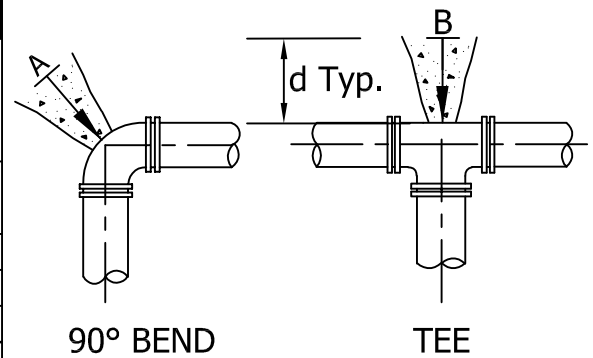
WATER AND SEWER  
SPACING AND  
CLEARANCE

**THRUST BLOCK TABLE****Minimum Bearing Area Against Undisturbed Soil (Ft<sup>2</sup>)***(block sizes based on 200 psi test pressure)*

Pipe Size	A	B	C	D	E	x (in)	d (ft)
4"	3	2	2	1	1	None	1
6"	5	4	4	2	2	None	1.25
8"	9	6	5	3	2	4	1.5
10"	13	10	7	4	3	5	2
12"	19	13	11	6	4	6	2.25
14"	26	19	14	7	4	9	2.75
16"	27	25	19	10	6	12	2.75
18"	42	30	23	12	6	15	3.25
20"	52	37	28	15	9	19	3.75
24"	74	53	41	21	11	27	4.5

**Notes:**

For different test pressure multiply bearing area by (actual test pressure ÷ 200)

**GATE VALVE****NOTES:**

1. SQUARE FEET OF CONCRETE THRUSTS - BLOCK AREA BASED ON SAFE BEARING LOAD OF 2000 POUNDS PER SQUARE FOOT.
2. AREAS MUST BE ADJUSTED FOR OTHER SIZE PIPE, PRESSURES & SOIL CONDITIONS.
3. CONCRETE BLOCKING SHALL BE CAST IN PLACE & HAVE MINIMUM OF 1/4 SQUARE FOOT BEARING AGAINST THE FITTING.
4. BLOCK SHALL BEAR AGAINST FITTINGS ONLY & SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING JOINT.
5. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.
6. IN CLAY OR FINE SILT, MULTIPLY BLOCK BEARING AREA BY 2.
7. IN MUCK OR PEAT, ALL THRUSTS SHALL BE RESTRAINED BY PILES OR TIE RODS TO SOLID FOUNDATIONS OR BY REMOVAL OF MUCK OR PEAT AND REPLACEMENT WITH BALLAST OF SUFFICIENT STABILITY TO RESIST THRUST.

**CITY OF KIRKLAND**

PLAN NO. CK-W.02

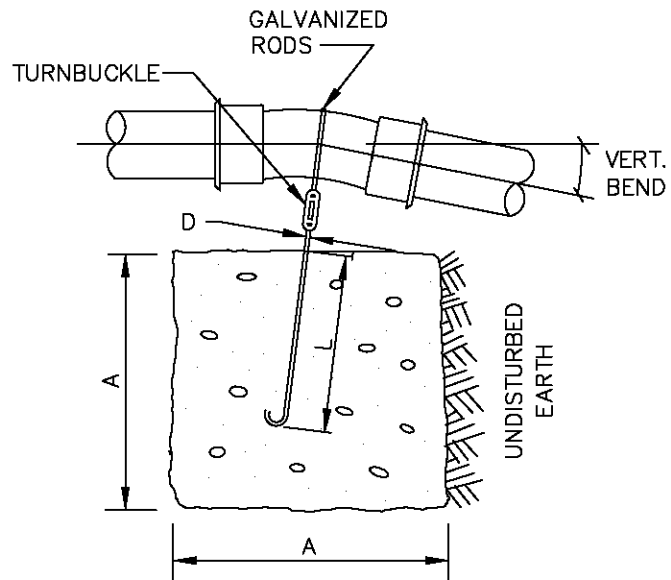
**CONCRETE THRUST  
BLOCKING**



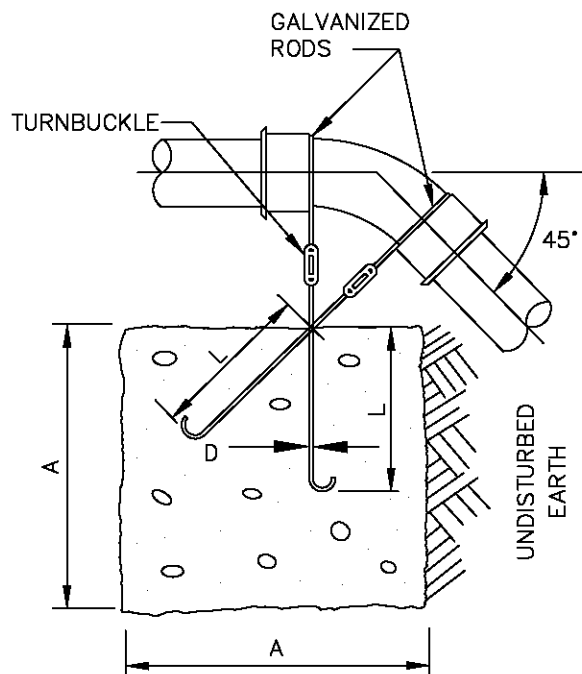
VERTICAL BLOCKING FOR 11 1/4"-22 1/2"-30° BENDS					
PIPE SIZE	V B	CU FT	A	D	L
4"	11 1/4"	8	2.0'	5/8"	1.5'
	22 1/2"	11	2.2'		2.0'
	30"	17	2.6'		
6"	11 1/4"	11	2.2'	5/8"	2.0'
	22 1/2"	25	2.9'		
	30"	41	3.5'		
8"	11 1/4"	16	2.5'	5/8"	2.0'
	22 1/2"	47	3.6'		
	30"	70	4.1'		3/4"
12"	11 1/4"	32	3.2'	3/4"	2.0'
	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"	
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'	5/8"	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'

NOTES:

1. CONCRETE BLOCKING BASED ON 200 PSI PRESSURE AND 3000 PSI CONCRETE.



VERTICAL BLOCKING  
FOR 11 1/4\", 22 1/2\", & 30° BENDS



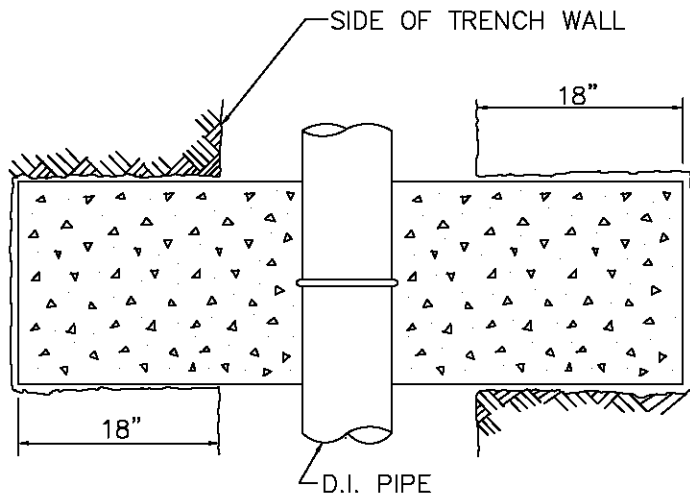
VERTICAL BLOCKING  
FOR 45° BENDS

CITY OF KIRKLAND

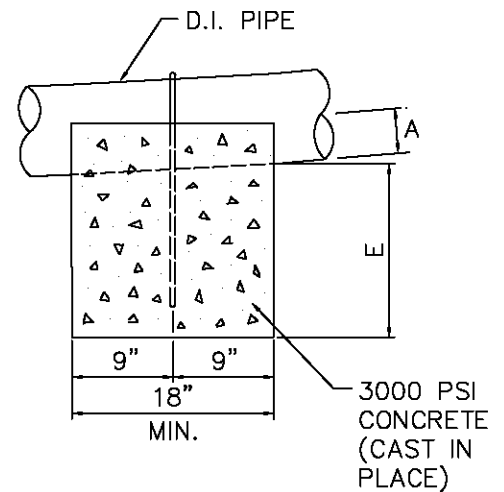
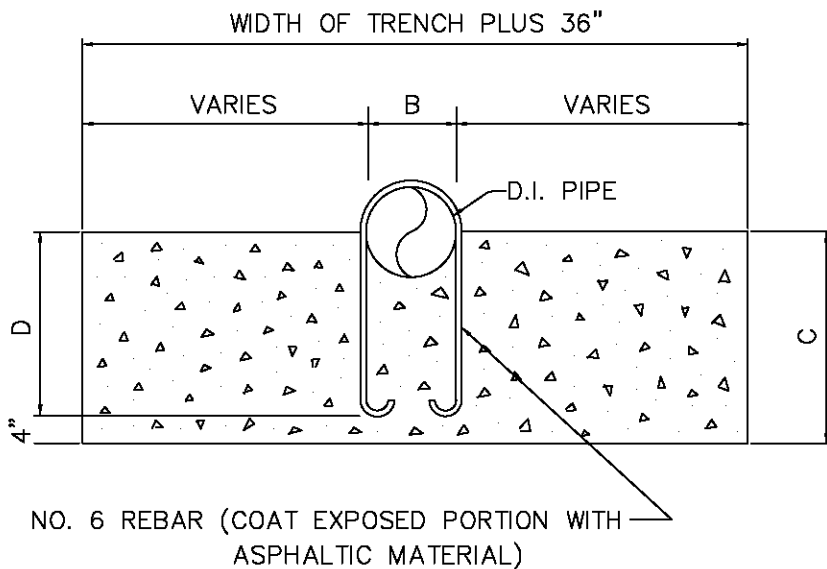
PLAN NO. CK-W.03



VERTICAL THRUST  
BLOCKING



PIPE SIZE	DIMENSIONS (INCHES)				
	A	B	C	D	E
4"	2.4	4.8	17	13	14.6
6"	3.5	6.9	18	14	14.5
8"	4.5	9.1	19	15	14.5
10"	5.6	11.1	20	16	14.4
12"	6.6	13.2	21	17	14.4
14"	7.7	15.3	22	18	14.3
16"	8.7	17.4	23	19	14.3
18"	9.8	19.5	24	20	14.2



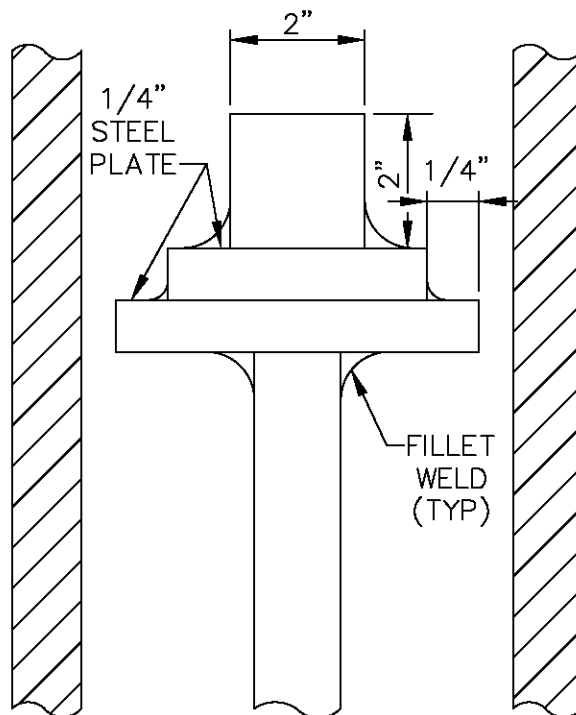
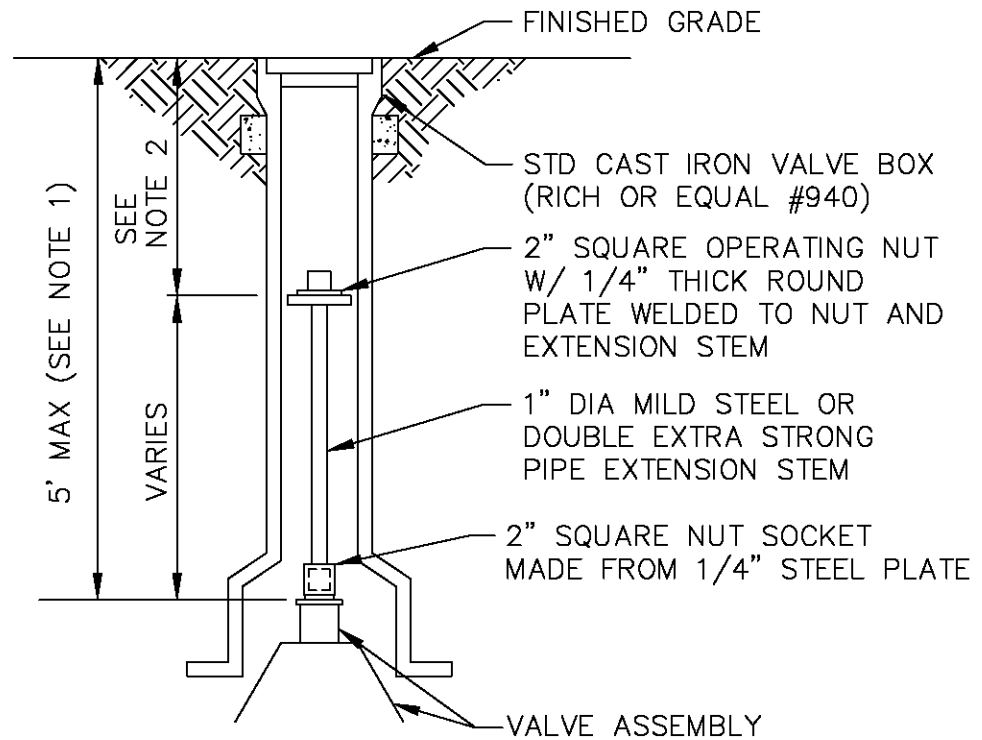
SLOPES > 20% — PROVIDE CONCRETE SLOPE  
ANCHORS (20' TO 25'  
ON CNTR.)

CITY OF KIRKLAND

PLAN NO. CK-W.04



CONCRETE  
SLOPE ANCHOR  
DETAIL



EXTENSION DETAIL

NOTE:

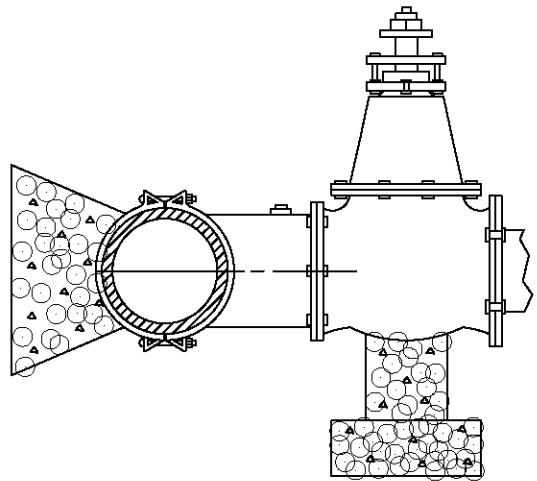
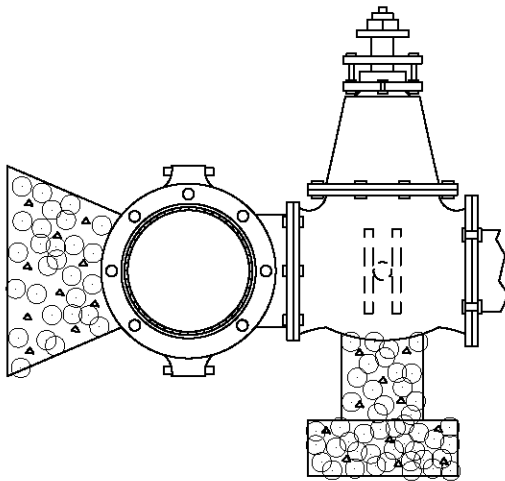
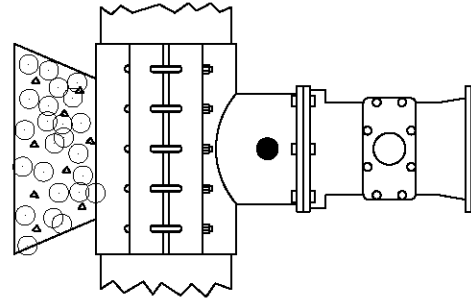
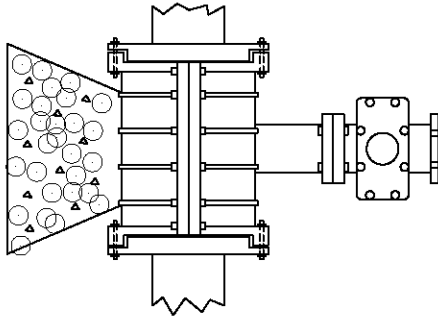
1. VALVE EXTENSIONS ARE ONLY REQUIRED IF DEPTH FROM FINISHED GRADE TO TOP OF OPERATING NUT IS GREATER THAN 5 FEET.
2. WHEN AN EXTENSION IS USED, THE DEPTH FROM EXTENSION OPERATING NUT TO FINISHED GRADE SHALL NOT BE LESS THAN 3 FEET.

CITY OF KIRKLAND

PLAN NO. CK-W.05



WATER  
VALVE  
EXTENSION



### CAST IRON TAPPING TEE MECHANICAL JOINT SLEEVE

INSTALLED ON ASBESTOS CEMENT PIPE,  
CAST IRON PIPE AND DUCTILE IRON PIPE.

### STAINLESS STEEL OR STEEL TAPPING TEE

#### STAINLESS STEEL TAPPING TEE

INSTALLED ON ASBESTOS CEMENT PIPE,  
CAST IRON PIPE AND DUCTILE IRON  
PIPE.

#### NOTES:

1. STAINLESS STEEL TAPPING TEES SHALL HAVE FULL CIRCLE SEAL. BOLTS AND NUTS SHALL BE STAINLESS STEEL.
2. STEEL TAPPING TEES SHALL BE EPOXY COATED. BOLTS AND NUTS SHALL BE COR-TEN, OR STAINLESS STEEL.
3. ALL TEES AND VALVES TO BE WATER TESTED BEFORE TAP.

#### STEEL TAPPING TEE

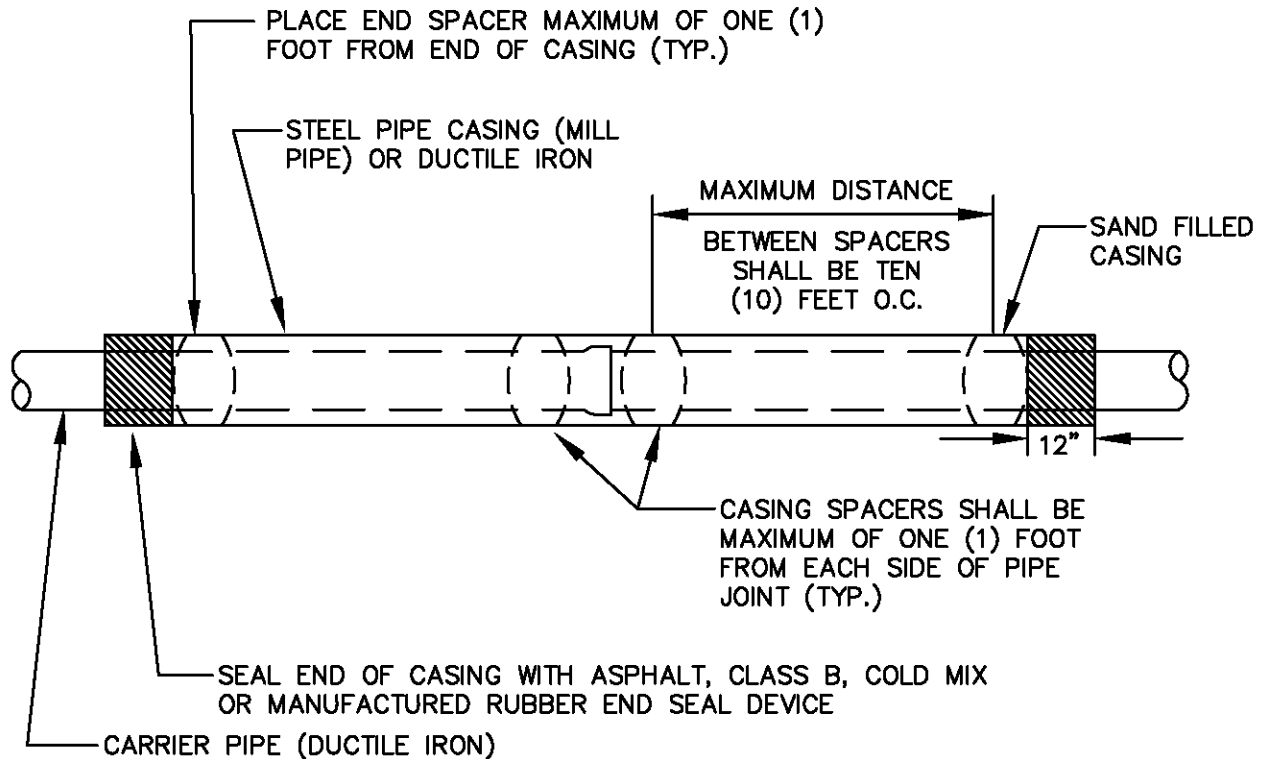
INSTALLED ON DUCTILE IRON PIPE ONLY.

CITY OF KIRKLAND

PLAN NO. CK-W.06



TAPPING TEES



CASING SPACERS (SEE APPROVED MATERIALS LIST)

CARRIER PIPE DIAMETER	4"	6"	8"	10"	12"
CASING DIAMETER (PUSH-ON JOINT CARRIER PIPE)	10"	12"	14"	16"	20"
CASING DIAMETER (MJ/MEGALUG JOINT CARRIER PIPE)	14"	16"	18"	20"	22"*
STEEL CASING THICKNESS	0.25"	0.25"	0.25"	0.25"	0.25"
SPACER BAND WIDTH	8"	8"	12"	12"	12"

\* 24" FOR DUCTILE IRON CASING.

ANTICORROSIVE COATING THICKNESS:

CARRIER - 8 MILLS DFT

CASING - 8 MILLS DFT

NOTES:

- CASING SPACERS SHALL BE "CENTER POSITIONING" TYPE.
- MINIMUM RUNNER WIDTH SHALL BE 2 INCHES.
- RUNNER HEIGHT SHALL BE SIZED TO PROVIDE:
  - MINIMUM 0.75" BETWEEN CARRIER PIPE BELL AND CASING PIPE WALL AT ALL TIMES.
  - MINIMUM 1" CLEARANCE BETWEEN RUNNERS AND TOP OF CASING WALL TO PREVENT JAMMING DURING INSTALLATION.
- STEEL CASING DIAMETERS ARE "OUTSIDE DIAMETER" FOR 16" AND LARGER.

CITY OF KIRKLAND

PLAN NO. CK-W.07




CASING  
INSTALLATION

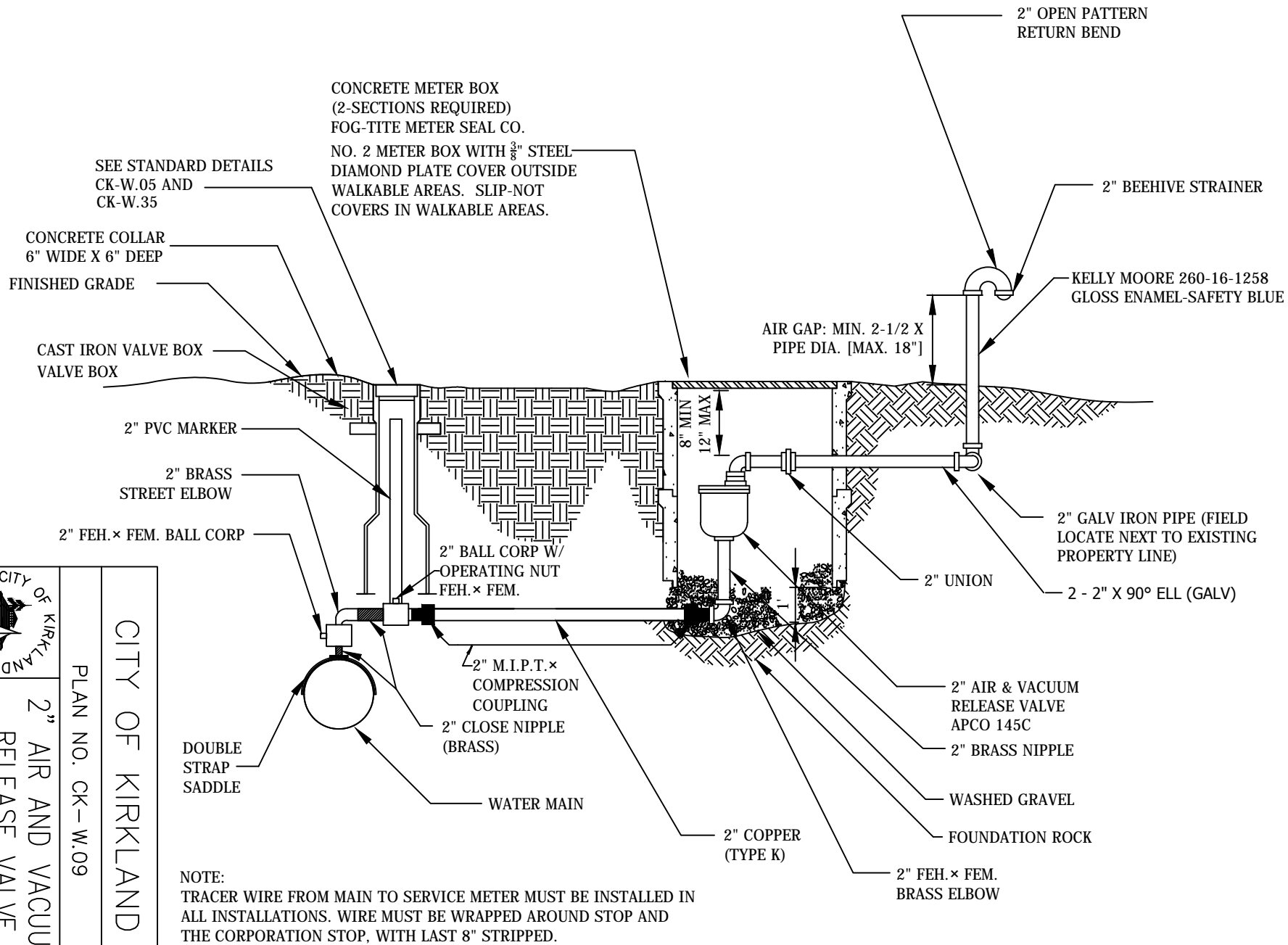
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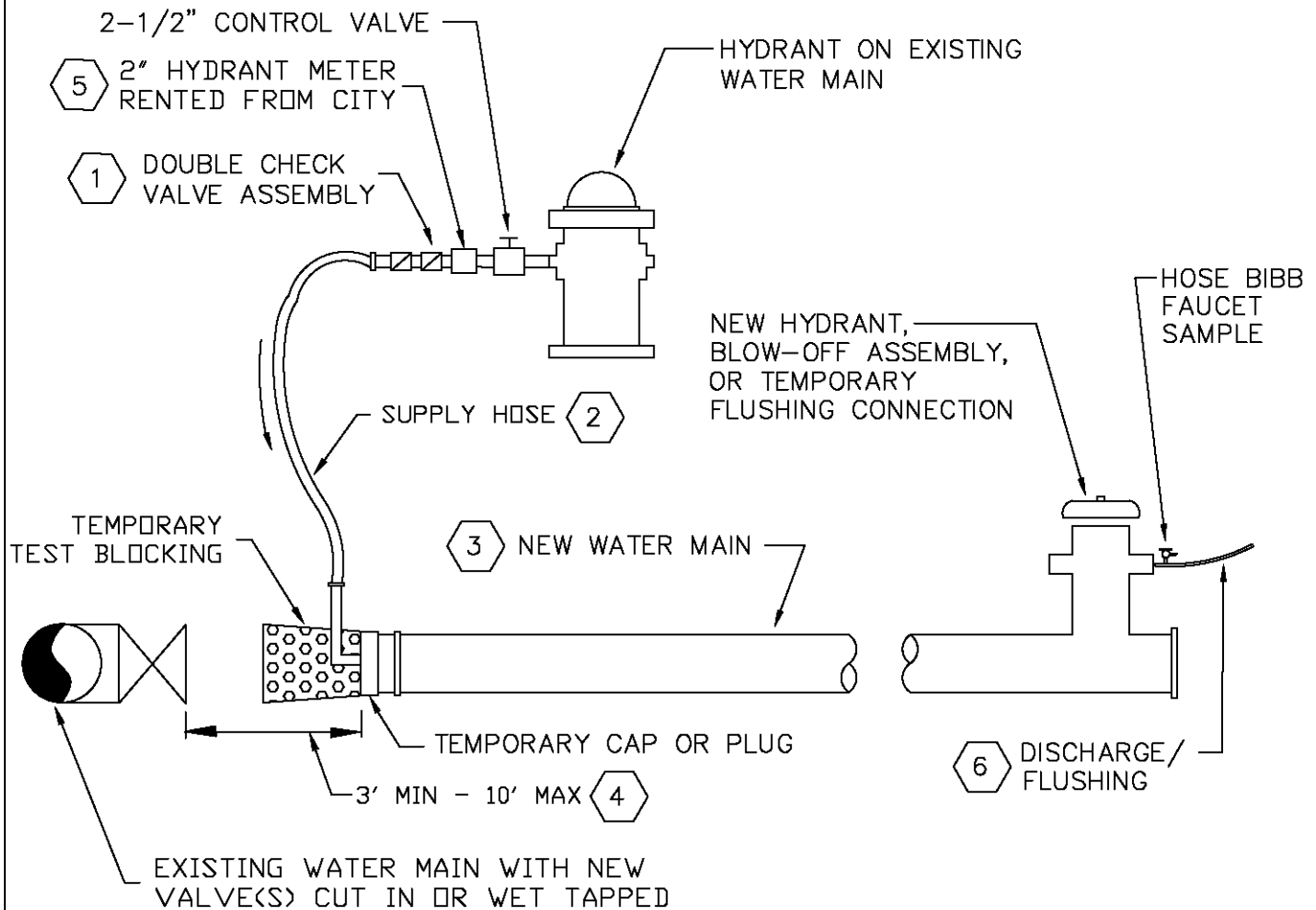
CITY OF KIRKLAND

PLAN NO. CK – W.08



	<p>2" AIR AND VACUUM RELEASE VALVE ASSEMBLY</p>
<p>CITY OF KIRKLAND</p>	





NOTES:

- 1 AN APPROVED BACKFLOW PREVENTION ASSEMBLY SHALL BE INSTALLED BETWEEN THE EXISTING AND NEW WATER LINES DURING DISINFECTION AND FLUSHING OF NEW WATERMAIN.
- 2 THE BACKFLOW PREVENTION ASSEMBLY AND SUPPLY HOSE MUST BE DISCONNECTED DURING HYDROSTATIC PRESSURE TESTING OF THE NEW MAIN.
- 3 THE NEW WATERMAIN SHALL BE CONNECTED TO THE EXISTING SYSTEM ONLY AFTER NEW MAIN IS FLUSHED, DISINFECTED AND SATISFACTORY BACTERIOLOGICAL SAMPLE RESULTS ARE OBTAINED.
- 4 THE INTERIORS OF ALL PIPES AND FITTINGS TO BE USED IN FINAL CONNECTION MUST BE SWABBED OR SPRAYED WITH A 1% AVAILABLE CHLORINE SOLUTION.
- 5 2" HYDRANT METER SHALL BE OBTAINED FROM THE CITY OF KIRKLAND PUBLIC WORKS DEPARTMENT.
- 6 DISCHARGE FLUSHING TO SEWER ONLY. PROVIDE AIR GAP AT DISCHARGE.

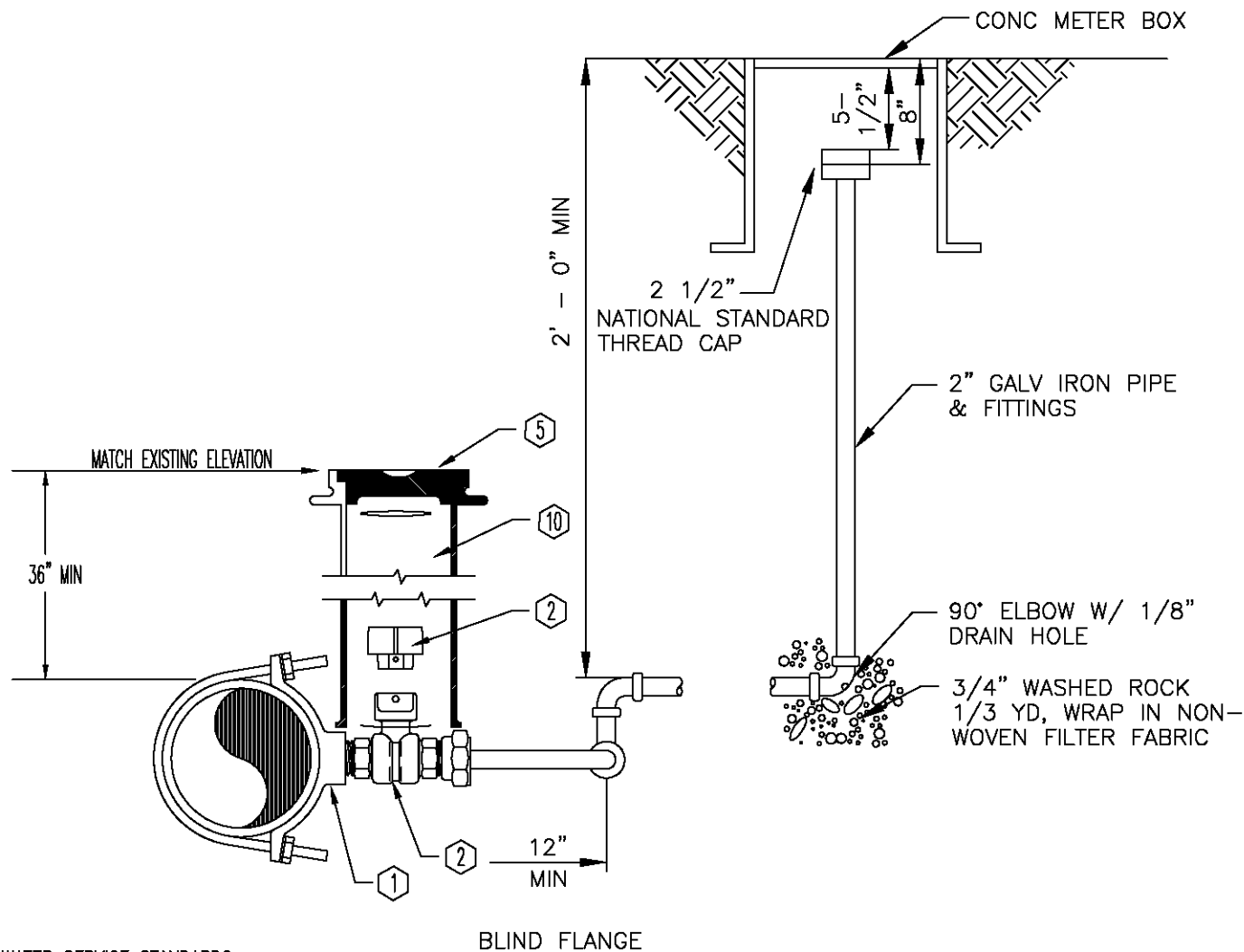
CITY OF KIRKLAND

PLAN NO. CK-W.10



FILLING  
NEW  
WATER MAINS





WATER SERVICE STANDARDS  
1-1/2" & 2" Copper Services

DESCRIPTION	MAKER OR RATING	2"
1. Double Strap Saddle	Romac or Equal	202 IPT
2. Ball Valve-2" Operating Nut w/Cotter Pin	Ford or equal	B11-777 w/Q167
5. Valve Box	Rich or Equal (940-B LOCKING)	
10. 2" Marker	PVC	

NOTES:

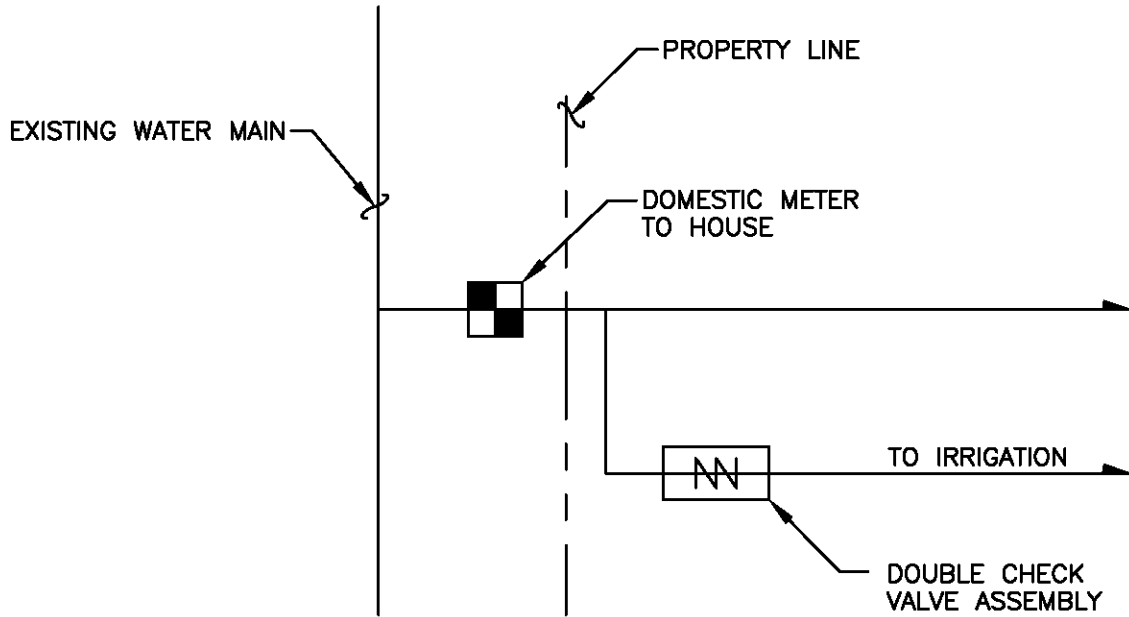
1. IF MAIN WILL BE EXTENDED IN THE FUTURE, A MAINLINE GATE VALVE IS TO BE INSTALLED A MINIMUM OF ONE FULL LENGTH OF PIPE UPSTREAM OF THE B.O.
2. A BLOW OFF MAY NOT BE USED ON A MAIN LINE PERMANENTLY DEAD ENDED - FIRE HYDRANT ONLY.

CITY OF KIRKLAND

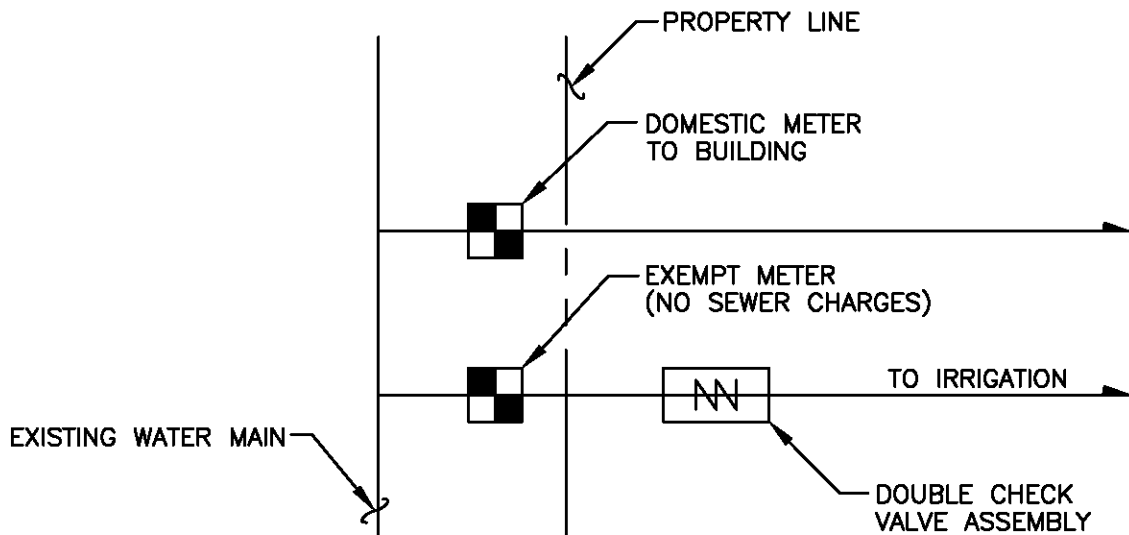
PLAN NO. CK-W.11



2" BLOW-OFF  
ASSEMBLY



SINGLE FAMILY



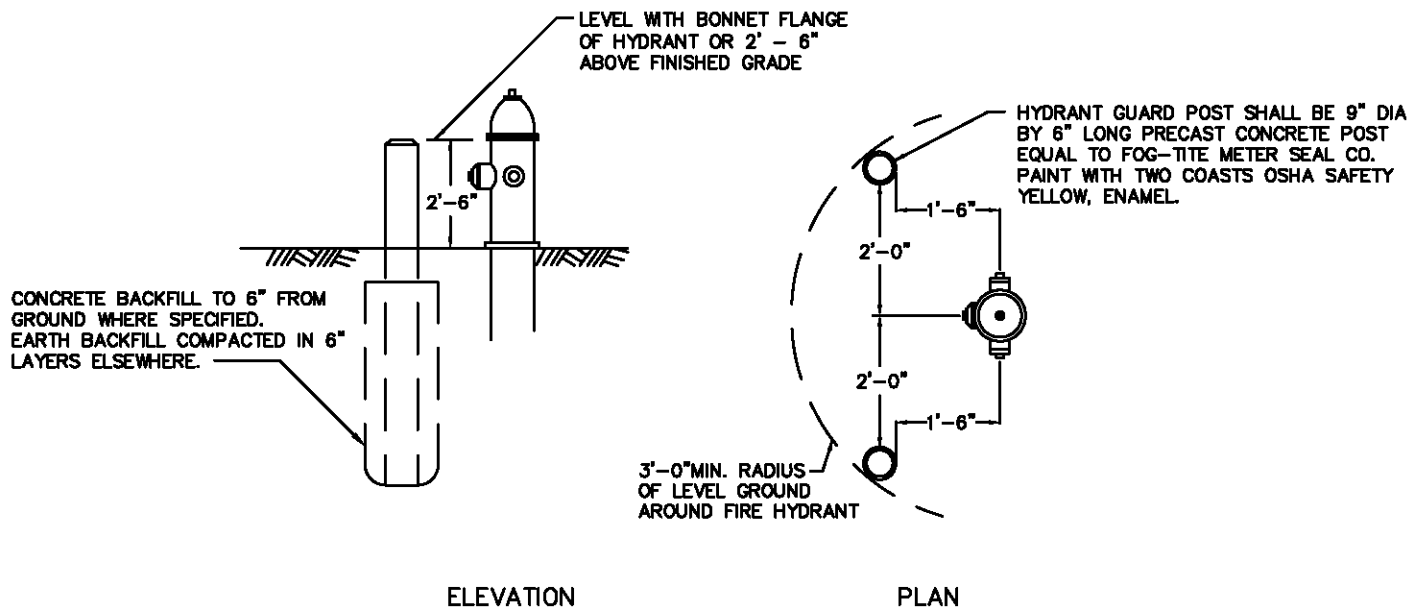
COMMERCIAL—MULTI—FAMILY

CITY OF KIRKLAND

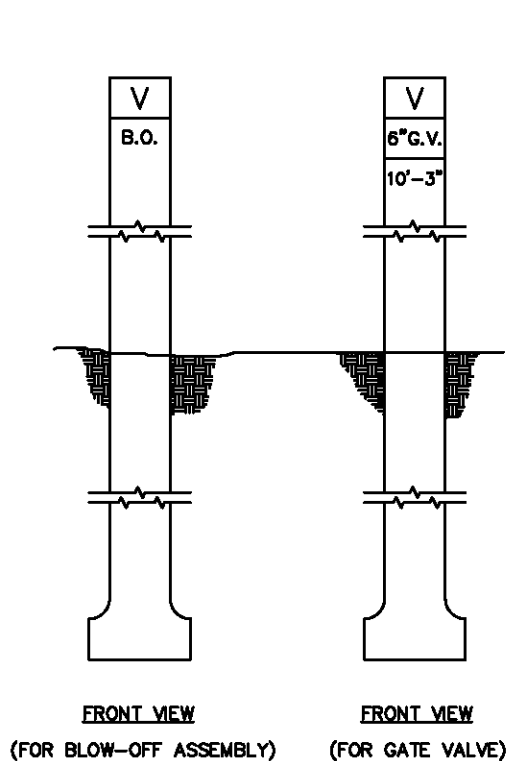
PLAN NO. CK—W.12



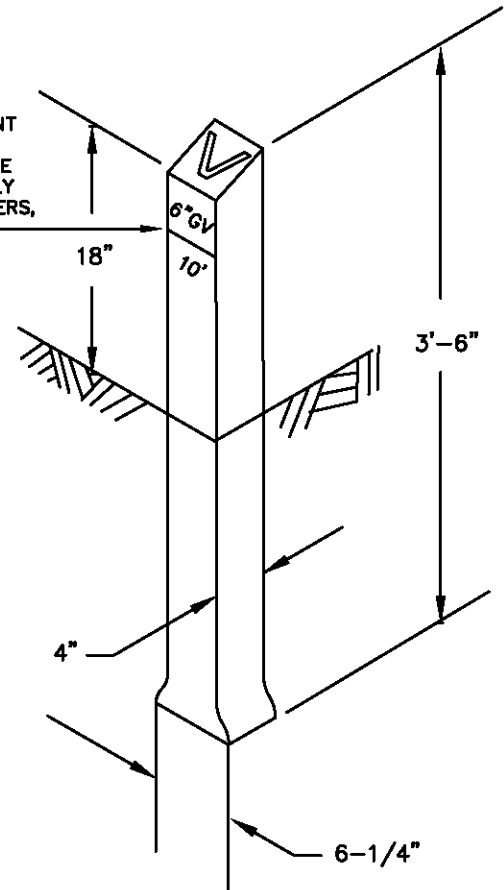
TYPICAL  
IRRIGATION  
CONFIGURATION



### FIRE HYDRANT GUARD POST



VALVE MARKER POST SHALL BE EQUAL TO FOG-TITE METER CO. PAINT AS SPECIFIED FOR HYDRANT GUARD POST. PAINT DISTANCE FROM THE VALVE MARKER TO THE VALVE ON THE POST WITH NEATLY STENCILED BLACK ENAMEL NUMBERS, 1" IN HEIGHT.



### VALVE MARKER POST

#### NOTES:

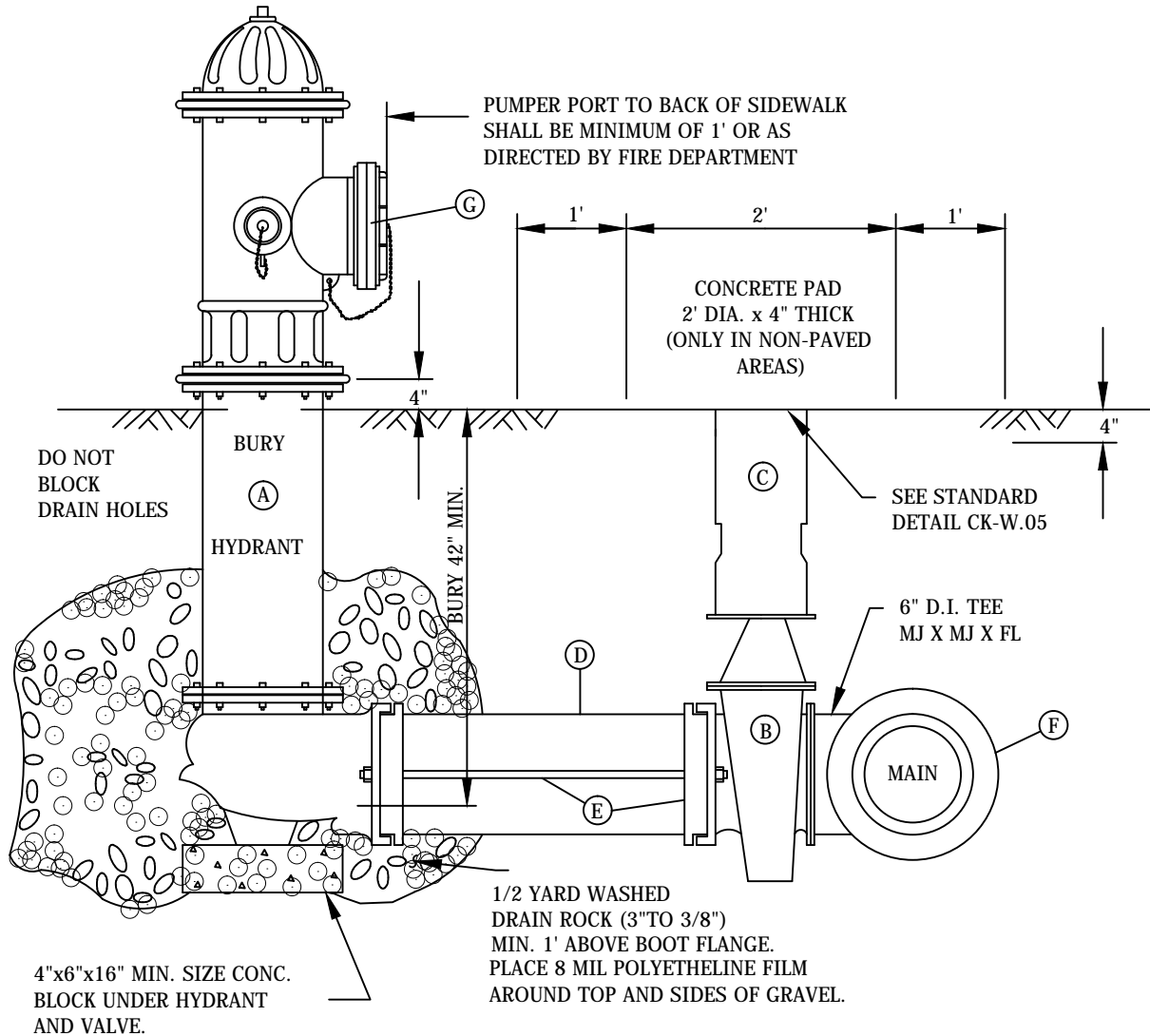
1. GUARD POSTS TO BE INSTALLED ONLY AS DIRECTED BY CITY OF KIRKLAND.
2. VALVE MARKERS TO BE USED FOR BLOW OFF AND MAINLINE VALVES OUTSIDE PAVED AREAS.

CITY OF KIRKLAND

PLAN NO. CK - W.13



HYDRANT PROTECTION  
AND VALVE  
MARKER POST



- A. 1-5 1/4" M.V.O. HYDRANT WITH 2-2 1/2" N.S.T. AND 1-4" PUMPER, SEATTLE STANDARD. THREAD-M.J. INLET, WITH LUGS, BRASS TO BRASS SUB-SEAT.
- B. 1-AUXILIARY GATE VALVE: 6" AWWA C509 OR C515, RESILIENT SEAT, "O" RING STEM SEAL, M.J.xFL. WITH LUGS.
- C. 1-TWO-PIECE CAST IRON VALVE BOX WITH LOCKING BOLTS EQUAL TO RICH SEATTLE TYPE #940.
- D. 1-6" DUCTILE IRON CLASS 52 CEMENT-LINED PIPE, LENGTH TO FIT.
- E. 2 - 3/4" GALVANIZED STEEL SHACKLE RODS, TAR SEALED AFTER ASSEMBLY.
- F. 1/4 CY - 1:3:6: CONCRETE MIX, POUR IN PLACE TO BLOCK. MAINTAIN CLEARANCE FOR BOLTS.
- G. 5" X 4" FEMALE SEATTLE STANDARD THREAD RIGID 5" STORZ ADAPTOR WITH ALL CAPS AND CHAINS OR CABLES. ADAPTOR MATERIAL TO BE ANODIZED ALUMINUM.

**NOTES:**

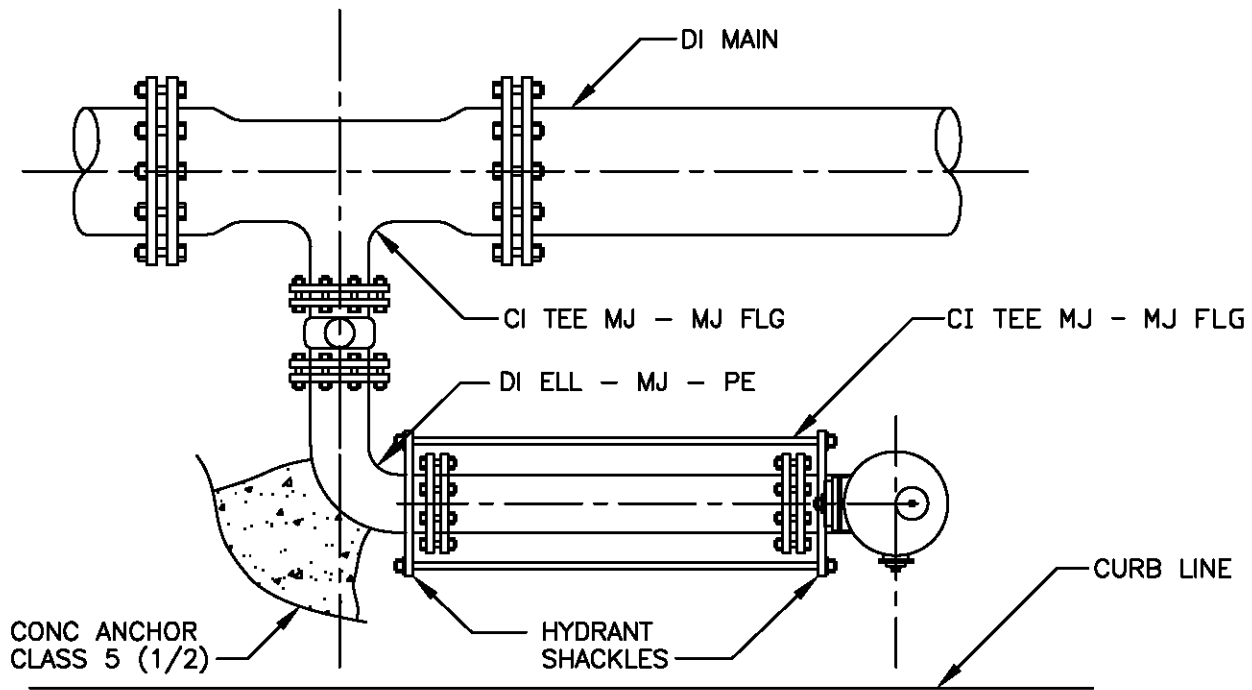
1. FIRE HYDRANT EXTENSION, IF REQUIRED.
2. FIRE HYDRANT TO BE PAINTED WITH TWO COATS OF HIGH GLOSS OSHA SAFETY YELLOW ENAMEL PAINT.
3. INSTALL BLUE - TYPE 2 R.P.M. ON STREET SURFACE ADJACENT TO MAIN PORT.

**CITY OF KIRKLAND**

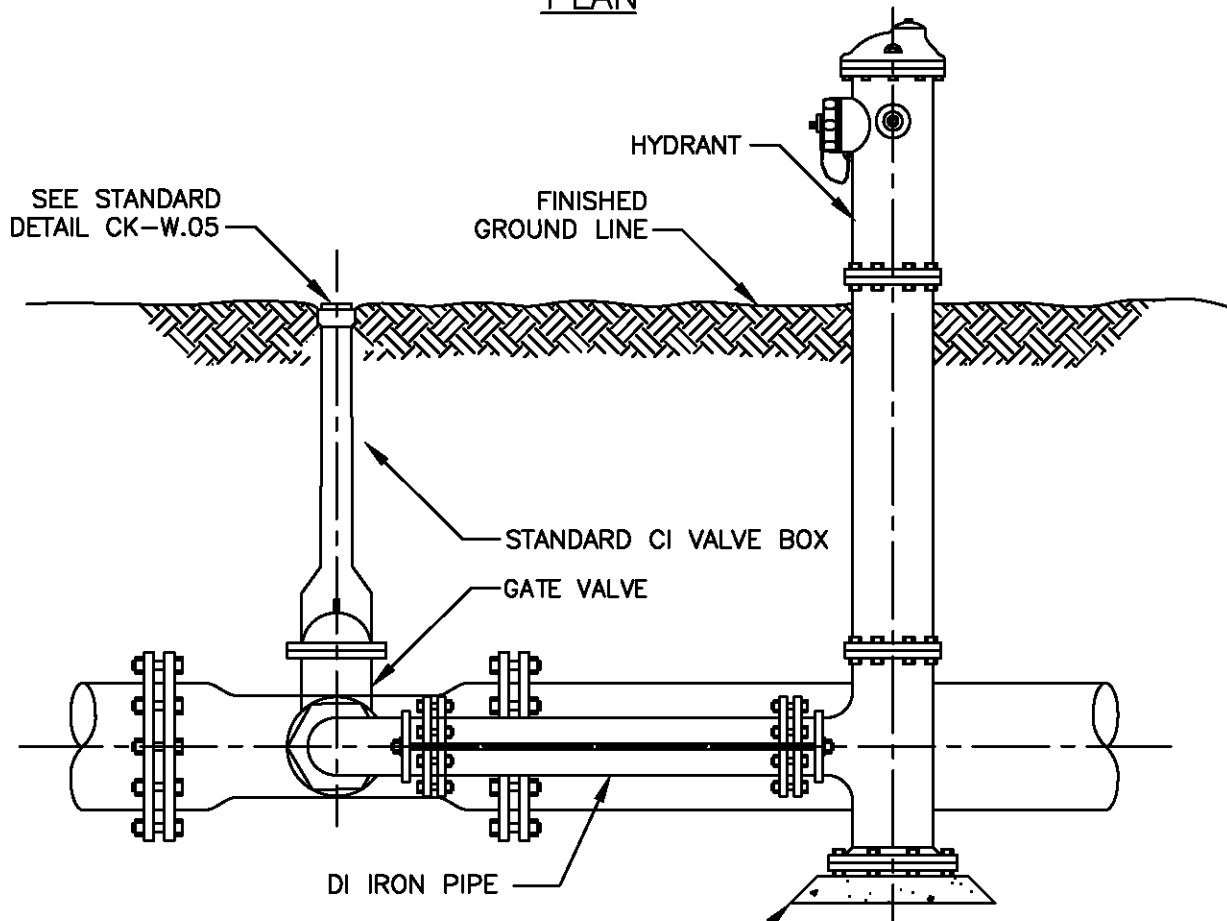
PLAN NO. CK-W.14



**FIRE  
HYDRANT  
ASSEMBLY**



PLAN



CONCRETE CL 5 (1/2)  
MIN SIZE 4" X 6" X 16" THICK

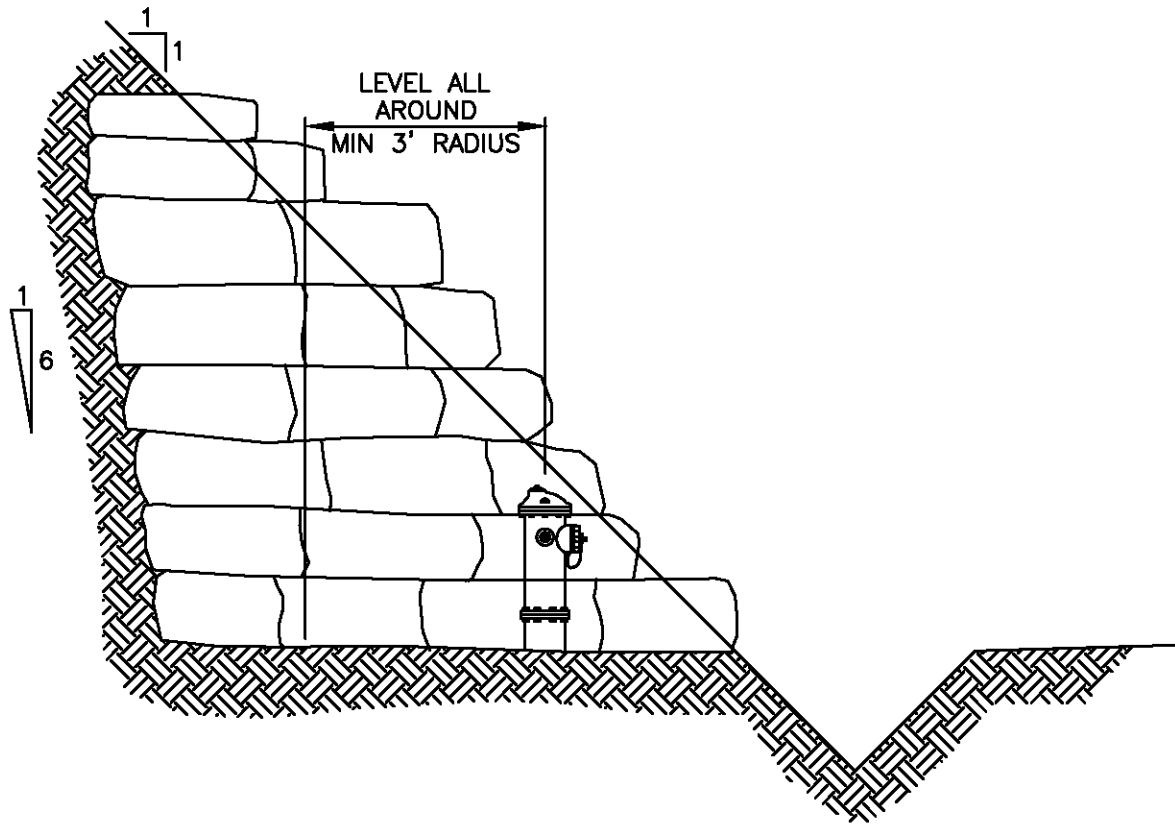
SIDE VIEW

CITY OF KIRKLAND

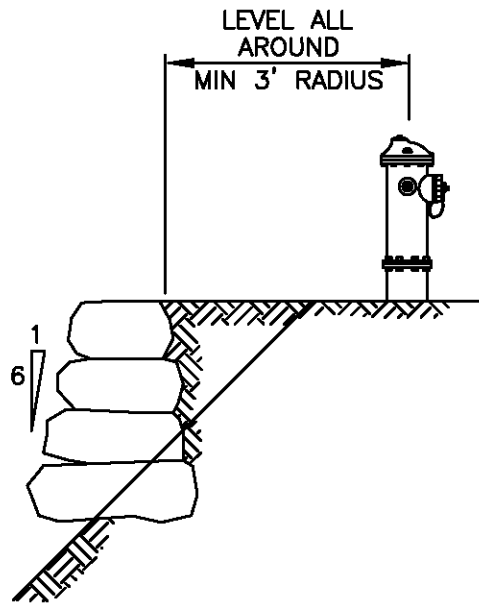
PLAN NO. CK-W.15



OFFSET  
HYDRANT  
LOCATION



CUT



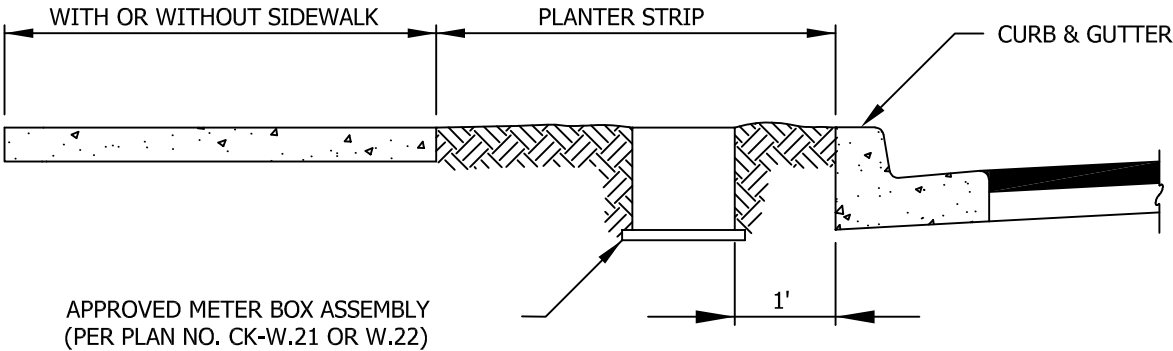
FILL

CITY OF KIRKLAND

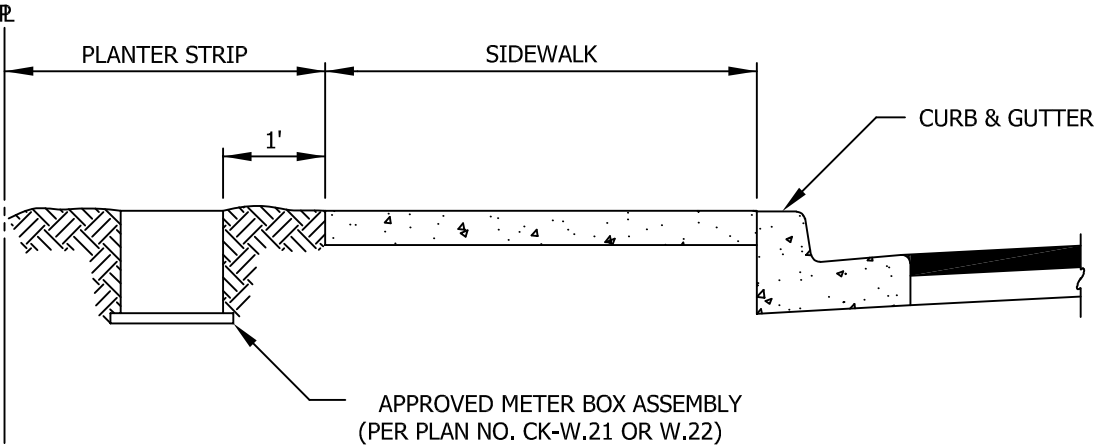
PLAN NO. CK-W.16



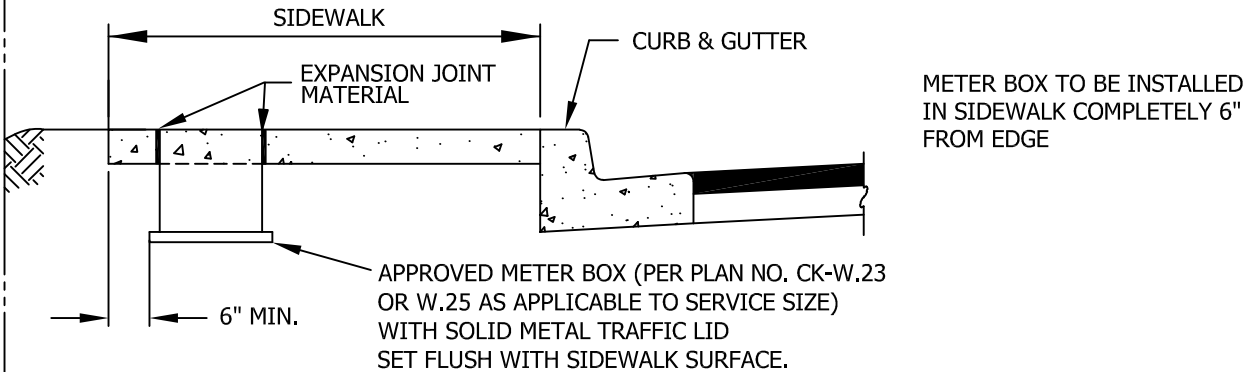
HYDRANT  
LOCATION  
IN CUT OR FILL



INSTALLATION IN PLANTER STRIP 3' OR WIDER



INSTALLATION BEHIND SIDEWALK



INSTALLATION IN SIDEWALK

NOTES:

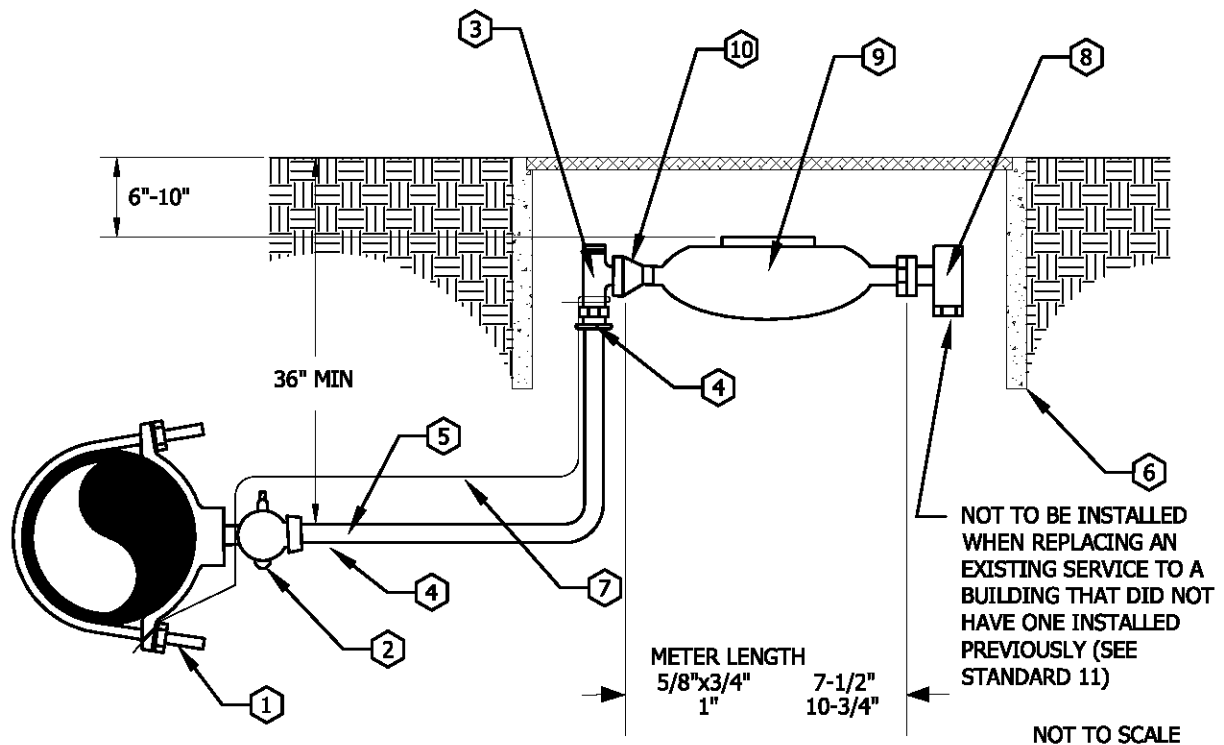
WATER METERS MUST BE LOCATED ALONG THE FRONTAGE THAT THE PROPERTY IS ADDRESSED FROM UNLESS OTHERWISE APPROVED BY THE PUBLIC WORKS DEPARTMENT.

CITY OF KIRKLAND

PLAN NO. CK-W.17



WATER METER  
PLACEMENT  
DETAILS



WATER SERVICE STANDARDS

DESCRIPTION	MAKER OR TYPE	1"
1. SINGLE STRAP SADDLE	STAINLESS ROMAC OR EQUAL	101 1PT
2. CORP STOP	FORD OR EQUAL	FB1101-4-G-NL
3. ANGLE STOP	FORD OR EQUAL	BA63-444W-G-NL
4. INSERTS	FORD OR EQUAL	#72 STAINLESS STEEL
5. POLY PIPE	POLYETHYLENE ASTM D2239	IPS-SDR-7(PE3408)
6. METER BOX	CARSON OR EQUAL	CK-W.21 (OR W.23 W/APPROVAL)
7. TRACER WIRE	CU SOLID WIRE	14 GAUGE
8. CHECK VALVE	-----	CITY TO INSTALL*
9. METER	-----	CITY TO INSTALL*
10. 1" x 3/4" METER ADAPTOR (FOR 5/8 x 3/4" MTR)	FORD OR EQUAL #A24	CITY TO INSTALL UNLESS A CIP PROJECT
11. 1" METER 3/4" METER	FORD OR EQUAL L31-44 FORD OR EQUAL L31-24	CONTRACTOR TO INSTALL

\*UNLESS A CIP PROJECT

**NOTES:**

- ALL FITTINGS MUST BE FORD OR EQUAL.
- TRACER WIRE FROM MAIN TO SERVICE METER MUST BE INSTALLED IN ALL INSTALLATIONS. WIRE MUST BE WRAPPED AROUND ANGLE STOP AND THE CORPORATION STOP, WITH LAST 8" STRIPPED.
- POLY SERVICE LINE IS TO BE CONTINUOUS FROM MAIN TO METER-NO SPLICES OF ANY KIND.
- POLY PIPE TO BE 1" FROM MAIN TO METER.
- METERS SHALL NOT BE LOCATED IN CONCRETE OR ASPHALT PAVING UNLESS UNAVOIDABLE.
- THE ANGLE STOP SHALL BE IN A POSITION THAT RESULTS IN THE METER BEING CENTERED DIRECTLY BENEATH THE METER READING LID.

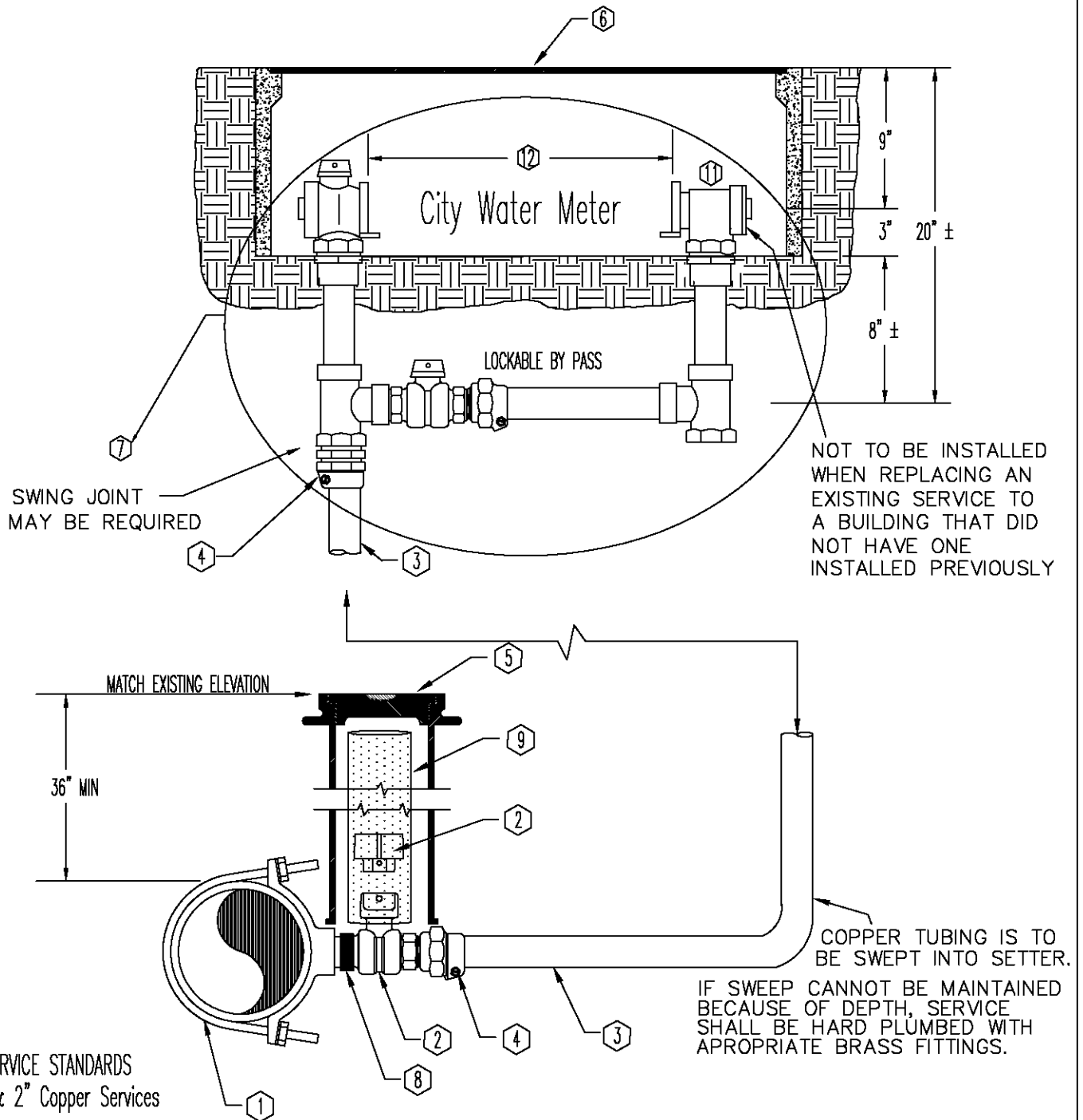
CITY OF KIRKLAND

PLAN NO. CK-W.18



5/8"x3/4" & 1"  
WATER METER SERVICE  
INSTALLATION





**WATER SERVICE STANDARDS**  
1-1/2" & 2" Copper Services

DESCRIPTION	MAKER OR RATING	1-1/2"	2"
1. Double Strap Saddle	Romac or Equal	202 IPT	202 IPT
2. Ball Valve-2" Operating Nut w/Cotter Pin	Ford or equal	B11-666 w/Q167	B11-777 w/Q167
3. Pipe - Soft Copper Tubing , Type K	ASTM B-88		
4. Coupling Male	Ford or Equal	C84-66	C84-77
5. Valve Box	Rich or Equal (940-B LOCKING)		
6. Meter Box	Carson or Equal	1324-15L	1324-15L
7. Meter Setter w/Lockable Bypass	Ford or Equal	VBH86-12B	VBH87-12B
8. Brass Nipple (3")		1-1/2"	2"
9. 2" Sleeve	PVC		
10. City to Install Meter			
11. New Construction Must Have Check Valve Existing Building Before 1990 Construction Must Have Angle Stop on Both Sides.			
12. Distance Between Flanges		13-1/4"	17-1/4"

**NOTES:**

1. THREAD SEALANT AND TEFLON TAPE MUST BE USED ON ALL FITTINGS.
2. METERS SHALL NOT BE LOCATED IN CONCRETE OR ASPHALT PAVING.

CITY OF KIRKLAND

PLAN NO. CK-W.19

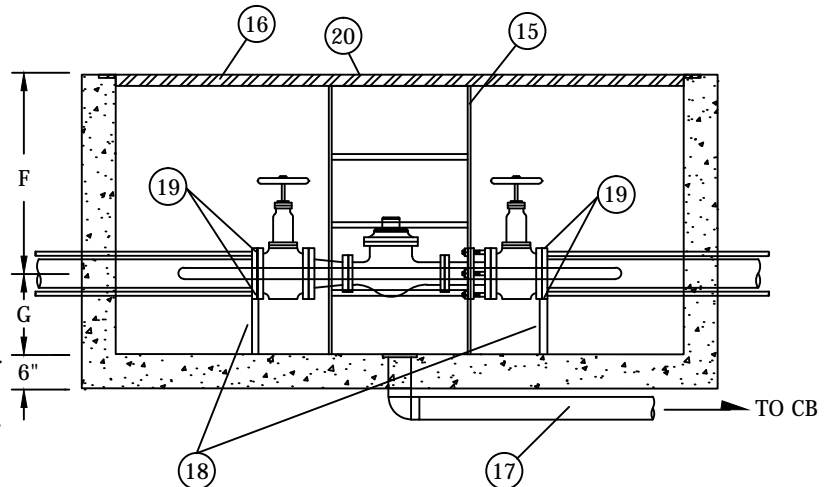
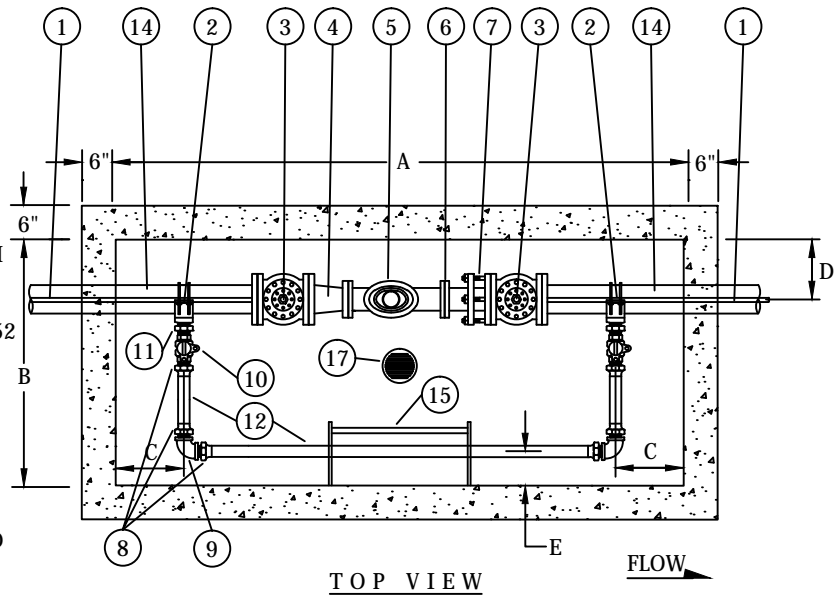


1-1/2" & 2" WATER  
METER SERVICE  
INSTALLATION

# MATERIAL LIST, COPPER BY-PASS

LAST REVISED:01/2019

- ① 4-3/4" SHACKLE RODS (TOP & BOTTOM)
- ② 2-2" ROMAC SADDLE
- ③ 2-4" DI GATE VALVES, FL W/HW EQUAL TO M&H RESILIENT SEAT
- ④ 1-4"x3" REDUCER, FL (3" METER ONLY)
- ⑤ 1-3" WATER METER (OR 4" AS REQ'D), INSTALLED EQUAL TO SENSUS OMNI C2 WITH 17" LAY LENGTH
- ⑥ 1-DI ADAPTER FLxPE, LENGTH TO FIT CLASS 52 3" WITH 3" METER  
4" WITH 4" METER
- ⑦ 1-DI COUPLE ADAPTER, FL, EQUAL TO ROMAC FCA 501 3"x4" WITH 3" METER
- ⑧ 6-2" MALE ADAPTERS, BRASS EQUAL TO FORD
- ⑨ 2-2", 90° ELBOWS, BRASS
- ⑩ 1-BALL VALVE W/ PADLOCK WING EQUAL TO FORD
- ⑪ 2-2"x4" NIPPLE, BRASS
- ⑫ 2" RIDGE COPPER PIPE, TYPE K
- ⑬ PRE-CAST CONCRETE UTILITY VAULT EQUAL TO UTILITY VAULT CO. 675-LA
- ⑭ 4" DI PIPE, FL
- ⑮ LADDER W/ 1' RINGS
- ⑯ 2 LOCKING STEEL COVERS EQUAL TO U.V. CO. 57TL-2-332P (SLIP RESISTANT FINISH)
- ⑰ 4" PVC DRAIN SYSTEM TO STORM SYSTEM W/ CHECK VALVE
- ⑱ PIPE SUPPORTS EQUAL TO STANDON MODEL S89
- ⑲ EYE BOLTS
- ⑳ BILCO TYPE LU-1 LADDER UP SAFETY POST



SIDE VIEW

## NOTES:

- METER MUST READ IN HUNDREDS OF CUBIC FEET
- VAULT WILL BE PRECAST W/ BOTTOM
- ALL PIPES & FITTINGS 4" AND LARGER SHALL BE CEMENT LINED
- PIPING FROM MAIN TO VAULT SHALL BE 4" ON 3" METER INSTALLATIONS
- TAPPING TEE WITH VALVE AS PER STANDARD DETAIL W.06 REQUIRED ON EXISTING MAINS
- 4" PVC DRAIN SYSTEM REQUIRED
- PIPE SUPPORTS TO BE ANCHORED TO FLOOR & BOLTED TO VALVES
- OUTSIDE VAULT - SHACKLE BACK TO APPROPRIATE LOCATION BASED ON CONDITION

VAULT DIMENSIONS AND PIPE PLACEMENT

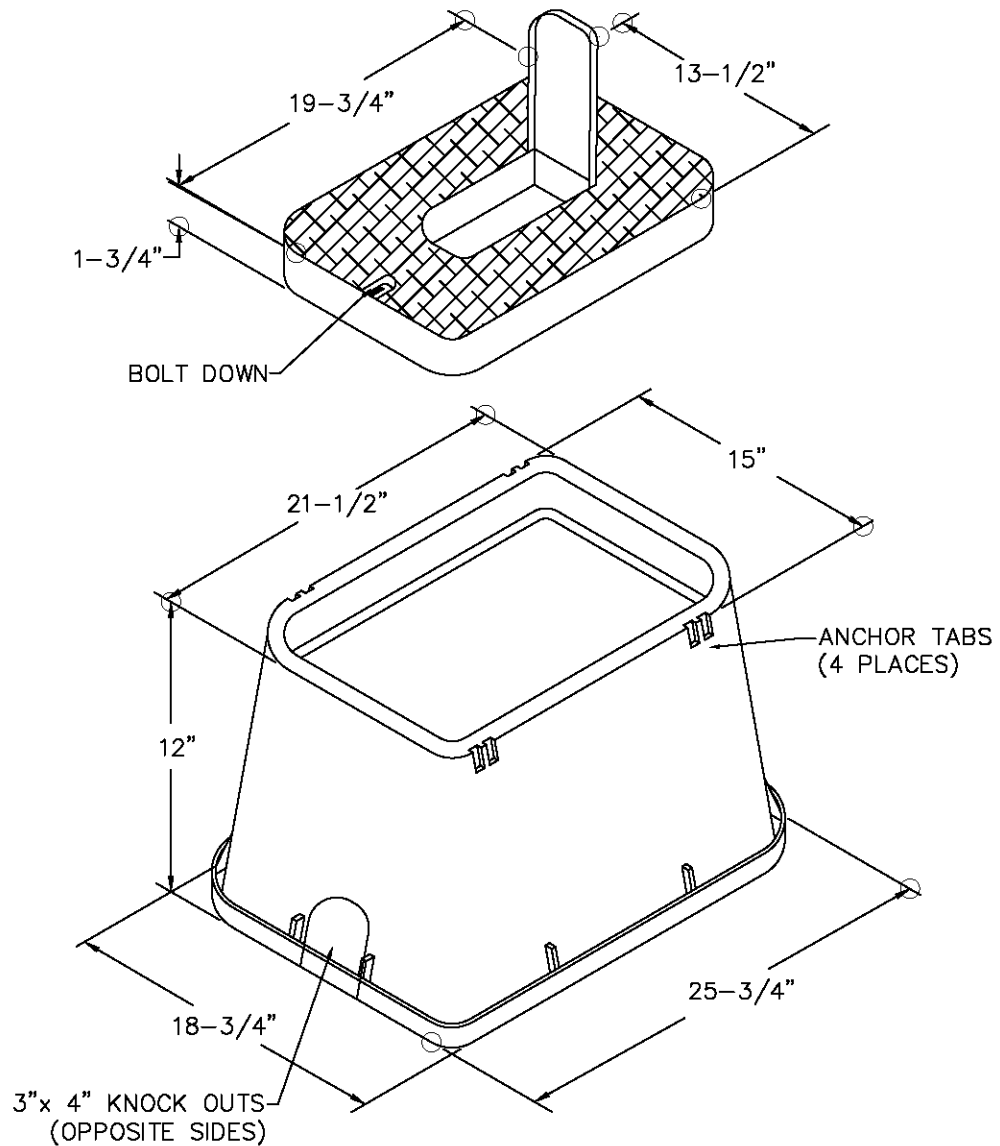
ITEM	A	B	C	D	E	F	G
DIMENSION	7'	4'	6"	12"	6"	2'-8"	1'

**CITY OF KIRKLAND**

PLAN NO. CK-W.20



**3" & 4" WATER  
METER SERVICE  
INSTALLATION**



NOTES:

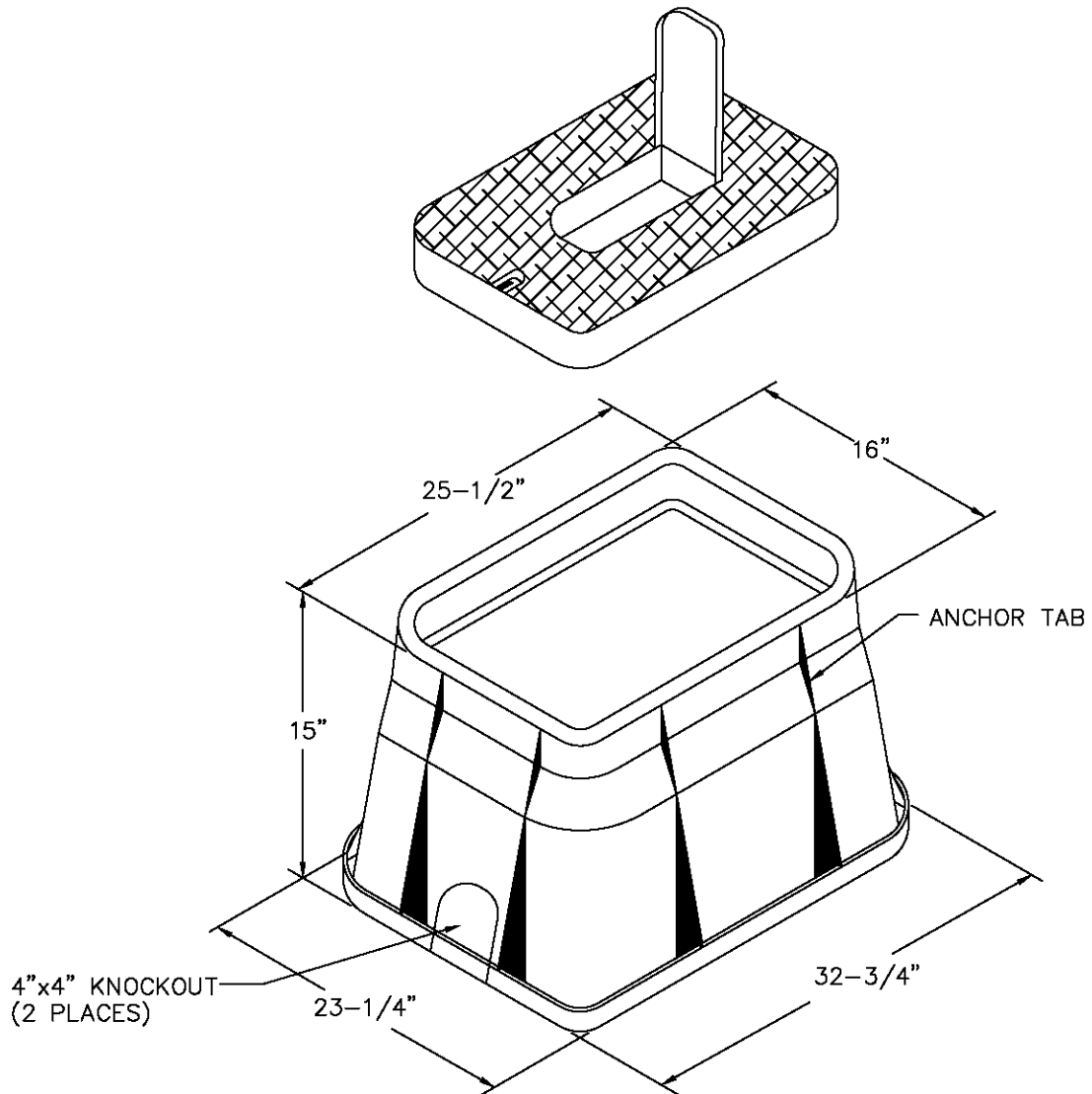
1. USE — CARSON MODEL 1220-12 WITH METER READING COVER OR EQUAL.
2. COVER MUST DISPLAY "W.M." OR EQUAL.
3. METER READING FLIP-UP LID SHALL BE PLASTIC.

CITY OF KIRKLAND

PLAN NO. CK- W.21



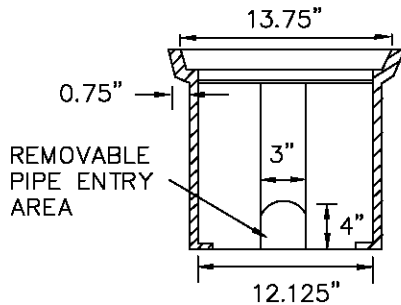
3/4" & 1" WATER  
METER BOX  
PLACED IN PLANTER



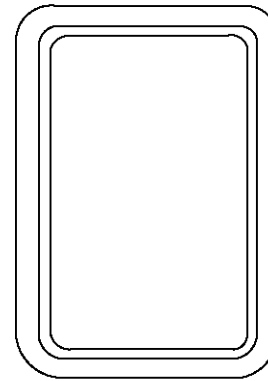
NOTES:

1. USE — CARSON MODEL 1324-15L WITH READING LID OR EQUAL
2. COVER MUST DISPLAY "W.M." OR EQUAL
3. METER READING FLIP-UP LID SHALL BE PLASTIC.

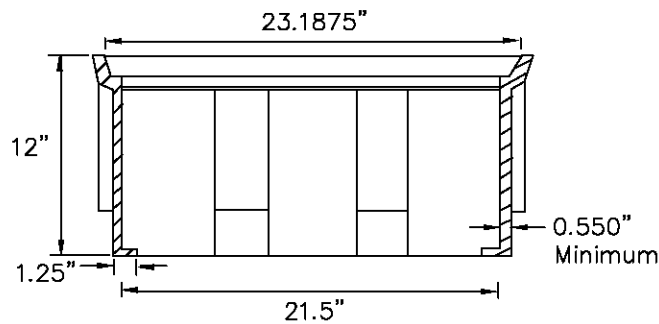
CITY OF KIRKLAND	
PLAN NO. CK- W.22	
	1-1/2" & 2" WATER METER BOX PLACED IN PLANTER



SHORT SIDE VIEW



TOP VIEW



LONG SIDE VIEW

**NOTE:**

MID-STATES PLASTICS, INC. PART NUMBER MSBCF 1324-12 (or equal).

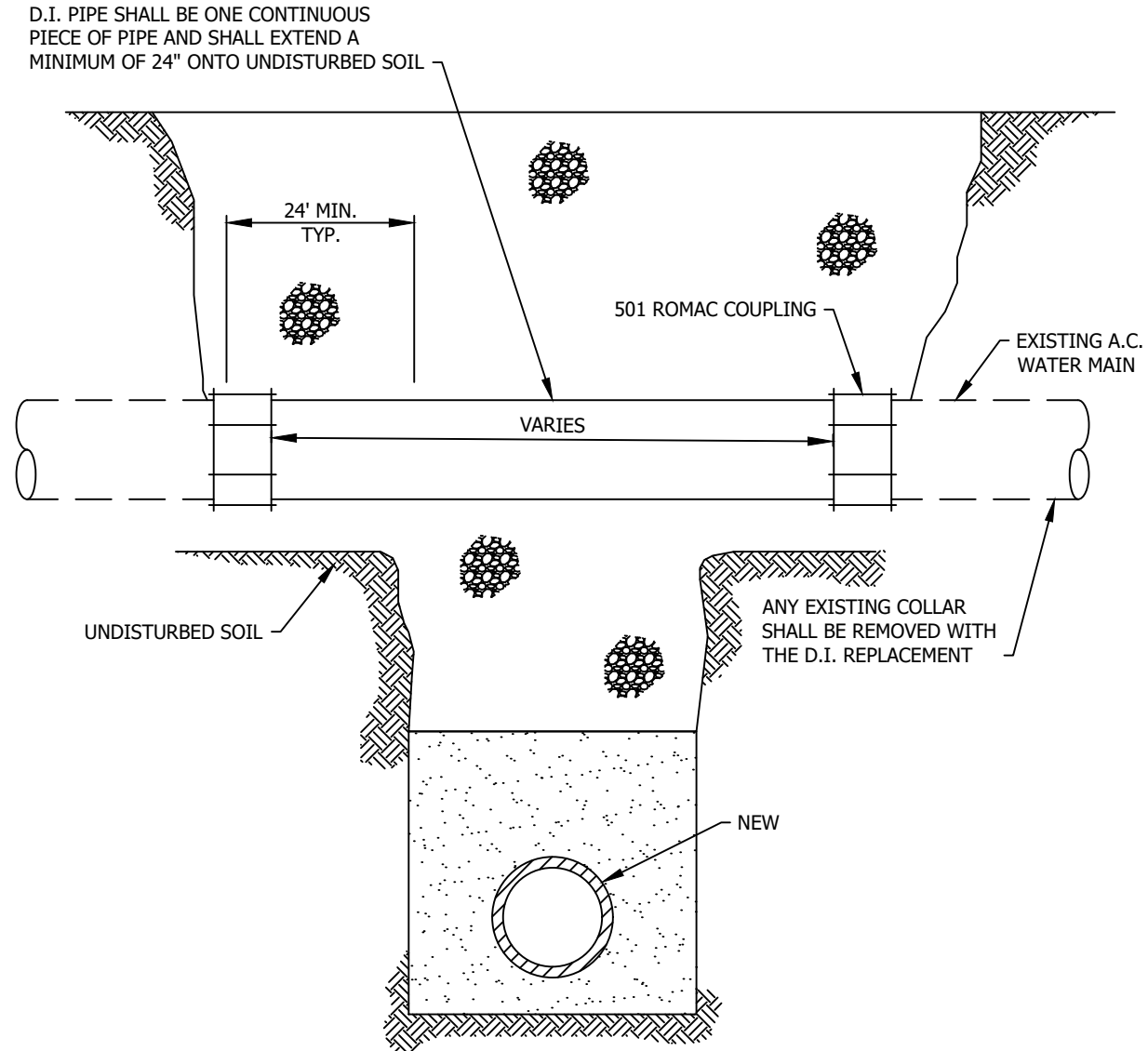
The Meter Box shall be high-density polyethylene of one-piece molded construction for durability and impact strength, and with a ductile iron cover (with flip-up meter reading window) installed shall be able to bear a 20,000lb load in a wheel load; and shall have a wall thickness of no less than 0.550". The Meter Box shall be black on the exterior to prevent UV degradation, and bright white on the interior to reflect light and ease meter reading service.

CITY OF KIRKLAND

PLAN NO. CK- W.23



3/4" AND 1" WATER  
METER TRAVEL BOX



**NOTES:**

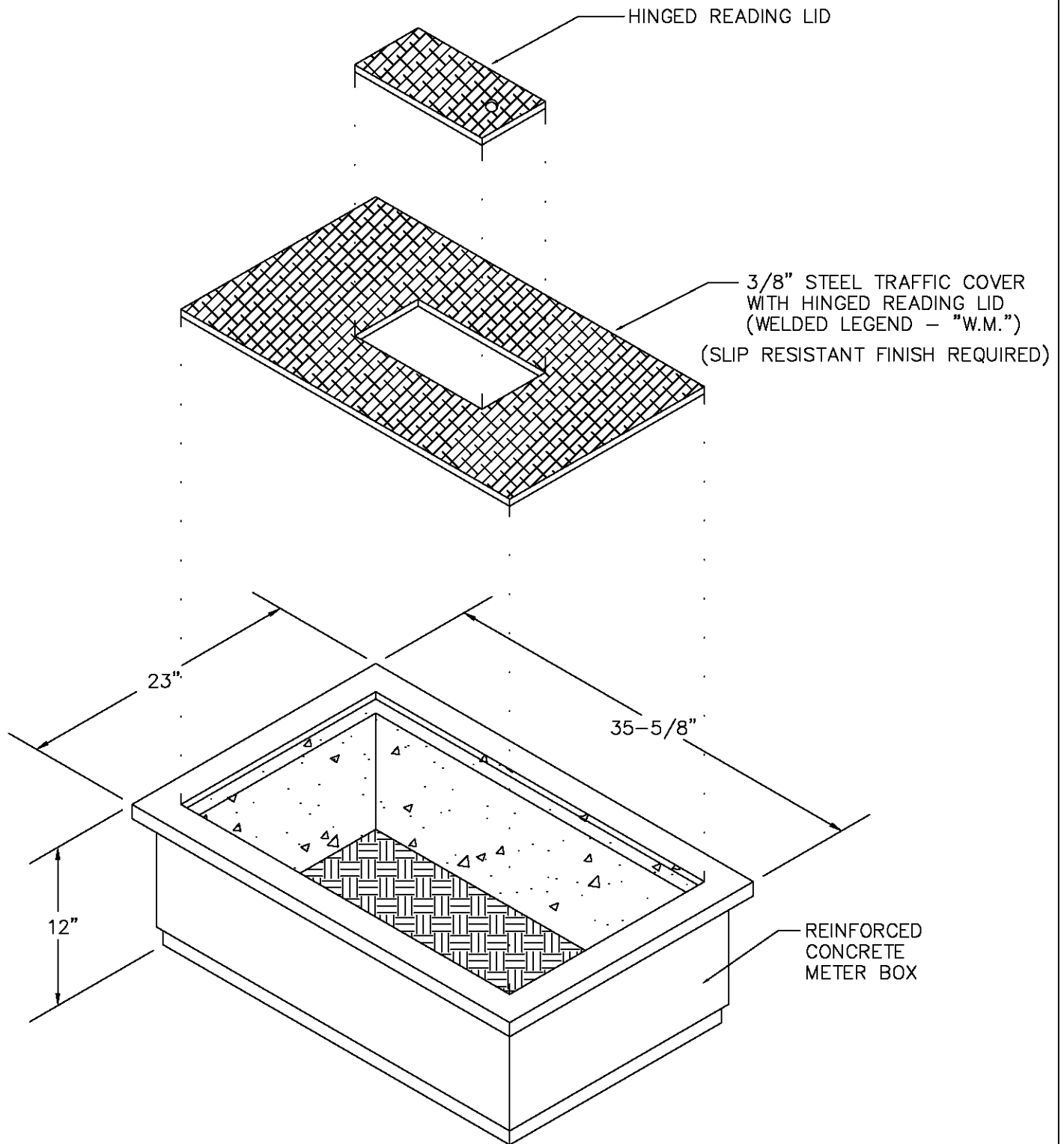
1. ALL APPLICABLE ENVIRONMENTAL PROTECTION AGENCY, PUGET SOUND AIR POLLUTION CONTROL AGENCY, AND LABOR AND INDUSTRY REQUIREMENTS AND REGULATIONS SHALL BE MET IN CUTTING, REMOVAL, HANDLING, AND DISPOSING OF A.C. PIPE.
2. CONTRACTOR SHALL SWAB AND/OR SPRAY D.I. WATER MAIN AND TRANSITION COUPLINGS WITH 1% HYPOCHLORITE SOLUTION PRIOR TO INSTALLATION.
3. THE D.I. PIPE REPLACEMENT IS REQUIRED ANYTIME THE CROSSING IS UNDER AN A.C. MAIN AND A "SOIL BRIDGE" CANNOT BE MAINTAINED OR THE CROSSING IS UNDER A COLLAR OR MILL OR AS DIRECTED BY PUBLIC WORKS. ALL PARTS MUST BE ON-SITE AND INSPECTED PRIOR TO SHUT DOWN REQUEST. A.C. MAIN MUST BE POT HOLED ON BOTH SIDES OF THE CROSSING AND AN O.D. MEASUREMENT TAKEN PRIOR TO ACQUIRING THE ROMAC 501 COUPLINGS. THE CONNECTION WILL BE VISUALLY INSPECTED UNDER SYSTEM PRESSURE AFTER INSTALLATION.

CITY OF KIRKLAND

PLAN NO. CK- W.24



**AC WATERMAIN  
CROSSING**



**NOTE:**

1. USE - FOG TITE #2 OR EQUAL

CITY OF KIRKLAND

PLAN NO. CK- W.25



1-1/2" OR 2" WATER  
METER TRAVEL BOX

DELETE

CITY OF KIRKLAND

PLAN NO. CK- W.26



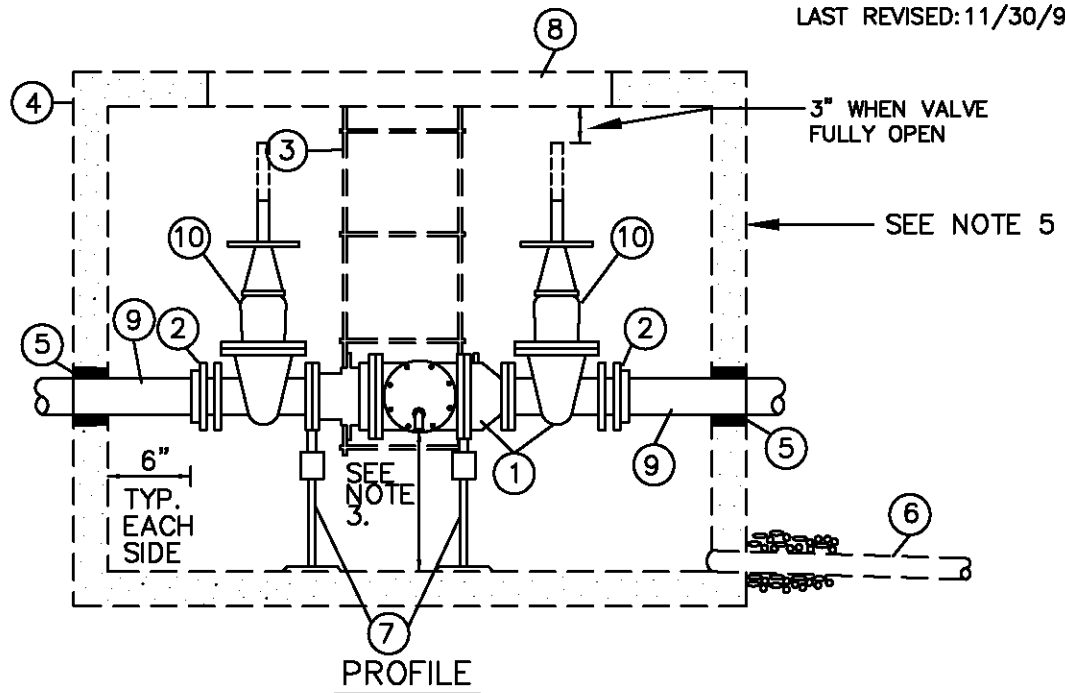


DELETE

CITY OF KIRKLAND

PLAN NO. CK-W.27





- ① STATE APPROVED REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY, COMPLETE WITH (2) RESILIENT SEATED O.S.&Y. GATE VALVES AND (4) RESILIENT SEATED TEST COCKS.
- ② UNI-FLANGE WITH SETSCREWS.
- ③ ONE GALVANIZED STEEL LADDER TO BE SECURED TO VAULT.
- ④ CONCRETE VAULT WITH A MINIMUM OF 2, 3'x3' DIAMOND PLATE DOORS RATED FOR H-20 LOADING, MARKED "WATER". VAULT SHALL BE EQUAL TO UTILITY VAULT CO. MODEL LISTED IN TABLE BELOW.
- ⑤ WATER TIGHT GROUT. RESTRAIN INLET/OUTLET PIPE WITH WELDED FLANGE OR ANCHOR BLOCK.
- ⑥ DRAIN, SLOPE TO DAYLIGHT. TO BE LAID IN LINE ON GRADE AS SIZED BY CITY OF KIRKLAND.
- ⑦ TWO ADJUSTABLE PIPE STANCHIONS, BOLTED TO FLOOR.
- ⑧ ACCESS TO BE CENTERED OVER ASSEMBLY.
- ⑨ CL. 52 D.I., M.J. WITH RETAINER GLANDS.
- ⑩ EACH VALVE SHALL BE MARKED WITH MODEL NUMBER WITH DESIGNATION OF RESILIENT SEAT: SUCH AS "RS" OR "R", WHICH MUST BE CAST, MOLDED, OR AFFIXED ONTO THE BODY OR BONNET OF THE VALVE. ALL FERROUS BODIED VALVES SHALL BE COATED WITH A MINIMUM OF 4MLS. OF EPOXY OR EQUIVALENT POLYMERIZED COATING.

SIZE	MIN. VAULT SIZE (INSIDE)			UTIL. VAULT CO. MODEL	UTIL. VAULT CO. COVER
	W	L	H		
3"	4'-3"	4'-8"	3'-11"	575-LA	64-2-332P
4"	4'-3"	5'-3"	4'-7"	577-LA	57TL-2-332P
6"	4'-4"	6'-6"	5'-5"	4484-LA	4484-TL2-332P
8"	5'-2"	7'-7"	7'-1"	687-LA	687-TL-2-332
10"	5'-4"	8'-8"	8'-0"	5106-2X	5106-TL3-332

## NOTES:

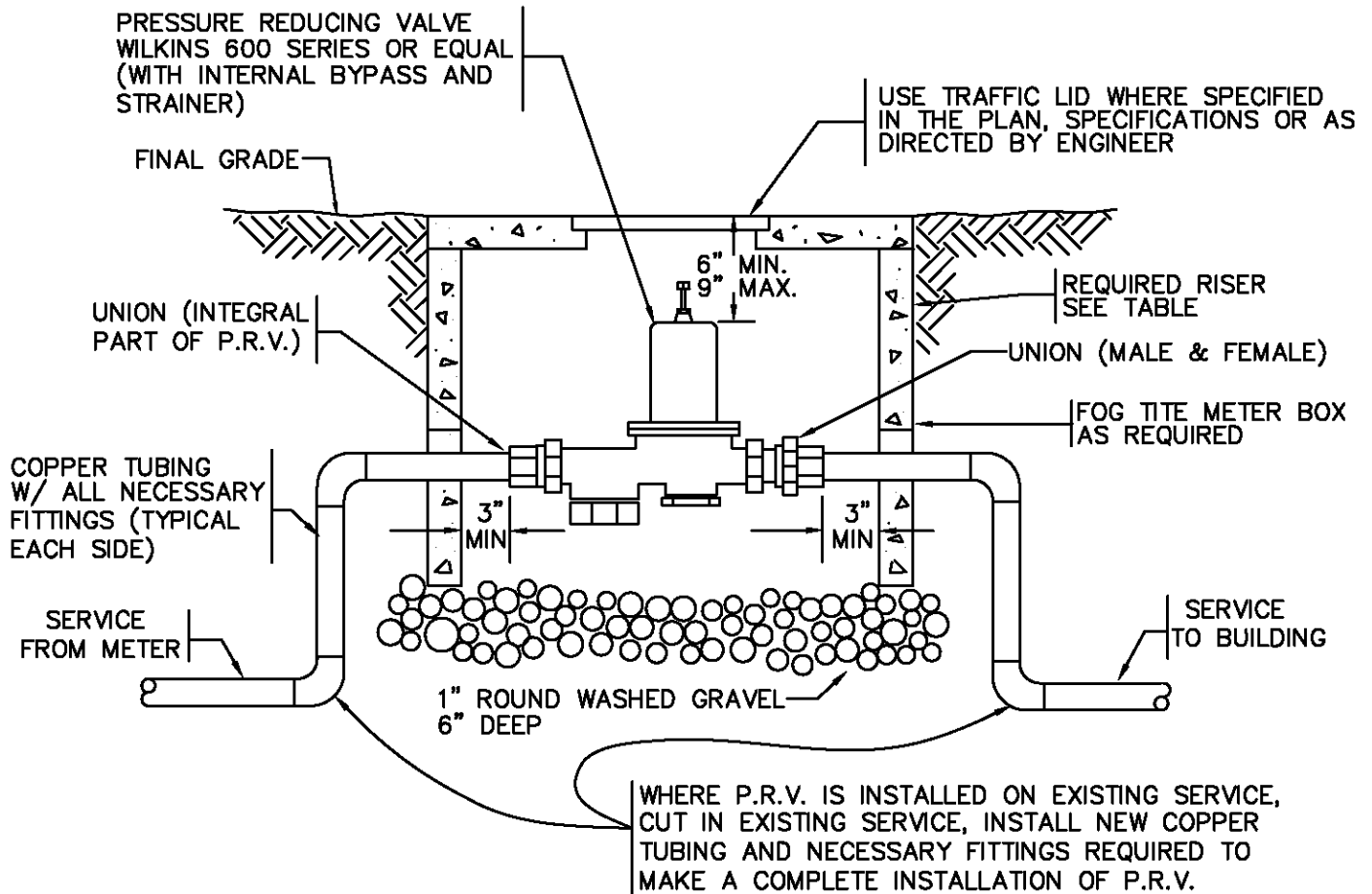
1. DAYLIGHT DRAIN MUST BE ABLE TO BE LINE SIGHTED, INSTALLED ABOVE MAXIMUM FLOOD LEVEL, AND BE ABLE TO HANDLE THE VOLUME OF WATER THAT CAN BE DISCHARGED FROM THE RELIEF VALVE PORT.
2. WHEN THE REDUCED PRESSURE ASSEMBLY IS LOCATED INSIDE A BUILDING A SIZED DRAIN LINE SHALL BE PROVIDED FOR RELIEF PORT. THERE MUST BE AN APPROVED AIR GAP BETWEEN THE RELIEF PORT AND DRAIN.
3. ALLOW 12"+ NOMINAL DIAMETER OF ASSEMBLY CLEARANCE BELOW RELIEF PORT FOR REPAIR.
4. ASSEMBLY TO BE MAINTAINED BY OWNER AND ANNUAL CERTIFICATION REQUIRED.
5. REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY WILL BE ALLOWED TO BE INSTALLED IN VAULTS ONLY IN CASES WHERE NO OTHER MEANS OF INSTALLATION IS AVAILABLE AND AS APPROVED BY THE CITY OF KIRKLAND.
6. WATERLINE SHALL NOT BE PUT INTO SERVICE UNTIL THE BACKFLOW PREVENTION ASSEMBLY IS APPROVED BY A CITY OF KIRKLAND WATER QUALITY INSPECTOR.
7. MINIMUM CLEARANCE BETWEEN ASSEMBLY AND WALL ON LADDER SIDE OF VAULT IS 24". MINIMUM CLEARANCE FROM OPPOSITE WALL IS 12". ALL CLEARANCES SHOWN ARE MINIMUM.
8. VAULTS SHALL NOT BE INSTALLED IN AREAS WITH VEHICULAR TRAFFIC.
9. TEE AND GATE VALVE REQUIRED ON MAIN.
10. IN CENTRAL BUSINESS DISTRICT, 3" THROUGH 6" ASSEMBLIES SHALL CONNECT TO WATER MAIN WITH 8" PIPE.

CITY OF KIRKLAND

PLAN NO. CK-W.28

REDUCED PRESSURE  
PRINCIPLE ASSEMBLY

P.R.V. SHALL HAVE AN INTEGRAL BYPASS



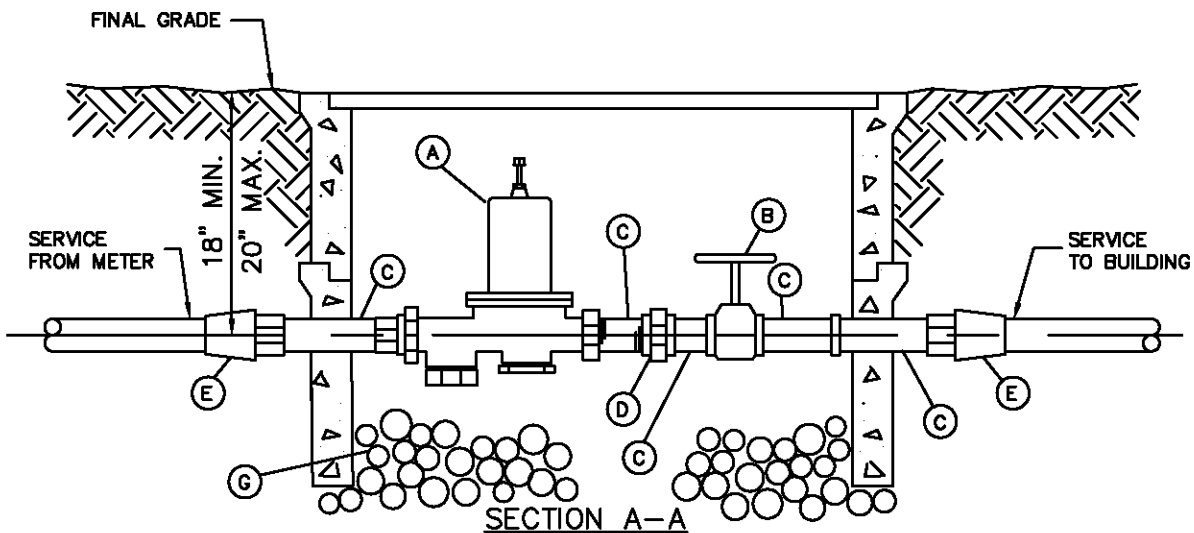
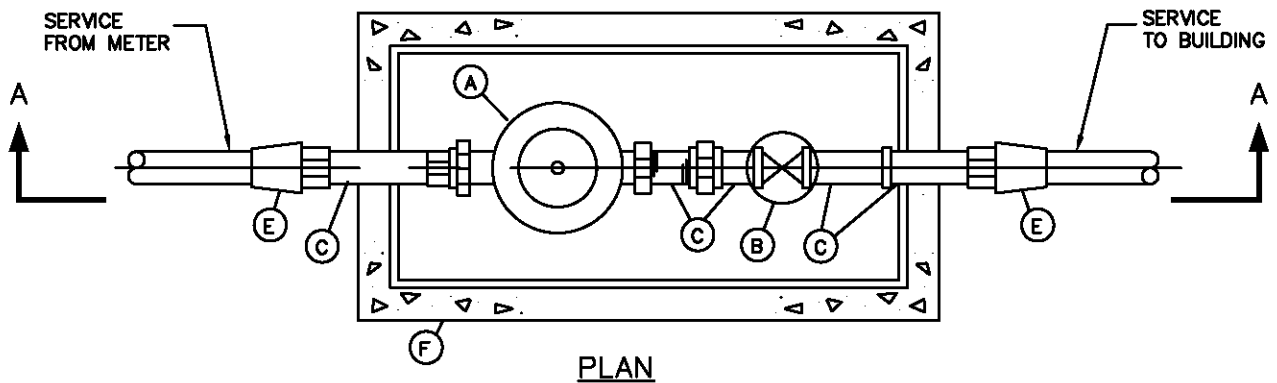
P.R.V. SIZE	FOG TITE METER BOX NO.	RISER REQUIRED
2"	2	12"
1 1/2"	2	12"
1 1/4"	1	6"
1"	1	6"
3/4"	1	4"
1/2"	1	4"

CITY OF KIRKLAND

PLAN NO. CK- W.29



INDIVIDUAL PRESSURE  
REDUCING VALVE  
ASSEMBLY  
RESIDENTIAL



### BILL OF MATERIALS

- (A) PRESSURE REGULATOR – WILKINS 600 SERIES OR EQUAL (WITH INTERNAL BYPASS AND STRAINER)
- (B) BRONZE GATE VALVE, 125-POUND, SOLID WEDGE OR DOUBLE DISC, WITH HANDWHEEL, OHIO BRASS, GRINNELL, OR EQUAL
- (C) NIPPLE x 2 1/2" LONG, MALE.
- (D) UNION, FEMALE.
- (E) ADAPTER, FEMALE x COMPRESSION FITTING FOR COPPER.
- (F) METER BOX FOR 1" INSTALLATION: FOGTITE B-10T IN NONTRAVELLED AREAS OR SIDEWALK. OLYMPIC FOUNDRY SM30 (18 3/4"x31"x16") IN AREAS WITH VEHICULAR TRAFFIC.  
FOR 1 1/2" & 2" INSTALLATION:  
17"x28" METER BOX W/TRAFFIC COVER AND 12" RISER, FOG TITE NO. 2T
- (G) 1" ROUND WASHED GRAVEL, 8" MIN. DEPTH.

### NOTES:

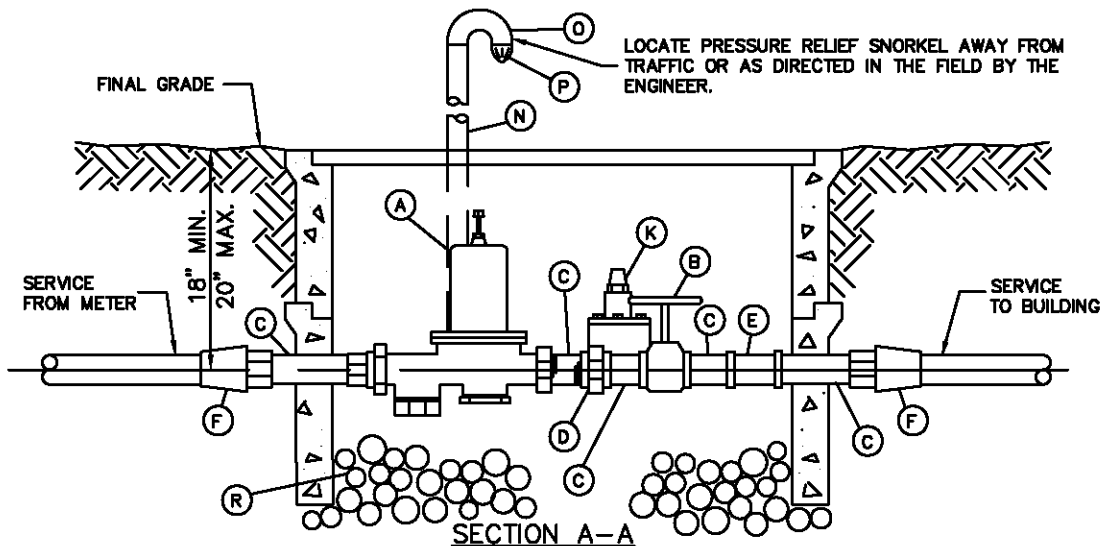
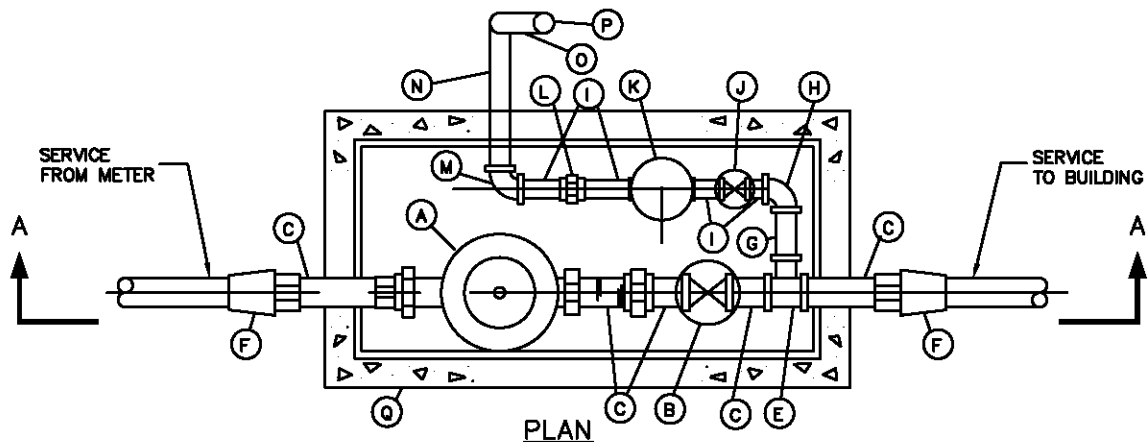
1. PRESSURE REGULATOR SIZE AS SPECIFIED OR SHOWN ON PLAN.
2. SIZES FOR ITEMS (B) THROUGH (E) SHALL CORRESPOND TO THE SPECIFIED SIZE OF THE PRESSURE REGULATOR.
3. ALL FITTINGS AND NIPPLES ARE BRASS WITH IRON PIPE THREADS.

CITY OF KIRKLAND

PLAN NO. CK- W.30



INDIVIDUAL PRESSURE  
REDUCING VALVE  
ASSEMBLY—MULTI-FAMILY  
OR COMMERCIAL



### BILL OF MATERIALS

- |   |  |
|---|--|
| (A) PRESSURE REGULATOR - WILKINS 600 SERIES OR EQUAL (WITH INTEGRAL BYPASS AND STRAINER)                  | (J) 3/4" BRONZE GATE VALVE, SOLID WEDGE TYPE-MUELLER H-10914.  |
| (B) BRONZE GATE VALVE, 125-POUND, SOLID WEDGE OR DOUBLE DISC, W/HANDWHEEL, OHIO BRASS, GRINNELL OR EQUAL. | (K) 3/4" PRESSURE RELIEF VALVE - CLAVAL 55 F   |
| (C) NIPPLE x 2 1/2" LONG MALE.  | (L) 3/4" UNION, FEMALE.  |
| (D) UNION, FEMALE.  | (M) 2" x 3/4" 90° ELBOW, FEMALE.   |
| (E) REDUCING TEE x 3/4" DIAMETER BRANCH, FEMALE.  | (N) 2" G.I. PIPE x LENGTH TO FIT AS DIRECTED, 10' MAX. INTEGRATED LENGTH. PAINTED WITH DAP DERUSTO - GLOSS BLUE #885 |
| (F) ADAPTER, FEMALE x COMPRESSION FITTING FOR COPPER.   | (O) 2" OPEN PATTERN RETURN BEND, G.I.  |
| (G) 3/4" NIPPLE x LENGTH TO FIT, MALE.  | (P) 2" BEEHIVE STRAINER.   |
| (H) 3/4" x 90° ELBOW, FEMALE.   | (Q) 17"x 28" METER BOX W/ TRAFFIC COVER AND 12" RISER, FOG TITE NO. 2T. (SEE NOTE 4.)                                |
| (I) 3/4" x 2 1/2" NIPPLE, MALE.   | (R) 1" ROUND WASHED GRAVEL, 8" MIN. DEPTH.   |

### NOTES:

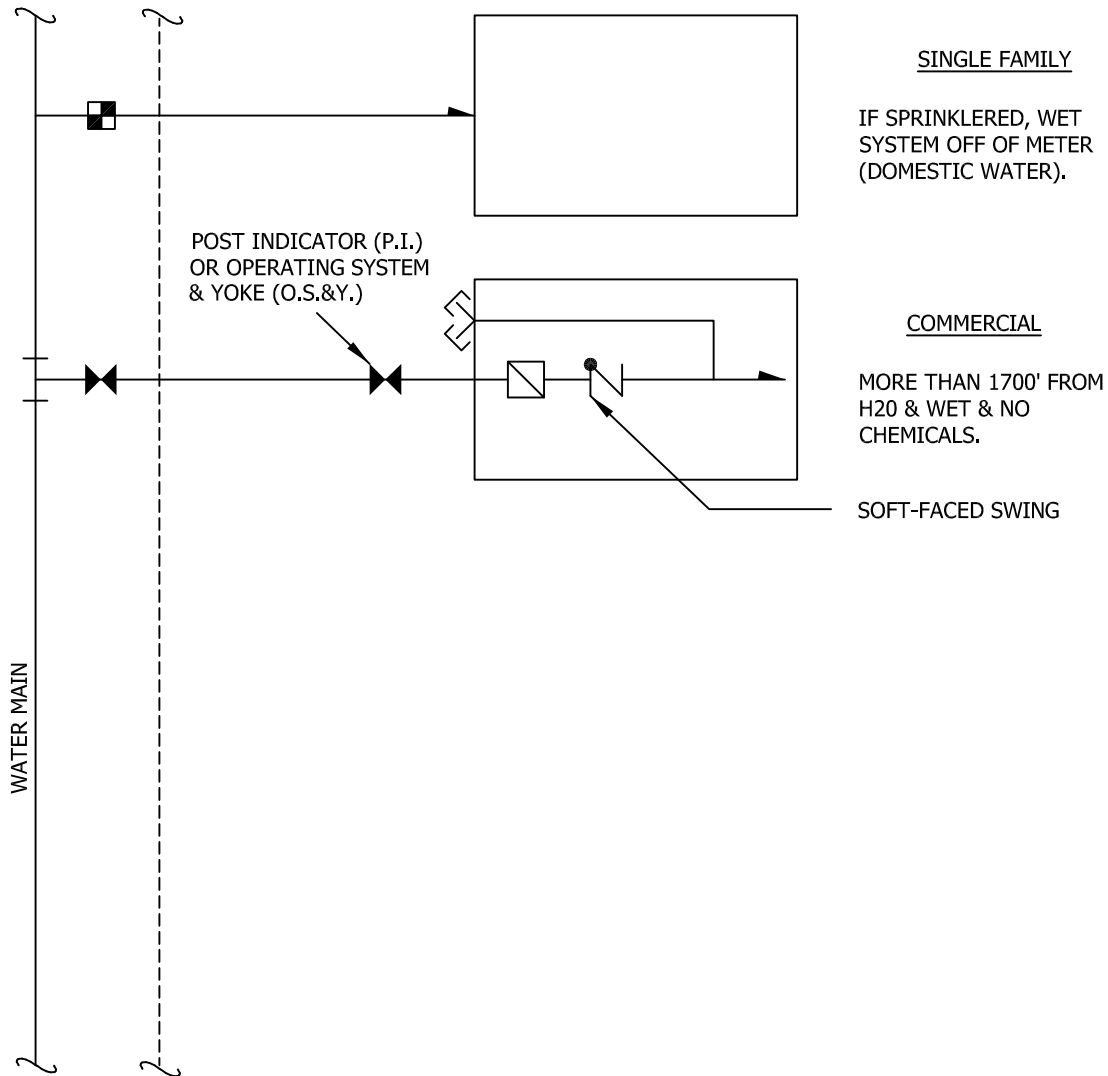
1. PRESSURE REGULATOR SIZE AS SPECIFIED OR SHOWN ON PLAN.
2. SIZES FOR ITEMS (B) THROUGH (F) SHALL CORRESPOND TO THE SPECIFIED SIZE OF THE PRESSURE REGULATOR.
3. FITTINGS AND NIPPLES ARE BRASS WITH IRON PIPE THREADS, UNLESS OTHERWISE SHOWN.
4. FOR 2" INSTALLATION, LARGER METER BOX IS REQUIRED, MINIMUM INSIDE LENGTH OF BOX SHALL BE 32".

CITY OF KIRKLAND

PLAN NO. CK-W.31



INDIVIDUAL PRESSURE  
REDUCING VALVE  
ASSEMBLY WITH PRESSURE  
RELIEF-MULTI-FAMILY  
OR COMMERCIAL



LEGEND

	SIAMESE CONNECTION
	METER
	ALARM
	CHECK VALVE
	GATE VALVE
	DRAIN
	TEE

NOTES

1. PREFERRED LOCATION INSIDE OF BUILDING (MECHANICAL ROOM).
2. IF VAULT IS OUTDOORS DRAIN TO DAYLIGHT.
3. ASSEMBLY MUST BE KEPT DRY.

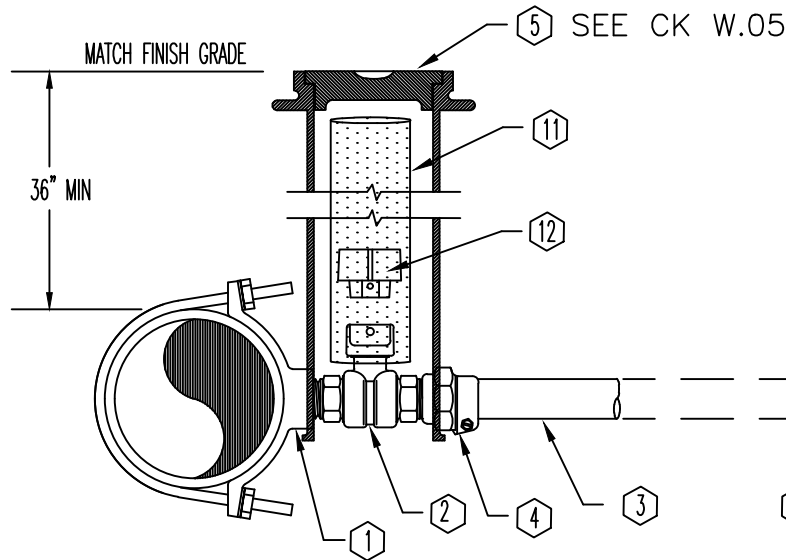
CITY OF KIRKLAND

PLAN NO. CK- W.32

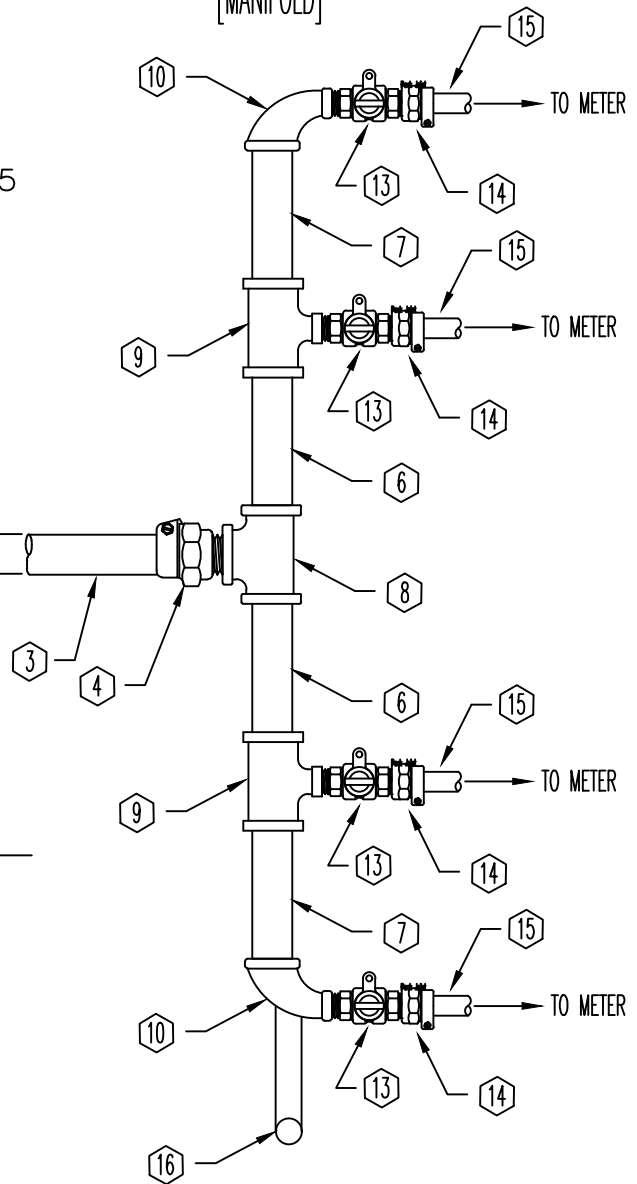


FIRE PROTECTION  
SPRINKLER  
ASSEMBLY

SIDE VIEW  
[CONNECTION TO WATERMAIN]



PLAN VIEW  
[MANIFOLD]



WATER SERVICE STANDARDS

DESCRIPTION	MAKER OR RATING	2"
1. Double Strap Saddle	Romac or Equal	202 IPT
2. 2" Ball Valve	Ford or equal	B11-777 w/Qt67
3. Pipe - Soft Copper Tubing , Type K	ASTM B-88	
4. 2" Pack Joint		C84-77
5. Valve Box	Rich or Equal (940)	
6. Nipple Brass		2" x 12"
7. Nipple Brass		2" x 18"
8. Brass Tee		2"
9. Brass Tee		2" x 1"
10. Brass 90° Elbow		2" x 1"
11. 2" Sleeve	PVC	
12. 2" Operating Nut w/Cotter Pin		
13. 1" Ball Valve Curb Stop	Ford or Equal	
14. 1" Pack Joint		
15. 1" Poly Pipe		
16. Blow Off Assembly		

NOTES

- SERVICES TO BE 1" POLY W/1" ANGLE STOPS
- SEE CK-W.12 FOR METER SET DETAILS
- RUN COPPER TRACING WIRE FROM VALVE BOX TO ALL METER BOXES.
- NOTCH VALVE BOX TO CRADLE VALVE ASSEMBLY, SET ON BRICKS
- BLOWOFF REQUIRED. SEE CK-W.11.
- TO BE USED ONLY IF REQUIRED BY THE PUBLIC WORKS DEPARTMENT.

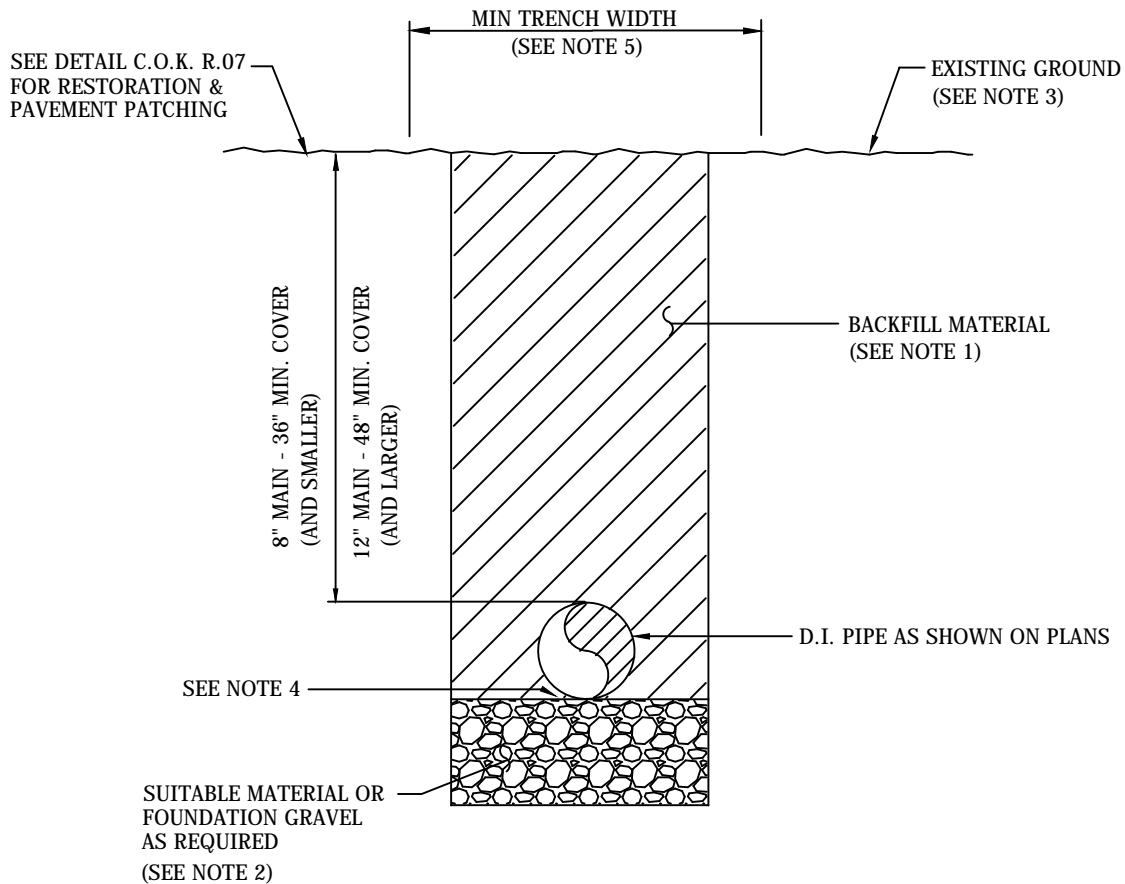
FOR 4 TO 6 SERVICES ONLY, UPON APPROVAL  
BY PUBLIC WORKS.

CITY OF KIRKLAND

PLAN NO. CK-W.33



2" MANIFOLD FOR  
4 TO 6 SERVICES



#### NOTES

1. ALL TRENCH BACKFILL MATERIAL SHALL CONSIST OF SUITABLE NATIVE EXCAVATED MATERIAL OR IMPORTED BACKFILL MATERIAL AS AUTHORIZED BY THE ENGINEER. ALL TRENCHES SHALL BE COMPACTED TO 95% MDD.
2. FOUNDATION GRAVEL SHALL BE REQUIRED TO PROVIDE A SOLID FOUNDATION FOR THE WATER MAIN IN THOSE AREAS OF THE TRENCH WHICH HAVE UNSUITABLE MATERIAL OR SOFT SPOTS.
3. GRAVEL SHOULDERS AND DRIVEWAYS SHALL BE RESTORED WITH A 3" MIN. THICKNESS LAYER OF 5/8" MINUS CRUSHED SURFACING.
4. PLACE AND COMPACT BACKFILL IN MAXIMUM 4" LIFT TO PIPE SPRINGLINE TO ASSURE NO VOIDS UNDER PIPE.
5. MINIMUM TRENCH WIDTH IS PIPE I.D. + 24",

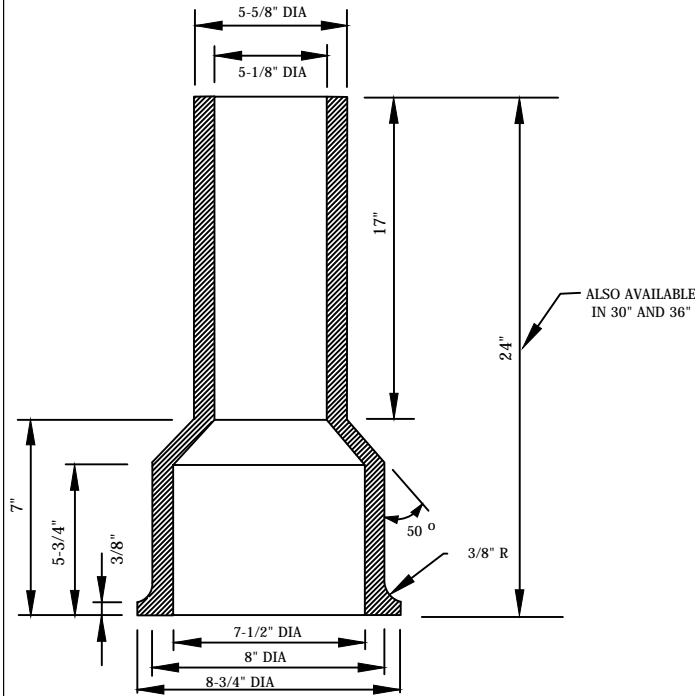
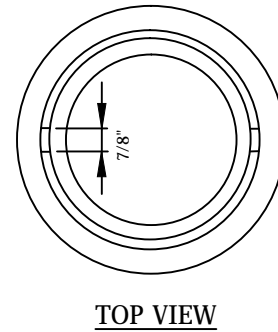
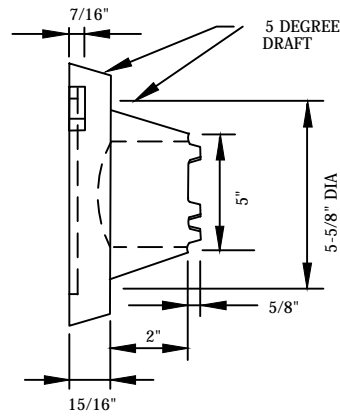
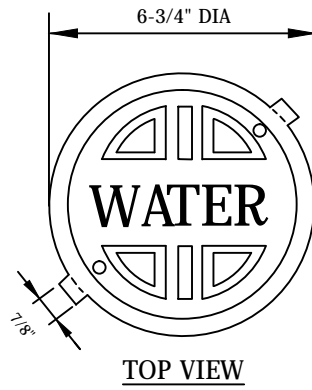
CITY OF KIRKLAND

PLAN NO. CK-W.34

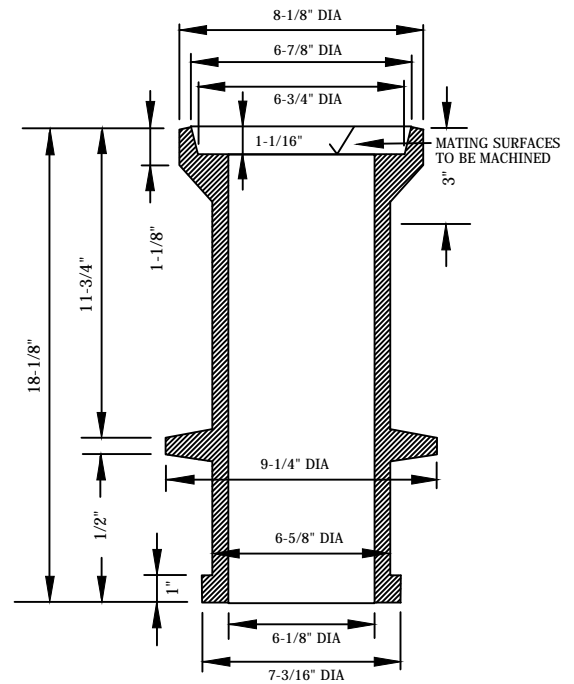


WATER  
TRENCH DETAIL

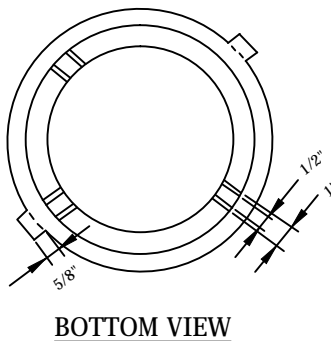




**24", 30", 36" VALVE BOX BASE**  
NOT TO SCALE



**18" VALVE BOX TOP**  
NOT TO SCALE



**NOTES:**

1. IF NEEDED, USE MULTIPLE BASE SECTIONS STARTING WITH 36" BASE.  
"SOIL PIPE" WILL NOT BE ACCEPTED.
2. MATERIAL SHALL BE CAST IRON ASTM A48, CL30.
3. OLYMPIC FOUNDRY PRODUCT OR EQUIVALENT.
4. PAINT VALVE LID WITH KELLY MOORE 5880 DTM GLOSS ENAMEL-  
SAFETY BLUE OR EQUAL.
5. ALL VALVE CAN LIDS SHALL BE 940-B "LOCKING" STYLE.

**CITY OF KIRKLAND**

PLAN NO. CK-W.35



**WATER VALVE BOX**

Sanitary Sewer

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## **SANITARY SEWER - PLAN NOTES**

1. A pre-construction conference shall be held prior to the start of construction. The Contractor shall be responsible for securing all necessary permits prior to construction.
2. All construction and materials shall conform to City of Kirkland Department of Public Works and current WSDOT/APWA standards and specifications for road, bridge, and municipal construction.
3. Approximate locations of existing utilities have been obtained from available records and are shown for convenience. The Contractor shall be responsible for verification of the locations shown and for discovery of possible additional utilities not shown so as to avoid damage or disturbance. The underground utility location service shall be contacted for field location prior to any construction. The owner or their representative shall be contacted if a utility conflict exists. For utility location in King County, call 1-800-424-5555. The Contractor is responsible to ensure that utility locates are maintained throughout the life of the project.
4. It shall be the Contractor's responsibility to coordinate their activities with local utility companies to ensure that all utilities are installed according to these plans and the requirements of the individual utility companies.
5. All manholes shall conform to WSDOT/APWA standards, eccentric cones with manufacturer-approved gaskets and 1/2" polypropylene-encapsulated safety steps and ladders. All manholes shall have cast iron rings and ductile iron covers. Lids shall have 2" raised letters marked "SEWER." All cleanouts shall have cast iron rings and covers marked "CO" that are in paved areas.
6. All side sewers shall be tested for acceptance at the same time the main sewer is tested. Side sewer locations shall be verified in the field prior to construction and backfilling. All side sewers shall be capped with a watertight plug, have a cleanout and test tee installed, and shall be marked for location with a 2" x 4" stake painted white, marked sewer, with 3' exposed, and the depth of the cap written on the stake. See Standard Detail S.18. The stake shall be secured to the end of the plug with wire a minimum of 16 gauge. Initial side sewer installation shall run to the property line. The remaining side sewer shall not be installed until testing and acceptance of the sewer trunk line by the City of Kirkland is completed. Number and location of side sewers shown are approximate only and may be changed as required during construction. Contractor shall notify Engineer when exact locations are determined and provide the Engineer and the City of Kirkland Department of Public Works with an as-built. If approved by the Public Works Department, all double-sided sewer wyes must be at the property line.
7. All main-line trenches shall be compacted prior to testing sewer lines for acceptance.
8. Pressure testing of gravity sewer mains shall conform to the following standards: (1) air testing will require a minimum of 4 psi for 15 minutes with no pressure drop; (2) water testing will require a minimum of 10' of head in a standpipe at the test location for 15 minutes with no drop in the water level in the standpipe. Either test is acceptable.

9. Pressure testing of force mains and laterals will require an air test of 25 psi minimum for 15 minutes with no pressure drop.
10. New connections to existing manholes or sewer lines shall be sealed off until upstream construction is finished, tested, cleaned, and accepted. All construction debris and water shall be removed prior to opening the seal.
11. All PVC sewer pipe and fittings shall meet the requirements of ASTM Specifications D-3034 for 4" to 15" diameter and ASTM F679 for 18" to 27" diameter. Pipe shall be SDR-35 and shall conform to standard specifications. Bedding and backfill shall meet WSDOT and APWA specifications.
12. Minimum slope for side sewers shall be two percent (2%).
13. An approved copy of the sewer plan must be on site whenever construction is in progress.
14. Prior to construction of sewer lines, the necessary lot corners must be set, and the Contractor shall be responsible for the verification of the location of pipes, manholes, and invert elevations.
15. Pipe anchors, if used, shall be installed: not over 36' center to center on grades from 20 percent to 35 percent; not over 24' center to center on grades from 35 percent to 50 percent; and not over 16' center to center on grades 50 percent and greater.
16. All manholes shall have a minimum of 0.10' to a maximum of 1.00' drop between invert in and invert out.
17. PVC sewer pipe shall be tested for deflection according to WSDOT/APWA specifications.
18. All trench backfill shall be compacted to 95 percent density in roadways, roadway shoulders, roadway prism and driveways, and 85 percent density in unpaved areas. All pipe zone compaction shall be 95 percent.
19. It shall be the responsibility of the Contractor to adjust all manhole lids and cleanout lids to match final asphalt elevations in roadways or ground elevations in landscaped areas.
20. When tying into existing manholes that are below minimum standards, the existing manhole must be upgraded to meet current standards.
21. All new sewer main extensions shall be videoed prior to final acceptance.
22. All fasteners (bolts, nuts, washers, etc.) on manhole and catch basin lids to be standard size. No metric fasteners allowed.

## **SANITARY SEWER - DESIGN CRITERIA**

### **I. MATERIALS**

#### **A. Pipe**

1. PVC pipe shall conform to the provisions of ASTM D-3034 for SDR-35 wall thickness. Pipe joints shall be rubber gasket type. Solvent cement joints shall not be used.
2. Pipe fittings shall be furnished with bells and spigots which are integral with the pipe wall.
3. PVC pipe for force mains and laterals shall be Schedule 40 with glue joints. Run tracer wire along length of force main/lateral pipe.
4. Ductile iron pipe, Class 50, shall be used when minimum cover or minimum separation from water main cannot be obtained.

#### **B. Manhole**

1. Concrete manhole adapters shall be Kor-n-seal boot or an approved equal.
2. Manholes shall be pre-cast and shall conform to Standard Plan No. S.09, S.10, and S.11. All holes for inlet and outlet pipe shall be blocked out when manhole sections are cast.
3. Ladder rungs and steps shall be 1/2" polypropylene-coated, safety-type step, 12" minimum width. Ladder side bars shall be 9/16" round bar, polypropylene coated (see Standard Plan No. S.14).
4. Manhole frames shall be cast iron and covers shall be ductile iron with a combined weight of not less than 360 pounds, and shall have a minimum clear opening of 23-3/4". Frames and covers shall be equal to Olympic Foundry MH 30D/T. Cover to be marked "SEWER" in 2" raised letters. In unimproved areas and easements, manhole shall extend a minimum of 6" and a maximum of 18" above grade. Manhole ring cover shall have three recessed 5/8" x 1-1/4" stainless steel socket head cap screws for locking.
5. Reducing cones shall provide an eccentric reduction from 48" to 24" and shall not be less than 17" in height.
6. Manhole sections shall be jointed with flexible joint using rubber gaskets conforming to ASTM C443. Joints shall be watertight.

### **II. JOINTING**

- #### **A.**
1. Care shall be taken in making all joints in order to secure complete watertightness.

- B. Deflection in the pipe shall not be allowed either vertically or horizontally unless instructed by the Engineer. If a deflection is necessary, as determined by the Engineer, the allowable deflection shall not exceed that recommended by the pipe manufacturer.

### **III. CONNECTION TO EXISTING LINES**

- A. The method of making connections to existing lines shall be approved by the Engineer prior to construction. No existing lines shall be abandoned and no new lines shall be put in operation until the new lines have been tested and accepted by the Engineer.
- B. It is the Contractor's sole responsibility to maintain the existing sewer lines in service before the new lines are put in operation.
- C. PVC pipe connections into new concrete manholes shall be made using Korn-seal boot or approved equal. Connections to existing concrete manholes shall be made by using a PVC manhole adaptor (sand collar).
- D. Grouting shall be non-shrink type.

### **IV. MANHOLES**

- A. Drop manhole assembly shall be constructed using PVC fitting with gasket-fitted joints. Glue jointing is not acceptable. Drop assembly shall conform to Standard Plan No. S.12. No outside drops are allowed. Dry manholes shall be allowed only when no other feasible alternative exists.
- B. Flow line inverts shall be channeled using concrete and shall be finished with smooth flow line and surface finished. When connecting into an existing manhole, the new flow channel shall interface with the existing channel. Channeling shall conform to Standard Plan No. S.13.
- C. All joints in the manhole shall be sealed against leaks.
- D. The manhole cover shall be adjusted to final grade with approved methods.
- E. Ladders and steps shall be secured and grouted in the new manholes before the manhole is put into service.
- F. Manholes shall be constructed at all horizontal and vertical bends and at changes in pipe material.

### **V. TESTING**

- A. Lamping of lines to check deflection in the pipe will be conducted prior to any pressure tests.
- B. Mandreling and/or video taping the sewer main may be required by the Public Works Department.
- C. A 15-minute, 4 psi air test with no pressure drop will be required to ensure joint seals.
- D. Force laterals require a 15 minute, 25 psi air test with no pressure drop.



## **VI. LATERALS**

### **A. Joint-Use Laterals**

1. Minimum pipe size shall be 6".
2. Maximum of two houses can be served on a single 6" line, unless otherwise approved by the Public Works Department.
3. One cleanout must be installed for every 100' of length and at each elbow greater than 22 1/2 degrees. Place locator tape on cap when outside of paved surface.
4. Any lateral under a structure such as a rockery and with less than 3' of cover below the structure base shall be ductile iron for 5' on each side of the structure.
5. Backflow valve/check valve will be required by the Engineer per Title 15 of the Kirkland Municipal Code.
6. Testing of laterals shall conform to Title 15 of the Kirkland Municipal Code.

### **B. Single-Family Laterals**

1. Minimum pipe size off the main channel to the property/right-of-way line shall be 6".
2. Minimum cover of 6' is required at the property/right-of-way line.
3. One service lateral for each family unit, unless otherwise approved by the Public Works Department.
4. Location of lateral shall be at lowest property corner or as conditions dictate.
5. Any lateral under a structure such as a rockery and with less than 3' of cover below the structure base shall be ductile iron for 5' on each side of the structure.
6. Backflow valve/check valve may be required by the Engineer.

### **C. Multifamily Laterals**

Backflow valve/check valve will be required by the Engineer per Title 15 of the Kirkland Municipal Code.

### **D. Laterals for commercial and multifamily applications shall be tied into a manhole whenever possible. When this is not feasible, laterals shall be connected to the sewer main by one of the following approved methods:**

1. Cut in a wye connection

2. PVC saddle
  3. Romac sewer saddle
  4. Inserta Tee
  5. Thermal Fusion for HDPE Mains.
- E. Existing Lateral
1. Existing PVC laterals may be reused. A video inspection must be submitted for review to determine size and condition.
  2. All other lateral types must be replaced to meet current specifications.
  3. Existing 6" concrete laterals may be slip line. A video inspection must be submitted for review to determine size and condition.

## **VII. SEWER LIFT STATIONS - PRIVATE**

- A. General Requirements
1. All pumps within lift stations must be submersible grinder pumps, manufactured by Hydromatic or equal.
  2. All equipment and accessories shall be standard manufactured items and those coming in direct contact with sewage shall be specifically manufactured for such use.
  3. The pressure piping downstream of the lift station must tie into a 6-inch side sewer which flows by gravity into the sewer main. No direct connections of force laterals and sewer mains will be allowed.
  4. Lift station chamber must be either concrete or fiberglass.
  5. The lift station must be cycled on/off ten times to ensure all floats and alarms function properly before being signed off by the City. This test must be witnessed by the Public Works Inspector.
- B. Single-Family Lift Stations - Specific Requirements
1. Lift station to be a minimum of a simplex system (one pump).
  2. There shall be a minimum of three mercury level control floats; one for turning the pump ON, the second for turning the pump OFF, and the third for a high-water alarm.
  3. Grinder pump shall be two HP minimum, which is adequate for a single residence with up to 70 feet of head.
  4. Audio and visual alarm panel to be located inside the single-family residence.

5. Pre-designed lift station packages are acceptable.
- C. Commercial and Multi-Family Lift Stations - Specific Requirements
1. Lift station to be a duplex system (dual pumps) and must be designed by a licensed professional engineer.
  2. Audio and visual alarms are required. Alarms are to be located within the building structure near the maintenance office or property manager's office.
  3. For multi-family projects, the Public Works Department shall determine if the development is to be served by individual lift stations for each unit/building or if the entire development may be served by one lift station. When the entire development is to be served by one lift station, a three-party maintenance agreement between the City of Kirkland, the development, and a lift station maintenance company shall be recorded with the property.

## **VIII. CONSTRUCTION**

A. Through Sewer Main Line

1. Minimum pipe size shall be 8" (size as required by flow calculations).
2. Maximum distance between manholes shall not exceed 400'.
3. Normal depth of pipe shall be 7' to 12'. All other depths to be approved by the Public Works Department.

B. Dead End Sewer Main Line

Dead end sewer main shall terminate with a manhole unless otherwise approved by the Public Works Department.

C. Required Separation Between Water Lines and Sanitary Sewers (Reference Standard Detail No. S.02).

1. *Horizontal Separation (Parallel)* - A minimum horizontal separation of ten (10) feet between gravity sanitary sewers and any potable water lines shall be maintained, whenever possible. The distance shall be measured from edge to edge.
2. *Unusual Conditions (Parallel)* - When local conditions prevent a horizontal separation as described above, a gravity sewer line may be laid closer than ten (10) feet to a water line provided:
  - a) It is laid in a separate trench; or it is laid in the same trench with the water line that is located at one side on a bench of undisturbed earth; and
  - b) In either case, the elevation of the crown of the gravity sewer must be at least 18 inches below the invert of the water line. When this vertical separation cannot be obtained, the gravity sewer shall be constructed of materials and joints that are

equivalent to water main standards of construction and shall be pressure tested to assure water tightness prior to backfilling.

3. *Vertical Separation (Perpendicular)* - Sewer lines crossing water lines shall be laid below the water lines to provide a separation of at least 18 inches between the invert of the water line and the crown of the sewer line, whenever possible.
4. *Unusual Conditions (Perpendicular)* - When local conditions prevent a vertical separation as described above, the following construction shall be used:
  - a) Gravity sewers passing over or under water lines shall be:
    - i. Constructed of material described in Standard Detail No. S.02. The one segment of the maximum standard length of pipe (but no less than 18 feet long) shall be used with the pipes centered to maximize joint separation; or
    - ii. Constructed of standard gravity sewer material encased in concrete or in a 1/4" thick continuous steel casing with all voids pressure-grouted with sand-cement grout.
    - iii. The length of the sewer pipe, in both i. and ii. above, shall be centered at the point of crossing so that the joints will be equidistant and as far as possible from the water line. The sewer pipe shall be the longest standard length available from the manufacturer.
  - b) Water lines passing under gravity sewers, in addition, shall be protected by providing:
    - i. A vertical separation of at least 18 inches between the invert of the sewer and the crown of the water line;
    - ii. Adequate structural support for the sewers to prevent excessive deflection of joints and settling on and breaking of the water lines; and
    - iii. The length of the sewer pipe shall be centered at the point of crossing so that the joints will be equidistant and as far as possible from the water line. The sewer pipe shall be the longest standard length available from the manufacturer.
  - c) Pressure sewers shall only be constructed under water lines with ductile iron pipe or standard sewer pipe in a steel casing for a distance of at least ten (10) feet on each side of the crossing.

#### D. Trench and Bedding Detail

1. Trench section shall conform to Standard Plan No. S.01.
2. The trench width to 6" above the top of pipe shall not be greater than 1 1/2 times the outside diameter of pipe plus 18", except that the trench width shall be such as to provide adequate space for workmen to place and joint the pipe properly and safely. Trench walls shall be kept vertical, except the walls of the trenches above an elevation 6" above the top of pipe may be sloped back to prevent the banks from sloughing into the ditch.

3. When soft or unstable material is encountered at the subgrade which, in the opinion of the City Engineer, will not uniformly support the pipe, such material shall be excavated to an additional depth as required by the City Engineer and backfilled with foundation rock material placed in 12" lifts and compacted to 95 percent of the maximum dry density to the pipe foundation grade.

Where unusually bad foundation conditions are encountered at the bottom of the trench, the City Engineer may order special foundation material to be placed.

4. Wherever necessary to prevent caving, excavations in sand, gravel, sandy soil, or other unstable material shall be adequately sheeted and braced. Where sheeting and bracing are used, the trench width may be increased accordingly. Trench sheeting shall remain in place until the pipe has been laid, tested for defects, and repaired if necessary, and the earth around it compacted to a depth of 2' over the top of the pipe.
5. Excavation for manholes and other appurtenances shall be sufficient to leave 12" minimum and 24" maximum clearance on all sides.
6. Joints shall not be left uncovered except in the immediate area of pipe laying. Under no circumstances shall water be permitted to rise in the trench until after the pipe has been placed, tested, and backfilled.
7. Regardless of the method of densification used, materials shall be brought up at substantially the same rate on both sides of the pipe, and care shall be taken so that the pipe is not floated or displaced. Fill material shall not be dropped directly on the pipe.
8. Pipe zone material shall consist of excavated or imported material free from roots or other organic material, mud, muck, and frozen material.
9. Pipe zone material shall be densified by compaction using mechanical tamping to a density of 95 percent of maximum dry soil density using a modified proctor. Equipment with suitably-shaped tamping feet shall be used to compact the material and ensure that the specified soil density is obtained beneath the haunches of the pipe. At the time of placement, the materials shall have the optimum moisture content required for compaction and the moisture content shall be uniform throughout each layer. Materials shall be placed in layers not more than 6" thick after each compaction.
10. Trench backfill above the pipe zone to the surface of the finish grade or native ground shall be placed so that the resulting density will be 95 percent of maximum dry soil density, modified proctor, within travelled ways and 85 percent of maximum dry soil density for areas outside travelled ways. Backfill material shall be placed in continuous horizontal layers not exceeding 12" in thickness. This will be strictly adhered to for all pipes placed in the right-of-way.
11. Native backfill shall be mounded to a height of 4" over the top of the trench for ordinary backfill outside travelled ways.

12. Material for backfilling around manholes and other appurtenances shall be gravel barrow. Materials shall be deposited in a manner to ensure that the manhole or other appurtenance is not disturbed from the proper alignment, and backfill shall be compacted to the ground surface.
13. All interior bracing placed inside the pipe by the manufacturer shall be removed only after the backfill is complete.

# **CITY OF KIRKLAND**

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## **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

### **Policy S-1: REQUIREMENTS FOR CONSTRUCTION NEAR LAKEFRONT SEWER LINE**

A public sewer main that is accessed by means of a public sewer easement traverses certain lakefront properties within the City of Kirkland. Since this line crosses private property, and needs to be maintained by the City, the following requirements must be met for new construction in these areas.

1. There must be no encroachment into the easement at the ground surface by a structure.
2. Under certain circumstances, a cantilevered building design may be allowed into the easement. Up to 4 feet may be allowed for the 2<sup>nd</sup> and 3<sup>rd</sup> floors of a structure, providing 10 feet of vertical clearance is maintained between the finished grade and the underside of the cantilevered portion of the building.
3. Re-routing of the sewer main will be considered on a case by case basis, at the discretion of the Public Works Department; minimum pipe slopes must be maintained.
4. The City may request addition easement width if the current easement is determined to be inadequate, or does not meet the requirements of Easement Width Requirements, Policy G-1.
5. Building or wall footings that abut the easement may be required to extend to a depth equal to, or greater than, the depth of the sewer main.
6. At the discretion of the City, shoring/piling construction may be necessary to protect the sewer main during construction of the residential foundation.
7. The owner must sign a Hold-Harmless Agreement when installing landscaping plants or appurtenances within the easement.

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## **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

### **Policy S-2:       CLOSED CIRCUIT CAMERA REQUIREMENTS FOR SEWER MAINS**

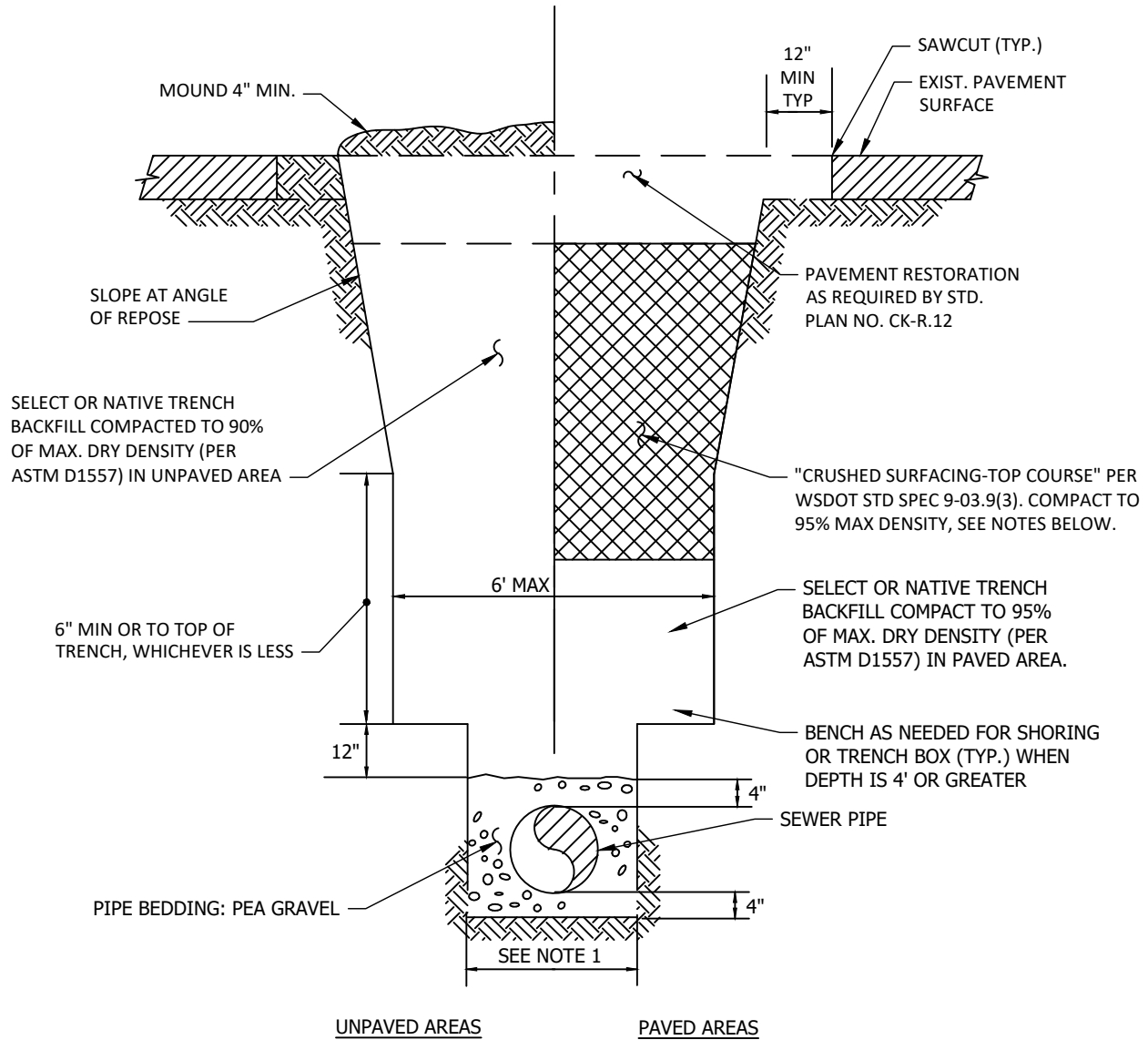
All newly installed sewer main lines meeting any of the following conditions will need to be inspected with a closed circuit camera.

1.     Any sanitary main section that is installed at less than 1%.
2.     Any sewer main that is in excess of 200' from manhole to manhole.
3.     Any sewer main terminated with a temporary clean-out.
4.     Any sewer main line section that has more than (2) laterals coming into it (manhole to manhole).
5.     Any sewer main that the City Inspector determines needs to be inspected due to ground conditions, poor installation techniques or suspicion of problems.

Any sewer main which is inspected with closed circuit camera at the completion of a project shall be re-inspected with a closed circuit camera at the end of the two-year maintenance period.

All main lines must be flushed clean and all the water must be exhausted by gravity (not by mechanical means) before sending the closed circuit camera through the main. This will give water a chance to settle in any potential low spots.





#### NOTES

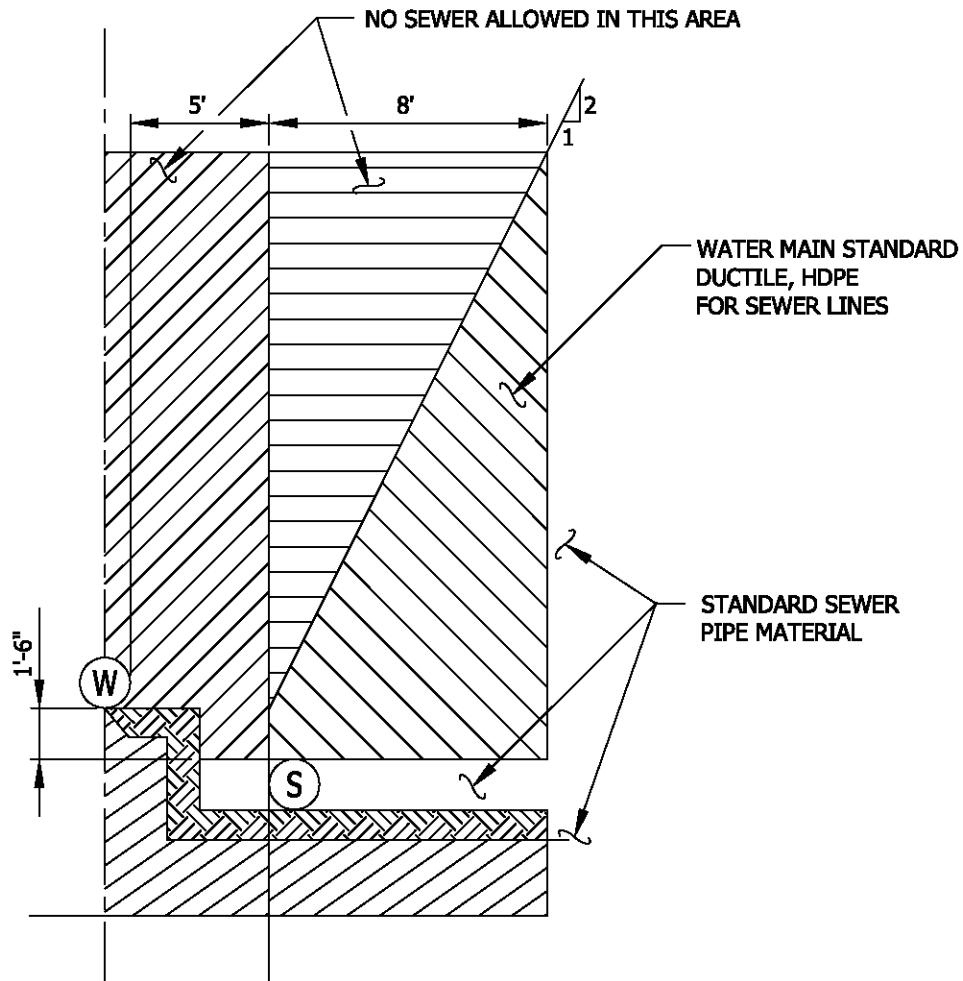
1. TRENCH BACKFILL BELOW TOP 4 FEET MAY BE NATIVE MATERIALS OR AS REQUIRED BY THE SPECIFICATIONS, OR AS DIRECTED BY THE PUBLIC WORKS INSPECTOR.
2. MINIMUM TRENCH WIDTH SHALL BE PIPE ID + 24".
3. IN PAVED AREAS USE CRUSHED ROCK BACKFILL  
 \* FULL DEPTH OF TRENCH WHERE SEWER MAIN CROSSES PERPENDICULAR TO THE TRAVELED LANE OR DRIVEWAY.  
 \* TOP FOUR FEET WHERE SEWER MAIN RUNS PARALLEL TO THE TRAVELED LANE, UNLESS EXISTING MATERIAL IS DETERMINED BY THE ENGINEER TO BE SUITABLE FOR BACKFILL.
4. THE STREET SHALL BE OVERLAID WHEN THE ASPHALT ROADWAY IS LESS THAN 5YRS OLD FOR UTILITY CROSSINGS, THE STREET SHALL BE OVERLAID AT LEAST 25 FEET ON EACH SIDE OF THE TRENCH. SEE OVERLAY POLICY R-7.

**CITY OF KIRKLAND**

PLAN NO. CK- S.01



**SANITARY SEWER  
TRENCH DETAIL**



### PARALLEL CONSTRUCTION

TABLE 1

WATER MAIN STANDARD PIPE MATERIAL

AWWA STANDARD			
TYPE OF PIPE	PIPE	JOINT	FITTINGS
DUCTILE IRON	C 1.52	C 111	C 110
CONCRETE CYLINDER	C 303		

#### NOTE:

1. TO BE USED WHEN 10' MINIMUM SEPARATION CANNOT BE OBTAINED.

**CITY OF KIRKLAND**

PLAN NO. CK- S.02



**WATER AND SEWER  
SPACING AND  
CLEARANCE**

NATIVE BACKFILL COMPACTED  
TO DENSITY OF ADJACENT  
SOIL, SEE SPECS

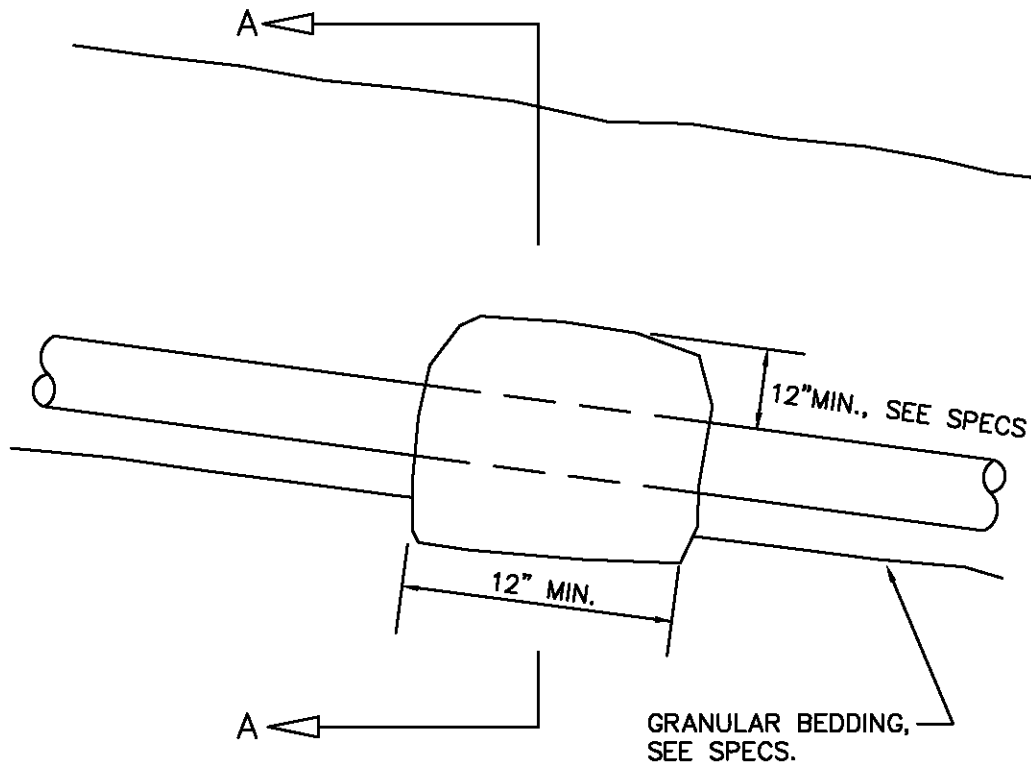
SOIL-CEMENT MIX  
PLACED AS DIRECTED  
BY ENGINEER

GRAVITY OR PRESSURE PIPE

12" MIN.

12" MIN.

SECTION A-A



**NOTE:**

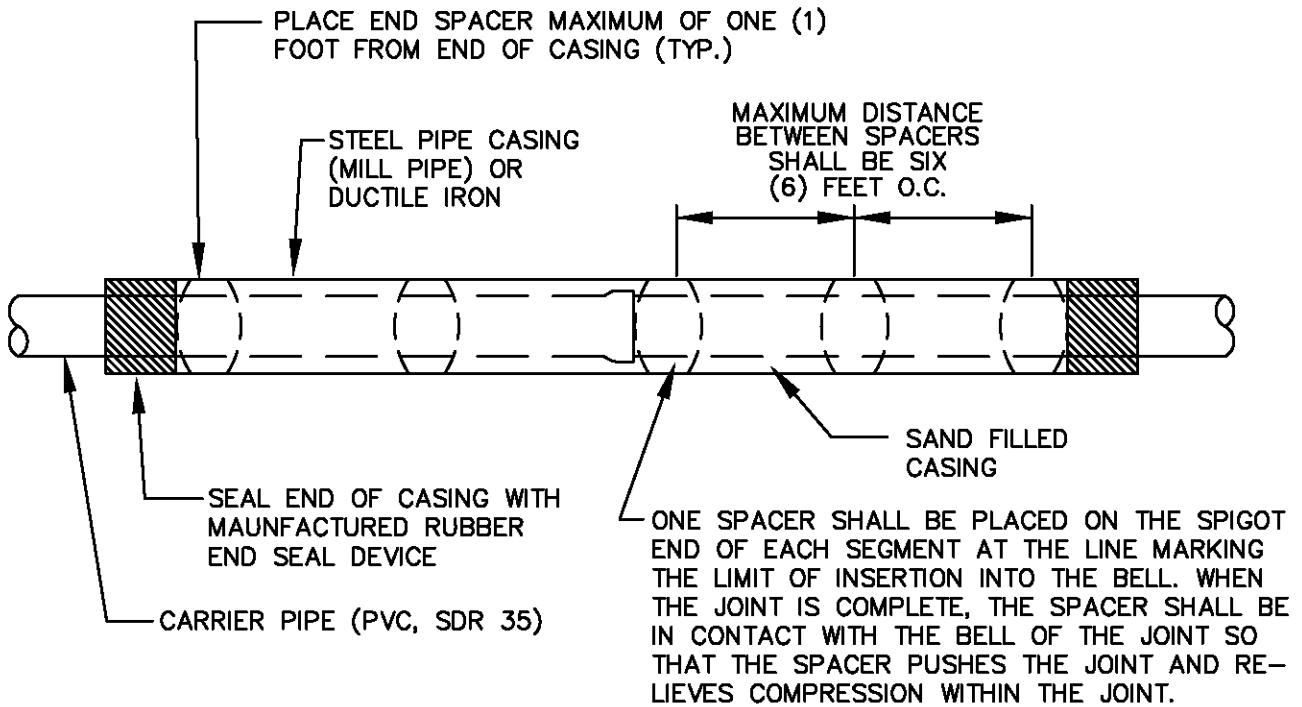
1. SOIL CEMENT BLOCKS PLACED OVER AND AROUND PIPE. TAMPED INTO PLACE BEFORE PLACING BACKFILL. USE 10% CEMENT WITH 90% NATIVE SOIL AND WATER TO SUIT TO FORM A DRY MIX THAT WILL HOLD ITS SHAPE WHEN MOLDED INTO A BALL. SOIL CEMENT BLOCKS REQUIRED ON SLOPES 20% OR GREATER.

CITY OF KIRKLAND

PLAN NO. CK-S.04



SOIL/CEMENT  
PIPE ANCHOR



CASING SPACERS (SEE APPROVED MATERIALS LIST)

CARRIER PIPE DIAMETER	8"	10"	12"
CASING DIAMETER	14"	16"	20"
STEEL CASING THICKNESS	0.25"	0.25"	0.25"
SPACER BAND WIDTH	12"	12"	12"

ANTICORROSIVE COATING THICKNESS:  
CASING - 8 MILLS DFT

NOTES:

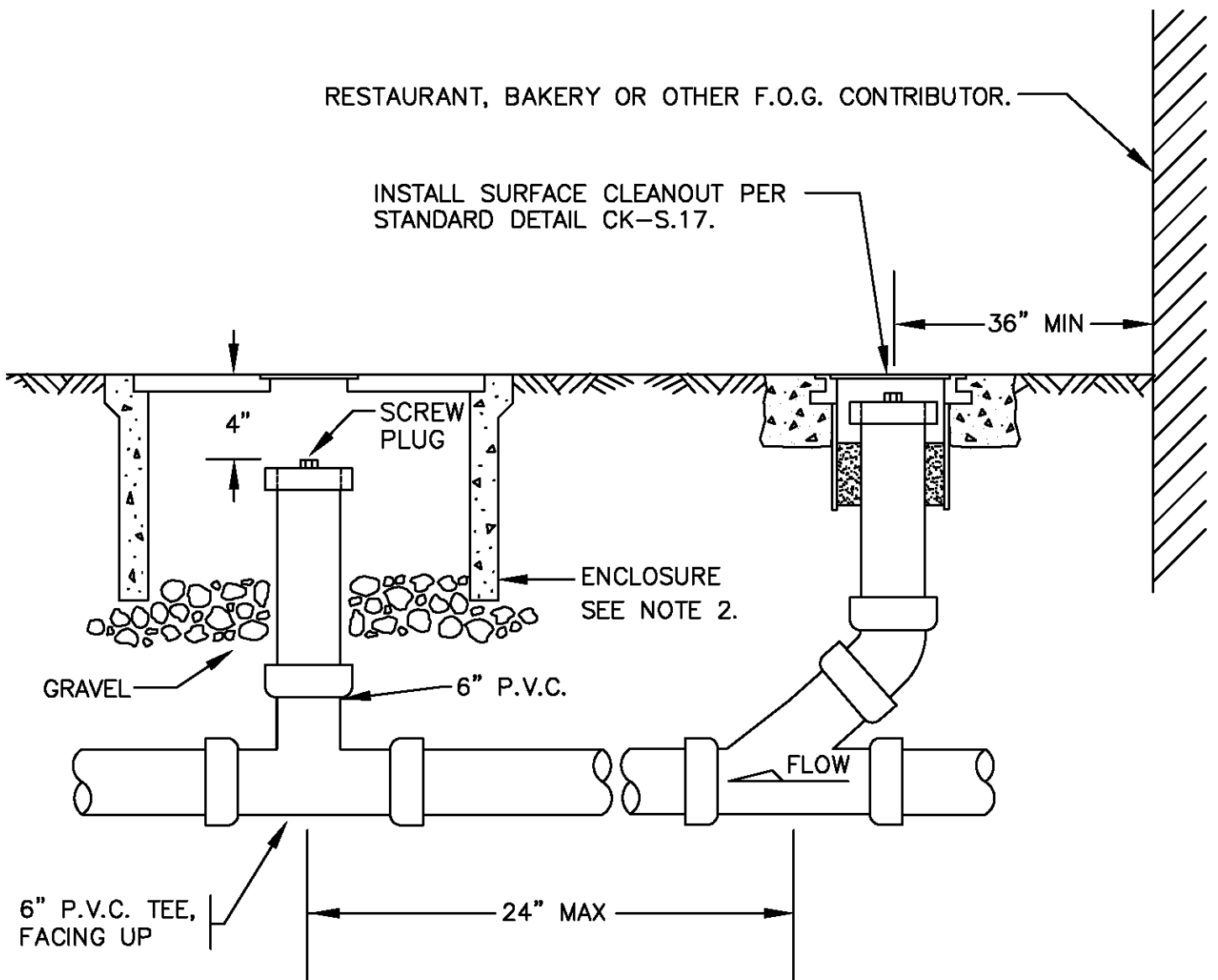
- CASING SPACERS SHALL BE "CENTER POSITIONING" TYPE.
- MINIMUM RUNNER WIDTH SHALL BE 2 INCHES.
- RUNNER HEIGHT SHALL BE SIZED TO PROVIDE:
  - MINIMUM 0.75" BETWEEN CARRIER PIPE BELL AND CASING PIPE WALL AT ALL TIMES.
  - MINIMUM 1" CLEARANCE BETWEEN RUNNERS AND TOP OF CASING WALL TO PREVENT JAMMING DURING INSTALLATION.
- STEEL CASING DIAMETERS ARE "OUTSIDE DIAMETER" FOR 16" AND LARGER.

CITY OF KIRKLAND

PLAN NO. CK-S.05




CASING  
INSTALLATION

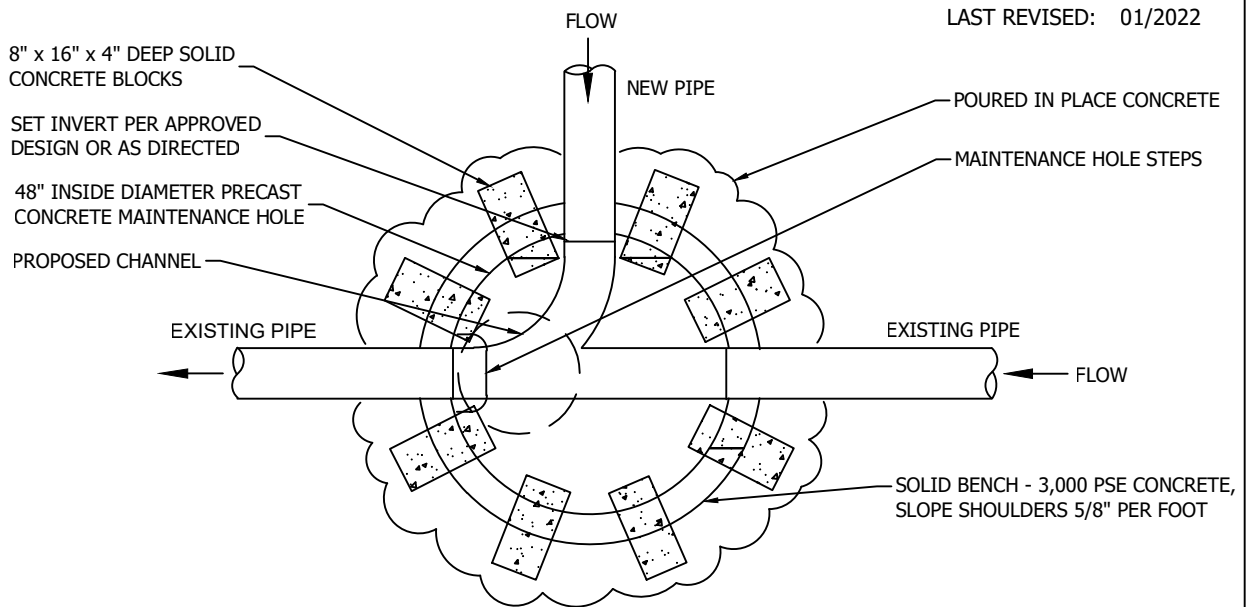


**NOTES:**

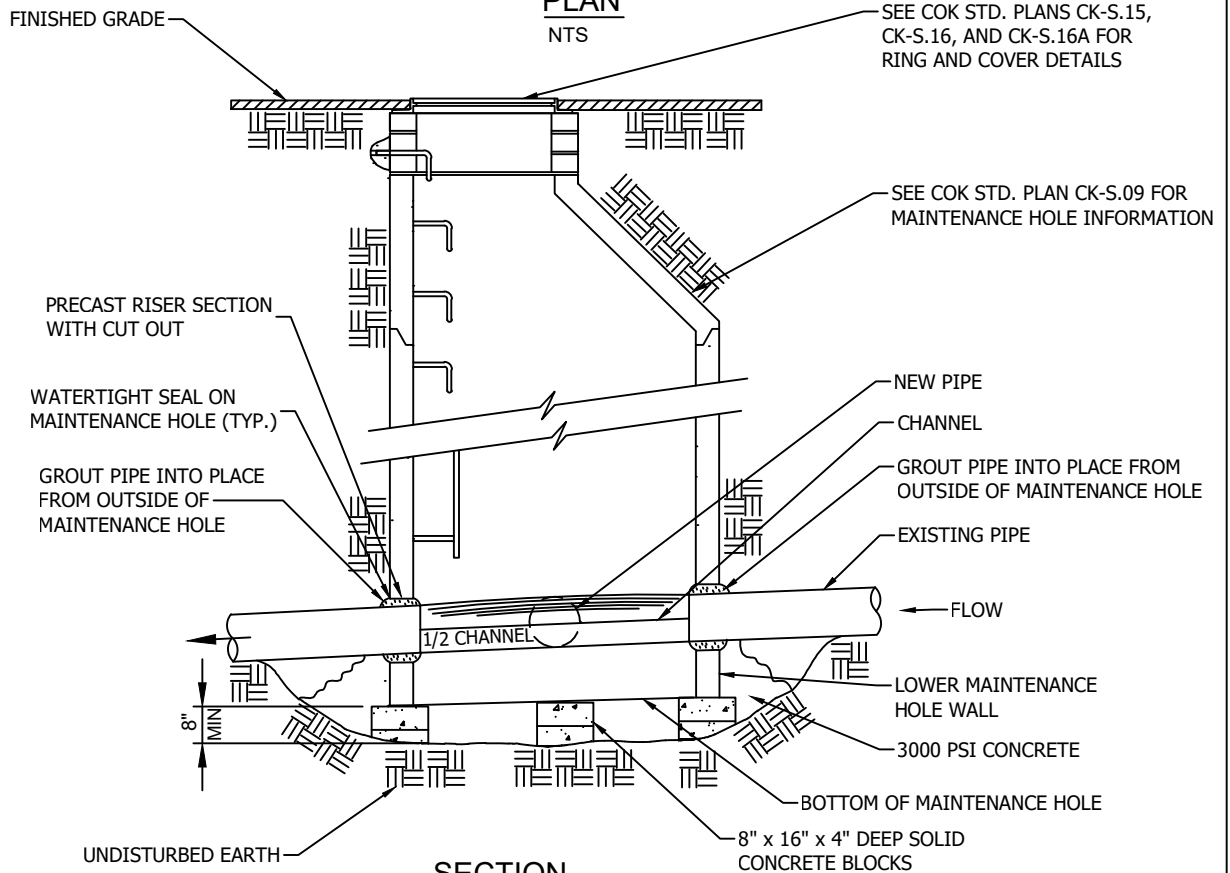
1. INSTALL SAMPLING TEE ON EXISTING OR NEW SIDE SEWER.
2. CONCRETE METER BOX, FOGTITE OR EQUAL.  
 FOGTITE 1-D IN NONTRAVELED AREAS.  
 FOGTITE B-10T IN SIDEWALK.  
 FOGTITE J-20S IN AREAS WITH VEHICULAR TRAFFIC (DIAMOND PLATE FRAME).

CITY OF KIRKLAND	
PLAN NO. CK-S.06	
	SAMPLING TEE

LAST REVISED: 01/2022



**PLAN**  
NTS



**SECTION**  
NTS

**NOTES:**

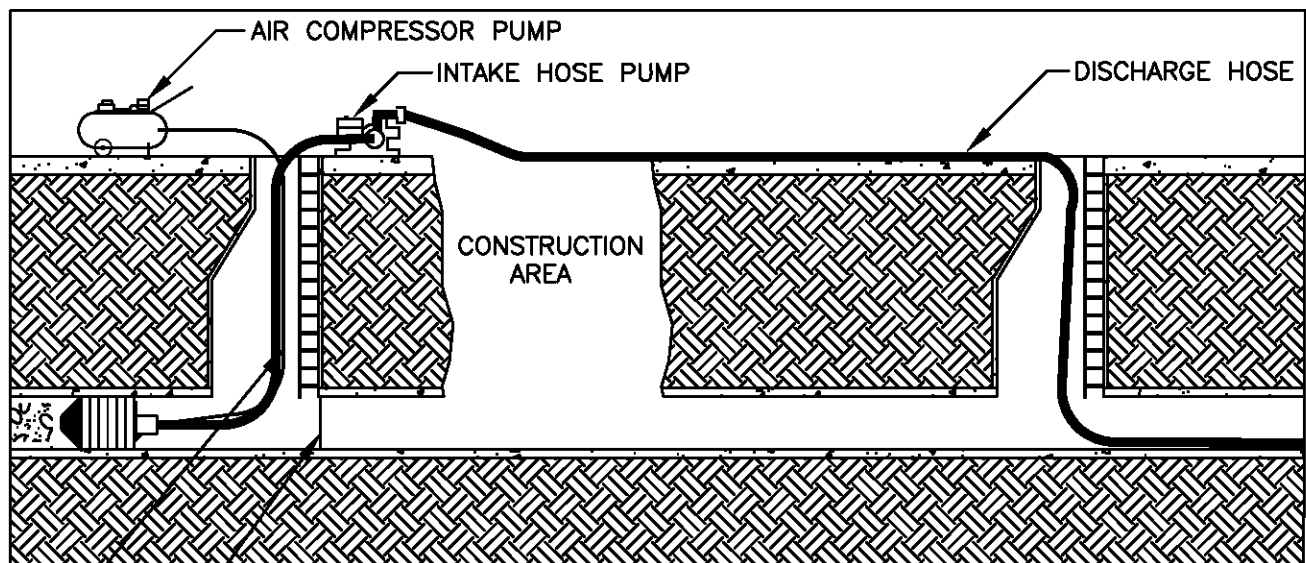
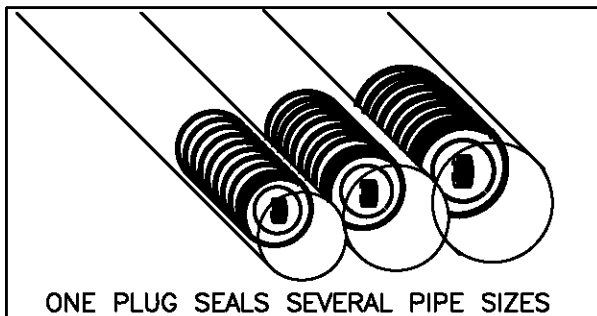
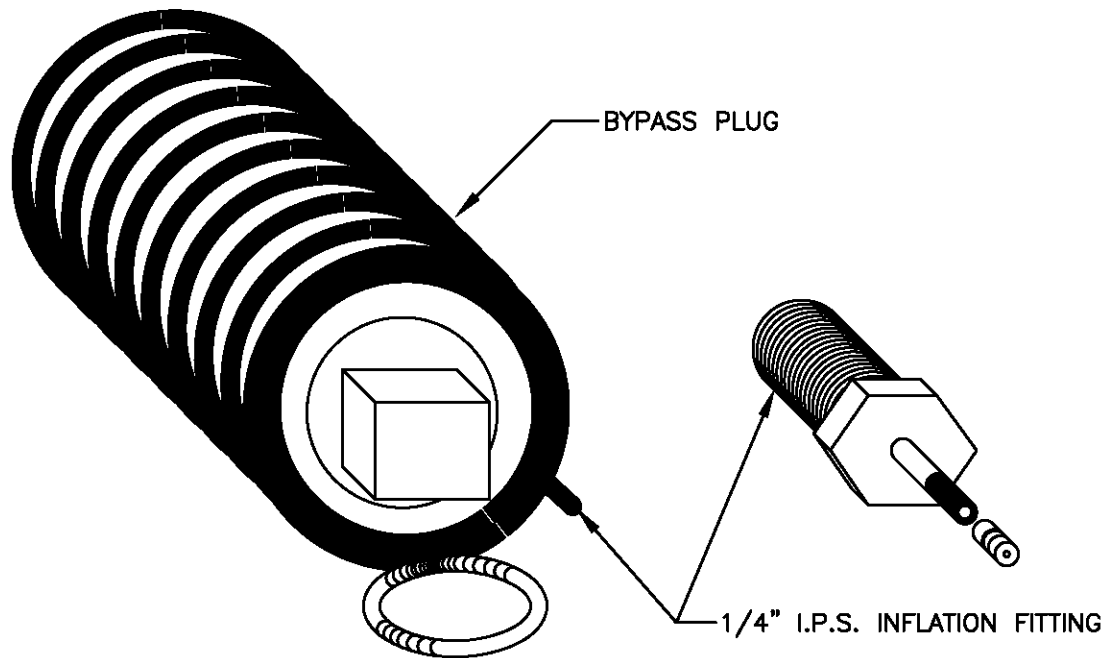
1. MAINTENANCE HOLES SHALL BE WATERTIGHT.
2. TOP OF EXISTING PIPE SHALL BE CUT AND REMOVED ONLY AFTER NEW PIPE IS TESTED, CCTV'D, AND APPROVED BY THE CITY.

**CITY OF KIRKLAND**

**PLAN NO. CK - S.07**



**48-INCH  
SADDLE  
MAINTENANCE HOLE**

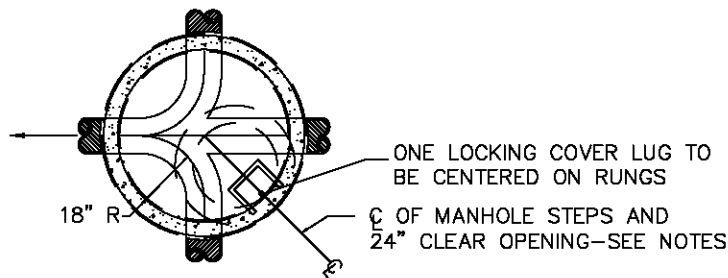


CITY OF KIRKLAND

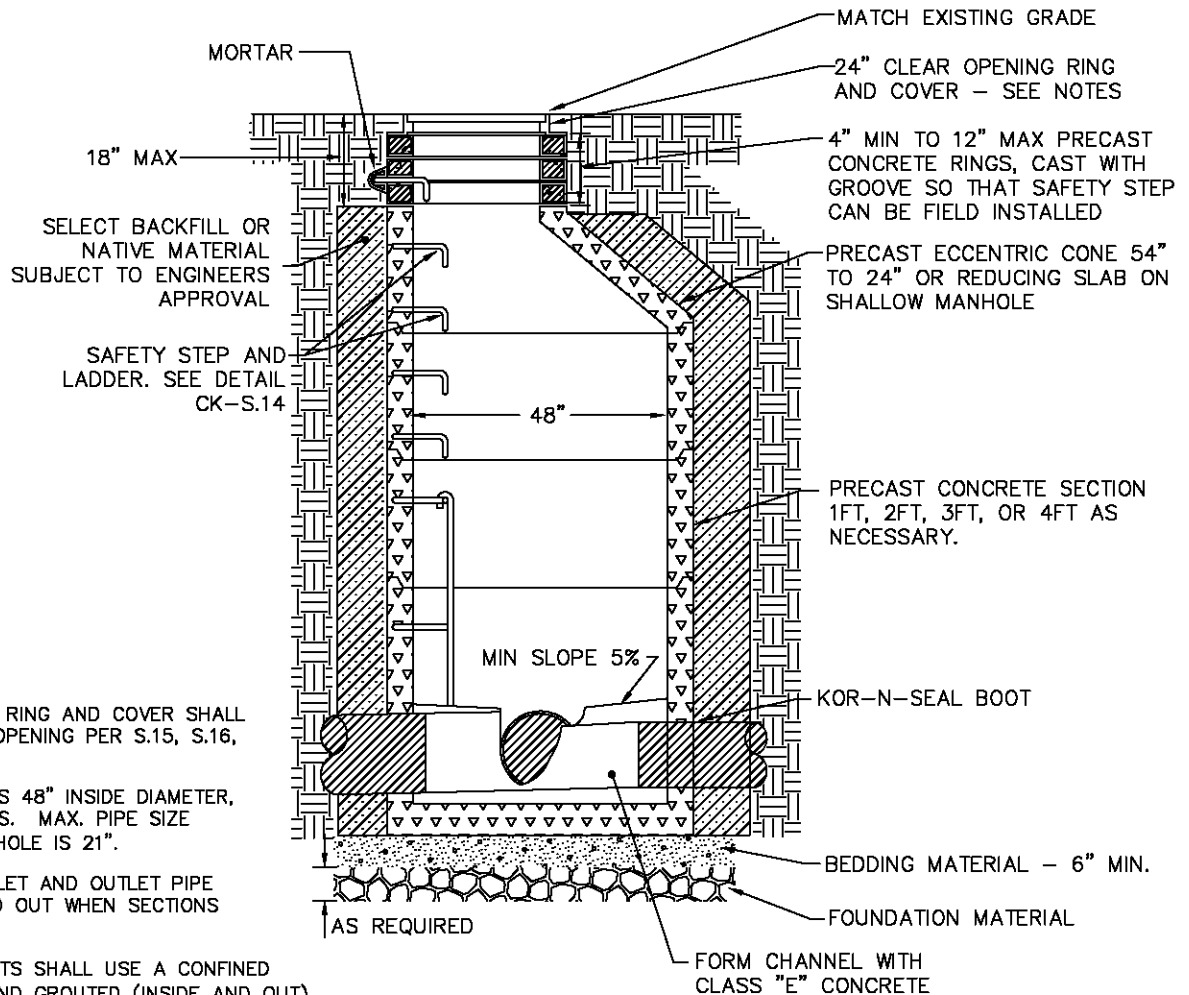
PLAN NO. CK-S.08



SEWER MAIN  
BYPASS PLUG



**PLAN VIEW**



**NOTES:**

1. LOCKING MANHOLE RING AND COVER SHALL HAVE 24" CLEAR OPENING PER S.15, S.16, S.16A.
2. MANHOLE SHOWN IS 48" INSIDE DIAMETER, 5" WALL THICKNESS. MAX. PIPE SIZE FOR THE 48" MANHOLE IS 21".
3. ALL HOLES FOR INLET AND OUTLET PIPE SHALL BE BLOCKED OUT WHEN SECTIONS ARE CAST.
4. ALL MANHOLE JOINTS SHALL USE A CONFINED RUBBER GASKET AND GROUTED (INSIDE AND OUT) TO MEET ASTM C-443 SPECIFICATIONS.
5. ALL PIPE THROUGH MANHOLE WALL SHALL HAVE A "KOR-N-SEAL" BOOT OR EQUAL.
6. MANHOLE STEPS SHALL BE 1/2" DIA. DEFORMED REINFORCING BARS
7. BEDDING AND FOUNDATION MATERIAL REQUIRED AS SHOWN ON DETAL AND AS NOTED IN THE SPECIFICATIONS. NATIVE MATERIAL MAY BE USED IF APPROVED BY ENGINEER.
8. LOCATION OF MANHOLE STEPS SHALL NOT BE OVER FLOW LINES AND SHALL BE APPROVED BY THE ENGINEER
9. 54" MANHOLE      27" MAX. PIPE  
72" MANHOLE      36" MAX. PIPE  
96" MANHOLE      48" MAX. PIPE

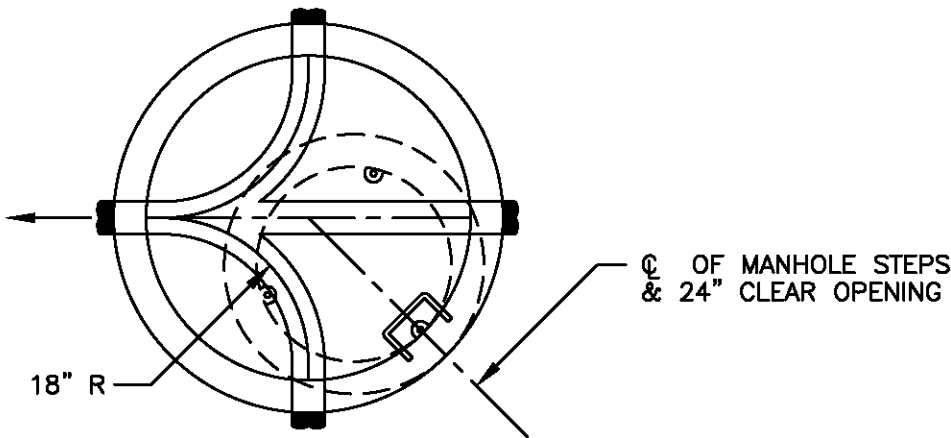
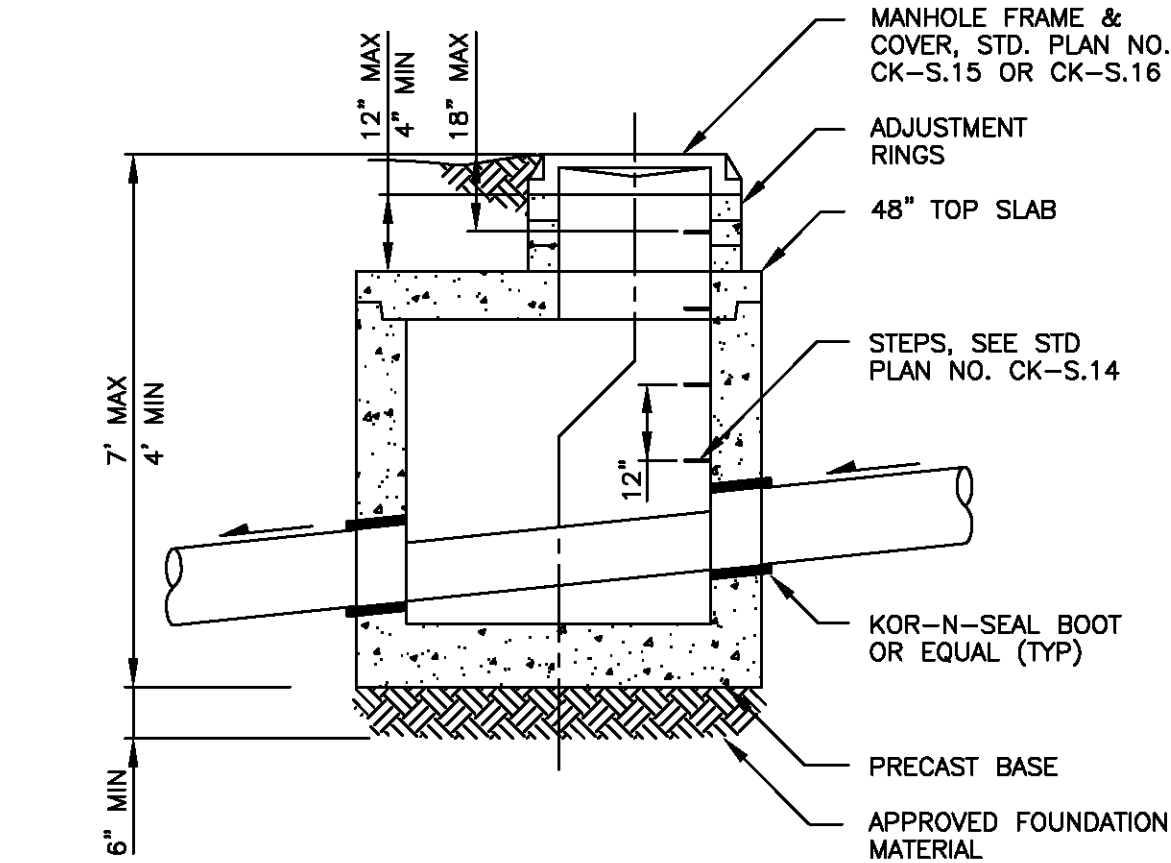
CITY OF KIRKLAND

PLAN NO. CK-S.09



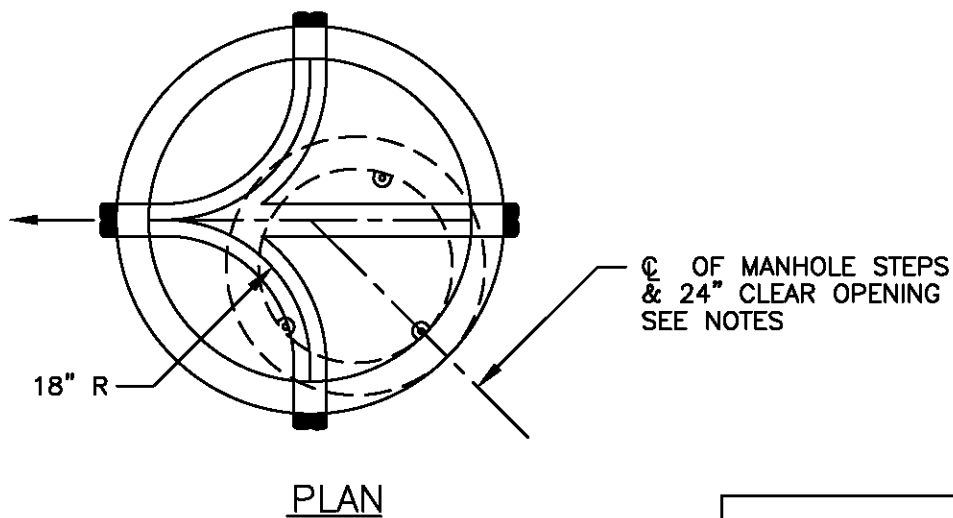
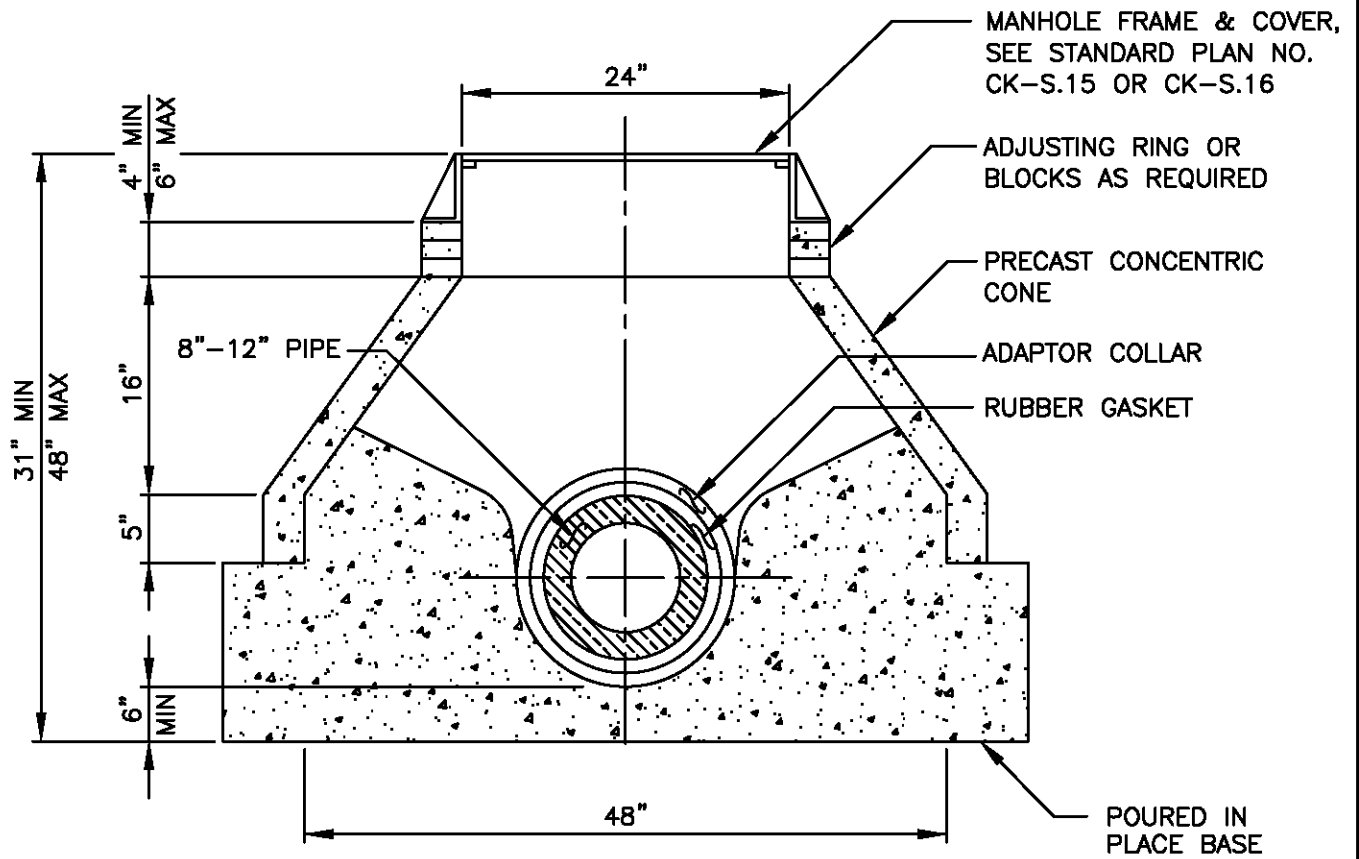
STANDARD 48"  
SANITARY SEWER  
MANHOLE





PLAN

CITY OF KIRKLAND	
PLAN NO. CK-S.10	
	SHALLOW MANHOLE ASSEMBLY

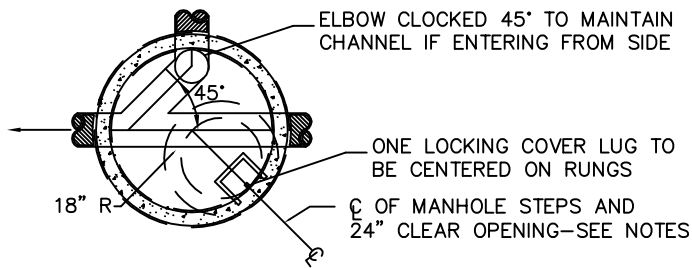


CITY OF KIRKLAND

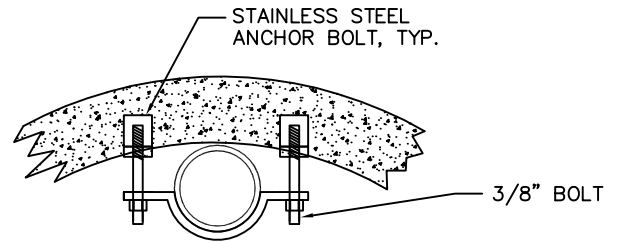
PLAN NO. CK-S.11



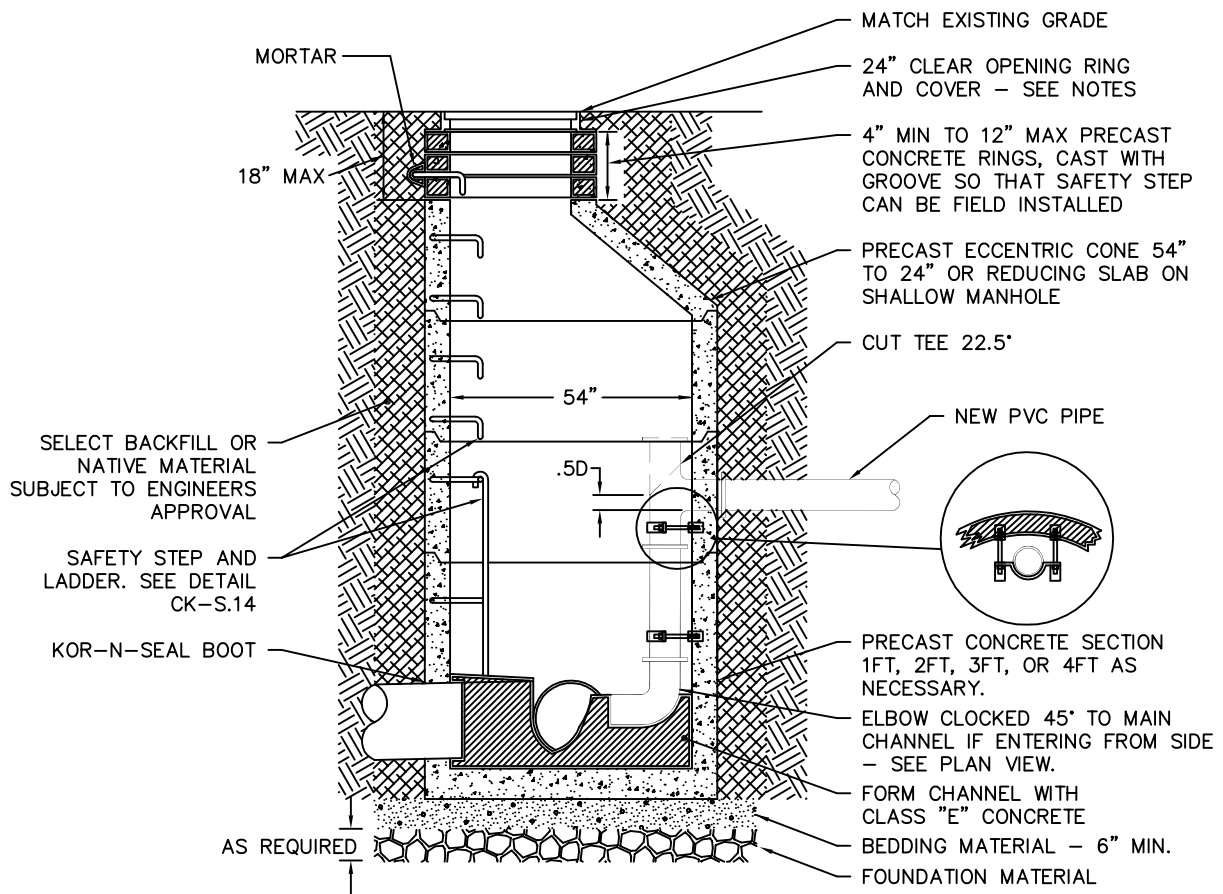
EXTRA SHALLOW  
MANHOLE ASSEMBLY



PLAN VIEW



STAINLESS STEEL PIPE STRAPPING  
PLAN VIEW



NOTES:

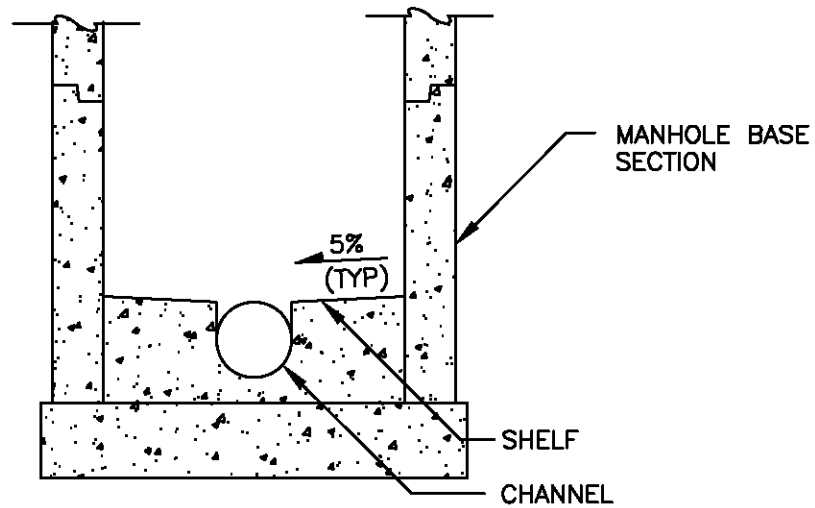
1. USE ONLY WHEN APPROVED BY PUBLIC WORKS.
2. NO EXTERNAL DROPS ALLOWED.

CITY OF KIRKLAND

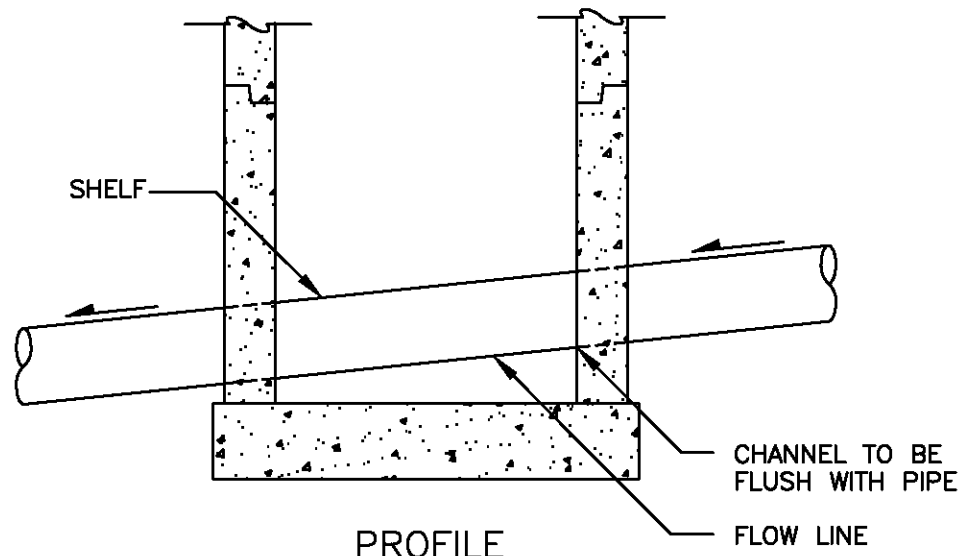
PLAN NO. CK-S.12



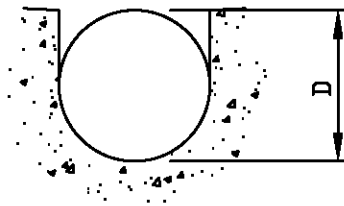
SANITARY SEWER  
INTERNAL DROP  
CONNECTOR



CROSS SECTION



PROFILE



CHANNEL SECTION

NOTES

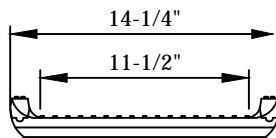
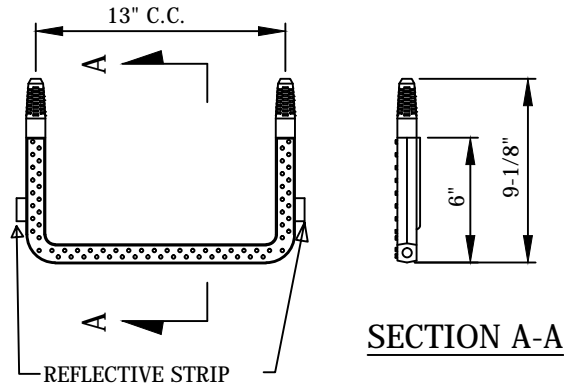
1. DEPTH OF CHANNEL MUST BE SAME AS PIPE DIAMETER.
2. MINIMUM 0.1' DROP ACROSS CHANNEL;  
MAXIMUM 1.0' DROP ACROSS CHANNEL.

CITY OF KIRKLAND

PLAN NO. CK-S.13



SEWER MANHOLE  
MAIN CHANNEL  
AND SHELF



**P-14938**  
**POLYPROPYLENE STEP**

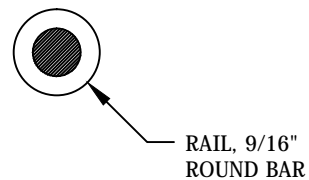
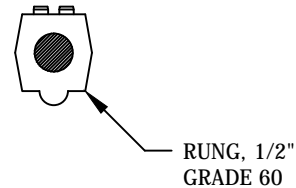
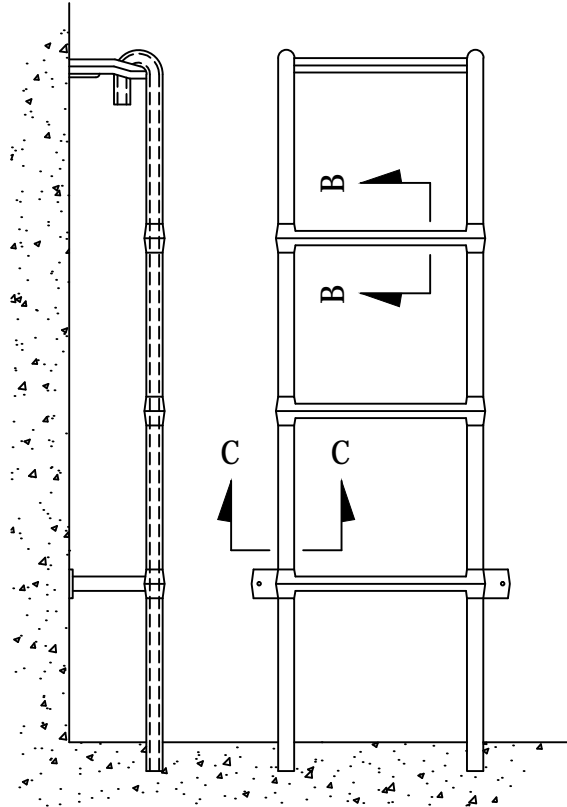
**SPECIFICATIONS:**

1. ALL STEPS SHALL MEET THE REQUIREMENTS OF ASTM C-478, AASHTO M-199, WISHA AND ALL ASHA SPECIFICATION.
2. THE POLYPROPYLENE SHALL CONFORM TO ASTM D-4101. ASTM D-4101.
3. THE 1/2" GRADE 60 DEFORMED REINFORCING BAR SHALL MEET ASTM A-615.
4. STEP REFLECTORS OR BRIGHT COLORED STEPS REQUIRED.

**INSTALLATION:**

1. THE STEP CAN BE CAST IN PLACE.
2. DRIVEN INTO PREFORMED HOLES WITH CONCRETE CURED TO 3,000 PSI MINIMUM.
3. DRIVEN INTO 2 PARALLEL 1" DIAMETER HOLES DRILLED 13" OR 10" ON CENTER, 3-1/2" DEEP.
4. DRILL 2 1-1/8" OR 1-1/4" HOLES, 3-1/2" DEEP, APPLY CURRENT WSDOT EPOXY SPECIFICATION IN THE HOLE AND AROUND THE BARBS OF THE STEP. PUSH THE STEP INTO THE HOLES ALLOWING THE EPOXY TO FLOW OUT TO THE SQUARE SHOULDER OF THE STEP.

ANY OF THE ABOVE METHODS WILL RESIST A PULLOUT FORCE OF OVER 1,500 LBS.

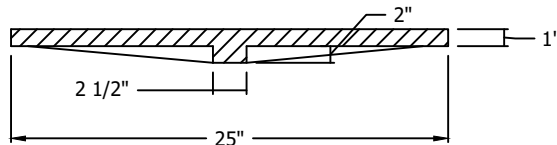
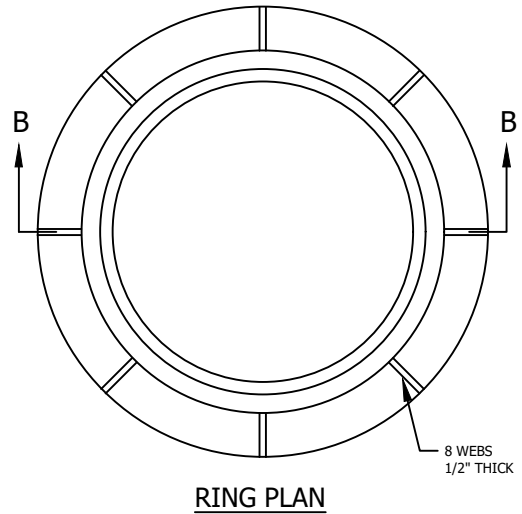
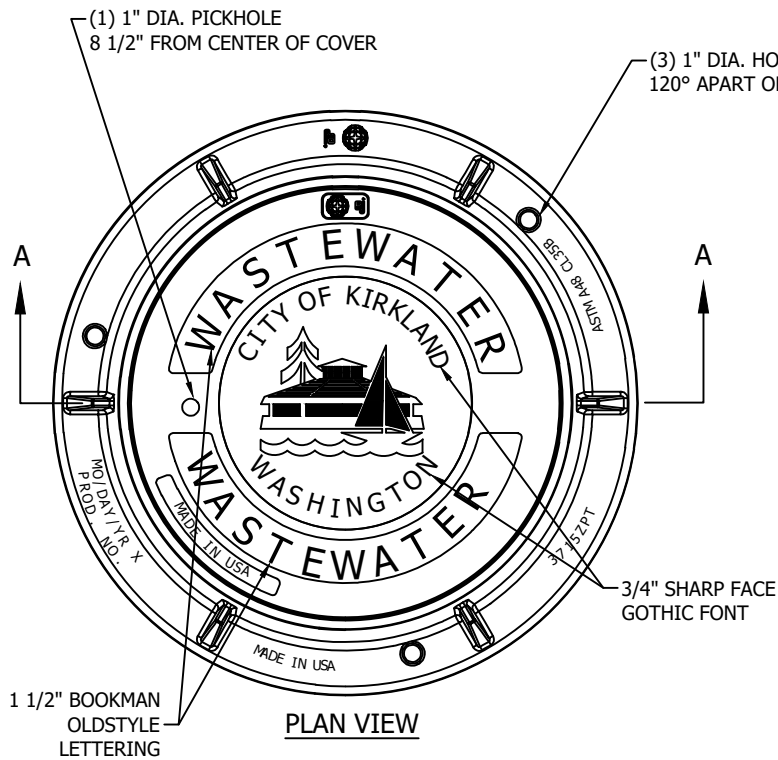


**CITY OF KIRKLAND**

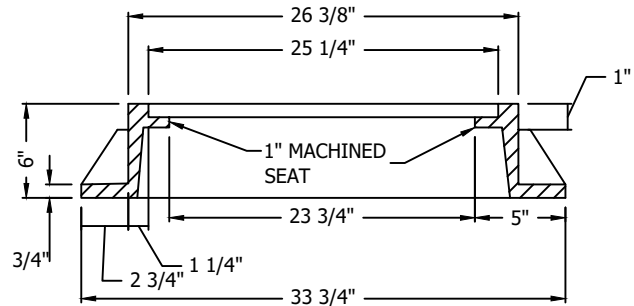
PLAN NO. CK-S.14



**LADDER AND  
MANHOLE STEPS**




COVER SECTION A-A

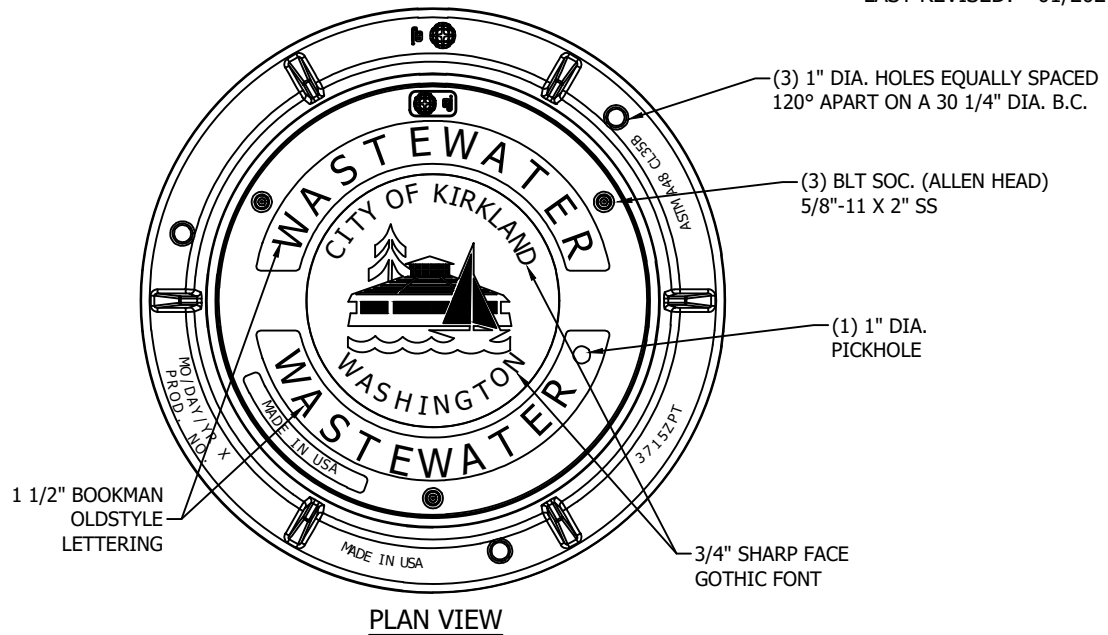


FRAME SECTION B-B

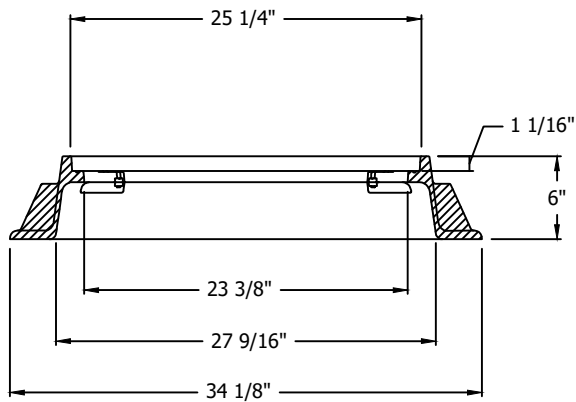
NOTES:

1. VERIFY SLOTTED FRAMES ARE THOROUGHLY FILLED IN WITH MORTAR FOR EFFICIENT INTERACTION WITH IRON AND STRUCTURE.
2. REQUIRED ON ALL ARTERIALS, COLLECTORS OR ANY TIME THAT THE IRON WILL BE WITHIN THE TRAVEL LANE.
3. LID SHALL BE MARKED "WASTEWATER".
4. CITY OF KIRKLAND LOGO REQUIRED.
5. LID MUST BE COVERED WITH TAR PAPER BEFORE OVERLAY.
9. DRILL AND TAP THREE 5/8"-11 NC HOLES THROUGH RING AT 120° AND 23-1/16" DIA. B.C.
10. COVER MATERIAL IS DUCTILE IRON ASTM A 48 CL35B, WITH A MINIMUM WEIGHT OF 141 LBS.
11. FRAME MATERIAL IS DUCTILE IRON ASTM A48 CL35B, WITH A MINIMUM WEIGHT OF 134 LBS.
12. PRODUCT SUPPLIED BY EJ, OR APPROVED EQUAL.
13. FRAME AND COVER SHALL BE H-20 LOADING RATED IF INSTALLED IN ROADWAY.

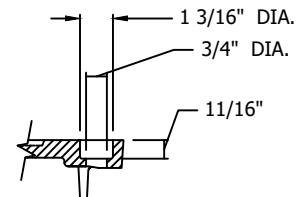
CITY OF KIRKLAND	
PLAN NO. CK - S.15	
	24" MANHOLE RING AND COVER



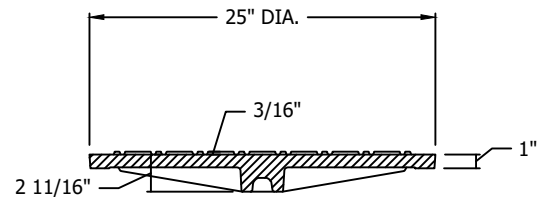
PLAN VIEW



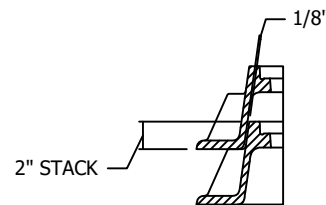
FRAME SECTION



BOLTHOLE DETAIL



COVER SECTION



STACKING DETAIL

NOTES:

1. VERIFY SLOTTED FRAMES ARE THOROUGHLY FILLED IN WITH MORTAR FOR EFFICIENT INTERACTION WITH IRON AND STRUCTURE.
2. REQUIRED ON ALL ARTERIALS, COLLECTORS OR ANY TIME THAT THE IRON WILL BE WITHIN THE TRAVEL LANE.
3. LID SHALL BE MARKED "WASTEWATER".
4. CITY OF KIRKLAND LOGO REQUIRED.
5. LID MUST BE COVERED WITH TAR PAPER BEFORE OVERLAY.
6. USE WITH THREE LOCKING BOLTS 5/8"-11 BOLT SOCKET (ALLEN HEAD), 2" LONG DRILL HOLES SPACED 120° APART ON 23-1/16" DIA. B.C.
7. COVER MATERIAL IS DUCTILE IRON ASTM A48 CL35B, WITH A MINIMUM WEIGHT OF 141 LBS.
8. FRAME MATERIAL IS DUCTILE IRON ASTM A48 CL35B, WITH A MINIMUM WEIGHT OF 134 LBS.
9. DRILL AND TAP THREE 5/8"-11 NC HOLES THROUGH RING AT 120° AND 23-1/16" DIA. B.C.
10. PRODUCT SUPPLIED BY EJ, OR APPROVED EQUAL.
11. FRAME AND COVER SHALL BE H-20 LOADING RATED IF INSTALLED IN ROADWAY.

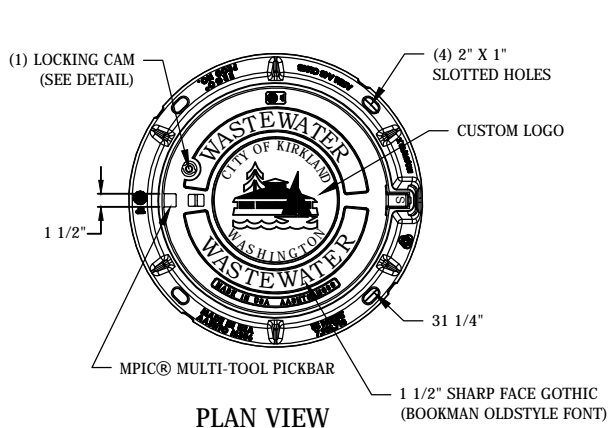
**CITY OF KIRKLAND**

**PLAN NO. CK - S.16**

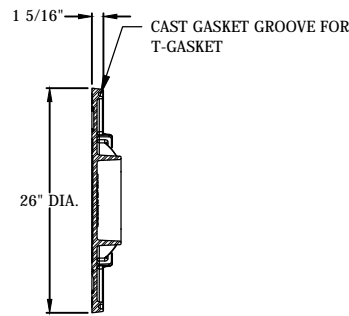


**24" MANHOLE FRAME  
W/LOCKING COVER  
AND LOGO**

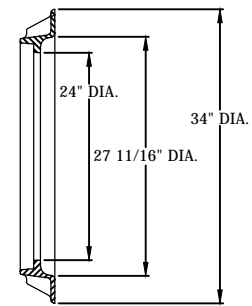
LAST REVISED: 01/2019



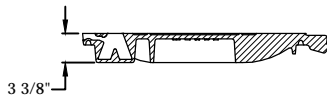
PLAN VIEW



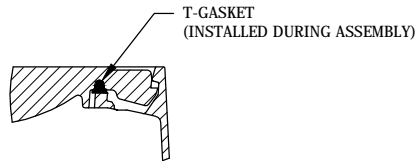
COVER SECTION



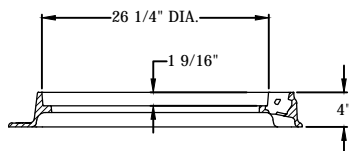
FRAME SECTION



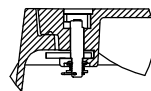
COVER SECTION



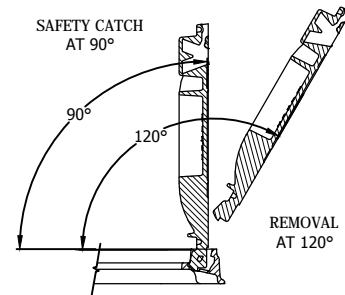
HINGE & GASKET VIEW



FRAME SECTION



CAM LOCK VIEW



HINGE POSITIONS

**NOTES:**

1. VERIFY SLOTTED FRAMES ARE THOROUGHLY FILLED IN WITH MORTAR FOR EFFICIENT INTERACTION WITH IRON AND STRUCTURE.
2. VERIFY BEDDING MORTAR IS NOT IN CONTACT WITH AREA UNDER LID FLANGE THAT WILL INTERFERE WITH CAMLOCK.
3. INSTALL PLUG IN LOCK HOLE TO KEEP LOCK FREE OF FOREIGN MATERIAL.
4. 24 INCH MANHOLE LID IS FITTED WITH AN INFILTRATION PLUG LOCATED IN THE HINGE HOUSING OF THE FRAME. VERIFY PLUG IS PROPERLY INSTALLED BEFORE INSTALLING THE FRAME.
5. REQUIRED ON ALL ARTERIALS, COLLECTORS OR ANY TIME THAT THE IRON WILL BE WITHIN THE TRAVEL LANE.
6. LID SHALL BE MARKED "WASTEWATER".
7. CITY OF KIRKLAND LOGO REQUIRED.
8. LID MUST BE COVERED WITH TAR PAPER BEFORE OVERLAY.
9. PRODUCT SUPPLIED BY EAST JORDAN IRON WORKS, OR APPROVED EQUAL.
10. FRAME AND COVER SHALL BE H-20 LOADING RATED IF INSTALLED IN ROADWAY.

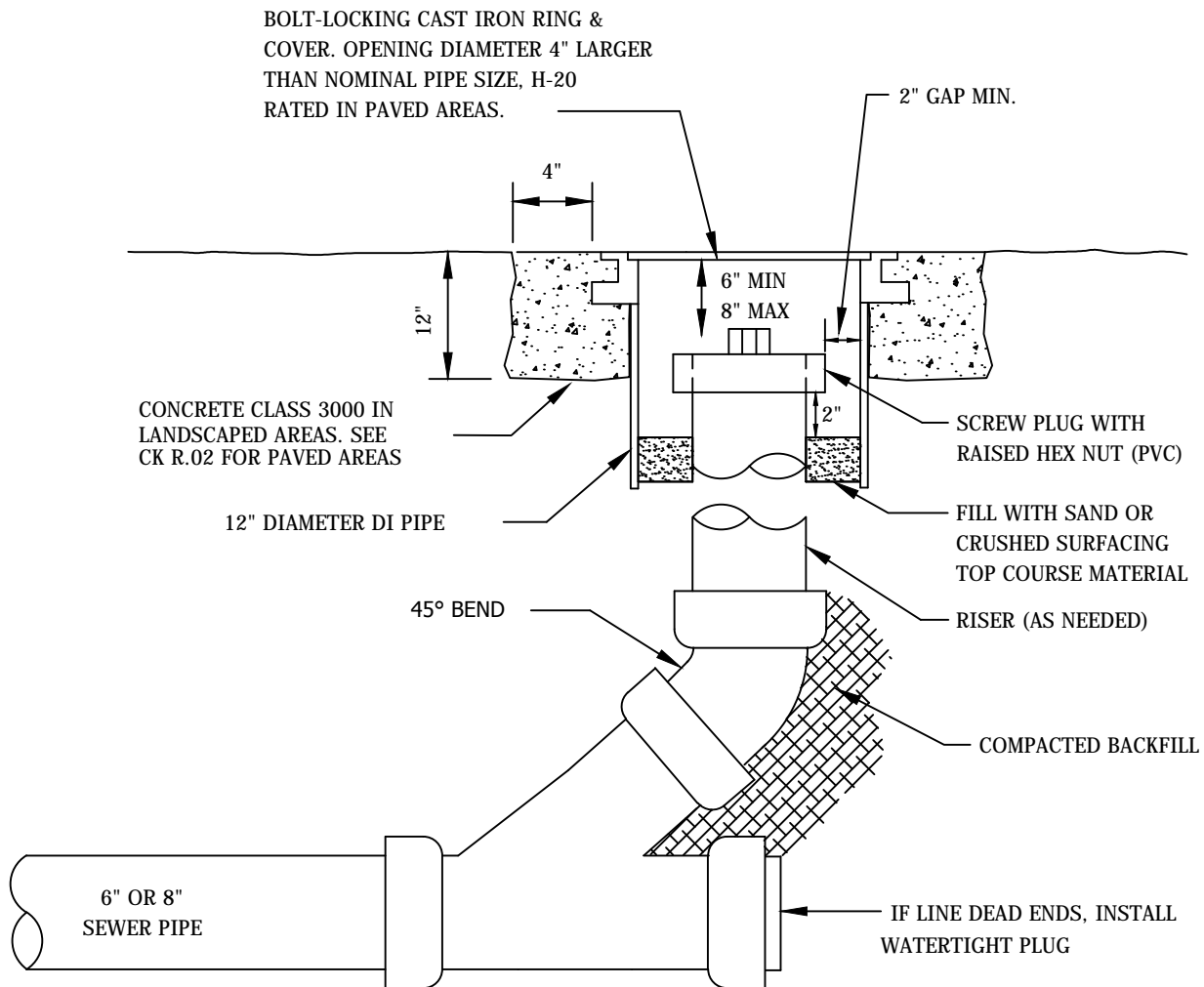
**CITY OF KIRKLAND**

**PLAN NO. CK-S.16A**



**MODIFIED 24"  
MANHOLE FRAME  
W/ LOCKING COVER**





NOTES:

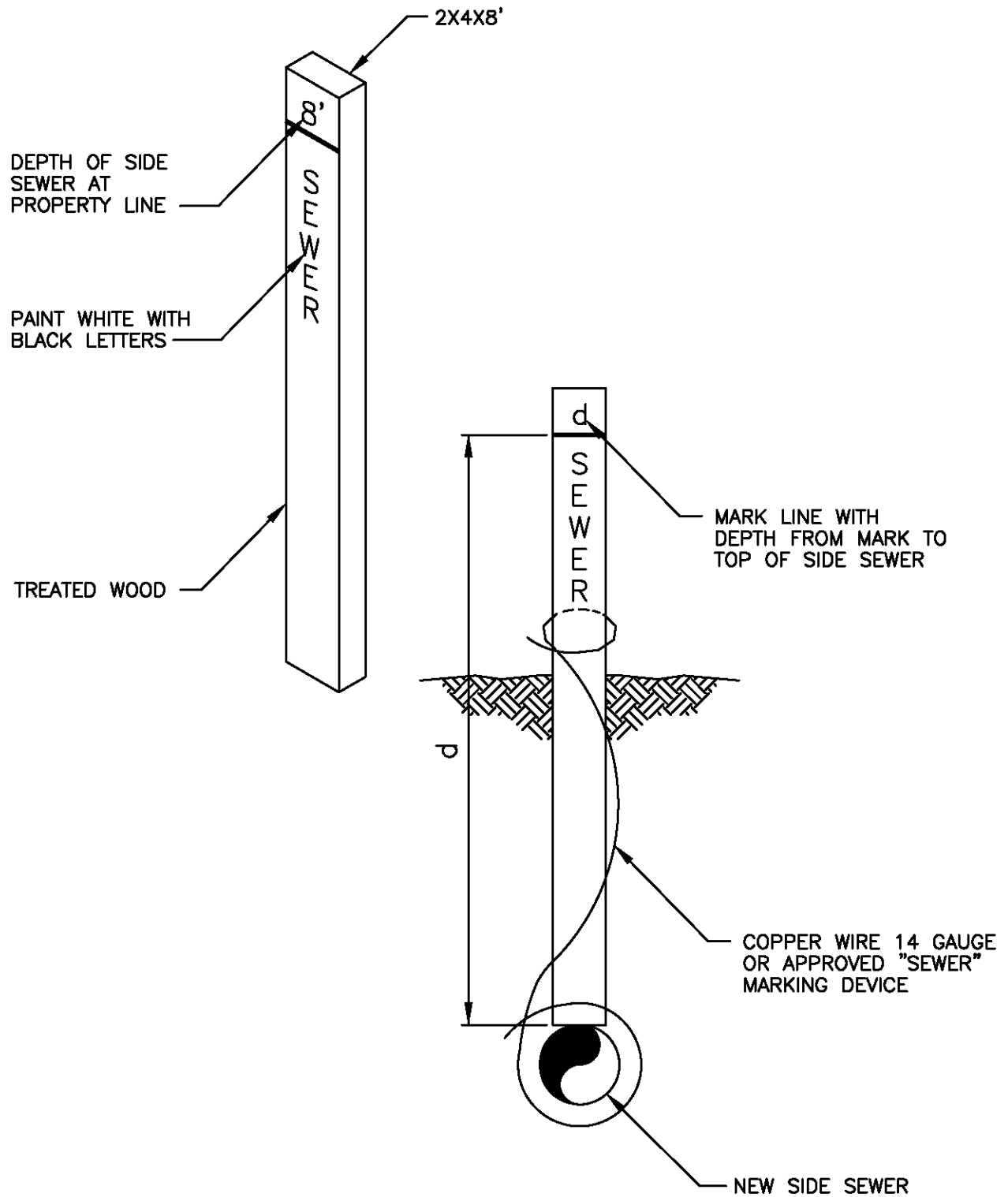
1. CAST IRON COVER SHALL READ "SEWER".
2. LOCKING BOLTS FOR COVER SHALL BE 5/8" -11 NC STAINLESS STEEL TYPE 304 SOCKET (ALLEN) HEAD BOLTS, 2 INCHES LONG.
3. TRANSITIONAL COUPLINGS SHALL BE FERNCO STRONG BACK RC SERIES OR APPROVED EQUAL.

CITY OF KIRKLAND

PLAN NO. CK- S.17



## CLEANOUT

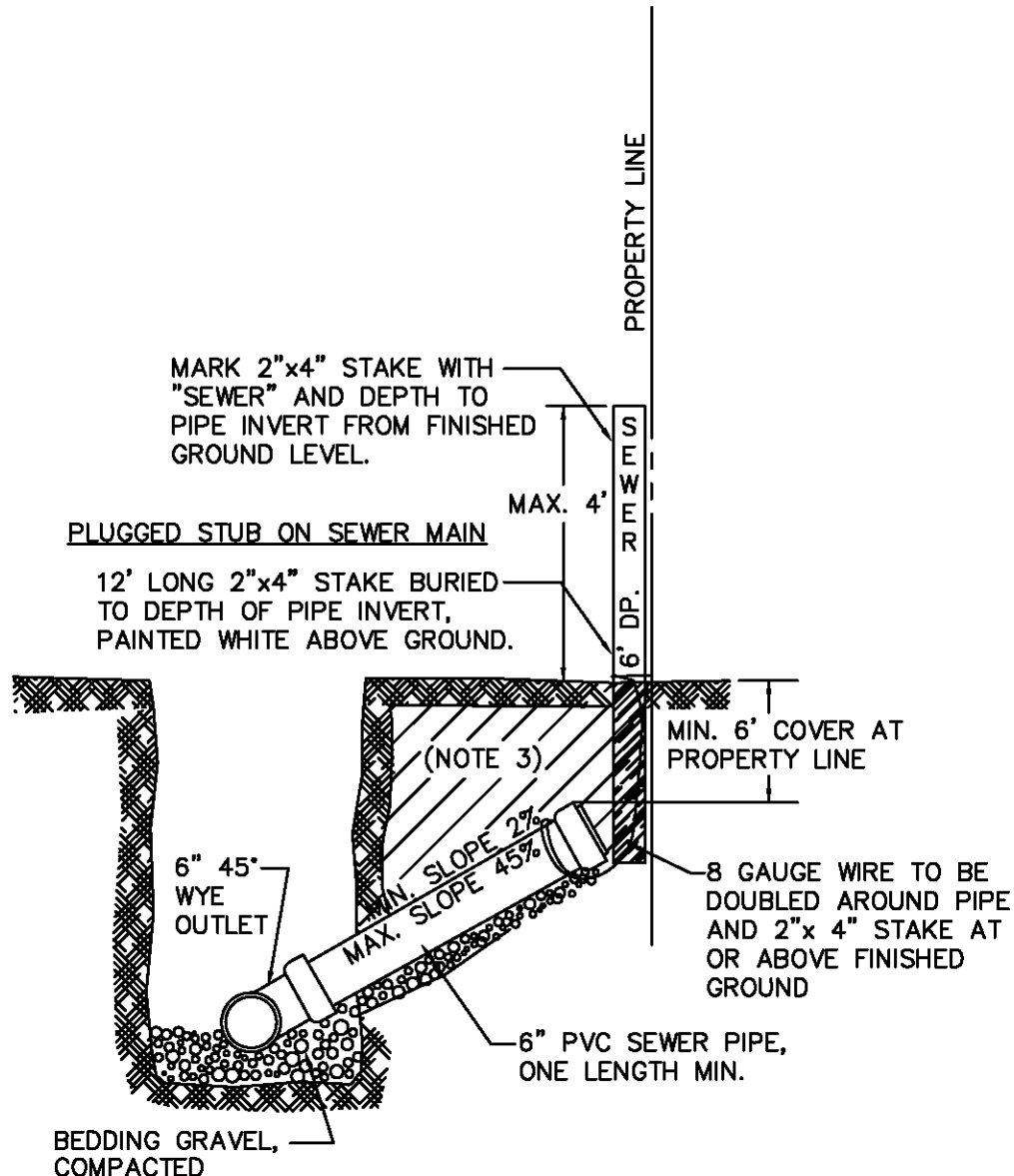


CITY OF KIRKLAND

PLAN NO. CK-S.18



SIDE SEWER  
MARKER POST



**NOTES:**

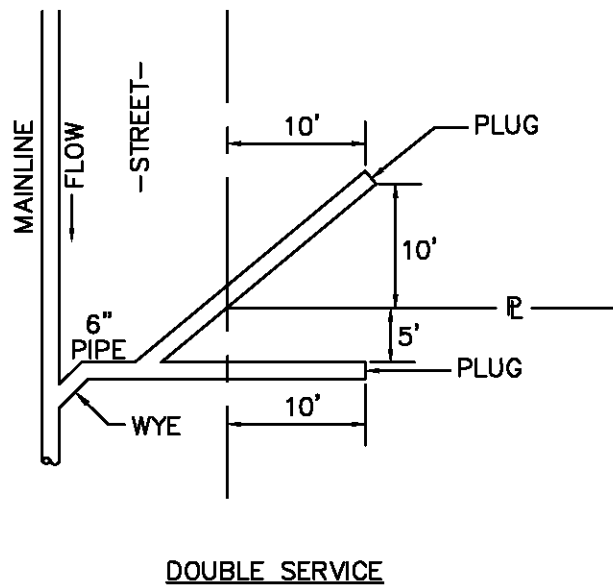
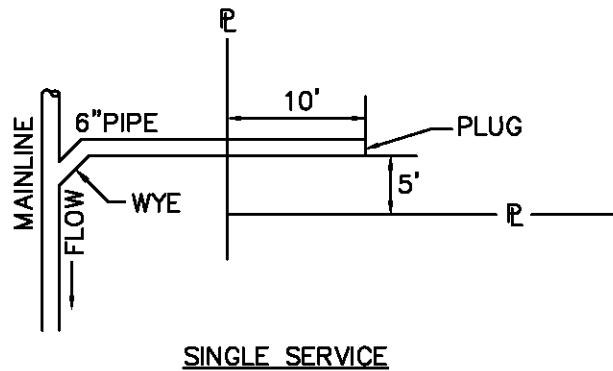
1. WHERE SIDE SEWER CONNECTS TO MANHOLE: INVERT OF SIDE SEWER SHALL BE EQUAL TO OR ABOVE MAIN SEWER CROWN, BUT NOT TO EXCEED 18" ABOVE INVERT OF MAIN SEWER. (FOR COMMERCIAL AND MULTIFAMILY APPLICATIONS ONLY)
2. UNLESS OTHERWISE INDICATED ON PLAN, SIDE SEWER SHALL BE MIN. OF 6' DEEP AT PROPERTY LINE, OR 5' LOWER THAN THE LOWEST ELEVATION, WHICHEVER IS LOWER.
3. TRENCH BACKFILL SHALL BE PER CITY OF KIRKLAND STD. PLAN NO. CK-S.01.

CITY OF KIRKLAND

PLAN NO. CK-S.19



SIDE SEWER STUB  
"PROFILE VIEW"



NOTES:

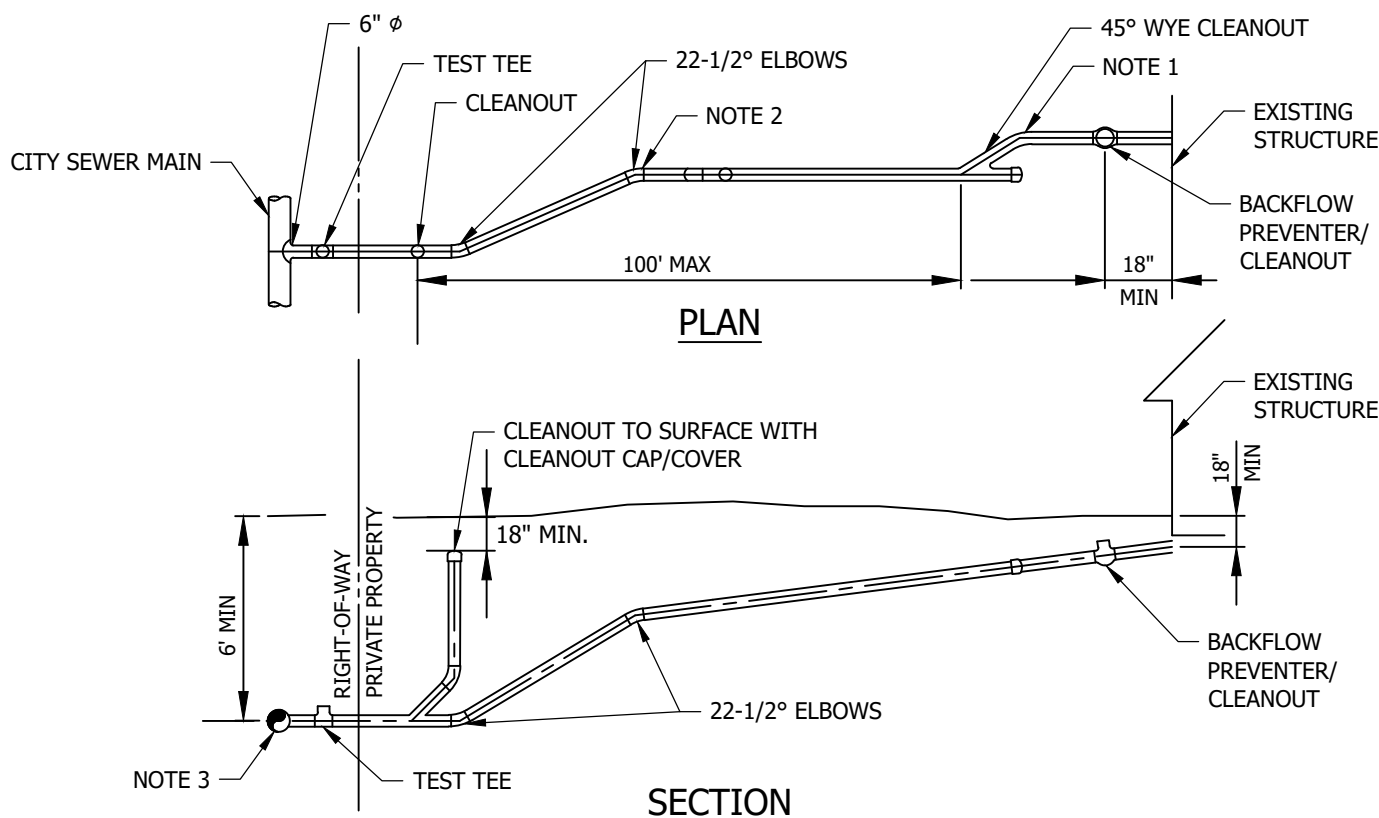
1. WHERE SIDE SEWER CONNECTS TO MANHOLE:  
INVERT OF SIDE SEWER SHALL BE EQUAL TO  
OR ABOVE MAIN SEWER CROWN, BUT NOT TO  
EXCEED 18" ABOVE INVERT OF MAIN SEWER.  
(FOR COMMERCIAL AND MULTIFAMILY  
APPLICATIONS ONLY)
2. UNLESS OTHERWISE INDICATED ON PLAN,  
SIDE SEWER SHALL BE MIN. OF 6' DEEP  
AT PROPERTY LINE, OR 5' LOWER THAN  
THE LOWEST ELEVATION, WHICHEVER IS  
LOWER.
3. TRENCH BACKFILL SHALL BE PER CITY OF  
KIRKLAND STD. PLAN NO. CK-S.01.

CITY OF KIRKLAND

PLAN NO. CK-S.19A



SIDE SEWER STUB  
"PLAN VIEW"



**NOTES:**

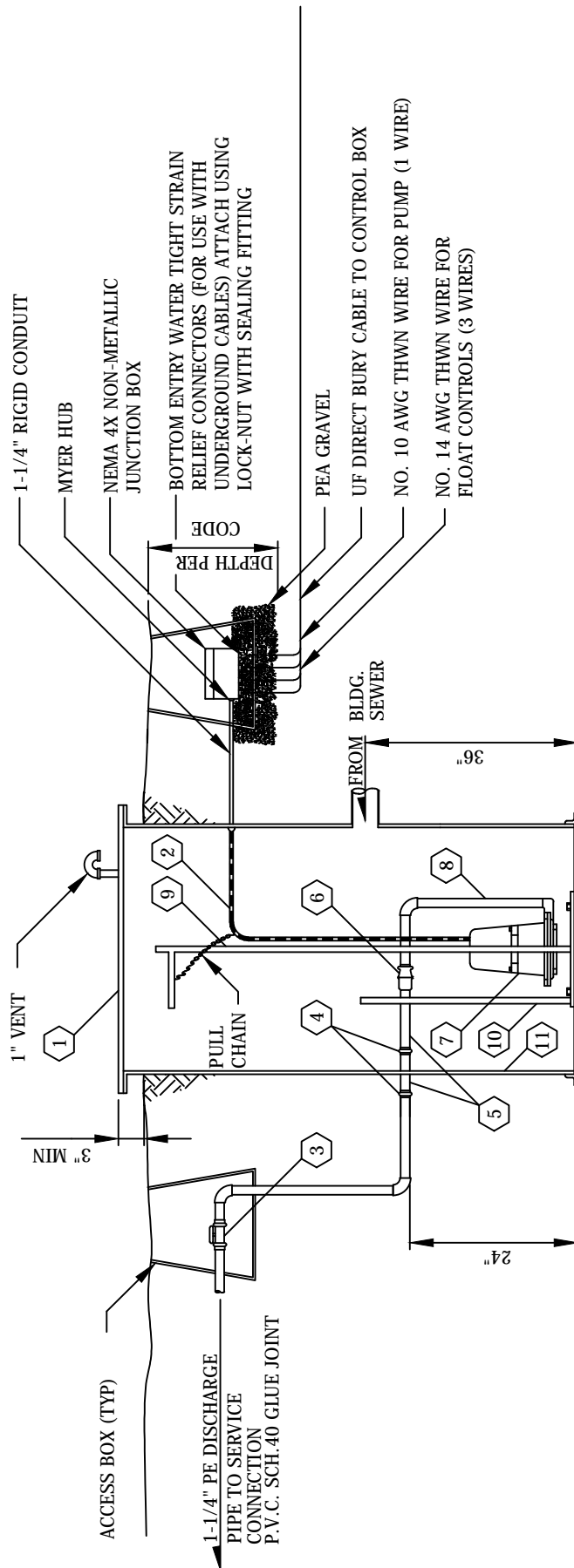
1. ELBOWS SHALL NOT BE GREATER THAN 45 DEGREES.
2. CLEAN OUT IS REQUIRED FOR EACH PIPE LENGTH GREATER THAN 100' AND FOR EACH 90 DEGREES ACCUMULATED ELBOW PER 100'.
3. RIGHT-OF-WAY RESTORATION SHALL MATCH OR EXCEED THE ORIGINAL CONDITION AND BE IN ACCORDANCE WITH THE CITY STANDARD.
4. BACKFILL FOR PAVED AREA SHALL BE 3/4" MINUS CRUSHED SURFACING TOP COURSE, COMPACTED IN 12" LIFTS.
5. ALL HOUSE PLUMBING OUTLETS MUST BE CONNECTED TO THE SEWER. NO DOWNSPOUTS OR STORM DRAINAGE MAY BE CONNECTED TO THE SEWER SYSTEM.
6. 6' MINIMUM COVERAGE AT PROPERTY LINE.
7. LAY PIPE IN STRAIGHT LINE BETWEEN BENDS. MAKE ALL CHANGES IN GRADE OR LINE WITH A 1/8 BEND OR WYE. 90 DEGREE CHANGE WITH 1/8 BEND AND WYE.
8. 6" SEWER PIPE MINIMUM SIZE IN STREET, AND ELSEWHERE AS DIRECTED BY ENGINEER. 2% MINIMUM GRADE (UNLESS DIRECTED BY ENGINEER) 50% MAXIMUM.
9. 4" SEWER PIPE MINIMUM SIZE ON PROPERTY. 2% MINIMUM GRADE, 100% (45 DEGREE) MAXIMUM.
10. TEST "T" WITH PLUG AT WYE.
11. ALL CONSTRUCTION WITHIN STREETS AND/OR PUBLIC RIGHT-OF-WAYS MUST BE DONE BY A STATE LICENSED GENERAL CONTRACTOR.
12. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT SIDE SEWER ORDINANCES.
13. ALL CONSTRUCTION REQUIRES A PERMIT AND PAYMENT OF FEE, COMPLETE LEGAL DESCRIPTION OF PROPERTY AND DIMENSIONS.
14. BACKFLOW PREVENTER (CHECK VALVE) IS REQUIRED:
  - a) IF CONNECTED TO A JOINT USE SIDE SEWER.
  - b) IF CONNECTION AT HOUSE IS LOWER THAN UPSTREAM MANHOLE LID.
15. AS-BUILT DRAWING SHOWING LOCATION OF SIDE SEWER IN RELATION TO THE HOUSE IS REQUIRED AFTER INSTALLATION.
16. SIDE SEWER BEDDING: PEA GRAVEL.
17. ASTM D-3034 OR SDR-35.

**CITY OF KIRKLAND**

PLAN NO. CK- S.20



**RESIDENTIAL  
SIDE SEWER  
INSTALLATION**



NOTES:

1. TOP OF TANK CAN BE SET FLUSH WITH GROUND, IF A CONCRETE PAD IS POURED AROUND THE LIFT STATION AND SLOPED AWAY FROM THE STATION. KEEP ROCKS AND DEBRIS OUT OF STATION.

2. ACCESS BOX:  
TRAFFIC AREAS - EQUAL TO  
CARSON MODEL 1419-14B WITH  
1419-2B COVER  
TRAFFIC AREAS- H-20 RATED  
CONCRETE BOX EQUAL TO  
FOGTTIE B9-1/2 METER BOX  
LIDS SHALL BE MARKED  
ELECTRICAL OR SEWER  
RESPECTIVELY OR HAVE NO  
MARKINGS AT ALL.

- ### 3. CONTROL FLOATS NOT SHOWN FOR CLARITY.

## GRINDER LIFT STA.

NTS

## MATERIALS LIST

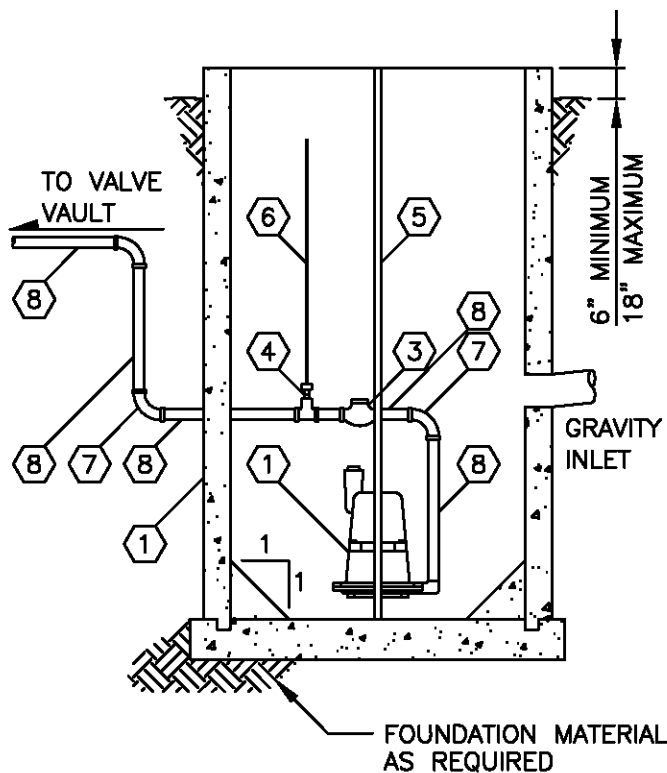
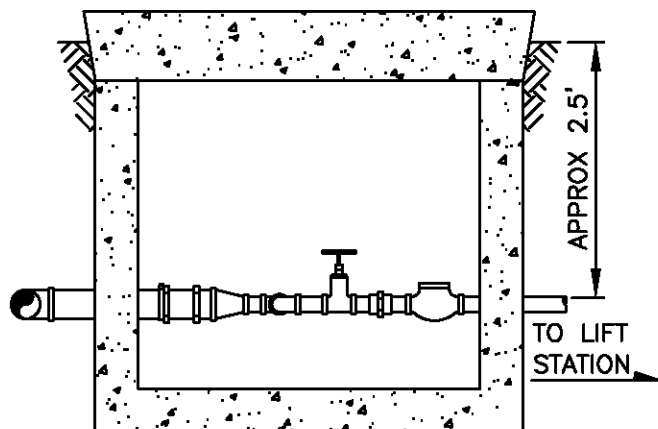
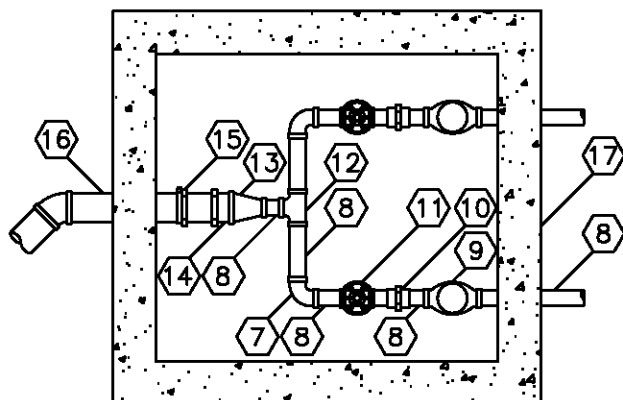
- |   |   |    |   |
|---|---|----|---|
| 1 | 24" DIA GALVANIZED COVER                                    | 7  | 2 HP GRINDER PUMP - SEE NOTES                     |
| 2 | POWER CONDUIT   | 8  | 1-1/4" GALVANIZED PIPING, APPROXIMATELY 1.2' LONG |
| 3 | 1-1/4" PVC TRUE UNION BALL VALVE (SS) HAYWARD OR EQUAL      | 9  | HOT DIPPED GALVANIZED STEEL RAIL GUIDE SYSTEM     |
| 4 | 1-1/4" PVC, COPPER OR APPROVED EQUAL UNION                  | 10 | HOT DIPPED GALVANIZED PUMP TECH SHORT RAIL        |
| 5 | 1-1/4" PVC, COPPER OR APPROVED EQUAL NIPPLES                | 11 | 24" X 60" FIBERGLASS TANK                         |
| 6 | CHECK VALVE AND PUMP DISCONNECT HYDROMATIC, GOULD OR EQUAL. |    |   |

## CITY OF KIRKLAND

PLAN NO. CK- S.21



# SINGLE FAMILY SIMPLEX SEWER LIFT STATION

LIFT STATION ELEVATIONVALVE VAULT ELEVATIONVALVE VAULT PLANEQUIPMENT SCHEDULE

ITEMS 1 THRU 6 BASED ON HYDR-O-RAIL, HYDR-O GRND DUPLEX PACKAGE LIFT STATION AS MANUFACTURED BY HYDROMATIC PUMP COMPANY.

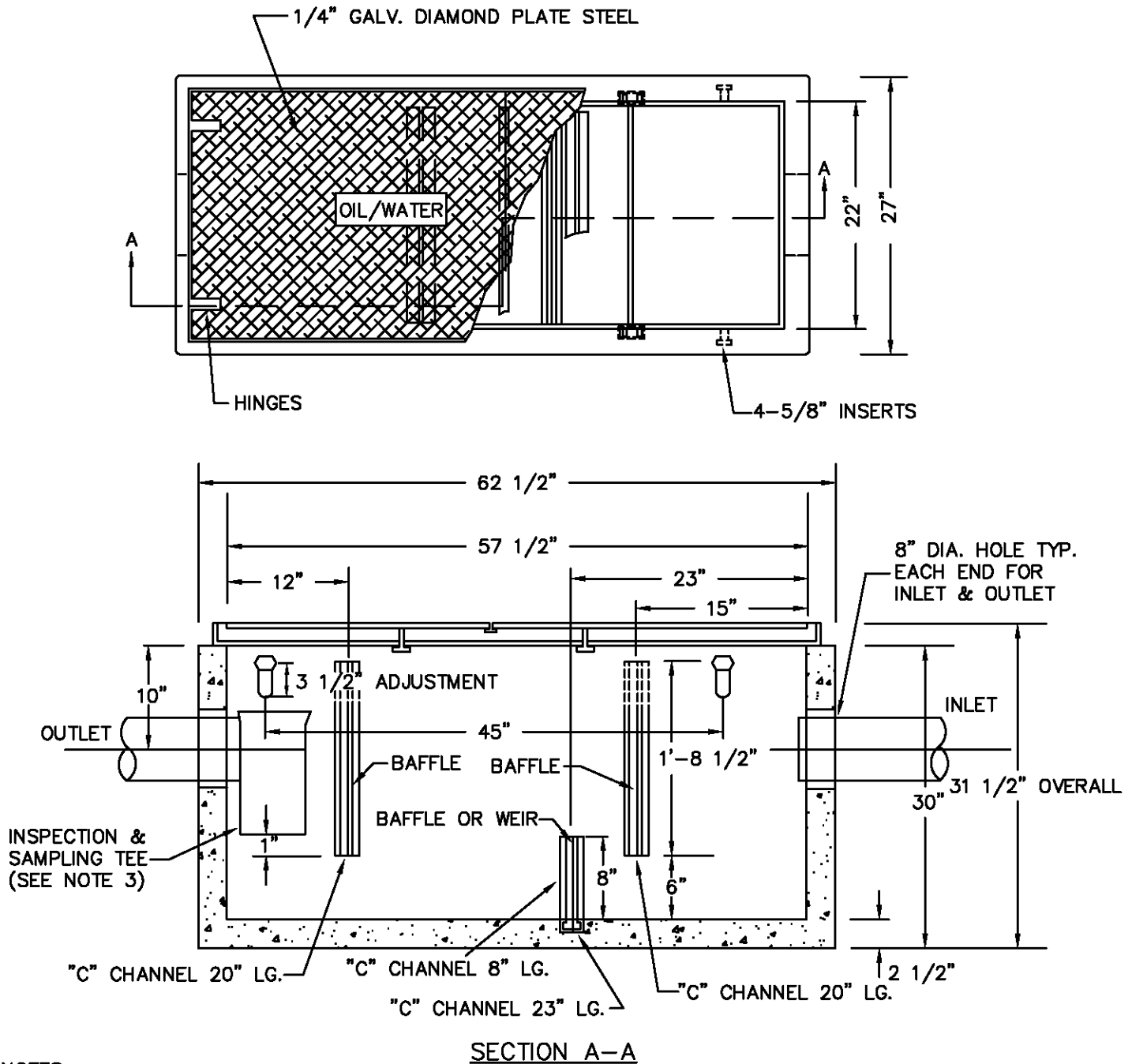
- ① 2 EXPLOSION-PROOF SUBMERSIBLE SEWAGE GRINDER PUMPS EQUAL TO HYDROMATIC 02FX500 5HP, 1750 RPM MOTOR. DESIGN POINT: GPM AT 54' TDH.
- ② 60" LD CONCRETE MANHOLE WITH GROUTED HOPPER BOTTOM AS SHOWN.
- ③ 2" BALL CHECK AGAINST HYDRAULICALLY SEALED DISCHARGE FLANGE EQUAL TO HYDROMATIC.
- ④ 2" GATE VALVE
- ⑤ 1-1/2" GALVANIZED GUIDE RAILS (2 EACH PER PUMP)
- ⑥ GATE VALVE EXTENSION (1 EACH PER VALVE)
- ⑦ 2" C.I. 90° BEND (S X S)
- ⑧ 2" C.I. PIPE (S X S)
- ⑨ 2" BALL CHECK (S X S)
- ⑩ 2" UNION
- ⑪ 2" GATE VALVE (S X S)
- ⑫ 2" C. I. TEE
- ⑬ 2" X 2-1/2" C.I. REDUCER (S X S)
- ⑭ 2-1/2" C.I. PIPE (S X S)
- ⑮ 2-1/2" COUPLING - C.I. TO PVC
- ⑯ 2-1/2" PVC PIPE & FITTINGS - ASTM D 2241 SDR 26. SEE SITE PLAN FOR CONTINUATION.
- ⑰ CONCRETE VAULT - 3.5' H X 3.5' L X 3.5' W EQUAL TO UTILITY VAULT MODEL 444-LA WITH 44-332P COVER. DRAIN TO NEAREST STORM DRAIN FACILITY.

CITY OF KIRKLAND

PLAN NO. CK- S.22



COMMERCIAL AND  
MULTI-FAMILY  
DUPLEX SEWER  
LIFT STATION



**NOTES:**

1. UTILITY VAULT COMPANY, INC., #25-SA, OR EQUAL. PRESET VAULT SHALL HAVE KNOCKOUTS AT ALL PIPE OPENINGS. IF KNOCKOUTS ARE NOT PRESENT THEN PIPE OPENINGS SHALL BE CORE-DRILLED. PIPE OPENINGS SHALL BE 2" LARGER THAN PIPE DIAMETER.
2. LOCATE WITHIN 20 FEET OF DRIVE FOR ACCESS BY MAINTENANCE VEHICLE.
3. INSPECTION AND SAMPLING TEE TO BE INSTALLED BY CONTRACTOR. LINE-SIZED PVC TEE SHALL BE USED WHERE LINE IS 6" DIA. OR GREATER. SIX INCH PVC TEE SHALL BE USED WHERE LINE-SIZE IS LESS THAN 6" DIA.
4. FILL WITH CLEAN WATER PRIOR TO STARTUP OF SYSTEM.
5. GRAY AND BLACK WATER SHALL BE CARRIED BY SEPARATE SIDE SEWER.
6. CONNECTIONS TO CONCRETE WALLS WITH P.V.C. PIPE REQUIRE KOR-N-SEAL CONNECTOR. SEAL ALL PIPE CONNECTIONS WITH NON-SHRINK GROUT.

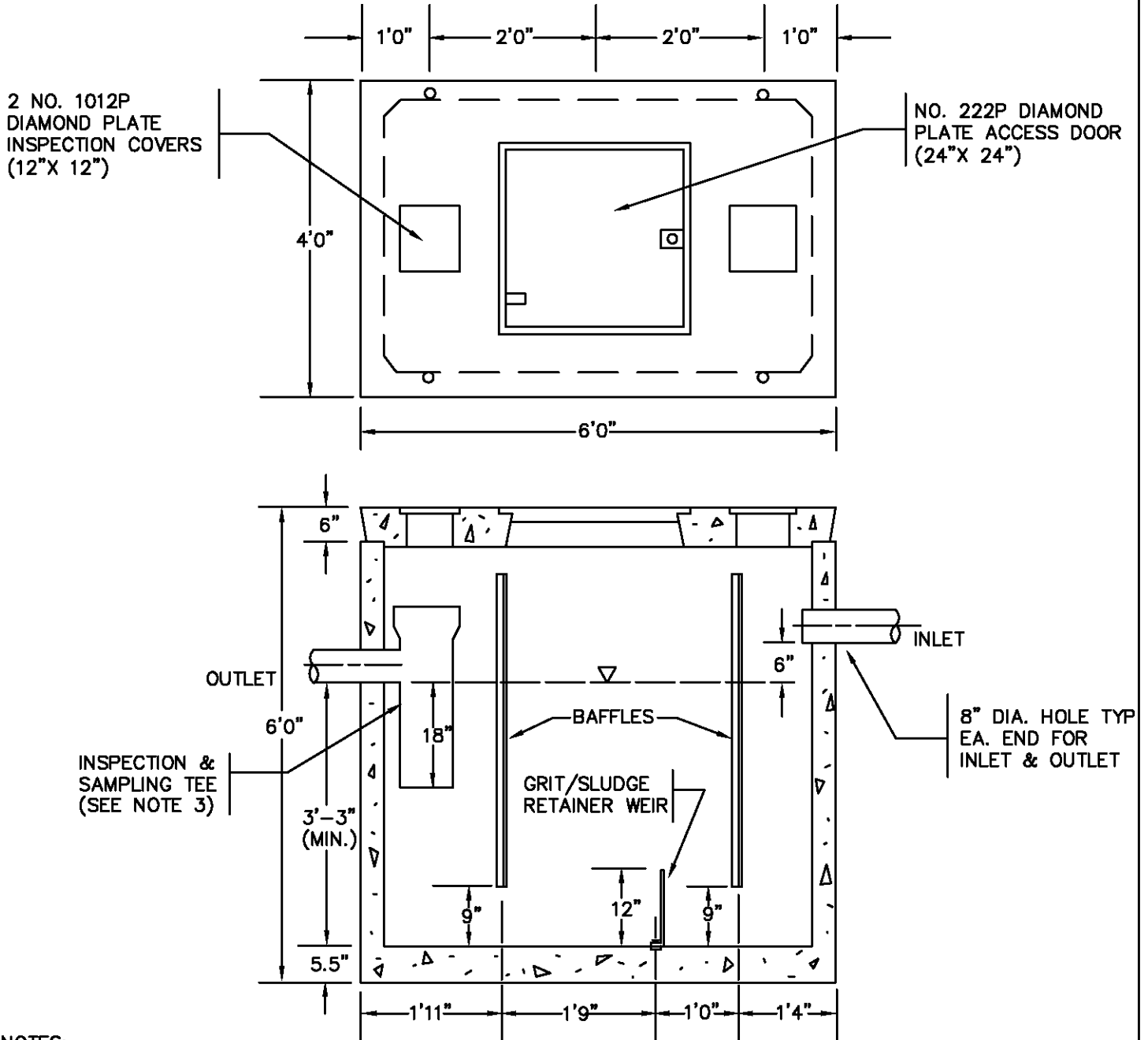
CITY OF KIRKLAND

PLAN NO. CK-S.23



100 GALLON BAFFLE  
TYPE OIL/WATER  
SEPARATOR





**NOTES:**

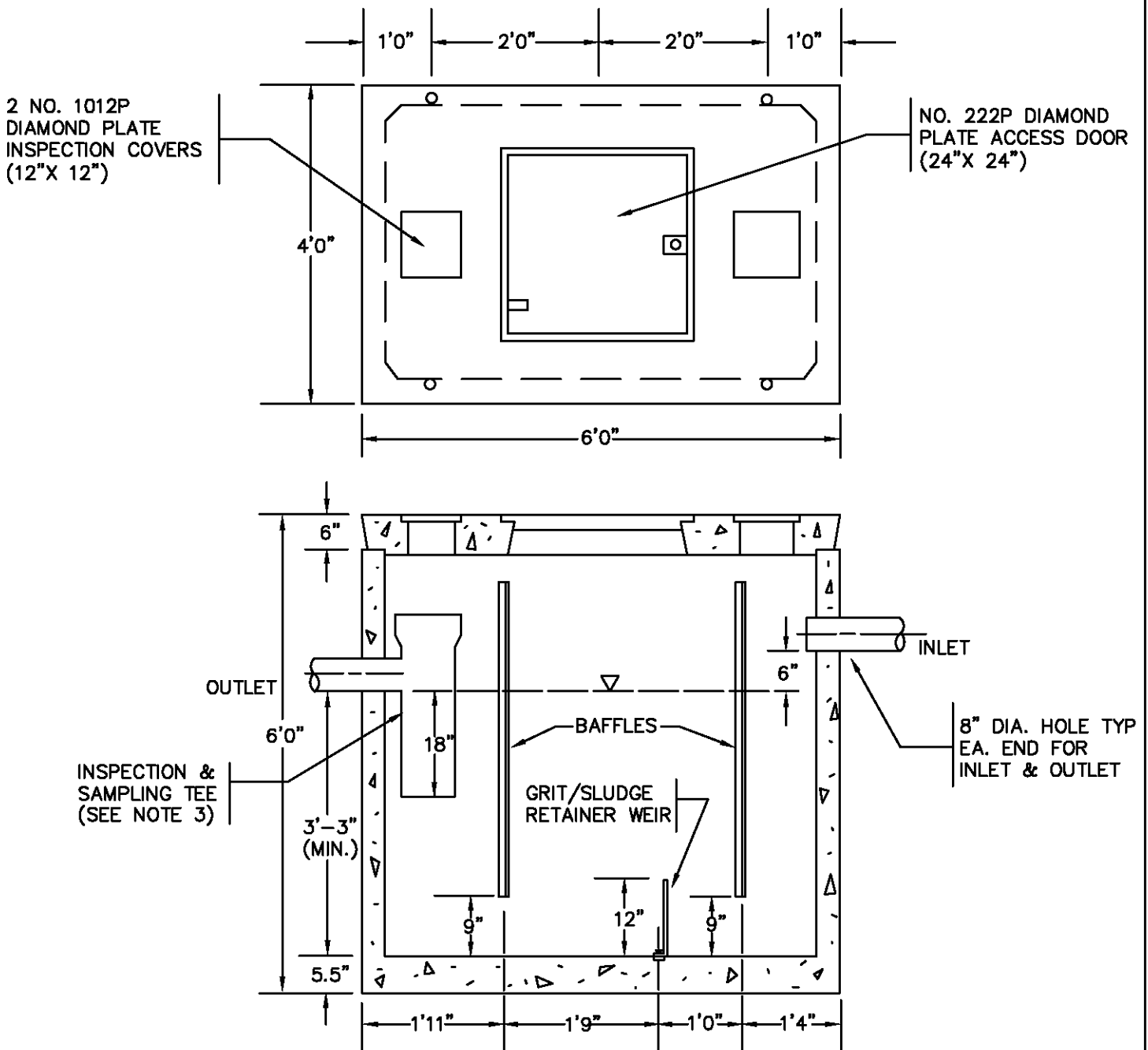
1. UTILITY VAULT COMPANY, INC., #660-SA, OR EQUAL. PRESET VAULT SHALL HAVE KNOCKOUTS AT ALL PIPE OPENINGS. IF KNOCKOUTS ARE NOT PRESENT THEN PIPE OPENINGS SHALL BE CORE-DRILLED. PIPE OPENINGS SHALL BE 2" LARGER THAN PIPE DIAMETER.
2. LOCATE WITHIN 20 FEET OF DRIVE FOR ACCESS BY MAINTENANCE VEHICLE.
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6. CONNECTIONS TO CONCRETE WALLS WITH P.V.C. PIPE REQUIRE KOR-N-SEAL CONNECTOR. SEAL ALL PIPE CONNECTIONS WITH NON-SHRINK GROUT.

CITY OF KIRKLAND

PLAN NO. CK-S.24



450 GALLON BAFFLE  
TYPE OIL/WATER  
SEPARATOR

**NOTES:**

1. UTILITY VAULT COMPANY, INC., #577-SA, OR EQUAL. PRESET VAULT SHALL HAVE KNOCKOUTS AT ALL PIPE OPENINGS. IF KNOCKOUTS ARE NOT PRESENT THEN PIPE OPENINGS SHALL BE CORE-DRILLED. PIPE OPENINGS SHALL BE 2" LARGER THAN PIPE DIAMETER.
2. LOCATE WITHIN 20 FEET OF DRIVE FOR ACCESS BY MAINTENANCE VEHICLE.
3. INSPECTION AND SAMPLING TEE TO BE INSTALLED BY CONTRACTOR. LINE-SIZED PVC TEE SHALL BE USED WHERE LINE IS 6" DIA. OR GREATER. SIX INCH PVC TEE SHALL BE USED WHERE LINE-SIZE IS LESS THAN 6" DIA.
4. FILL WITH CLEAN WATER PRIOR TO STARTUP OF SYSTEM.
5. GRAY AND BLACK WATER SHALL BE CARRIED BY SEPARATE SIDE SEWER.
6. CONNECTIONS TO CONCRETE WALLS WITH P.V.C. PIPE REQUIRE KOR-N-SEAL CONNECTOR. SEAL ALL PIPE CONNECTIONS WITH NON-SHRINK GROUT.

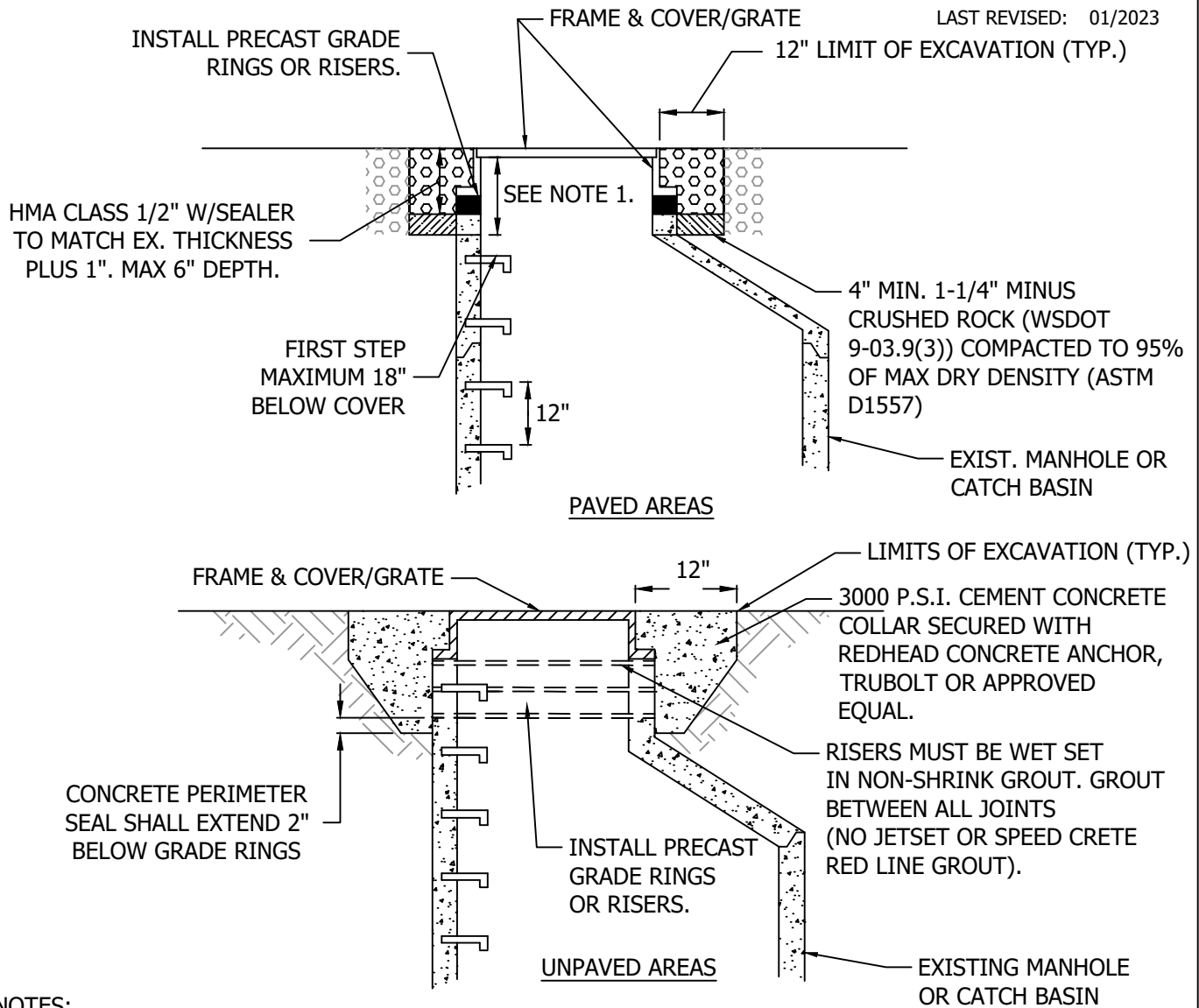
WATER DEPTH	GALLONS	FLOW RATE AT 45 MINUTE RETENTION
4'-0"	800	17.8 G.P.M.
5'-0"	1000	22.2 G.P.M.

CITY OF KIRKLAND

PLAN NO. CK-S.25

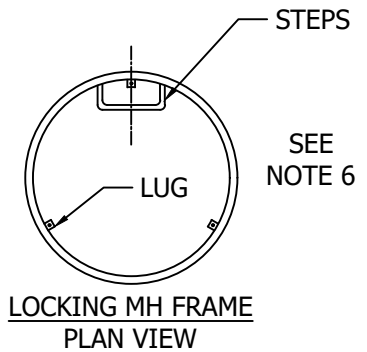


800 & 1000 GALLON  
BAFFLE TYPE OIL/  
WATER SEPARATOR



**NOTES:**

1. WHERE DEPTH OF NECK EXCEEDS 18 INCHES (INCLUDING FRAME AND COVER), ADJUST MANHOLE/CATCH BASIN TO GRADE BY INSERTING NEW BARREL SECTION BETWEEN THE CONE/SLAB AND EXISTING BARREL.
2. GRADE RINGS, RISERS AND FRAME SHALL BE SET IN 3/4" NON-SHRINK GROUT, GROUT BETWEEN ALL JOINTS. ALL SURFACES MUST BE CLEAN OF DEBRIS AND DIRT, AND WETTED PRIOR TO GROUTING. GROUT SMOOTH INSIDE AND OUTSIDE SURFACES PRIOR TO BACKFILL.
3. STEPS OR HAND HOLDS SHALL BE ADDED PER ASTM C478.
4. PRECAST GRADE RINGS AND RISERS MUST BE CAST WITH GROOVE TO ALLOW FIELD INSTALLATION OF SAFETY STEP WHEN RISER IS 4" OR HIGHER.
5. REPLACE EXISTING FRAME AND COVER/GRATE IF NOT MEETING CURRENT SPECIFICATIONS.
6. IF REQUIRED: LOCKING MH SHALL BE POSITIONED WITH ONE LUG CENTERED OVER STEPS, UNLESS USING CK-S.16A CASTING.

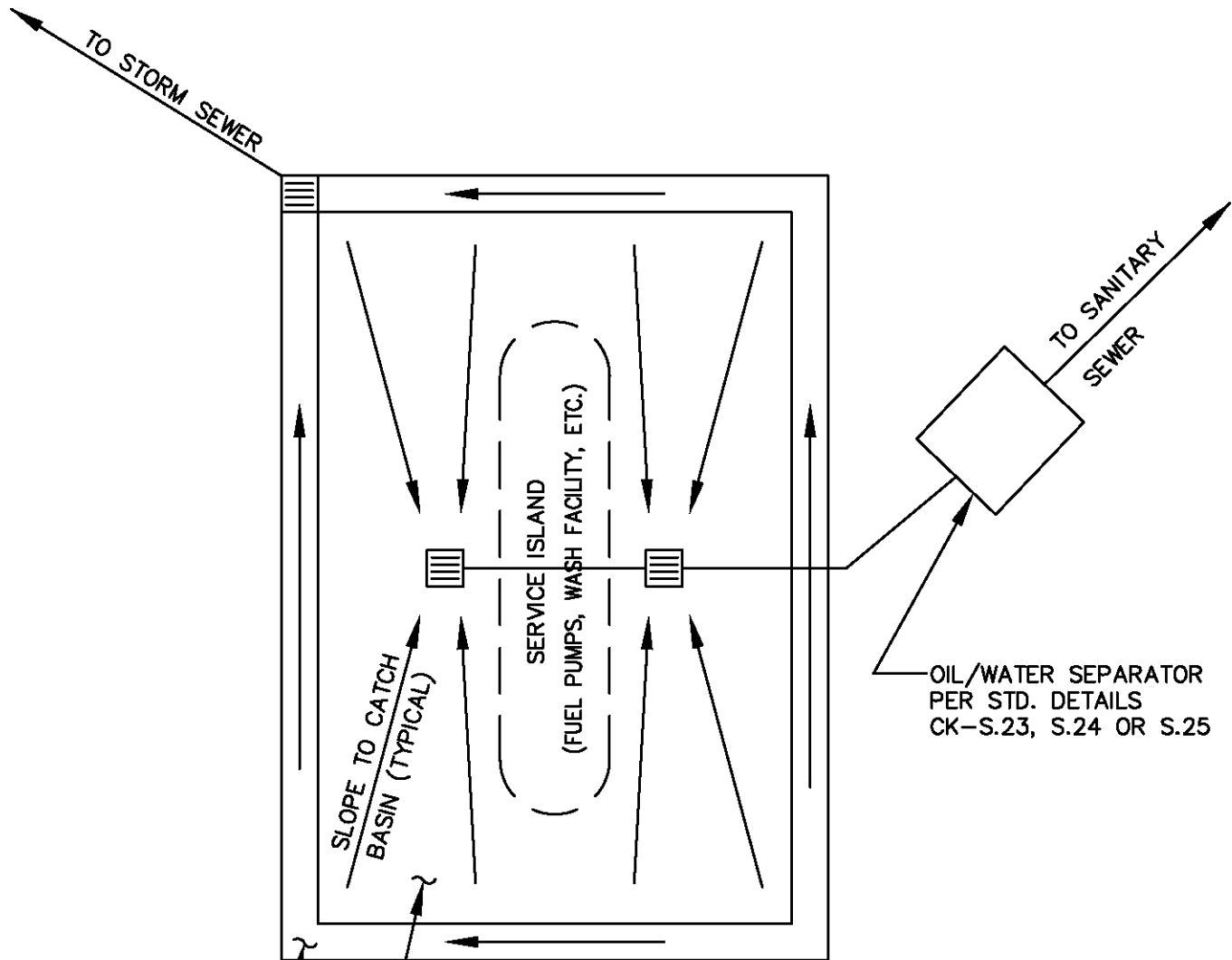


**CITY OF KIRKLAND**

**PLAN NO. CK - S.26**



**MANHOLE  
FRAME AND GRATE  
ADJUSTMENT**



UNCOVERED PAVED VEHICLE SERVICE AREA.  
NOTE: UNCOVERED AREA GRADED TO DRAIN  
TO SANITARY SEWER SHALL NOT EXCEED  
200 SQ. FT. AREAS OVER 200 SQ. FT.  
REQUIRE ROOF, WITH ROOF DRAINING TO  
STORM SYSTEM.

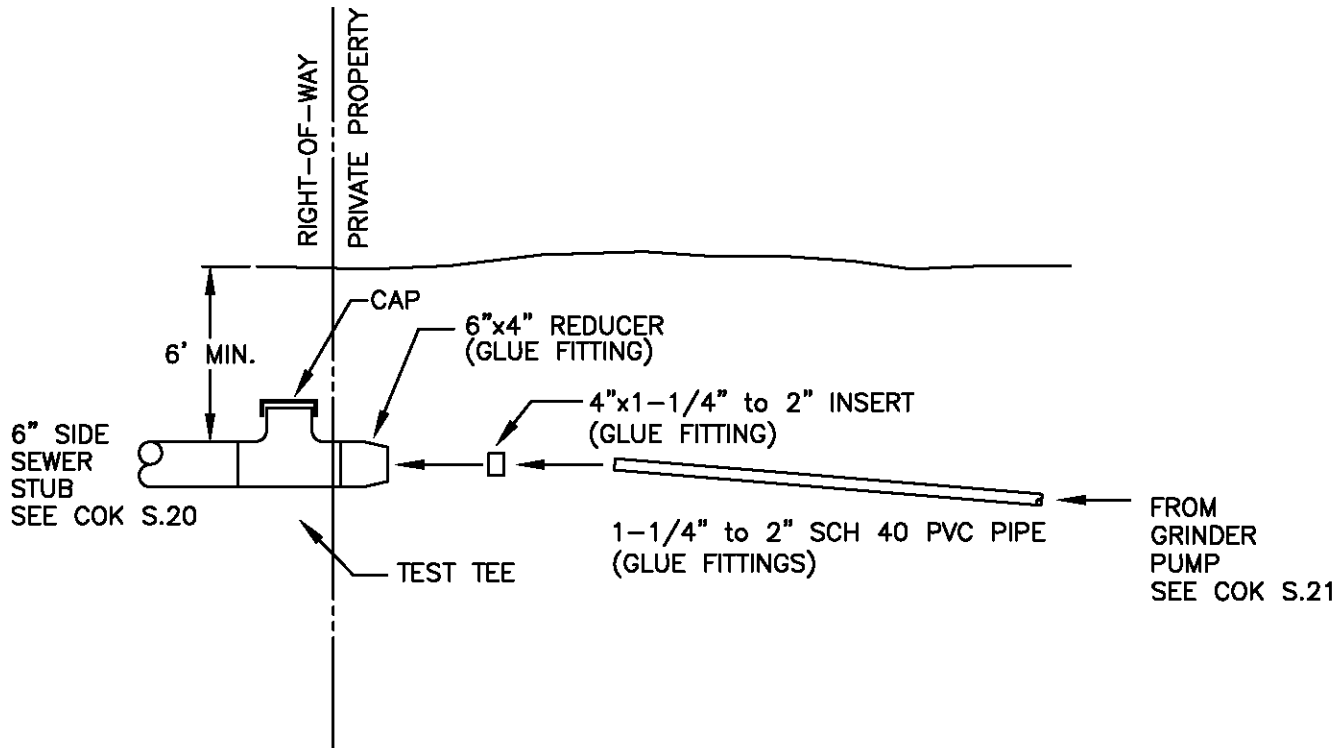
PAVED GUTTER. SLOPE TO STORM SEWER INLET.  
NOTE: GUTTER NOT REQUIRED WHERE SURROUNDING  
GRADE DRAINS AWAY FROM SERVICE AREA.

CITY OF KIRKLAND

PLAN NO. CK-S.27



PAVED VEHICLE  
SERVICE AREA  
DRAINAGE DETAIL



# SECTION

## NOTES

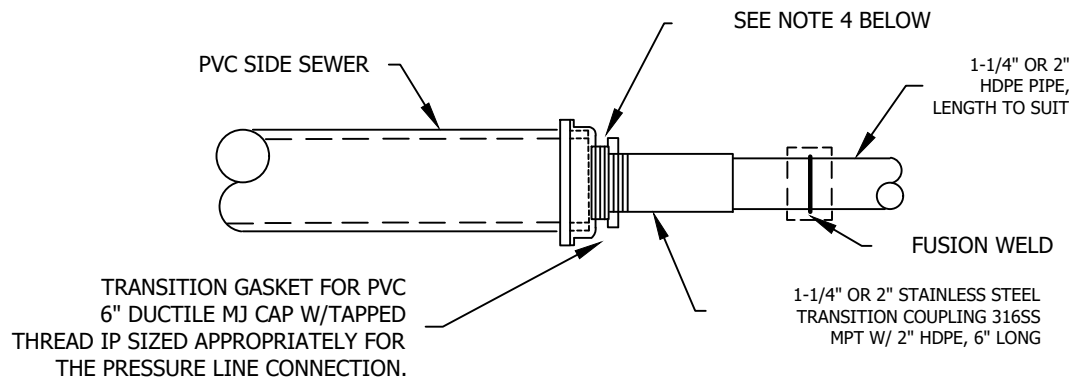
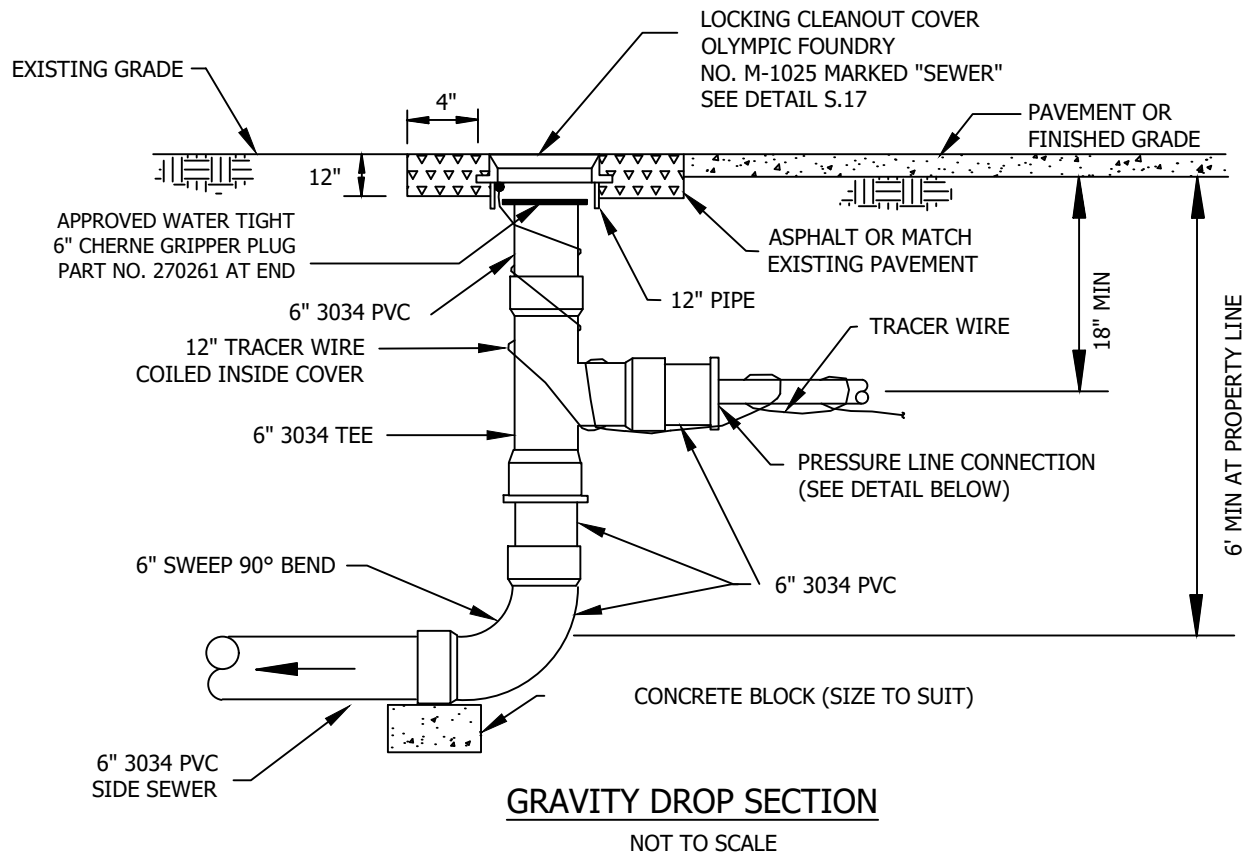
1. GRINDER PUMP DISCHARGE LINE MUST FLOW INTO A 6 INCH P.V.C. GRAVITY LINE. SIDE SEWER STUB.
2. 6 FOOT MINIMUM COVERAGE AT PROPERTY LINE AND IN RIGHT-OF-WAY.
3. 18 INCH MINIMUM COVERAGE OF PIPE ON PRIVATE PROPERTY.
4. RIGHT OF WAY RESTORATION SHALL MATCH OR EXCEED THE ORIGINAL CONDITION AND BE IN ACCORDANCE WITH THE CITY STANDARD.
5. BEDDING TO BE CLASS F PEA GRAVEL FOR GRINDER PUMP FORCE MAIN.
6. GRINDER PUMP FORCE MAIN SHALL BE LAID STRAIGHT WITH MINIMUM DEFLECTION.
7. PROTECTIVE STEEL CASING IS REQUIRED IF:
  - A. LESS THAN 3 FEET OF COVERAGE IS ATTAINABLE UNDER A DRIVING SURFACE.
  - B. UTILITY SEPARATION IS LESS THAN ADEQUATE.

CITY OF KIRKLAND

PLAN NO. CK-S.28



SINGLE FAMILY  
SIMPLEX SEWER  
LIFT STATION  
GRAVITY/FORCE-MAIN  
CONNECTION



**NOTES:**

1. ALL PVC FITTINGS SHALL BE GASKETED.
2. NO COLLECTION VALVE BOX REQUIRED.
3. CAP MAY BE BURIED 18" BELOW GRADE WITH PVC CAP, IF NOT PLACED UNDER HARD SURFACES.
4. FOR 1-1/4" SERVICE USE 2"x1-1/4" BRASS BUSHING FOR 2" TAP.
5. FOR 2" SERVICE, OMIT BUSHING.

**CITY OF KIRKLAND**

PLAN NO. CK- S.28A



SHALLOW FORCE  
MAIN CONNECTION

# Storm Drainage

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### **STORM DRAINAGE - PLAN NOTES**

1. A pre-construction conference shall be held prior to the start of construction. The Contractor shall be responsible for securing all necessary permits prior to construction.
2. Before any construction may occur, the contractor shall have plans which have been signed and approved by the City of Kirkland Public Works Department, obtained all City, county, state, federal and other required permits, and have posted all required bonds.
3. All storm drainage improvements shall be designed and constructed in accordance with the latest edition of the City of Kirkland Public Works Pre-Approved Plans and Policies and the Standard Specifications for Road, Bridge and Municipal Construction, prepared by WSDOT and the American Public Works Association (APWA).
4. Any deviation from the approved plans will require written approval, all changes shall be submitted to the City.
5. A copy of the approved storm water plans must be on the job site whenever construction is in progress.
6. All disturbed areas shall be seeded and mulched or similarly stabilized to the satisfaction of the City of Kirkland Department of Public Works for the prevention of on-site erosion after the completion of construction.
7. Minimum cover over storm drainage pipes in ROW or vehicular path shall be subject to Pre-Approved Plan CK-D.01, unless other design is approved.

8. All catch basins shall be Type I unless otherwise noted. Catch basins with a depth of over five feet (5') to the pipe invert shall be a Type II catch basin. Type II catch basins exceeding five feet (5') in depth shall have a standard ladder installed, unless approved by City of Kirkland Engineer.
9. All storm drainage main extensions within the public right-of-way or in easements must be staked for line and grade prior to starting construction.
10. Rock for erosion protection of roadway ditches, where required, must be of sound quarry rock, placed to a depth of one foot (1') and must meet the following specifications: 4"-8" rock/40%-70% passing; 2"-4" rock/30%-40% passing; 2"-minus rock/10%-20% passing. Recycled concrete shall not be used for erosion protection, including for construction entrance or temporary stabilization elsewhere on site.
11. All pipe, manholes, catch basins, and appurtenances shall be laid on a properly prepared foundation in accordance with the current State of Washington Standard specifications for road and bridge construction (WSDOT). This shall include necessary leveling of the trench bottom or the top of the foundation material as well as placement and compaction of required bedding material to uniform grade so that the entire length of the pipe will be supported on a uniformly dense, unyielding base. If the native material in the bottom of the trench meets the requirements for "gravel backfill for pipe bedding," the first lift of pipe bedding may be omitted provided the material in the bottom of the trench is loosened, regraded, and compacted to form a dense unyielding base. All pipe bedding shall be APWA Class B, Type I, or better. Pipe shall not be installed on sod, frozen earth, large boulders, or rock. Pipe bedding for flexible pipes shall be pea gravel to the springline of the pipe.
12. Construction of dewatering discharges shall always meet water quality guidelines listed in COK Policy E-1. Specifically, discharges to the public stormwater drainage system must be below 25ntu, and not considered a prohibited discharge (per KMC 15.52.090). Temporary discharges to sanitary sewer require prior authorization and permit from King County Industrial Waste Program (206-477-5300) and notification to the Public Works Construction Inspector.
13. Issuance of a Building or Land Surface Modification permit by the City of Kirkland does not relieve the owner of the continuing legal obligation and/or liability connected with storm surface water disposition. Further, the City of Kirkland does not accept any obligation for the proper functioning and maintenance of the system during or following construction except as outlined in the City of Kirkland Public Works Standards.
14. All trench backfill shall be compacted to 95 percent density in roadways, roadway shoulders, roadway prism and driveways, and 85 percent density in unpaved areas. All pipe zone compaction shall be 95 percent.
15. The Contractor shall be responsible for providing adequate safeguards, safety devices, protective equipment, confined space protection, flaggers, and any other needed actions to protect the life, health, and safety of the public, and to protect property in connection with the performance of work covered by the contract. Any work within the traveled right-of-way that may interrupt normal traffic flow shall require a Traffic Control Plan approved by the City of Kirkland. All sections of the WSDOT Standard Specifications, Traffic Control, and the Manual of Uniform Traffic Control Devices (MUTCD) shall apply.
16. No final cut or fill slope shall exceed slopes of two (2) horizontal to one (1) vertical without stabilization by rockery or by a structural retaining wall.

17. All manhole ladders shall be firmly attached and extend to within 1' of the bottom of the Storm Drainage – Plan notes (continued)

18. Approximate locations of existing utilities have been obtained from available records and are shown for convenience. The Contractor shall be responsible for verification of existing utility locations whether or not these utilities are shown on the plans. The Contractor shall exercise all care to avoid damage to any utility. If conflicts with existing utilities arise during construction, the contractor shall notify the City Construction Inspector and any changes required shall be approved by the Development Engineer prior to commencement of related construction on the project.
19. The underground utility location service shall be contacted for field location of existing utilities prior to any construction. The owner or their representative shall be contacted if a utility conflict exists. For utility location in King County, call 1-800-424-5555. The Contractor is responsible to ensure that utility locates are maintained throughout the life of the project.
20. The Contractor shall verify the locations, widths, thicknesses, and elevations of all existing pavements and structures that are to interface with new work. Provide all trimming, cutting, saw cutting, grading, leveling, sloping, coating, and other work, including materials as necessary, to cause the interface with existing works to be proper, acceptable to the Engineer and the City of Kirkland, complete in place and ready to use.
21. All inlet, manhole, and catch basin frames and grates shall not be adjusted to grade until immediately prior to final paving. All catch basin grates shall be set 0.10' below pavement level.
22. Open cut road crossings for utility trenches on existing traveled roadway shall be backfilled only with 5/8" minus crushed rock and mechanically compacted (unless otherwise approved by the City). For streets classified as arterials or collectors, backfill for crossings shall be CDF. Cuts into the existing asphalt shall be neat line cut with saw or jackhammer in a continuous line. A temporary cold mix patch must be placed immediately after backfill and compaction. A permanent hot mix patch shall be placed within 30 days and shall be a minimum of 1" thicker than the original asphalt with a minimum thickness of 2". See Standard D.02.
23. All damages incurred to public and/or private property by the contractor during the course of construction shall be promptly repaired to the satisfaction of the City Construction Inspector before project approval and/or the release of the project's performance bond.
24. Grout all seams and openings in all inlets, catch basins, and manholes. Jetset or speed crete red line grout is NOT allowed.
25. When widening an existing roadway where an existing Type I catch basin will remain in the travel lane, the existing frame and cover shall be replaced with a round, locking frame and cover.
26. For other than single-family dwellings, all exposed or readily exposed indoor storm drainage piping/plumbing shall be labeled with the words "STORM DRAIN" with minimum 2 inch high letters.
27. Recycled concrete shall not be used around stormwater facilities.

28. All fasteners (bolts, nuts, washers, etc.) on manhole and catch basin lids to be standard size. No metric fasteners allowed.
29. A special inspection using CCTV by a PACP (Pipeline Assessment Certification Program) or equivalent certified vendor is required for new storm segments that are publicly owned and maintained before inspector sign off.
30. Special Construction Note for Filterra Tree Boxes Only: At the time of planting, in addition to Filterra manufacturer specifications, trees must be a minimum 51 inches tall (4.25 feet) above the tree grate surface and .75 inch diameter at the grate opening. Pending design of the Filterra system, it is expected that in order to achieve this height above grate, the tree should measure at least 5.25 feet from the root collar of the tree.

## **STORM DRAINAGE - DESIGN CRITERIA**

### **I. DESIGN**

- A. To comply with the National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit, Kirkland adopted the 2021 King County Surface Water Design Manual. All development proposals are required to comply with the design standards in this manual.

### **II. PIPE**

#### A. Materials

##### 1. Acceptable Types

##### a. Publicly owned and maintained conveyance systems

- i. PVC 3034
- ii. Ductile Iron
- iii. C900/C905
- iv. HDPE for elevated (above ground) use only with approval from Public Works (not ADS N-12)

##### b. Privately owned and maintained conveyance systems, and Publicly and privately owned and maintained detention tanks

- i. PVC 3034
- ii. CPEP (ADS N-12 or equal)
- iii. Hancor High Q
- iv. Treatment 1 Steel
- v. Aluminum CMP: Pipe thickness shall be 0.060" (16 ga.) unless minimum bury cannot be obtained.
- vi. Concrete: Pipe must be steel reinforced type for sizes larger than 12" diameter.
- vii. Ductile Iron
- viii. C900/C905

- 2. All pipes shall have a minimum 18" of pipe cover in the ROW or private drives exposed to vehicular traffic. If pipe cover is less than 18 inches the pipe shall be ductile iron (Class 50) or C-900. Also, any pipes proposed to be installed in the load bearing zone of structural walls must be protected by a ductile iron (Class 50) sleeve. The design or use of DI sleeves must be approved by the City of Kirkland Department of Public Works.

3. Storm drainage pipes laid 16 feet and deeper must be cement lined, ductile iron pipe, Class 50.

B. Sizing

1. Size of the required pipe will be based on the Manning Equation with a minimum slope of 0.02 ft/ft for 6" pipe, 0.01 ft/ft for 8" pipe and 0.005 ft/ft for 12" pipe. Minimum velocity at full flow shall be 3.0 feet per second.
2. The following is a list of the minimum pipe diameter size for the listed pipe type:
  - a. Main Line 12"
  - b. Curb Inlet Crossing 12"
  - c. Side Line 6"
  - d. Perf Drain Line 6"
  - e. Rockery/Retaining Wall Drain 6"
3. Downstream pipe shall be the same size or larger than the upstream pipe.

C. Jointing

1. Aluminum CMP shall be band and gasket at all joints except in areas where a high water table problem exists.
2. Concrete pipe joints shall be styrene butadiene rubber (SBR) ring gasket.
3. PVC pipe shall be SBR gasket slide jointing.

D. Horizontal and Vertical Clearance

1. Minimum Horizontal Clearance between storm drainage, sanitary sewer, and water pipes shall be 5 feet, unless another design alternative has been specifically approved by the Development Engineer.
2. Minimum Vertical Clearance where storm drainage, sanitary sewers and water mains cross shall be 18 inches between the pipes, unless an alternative design has been specifically approved by the Development Engineer.

E. General

1. Bends are not allowed in main lines.
2. A catch basin is required for the following conditions:
  - a. A change in the flow-line slope.
  - b. At a maximum distance of 300' in a main line.

- c. A change in the pipe size.
  - d. For the jointing of two or more main lines.
  - e. For a side-line service.
  - f. A change in pipe-material type.
3. Tapping Tees are acceptable for side services where structures cannot be installed due to other structure conflicts, but only if a yard drain is located within 10' of the property line.

Blind tee connections to the City's storm system may be allowed on a case-by-case basis as determined by the City Public Works Department. Installation and examples of prohibited connections are found in Pre-Approved Plan No. CK-D.03A. *Hot saw cutting of the City's storm main is prohibited.*

- a. In areas having an existing piped conveyance system, the stormwater outfalls for single family roof, footing, and yard drains may be made by the two methods mentioned above or by the following (in order of preference),
    - i. Catch basin or manhole
    - ii. Cut-in Tee
    - iii. Core and Saddle Tap (Romac Sewer Saddle Model CB, or Equal, limited to 4" and 6" private connections)
    - iv. Inserta Tee (cored per manufacturer instructions)
  - b. Styrene butadiene rubber (SBR) sleeve and gasket to seal
  - c. Stainless steel metal parts to clamp.
4. All driveway culverts located within City of Kirkland rights-of-way shall be of sufficient length to provide a minimum 3:1 slope from the edge of the driveway to the bottom of the ditch. Culverts shall have beveled end sections to match the side slope.
5. Public Storm drains are to be centered in easements with a minimum width of 15 feet or two times the depth of the utility, whichever is greater. Reduction of the easement width may be allowed on a case-by-case basis.
6. Drainage outlets (stub-outs) shall be provided for each individual lot, except for those lots approved for infiltration by City of Kirkland Department of Public Works. Stub-outs shall conform to the following:
- a. Each outlet shall be suitably located at the lowest elevation on the lot, so as to service all future roof downspouts, footing drains, driveways, yard drains, and any other surface or subsurface drains necessary to render the lots suitable for their intended use. Each outlet shall have free-flowing positive drainage to an approved storm water conveyance system or to an approved outfall location.



- b. Outlets on each lot shall be located with a 5' high, white 2" x 4" stake marked "STORM" or "DRAIN." The stub-out shall visibly extend above surface level and be secured to the stake.
  - c. Pipe material shall conform to City of Kirkland standards.
  - d. Drainage easements are required for drainage systems designed to convey flows across more than one lot.
  - e. The Developer and/or Contractor is responsible for coordinating the locations of all stub-out conveyance lines with respect to the utilities (e.g., power, gas, telephone, television).
  - f. All individual stub-outs shall be privately owned and maintained by the respective property owner.
- 7. Building structures shall not be permitted within 10' of the outside of any storm drainage pipe, or 15' from the top of any channel bank.
  - 8. All building downspouts, footing drains, and lot drains on commercial sites shall be connected to the storm drainage system, unless otherwise approved by the Department of Public Works.
  - 9. Projects proposing to construct or replace onsite conveyance system elements that receive runoff from non-roof-top pollution generating impervious surface area must provide a spill control device as detailed in Section 4.2.1.1 of the 2021 King County Surface Water Design Manual prior to discharge from the site or into a natural onsite drainage feature. The intent of this device is to temporarily detain oil or other floatable pollutants before they enter the downstream drainage system in the event of an accidental spill or illegal dumping. It may consist of a tee section in a manhole or catch basin, or an equivalent alternative as specified in Section 4.2.1.1.

### **III. CATCH BASINS/INLETS**

#### **A. Material**

- 1. Shall be precast concrete steel reinforced construction.
- 2. Adjustment rings shall be precast concrete.
- 3. Grates and covers shall be ductile iron and frames shall be cast iron. Alternate plans are acceptable provided that they conform to shop drawings approved by the City of Kirkland. Covers shall be marked "STORM".

#### **B. Sizing**

- 1. Acceptable pipe sizes used with specific drainage structures shall conform to the following table:

**Table 1:** Pipe Sizes and Drainage Structures

Basin Type	Pipe Size								
	6"	8"	12"	15"	18"	24"	30"	36"	48"
Yard Drain	X								
Curb Inlet	X	X							
Type I CB	X	X	X	X					
Type I-L CB	X	X	X	X	X				
Type II-48" CB	X	X	X	X	X	X	X		
Type II-54" CB	X	X	X	X	X	X	X	X	
Type II-72" CB	X	X	X	X	X	X	X	X	X

2. Type II CB shall be used for all pipes larger than 18" and shall be sized at 1-1/2 times the largest connected pipe's diameter.
3. Public drainage structures easements on private property shall be channelized structures.

#### C. Depth

1. All catch basins with 5' or less between the top of grate and the pipe invert can be Type I CBs.
2. All catch basins with more than 5' between the top of grate and the pipe invert must be Type II CB's.

#### D. Spacing

1. For grades less than 8 percent, catch basin spacing shall be a maximum of 300 feet.
2. For grades from 8 to 12 percent, catch basin spacing shall be a maximum of 200 feet.
3. For grades greater than 12 percent, catch basin spacing shall be a maximum of 150 feet.

#### E. Grate Selection

1. Vaned or BI-Vaned grates only.
2. Through-curb frames with vaned grates shall be used for grade change points where the slope changes from a 6 percent or greater slope to a 2 percent or less slope.
3. Solid lids for Type II catch basins shall be round traffic-bearing and marked "STORM" or "DRAINAGE". Type I shall be traffic-bearing steel plates. Any solid lid in the public right-of-way shall be a round frame and cover that is referred to in the specifications.

4. All frame and covers shall be lockable with a standard 5/8" hex drive bolt (except Ergo frame and cover).

F. Joints

1. Type I joints shall be non-shrink grout.
2. Type II and larger manholes shall have gasketed joints and shall be watertight sealed.
3. Existing concrete pipe and CMP pipe shall be joined to the catch basin with non-shrink grout between the pipe and the structure.
4. PVC and other plastic pipes require a coupling adapter made for the pipe type and concrete joining and shall be installed with non-shrink grout to seal the connection.

G. Construction

1. Catch basins shall be bedded in pea gravel when:
  - a. The catch basin is a Type II or larger manhole assembly.
  - b. The placement is in a water table and the soil is unstable.
  - c. The base soils are over-excavated.
2. Adjustments over 2" to grade shall be with concrete adjustment rings. This should apply to all drawings.
3. Adjustments under 2" shall be with concrete or non-shrink grout. This should apply to all drawings.
4. For Type II CB's with eccentric cone top-section, the maximum adjustment distance is 12", not including casting.
5. For Type II CB's with flat-top, the maximum adjustment distance is 12", not including casting.
6. All connections to structures shall use sand collars with non-shrink grout (no Jet Set allowed).
7. Wood, rock, expansion joint or red brick shall not be used at any time. If standard grey concrete 2"x4"x8" bricks are used they shall be totally encapsulated with concrete or grout. This should apply to all drawings.
8. All adjustment risers shall be grouted down with non-shrink grout or some type of Portland and sand mixture. Dry stacking is not allowed.
9. In City approved circumstances where paved access cannot be provided to a catch basin, the catch basin shall be within 50 ft of paved access and pedestrian access must be maintained, i.e., fences shall have gates, etc. If paved access cannot be provided within 50ft of a catch basin, then the catch basin shall not have a sump and shall be channeled. In cases where a channeled catch basin is used there must

be a standard catch basin with paved access at least 200 ft upstream. In addition, the pipe slope downstream of the standard catch basin shall be 2% minimum.

#### H. Privately Owned Catch Basins, Area Drains, and Inlets.

1. Parking lots for three or more vehicles must have a catch basin to collect storm water.
2. All stormwater conveyance systems along Lake Washington shall pass through a structure, appropriate to the catch basin service area, with a floatable material separator, prior to discharging into the lake.
3. The service areas for all private Catch Basins and Area Drains shall conform to the following table:

<b>CATCH BASIN SERVICE AREAS</b> (This table does not apply to catch basins located in public streets)	
Catch Basin/Area Drain Size	Maximum Impervious Area Served
<u>Area/ Yard Drains</u> Yard Drain Standard Plan CK-D.05. The minimum sump is 1 foot in diameter and 18-inches-deep below the invert of the outlet pipe.	500 square feet
<u>Type 1 Catch Basins or Type 40</u> Catch Basin Standard Plan CK-D.07 or CK-D.05A. The sump is approximately 22 inches by 26 inches and 17 inches-deep below the outlet.	with a 4 inch outlet, 7,500 square feet with a 6 inch outlet, 15,000 square feet
<u>Type 2 Catch Basins</u> Catch Basin Standard Plan CK-D.09. The sump is a minimum of 4 feet in diameter and 2 feet deep below the outlet.	30,000 square feet

#### IV. PUBLICLY MAINTAINED DETENTION TANK

1. Coated Corrugated Metal Pipe (CMP):
  - a. Standard Specification: WSDOT 9-05.10
  - b. Exterior Protective Coating: Aluminum (Al Type 2) WSDOT / AASHTO M36 /M274
  - c. Alternate Exterior Protective Coating: Polymer per WSDOT / AASHTO M36 /M246
  - d. Interior Design: smooth or shallow corrugation; Manning's range,  $n = 0.012$  to  $0.015$
  - e. Maximum Diameter = 10 feet

f. Named Product: Contech ULTRA FLO, or Equal

2. Aluminum Alloy Pipe:

a. Standard Specification: WSDOT 9.05.5 and 9-05.11

b. Protective Polymer Coating: WSDOT / AASHTO M36 /M246

c. Interior Design: smooth or shallow corrugation; Manning's range,  $n = 0.012$  to  $0.015$

d. Maximum Diameter = 10 feet

e. Named Product: Contech CORLIX, or Equal

3. Steel-Reinforced Polyethylene Pipe (SRPE):

a. Standard Specification: WSDOT 9-05.21 and 9-05.22

b. Interior: smooth or shallow corrugation; Manning's range,  $n = 0.012$  to  $0.015$

c. Maximum Diameter = 10 feet

d. Named Product: Contech DuroMaxx, or Equal

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy D-2: BASIC AND SIMPLIFIED PROJECT DRAINAGE REVIEW REQUIREMENTS**

Kirkland Municipal Code (KMC) Chapter 15.52 requires a storm drainage design for all projects that trigger a drainage review per KMC 15.52.050. All projects must collect and convey stormwater runoff in a manner that does not create a drainage problem (or aggravate an existing problem) on adjacent properties. Kirkland has adopted the 2021 King County Surface Water Design Manual (KCSWDM) and the Kirkland Addendum to the 2021 KCSWDM (Pre-Approved Plans Policy D-10) for development in Kirkland, effective July 1, 2022.

Below are the levels of drainage review used in Kirkland (based on project and site characteristics):

- Basic drainage review
- Simplified drainage review
- Targeted drainage review
- Full drainage review

This policy includes the drainage review criteria and applicable submittal requirements for projects requiring Basic and Simplified drainage review. See Pre-Approved Plans Policy D-3 for details on Targeted and Full drainage reviews.

**A. Basic Drainage Review**

A project resulting in between 500ft<sup>2</sup> to 1,999ft<sup>2</sup> of *new impervious surface*<sup>1</sup> plus *replaced impervious surface*<sup>2</sup> areas.

**B. Simplified Drainage Review**

A single family residential project resulting in 2,000 sf or more of new plus replaced impervious surface, OR 7,000ft<sup>2</sup> or more of land disturbing activity (activity resulting in a change in the existing soil cover), **AND** ALL of the following:

1. Results in less than 5,000 sf of new plus replaced pollution generating impervious surface (PGIS), and
2. Results in less than ¾ acre of pollution generating pervious surfaces (PGPS), and
3. a. Projects predominantly on till soils: results in less than 7,947 sf of target impervious surface AND proposed pervious area is equal to or less than 14,941 – 1.88 x (total target impervious surface, OR  
b. Projects predominantly on outwash soils: results in less than 6,872 sf of target impervious surfaces AND proposed pervious area is equal to or less than 20,343 – 2.96 x (total target impervious surfaces), and
4. Does **not** contain (or is not adjacent to) a flood, erosion, steep slope, or landslide hazard areas, and
5. Does **not** contain (or is not adjacent to) surface water critical areas such as wetlands, streams, and lakes, and
6. Does **not** propose to construct or modify a drainage pipe/ditch that is 12in or more in size/depth, or receives surface and stormwater runoff from a drainage pipe/ditch that is 12in or more in size/depth.

**NOTE:** If the project does not qualify for either basic or simplified drainage review, please see Pre-Approved Plans Policy D-3 for details on Targeted and Full drainage reviews.

<sup>1</sup>**New impervious surface** means the addition of a hard or compacted surface like roofs, pavement, gravel, or dirt; or the addition of a more compacted surface, like paving over pre-existing dirt or gravel.

<sup>2</sup>**Replaced impervious surface** means any existing impervious surface on the project site that is proposed to be removed (removal of building/concrete/asphalt down to foundation) and re-established as impervious surface.

<sup>3</sup>**New pervious surface** means the conversion of a native vegetated surface or other surface to a non-native pervious surface (i.e., conversion of forest to lawn or bare soil), or any alteration of existing non-native pervious surface that significantly increases surface and storm water runoff.

<b>DRAINAGE REVIEW SUBMITTALS</b>		
<b>Permit or Project Type</b>	<b>Drainage Review Level</b>	<b>Submittals Required for Drainage Review</b>
<b>Single Family Residential</b>	If a part of a subdivision	<ul style="list-style-type: none"> <li>• Drainage Plan for individual site/lot (as shown on approved LSM)</li> <li>• Soil Report (if required)</li> <li>• ESC Plan</li> </ul>
	Basic	<ul style="list-style-type: none"> <li>• Site Plan</li> <li>• Drainage Plan</li> <li>• Soil Report (if required)</li> <li>• ESC Plan</li> </ul>
	Simplified	<ul style="list-style-type: none"> <li>• Drainage Plan</li> <li>• Drainage TIR with supporting documentation</li> <li>• Soil Report (if required)</li> <li>• Small Site CSWPP Plan</li> </ul>
<b>Commercial and Multi-Family</b>	Basic	<ul style="list-style-type: none"> <li>• Site Plan</li> <li>• Drainage Plan</li> <li>• Soil Report (if required)</li> <li>• ESC Plan</li> </ul>
<b>Notes:</b> <ol style="list-style-type: none"> <li>1. <b>Drainage Plans</b> must be prepared by a professional engineer or architect.</li> <li>2. <b>Soil Report</b> is required for infiltration facilities and infiltrating flow control BMPs. For additional information on the soil report requirements, see Chapter 5.2 (2021 KCSWDM) for infiltration facilities, and Pre-Approved Plans Policy D-8 for flow control BMPs.</li> <li>3. <b>Erosion and Sediment Control (ESC) Plan</b> includes erosion control measures to prevent the transport of sediment from the site. For examples of erosion control measures, see Appendix C.3 (2021 KCSWDM).</li> <li>4. <b>Site Plan</b> must show that the project meets the requirements of KMC 21.41.507 &amp; 15.52. Plan must be prepared by a professional engineer or architect.</li> <li>5. <b>Drainage Technical Information Report (TIR)</b> for details see the 2021 KCSWDM, section 2.3.1.1.</li> <li>6.</li> <li>7. <b>Small Site CSWPP Plan</b> is a modified version of the CSWPP Plan for projects subject to Simplified Drainage Review. See Pre-Approved Plans Policy D-12.</li> <li>8. For terminology clarifications, see <b>definitions</b> in the 2021 KCSWDM.</li> </ol>		

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### DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

#### **Policy D-3: TARGETED AND FULL DRAINAGE REVIEW REQUIREMENTS**

Kirkland Municipal Code (KMC) Chapter 15.52 requires a storm drainage design for all projects that trigger a drainage review per KMC 15.52.050. All projects must collect and convey stormwater runoff in a manner that does not create a drainage problem (or aggravate an existing problem) on adjacent properties. Kirkland has adopted the 2021 King County Surface Water Design Manual (KCSWDM) and the Kirkland Addendum to the 2021 KCSWDM (Pre-Approved Plans Policy D-10) for development in Kirkland, effective July 1, 2022.

Below are the levels of drainage review used in Kirkland (based on project and site characteristics):

- Basic drainage review
- Simplified drainage review
- Targeted drainage review
- Full drainage review

This policy includes the drainage review criteria and applicable submittal requirements for projects requiring Targeted and Full drainage review. See Pre-Approved Plans Policy D-2 for details on Basic and Simplified drainage reviews.

#### **A. Basic and Simplified Drainage Review**

Typical **Basic** projects create between 500 and 1,999ft<sup>2</sup> *new impervious<sup>1</sup> plus replaced impervious<sup>2</sup> surface areas* and **Simplified** projects are single family residential creating 2,000ft<sup>2</sup> or more of new plus replaced impervious surface area, and do not contain critical areas. See Policy D-2 for details on Basic and Simplified drainage review criteria and requirements.

#### **B. Targeted Drainage Review**

**Targeted** drainage review is required for projects that meet the new/replaced impervious area criteria for Basic or Simplified, and/or have characteristics that require a more in-depth level of review, such as:

- Projects containing or adjacent to a flood, erosion, steep slope, or landslide hazard areas,
- Projects containing or adjacent to surface water critical areas such as wetlands, streams, and lakes,
- Projects proposing to construct or modify a drainage pipe/ditch that is 12 in or more in size/depth, or receives runoff from a drainage pipe/ditch that is 12 in or more in size/depth,
- Projects are a redevelopment project proposing \$100,000 or more of improvements to an existing high-use site.

#### **C. Full Project Drainage Review**

Full drainage review is required for the following proposed projects (new or redevelopment):

- All non-single family residential projects that result in 2,000ft<sup>2</sup> or more of new plus replaced impervious surface area, OR
- Single family residential projects that exceed the Simplified drainage review level. For example:
  - Project results in 5,000ft<sup>2</sup> or more new plus replaced pollution generating impervious surface (PGIS) area,
  - Project results in ¾ acre or more pollution generating pervious surface (PGPS) area (like lawn, landscaped areas, grassed modular grid pavement, parks, and sports fields).

<sup>1</sup>**New impervious surface** means the addition of a hard or compacted surface like roofs, pavement, gravel, or dirt; or the addition of a more compacted surface, like paving over pre-existing dirt or gravel.

<sup>2</sup>**Replaced impervious surface** means any existing impervious surface on the project site that is proposed to be removed (removal of building/concrete/asphalt down to bare soil) and re-established as impervious surface.



### D. Drainage Submittal Requirements Table

DRAINAGE REVIEW SUBMITTALS		
Permit or Project	Drainage Review Level	Required for Drainage Review
<b>Single Family Residential</b>	If part of a subdivision	<ul style="list-style-type: none"> <li>• Drainage Plan for individual site/lot (as shown on approved LSM)</li> <li>• Soil Report (if required)</li> <li>• CSWPP Plan</li> </ul>
	Targeted	<ul style="list-style-type: none"> <li>• Engineering Plans</li> <li>• Drainage TIR</li> <li>• Soil Report (if required)</li> <li>• CSWPP Plan</li> </ul>
	Full	<ul style="list-style-type: none"> <li>• Engineering Plans</li> <li>• Drainage TIR addressing ALL core requirements</li> <li>• Soil Report</li> <li>• CSWPP Plan</li> </ul>
<b>Commercial and Multi-Family</b>	Targeted	<ul style="list-style-type: none"> <li>• Engineering Plans</li> <li>• Drainage TIR</li> <li>• Soil Report (if required)</li> <li>• CSWPP Plan</li> </ul>
	Full	<ul style="list-style-type: none"> <li>• Engineering Plans</li> <li>• Drainage TIR addressing ALL core requirements</li> <li>• Soil Report (if required)</li> <li>• CSWPP Plan</li> </ul>
<b>Other Projects</b>	Targeted or Full	<ul style="list-style-type: none"> <li>• Engineering Plans</li> <li>• Drainage TIR</li> <li>• Soil Report (if required)</li> <li>• CSWPP Plan</li> </ul>
<b>Notes:</b> <ol style="list-style-type: none"> <li>1. <b>Engineering plans</b> must be signed and stamped by a professional engineer registered in the state of Washington.</li> <li>2. <b>Drainage Technical Information Report (TIR)</b> for additional information on TIR requirements, see the 2021 KCSWDM, section 2.3.1.1.</li> <li>3. <b>Soil Report</b> is required for infiltration facilities and infiltrating flow control BMPs. For additional information on the soil report requirements, see Chapter 5.2 (2021 KCSWDM) for infiltration facilities, and Pre-Approved Plans Policy D-8 for flow control BMPs.</li> <li>4. <b>Construction Stormwater Pollution Prevention (CSWPP) Plan</b> includes both erosion control measures and stormwater pollution prevention and spill measures. For more information, see Pre-Approved Plans Policy D-12.</li> <li>5. For terminology clarifications, see <b>definitions</b> in the 2021 KCSWDM.</li> </ol>		

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy D-4: Construction Stormwater General Permit, Industrial Stormwater General Permit, and Underground Injection Control (UIC) Well Requirements**

**When Construction Stormwater General Permits Are Required:**

**For projects 1 acre or larger**, applicants are required to submit a Notice of Intent (NOI) to the Department of Ecology (Ecology) and obtain coverage under Ecology's Construction Stormwater General Permit (CSGP). This permit is issued by Ecology as part of the Federal Clean Water Act. Among other requirements, the CSGP will require a more detailed Construction Stormwater Pollution Prevention (CSWPP) Plan, in their format. Applicants must submit a draft Ecology CSWPP Plan at COK permit submittal, and final Ecology CSWPP Plan at the COK Per-Construction Meeting. For additional information, see the following Ecology website:

<https://ecology.wa.gov/regulations-permits/permits-certifications/stormwater-general-permits/construction-stormwater-permit>

**When Industrial Stormwater General Permits Are Required:**

Certain industrial sites or activities require coverage under the Industrial Stormwater General Permit (ISGP). This permit is issued by Ecology as part of the Federal Clean Water Act. New permittees must submit a complete Notice of Intent (NOI) at least 60 days before discharging stormwater from the facility. Additional information, including a list of applicable industrial activities, can be found at the following Ecology website:

<https://ecology.wa.gov/regulations-permits/permits-certifications/stormwater-general-permits/industrial-stormwater-permit>

**When Underground Injection Control Wells Are Required:**

**Register Infiltration /Drywell Systems:** Ecology requires registration of infiltration trenches and drywells that receive runoff from impervious areas other than roofs of single-family homes; as part of the Underground Injection Control (UIC) Program. For additional information, view <https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Underground-injection-control-program>. It is the applicant's responsibility to follow through with the registration process. Failure to do so may result in enforcement of WAC 173-218-130 by Ecology.

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy D-5: REQUIRED STORM SYSTEM EXTENSION PRIOR TO CONNECTION**

Prior to the connection or reconnection of any property, new development, and redevelopment projects to the public storm system, the storm main system must be extended to the subject property's farthest property line by way of public right-of-way or easement. The purpose of the storm system extension is to serve the property/development and provide for future extensions and connections as development and building projects occur upstream/upslope of the subject property. The Public Works Department requires storm system extensions as follows:

- If there is a need to collect and convey storm water from properties and rights-of-way upstream/upslope from the subject property, the Public Works Department shall determine the length and number of storm drain extensions required of the subject property. Depending on the characteristics of the upstream/upslope properties and right-of-way, more than one storm line extension may be necessary.
- The storm system must traverse along or through the subject property within a right-of-way or a recorded public storm drainage easement.
- If the property proposed for connection or reconnection has a public storm system fronting the property and the storm system extends to the farthest property line, and no other storm drain extensions are required either along another right-of-way frontage or through an easement, then the applicant may connect with an approved method as outlined in the current edition of the Public Works Department Pre-Approved Plans.
- If ground water is present on the property and it will be collected and directed to the ROW, it must be connected to the city storm system. Curb discharge will not be allowed. A storm extension will be required if no storm connection is available.

#### **Exemptions for single family infill projects only.**

If the property is over 330 feet from any approved storm system connection point, the property may be exempted from this policy if approved by the Public Works Department. The single-family home must manage storm water on site if feasible. If managing storm water on site is not feasible, contact Public Works to evaluate possible alternatives.

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### DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

#### **Policy D-6: DRAINAGE DITCH FILL-IN**

Any request to fill in an existing drainage ditch located within the City of Kirkland (COK) public right-of-way must comply with the requirements of this policy and the COK [Public Works Department Pre-Approved Plans](#). All costs associated with the required work will be borne by the applicant. Applicant is required to contact WA Dept. of Fish and Wildlife and US Army Corps of Engineers to determine if other permits are needed.

Upon receiving an inquiry to fill in a drainage ditch, Public Works staff will review the request and determine conditions on the subsequent work. Each request to fill in a ditch will be reviewed on a case-by-case basis, and will be conditioned accordingly. Public Works staff will review the application for completeness, review record drawings, and will conduct a site visit. Planning and Community Development staff will check for sensitive areas and possible stream determination. After reviewing this information, staff will either approve or deny the request. A request may be denied depending on potential stream impacts or if the ditch provides required water quality treatment.

#### PROCESS TO FILL-IN A DRAINAGE DITCH

Staff will create a permit and add conditions if approved; or let applicant know why request was denied.

If approved:

- 1) The property owner must obtain a [right-of-way permit](#) from Public Works.
- 2) Print and fill out the permit application and apply at the Public Works counter at City Hall.
- 3) The property owner must hire a state-licensed general contractor to perform the work.
- 4) The contractor must meet with the public works inspector at the site to review the scope of work to be performed.
- 5) Include a site plan of the proposed project with the application (see below for requirements).
- 6) Include a profile plan of the storm drain extension.
- 7) Include an Erosion and Sediment Control Plan for the land-disturbing project.
- 8) The property owner must post a right-of-way security deposit, based on the dollar value of the work to be performed. After completion of the work and acceptance by the Public Works Department, the City will then retain the right-of-way security deposit for 90 days. After the 90 days have elapsed, the Public Works Department will re-inspect the work. Once this has been completed, the security will be released.

The following are typical design requirements for a ditch fill-in:

- 1) Design of the storm drainage system by a civil engineer.
- 2) Installation of pipe in the ditch to continue conveyance of surface water.
- 3) Installation of 12" diameter PVC gravity pipe (ASTM D-3034), ductile iron pipe when minimum cover cannot be obtained.
- 4) Installation of a catch basin at both or one end of the ditch.

- 5) Installation of a catch basin to connect with existing pipes.
- 6) Saw-cutting, removal, and replacement of asphalt when the work encroaches into the pavement.
- 7) Applicant must determine if a US Army Corps of Engineers permit is needed (may be covered under Nationwide Permit #18 if fill is less than 25 cubic yards or 675 cubic feet, USACE requires notification if greater than 10 cubic yards or 270 cubic feet).
- 8) Applicant must determine if a Washington Department of Fish and Wildlife (WDFW) Hydraulic Project Approval (HPA) is needed (typically if the project is identified as a water of the state)

Please know that the Army Corps of Engineers (COE) and Department of Fish and Wildlife have asserted jurisdiction over upland ditches draining to streams. Either an existing Nationwide COE permit or an Individual COE permit and/or an HPA may be necessary for work within ditches, depending on the project activities. Applicants shall obtain the applicable COE and WDFW permits; information about COE permits can be found at: U.S. Army Corps of Engineers, Seattle District Regulatory Branch <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx> Specific questions can be directed to: Seattle District, Corps of Engineers, Regulatory Branch, CENWS-OD-RG, Post Office Box 3755, Seattle, WA 98124-3755, Phone: (206) 764-3495

Information about WDFW HPA permit can be found at:  
<http://wdfw.wa.gov/licensing/hpa/>

References:

[Storm Drainage Index and Notes](#)

City of Kirkland Pre-Approved Plans [D.07](#) and [D.14](#)

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy D-7: PRIVATE MAINTENANCE AGREEMENT  
AND LICENSE TO ENTER FOR A STORMWATER FACILITY**

The Private Maintenance Agreement and License to Enter will be recorded on all projects that construct a stormwater and/or LID facility.

The applicant must provide the City with an original signed copy of the maintenance agreement and license to enter prior to issuance of a Building or Land Surface Modification permit.

Maintenance Standards

The Maintenance Standards for the following flow control BMPs are included in this policy:

1. Permeable Pavement (permeable asphalt/concrete, and interlocking concrete paver blocks)
2. Bioretention and Rain Gardens
3. Infiltration Systems (including drywells and infiltration trenches)
4. Infiltration Vaults
5. Basic Dispersion Systems (including dispersion trenches, splash blocks, rock pads, and vegetated dispersion areas)
6. Vegetated Roofs
7. Rainwater Harvesting Systems
8. Native Growth Retention Area (NGRA)

Additional maintenance standards for these and other stormwater facilities can be found in the King County Surface Water Design Manual, and KMC 15.52.120.

## General Maintenance Requirements for Permeable Pavement

Maintenance Components	Required Inspection Frequency <sup>1</sup>	Condition When Maintenance is Required	Action Required
<b>Surface (address applicable components)</b>			
Permeable Asphalt or Concrete	Ongoing	Proactive measures.	Prohibit use of sand and sealant application and protect surface from adjacent runoff.
	A	Infiltration capacity of surface is restricted due to clogging.	Remove sediment and debris using brushes or sidewalk sweepers equipped with vacuums. After sediment removal, use an industrial pressure washer to restore permeability.
	A	Major cracks or trip hazards, and concrete spalling and raveling.	Fill with patching mixes. Large cracks and settlement may require cutting and replacing the pavement section.
Interlocking Concrete Paver Blocks	A	Infiltration capacity of surface is restricted due to clogging.	Remove sediment and debris using brushes or sidewalk sweepers equipped with vacuums.
	A	Paver block is missing or damaged.	Replace or repair damaged paver block.
	A	Settlement of surface.	May require resetting of blocks.
	A	Loss of void material between paver blocks.	Refill per manufacturer's recommendations.
Spill Response	As needed	Release of pollutants.	Clean up spills as soon as possible to prevent contamination of stormwater.

<sup>1</sup>Inspection Frequency: **A** = Annually; **B** = Biannually (twice per year); **S**= Additional inspections should be performed after major storm events. For debris/clog related maintenance, inspection should occur in the early fall, after deciduous trees have lost their leaves.

## General Maintenance Requirements for Bioretention and Rain Gardens

Maintenance Components	Required Inspection Frequency <sup>1</sup>	Condition When Maintenance is Required	Action Required
<b>Ponding Area</b>			
Earthen reservoir (berms, weirs, and side slopes)	B, S	Erosion (gullies/rills) greater than 2 inches deep around inlets, outlet, and side slopes	Eliminate cause of erosion and stabilize damaged area (regrade, rock, vegetation, erosion control blanket)
	A, S	Settlement greater than 3 in.	Restore to design height
	A, S	Downstream face of berm or embankment wet, seeps or leaks evident	Plug holes. Contact geotechnical engineer ASAP.
Sediment or debris accumulation	B	Accumulated sediment or debris significantly impacting rain garden infiltration rate or surface storage capacity	Remove excess sediment, bioretention soil, or debris. Identify and control the sediment source.
Inlet via surface flow	A, S	Soil is exposed, signs of erosion are visible	Repair and control erosion sources
Inlet via concentrated flow (curb cuts or pipe)	A, S	Sediment, vegetation, or debris partially or fully blocking inlet structure. Pipe is damaged or clogged.	Clear the blockage. Identify source of blockage and take actions to prevent future blockages. Repair or replace pipe if needed.
	A, S	Water disrupts soil media	Reconfigure inlet, add plants/rock
Outlet pipe/structure	A, S	Sediment, vegetation, or debris partially or fully blocking outlet structure. Pipe is damaged or clogged.	Clear the blockage. Identify source of blockage and take actions to prevent future blockages. Repair or replace pipe if needed.
Trash rack	A, S	Trash or other debris present	Remove and dispose trash/debris
	A	Bar screen damaged or missing	Repair or replace bar screen
Check dams and weirs	A, S	Sediment, vegetation, or debris blocking flow control weir or check dam	Clear the blockage
	A, S	Erosion and/or undercutting is present	Repair and take preventative measures to prevent future erosion or undercutting
	A	Grade board or top of weir damaged or not level	Restore to level position
Overflow or emergency spillway	A, S	Overflow spillway is 50% plugged with sediment or debris	Remove and dispose sediment/debris
	A, S	Native soil is exposed or other signs of erosion damage	Repair erosion and stabilize surface of spillway
Bioretention soil	As Needed	Water remains in the basin 48 hours or longer after the end of a storm	Check underdrain and remove clogs. If soil is clogged, remove upper 3" of soil and replace with imported bioretention soil. Identify clogging sources and correct.

<sup>1</sup>Inspection Frequency: **A** = Annually; **B** = Biannually (twice per year); **S**= Additional inspections should be performed after major storm events. For debris/clog related maintenance, inspection should occur in the early fall, after deciduous trees have lost their leaves.



## General Maintenance Requirements for Bioretention and Rain Gardens (continued)

<b>Vegetation</b>			
Vegetation along cell bottom	Monthly	Poor vegetation growth (less than 75% coverage) or weeds cover more than 15% of area	Determine cause of poor vegetation growth and correct. Remove weeds and replant with native species as necessary to obtain coverage.
Vegetation along cell upland slope	Monthly	Poor vegetation growth (less than 75% coverage) or weeds cover more than 15% of area	Determine cause of poor vegetation growth and correct. Remove weeds and replant with native species as necessary to obtain coverage.
Trees and shrubs	A	Large trees and shrubs interfere with operation of the basin or access for maintenance	Prune or remove large trees and shrubs. Replace with other native species as necessary to obtain coverage.
	A	Standing dead vegetation is present	Remove dead vegetation when covering greater than 10% of basin area. Replace dead vegetation annually or immediately if necessary to control erosion. Determine cause for dead vegetation and correct problem.
Mulch	A	Bare spots (without mulch cover) are present or mulch depth is less than 2 inches	Replenish mulch to cover bare spots and augment to minimum depth of 3 inches.
Weeds	Monthly (March-September)	Weeds are present. See King County noxious weed list: <a href="http://www.dnr.metrokc.gov/wlr/lands/weeds/laws.htm">www.dnr.metrokc.gov/wlr/lands/weeds/laws.htm</a>	Remove weeds. To protect water quality, do not use herbicides or pesticides. Class A & B noxious weeds must be removed, bagged, and disposed of as garbage immediately. Reasonable attempts must be made to remove class C.
Line of sight	A	Vegetation causes visibility or driver safety issues.	Prune or remove if continual safety hazard
<b>Irrigation</b>			
Irrigation system (if any)	Monthly (May-Sept)	Irrigation system is present but not functioning properly	Follow manufacturer's instructions for operation, maintenance, and troubleshooting
Plant Watering	Weekly or as required (May-Sept)	Plant establishment period (2-3 years)	Water weekly during periods of no rain to ensure plant establishment
	As Needed	Longer term period (3+ years)	Water during drought conditions or more often if necessary to maintain plant cover
<b>Pest Control</b>			
Mosquitoes	B, S	Standing water remains for 3 days following storms.	Manually remove standing water, identify cause and take appropriate actions to improve the drainage.
Rodents	As Needed	Rodent holes present	Fill and compact soil around the holes
<b>Other</b>			
Spill Response	As Needed	Release of pollutant into rain garden	Clean up spill as soon as possible to prevent contamination of stormwater. Replace vegetation if needed.

<sup>1</sup>Inspection Frequency: **A** = Annually; **B** = Biannually (twice per year); **S**= Additional inspections should be performed after major storm events. For debris/clog related maintenance, inspection should occur in the early fall, after deciduous trees have lost their leaves.

## General Maintenance Requirements for Infiltration Systems (Drywells and Infiltration Trenches)

Maintenance Components	Required Inspection Frequency <sup>1</sup>	Condition When Maintenance is Required	Action Required
Rock Trench / Well			
Surface of trench/well (i.e, water enters through exposed aggregate)	Fall, Spring	Accumulated trash, debris, or sediment on drain rock surface impedes sheet flow into facility	Remove/dispose in accordance with local solid waste requirements
	A, W	Vegetation/moss present on drain rock surface impedes sheet flow into facility	Maintain open, freely draining drain rock surface
Drain Rock	Fall, Spring	If water enters the facility from the surface, inspect to see if water is ponding at the surface during storm event	Clear piping through facility when ponding occurs  Replaced rock/sand reservoirs as necessary
		If buried drain rock, observe drawdown through observation port or cleanout	Tilling of subgrade below reservoir may be necessary (for trenches) prior to backfill
Inlet/Outlet Pipe Conveyance			
Pipes(s)	A, W	Accumulation of trash, debris, or sediment in roof drains, gutters, driveway drains, area drains, etc.	Remove/dispose
	A, W	Pipe from sump to trench or drywell has accumulated sediment or is plugged	Clear sediment from inlet/outlet pipe screen and inlet/outlet pipe
	A, W	Cracked, collapsed, broken, or misaligned drain pipes	Repair/seal cracks  Replace where repair is insufficient
Roof Downspout	B, W	Splash pad missing or damaged	Replace/replace
	A, W	Leaves or other debris plugging downspout	Remove/dispose
Storage Sump			
Sump	A	Sediment in the sump should be removed annually	Remove/dispose in accordance with local solid waste requirements
Access Lid	A	Cannot be easily opened	Repair/replace
	A	Buried	Refer to record drawings for design intent. If the access lid was designed to be exposed, expose and restore to surface grade
	A	Cover missing	Replace

<sup>1</sup>Inspection Frequency: **A** = Annually; **B** = Biannually (twice per year); **W** = At least one visit should occur during the wet season (for debris/clog related maintenance)

## General Maintenance Requirements for Infiltration Vaults

Maintenance Components	Required Inspection Frequency <sup>1</sup>	Condition When Maintenance is Required	Action Required
<b>Site</b>			
Trash and debris		Any trash and debris which exceed 1 cubic foot per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one standard size office garbage can). In general, there should be no visual evidence of dumping	Remove trash and debris from site
Noxious Weeds		Any noxious or nuisance vegetation which may constitute a hazard to City personnel or the public.	Noxious and nuisance vegetation removed according to applicable regulations.
Contaminants and pollution		Any evidence of contaminants or pollution such as oil, gasoline, concrete slurries or paint	Materials removed and disposed of according to applicable regulations.
Grass/ groundcover		Grass or groundcover exceeds 18 inches in height	Mow grass to a height no greater than 6 inches.
<b>Infiltration Vault Storage Area</b>			
Sediment accumulation		If two inches or more sediment is present or a percolation test indicates facility is working at or less than 90% of design	Remove sediment and reestablish infiltration to infiltrate as designed
<b>Inlet/Outlet Pipes</b>			
Sediment Accumulation		Sediment filling 20% or more of the pipe.	Remove sediment from inlet/outlet pipes so the system is clear of sediment.
Trash and Debris		Trash and debris accumulated in inlet/outlet pipes (includes floatables and non-floatables).	Remove trash or debris in pipe
Damaged		Cracks wider than 1/2-inch at the joint of the inlet/outlet pipes or any evidence or soil entering at the joints of the inlet/outlet pipes.	Repair cracks so that no cracks are more than 1/4-inch wide at the joint of the inlet/outlet pipe.  Replace where repair is insufficient.
<b>Access Manhole</b>			
Cover/lid not in place		Cover/lid is missing or only partially in place. Any open manhole requires IMMEDIATE maintenance.	Replace or reposition cover/lid.
Locking mechanism not working		Mechanism cannot be opened by one maintenance person with proper tools. Bolts cannot be seated. Self-locking cover/lid does not work.	Repair mechanisms, bolts, or cover/lid. If cannot be repaired, replace the lid so that it can be opened with proper tools.
Cover/lid difficult to remove		One maintenance person cannot remove cover/lid after applying 80 lbs of lift.	
Ladder rungs unsafe		Missing rungs, misalignment, rust, or cracks	

## General Maintenance Requirements for Infiltration Vaults (continued)

Large Access doors/plate			
Damage or difficult to open		Large access doors or plates cannot be opened/removed using normal equipment	Replace or repair access door so it can open as designed
Gaps, doesn't cover completely		Large access doors not flat and/or access opening not completely covered.	
Lifting Rings missing, rusted		Lifting rings not capable or listing weight of door or plate	Repair/replace rings.
Infiltration Vault Filter Bag			
Plugged		Filter bag more than ½ full	Replace filter bag or redesign system
Infiltration Vault			
Sediment accumulation		6" or more of sediment has accumulated	Remove sediment and dispose.
Damage to wall, frame, bottom, and/or top slab		Cracks wider than ½-inch, any evidence of soil entering the structure through cracks or qualified inspection personnel determines that the vault is not structurally sound	Seal vault so that it is structurally sound.

<sup>1</sup>Inspection Frequency: **A** = Annually; **B** = Biannually (twice per year); **W** = At least one visit should occur during the wet season (for debris/clog related maintenance)

## General Maintenance Requirements for Basic Dispersion Systems

Maintenance Components	Required Inspection Frequency <sup>1</sup>	Condition When Maintenance is Required	Action Required
<b>Dispersion Trench</b>			
Dispersion trench	A	Visual evidence of water discharging at concentrated points along trench	Remove debris, realign notched grade board, or rebuild trench to standards
Surface of trench	Fall and Spring	Accumulated trash/debris or sediment on drain rock surface impedes sheet flow	Remove trash/debris, sediment
	A, W	Vegetation/moss present on drain rock surface impedes sheet flow from facility	Maintain open, freely draining drain rock surface
Pipe(s) to trench	A, W	Accumulation of trash/debris or sediment in roof drains, gutters, driveway drains, area drains, etc.	Remove trash/debris, sediment
	A, W	Pipe from sump to trench or drywell has accumulated sediment or is plugged	Clear sediment from inlet/outlet pipe screen and pipe
	A, W	Cracked, collapsed, broken, or misaligned drain pipes	Repair/seal cracks, or replace pipe
Sump	A	Sediment in sump	Remove sediment. Clear sediment from inlet/outlet pipe screen and pipe.
Access lid	A	Lid cannot be easily opened	Repair or replace lid
	A	Lid is buried	Expose and restore to surface grade
	A	Cover is missing	Replace cover
<b>Splash Block (Downspout Dispersion)</b>			
Splash block	B	Water is directed towards building structure	Reconfigure/repair blocks to direct water away from building structure
	B	Water disrupts soil media	Reconfigure/repair blocks
<b>Rock Pad (Concentrated Flow Dispersion)</b>			
Rock pad	A	Thin layer of rock above native soil in area 6 square feet or larger, or any exposure of native soil	Replace/repair rock pad to meet design standards. Enlarge pad size or add additional courses of rock.
	A	Soil erosion in or adjacent to rock pad	Eliminate cause of erosion, repair/replace rock
<b>Vegetated Dispersion Area (Sheet Flow Dispersion)</b>			
General dispersion area	B, S	Erosion (gullies/rills) greater than 2 inches deep	Eliminate cause of erosion and regrade, rock, and revegetate
	B, S	Accumulated sediment/debris blocks or channelizes flow path	Remove excess sediment or debris, identify and control sediment source
Ponded water	B, S	Standing surface water more than 3 days after storm event	Regrade to eliminate depressions or aerate/amend soils to increase infiltration
Plant establishment	Weekly (May-Sept)	Plant establishment period (2-3 years)	Water weekly during periods of no rain to ensure plant establishment
Vegetation	As needed	Poor vegetation such that erosion is occurring	Water, amend soils, replant with species for existing soil/moisture conditions
	B, S	Vegetation inhibits flow along flowpath	Trim, weed, or replant to restore dispersed flow path

<sup>1</sup>Inspection Frequency: **A** = Annually; **B** = Biannually (twice per year); **W** = At least once during the wet season; **S** = Additional inspections should be performed after major storm events. For debris/clog related maintenance, inspection should occur in the early fall, after deciduous trees have lost their leaves.

## General Maintenance Requirements for Vegetated Roofs

Maintenance Components	Inspection Frequency <sup>1</sup>	Condition When Maintenance is Required	Action Required
<b>Structural</b>			
Drain pipes	B, S	Soil, vegetation, pebbles, or other debris partially or fully blocking drain pipe.	Clear roof drains of any debris. Identify source of blockage and take actions to prevent future blockages.
	B, S	Pipe is damaged with cracks, settling, improper alignment.	Repair or replace pipe if needed, and re-compact soils or fill materials surrounding the pipe.
Access	B	Egress and ingress routes obstructed or unsafe.	Clear all obstructions from access routes, and follow applicable safety procedures.
Fire ventilation (if part of design)	B, S	Plugged ventilation points.	Remove blockage and take corrective action to insure proper operation.
<b>Vegetation</b>			
Vegetation	Monthly	Poor vegetation growth, bare areas (less than 90% plant coverage)	Determine cause of poor vegetation growth and correct. Replant with manufacturer recommended plant species, typically succulents adapted to harsh conditions.
Weeds and Dead Heading	Twice Monthly (Mar-Sept)	Invasive, nuisance, or woody plants are present.	Remove all weeds and dead head manually and without herbicide applications. Remove all woody plants as their roots can damage roof membranes.
Leaf removal	Twice Monthly (Aug –Oct)	Tree leaves present covering succulents.	Remove matted tree leaves to prevent smothering.
Soil	Monthly	Displaced soil, typically due to nesting birds.	Replace displaced soil immediately.
Fertilization	April	Lack of plant growth	Use manufacturer's recommendation or an encapsulated, organic slow release fertilizer. Verify first with manufacturer that membrane is resistant to fertilizer,
<b>Irrigation</b>			
Irrigation system	B	Irrigation system is not functioning properly	Follow manufacturer's instructions for operation, maintenance, and troubleshooting
Plant Watering	As needed	Early plant establishment and during drought conditions.	Saturate to the base of the soil substrate and allow soil to dry completely. Water monthly during first growing season.
	Winter	Do not water in winter.	Do NOT water 4 weeks before expected frost (late Fall) or during the winter.
<b>Pest Control</b>			
Mosquitoes	B, S	Standing water remains for 3 days following storms.	Remove standing water, identify cause and take appropriate actions to improve the drainage. Do not use pesticides.
Birds	As needed	Seeds removed, plants dug up	Replant, tie streamers (or other) to keep birds away
<b>Other</b>			
Contaminants	As Needed	Release of pollutant onto vegetated roof	Remove pollutant immediately and contact the manufacturer to prevent potential damage to the membrane. Replace vegetation if needed.

<sup>1</sup>Inspection Frequency: **A** = Annually; **B** = Biannually (twice per year); **S**= Additional inspections should be performed after major storm events.

### General Maintenance Requirements for Rainwater Harvesting System

Maintenance Components	Required Inspection Frequency <sup>1</sup>	Condition When Maintenance is Required	Action Required
<b>Rainwater Harvesting System</b>			
Access Manhole	A	Manhole is blocked by obstruction or debris.	Remove obstruction or debris.
Cistern tank	A	Sediment depth in cistern is 4" or greater.	Remove sediment from cistern when there is little or no water in it. Use standard power washer and vacuum/vactor truck.
Inlet/outlet pipe	A	Inlet/outlet pipes are blocked with sediment or debris.	Remove sediment or debris from inlet/outlet pipes.
Pump	A	Sediment depth in pump sump is 4" or greater.	Remove sediment from pump sump.
	A	Pump does not work properly.	Refer to pump instruction manual.

<sup>1</sup>Inspection Frequency: **A** = Annually; **B** = Biannually (twice per year); **S**= Additional inspections should be performed after major storm events. For debris/clog related maintenance, inspection should occur in the early fall, after deciduous trees have lost their leaves.

### General Maintenance Requirements for Native Growth Retention Area (NGRA)

Maintenance Components	Required Inspection Frequency <sup>1</sup>	Condition When Maintenance is Required	Action Required
<b>Native Growth Retention Area</b>			
Non-native, invasive and noxious plants	Monthly (March-September)	Non-native, invasive and noxious plants are present. See King County noxious weed list: <a href="http://www.dnr.metrokc.gov/wlr/lands/weeds/laws.htm">www.dnr.metrokc.gov/wlr/lands/weeds/laws.htm</a>	Remove non-native, invasive and noxious plants. To protect water quality, do not use herbicides or pesticides. Class A & B noxious weeds must be removed, bagged, and disposed of as garbage immediately (do not place in yard waste).
Trees	A	Dangerous or diseased trees.	All trees shall be retained, unless dangerous or diseased. Remove dangerous or diseased trees, and replace with similar native species.

<sup>1</sup>Inspection Frequency: **A** = Annually; **B** = Biannually (twice per year); **S**= Additional inspections should be performed after major storm events. For debris/clog related maintenance, inspection should occur in the early fall, after deciduous trees have lost their leaves.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY****Policy D-8: SOIL INFORMATION FOR STORMWATER DEVELOPMENT TO MEET FLOW CONTROL BMP REQUIREMENTS**

The soil information requirements below (i.e., Flow Control BMP Soil Report and Special Inspection for Soils) are necessary for designing flow control Best Management Practices (BMPs) per 2021 King County Surface Water Design Manual (KCSWDM). There are many other reasons a soil report is necessary for a project (e.g., steep slopes, sensitive areas, etc.). The requirements below do not replace any requirements from other City departments. If proposing to do an infiltration facility to meet Core Requirement #3: Flow Control Facility in the 2021 KCSWDM, you do not need to meet the requirements of this policy. Instead, you must meet Chapter 5.2 requirements of the 2021 KCSWDM and review City of Kirkland Addendum to the KCSWDM (Pre-Approved Plans, Policy D-10) for soil report requirements and analysis.

***A. Flow Control BMP Soil Report******When is a Flow Control BMP Soil Report required?***

A Flow Control BMP Soil Report is required any time a project triggers flow control BMPs per the 2021 KCSWDM and can't meet the criteria for full dispersion, is located within a steep slope hazard area (>40% slope) or landslide hazard area OR does not trigger flow control BMPs but is planning to fully infiltrate all the stormwater runoff on the project site (i.e. there is no overflow for the infiltration BMP).

***Who can prepare a Flow Control BMP Soil Report?***

The Flow Control BMP Soil Report must be prepared by either a licensed onsite sewage system designer or a licensed engineer with geotechnical and/or hydrogeologic experience, licensed hydrogeologist, or licensed engineering geologist.

***What information is required in a Flow Control BMP Soil Report?***

At minimum, the Flow Control BMP Soil Report shall include:

- A sufficient number of soil logs to establish the type and limits of soil on project site. At minimum, identify the limits of any outwash type soils.
- At least 1 soil log for each proposed infiltration location on individual lots. The soil log should be a minimum of 4 feet below expected finished grade and at least 1 foot below the expected bottom elevation of the flow control BMP.
- No soil log or infiltration testing shall be completed within the drip line of any tree.
- Elevation of anticipated seasonal high groundwater level.
- A description of the SCS series of the soil and textural class of each horizon through the depth of the log, noting high groundwater level or evidence of it, such as mottling.
- A grain size analysis in accordance with ASTM standards is required, unless infiltration is infeasible and proven with an infiltration test (measured rate less than 0.3 inches per hour). If the measured infiltration rate is greater than 0.3 inches per hour, the BMP shall be designed using the SCS series and Appendix C sizing associated with the series.
- Groundwater Protection testing per Chapter 5.2.1 (page 5-51 of the 2021 KCSWDM) if proposing to infiltrate pollution generating impervious surfaces (PGIS).
- Infiltration testing is required for projects that do not have an overflow connection to the City storm system. An infiltration rate(s) must be reported. The flow control BMP must be designed to fully infiltrate the 100-year storm event on site and must meet minimum



measured infiltration rate standards set within Policy D-10. The following information shall be included in the Flow Control BMP Soil Report:

- The infiltration test shall occur at the bottom elevation of the proposed infiltration BMP. The following test procedures are allowed. The lowest measured infiltration rate must be used to determine the design infiltration rate. If the measured infiltration rate is less than 0.3 in/hr, infiltration is not feasible on this site and other stormwater designs must be evaluated.
  - EPA falling head percolation test procedure – 3 infiltration tests (arrayed in a triangle) is required.
  - Double ring infiltrometer test - 3 infiltration tests (arrayed in a triangle) are required.
  - Single ring percolation test - 3 infiltration tests (arrayed in a triangle) are required.
  - Small or large scale pilot infiltration test (PIT) – 1 infiltration test required.

**NOTE:** If infiltrating more than 1 lot OR 10,000 sf or more of impervious, OR  $\frac{3}{4}$  acre pervious surface, OR 5,000 sf or more of PGIS, OR meeting LID performance criteria, Policy D-8 does not apply. Follow Chapter 5.2 of the 2021 KCSWDM and the City of Kirkland Addendum to the KCSWDM (Pre-Approved Plans, Policy D-10) for requirements.

## ***B. Special Inspection for Soils***

### ***What Triggers a Special Inspection for Soils?***

Any time a project uses an infiltration system (including, but not limited to, infiltration trench, drywell, rain garden, or infiltration vault) to meet a flow control exemption, reduce the size of the flow control facility, as a flow control facility, or to fully infiltrate the 100-year storm event on site due to no overflow, a stamped special inspection memorandum will be required. The design engineer is responsible for identifying on plans when the project will require a special inspection.

### ***What information is gathered in a Special Inspection for Soils?***

Depending on how the infiltration system was sized, the special inspection shall include:

- Sized per small site BMPs in Appendix C:
  - The licensed engineer with geotechnical and/or hydrogeologic experience, licensed hydrogeologist, or licensed engineering geologist on record shall be present when the subsurface is exposed by the contractor, verifying the soils will function as designed.
  - A stamped technical memorandum submitted to the City's inspector or development engineer by the geotechnical engineer or geologist, including findings during site visit and a location map. The stamped technical memorandum shall be submitted for review and approval prior to finaling the permit.
- Sized using an infiltration rate:
  - The licensed engineer with geotechnical and/or hydrogeologic experience, licensed hydrogeologist, or licensed engineering geologist on record shall be present when the subsurface is exposed by the contractor to do the performance testing. Performance testing shall meet the same infiltration test requirements noted above to verify the measured infiltration rate used in design.
  - A stamped technical memorandum submitted to the City's inspector or development engineer by the geotechnical engineer or geologist that includes infiltration test results and recommendations, field notes from testing, and location of the tests in relation to the infiltration system. The stamped technical memorandum shall be submitted for review and approval prior to finaling the permit.

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy D-9: STORMWATER PUMP SYSTEM REQUIREMENTS**

Pump systems may be used for conveyance of stormwater flows from a project site, if no other feasible option exists. If the Public Works Department approves the use of a pump system, it shall meet the following minimum requirements:

- 1) The pump system must be privately owned and maintained. The pump system must have a dual pump (alternating), unless otherwise approved by the Public Works Department.
- 2) The pump system shall be used to convey water from one location or elevation to another within the project site, prior to gravity discharge to the public storm drainage system.
- 3) The pump system shall be connected to a natural gas generator system. For all other alternatives, such as battery powered systems, may be proposed for review as a stormwater adjustment (see Policy D-11). A minimum of 48 hours of backup power is required onsite. Show the location of the generator pad on the site plan (the Planning Department must approve the location).
- 4) To determine the flow to size the pump, use an approved model per the 2021 King County Surface Water Design Manual at a 15-minute time step.
- 5) All pumps shall be equipped with an external visual and audible alarm system.
- 6) The pump system shall not violate any City ordinances or codes.
- 7) The gravity-flow components of the drainage system to and from the pump system must be designed so that pump failure does not result in flooding of a building or emergency access, or overflow to a location other than the natural discharge point for the project site. An overflow/flooding hold-harmless agreement may be required at the discretion of Public Works.
- 8) The pump system shall be designed by a licensed Civil Engineer. At a minimum, the civil plans should specify the catch basin structure size/type, pump size/type, rim and invert elevations, and a plan view of the force main and the transition to gravity sewer.
- 9) No forced main system shall be directly connected to the City's storm conveyance. All forced main from pump systems shall connect to a CB or yard drain on site and gravity to the storm system in the right-of-way.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy D-10:           ADDENDUM TO THE 2021 KING COUNTY  
SURFACE WATER DESIGN MANUAL**

This addendum to the 2021 King County Surface Water Design Manual (KCSWDM) applies to development and redevelopment proposals within the City of Kirkland. This Addendum includes minor revisions to the KCSWDM to address the differences between King County's and the City's organization and processes. No major substantive changes have been made to the KCSWDM in order to maintain equivalency in review requirements and level of protection provided by the manual. It is our intent to maintain equivalency with the 2019 Ecology Stormwater Management Manual for Western WA.

The 2021 KCSWDM and the Addendum contained in this policy D-10 were adopted by Council in June 2022, with an effective date of July 1, 2022. If King County issues addendums to the 2021 KCSWDM, these are automatically adopted by Kirkland unless otherwise stated. The City Council must approve adoption of any version of the KCSWDM other than the 2021 KCSWDM.



# **Addendum to the 2021 King County Surface Water Design Manual**

Effective date: July 1, 2022

Updated: January 1, 2024

## Introduction

This addendum to the 2021 King County Surface Water Design Manual (KCSWDM) applies to development and redevelopment proposals within the City of Kirkland. The KCSWDM has adopted requirements of the Clean Water Act, the Endangered Species Act, and the State Growth Management Act. This addendum includes minor revisions to the KCSWDM to address the differences between King County's and the City's organization and processes. No major substantive changes have been made to the KCSWDM in order to maintain equivalency in review requirements and level of protection provided by the manual. It is the City of Kirkland's intent to maintain equivalency with the 2019 Ecology Stormwater Management Manual for Western WA (Ecology Manual).

## Addendum Organization

The information presented in this addendum is organized as follows:

**I. Terminology:** At times King County and the City of Kirkland use different terminology to describe or to refer to equivalent subject matter. This section identifies these terms and the City of Kirkland's equivalent terminology.

**II. Key Revisions:** This section specifically identifies the minor revisions the City has made to the KCSWDM.

**III. Code Reference Tables:** King County code is referenced in many places throughout the KCSWDM. This section identifies these county code references and states the equivalent city code where applicable.

**IV. Mapping:** The City of Kirkland equivalents to the Flow Control Applications map, Landslide Hazard Drainage Areas map, and Sensitive/Critical Areas map are available online at:

[http://www.kirklandwa.gov/depart/Information\\_Technology/GIS.htm](http://www.kirklandwa.gov/depart/Information_Technology/GIS.htm)

**V. Reference Materials:** This section identifies which reference materials provided in the KCSWDM are applicable and which are not. It also identifies equivalent City of Kirkland reference materials available.

**Note:** Clarifications and interpretations to the KCSWDM or this addendum are documented and made available through City Regulatory Code and the Public Works Pre-Approved Plans.

## I. Terminology

At times King County and the City of Kirkland use different terminology to describe or to refer to equivalent subject matter. This section identifies these terms and the City of Kirkland's equivalent terminology.

- **Critical Drainage Area (CDA).** This definition does not apply in the City of Kirkland.
- **Department of Permitting and Environmental Review (DPER).** All references to DPER conducting drainage reviews or determinations shall refer to City of Kirkland Development Services.
- **Department of Natural Resources and Parks (DNRP).** All references to DNRP shall refer to City of Kirkland Parks, Planning and Community Development and/or Public Works Departments.
- **Director.** All references to the Director shall refer to the City of Kirkland Public Works Director.
- **Industrial Waste Program.** All references to the Industrial Waste Program shall refer to the City of Kirkland Wastewater Division or Northshore Utility District (depending on location within the city).
- **King County.** All references to King County shall refer to the City of Kirkland (COK).
- **King County Code (KCC).** All references to the KCC shall refer to the City of Kirkland Municipal Code (KMC). Check code reference table for equivalent code sections.
- **King County Designated/Identified Water Quality Problem.** This determination is made on a case-by-case basis in the City of Kirkland.**King County Road Standards.** All references to the King County Road Standards shall refer to the City of Kirkland Public Works Pre-Approved Plans.
- **Local Services Permitting Division.** All references to the Local Services Permitting Division shall refer to the City of Kirkland Development Group.
- **Overflow Pipe:** A pipe shall be considered an overflow if sufficient storage is provided below the invert of the pipe to meet flow control BMP requirements. In these situations, the flow control BMP will be allowed the credit associated with the BMP. Per the new impervious surface definition in the 2021 KCSWDM, if the pipe is used as an underdrain, the area will be counted as new or replaced impervious surface area.
- **Project Size.** The project size is based on the parcel(s) and/or right-of-way included in the project scope. It will be assumed the area disturbed by development will encompass the entire parcel(s) and right-of-way, unless there is an easement, defined stream/wetland and buffer, NGPE, or other condition which limits the amount of developable area.
- **Sensitive Area Folio.** Refer to City of Kirkland Sensitive Areas Map at: [http://www.kirklandwa.gov/depart/Information\\_Technology/GIS.htm](http://www.kirklandwa.gov/depart/Information_Technology/GIS.htm)
- **Solid Waste Division.** All references to Solid Waste Division shall refer to the City of Kirkland Solid Waste Program.
- **Stormwater Services.** All references to Stormwater Services shall refer to the City of Kirkland Surface Water Management Group.
- **Utility Inspection Program.** All references to the Utility Inspection Program shall refer to the City of Kirkland Development Group.
- **Wastewater Treatment Division Industrial Waste Section.** All references to the Wastewater Treatment Division Industrial Waste Sections shall refer to City of Kirkland Development Group.
- **Water and Land Resources (WLR) Division.** All references to the WLR Division shall refer to the City of Kirkland Surface Water Management Group.
- **Zoning Classifications: Where the KCSWDM references Agricultural (A) Zoning, Forest (F) Zoning, or Rural (R) Zoning.** These zoning classifications are

intended for areas outside of the Urban Growth Boundary, therefore the City of Kirkland contains no equivalent zoning. Refer to city zoning maps to determine which zoning classifications apply to your project. The City of Kirkland Land Use Map can be found at: [http://www.kirklandwa.gov/depart/Information\\_Technology/GIS.htm](http://www.kirklandwa.gov/depart/Information_Technology/GIS.htm)

## II. Key Revisions

This section includes minor revisions and clarifications to the 2021 KCSWDM to address the differences between King County's and the City of Kirkland's organization and processes, as well as to ensure equivalency with the 2019 Ecology Manual. Unless specifically noted as a clarification, the items below are minor revisions.

### **Chapter 1: Drainage Review and Requirements**

Applies with the revisions stated below:

If a project uses multi-family zoning and density, then multi-family stormwater requirements apply to the entire project even if the project includes detached single family homes.

#### **1.1 Drainage Review**

Criteria for review levels are defined in the COK Public Works Pre-Approved Plans, Policies D-2 and D-3. Drainage review levels used in the City of Kirkland are listed below:

- Basic drainage review
- Simplified drainage review
- Targeted drainage review
- Full drainage review

When determining the level of drainage review, the following items apply:

- Clarification: Areas that change from existing gravel to paved surface will be counted as new impervious surface area, not replaced impervious area.
- Clarification: Flow control BMPs cannot be used to reduce the level of drainage review, but can be used to meet a flow control exemption or exception. For example, proposed driveways and roads will always be counted as fully impervious for the drainage review level, but permeable pavement can be used to meet a flow control exemption or exception.
- Clarification: Target impervious surfaces for the determination of drainage review (found in section 1.1.2.1) are different than target impervious surfaces that require mitigation under a simplified drainage review in Appendix C. After determining drainage review, if the project falls under a simplified drainage review, target impervious surfaces = all new and replaced impervious surfaces and must evaluate flow control BMPs to the maximum extent feasible.
- Projects that are solely utility projects (ex: replace water or sewer main, upsize water or sewer main, or similar) that replace the ground surface with in-kind material or materials with similar runoff characteristics are only subject to Core Requirement #5, Construction Stormwater Pollution Prevention.
- KCSWDM triggers a full drainage review for non-single family residential projects that create more than 2,000 sf of new plus replaced impervious surface. The City has the ability to reduce the drainage review to a simplified review if the City classifies the work as maintenance activity (ex: structural repair to pavement, sidewalk maintenance. etc) and the following criteria for the project can be met:
  - Creates less than 5,000 sf of replaced impervious surface
  - Does not create any new impervious surface



## **1.2 Core Requirements**

### **1.2.2 Core Requirement #2: Offsite Analysis**

Offsite analysis requires photos taken onsite (not Google Street View) to within 1/4-mile downstream of site discharge point to assess downstream condition.

#### **1.2.2.1.1 Downstream Drainage Problems Requiring Special Attention**

For item 4, Potential Impacts to Wetland Hydrology problem, refer to COK Public Works Pre-Approved Plans, Policy D-13, to determine the level of review needed for the wetland, reporting information required, and potential modelling to determine impacts.

#### **1.2.2.3 Water Quality Project Impact Mitigation**

Exclude Bacteria from mitigation. Bacteria problems are addressed through educational programs and source control.

Phosphorus Problem – Forbes Lake is listed as a Category 5 water body for phosphorus. All projects that drain to Forbes Lake that trigger water quality treatment shall be assumed to be located within a designated Sensitive Lake WQ Treatment Area for the purposes of applying area-specific water quality treatment requirement in Section 1.2.8.1.

### **1.2.3 Core Requirement #3: Flow Control**

Clarification: Historic (forested) conditions will be used for pre-developed runoff modeling of all projects in Level 2 flow control areas.

A City of Kirkland flow control map is located at:

[http://www.kirklandwa.gov/depart/Information\\_Technology/GIS.htm](http://www.kirklandwa.gov/depart/Information_Technology/GIS.htm)

Projects triggering a Full Project Drainage Review proposing infiltration/bioretenion facilities or pervious pavement to meet Level 1 or 2 flow control or for onsite flow control BMPs require a soils report per COK Pre-Approved Plans, Policy D-8.

Pumping systems are not allowed downstream of flow control unless approved. Steady state pump systems do not meet duration discharge requirement of flow control.

#### **1.2.3.1 Area-Specific Flow Control Facility Requirement**

For projects that trigger Core Requirement #3: Flow Control Facilities, facility design shall be as follows:

- Projects shall start with a maximum impervious coverage permitted by the Kirkland Zoning Code (KZC) plus an additional 10% as referenced in Section 3.2.2.1 in this Policy.
- If a project can't meet an exemption or exception within this section and a detention facility is required, flow control BMP credits per 1.2.3.2 D are not allowed to reduce the size of the vault unless a project can meet full dispersion as outlined in 1.2.3.2 C or full infiltration. Refer to Table 1.2.9.A in this Policy for additional criteria for full infiltration. Projects are still required to meet Core Requirement #9: Flow Control BMPs to the maximum extent feasible.

- Flow control BMP credits per 1.2.3.2.D are allowed to be used if a project can meet an exemption or exception within this section. In addition, refer to Table 1.2.9.A in this Policy for additional criteria for full infiltration.

Regarding Exceptions to Flow Control Requirements in both Basic (#1) and Conservation (#2) Flow Control Areas, flow control can be waived if a threshold discharge area generates less than a 0.15 cfs increase in 100-yr peak flows using a 15-minute time step. The intent to still allow the 0.10 cfs increase at the 100-yr peak flow with a 1-hour time step were for areas that do not include a 15-minute time step in the approved model. All areas in Kirkland have a 15-minute time step, and therefore must use 15-minute time step for the exception.

Commercial and industrial redevelopment projects within conservation flow control areas must include calculations within the TIR to show how the assessed value of the existing project site improvements was determined.

Clarification: Areas that are proposed to be protected through planning easements (grove easements, PNAs, etc.) may only be modeled as forest if an NGRA is also placed over the areas. Planning easements either do not protect the land (such as grove easements) or do not require monitoring (PNAs). NGRA easements shall not overlap NGPEs. Below is a table for modeling allowances:

<b>Easement Type/Land Use</b>	<b>Modeled As:</b>
Native Growth Retention Area (NGRA)	Forest
Native Growth Protection Easement (NGPE)	Forest
Preserved Grove Easement	Grass
Landscape Easement	Grass
Protective Native Areas (PNA)	Grass
Shoreline Planting	Grass
Preserved Grove Easement + NGRA Overlap	Forest
Landscape Easement + NGRA Overlap	Forest
PNA + NGRA Overlap	Forest
Shoreline Planting + NGRA Overlap	Forest

Clarification: Only BMPs listed on Table 1.2.9.A (page 1-95) can be used on a threshold discharge area to meet the 0.15 cfs limit unless otherwise approved through the adjustment process, Policy D-11. For example, products like infiltrator chambers are not equivalent to gravel filled infiltration trenches in Appendix C and shall submit an adjustment to the manual per Policy D-11 in the COK Public Works Pre-Approved Plans to show equivalence.

Clarification: To meet the requirements of the 0.15 cfs exception, total pre-developed and post-developed areas must match (unless full infiltration is used).

Clarification: Regarding Target Surfaces in Conservation Flow Control Areas to be mitigated, vegetated areas in easements and/or tracts must be modeled from forested in the pre-developed condition to lawn in the developed condition, unless the area is

placed in a tract or easement that will preserve the native vegetation during and after construction.

Clarification: Threshold and modeling calculations of pervious and impervious areas, turf areas, including lawn or synthetic turf, that do not have an underdrain are considered 100% pervious. Areas that have an underdrain are considered 100% impervious.

Clarification: Wheel strip driveways shall not be used for Flow Control BMP credit. See C.2.9.3 in this policy for more information.

#### **1.2.3.2 Flow Control Facility Implementation Requirements**

##### **G. Mitigation Trade**

Projects that would like to use the mitigation trade option (area swap) must use an area that is within the public right of way. Mitigation trade areas can't be from private property.

#### **1.2.4 Core Requirement #4: Conveyance System**

##### **1.2.4.3 Conveyance System Implementation Requirements**

##### **G. Spill Control**

City of Kirkland will only require spill control requirements on commercial and multifamily projects that do not require flow control. Single family residential will install a tee per City Pre-Approved Plan CK-D.45.

#### **1.2.6 Core Requirement #6: Maintenance and Operations**

Refer to KMC 15.52.070 for City Acceptance of new drainage facilities.

If the project proposes a propriety system not covered in the 2021 KCSWDM, the applicant shall submit an adjustment to the manual per Policy D-11 in the COK Public Works Pre-Approved Plans. The adjustment should include inspection and maintenance standards, including frequency of inspections and a log of maintenance activity.

#### **1.2.7 Core Requirement #7: Financial Guarantees and Liability**

This section is replaced by KMC 15.52.080, Bonds.

#### **1.2.8 Core Requirement #8: Water Quality**

##### **1.2.8.1 A. Basic WQ Treatment Areas**

Reductions of water quality treatment level from Enhanced to Basic, Exception #4, is not allowed in the City of Kirkland. Projects in Kirkland cannot reduce the level of required water quality treatment by prohibiting the use of leachable metals on the property.

For a bioretention to meet enhanced basic water quality treatment, it must be designed, using an approved continuous runoff model, to infiltrate 91% of the influent runoff, consistent with the 2019 Ecology Manual, and designed per 2019 Ecology Manual BMP T7.30. Bioretention facilities that will be drain to Forbes Lake must be designed with no underdrain.

The City will accept all water quality treatment facility-types identified in the 2019 Ecology Manual, with the following additions and alterations:

- Emerging technologies will be considered on a case-by-case basis, via adjustment process, Policy D-11 in the COK Public Works Pre-Approved Plans, provided the product has received a level of use designation from WA State Dept. of Ecology (see the following website):  
<http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html>
- Only Filterra systems are pre-approved in addition to the approved King County Water Quality facilities for publicly maintained enhanced basic systems and do not need an adjustment process. Filterra trees shall meet COK Policy R-10.
- Water quality facilities proposed to be publicly maintained shall provide configuration that allows drawdown of permanent pool(s) for maintenance access.

#### **1.2.8.1 C. Sphagnum Bog WQ Treatment Areas**

This section does not apply to the City of Kirkland.

#### **1.2.8.2 Water Quality Implementation Requirements**

##### **C. Treatment Trade**

Projects that would like to use the treatment trade option (area swap) must use an area that is within the public right of way. Treatment trade areas can't be from private property.

#### **1.2.9 Core Requirement #9: Flow Control BMPs**

Clarification: All proposed projects that are subject to clearing and grading that have not been covered by impervious surface, incorporated into a drainage facility or engineered as structural fill or slope shall, at project completion, meet soil amendment requirements per Pre-Approved Plan COK.E-12. [Any project that is subject to Core Requirement #9 will be required to provide soils that meet Pre-Approved Plan E.12 within the clearing limits, i.e. in all disturbed areas.] Note that the definition of New Pervious Surface includes areas where alteration of soil characteristics has occurred. In Kirkland this will include all areas within the clearing limits of a site.

When evaluating BMPs within the right of way to the maximum extent feasible, the BMPs must be evaluated in the following order for:

##### Sidewalk (that is a target surface):

1. Slope sidewalk (5') to landscape strip (4.5') – See Pre-Approved Plan CK-R.08 for implementation details
2. Bioretention
3. Pervious Concrete
4. Limited Infiltration

##### Road Widening (that is a target surface):

1. Bioretention
2. Porous Concrete Parking Strip (if applicable)
3. Limited Infiltration
4. Porous Asphalt

#### **1.2.9.1 Flow Control BMP Requirements Overview**

##### **A. Target Surfaces**

If a project or threshold discharge area of a project meets the Direct Discharge Exemption per Section 1.2.3.1, soil amendment is required for new pervious areas and flow control BMPs need to be evaluated in the following order for impervious areas:

1. Full Infiltration
2. Basic Dispersion

If basic dispersion is found to be a feasible BMP, limited infiltration, bioretention and/or permeable pavement may be used instead of basic dispersion to meet the flow control BMP requirement. If basic dispersion is found to be infeasible, perforated pipe connection is not required in the City and the flow control BMP requirement is considered met.

### **1.2.9.2 Individual Lot BMP Requirements**

Requirement #5, implementation of Reduced Impervious Surface Credit and Native Growth Retention Credit, for both Small Lot BMP Requirements and Large Lot BMP Requirements is not required in the City of Kirkland. King County has high lot coverage so the reduction of 10% lot coverage to meet the flow control BMP requirement is achievable. The City of Kirkland justifies meeting this requirement for implementation with an already lower lot coverage than King County (typically 70% lot coverage in King County compared to 50% lot coverage in Kirkland).

Requirement #7, installation of perforated pipe connection, is not required in the City of Kirkland. If the applicant has reached this level, it is viewed that LID is infeasible on the site and do not want to introduce additional water into the ground.

#### **1.2.9.2.3 Large Rural Lot BMP Requirements**

This section does not apply to the City of Kirkland.

#### **1.2.9.4.1 Use of Credit by Subdivision Projects**

A. Subdivision Implementation of BMPs within Road Right-of-Way Item #3: If the road right-of-way will be maintained by the City of Kirkland, the flow control BMPs must be approved by the public works department. Refer to section 1.2.9.2, Requirement #3, in the Addendum for the order of BMP evaluation in the right-of-way.

### **1.2.9.4 Requirements for use of BMP Credits**

Regarding Table 1.2.9.A Flow Control BMP Facility Sizing Credits:

Footnote (3) regarding full infiltration – For any project subject to Basic or Simplified Drainage Review, and for any single family residential project subject to Directed, Full or Large Project Drainage Review, the design requirements and specifications in Appendix C, Section C.2.2 may be used for design of full infiltration on individual lots. In addition, refer to section C.1.3 in this Policy for additional criteria for full infiltration. For all other projects, including any project where full infiltration is proposed to serve more than one lot, full infiltration must be designed in accordance with infiltration facility standards in Section 5.2. In addition, to receive a full infiltration credit in the City of Kirkland, the

geotechnical engineer must classify the soil as outwash conditions (medium sands or better) and provide an infiltration test per Section 5.2.1 the 2021 KCSWDM along with any additional requirements within this Policy to show a measured infiltration rate of 8 inches / hour or greater to qualify for the full infiltration credit.

Credits for Restricted Footprint – Restricted footprint shall include all surfaces that are impervious on the property, including eaves on rooftops over pervious surfaces. Also, impervious surface limit must be reduced by 5% or greater and the restricted footprint area shall be rounded up or down to the nearest 100 square feet, to receive the facility sizing credit. If additional restrictions are needed they shall be in 100 square foot increments.

Example:

If a lot has an area of 7200 SF and is situated in a 50% max lot coverage zone, then the maximum allowable impervious surface area for surface water mitigation purposes is  $7200 \text{ SF} \times (0.50 + 0.10) = 4320 \text{ SF}$  (additional 10% per Section 3.2.2.1).

A 5% minimum reduction implies  $7200 \text{ SF} \times 0.55 = 3960 \text{ SF}$  impervious surface. The Restricted Footprint shall be rounded up or down and recorded as 4000 SF, or additional reductions at 100 SF increments if so desired (3900 SF, 3800 SF, and so on).

### **1.3.1 Special Requirement #1: Other Adopted Area-Specific Requirements**

Projects located in the Holmes Point Area must also comply with lot coverage and other standards included in the Kirkland Zoning Code, *Chapter 70 – Holmes Point Overlay Zone*.

### **1.3.3 Special Requirement #3: Flood Protection Facilities**

This section does not apply to the City of Kirkland.

### **1.3.4 Special Requirement #4: Source Controls**

With regard to threshold for triggering this requirement, if the proposed project requires a non-single family residential site development permit, then water quality source control is applicable. Required source control BMPs should be called out in TIR and structural BMPs called out in plans. Some highlighted sections common to projects in Kirkland are:

- Cleaning and maintaining stormwater drainage system (A-1);
- Storage and use of pesticides and fertilizers (A-5);
- Storage of solid waste and food wastes (A-8);
- Parking Lots, Driveways and Outside Storage Areas (A-31);
- Animal Waste (A-34)
  - Covered waste containers and waste collection services required at properties with designated dog exercise areas.

## **1.4 Adjustment Process**

Refer to the Surface Water Adjustment Process defined in COK Public Works Pre-Approved Plans, Policy D-11.

## **Chapter 2 Drainage Plan Submittal**

Applies with the revisions stated below:

### **2.1 Plans Required for Drainage Review**

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

### **2.2 Plans Required with Initial Permit**

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

### **2.3 Drainage Review Plan Specifications**

#### **2.3.1.1 Technical Information Report**

An Operation and Maintenance Manual is required for all privately maintained stormwater detention and water quality facilities, and is submitted as part of the permit application.

#### **2.3.1.2 – Site Improvement Plan**

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

#### **2.3.1.3 – ESC Plan Section**

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

#### **2.3.1.4 – Stormwater Pollution Prevention and Spill (SWPPS) Plan**

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-12.

#### **2.3.2 – Projects in Targeted Drainage Review (TDR)**

Refer to the COK Public Works Pre-Approved Plans, Policies G-7, D-2, and D-3.

### **2.4 Plans Required After Drainage Review (pg 2-35)**

Refer to the COK Public Works Pre-Approved Plans, policies G-7, D-2, and D-3.

## **Chapter 3 Hydrologic Analysis & Design**

Applies with the revisions stated below:

### **3.2.2.1 Generating Time Series**

#### **Calculation of Impervious Area**

For calculating impervious coverage for proposed residential and commercial development must be estimated for each specific proposal. Impervious coverage for frontage layouts – streets, sidewalks, trails, etc – shall be taken from the layouts of the proposal. House/driveway or building coverage shall be as follows:

- For residential development, the assumed impervious coverage shall be the maximum impervious coverage permitting by the Kirkland Zoning Code (KZC) plus an additional 10%.
- For standalone SFR projects, the assumed impervious will be as shown as approved as part of the building permit
- For commercial or multi-family development, the impervious coverage shall either:

- Assume the maximum impervious coverage permitted by the KZC plus an additional 10% OR
- Estimate impervious coverage from layouts of the proposal. If estimated from the layouts of the proposal, the impervious coverage shall include calculations of all impervious surfaces, including eaves. This option may require a Reduced Impervious Surface Limit to be recorded on the property.

If an existing home is proposed to remain in this development, there are the following options to address the storm drainage from that house/lot:

1. Evaluate the proposed lot as new/replaced impervious at the required lot coverage as part of the subdivision TIR, OR
2. Remove the lot from calculations as non-targeted surfaces. If this method is taken, the existing home cannot be redeveloped within 5 years of the recording of the short plat. If the home is redeveloped within that time period, a storm drainage analysis must be provided for the entire subdivision including the lot at full lot coverage as part of the building permit. The following note must be included on the subdivision:

*Redevelopment of Lot\_: Since the home currently constructed on the existing parcel that is proposed to remain as Lot \_ has not been evaluated as part of the storm drainage analysis, the existing home cannot be redeveloped within 5 years of the recording of this plat. If the home is redeveloped within that time period, a storm drainage analysis must be provided for the entire subdivisions including Lot \_\_ at the redeveloped impervious coverage.*

### **3.3.2 Flow Control Design Using the Runoff File Method**

#### **Evaluating Flow Control Performance**

Clarification: If having difficulties meeting the lower part of the duration curve (50% of the 2-year to the 2-year), refer to footnote 10 in the 2021 KCSWDM.

## **Chapter 4 Conveyance System Analysis & Design**

Applies with the revisions stated below:

### **4.2.1 Route Design**

Permanent drawdown pumping of the groundwater table, or groundwater collection, that would result in a continuous discharge to the City's stormwater system is not allowed within the City of Kirkland. No permanent groundwater discharge is allowed into the City's stormwater system.

### **4.2.1 Design Criteria**

#### **Pipe Cover**

18-inch pipe cover minimum is allowed.

## **Chapter 5 Flow Control Design**

Applies with the revisions stated below:

Refer to Policy R-16 for gate requirements to publicly maintained drainage systems.

### **5.1 Detention Facilities**

Use details located in the COK Public Works Pre-Approved Plans, if available.



#### **5.1.1.1 Construction of Access Roads**

Maintenance access road(s) per Pre-Approved Plan CK-D.37 shall be provided to the control structure and other drainage structures associated with the detention facility (e.g., inlet, access openings, emergency overflow or bypass structures). Vehicular access to the drainage structures associated with the detention facility shall not be obstructed on a temporary or permanent basis without prior approval from the City. Location of parking stalls shall not obstruct maintenance access. Where maintenance access is required on a driveway that shares access to residential units, a min. 16' wide drive line is required to accommodate two-way traffic.

#### **5.1.2 Detention Tanks**

##### **5.1.2.1 Design Criteria**

Setbacks: Refer to Policy G-1 Easement Width Policy. For vaults and tanks deeper than 10' measured from finished grade to bottom of facility, a 1:1 easement width to facility depth ratio is required (e.g., a 13' deep tank measured from finished grade to bottom of pipe would require a 13' easement).

Dead Storage: The maximum allowable dead storage within a detention tank is 1 foot, unless a gravity system can be provided to the sanitary sewer or stormwater system.

Riser: Maximum length on notch is 24 inches and minimum width is ¼-inch.

Materials: Bottomless pipe arches are not allowed within the public right of way. Pipe arches with a bottom must be approved by the City prior to being installed within the public right of way.

Materials: Pipe materials for publicly maintained detention tanks are restricted to the following:

1. Coated Corrugated Metal Pipe (CMP): Contech ULTRA FLO, or Equal
2. Aluminum Alloy Pipe: Contech CORLIX, or Equal
3. Steel-Reinforced Polyethylene Pipe (SRPE): Contech DuroMaxx, or Equal

See CK-D.34 and STORM DRAINAGE - DESIGN CRITERIA for more information.

Maximum depth for all detention tank systems shall be 15 feet from rim to tank invert.

#### **5.1.3 Detention Vaults**

##### **5.1.3.1 Design Criteria**

Setbacks: Refer to Policy G-1 Easement Width Policy

#### **5.1.4.1 Control Structures Design Criteria**

A removable screen is required when the bottom orifice size is 1" or less. The screen shall be made from stainless steel mesh, 8 inch depth, and attached with a minimum of 3 stainless steel screws. The size of the mesh openings must be less than the orifice diameter (0.25 inch mesh typical).

#### **5.1.5 Parking Lot Detention**

Parking lot detention is not allowed in the City of Kirkland.

#### **5.2.1 General Requirements for Infiltration Facilities**

### **Testing Procedure**

In addition to the small and large PIT, EPA falling head percolation test (follow test procedure in 2021 KCSWDM, Reference 6-A) is an acceptable testing procedure for determining a design infiltration rate. The correction factor for determining the design infiltration rate is  $F(\text{testing}) = 0.30$ . Refer to the table below for what type of infiltration test is acceptable for meeting the LID Performance Standard or for designing infiltration facilities.

A large PIT will be required for infiltration facilities that will infiltrate more than 1 acre of impervious area.

### **Allowable Infiltration Testing Methods**

	Small PIT	Large PIT	Single Ring Infiltrometer	EPA Falling Head
LID Performance Standard	Accepted	Accepted	Accepted	Accepted
Inf Facility serving < 1 acre of impervious area	Accepted	Accepted	Not Accepted	Accepted
Inf Facility serving > 1 acre of impervious area	Not Accepted	Accepted	Not Accepted	Not Accepted

The single ring infiltrometer and EPA falling head test will require a minimum of 3 tests (arrayed in a triangle) per infiltration BMP or facility location. The lowest measured rate shall be used in determining the design infiltration rate.

NOTE: Grain size analysis is not an allowable method for determining an infiltration rate for the LID Performance Standard and infiltration facility sizing.

## **Chapter 6 Water Quality Design**

Applies with the revisions stated below:

Refer to Policy R-16 for gate requirements to publicly maintained drainage systems.

Use details located in the COK Public Works Pre-Approved Plans, if available.

### **6.1.2 Enhanced Basic Water Quality Menu**

For a bioretention to meet enhanced basic water quality treatment, it must be designed, using an approved continuous runoff model (WWHM 2012) to infiltrate 91% of the influent runoff per Ecology Manual BMP T7.30. Bioretention facilities that will be located within the Forbes Lake subbasin must be designed with no underdrain.

## **Appendix A: Maintenance Requirements for Flow Control, Conveyance, and Water Quality Facilities**

If the project proposes a propriety system not covered in the 2021 KCSWDM, the applicant shall submit and adjustment to the manual per Policy D-11 in the COK Public Works Pre-Approved Plans. The adjustment should include inspection and maintenance standards, including frequency of inspections and a log of maintenance activity.

## **Appendix B: Master Drainage Plan Objective, Criteria and Components, and Review Process**

This Appendix does not apply to projects in the City of Kirkland.

## **Appendix C: Small project Drainage Requirements**

Applies with the revisions stated below:

### **C.1.3 Application of Flow Control BMPs**

For any soil investigation or reporting information, refer to COK Public Works Pre-Approved Plans, Policy D-8.

In addition to Policy D-8, if a project would like to claim full infiltration in the City of Kirkland, the geotechnical engineer must classify the soil as outwash conditions (medium sands or better) and provide an infiltration test per Section 5.2.1 of the 2021 KCSWDM along with any additional requirements within this Policy to show a measured infiltration of 4 inches / hour or greater to qualify.

### **C.2.2.3 Use of Gravel Filled Trenches for Full Infiltration**

Products like infiltrator chambers are not equivalent to gravel filled infiltration trenches in Appendix C. If the project would like to use proprietary items, the applicant shall submit an adjustment to the manual per Policy D-11 in the COK Public Works Pre-Approved Plans.

### **C.2.3.3 & C.2.3.4 – Use of Gravel Filled Trenches for Limited Infiltration**

Clarification: The minimum length requirement per 1,000 sf of tributary surface must be met regardless of width of trench.

Drywells have a maximum surface area of 100 sf, minimum 4' per side.

### **C.2.4.1 Minimum Design Requirements for Basic Dispersion**

**11. Basic dispersion is not allowed to discharge or sheet flow directly onto adjacent private property parcels. Runoff downstream of limited dispersion facilities shall be either collected and directed to storm conveyance, or prevented from contributing to neighboring parcels and kept onsite.**

### **C.2.6 Requirements for Use of Bioretention**

Cells shall be designed to drain within 24 hours. Water storage volume in cubic feet shall be equal to 0.25 times the square footage of the impervious surface or per Section C.2.6.4 of the 2021 KCSWDM, whichever is greater, or sized using WWHM 2012 or another approved continuous runoff model.

Do not place geotextile fabric between the Bioretention Soil Mix (BSM) layer and the subgrade. Geotextile fabric for non-woven soil separation may be used with City approval. Wrapping an optional under-drain pipe with filter fabric is not permitted.

#### **C.2.7.2 – C.2.7.4 Permeable Pavement: Pervious Concrete, Porous Asphalt, Permeable Pavers**

Permeable pavement shall not be located over cisterns, utility vaults, underground parking, in high volume intersections, under solid waste dumpsters, or where there is a high risk of chemical spillage.

Groundwater must be at least 3 feet below the aggregate base course layer if designing with an infiltration rate. One foot of separation may be used to meet Core Requirement #9 in the 2021 KCSWDM.

Protect pervious pavement from fines and other sediment during construction by covering with visqueen or similar impervious material.

For areas that transition from pervious concrete or porous asphalt to traditional impervious concrete or asphalt, install a concrete divider or extend the pervious reservoir base course under the impervious surface to account for settling.

Sand is not allowed in between or below permeable pavers in the City of Kirkland. See permeable paver detail CK-L.09 for aggregate size approved for use between and below pavers.

For additional requirements of this BMP, refer to the COK Public Works Pre-Approved Plans, Detail CK-L.09. Other proprietary systems may be allowed with Surface Water Engineer approval.

#### **C.2.7.6 Grassed Modular Grid Pavement**

Modular grid pavement with grass planted in the openings or in a thin layer of soil over the grid material cannot be used for single family residential driveways that are used on a daily basis in the City of Kirkland. Past performance shows the grass does not grow well when subject to vehicular traffic on a daily basis.

Modular grid pavement must be designed to meet H-20 loading.

### **C.2.9 Reduced Impervious Surface Credit**

#### **C2.9.2 Restricted Footprint**

In addition to the criteria listed, impervious surface limit must be reduced by 5% or greater and the restricted footprint area shall be rounded up or down to the nearest 100 square feet, to receive the facility sizing credit.

Example:

If a lot has an area of 7200 SF and is situated in a 50% max lot coverage zone, then the maximum allowable impervious surface area for surface water mitigation purposes is  $7200 \text{ SF} \times (0.50 + 0.10) = 4320 \text{ SF}$  (additional 10% per Section 3.2.2.1).

A 5% minimum reduction implies  $7200 \text{ SF} \times 0.55 = 3960 \text{ SF}$  impervious surface. The Restricted Footprint shall be rounded up or down and recorded as 4000 SF, or additional reductions at 100 SF increments if so desired (3900 SF, 3800 SF, and so on).

### **C.2.9.3 Wheel Strip Driveways**

Wheel strips may only be used to meet Core Requirement #9, maximum extent feasible, and may not be used for Flow Control BMP credit to meet Core Requirement #3. Actual impervious surface limits of wheel strips shall be used to estimate impervious surface coverage. See Policy R-1 for additional requirements on wheel strip driveways.

### **C.2.10 Native Growth Retention Credit**

For additional implementation requirements of this BMP, refer to COK Public Works Pre-Approved Plans, Policy D-15.

## **Appendix D: Construction Stormwater Pollution Prevention Standards**

Use details located in the COK Public Works Pre-Approved Plans, if available.

### **D.2.4.2 Wet Season Requirements**

Refer to ESC Notes in the COK Public Works Pre-Approved Plans.

## **III. Code Reference Tables**

King County Code is referenced in many places throughout the KCSWDM. The following table identifies the county code references and states the equivalent City of Kirkland code where applicable (Kirkland Municipal Code is KMC and Kirkland Zoning Code is KZC). Policies are located in the Public Works (PW) Pre-Approved Plans.

<b>King County Code Reference</b>	<b>Subject of Reference</b>	<b>COK Code/Policy Equivalent</b>	<b>Comment</b>
KCC 2.98	Adoption procedures and Critical Drainage Areas	KZC Chapter 90	
Title 9	Surface Water Management	KMC 15.52	
KCC 9.04	Surface Water Run-off policy	KMC 15.52	
KCC 9.04.020	Definitions	KMC 15.04	
KCC 9.04.030	Drainage Review	PW Pre-Approved Plans	Policy D-2, D-3
KCC 9.04.050	Drainage Review-requirements	PW Pre-Approved Plans	Policy D-2, D-3
KCC 9.04.060	Critical drainage and/or erosion areas	KZC 85, KZC 90	
KCC 9.04.070	Engineering plans for the purposes of drainage review	KMC 15.52.050, KMC15.52.060 and PW Pre-Approved Plans	Policy D-2, D-3, D-11
KCC 9.04.090	Construction timing and final approval	KMC 15.52.060	Policy D-12
KCC 9.04.095	Vesting for lots in final short plats	KMC 22.20.370	
KCC 9.04.100	Liability Requirements	KMC 15.52.080	
KCC 9.04.115	Drainage Facilities accepted by King County	KMC 15.52.070	
KCC 9.04.120	Drainage Facilities NOT accepted by King County	KMC 15.52.070	
KCC 9.12.025	Prohibited discharges in the water quality section	KMC 15.52.090	Policy D-4

KCC 9.12	Water Quality	KMC 15.52.090 – 15.52.110	
KCC 9.12.035	Water Quality: Stormwater Pollution Prevention Manual Adoption	KMC, 15.52.090, KMC 15.52.100	Policy D-4
KCC 16.82	Erosion and Sediment Control, Clearing and Grading	KMC 15.52.060	
KCC 16.82.095(A)	ESC standards: seasonal limitation period	PW Pre-Approved Plans	Erosion/Sediment Control Plan Notes
KCC 16.82.100(F)	Grading standards: preservation of duff layer	KZC Chapter 95	
KCC 16.82.100(G)	Grading Standards: soil amendments	KZC Chapter 95, Pre-approved Plans	
KCC 16.82.150	Clearing standards in rural zone	Not applicable	COK does not contain rural zones
KCC 17	Fire Code	KMC 21.33	
KCC 20.70.020	Critical Aquifer recharge area	Not applicable	No critical aquifer recharge areas in COK
KCC 21A.24	Critical Areas Requirements	KZC Chapters 85 and 90	
21A.30	Animals in Residential Zones	KZC 115.20	
KCC 21A.14.180.D	On-site recreation space required	No equivalent City code exists	On-site recreation space is not required
KCC 21A.24	Critical Areas Code	KZC Chapter 90	
KCC 21A.38	Property specific development standards or special district overlays	KZC Chapter 70, KZC Chapter 90	
KCC 23.20	Code compliance: citations	KMC 1.12.030	
KCC 23.24	Code compliance: notice and orders	KMC 1.12.040	
KCC 23.28	Code compliance: stop work orders	KMC 1.12.070	
KCC 23.40	Code compliance: liens references on declaration of covenants form	KMC Title 15	

## IV. Mapping

Below is a list of City of Kirkland maps to be used during drainage design. The maps can be viewed on-line or viewed at the Public Works counter at City Hall.

The maps are available on the following website:

[http://www.kirklandwa.gov/depart/Information\\_Technology/GIS.htm](http://www.kirklandwa.gov/depart/Information_Technology/GIS.htm)

1. Base Map
2. Flow Control Map
3. Sensitive Areas Map
4. Land Use Map

## V. Reference Materials

This section identifies which reference materials provided in the 2021 KCSWDM are applicable and which are not. Reference materials that have been struck through (i.e., ~~struck through~~) are not applicable to projects in the City of Kirkland.

1. KCC 9.04—Surface Water Runoff Policy
2. Adopted Critical Drainage Areas
3. Other Adopted Area Specific Drainage Requirements
  - A. RA Zone Clearing Restrictions
4. Other Drainage Related Regulations and Guidelines
  - A Grading Code Soil Amendment Standard
  - B Clearing & Grading Seasonal Limitations
  - C Landscape Management Plan Guidelines
  - D Shared Facility Maintenance Responsibility Guidance
5. Wetland Hydrology Protection Guidelines
6. Hydrologic/Hydraulic Design Methods
  - A Infiltration Rate Test Methods
  - B Pond Geometry Equations
  - C Introduction to Level Pool Routing
  - D Supplemental Modeling Guidelines
7. Engineering Plan Support
  - A King County Standard Map Symbols
  - B Standard Plan Notes and Example Construction Sequence
  - C Stormfilter Facility Access and Cartridge Configuration
8. Forms and Worksheets
  - A Technical Information Report (TIR) Worksheet
  - B Offsite Analysis Drainage System Table
  - C Water Quality Facility Sizing Worksheets
  - D Flow Control and Water Quality Facility Summary Sheet and Sketch
  - E CSWPP Worksheet Forms
  - F Adjustment Application Form and Process Guidelines
  - G Dedication and Indemnification Clause—Final Recording
  - H Bond Quantities Worksheet
  - I Maintenance and Defect Agreement
  - J Drainage Facility Covenant
  - K Drainage Release Covenant
  - L Drainage Easement
  - M Flow Control BMP Covenant and BMP Maintenance Instructions (Recordable format)
  - N Impervious Surface Limit Covenant
  - O Clearing Limit Covenant
  - P River Protection Easement
  - Q Leachable Metals Covenant
9. Interim Changes to Requirements
  - A Blanket Adjustments
  - B Administrative Changes
10. King County Identified Water Quality Problems
11. Materials
  - A (VACANT)
  - B (VACANT)
  - C Bioretention Soil Media Standard Specifications
  - D (VACANT)
  - E Roofing Erodible or Leachable Materials
12. (VACANT)

~~13. (VACANT)~~

14. Supplemental Approved Facilities

A Approved Proprietary Facilities

B Approved Public Domain Facilities



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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy D-11: SURFACE WATER ADJUSTMENT PROCESS**

This process is provided for the occasions when site conditions dictate or a project applicant requests modifications to one of the surface water core or special requirements, or any other specific requirement or standard contained in the King County Surface Water Design Manual or the City of Kirkland Public Works Pre-Approved Plans. A fee will be required for review of an adjustment request. For projects with complex drainage issues (such as extensive modeling or review of modeling results), review by a third party may be required at the applicant's expense. Proposed adjustments must be approved prior to final permit approval.

#### **Adjustment Process**

1. Complete a Surface Water Standards Adjustment Request form (see page 2 of this policy).
2. Submit the request form and additional materials, including fee, to the Public Works Department. Include all materials that may assist in a complete review and consideration of the request. Failure to provide all pertinent information may result in delayed processing or denial of request.
3. The request will be reviewed, and the applicant will be notified of approval/denial.

#### **Adjustment Criteria**

Adjustments to the surface water design requirements may be granted provided that granting the adjustment will achieve ALL of the following:

1. The adjustment will produce a compensating or comparable result that is in the public interest, AND
2. The adjustment meets the objectives of safety, function, appearance, environmental protection, and maintainability based on sound engineering judgment, AND
3. Granting the adjustment for the individual property in question will not create a significant adverse impact to public health, welfare, water quality, and properties downstream or nearby, AND
4. The adjustment requires the best practicable alternative for achieving the spirit and intent of the requirements in question, AND,
5. The granting of any adjustment that would be in conflict with the requirements of any other department will require review with that department.

The City of Kirkland recognizes there are special circumstances or conditions affecting property such that strict application of the criteria for producing a compensating or comparable result would deprive the applicant of all reasonable use of the parcel of land in question. In these cases Public Works staff will work with the applicant, and every effort will be made to find creative ways to meet the intent of the requirement and to achieve a mutually satisfactory result.

#### **Adjustment Reconsideration Process**

The applicant may request reconsideration of the denial or conditions of approval of an adjustment request by submitting a formal letter to the Public Works Director within 15 working days of the decision. This letter must include justification for reconsideration of the decision, along with a copy of the adjustment request. The director shall respond to the applicant in writing within 15 working days. The director's decision on the reconsideration request shall be final. A per-hour review fee will be charged to the applicant for review of a reconsideration request.

#### **Exceptions/Variances**

For applicants requesting a formal exception/variance from the minimum requirements, see the City of Kirkland Western Washington Phase II Municipal Stormwater Permit (Appendix I, Section 6).



## SURFACE WATER DESIGN STANDARDS ADJUSTMENT REQUEST

### Instructions to Applicant/Design Engineer:

Please complete this form and submit to the COK Public Works Department. Include all materials that may assist in a complete review and consideration of the adjustment request. Failure to provide all pertinent information may result in delayed processing or denial of request.

<b>COK Permit Number:</b>		<b>Request date:</b>	
<b>Project Name:</b>			
<b>Project Address:</b>			
Applicant Name:	Design Engineer Name and Firm:		
Applicant Phone:	Design Engineer Phone:		
Applicant Signature:	Design Engineer Signature:		

### Description of Adjustment Request:

### Justification for Adjustment Request:

Applicable KC Surface Water Design Manual: ☐ 2009 or ☐ 2016 or ☐ 2021

Applicable Section(s) of Standards:

---

COK Determination: ☐ Approved ☐ Denied

Conditions (if applicable):

COK Staff Signature: \_\_\_\_\_ Date: \_\_\_\_\_

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy D-12: CONSTRUCTION STORM WATER POLLUTION PREVENTION PLAN**

All proposed projects that will conduct construction activities onsite, or offsite must provide stormwater pollution prevention and spill controls to prevent, reduce, or eliminate the discharge of pollutants (including sediment) to onsite or adjacent stormwater systems or watercourses.

If the project is a simplified drainage review (refer to COK Policy D-2), the project must meet the following conditions per the 2021 King County Surface Water Design Manual (KCSWDM), Appendix C, Section C.1.4.

The project must submit a Simplified Construction Stormwater Pollution Prevention Plan (SCSWPP) which contains a narrative explaining how each category below is addressed in the site specific SCSWPP Plan. Additional information can be found in Section C.1.4.1 of the 2021 KCSWDM.

1. Mark Clearing Limits / Minimize Clearing
2. Minimize Sediment Tracked Offsite
3. Control Sediment
4. Stabilize Exposed Soils
5. Control Runoff
6. Control Dewatering
7. Control Other Pollutants (SWPPS)
8. Protect Existing and Proposed Flow Control BMPs
9. Maintain BMPs During Construction and Final Site Stabilization

If the project is a targeted or full drainage review (refer to COK Policy D-3), the project must meet the following conditions per the 2021 KCSWDM, Section 1.2.5.

The project must submit a Construction Stormwater Pollution Prevention (CSWPP) Plan which contains both:

- Erosion and sediment control measures (see section A below), and
- Stormwater pollution prevention and spill control measures (see section B below).

#### **A. Erosion Sediment Control (ESC) Measures**

Each category below must be addressed in the site specific CSWPP Plan. Additional information can be found in the 2021 KCSWDM (Appendix D) and the Kirkland Pre-Approved Plans.

1. Clearing Limits
2. Cover Measures
3. Perimeter Protection
4. Traffic Area Stabilization
5. Sediment Retention
6. Surface Water Collection
7. Dewatering Control
8. Dust Control
9. Flow Control
10. Control of Pollutants
11. Protect Existing and Proposed Flow Control BMPs

12. Maintain BMPs
13. Manage the Project

**B. Stormwater Pollution Prevention and Spill (SWPPS) measures:**

Each category below must be addressed in the site specific CSWPP Plan. Additional information can be found in the 2021 KCSWDM (Appendix D) and the Kirkland Pre-Approved Plans.

1. Follow effective pollutant handling and disposal procedures.
2. Provide cover and containment for materials, fuel and other pollutants.
3. Manage the project site to maximize pollutant control and minimize pollutant sources.
4. Protect from spills and drips of petroleum products and other pollutants.
5. Avoid over-application or untimely application of chemicals and fertilizers.
6. Prevent or treat contamination of stormwater runoff by pH modifying sources.

**Note:** For **projects 1 acre or larger**, applicants are required to submit a Notice of Intent (NOI) to Ecology and obtain coverage under Ecology's Construction Stormwater General Permit (CSWGP); issued by the WA State Department of Ecology, as part of the Federal Clean Water Act. The Ecology permit will require a more detailed CSWPP Plan in their format. Applicants must submit a draft Ecology CSWPP Plan at COK permit submittal, and final Ecology CSWPP Plan at the COK Pre-Construction Meeting. The Ecology CSWPP Plan meets Section 1.2.5 of the 2021 KCSWDM and is an approved method to meet this Policy. For additional information, see the following Ecology website:

<http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html>

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### DEPARTMENT OF PUBLIC WORKS

#### PRE-APPROVED PLANS POLICY

#### **Policy D-13: WETLAND HYDROLOGY STUDY GUIDELINES**

This policy is in place to provide guidance on requirements regarding offsite analysis, specifically related to potential impacts to wetland hydrology. If a project triggers Core Requirement #2: Offsite Analysis and has a wetland on the property, see requirements below for *A. Onsite Wetlands*. If the project triggers Core Requirement #2: Offsite Analysis, locates a wetland within ¼ mile downstream, AND is not exempt from Core Requirement #3: Flow Control Facilities, see requirements below for *B. Offsite Wetlands*.

##### A. Onsite Wetlands

The project identified a wetland on the property and is required by Kirkland Zoning Code (KZC) Chapter 90 to create a Critical Area Report. Refer to the Planning Department for additional information on the Critical Area Report.

In addition to the Critical Area Report, an Onsite Wetland Hydrology Study is required by the Public Works Department. This Onsite Wetland Hydrology Study must describe:

- The change in flow rate from existing to developed conditions (if there is a vault onsite, use the flow release from the detention system).
- Hydrologic report analysis of the hydroperiod of the wetland and the fluctuation in water level due to the increase/decrease in flows (use WWHM 2012) modeled for individual days or on a monthly basis based on the criterion outlines in the Department of Ecology 2014 Stormwater Management Manual for Western Washington, Volume I, Appendix I-D, Guide Sheet 3B.
- Memorandum from a wetland qualified critical area professional (as defined in KZC Chapter 90) stating whether the proposed project will have adverse impacts on wetland functions, including but not limited to amphibian reproduction and potential changes in vegetation composition or structure, as a result of effects of changes to the hydroperiod.
- If the memorandum indicates there will be adverse impacts, include how the project proposes to mitigate for these impacts.

##### B. Offsite Wetlands

The project identified a wetland ¼ mile downstream of the property. The Public Works Department will determine on a case-by-case basis what elements of the Wetland Hydrology Study, above, and the Critical Area Report, KZC 90.110, are required for an Offsite Wetland Hydrology Study.

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**DEPARTMENT OF PUBLIC WORKS**

**PRE-APPROVED PLANS POLICY**

**Policy D-14: SPECIAL STORMWATER REQUIREMENT**

This policy is required for the parcels located within Figure 1. Projects located within Figure 1 are subject to the following requirements:

1. All projects are required to meet the 2021 King County Surface Water Design Manual and the City of Kirkland Addendum (Policy D-10)
2. In addition, projects must fully infiltrate the 100-year storm event for areas that currently do not have a direct connection to the City's stormwater system.
  - a. If infiltration is not feasible on site, a detention system is required. The 2, 10 and 100-year developed peak flow must match the existing 2, 10 and 100-year peak flow for the area currently connected to the City's stormwater system.
3. If the project triggers flow control, the flow control facility must meet Level 2 flow control AND the 100-year developed peak flow must match the existing 100-year peak flow for the area currently connected to the City's stormwater system.

Below is an example:

Project Description

An existing house is looking to add an addition to the house. In existing conditions, 1,000 sf of impervious area is currently connected to the City's stormwater system, and 1,000 sf of impervious area disperses on the site. The project proposed tear down and rebuild 3,000 sf of impervious surface on the lot.

















Drainage Requirements

In addition to meeting the 2021 KCSWDM and COK Addendum, this project must fully infiltrate 2,000 sf of impervious area. Only 1,000 sf was in existing conditions was connected to the City's stormwater system. If infiltration is not feasible, a detention system must be designed. The detention system release rate shall match the 2, 10, and 100 year peak flow for 1,000 sf of impervious area.





Address

-  Other Address  
 Current Address  
 Current ADU  
 Pending Address
-  City Limits  
 Grid  
 QQ Grid  
 Cross Kirkland Corridor  
 Regional Rail Corridor  
 Streets  
 Parcels  
 Buildings  
 Lakes  
 Parks  
 Schools  
 Olympic Pipeline Corridor

1:2,400



## Notes

0.1 Miles

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No warranties of any sort, including but not limited to accuracy, fitness, or  
merchantability, accompany this product.

NAD\_1983\_StatePlane\_Washington\_North\_FIPS\_4601\_Feet

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**DEPARTMENT OF PUBLIC WORKS**

**PRE-APPROVED PLANS POLICY**

**Policy D-15: NATIVE GROWTH RETENTION AREA (NGRA) ADDITIONAL REQUIREMENTS**

In addition to the requirements identified in the 2021 King County Surface Water Design Manual (KCSWDM) in Appendix C, Section 2.10 - NGRA, the following criteria apply.

**Design/Construction**

- The minimum allowable area to set aside for a NGRA shall be 10% of the lot and under no circumstances shall be less than 2,000 sf. NGRAs that are contiguous with NGPE's may reduce size to 500 sf if 10% coverage is achieved.
- The Native Growth Retention Area (NGRA) needs to be contiguous on the lot and not separated by fencing. Projects that propose to create NGRAs on multiple lots should make the NGRA contiguous between lots.
- With a subdivision, the NGRA can be on one or multiple lots. (ex: in a 2 lot short plat, the entire NGRA could be on one lot to meet the 0.15 c.f.s. exception in the 2021 KCSWDM).
- A NGRA cannot be created over a native growth protection easement (NGPE). The NGPE is a requirement of planning and the sensitive area and the buffer must be mitigated for through the zoning code. The NGRA intent is to preserve or create additional forested areas outside of buffer requirements.
- A minimum width of 25 feet is required for the native growth retention area.
- Special inspection by a third party or internal staff will be required to document the type and quantity of plants are meeting the approved design.
- Public utilities and access to public utilities are not allowed within the NGRA
- NGRA shall be fenced using a split-rail. A sign designating the area a a NGRA shall be installed on the split-rail. (One sign on each property). Gate access is allowed.
- The following language must be recorded on the plat: NGRAs that are contiguous with a NGPE shall not fence between NGRA and NGPE, only between NGRA and developed area.

"The owners of the land herein short subdivided hereby grants to the City of Kirkland a municipal corporation, a native growth retention area easement over, across, under and on that area shown hereon as Native Growth Retention Area (NGRA). The City shall have a license to enter the property to access the easement area for the purposes of monitoring for compliance with the terms of this easement as outlined in the 2021 King County Surface Water Design Manual.



It is the responsibility of the property owner(s) to maintain the NGRA. Maintenance shall include removing non-native, invasive and noxious plants; and planting native plants and trees as determined by the City of Kirkland.

All trees within the NGRA shall be retained, aside from approved timber harvest activities and the removal of dangerous or diseased trees. The NGRA may be used for passive recreation; provided temporary structures with or without foundation (tree houses, sheds, etc) are not installed and any cleared and compacted areas do not exceed eight percent (8%) of the NGRA. All improvements within NGRA shall require written approval by the City of Kirkland Public Works Department Stormwater Engineering staff. It shall be the responsibility of the property owner to gain all permits and approvals.

Each of the undersigned owners agree to defend, pay, and save harmless the City of Kirkland, its officials, agents, and employees from any and all claims of every nature whatsoever, real or imaginary, which may be made against the City, its officers, agents, or employees for any damage to the property or injury to any person arising out of the existence of said native growth retention area over said owner's property or the actions of the undersigned owners in carrying out the responsibilities under this agreement, including all costs and expenses, and recover attorney's fees as may be incurred by the City of Kirkland in defense thereof; excepting therefrom only such claims as may arise solely out of the negligence of the City of Kirkland, its officers, agents, or employees.

This easement is given to satisfy a condition of the development permit approved by the City of Kirkland under Kirkland file/permit no. SUBXX-XXXXX.

This easement shall be binding upon the parties hereto, their successors and assigns, and shall run with the land."

### **0-3 Years after Construction**

- The City may contract with a third party to monitor the native growth retention area for the first 3 years. Minimum plant survival after 3 years is 90%. Maximum aerial cover by invasive weed species is 10%. The developer will be responsible for paying for the monitoring and reporting. The monitoring report shall include:
  - A minimum of 3 photo points
  - Plant counts
  - Type and amount of invasive species (maintenance is required after 5% invasive species)
  - Recommendation for maintenance needs, if any
- The developer will be responsible for the maintenance of the native growth retention area. The maintenance shall include irrigation / watering of the plants for survival and implementing the maintenance recommendations from the monitoring report.
- The developer shall be responsible for posting a maintenance security for the first 3 years (value equal to \$30 per square foot of NGRA, Min = \$15,000 to Max = \$60,000). The maintenance security will be used if the developer does not implement the maintenance recommendations from the monitoring report in a timely manner.

- If native plant survival and invasive species cover standards are not achieved, the City has the ability to extend the monitoring period an additional year to ensure plant survival prior to handing over to the responsibility of maintenance to the homeowners.
- The developer shall be responsible for paying a monitoring fee (fees will be determined at time of review, and are expected to be similar to \$11,200 for NGRA areas from 500 to 2499 sf; \$15,169 for areas from 2500 sf to 10,000 sf).

**> 3 years after Construction**

- Following the approval of the maintenance / monitoring requirements of the construction mentioned above, maintenance will be the responsibility of the homeowner.
- The City will inspect the native growth retention area on an annual basis if the area is used to meet a flow control exception or reduce the size of a detention system.

**CITY OF KIRKLAND**

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**DEPARTMENT OF PUBLIC WORKS**

**PRE-APPROVED PLANS POLICY**

**Policy D-16: RECYCLED CONCRETE AND CEMENT TREATMENT USE WITHIN CITY LIMITS**

**Recycled Concrete:**

Recycled concrete is not allowed within the City of Kirkland. See special provisions for capital improvement projects.

**Cement Treatment:**

Soil amendments are sometimes used to stabilize construction sites in order to stabilize the ground for building. The applicant may apply for use of soil amendments allowed under this policy. Additional conditions may vary from site to site, but the conditions below must be followed.

***Soil Amendment Conditions:***

- 1) Fly ash or kiln dust are not allowed within the City of Kirkland. Only Portland Cement Type II (cement treatment) as the soil amendment additive is allowed.
- 2) Cement treatment is only allowed under impervious areas and under the following types of impervious areas:
  - a. Within the City right-of-way, cement treatment is only allowed under the road prism.
  - b. Shared access private driveways
  - c. Commercial properties
  - d. Cement treatment is not allowed within any utility trenching.
- 3) Cement treatment is not allowed within the buffer of a wetland, stream or lake.
- 4) If cement treatment is placed near low impact development (LID), a geotechnical engineer shall be on site to verify permeability of soil

***Conditions for Implementation of Soil Amendment:***

- 1) The contractor shall hold a preconstruction meeting with the assigned inspector to discuss potential application of cement treatment.
- 2) The application rate shall be determined by the geotechnical engineer. The geotechnical engineer must be present during application.
- 3) Cement treatment shall not be mixed or placed while the temperature is at or below 40 degrees or while raining.

- 4) The contractor shall be prepared to implement dust control, as needed, to prevent fugitive dust during the treatment process.
- 5) Cement treatment to be placed in a uniform layer over the subgrade by the use of an approved, large-wheeled, mechanical spreader capable of measure the rate of cement application
- 6) Cement treatment will be mixed in to the top 12 inches or as recommended by geotechnical engineer using skirted rototilling equipment.
- 7) Treated areas to be regraded and compacted within 1 hour of application.
- 8) Treated area should be left undisturbed for at least 24 hours after compaction. After 24 hours, the treated subgrade shall be proof rolled. The proof roll shall be conducted under observation of the geotechnical engineer.
- 9) In the event the treated areas degrade due to equipment traffic or do not pass the proof roll test, the areas should be re-excavated and import shall be used to meet compaction requirements.

The following erosion control BMPs must be in place until the cement treated base is covered with an impervious surface:

- 1) Stormwater from the application area shall be kept separate from uncontaminated stormwater
- 2) During application, stormwater runoff shall be collected in a permanent system that is not connected to the City storm system (Capping storm is not allowed. Temporary collection systems may be required). Ponds are not an allowable method to store runoff from the cement treatment area.
- 3) Stormwater runoff shall be disposed to either sanitary sewer (must obtain a King County Industrial Waste Water Permit) or transported offsite to an approved site.
- 4) An emergency backup plan must be prepared and ready to implement to handle large quantities of stormwater sized for the developed condition 10-year peak discharge using the approved model with 15-minute time steps as computed in the hydrologic analysis.

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**DEPARTMENT OF PUBLIC WORKS**

**PRE-APPROVED PLANS POLICY**

**Policy D-17: CONDITION OF STORM SYSTEM FOR RELEASE OF  
2-YEAR MAINTENANCE SECURITY**

When a short plat development permit receives Final Inspection status, a 2-year maintenance security is collected for the improvements. Prior to releasing the maintenance security (typically a bond) after the 2-year maintenance period, the storm system shall be cleaned as directed by the Public Works Department Construction Inspector, and as follows:

**Catch Basins:**

The PW Inspector will inspect each catch basin for both maintenance defects and cleanliness. If sediment has accumulated in the catch basin, the developer shall hire a vactor truck to clean the catch basin.

**Detention Vault/Pond/Tank:**

The PW Inspector will inspect the vault/pond/tank for sediment deposition. If sediment has accumulated, the PW Inspector will require the developer to clean the vault.

**Cartridge System:**

The PW Inspector will require the developer to replace the cartridge system prior to releasing the maintenance security.

**Filtterra:**

The PW Inspector will require the mulch layer to be replaced prior to releasing the maintenance security.

**Wetvault:**

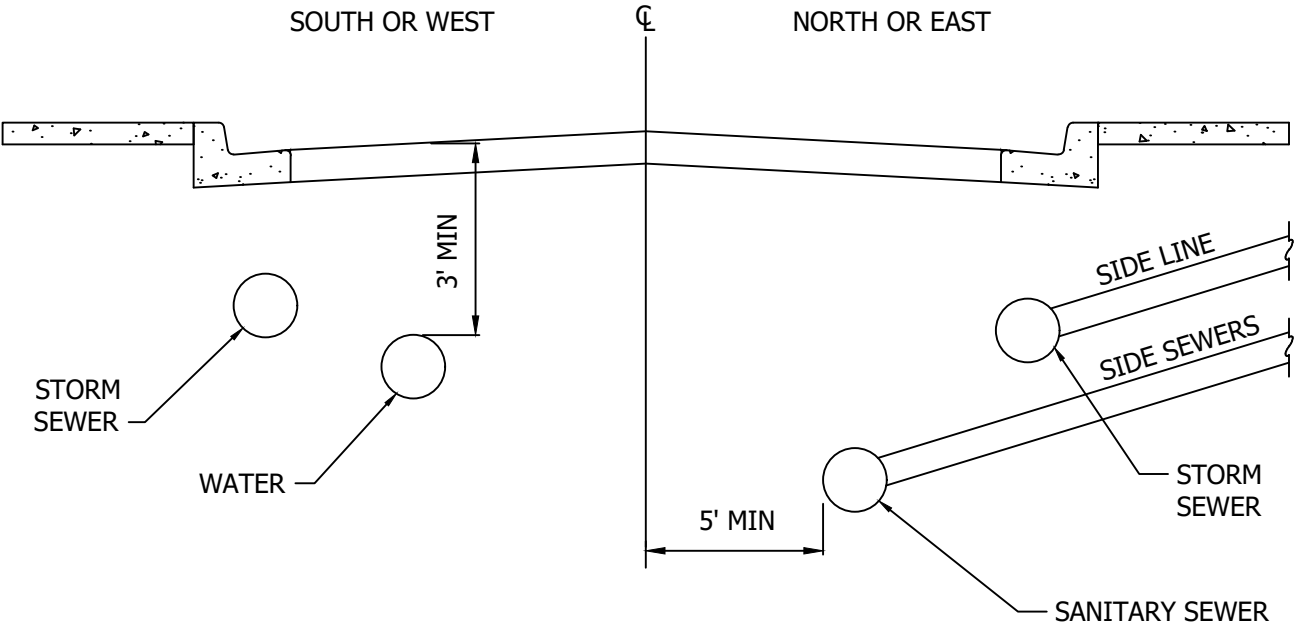
If not clearly visible that the wetvault is clean, the PW Inspector will require to the developer to pump the wetvault and clean it prior to releasing the maintenance security.

**Rain Garden:**

The PW Inspector will require the developer to remove any sediment that has entered the rain garden and replace any plants that died prior to releasing the maintenance security.

**Infiltration System:**

The PW Inspector will require the developer to clean the presettling system prior to releasing the maintenance security.



NOTES:

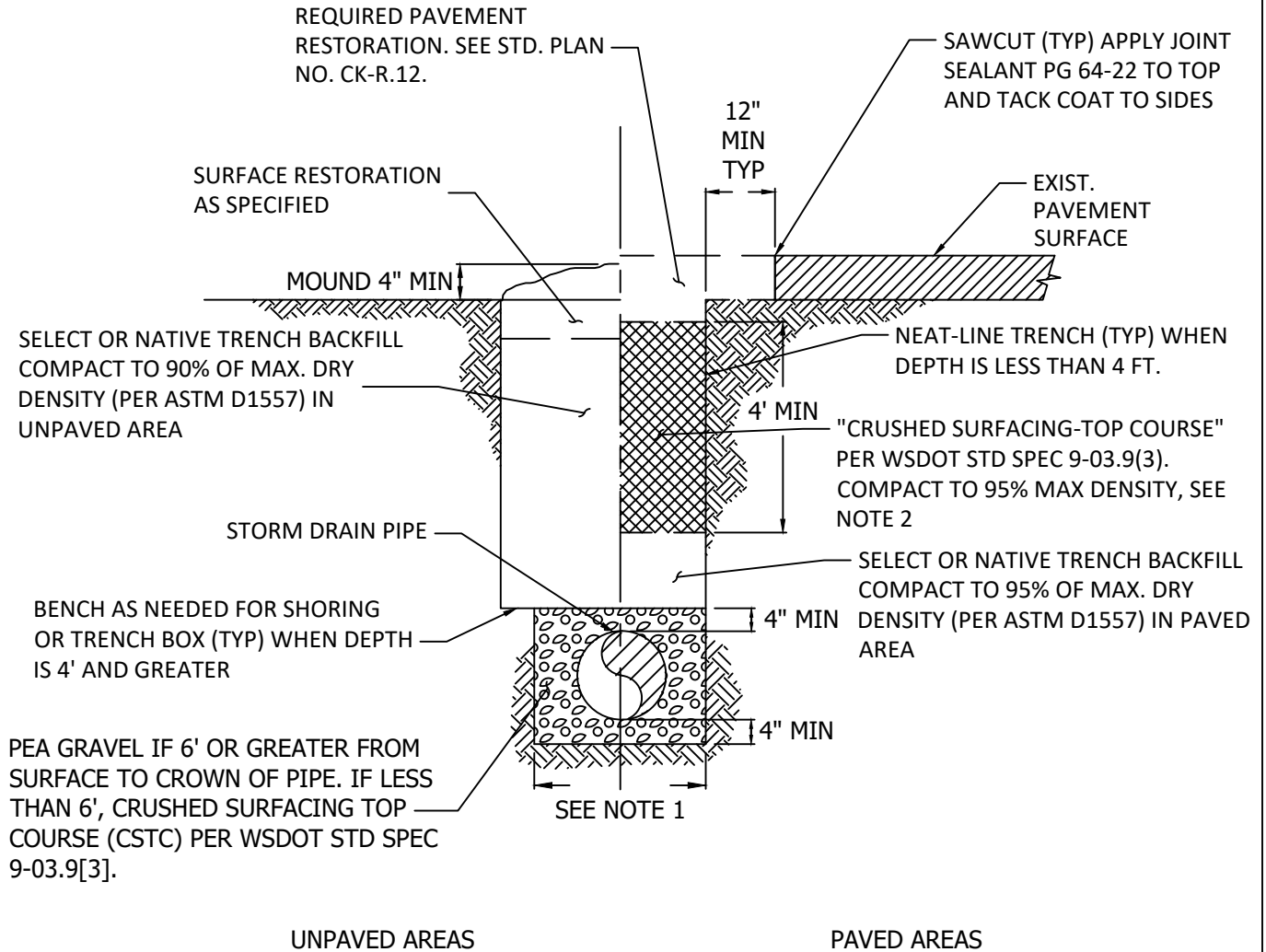
1. UNLESS STATED OTHERWISE, OR APPROVED BY THE CITY, ALL UTILITIES SHALL HAVE 2 FEET MINIMUM COVER IN AREAS SUBJECT TO VEHICULAR LOADS. IF MINIMUM COVER CANNOT BE PROVIDED, DUCTILE IRON OR SDC-900 MATERIAL SHALL BE USED FOLLOWING APPROVAL BY THE CITY.
2. UTILITIES MAY HAVE 1.5 FOOT MINIMUM COVER IN AREAS NOT SUBJECT TO VEHICULAR LOADS.
3. FOR JOINT OCCUPANCY TRENCH, SEE CK-R.06.

CITY OF KIRKLAND

PLAN NO. CK - D.01



TYPICAL UTILITY  
LOCATIONS



NOTES:

1. MAXIMUM WIDTH OF TRENCH AT TOP OF PIPE  
 \* 30" FOR PIPE UP TO AND INCLUDING 12" NOMINAL DIAMETER.  
 \* OD PLUS 16" FOR PIPE LARGER THAN 12" NOMINAL DIAMETER.
2. WHERE TRENCH IS PERPENDICULAR TO TRAVELED LANES, BACKFILL FULL DEPTH WITH CRUSHED SURFACING-TOP COURSE. WHERE TRENCH IS PARALLEL TO TRAVELED LANES, BACKFILL THE TOP 4' OF TRENCH TO SUBGRADE WITH CRUSHED SURFACING-TOP COURSE. SUITABLE EXCAVATED MATERIAL MAY BE USED PROVIDED 95% MAX. COMPACTION DENSITY (ASTM D1557) CAN BE ACHIEVED.
3. SEE OVERLAY POLICY R-7.
4. USE OF RECYCLED CONCRETE IS PROHIBITED, UNLESS APPROVED BY THE CITY. SEE POLICY D-16.

CITY OF KIRKLAND

PLAN NO. CK - D.02



STORM TRENCH  
DETAIL

1. "D", THE INSIDE DIAM. OF THE INLET PIPE, SHALL BE 6" OR LESS. FOR LARGER VALUES OF "D", USE A MANHOLE OR CATCH BASIN.
2. IN NO CASE SHALL THE OUTSIDE DIAM. OF THE INLET PIPE EXCEED ONE-HALF THE INSIDE DIAM. OF THE MAIN STORM DRAIN PIPE.
3.  $\frac{1}{4}$  OF INLET PIPE SHALL BE ON RADIUS OF MAIN STORM DRAIN.
4. THE MIN. OPENING INTO THE EXISTING STORM DRAIN SHALL BE THE OUTSIDE DIAM. OF THE INLET PIPE PLUS 1".
5. IF ANGLE IS GREATER THAN 45° FIELD TAPPING IS NOT ALLOWED.

6. MAINLINE SHALL HAVE 12" MIN. DIAM.
7. FOR THERMOPLASTIC AND D.I. INLET PIPES, CORE DRILL MAIN AND CONNECT WITH SADDLE TEE OR INSERTA TEE. SEE CK-D.03A.
8. FOR CONCRETE INLET PIPES CORE DRILL AND GROUT.

PLAN NO. CK - D.03



# FIELD-TAPPING OF CONCRETE PIPE



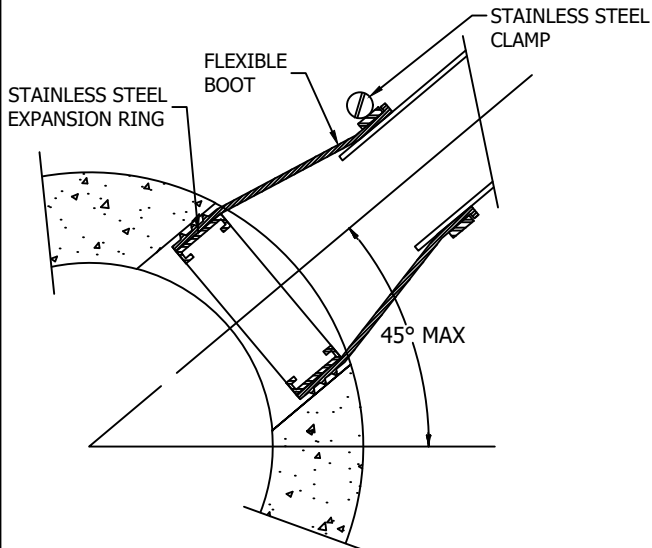
STORM DRAIN CONNECTIONS SHALL BE BY:

LAST REVISED: 07/2021

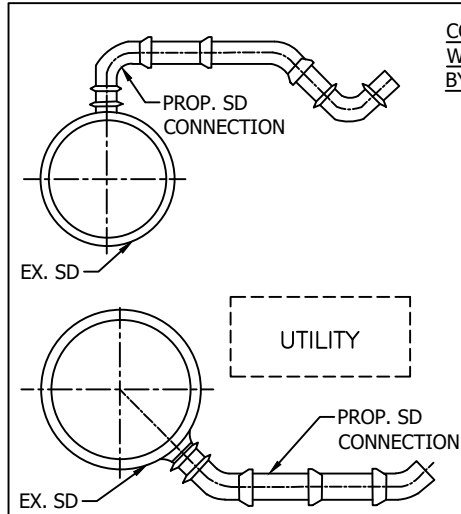
- CONNECTING TO AN EXISTING CATCH BASIN OR MANHOLE
- CONSTRUCTING A NEW CATCH BASIN OR MANHOLE ON THE EXISTING STORM DRAINAGE PIPELINE AND CONNECTING THE CONVEYANCE PIPELINE TO THIS STRUCTURE

ALTERNATIVE CONNECTIONS MAY ONLY BE ALLOWED WITH PRIOR APPROVAL BY THE CITY PUBLIC WORKS INSPECTOR:

- CUT-IN TEE
- INSERTA TEE (CORED PER MANUFACTURERS INSTRUCTIONS, SBR RUBBER SLEEVE AND GASKET TO SEAL AND SS METAL PARTS TO CLAMP)
- CORE AND SADDLE TAP (ROMAC SEWER SADDLE, OR EQUAL. LIMITED TO 4-INCH AND 6-INCH PRIVATE CONNECTIONS)



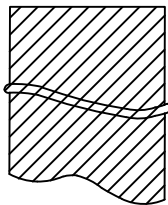
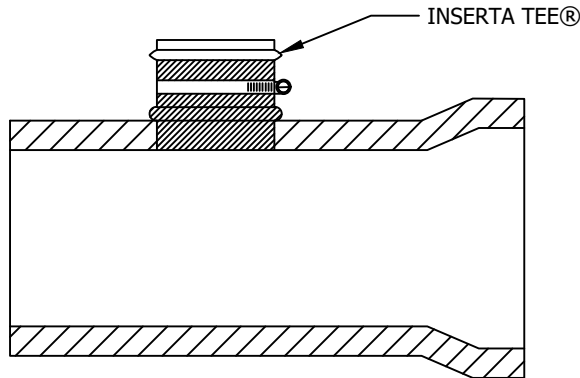
CORES TO CONCRETE MAINS SHALL BE DONE BY HOLE SAW. DRILL HOLES SHALL BE MADE BASED ON GIVEN TEE OPENING. SQUARE CUTS BY JIGSAW OR CIRCULAR SAW SHALL BE PROHIBITED.



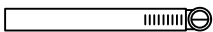
CONNECTIONS THAT WILL NOT BE APPROVED BY THE CITY INCLUDE:

- CONNECTIONS TO FORCE MAINS.
- CONNECTIONS OF LATERAL PIPES WITH A DIAMETER LARGER THAN THE MAINLINE PIPE.
- CONNECTIONS THAT RESEMBLE FIGURES TO THE LEFT.

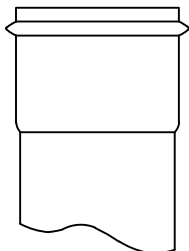
SERVICE LATERALS MUST BE AT LEAST ONE STANDARD PIPE SIZE SMALLER THAN THE MAINLINE PIPE INSIDE DIAMETER.



COMPLETE RUBBER SLEEVE (ASTM C-443) INCLUDES A MOLDED SEGMENT THAT HOLDS IT IN PLACE.



STAINLESS STEEL BAND (9/16" SERIES 300) SECURES UPPER HALF OF RUBBER SLEEVE TO THE PVC HUB



PVC HUB (ASTM 3034 SDR 35) DRIVE INTO CENTER OF RUBBER SLEEVE AFTER SLEEVE IS PLACED IN HOLE.

NOTES:

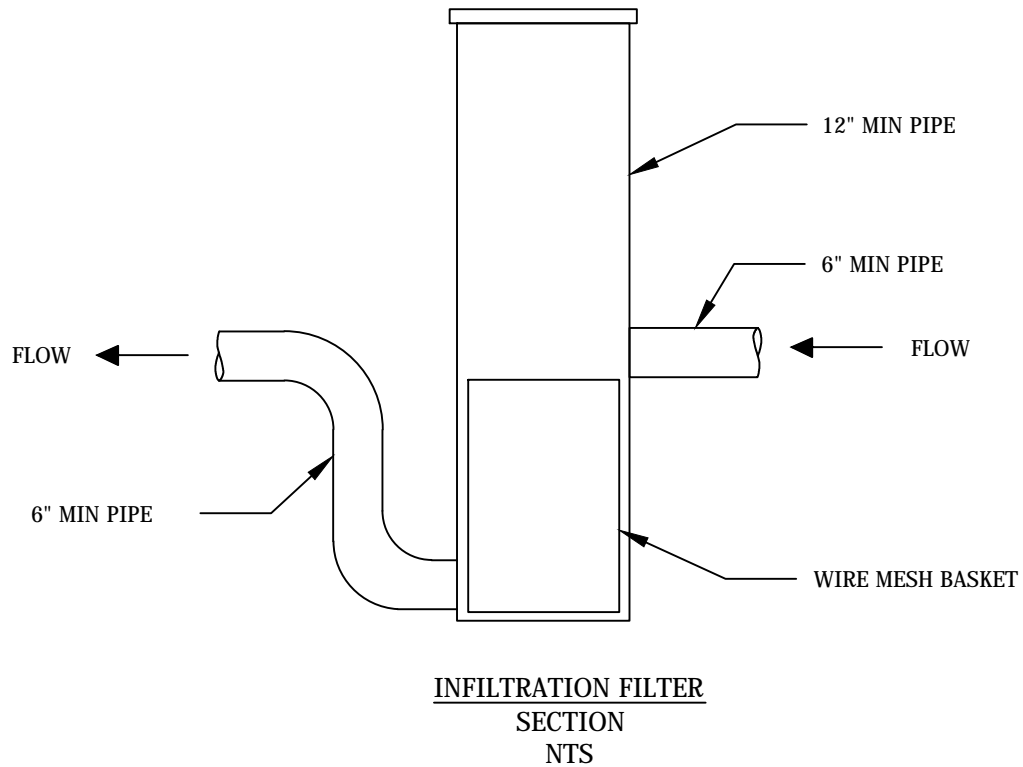
- 1.) ALL INSERTA-TEE HOLES SHALL BE MACHINE DRILLED.
- 2.) INSERTA-TEES ARE NOT APPROVED FOR NEW MAIN / LATERAL CONNECTION.

CITY OF KIRKLAND

PLAN NO. CK - D.03A



BLIND TEE  
CONNECTION



NOTES:

1. PRODUCT SHALL BE ORENCO SCB1236-6L STORMWATER CATCH BASIN OR EQUIVALENT.

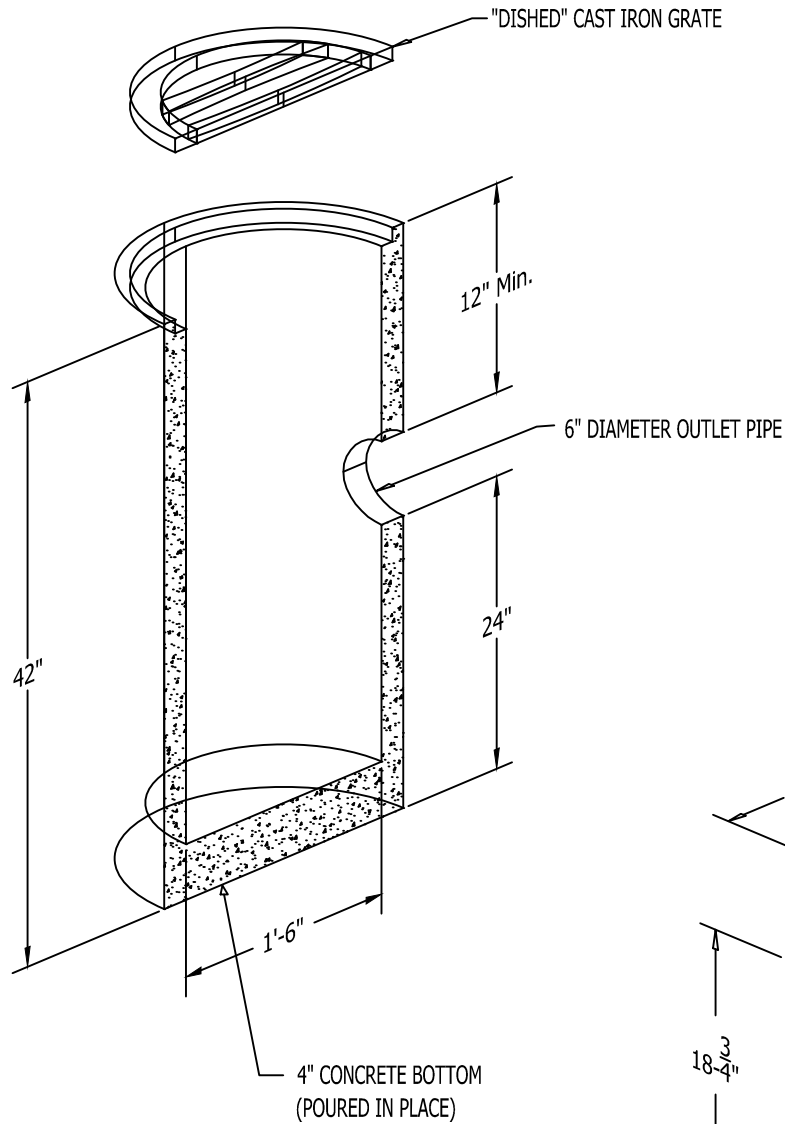
2. PLACE THE INFILTRATION FILTER UPSTREAM OF THE INFILTRATION SYSTEM (EX: DRYWELL, INFILTRATION TRENCH, ETC). SEE DETAIL CK-D.22B FOR PLACEMENT LOCATION.

CITY OF KIRKLAND

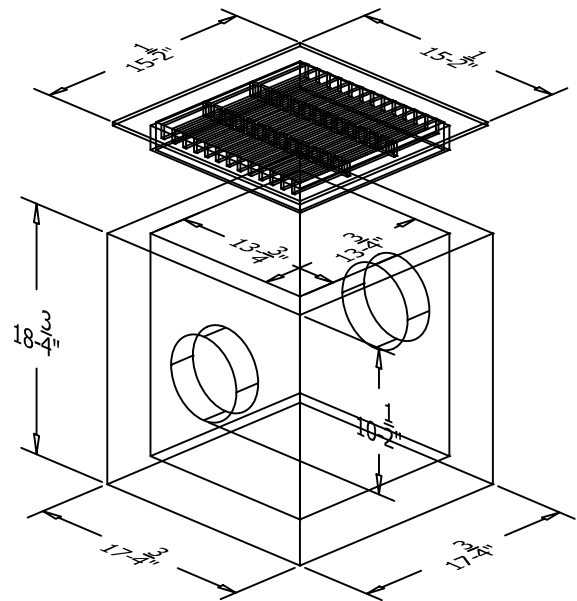
PLAN NO. CK- D.04



**INFILTRATION  
FILTER**



ROUND TYPE



SQUARE TYPE

NOTES

1. FOR USE IN NON-TRAFFIC AREAS ONLY, SUCH AS ENCLOSED YARDS IN PRIVATE RESIDENCES AND ENCLOSED PLAY AREAS IN SCHOOL GROUNDS.
2. FOR USE WITH 6" PIPES AND SMALLER, AND DEPTH LESS THAN 18".
3. LAST STRUCTURE BEFORE ROW HAS 18" MIN. SUMP DEPTH

**CITY OF KIRKLAND**

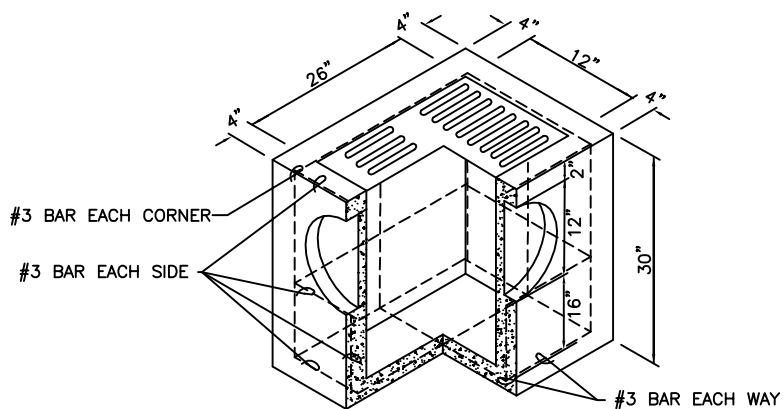
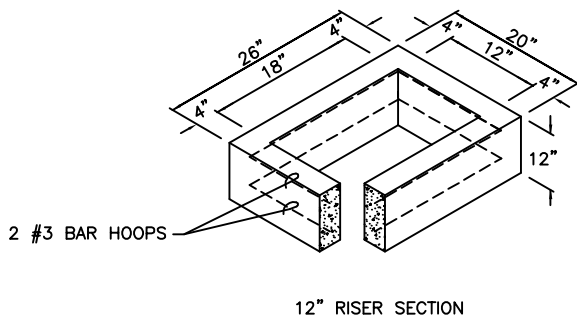
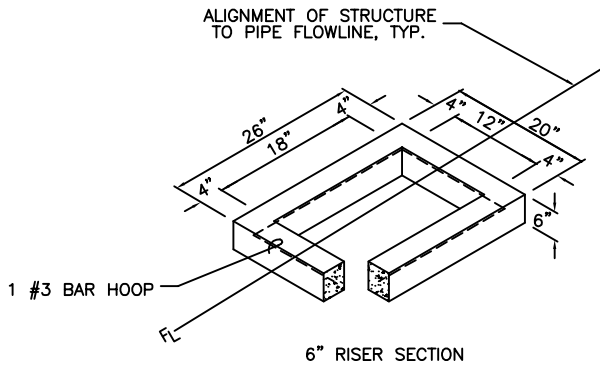
PLAN NO. CK- D.05



**YARD DRAIN**

NOTES:

1. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000.
2. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
3. KNOCKOUT OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS.
4. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
5. CATCH BASIN FRAME AND GRATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
6. CHANNELLING OF ON-SITE CATCH BASINS MAY BE REQUIRED FOR PRIVATE STORM DRAINAGE CONVEYANCE SYSTEMS.



PRECAST BASE SECTION  
(MEASUREMENT AT THE TOP  
OF THE BASE)

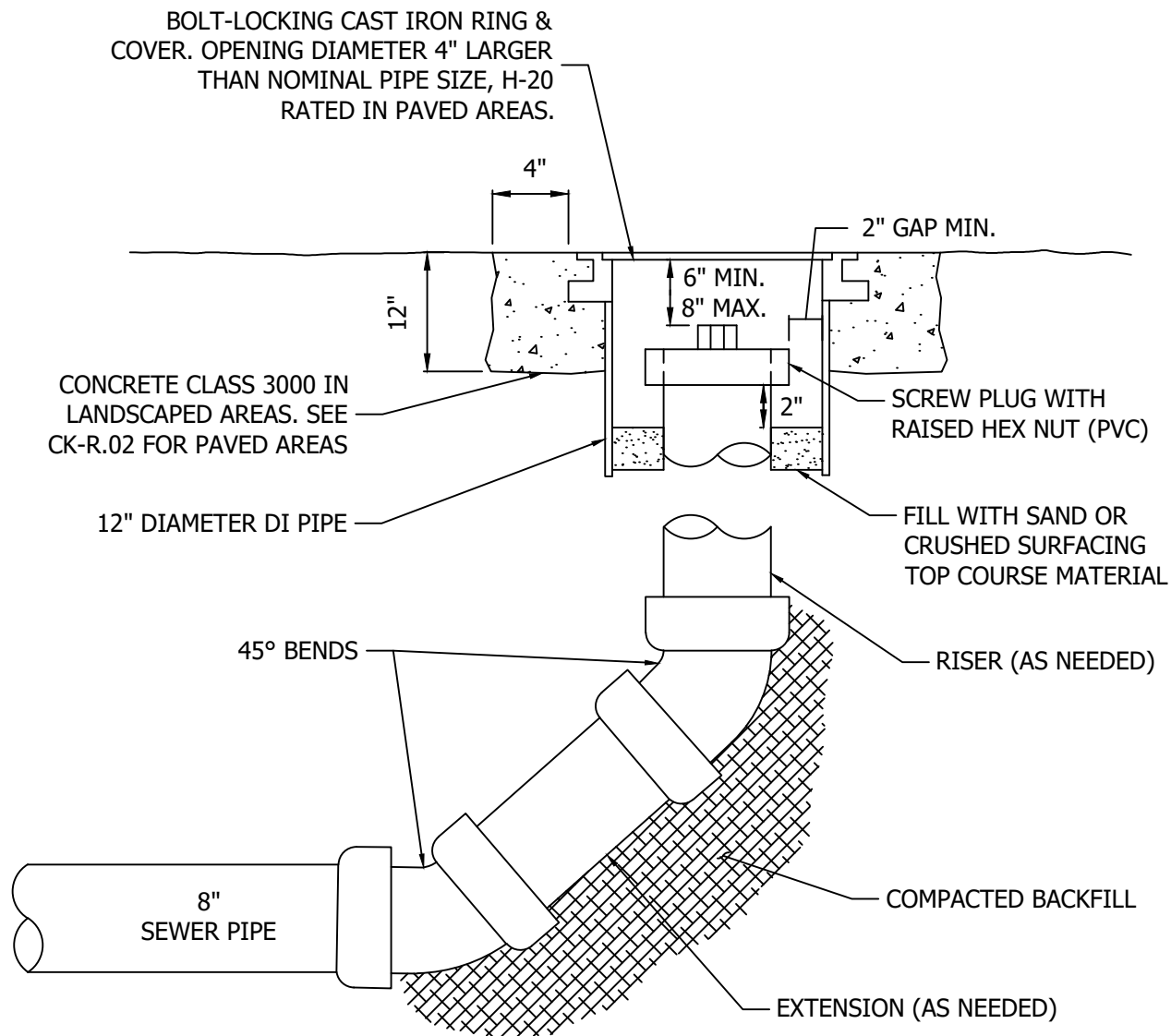
NOT TO SCALE

CITY OF KIRKLAND

PLAN NO. CK-D.05A




YARD DRAIN TYPE 40  
FOR PRIVATE SYSTEMS

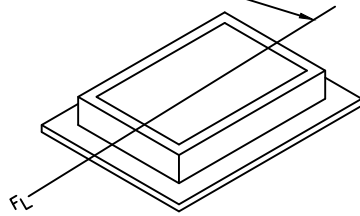


NOTES:

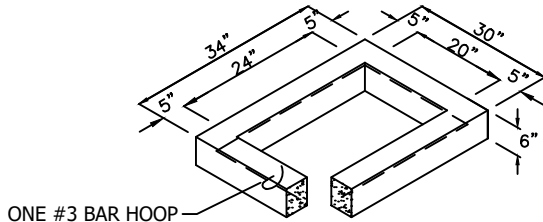
1. CAST IRON COVER SHALL READ EITHER "STORM" OR "DRAIN".
2. LOCKING BOLTS FOR COVER SHALL BE 5/8" -11 NC STAINLESS STEEL TYPE 304 SOCKET (ALLEN) HEAD BOLTS, 2 INCHES LONG.
3. ALL FITTINGS AND PIPE SHALL BE GASKETED (NOT GLUED). PIPE AND FITTING MATERIAL SHALL BE SDR 35.
4. WYE CONFIGURATION ONLY ALLOWED FOR PRIVATELY MAINTAINED SYSTEMS.

CITY OF KIRKLAND	
PLAN NO. CK - D.05B	
	CLEANOUT

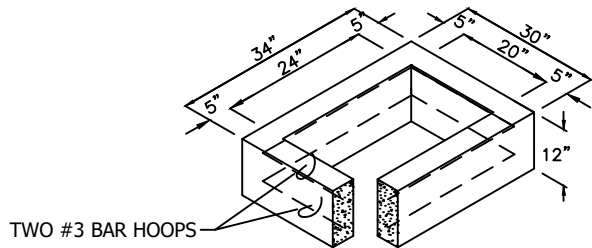
ALIGNMENT OF STRUCTURE  
TO PIPE FLOWLINE (TYP.)



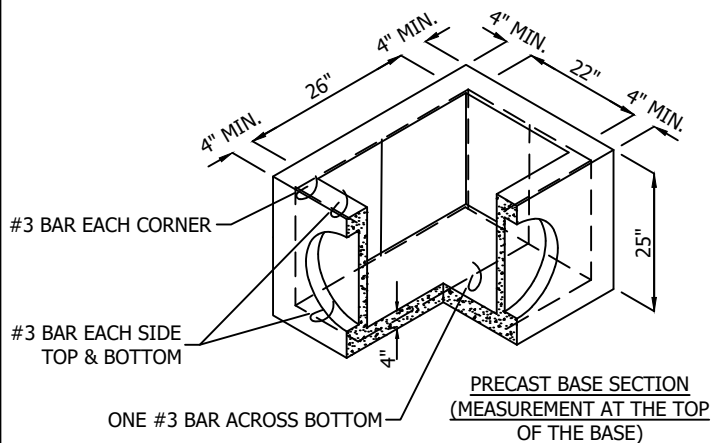
FRAME AND GRATE (SEE APPLICABLE  
STANDARD DETAILS CK-D.11 THROUGH D.16A.)



6" RISER SECTION



12" RISER SECTION



#### NOTES:

LAST REVISED: 01/2023

1. CONCRETE INLET TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASHTO M 199) & C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.
2. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497 (AASHTO M 221). WIRE FABRIC SHALL NOT BE PLACED IN KNOCKOUTS.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
5. KNOCKOUT OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS CURB INLET WALL THICKNESS.
6. ROUND KNOCKOUTS MAY BE ON ALL 4 SIDES WITH MAX. DIAM. OF 16".
7. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
8. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED 1/2" PER FOOT.
9. CONCRETE INLET FRAME AND GRATES SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
10. FRAME AND GRATE SHALL BE INSTALLED WITH FLANGE DOWN.
11. APPROVAL BY THE CITY OF KIRKLAND REQUIRED.
12. CURB INLET MUST DRAIN TO CATCH BASIN WITH SUMP.
13. ALL NEW PVC PIPES SHALL BE INSTALLED WITH SAND COLLARS AND A NON-SHRINK GROUT. JETSET OR SPEED CRETE RED LINE GROUT NOT ALLOWED.
14. 1", 2", AND 4" RISERS ACCEPTED AS NEEDED.
15. MINIMUM 10' FROM ADJACENT TREES, UNLESS OTHERWISE APPROVED.

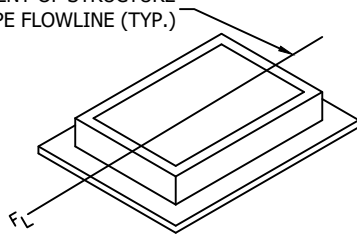
CITY OF KIRKLAND

PLAN NO. CK - D.06

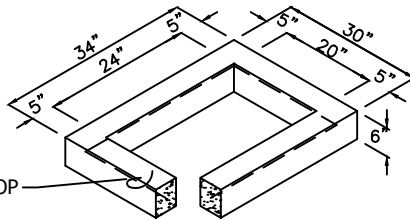


CURB INLET

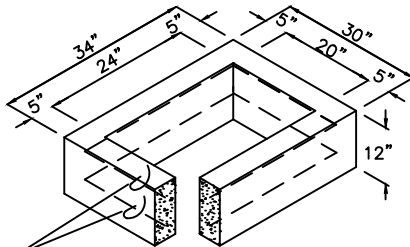
ALIGNMENT OF STRUCTURE  
TO PIPE FLOWLINE (TYP.)



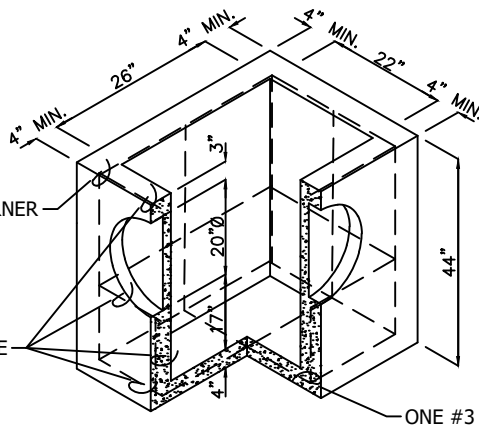
FRAME AND GRATE  
(SEE STANDARD DETAILS D.11 THROUGH D.16A)



6" RISER SECTION



12" RISER SECTION



PRECAST BASE SECTION  
(MEASUREMENT AT THE TOP OF THE BASE)

LAST REVISED: 01/2023

NOTES:

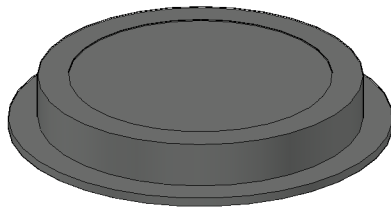
1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASHTO M 199) & C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.
2. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497 (AASHTO M 221). WIRE FABRIC SHALL NOT BE PLACED IN KNOCKOUTS.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
5. KNOCKOUT OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS.
6. ROUND KNOCKOUTS MAY BE ON ALL 4 SIDES, WITH MAX. DIAM. OF 20". KNOCKOUTS MAY BE EITHER ROUND OR "D" SHAPE.
7. THE MAX. DEPTH FROM THE FINISHED GRADE TO THE PIPE INVERT IS 5'-0".
8. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION AND RISER SECTION SHALL NOT EXCEED 1/2" PER FOOT.
9. CATCH BASIN FRAME AND GRATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
10. FRAME AND GRATE SHALL BE INSTALLED WITH FLANGE DOWN.
11. EDGE OF RISER OR BRICK SHALL NOT BE MORE THAN 2" FROM VERTICAL EDGE OF CATCH BASIN WALL.
12. ACCEPTABLE PIPE SIZES ARE 8", 12" OR 15". 6" PIPE IS ONLY ACCEPTABLE ON PRIVATE SYSTEMS.
13. ROUND SOLID LIDS REQUIRED WHENEVER CATCH BASIN DOES NOT COLLECT SURFACE WATER. SEE CK-D.18 AND CK-D.18A FOR REFERENCE.
14. ROUND CONCRETE RISERS ARE REQUIRED FOR ROUND SOLID LOCKING LIDS.
15. ALL NEW PVC PIPES SHALL BE INSTALLED WITH SAND COLLARS AND A NON-SHRINK GROUT. JETSET OR SPEED CRETE RED LINE GROUT NOT ALLOWED.
16. 1", 2", AND 4" RISERS ACCEPTED AS NEEDED.
17. MINIMUM 10' FROM ADJACENT TREES, UNLESS OTHERWISE APPROVED.
18. CLEAN SURFACE AND BOTTOM AREA. PROVIDE UNIFORM CONTACT. THE SURFACE AREA OF THE BASE SECTION MUST BE MORTARED TO THE BOTTOM AREA OF THE RISER SECTION.

CITY OF KIRKLAND

PLAN NO. CK - D.07



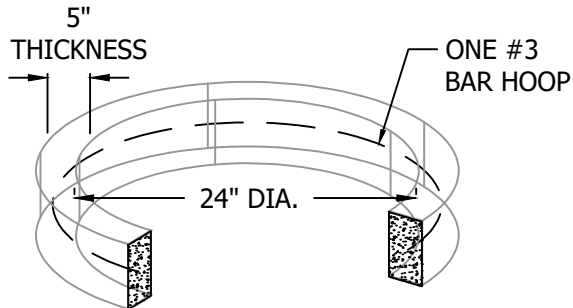
CATCH BASIN  
TYPE 1



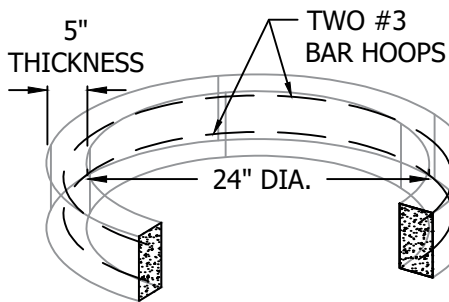
FRAME AND GRATE  
(SEE STANDARD DETAILS  
D.18 AND D.18A)

NOTES:

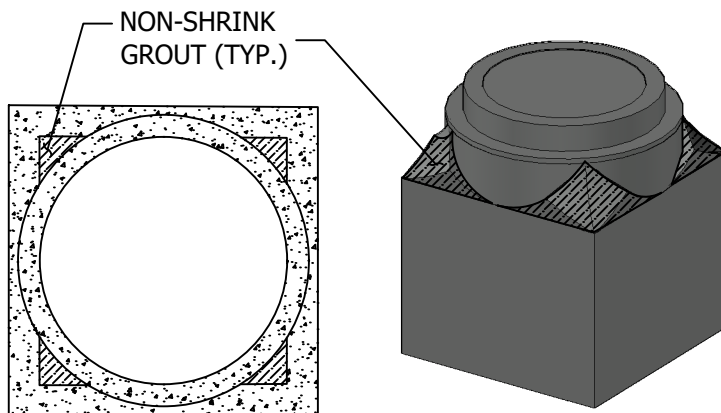
1. GROUT SHALL BE APPLIED BETWEEN ALL MATING SURFACES TO ENSURE A WATER TIGHT SEAL AND STRONG BOND.
2. COMMERCIALY AVAILABLE CONVERTER FROM RECTANGULAR STRUCTURE TO CIRCULAR RISER MAY BE USED IF APPROVED BY PUBLIC WORKS DEPARTMENT.
3. 1", 2", AND 4" RISERS ACCEPTED AS NEEDED.



6" RISER SECTION



12" RISER SECTION



TRANSITION DETAIL  
2-D PLAN VIEW

TRANSITION DETAIL  
3-D CONCEPTUAL  
VIEW

CITY OF KIRKLAND

PLAN NO. CK - D.07A

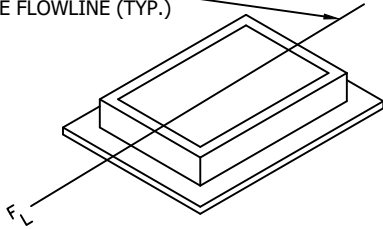


CIRCULAR RISER  
AND TRANSITION FOR  
TYPE 1 AND 1-L CB

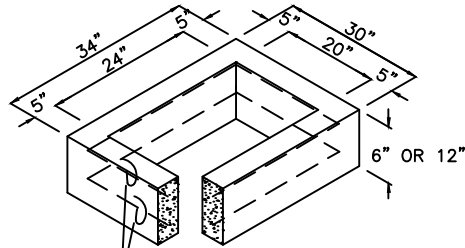


NOTES

ALIGNMENT OF STRUCTURE  
TO PIPE FLOWLINE (TYP.)

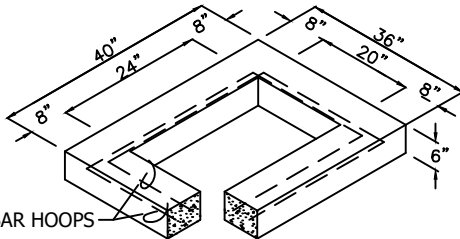


FRAME AND GRATE (SEE APPLICABLE  
STANDARD DETAILS CK-D.11 THROUGH D.16)



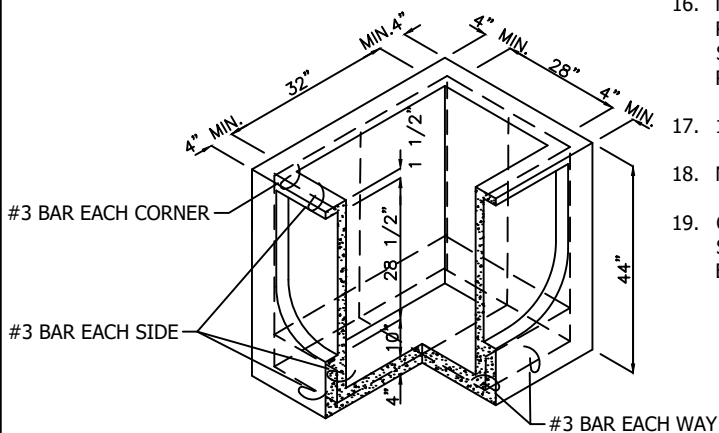
ONE #3 BAR HOOP FOR 6"  
TWO #3 BAR HOOPS FOR 12"

RISER SECTION



TWO #3 BAR HOOPS

6" REDUCING SECTION



PRECAST BASE SECTION  
(MEASUREMENT AT THE  
TOP OF THE BASE)

1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASHTO M 199) & C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.
2. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497 (AASHTO M 221). WIRE FABRIC SHALL NOT BE PLACED IN KNOCKOUTS.
3. ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000.
4. PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. ALL PIPE SHALL BE INSTALLED IN FACTORY PROVIDED KNOCKOUTS. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT.
5. KNOCKOUT OR CUTOUT HOLE SIZE IS EQUAL TO PIPE OUTER DIAM. PLUS CATCH BASIN WALL THICKNESS.
6. KNOCKOUTS MAY BE ON ALL 4 SIDES WITH MAX. DIAM. OF 28". KNOCKOUTS MAY BE EITHER ROUND OR "D" SHAPE.
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. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
9. FRAME AND GRATE SHALL BE INSTALLED WITH FLANGE DOWN.
10. MAX. DEPTH FROM FINISHED GRADE TO PIPE INVERT SHALL BE 5'-0".
11. EDGE OF REDUCING SECTION OR BRICK SHALL NOT BE MORE THAN 2" FROM VERTICAL EDGE OF CATCH BASIN WALL.
12. ACCEPTABLE PIPE SIZES ARE 8", 12", 15" OR 18". 6" PIPE IS ONLY ACCEPTABLE ON PRIVATE SYSTEMS.
13. ROUND SOLID LOCKING LIDS REQUIRED WHENEVER CATCH BASIN DOES NOT COLLECT SURFACE WATER, OR WHEN LOCATED IN SIDEWALK AND PLANTER AREAS. SEE CK-D.18 AND CK-D.18A FOR REFERENCE.
14. ROUND CONCRETE RISERS ARE REQUIRED FOR ROUND SOLID LOCKING LIDS.
15. ALL NEW PVC PIPES SHALL BE INSTALLED WITH SAND COLLARS AND A NON-SHRINK GROUT. JETSET OR SPEED CRETE RED LINE GROUT NOT ALLOWED.
16. MAXIMUM RISE OF 20" X 24" RISER THROAT SHALL BE 12". IF MORE RISE IS NEEDED IT SHALL BE PROVIDED WITH AN ADDITIONAL RISER SECTION(S) BENEATH THE REDUCING SLAB, IF REDUCING SLAB IS REQUIRED.
17. 1", 2", AND 4" RISERS ACCEPTED AS NEEDED.
18. MINIMUM 10' FROM ADJACENT TREES, UNLESS OTHERWISE APPROVED.
19. CLEAN SURFACE AND BOTTOM AREA. PROVIDE UNIFORM CONTACT. THE SURFACE AREA OF THE BASE SECTION MUST BE MORTARED TO THE BOTTOM AREA OF THE RISER SECTION.

CITY OF KIRKLAND

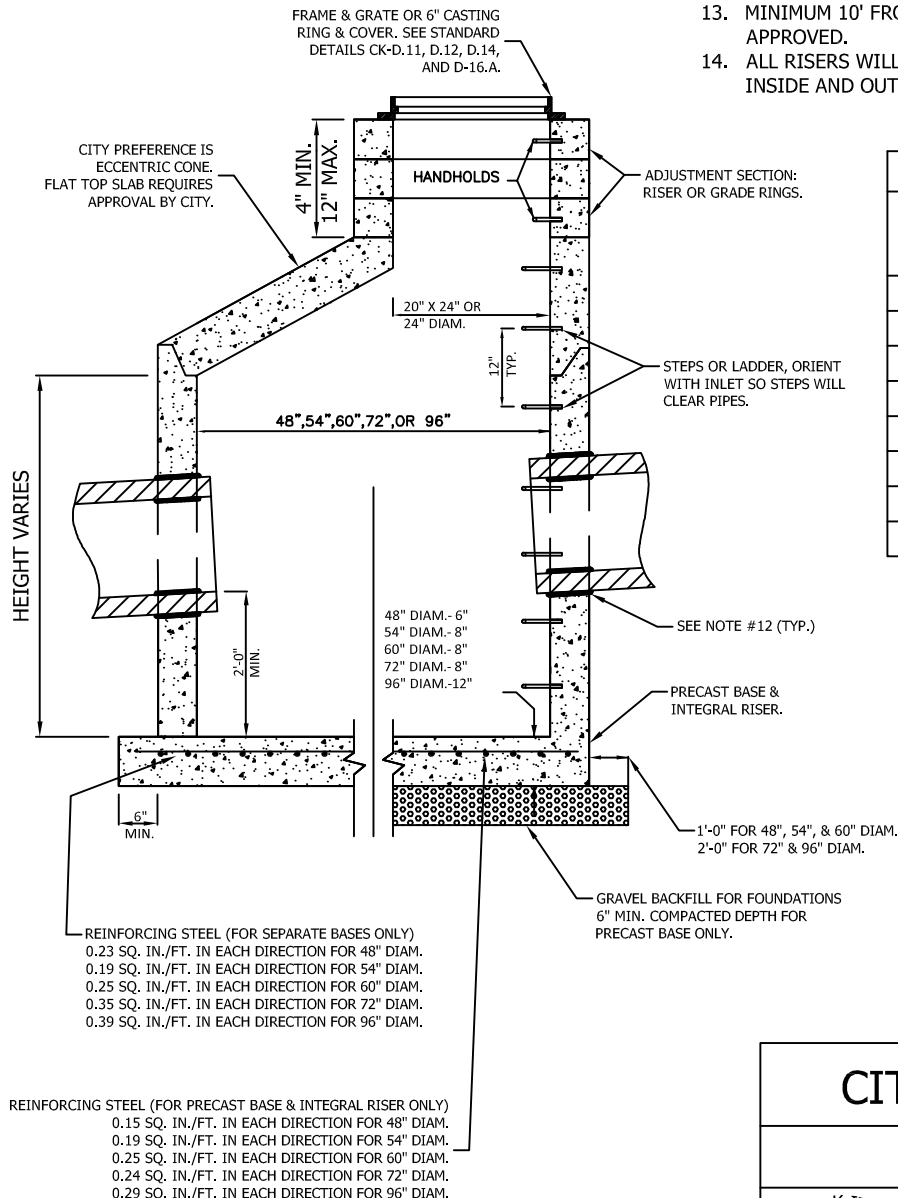
PLAN NO. CK - D.08



CATCH BASIN  
TYPE 1-L

**NOTES:**

- CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478 (AASHTO M199) AND ASTM C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.
- HANDHOLDS IN ADJUSTMENT SECTION SHALL HAVE 3" MIN. CLEARANCE. STEPS IN CATCH BASIN SHALL HAVE 6" MIN. CLEARANCE. SEE STD. DTL. NO. CK-D.12, CATCH BASIN DETAILS. HANDHOLDS SHALL BE PLACED IN ALTERNATING GRADE RINGS OR LEVELING BRICK COURSE WITH A MIN. OF ONE HANDHOLD BETWEEN THE LAST STEP AND TOP OF THE FINISHED GRADE.
- ALL REINFORCED CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. ALL PRECAST CONCRETE SHALL BE CLASS 4000.
- PRECAST BASES SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE WALL THICKNESS OF 2" MIN. UNUSED KNOCKOUTS NEED NOT BE GROUTED IF WALL IS LEFT INTACT. PIPES SHALL BE INSTALLED ONLY IN FACTORY KNOCKOUTS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
- CATCH BASIN FRAMES AND GRATES OR COVERS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
- ALL BASE REINFORCING STEEL SHALL HAVE A MIN. YIELD STRENGTH OF 60,000 PSI AND BE PLACED IN THE UPPER HALF OF THE BASE WITH 1" MIN. CLEARANCE.
- MIN. SOIL BEARING VALUE SHALL EQUAL 3,300 POUNDS PER SQUARE FOOT.
- FOR DETAILS SHOWING LADDER, STEPS, HANDRAILS AND TOP SLABS, SEE STD. DTLs. NO. CK-D.12 AND CK-S.14.
- ALL MANHOLE JOINTS SHALL USE A CONFINED RUBBER GASKET AND GROUTED (INSIDE AND OUT) TO MEET ASTM C-443 SPECIFICATIONS.
- ROUND SOLID LOCKING LIDS REQUIRED WHENEVER CATCH BASIN DOES NOT COLLECT SURFACE WATER, OR WHEN LOCATED IN SIDEWALK AND PLANTER AREAS. SEE CK-D.18, CK-.18A, AND CK-D.18B FOR REFERENCE.
- ROUND CONCRETE RISERS ARE REQUIRED FOR ROUND SOLID LOCKING LIDS.
- ALL NEW PIPES SHALL BE INSTALLED WITH EITHER A KOR-N-SEAL BOOT, OR SAND COLLARS AND A NON-SHRINK GROUT. JETSET OR SPEED CRETE RED LINE GROUT NOT ALLOWED.
- MINIMUM 10' FROM ADJACENT TREES, UNLESS OTHERWISE APPROVED.
- ALL RISERS WILL BE WET SET IN GROUT, AND SMOOTHED INSIDE AND OUT PRIOR TO BEING BURIED.



CATCH BASIN DIMENSIONS				
CATCH BASIN DIAMETER	MIN. WALL THICKNESS	MIN. BASE THICKNESS	MAXIMUM KNOCKOUT SIZE	MINIMUM DISTANCE BETWEEN KNOCKOUTS
48"	4"	6"	36"	8"
54"	4.5"	8"	42"	8"
60"	5"	8"	48"	8"
72"	6"	8"	60"	12"
84"	8"	12"	72"	12"
96"	8"	12"	84"	12"
120"	10"	12"	96"	12"
144"	12"	12"	108"	12"

**ACCEPTABLE PIPE SIZES:**

Basin Type	Pipe Size							
	6"	8"	12"	15"	18"	24"	30"	36"
Type II-48" CB	X	X	X	X	X	X	X	
Type II-54" CB	X	X	X	X	X	X	X	
Type II-60" CB	X	X	X	X	X	X	X	
Type II-72" CB	X	X	X	X	X	X	X	X
Type II-96" CB	X	X	X	X	X	X	X	X

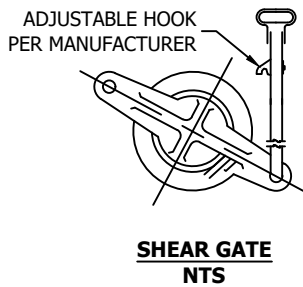
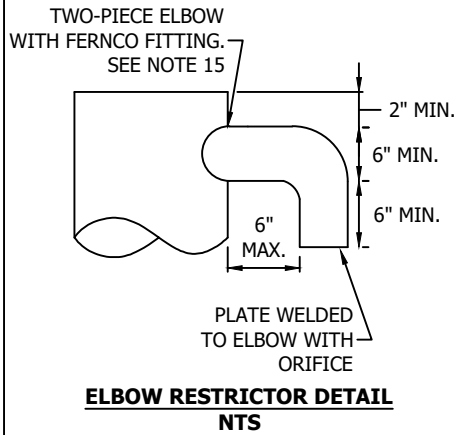
**CITY OF KIRKLAND**

PLAN NO. CK- D.09

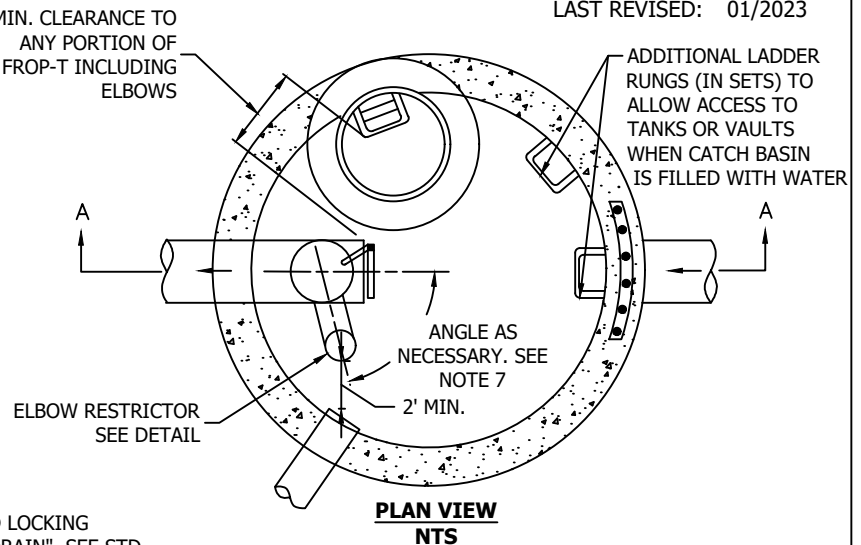


**CATCH BASIN  
TYPE 2  
48", 54", 60", 72", 96"**

LAST REVISED: 01/2023

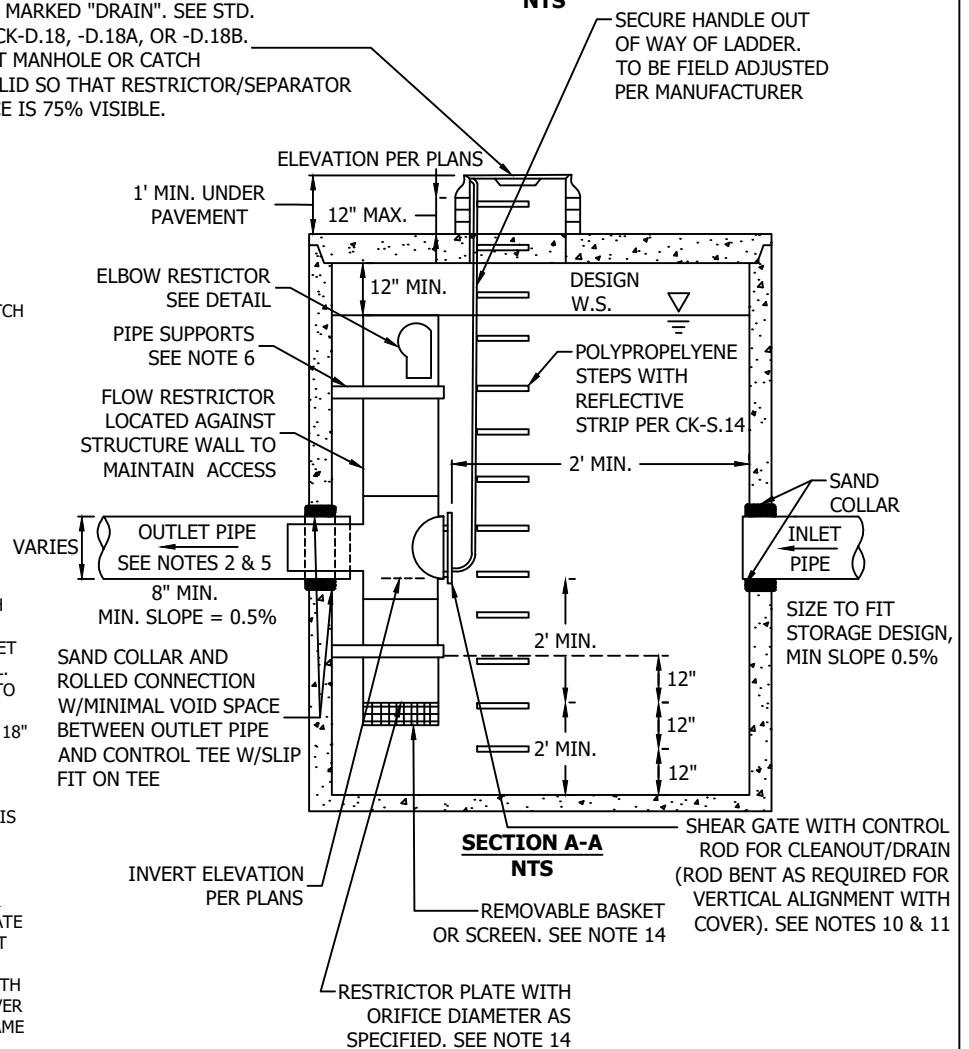


FRAME GRATE AND LOCKING COVER MARKED "DRAIN". SEE STD. DWG. CK-D.18, -D.18A, OR -D.18B. OFFSET MANHOLE OR CATCH BASIN LID SO THAT RESTRICTOR/SEPARATOR DEVICE IS 75% VISIBLE.



#### NOTES:

- USE A MINIMUM OF A 54" DIAMETER TYPE-II CATCH BASIN.
- OUTLET CAPACITY: 100-YEAR DEVELOPED PEAK FLOW.
- METAL PARTS SHALL BE CORROSION RESISTANT, EITHER ALUMINUM OR STAINLESS STEEL. RISER STRUCTURE MATERIAL SHALL BE ALUMINUM. FASTENERS MAY BE STAINLESS STEEL.
- FRAME & LADDER OR STEPS TO OFFSET SO:
  - CLEANOUT GATE IS VISIBLE FROM TOP.
  - CLIMB-DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE.
  - FRAME IS CLEAR OF CURB.
- IF METAL OUTLET PIPE CONNECTS TO CEMENT CONCRETE PIPE: OUTLET PIPE TO HAVE SMOOTH O.D. EQUAL TO CONCRETE PIPE I.D. LESS 1/4".
- PROVIDE TWO 3" X 0.100 GAGE SUPPORT BRACKET BOLTED OR EMBEDDED 2" INTO CONCRETE WALL.
- LOCATE ELBOW RESTRICTOR(S) AS NECESSARY TO PROVIDE MINIMUM CLEARANCE AS SHOWN.
- TOP HAND HOLD SHALL BE LOCATED LESS THAN 18" BELOW FINISHED GRADE.
- LOCATE ADDITIONAL LADDER RUNGS IN STRUCTURES USED AS ACCESS TO TANKS OR VAULTS TO ALLOW ACCESS WHEN CATCH BASIN IS FILLED WITH WATER.
- SHEAR GATE SHALL BE PRODUCT MADE OF CAST ALUMINUM (NO CAST IRON).
- GATE SHALL BE 8" OR LARGER IN DIAMETER FOR OUTLET PIPES SMALLER THAN 23" DIAMETER. GATE SHALL BE 12" OR LARGER DIAMETER FOR OUTLET PIPES 24" DIAMETER AND LARGER.
- LIFT ROD: AS SPECIFIED BY MANUFACTURER. WITH HANDLE TENDING TO WITHIN ONE FOOT OF COVER AND ADJUSTABLE HOOK LOCK FASTENED TO FRAME OR UPPER HANDHOLD.
- FILL CATCH BASIN TO INVERT LEVEL OF OUTFLOW PIPE TO PREVENT ANY OIL ESCAPING.
- REMOVABLE BASKET OR SCREEN REQUIRED REGARDLESS OF BOTTOM ORIFICE SIZE. ALUMINUM MESH, 8" DEPTH, MIN. 3 STAINLESS STEEL SCREWS, 0.5" EXPANDED SHEET MESH TYPICAL.
- CITY OF KIRKLAND REQUIRES ELBOW AND FERNCO, INDIANA SEAL OR EQUIVALENT TO BE REMOVABLE.
- ALL NEW PVC PIPES SHALL BE INSTALLED WITH SAND COLLARS AND A NON-SHRINK GROUT. JETSET OR SPEED CRETE RED LINE GROUT NOT ALLOWED.
- MINIMUM 10' FROM ADJACENT TREES, UNLESS OTHERWISE APPROVED.

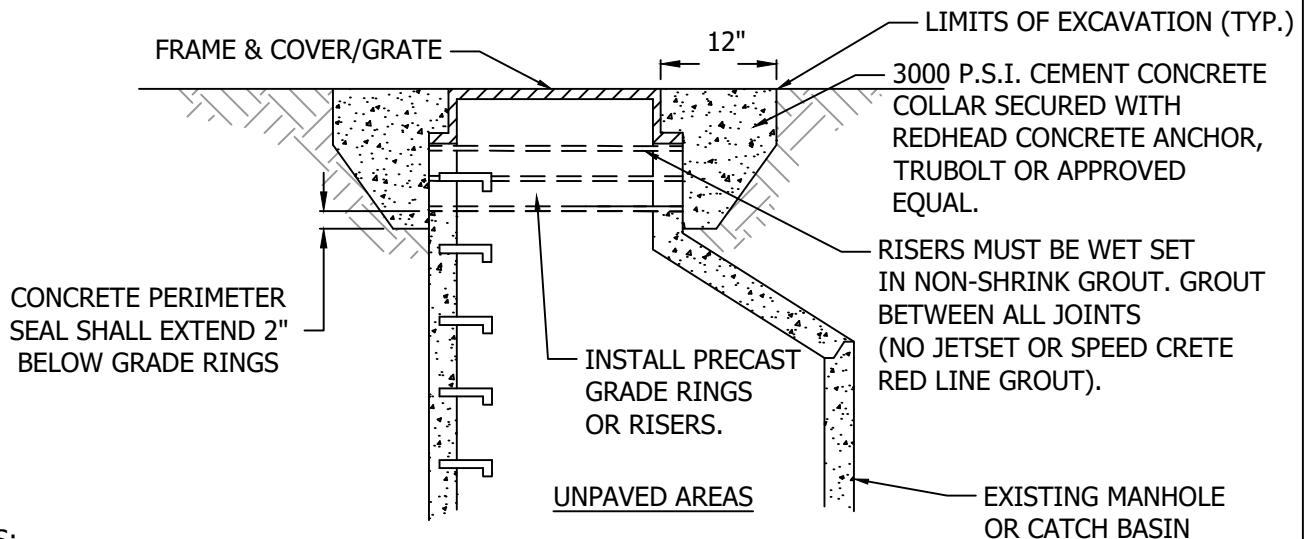
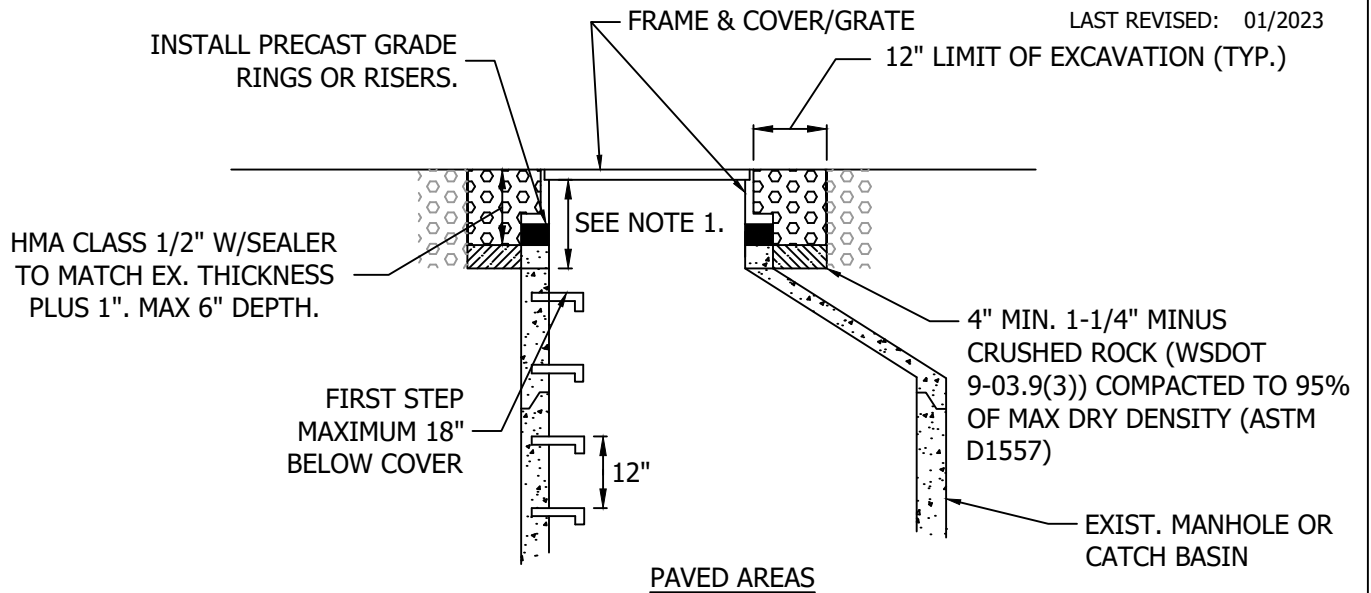


CITY OF KIRKLAND

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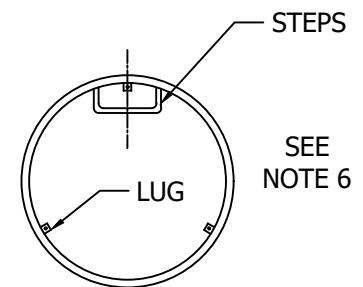


CATCH BASIN-TYPE 2  
W/OIL SEPARATOR  
FLOW RESTRICTOR



**NOTES:**

1. WHERE DEPTH OF NECK EXCEEDS 18 INCHES (INCLUDING FRAME AND COVER), ADJUST MANHOLE/CATCH BASIN TO GRADE BY INSERTING NEW BARREL SECTION BETWEEN THE CONE/SLAB AND EXISTING BARREL.
2. GRADE RINGS, RISERS AND FRAME SHALL BE SET IN 3/4" NON-SHRINK GROUT, GROUT BETWEEN ALL JOINTS. ALL SURFACES MUST BE CLEAN OF DEBRIS AND DIRT, AND WETTED PRIOR TO GROUTING. GROUT SMOOTH INSIDE AND OUTSIDE SURFACES PRIOR TO BACKFILL.
3. STEPS OR HAND HOLDS SHALL BE ADDED PER ASTM C478.
4. PRECAST GRADE RINGS AND RISERS MUST BE CAST WITH GROOVE TO ALLOW FIELD INSTALLATION OF SAFETY STEP WHEN RISER IS 4" OR HIGHER.
5. REPLACE EXISTING FRAME AND COVER/GRATE IF NOT MEETING CURRENT SPECIFICATIONS.
6. IF REQUIRED: LOCKING MH SHALL BE POSITIONED WITH ONE LUG CENTERED OVER STEPS, UNLESS USING CK-D.18A CASTING.



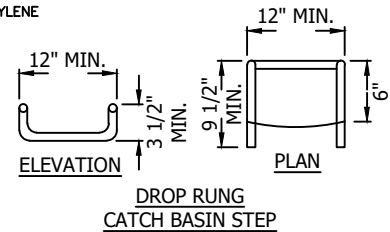
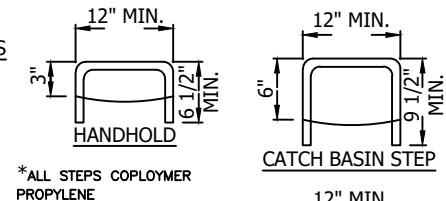
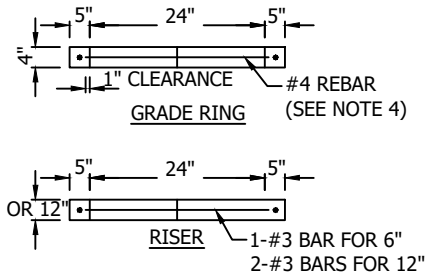
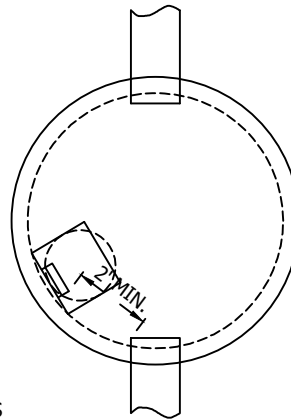
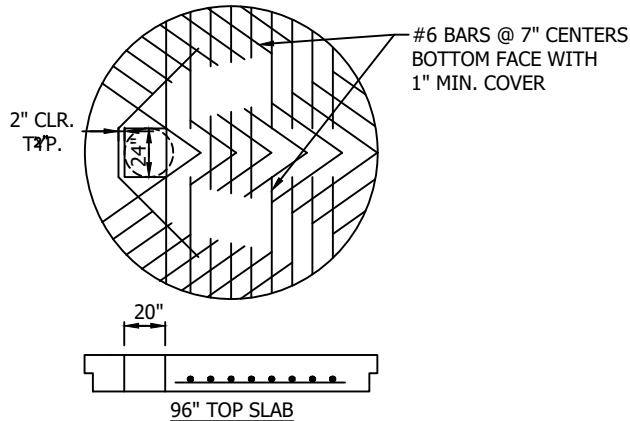
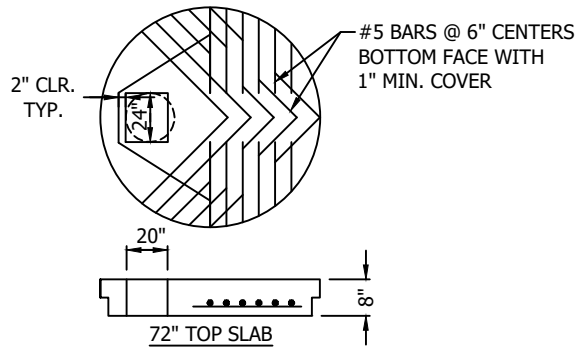
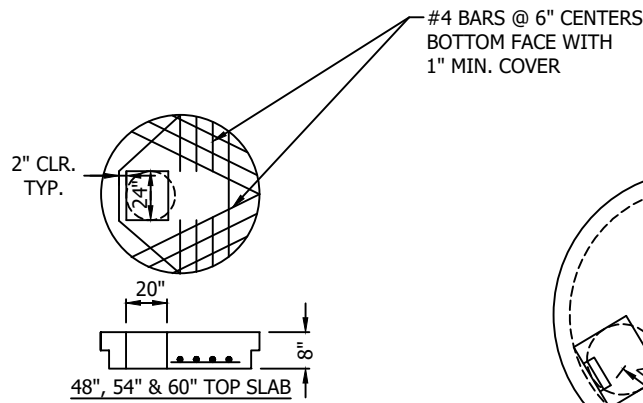
**LOCKING MH FRAME  
PLAN VIEW**

**CITY OF KIRKLAND**

**PLAN NO. CK - D.11**

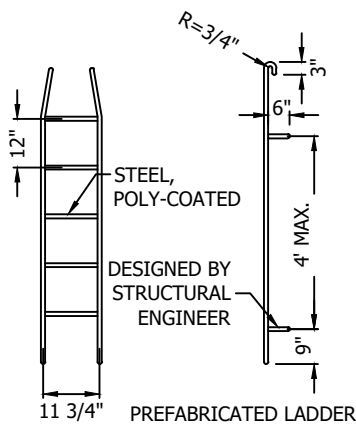


**MANHOLE/CB  
FRAME AND GRATE  
ADJUSTMENT**



**NOTES:**

1. PROPRIETARY CATCH BASIN HANDHOLDS AND STEPS ARE ACCEPTABLE, PROVIDED THAT THEY CONFORM TO SEC. R, ASTM C478, AASHTO M-199 AND MEET ALL WISHA REQUIREMENTS. RETRO-REFLECTIVE MARKERS REQUIRED AT EACH END OF STEPS AND HAND-HOLDS.
2. CATCH BASIN STEP/HANDHOLD LEGS SHALL BE PARALLEL OR APPROXIMATELY RADIAL AT THE OPTION OF THE MANUFACTURER, EXCEPT THAT ALL STEPS IN ANY CATCH BASIN SHALL BE SIMILAR. PENETRATION OF OUTER WALL BY A LEG IS PROHIBITED.
3. HANDHOLDS AND STEPS SHALL HAVE "DROP" RUNGS AS SHOWN ON DETAIL OR PROTUBERANCES TO PREVENT SIDEWAYS SLIP.
4. SLAB OPENING MAY BE 24" X 20" RECTANGLE FOR CATCH BASIN OR 24" DIAM. CIRCLE FOR MANHOLE.
5. AS AN ACCEPTABLE ALTERNATIVE TO REBAR, WELDED WIRE FABRIC HAVING A MIN. AREA OF 0.12 SQUARE INCHES PER FOOT MAY BE USED. WELDED WIRE FABRIC SHALL COMPLY TO ASTM A497.
6. LADDERS OR STEPS SHALL EXTEND TO WITHIN 16" OF BOTTOM OF CATCH BASIN.
7. HANGING LADDERS SHALL BE PERMANENTLY FASTENED AT TOP BY HANGING ON STEP AND BY BOLTING.
8. ADDITIONAL SAFETY FEATURES MAY BE REQUIRED IN VERY DEEP OR UNUSUAL STRUCTURES.

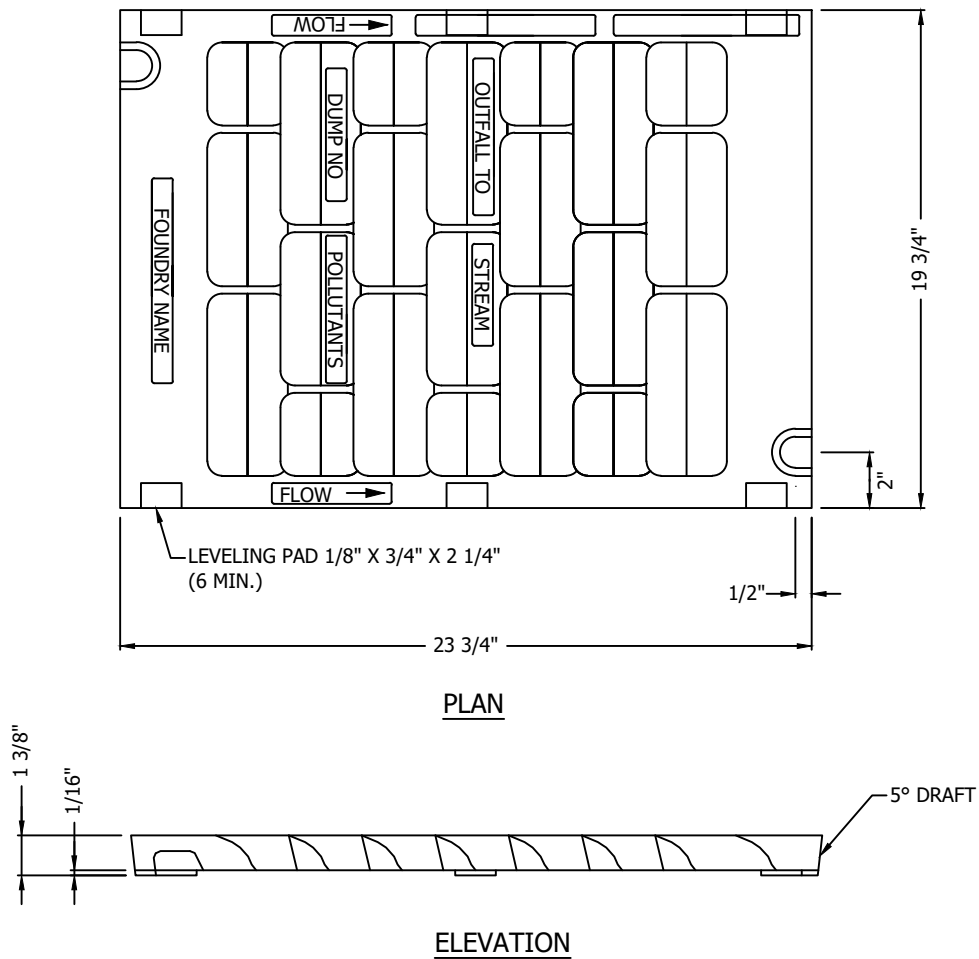


**CITY OF KIRKLAND**

**PLAN NO. CK - D.12**




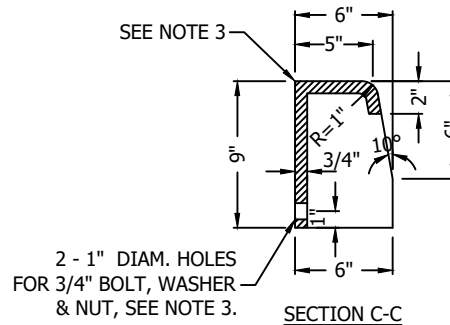
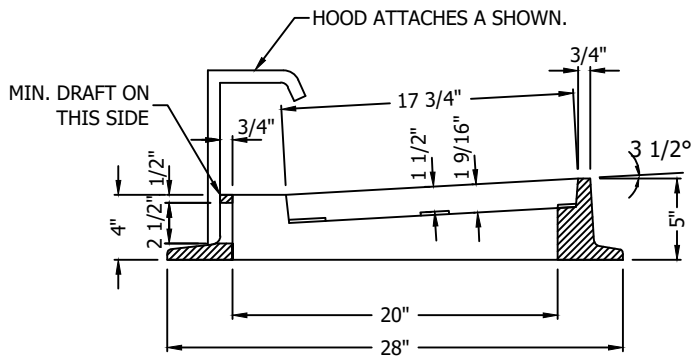
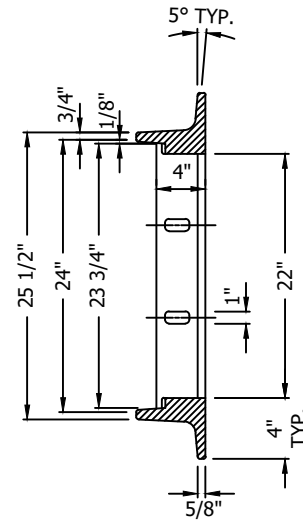
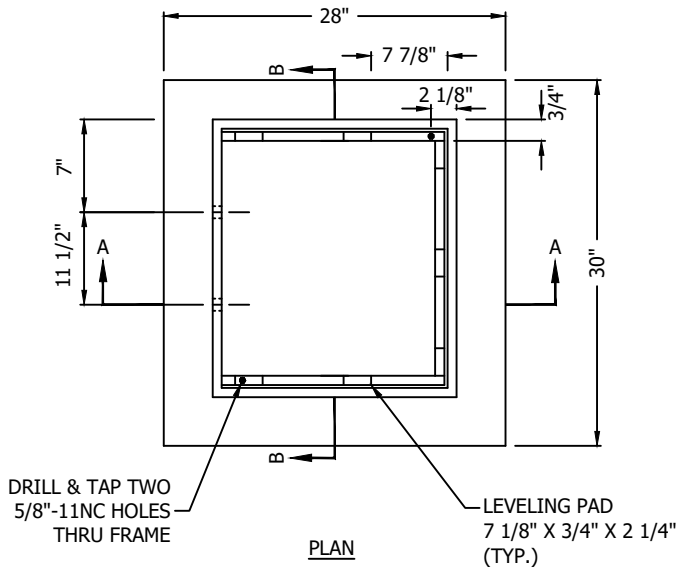
**CATCH BASIN INLET  
PRECAST COVER AND  
EXTENSION UNITS**



**NOTES:**

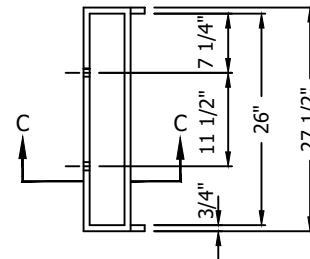
1. USE EAST JORDAN IRON WORKS OR EQUAL TWO BOLT LOCK CAPABILITY THAT MEETS WSDOT SPEC. MANUFACTURER SUBJECT TO APPROVAL BY CITY.
2. USE WITH TWO LOCKING BOLTS 5/8"-11 NC STAINLESS TYPE 304 STEEL SOCKET HEAD (ALLEN HEAD) BOLTS, 2" LONG. FRAMES SHALL INCLUDE THREADS AS DROP-OUT REPLACEABLE NUTS.
3. MATERIAL IS DUCTILE IRON ASTM A536 GRADE 80-55-06.
4. "OUTFALL TO STREAM DUMP NO POLLUTANTS" MAY BE LOCATED ON BORDER AREA.
5. SHALL CONFORM TO SEC. 7.05 OF THE STANDARD SPECIFICATIONS.
6. WELDING IS NOT PERMITTED.
7. EDGES SHALL HAVE 0.125" RADIUS, 0.125" CHAMBER OR COMPLETE DEBURRING.
8. USE A BI-DIRECTIONAL VANED GRATE AT ANY LOW POINT OR WHEN FLOWS COME FROM MULTIPLE DIRECTIONS.
9. NO EXPANSION MATERIAL IN THE FLOW LINE, WHERE CONCRETE COMES TO FRAME.
10. FRAME AND COVER SHALL BE H-20 LOADING RATED IF INSTALLED IN ROADWAY.
11. MUST BE MADE IN USA.

<b>CITY OF KIRKLAND</b>	
<b>PLAN NO. CK - D.14</b>	
	<b>VANED GRATE FOR CATCH BASIN AND INLET</b>



**NOTES:**

1. FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS OR EQUAL, SUBJECT TO APPROVAL BY CITY. MATERIAL SHALL CONFORM TO SECTION 9-05.15(2) OF THE STANDARD SPECIFICATION.
2. PATTERN ON TOP SURFACE SHALL SPECIFY THE FISH LOGO AND DUMP NO POLLUTANTS (NO DIAMOND PATTERN).
3. BOLT, WASHER, AND NUT SHALL BE GALVANIZED OR CORROSION RESISTANT. BOLTS SHALL BE INSERTED INTO THE FACE OF THE HOOD WITH WASHER AND NUT SECURED TO THE BACK SIDE OF THE HOOD.
4. USE APPROPRIATE GRATE DEPENDING ON THE DIRECTION OF FLOW.
5. NO HORIZONTAL CROSS BAR IN THE OPENING.
6. 18" X 24" VANED OR BI-VANED LID. APPLICATION OF THIS DETAIL NOT TO REPLACE FUNCTION OF CK-D.14.
7. MUST BE MADE IN THE USA.
8. TROWELED EDGE MUST BE IN CONTACT WITH FRAME (RATHER THAN EXPANSION JOINT).

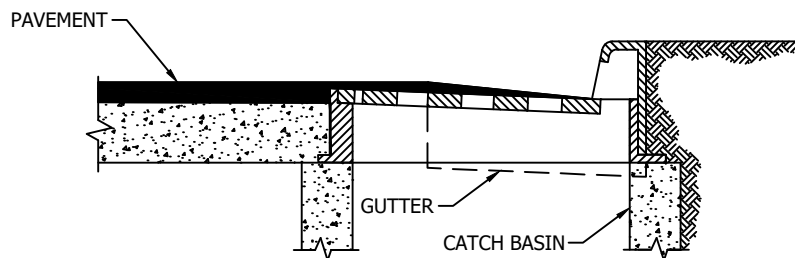
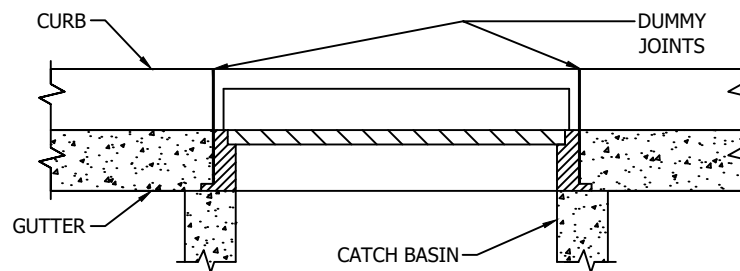
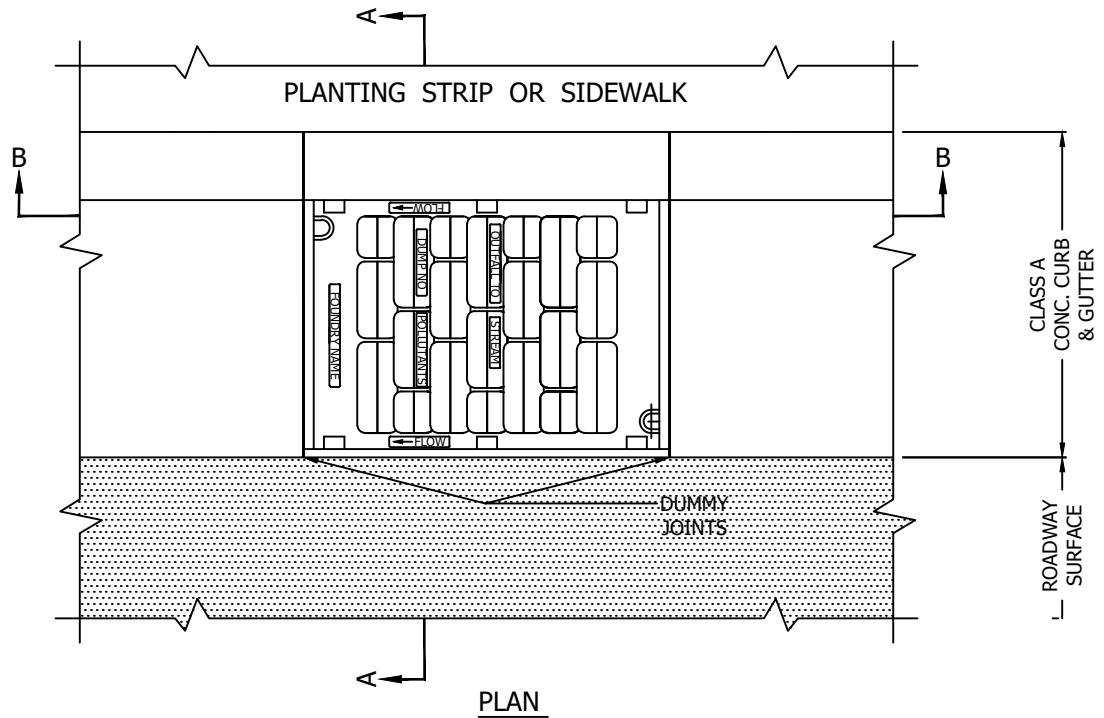


CITY OF KIRKLAND

PLAN NO. CK - D.15




OPEN CURB FACE  
FRAME AND GRATE  
DETAILS

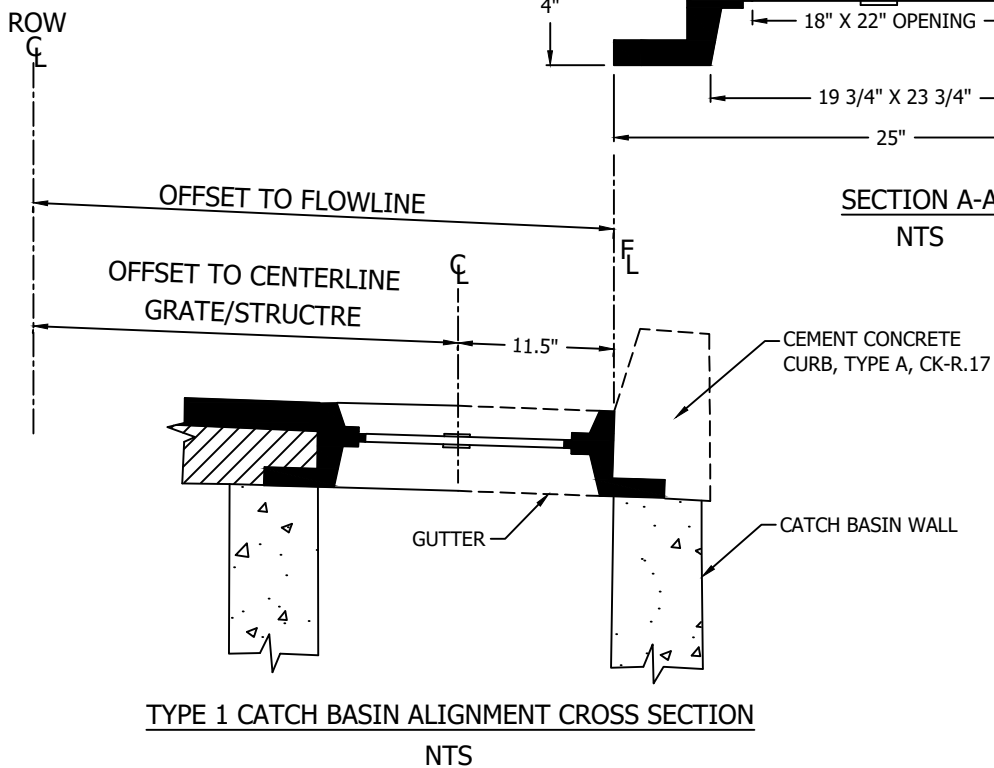
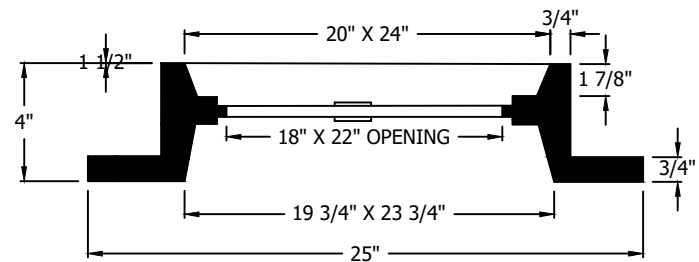
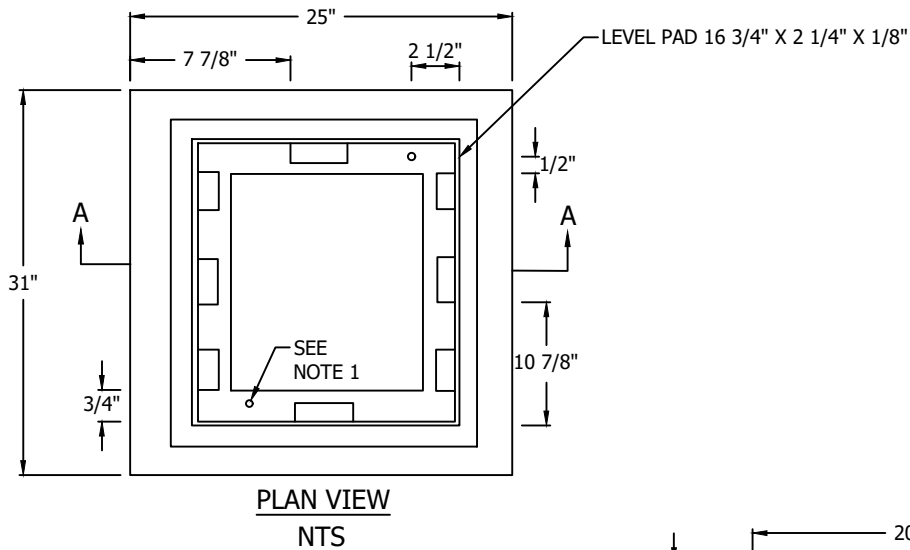


**NOTES:**

1. FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS OR EQUAL, SUBJECT TO APPROVAL BY CITY. SEE CK-D.15.
2. PATTERN ON TOP SHALL SPECIFY FISH LOGO AND DUMP NO POLLUTANTS (NO DIAMOND PATTERN).
3. CASTING MUST BE SET 0.5" BELOW FINAL ROAD/GUTTER GRADE.
4. HOOD SHALL MATCH TOP OF CURB ELEVATION.
5. NO HORIZONTAL CROSS BAR IN THE OPENING.
6. TROWELED EDGE MUST BE IN CONTACT WITH FRAME (RATHER THAN EXPANSION JOINT).
7. MUST BE MADE IN THE USA.

CITY OF KIRKLAND	
PLAN NO. CK - D.16	
	THROUGH-CURB INLET FRAME AND GRATE WITH VERTICAL CURB INSTALLATION





**NOTE:**

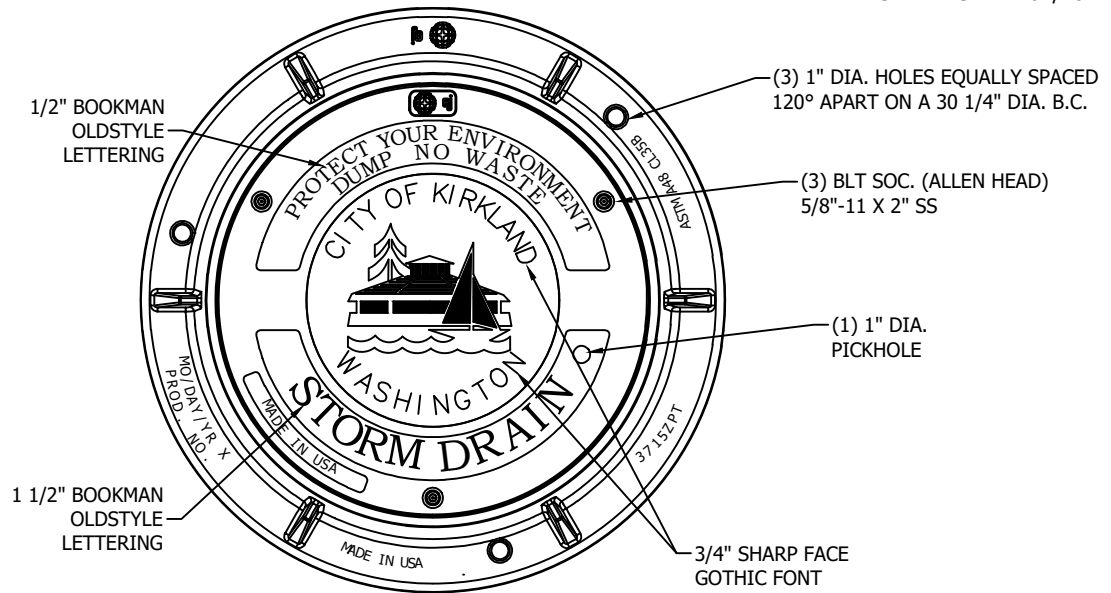
1. FRAME MATERIAL IS CAST IRON PER ASTM A48 CLASS 30.
2. SET FRAME TO GRADE AND CONSTRUCT ROAD AND GUTTER TO BE FLUSH WITH FRAME.
3. BACK OF FRAME SHALL BE IN FLOWLINE OF GUTTER.
4. MUST BE MADE IN THE USA.

**CITY OF KIRKLAND**

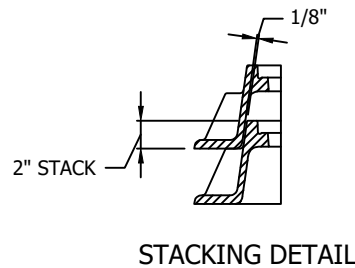
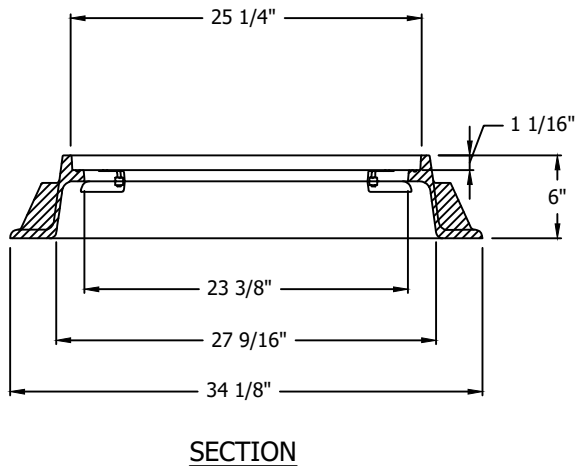
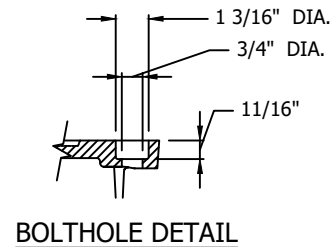
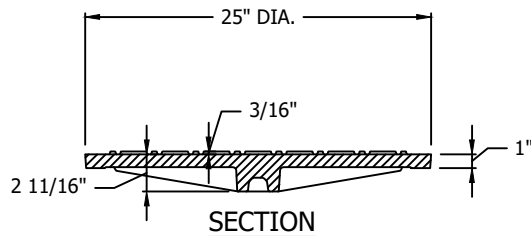
**PLAN NO. CK - D.16A**



**STANDARD FRAME  
WITH CURB  
INSTALLATION**




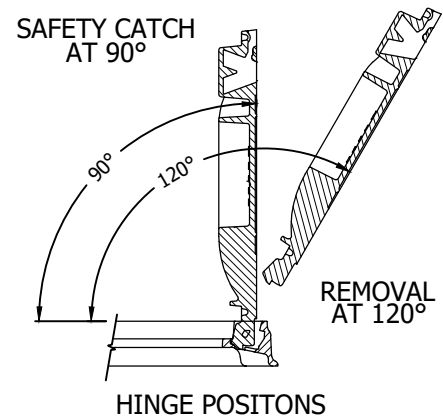
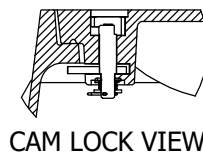
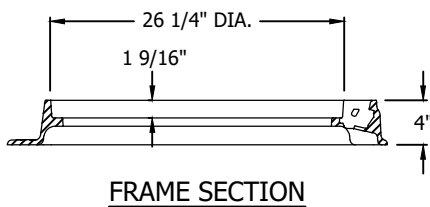
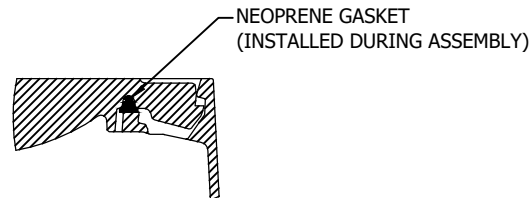
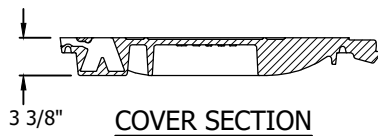
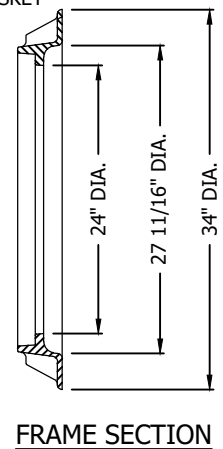
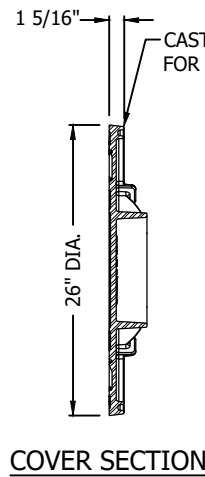
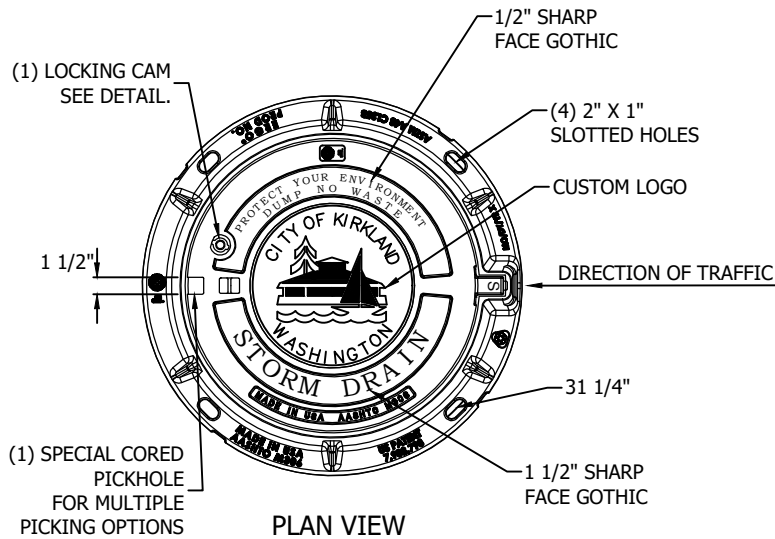
PLAN VIEW



NOTES:

1. COVERS SHALL BE GRAY IRON, LOCKING, WITH A MINIMUM WEIGHT OF 141 LBS.
2. MINIMUM WEIGHT OF FRAME SHALL BE 134 LBS.
3. PRODUCT SUPPLIED BY EJ GROUP, INC., APPROVED EQUAL.
4. CITY OF KIRKLAND LOGO REQUIRED
5. THIS SPEC SHOULD NOT BE USED IN THE ROADWAY.
6. MUST BE MADE IN THE USA.

CITY OF KIRKLAND	
PLAN NO. CK - D.18	
	<b>24" MANHOLE FRAME W/LOCKING COVER AND LOGO</b>



**NOTES:**

1. VERIFY SLOTTED FRAMES ARE THOROUGHLY FILLED IN WITH MORTAR FOR EFFICIENT INTERACTION WITH IRON AND STRUCTURE.
2. VERIFY BEDDING MORTAR IS NOT IN CONTACT WITH AREA UNDER LID FLANGE THAT WILL INTERFERE WITH CAMLOCK.
3. INSTALL PLUG IN LOCK HOLE TO KEEP LOCK FREE OF FOREIGN MATERIAL.
4. 24 INCH MANHOLE LID IS FITTED WITH AN INFILTRATION PLUG LOCATED IN THE HINGE HOUSING OF THE FRAME. VERIFY PLUG IS PROPERLY INSTALLED BEFORE INSTALLING THE FRAME.
5. REQUIRED ON ALL ARTERIALS, COLLECTORS OR ANY TIME THAT THE IRON WILL BE WITHIN THE TRAVEL LANE.
6. LID SHALL BE MARKED "STORM DRAIN".
7. CITY OF KIRKLAND LOGO REQUIRED.
8. LID MUST BE COVERED WITH TAR PAPER BEFORE OVERLAY.
9. PRODUCT SUPPLIED BY EAST JORDAN IRON WORKS, OR APPROVED EQUAL.
10. FRAME AND COVER SHALL BE H-20 LOADING RATED AND BE AT MINIMUM 7" TALL IF INSTALLED IN ROADWAY.
11. 7" TALL ERGO CASTING REQUIRED FOR CONCRETE ROADWAYS.
12. MUST BE MADE IN THE USA.

**CITY OF KIRKLAND**

**PLAN NO. CK - D.18A**



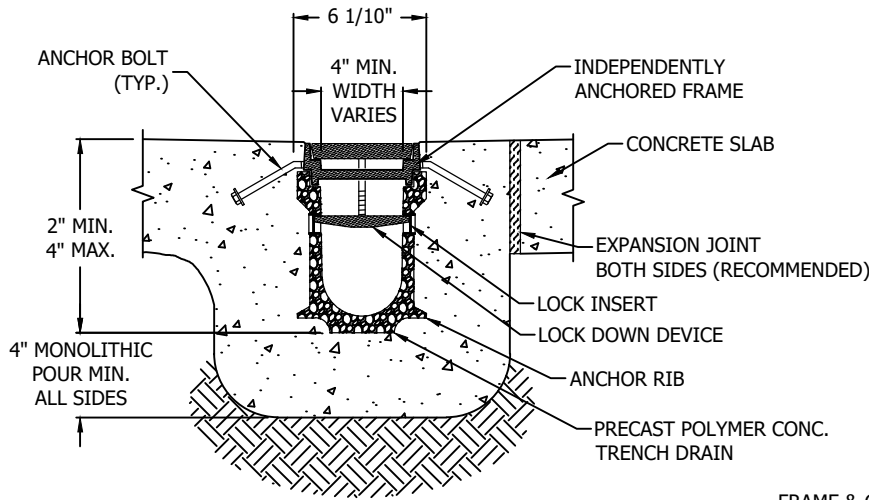
**MODIFIED 24"  
MANHOLE FRAME  
W/ HINGED COVER**

ISOLATION JOIN PER WSDOT  
STD PLAN A-40.15, TYP.

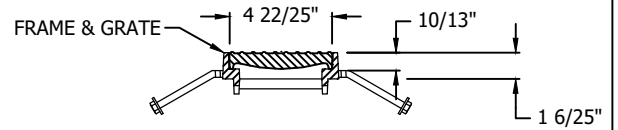


# DEEP MANHOLE FRAME CASTING

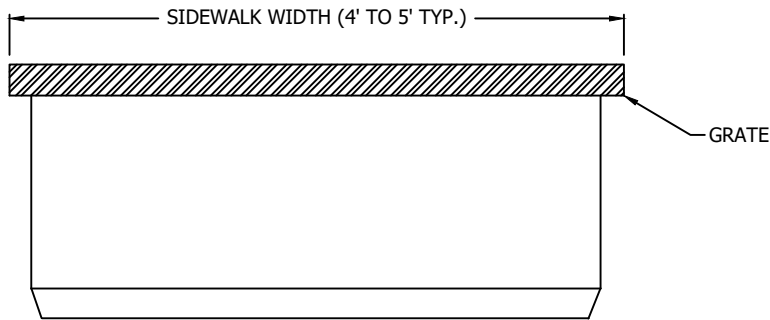
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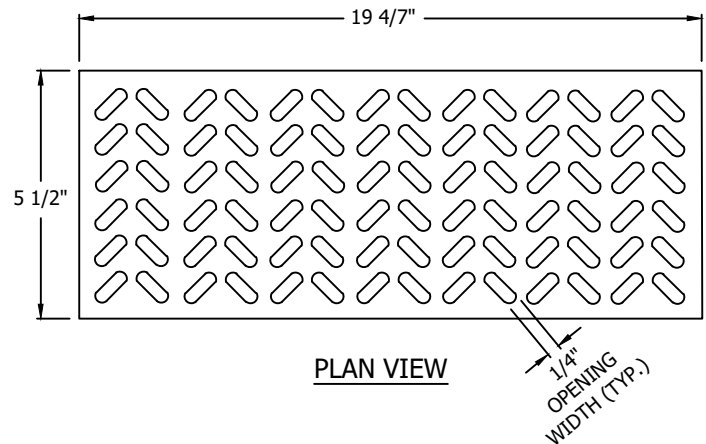
END VIEW



GRATE END VIEW



SIDE VIEW



PLAN VIEW

**NOTES:**

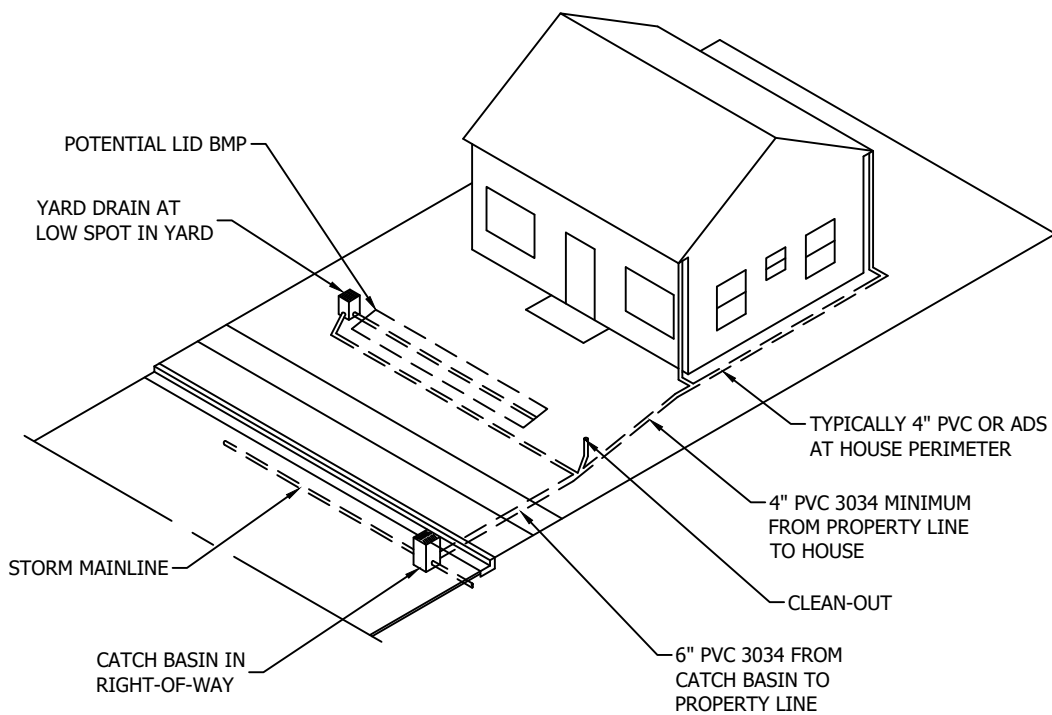
1. PRODUCT IS TRENCH FORMER TFX ([www.abtdrains.com](http://www.abtdrains.com)), POLYCAST DRAIN ([www.precastdrain.com](http://www.precastdrain.com)), OR EQUIVALENT.
2. TO BE USED IN LIEU OF D-19, WHEN CURB HEIGHT DOES NOT ALLOW PIPE INSTALLATION.
3. USE ADA/HEEL PROOF GRATE PER ADA SPECIFICATION 302.3.

**CITY OF KIRKLAND**

**PLAN NO. CK - D.19B**



**PRECAST CHANNEL  
DRAIN  
FORMING SYSTEM**



NOTES

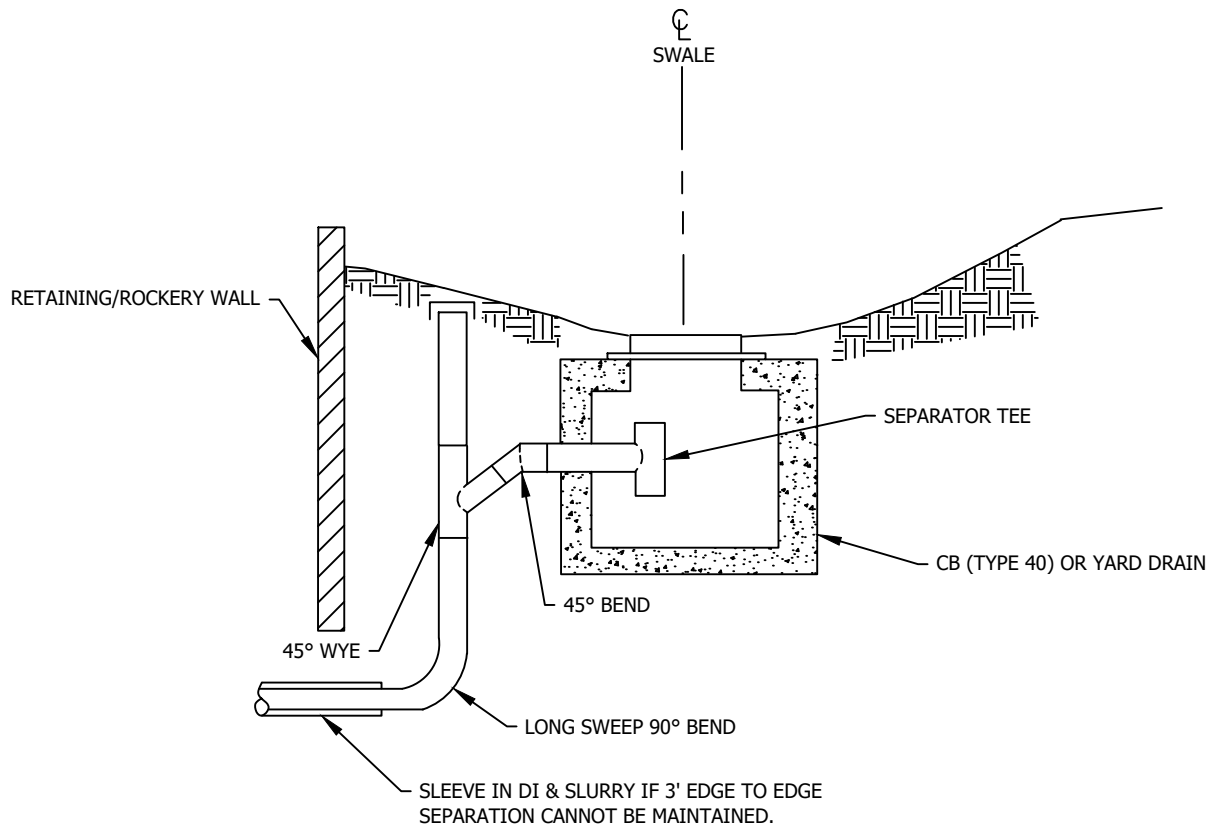
1. ALL HOUSE DOWNSPOUTS AND EXTERIOR SURFACE DRAINS MUST BE CONNECTED TO THE PUBLIC DRAIN SYSTEM, DETENTION FACILITY OR LID BMP (IF APPLICABLE). NO STORM DRAINAGE MAY BE CONNECTED TO PUBLIC SANITARY SEWER SYSTEM.
2. MINIMUM GRADE 2 % FOR 6" AND 2 % FOR 4", AND 1% FOR 8".
3. ALL CONSTRUCTION WITHIN STREETS AND/OR PUBLIC RIGHT-OF-WAYS MUST BE DONE BY A GENERAL CONTRACTOR LICENSED BY THE STATE AND COK.
4. NEW TIE-INS MUST INSTALL PVC/DI TEE OR INSERTA TEE FOR LATERAL CONNECTION. NO BREAK-IN CONNECTIONS WITH MORTAR ALLOWED. LATERAL PIPE MAY NOT PROTRUDE INTO MAINLINE.
5. BACKFILL MATERIAL IN THE RIGHT-OF-WAY AND UNDER PAVED SURFACES SHALL BE 5/8" MINUS COMPACTED TO 95 % OR GREATER (CRUSHED SURFACING TOP COURSE PER WSDOT 9-03.9(3)).
6. CLEANOUTS REQUIRED FOR EACH PIPE LENGTH GREATER THAN 100' AND FOR EACH ACCUMULATED 90 DEGREES PER 100'.

CITY OF KIRKLAND

PLAN NO. CK - D.20



LOT DRAIN  
CONNECTIONS



**SIDE VIEW**  
**NOT TO SCALE**

**NOTE:**

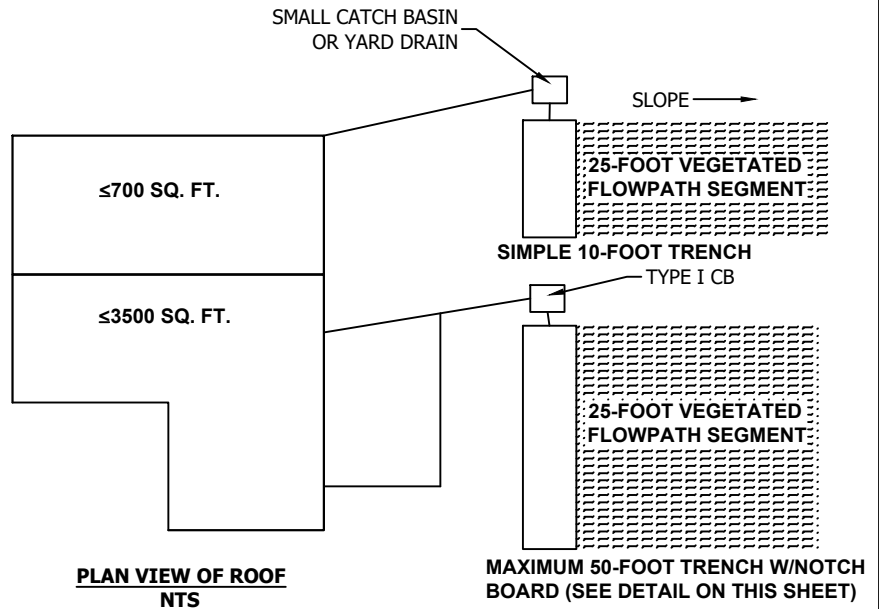
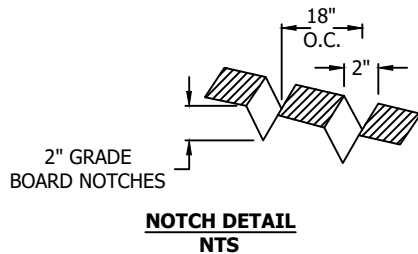
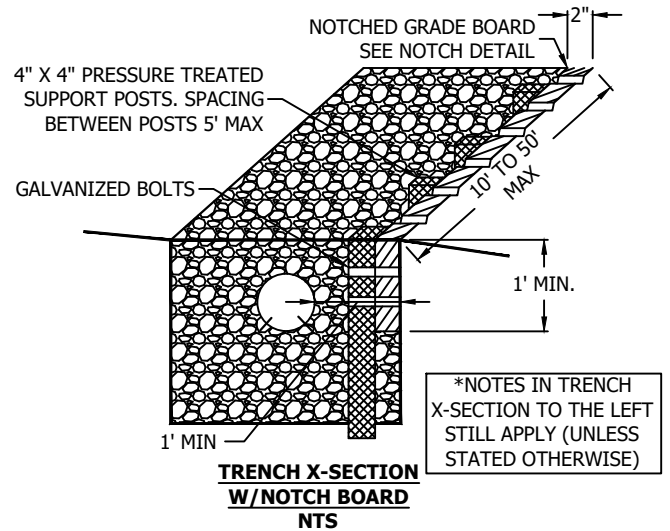
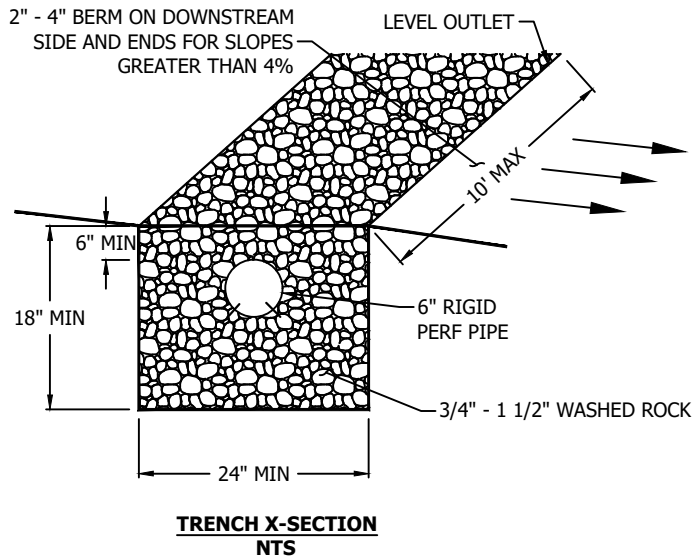
ALL PIPE SHALL BE PVC ASTM 3034, SDR35, OR PVC C900.  
USE PVC C900 UNDER WALL OR FOR CUTS IN EXCESS OF 5 FEET.

CITY OF KIRKLAND

PLAN NO. CK-D.20A



DROP-CONVEYANCE  
DRAIN



**NOTES:**

1. BASIC DISPERSION TRENCH MUST DISCHARGE RUNOFF SUCH THAT IT FLOWS OVER A MINIMUM 25' DISTANCE OF VEGETATED AREA (VEGETATED FLOWPATH SEGMENT).
2. THE VEGETATED FLOWPATH SEGMENT MUST BE OVER WELL-ESTABLISHED LAWN OR PASTURE, LANDSCAPING WITH WELL-ESTABLISHED GROUND COVER, OR NATIVE VEGETATION WITH NATURAL GROUND COVER. THE GROUND COVER MUST BE DENSE ENOUGH TO HELP DISPERSE & INFILTRATE FLOWS AND TO PREVENT EROSION.
3. THE VEGETATED FLOWPATH SEGMENT MUST BE ONSITE OR IN AN OFFSITE TRACT OR EASEMENT AREA RESERVED FOR SUCH DISPERSION.
4. DISPERSION DEVICES ARE NOT ALLOWED IN CRITICAL AREA BUFFERS OR ON SLOPES STEEPER THAN 20%. DISPERSION DEVICES PROPOSED ON SLOPES STEEPER THAN 15% OR WITHIN 50 FEET OF A STEEP SLOPE HAZARD OR LANDSLIDE HAZARD AREA MUST BE APPROVED BY A GEOTECHNICAL ENGINEER OR ENGINEERING GEOLOGIST UNLESS OTHERWISE APPROVED BY CITY ENGINEER.
5. FOR SITES WITH SEPTIC SYSTEMS, THE DISCHARGE OF RUNOFF FROM DISPERSION TRENCHES MUST BE LOCATED DOWN SLOPE OF THE PRIMARY AND RESERVE DRAINFIELD AREAS. CITY STAFF MAY WAIVE THIS REQUIREMENT IF SITE TOPOGRAPHY PROHIBITS DISCHARGED FLOWS FROM INTERSECTING THE DRAINFIELD.
6. THE DISPERSION OF RUNOFF MUST NOT CREATE FLOODING OR EROSION IMPACTS ON ADJACENT PROPERTIES.

**CITY OF KIRKLAND**

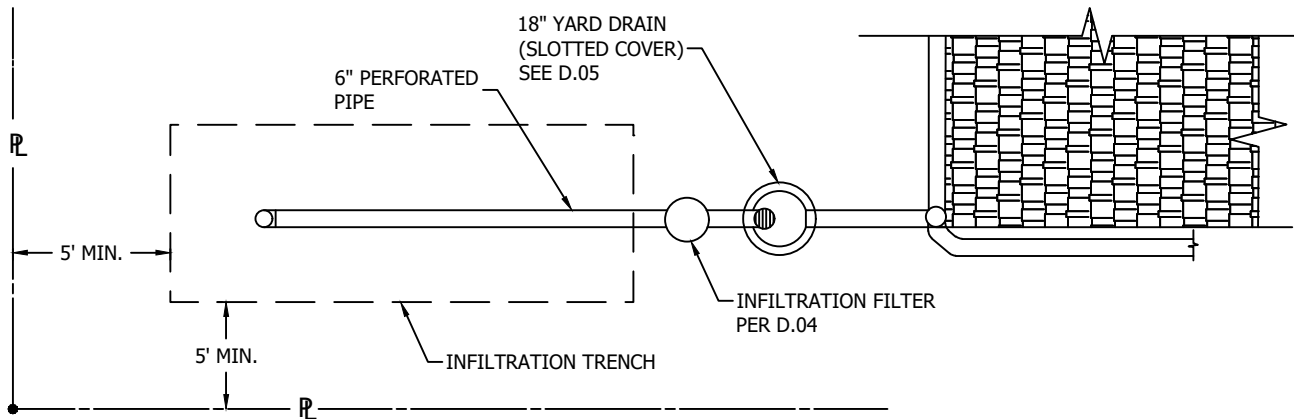
**PLAN NO. CK - D.21**



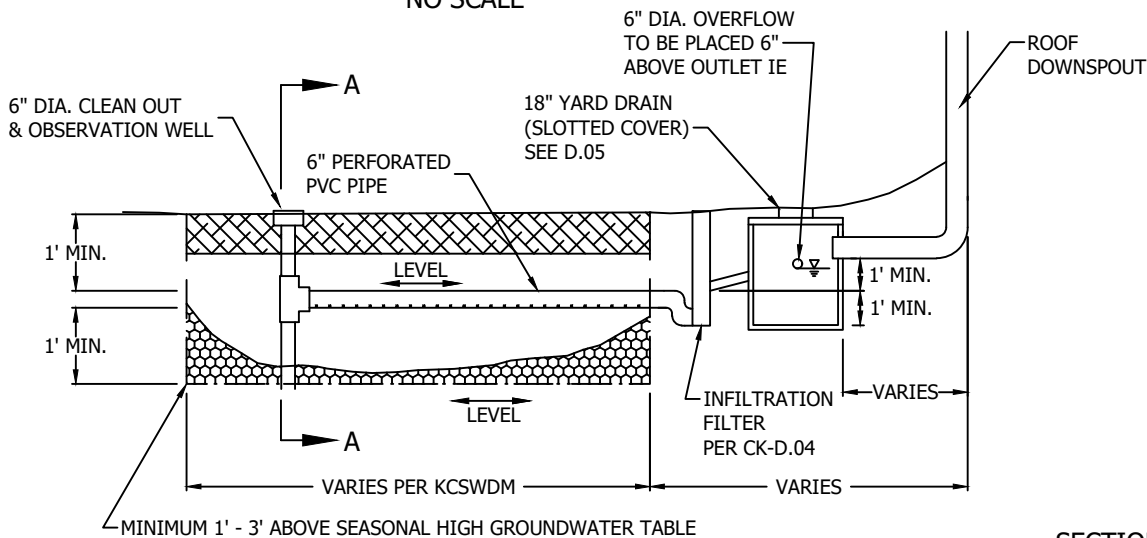
**BASIC DISPERSION  
TRENCH**



**PLAN VIEW  
NO SCALE**



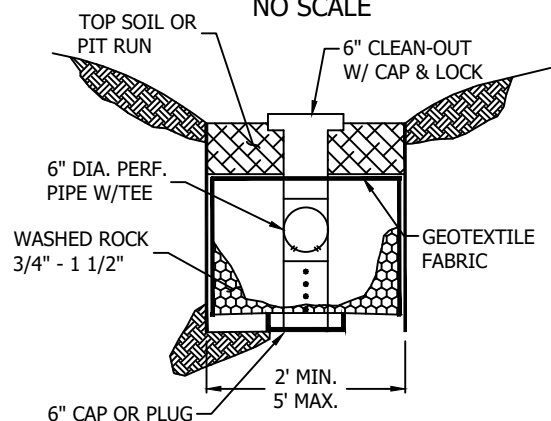
**PROFILE VIEW  
NO SCALE**



**NOTES:**

1. SPECIAL INSPECTION WILL BE REQUIRED FOR PROJECTS THAT USE AN INFILTRATION TRENCH TO MEET AN EXEMPTION, REDUCE THE SIZE OF A DETENTION FACILITY, OR AS A FLOW CONTROL FACILITY. SEE POLICY D-8 FOR REQUIREMENTS.
2. FOR SMALL SITE PROJECTS, SEE POLICY D-8 FOR SOIL INFORMATION REQUIREMENTS AND APP. C, 2016 KING COUNTY SURFACE WATER DESIGN MANUAL (KCSWDM) FOR SIZING AND DESIGN CRITERIA. FOR PROJECTS OTHER THAN SMALL SITE, USE DESIGN CRITERIA IN SECTION 5.2 IN THE 2016 KCSWDM.
3. MINIMUM SPACING BETWEEN TRENCH EDGES SHALL BE 5 FEET.
4. MAXIMUM TRENCH LENGTH MUST NOT EXCEED 100 FEET FROM THE INLET SUMP.
5. A MIN. 5-FT SETBACK SHALL BE MAINTAINED FROM ANY PROPERTY LINE OR NGPE.
6. A 50-FT SETBACK IS REQUIRED FROM STEEP SLOPE HAZARD AREAS OR LANDSLIDE HAZARD AREAS.
7. SHALL BE LOCATED 30-FT DOWN SLOPE FROM ANY SEPTIC TANK/DRAIN FIELD ONSITE OR ON ADJACENT PROPERTIES, AND A MINIMUM OF 100-FT UPSLOPE FROM ANY SEPTIC TANK/DRAIN FIELD ONSITE OR ON ADJACENT PROPERTIES. ALL SEPTIC TANK/DRAIN FIELD SYSTEMS SHALL BE IDENTIFIED AND SHOWN ON PLAN SET PRIOR TO INFILTRATION SYSTEM APPROVAL.
8. WHEN AN INFILTRATION TRENCH IS LOCATED UNDER DRIVEWAYS, IT SHALL ONLY BE PLACED UNDER 6" THICK DRIVEWAYS, CLEANOUT MUST MEET CK-S.09, AND 2' MINIMUM COVER.
9. THE INFILTRATION AREA AND A 5-FT BUFFER MUST BE FENCED PRIOR TO CONSTRUCTION AND UNTIL FINAL STABILIZATION OF THE SITE TO PREVENT SOIL COMPACTION BY CONSTRUCTION ACTIVITIES. FOR EXPOSED INFILTRATION TRENCHES, SILT FENCE SHALL BE INSTALLED AROUND THE CONSTRUCTED PERIMETER TO PREVENT SEDIMENTATION OF THE FACILITY.
10. THE DISTANCE MEASURED DOWN FROM THE BOTTOM OF THE TRENCH TO THE MAXIMUM WET SEASON WATER TABLE OR HARDPAN MUST BE AT LEAST 3 FEET.
11. IF SPECIAL INSPECTION IS REQUIRED, SEE POLICY D-8.

**SECTION A-A  
NO SCALE**

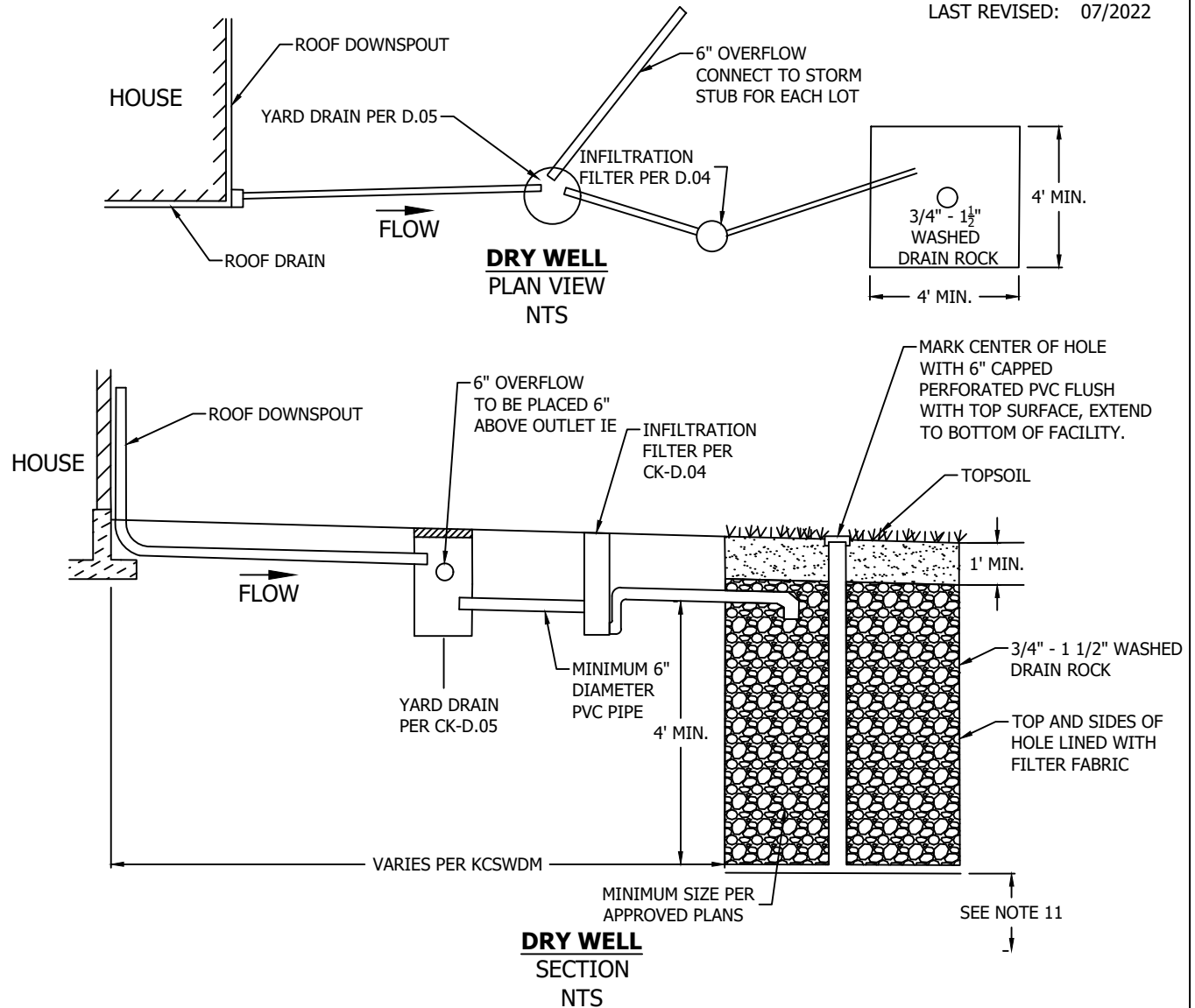


**CITY OF KIRKLAND**

**PLAN NO. CK - D.22**



**INFILTRATION  
TRENCH**



**NOTES:**

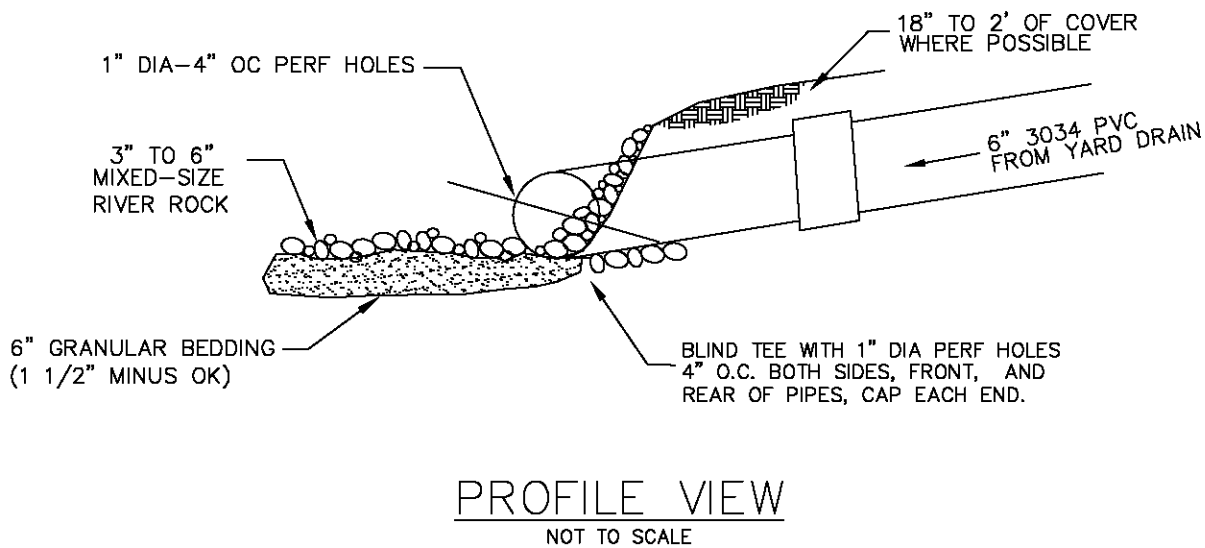
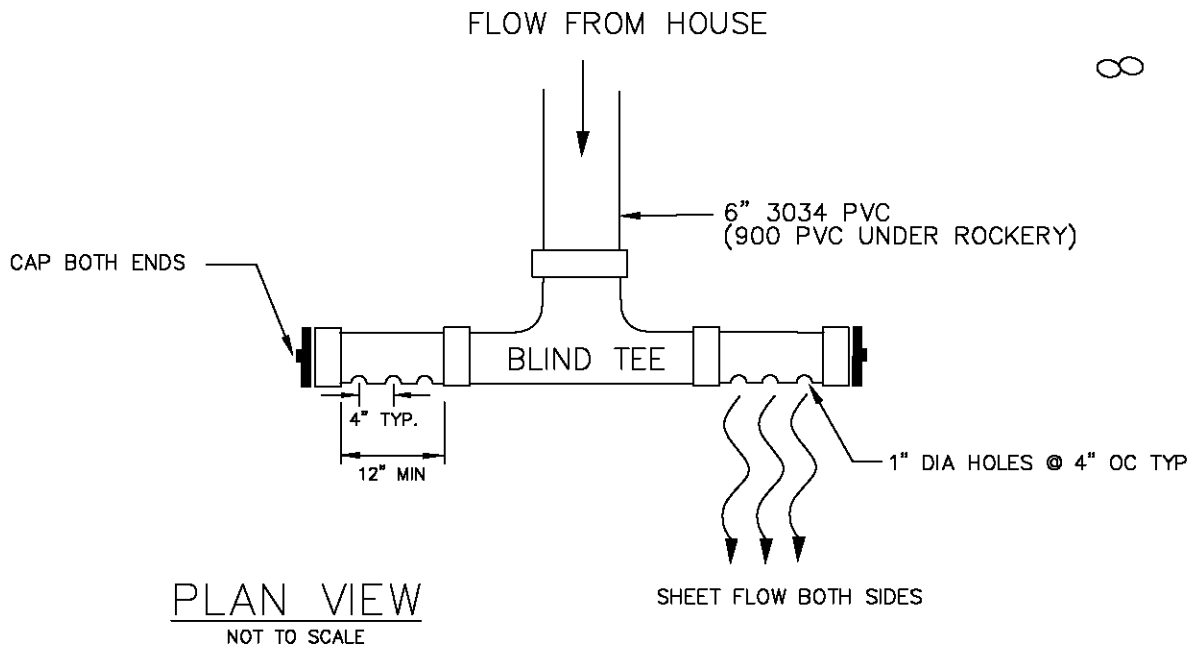
1. SPECIAL INSPECTION WILL BE REQUIRED FOR PROJECTS THAT USE AN INFILTRATION TRENCH TO MEET AN EXEMPTION, REDUCE THE SIZE OF A DETENTION VAULT, OR AS A FLOW CONTROL FACILITY. SEE POLICY D-8 FOR REQUIREMENTS.
2. THIS DETAIL APPLIES TO SMALL SITE PROJECTS, AS DESCRIBED IN APPENDIX C, 2021 KCSWDM. FOR PROJECTS OTHER THAN SMALL SITE, USE DESIGN CRITERIA IN SECTION 5.2 IN THE 2021 KCSWDM.
3. MINIMUM SPACING BETWEEN DRYWELLS SHALL BE 10 FEET.
4. A MAXIMUM OF 5,000 SF OF IMPERVIOUS AREA IS ALLOWED TO DRAIN TO ONE DRYWELL.
5. A MINIMUM 5-FT SETBACK SHALL BE MAINTAINED FROM ANY PROPERTY LINE OR NGPE.
6. A 50-FT SETBACK IS REQUIRED FROM STEEP SLOPE HAZARD AREAS OR LANDSLIDE HAZARD AREAS.
7. INFILTRATION SYSTEMS SHALL BE LOCATED 30-FT DOWN SLOPE FROM ANY SEPTIC TANK/DRAIN FIELD ONSITE OR ON ADJACENT PROPERTIES, AND A MINIMUM OF 100-FT UPSLOPE FROM ANY SEPTIC TANK/DRAIN FIELD ONSITE OR ON ADJACENT PROPERTIES. ALL SEPTIC TANK/DRAIN FIELD SYSTEMS SHALL BE IDENTIFIED AND SHOWN ON PLAN SET PRIOR TO INFILTRATION SYSTEM APPROVAL.
8. INFILTRATION DRYWELLS SHALL ONLY BE PLACED UNDER 6" THICK DRIVEWAYS, CLEANOUT MUST MEET CK-D.05B, AND 2' MINIMUM COVER.
9. THE INFILTRATION AREA AND A 5-FT BUFFER MUST BE FENCED PRIOR TO CONSTRUCTION AND UNTIL FINAL STABILIZATION OF THE SITE TO PREVENT SOIL COMPACTION BY CONSTRUCTION ACTIVITIES. FOR EXPOSED INFILTRATION AREAS, SILT FENCE SHALL BE INSTALLED AROUND THIS CONSTRUCTED PERIMETER TO PREVENT SEDIMENTATION OF THE FACILITY.
10. IF SPECIAL INSPECTION IS REQUIRED, SEE POLICY D-8.
11. DRYWELL MAXIMUM SURFACE AREA SHALL BE 100 SQUARE FEET, MINIMUM WIDTH SHALL BE 4 FEET.
12. THE DISTANCE MEASURED DOWN FROM THE BOTTOM OF THE DRYWELL TO THE MAXIMUM WET SEASON TABLE OR HARDPAN MUST BE AT LEAST 3 FEET.

**CITY OF KIRKLAND**

**PLAN NO. CK - D.22B**




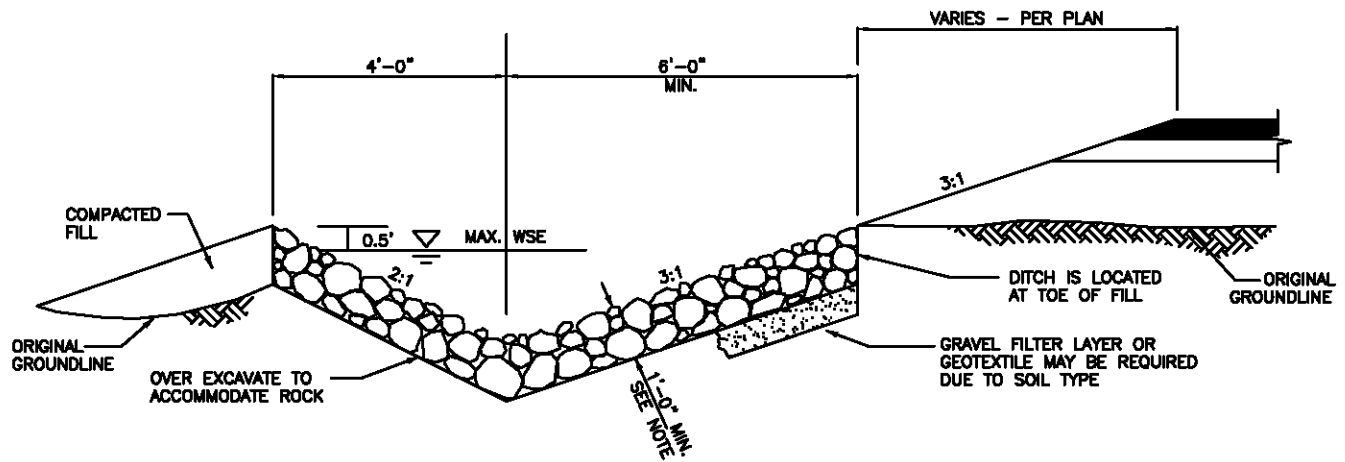
**INFILTRATION  
DRYWELL**



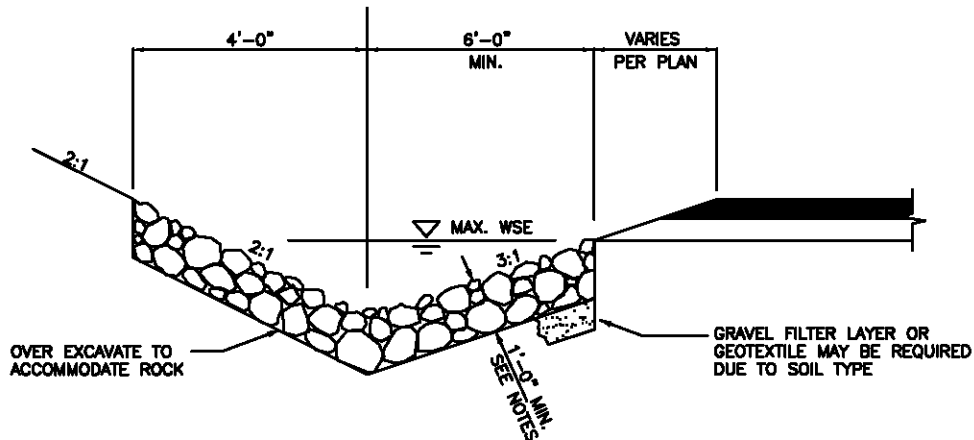
### NOTES:

1. LEVEL SPREADER SHALL BE CONSTRUCTED SO AS TO PREVENT POINT DISCHARGE AND EROSION.
2. LEVEL SPREADERS MAY BE PLACED NO CLOSER THAN 50' TO ONE ANOTHER (100' ALONG FLOWLINE).
3. HAND PLACE AND INTERLOCK RIVER ROCK (OR EQUAL) OVER GRANULAR BEDDING.  
FILL IN VOID SPACE WITH SMALLER ROCK.
4. A VEGETATED FLOWPATH OF 25' MIN. IS REQUIRED AFTER LEVEL SPREADER, PRIOR TO PROPERTY LINE.

CITY OF KIRKLAND	
PLAN NO. CK-D.23A	
	ALTERNATE LEVEL SPREADER



ROCK-LINED SHOULDER DITCH  
IN FILL SECTION



ROCK-LINED SHOULDER DITCH  
IN CUT SECTION

**NOTES:**

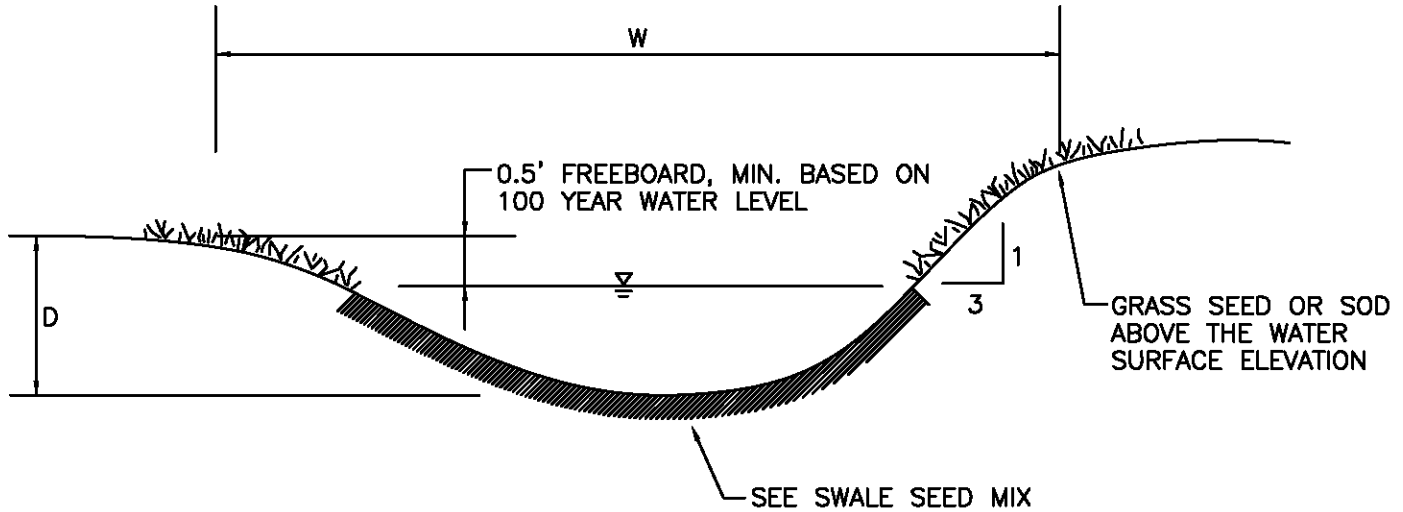
1. ROCK LINED DITCHES TO BE USED WHEN FLOW VELOCITIES EXCEED 4 FPS.
2. ROCK SIZE AND DEPTH DEPENDENT ON FLOW VELOCITY. MINIMUM ROCK SIZE 2"-4" QUARRY SPALLS.

CITY OF KIRKLAND

PLAN NO. CK-D.24



ROCK-LINED  
SHOULDER DITCHES



TYPICAL SECTION

NOTES:

1. D AND W SIZED TO ACCOMMODATE DESIGN FLOW, PER CHAPTER 6.3 OF THE KING COUNTY SURFACE WATER DESIGN MANUAL.
2. ROUND ALL CORNERS FOR EASE OF MOWING.
3. MAXIMUM DESIGN VELOCITY SHALL BE 1 FPS FOR WATER QUALITY TREATMENT, AND 3 FPS FOR 100-YR CONVEYANCE.
4. MINIMUM SWALE LENGTH IS 100 FEET.
5. MINIMUM BOTTOM WIDTH IS 2 FEET (b).
6. SLOPE SHALL BE BETWEEN 1 AND 6%.
7. ADD SPREADER WEIR AT SWALE INLET FOR EVEN FLOW DISTRIBUTIONS.
8. LOCATE ALL SEDIMENT TRAPS FOR EASE OF MAINTENANCE.

CITY OF KIRKLAND

PLAN NO. CK-D.25



GRASS-LINED  
SWALE

**TABLE 6.3.1.C  
GRASS SEED MIXES SUITABLE FOR BIOFILTRATION SWALE TREATMENT AREAS\***

MIX 1		MIX 2	
75–80 percent	Tall or Meadow Fescue	60–70 percent	Tall Fescue
10–15 percent	Seaside Creeping Bentgrass or Colonial Bentgrass	10–15 percent	Seaside Creeping Bentgrass or Colonial Bentgrass
5–10 percent	Redtop	10–15 percent	Meadow Foxtail
		6–10 percent	Alsike Clover
		1–5 percent	Marshfield Big Trefoil
		1–6 percent	Redtop

NOTE: All percentages are by weight.

**TABLE 6.3.1.D FINELY-TEXTURED PLANTS TOLERANT OF  
FREQUENT SATURATED SOIL CONDITIONS OR STANDING WATER**

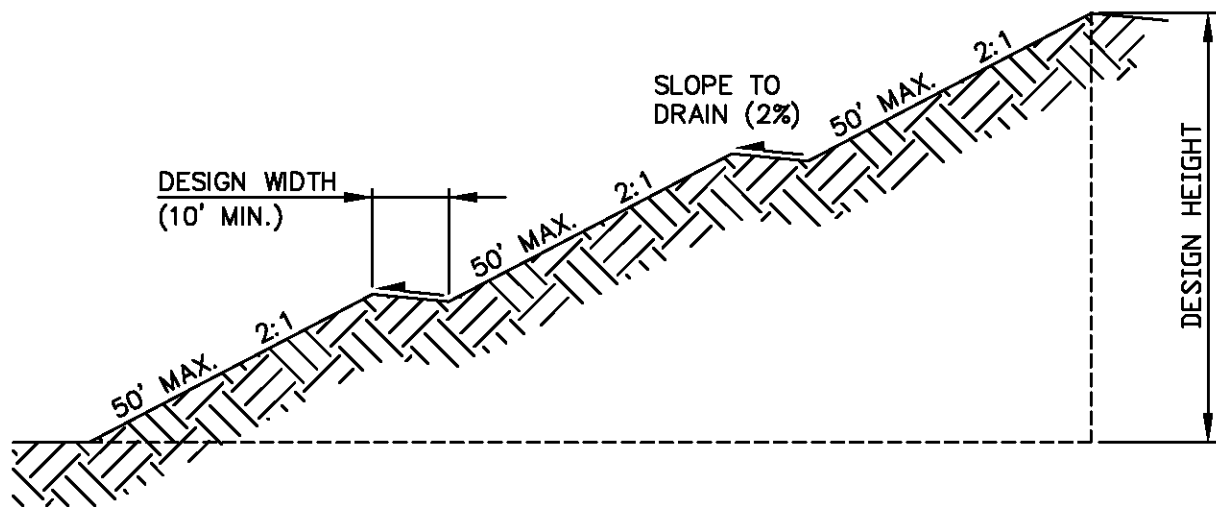
GRASSES		WETLAND PLANTS	
Water Foxtail	<i>Alopercurus geniculatus</i>	Sawbeak Sedge	<i>Carex stipata</i>
Shortawn Foxtail	<i>Alopercurus aequalis</i>	Spike Rush	<i>Eleocharis palustris</i>
Bentgrass	<i>Agrosits spp.</i>	Slender Rush	<i>Juncus tenuis</i>
Spike Bentgrass	<i>A. exarata</i>	Grass-leaf Rush	<i>Juncus marginatus</i>
Redtop	<i>A. alba or gigantea</i>		
Colonial Bentgrass	<i>A. tenuis or capillaris</i>		
Mannagrass	<i>Glyceria spp.</i>		
Western	<i>G. occidentalis</i>		
Northern	<i>G. borealis</i>		
Slender-Spiked	<i>G. leptostachya</i>		
Rough-Stalked Bluegrass	<i>Poa trivialis</i>		
Velvet Grass	<i>Holcus mollis</i>		

CITY OF KIRKLAND

PLAN NO. CK-D.25A



SWALE SEED MIX  
FOR CK-D.25

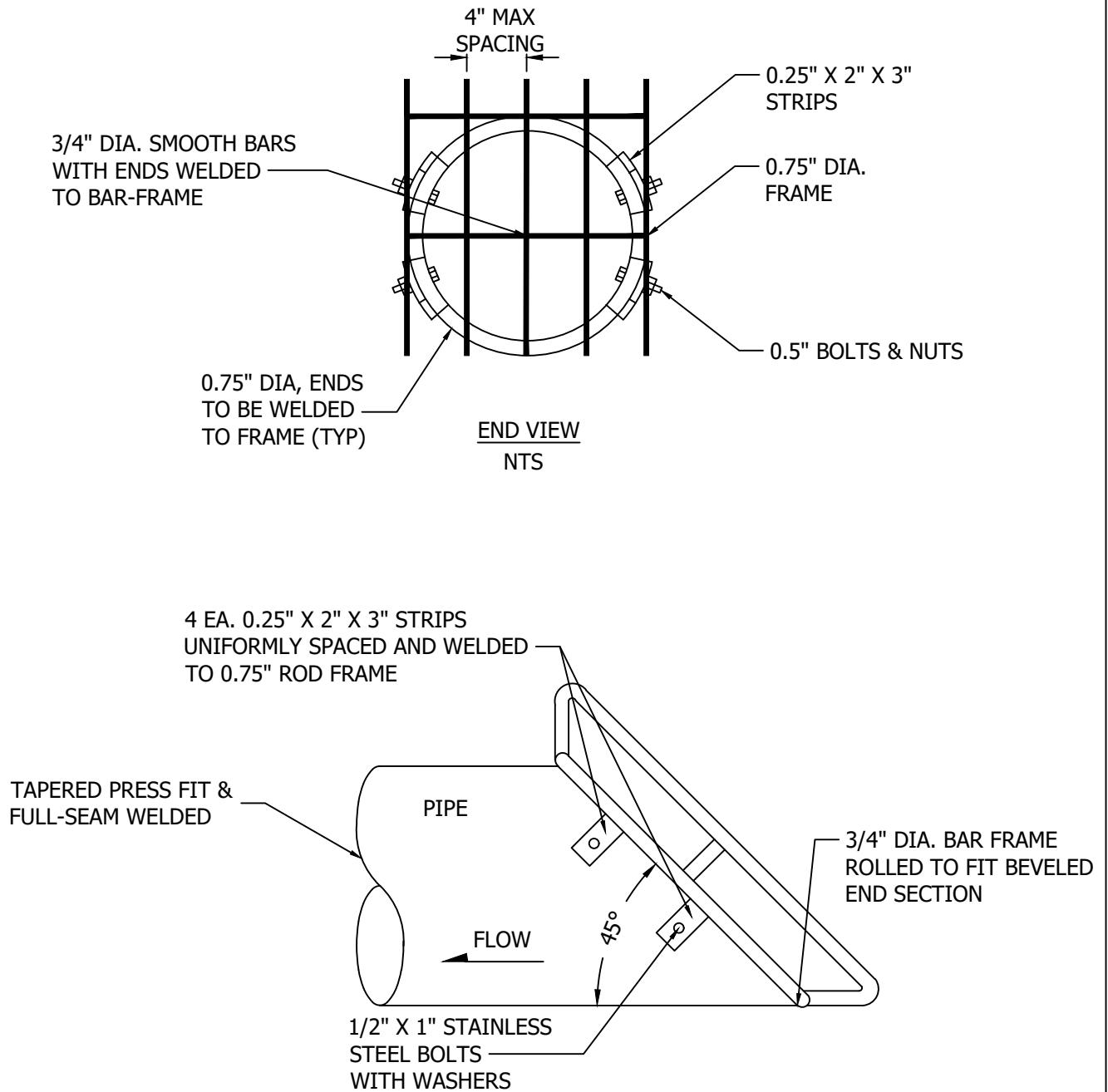


CITY OF KIRKLAND

PLAN NO. CK-D.26




GRADIENT TERRACE  
CROSS-SECTION

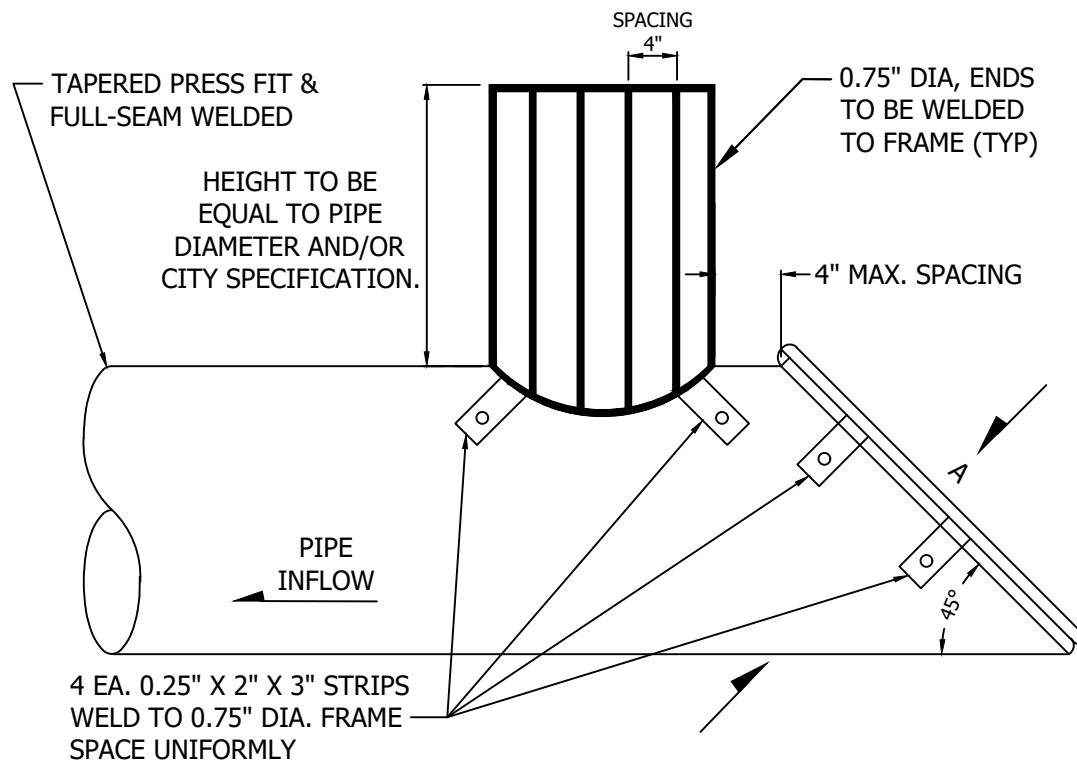
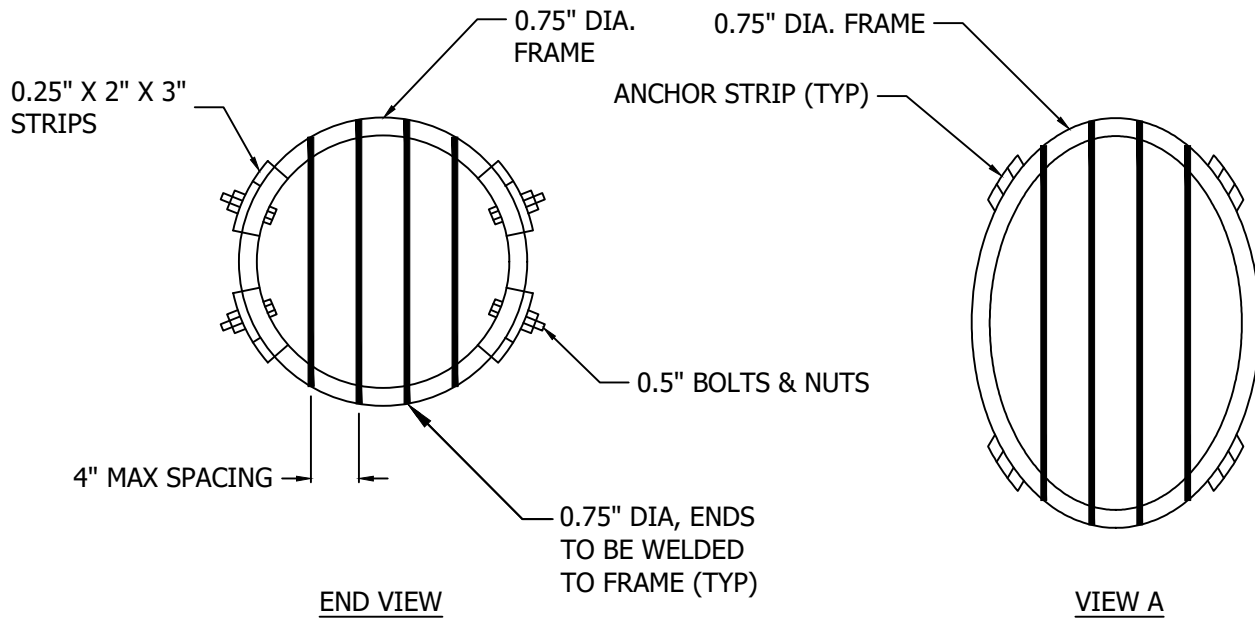


**NOTES:**

1. ATWOOD FABRICATION OR APPROVED EQUAL.
2. REQUIRED FOR ANY PIPE 8" OR LARGER.
3. DEBRIS BARRIER MUST BE ALL ALUMINUM.
4. DEBRIS BARRIER NOT ALLOWED ON OUTLET END.
5. ALL BOLT HARDWARE SHALL BE STAINLESS STEEL.


CITY OF KIRKLAND	
PLAN NO. CK - D.27	
	TYPICAL DEBRIS BARRIER

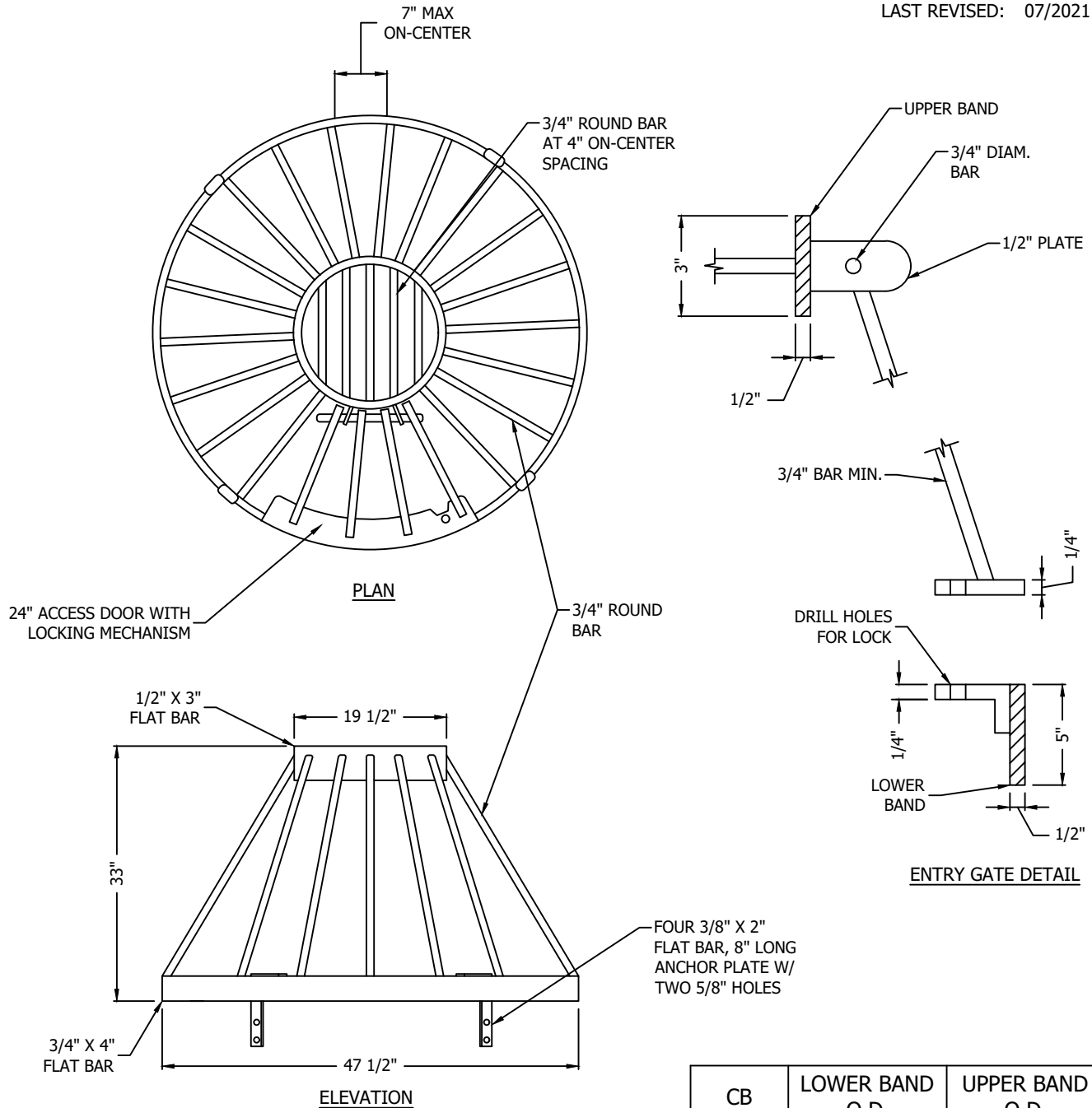




# **NOTES**

1. REQUIRED FOR ANY PIPE 8" OR LARGER.
2. DEBRIS BARRIER MUST BE ALL ALUMINUM.
3. DEBRIS BARRIER NOT ALLOWED ON OUTLET END.
4. ALL BOLT HARDWARE SHALL BE STAINLESS STEEL.
5. ATWOOD FABRICATION OR APPROVED EQUAL.

CITY OF KIRKLAND	
PLAN NO. CK - D.27A	
	TYPICAL DEBRIS BARRIER WITH OVERFLOW



**NOTES:**

1. ALL METAL PARTS SHALL BE 6061 ALUMINUM, STAINLESS STEEL HARDWARE.
2. ALL JOINTS SHALL BE WELDED SOLID.

CB	LOWER BAND O.D.	UPPER BAND O.D.
48"	47.5"	19.5"
54"	53.5"	23.5"
60"	59.5"	23.5"
72"	71.5"	28.5"
96"	95.5"	36.0"

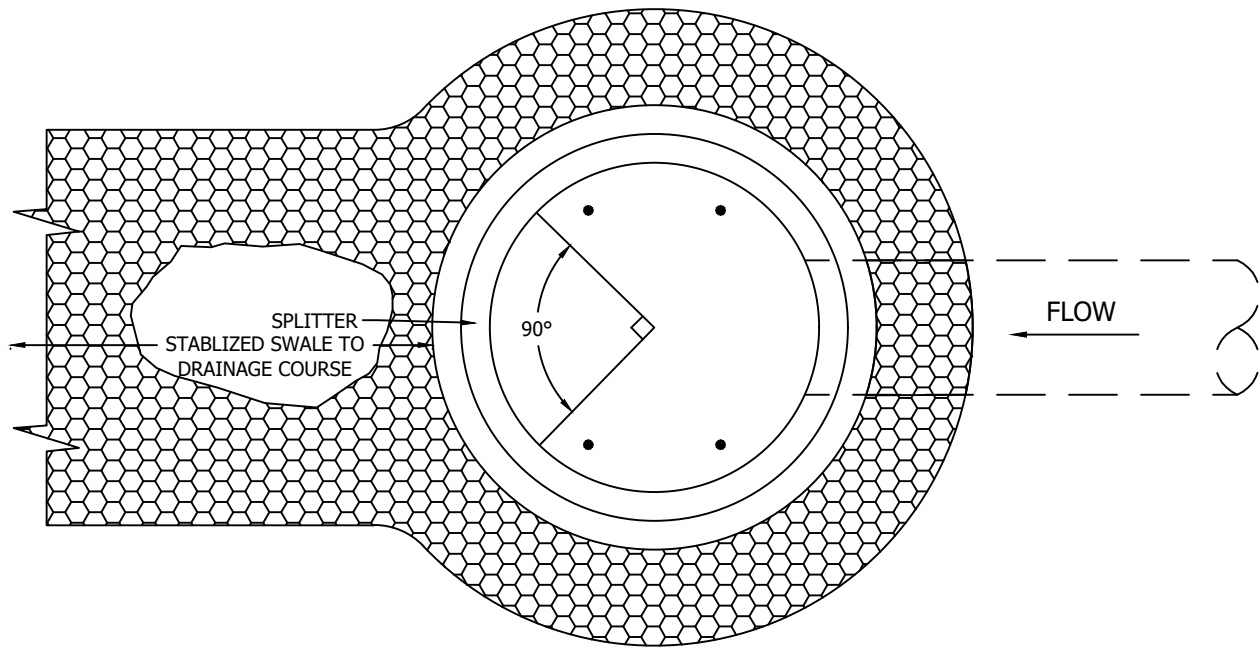
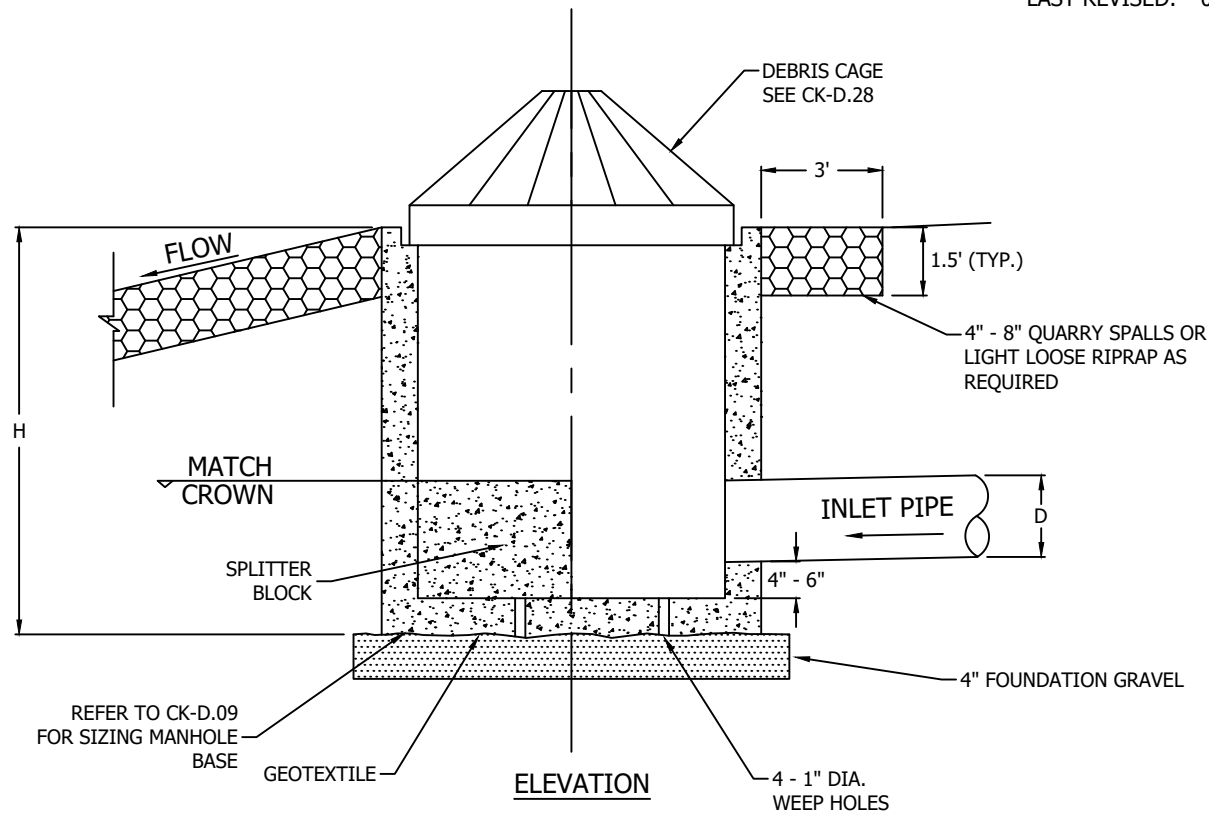
**CITY OF KIRKLAND**

**PLAN NO. CK - D.28**




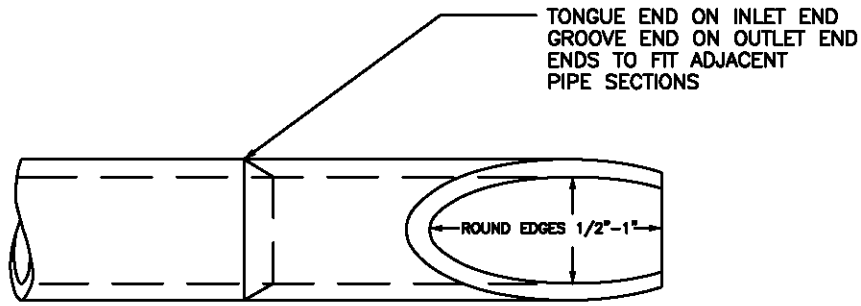
**DEBRIS CAGE**

NOT TO SCALE

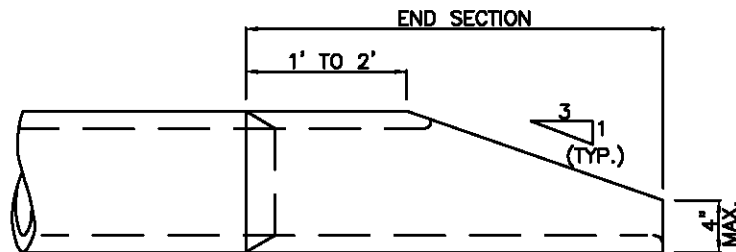


INLET PIPE SIZE "D"	BASE HEIGHT "H"
8"	2'
12"	3'
18"	3'
24"	4'

CITY OF KIRKLAND	
PLAN NO. CK - D.29	
	ENERGY DISSIPATOR

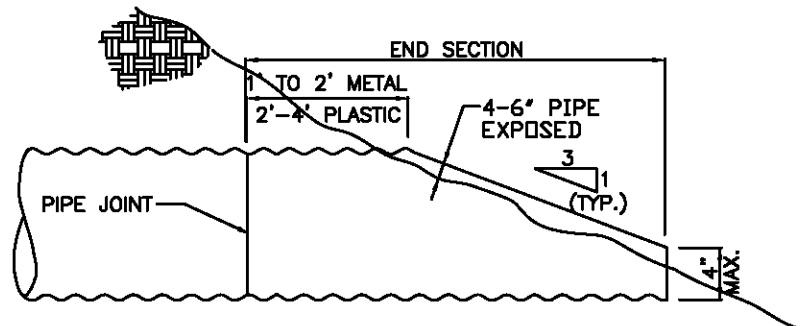


PLAN



ELEVATION

CONCRETE PIPE



METAL & THERMO-PLASTIC PIPE

NOTE:

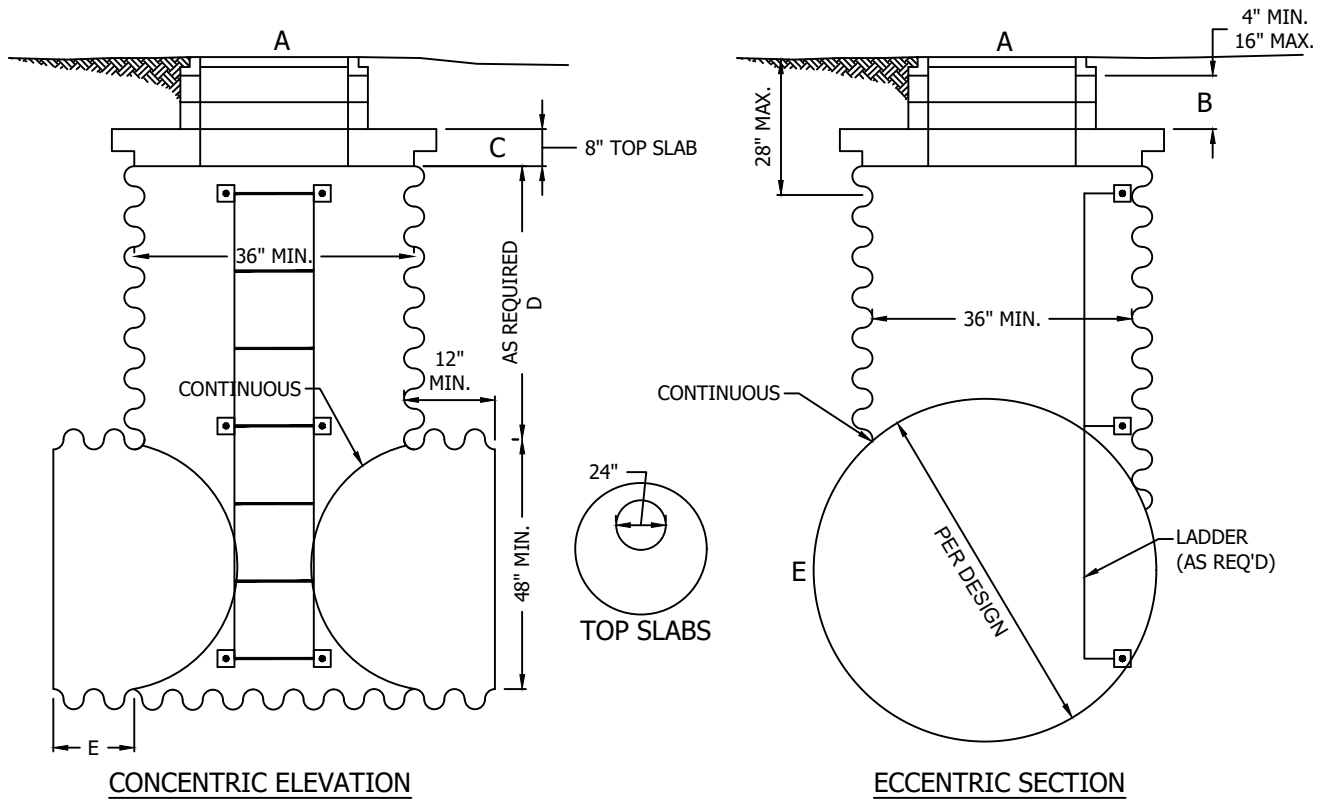
SIDE SLOPE SHALL BE WARPED TO MATCH THE BEVELED PIPE END. WHEN CULVERT IS ON SKEW, BEVELED END SHALL BE ROTATED TO CONFORM TO SLOPE. IF SLOPE DIFFERS FROM 3:1, PIPE SHALL BE BEVELED TO MATCH SLOPE.

CITY OF KIRKLAND

PLAN NO. CK-D.30



BEVELED END  
PIPE SECTION




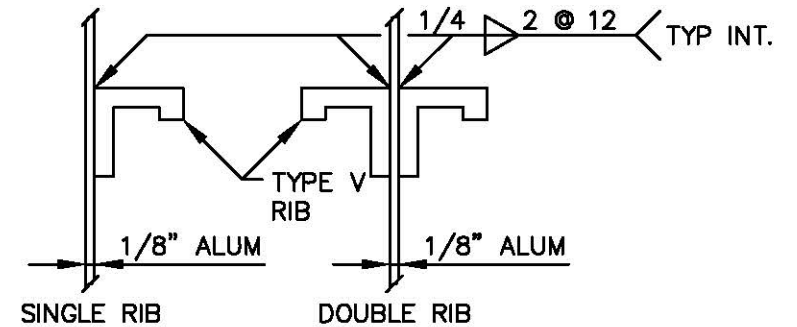
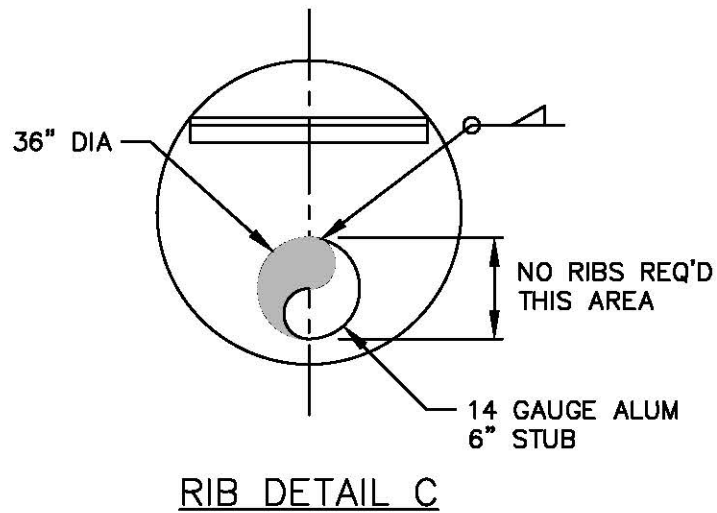
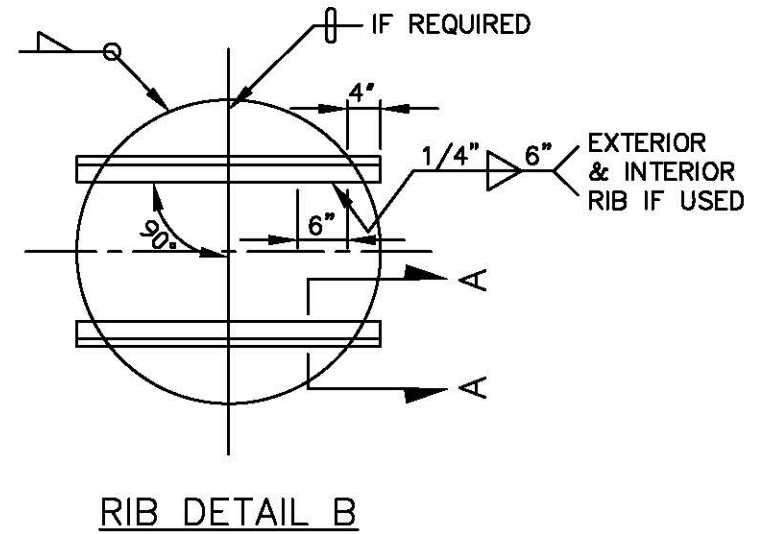
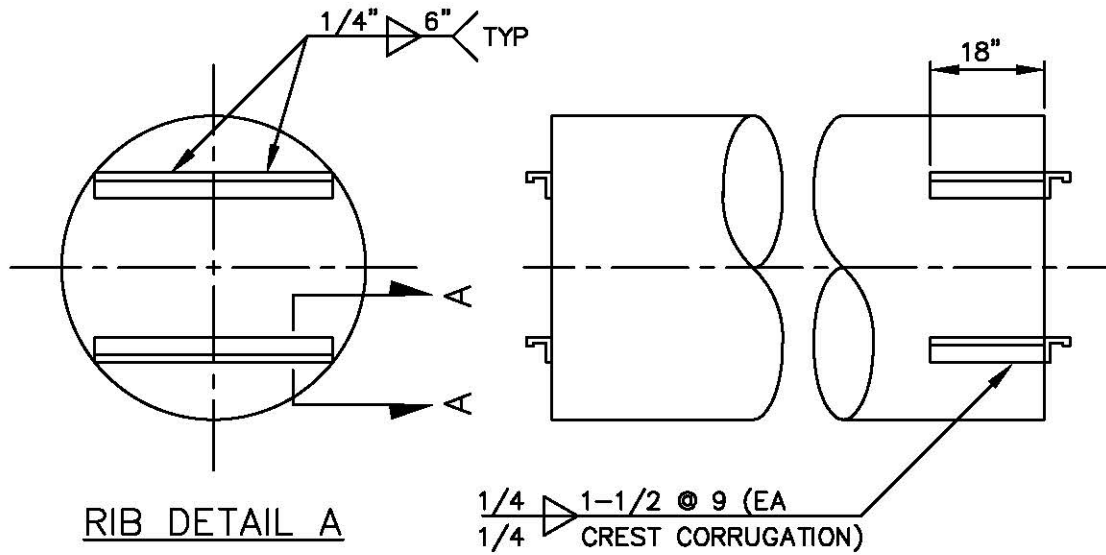
#### LEGEND

- A. 24" MANHOLE FRAME WITH LOCKING COVER PER CK-D.18 OR CK-D.18A.
- B. CONCRETE GRADE RINGS AS NEEDED TO MATCH FINISHED GRADE. SEE CK.D09.
- C. CONCRETE TOP SLAB SHORT ADJUSTMENT UNIT WITH FRAME AND GRATE PER STANDARDS.
- D. MATERIAL TO MATCH DETENTION PIPE. CMP RISER: 16 GAUGE HELICAL OR ANNULAR CORRUGATED METAL PIPE, MATERIAL AND DIAMETER TO MATCH DETENTION PIPE. FOR DEPTHS GREATER THAN 4' USE STEPS PER STANDARD PLAN CK-D.12. FOR DEPTHS GREATER THAN 5' AN ACCESS RISER WITH A MINIMUM DIAMETER OF 48" WILL BE USED.
- E. CORRUGATED METAL STUBS AND DETENTION PIPE TO BE SAME GAUGE. STUB LENGTHS TO BE 12" MIN.

#### NOTES


1. ALL METAL PARTS AND SURFACES MUST BE ALUMINUM OR ALUMINIZED. ALL CUTS MUST BE SPRAYED WITH ALUMINIZED TREATMENT.
2. NOT FOR USE IN PUBLIC ROADWAYS. USE IN DRIVEWAYS AND OTHER TRAFFIC AREAS AS APPROVED BY PUBLIC WORKS.
3. A MAX. DEPTH OF 15' AND A MAX. COVER OF 8' IS ALLOWED FOR TANKS.
4. CORRUGATED METAL MANHOLE ONLY ALLOWED TO BE USED TO ACCESS PROPOSED DETENTION TANK FACILITIES.

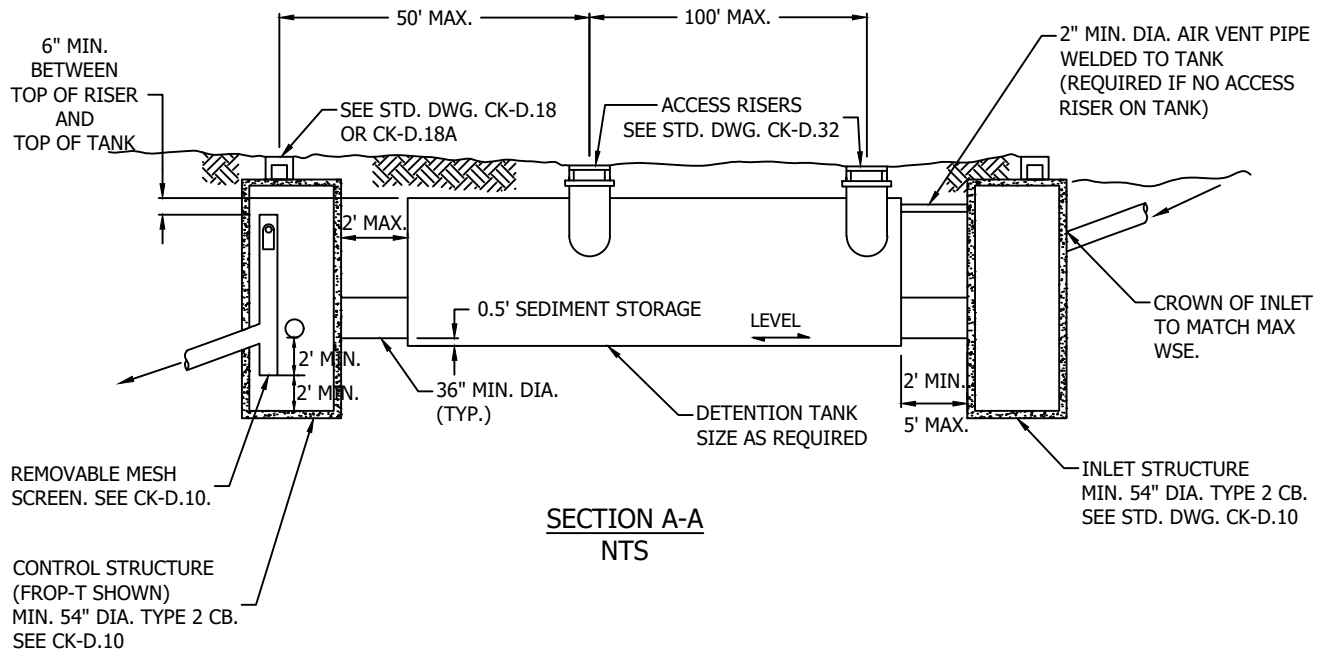
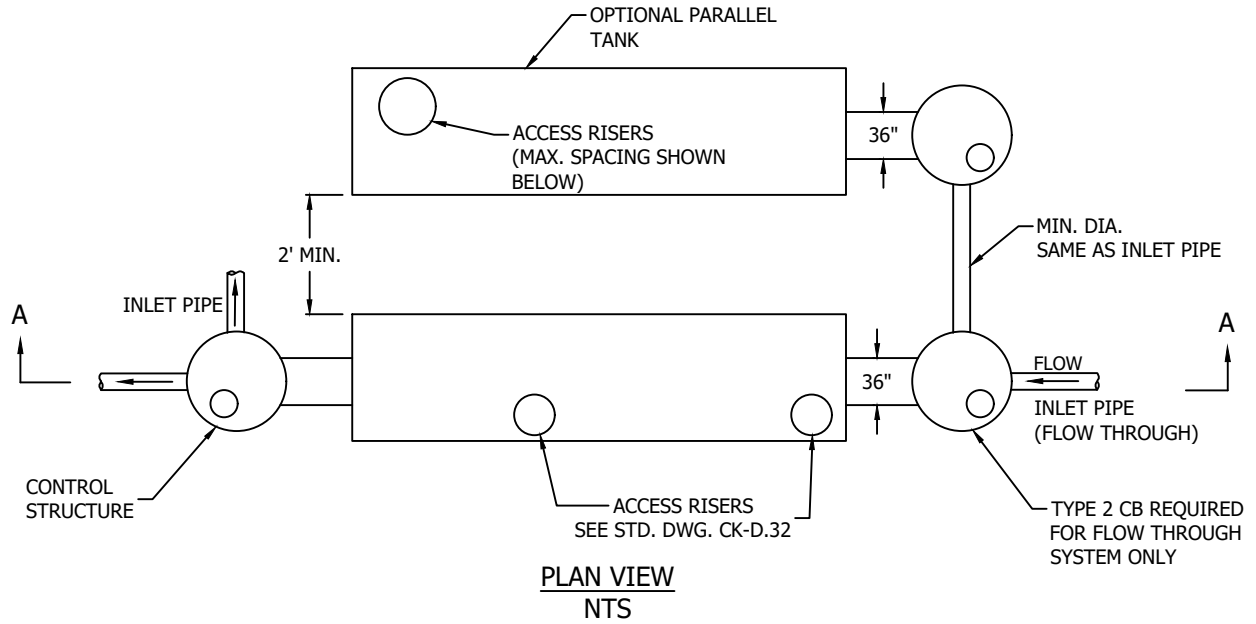
CITY OF KIRKLAND	
PLAN NO. CK - D.32	
	CORRUGATED METAL MANHOLE



#### NOTES

1. USE RIB DETAIL B WHEN SIDE BRACKETS ARE REQUIRED.
2. RIBS ARE NOT REQUIRED TO BE USED AROUND TANK NOZZLES AS SHOWN IN DETAIL C.

	CITY OF KIRKLAND	
	PLAN NO. CK-D.33	
DETENTION STRUCTURE END PLATE DETAIL		



**NOTES:**

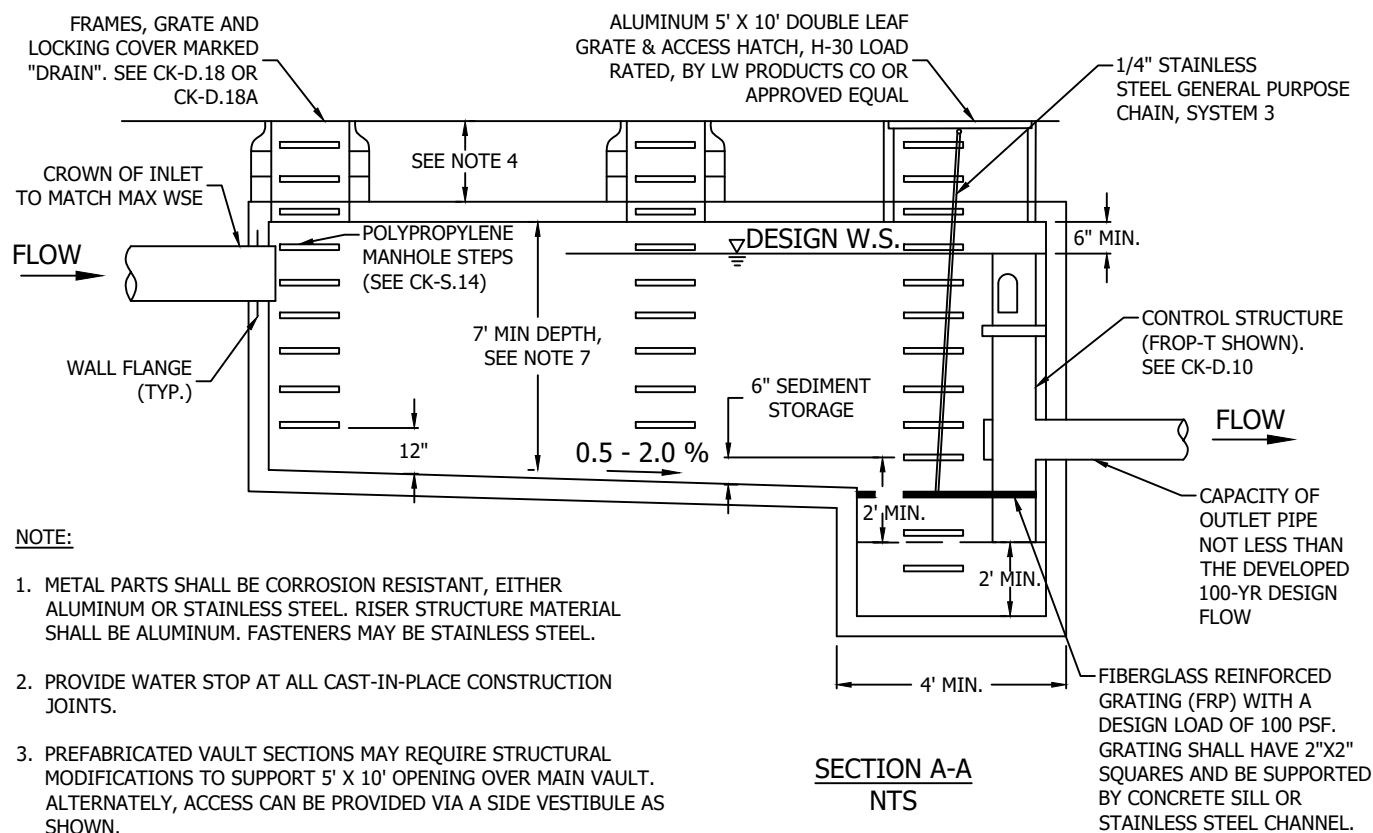
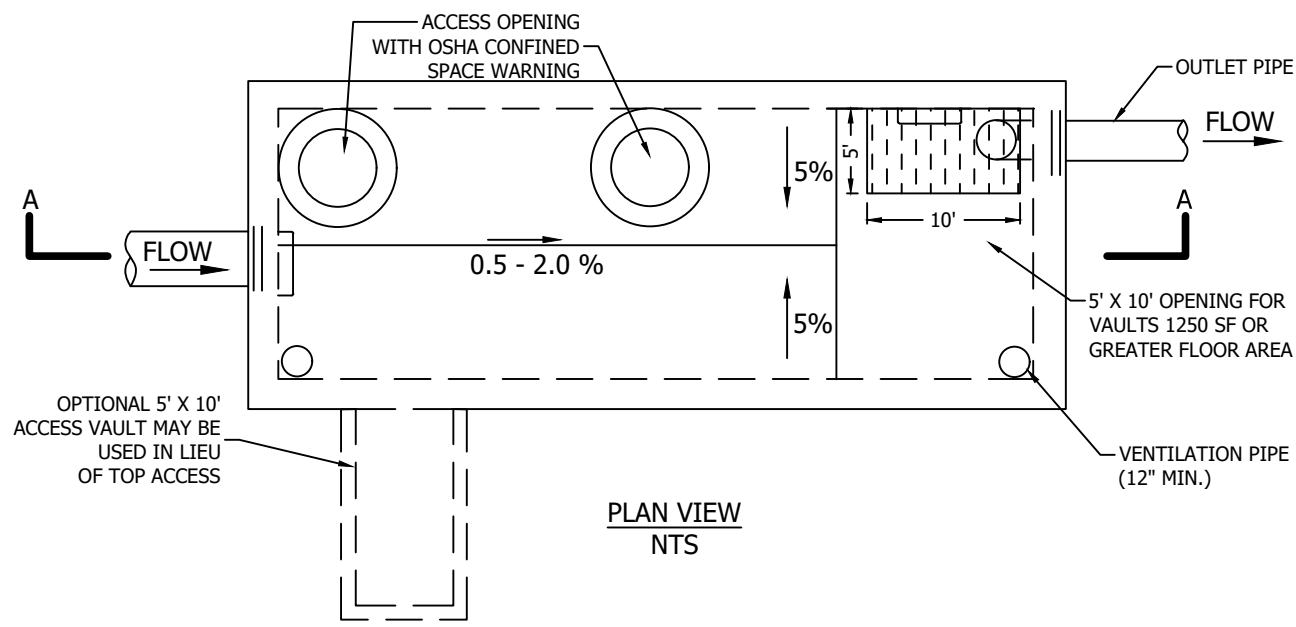
1. METAL PARTS SHALL BE CORROSION RESISTANT, EITHER ALUMINUM OR STAINLESS STEEL. RISER STRUCTURE MATERIAL SHALL BE ALUMINUM. FASTENERS MAY BE STAINLESS STEEL.
2. ACCESS MANHOLES SHALL BE POSITIONED 50' MAX FROM ANY POINT WITHIN THE STRUCTURE.
3. ONE ACCESS RISER MINIMUM FOR ALL TANKS.
4. NO INLET PIPES SHALL BE WELDED TO THE SIDES OF TANKS; ALL CONNECTIONS SHALL BE THROUGH CATCH BASINS, UNLESS APPROVED BY THE CITY.
5. A MAX. DEPTH OF 15' AND A MAX. COVER OF 8' IS ALLOWED FOR TANKS.
6. ALLOWABLE TANK TYPES (SEE POLICY D-10):
  - a. COATED CORRUGATED METAL PIPE (CMP)
  - b. ALUMINUM ALLOY PIPE
  - c. STEEL-REINFORCED POLYETHYLENE PIPE (SRPE)


**CITY OF KIRKLAND**

**PLAN NO. CK - D.34**

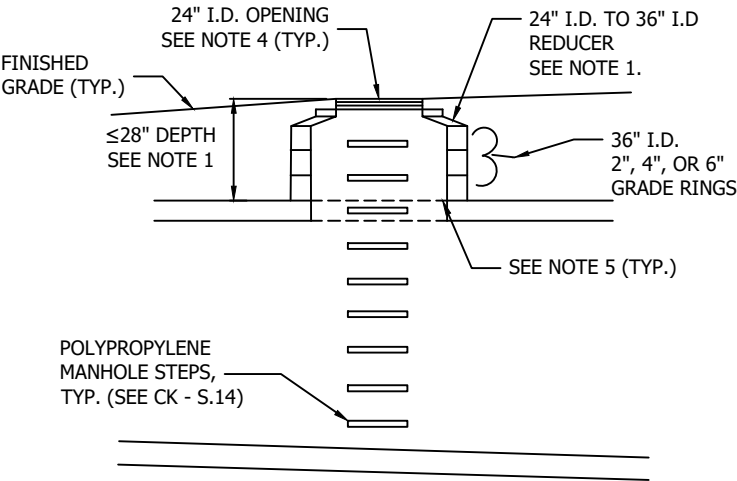


**DETENTION TANK**

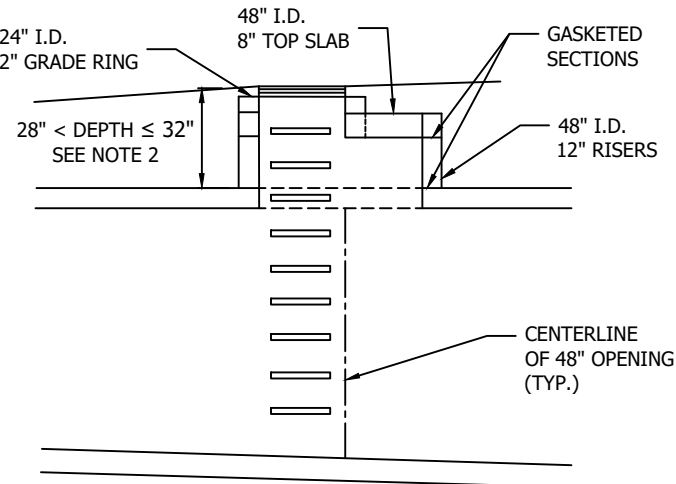


CITY OF KIRKLAND	
PLAN NO. CK - D.35	
	DETENTION VAULT

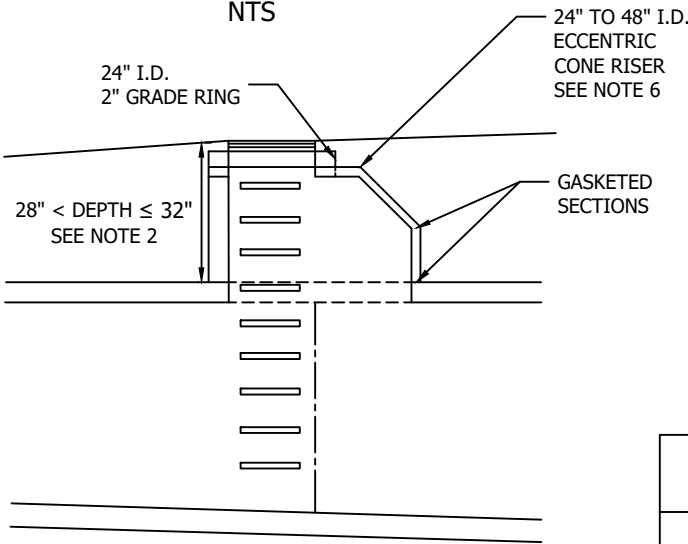




GRADE RINGS ONLY  
PROFILE VIEW  
NTS



GRADE RINGS, RISERS AND TOP SLAB  
PROFILE VIEW  
NTS



GRADE RINGS WITH ECCENTRIC  
CONE TRANSITION  
PROFILE VIEW  
NTS

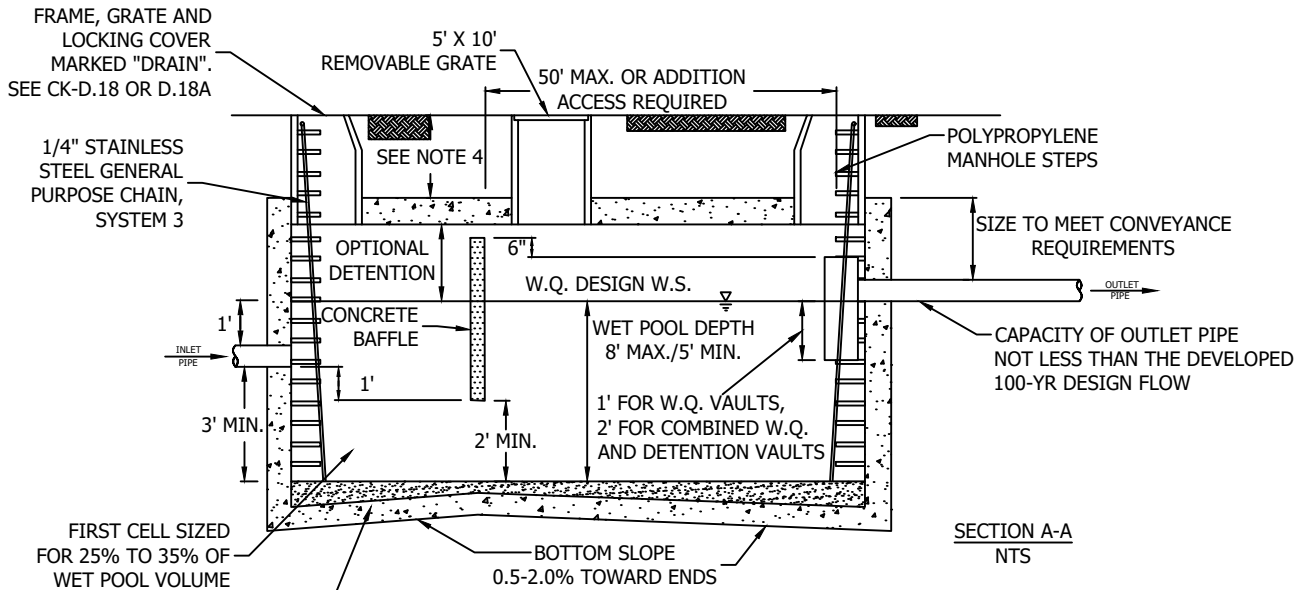
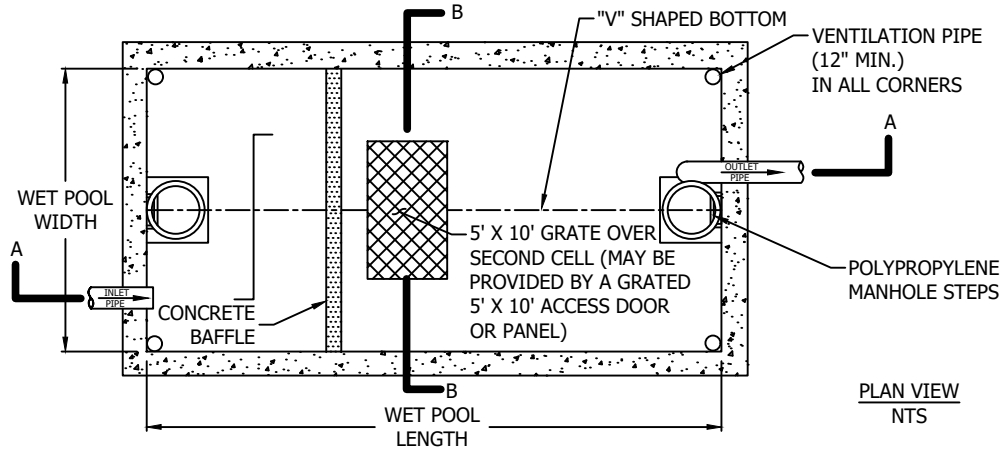
- NOTE:**
1. 24 INCH ACCESS LID SET ON REDUCER ATOP 36 INCH GRADE RINGS TO BE USED WHEN DEPTH TO VAULT OPENING IS 28 INCHES OR LESS FROM THE SURFACE.
  2. TRANSITION TO 48 INCH ACCESS TO BE USED WHEN DEPTH TO VAULT OPENING IS GREATER THAN 28 INCHES FROM THE SURFACE. FOR DEPTHS BETWEEN 28 INCHES AND 32 INCHES, USE COMBINATION OF RISERS AND TOP SLAB. FOR DEPTHS GREATER THAN 32 INCHES, USE ECCENTRIC CONE TRANSITION.
  3. REFER TO MANUFACTURER FOR HOW ACCESS RISERS AND TOP SLAB SHALL BE STRUCTURALLY SUPPORTED.
  4. REFER TO CK-D.18, CK-D.18A, AND CK-D.18B FOR APPROPRIATE 24 INCH ACCESS CASTING.
  5. BOND FROM ACCESS RISERS, GRADE RINGS, OR CONE TO VAULT SHALL BE WET SET IN 3/4" NON-SHRINK GROUT. GROUT BETWEEN ALL JOINTS (NO JETSET OR SPEED CRETE RED LINE GROUT). ALL SURFACES MUST BE CLEAN OF DEBRIS AND DIRT, AND WETTED PRIOR TO GROUTING. GROUT SMOOTH INSIDE AND OUTSIDE SURFACE PRIOR TO BACKFILL.
  6. MUST BE ECCENTRIC CONE. CONCENTRIC CONE IS NOT ALLOWED.

CITY OF KIRKLAND

PLAN NO. CK - D.35A

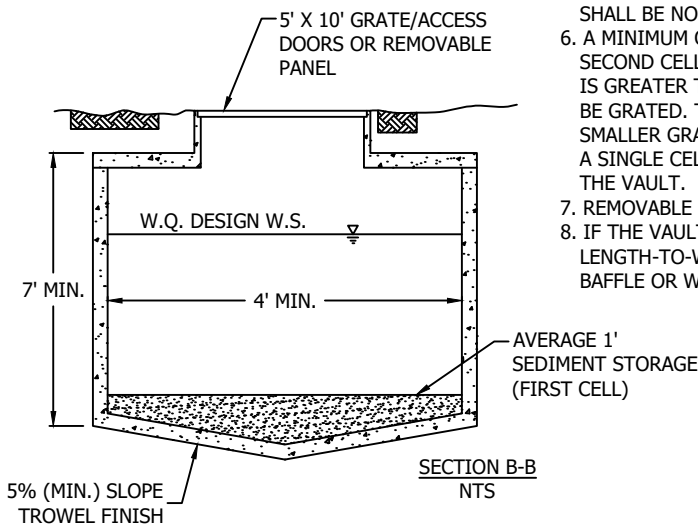


VAULT  
ACCESS



**NOTE:**

1. HARDWARE AND METAL PARTS SHALL BE ALUMINUM OR STAINLESS.
2. PROVIDE WATER STOP AT ALL CAST-IN-PLACE CONSTRUCTION JOINTS.
3. PREFABRICATED VAULT SECTIONS MAY REQUIRE STRUCTURAL MODIFICATIONS TO SUPPORT 5' X 10' OPENING OVER MAIN VAULT. ALTERNATELY, ACCESS CAN BE PROVIDED VIA A SIDE VESTIBULE AS SHOWN.
4. REFER TO CK-D.35 AND D.35A FOR ACCESS SIZING.
5. DISTANCE BETWEEN ACCESS MANHOLES AND ANY POINT WITHIN THE STRUCTURE SHALL BE NO GREATER THAN 50' MAX.
6. A MINIMUM OF 50 SQUARE FEET OF GRATE SHALL BE PROVIDED OVER THE SECOND CELL. FOR VAULTS IN WHICH THE SURFACE AREA OF THE SECOND CELL IS GREATER THAN 1,250 SQUARE FEET, 4% OF THE TOTAL SURFACE AREA SHALL BE GRATED. THIS REQUIREMENT MAY BE MET BY ONE GRATE OR BY MANY SMALLER GRATES DISTRIBUTED OVER THE SECOND CELL AREA. IF THE VAULT IS A SINGLE CELL, VENTILATION SHALL BE PROVIDED OVER THE SECOND HALF OF THE VAULT.
7. REMOVABLE BAFFLE IS NOT ALLOWED IN PUBLICLY MAINTAINED VAULTS.
8. IF THE VAULT IS LESS THAN 2,000CF (INSIDE DIMENSIONS) OR IF THE LENGTH-TO-WIDTH RATIO OF THE VAULT POOL IS 5:1 OR GREATER, THE BAFFLE OR WALL MAY BE OMITTED AND THE VAULT MAY BE ONE-CELLED.

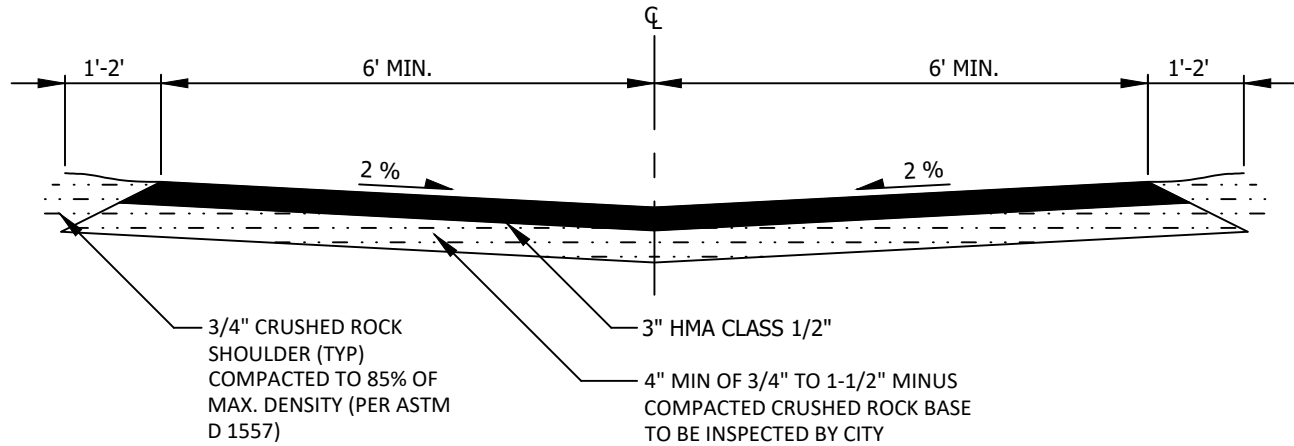


CITY OF KIRKLAND

PLAN NO. CK - D.36



WET VAULT



#### NOTES

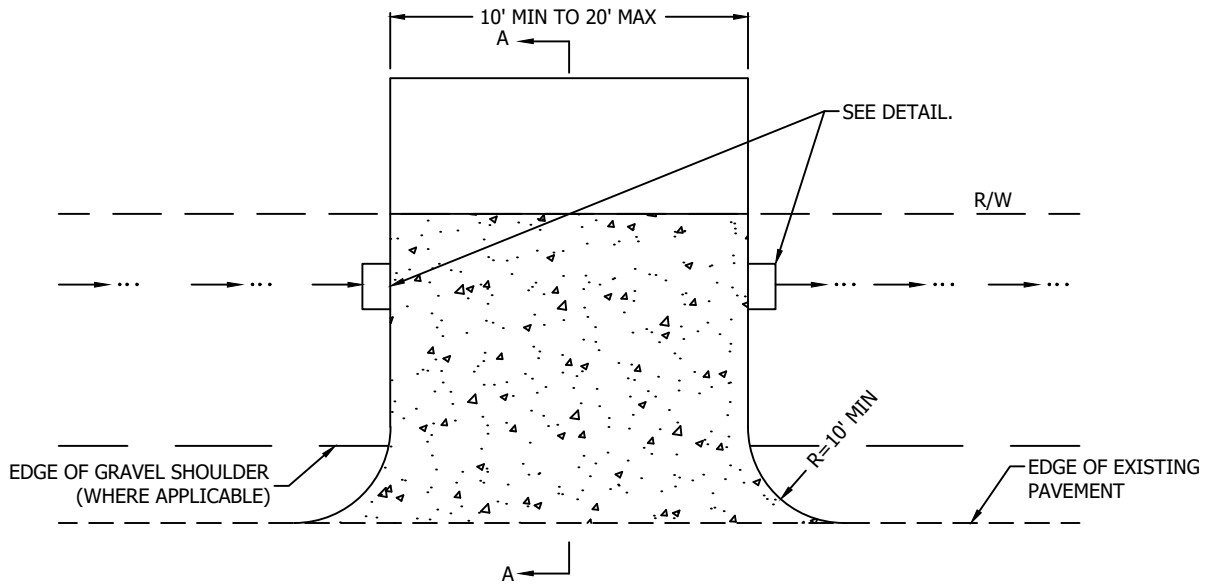
1. ALL UTILITY ACCESS ROADS SHALL HAVE A MINIMUM PAVEMENT WIDTH OF 12 FEET UNLESS APPROVED BY THE PUBLIC WORKS DEPARTMENT.
2. INVERT DRAINAGE TO BE COLLECTED AT LOW END OF IMPROVED SECTION WITH CATCH BASIN INSTALLATION AND TIGHTLINED TO STORM DRAIN SYSTEM.
3. COMPACTION TESTS ON SUBGRADE AND ROCK GRADE SHALL BE REQUIRED. THE NUMBER OF TESTS SHALL BE AT THE DISCRETION OF THE CITY INSPECTOR. ALL TESTS, AS REQUIRED, SHALL BE AT THE EXPENSE OF THE CONTRACTOR OR DEVELOPER THROUGH ANY LICENSED TESTING LAB OF THEIR CHOICE. THE MINIMUM COMPACTION SHALL BE 95% OF MAXIMUM RELATIVE DENSITY (PER ASTM D1557) ON BOTH SUBGRADE AND ROCK SURFACES.
4. ADJUSTMENT OF CATCH BASIN LIDS OR GRATES, MANHOLE LIDS, MONUMENT CASES, VALVE BOXES, ETC., SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR OR DEVELOPER AS REQUIRED AND SHALL BE ADJUSTED AFTER THE FINAL LIFT OF ASPHALT HAS BEEN PLACED. REFER TO CK-D.06 THROUGH D.11 FOR PROPER GROUTING AND CASTING INFORMATION.
5. PRIOR TO INSTALLING 2" ASPHALT OVERLAY, PRE-EMERGENCE HERBICIDE MUST BE APPLIED OVER THE COMPACTED BASE COURSE MATERIAL AND BELOW SHOULDER.
6. ACCESS ROADS WITH CURVES MUST BE EVALUATED WITH TURNING TEMPLATES AND MADE WIDER AS NEEDED.

CITY OF KIRKLAND

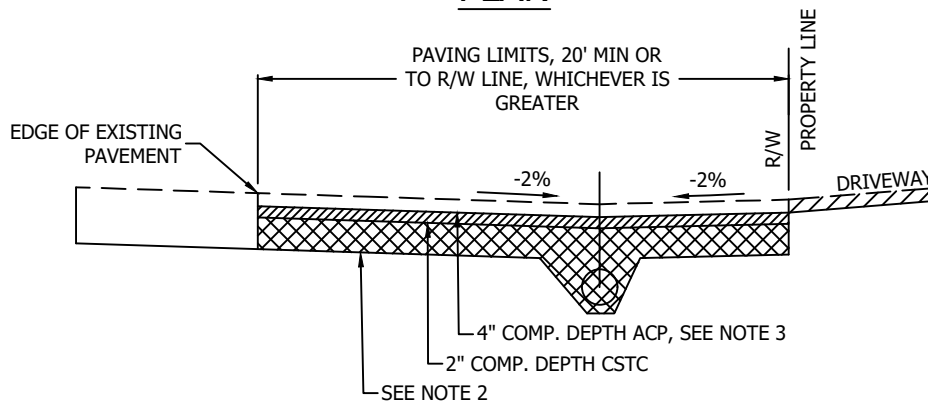
PLAN NO. CK - D.37



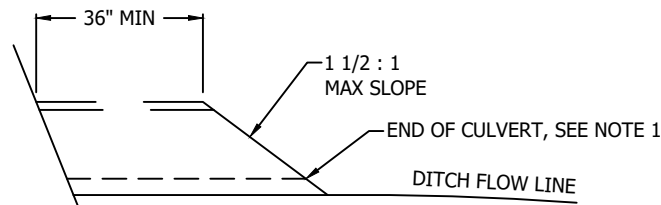
UTILITY  
ACCESS ROAD  
CROSS-SECTION



**PLAN**



**SECTION A-A**



**DETAIL**

**NOTES:**

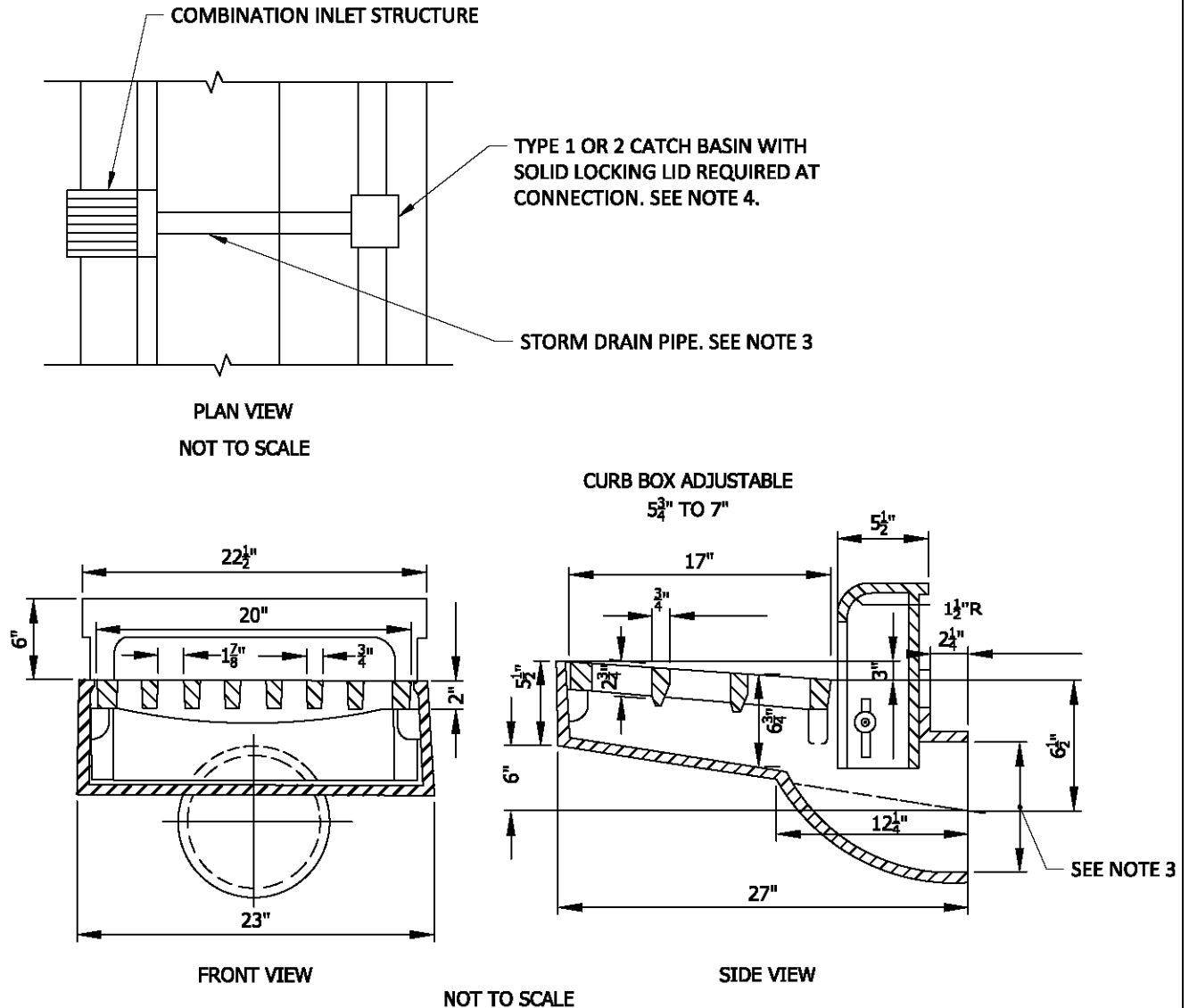
1. USE PVC 3034 PIPE. FOR LESS THAN 18 INCHES OF COVER, USE C900 OR DI CLASS 50 OR ABOVE.
2. USE 5/8 INCH CRUSHED ROCK, WITH A MINIMUM OF 0.1 FEET UNDER THE PIPE AND 100% CRUSHED ROCK BACKFILL.
3. ONLY ASPHALT PAVING IS ALLOWED IN THE RIGHT OF WAY.

**CITY OF KIRKLAND**

**PLAN NO. CK - D.40**



**CULVERT UNDER  
RESIDENTIAL  
DRIVEWAY**



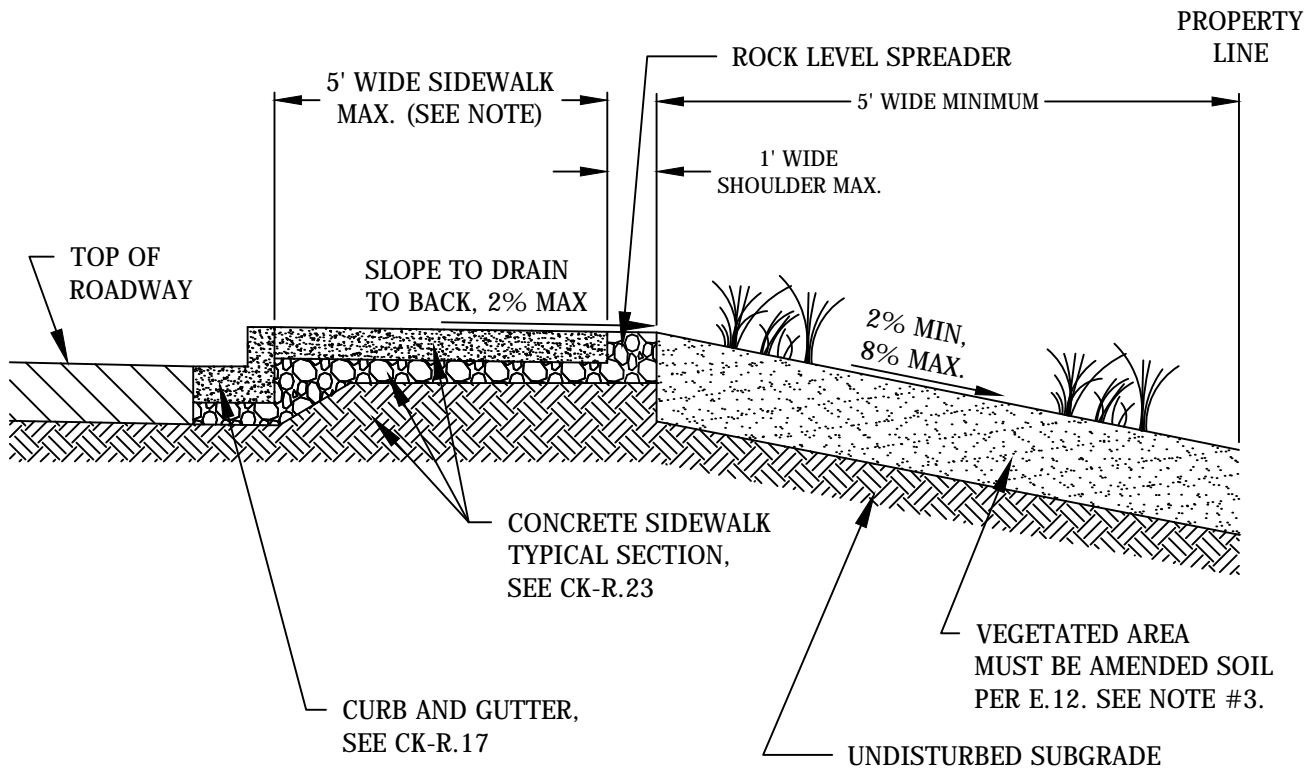
1. FOR USE WHERE CONDITIONS DO NOT PERMIT USE OF A CATCH BASIN UNDER INLET. COK PUBLIC WORKS APPROVAL REQUIRED.
2. DUCTILE IRON GRATE AND CASTING.
3. 12" REAR OUTLET ONLY. 8" IF APPROVED BY PUBLIC WORKS DEPARTMENT.
4. CONNECTION MUST BE MADE AT A STRUCTURE NO BLIND TEES.
5. PRODUCT SUPPLIED BY NEENAH OR APPROVED EQUAL

**CITY OF KIRKLAND**

PLAN NO. CK- D.41



**COMBINATION INLET  
FRAME, GRATE & CURB  
BOX DETAIL**



## PROFILE VIEW

NOT TO SCALE

### NOTE:

1. LONGITUDINAL SLOPE SHALL BE 10% MAXIMUM.
2. THE USE OF REVERSE SLOPE SIDEWALK REQUIRES APPROVAL FROM COK PUBLIC WORKS DEPARTMENT ON CASE-BY-CASE BASIS.
3. IF THIS AREA REMAINS UNDISTURBED AND NATIVE VEGETATION REMAINS, AMENDED SOILS ARE NOT REQUIRED.

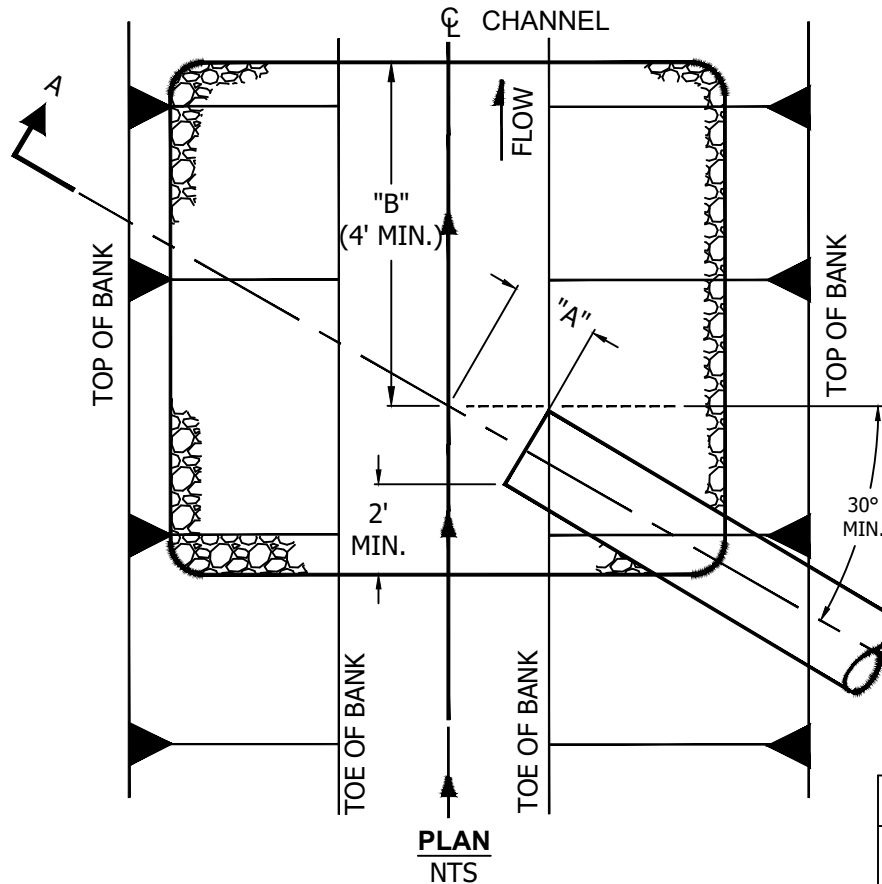
CITY OF KIRKLAND

PLAN NO. CK- D.42

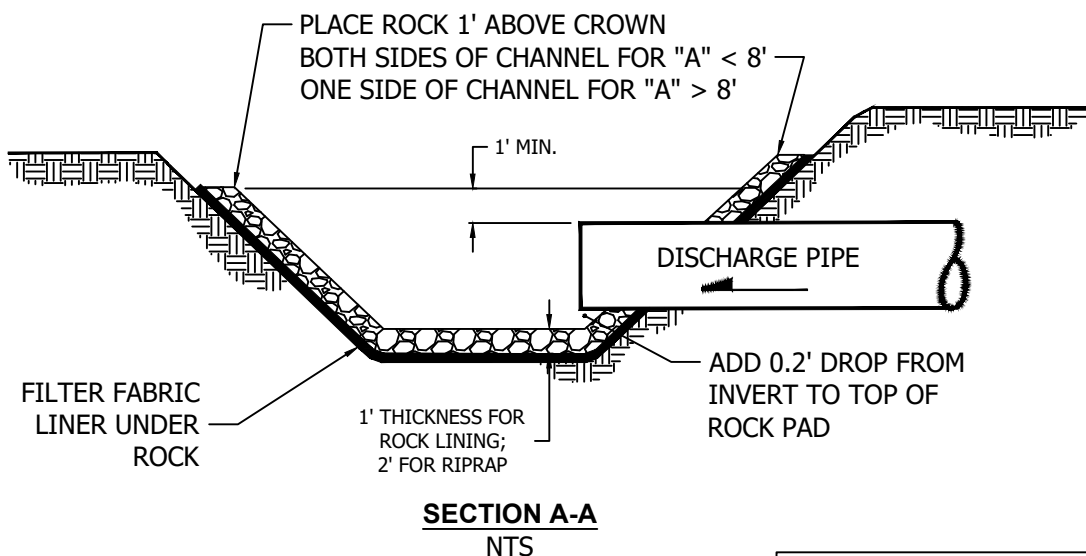



REVERSE SLOPE  
SIDEWALK

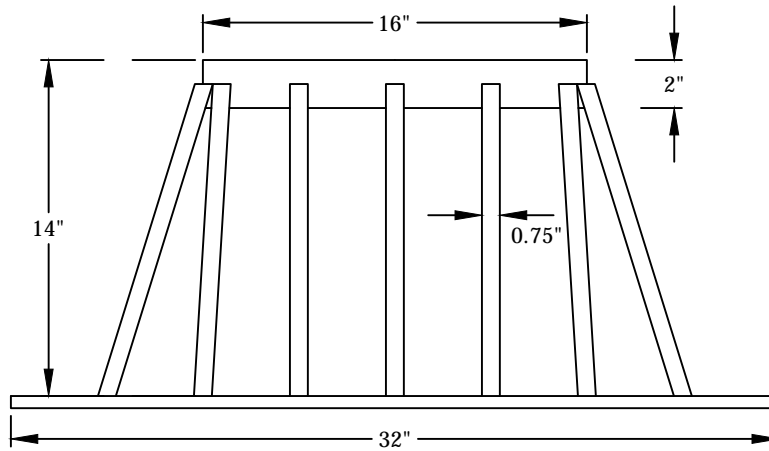
IF DISCHARGE VELOCITY IS LESS THAN OR EQUAL TO 5 FPS, USE ROCK LINING. IF DISCHARGE VELOCITY IS GREATER THAN 5 BUT EQUAL OR LESS THAN 10 FPS, USE RIPRAP. (TO BE DETERMINED BY ENGINEER)



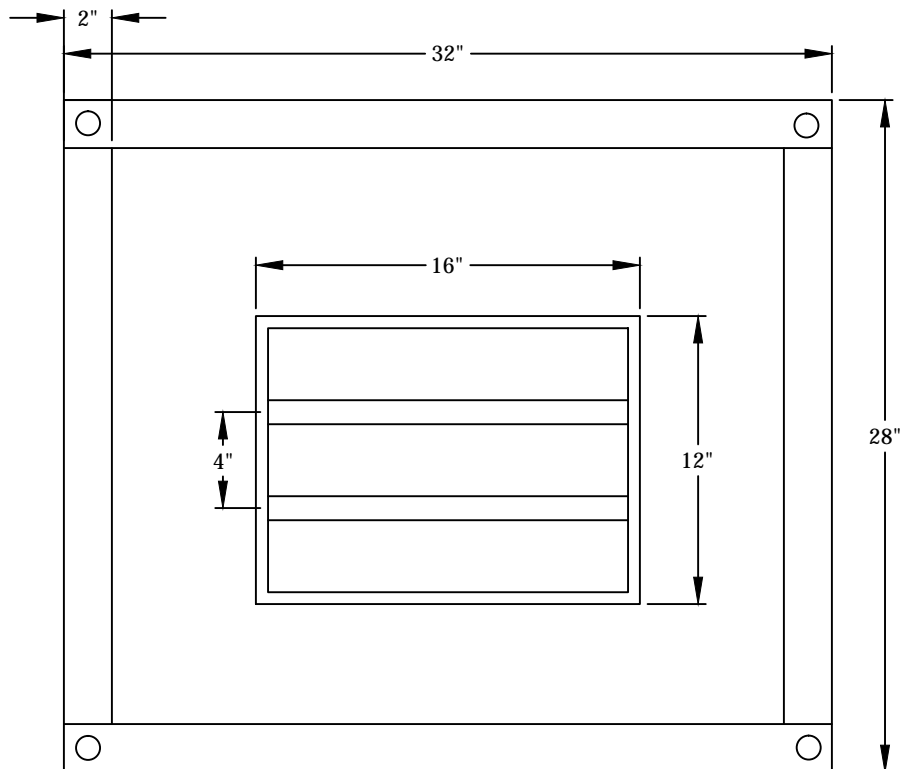
REQUIRED DIMENSIONS	
"A" + "B"	8' FOR ROCK LINING
	12' FOR RIP RAP



CITY OF KIRKLAND	
PLAN NO. CK - D.43	
	OUTFALL PROTECTION



DETAIL  
NTS



PLAN  
NTS

**NOTES**

1. TO BE PLACED ON TOP OF VERTICAL OVERFLOW STRUCTURES, I.E., WITHIN BIORETENTION CELLS
2. 3/8" x 2 FLAT BAR
3. 3/4" ROUND BAR
4. 4-5/8" HOLE FOR MOUNTING
5. ALL MATERIAL 6061 ALUMINUM
6. MUST BE ANCHORED TO CONCRETE IN REMOVABLE FASHION WITH CORROSION-RESISTANT HARDWARE
7. PRODUCT: ATWOOD FABRICATION OR EQUAL

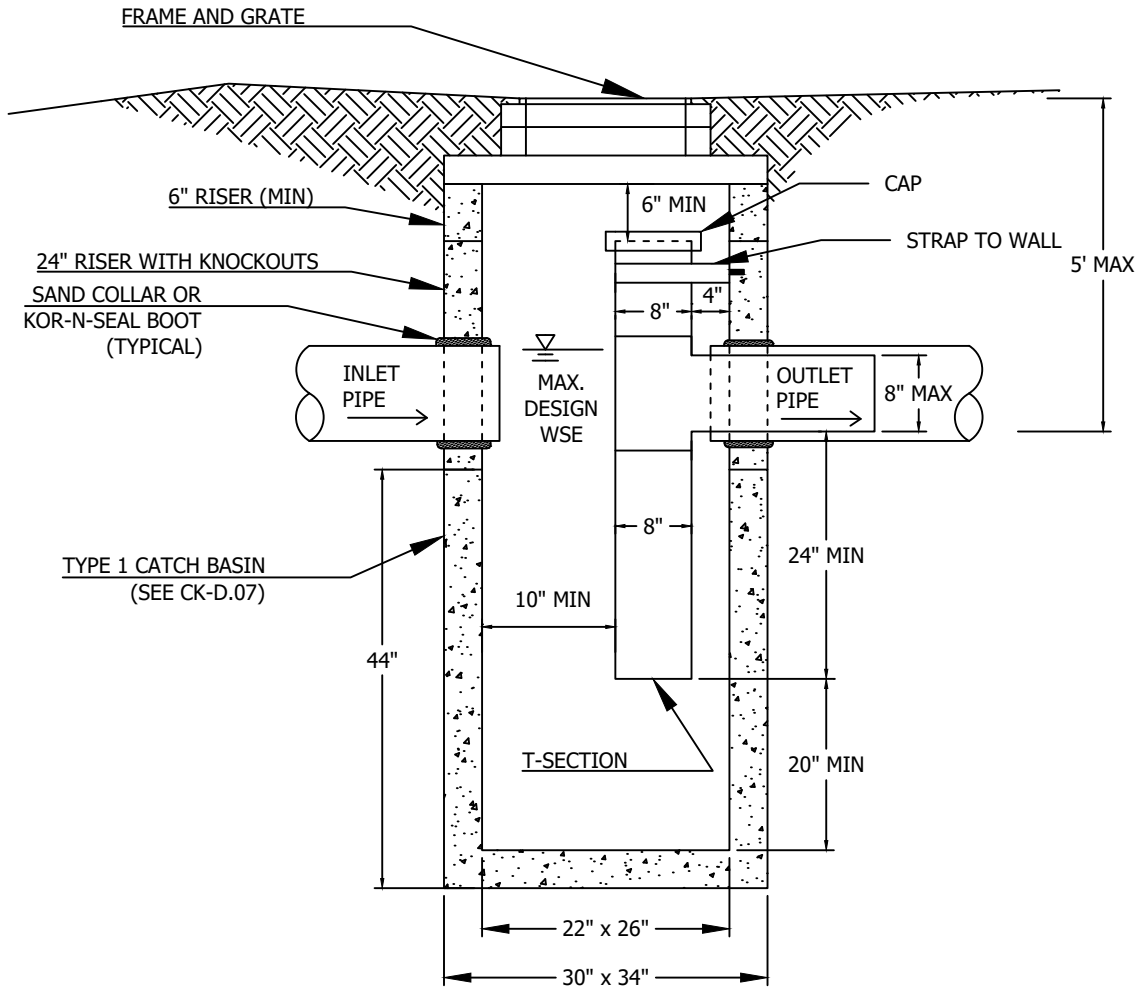
**CITY OF KIRKLAND**

PLAN NO. CK- D.44



**TYPE 1 CB  
DEBRIS (BIRD) CAGE**





## DETAIL NTS

### NOTES

1. MAX. OUTLET PIPE DIAMETER IS 8 INCHES. VERTICAL RISER SECTION SHALL BE ALIGNED PLUMB VERTICALLY. HORIZONTAL RISER SECTION SHALL MATCH OUTLET PIPE SLOPE.
2. ALL METAL PARTS AND SURFACES MUST BE CORROSION RESISTANT. STEEL HARDWARE SHALL BE GALVANIZED. PIPES SHALL BE PVC. COMPLETE CORROSION PROTECTION MUST BE ASSURED.
3. APPLY NON-SHRINK GROUT TO INSIDE AND OUTSIDE OF ALL JOINTS, RINGS, RISERS AND FRAMES.
4. SLIP SMOOTH-BORE HORIZONTAL LEG OF FLOW CONTROL TEE INSIDE CARRIER PIPE.
5. NO FLOW CONTROL JOINT OUTSIDE OF STRUCTURE.

CITY OF KIRKLAND

PLAN NO. CK- D.45



PRIVATE TYPE 1 W/  
SPILL CONTROL

LID Storm

## INDEX

### **STORMWATER LOW IMPACT DEVELOPMENT (LID) POLICIES**

- L-1 NOT USED
- L-2 NOT USED
- L-3 Surface Water Management Rate Reduction for Commercial Rainwater Harvesting

### **STORMWATER LID PRE-APPROVED DESIGN CRITERIA, & PLANS**

Bioretention Cell (Engineered Rain Garden) Piped Inflow and Outflow .....	L.01
Bioretention Cell (Engineered Rain Garden) Overland Inflow and Outflow .....	L.02
Bioretention Cell (Engineered Rain Garden) Construction Requirements .....	L.03
Bioretention Sample Plot – Sun/Partial Shade .....	L.04
NOT USED .....	L.05
Pervious Concrete Sidewalk .....	L.06
Pervious Concrete Detail.....	L.07
Porous Asphalt Detail .....	L.08
Permeable Paver Detail .....	L.09
Check Dam and Interceptor Trench .....	L.10

**CITY OF KIRKLAND**

123 FIFTH AVENUE • KIRKLAND, WASHINGTON 98033-6189 • (425) 587-3800

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy L-3: SURFACE WATER MANAGEMENT (SWM) RATE REDUCTION  
FOR COMMERCIAL RAINWATER HARVESTING**

KMC 15.56.060 (Qualified rainwater harvesting discount) provides a 10% reduction in the monthly service rate for parcels containing new or remodeled commercial buildings that utilize a permissive rainwater harvesting system. The system must be designed to collect and use at least 95% of the average annual runoff volume from the impervious surface. The rate reduction will only apply to the portion of impervious area draining to the rainwater harvesting system, not to all the impervious area on site.

Qualifying for the monthly service rate reduction does not relieve the property owner from the obligation to comply with applicable stormwater and drainage code requirements for the buildings and site.

To request the SWM rate reduction, complete the attached request form and submit it to the Public Works Department.



## SURFACE WATER MANAGEMENT (SWM) RATE REDUCTION FOR COMMERCIAL RAINWATER HARVESTING REQUEST FORM

The purpose of this form is for an applicant to request a 10% reduction in the surface water management rate for installation of a qualified commercial rainwater harvesting system. Please provide the requested information below, and submit this form to the Public Works Department.

<b>Date:</b>	
<b>Site Address:</b>	
<b>Parcel Number(s):</b>	
<b>Applicant Name:</b>	
<b>Applicant Phone Number:</b>	

<b>Amount of impervious area conveyed to Rainwater Harvesting System (in ft<sup>2</sup>)</b>	
<b>Total amount of impervious area on site (in ft<sup>2</sup>)</b>	

Attach all documents necessary to verify this request. At a minimum, attach the following items:

1. Calculations (i.e., areas, runoff volume, etc.)
2. A detail of the system, including dimensions
3. A site map showing areas draining to rainwater harvesting system

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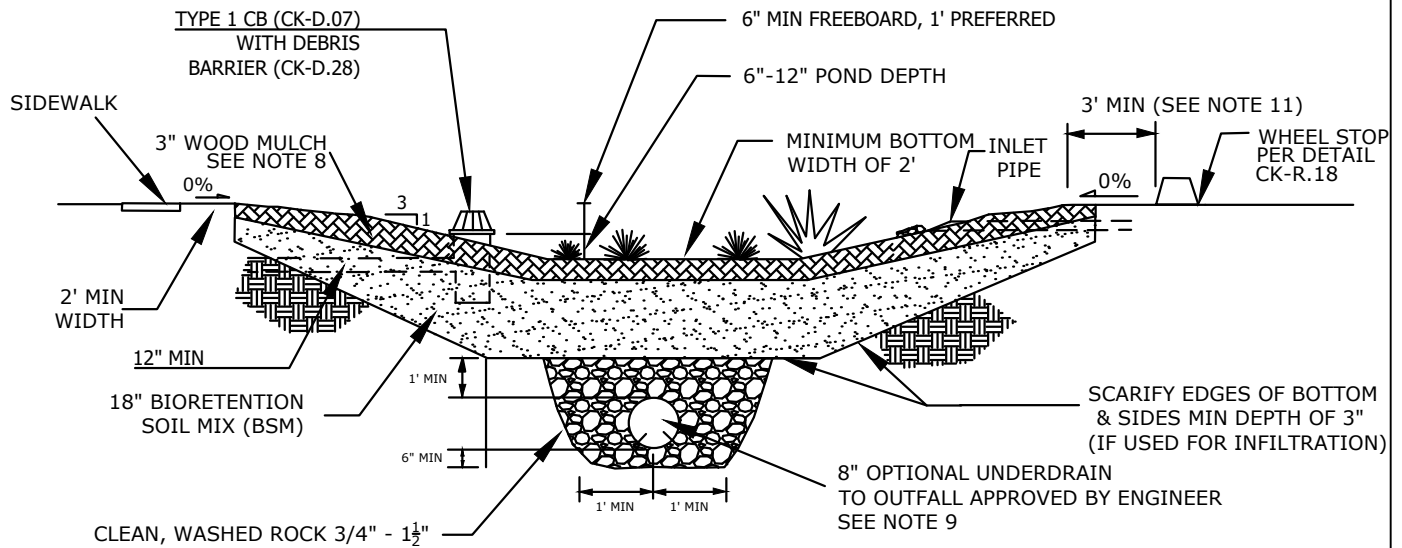
### Rate Reduction Calculation (to be completed by City staff)

Enter impervious area (ft<sup>2</sup>) conveyed to the Rainwater Harvesting System

Enter monthly SWM rate x 12

Yearly Amount of Rate Reduction

$$[ ( \text{Area} \times 1/2600\text{ft}^2 \times \text{Rate} ) + 7.5\% ] \times 10\% = \text{Reduction}$$



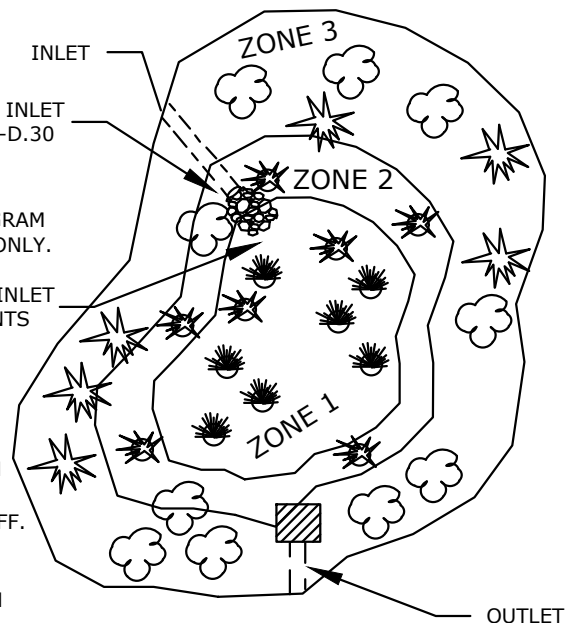
**SIDE VIEW**

NTS

RAIN GARDEN SHAPES WILL VARY.  
SHAPE AND PLANTS SHOWN IN DIAGRAM  
ARE FOR ILLUSTRATION PURPOSES ONLY.

CLEAR ZONE AT INLET  
WITH NO PLANTS

BEVEL END PIPE INLET  
PER DETAIL CK-D.30



**PLAN VIEW**

NTS

**NOTES**

1. MAXIMUM BOTTOM SLOPE OF CELL IS 0.5%.
2. OVERFLOW POINT SHALL BE AT LEAST 6" BELOW ANY ADJACENT PAVEMENT AREA.
3. MINIMUM 3' DEPTH BETWEEN UNDERDRAIN (IF PRESENT) OR BOTTOM OF BIORETENTION SOIL MIX (BSM) AND WATER TABLE.
4. INSTALL STREAMBED COBBLE (1" - 4") AT INLET TO DISSIPATE RUNOFF.
5. BSM SHALL CONTAIN THE FOLLOWING:
  - AGGREGATE TO COMPOST RATIO: 60% MINERAL AGGREGATE (WITH LESS THAN 5% FINES), 40% MAX COMPOST (MEET REQUIREMENTS IN WAC 173-350-220).
  - TOTAL BSM ORGANIC MATTER CONTENT OF 4-8% (BY DRY WEIGHT)
  - BSM DEPTH OF 12-24". ENHANCED TREATMENT REQUIRES MIN DEPTH OF 18".
6. MINIMUM SETBACK OF 5' FROM TOP OF BIORETENTION CELL TO BUILDING STRUCTURES AND PROPERTY LINES. DO NOT LOCATE IMMEDIATELY UPSLOPE OF BUILDING STRUCTURES.
7. MAX 3" MULCH LAYER IN PONDING AREA AND ON SIDES SLOPES. MULCH MUST BE ARBORIST OR HOG FUEL WITHOUT BARK, CONSISTING OF SHREDDED OR CHIPPED HARDWOOD. MULCH SHALL NOT CONTAIN WEED SEEDS, GRASS CLIPPINGS, OR BARK.
8. IF OPTIONAL UNDERDRAIN IS USED:
  - USE SLOTTED SUBSURFACE DRAIN PVC PER ASTM D1785 SCH 40, NOT PERFORATED PVC OR FLEXIBLE SLOTTED HDPE
  - 0.5% MIN SLOPE
  - PROVIDE A CLEAN OUT EVERY 250-300 FEET
9. FOR CELLS IN PARKING LOTS, ADD NARROW GRAVEL FOOT PATHS ACROSS CELLS FOR FOOT TRAFFIC.
10. 2' MIN BETWEEN WHEEL STOP AND EDGE OF ASPHALT, EXTEND FLAT SOIL 1' FROM EDGE OF ASPHALT BEFORE STARTING 3H:1V SLOPE.

**PLANTING ZONES**

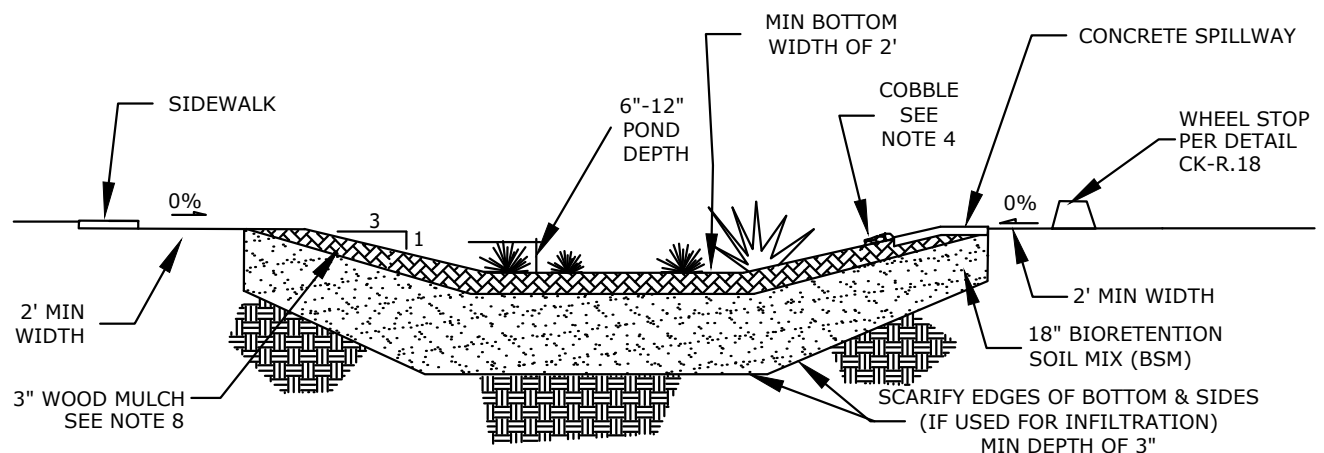
- ZONE 1: AREA WITH FREQUENT STANDING WATER.
- ZONE 2: AREA WITH OCCASIONAL STANDING WATER, AND EXTENDED DRIER PERIODS.
- ZONE 3: AREA WITH DRIER CONDITIONS.

**CITY OF KIRKLAND**

**PLAN NO. CK - L.01**

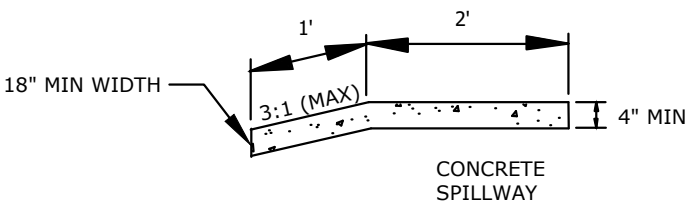


**BIORETENTION CELL  
PIPED I/O**



## SIDE VIEW

NTS



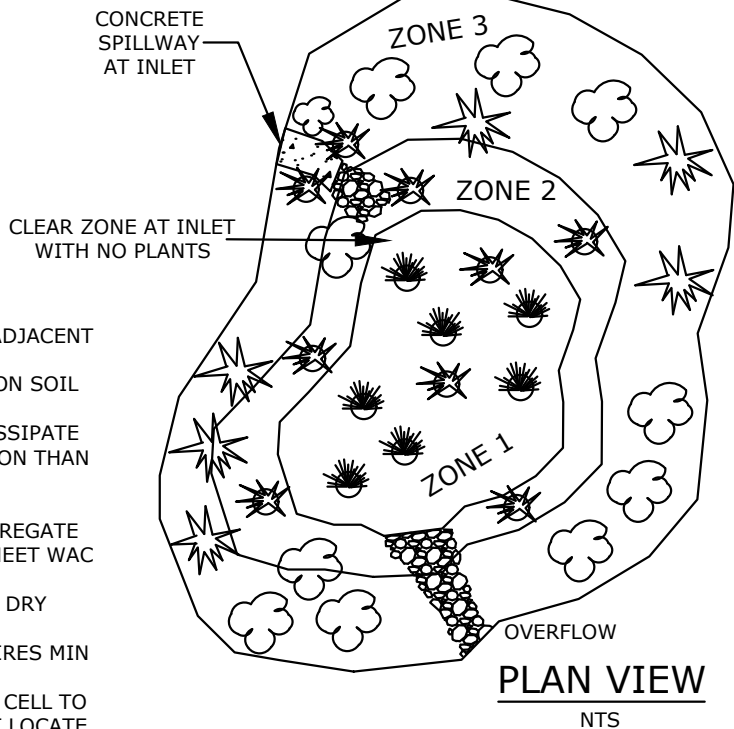
RAIN GARDEN SHAPES WILL VARY.  
SHAPE AND PLANTS SHOWN IN DIAGRAM  
ARE FOR ILLUSTRATION PURPOSES ONLY.

### PLANTING ZONES

- ZONE 1: AREA WITH FREQUENT STANDING WATER.  
ZONE 2: AREA WITH OCCASIONAL STANDING WATER, AND EXTENDED DRIER PERIODS.  
ZONE 3: AREA WITH DRIER CONDITIONS.

### NOTES

1. MAXIMUM BOTTOM SLOPE OF CELL IS 0.5%.
2. OVERFLOW POINT SHALL BE AT LEAST 6" BELOW ANY ADJACENT PAVEMENT AREA.
3. MINIMUM 3' DEPTH BETWEEN BOTTOM OF BIORETENTION SOIL MIX (BSM) AND WATER TABLE)
4. INSTALL STREAMBED COBBLE (1" - 4") AT INLET TO DISSIPATE RUNOFF. PLACE COBBLE AT SLIGHTLY HIGHER ELEVATION THAN INLET ELEVATION.
5. BSM SHALL CONTAIN THE FOLLOWING:
  - AGGREGATE TO COMPOST RATIO: 60% MINERAL AGGREGATE (WITH LESS THAN 5% FINES), 40% MAX COMPOST (MEET WAC 173-350-220)
  - TOTAL BSM ORGANIC MATTER CONTENT OF 4-8% (BY DRY WEIGHT)
  - BSM DEPTH OF 12-24". ENHANCED TREATMENT REQUIRES MIN DEPTH OF 18"
6. MINIMUM SETBACK OF 5' FROM TOP OF BIORETENTION CELL TO BUILDING STRUCTURES AND PROPERTY LINES. DO NOT LOCATE IMMEDIATELY UPSLOPE OF BUILDING STRUCTURES.
7. MAX 3" MULCH LAYER IN PONDING AREA AND ON SIDE SLOPES. MULCH MUST BE ARBORIST OR PLAYFIELD WOOD CHIPS WITHOUT BARK, CONSISTING OF SHREDDED OR CHIPPED HARDWOOD. MULCH SHALL NOT CONTAIN WEED SEEDS, GRASS CLIPPINGS, OR BARK.
8. FOR CELLS IN PARKING LOTS, ADD NARROW GRAVEL FOOT PATHS ACROSS CELLS FOR FOOT TRAFFIC.



CITY OF KIRKLAND

PLAN NO. CK - L.02



BIORETENTION CELL  
OVERLAND I/O

# BIORETENTION CELL (ENGINEERED RAIN GARDEN) CONSTRUCTION REQUIREMENTS

LAST REVISED: 03/31/2016

## **Inspection #1 - TESC and Grading**

1. Bioretention areas shall not be used as sediment control facilities and shall be protected from siltation and compaction during construction. All drainage should be directed away from bioretention areas after initial rough grading; block cell inlets with temporary concrete or sand bags during construction. If site constraints require bioretention areas to be used for sediment control, initially excavate to 6" above final grade, and when other earth disturbing work is done then excavate down to final grade and install the bioretention facilities as designed.
2. TESC is correctly installed.
3. Rough grading (verify construction staking) and bioretention dimensions are to plan.
4. Curb cut openings are blocked.
5. A special inspection will be required for rain gardens that are used to meet an exemption to flow control, reduce the size of a detention facility, or as a flow control facility. Additional information for what's required in a special inspection can be found in policy D-8.

## **Inspection #2 - Bioretention Soil Mix (BSM) and Bioretention**

1. Prior to inspection, applicant must submit soil test verification (lab report within past 30 days) to PW inspector prior to soil installation. Soil test verification should include infiltration rate (must match design infiltration rate), sieve analysis (less than 5% fines), and organic matter content (4-8% by dry weight).
2. Subgrade soil has been scarified at least 3 inches (required only if cell is used for infiltration).
3. Subgrade soil is free of construction runoff fines. If sediment has entered the bioretention area, remove enough subgrade soil to remove the fines and replace with BSM.
4. Overflows and under-drains (if installed) are at proper locations and elevations.
5. Excavated cell subgrade is not over-saturated, and BSM is not saturated when placed.
6. Aggregate backfill for underdrains (if installed) is free of fines. If fines are present, remove top 6 inches of backfill and replace.

## **Inspection #3 - BSM Placement and pre-planting**

1. Verify the BSM soil delivered meets soil test verification (lab report from Inspection #2) with a truckload ticket or other documentation.
2. BSM depth and cell side slopes are per plan.
3. Verify placement & plants prior to plant installation. Plants shall not be installed next to water meters.
4. If planting will be more than 30 days out, mulch must be placed immediately after BSM placement (prevents weed establishment).

## **Inspection #4 - Post Planting and Mulch**

1. Plant quantities are per plan.
2. Mulch & Coarse Compost type and depth (2-3 inches). Verify ESC is adequate, and no sediment has accumulated on the mulch.
3. Finished cell elevation (including mulch) is below sidewalks, curbs, driveways, and other pavement per plan.
4. No excessive weed or other invasive plant establishment.
5. All pipes, culverts, conveyance systems, flow control structures, inlet spillways (2-3' drop) and outlet overflows are free and clear of debris.
6. Temporary watering plan is in place (either on-site irrigation or other plan).

## **Inspection #5 - Final (starts maintenance bond period)**

1. Final grade per plan, including letter of approval from design engineer for final survey of cell volume and contributing area size.
2. BSM is not clogged and infiltration rate is adequate through visual assessment. No ponding following precipitation events.
3. Removal of TESC
4. Installation of additional soil will be needed along the edge of cells 1 to 2 months after cell construction (due to settling).
5. 1 year verification walk through is required during maintenance bond period.
6. Due to plant survival rate required, Developer/Contractor must make provisions for a water truck or temporary irrigation from existing service on site for the first 2 years after final.

## **Inspection #6 - End of Maintenance Bond Period**

1. No sediment on top of mulch and coarse compost.
2. BSM is not clogged and infiltration rate is adequate through visual assessment  
Drains in 24 to 48 hours.
3. Aerial plant cover must be at least 80% within 2 years after plant installation.  
Owner responsible for continued irrigation, and plant replacement if needed.

CITY OF KIRKLAND

PLAN NO. CK-L.03



BIORETENTION CELL  
CONSTRUCTION  
REQUIREMENTS



## BIORETENTION SAMPLE PLOTS

LAST REVISED: 01/2017

### NTS

#### ZONE 1 - AREA WITH FREQUENT STANDING WATER

SYMBOL	PLANT NAME	QUANTITY
CO	Carex obnupta* (Slough sedge)	4
JE	Juncus effusus* (Common rush)	14

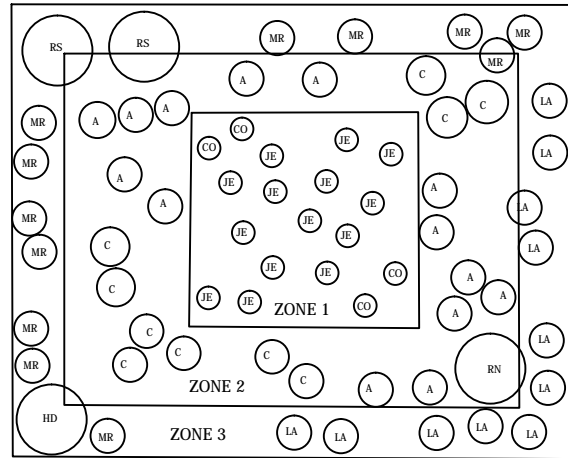
Note: Emergents are shown in diagram as 4" pots,  
not individual plugs.  
For example, 3 plugs = one 4" pot.

#### ZONE 2 - AREA WITH OCCASIONAL STANDING WATER

SYMBOL	PLANT NAME	QUANTITY
RN	Rosa nutkana* (Nootka rose)	1
A	Aquilegia formosa* (Western columbine)	14
C	Camassia quamash* (Common camas)	10

#### ZONE 3 - AREA WITH DRIER CONDITIONS

SYMBOL	PLANT NAME	QUANTITY
RS	Ribes sanguineum* (Red-flowering currant)	2
HD	Holodiscus discolor* (Oceanspray)	1
LA	Lavandula angustifolia (Lavender)	12
MR	Mahonia repens (Creeping mahonia)	12



As shown: 4 Shrubs + 66 Herbaceous/Emergents

70 total plants for 100 sq. ft.

The plants above are suggested options for sun/partial shade, but other plants can be substituted from the lists below.

#### ZONE 1 SHRUBS

Lonicera involucrata\* (Black twinberry)  
Physocarpus capitatus\* (Pacific ninebark)  
Rosa pisocarpa\* (Clustered wild rose)  
Spiraea douglasii\* (Steeplebush)  
Dwarf Arctic Willow  
Dwarf Dogwood

#### ZONE 1 EMERGENTS

Carex obnupta\* (Slough sedge)  
Carex stipata\* (Sawbreak sedge)  
Juncus effusus\* (Common rush)  
Juncus ensifolius\* (Daggerleaf rush)  
Juncus tenuis\* (Slender rush)  
Scirpus acutus\* (Hardstem bulrush)  
Scirpus microcarpus\* (Small-fruited bulrush)

#### ZONE 2 SHRUBS

Acer circinatum\* (Vine maple)  
Oemleria cerasiformis\* (Indian plum/Osoberry)  
Ribes lacustre\* (Black swamp gooseberry)  
Rosa nutkana\* (Nootka Rose)  
Rosa rugosa (Rugosa Rose)  
Rubus parviflorus\* (Thimbleberry)  
Rubus spectabilis\* (Salmonberry)  
Sambucus racemosa\* (Red elderberry)  
Symphoricarpos albus\* (Snowberry)  
Vaccinium parvifolium\* (Red huckleberry)

#### ZONE 2 HERBACEOUS

Asarum caudatum\* (Wild ginger)  
Aquilegia formosa\* (Western columbine)  
Aster chilensis\* (California Aster)  
Aster subspicatus\* (Douglas' aster)  
Camassia quamash\* (Common camas)  
Camassia leichtlinii\* (Giant camas)  
Iris douglasiana\* (Pacific coast iris)  
Juncus tenuis\* (Slender rush)  
Iris sibirica\* (Siberian iris)  
Tellima grandiflora\* (Fringecup)  
Tiarella trifoliata\* (Foamflower)  
Tolmiea menziesii\* (Piggy-back plant)  
Viola species\* (Violets)

#### ZONE 3 SHRUBS

Holodiscus discolor\* (Oceanspray)  
Philadelphus lewisii\* (Mock-orange)  
Pinus mugo pumilio (Mugho pine)  
Ribes sanguineum\* (Red-flowering currant)  
Rosa gymnocarpa\* (Baldhip rose)  
Arbutus unedo (Compacta)  
Cistus purpureus (Orchid rockrose)  
Cistus salviifolius (White rockrose)  
Osmanthus delavayi (Delavay Osmanthus)  
Osmanthus x burkwoodii (Devil wood)  
Rhododendron ('PJM' hybrids)  
Vaccinium ovatum\* (Evergreen Huckleberry)  
Myrica californica\* (Pacific wax myrtle)

#### ZONE 3 GROUND COVER

Arctostaphylos uvaursi\* (Kinnikinnick)  
Gaultheria shallon\* (Salal)  
Helianthemum nummularium (Sunrose)  
Lavandula angustifolia (Lavender)  
Mahonia nervosa\* (Oregon grape)  
Mahonia repens (Creeping mahonia)  
Penstemon davidsonii\* (Davidson's penstemon)  
Wild Strawberry

\*Denotes native species

## NOTES

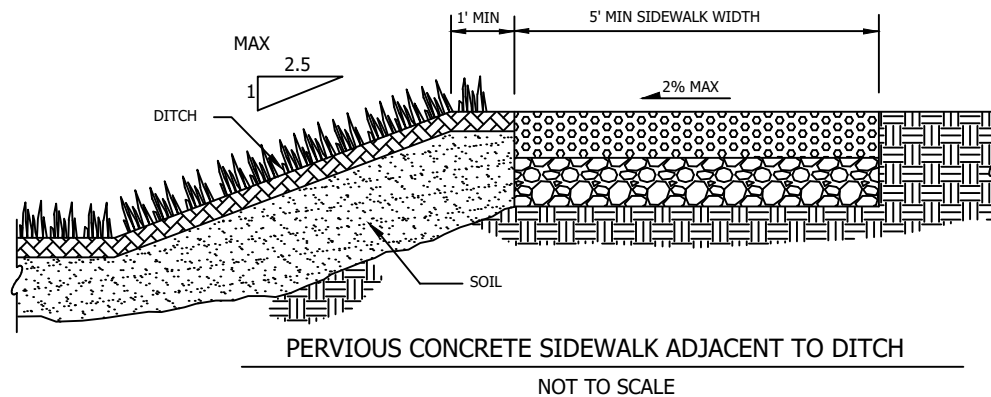
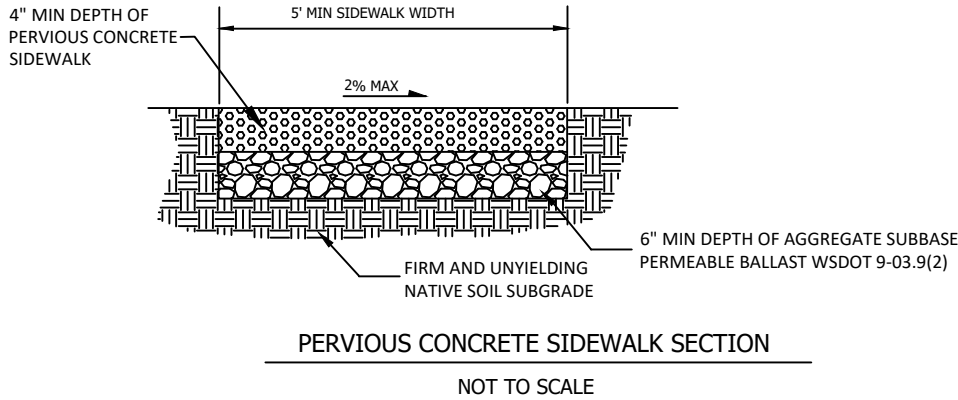
1. INCORPORATE A MINIMUM OF 3 DIFFERENT SHRUBS AND 3 HERBACEOUS GROUND COVER SPECIES IN EACH FACILITY.
2. MINIMUM PLANT QUANTITIES ARE 70 PLANTS PER 100 SQ. FT. BIORETENTION AREA; INCLUDING 4 SHRUBS MIN.
3. BIORETENTION CELLS MUST CONTAIN PLANTING ZONES 1, 2, and 3.
4. TREES CAN BE INSTALLED IN CELLS, BUT SPECIES AND PLACEMENT MUST BE APPROVED BY ENGINEER.
5. EMERGENTS SHALL BE INSTALLED AS 4" POTS, OR AS PLUGS IN CLUSTERS OF 3, AT 9" O.C.
6. SHRUBS SHALL BE INSTALLED AS 1-GAL CONTAINER SIZE, AT 1-2' O.C. DO NOT INSTALL SHRUBS LARGER THAN 1-GAL.
7. DO NOT USE TURF GRASS MIX IN BIORETENTION CELLS.
8. ADDITIONAL APPROVED PLANTS CAN BE FOUND IN THE 2012 LOW IMPACT DEVELOPMENT TECHNICAL GUIDANCE MANUAL FOR PUGET SOUND.

CITY OF KIRKLAND

PLAN NO. CK-L.04



BIORETENTION  
SAMPLE PLOTS



**NOTES**

1. SEE SIDEWALK AND DRIVEWAY STANDARD PLANS CK-R.23 AND CK-R.21 FOR JOINTING AND LAYOUT.
2. PERVIOUS CONCRETE PAVEMENT SHALL CONFORM TO ALL REQUIREMENTS OF ACI 522.1-13 SPECIFICATION FOR PERVIOUS CONCRETE PAVEMENT PUBLISHED BY THE AMERICAN CONCRETE INSTITUTE, EXCEPT AS DIRECTED BY THE ENGINEER. CONCRETE MIX SHALL MEET THE FOLLOWING:
  - A. 100% PASSING 3/8" SIEVE
  - B. WATER/CM RATIO BETWEEN 0.28-0.35
3. AGGREGATE FOR SUBBASE SHALL BE CLEAN, ANGULAR ROCK CONFORMING TO PERMEABLE BALLAST WSDOT 9-03.9(2). BEFORE PLACEMENT OF BASE AGGREGATE AND PERVIOUS CONCRETE, REMOVE ANY FINE DEPOSITED MATERIAL WITH LIGHT EQUIPMENT AND SCARIFY AREA TO A MIN. 6 INCH DEPTH.
4. PERVIOUS SIDEWALK SHALL NOT CONTAIN SURFACE MOTTLING.
5. WHERE PERVIOUS SIDEWALK IS WITHIN CRITICAL ROOT ZONE OF EXISTING TREES TO BE SAVED, REDUCE SUBBASE DEPTH TO 2".
6. SIDEWALK SHALL NOT BE POURED IN ADVERSE WEATHER CONDITIONS. SEE POLICY R-8, PLACING CONCRETE OR ASPHALT IN ADVERSE WEATHER CONDITIONS.
7. MIN. 6" THICKNESS OF PERVIOUS CONCRETE THROUGH DRIVEWAY APPROACHES, APRONS, AND SIDEWALKS ADJACENT TO CURBS AT STREET INTERSECTION RADII.
8. WHEEL CHAIR CURB RAMP SHALL BE 4000 PSI P.C.C. CAST IN PLACE CONCRETE PER STANDARD PLAN CK-R.21.
9. PERVIOUS CONCRETE SIDEWALK SHALL BE TESTED PRIOR TO ACCEPTANCE. ONE TEST PER 2500 SF AREA MINIMUM. TESTING SHALL MEET ASTM C1701 AND SHALL MEET A MINIMUM OF 100 IN/HR.
10. IMPERVIOUS CHECK DAMS IN THE BASE COURSE ARE REQUIRED FOR SLOPES AT 5% OR GREATER. REFER TO DETAIL L.10 FOR CHECK DAM DETAILS.
11. SIDEWALK PANELS BETWEEN DRIVEWAY AND DRIVEWAY RAMP WITHIN THE TYPICAL VEHICLE PATH SHALL NOT BE PERVIOUS. EXTEND PERVIOUS RESERVOIR BASE COURSE UNDER IMPERVIOUS SURFACE TO ACCOUNT FOR SETTLING.

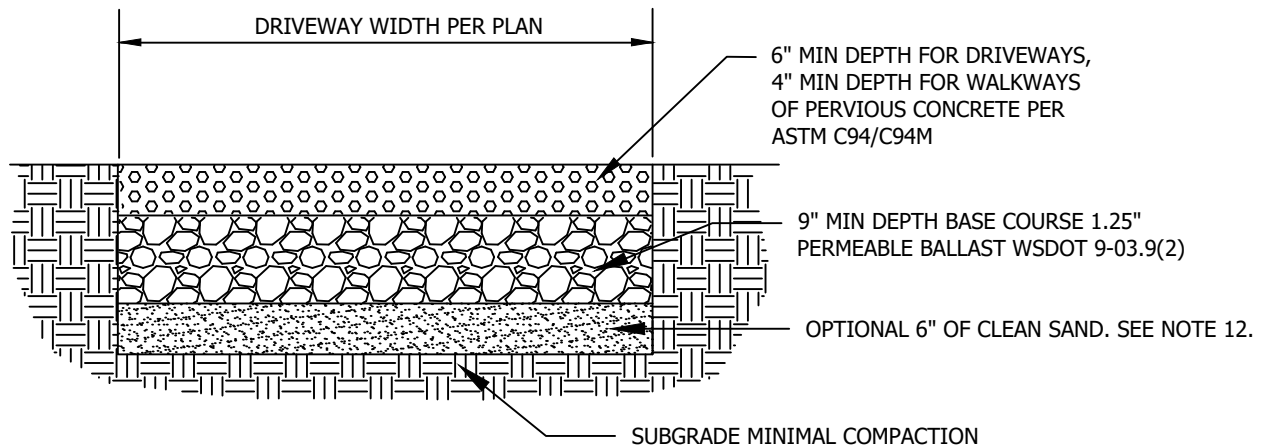
**IF SPECIAL INSPECTION  
REQUIRED,  
SEE POLICY D-8.**

**CITY OF KIRKLAND**

**PLAN NO. CK - L.06**



**PERVIOUS CONCRETE  
SIDEWALK**



### PERVIOUS CONCRETE SECTION

NOT TO SCALE

#### NOTES

1. SEE DRIVEWAY STANDARD PLAN CK-R.21 FOR JOINTING AND LAYOUT.
2. PERVIOUS CONCRETE PAVEMENT SHALL CONFORM TO ALL REQUIREMENTS OF ACI 522.1-13 SPECIFICATION FOR PERVIOUS CONCRETE PAVEMENT PUBLISHED BY THE AMERICAN CONCRETE INSTITUTE, EXCEPT AS DIRECTED BY THE ENGINEER. CONCRETE MIX SHALL MEET THE FOLLOWING:
  - A. 100% PASSING 3/8" SIEVE
  - B. WATER/CM RATIO BETWEEN 0.28-0.35
3. AGGREGATE FOR BASE COURSE SHALL BE CLEAN, CONFORMING TO PERMEABLE BALLAST WSDOT 9-03.9(2). BEFORE PLACEMENT OF BASE AGGREGATE AND PERVIOUS CONCRETE, REMOVE ANY FINE DEPOSITED MATERIAL WITH LIGHT EQUIPMENT AND SCARIFY AREA TO A MIN. 6 INCH DEPTH.
4. PERVIOUS DRIVEWAY SHALL NOT BE POURED IN ADVERSE WEATHER CONDITIONS. SEE POLICY R-8, PLACING CONCRETE OR ASPHALT IN ADVERSE WEATHER CONDITIONS.
5. PERVIOUS DRIVEWAY TO BE INSTALLED AFTER CONSTRUCTION OF HOUSE. AFTER INSTALLATION, PROTECT PERVIOUS CONCRETE FROM LANDSCAPE AND OTHER CONSTRUCTION ACTIVITIES.
6. SUBGRADE IS TO BE COMPACTED TO THE MINIMUM NECESSARY FOR STRUCTURAL STABILITY, USING DUAL WHEEL SMALL MECHANICAL ROLLERS IN STATIC MODE. HEAVY EQUIPMENT OR TRUCK TRAFFIC IS NOT ALLOWED ON SUBGRADE.
7. TO PREVENT COMPACTION, INSTALL THE AGGREGATE BASE IN THE FOLLOWING MANNER (BACK DUMPING):  
DUMP AGGREGATE BASE ONTO SUBGRADE FROM THE EDGE OF THE INSTALLATION, THEN PUSH IT OUT ONTO THE SUBGRADE.  
DUMP SUBSEQUENT LOADS FROM ON TOP OF THE AGGREGATE BASE AS THE INSTALLATION PROGRESSES.
8. PERVIOUS CONCRETE SIDEWALK SHALL BE TESTED PRIOR TO ACCEPTANCE. ONE TEST PER 2500 SF AREA MINIMUM. TESTING SHALL MEET ASTM C1701 AND SHALL MEET A MINIMUM OF 100 IN/HR.
9. IMPERVIOUS CHECK DAMS IN THE BASE COURSE ARE REQUIRED FOR SLOPES BETWEEN 5% AND 10%. SLOPE SHALL NOT EXCEED 10%.
10. PERVIOUS DRIVEWAY SHALL NOT CONTAIN SURFACE MOTTILING.
11. NO HORIZONTAL GEOTECHNICAL FABRIC UNLESS RECOMMENDED BY GEOTECHNICAL PROFESSIONAL DUE TO POOR SOIL STRENGTH. VERTICAL SEPARATION WITH GEOTECHNICAL FABRIC MAY BE REQUIRED PER ENGINEER, DEPENDENT ON ADJACENT STRUCTURES.
12. A 6" CLEAN SAND LINER CAN BE PLACED IN LIEU OF MEETING THE CRITERIA FOR GROUNDWATER PROTECTION (SECTION 5.2.1 OF KCSWDM) FOR DRIVEWAYS SERVING TWO HOUSEHOLDS OR LESS.

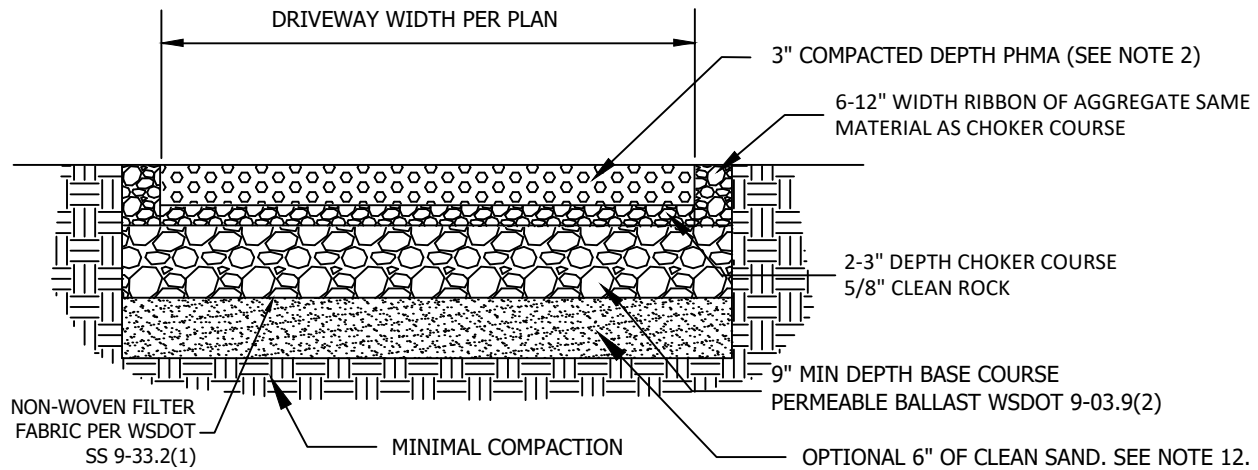
**IF SPECIAL INSPECTION  
REQUIRED,  
SEE POLICY D-8.**

**CITY OF KIRKLAND**

**PLAN NO. CK - L.07**



**PERVIOUS CONCRETE  
DETAIL**



### POROUS ASPHALT SECTION

NOT TO SCALE

#### NOTES:

1. SEE DRIVEWAY STANDARD PLANS CK-R.21 FOR JOINTING AND LAYOUT.
2. POROUS HOT MIX ASPHALT (PHMA) SHALL CONFORM TO WSDOT 9-03.8/5-04.2.
3. AGGREGATE FOR BASE COURSE SHALL BE CLEAN, ANGULAR DRAIN ROCK CONFORMING TO PERMEABLE BALLAST WSDOT 9-03.9(2). BEFORE PLACEMENT OF BASE AGGREGATE AND POROUS ASPHALT, REMOVE ANY FINE DEPOSITED MATERIAL WITH LIGHT EQUIPMENT AND SCARIFY AREA TO A MIN. 6 INCH DEPTH.
4. POROUS ASPHALT SHALL NOT BE POURED IN ADVERSE WEATHER CONDITIONS. SEE POLICY R-8, PLACING CONCRETE OR ASPHALT IN ADVERSE WEATHER CONDITIONS.
5. POROUS DRIVEWAY TO BE INSTALLED AFTER CONSTRUCTION OF HOUSE. AFTER INSTALLATION, PROTECT POROUS ASPHALT FROM LANDSCAPE AND OTHER CONSTRUCTION ACTIVITIES.
6. SUBGRADE IS TO BE COMPACTED TO THE MINIMUM NECESSARY FOR STRUCTURAL STABILITY, USING DUAL WHEEL SMALL MECHANICAL ROLLERS IN STATIC MODE. HEAVY EQUIPMENT OR TRUCK TRAFFIC IS NOT ALLOWED ON SUBGRADE. SCARIFY TOP 1/4" OF SURFACE PRIOR TO PLACEMENT OF GEOTEXTILE.
7. TO PREVENT COMPACTION, INSTALL THE AGGREGATE BASE IN THE FOLLOWING MANNER (BACK-DUMPING):
  - DUMP AGGREGATE BASE ONTO SUBGRADE FROM THE EDGE OF THE INSTALLATION, THEN PUSH IT OUT TO THE SUBGRADE.
  - DUMP SUBSEQUENT LOADS FROM ON TOP OF THE AGGREGATE BASE AS THE INSTALLATION PROGRESSES.
8. POROUS ASPHALT SHALL BE TESTED PRIOR TO ACCEPTANCE. ONE TEST PER 2500 SF AREA MINIMUM. TESTING SHALL MEET ASTM C1701 AND SHALL MEET A MINIMUM OF 100 IN/HR.
9. SLOPE SHALL NOT EXCEED 5% FOR POROUS ASPHALT.
10. POROUS ASPHALT SHALL NOT CONTAIN MOTTILING OR SURFACE RAVELING.
11. NO HORIZONTAL GEOTEXTILE FABRIC UNLESS RECOMMENDED BY GEOTECHNICAL PROFESSIONAL DUE TO POOR SOIL STRENGTH. VERTICAL SEPARATION WITH GEOTECHNICAL FABRIC MAY BE REQUIRED PER ENGINEER DEPENDENT ON ADJACENT STRUCTURES.
12. A 6" CLEAN SAND LINER CAN BE PLACED IN LIEU OF MEETING THE CRITERIA FOR GROUNDWATER PROTECTION (SECTION 5.2.1 OF KCSWDM) FOR DRIVEWAYS SERVING TWO HOUSEHOLDS OR LESS.

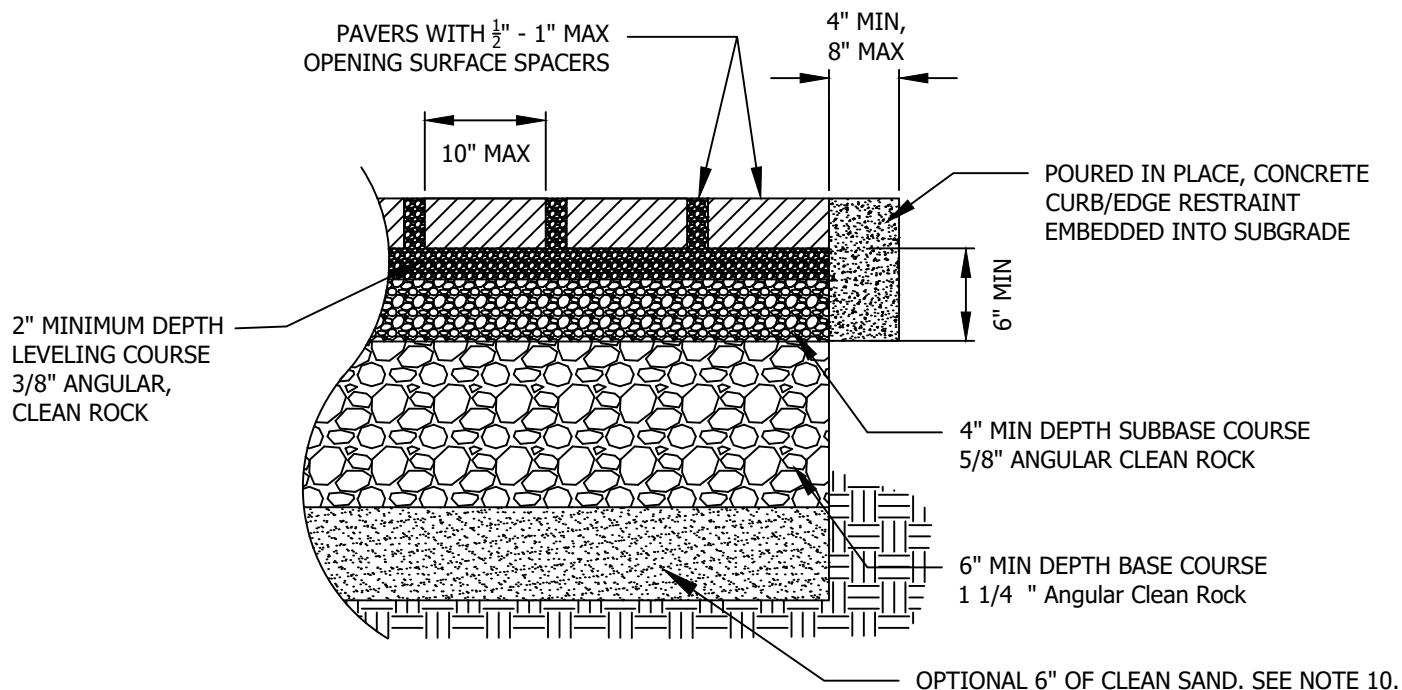
**IF SPECIAL INSPECTION  
REQUIRED,  
SEE POLICY D-8.**

**CITY OF KIRKLAND**

**PLAN NO. CK - L.08**



**POROUS ASPHALT  
DETAIL**



### PERMEABLE PAVER SECTION

NOT TO SCALE

#### NOTES:

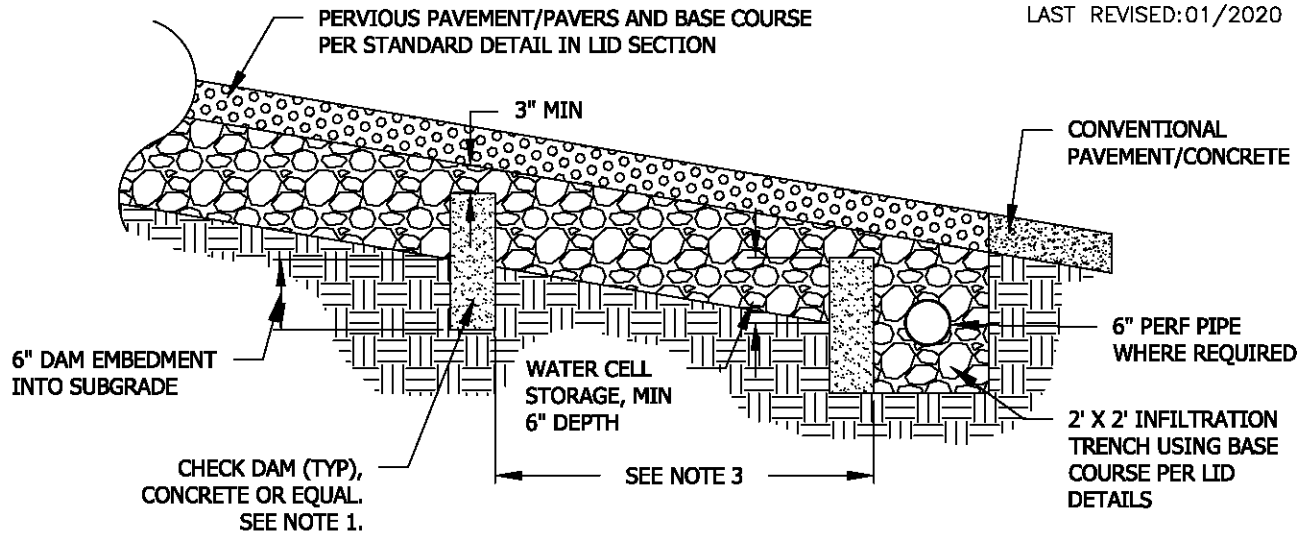
1. SEE DRIVEWAY STANDARD PLANS CK-R.21 FOR JOINTING AND LAYOUT.
2. PERMEABLE PAVERS SHALL CONFORM TO ALL REQUIREMENTS BELOW:
  - A. 3-1/8" THICK PAVERS FOR VEHICULAR APPLICATIONS
  - B. 2-3/8" THICK PAVERS FOR PEDESTRIAN AREAS
  - C. SURFACE AREA AND ASPECT RATIO REQUIREMENTS OF ASTM C936
3. AGGREGATE FOR BASE COURSE SHALL BE CLEAN, ANGULAR ROCK 1-1/4", CONFORMING TO PERMEABLE BALLAST WSDOT 9-03.9(2).
4. PERMEABLE PAVERS TO BE INSTALLED AFTER CONSTRUCTION OF HOUSE. AFTER INSTALLATION, PROTECT PERMEABLE PAVEMENT FROM LANDSCAPE AND OTHER CONSTRUCTION ACTIVITIES.
5. SUBGRADE IS TO BE COMPACTED TO THE MINIMUM NECESSARY FOR STRUCTURAL STABILITY, USING DUAL WHEEL SMALL MECHANICAL ROLLERS IN STATIC MODE. HEAVY EQUIPMENT OR TRUCK TRAFFIC IS NOT ALLOWED ON SUBGRADE.
6. TO PREVENT COMPACTION, INSTALL THE AGGREGATE BASE IN THE FOLLOWING MANNER (BACK-DUMPING):
  - DUMP AGGREGATE BASE ONTO SUBGRADE FROM THE EDGE OF THE INSTALLATION, THEN PUSH IT OUT ONTO THE SUBGRADE.
  - DUMP SUBSEQUENT LOADS FROM ON TOP OF THE AGGREGATE BASE AS THE INSTALLATION PROGRESSES.
7. PERVIOUS CONCRETE SIDEWALK SHALL BE TESTED PRIOR TO ACCEPTANCE. ONE TEST PER 2500 SF AREA MINIMUM. TESTING SHALL MEET ASTM C1701 AND SHALL MEET A MINIMUM OF 100 IN/HR.
8. IMPERVIOUS CHECK DAMS IN THE BASE COURSE ARE REQUIRED FOR SLOPES BETWEEN 5% AND 12%. SLOPE SHALL NOT EXCEED 12%.
9. NO HORIZONTAL GEOTEXTILE FABRIC UNLESS RECOMMENDED BY GEOTECHNICAL PROFESSIONAL DUE TO POOR SOIL STRENGTH. VERTICAL SEPARATION WITH GEOTECHNICAL FABRIC MAY BE REQUIRED PER ENGINEER, DEPENDENT ON ADJACENT STRUCTURES.
10. A 6" CLEAN SAND LINER CAN BE PLACED IN LIEU OF MEETING THE CRITERIA FOR GROUNDWATER PROTECTION (SECTION 5.2.1 OF KCSWDM) FOR DRIVEWAYS SERVING TWO HOUSEHOLDS OR LESS.

**CITY OF KIRKLAND**

PLAN NO. CK- L.09

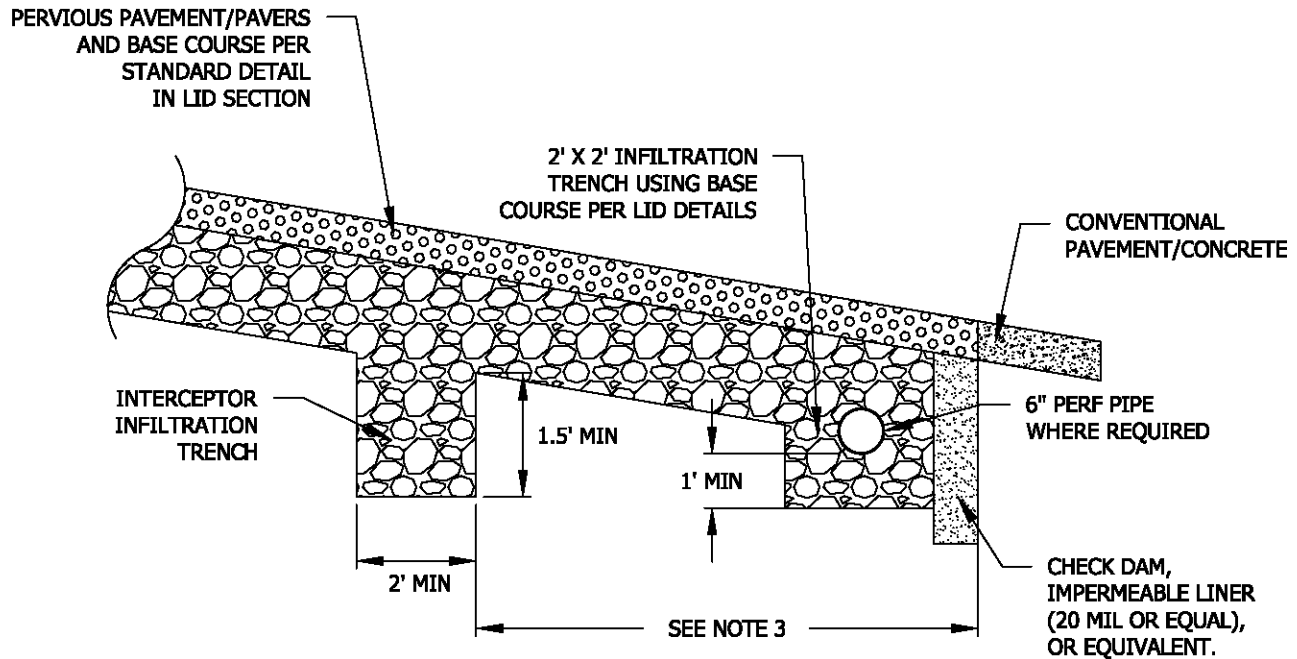


**PERMEABLE PAVER  
DETAIL**



### CHECK DAM DETAIL

NOT TO SCALE



### INTERCEPTOR INFILTRATION TRENCH DETAIL

NOT TO SCALE

#### NOTES:

1. CHECK DAM TO BE 6" WIDE CONCRETE. EXTEND DAM INTO NATIVE MATERIAL 6" ON EACH SIDE AS DIRECTED BY ENGINEER.
2. CHECK DAM OR INTERCEPTOR TRENCH REQUIRED FOR LONGITUDINAL SLOPES AT 5% OR GREATER.
3. DISTANCE BETWEEN CHECK DAM OR INTERCEPTOR TRENCH SHALL BE THE FOLLOWING:
  - 5% SLOPE: 10' SPACING
  - 6% SLOPE: 9' SPACING
  - 7% SLOPE: 8' SPACING
  - 8% SLOPE: 7' SPACING
  - 9% SLOPE: 6' SPACING
  - 10% SLOPE: 5' SPACING
4. NO HORIZONTAL GEOTEXTILE FABRIC UNLESS RECOMMENDED BY GEOTECHNICAL PROFESSIONAL DUE TO POOR SOIL STRENGTH. VERTICAL SEPARATION WITH GEOTECHNICAL FABRIC MAY BE REQUIRED PER ENGINEER, DEPENDENT ON ADJACENT STRUCTURES.

CITY OF KIRKLAND

PLAN NO. CK- L.10



**CHECK DAM &  
INTERCEPTOR TRENCH**

Roadway

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## **ROADWAY - PLAN NOTES**

1. A pre-construction conference shall be held prior to the start of construction. The Contractor shall be responsible for securing all necessary permits prior to construction.
2. All roadway work and material shall be in accordance with the current APWA and City of Kirkland standards and specifications.
3. All public roadways shall be constructed of 2" Class "B" AC paving on 4" asphalt-treated base (ATB), unless otherwise approved by the Public Works Department.
4. A copy of the approved roadway plans must be on the job site whenever construction is in progress.
5. Density test reports will be required for all public roadways and all private roadways within plats. All trench backfill shall be compacted to 95 percent density in roadways, roadway shoulders, roadway prism and driveways, and 85 percent density in unpaved areas. All pipe zone compaction shall be 95 percent.
6. All commercial and residential driveways must conform to the City of Kirkland Department of Public Works Driveway Policy.
7. All concrete for sidewalks and curb and gutter must be 4,000 psi minimum. (5-3/4 sack mix.)
8. In the case of new road construction or reconstruction requiring mailboxes to be moved or rearranged, the Developer/Contractor shall coordinate with the U.S. Postal Service for the new location of the mailbox structure.
9. Any roadway signage or striping removed or temporarily moved by the Contractor shall be restored to meet the current City of Kirkland standards.
10. It is the responsibility of the Contractor to provide adequate temporary traffic control to ensure traffic safety during construction activities. Therefore, the Contractor shall submit a traffic control plan to the Public Works Department at least 48 hours prior to starting any work in the right-of-way. All traffic control devices shall conform to the "Manual on Uniform Traffic Control Devices" (MUTCD) or as modified by the Traffic Engineer.
11. Where a sidewalk is to be constructed above a slope or adjacent to a rockery or retaining wall where the lowest finished elevation of the slope, rockery, or retaining wall is to be thirty inches (30") or more below the finished elevation of the sidewalk, a safety railing shall be required when: (a) The plane of the wall face is less than 4' in horizontal distance from the outside edge of the sidewalk; (b) The slopes adjacent to the sidewalk average greater than two to one.
12. The maximum grade for private roadways shall be twenty percent (20%), or fifteen percent (15%) if used for fire access. For public roadways, the maximum grade shall be fifteen percent (15%).
13. Dead-end streets shall be appropriately signed and barricaded. See most current edition of the MUTCD.

14. Sidewalk and curb and gutter cannot be poured monolithically. There must be a cold joint or full-depth expansion joint between them.
15. Measures shall be taken by the developer to provide ground cover in areas within the right-of-way which have been stripped of natural vegetation or have a potential for erosion.
16. The developer shall coordinate with Puget Power for the design and installation of street lights on all newly-created public roadways and existing roadways.
17. When an existing roadway is to receive a half-street overlay, the existing roadway must be cold planed at the edge of the gutter and centerline. When the existing roadway is to receive a full-street overlay, it must be cold planed at the edge of both gutters. See City of Kirkland Standard Detail No. R.13.
18. All new signs required in the public right-of-way must be purchased from, and installed by, the City of Kirkland Public Works Department.
19. When installing new sidewalk, the area behind the sidewalk must be graded so that the yard drainage does not drain over the sidewalk.
20. Any existing public improvements damaged during construction shall be replaced prior to final inspection.
21. The Contractor is responsible for keeping all public streets free from mud and debris at all times. The Contractor shall be prepared to use power sweepers or other pieces of equipment necessary to keep the roadways clean.
22. Backfill in all street cuts on arterials will be control density fill (CDF). Contractor must provide steel plating necessary to allow the CDF to cure.
23. When constructing new curb and gutter which does not align with the existing edge of pavement, the roadway must be tapered from the ends of the new curb and gutter to match the existing pavement. The entry taper into the new improvements shall be 5:1 and leaving the new improvements shall be 10:1.
24. When an existing roadway is to be widened, the existing pavement must be saw cut at least one foot from the edge to provide a proper match between new and existing asphalt. However, when the existing pavement contains alligatored areas, those areas must be removed prior to widening. All saw cuts shall be parallel or perpendicular to the right-of-way centerline.
25. All rockeries must be constructed in accordance with the most current guidelines of the Association.

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### DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

#### Policy R-1: PRIVATE DRIVEWAY PAVING MATERIAL REQUIREMENTS

##### PERMITS:

- No Fee Public Works (PUB) Permit – for replacing in-kind or upgrading material within the same limits of the existing driveway. No impacts to public improvements in the ROW, such as curb & gutter, sidewalk, road pavement, or the drainage system.
- Basic PUB Permit – for driveway paving projects with alterations to the driveway ramp and curb only. No impacts to public sidewalk, road pavement, or the drainage system. A ROW Restoration Security is required.
- Standard PUB Permit – for driveway paving projects with significant impacts to public street improvements. Including impacts and restoration of public sidewalk, road pavement, and/or the drainage system (pipe, culverts, ditch, catch basins). A ROW Restoration Security is required. Public Works may require a larger security depending on the estimated ROW restoration needs.

##### APPROVED PAVEMENT MATERIALS:

- Hot Mixed Asphalt (HMA) pavement (refer to Pre-Approved Plan CK-R.11)
- Porous Asphalt pavement (refer to Pre-Approved Plans CK-L.08 & CK-L.10)
- Concrete pavement (4" thick on private property, 6" thick in ROW, placed on 4" crushed rock base (CSTC); 4,000 psi minimum concrete strength; 5-3/4 sack mix)
- Pervious Concrete pavement (refer to Pre-Approved Plans CK-L.07 & CK-L.10)
- Permeable Paver (refer to Pre-Approved Plans CK-L.09 & CK-L.10)
- Grasscrete materials are only allowed in areas where vehicular access is limited (maintenance access, fire access, etc.)

##### NOTES AND RESTRICTIONS:

- Concrete pavement, pervious concrete, and permeable paver are not allowed in the ROW, if the street abutting the driveway does not have a concrete curb and gutter.
- Private walkways may use any of the materials listed above, per Pre-Approved Plans.
- Drainage review may be required depending on the amount of new or replaced impervious surface area generated by the project. Refer to Storm Drainage policies D-2 and D-3 for details. Grind and overlay projects (no disturbance of crushed rock base or subgrade) will not trigger drainage review.
- Refer to Policy D-8 for soil requirements applicable to porous, pervious, or permeable pavement materials.
- Refer to Policy R-2 for paving private roads providing access to public utilities.
- Refer to Roadway Pre-Approved Plans for applicable ROW restoration standards.
- Wheel strip driveways are only allowed for single family residential projects with a lengthy driveway access. Wheel strip driveways are not allowed for projects with the potential to serve more than one single family residence (including ADU's and DADU's). If permeable materials are proposed for the wheel strip, the entirety of the driveway (wheel strip and internal pervious area) must be included in the impervious surface calculation.



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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy R-2:      PAVING OF PRIVATE ROADS PROVIDING ACCESS TO PUBLIC  
UTILITIES**

When designing private roads for access to single family, multi-family or commercial development, where the roads will be utilized by the City of Kirkland for maintenance of City utilities, the road will be designed to the City's Pre-Approved Plan CK-D.37.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY****Policy R-3: GUIDELINES FOR TRAFFIC ISLANDS<sup>1</sup>**

<b>Visibility</b>	
<i>Signs</i>	Generally follow section 2B-28 of the MUTCD. Use R4-7 KEEP RIGHT signs near the ends of islands. Where there are groups of islands, a single sign at the end of each end of the group is adequate. Intermediate signs may be necessary if a group is intersected by a collector or arterial. When islands are more isolated, signs are placed in the end of each island. Islands such as pedestrian islands that already have a sign near their ends do not need KEEP RIGHT signs. Signs should be placed upstream of any trees on island that would otherwise block driver's views to the signs.
<i>Paint</i>	Yellow traffic paint is placed on the ends of islands. Glass beads are hand cast on the paint to enhance reflectivity. Painting is currently done annually. Paint for stamped HMA islands to be Siplast, Street Bond 150 (color Terra Cotta).
<i>Reflectors</i>	Reflectors are normally installed on the pavement in front of islands.
<i>Lighting</i>	No special lighting need be provided simply because an island is installed.
<b>Other Elements</b>	
<i>Placement</i>	Islands are placed on Collectors and Arterials wherever possible. Driveways are not generally closed unless there is a crash problem. A minimum storage of 40 feet is provided for private driveways and the amount of storage provided at multifamily, office and commercial driveways may be greater depending on the driveways' expected left turning volumes. At T-Intersections, islands located on arterial streets should be placed at least 50 feet to the left of the intersecting street. This distance is measured from the island nose to center of the intersecting street. Island ends should be shaped with consideration for, among other things, access and to minimize the need to sweep them by hand.
<i>Size</i>	AASHTO "Green Book" policies should be followed in the sizing of islands. Islands should be at least 100 ft <sup>2</sup> in area. A "shy" distance of at least 12 inches should be provided between the island and edge of the traveled way.
<i>Curb Type</i>	Curbs shall be 4,000 PSI concrete curb and gutter (See CK-R.17). 3,000 PSI concrete extruded or mountable curbs are acceptable in special circumstances with approval by engineer.
<i>Sight Distance</i>	Stopping sight distance should be available for drivers approaching the island to see a pedestrian entering the roadway. Provision of sight distance may be the control for the type and amount of landscaping that is provided.
<i>Trees, Sod, &amp; Irrigation</i>	Trees and sod should be in each island where appropriate. Trees should not be installed if their presence reduces the safe and reasonable sight distance. Tree type should be selected from an accepted list based on the location and type of island. Tree canopies should be at least 7' above the pavement and installed following Kirkland Pre-approved Plans. When islands are built on existing pavement, underlying pavement should be removed to provide appropriate drainage based on the soil type, tree type and topography of the island surface. All islands with sod and trees should be provided with irrigation that uses standard parts.

<sup>1</sup> The term island is used to refer to both islands and medians.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy R-4: Driveway Policy**

**I. DEFINITIONS AND CLASSIFICATIONS**

1. Driveways are vehicle accesses to individual properties, parking spaces, and parking facilities, including garage doors/entrances.
2. Driveway Types
  - a. Residential Driveway: One providing access to a single-family residence or a duplex.
  - b. Multifamily / Non-Residential Driveway: One providing access to an office, retail, institutional, industrial building, or to residential developments of more than two units.
3. Sight Obstruction: any structure, monument, sign, fence, shrubbery, rockery, parked vehicles, hedge or natural growth located within the driveway / intersection sight area and the height limits defined in Public Works Pre-Approved Plan Policy R-13 that may obstruct the visibility for drivers.
4. Sight Distance Triangle or Driver's Sight Area: the area at an intersection or driveway that must be clear of sight obstructions. Sight distance triangle is shown in Figure 1 of Public Works Pre-Approved Plans Policy R-13.
5. High Accident Location (HAL): An intersection or road segment that has an accident rate that exceeds the average accident rate for similar locations during a given period and/or experiences abnormal accident patterns. For information on High Accident Locations contact Transportation Engineering Supervisor Jennifer Palmer at 425-587-3894 or by e-mail at [jpalmer@kirklandwa.gov](mailto:jpalmer@kirklandwa.gov). For crash data, please contact Transportation Engineering Analyst David Gourlie at 425-587-3867 or [dgourlie@kirklandwa.gov](mailto:dgourlie@kirklandwa.gov).
6. Traveled Way: The portion of the road intended for the movement of vehicles and bicycles, exclusive of parking lanes and shoulders.
7. How driveways are measured (see Figure 1):
  - a. Driveway offsets from intersections are measured using the standards outlined in Table 1.
    - 1) The intersection measurement point depends on the type of intersection, presence of crosswalks, and street functional classification.
    - 2) The intersection measurement point shall be selected to provide the most conservative driveway setback.

- 3) All driveways shall be measured from the curb return or closest tangent of the proposed driveway.

Table 1. Intersection offset spacing measurement

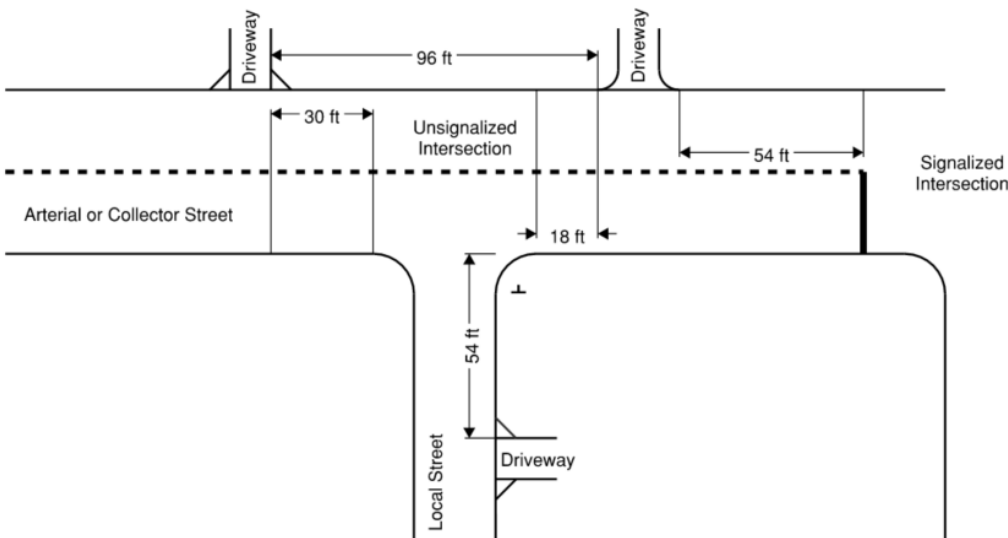
Intersection Offset Cases	Intersection Measurement Point	Driveway Measurement Point
1. Driveway offset from a signalized intersection	Back of the stop bar	Curb return or closest tangent of the proposed driveway
2. Driveway offset from an unsignalized intersection on a collector or arterial street	<ol style="list-style-type: none"> <li>a. Crosswalk present at intersection: nearest edge of crosswalk</li> <li>b. Curb present on intersecting street: the curb return of the intersection</li> <li>c. Curb not present on intersecting street: edge of roadway</li> </ol>	Curb return or closest tangent of the proposed driveway
3. Driveway offset from an unsignalized intersection on a local street	<ol style="list-style-type: none"> <li>a. Crosswalk present at intersection: nearest edge of crosswalk</li> <li>b. Curb present on intersecting street: the face of curb</li> <li>c. Curb not present on intersecting street: edge of roadway</li> </ol>	Curb return or closest tangent of the proposed driveway

- b. Driveway offsets from adjacent driveways are measured from the curb return or closest edge of each driveway.

#### 8. Modifications

A modification to this policy may be proposed by the City or requested by the applicant. The applicant may request for a variance by submitting a written request, prepared by a licensed transportation engineer, to the City Transportation Engineer. Along with the request, the applicant shall provide an engineering analysis and supporting data. Ideally, the request will be supported by policies found in current transportation engineering design materials such as those published by NACTO, AASHTO, ITE or WSDOT. The City Transportation Engineering Manager will make the final decision as to whether or not the variance should be granted.

Figure 1. Example of driveway spacing measurements



## II. DRIVEWAY DESIGN, CONSTRUCTION, MAINTENANCE AND OPERATION

### 1. General Considerations

- a. Driveways shall be designed to allow safe and efficient movement of vehicles to/from the intersecting street.
- b. Construction shall be in accordance with APWA Standards Specifications, Washington State Chapter and City of Kirkland Pre-Approved Plans.
- c. Maintenance of driveways including pavement, signing and marking shall be the responsibility of the owner whose property the driveway serves.
- d. Whenever practical consolidation of driveways of adjoining properties is encouraged. Therefore, in conjunction with approval of development the City may request developers to provide access and circulation easement to an adjacent owner where joint access is reasonable to serve future development.
- e. All abandoned driveways on the street frontage to be improved shall be removed and the curbing and sidewalk to be restored to City standards.
- f. The continued use of pre-existing driveways may be prohibited with the redevelopment of a site.
- g. Per KZC 105.100, driveway materials must match or exceed the adjacent road. Pervious surfaces can be used in compliance with the stormwater design manual.
- h. Driveways providing access onto arterial streets may be denied if alternate access is available or if the Public Works Director identifies potential safety issues.
- i. In general, left turn restrictions shall be imposed at driveways when one or more of the following conditions are met:

- 1) Located within 150 ft of signalized intersections, within 150 ft of unsignalized intersections located on arterial streets, or within 200 ft of intersections considered High Accident Locations (HAL). (See R-4 I.7. Definition and Classification section for measurement guidelines.)
- 2) Location does not meet spacing, offset, and/or setback requirements.
- 3) Location experiences safety and operational conflicts.
- 4) Where Transportation Division Staff considers it necessary based on an engineering investigation.

A variance to these restrictions may be requested by submitting a written request to the Public Works Director. Along with the request, the applicant shall provide an engineering analysis and supporting data for review. The analysis shall be prepared by a licensed transportation engineer. The Public Works Director will make the final decision as to whether or not the variance should be granted.

- j. It is preferred that new driveways be aligned with existing opposing driveways or be offset to the left of the existing opposing driveway in order to minimize left turn conflicts on the streets.
- k. Unless it creates significantly more traffic conflicts and impacts to traffic flow, driveway(s) shall be located off the street with the lower functional classification.
- l. For commercial and multi-family developments with more than 4 dwelling unit, on-site parking within 25 feet of the driveway or garage entrance, measured from the back of sidewalk or garage entrance/door, is prohibited.
- m. Internal parking garage facility ramps shall be 24 feet wide.
- n. Approaching vehicles from a parking garage facility ramp must be visible to drivers in the parking aisle approaching the ramp.

## 2. Access from Alleys

- a. Driveway for multi-family with more than 4 dwelling units and non-residential uses accessing from arterial or collector streets shall be, at the minimum 24 feet in width. Within a parking structure, driveway width shall be, at the minimum, 24 feet in width.

In order for a property to have access from an alley, it must have frontage on another public street, i.e., an alley cannot serve as the sole access (vehicular and pedestrian) to a property.

## 3. Vehicle Gates

- a. A vehicle gate is defined as a physical barrier that controls access to enter and exit a property. The most common types of gates are swing gates and sliding gates.
- b. Gates shall be installed on private property, unless approved by Kirkland Public Works.
- c. Gates must be located, at a minimum, 25 feet from the back of sidewalk or from the face of curb or edge of traveled way if there is no sidewalk.
- b. Swing gates must open inward unless the gate itself does not obstruct a public sidewalk, walkway, bicycle lane, or street, AND there is at least a 25-foot queue area in front of an opened gate for vehicles entering to queue without obstructing a public sidewalk, walkway, bicycle lane, or street.

- c. Call box and gate control box must be located so that a vehicle waiting does not obstruct a public sidewalk, walkway, bicycle lane, or street.
4. Number and Locations of Driveways
  - a. Single Family Driveways: One driveway.  
Single Family with an Accessory Dwelling Unit: One Driveway
  - b. Circular Driveways: The following criteria must be met for a circular driveway to be approved:
    - 1) The property frontage exceeds 60' and/or a minimum 15' inside radius for the circular driveway would exist from the back of sidewalk.
    - 2) The width of the curb cuts for the proposed circular driveway shall not exceed 10' each.
    - 3) Spacing, offset and setback from intersections shall be as recommended for the conventional driveways.
  - c. Multifamily / Non-residential: One driveway.
  - d. Driveways at Corner Lots: Driveways at corners must follow recommended setback from intersections or be located at the farthest property line.

5. Proximity to Mid-Block Crosswalk

Driveways must be located at least 25' from the nearest edge of the crosswalk measured from the nearest edge of the proposed driveway. In the case where the crosswalk has a protective island and the proposed driveway is to the right of the crosswalk, the proposed driveway shall be located at a minimum of 50' from the nearest edge of the crosswalk.

6. Proximity to Transit Loading Zone

Driveways must be located at least 20 feet from the nearest edge of a transit loading zone.

7. Spacing, Offset and Setback from Intersections

Allowed spacing between driveways, offset from existing opposing driveways and setback from intersections shall be measured as described in Section I.7. Definition and Classification. Factors taken into account in the determination of the recommended values or any proposed variances are:

- Street Functional Classification
- Projected Daily and Peak Driveway Volumes
- Best available speed data.
- Impacted Street Peak Traffic Volumes.
- Intersection Geometry (Number of Lanes, Lane Usage)
- Street and Intersection Safety Characteristics
- Parcel size
- Availability of alternate access

Table 2 shows recommended (desirable) and minimum (required) values for driveway setback, spacing, and offset.

Table 2. Required driveway setback, spacing, and offset

	<b>Street Functional Type where the driveway is located</b>		<b>Land Use Category</b>		
			<b>Residential (4 units or less)</b>	<b>Multi-family / Non-residential</b>	
			<b>Minimum</b>	<b>Recommended</b>	<b>Minimum<sup>1</sup></b>
<b>Setback from Intersections</b>	Local		50'	75'	75'
	Collector	Unsignalized	75'	75'	75'
		Signalized	100'	200'	150'
	Arterial	Unsignalized	100'	150'	100'
		Signalized	150'	200'	150'
		HAL	150'	200'	150'
<b>Spacing</b>	Local		10'	50'	50'
	Collector		20'	50'	50'
	Arterial		100'	150'	150'
<b>New driveway offset to the Left of Existing Opposing Driveway</b>	Local		NA	NA	NA
	Collector		NA	NA	NA
	Arterial	25-30 MPH	100'	150'	150'
		35 MPH	150'	200'	150'

<sup>1</sup>Recommended values are required. Minimum values are only permitted if the use of recommended values increases the potential for traffic conflicts at the proposed driveway location and/or results in reduced sight distance that cannot be mitigated, such as the presence of horizontal or vertical curves.

#### 8. Width of Driveway Entrance

Driveway width shall be measured at the throat and shall adhere to the requirements in Table 3:

Table 3. Required driveway widths

<b>Driveway Type</b>	<b>One Way</b>	<b>Two Way</b>
Single Family (including Detached Dwelling Units, Duplexes, and Two/Three-Unit Homes per <a href="#">KZC 115.115(5)</a> )	10'	20'
Single Family Joint-Use	10'	24' <sup>4</sup>
Multi-Family (4 units or less)	10'	20' <sup>1</sup>
Multi-Family 5 or more	12-15'	24' <sup>2,3,4</sup>
Non-Residential	12-15'	24' <sup>2,3,4</sup>

<sup>1</sup>The first 25 feet of the driveway measured from behind the sidewalk must be 24 feet wide. If rolled curb is allowed, the rolled curb may be included in the 20-foot driveway width. However, the first 25 feet of the driveway measured from behind the sidewalk must be 24 feet wide excluding rolled curb.



<sup>2</sup>If medians, traffic islands and turn lanes are used in driveway, greater width shall be considered. Driveways may be wider to provide for truck access when truck load/unload is required on site. A turning path illustration using the AASHTO design vehicle must be provided for Kirkland Public Works review and approval. The appropriate AASHTO design vehicle shall be based on the operational characteristics of the site and approved by Kirkland Public Works prior to completing the analysis. Approval shall be on a case-by-case basis. The goal is to minimize the width of the driveway.

<sup>3</sup> This standard may be reduced to no less than 20 feet if the City's Transportation Engineer determines that there are no conflicts due to sight obstructions, location, traffic volumes, or other circulation factors. The applicant must request a driveway variance and the burden of proof is on the applicant to demonstrate that a narrower driveway is safe. If turning path illustrations are used to support the driveway variance, the appropriate AASHTO design vehicle shall be based on the operational characteristics of the site and approved by Kirkland Public Works prior to completing the analysis.

<sup>4</sup> Variance to the driveway width: the applicant must demonstrate that the proposed width of the driveway will allow two opposing standard size passenger vehicles passing each other to have at least 2 feet of clearance between the vehicles and 18 inches of clearance between the vehicles and any walls, permanent structures, vertical curbs, or similar obstructions. If the driveway provides access to delivery trucks, then these clearances must be met for the opposing truck and passenger vehicle. The appropriate AASHTO design vehicle shall be based on the operational characteristics of the site and approved by Kirkland Public Works prior to completing the analysis.

## 9. Grades, Throat Length, Horizontal and Vertical Alignment

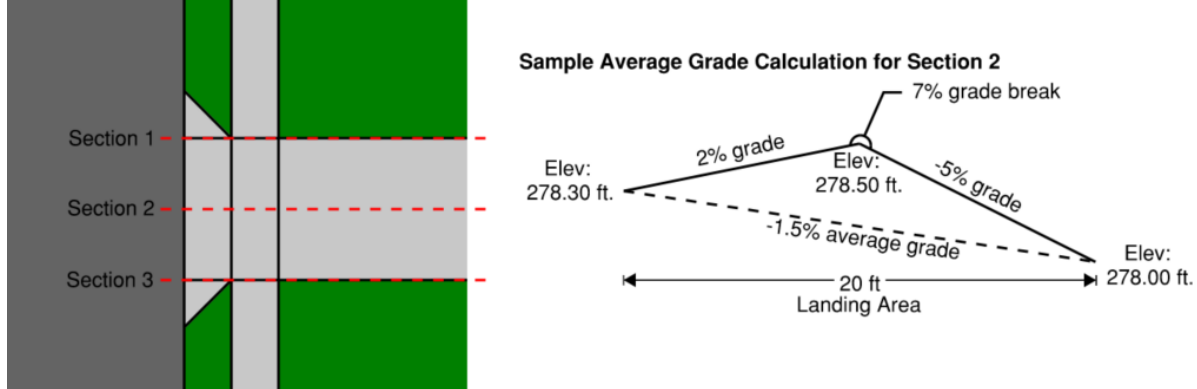
New driveways shall preferably intersect the adjacent street at 80 to 100 degree angle. For Multifamily /Non-Residential driveways the average grade on the landing (distance behind back of existing or future curb line) shall not exceed 6%. Average grade on the landing is measured using the following equation for at least three driveway sections, the left side of driveway, center, and right side of driveway. Grade breaks within the landing area are permitted provided that the difference in grade does not exceed 8%, as shown in Figure 2. Grade beyond landing shall not exceed 15%. (*see Table 4*)

Table 4. Required driveway landing area and throat length

<b><u>Driveway Daily Volumes</u></b>	<b><u>Landing (Relatively Flat Distance Behind Back of Existing or Future Curb line)</u></b>	<b><u>Throat Length (Distance between face of curb and the parking area served)</u></b>
<100	20'	20'
100 - 1500	20'-25'	40'
>1500	30'	60'

$$\text{Average Grade} = \frac{\text{Elevation at existing future curb line} - \text{Elevation at back of landing}}{\text{Required landing length}} * 100 \text{ for each section}$$

Figure 2. Average grade calculation



## 10. Traffic Control at Driveways

- Multifamily / Non-residential driveways may be controlled by stop signs, roundabouts or traffic signals.
- Traffic signalization may be considered to control driveways projected to exceed 2000 vehicles per day and that are located on arterial streets with ADT in excess of 15,000. Traffic signal warrant analysis shall be performed at driveways considered for signalization.
- Signalized driveways shall be designed and built so as to minimize interference with existing traffic signals and shall have a minimum 100 ft storage area between the face of curb and any turning and parking maneuver within the development.
- For multi-family and non-residential use, parking shall be located at a minimum of 25 feet behind the back of sidewalk.
- For parking garage facilities having 10 or more parking spaces, parking shall be located a minimum of 25 feet beyond the garage entrance.

## 11. Sight Distance

Public Works Pre-Approved Plan Policy R-13 specifies sight distance requirements for driveways and various types of intersections.

# TEMPLATES FOR REQUIRED VEHICLE TURNAROUND AREA

SUPPLEMENTAL TO PRE-APPROVED POLICY R-4

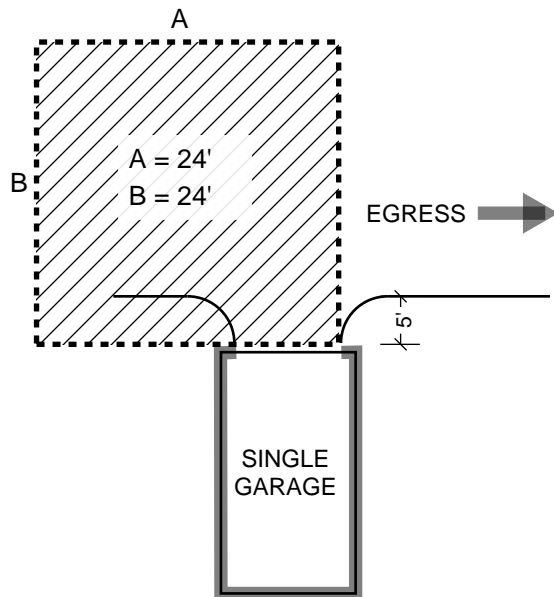
CITY OF KIRKLAND, PUBLIC WORKS DEPARTMENT, REV. 2/01/2023

THE FOLLOWING VEHICLE TURNAROUND AREA TEMPLATES ARE REQUIRED FOR SINGLE-FAMILY RESIDENTIAL DEVELOPMENT PROJECTS WITH MULTIPLE DWELLING UNITS PROPOSED ON A SINGLE LOT (I.E., COTTAGE, CARRIAGE AND TWO/THREE-UNIT HOMES, AND/OR ACCESSORY DWELLINGS UNITS).

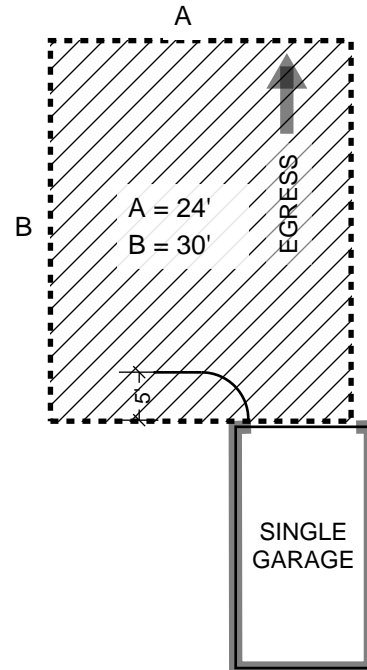
A PARKED VEHICLE MUST BE PROVIDED WITH THE MINIMUM TURNAROUND AREA PRESCRIBED BY THE TEMPLATES. THE VEHICLE MUST BE ABLE TO USE THE TURNAROUND AREA TO BACK OUT IN ONE SINGLE MANEUVER AND DRIVE FORWARD TOWARDS THE EGRESS.

AN AUTOTURN ANALYSIS IS NOT REQUIRED IF THE PRESCRIBED TEMPLATES ARE USED. IF THE APPLICANT ELECTS TO PERFORM AN AUTOTURN ANALYSIS IN-LIEU OF USING THE TEMPLATES, THEN THE INPUT PARAMETERS FOR THE AUTOTURN ANALYSIS MUST BE SUBMITTED FOR REVIEW. AUTOTURN INPUT PARAMETERS SHALL BE SET SUCH THAT THE VEHICLE DIMENSIONS ARE 16 FT LONG BY 6 FT WIDE; THE WHEELBASE IS 9.5 FT; AND TURNING RADIUS IS 20 FT.

## GARAGE PARKING SCENARIOS

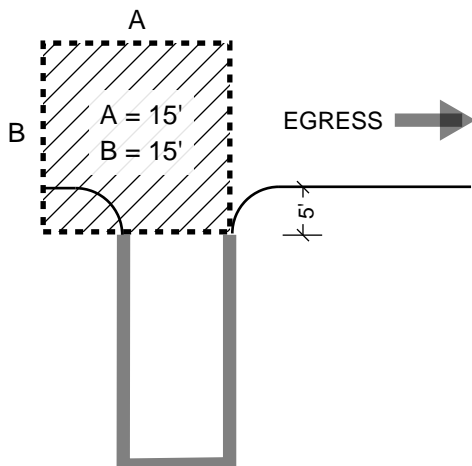


EGRESS DIRECTION IS ADJACENT TO GARAGE

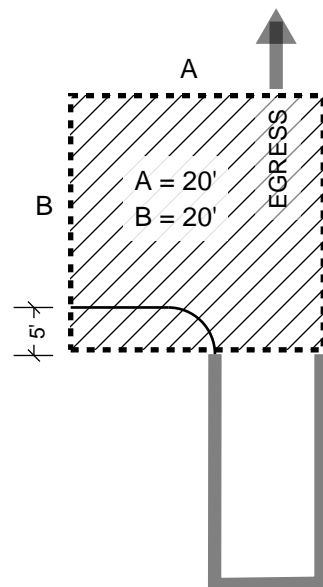


EGRESS DIRECTION IS OPPOSITE TO GARAGE

## SURFACE PARKING SCENARIOS



EGRESS DIRECTION IS ADJACENT TO STALL



EGRESS DIRECTION IS OPPOSITE TO STALL

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy R-5: Curb Ramp Installation and Replacement Policy**

This policy is intended to provide clear direction on when curb ramps meeting ADA standards must be installed. See the following matrix for more information.

<b>Description of Work</b>	<b>New Construction</b>	<b>Alteration</b>	<b>Maintenance</b>	<b>Comments</b>
<b>Street Paving</b>				
New street paving or overlay through an intersection (Figures 1 & 2)	X			Sidewalk ramps are required on all corners of the intersections where pedestrian crossings/crosswalks are permitted and curbing or sidewalk is present as impacted by paving.
Slurry seal through an intersection			X	No action required.
New street paving or overlay (Figure 3)		X		Sidewalk ramps are required on the leg of the intersections where pedestrian crossings are permitted and curbing or sidewalk is present. Half-street overlays trigger new curb ramp installation.
<b>Private Construction</b>	<b>NC</b>	<b>A</b>	<b>M</b>	
Construction of any new structure, including a new single family residence, and where installation of public improvements has not been deferred	X			Sidewalk ramps are required on all corners of the intersections and at mid-block locations where pedestrian crossings are permitted and curbing or sidewalk is present on project frontage.
Addition or remodel of an existing structure that exceeds the 50% threshold for multi-family or non-residential projects or \$200,000 for single family alterations as defined by the Kirkland Zoning Code and the Uniform Building Code as amended by the City of Kirkland		X		Sidewalk ramps are required on all corners of the intersections and at mid-block locations where pedestrian crossings are permitted and curbing or sidewalk is present on project frontage.

Signals and Crosswalks	NC	A	M	
Construct new traffic signal, including installation of accessible pedestrian signal equipment (Figure 4)	X			Sidewalk ramps are required on all corners of the intersections where pedestrian crossings/crosswalks are permitted and curbing or sidewalk is present as impacted by construction. See City of Kirkland Policy R-31 Accessible Pedestrian Signal Policy for detail on APS requirements.
Upgrade the existing traffic signal	X	X		Sidewalk ramps are required on all corners of the intersections where pedestrian crossings/crosswalks are permitted and curbing or sidewalk is present as impacted by construction.
Routine maintenance on a traffic signal where there is no alteration to the sidewalk or street.			X	No action required.
Installation of a new pedestrian crosswalk (Figure 5)	X			Installation of a new crosswalk where curbing is a barrier to the pedestrian walkway requires new curb ramps. Placement of thermoplastic/paint does not trigger an upgrade to existing curb ramps. Curb ramps will be evaluated on a case-by-case basis for raised crosswalks.
Sidewalks and Trails	NC	A	M	
New or reconstructed sidewalk or trail construction up to and/or within a corner's radius midpoint (Figure 6)	X			Sidewalk ramps, including receiving ramps, shall be upgraded/constructed on the leg of the intersection that the new sidewalk or trail approaches where curbing or sidewalk is present. The ramps on the corner's adjacent leg shall be upgraded/constructed if the proposed construction extends beyond the midpoint (>50%) of the corner's radius.
Reconstruct sidewalk midblock (Figure 6)			X	No action required unless a curb ramp is impacted by the replacement.
New or reconstructed sidewalk or trail that abuts or crosses an existing driveway or alley approach	X	X		Replace driveway/alley approach per City standards, or construct and route a 5-foot wide minimum accessible sidewalk at the back of the driveway/alley. Layout shall be as acceptable to the City. Existing single family homes are exempt from improving driveways other than their own, and for constructing alley approach improvements.

Curb and Gutter	NC	A	M	
New or reconstructed curb or curb and gutter up to or within a corner's radius midpoint (Figure 7)	X	X		Sidewalk ramps shall be upgraded/constructed on the leg of the intersection that the new curb impacts and/or touches.
Replacing curb or curb and gutter midblock			X	No action required as long as not in the crosswalk.
Utility Improvements	NC	A	M	
Utility excavations through an intersection		X		For curb ramps that are impacted by trenching or excavation for utility installation, construct new or replace existing sidewalk ramps within the intersection where pedestrian crossings are permitted and where curbing or sidewalk is present.
Utility excavations that impact more than 50% of a block's width (regardless of length) and extend up to or beyond a corner's radius		X		See STREET PAVING category, Figure 3.
Planter strip trenching, regardless of location, that does not impact a curb ramp or curb and gutter.			X	No action required.
On-street Parking	NC	A	M	
Repaint existing on-street parking stalls			X	No action required.
Layout modifications to existing on-street parking stalls (e.g. change parallel parking to angle parking)		X		Stripe new ADA accessible stalls, construct new ramps to provide sidewalk access.
On-Street parking stall striping associated with new construction (e.g. new pavement/overlay, new parking areas within planter strip/ROW, etc.)	X			Improvements to be determined on a case-by-case basis.

On-Street accessible parking stalls requested by citizens or commercial businesses		X		Improvements to be determined on a case-by-case basis.
Miscellaneous Striping	NC	A	M	
Installation of Bike Lanes			X	No action required.
Lane Reconfiguration			X	No action required.
Receiving Ramp Const.	NC	A	M	
If a ramp is upgraded/constructed and an existing receiving ramp is present, will the existing receiving ramp be upgraded or reconstructed?	X	X		No action required.
If a ramp is upgraded/constructed and an existing receiving ramp is NOT present, will a new ramp be constructed?	X			If the crosswalk connects to a pedestrian facility (sidewalk), then a curb ramp shall be installed.
Other	NC	A	M	
Tree installation or removal without curb, gutter, or sidewalk impacts	X	X	X	Does not change use, no action required. Maintain clear accessible path in accordance with City requirements.
Speed hump installation without impact to curb, gutter, sidewalk, or pedestrian route.	X	X		Does not change use, no action required.
Traffic Circle	X			Traffic circles will be evaluated on a case-by-case basis.
Roundabout	X			See street paving for standards.
Pedestrian Island	X			Construct new, replace existing or retrofit sidewalk ramps (including receiving ramps) for the crossing that includes the pedestrian island.

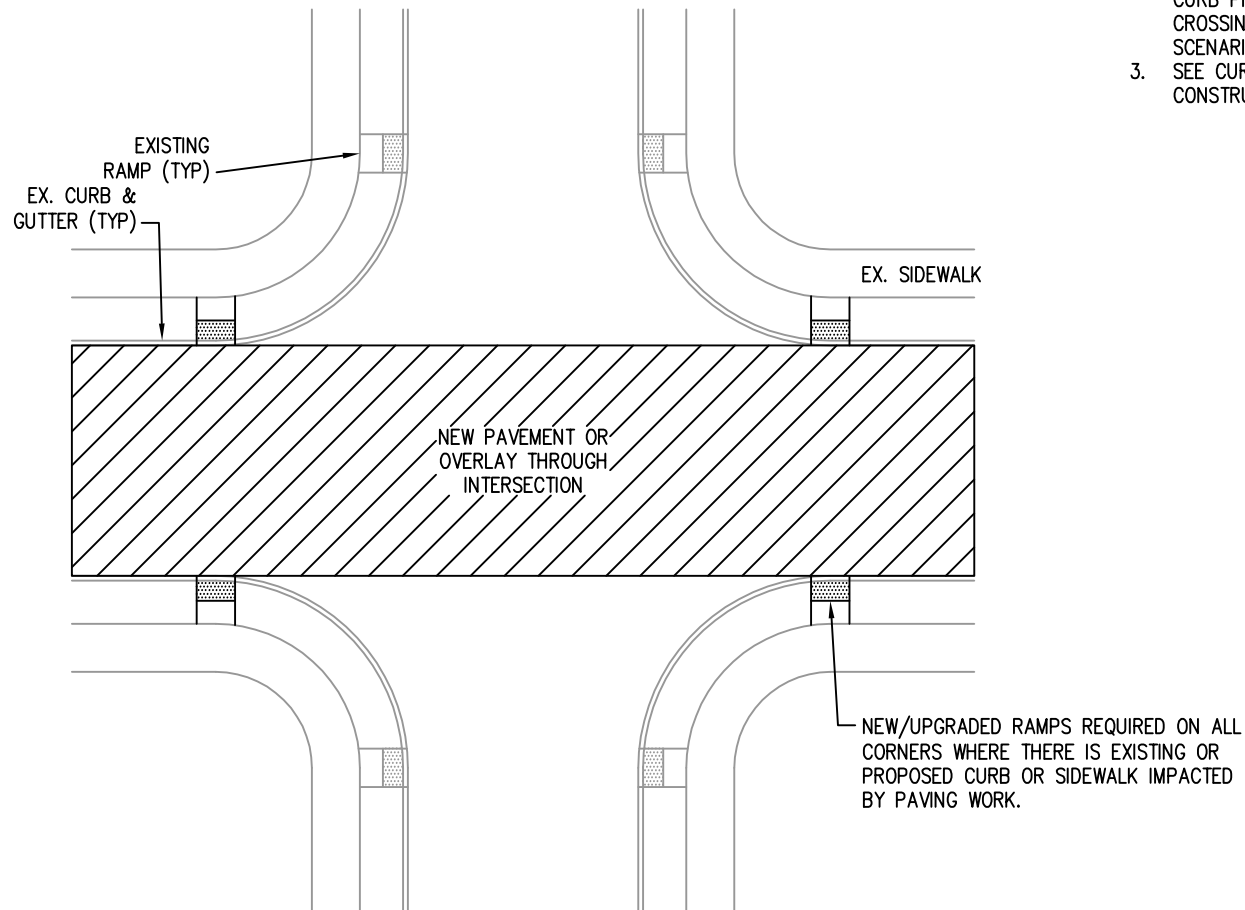


**General Notes**

- All curb ramp construction/upgrades shall be built concurrent with all other planned work.
- Arterial and mid-block crossings shall be as approved by the City.
- All roadway restoration shall be in accordance with City Pre-Approved Plans and Policies.
- Directional ramps are preferred over 45-degree ramps.
- Forty-Five (45) degree ramps shall be installed only after approval by the City's ADA coordinator and/or the Construction Division Manager.
- All curb ramp designs shall be stamped by a licensed Professional Engineer. If meeting the current design standards is not possible, ramps shall be constructed to the maximum extent feasible as indicated by an Engineer's note on the stamped drawings. Rationale supporting the design variance shall include a description of the scope of work, the site-specific factors affecting compliance, and the measures implemented to improve conditions. A full Maximum Extent Feasible (MEF) form shall be provided to the City by the Project Engineer with the as-builts after construction.
- All curb ramp installation and upgrades must be included in the area of impact for environmental, stormwater, and construction stormwater design and permitting.

## NOTES:

1. SEE FIGURES 2 AND 3 FOR ADDITIONAL STREET PAVING REQUIREMENTS.
2. RAMP CONSTRUCTION IS REQUIRED IF THERE IS A SIDEWALK OR CURB PRESENT AT THE AFFECTED END OF THE PEDESTRIAN CROSSING. SEE FIGURE 10 FOR VARIOUS RAMP CONSTRUCTION SCENARIOS.
3. SEE CURB RAMP INSTALLATION MATRIX FOR ADDITIONAL RAMP CONSTRUCTION GUIDELINES.



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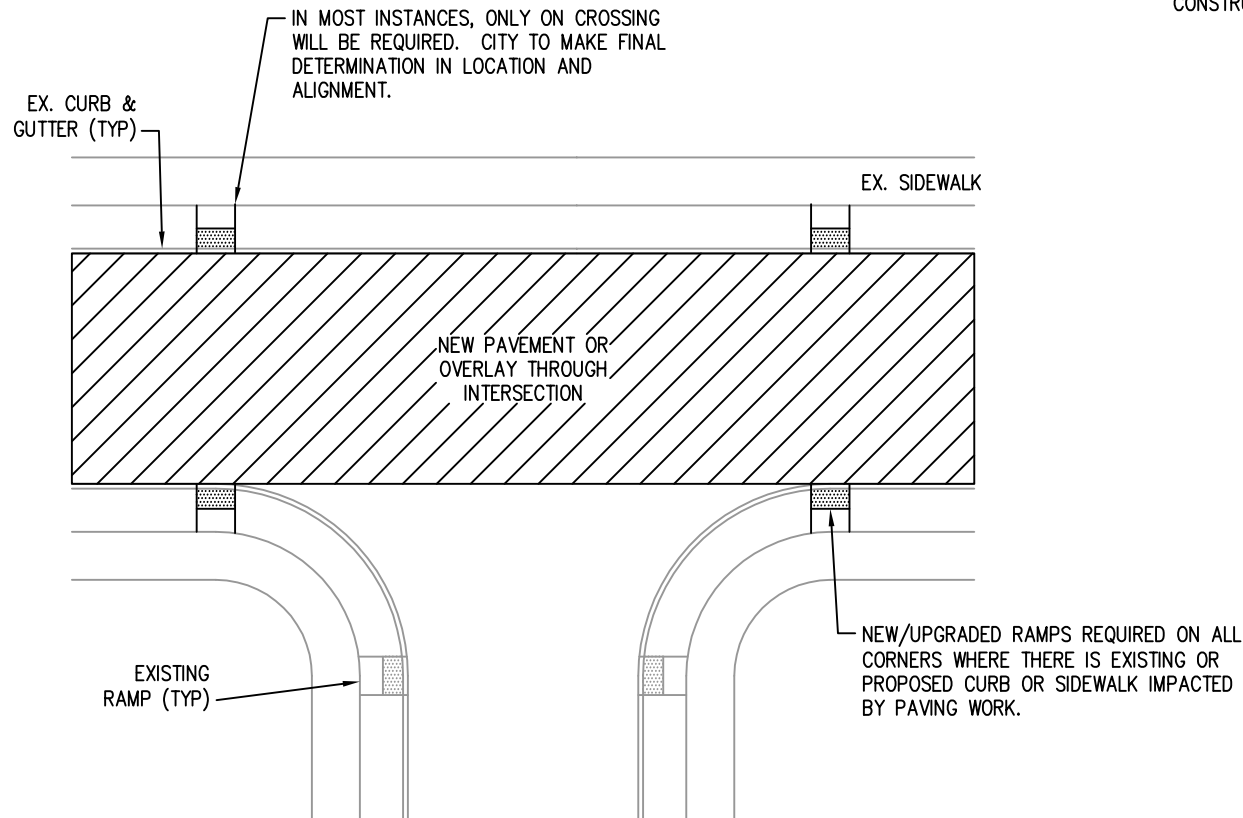
POLICY R-5, FIGURE 1



STREET PAVING  
IMPROVEMENTS  
FULL INTERSECTION

## NOTES:

1. SEE FIGURES 1 AND 3 FOR ADDITIONAL STREET PAVING REQUIREMENTS.
2. RAMP CONSTRUCTION IS REQUIRED IF THERE IS A SIDEWALK OR CURB PRESENT AT THE AFFECTED END OF THE PEDESTRIAN CROSSING. SEE FIGURE 10 FOR VARIOUS RAMP CONSTRUCTION SCENARIOS.
3. SEE CURB RAMP INSTALLATION MATRIX FOR ADDITIONAL RAMP CONSTRUCTION GUIDELINES.



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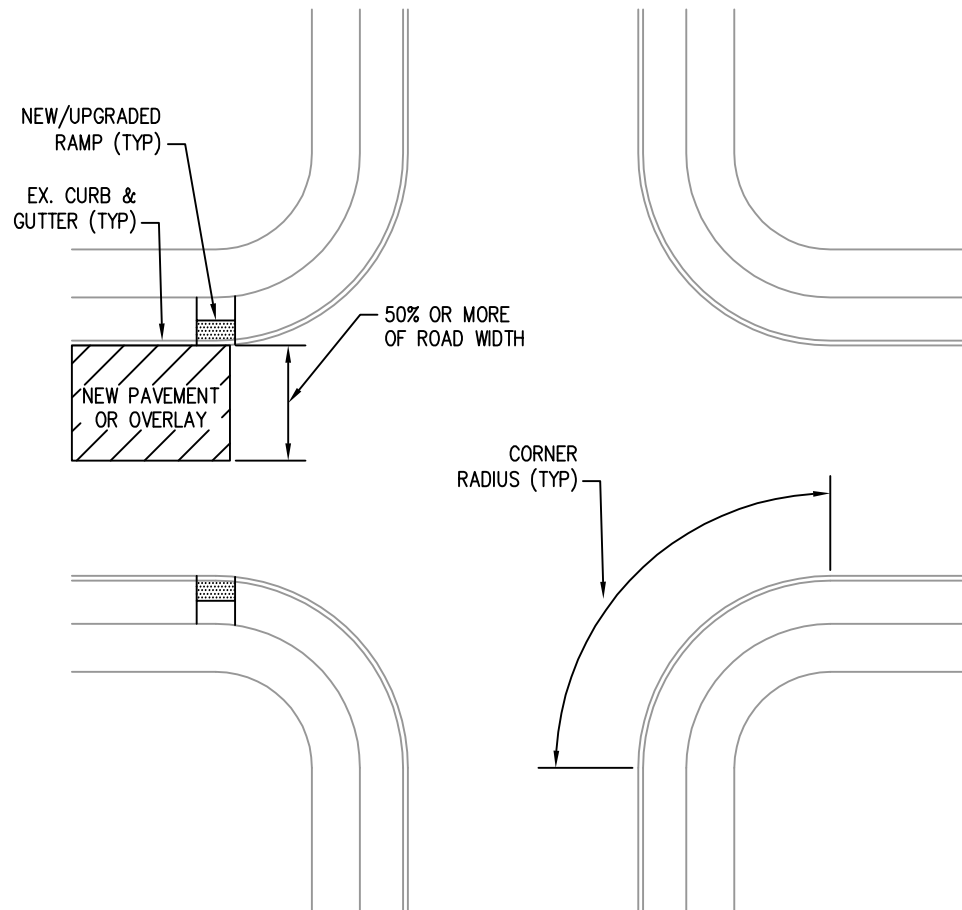
POLICY R-5, FIGURE 2



STREET PAVING  
IMPROVEMENTS  
T-INTERSECTION

## NOTES:

1. NEW/UPGRADED RAMPS REQUIRED WHEN:
  - PAVEMENT/OVERLAY EXTENDS UP TO OR WITHIN THE CORNER'S RADIUS
  - PAVEMENT OVERLAY TOUCHES A CURB RAMP.
2. FOR RAMP REQUIREMENTS WHEN THE PAVING/OVERLAY EXTENDS INTO THE INTERSECTION, SEE FIGURES 1 AND 2.
3. RAMP CONSTRUCTION IS REQUIRED IF THERE IS A SIDEWALK OR CURB PRESENT AT THE AFFECTED END OF THE PEDESTRIAN CROSSING. SEE FIGURE 10 FOR VARIOUS RAMP CONSTRUCTION SCENARIOS.
4. SEE CURB RAMP INSTALLATION MATRIX FOR ADDITIONAL RAMP CONSTRUCTION GUIDELINES.



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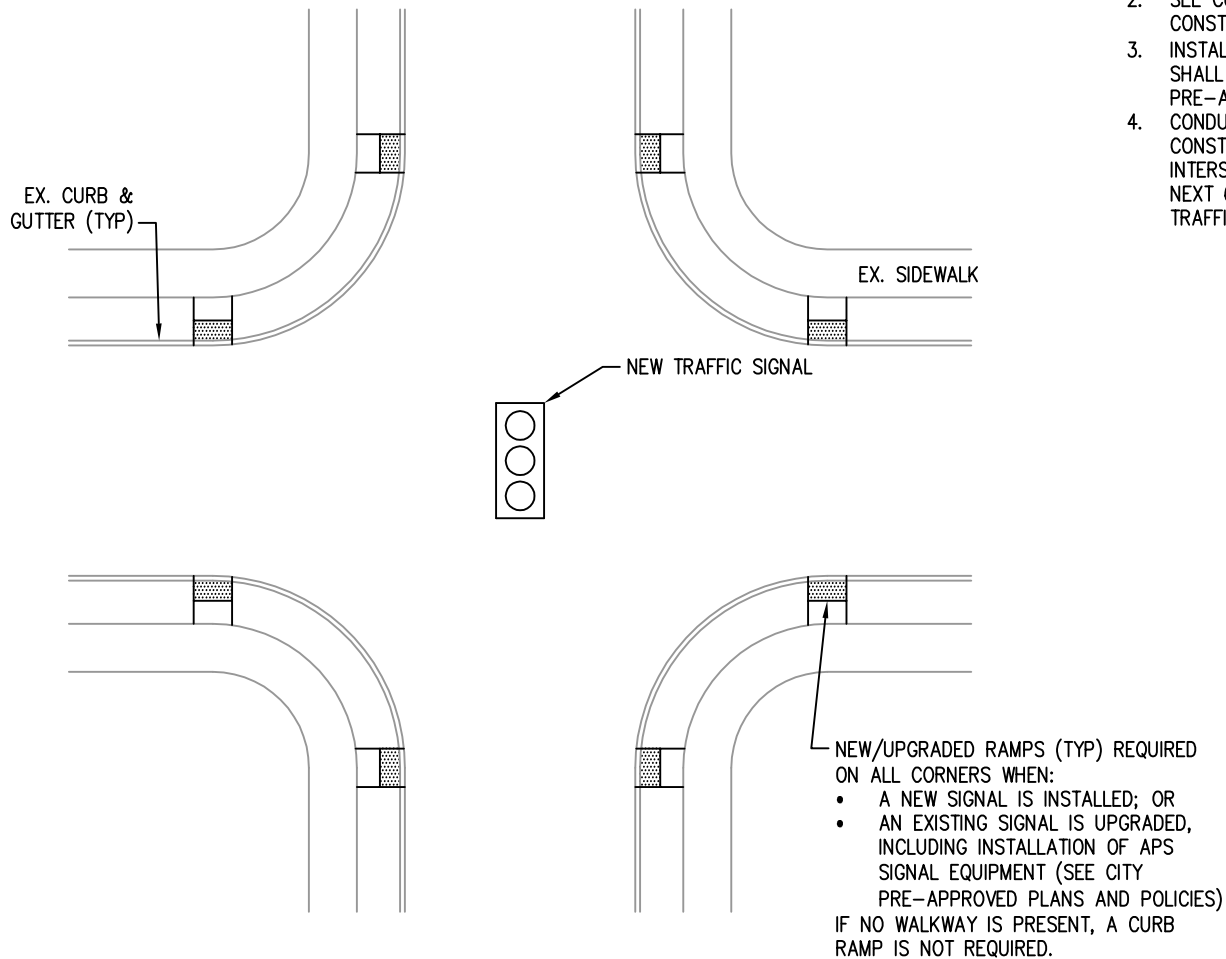
POLICY R-5, FIGURE 3



STREET PAVING  
IMPROVEMENTS  
ABUTTING INTERSECTION

## NOTES:

1. RAMP CONSTRUCTION IS REQUIRED IF THERE IS A SIDEWALK PRESENT AT THE AFFECTED END OF THE PEDESTRIAN CROSSING. SEE FIGURE 10 FOR VARIOUS RAMP CONSTRUCTION SCENARIOS.
2. SEE CURB RAMP INSTALLATION MATRIX FOR ADDITIONAL RAMP CONSTRUCTION GUIDELINES.
3. INSTALLATION OF ACCESSIBLE PEDESTRIAN SIGNAL (APS) SYSTEMS SHALL COMPLY WITH CITY OF KIRKLAND POLICIES AND PRE-APPROVED PLANS.
4. CONDUIT FOR APS SHALL BE INSTALLED DURING CURB RAMP CONSTRUCTION AT ALL SIGNALIZED INTERSECTIONS AND AT INTERSECTIONS WHERE SIGNALIZATION IS ANTICIPATED WITHIN THE NEXT 6 YEARS. COORDINATE WITH THE PUBLIC WORKS ENGINEERING TRAFFIC SECTION.



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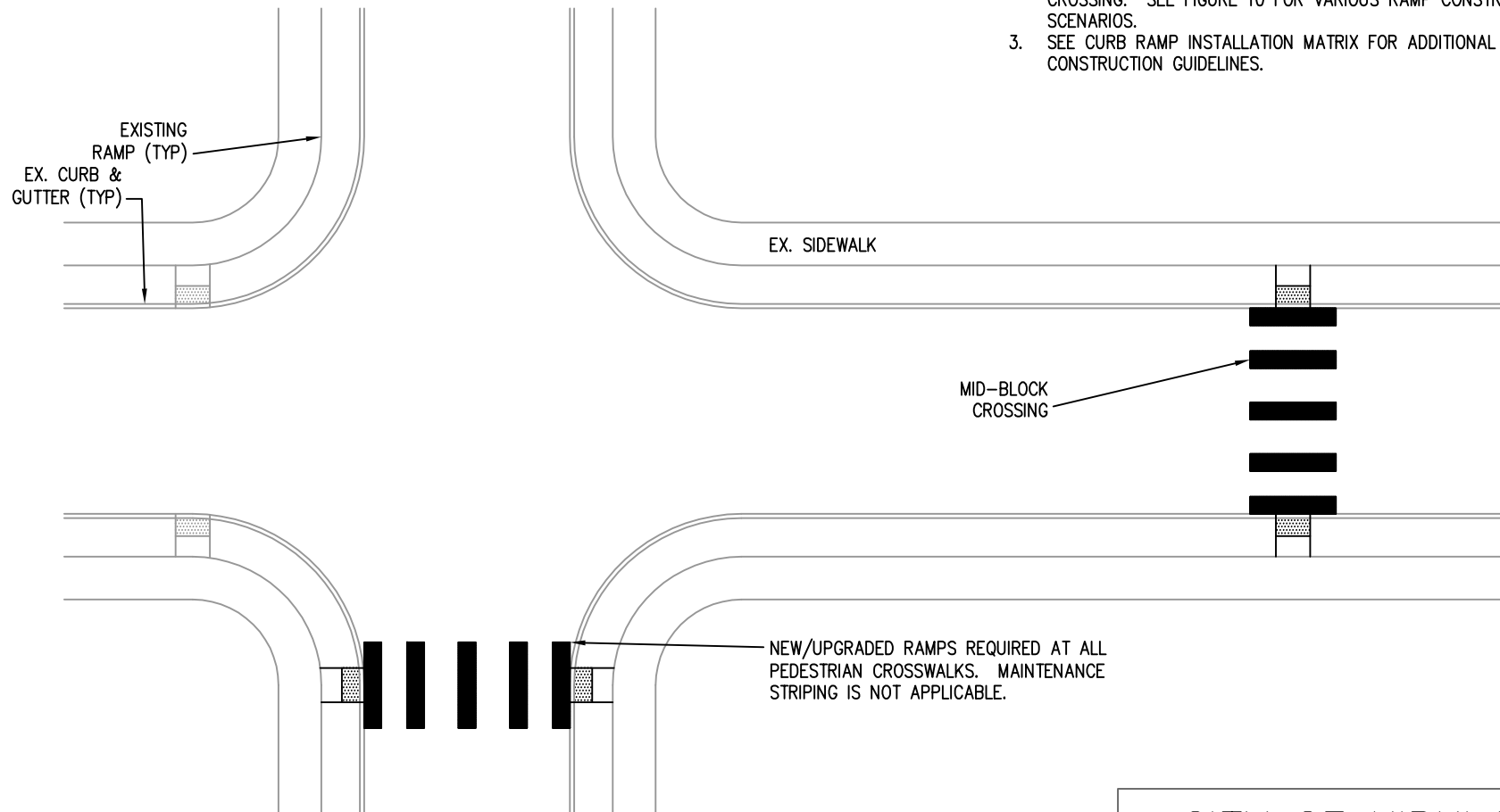
POLICY R-5, FIGURE 4



TRAFFIC SIGNAL  
IMPROVEMENTS

## NOTES:

1. THERMOPLASTIC SHALL BE USED FOR ALL PEDESTRIAN STRIPING.
2. RAMP CONSTRUCTION IS REQUIRED IF THERE IS A SIDEWALK OR CURB PRESENT AT THE AFFECTED END OF THE PEDESTRIAN CROSSING. SEE FIGURE 10 FOR VARIOUS RAMP CONSTRUCTION SCENARIOS.
3. SEE CURB RAMP INSTALLATION MATRIX FOR ADDITIONAL RAMP CONSTRUCTION GUIDELINES.



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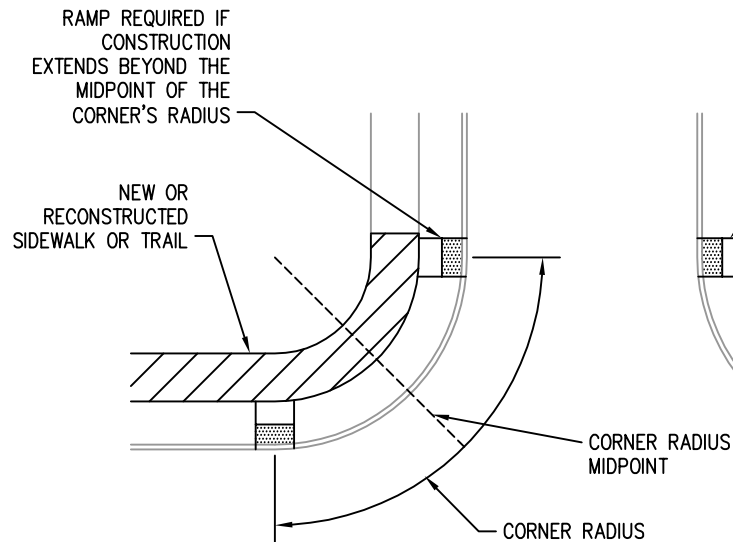
POLICY R-5, FIGURE 5



PEDESTRIAN  
CROSSWALK  
IMPROVEMENTS

## NOTES:

1. NEW/UPGRADED RAMPS REQUIRED WHEN NEW OR RECONSTRUCTED SIDEWALK OR TRAIL IS INSTALLED UP TO OR WITHIN THE CORNER'S RADIUS.
2. RAMP UPGRADE/CONSTRUCTION IS REQUIRED ON THE LEG OF THE INTERSECTION THE CONSTRUCTION APPROACHES, INCLUDING ON THE ADJACENT LEG IF CONSTRUCTION EXTENDS BEYOND THE MIDPOINT OF THE CORNER'S RADIUS.
3. RAMP CONSTRUCTION IS REQUIRED IF THERE IS A SIDEWALK PRESENT AT THE AFFECTED END OF THE PEDESTRIAN CROSSING. SEE FIGURE 10 FOR VARIOUS RAMP CONSTRUCTION SCENARIOS.
4. SEE CURB RAMP INSTALLATION MATRIX FOR ADDITIONAL RAMP CONSTRUCTION GUIDELINES.



RECEIVING RAMP NOT REQUIRED TO BE COMPLIANT. INSTALL NEW IF NONE EXISTS.

EX. SIDEWALK

RECEIVING RAMP NOT REQUIRED TO BE COMPLIANT. INSTALL NEW IF NONE EXISTS.

EX. CURB & GUTTER (TYP)

RECONSTRUCT SIDEWALK MID-BLOCK/OUTSIDE THE CORNER RADIUS, NO RAMPS REQUIRED.

CITY OF KIRKLAND

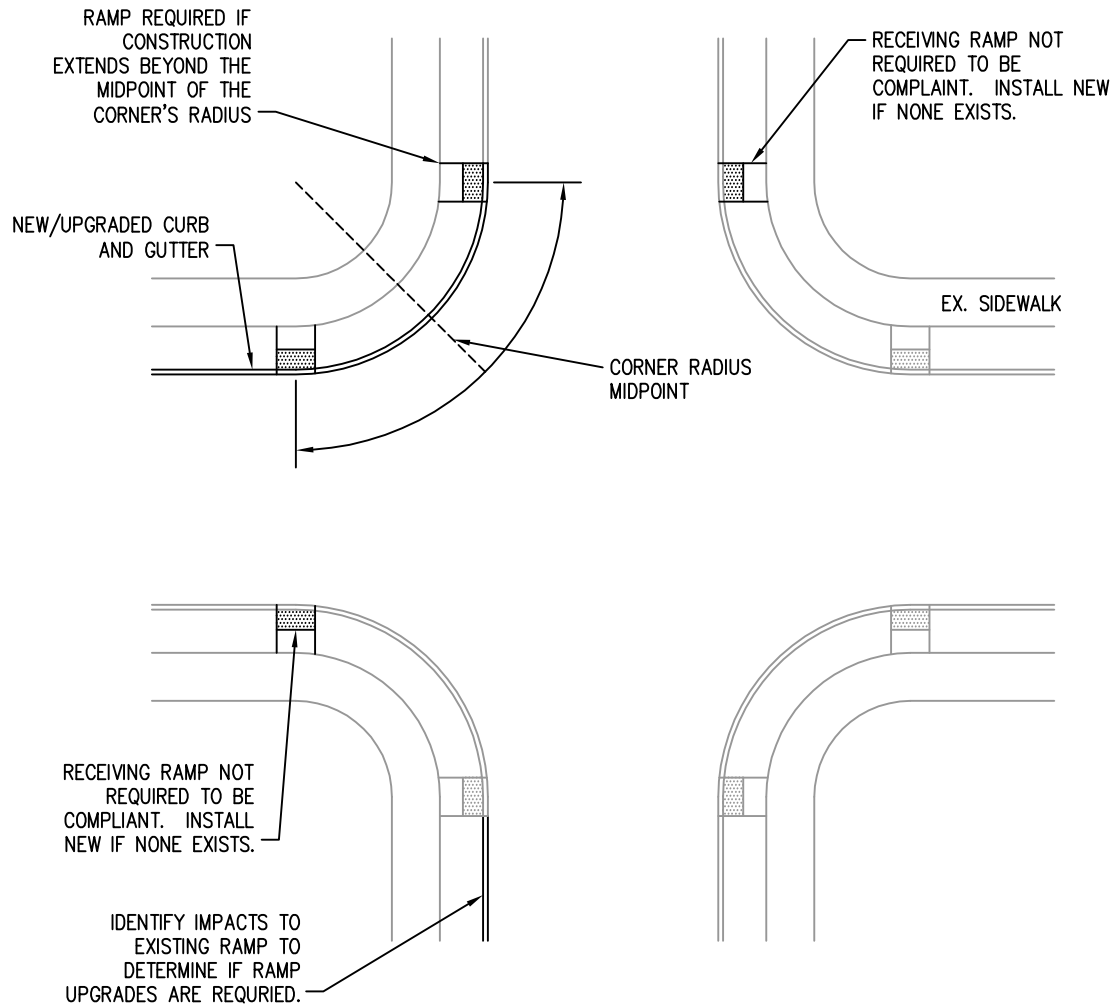
POLICY R-5, FIGURE 6



SIDEWALK AND TRAIL IMPROVEMENTS

## NOTES:

1. NEW/UPGRADED RAMPS REQUIRED WHEN NEW/UPGRADED CURB AND/OR GUTTER IMPACTS OR TOUCHES THE CURB RAMP.
2. RAMP UPGRADE/CONSTRUCTION IS REQUIRED ON THE LEG OF THE INTERSECTION THE CONSTRUCTION APPROACHES, INCLUDING ON THE ADJACENT LEG IF CONSTRUCTION EXTENDS BEYOND THE MIDPOINT OF THE CORNER'S RADIUS.
3. IF RAMPS ARE LOCATED OUTSIDE THE CORNER'S RADIUS, BUT IMPACTED BY CURB AND/OR GUTTER IMPROVEMENTS, RAMPS SHALL BE REPLACED OR UPGRADED AS DESCRIBED ABOVE OR AS REQUIRED BY THE CITY.
4. RAMP CONSTRUCTION IS REQUIRED IF THERE IS A SIDEWALK OR CURB PRESENT AT THE AFFECTED END OF THE PEDESTRIAN CROSSING. SEE FIGURE 10 FOR VARIOUS RAMP CONSTRUCTION SCENARIOS.
5. SEE CURB RAMP INSTALLATION MATRIX FOR ADDITIONAL RAMP CONSTRUCTION GUIDELINES.



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POLICY R-5, FIGURE 7



CURB AND GUTTER IMPROVEMENTS



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## DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

### **Policy R-6: PARKING RESTRICTIONS IN THE PUBLIC RIGHT-OF-WAY**

The Kirkland Municipal Code (KMC) specifies parking restrictions in the public right-of-way in the following sections:

- Chapter 12.40 - Abandoned and Unauthorized Vehicles
- Chapter 12.44 - Stopping, Standing, or Parking Prohibited in Specified Places, Reserving Portion of Highways
- Chapter 12.45 - Parking

The purpose of Policy R-6 is to clarify designation and implementation of the above parking restrictions for new and existing developments and in response to citizen requests. In general drivers should be aware of the parking restrictions without them being designated. However, when drivers park habitually in violation of parking restrictions, formal designation of No Parking reminds drivers of parking restrictions.

In some situations, Public Works will designate No Parking in zones where sight distance, pavement width or other factors indicate parking should be restricted for traffic safety or access. The Fire Department, working in conjunction with Public Works, may similarly designate No Parking zones for emergency service needs.

No Parking restrictions are indicated either by signs or red curb. No Parking signs shall comply with Sections 2B.46 through 2B.49 of the Manual of Uniform Traffic Control Devices (latest edition). Red curb shall conform to City of Kirkland standards and can be implemented by the City or citizens who received written authorization from the City in accordance with Policy R-19. Public Works will review citizen requests for parking restrictions on public right-of-way on a case-by-case basis.

The City shall install No Parking signs or paint curbs red when the following conditions are met:

1. On all new roadways where the pavement width is less than 24 feet, parking shall be prohibited on one side of the roadway.
2. On existing paved streets where new half-street improvements are being installed:
  - a. If the new total paved width is less than 24 feet, then parking shall be prohibited along the new frontage improvements.
  - b. If the new total paved width is 24 feet or more, then parking will be allowed on both sides of the road, unless other factors indicate otherwise.
3. Public Works determines parking should be restricted based on a site evaluation and/or engineering analysis.
4. On all sides of new hammerheads turn-arounds located within the right-of-way.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy R-7: STREET ASPHALT OVERLAY POLICY**

All public streets shall be overlaid when any of the following conditions apply:

1. When any utility is installed in the roadway and is parallel to the right-of-way centerline, the roadway must be overlaid from the centerline to the curb line for the entire length of the utility extension. If the utility trenching encroaches on both sides of the centerline, a full street overlay will be required.
2. When any utility installed in the roadway consists of three or more perpendicular trenches within 150', the roadway must be overlaid from the curb line to the centerline. If a trench extends beyond the centerline, a full street overlay will be required.
3. When any utility is installed in the roadway and is at an oblique angle to the right-of-way centerline, the roadway must be overlaid from the centerline to the curb line for the entire length of the utility extension. If the utility trenching encroaches on both sides of the centerline, a full street overlay will be required.
4. When the permit conditions require street improvements, where the existing pavement (and abutting paved alley) is alligatored, the existing pavement must be overlaid from the centerline to the new curb line; and, when the abutting alley requires utility patches that would be compromised without an overlay. In the case of alleys, if the alligatoring is severe, an entire overlay from property line to property line may be required.
5. When the asphalt that is to be trenched or potholed is less than five years old, see asphalt overlay for Roadway Trench Repair Standard CK-R.13A.
6. Any street cut within a street that has been Slurry Sealed within the last 3 years shall be patched with a standard tee-cut and then covered with an elastomeric seal coat (Henry 130 or equal).

In all cases where a street overlay is required, both ends of the overlay area must be cold-planed perpendicular to the roadway a minimum length of 50' to provide a flush transition. For half-street or full-street overlays, cold planing (grinding) of the entire paving area is required (centerline to gutter or gutter to gutter). When curb and gutter does not exist, the new overlay surface may, at the Engineer's discretion, be tapered to meet the elevation of adjacent paved surfaces. All asphalt joints and tapered transitions shall be sealed with PG64-22 or equivalent.

See Asphalt Overlay for Roadway Trench Repair Standard CK-R-13A.

Private roads are expected to be restored to equal or better condition after construction. In general, the Public Works Department will enforce the above conditions on private roads.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy R-8: PLACING CONCRETE OR ASPHALT IN ADVERSE WEATHER  
CONDITIONS**

Once a permit has been issued, the Contractor shall call 24 hours in advance of paving or the placement of concrete to coordinate construction efforts with the inspector. The contractor shall obtain approval from the City's inspector or Development Engineer prior to placing asphalt or concrete. The following criteria is a basis for placing concrete or asphalt:

**1. Asphalt**

- A. Shall not be placed in the rain.
- B. All final 2"-lift of Hot Mix Asphalt must be placed when the air temperature is 45 degrees and rising.
- C. ATB shall not be placed when the air temperature is below 35 degrees.
- D. Shall not be placed on frozen or ice-coated ground or subgrade.

**2. Concrete**

- A. Shall not be placed in the rain.
- B. Shall not be placed when the air temperature is above 90 degrees.
- C. Shall not be placed on frozen or ice-coated ground or subgrade, against or on ice-coated forms.
- D. **IF** freezing conditions result within 72 hours following the pour, all concrete shall be covered with plastic and straw or some other method (i.e. blankets) to keep the concrete from freezing.

WSDOT Standard Specifications shall be recognized and adhered to, specifically sections 5-04.3(16), 6-02.3(14), 5-05.3(14). If a conflict occurs between the above criteria and WSDOT, the stricter of the two shall apply.

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy R-9: NEW PLAT ROAD PAVING POLICY**

When constructing new plat roadways in previously unopened rights-of-way or in newly dedicated rights-of-way, the permittee must post a one-year performance security for the final 2" lift of asphalt pavement prior to recording the plat. Within the one-year period following, the Public Works Department will determine when the final lift may be installed. The final lift will not be installed until all ATB and base failures have been removed and restored and until the single-family homes within the plat have been constructed.

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### DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

#### **Policy R-10: STREET TREE SELECTION LIST, AND PLANTING AND PRUNING PROCEDURES**

##### **PLANT APPLICATION & PLANTING PROCEDURES:**

The City of Kirkland requires the planting and maintenance of trees along public streets. An adjacent property owner or tenant may plant a tree in a street-planting strip or near the road subject to City review and approval of the type of tree and the planting location. Contact the Public Works Department at 425-587-3800 for an application. After you receive approval to plant, you will be responsible for properly planting and maintaining the tree. This includes watering during the drier seasons, mulching, and pruning.

When private contractors, developers, and property owners are required to plant street trees as part of a private development or redevelopment project, standards of tree selection, location, planting, and a two-year maintenance bond are required.

Besides selecting a tree for aesthetics, please consider the following before you choose a tree and plant it:

1. In most cases, the planting of trees is required only when there is a curbed roadway and a minimum 4.5 foot wide planting strip.
2. Trees must be planted to the following standards:
  - a. Located a minimum of 30 inches back from the face of the curb.
  - b. Located a minimum of 5 feet from underground utility lines if possible.
  - c. Located a minimum of 20 feet from street lights, pedestrian lights, or other existing trees. Mature crown spread of the species selection shall not grow into street lights.
  - d. Located a minimum of 30 feet from uncontrolled intersections — Measured back from the inside radius of the intersection area on all approaches.
  - e. Located a minimum of 50 feet from controlled intersections. Measured back from the stop bar or the inside radius of the intersection area on all approaches.
  - f. **Before planting, you MUST call 72 hours in advance for underground utility locations. This is a toll free call @ 1-800-424-5555.** They will mark your planting strip for the location of your water, electric, gas, and power lines. Knowing these locations in advance may save you time and money by preventing an accident.
  - g. Unless automatic irrigation is provided, trees must be planted between

October and February.

- h. Deciduous trees shall be a minimum 2-inch caliper when planted. Conifer trees shall be a minimum of 6 to 8 feet tall when planted.
- i. Conifer trees are approved on a case-by-case basis. Safety and impact on maintenance workload will be primary considerations. Conifer trees are never allowed in center medians.
- j. For newly planted street trees there should be no branching from the trunk below 5 feet from the ground or walk provided that the branches do not encroach into the sidewalk or street.
- k. Trees that are naturally resistant to pests and produce little fruits are required.

### **TREE SELECTION:**

This document refers to trees on public rights-of-way only.

Refer to the "Recommended Kirkland Street Tree Planting List" below for a listing of trees generally recommended for planting within the planting strip area. This list includes a variety of tree shapes and sizes that can be utilized in a variety of circumstances. Please be aware that this list concentrates on hardy and readily available tree species in the Kirkland area. Also, be aware that current industry belief is that species diversity is a major key to a healthy community/urban forest. It is now recommended that no one species account for more than 8% of the total number of trees in the forest. Therefore, certain trees may not be considered appropriate due to an existing overabundance of that species in a certain part of town. Contact the City of Kirkland Street Department at 425-587-3900 for details. (Specific tree species that are limited in certain neighborhoods include: Norway Maple, Crimson King Maple, Red Maple, Pin Oak, Sweetgum.)

Also please be aware that the list is updated every two years. Tree species may be added or removed from the list as information becomes available. This means that tree species you may see in and around Kirkland are no longer permitted to be planted. Or it may mean that certain species of trees were not readily available at the last review of the list. If there is a particular tree you are interested in that is not on the list, and is also not on the "Trees Not Recommended or Not Permitted along Kirkland Streets" below, you may provide the name of the tree and information for the City to consider with your application. The request and information will be reviewed in relation to the other demands of the right of way. You will then be informed of the decision.

When planting trees under utility lines, choose only small-scale trees that will remain small when mature.

Planting widths: The City Code requires that trees be planted 30 feet on center.

There is no need to meet a City staff representative on site. If you have specific

concerns, you may note them on the planting application. Be specific and the City will address your concerns. If you have any questions you may call 425-587-3225 and talk with the permit technician. Staff will consider alternative species proposed on a case-by-case basis. If you are requesting permission to plant a tree species not on this list please provide information about the tree's growth habit, mature size, disease and insect resistance, and any other pertinent information that supports the inclusion of the tree.

If street trees are required within the Seattle City Light Easement, only Mt. St. Helens Plums are allowed due to a mature height of only 10 feet.

### **PROHIBITED STREET TREES FOR THE CITY OF KIRKLAND:**

City of Kirkland Code allows the City to prohibit the following trees from being planted on public rights-of-way. The trees may not be planted closer than the listed minimum planting distance to streets or sewers:

<u>SPECIES:</u> <u>DISTANCE:</u>	<u>MINIMUM PLANTING</u>
<i>Populus trichocarpa</i> , Black Cottonwood	40'
<i>Populus deltoides</i> , Eastern Cottonwood	40'
<i>Populus nigra 'Italica'</i> , Lombardy Poplar	40'
<i>Ailanthus altissima</i> , Tree of Heaven	25'
<i>Salix sp.</i> , Willow trees	25'
<i>Ulmus americana</i> , American Elm	40'
Sycamore	40'
London Plane	40'
<i>Prunus sp.</i> , Cherry, stone fruits, etc (Malus, Crab Apple, WSU approved for western Washington only)	25'
<i>Alnus rubra</i> , Red Alder	25'
<i>Robinia pseudoacacia</i> , Black Locust	30'
<i>Pinus sp.</i> , any Pine trees	30'
Betula jacquemontii or nigra any Birch	Not Allowed

### **MAINTENANCE RESPONSIBILITY:**

Trees planted or growing naturally on City of Kirkland rights-of-way are property of the City and require a permit to prune, cut, or remove. All pruning and trimming is to be done to current standards adopted by the International Society of Arboriculture or the National Arborist Association. Trees are to be pruned 8 feet above sidewalks and 14 feet above roadways. Newly planted street trees may have branching 5 feet from the ground or walk provided that the branches do not encroach into the sidewalk or street. Current City policy is that it is the responsibility of the adjacent property owner to perform maintenance on the trees. Maintenance includes watering, feeding, mulching, and protecting a street tree to help achieve its mature size and full environmental function.

If you have any questions about maintenance or about caring for street trees you can call the Streets Maintenance Division at 425-587-3900.

**TREE PRUNING AND REMOVAL:**

The pruning and removal of street trees and right-of-way trees is prohibited without a written permit from the City Department of Public Works obtained in advance. To request such a permit, contact Public Works at 425-587-3800 or use the website below:

<http://www.ci.kirkland.wa.us>

Under the **Most Requested** section, choose **Tree Regulations**.




## APPROVED STREET TREE LIST

Please note all trees might not be readily available.

Although the trees listed here have been pre-approved, other species may be considered for approval.






## SMALL COLUMNAR TREES

Scientific & Common Name	Mature Height	Spread	OK Under Wires?	Min. Strip Width	Drought Tolerant*	Flower Color	Comments
<i>Malus 'Adirondack'</i> Adirondack Crabapple	20	10	Yes	5		white	Fruiting
<i>Malus 'Red Baron'</i> Red Baron Crabapple	20	15	Yes	5		pink	Fruiting
<i>Prunus serrulata 'Royal Burgandy'</i> Amanogawa Flowering Cherry	20	15	Yes	5		dbl pink	Bronze-purple fall color
<i>Prunus serrulata 'Amanogawa'</i> Amanogawa Japanese Flowering Cherry	25	12	Yes	6		white, pink	
<i>Cornus mas 'Saffron Sentinel'</i> Cornelian Cherry	22	12	Yes	4		yellow	Blooms on bare wood, red fruit, crimson fall color. Native, part shade OK
<i>Malus 'Sentinel'</i> Sentinel Crabapple	20	12	Yes	4		pink	Fruiting



## SMALL TREES

Scientific & Common Name	Mature Height	Spread	OK Under Wires?	Min. Strip Width	Drought Tolerant*	Flower Color	Comments
<i>Acer buergerianum</i> Trident Maple	30	30	Yes	5		N/A	Shrublike, must be trained to single stem
<i>Acer ginnala</i> Flame Maple	25	20	Yes	5		white	
<i>Acer griseum</i> Paperbark Maple	30	20	Yes	5		N/A	Smooth, peeling, cinnamon colored bark
<i>Acer palmatum</i> Japanese Maple	20	25	Yes	5		N/A	Select larger varieties for street tree plantings
<i>Acer triflorum</i> Three-flower Maple	25	20	Yes	5		N/A	Peeling bark
<i>Amelanchier grandiflora 'Princess Diana'</i> Princess Diana Serviceberry	20	15	Yes	4		white	
<i>Amelanchier x grandiflora 'Autumn Brilliance'</i> Autumn Brilliance Serviceberry	20	15	Yes	4		white	Edible small fruit

# Pre-Approved Plans, Policy R-10

Scientific & Common Name	Mature Height	Spread	OK Under Wires?	Min. Strip Width	Drought Tolerant*	Flower Color	Comments
<i>Arbutus 'Marina'</i> Strawberry Tree	25	20	Yes	5		pink	Broadleaf evergreen, drops leaves year-round
<i>Asimina triloba</i> Paw Paw	30	20	Yes	5		crimson	Edible 2-4" L fruit can be messy
<i>Carpinus japonica</i> Japanese Hornbeam	20	25	Yes	5		N/A	Wide spreading, slow growing
<i>Cercis canadensis</i> Eastern Redbud	25	30	Yes	5		pink	
<i>Cercis siliquastrum</i> Judas Tree	25	30	Yes	5		pink	Drought resistant
<i>Maackia amurensis</i> Amur Maackia	30	20	Yes	5		white	
<i>Cornus alternifolia</i> Pagoda Dogwood	25	25	Yes	5		white	Varied fall color
<i>Cornus kousa</i> Kousa Dogwood	20	20	Yes	4		white	Disease resistant, does not do well in dry areas
<i>Cotinus obovatus</i> American Smoke Tree	25	25	Yes	4		pink	
<i>Franklinia alatamaha</i> Franklin Tree	20	20	Yes	5		white	Large white flowers with orange centers, orange-red fall color
<i>Lagerstroemia x 'Tuscarora'</i> Tuscarora Hybrid Crape Myrtle	20	20	Yes	4		pink	Drought resistant
<i>Magnolia 'Elizabeth'</i> Elizabeth Magnolia	30	20	Yes	5		yellow	Broadleaf evergreen, drops leaves year-round
<i>Magnolia 'Galaxy'</i> Galaxy Magnolia	30	15	Yes	5		magenta	
<i>Magnolia x loebneri</i> Loebneri Magnolia	20	20	Yes	5		white	
<i>Malus 'Golden Raindrops'</i> Golden Raindrops Crabapple	20	20	Yes	5		white	Disease resistant, fruiting
<i>Malus 'Donald Wyman'</i> Donald Wyman Crabapple	25	25	Yes	5		white	Disease resistant
<i>Malus 'Lanzam'</i> Lancelot Crabapple	15	15	Yes	4		white	Fruiting
<i>Parrotia persica</i> Persian Parrotia	30	20	No	5		red	Drought tolerant, red, orange, yellow fall colors
<i>Prunus 'Frankthrees'</i> Mt. St. Helens Plum	10	20	Yes	5		pink	Burgundy leaves
<i>Prunus 'Newport'</i> Newport Plum	20	20	Yes	5		pink	Burgundy leaves, edible fruit







# Pre-Approved Plans, Policy R-10

Scientific & Common Name	Mature Height	Spread	OK Under Wires?	Min. Strip Width	Drought Tolerant*	Flower Color	Comments
<i>Prunus 'Snowgoose'</i> Snow Goose Cherry	20	20	Yes	5		white	Disease resistant
<i>Prunus x yedoensis 'Akebono'</i> Akebono Flowering Cherry	25	25	Yes	6		pink	
<i>Syringa pekinensis and others</i> Tree Lilac	20	20	Yes			lilac, white	
<i>Stewartia monodelpha</i> Orange Bark Stewartia	30	20	Yes	5		white	Brown seed pods
<i>Stewartia psuedocamellia</i> Japanese Stewartia	25	15	Yes	5		white	Avoid hot, dry areas
<i>Styrax obassia</i> Fragrant Styrax	25	20	Yes	5		white	




## MEDIUM COLUMNAR TREES

Scientific & Common Name	Mature Height	Spread	Under Wires?	Strip Width	Drought tolerant	Flower color	Comments
<i>Acer rubrum 'Bowhall'</i> Bowhall Maple	40	20	No	6		N/A	
<i>Carpinus betulus 'Fastigiata'</i> Pyramidal European Hornbeam	40	15	No	5		N/A	Broadens when older
<i>Fagus sylvatica 'Dawyck Purple'</i> Dawyck Purple Beech	40	12	No	6		N/A	Purple foliage, seed pods
<i>Gleditsia tricanthus 'Draves'</i> Streetkeeper Honeylocust	45	20	No	6		N/A	Tight, narrow form
<i>Liriodendron tulipifera 'Fastigiatum'</i> Columnar Tulip Tree	40	10	No	6		white	Does well next to buildings
<i>Malus 'Tschonoskii'</i> Tschonoski Crabapple	30	15	Yes	5		white	Pyramidal, sparse fruit
<i>Oxydendron arboreum</i> Sourwood	35	12	No	5		white	Brilliant fall color
<i>Prunus argentii 'Columnaris'</i> Columnar Sargent Cherry	35	15	No	8		pink	Can suffer from brown rot in spring, great fall color
<i>Prunus x hillieri 'Spire'</i> Spire Cherry	30	10	Yes	6		pink	Can suffer from brown rot in spring



**MEDIUM TREES**

Scientific & Common Name	Mature Height	Spread	Under Wires?	Strip Width	Drought tolerant	Flower color	Comments
<i>Acer grandidentatum</i> 'Schmidt' Rocky Mountain Glow Maple	25	20	Yes	5		N/A	Red colors in fall
<i>Acer rubrum</i> 'Karpick' Karpick Maple	40	20	No	6		N/A	
<i>Acer truncatum</i> x <i>A. platanoides</i> 'Kiethsform' Norwegian Sunset Maple	35	25	No	5		N/A	Red/orange fall color
<i>Acer truncatum</i> x <i>A. platanoides</i> 'Warrenred' Pacific Sunset Maple	30	25	No	5		N/A	
<i>Betula albosinensis</i> var. <i>septrionalis</i> Chinese Red Birch	40	35	No	5		N/A	White/pink peeling bark
<i>Carpinus caroliniana</i> American Hornbeam	25	20	Yes	5		N/A	Brilliant fall color
<i>Cladrastis kentukea</i> Yellowwood	40	40	No	5		white	flower clusters in spring, bright yellow fall color
<i>Cornus controversa</i> 'June Snow' Giant Dogwood	40	30	No	5		white	
<i>Cornus</i> 'Eddie's White Wonder' Eddie's White Wonder Dogwood	30	20	Yes	5		white	
Thornless Cockspur Hawthorn	25	30	Yes	5		white	Red fruit
<i>Crataegus phaenopyrum</i> Washington Hawthorn	25	20	Yes	5		white	Do not plant in high use areas, large thorns
<i>Crataegus</i> x <i>lavalleyi</i> Lavalle Hawthorn	25	20	Yes	5		white	Thorns when trees are young, fruit stays on tree
<i>Davidia involucrata</i> Dove Tree	40	30	No	5		white	Large flowers in May
<i>Eucommia ulmoides</i> Hardy Rubber Tree	50	40	No	6		N/A	
<i>Fagus sylvatica</i> 'Rohanii' Purple Oak Leaf Beech	50	30	No	6		N/A	Purple leaves
<i>Halesia monticola</i> Carolina Silverbell	35	30	No	5		white	Fruit/seeds can be messy
<i>Koelreuteria paniculata</i> Goldenrain Tree	30	30	Yes	5		yellow	Slow growing
<i>Magnolia denudata</i> Yulan Magnolia	40	40	No	5		white	Fragrant flowers in spring
<i>Magnolia grandiflora</i> 'Victoria' Victoria Evergreen Magnolia	25	20	Yes	5		white	Evergreen, drops leaves year-round
<i>Magnolia kobus</i> Kobus Magnolia	30	20	Yes	5		white	Flowers don't emerge until tree is mature
<i>Ostrya virginiana</i> Ironwood, American hophornbeam	40	25	No	5		N/A	Slow growing


## Pre-Approved Plans, Policy R-10

Scientific & Common Name	Mature Height	Spread	Under Wires?	Strip Width	Drought tolerant	Flower color	Comments
<i>Phellodendron amurense</i> 'Macho' Macho Cork Tree	40	40	No	5		N/A	
<i>Prunus cerasifera</i> 'Krauter Vesuvius' Vesuvius Flowering Plum	30	20	Yes	5		pink	Drought tolerant, fruitless
<i>Pterostyrax hispida</i> Fragrant Epaulette Tree	40	30	No	5		white	
<i>Quercus ilex</i> Holly Oak	40	30	No	5		N/A	Broadleaf evergreen, drops leaves year- round
<i>Styrax japonica</i> Japanese Snowbell	25	25	Yes	5		white	
<i>Tilia cordata</i> Little-leaf Linden	30	20	Yes	5		N/A	
<i>Tilia cordata</i> 'Chancellor' Chancellor Linden	35	20	No	6		N/A	
<i>Ulmus parvifolia</i> 'Emer I' Athena Classic Elm	30	35	No	5		N/A	High resistance to Dutch Elm disease


### MEDIUM/LARGE TREES

Scientific & Common Name	Mature Height	Spread	Under Wires?	Strip Width	Drought tolerant	Flower color	Comments
<i>Acer campestre</i> Hedge Maple	50	30	No	5		N/A	Don't let the name fool you, this can get to be a large tree
<i>Acer campestre</i> 'Evelyn' Queen Elizabeth Hedge Maple	40	30	No	5		N/A	Upright branching
<i>Acer freemanii</i> 'Autumn Blaze' Autumn Blaze Maple	50	40	No	6		N/A	Cross between silver and red maple - good fall color
<i>Acer miyabei</i> 'Morton' State Street Maple	40	30	No	6		N/A	
<i>Aesculus x carnea</i> 'Briotii' Red Horsechestnut	30	35	No	6		red	Drought and heat resistant, can be invasive
<i>Ginkgo biloba</i> 'Autumn Gold' Autumn Gold Ginkgo	45	35	No	6		N/A	
<i>Liquidambar styraciflua</i> 'Morraine' Morraine Sweetgum	40	25	No	8		N/A	More compact sweetgum
<i>Nothofagus antarctica</i> Southern Beech	50	35	No	5		N/A	Needs irrigation
<i>Tilia americana</i> 'Redmond' Redmond Linden	50	30	No	8		N/A	Pyramidal, needs lots of water when young
<i>Tilia cordata</i> 'Greenspire' Greenspire Linden	40	30	No	6		N/A	Pyramidal, often times has structural issues because of tight branching
<i>Ulmus parvifolia</i> 'Emer ii' Allee Elm	45	35	No	5		N/A	Resistant to Dutch Elm disease, good fall color







**LARGE COLUMNAR TREES**

Scientific & Common Name	Mature Height	Spread	Under Wires?	Min. Strip Width	Drought tolerant	Flower color	Comments
<i>Acer nigrum</i> 'Green Column' Green Column Black Sugar Maple	50	10	No	6		N/A	Does well close to buildings
<i>Ginkgo biloba</i> 'Princeton Sentry' Princeton Sentry Ginkgo	40	15	No	6		N/A	Narrow growth patten
<i>Nyssa sylvatica</i> Tupelo	60	20	No	6		N/A	Scarlet fall color
<i>Quercus x 'Crimschmidt'</i> Crimson Spire Oak	45	15	No	6		N/A	
<i>Quercus frainetto</i> Italian Oak	50	30	No	6		N/A	Drought resistant
<i>Quercus robur</i> 'Fastigiata' Skyrocket Oak	40	15	No	6		N/A	Dead/brown leaves can hang on tree through winter
<i>Taxodium distichum</i> 'Mickelson' Shawnee Brave bald Cypress	55	20	No	6		N/A	Deciduous conifer

**LARGE TREES**

Scientific & Common Name	Mature Height	Spread	Under Wires?	Strip Width	Drought tolerant	Flower color	Comments
<i>Acer saccharum</i> 'Bonfire' Bonfire Sugar Maple	50	40	No	6		N/A	Fastest growing sugar maple
<i>Acer saccharum</i> 'Commemoration' Commemoration Sugar Maple	50	35	No	6		N/A	
<i>Acer saccharinum</i> 'Green Mountain' Green Mountain Sugar Maple	45	35	No	6		N/A	Reliable fall color
<i>Acer saccharum</i> 'Legacy' Legacy Sugar Maple	50	35	No	6		N/A	
<i>Aesculus flava</i> Yellow Buckeye	60	40	No	6		yellow	
<i>Catalpa speciosa</i> Northern Catalpa	50	35	No			white	Big leaves, big tree. Clusters of flowers speckled yellow/purple up close
<i>Cercidiphyllum japonicum</i> Katsura Tree	40	40	No	6		N/A	Requires lots of water when young
<i>Ginkgo biloba</i> 'Magyar' Magyar Ginkgo	50	25	No	6		N/A	More upright and columnar than "Autumn Gold"
<i>Gymnocladus dioica</i> 'Espresso' Espresso Kentucky Coffee	50	35	No	6		N/A	
<i>Liquidambar styraciflua</i> 'Rotundiloba' Rotundiloba Sweetgum	45	25	No	6		N/A	Fruitless
<i>Liriodendron tulipifera</i> Tulip Tree	60	30	No	6		yellow	Very fast growing, can get large in open areas
<i>Metasequoia glyptostroboides</i> Dawn Redwood	70	25	No	6		N/A	Fast growing, deciduous conifer, golden needles in fall

# Pre-Approved Plans, Policy R-10

Scientific & Common Name	Mature Height	Spread	Under Wires?	Strip Width	Drought tolerant	Flower color	Comments
<i>Plantanus x acerifolia</i> London Planetree	75	60	No	6		N/A	More anthracnose resistant, large tree that needs space
<i>Quercus bicolor</i> Swamp White Oak	60	40	No	6		N/A	Shaggy, peeling bark. Heat/drought tolerant, tolerates poorly-draining soil.
<i>Quercus coccinea</i> Scarlet Oak	60	40	No	6		N/A	Brilliant fall color
<i>Quercus garryana</i> Oregon Oak	50	40	No	8		N/A	PNW native
<i>Quercus imbricaria</i> Shingle Oak	60	50	No	6		N/A	
<i>Quercus muehlenbergii</i> Chestnut Oak	60	50	No	6		N/A	
<i>Quercus robur</i> English Oak	60	40	No	8		N/A	Can be invasive due to acorn germination. Dead leaves can be persistent through winter
<i>Quercus rubra</i> Red Oak	60	45	No	8		N/A	Fast growing, large tree that needs space, acorns
<i>Quercus velutina</i> Black Oak	60	50	No	8		N/A	More drought tolerant than Red Oak, acorns
<i>Taxodium distichum</i> Bald Cypress	55	35	No	8		N/A	Deciduous conifer, columnar when young and broadly spreading when mature
<i>Ulmus 'Homestead' or 'Emerald Sunshine'</i> Homestead Elm	60	35	No	6		N/A	Resistant to Dutch Elm disease
<i>Ulmus 'Frontier'</i> Frontier Elm	50	35	No	6		N/A	Resistant to Dutch Elm disease
<i>Zelkova serrata 'Green Vase'</i> Green Vase Zelkova	45	40	No	6		N/A	Dark green leaves turn orange, red and purple in the fall
<i>Zelkova serrata 'Village Green'</i> Village Green Zelkova	40	40	No	6		N/A	



\*Drought tolerant once established (water for the first 2 summers).

## **CITY OF KIRKLAND**

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy R-11: REPLACEMENT OF EXISTING CURB AND SIDEWALK**

Over time, public improvements such as curb, gutter, sidewalks, and driveways deteriorate by cracking, heaving, spalling, exposing aggregate, joint separation, etc. According to the Kirkland Municipal Code, KMC 19.20.020 & 030, street improvements are to be maintained "in a safe condition, free of any obstructions or defects . . .", and . . . the expense of maintenance and repair are "to borne by the property directly abutting thereon . . . ." When redevelopment of a property occurs, it provides an opportunity to have the property owner repair the deteriorated street improvements. In addition to the general design criteria found in the Public Works Pre-Approved Plans, the conditions under which curb, sidewalk, and driveway remain, or may be replaced are as follows:

1. Each 10 foot section of curb, sidewalk and/or driveway, and curb ramp will be allowed one crack perpendicular to the road. The crack should show no differential settlement, no spalling, and be no greater than 1/32" in width for recently completed construction (within one year of installation).
2. If a sidewalk panel must be replaced, it may be saw cut on the "finish joint" and half of the 10 foot section replaced (curb sections must be a minimum of 5 feet in length).
3. If a curb must be replaced, the entire 10 foot section must be replaced from expansion joint to expansion joint.
4. If the curb, sidewalk, and/or driveway are heaved, spalled, aggregated, and/or have separated joints, they shall be removed and replaced.
5. The City Engineer shall determine which curbs, sidewalks, and driveways shall be removed and replaced.
6. No color or tint shall be added, unless approved by Public Works.



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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY****Policy R-12: Required Right of Way Dedications for Principal and Minor Arterials**

Per sections 110.45, 110.50 and 110.60 of the Kirkland Zoning Code, the Public Works Director has determined that the following minor and principal arterial streets are to be improved per the table below. To achieve the final build-out of these street projects, a development which abuts one of the described arterials, is required to dedicate Right-of-Way as outlined in the attached pages.

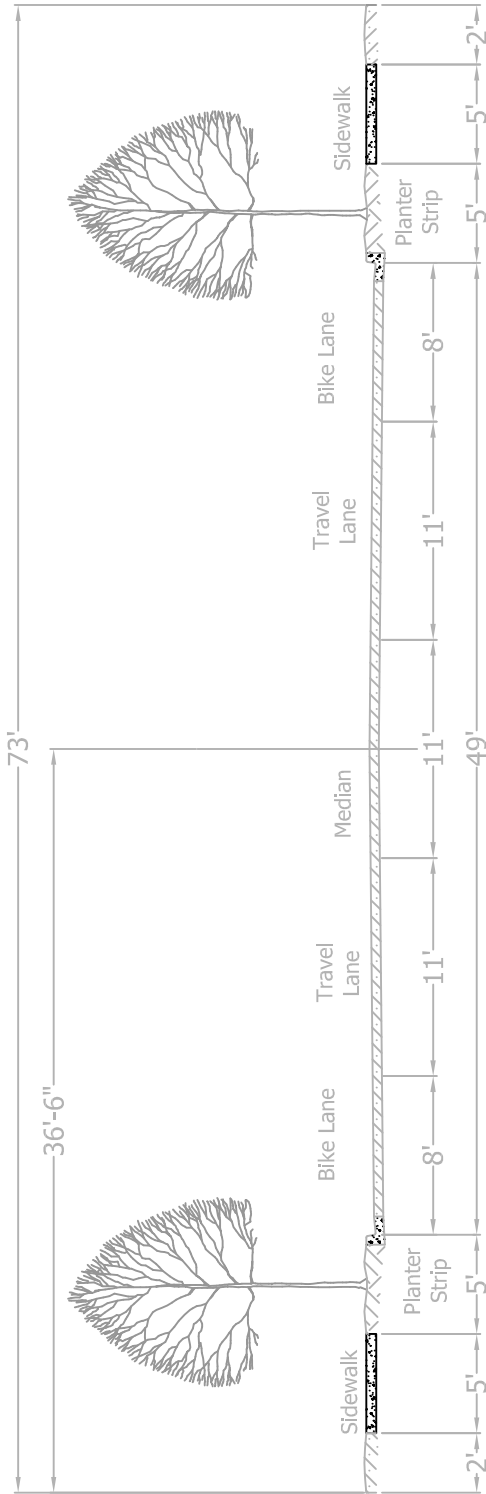
<b>Street</b>	<b>Section</b>	<b>Dedication Required</b>	<b>Build-out Widths</b>
NE 132 <sup>nd</sup> St.	100 <sup>th</sup> Ave. NE to 132 <sup>nd</sup> Ave. NE	7.5' on each side*	See attachment R-12A
132 <sup>nd</sup> Ave NE	NE 85 <sup>th</sup> St. to Slater Ave. NE	7.5' on each side*	See attachment R-12A
120 <sup>th</sup> Ave NE	Totem Lake Blvd. to NE 128 <sup>th</sup> St.	7.5' on each side*	See attachment R-12B
120 <sup>th</sup> Ave. NE	NE 128 <sup>th</sup> St. to NE 132 <sup>nd</sup> St.	17.5' on each side*	See attachment R-12B
124 <sup>th</sup> Ave. NE	NE 116 <sup>th</sup> St. to NE 124 <sup>th</sup> St.	8' on each side**	See attachment R-12C
124 <sup>th</sup> Ave. NE	NE 90 <sup>th</sup> St. to NE 116 <sup>th</sup> St.	11.5' on each side*	See attachment R-12C
NE 85 <sup>th</sup> St	128 <sup>th</sup> Ave NE to 132 <sup>nd</sup> Ave NE	Varies	See attachment R-12D
Totem Lake Blvd	NE 132 <sup>nd</sup> St. to NE 124 <sup>th</sup> St.	Varies	See attachment R-12E

**Note:**

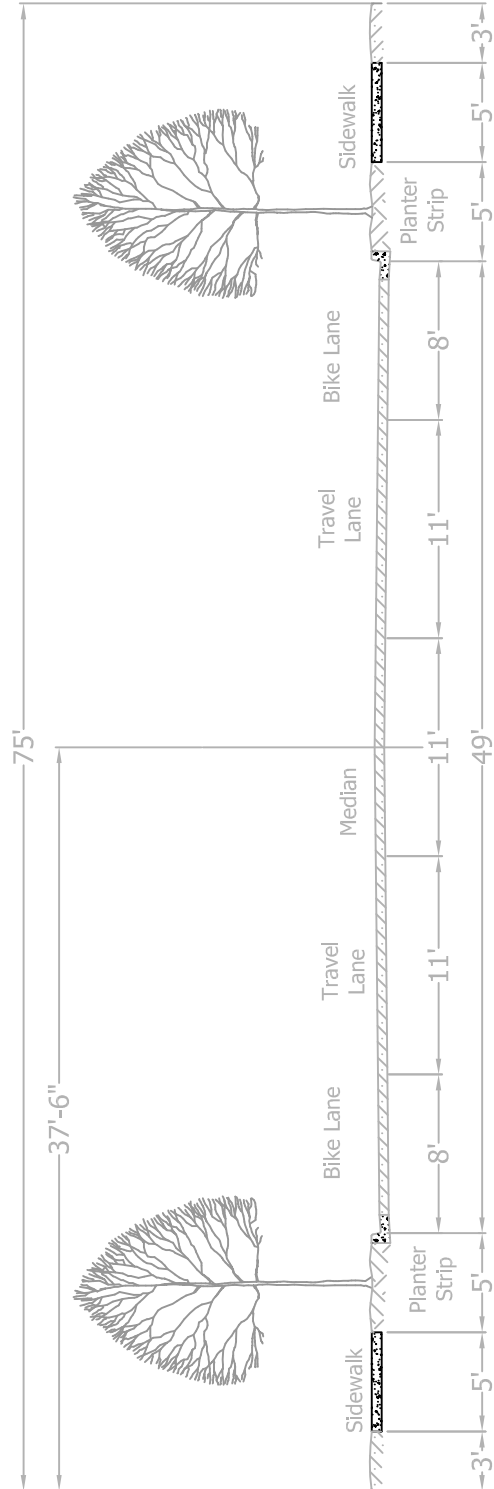
In some cases, a utilities easement may also be required in addition to the Right-of-Way dedication.

\*Assumes an existing 60' right of way.

\*\* Assumes an existing 84' right of way.



NE 132nd St. from 100th Ave. NE to 132th Ave. NE



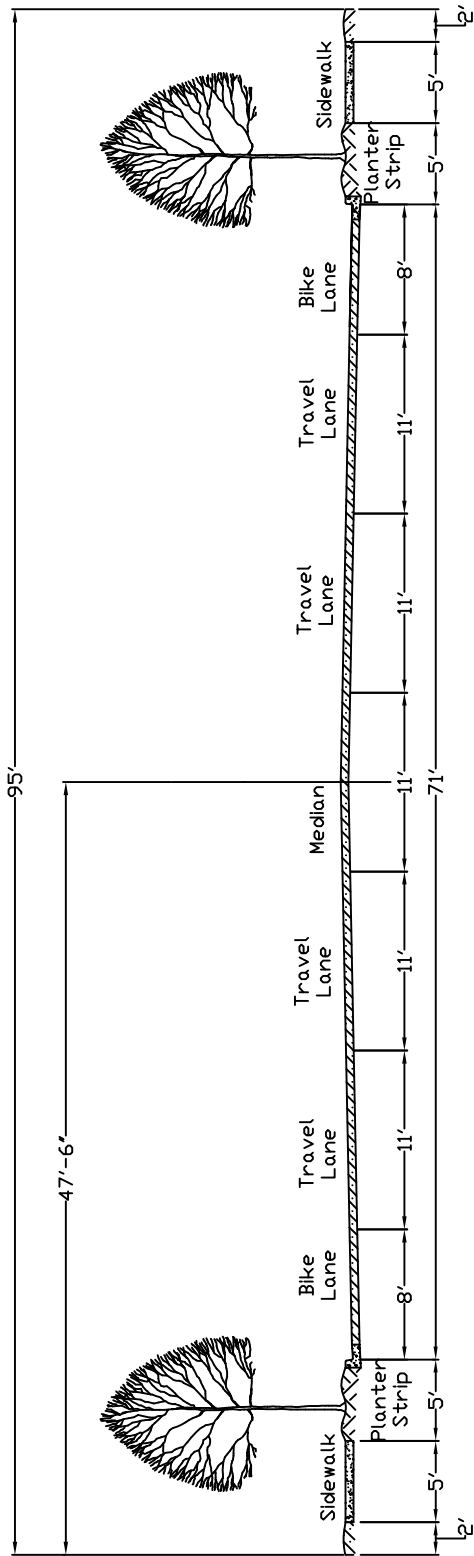
132nd Ave. NE from NE 85th St. to Slater Ave. NE

# CITY OF KIRKLAND

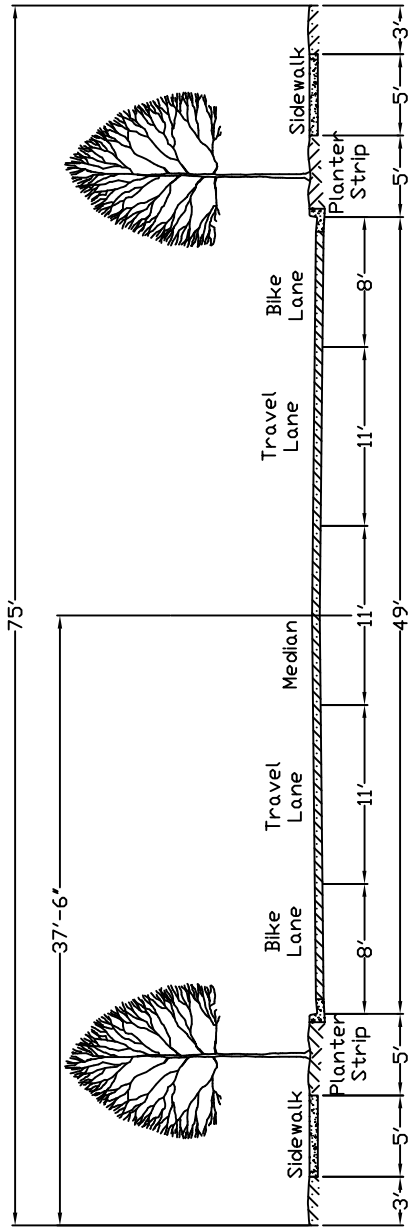
ATTACHMENT R-12A




BUILD - OUT WIDTHS  
FOR 132ND AVE. NE  
AND NE 132ND ST.

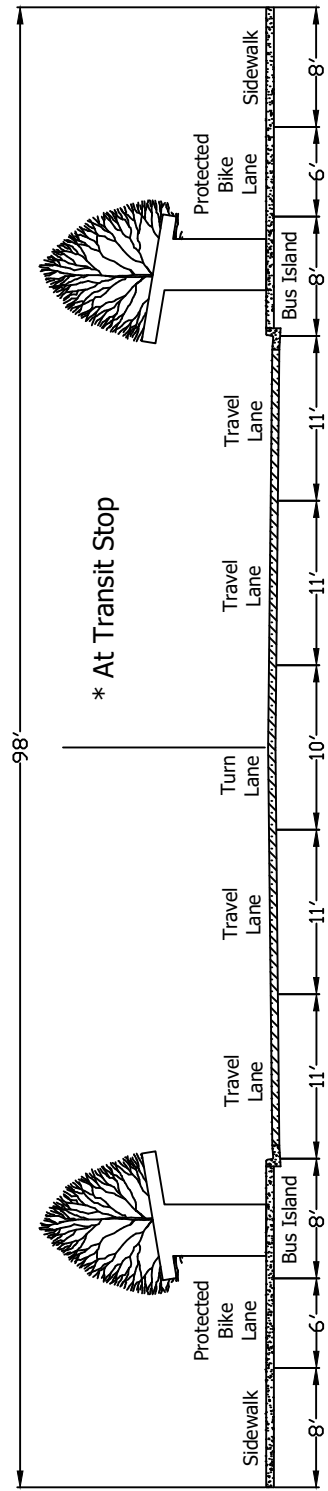
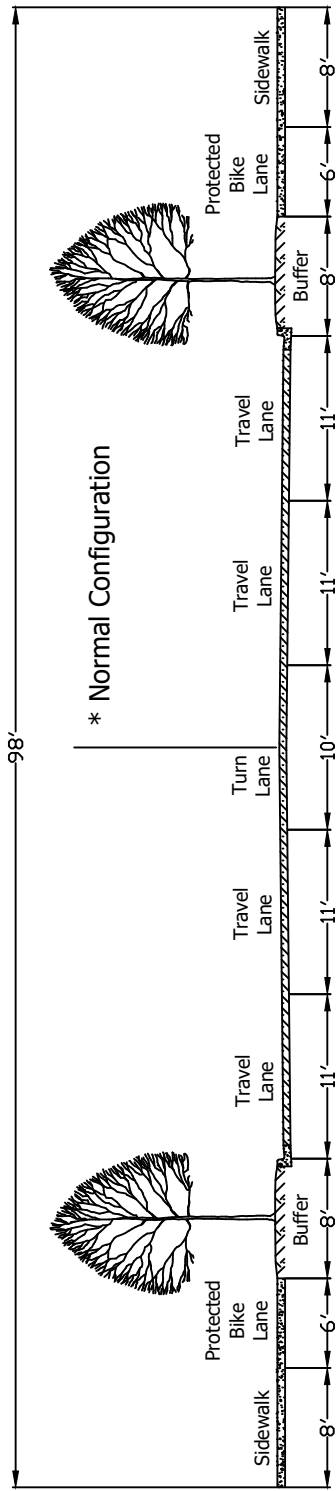


120th Ave. NE from NE 128th St. to NE 132nd St.

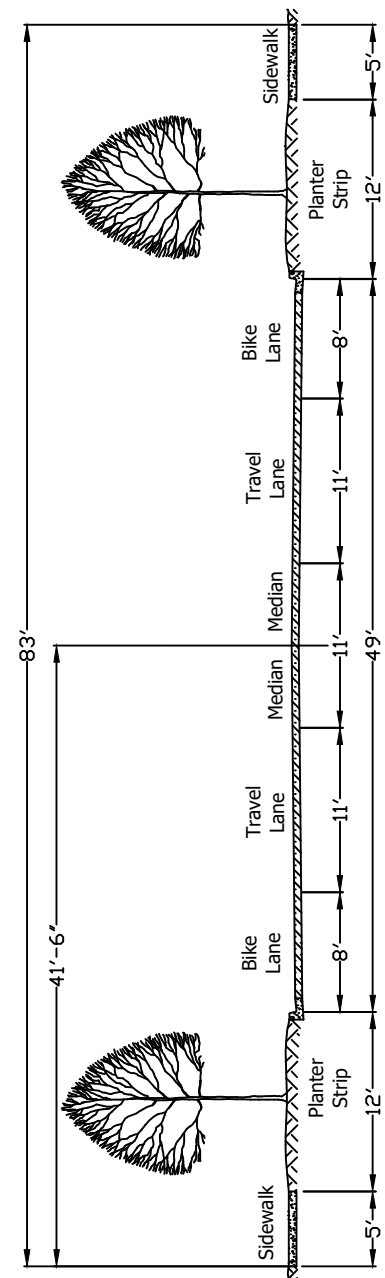


120th Ave. NE from Totem Lake Blvd. to NE 128th St.

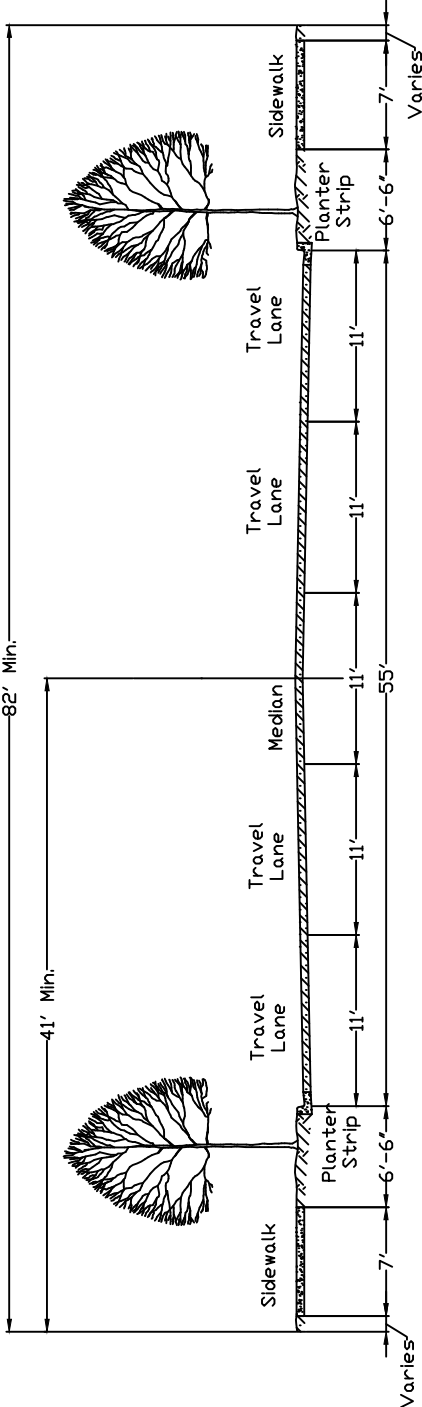
CITY OF KIRKLAND	
ATTACHMENT R-12B	
	Build - Out Widths for 120th Ave. NE



124th Ave. NE from NE 116th St. to NE 124th St.

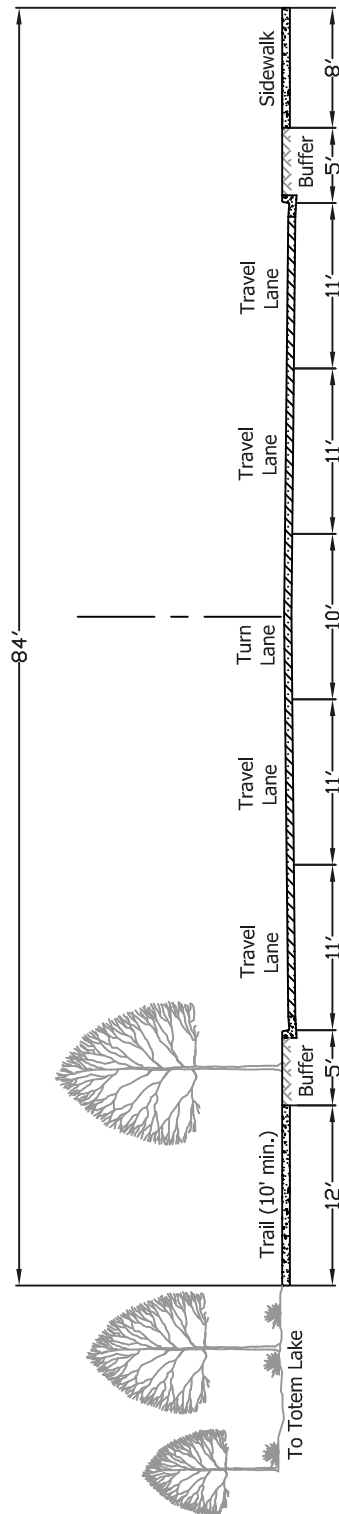


124th Ave. NE from NE 90th St. to NE 116th St.



NE 85th St. from 128th Ave. NE to 132nd Ave. NE

CITY OF KIRKLAND	
ATTACHMENT R-12D	
	Build - Out Widths for NE 85th St.



NE 132nd Street to NE 124th Street

CITY OF KIRKLAND

ATTACHMENT R-12E



Totem Lake Blvd.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY****Policy R-13: INTERSECTION SIGHT DISTANCE****Sight Distance at Intersections**

1. General – These guidelines establish the sight distance triangle that must be kept clear of sight obstructions for all intersections and driveways pertaining to new developments. They are also applicable to the investigation of sight-distance complaints at existing intersections and driveways. The sight distance triangle depends primarily on the required visibility for drivers and pedestrians at intersections and driveways. It is determined by the type of intersection control (stop or yield sign, traffic signal or no control) and the speed limit on the major road or street entered upon. In the following sub-sections, the sight distance requirements used to properly establish sight distances triangles at various types of intersections and driveways are presented. Table 2 on page 2 lists recommended (desirable) and minimum (required) sight distances values and Figures 1, 2, 3a, 3b and 4 on pages 5 through 8 show corresponding sight distance triangles.
2. Types of Intersections and Driveways. – Table 1 below summarizes the characteristics of various types of intersections and driveways.

**TABLE 1: Types of Intersections and Driveways. Use this table to determine type (A through G)**

Intersections		
Type	Control Type	Speed Limit (MPH) on Major Street or Street Entered Upon
A	No Control	25
B	Stop Control on Minor Street	Any
C1	Yield – Crossing Maneuver from Yield Controlled Approach	25
C2	Yield – Turning Maneuver from Yield Controlled Approach	25
D	Signal	Any
E	All Way Stop	Any
G	Cases not covered by Types A through E	
Driveways		
Type	Driveway PM Peak Volume	Major Street Average Daily Traffic
F1	<10	< 6000
F2	10 ≥ and < 50	Any
F3	50 ≥ and ≤200	Any
F4	> 200	Any
G	Cases not covered by Types F1 through F4	

3. How to Establish Sight Distance Triangles– Sight distance triangles for various types of intersections and driveways are shown in **Figures 1, 2, 3a and 3b** on pages 5 through 7. In these figures, the sight distance triangles are represented by the shaded areas. Point A, or driver's decision point, represents the location of the driver; Point B is located on the major road at a specific distance (to the right and to the left) from the driver. This distance, referred to as the required sight distance, represents how far (on the major road) the driver should be able to see so as to safely exit a minor road or driveway or to make a right turn on red at a signalized intersection. In Figure 4 on page 8 the driver/pedestrian sight distance triangle also referred to as "pedestrian/driver inter-visibility area" is represented by the shaded area. This is the area that must be kept free of obstructions thus drivers exiting a driveway can see approaching pedestrians on the sidewalk and vice versa. Figure 4 does not apply to entrance to buildings and/or parking lots located inside buildings. **Table 2** on page 2 shows (in the right most columns) the sight distances values that need to be used to determine the sight distance triangle at various types of intersections and driveways.

For **uncontrolled intersections** (no traffic light, stop sign or yield sign described in **Type A/Figure 1**) or a **yield-controlled intersection** described in **Type C/Figure 3a**, contact **Jennifer Palmer**, City Transportation Engineer Supervisor, at **425-587-3894** to have the Public Works Department determine the required sight distance triangle.

**TABLE 2: Sight Distance Triangle Guidelines**

Type of Intersection or Driveways	Distance from Edge of Traveled Way (ft)	Major Street (Street Entered Upon)		
		Speed Limit (MPH)	Sight Distance Value (ft) (a) (B-C1) and (B-C2)	
			Recommended (Desirable)	Minimum (Required) (d)
<b>A – Uncontrolled</b> (See Figure 1)	115 (b)	25	115	115
<b>B - Stop Control on Minor Street</b> (See Figure 2)	14.5	25	280	155
		30	335	200
		35	390	250
<b>C - Yield Sign On Minor Street</b>				
<b>C-1: Yield Control – Crossing Maneuver</b> (See Figure 3.a)	130 (c)	25	240	240
		30	290	290
		35	335	335
<b>C-2: Yield Control – Turning Maneuver</b> (See Figure 3.b)	82 (c)	25	295	295
		30	355	355
		35	415	415
<b>D – Signalized Intersection</b> (See Figure 2)	14.5	25	240	155
		30	290	200
		35	335	250



<b>F1 – F4 Driveways</b> (See Figure 2)					
Type	Distance from Edge of Traveled Way (ft)	Average Daily Traffic	Speed Limit (MPH)	Recommended (Desirable)	Minimum (Required) (d)
<b>F1</b> ( <10 Peak Hour Trips)	10	<6000	25	155	155
			30	200	200
<b>F2</b> (10-49 Peak Hour Trips)	14.5	<6000	25	155	155
			30	200	200
			35	250	250
		>6000	25	280	155
			30	335	200
			35	390	250
<b>F3</b> (50-200 Peak Hour Trips)	14.5	<6000	25	155	155
			30	200	200
	14.5	>6000	25	280	155
			30	335	200
			35	390	250
<b>F4</b> ( >200 Peak Hour Trips)	14.5	<6000	25	280	155
			30	335	200
	14.5	>6000	25	280	155
			30	335	200
			35	390	250
			35	390	250
<b>F1-F4</b> (See Figure 4)	80 (e)	NA	NA	22 (f)	NA

## Footnotes:

(a) These values should be adjusted for grades with slopes of a magnitude of grade greater than 3%, number of lanes greater than two, for skewed intersections or for design vehicles other than passenger cars, using the intersection sight distance procedures in Chapter 9 of a Policy on Geometric Design, AASHTO, 7<sup>th</sup> Edition

(b) Distance back from center of intersection.

(c) Distance back from point C2 for types C-1 and C-2 intersections.

(d) Minimum (Required) only permitted if Recommended (Desired) is not possible (see page 3 for further explanation).

(e) Distance from back of the sidewalk.

(f) Distance parallel to the sidewalk from the center of the driveway.

- a. The values in **Table 2** on page 2, referred to as **Recommended (Desirable)** sight distance are based on the intersection sight distance procedures in Chapter 9 of A policy on Geometric Design, AASHTO, 7<sup>th</sup> Edition.

- b. The values on **Table 2 on** page 2, referred to as **Minimum (Required)** sight distance are based on the stopping sight distance values in Chapter 3 of A policy on Geometric Design, AASHTO, 7<sup>th</sup> Edition.
- c. The **Recommended** values are required. If the **Recommended** values cannot be reasonably obtained due to the presence of fixed structures that cannot be removed or roadway features such as horizontal and vertical curves then the driveway shall be relocated or designed to maximize sight distance, but in no way can the sight distance be less than the **Minimum** value. The **Minimum** values may be permitted, on a case-by-case basis, on streets that allow angle parking and have 25 MPH speed limit and at existing public street intersections that is not a high accident location (excluding driveways and private streets) unless the public street intersection will be redesigned.
- d. To determine the **Average Daily Traffic for Driveways F1 through F4**, see the City's web site at [www.kirklandwa.gov](http://www.kirklandwa.gov) go to City Departments, Public Works, Transportation, Data and Resources.
- e. To determine the **number of Peak Hour Trips for Driveways F1 through f4**, contact Jennifer Palmer, Transportation Engineering Supervisor at [jpalmer@kirklandwa.gov](mailto:jpalmer@kirklandwa.gov) to have the Public Works Department estimate the number of PM peak hour trips.

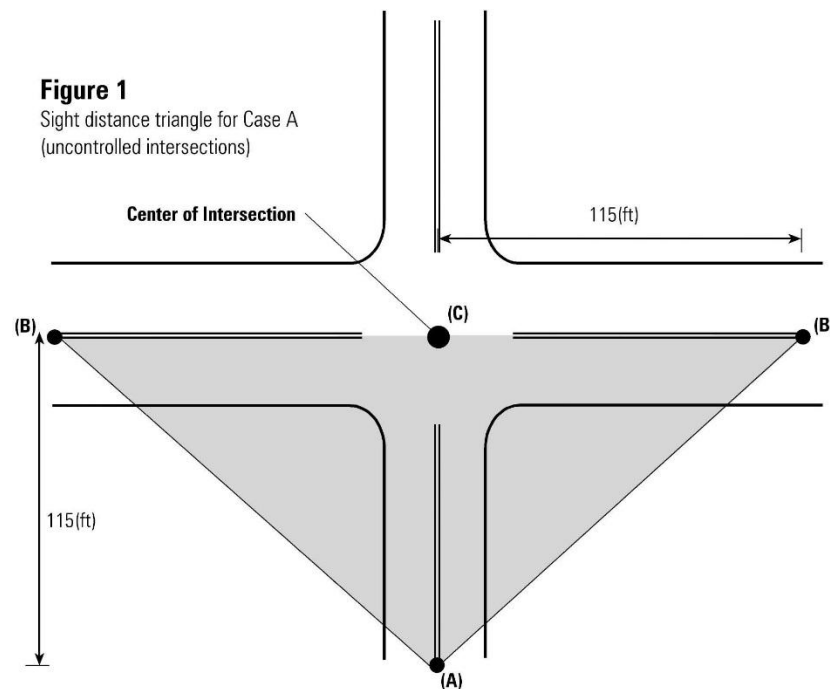
#### 4. Permissible Intrusion in the Area To Be Kept Clear of Sight Obstruction

- a. General – Except as stated in subsection (4)(b) of this section or unless specifically approved by the Public Works Director, no structure, improvement, vegetation or other objects may be within the area to be kept clear of sight obstructions between three (3) feet and eight (8) feet above finished grade within the sight distance triangle as defined below.
- b. Exceptions – The following are permitted to be within the area that must be clear of sight obstructions:  
Natural and fabricated objects and natural topography of the ground if the Public Works Director determines that adequate visual access is available. However, to fulfill the intent of this section, the Public Works Director may require land surface modification as part of any development activity on the subject property.

#### **Type A – Uncontrolled Intersections**

##### **Uncontrolled intersections are not controlled by either stop or yield signs.**

They are usually located on streets that carry very low volumes and have a 25 MPH speed limit. Figure 1 below shows the sight distance triangle for this type of intersection. In this Figure, Point A and point B are each located on the center of the intersecting street approaches, 115 ft from Point C, which is located at the center of the intersection. The sight distance triangle area that must be kept free of sight obstructions is the shaded area limited by segments AC, BC and AB.



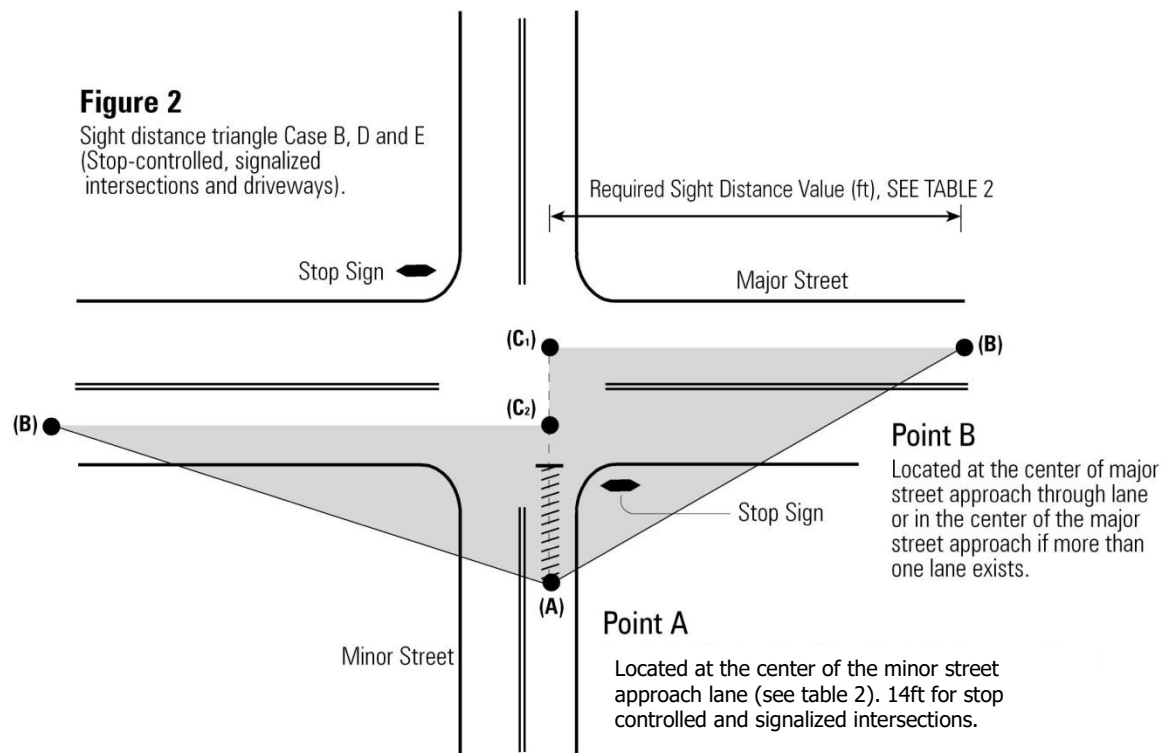
## Type B – Stop Controlled Intersections

**Type B intersections are those at which the minor street approaches are controlled by stop signs.** Sight distance triangle to the left is the shaded area bounded by segments A-B, B-C2 and A-C2; whereas sight distance triangle to the right is the shaded area bounded by the A-B, B-C1 and A-C1 segments as shown in Figure 2 below. Point A, or decision point, is located in the center of the minor street approach lane, 14.5 ft. from the edge of the major road's traveled way. **The traveled way is the portion of the road intended for the movement of vehicles and bicycles, exclusive of shoulders and turning lanes.**

At existing intersections, where sight obstructions within the sight triangle cannot be removed due to limited right of way, the setback distance may be reduced. Drivers who do not have the desired sight distance creep out until the sight distance is available; therefore, the setback may be reduced to 10 feet.

Point B is located on the center of the through lane on the major street (or in the center of the major street approach if more than one lane exists), a specific distance left and right from Points C1 and C2. The distance C1-B (same as C2 –B) is the required sight distance, which can be found in Table 2 on page 2.

If a parking lane exists on the major street, it may be excluded from the traveled way. Usually these are cases where volumes and speeds are low and therefore the overall safety risk at the intersection is considered low. If the on-street parking is allowed on the major street, but the parking lane is not specifically striped, then the edge of the traveled way is assumed to be 7 ft from the face of curb or edge of pavement.

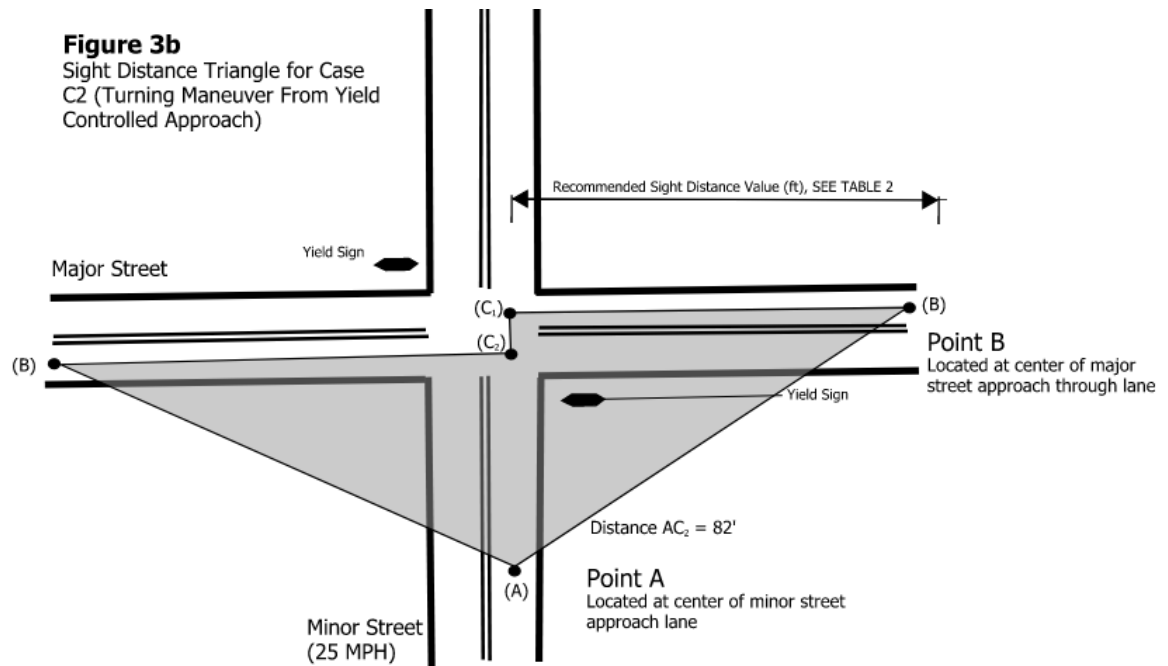
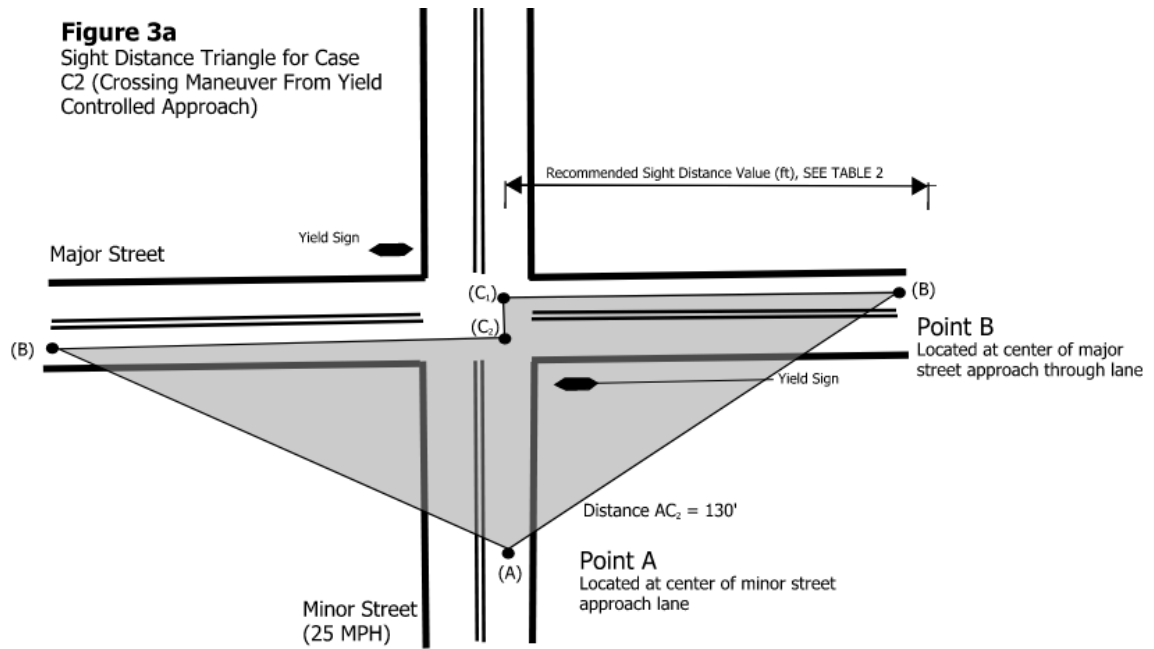


### Type C – Yield Controlled Intersections

Yield control at intersections shall only be applied to a local street whose speed limit is 25 MPH or less. Two situations need to be considered for yield-controlled intersections: making a crossing maneuver from the yield-controlled approach and making a turning maneuver from the yield-controlled approach. The sight distance triangles for each of these situations are shown in Figures 3a and 3b on page 7 respectively for Types C-1, crossing maneuver for a yield-controlled approach and C-2, turning maneuver from a yield-controlled approach.

Figure 3a and Figure 3b show the approach sight distance triangles for these two maneuvers. Within the approaching sight distance triangle Point A is located in the center of the minor street approach lane, 130 ft from Point C2 for crossing maneuvers and 82 feet for turning maneuvers. Point C2 is located at the center of the nearest major street approach lane. In both figures, points C1 and C2 are separated by a distance equal to the width of one through lane on the major street.

The departure sight distance triangles similar to the sight distance triangles at stop-controlled intersections (Type B above on page 2) should also be provided for yield-controlled intersections. Drivers attempting to make a turning a maneuver at a yield-controlled approach may come to a complete stop at the yield sign. However, it is not necessary to check these departure sight distance triangles since approach sight distance triangles for turning movements at yield-controlled approaches are larger than the sight distance triangles for turning movements from stop-controlled approaches.



### **Type D- Signalized Intersections and Signalized Driveways**

At signalized intersections and signalized driveways, in order to turn right on red, drivers should be able to clearly see vehicles approaching from the left; the applicable sight distance triangle is the shaded area bounded by the A-B, B-C2, and A-C2 setback lines shown in Figure 2 on page 6. Sight distance (B-C2) values are summarized in Table 2 on page 2.

### **Type E – All Way Stop Controlled Intersections**

The only sight distance requirement for all-way stop controlled intersections is that the first stopped vehicle on one approach should be visible to the first stopped vehicle on all other approaches.

### **Type F1 through F4 – Driveways not Controlled by Traffic Signals**

Driveways not controlled by traffic signals operate as Type B, Stop-Controlled Intersections; therefore, the applicable sight distance triangles are shown in Figure 2 on page 6. For driveways Type E1, Point A is located 10 ft from the edge of the major route's traveled way. For driveway Types E2 through E4, Point A is located 14 ft from the edge of the major route's traveled way. Sight distances values (B-C1, B-C2) are summarized in Table 2 on page 2.

Additionally, drivers emerging from driveways must be able to see approaching pedestrians on the sidewalk and vice versa. In Figure 4 below, the shaded areas on each side of the driveway show the pedestrian/vehicle sight distance triangle or pedestrian/vehicle inter-visibility area which must be kept free of obstructions per Section 4 of these guidelines. The driver's point of view (point A) is located at the center of the driveway approach lane measured 14 feet from the back of the sidewalk. The pedestrian/vehicle sight distance triangles must extend to a point 15 feet from the edge of the driveway, on either side of the driveway (Point B).

Drivers exiting parking garages shall have clear sight distance on both sides of the exiting lane, as shown in Figure 4. Sight distance shall be measured 14 feet from the back of sidewalk or alley, if there is no sidewalk.

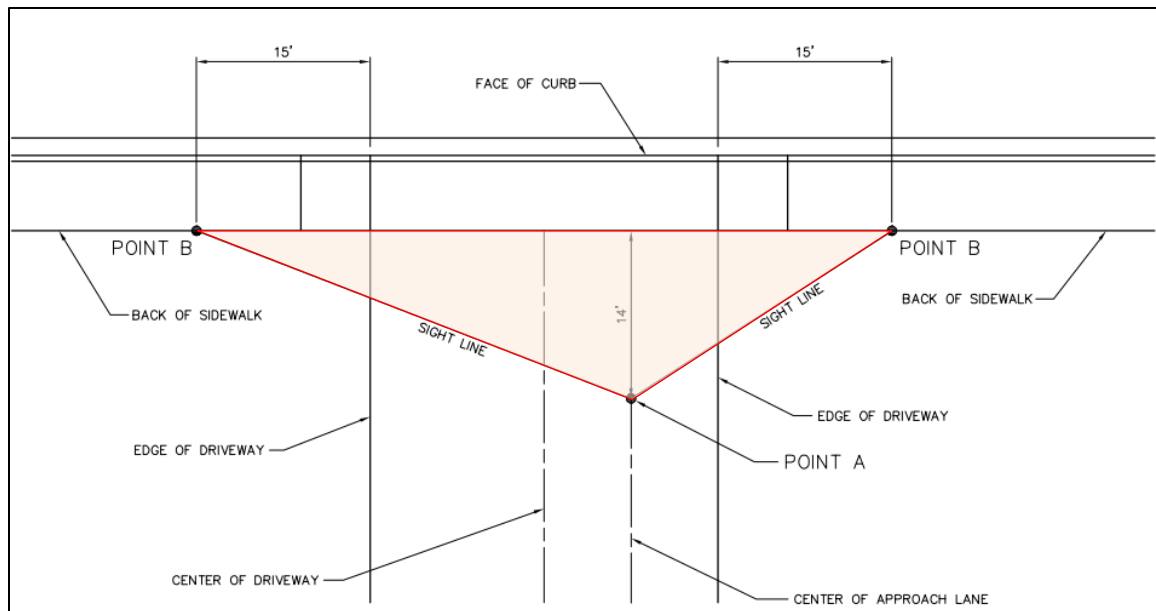


Figure 4. Pedestrian sight distance.

### **Type G- Intersections and Driveways not Covered in Types A-F.**

The sight distance triangle for intersections and driveways that do not fit any of the types previously described are to be analyzed on a case-by-case basis with review and approval from Kirkland Public Works.

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy R-14: Neighborhood Access Street Improvement Modification and Waiver Process**

The traditional street standard within the City of Kirkland consists of paving, storm drainage, vertical curb and gutter, landscape strip with street trees, and a sidewalk. However, the City also recognizes that the traditional improvements may not be desired by property owners in certain neighborhoods or along certain streets. And, the City encourages the use of Low Impact Development (LID) techniques to reduce the surface water impacts associated with the addition of new impervious surfaces. Given this, the City Council has directed the Public Works Staff to:

- Seek opportunities to use LID techniques when constructing street improvements.
- Work with property owners on a case-by-case basis to determine if the traditional street improvements should be modified with LID improvements, or if all street improvements should be waived to meet the desire of the neighborhood.

When considering the modification or waiver, the following criteria shall be followed or met:

#### **A. Modifications**

1. Only Neighborhood Access type streets are eligible for modified street improvements. Collector and Arterial type streets shall have traditional street improvements unless otherwise approved by the Public Works Director.
2. A modified street improvement shall still include sidewalk, street trees, storm drainage collection, but include a concrete edge treatment only (no curb).
3. Generally, the modification area should be at least one block long, and shall not have any existing traditional street improvements. In cases where the property owners desire to have modified street improvements, but there are islands of existing traditional street improvements, the Public Works Department shall review the street and determine if it is feasible and safe to install modified improvements along the remainder of the street.
4. Property owners along dead-end streets 300 to 400 feet in length, or looped streets less than 1000 feet in length, may also propose to modify their street improvements by designating only one side of the street for sidewalk.

#### **B. Waivers**

1. Only Neighborhood Access type streets are eligible for a street improvement waiver. In addition, the street is not eligible for a waiver if it has any of the following designations:
  - School walk route.



## Policy R.14 Neighborhood Access Street Improvement Modification and Waiver Process

- Walking routes adopted within a Neighborhood Plan or the City-wide Non-motorized Plan.
  - Commercial, multi-family, or medium density residential (RS 5000 or lower) land use designations.
  - Streets with greater than 500 total vehicle trips per day (if the City does not have trip data for particular street, it will be assumed that it is less than 500 trips per day)
2. Generally, the street improvement waiver area should be at least one block long and shall not have any existing street improvements. In cases where the property owners desire to have the street improvements waived, but there are islands of existing street improvements, the Public Works Department shall review the street and determine if it is feasible and safe to grant a street improvement waiver along the remainder of the street. Granting of street improvement waivers should be avoided when there are several existing islands of improvements and there is a potential for redevelopment of other adjacent properties.
  3. If the City and a Neighborhood approve a street improvement waiver, all future development permits along the subject street, including subdivisions, will receive a street improvement waiver. A waiver of street improvements can be changed by a future vote of the subject neighborhood.
  4. If a new public street (typically occurring as a result of a new subdivision) intersects with a street that has received a street improvement waiver, the new public street shall be improved with traditional or modified street improvements unless otherwise approved by the Public Works Director.

### C. Neighborhood Voting Process

1. An individual, a group, or the City may initiate the process to determine if there is desire by the respective property owners to have the street improvements modified or waived.
2. Before approving a modification or a waiver, the Public Works Department will send a ballot to the property owners along the subject street.
  - When less than 70 tax parcels are impacted by the street improvements:  
At least 70% of those property owners that receive a ballot must vote "yes" for the street improvement modification or waiver.
  - Where 70 or more tax parcels are impacted by the street improvements:  
At least 70% of the property owners that return a ballot must vote "yes" for the improvement modification or waiver. In addition, at least 70% of the ballots must be returned to constitute a valid vote.
3. After the ballots are returned, a letter will be sent to each owner letting them know of the voting results.

- D. Appeals - The decision of the Public Works Director regarding street improvement modifications or waivers may be appealed using the appeal provisions, as applicable, of Process I of this code, KZC 145.60 through 145.110.

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy R-15: Permitted Landscaping in Public Right-of-way**

Kirkland Municipal Code (KMC) 19.04.050 allows property owners to incorporate unused public right-of-way into the landscaping design of the abutting property. KMC 19.04.010 does not allow a person to place objects within the public right-of-way that obstruct or tend to obstruct vehicles or pedestrians traveling thereon except as provided for in 19.010.40 or without City of Kirkland authorization. The KMC does not define "landscaping" sufficiently to help the property owner choose appropriate landscaping that preserves the right-of-way for public use, now or in the future. To preserve the public right-of-way, the restrictions in 19.04.010 shall take precedence over the exception allowed in 19.04.050.

Landscaping shall be limited in size to not impact or obstruct the installation or maintenance of existing or future utilities. (ex. No trees, arborvitae or large bushes)

In addition, landscaping shall not obstruct sight distance of drivers exiting driveways or at intersections in accordance with Kirkland Zoning Code 115.135 and Policy R-13 – Intersection Sight Distance.

Policy R-15 clarifies acceptable landscaping for the following three situations:

- In the public right-of-way Between the curb and sidewalk and back of sidewalk
- In the public right-of-way between the property line and curb when a sidewalk or other designated path does not exist
- In the public right-of-way between the property line and edge of pavement when a curb does not exist

Public Works will evaluate other situations on a case-by-case basis.

#### **Permit and Hold Harmless Agreement**

Depending on the landscaping, the City might require the adjacent property owner to obtain a City Right-of-way Permit, sign a City Hold Harmless Agreement (Agreement) and the Agreement must be recorded. The City can revoke a Right-of-way Permit at any time. The Agreement informs the signatory the City will not be held responsible for any damages resulting from the construction of a fence within a public right-of-way. The property owner should meet with City staff to review the proposed or existing landscaping to determine the need for a permit and Agreement.

#### **In Public Right-of-way Between Curb and Sidewalk and Back of Sidewalk**

Plantings selection and installation shall conform to Kirkland Zoning Code Chapter 95. Plant selection should be guided by the Kirkland Plant List referenced in KZC 95.50.5.a and available on the City's website. Between curb and sidewalk, plant height shall be maintained no higher than 12 inches, except for required street trees. Landscaping shall not encroach on or overhang the sidewalk or curb in the public right-of-way.

#### **In Public Right-of-Way between Property Line and Curb without a Sidewalk or Path**

Public Works will allow property owners to implement the following ground treatments in the public street right-of-way between the property line and curb.

- Grass
- Gravel
- Mulch
- Low-growth plants no more than 12 inches maximum height, provided the landscaping design leaves a minimum 5-foot wide continuous opening available for pedestrian passage in the right-of-way, and the plants do not encroach on the 5-foot wide opening or overhang the curb.

Landscaping shall not obstruct or tend to obstruct pedestrian passage along the public right-of-way per Kirkland Municipal Code Section 19.04.010. Landscaping shall not block access to curb at intersections. River cobbles, boulders, ground modifications, fencing or other treatments are not allowed if these treatments might impede pedestrian passage.

### **In Public Right-of-Way without a Curb between Property Line and Edge of Pavement**

A property owner can implement the following ground treatments in the public street right-of-way between the property line and edge of pavement.

- Grass
- Gravel
- Mulch

These treatments shall be implemented in a manner that does not remove or otherwise restrict parking. River cobbles, boulders, shrubs, trees or other objects shall not be placed in the road shoulder that would obstruct or tend to obstruct vehicles or persons per Kirkland Municipal Code Section 19.04.010.

If the City's Street Division installs gravel in lieu of landscaping, the City will maintain the graveled portion.

### **Public Right-of-way Landscaping Maintenance**

The owner of the abutting property is responsible for maintaining the landscaping, including watering, trimming, and weeding, unless the property owner obtains a written agreement from the City's Maintenance Center agreeing to perform this work.

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy R-16: FENCES IN OR NEXT TO PUBLIC RIGHT-OF-WAY**

Kirkland Zoning Code (KZC) 115.40 and 115.115 establish location and other criteria for fences or fences combined with retaining walls installed on private property or in the public right-of-way. Fences are subject to sight distance requirements in KZC 115.135 and Policy R-13 – Intersection Sight Distance. Kirkland Municipal Code (KMC) 19.04.010 does not allow objects to be placed in public right-of-way that impedes vehicle or pedestrian travel, as applicable. Objects can include fences and/or retaining walls.

The purpose of Policy R-16 is to clarify situations not specifically identified in City Codes, such as where fences might meet criteria, but, because of other factors, create a potential traffic safety issue or unnecessarily restrict the public right-of-way. In other situations, fences might not meet prescriptive criteria and yet are not creating a traffic safety issue because of topography or other existing conditions. Public Works and/or the Planning Department are allowed to consider requests for special fencing situations on a case-by-case basis. Public Works can also take action to mitigate issues existing fences create in the public right-of-way, after considering the circumstances, consequences and benefits.

#### **Permit and Hold Harmless Agreement**

For a fence built in the public right-of-way, the fence owner must obtain a City Right-of-way Permit, sign a City Hold Harmless Agreement (Agreement) and the Agreement must be recorded. The City can revoke a Right-of-way Permit at any time. The Agreement informs the signatory the City will not be held responsible for any damages resulting from the construction of a fence within a public right-of-way.

#### **Special Considerations**

KZC 115 allows fences to be:

1. 3.5 feet in height within 3 feet of the property line abutting a principal or minor arterial except where the abutting arterial contains an improved landscape strip between the street and sidewalk; or
2. No closer than 15 feet to any street curb or the edge of pavement if no curb exists, unless the location of the property line is closer than 15 feet; or
3. Fences over 3 feet in height are not allowed within the areas of a sight distance triangle on each side of streets or driveways at intersections.

However, Public Works can reduce the fence height to less than 3 feet and/or alter location criteria next to streets or existing driveways when fences in the public right-of-way would obstruct sight

distance in accordance with Policy R-13 - Intersection Sight Distance. If the fence is on private property, the City can enforce KZC 115.135 based on Policy R-13.

The combined height of fences plus retaining walls cannot exceed heights specified in KZC 115.115. In addition, these heights are also subject to KZC 115.135 and R-13.

### **Gate Requirements on Private Property Fences (for access to publicly maintained systems)**

Provide an access gate for the Public Works Department to inspect and maintain publicly maintained utility systems (example: storm drainage or sanitary sewer system) installed in a public utility easement that is located on private property. Gate specifications:

- Install the gate on private property fencing abutting the right-of-way.
- The location of the gate is either specified on the LSM or Building permit plans, and may be augmented by the Public Works construction inspector during construction.
- Gate width shall be a minimum of 12' wide, unless a larger gate is required by Public Works.
- Gate height shall be equal to the property fence (typically 6' tall).
- Gate material shall be equal to construction and appearance to the property fence.
- A Gate Keeper lock will be required to allow access to both the property owner and the City. Contact the Public Works construction inspector for details about the Gate Keeper lock.
- Maintenance of the gate, as with the property fencing, is the responsibility of the homeowner.

## CITY OF KIRKLAND

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### PRE-APPROVED PLANS POLICY

#### Policy R-17: SPEED LIMITS

##### BACKGROUND

The City Council asked the Transportation Commission to establish a policy for setting speed limits. Transportation Staff reviewed technical information, heard from interested citizens and considered various approaches to setting speed limits. The findings were presented at the January 3, 2006 Council meeting and modified in response to direction given by the City Council. (Ref. attached Memorandum to the Kirkland City Council from the Transportation Commission dated January 5, 2006.)

##### POLICY PRINCIPLES

1. This policy is one of the Public Works Administrative Policies and is for use on collector and arterial streets.
2. Kirkland streets are posted at one of three speed limits: 25; 30; or 35 MPH.
3. Changes to existing speed limits should generally occur in 5 MPH increments.
4. Posted speed limits are based on the 85th percentile of prevailing speeds as measured on the roadway in question. Figure 1 shows the relationship between prevailing and posted speed.
5. As shown in Figure 1, for certain prevailing speeds, more than one speed limit could be selected for posting. These prevailing speeds are shown near the striped arrows on the prevailing speed side of Figure 1. In these cases the higher posted speed should be used unless special conditions are present. Typical special conditions are shown in note 3 of Figure 1.
6. Posted speed limits should be reasonable, safe and based on engineering/traffic studies.
7. When there is a need to reduce operating speeds, traffic operational or physical changes should be considered to change the feel of the road so that drivers will tend to drive more slowly.

##### IMPLEMENTING THE POLICY

1. Speed limit evaluations should take place when specific concerns are raised rather than on a routine basis.
2. Findings of all evaluations should be reported to the Transportation Commission
3. The Transportation Commission will report their findings to Council. The City Council makes the final decisions as to whether or not a speed limit should be changed.

##### GUIDELINES FOR THE EVALUATION OF REQUESTS TO CHANGE SPEED LIMITS

Changes are made in five MPH increments between 25, 30 and 35 MPH. This results in four possible changes as shown in the shaded boxes below:

**Possible speed limit changes**

To	From		
	25 MPH	30 MPH	35 MPH
25 MPH	X	Lower by 5 MPH	Lower by 10 MPH
30 MPH	Raise by 5 MPH	X	Lower by 5 MPH
35 MPH	Raise by 10 MPH	Raise by 5 MPH	X

The policy is for use on collector and arterial streets. The speed limit on local streets is 25 MPH.

The 85th percentile speed (the speed at which 85% of the traffic is traveling at or below) is used to determine the prevailing speed. This is a simple and fact-based method for establishing a posted speed limit based on the logic that most drivers will operate at speeds that are safe and reasonable. This is the key tenet of our policy.

Further, *prevailing speeds do not change when the speed limit alone is changed* and artificially low speed limits have several negative effects. First, they may not be in keeping with RCW requirements for reasonableness. Second, complaints are received from those who think that drivers should be traveling closer to the speed limit. These complaints are extremely difficult to address without committing unreasonably high levels of enforcement personnel. Low speed limits also create frustration and complaints from drivers. Some other negative consequences include general disregard for speed limits, dangerous maneuvers by frustrated drivers –both those who wish travel faster and those who think all should follow the low speed limit-- and inconsistency between speed limits on similar roadways.

The most effective way to alter the travel speed is to change the feel of the road so that drivers will tend to drive more slowly. This type of change is often difficult and expensive to accomplish. Nonetheless, locations where speeds are perceived to be too high should be considered for measures to reduce prevailing speeds. There is a wide range of such arterial traffic calming measures, but typical examples include medians, curb bulb-outs, and landscape strips between sidewalk and curbs. Land use characteristics such as building fronts which are close to the street are also useful although such changes usually take place over relatively long time periods. Once prevailing speeds are reduced, the speed limit can be lowered.

#### MEASURING THE PREVAILING SPEED

Automatic counters are used to measure speeds for several days. This typically results in thousands of data points. Peak and off-peak observations are used together to determine the 85th percentile speed.

#### DETERMINING THE SPEED LIMIT

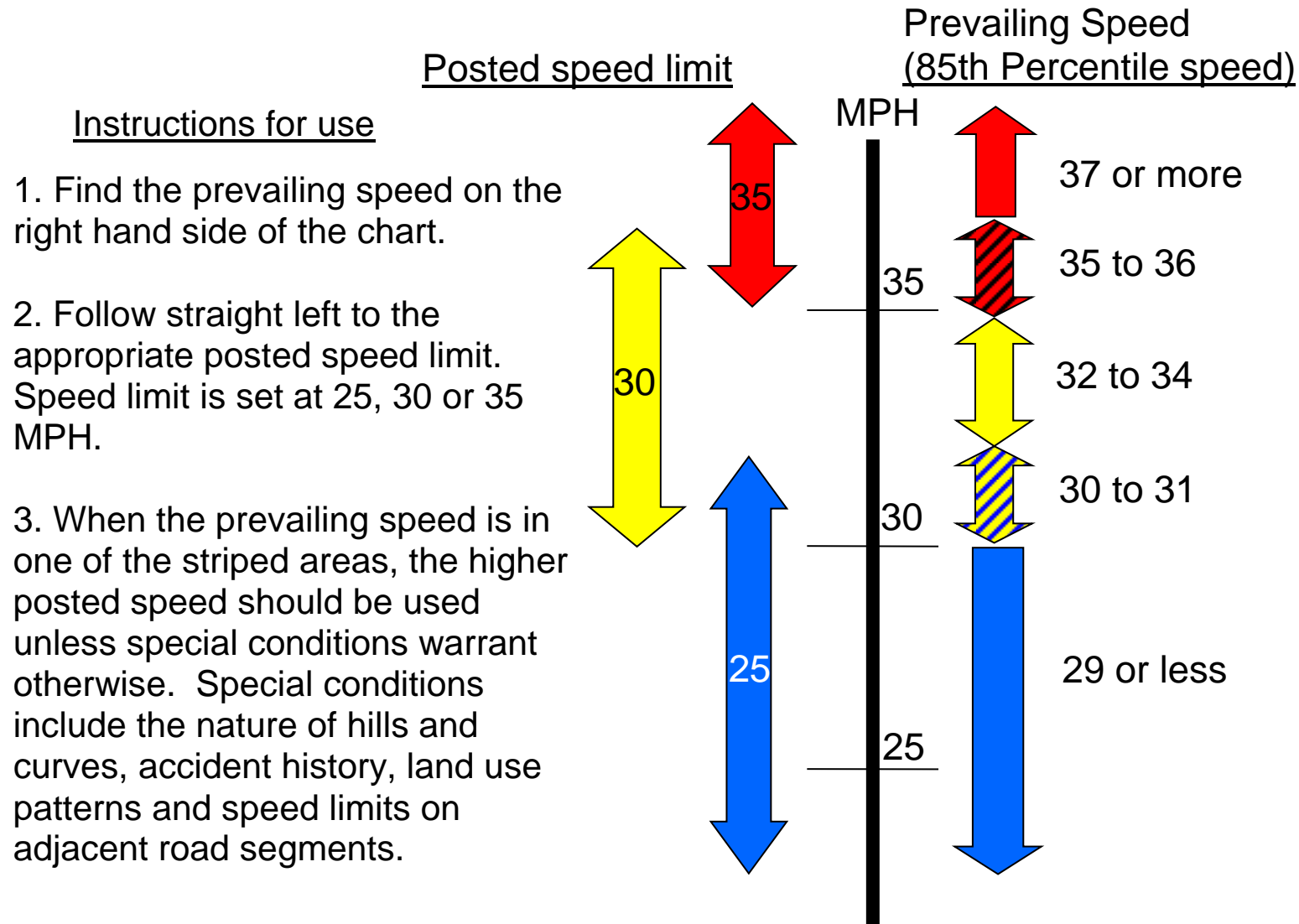
Figure 1 shows the relationship between prevailing and posted speed. Note that it is skewed to recommend a posted speed just slightly lower than the prevailing speed. This recognizes most citizens' support for lower rather than higher speed limits.

Note that for some prevailing speeds, Figure 1 allows more than one posted speed. The decision is made

by considering the prevailing speeds that are shown next to the striped arrows on the prevailing speed side of Figure 1. In these cases the higher posted speed should be used unless special conditions are present. For example, an 85th percentile speed of 31 MPH could be posted at 25 or 30 MPH. In this example, the speed limit should be posted at 30 MPH unless conditions warrant a lower speed limit. Examples of these conditions are indicated on Figure 1, but we do not intend for that list to be an exhaustive one. Staff should evaluate and consider the conditions on a consistent but case by case basis.

Flexibility is intentionally built into the policy. While this does not give a predetermined precise answer for each and every application, it makes for a policy that is better suited to a wide range of conditions.

Figure 1. Relationship between prevailing and posted Speed







## CITY OF KIRKLAND

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[www.ci.kirkland.wa.us](http://www.ci.kirkland.wa.us)

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### MEMORANDUM

**To:** Kirkland City Council

**From:** Kirkland Transportation Commission, Dan Fisher, Chair

**Date:** January 5, 2006

**Subject:** Speed Limit Policy

### BACKGROUND

As part of the Commission's 2005 work plan, the City Council asked the Transportation Commission to establish a policy for setting speed limits. During the past year we have reviewed technical information, heard from interested citizens and considered various approaches to setting speed limits. We presented our findings at the January 3, 2006 Council meeting and Council asked that a seventh principle be added. That principle describes reduction of operating speeds through means other than lowering speed limits.

### POLICY

#### *Policy principles*

1. This policy is one of the Public Works Administrative Policies and is for use on collector and arterial streets.
2. Kirkland streets are posted at one of three speed limits: 25; 30; or 35 MPH.
3. Changes to existing speed limits should generally occur in 5 MPH increments.
4. Posted speed limits are based on the 85th percentile of prevailing speeds as measured on the roadway in question. Figure 1 shows the relationship between prevailing and posted speed.
5. As shown in Figure 1, for certain prevailing speeds, more than one speed limit could be selected for posting. These prevailing speeds are shown near the striped arrows on the prevailing speed side of Figure 1. In these cases the higher posted speed should be used unless special conditions are present. Typical special conditions are shown in note 3 of Figure 1.
6. Posted speed limits should be reasonable, safe and based on engineering/traffic studies.
7. When there is a need to reduce operating speeds, traffic operational or physical changes should be considered to change the feel of the road so that drivers will tend to drive more slowly.

#### *Implementing the policy*

1. Speed limit evaluations should take place when specific concerns are raised rather than on a routine basis.
2. Findings of all evaluations should be reported to the Transportation Commission
3. The Transportation Commission will report their findings to Council. The City Council makes the final decisions as to whether or not a speed limit should be changed.

This portion of the memo is intended to provide information about policy's basis.

*What types of speed limit changes are covered by this policy?*

Since changes are made in five MPH increments between 25, 30 and 35 MPH, this leaves four changes as shown in the shaded boxes below:

To	Possible speed limit changes		
	From		
	25 MPH	30 MPH	35 MPH
25 MPH	X	Lower by 5 MPH	Lower by 10 MPH
30 MPH	Raise by 5 MPH	X	Lower by 5 MPH
35 MPH	Raise by 10 MPH	Raise by 5 MPH	X

The policy is for use on collector and arterial streets. The speed limit on local streets is 25 MPH.

*Are there state laws that govern speed limits set by local governments like Kirkland?*

RCW § 46.61.415 requires local agencies to perform an "engineering and traffic investigation" to support posting of speed limits which are "reasonable and safe." After reviewing the speed limit policies of multiple jurisdictions and agencies we found that without exception they were based on similar principles. School zone speed limits are also covered by RCW and are time-of-day speed limits near schools.

*Why is the 85th percentile speed used as a basis for the posted speed limit?*

Setting speed limits based on the prevailing speed of traffic is common and accepted practice across the US and in other countries as well. Typically, measurement of the 85th percentile speed (the speed at which 85% of the traffic is traveling at or below) serves as the method for determination of the prevailing speed. The logic behind this is as follows: Since most drivers will operate at speeds that are safe and reasonable, measuring the prevailing speed of traffic is a simple and fact-based method for establishing a posted speed limit. This is the key tenet of our policy.

*How is the prevailing speed determined?*

Automatic counters are used to measure speeds for several days. This typically results in thousands of data points. Peak and off-peak observations are used together to determine the 85th percentile speed.

*How is the appropriate posted speed determined once the 85th percentile speed is known?*

Figure 1 shows the relationship between prevailing and posted speed. Note that it is skewed to recommend a posted speed just slightly lower than the prevailing speed. This recognizes most citizens' support for lower rather than higher speed limits.

*For some prevailing speeds, Figure 1 allows more than one posted speed. How do you pick which posted speed to use?*

As shown in Figure 1, for certain prevailing speeds, more than one speed limit could be selected for posting. These prevailing speeds are shown next to the striped arrows on the prevailing speed side of Figure 1. In these cases the higher posted speed should be used unless special conditions are present. For example, an 85th percentile speed of 31 MPH could be posted at 25 or 30 MPH. In this example, the speed limit should be posted at 30 MPH unless conditions warrant a lower speed limit. Examples of these conditions are indicated on Figure 1, but we do not intend for that list to be an exhaustive one. Staff should evaluate and consider the conditions on a consistent but case by case basis.

*Why does the policy have so much "wobble room"?*

We have intentionally built flexibility into the policy. While this does not give a predetermined precise answer for each and every application, it makes for a policy that is better suited to a wide range of conditions.

*Why does the policy support a higher speed limit even if drivers are already going too fast?*

Part of the answer to this question is contained in the answer to why the 85th percentile speed is used (see above). Further, based on the information we have reviewed, we conclude that *prevailing speeds do not change when the speed limit alone is changed*. This is an important concept and based on our discussions with citizens it is one that most people find counterintuitive. It means that if the prevailing speed is perceived to be too high, a reduction in the speed limit alone is not adequate to lower speeds. Perhaps the most practical evidence in support of the fact that speed limits do not, by themselves, alter travel speeds is experienced on roadway segments where the speed limit "feels too low." It is this "feel" that is the most important factor in determining how fast drivers will travel. When speeds are measured on streets where the speed limit feels too low, it is usually found that the 85th percentile speed is well above the posted speed limit.

*If the speed limit can't be lowered, but cars are still traveling too fast, what else is available?*

The most effective way to alter the travel speed is to change the feel of the road so that drivers will tend to drive more slowly. This type of change is often difficult and expensive to accomplish. Nonetheless, locations where speeds are perceived to be too high should be considered for measures to reduce prevailing speeds. There is a wide range of such arterial traffic calming measures, but typical examples include medians, curb bulb-outs, and landscape strips between sidewalk and curbs. Land use characteristics such as building fronts which are close to the street are also useful although such changes usually take place over relatively long time periods. Once prevailing speeds are reduced, the speed limit can be lowered.

*Prevailing speeds might be lowered by lowering the speed limit, why not try it?*

It is common for those who support a speed limit not in keeping with the prevailing speed to argue that lowering the speed limit has no negative effects. Speed limits that are too low do have several negative effects. First, they may not be in keeping with RCW requirements for reasonableness. Second, complaints are received from those who think that drivers should be traveling closer to the speed limit. These complaints are extremely difficult to address without committing unreasonably high levels of enforcement personnel. Low speed limits also create the feeling described above of a speed limit that is too low which leads to frustration and complaints from drivers. Some other negative consequences include general disregard for speed limits, dangerous maneuvers by frustrated drivers—both those who wish to travel faster and those who think all should follow the low speed limit—and inconsistency between speed limits on similar roadways.

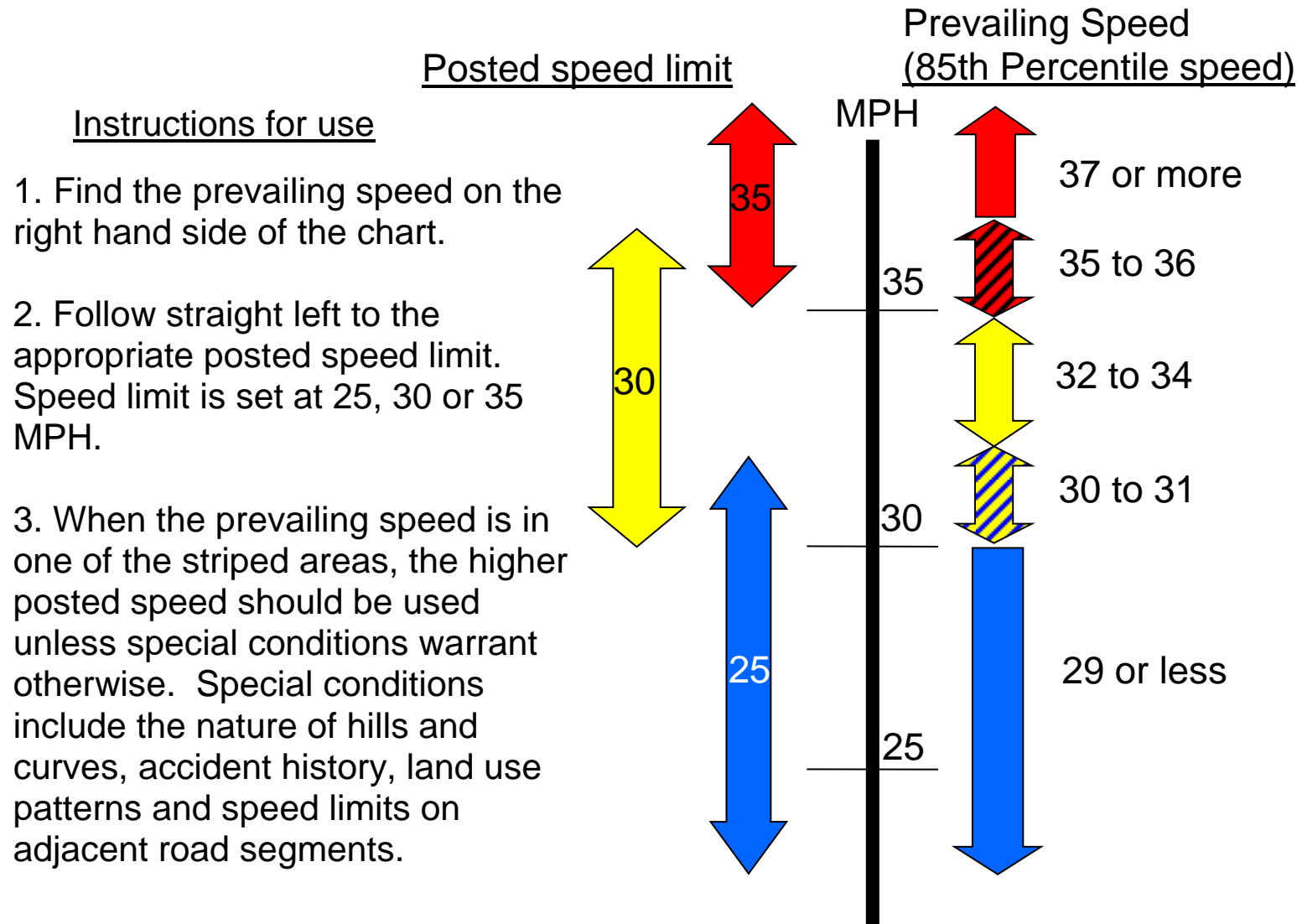
*Were other methods for determining speed limits considered?*

In our discussions with citizens we heard proposals for three other methods for establishing speed limits. One was to let neighborhood associations vote to determine an appropriate speed limit. We feel that this would violate the RCW requirements of basing speed limits on an engineering and traffic investigation and possibly the requirement that speed limits be safe and reasonable.

Another citizen proposed a much more detailed approach to setting the speed limit. It involved detailed quantitative evaluation of a series of factors for each speed limit considered. We viewed this approach as involving more analysis than is necessary given the effort necessary to develop and implement it. This conclusion is based mainly on Staff comments that speed limit review has been requested on only three to five sections of roadway in the past 12 years. Also, those who are unhappy with the outcome would have a series of factors and ratings to debate; instead of making decisions less subject to speculation, this more detailed approach might make them made more so.

Rising out of a concern for more consistency between speed limits, it was proposed that one speed limit be proposed for all streets or that speed limits be posted based on street functional classification. While we felt that consistency of speed limits between sections of the same roadway is a valid concern, it should not be the only factor considered nor should it outweigh prevailing speed as the primary factor. Consistency between speed limits on adjacent roadway segments should be considered when choosing a posted speed. (see discussion of Figure 1 above and note 3 on Figure 1).

Figure 1. Relationship between prevailing and posted Speed



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### **PRE-APPROVED PLANS POLICY**

#### **Policy R-18: PERMANENT RADAR SIGNS**

BACKGROUND: Reference the Memorandum, "Permanent Radar Sign Policies" dated September 2006 to the Kirkland City Council from the Transportation Commission. This document is available on-line or from the Transportation Division of Public Works.

1. Radar signs are considered as one of the several traffic calming tools available for solving speeding problems in Kirkland.
2. Radar signs can be used on 2 or 3 lane arterials and collector streets, especially where other traffic calming devices may not be appropriate, such as streets with traffic volumes greater than 5,000 vehicles per day and on Primary Emergency Response Routes.
3. Radar signs should not be used use on local streets where other traffic calming measures are applicable.
4. Each application of radar signs needs a "before and after" study with community feedback to build upon our experience of where the signs are most effective.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy R-19: CURB PAINTING: AUTHORIZATION FOR PAINTINGS BY  
ADJACENT PROPERTY OWNERS**

Initiated December 2008

**Background:** Public Works receives routine requests to have curbing painted red to designate 'no parking zones'. Many of these requests are for on-safety situations. An example is:

- Requests for painting 5 feet on each side of a driveway to remind motorists not to park too closely to the driveway. Such parking is already illegal and enforceable, but some residents want the red paint as a reminder.

Note that Red Curb is no longer authorized for mailboxes only. Instead, refer to pre-approved plan policy R-37, Mailbox No Parking Signs: Authorization for Property Owners.

The number of painted curbs has grown over the years to the point where City Maintenance Crews are hard-pressed to maintain them. The budget cuts for 2010/2011 significantly reduced the City's ability to maintain existing and paint new 'no parking zones' by reducing funds for seasonal summer laborers.

To address the on-going needs for 'no parking' zones that are not safety-related, a procedure was developed whereby the City would give residents or property owners authorization, with specific conditions, to paint the curbs abutting their property.

Attached is a letter that provides the format for the authorization to paint and maintain the curbs.

This service would be managed by the Neighborhood Traffic Control Coordinators.

December 10, 2012

DATE

Kirkland, WA 98033

**Subject: Red Curb Painting Authorization, LOCATION Kirkland, WA**

This letter authorizes you to paint the curb red from the edges of the driveway (defined in Figure 1) for 5 feet on either side of your driveway. Please do not exceed this authorized length; you will be required to remove excess red.

This red curb authorization is in accordance with the attached policy R-19, subject to conditions listed in this authorization and authorized for the above-described segments. Please retain this letter as proof of the City's authorization. If you move in the future, please leave this letter with the new occupants.

**Conditions:**

1. Standard, water-based red curb marking paint (called Red Zone Marking Paint) must be used for painting red curb. This is available at Miller Paint Company, 11730 118<sup>th</sup> Ave NE, Suite A300, Kirkland, WA 98034, (425) 822-6092.
2. The City of Kirkland will not maintain these paint markings. Maintenance of red curb will be solely your responsibility.
3. This authorization does not expire unless the City of Kirkland revokes it. The City reserves the right to revoke the authorization at any time.
4. The City does not warrant that motorists will comply with this red curb, but it is officially approved and as enforceable as if City crews had done the painting. For enforcement, please contact the police at non-emergency 911 number (425) 577-5656 or [police@kirklandwa.gov](mailto:police@kirklandwa.gov).

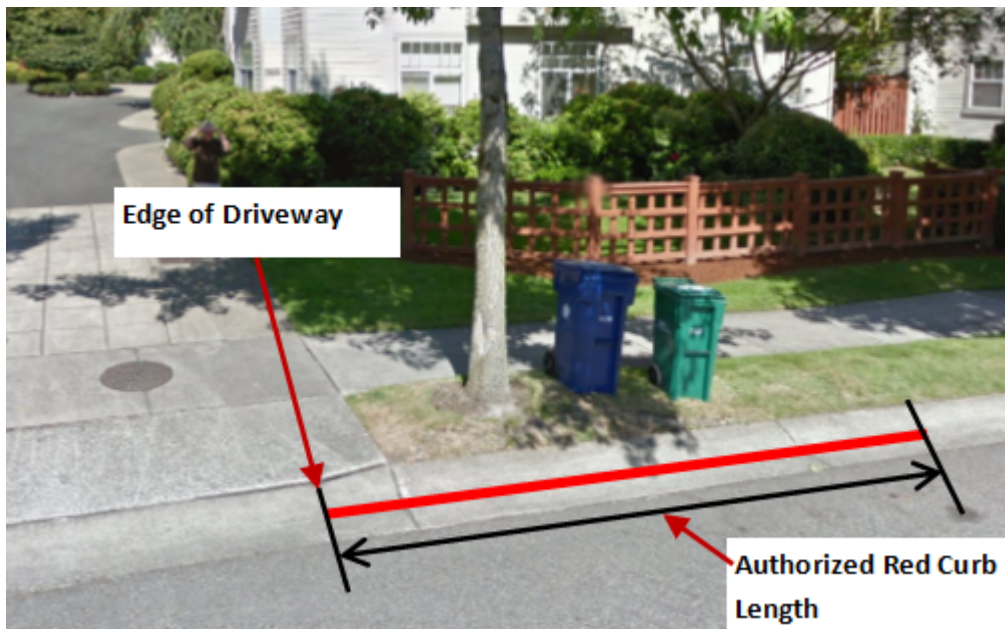
Please let me know if you have any questions. Please also let me know when you have painted red curb, and I will field check and sign off. If you have any questions regarding this authorization, please contact me at (425) 587- or .

Sincerely,  
PUBLIC WORKS DEPARTMENT

Neighborhood Traffic Control Coordinator



Figure 1 – Edge of Driveway Defined



Note: Authorized red curb length is 5 feet, measured south and north from edge of driveway.

**NOTE: If alternate lengths are authorized, include a Figure 2 showing the actual lengths and referencing this in the letter.**

**ATTACH Policy R-19**

**CITY OF KIRKLAND**

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**PRE-APPROVED PLANS POLICY**

**Policy R-20: NEIGHBORHOOD TRAFFIC CONTROL PROGRAM  
(NTCP) TRAFFIC PLANNING AND COMMUNITY  
ACCEPTANCE**

The Neighborhood Traffic Control Program (NTCP) uses a three-phase approach to calm traffic on neighborhood access roads; i.e., local, residential streets.

The first phase involves low cost, easy to implement tools, such as education, pavement striping and markings, signage, and the portable radar trailer– each as appropriate to address the issue at hand.

The second phase involves more costly devices, such as radar speed signs or low-cost tactical urbanism approaches that do not restrict the travel lanes but encourage drivers to travel at the legal speed limit.

The third phase involves restrictive physical changes to the street, such as speed cushions and traffic circles. Because restrictive measures require driving over or around these devices on a daily basis, the City will not implement them unless these are in a traffic plan that has strong support from the local residents and key stakeholders.

Guidelines for traffic calming, community outreach, acceptance and funding are outlined below. Variances from these guidelines might be allowed, depending on the specific circumstances.

**Traffic Calming Guidelines**

Traffic studies (speed and volume) and crash history are elements to consider when deciding if traffic calming should be implemented and the types of measure that might be appropriate. In addition, general guidelines for implementing traffic calming measures include:

- The maximum legal speed limit is 25 miles per hour.
- The street is not an arterial or collector.
- The street is not on a primary emergency response route or bus route.
- The street has measured average daily traffic volumes of at least 300 but less than 3,000 vehicles per day.
- At least 15% of the vehicles must be exceeding the posted speed limit by at least 7 miles per hour as determined by traffic studies.
- Traffic calming changes should not adversely affect neighboring streets; i.e., result in significant changes in speed or traffic volume.
- Traffic volumes should include no more than 5 percent long wheel-based vehicles.

## Community Engagement

Traffic calming plans that include only Phase One or Phase Two measures require minimal community engagement. If the proposed measures create new noise or visual impacts, the City might notify residents most directly affected. Notifications are typically informational, providing these residents an opportunity to ask questions but are not a voting process.

The process that includes Phase Three restrictive devices requires community engagement, as follows:

1. Public Works will identify the boundaries of the affected neighborhood, which should typically include:
  - a. Residents who live on the street.
  - b. Residents on local streets that feed into the street in question.
  - c. Nearby residents that would likely use the street to reach other destinations because it is the most direct route. The boundary does not usually include residents or businesses from outlying areas that use the street as an alternative to a more direct but more congested route (i.e., "cut-through" traffic).
2. City staff will identify key stakeholders that could be affected and should be included in the traffic planning process. Examples of key stakeholders are homeowner associations (HOAs), neighborhood associations, Kirkland Police, the Kirkland Fire Department, schools with bus routes, transit agencies and businesses within the community boundary, as appropriate.
3. The City will solicit residents from within the community to be part of a neighborhood task force that works with City staff to prepare a traffic calming plan.
4. The City will work with HOAs and the task force to help keep the community at large informed of progress.
5. Once a final draft traffic plan is prepared, the City will mail this to the neighborhood seeking comment and ask HOAs and neighborhood associations (if applicable) to post it to their websites, social media and add to newsletters, if available. The comment period is typically two weeks from the date of mailing.
6. After the comment period, City staff will finalize the traffic plan and present it to the task force. The final plan will be mailed out with ballots, and the results of the balloting will determine community acceptance.

## Community Acceptance

Traffic plans that include Phase Three traffic calming tools need strong community support. The community engagement process described above will help prepare the community for voting to approve the final traffic plan. Balloting guidelines for approving a proposed traffic plan are:

- Ballots will be mailed to each household or business with an address that is within the community boundary defined by Public Works.
- Only the City can distribute the ballots.
- Each household or business is allowed one vote.
  - For balloting purposes, each unit in a multi-family complex is a household.
  - Each business is allowed one vote.
- When the community at large is 100 households or less, at least 70% of those who receive a ballot must vote “yes”.
- When the community at-large is more than 100 households, at least 70% of those who return a ballot must vote “yes”.
- Abstaining votes or undeliverable ballots are subtracted from the total number of ballots when calculating the percentage of “yes” votes.
- Official city-issued ballots signed by the voter can be returned by fax, mail, email, or hand delivered. All responses must include the voter’s name, phone number, and address for verification purposes only.

## Funding

Phase One measures are usually low cost and can commonly be incorporated into other City-funded programs. Examples include the annual striping program or installation of standard signs by City crews. Phase Two and Phase Three measures are more costly and typically outside the scopes of existing City programs. Other funding opportunities might be possible, depending on the cost and types of measures, such as the annual Neighborhood Safety Program, which awards grants to City neighborhoods, and the Capital Improvement Program. Other City initiatives might apply at the time a traffic plan is developed and approved. Most programs, though, allocate funds based on a prioritization process, so funding might not be immediately available when a traffic plan is approved. Traffic plans cannot be implemented until funding is secured.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy R-21: ROADSIDE MEMORIAL SIGN PROGRAM**

The purpose of the Memorial Sign Program is to:

- a. Provide families of persons fatally injured in crashes with a way to sponsor a memorial sign to be erected near the scene of the crash;
- b. Ensure that memorial signs are located and installed in a safe and consistent manner; and
- c. Increase the public's awareness of the need to drive safely.

The program specifics are detailed on the following pages, along with sign schematics and the sign permit application.

## **City of Kirkland Public Works Roadway Policy R-21**

### **Roadside Memorial Signs**

**Approved by City Council 4/2/2013**

#### **A. Purpose**

1. The purpose of the Memorial Sign Program is to:
  - a. Provide families of persons fatally injured in crashes with to sponsor a memorial sign to be erected near the scene of the crash;
  - b. Ensure that memorial signs are located and installed in a safe and consistent manner; and
  - c. Increase the public's awareness of the need to drive safely.

#### **B. Definitions**

1. Deceased: Any person who was fatally injured in a vehicle crash.
2. Immediate family member: A spouse, domestic partner, child, stepchild, brother, stepbrother, sister, stepsister, mother, stepmother, father, stepfather, grandparent, step grandparent or lineal descendent of the deceased.
3. Single crash site: The site of all vehicle crashes that occur within 1,000 feet from each other, regardless of when they occur.
4. Sidewalk: Includes any structure or form of street improvement in the space between the street margin and the roadway, known as the sidewalk area. (KMC 19.20.010).
5. Representative: A person authorized by and acting in the interest of an immediate family member

#### **C. Long-term memorial application procedure**

1. An immediate family member or their representative may apply to sponsor a sign memorializing the deceased.
2. The applicant must complete and return a memorial sign application on forms furnished by the City. The documentation provided by applicant must establish that the deceased died as a result of a vehicle crash at a specific location in the City of Kirkland.
3. In the absence of the accident report, the applicant may produce other information or documents that are equally reliable. The City, in its sole discretion, shall determine whether other information or documents provided in lieu of an accident report are sufficiently reliable.
4. Sign applications will not be accepted for private streets.
5. A person may file an application under this policy to memorialize a fatality in a crash that occurred not more than two years prior to the application date.

#### **D. City review of long-term memorial sign application**

1. The City shall review all applications to ensure they are complete and accurate. The City may request more information from the applicant if the application is not complete or if the City needs additional information to process the application. The City shall deny any

application that does not meet the criteria set forth in this Policy or does not contain the information required in this Policy or in the application.

2. Within 45 days after the City receives a correctly completed application submitted pursuant to this policy, the City shall complete its review of the application and inspect the proposed site for the memorial sign and shall send a written decision to the applicant indicating why or why not the application is accepted and indicating the proposed location of the sign.

**E. Location, placement, and ownership of long-term memorial signs**

1. Once an application has been approved, the applicant must pay the fee set forth in the City of Kirkland Public Works fee schedule to cover the cost of administration, fabrication, installation, and maintenance of the memorial sign and any name plaque that may be requested.
2. The City will select, purchase, install, remove, and retain ownership of memorial signs.
3. 24" by 24" signs will be installed in accordance with applicable City policies and standards for signs. This includes posts, hardware, materials, vertical, longitudinal, and lateral positioning. 24" by 12" name plaques shall be installed directly below the sign.
4. Memorial signs shall be placed only in a City right-of-way, on the right side of the roadway, facing oncoming traffic. Signs will not be installed in the median of any City roadway.
5. Memorial signs shall be placed in close proximity to where the accident occurred at a location where the City determines it is safe and practical to do so.
6. Only one sign will be installed per intersection or per 1,000 feet of roadway for each direction of traffic. However, a memorial sign will not be placed in a location where the memorial sign obstructs the visibility of an existing traffic sign, or traffic signal or impairs sight distance below adopted City standards. Signs will not be placed on any bridge over I-405, or where these signs cause any concern or obstruction to any public appurtenance.
7. The City will not replace the sign should it be vandalized, damaged, or found missing; however, the applicant may apply for a new sign, including payment of the fee set forth in the City of Kirkland Public Works fee schedule. Any replacement signs will continue the five year period (section E8) that began timing with the original sign
8. Unless it is determined that public safety requires the sign to be removed, the City of Kirkland will allow the sign to remain in the right-of-way for five years after its placement, or until the City determines that the condition of the sign has deteriorated to a point where it is no longer serviceable, whichever occurs first. The City shall remove and retain ownership of the sign after removal. The City may properly dispose of the sign unless applicant has requested, in writing on the application, possession of the sign after its removal. The applicant shall be responsible for promptly obtaining the sign from the City after its removal. Any signs left unclaimed after 45 days will be disposed of. The request to take possession of the sign is incumbent on the applicant.

**F. Wording on long-term memorial signs**

1. One of the following six messages, related to the cause of the crash, is available for standard memorial sign installation. The City, in its discretion, shall determine whether the requested message is related to the cause of the crash:

- a. *Please don't drink and drive.*
  - b. *Please drive safely.*
  - c. *Seat belts save lives.*
  - d. *Watch for pedestrians.*
  - e. *Watch for bicyclists.*
  - f. *Watch for motorcyclists.*
2. A secondary plaque displays the message *In Memory Of*, together with the victim's name (See Schematic below). No more than three name plaques may appear below a single memorial sign.

**G. Multiple long term memorial sign applications**

1. Only one sign will be installed per single crash site. Should a sign already exist, an additional name plaque may be added to an existing sign upon City approval. Multiple deceased names may appear on one sign.
2. The City may approve applications for an additional memorial sign at an existing crash site under the following circumstances:
  - a. Additional name plaques can be attached to the existing sign installation; or
  - b. A second memorial sign can be installed across the roadway from the first sign installation so that the second sign installation faces the traffic approaching from the opposite direction.

**H. Informal short-term memorials and anniversary memorials**

1. The placement of informal memorials shall be allowed in the right-of-way for up to 14 days after an accident with the following conditions:
  - a. The memorial does not exceed three feet in height (except bicycles) and up to nine square feet in surface area and is contained in the right-of-way.
  - b. The memorial does not cause unsafe conditions for passing motorists, pedestrians or bicyclists or for people who are maintaining or visiting the memorial. At the sole discretion of the City, items may be rearranged or removed to improve safety.
  - c. Those visiting and/or maintaining the memorial comply with all other applicable laws.
  - d. No materials are placed on bridges over I-405.
  - e. Public Works Transportation Division is notified prior to installation.
2. At the end of the 14-day period, the City may remove any items from the memorial site.
3. The placement of an anniversary memorial shall be allowed in the right-of-way for up to seven days after each anniversary of the vehicle crash, for up to four years. At the end of the seven-day period, the City may remove any items from the memorial site.
4. Unattended candles shall not be allowed at memorial sites and may be immediately removed by the City.
5. Nothing in items 1 thru 4 shall prevent the City, at its sole discretion, from removing a memorial immediately in response to a threat to public safety.
6. Any durable materials removed by the City will be held for 45 days. At the end of this period if the materials have not been claimed they will be disposed of in accordance with procedures described in the Kirkland Municipal Code.



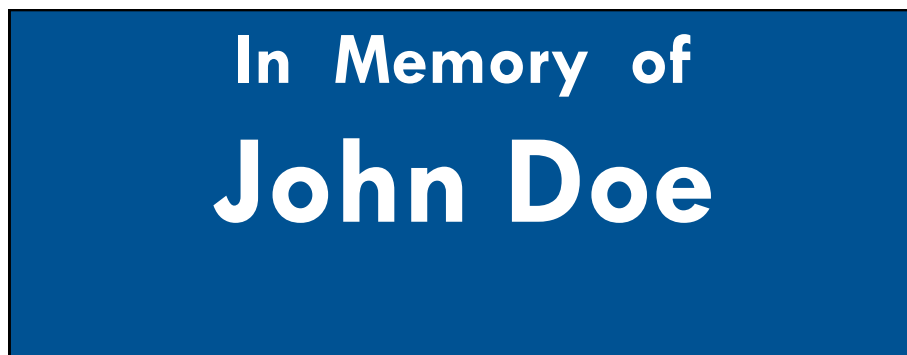
## Schematic of Memorial Signs

24"



24"

12"



24"



## Memorial Sign Permit Application

Public Works Department  
Kirkland City Hall  
123 Fifth Ave, Kirkland WA 98033

Open Monday-Friday, 8am-5pm  
publicworks@kirklandwa.gov  
Phone: 425.587.3800

Application Date: \_\_\_\_\_

Application No.: \_\_\_\_\_  
(for City use only)

Applicant: \_\_\_\_\_

Address: \_\_\_\_\_

Contact Phone: \_\_\_\_\_

Email (optional): \_\_\_\_\_

\* \* \* \* \*

Name of Deceased: \_\_\_\_\_  
(As it should appear on sign)

Date of Accident: \_\_\_\_\_

Relationship to Deceased: \_\_\_\_\_  
(Must be immediate family member or representative)

Location of Accident: \_\_\_\_\_

\_\_\_\_\_  
(Address, intersection, or distance and direction from intersection – must be within Kirkland city limits )

Wording Requested on Sign (Please select one.)

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Please Don't Drink and Drive. | <input type="checkbox"/> Please Drive safely.   | <input type="checkbox"/> Watch for bicyclists.    |
| <input type="checkbox"/> Seat belts save lives.        | <input type="checkbox"/> Watch for pedestrians. | <input type="checkbox"/> Watch for motorcyclists. |

### REQUIRED INFORMATION

- ☐ Documentation establishing death as a result of a vehicle crash in Kirkland jurisdiction .  
(The City, in its sole discretion, shall determine whether other information or documents provided in lieu of an accident report are sufficiently reliable.)
- ☐ Applicant requests to be present at time of sign installation. (Staff will make an effort to make arrangements with family, but City crew work scheduling may determine schedule if family availability is limited.)
- ☐ Applicant requests to pick up sign upon its removal from the roadway at the end of 5 years. (It will be the applicant's responsibility to promptly pick up sign once notified. If unable to contact, City will dispose of sign.)

**Note:** Once your application has been reviewed, a staff member from Public Works will contact you regarding your request (within 45 days of submittal). A \$400 (sign and plaque) or \$170 (plaque on existing sign) fee is due upon approval. Please call 425.587.3800 with any questions.

Requested Sign Location (attach map if available): \_\_\_\_\_

\_\_\_\_\_  
Signs will be installed in accordance with applicable City policies and standards for signs. This includes posts, hardware, materials, and positioning. Name plaques shall be installed directly below the sign.

Memorial signs shall be placed only in a City right-of-way, on the right side of the roadway, facing oncoming traffic. Signs will not be installed in the median of any City roadway.

See full policy for further details and regulations.

THIS FORM IS A PUBLIC RECORD

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### DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

#### Policy R-22: PEDESTRIAN FLAG PROGRAM

- **Purpose of the Program:** Pedestrian flags are intended to assist pedestrians in gaining the attention of motorists approaching certain marked crosswalks. The pedestrian flags are not intended as a substitute for the vigilance and safe crossing techniques that pedestrians must use for crossing any street, whether or not it has enhanced crossing treatments.
- **Installation and Maintenance:** Public Works staff installs the equipment that holds the flags and provides the flags that volunteers use to replace missing and damaged flags. Public Works staff and/or volunteers monitor, replace, and redistribute flags in the Central Business District (CBD), volunteers provide the same services at locations remote from the CBD.
- **New Installations:** Typically, new flag installations are initiated by a request from a citizen who is willing to volunteer to maintain the flags at a particular location. Public Works staff checks the location to ensure that flag installation criteria are met and that flags would be a good application.
- **Flag installation Criteria:**
  1. Flags are only installed at existing marked crosswalks on city-maintained streets in the City of Kirkland.
  2. The crosswalk is not controlled by any traffic control devices, i.e. traffic signal, regulatory signs (Stop/Yield), or pedestrian activated crossing light systems, i.e. RRFBs (Rectangular Rapid Flashing Beacons).
  3. A volunteer is required for each location outside the Central Business District (CBD) to monitor, replace missing flags, and redistribute flags as necessary.
  4. Flags can also be installed temporarily at non-operating crossing light systems until repairs have been made or at other locations on a temporary basis.
- **Flag equipment Removal:** Flag equipment can be removed if it's determined by Public Works staff that the flags are no longer necessary for the crossing, i.e., addition of traffic control devices, a crossing light system; vandalism, or misuse of equipment; or if no volunteer available to maintain the flags (applies to crossings remote from the CBD).

## **CITY OF KIRKLAND**

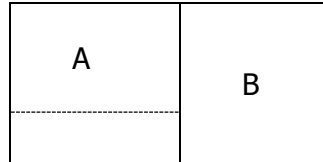
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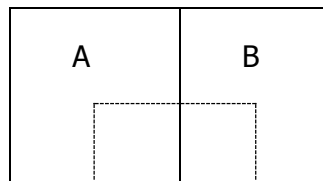
### **PRE-APPROVED PLANS POLICY**

#### **Policy R-23: FREQUENTLY ASKED QUESTIONS ABOUT EASEMENTS AND ROADS**

- 1) Where is fire access needed?
  - A fire vehicle has to be able to park in an easement or a public right-of-way within 150 feet of the farthest point on a lot where a house could be built.
- 2) How does the fire department measure fire access distances?
  - From the face of the curb in the adjacent right-of-way, or if the curb is not required, from the edge of the asphalt (public road edge).
- 3) When is right-of-way dedication required?
  - When serving five or more detached dwelling units.
- 4) If right-of-way dedication isn't required, what is the minimum pavement width for an easement ?
  - 20 feet if providing access to more than 2 homes.
  - 16 feet if providing access to no more than 2 homes.
  - 10 feet if providing access to no more than 2 homes and the furthest point of the property where a home could be built is less than 150 feet from the right-of-way.
- 5) What is the required easement width?
  - Private roads adjacent to exterior property lines must be setback 5 feet from neighboring property. Therefore, the easement width must be 5 feet wider than the pavement width (15 foot easement for a 10 foot road, 21 foot easement for a 16 foot wide road...).
  - To avoid additional setbacks on the subject property, roads requiring 20 feet of pavement will have the 5 foot setback in a separate landscape easement.
- 6) If an easement or private road runs down the middle of the property, are there landscape buffers required on each side?
  - No
- 7) When is a fire vehicle turn around required on a private single-family (or two unit home) road?
  - If the access road is 150 feet or longer.
  - Access roads 150 to 200 feet in length which have 20 feet of paved surface do not require a turn-around.
- 8) How many lots can be served by an easement while retaining the easement area in lot square footage?
  - One. The area of a vehicular-access easement shall be included if it serves only one lot that doesn't have a direct access to the right-of-way and the serving lot has direct access to the right-of-way. However, the paved surface within the easement will be included in lot coverage.



- 9) Can an easement be divided in  $\frac{1}{2}$  with two lots each owning  $\frac{1}{2}$  and having use of the other  $\frac{1}{2}$ ?
- Yes, if both lots have frontage on the right-of-way. This would be considered a driveway easement.
  - There are no setbacks from a driveway easement.



- 10) How are the setbacks determined?
- The required setback from any right-of-way or easement 21 feet or less in width is a rear yard.
  - The required setback from any right-of-way or easement greater than 21 feet in width is a front yard.
  - The required setback from an easement serving only one lot that doesn't have direct access to the right-of-way is a side yard.
- 11) What is the maximum length a public road can be without a cul-de-sac?
- The Zoning Code states that a public road longer than 200 feet in length shall have a cul-de-sac. Public roads less than 200 feet in length shall have a vehicular hammerhead turn-around; in this case the vehicular turn-around may be added to the end of the 200 foot long road, thus, making the overall length of the road 220 feet.
- 12) When measuring the length of a public road to determine if a cul-de-sac is required, where do you measure?
- The measurement is taken from the face of the curb at the intersection street.
- 13) When should a parking pad be provided?
- Chapter 105.47 of the KZC requires a 20' x 20' minimum parking pad between the garage and the access easement, tract, or right-of-way serving the garage (public alleys are exempt). As an example, if a home fronts on an access easement and the required setback from the access easement is only 10', a 20' x 20' parking pad should be provided in front of the garage (garage will be set back 20 ft. minimum from access easement).
  - Intent: A parking pad is required to assure that the access easement is kept unobstructed. When a parking pad is not provided, parking will often occur within the access easement where parking is not allowed.

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**DEPARTMENT OF PUBLIC WORKS**  
**PRE-APPROVED PLANS POLICY**

**Policy R-24: Rectangular Rapid Flash Beacon (RRFB) Installation Policy****RRFB Power Source Determination**

Installation of an RRFB at a mid-block crossing can improve pedestrian safety and comfort. RRFBs have been proven to significantly increase vehicle yield rates at pedestrian crossings, but they can only do this when they are installed and functioning properly.

In order to maximize dependability and reduce ongoing maintenance cost the City prefers that RRFBs be installed with a direct AC power connection. There are instances where there is a need to install a RRFB but providing an AC power connection would make the location cost-prohibitive. In these cases DC (solar) powered RRFBs may be used. The following criteria shall be used when determining if a DC (solar) powered RRFB is acceptable.

Table 1: RRFB Power Source Determination

<b>Access to Power</b>	<b>Solar Exposure</b>	
	<b>Inadequate</b>	<b>Adequate</b>
$\leq 50'$	AC	AC
$> 50'$	AC	DC (solar)

**NOTE:**

The location of RRFBs will be determined based on its effectiveness to provide a benefit to pedestrians crossing at the crosswalk. The RRFBs will not be located based solely on optimizing access to power.

**RRFB Placement and Installation**

All new RRFB units installed within the City shall be double-sided.

Installations for two- or three-lane sections (one lane in each direction plus two-way left-turn lane) shall not include center unit in median island.

Installations on five-lane sections (two lanes in each direction plus two-way left-turn lane) shall require a median island with RRFB unit.

All RRFB posts shall be breakaway.

See City of Kirkland Roadway Pre-Approved Plans and contract special provisions for additional details.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy R-25: USE OF TEMPORARY SOIL NAILS**

The use of temporary soil nails within public rights-of-way or easements is approved only on a case-by-case basis by the Public Works Department through a right-of-way or PUB permit. If approved, the design and installation of soil nails must avoid existing utilities; if utilities are impacted from soil nails or the installation of soil nails, the cost of repairing utilities is the responsibility of the proponent, permittee, or contractor. Any temporary installation of soil nails within a right-of-way or easement shall be de-stressed/de-tensioned, clipped or otherwise removed from being effective after the temporary need is over, or as prescribed by the Public Works Department.

Permanent soil nails within the public right-of-way or within an easement are not permitted.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy R-26: DEVELOPMENT STREET LIGHTING STANDARDS**

The street lighting standards below apply to new development and redevelopment projects:

1. All new development subject to Chapter 110 of the Kirkland Zoning Code shall install new street lights in conjunction with the installation of the required street improvements. The street light design shall be initiated by the developer with Puget Sound Energy and will be reviewed and approved by the Public Works Department.
2. If new street lights are required, they shall be LED fixtures.



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## **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

### **Policy R-27: Long-term Street Improvement Closure Policy**

The purpose of this policy is to outline when Street Improvements (sidewalks, bike lanes, and parking lanes) can be closed for construction or maintenance purposes.

1. Street Improvements serve the public. Closure of any street improvement should be minimized whenever possible. Street Improvement closures will be reviewed for new construction or required maintenance on existing buildings.
2. Street Improvements shall not be closed or detoured for the convenience of a development project to have more room to work. Temporary long-term use of the street improvement area to store or stage materials, equipment, job trailers, etc. shall not be allowed.
3. The Public Works Construction Inspector has the authority to require immediate field changes to Street Improvement detours or closures to address pedestrian, bicycle and vehicular safety, or functionality issues.
4. All Street Improvement closures and detour plans must be reviewed and approved by the Public Works Department.
5. A sidewalk detour plan is required for the temporary closure of any street improvement on a Collector or Arterial type street, along any City-adopted School Walk route, or any other street with a high-use of pedestrians as determined by the Public Works Department.
6. All detour plans shall be designed per the standards in the Manual on Uniform Traffic Control Devices (MUTCD). Link to MUTCD: <http://mutcd.fhwa.dot.gov/>
7. Pedestrian detours should be maintained on the same side of the street whenever possible. As an example, temporary closure of parking and detouring pedestrians into an approved route along the parking lane is preferred to detouring the pedestrians to the opposite side of the street.
8. When it is necessary to detour pedestrians to the opposite side of the street, the detour shall provide the safest and shortest route possible.
9. The Public Works Department may approve daily closures of Street Improvements (with an approved detour route plan) to facilitate construction work in the public right-of-way, but the street improvements shall be reopened at the end of each work day.

10. A long-term closure is any closure exceeding two weeks. The Public Works Department may approve long-term closures of street improvements (with approved detour routes) to facilitate construction or maintenance work in the public right-of-way under the following conditions:

- a. The closure is limited to the shortest time frame possible. The Contractor shall submit a proposed Street Improvement closure schedule describing the type of work causing the closure and the proposed number of days for the closure.
- b. A closure is limited to eight weeks unless approved by the Public Works Director. A request to exceed the 8-week limit will be reviewed on a case by case basis and must be due to extenuating circumstances such as weather delays or unknown construction changes (such as unknown utility relocations). Each extension request will be reviewed and considered in two-week increments.
- c. The Public Works Department will review and may approve multiple closures of up to eight (8) weeks in duration for large complex construction projects.

Note: Large complex construction projects with small-to-zero required setback from the public right-of-way (as adopted by the Kirkland Zoning Code) will typically require long-term Street Improvement closures in order to allow for parking structure excavation and construction, new street improvement and utility installation, and construction of the building. Many buildings with zero setbacks are required to provide covered pedestrian amenities such as awnings or other features which must be completed before the new sidewalk can be opened to pedestrians.

- d. If a development project has multiple right-of-way frontages, the long-term closure of Street Improvements on each frontage will be reviewed separately.

11. Failure to adhere to this policy will result in an immediate Stop Work Order, fines, or both as outlined in the Section 19.04.010 of the Kirkland Municipal Code.

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**DEPARTMENT OF PUBLIC WORKS**

**PRE-APPROVED PLANS POLICY**

**POLICY R-28:**

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY****Policy R-29: Guidelines for Temporary Traffic Control Plan Preparation****PURPOSE:**

The purpose of these guidelines is to assist in the preparation of Temporary Traffic Control Plans (TTCPs) in the City of Kirkland.

An acceptable TTCP provides the guidance and warning necessary for the orderly and predictable movement of traffic through and around work zones thereby minimizing inconvenience to the public while providing safety and accessibility for all road users and workers.

A Temporary Traffic Control Plan (TTCP) is required for any project that may include work within traffic lanes, shoulders, sidewalks, crosswalks, parking and bicycle facilities:

- Along arterial and collector streets.
- Within 200 feet of signalized intersections.
- Central Business District.

In addition, a TTCP is required for:

- Projects that require full or partial road closures.
- Special Events (public or private) expected to have traffic impacts on City streets.
- Work on any street that Public Works deems necessary.

For projects or work activities that do not require a TTCP, the contractor is responsible for implementing appropriate traffic control per MUTCD (Manual of Uniform Traffic Control Devices) recommendations.

TTCPs require a minimum two-week review period for each submittal by Public Works.

**GENERAL NOTES:**

1. TTCPs must conform to the most recent edition of the Manual of Uniform Traffic Control Devices (MUTCD) and any supplements.
2. TTCP must be site and project specific; therefore, typical drawings, taper tables and MUTCD illustrations, by themselves, are insufficient. All TTCP shall clearly indicate all existing transportation facilities impacted by work including roads, bike lanes, sidewalks, transit stops, and driveways.
3. TTCPs must fit field conditions so field check of the project site is recommended prior to and during the preparation of a TTCP.
4. Based upon the complexity of a project, a suitable sequence of construction must be discussed with City Staff prior to fully developing TTCPs. Each construction phase shall be provided with appropriate work zone traffic control and the impacts of utility relocation, traffic delays, detours and capacity restrictions must be considered and addressed.

5. No more than one TTCP shall be in use at any given time for a single project. If multiple TTCPs are submitted for review and approval at one time, then the TTCPs shall be clearly labelled as separate plans.
6. Previously approved TTCPs cannot be combined into a new TTCP without review and approval by Public Works.
7. Road and/or sidewalk closure must be evaluated by Public Works with respect to both the necessity as well as the impact of the closure to the public. Road closures shall require additional temporary traffic control including advance notification, approach and detour signage. The utilization of VMS (Variable Message Signs) is recommended to convey information to the public on the proposed closure at least two weeks in advance.
8. Any work impacting sidewalks, pedestrian crossings and bike facilities shall be specified and appropriate detour shall be included in the proposed TTCP.
9. Any work requiring the temporary closure of a crosswalk equipped with Pedestrian Flags will require the flags to be removed and the flag holders bagged. Flags will be returned to holders when crosswalk access is restored.
10. Any work within the public right of way shall be restricted to the hours of 9:00 AM to 3:00 PM, Monday through Friday on arterial streets. Work on Holidays, weekends or at night shall not occur unless an exception is granted by Public Works.
11. Reduced work hours may be required for any project located near a school to minimize traffic impacts during pick-up and drop-off times.
12. Construction activity, loading and unloading of equipment shall not block any traffic lane other than those previously specified on the TTCP.
13. Any construction activity that involves lane closures at or within 150 feet of a signalized intersection will require a Uniformed Police Officer at the intersection, unless otherwise approved by the City of Kirkland Transportation Engineer.
14. Access shall be maintained to all driveways unless permission for closure is granted by the property owner or manager.
15. Accessibility for emergency vehicles shall be maintained at all times.
16. Pavement excavation shall be limited to a maximum of one travel lane at a time unless otherwise specified on the TTCP.
17. Temporary "No Parking" signs shall be placed 24 hours prior to commencing work.
18. All Temporary Traffic Control (TTC) devices shall be removed as soon as practical when they are no longer needed. Similarly, when work is suspended for short periods of time, TTC devices that are no longer necessary shall be removed or covered.
19. Two travel lanes (one for each approach) have to be open at all times on arterial streets unless an exception is granted by Public Works.
20. TTCPs that require the presence of UPO (Uniform Police Officer) to manage traffic at signalized intersections need input from Public Works Traffic Group regarding whether or not the traffic signal will be operated in red flashing mode. Public Works Traffic Group must be notified at least one day in advance for any signal that will be placed in red flashing mode.
21. TTC shall be placed in locations that minimize impacts to sidewalk and bike lanes to the extent feasible.
22. Approved night work requires all traffic control devices to be retroreflective.

#### **NIGHT WORK:**

Public works will require night work for TTCPs that have severe traffic impacts as determined by the Public Works Traffic Group. Typical night work hours are 9PM-5AM although extended hours may be permitted by Public Works. Night work shall always be required if two lanes of traffic (one for each approach) cannot be maintained on an arterial street unless an exception is granted by Public Works. Night work shall also be required if an evaluation of existing traffic volumes and patterns finds that any TTCP will functionally reduce an arterial or high-volume collector street to only one lane of traffic. The following configurations may require night work:

- Work at signals that requires shifting one direction of traffic into a left turn pocket where a high volume of left turns occur
- Work at signals that requires shifting two directions of traffic into left turn pockets
- Work at signals that requires shifting a high-volume left-turn movement into a through lane on a single approach to the intersection
- Work at signals that requires shifting left-turning traffic into a through lane on multiple approaches to the intersection

If an initial TTCP review finds that night work will be required by Public Works, a pre-construction meeting shall be required to confirm the extents of the work required, the duration of work, anticipated noise levels, and any potential alternatives to mitigate the impact of night work to adjacent residents prior to review and approval of the TTCP. If Public Works determines that there is no feasible alternative to night work, then an applicant may apply for a work hours exception and noise variance from the Planning department.

## **TTCP REQUIREMENTS:**

This section specifies the elements (in content and format) that need to be included on a TTCP in order for the plan to be approved. Failure to include any of the following elements may require resubmittal of a TTCP:

1. Description of the work, address/location, work hours, and contact information.
2. Vicinity map showing the location of the project.
3. The TTCP shall be drawn on 11" X 17" sheets. Electronic submittal is encouraged.
4. The TTCP drawings must use legible lettering and clear, contrasting, symbols for viewing or printing and must indicate north arrow and scale.
5. Nearby streets with street names to assure proper orientation.
6. Posted speed limit.
7. Existing channelization including travel lanes, left /right turn bays, two-way left turn lanes, curbs and gutter, driveways, sidewalks, shoulders, bike lanes, parking lanes, median islands, traffic control devices including traffic signals and signs within the traffic control zone including areas affected by taper transition.
8. Existing bus stop locations within the extents of the traffic control zone.
9. Dimensions of all the work zone components shown in **Figure 1**. These include:
  - **Advance Warning Area** - Where traffic first recognizes a work zone is approaching.
  - **Transition Area**- Where traffic is redirected from the normal travel path. Transitions can occur as a lane or shoulder closure, lane shifting, or an entirely new alignment via a crossover or on-site diversion. Use of the proper **Taper Length (L)** is recommended (See **Table 1**) to increase the safety performance of the transition area. There are four types of tapers: merging, shifting, shoulder, one-lane/ two-way and downstream. These are shown in **Figure 2**.

- **Buffer space** - Provides protection for motorists and workers, typical length is 50 to 100 ft. There are two types of buffer spaces: longitudinal, which provides a recovery area for errant vehicles prior to reaching the work area, and lateral buffer or "shy distance, which is developed between the edge of the travel lane and the edge of the work area.
  - **Work Area** - Where work is being conducted.
  - **Termination area** – where traffic resumes normal path, typical length 50-100 ft)
10. The TTCP drawings must show the type and size of all the appropriate TTC devices (signs, drums, cones, barricades, arrow panels, etc.) using MUTCD coding designation and sign names on each component of the work zone. The size of advanced warning signs shall be based on the posted speed (See **Table 2**); larger signs may be used if a smaller sign size is not available.
  11. The TTCP drawings must show the spacing of signs, barricades, delineators, drum and cones and identify taper length. **Table 3** shows recommended sign spacing and **Table 4** shows recommended channelizing device spacing.
  12. TTCP shall show all the traffic control devices required to guide pedestrian through or around the work zone.

**Table 1, Taper Length Criteria and Formula**

Type of Taper	Taper Length	Taper Formula: $L = WS^2/60$ , W(typical offset = 12ft ), S(Speed)			
		25 MPH	30MPH	35MPH	40MPH
Merging	L	120-150'	150-200'	200-250'	250-300'
Shifting	0.5L	60-80'	80-100'	100-125'	125-150'
Shoulder	0.33L	50'	60'	80'	80'
One Lane/two-Lane Taper	50-100'	50'	60'	80'	100'
Downstream	50-100'	50'	60'	80'	100'

**Table 2, Sign Sizing**

Posted Speed Limit (MPH)	Sign Size
Not Allowed	24"x24"
25 or 30	30"x30"
35	36"x36"
40	48"x48"

**Table 3, Sign Spacing**

Posted Speed Limit (MPH)	Spacing (ft)
25	100-150
30	150-200
35	200-300
40	300-350

**Table 4, Channelizing Device Spacing**

Posted Speed Limit (MPH)	Taper Spacing (ft)	Tangent Spacing (ft)
25 or 30	20	40
35 or 40	30	60



**Figure 1. Component Parts of a Temporary Traffic Control Zone**

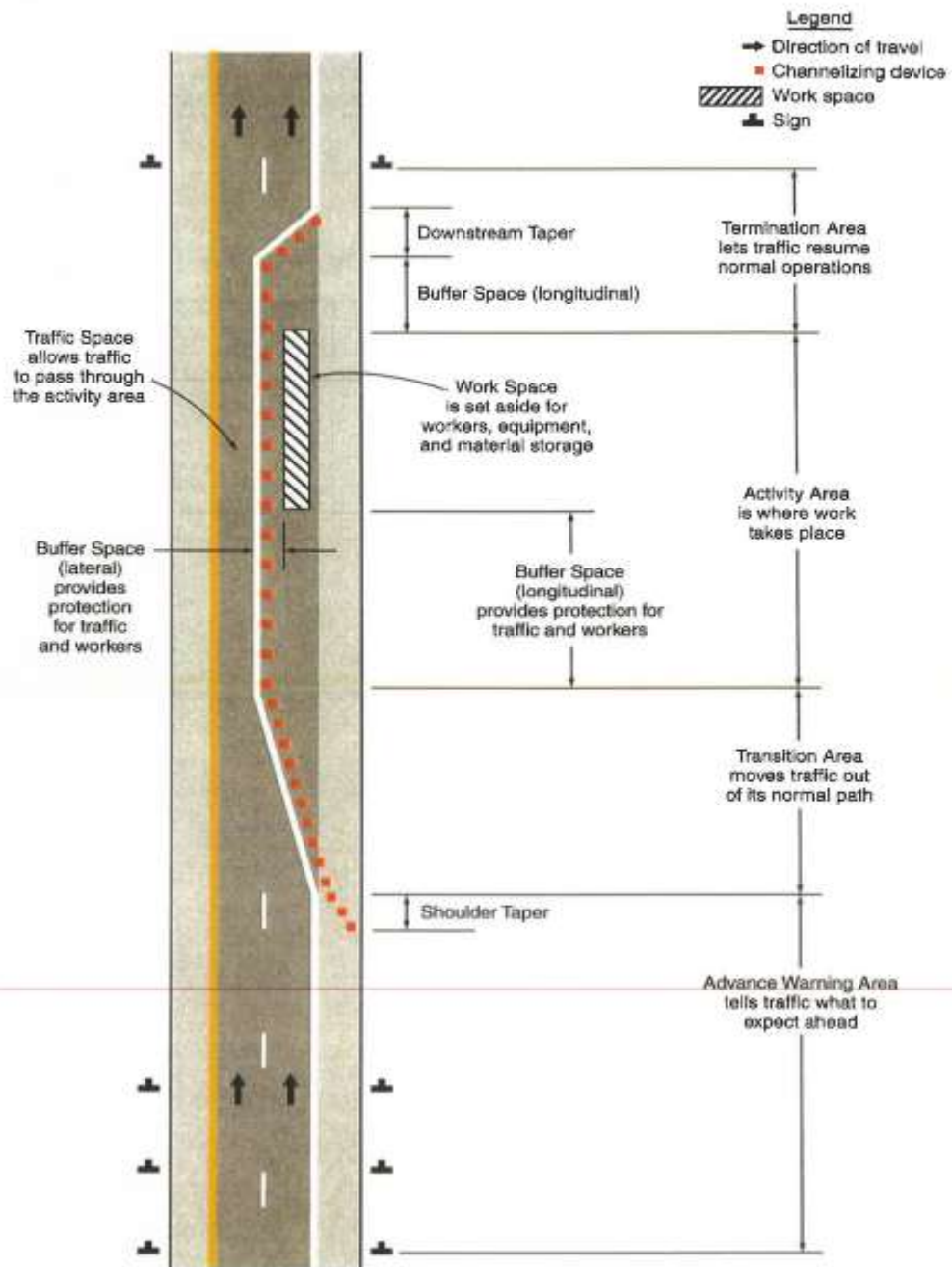
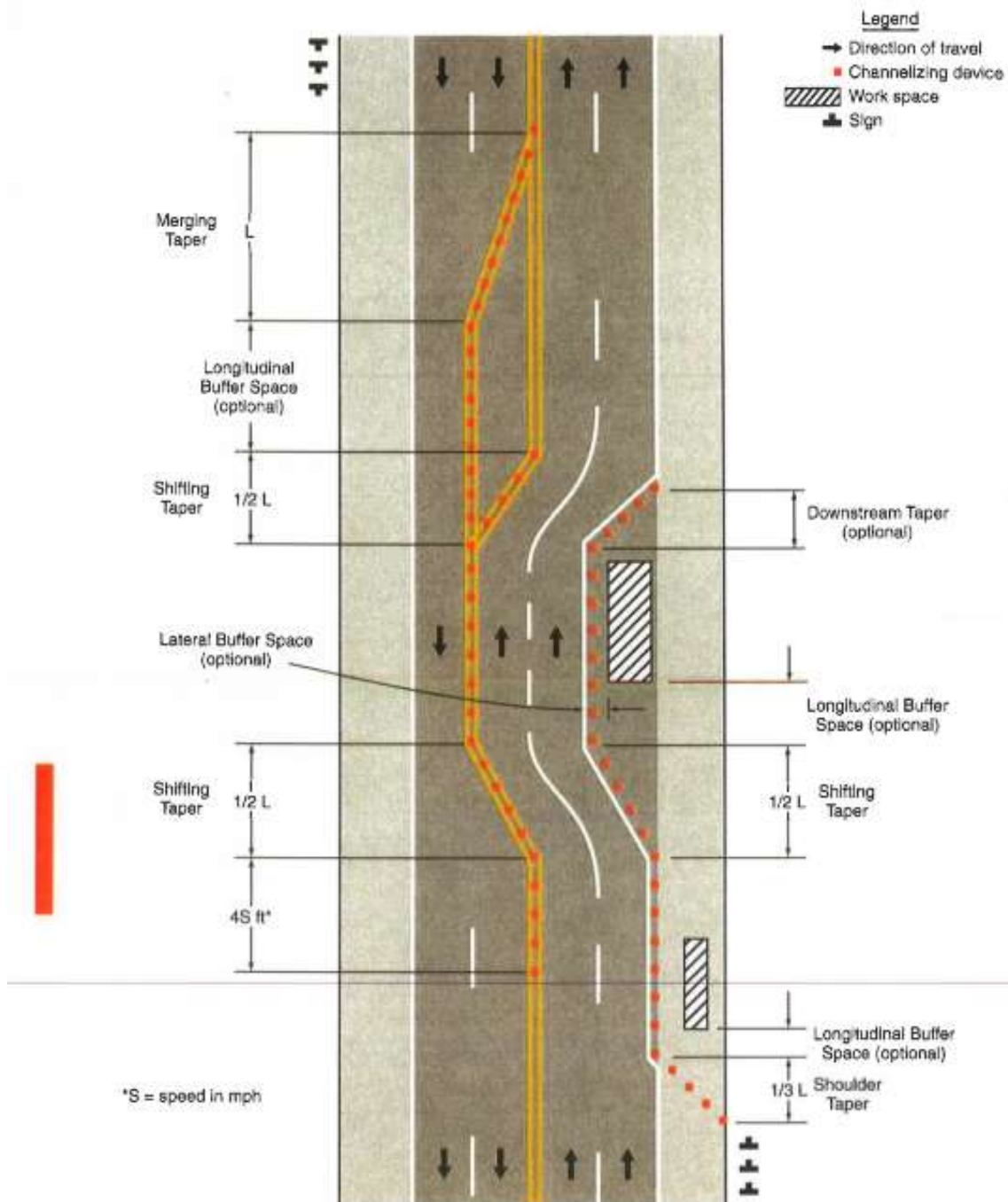


Figure 2. Types of Tapers and Buffer Spaces



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**DEPARTMENT OF PUBLIC WORKS****PRE-APPROVED PLANS POLICY****Policy R-30: Street Light Installation Policy**

Street lighting serves a number of purposes including illuminating travel ways for vehicles, pedestrians, and bicyclists. In some situations, street lights have been shown to have an impact on crime reduction or prevention. Conversely, light pollution and/or glare can disrupt natural areas, impact views, and lead to higher energy and maintenance costs. Consideration of various factors will impact the decision of whether or not to install street lights. This policy helps the public and City staff understand the process for installing individual street lights within Kirkland. New street lights will be LEDs, which have lower power consumption and maintenance costs over time than HPS (High Pressure Sodium).

The City also replaces existing sodium vapor street lights with LEDs upon request. This policy assists the public and City staff in understanding the process for replacing HPS with LED street lights.

**New Street Lights**

Residents, businesses, or groups of individuals may petition the City for installation of street lights on public streets or right of way. Two possible scenarios for requesting new street lights are:

1. Where an existing power pole exists
2. Where a new pole is required

The process for each scenario is outlined below.

**1. Utility pole currently exists**

The process to have a new street light installed on an existing pole is as follows:

- a) Proponent will identify the location of the utility pole to be used for the proposed street light, document the pole ID #(Number(s)), and provide this information to Public Works staff via phone call (425-587-3800), email, or letter. In general, new street lights can be considered if street lights do not already exist within 100 feet of the proposed new street light location.
- b) Proponent will contact impacted residents and obtain agreement for installation of the new street light. All impacted residents (those within 100 feet of the new light location) must agree with the installation. Residents whose view will be impacted by the proposed light should be included even if they are beyond the 100-foot buffer.
- c) Proponent will submit the signed **Street Light Petition 1** to Public Works staff via fax (425-587-3807) or email;
- d) Public Works Staff will verify the information and contact Puget Sound Energy (PSE) to request the installation of the new street light. PSE will make a field check the power pole and complete an illumination analysis if the pole can support a street light. PSE will submit a cost estimate and design for the City's approval.

- e) If a street light can be installed at a reasonable cost on an existing utility pole, the City will pay PSE to install the new street light and also pay ongoing monthly costs.
- f) Once the new street light cost is final, the City will approve PSE to install the new street light. Installation can take up to 60 to 90 days depending on PSE's workload.
- g) If PSE decides a street light cannot be added to the existing power pole and a new pole is required, the City will refer the proponent to the process described in Scenario 2.

## 2. Utility pole does not currently exist

For this scenario, proposed street lights need to be installed on new poles and require underground wiring from an existing source that PSE identifies. **The costs involved with pole installation are the responsibility of the proponent(s).** The process to have a new street light and pole installed is:

- a) Proponent will identify the proposed location for the new light and provide this information to Public Works staff via phone call (425-587-3800), email, or letter.
- b) Proponent will contact impacted residents and obtain agreement for installation of the new pole and street light. All impacted residents (those within 100 feet of the proposed location) must agree with the installation. Residents whose view will be impacted by the proposed light should be included even if they are beyond the 100-foot buffer.
- c) Proponent will submit the signed **Street Light Petition 2** to Public Works staff via fax (425-587-3807) or email, and acknowledge they understand they are responsible for paying for the new street light and pole.
- d) Public Works staff will contact PSE to request a cost estimate and will then advise the proponent about the cost of the pole/light installation.
- e) If proponent accepts the cost, proponent will make the necessary arrangements directly with PSE for the installation of the new pole and street light within public right of way. Once the light is installed, the City pays the ongoing monthly cost directly to PSE.

## 3. Upgrade Existing HPS to LED's Street Lights

The City sometimes receives requests to replace existing HPS lights with LEDs. The following describes a process for small upgrade requests of one to three street lights where the proponent resides. The City does not have a dedicated budget for city-wide or even neighborhood-wide upgrades to LED street lights. Large replacement requests shall be considered separately in the context of priority and available budget.

The process to upgrade an HPS street light to a LED is as follows:

- a) Proponent will provide the location and identification numbers of the street light pole for upgrading to public works staff via phone call (425-587-3800), email, or letter.
- b) Public Works staff will check the proposed location and notify the proponent about the adequacy of the proposed location.
- c) Proponent will contact impacted residents and obtain agreement for upgrade of the street light to LED. All impacted residents (those within 100 feet of the proposed location) must agree with the installation. Residents whose view will be impacted by the proposed light should be included even if they are beyond the 100-foot buffer.
- d) Proponent will submit the signed **Street Light Petition 3** to Public Works staff via fax (425-587-3807) or email;
- e) Public Works staff will request a cost quote from PSE for upgrading the street light.
- f) If PSE's cost quote is reasonable, Public Works staff will inform the proponent and make the necessary arrangements with PSE for the upgrade. Once the light is installed, the City continues to pay the ongoing monthly cost directly to PSE.

g) After installation, if a resident objects to the glare, Public Works will consider requesting PSE install a shield. Please note the City will only agree to installing a back shield for residents behind the street light. The City typically does not allow front shields to be installed because of the potential for these shields to reduce illumination of the street right of way.

**City of Kirkland**  
**Department of Public Works**  
**Street Light Petition 1**

**Street Light on existing PSE Pole**

To: Transportation Engineer/Neighborhood Traffic Control Coordinator

We, the undersigned, residing near \_\_\_\_\_, state that we have no objection to the installation of a street light on \_\_\_\_\_ at/near  
(Address/Location)\_\_\_\_\_

We request the City of Kirkland to install the street light based on its street light installation policy R-30.

Once installed, we understand the City of Kirkland will pay the ongoing monthly cost of the new street light.

We understand that if additional preparation work is required, the City will notify us of the work and cost estimate and confirm that we are willing to pay the extra cost before directing PSE to install the street light.

Name	Address/Phone/e-mail	Signature

**City of Kirkland**  
**Department of Public Works**  
**Street Light Petition 2**

**Street Light on a new PSE Pole**

To: Transportation Engineer/Neighborhood Traffic Control Coordinator

We, the undersigned, residing near \_\_\_\_\_, state that we have no objection to the installation of a street light on \_\_\_\_\_ at/near  
(Address/Location)\_\_\_\_\_

We request the City of Kirkland approve the proposed street light on a new pole based on its street light installation policy R-30. We understand the City will obtain a cost estimate from PSE, notify the proponent of the estimate and confirm the proponent will pay the cost of installation before the City gives final approval for street light and pole installation. The proponent will arrange and pay PSE for the street light installation.

Once installed, we understand the City of Kirkland will pay the ongoing monthly cost of the light.

Name	Address/Phone	Signature

**City of Kirkland**  
**Department of Public Works**  
**Street Light Petition 3**

**Upgrade Existing HPS Street Light to LED**

To: Transportation Engineer/Neighborhood Traffic Control Coordinator

We, the undersigned, residing near \_\_\_\_\_, state that we have no objection to the upgrade of an existing HPS street light to LED on \_\_\_\_\_ at/near  
(Address/Location)\_\_\_\_\_

We request the City of Kirkland upgrade the proposed street light to LED based on its street light installation policy R-30.

Once installed, we understand the City of Kirkland will pay the ongoing monthly cost of the light.

Name	Address/Phone	Signature



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## DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

### **Policy R-31: Policy for Installation of Accessible Pedestrian Signals and Pushbuttons**

#### **Intent:**

It is the City's intention to be consistent with the most current version of the Public Right of Way Access Guidelines (PROWAG) in the provision of and location of accessible pedestrian signals and pushbuttons<sup>1</sup> (APS) at traffic signals. Further guidance is available in 28 CFR Part 36 and MUTCD section 4E.09.

#### **Purpose:**

The purpose of this policy is to establish reasonable and consistent policy for installing APS.

#### **Scope (items presented in no particular order):**

1. *Requests.* Requests for APS signals from the public will be responded to in a timely manner<sup>2</sup> and the consideration for installation will be done in accordance with applicable sections of the ADA.
2. *New construction:* New construction of traffic signal projects requires installation of APS and associated accessible features when pedestrian signals are installed.
3. *Curb ramp replacement at traffic signals:* Altering or replacing curb ramps does not require installation of APS. The altered or new curb ramps shall install poles at accessible locations using existing pedestrian push buttons.
4. *Minor work and routine maintenance at traffic signals:* Projects, including but not limited to: emergency repairs<sup>3</sup>, signal timing adjustments (including signal phasing or coordination changes), vehicular detection installation and repairs, installation and repair of CCTV or other cameras, vehicular signal head upgrades and repairs<sup>4</sup>, and repair of pedestrian detection do not require installation of APS and associated accessible features.

Signal controller software upgrades and repairs and/or cabinet upgrades and repairs that do not alter the operation or display of pedestrian signals do not require installation of APS and associated accessible features.

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<sup>1</sup> An **Accessible Pedestrian Signal and pedestrian pushbutton** is an integrated device that communicates information about the WALK and DON'T WALK intervals at signalized intersections in non-visual formats (i.e., audible tones and vibrotactile surfaces) to pedestrians who are blind or have low vision.

<sup>2</sup> Timely manner means, at minimum, discussing the proposed timeframe with the requestor and agreement on a date for installation of APS

<sup>3</sup> Emergency repairs include repairs such as the replacement of a traffic control signal component with a replacement component that is similar in physical appearance and operation

<sup>4</sup> All signals maintained by the City of Kirkland have countdown pedestrian signal heads.

5. *Other traffic signal projects:* For traffic signal improvement projects that are not new construction, minor work and routine maintenance or curb ramp replacement projects:
- A. Where the project scope, includes the alteration, installation or replacement of any pole to which a pedestrian push button is attached, installation of APS on poles in accessible locations is required. Relocation of poles may be required to achieve accessibility. Construction or alteration of curb ramps is not required.
  - B. Where the project scope, does not include the alteration, installation or replacement of any pole to which a pedestrian push button is attached, installation of APS at existing push button locations is required. Relocation of poles, construction or alteration of curb ramps, etc. is not required.
  - C. Signal controller software upgrades and repairs and/or cabinet upgrades and repairs that alter the operation or display of pedestrian signals require installation of APS at existing push button locations. Relocation of poles, construction or alteration of curb ramps, etc. is not required.
  - D. Adding or revising pedestrian signal heads or pedestrian detectors require installation of APS at existing push button locations. Relocation of poles, construction or alteration of curb ramps, etc. is not required.
  - E. In addition to the areas above, APS will be installed through fulfillment of the city's obligations to complete its ADA Transition Plan.

## DEPARTMENT OF PUBLIC WORKS

### PRE-APPROVED PLANS POLICY

#### Policy R-32: Marking of On-Street Bike Lane as Part of a Resurfacing Project Policy

These guidelines are for the striping of non-separated bike lanes for a resurfacing project. The guidelines are intended to allow flexibility in design, since there are often competing interests that will have to be balanced to provide the best design. AASHTO and NACTO Guidelines should be consulted in the design of bike lanes.

#### 1. Space for Bikes and Pedestrians

- a. Consider removing and/or narrowing parking and/or car travel lanes.
- b. Install bicycle facilities on both sides of the roadway as long as there is a walkway on one side.
- c. Design decisions based on:
  - i. Volumes of various modes
  - ii. Improvement of the quality of biking and walking facilities possible with removal
  - iii. Any other appropriate considerations.
- d. Outreach/notification is required when parking or car lanes are proposed for removal.

#### 2. Area for Walking

- a. If a walkway (sidewalk or paved shoulder) exists along one side of a street segment, there is no need to provide a walkway on the other side of the street segment.
- b. If there is no sidewalk on either side of the street, provide a 5' wide (min.) walkway on at least one side of the street.
- c. In other areas, usually provide a walkway (as in b. above), but consider the length of missing walkway, continuity of bicycle and pedestrian facilities on adjacent parts of the street, crosswalks that connect to walkways, etc.
- d. Do not place pavement markings in shared bicycle/walkway areas.
- e. If width of shared bicycle/walkway area is 7' or wider, place "No Parking" signs.

#### 3. Area for Biking

Bike Lane Design Guidelines					
Condition	Minimum Bike Lane Width	Available width for Bike Facility	Suggested Bike Travel Lane Width <sup>a</sup>	Bike Lane/Travel Lane Buffer <sup>b,c</sup>	Pre-approved Plan No.
No curbs or other barriers	4 feet	4'	4'	0'	CK-R.35a
		4' < w < 6'	4' to 6'	0'	CK-R.35a
		6' ≤ w < 7'	4' to 5'	2'	CK-R.35b
		7' ≤ w < 8'	5' to 6.5'	3'	CK-R.35b
		8' ≤ w < 9.5'	5' to 6.5'	3'	CK-R.35b
		≥9.5' w/o Parking	6.5'	3'	CK-R.35b
		≥9.5' w/ Parking <sup>d</sup>	5'	3'	CK-R.35b
Curb or other barriers	5 feet	5' ≤ w < 7'	5' ≤ w < 7'	0'	CK-R.35a
		7' ≤ w < 8'	5' ≤ w < 6'	2'	CK-R.35b
		8' ≤ w < 9.5'	5' ≤ w < 6.5'	3'	CK-R.35b
		≥9.5' w/o Parking	6.5'	3'	CK-R.35b
		≥9.5' w/ Parking <sup>d</sup>	5'	3'	CK-R.35b

- a. Bike travel lane width measured from pavement edge, face of curb or face of barrier to the center of bike lane marking.
- b. Buffer is measured from the center to center of lane markings.
- c. Buffers are cross-hatched. Interior diagonal cross-hatching consists of 4" wide white lines angled at 45 degrees and striped at 20-foot intervals.
- d. Use 2' to 3' wide parking buffer.

#### 4. **General Guidelines**

- a. Car lane widths: 10 feet typical, 12 feet maximum
- b. Typical taper rate for bike lane & buffer is 35:1
- c. Car parking lane width with bike lane: 7' minimum, 8' is desirable
- d. 6" white lines delineate bike lanes and buffers
- e. Consistent lane widths and buffers for cars and bikes between both directions of travel, symmetric around the center line of pavement and along roadway segment are desirable.
- f. Maintain consistent travel lane width, then buffer width, and vary bike lane width.
- g. Extruded curb can be used between a walkway and a bike lane. It is not usually used between a car lane and bike lane.

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy R-33 - Crosswalk Location Evaluation Policy**

##### **1. Policy Objectives**

The City of Kirkland is committed to implementing a safe, efficient, and inclusive multimodal transportation system. This system includes pedestrian facilities such as crosswalks. This policy establishes evaluation procedures, based on objective criteria, to help identify crosswalk locations that meet basic operational and safety requirements. In addition, this policy identifies appropriate safety enhancements at uncontrolled marked crosswalks based upon roadway geometrics, traffic volumes and speeds, traffic operation conditions and pedestrian crossing demand. Lastly, this policy determines striping requirements for controlled crosswalk locations.

The need, location, and safety enhancements for new crosswalks should be evaluated using engineering judgement. Exceptions to specific conditions in this policy may be considered. Requests for exceptions should be provided in writing and include details of an engineering investigation and documentation of justification for review by City of Kirkland Transportation Staff.

The fact that crosswalk evaluation guidance is presented in this policy does not mean that the City of Kirkland is required to modify or upgrade existing locations to meet current criteria. This policy is intended for use with public and private new construction and significant alterations to the City's existing infrastructure, excluding regular maintenance activities.

##### **2. Standard Practice / Technical Sources**

The City of Kirkland follows best practice guidelines for the implementation of pedestrian crossings. The technical sources on which this policy is based include:

- 2.1 Manual of Uniform Traffic Control Devices (MUTCD): The MUTCD is published by the Federal Highway Administration (FHWA). It establishes national standards and guidelines for the implementation of traffic control devices including signs, markings, and traffic signals.
- 2.2 Chapter 20 in the Highway Capacity Manual (HCM): The HCM is published by the Transportation Research Board (TRB). It establishes methodologies to determine the Capacity and Level of Service (LOS) of various types of transportation facilities.
- 2.3 National Cooperative Highway Research Program (NCHRP) 562 – Improving Pedestrian Safety at Unsignalized Crossings. The NCHRP 562 provides recommendations for the selection of pedestrian safety enhancements at uncontrolled marked crosswalks based on pedestrian volumes, street geometry, and prevailing traffic operation conditions such as traffic volumes and speed.
- 2.4 AASHTO (American Association of Highways Transportation Officials) A Policy on Geometric Design for Highways and Streets. This is commonly referred to as AASHTO "Green Book"

and it encompasses the current geometric design and research practice for highways, local streets, and multimodal facilities.

- 2.5 AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities Second Edition. This guide provides information on the planning, design, and operation of pedestrian facilities along streets and highways.

### 3. Definitions

- 3.1 Uncontrolled marked crosswalks: These are marked crosswalks located at midblock locations or at intersections and are not controlled by either traffic signals or stop signs. Drivers are required to stop for pedestrians at these facilities. Depending on pedestrian volumes and prevailing traffic/geometric conditions at the crosswalk location, safety enhancements such as those listed in section 4.3 below may be required.
- 3.2 Controlled marked crosswalks: these are marked crosswalks controlled by stop signs or traffic signals.
- 3.3 Controlled unmarked crosswalks: these are crosswalks locations (without crosswalk lines) controlled by stop signs.
- 3.4 Uncontrolled unmarked crosswalk: this refers to the areas intended for pedestrian circulation located on each leg of an intersection. RCW 46.04.160 defines an unmarked crosswalk as "the portion of the roadway between the intersection area and a prolongation or connection of the farthest sidewalk line or in the event there are no sidewalks then between the intersection area and a line ten feet therefrom, except as modified by a marked crosswalk." RCW 46.61.235 establishes that pedestrians have the right of way whenever crossing at unmarked crosswalks.
- 3.5 School Crosswalks: These are uncontrolled marked crosswalks typically located on school walk routes and at/within the vicinity of school zones. Some school crosswalks may be controlled by crossing guards during school peak periods.

### 4. New Uncontrolled Marked Crosswalks

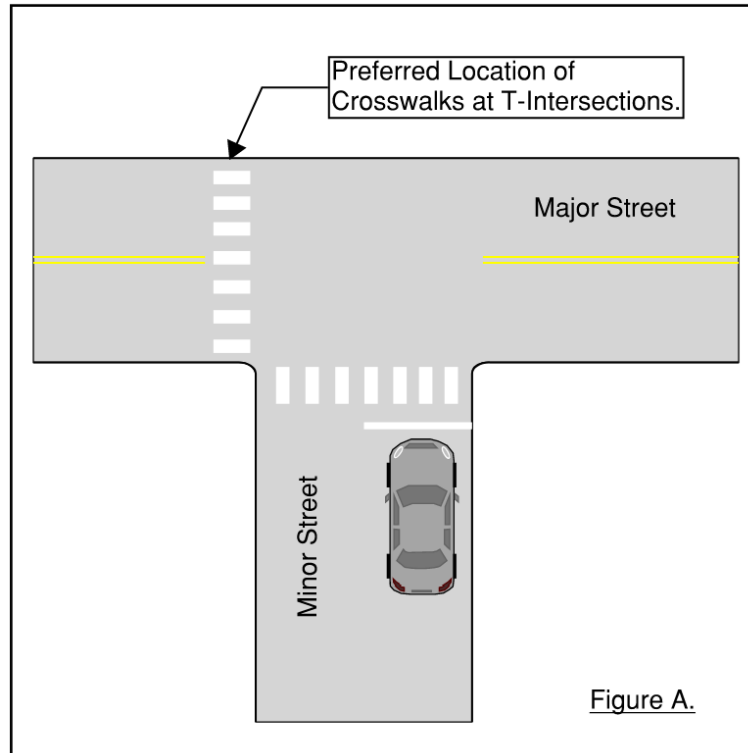
- 4.1. Evaluation Criteria: The following criteria apply to marking uncontrolled crosswalks at midblock locations and/or intersections.
- 4.1.1 **Stopping Sight Distance (SSD)**. In order to make sure that pedestrians can be seen by oncoming vehicles, uncontrolled crosswalks shall only be marked if available SSD is equal to or greater than the values shown in Table 4.1. These SSD values are from Chapter 3 in AASHTO A Policy Geometric Design of Highways and Streets, 2018 Edition. SSD is based on the posted speed limit or the 85th percentile speed as measured in a recent traffic study, whichever is higher. **Marked crosswalks shall not be installed at locations that do not meet SSD criteria.**

**Table 4.1: Stopping Sight Distance Recommended Values**

<b>Speed Limit or 85<sup>th</sup> Percentile Speed (miles per hour)</b>	<b>Stopping Sight Distance (feet)</b>
25	155
30	200
35	250
40	305
45	360

- 4.1.2 Connectivity to Sidewalks, Trails and/or Paved Shoulders/walkways. **Crosswalks should not be marked unless the crosswalks connect to a designated walkway.**
- 4.1.3 Illumination at crosswalks. Lighting analysis is required to identify existing deficiencies and to determine lighting improvements at new crosswalks located at midblock or at intersections. Required lighting level at uncontrolled marked crosswalks is specified in City Policy R-40, Lighting Design Guidelines. **Crosswalks shall not be marked unless lighting requirements are met. Lighting improvements may be required as part of a new marked crosswalk installation.**
- 4.1.4 ADA Compliance. Before locating new crosswalks, appropriate accommodations for accessibility shall be in place, such as curb ramps with compliant landing depth.
- 4.1.5 Proximity to bus stops/other pedestrian generators. Crosswalks should be located so that they provide opportunities to minimize out of direction travel and to channel multiple pedestrian desire lines to a single crossing location to reach destinations such as bus stops, schools, parks, multifamily, mixed-use, or commercial developments.

- 4.1.6 Turning Vehicle Impacts. To reduce the impacts of turning vehicles, new mid-block crosswalks should be located at least 100 ft away from side streets and major (high-volume) driveways. Crosswalks located at or near T-intersections should be offset to the driver's left of the minor street or driveway approach. See Figure A below for clarification.



- 4.1.7 Proximity to signalized intersection: Crosswalks should not be installed within 400 ft of signalized intersections, as measured from the nearest marked crosswalk at the intersection, or less than 200 feet from the opening of a left-turn in advance of a signalized intersection. This is to prevent queue spill-back patterns from blocking the crosswalk or obscuring the view of the crosswalk to oncoming traffic.
- 4.1.8 Proximity to existing uncontrolled marked crosswalks. **Crosswalks should not be installed within 200 ft of an existing uncontrolled marked crosswalk.**
- 4.1.9 Minimum AADT (Average Annual Daily Traffic): uncontrolled marked crosswalks should not be installed on streets carrying less than 3,000 AADT unless serving a transit route, greenway, school walk route, or other location with high pedestrian volumes. In some cases, ADT counts can also be used; however, a seasonal factor may need to be applied due to normal variations of traffic volumes. Coordinate use of ADT volumes with City of Kirkland Transportation Division Staff for approval.
- 4.1.10 Pedestrian volumes. Minimum peak-period pedestrian volume thresholds that need to be met in order to warrant installation of uncontrolled marked crosswalks are depicted in Table 4.2 below. **New crosswalk locations should meet the minimum pedestrian volume thresholds shown in Table 4.2 below.** Pedestrian volumes can be obtained via observed counts or projected pedestrian demand in the case of new developments or induced pedestrian demand.



**Table 4.2 Minimum Peak- Period Volumes (\*)**

Average Pedestrian Hourly Volumes	Period
20 Pedestrian/Hour	One-Hour
18 Pedestrian /Hour	Two-Hour
15 Pedestrian/ Hour	Three-Hour
(*) Minimum Pedestrian Volumes (total of both approaches) Recommended in NCHRP 562	

#### 4.2. Evaluation Procedure

The decision of whether to mark a new crosswalk ultimately lies with City Staff. This evaluation procedure is intended to be used by City staff and design professionals to create a safer crossing environment. The evaluation procedure for new marked crosswalks includes the following steps.

- 4.2.1 Perform a field investigation to determine available SSD and compare it to the required SSD value shown in Table 4.1.
- 4.2.2 Perform a field visit to assess existing conditions including road geometrics, presence of sidewalks/paved walkway, street lighting, pedestrian generators, traffic signals, signs, uncontrolled marked crosswalks, and driveways located within the vicinity of the proposed crosswalk. The results of the assessment will determine if criteria 4.1.2 to 4.1.8 are met.
- 4.2.3 Determine if minimum peak-period pedestrian volume shown in Table 4.2 above is met. Pedestrian counts may need to be performed if recent pedestrian counts are not available (within the last calendar year). Pedestrian counts should be performed in average weather conditions (i.e., no major wind, snow, or ice events).
- 4.2.4 Determine most recent AADT count at the proposed location. The City's AADT information is publicly available at the links below.

Spreadsheet: <https://www.kirklandwa.gov/Government/Departments/Public-Works-Department/Transportation/Data-and-Resources-Transportation-Division/Traffic-Count-and-Crash-Analysis-Summaries>

Interactive GIS map:

<https://experience.arcgis.com/experience/6107b9c27c1b43718e685a73307281c4>

NTCP ADT counts (if approved for use by Transportation Staff):\_

<https://kirklandwa.maps.arcgis.com/apps/instant/sidebar/index.html?appid=6b7da228774248bcaa8179ae5dc83329>

4.2.5 Use Form in Appendix A to document evaluation results. Installation of new uncontrolled marked crosswalk should only be considered if all the criteria are met. Should the criteria be met only partially, provisions should be made to achieve compliance with said requirements prior to installation, or a documented engineering investigation and design exception shall be submitted to City Transportation Staff for review and approval.

4.2.6 Identify required pedestrian safety enhancements using Table 4.3 below. The installation of markings and signs at an uncontrolled crossing location does not necessarily result in vehicles stopping for pedestrians; therefore, depending on the specific roadway and traffic conditions prevailing at the location, additional pedestrian safety enhancements may be required, including traffic control devices such as those listed below.

4.3. **Pedestrian Safety Enhancements for Both Existing and New Crosswalks**

New uncontrolled marked crosswalks shall comply with striping and signage requirements per Parts 2 and 3 in the MUTCD. In addition to the basic striping and signage requirements, pedestrian safety enhancements such as those described below may be required to mitigate the risks associated with the specific characteristics of the location. Table 4.3 identifies appropriate pedestrian safety enhancements based upon the street functional classification, posted speed limit or 85<sup>th</sup> percentile speed, AADT, and street geometrics. In selecting appropriate improvements, the crash history and specific pedestrian safety needs associated with the crosswalk location should also be considered.

① **Basic MUTCD striping and signage per MUTCD Parts 2 and 3.**

② **Pedestrian Crossing Flags:** These are flags, usually orange, that are held by pedestrians crossing or waiting to cross. The flags are typically stored in sign-mounted holders on both sides of the street. [City of Kirkland Policy R-22](#) establishes specific requirements for installation of pedestrian flags at uncontrolled marked crosswalk locations.

③ **Raised Crosswalks (RC):** These are elevated above the surface of the adjacent travel lanes to increase driver's attention of pedestrians at the crosswalk and slow down approaching vehicles. RCs also function as an extension of the sidewalk, allowing pedestrians to cross at a constant grade without the need of curb ramps. Raised crosswalks are appropriate on local and collector streets with an AADT of less than 4,000 vehicles per day. Because they are similar to speed cushions, installation of raised crosswalks should follow the guidance for "Phase Three" high-intervention traffic calming in the City's [Neighborhood Traffic Control Program Policy R-20](#).

More information can be found at this link:

<https://www.kirklandwa.gov/Government/Departments/Public-Works-Department/Transportation/Getting-Around-Transportation-Division/Neighborhood-Traffic-Control>

④ **Curb Extensions (Bulb-Outs):** Curb extensions provide pedestrian refuge, reduce the

overall street crossing distance, and improve sight distance for both drivers and pedestrians. Only applicable when on-street parking is present. It is preferred that curb extensions be hardscaped concrete curb and sidewalk; however, curb extensions using pavement markings, delineators, and/or other channelization devices may be considered with approval from City Transportation Staff.

⑤ **Advance Stop Bar and Sign:** Advance stop lines are recommended on multi-lane roads to ensure that pedestrians are visible to drivers in all lanes. Per MUTCD, at midblock uncontrolled crossing locations advance stop lines should be placed adjacent to the “Stop Here for Pedestrians” (R1-5b) sign located 20 to 50 ft in advance of the nearest crosswalk edge lines.

⑥ **Pedestrian Median Refuge Islands:** These are treatments that allow pedestrians to cross one direction of travel at a time. They are typically raised above the roadway surface, and in some cases, they are offset so the crossing pedestrians view/face the second direction of street traffic. The AASHTO recommended minimum crossing width is 6 ft, but 8 ft is preferable to accommodate groups of pedestrians and wheeled devices including bicycles.

⑦ **Rectangular Rapid Flashing Beacons (RRFBs):** RRFBs consist of rectangular-shaped yellow indicators with a light- emitting diode (LED) -array-based light source that flashes when activated. They are placed on both side of a crosswalk, under the pedestrian crossing sign and above the diagonal downward arrow plaque pointing at the crossing. Refer to [City of Kirkland Policy R-24](#) for more information.

⑧ **High Intensity Activated Crosswalk (HAWK):** A HAWK, also known as a pedestrian hybrid beacon, is a pedestrian activated traffic control device that functions as a traffic signal providing yellow and red indications. [Chapter 4.J in the MUTCD](#) provides guidance for the implementation of HAWKs. The main objective of a HAWK is to stop vehicles to allow pedestrians to cross while also allowing vehicles to proceed as soon as the pedestrians have cleared the roadway. Installation of HAWK signals must be justified based on a traffic engineering study. Pedestrian signals can also be considered in this category for locations with geometric constraints that would render a HAWK signal infeasible based on an engineering study.

	<b>Table 4.3– Safety Enhancements at Uncontrolled Marked Crosswalk Locations (*)</b>									
	<b>AADT ≤ 4,000</b>	<b>4,000 &lt; AADT &lt; 9,000</b>			<b>9,000 ≤ AADT ≤ 15,000</b>			<b>AADT &gt; 15,000</b>		
<b>Street Functional Classification</b>	<b>Local - Collector</b>	<b>Collector – Minor Arterial</b>			<b>Minor – Principal Arterial</b>			<b>Principal Arterial</b>		
Posted Speed Limit or 85 <sup>th</sup> Percentile Speed (mph), whichever is higher	25 or below	<30	30 - 35	≥35	<30	30 - 35	≥35	<30	30 - 35	≥35
<b>Two Lanes</b> (One lane on each direction, one way street)	① <b>②</b> <b>③</b>	① ② ④ <b>⑦</b>	① ② ④ <b>⑦</b>	① ② ④ ⑦	① ④ <b>⑦</b>	① ④ <b>⑦</b>	① ④ ⑦	① ④ <b>⑦</b>	① ④ ⑦	① ④ ⑦ <b>⑧</b>
<b>Three Lanes with Raised Median Island</b> (One lane on each direction plus median in two-way left-turn lane)	NA	① ② ④ ⑤ <b>⑦</b>	① ② ④ ⑤ <b>⑦</b>	① ② ④ ⑤ ⑦	① ② ④ ⑤ <b>⑦</b>	① ② ④ ⑤ <b>⑦</b>	① ④ ⑤ ⑦	① ④ ⑤ ⑦	① ④ ⑤ ⑦	① ④ ⑤ ⑦ <b>⑧</b>
<b>Three Lanes without Raised Median</b> (One lane on each direction with two-way left turn, no median)	NA	① ② ④ ⑤ <b>⑦</b>	① ② ④ ⑤ <b>⑦</b>	① ② ④ ⑤ ⑦	① ④ ⑤ ⑥ <b>⑦</b>	① ④ ⑤ ⑥ <b>⑦</b>	① ④ ⑤ ⑥ ⑦	① ④ ⑤ ⑥ ⑦	① ④ ⑤ ⑥ ⑦	① ④ ⑤ ⑥ ⑦ <b>⑧</b>
<b>Four Lanes with Raised Median</b> (Two lanes on each direction with median)	NA	NA	NA	NA	① ④ ⑤ <b>⑦</b>	① ④ ⑤ ⑦	① ④ ⑤ ⑦ <b>⑧</b>	① ④ ⑤ ⑦	① ④ ⑤ ⑦ <b>⑧</b>	① ④ ⑤ ⑦ <b>⑧</b>
<b>Four Lanes without Raised Median</b> (Two lanes on each direction, no median)	NA	NA	NA	NA	① ④ ⑤ ⑥ <b>⑦</b>	① ④ ⑤ ⑥ ⑦	① ④ ⑤ ⑦ <b>⑧</b>	① ④ ⑤ ⑥ ⑦	① ④ ⑤ ⑦ <b>⑧</b>	① ④ ⑤ ⑥ ⑦ ⑧
(*) Improvements in bold characters and highlighted in yellow are considered optional.										

## **5. Controlled Crosswalk Striping Requirements**

- 5.1. Signalized Intersections: Pedestrian crosswalk striping and stop bars are required at signalized intersections and must conform with [City Pre-Approved Plan CK-R.28](#).
- 5.2. All Way Stop: Pedestrian crosswalk striping and stop bars are required at ALL-Way Stop controlled intersections and must conform with [City Pre-Approved Plan CK-R.28](#).
- 5.3. Stop-controlled intersections:
  - 5.3.1 Crosswalk striping and stop bars are required at the stop-controlled approaches on collector streets intersecting arterials.
  - 5.3.2 Crosswalk striping and stop bars are required at the stop-controlled approaches on local streets intersecting arterials.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy R-34: ON-STREET PARKING**

**A. ON STREET PARKING DESIGN**

On-Street Parking Stalls				
	Width	Length	Curb Radius	Distance from Driveway
End Stall	7-8 feet	20 feet	15 feet (see CK-R.24)	30 feet
Center Stalls	7-8 feet	22 feet	N/A	N/A

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### DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

#### Policy R-34A: ON-STREET PARKING

## I. ON STREET PARALLEL PARKING DESIGN

On-Street Parking Stalls				
	Width	Length	Curb Radius	Distance from Driveway
<b>End Stall</b>	7-8 feet	20 feet	15 feet (see CK-R.24)	30 feet
<b>Center Stalls</b>	7-8 feet	22 feet	N/A	N/A

## II. ON STREET ADA PARKING REQUIREMENTS

Any modification to on-street parking must align with the City's commitment to provide sufficient on-street accessible (ADA) parking spaces. Federal guidelines require that accessible parking spaces be provided on block perimeters where on-street marked or metered parking is provided (see U.S. Access Board's Proposed Rights-of-Way Guidelines (PROWAG), Section R309 "On-Street Parking Spaces"). On such block perimeters, the number of accessible spaces provided must meet the minimums shown in Table 1 or as required by current federal ADA guidelines, whichever is greater.

Table 1: On-Street Accessible Parking Spaces	
Total Number of Marked or Metered Parking Spaces on the Block Perimeter	Minimum Required Number of Accessible Parking Spaces
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 and over	4% of total

If the applicant's development will affect the quantity of marked or metered on-street parking spaces, the applicant may be required to convert existing standard parking spaces to accessible spaces. For example, if the block perimeter has 22 marked or metered spaces, and the development involves adding 6 marked or metered spaces, the new total would be 28 marked or metered spaces. Abiding by the requirements in Table 1, the block perimeter would need 2 accessible on-street parking spaces.

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy R-34B: ON-STREET PARKING IMPACT STUDY**

General - The City of Kirkland requires adequate parking to be provided on-site for all land uses. The Kirkland Zoning Code specifies parking requirements for many uses. The Planning Department can help an applicant determine their use(s) and parking requirements. For a modification to a decrease in the required number of spaces may be granted if the number of spaces proposed is documented by an adequate and thorough parking demand and on-street parking impact studies to be sufficient to fully serve the use. The study shall be prepared by a licensed transportation engineer or other qualified professional and shall analyze the operational characteristics of the proposed use which justify a parking reduction. The scope of the study shall be proposed by the applicant's transportation engineer and approved by the City Transportation Engineer. It is recommended that the applicant's engineer contact the City Transportation Engineer to determine the scope of the parking study.

**I. Define Study Area**

- A. Maximum of 800 feet (2-1/2 blocks) walking distance
- B. Minimum of 200 feet from the project site (one block distance)
- C. Consider the constraints of major arterials and geographic boundaries

**II. Map Legal Parking Supply by Block Face**

- A. Use techniques shown in Sample Data Sheet for measuring legal parking supply.



### **III. Define Study Time (exclude holiday week)**

- A. The parking study should occur between 6AM and 6PM or as defined by the City Transportation Engineer. The scope and study period must be approved by the City Transportation Engineer. Typical study scope:
  - a. 3 consecutive days minimum, 5 days preferred (same week, non-holiday week)  
Tues, Wed & Thurs or Mon to Friday
  - b. Typical times: 6AM, 7AM, 8AM, 9AM, 11AM, 1PM, 4PM, 5PM & 6PM or as required by the City Transportation Engineer (one sweep each hour)
  - c. For special use with weekend impact, collect parking data for 3 consecutive weekends (Saturday and Sunday)

#### **IV. Document Existing Conditions**

- A. Record the number of parked vehicles by block face and time
- B. Calculate the parking utilization by block face for existing conditions

$$\frac{(\# \text{ of vehicles parked})}{(\# \text{ of legal parking supply})} \times 100 = \% \text{ Parking Utilization}$$

#### **V. Document Cumulative Project Impact**

- A. Estimate the average and peak parking demand of project, using acceptable source (source must be approved by the City Transportation Engineer). The demand should include parking needs of tenants/employees and guests. Empirical parking data should be provided instead of theoretical estimation.
- B. Estimate overflow parking for the proposed project (estimated parking demand minus the parking supply).
- C. Identify any other proposed developments in the vicinity that would impact the on-street parking supply (the City Transportation Engineer will provide the information).
- D. Calculate the future average and peak parking utilization rates for the study area.

#### **VI. Report Preparation**

- A. Document all assumptions.
- B. Provide all backup data including count sheets, maps and any relevant data.
- C. Identify the block faces for the on-street parking data on a map showing the number of parking available.
- D. Provide the parking supply and utilization for each block face.

*F.* Proposed mitigation if applicable.

### VIII. Sample Data Sheet.

# On-Street Parking Utilization Study SAMPLE DATA SHEET

Date Nov. 12, 2008  
 Street 10th Avenue  
 Segment Houghton Street to Juanita Lane  
 Side West

sample measurements

0 feet 2 start of measurement (back of sidewalk); if no sidewalk, 10 feet behind the edge of pavement.

S 3 stop sign  
 Clearance Area # of space

## Measure Direction

1. direction of traffic is always toward the top of page
2. edge of sidewalk (SW) starts the measurements
3. Identify presence of stop sign or yield sign with (S)
4. Measure between of curb radius tangent if no sidewalk
5. Identify edge of driveway and using (DW)
6. Measurement to and identify fire hydrant
7. Identification of special zone: loading zone (LZ), no parking zone (NP), time limit zone (TL), parking meter (PM)
8. Measurement of edges of special zone
9. Note any irregularities

## Distance Measured From

20 feet edge of sidewalk (SW), no sign (NS) (beginning of block on direction of traffic)  
 30 feet stop sign or yield sign  
 20 feet Crosswalk  
 20 feet driveway entrance to any fire station on both side of street unless posted  
 30 feet of the nearest rail of a railroad crossing or as posted  
 5 feet each side of driveway  
 15 feet fire hydrant, Hyd  
 0 feet special zone (loading, no parking...)  
 0 feet edge of sidewalk (SW) at end of block

## Distance # of spaces

16-31 feet 1  
 32-53 feet 2  
 54-69 feet 3  
 70-91 feet 4  
 92-108 feet 5  
 108-129 feet 6  
 130-145 feet 7  
 146-167 feet 8  
 168-183 feet 9  
 184-205 feet 10  
 206-221 feet 11  
 222-243 feet 12  
 244-259 feet 13  
 260-281 feet 14  
 282-297 feet 15  
 298-319 feet 16  
 320-335 feet 17  
 336-357 feet 18  
 358-373 feet 19  
 374-395 feet 20

A calculate length between 2 and 4  
 B calculate length between 6 and 7  
 C calculate length between 7 and 8  
 D calculate length between 10 and 11  
 - feet

Direction of traffic

70 feet 4

Driveway 5

80 feet 6

B

driveway clearance 168 feet  
 sign clearance -80 feet  
 driveway clearance 88 feet  
 hydrant clearance -5 feet  
 Clearance 68 feet

3

168 feet Hydrant 7

C

200 feet  
 -168 feet  
 32 feet  
 hydrant clearance -15 feet  
 Clearance 15 feet

0

200 feet 8

Loading Zone, LZ 9

No Parking

0

250 feet 10

Loading Zone

288 feet  
 -250 feet  
 38 feet

2

D

288 feet SW 11

Total 6 spaces

**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY****Policy R-35: Guidelines for Temporary Non-Vehicle use of Parking Stalls****PURPOSE:**

The purpose of this policy is to clarify the restrictions and design standards for short-term non-vehicle use of regulated parking stalls in the City of Kirkland. In general, any parking stall occupant should be aware of the parking restrictions and these standards without them being designated or signed at any location. However, if a parking stall user is found in violation of these restrictions or standards, any future proposed uses may be denied and they will be subject to any fine determined by the City.

In most situations, Public Works will approve all temporary non-vehicle uses in regulated parking stalls throughout the City. Public Works staff will work in conjunction with the Police Department and the Fire Department to evaluate for any safety risk posed to the public.

A Site Plan is required for review of all Temporary Non-Vehicle uses proposed. The site Plan must identify the following items:

- Adjacent Land use (both side of the street)
- Sidewalk width
- Bike lane width
- Exact location and distance from nearest driveways, crosswalks, and intersections
- Nearest waste receptacles (depending on the proposed use, the applicant may be required to provide these as part of the permit)
- The profile of the proposed use and the impact on the surrounding area
- All utilities and other city assets (sewer drains, light posts, trees, etc.)

A Temporary is required if the proposed use is expected to overlap with any travel lanes within the right-of-way (shoulders, sidewalks, crosswalks, parking and bicycle facilities), in accordance with Pre-Approved Plans Policy R-29.

**GENERAL NOTES:**

1. All proposed uses must be equally available for the public for use.
2. No more than two parking stalls may be occupied at one time unless approved by the Public Works Department.
3. No use shall last longer than 24-hours.
4. No devices/signs/equipment which redirect movement in the roadway travel lanes is not allowed without department approval.
5. Any use of heating equipment requires the approval from the fire department
6. Artwork is allowed and encouraged, however, it cannot replicate any traffic control symbols
7. Painting on the pavement surface is not allowed

8. Play equipment is allowed, as long as the use does not overlap and impede movement in the travel lanes.
9. The Public Works Department reserves the right to deny any proposed use for any reason.
10. The Public Works Department issued parking permit must be on display at all times.
11. No Parking restriction signs must be in place no less than 24 hours prior to the proposed use date.
12. All adjacent land uses must be notified of the proposed use date and time at least two (2) business days prior to the prior to the proposed use date.

## REQUIREMENTS:

Deck use requirements (Pre-Approve Plans No. E):

1. There must be a minimum gap of 6" between the deck and curb,
2. The top layer of the deck must be no more than ¼" above the top of the sidewalk,
3. The top layer of the deck must be no more than ½" between the top layer and the curb,
4. If a deck is to be used, ADA access must be provided in compliance with Title II of the American Disabilities Act.

Other Required equipment (Figure F)

1. Traffic reflector tubes (a.k.a. plastic bollards) linked with a rope along the outside barrier of the parking stall placed at every corner and every 10' of the parking stall to be used.

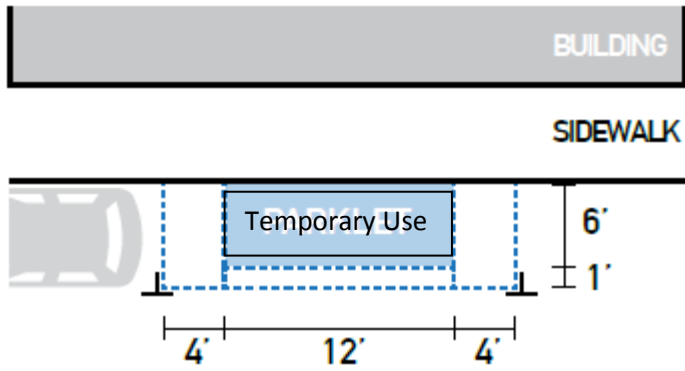
**Table 1:**

Proposed Use Design Guidelines									
Location	Stall width (ft)	Stall length (ft)	Buffer from travel lane (ft)	Buffer from car use (ft)	Available width for use (ft)	Available length for use (ft)	Min Height for use (ft)	Max Height for use (ft)	Pre-approved Plan No.
Mid-block	7	20	1	4	6	12	30"	8	A
Mid-block	7	40	1	4	6	32	30"	8	B
Corner	7	20	1	4*	6	12	30"	3	C
Corner	7	20	1	4*	6	32	30"	3	D

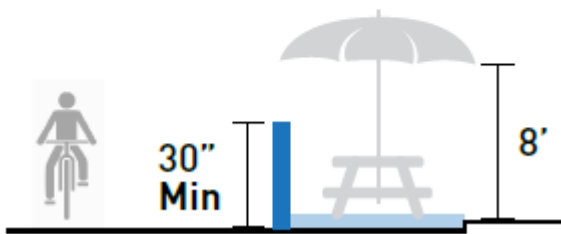
\*The 4' buffer only applies on the side adjacent to car parking uses. The corner side does not require a buffer.

Drawing A

## MINIMUM DIMENSIONS

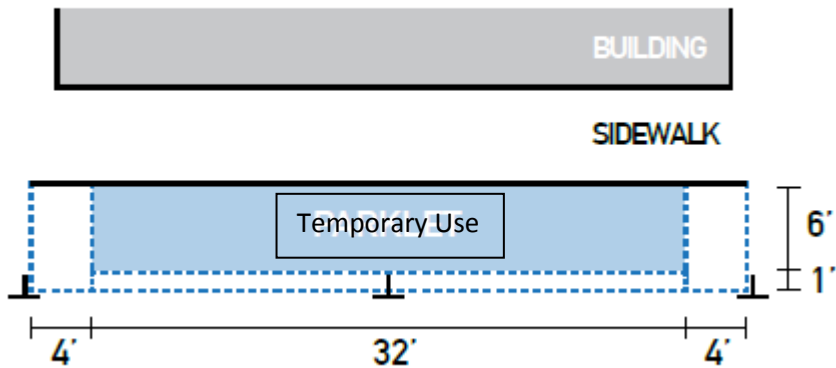


## MINIMUM HEIGHT

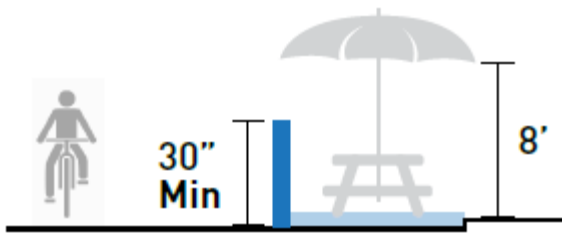


Drawing B

## DOUBLE SPACE DIMENSIONS

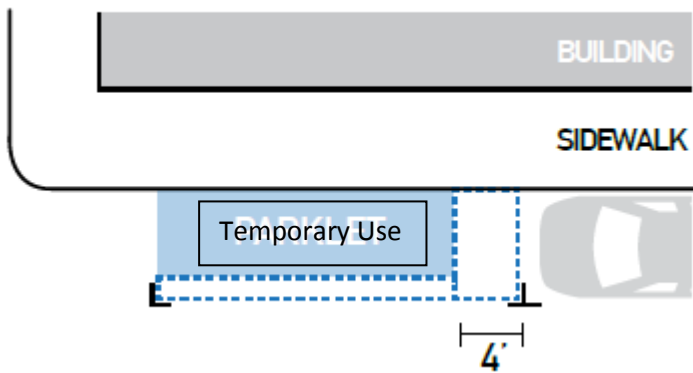


## MINIMUM HEIGHT

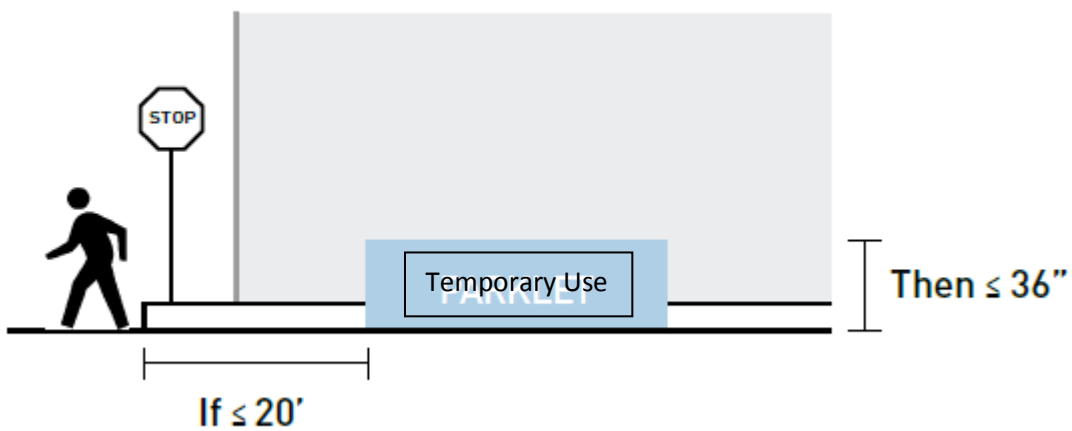


Drawing C

## CORNER BUFFER

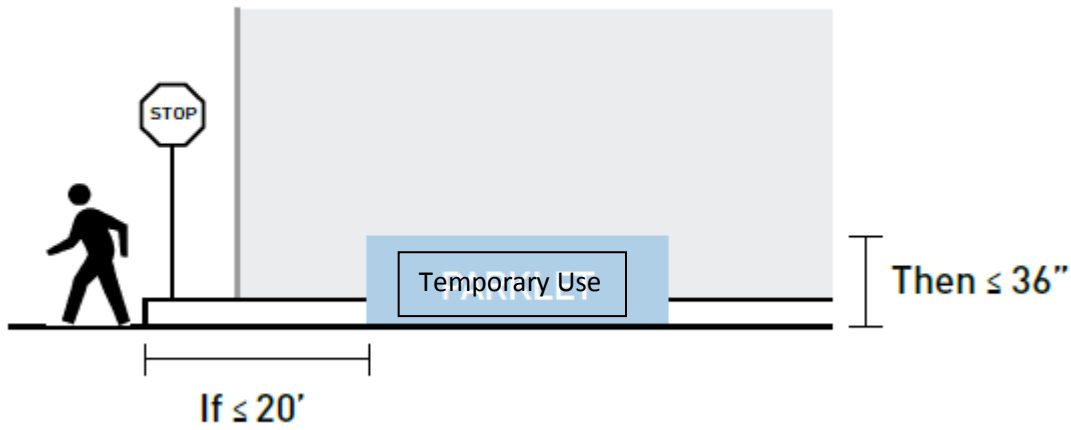


## MAXIMUM HEIGHT NEAR CORNERS



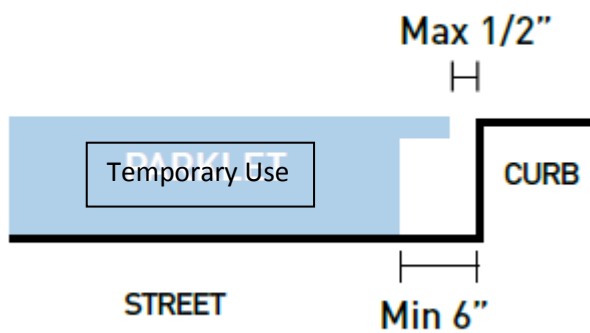
Drawing D

## MAXIMUM HEIGHT NEAR CORNERS



Drawing E

## GUTTER & DECK GAP



## MAXIMUM VERTICAL GAP

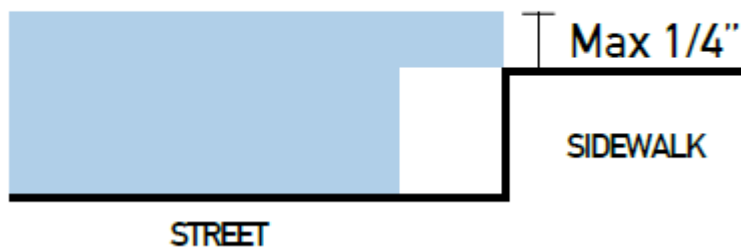
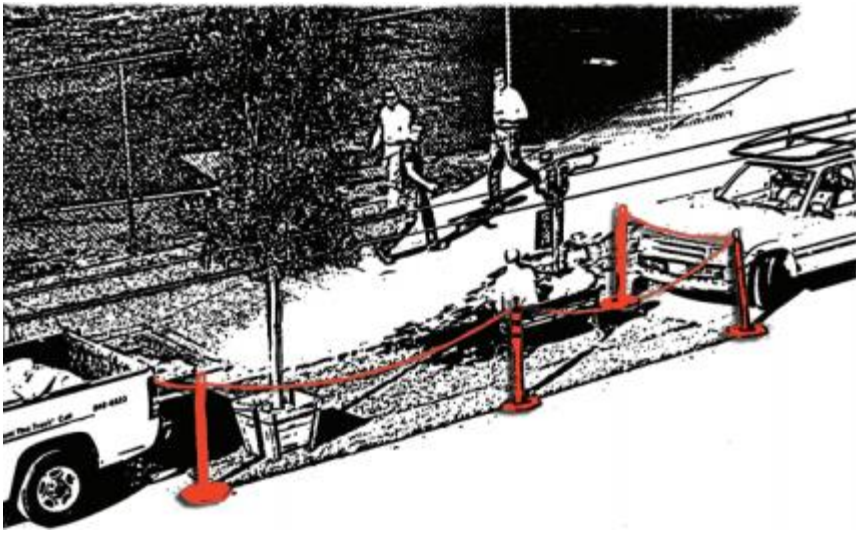


Figure F





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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY****Policy R-36: Bike Parking Guidelines****1. Introduction/Overview**

Bike parking facilities are an essential component of bicycle infrastructure as part of Kirkland's multimodal transportation system. Providing convenient and secure bike parking is critical to support existing cyclists, attract new riders, and reduce the barriers to cycling for all types of trips. Kirkland's Active Transportation Plan recognizes the importance of bike parking in Objective 2-10: Update bicycle parking policy and programs to ensure parking is available at both ends of bike trips. Providing specific design recommendations for bike parking as part of this guide ensures that the constructed bike parking meets the needs of cyclists throughout the city. The Kirkland Zoning Code<sup>1</sup> identifies the number of bike parking spaces that shall be provided with new development throughout the city but offers limited design or performance standards for bike parking. This guide outlines design recommendations for bicycle parking to ensure that new development provides bike parking facilities that align with best practice and provide secure and convenient bike parking options. The content of this guide was developed from best practices contained in the Association of Pedestrian and Bicycle Professionals' Bicycle Parking Guidelines<sup>2,3</sup>.

The following design guidelines apply to both bicycle parking provided as part of new development and bicycle parking within the public right-of-way. Acceptable bike parking design varies based on the expected parking duration. Short-term bike parking, typically four hours or less, should provide convenient and highly visible access to destinations while long-term bike parking should emphasize security and weather protection. Table 1 summarizes characteristics of different types of short- and long-term bike parking options that are permitted in the City of Kirkland.

**Table 1: Types of Short- and Long-Term Bike Parking**

Type of Bike Parking	Permitted Design Option	Characteristics
Short-Term: Bicycle parking designed for visitors to provide convenient options for trips of four hours or less	Sidewalk Bike Racks	<ul style="list-style-type: none"> <li>Located within sidewalk furnishing zone</li> <li>For use by general public</li> <li>Does not include weather protection</li> </ul>
	On-Street Bike Parking Corrals	<ul style="list-style-type: none"> <li>Installed by City of Kirkland</li> <li>Located in the roadway adjacent to the curb in an on-street parking stall or the 30 ft no parking zone approaching a stop sign</li> <li>For use by general public</li> </ul>

Type of Bike Parking	Permitted Design Option	Characteristics
		<ul style="list-style-type: none"> <li>Does not include weather protection</li> </ul>
	Bike Racks on Private Property	<ul style="list-style-type: none"> <li>Installed by developer</li> <li>Located within private property</li> <li>For use by visitors to property</li> <li>Should include weather protection</li> <li>May include other amenities (see Section 2.4)</li> </ul>
	Event Bike Parking	<ul style="list-style-type: none"> <li>Provided by event organizers or volunteers</li> <li>Located within event area</li> <li>For use by attendees</li> <li>May include weather protection</li> </ul>
Long-Term: Bicycle parking design for residents or employees to provide secure options for storage or trips longer than four hours	Bike Lockers	<ul style="list-style-type: none"> <li>Individual locked spaces to store one bicycle</li> <li>Installed by developer or transit agency</li> <li>Located within private property (e.g. outside, parking garage)</li> <li>May include weather protection over locker (e.g. canopy)</li> </ul>
	Bike Cages	<ul style="list-style-type: none"> <li>Common secure areas to store multiple bicycles</li> <li>Installed by developer</li> <li>Located within private property (e.g. outside, parking garage)</li> <li>Includes weather protection</li> </ul>
	Bike Rooms	<ul style="list-style-type: none"> <li>Common secure areas to store multiple bicycles</li> <li>Installed by developer</li> <li>Located within private property (e.g. parking garage, inside building)</li> <li>Includes weather protection</li> <li>May include additional bike amenities (see Section 3.4 )</li> </ul>

Bicycles come in many different shapes and sizes, and the provided bicycle parking must be tailored to suit different types of users. In most cases, the provided bicycle parking should be sized to accommodate a standard adult-sized bicycle, typically 6 ft. long by 2 ft. wide by 4 ft. tall. Oversized bicycles (*e.g.* cargo bikes, longtail bikes, recumbents) are becoming increasingly common and require additional design considerations to ensure safe, convenient, and secure bicycle parking that does not impede pedestrian access. These bicycles may be 4 to 6 ft. longer than a standard adult bicycle. Electric bicycles also require special design considerations, including access to charging outlets. These bikes also tend to be heavier due to the included battery, making horizontal (*i.e.*, no lifting required) bike parking preferable for many users.

## **2. Short Term Bicycle Parking**

Short-term bike parking, typically four hours or less, must be designed to provide secure and convenient bicycle storage options for visitors to businesses and residences. The following sections specify the appropriate design elements for sidewalk bike racks, on-street bike parking corrals, and bike racks installed on private property.

### **2.1 Acceptable Bicycle Racks**

Short-term bicycle parking racks shall be Inverted U type racks. Kirkland's standard bicycle rack is detailed in [CK-R.40](#). All bicycle racks installed in public right-of-way or private property shall be cane detectable. Other bicycle racks may be approved by Public Works provided that they meet the following functional criteria:

- Support the frame of the bicycle in two places
- Prevent the bicycle wheels from tipping
- Allow the frame and one wheel of the bike to be locked when both wheels are left on the bike or the frame and both wheels of the bike to be locked when the front wheel is removed
- Allow locking with a U-shaped lock
- Allow parking by a wide variety of bicycle shapes and sizes including, but not limited to, bicycles without a traditional diamond-shaped frame, oversized bicycles, electric bicycles, bicycles with water bottle cages, or bicycles without kickstands
- Allow for secure anchoring to a hard surface
- Utilize an intuitive design

Bicycle racks that do not support a bicycle's frame (*i.e.*, a wheel-bending type rack) will generally not be approved.

Bicycle racks shall be constructed from either galvanized or stainless steel. Colored thermoplastic coated bicycle racks may be permitted by Public Works provided that an applicant considers longevity and maintenance of the thermoplastic coating. Square tubing is preferred for short-term bicycle racks to resist pipe cutting attacks.

Approved bicycle racks shall be mounted to a hard surface. Concrete is the preferred hard surface for bicycle parking areas although asphalt may be used if a concrete footing is also provided for each anchor point. Bicycle racks shall be anchored using the provided surface flanges with tamper resistant hardware (*e.g.*, security nuts). All bicycle racks shall be installed following the manufacturer's specifications.

On-street bicycle parking corrals may be installed on asphalt surfaces by using a base rail which should be attached to the asphalt pavement per manufacturer specifications.

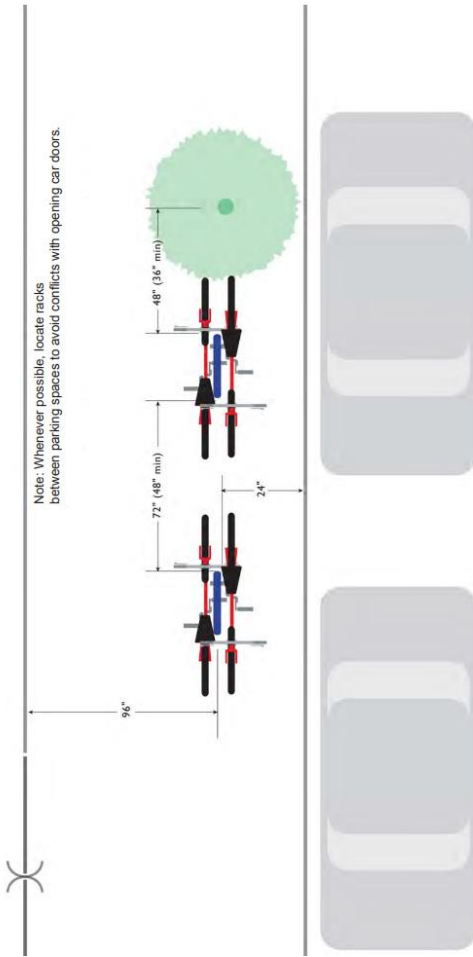
## **2.2 Bicycle Parking Location and Design**

Bicycle parking shall generally be located to provide adequate clearance from sidewalks, street or property furnishings, buildings, streets, and driveways while still providing convenient access to building entrances. Designated micromobility parking may be located next to bicycle parking to facilitate appropriate parking. Short-term bicycle parking racks installed by the City of Kirkland shall be located in either existing, on-street parking spaces as a bike corral, or within the sidewalk furnishing zone as a sidewalk bike rack. Short-term bicycle racks installed as part of a new development shall be located on private property and within 50 feet of each public building entrance. Short-term bicycle racks required for new development may be permitted within the public right-of-way in urban centers (*i.e.*, Totem Lake, Juanita Business District, Central Business District, or NE 85<sup>th</sup> Street Station Area) provided that the rack is within 50 feet of a public, pedestrian-oriented building entrance and there is adequate space within the right-of-way (see Figure 1 or 2).

The configuration of bike parking and any required clearances depends on the orientation of bike racks within the bike parking area. Parallel bike parking installations (see Figure 1) arrange bike racks end to end and are typically seen in the sidewalk furnishing zone to minimize encroachment into the pedestrian clear zone, the primary, accessible portion of the sidewalk that runs parallel to the street. Perpendicular bike parking installations (see Figure 2) group bike racks side to side and require a greater clear zone on each side of the rack to accommodate bikes of different shapes and sizes. Parallel bike parking installations require a minimum 6 ft. between racks while perpendicular bike parking installations require a minimum 3 ft. between racks. Bike racks should also be installed at least 2 ft. from building walls or the edge of curb although 3 ft. is preferred where feasible. A 3 ft. clearance from the edge of curb is required whenever bike parking is adjacent to a parking lane.

Bike parking should generally be located outside of the pedestrian clear zone, typically the required sidewalk width, in line with other street or property furnishings, and should be accessible from the sidewalk. In locations with wide sidewalks or pedestrian plazas, bike parking may be permitted to intrude within the pedestrian zone although a minimum 5 ft. pedestrian clear zone must be maintained. Bike parking within a plaza should be strategically located next to building entrances and away from major pedestrian flows.

Short-term bike parking should also be placed to avoid conflicts with vehicles accessing a site. Bike parking within the street furnishing zone should be located at least 5 ft. from driveways. Bike parking accessible from a vehicle driveway shall be designed such that parked bicycles do not extend into the minimum required vehicle drive aisle. Typical short-term bike parking configurations are seen below:



**Figure 1: Typical Layout of Parallel Sidewalk Bike Parking Installations (Source: APBP<sup>2</sup>)**

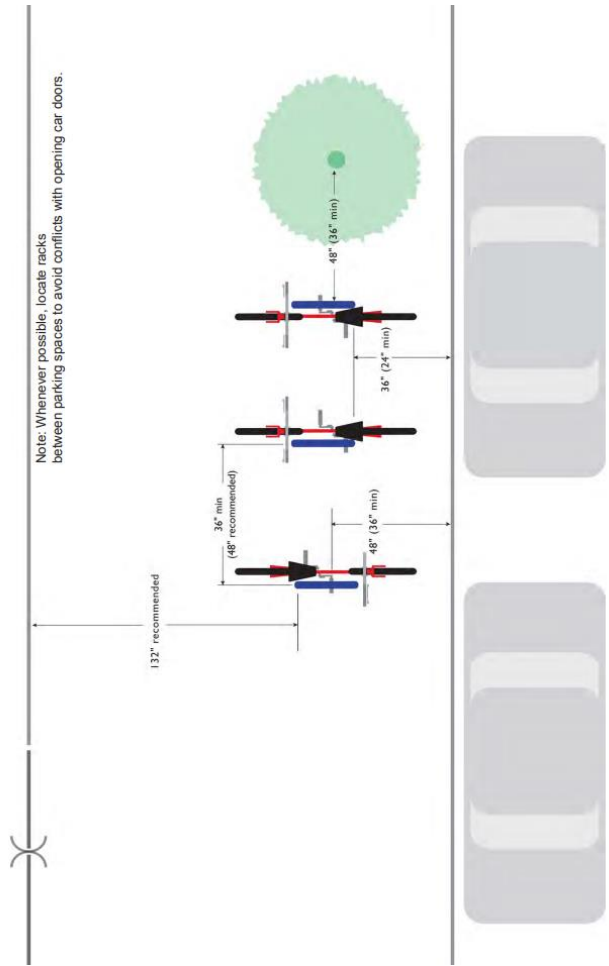


Figure 2: Typical Layout of Perpendicular Sidewalk Bike Parking Installations (Source: APBP<sup>2</sup>)

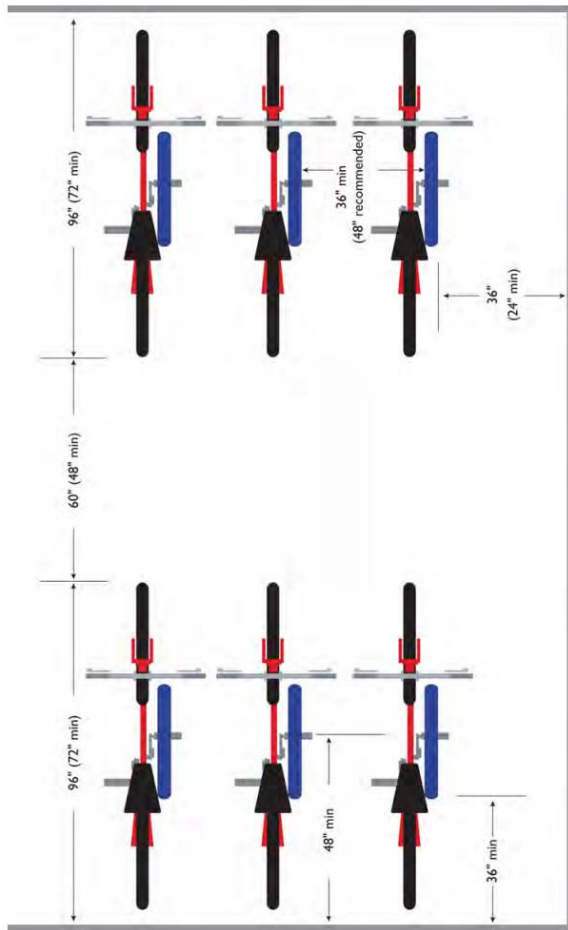
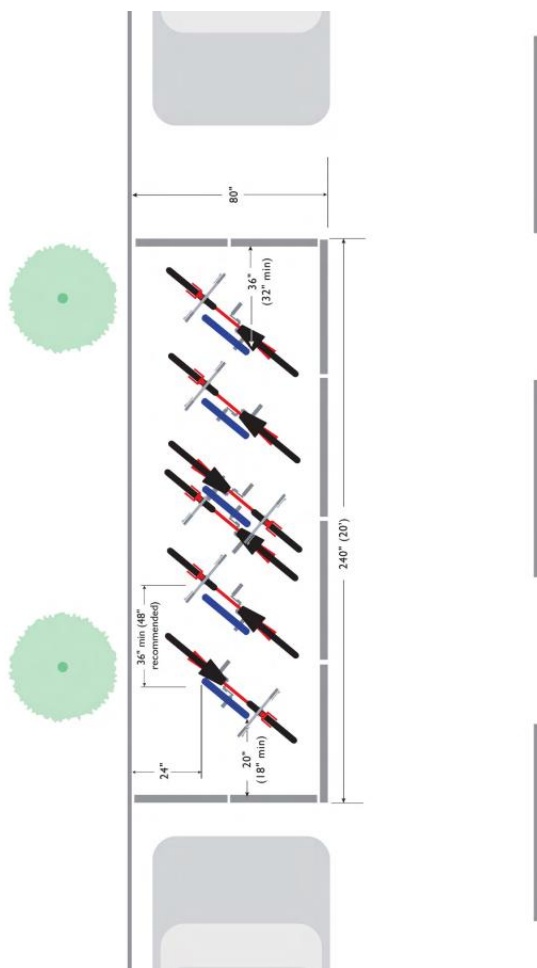


Figure 3: Typical Layout of a Bike Parking Area on Private Property (Source: APBP<sup>2</sup>)





**Figure 4: Typical Layout of a Bike Parking Corral (Source: APBP<sup>2</sup>)**

### **2.3 Additional Short-Term Bicycle Parking Requirements**

Short-term bicycle parking located on private property shall typically include weather protection. When short-term bike parking is provided within a plaza, it should be strategically located to utilize available weather protection, such as building overhangs, without introducing new structures. Bike parking located in central plaza areas may be exempt from weather protection requirements. The provided weather protection shall cover the required bike parking and circulation area with a minimum 8 ft. clearance between the ground and bottom of weather protection. The weather protection shall include a separate drain which directs water away from the provided bicycle parking area. All weather protection shall be designed to meet applicable structural and building codes.

### **2.4 Optional Short-Term Bicycle Parking Amenities**

Short-term bicycle parking may also include a bike repair station or charging outlets for electric bicycles on private property. Bike repair stations may be used by cyclists to make minor tune ups and can include elements like a stand to hold the bicycle, tire pump, and tools. Repair stations should be installed according to the manufacturer's specifications, and all individual components (*e.g.*, repair tools) should be attached to the stand body in a secure manner to minimize potential theft. If provided, the repair station should be located underneath the required weather protection. The bike repair station shall be

situated to provide sufficient clearance between the repair station and adjacent racks or walls so that a user may freely work on their bike without reducing the availability of bike parking. The final position of any repair station must be approved by Public Works as part of the design process.

New developments may also install exterior charging outlets on private property to charge electric bicycle batteries. The design of charging outlets shall consider the security of a users' battery pack, required weather protection, and the universality of the provided charging ports. External charging outlets shall be constructed to meet all applicable codes and house cords internally to minimize potential tripping hazards. Maintenance of the provided charging outlets is the sole responsibility of the property owner.

### **3. Long Term Bicycle Parking**

Long-term bike parking, typically for more than four hours, must be designed to provide secure and convenient bicycle storage options for employees and residents. The following sections specify the appropriate design elements for bike lockers, bike cages, and bike rooms installed on private property.

#### **3.1 Acceptable Bike Parking Types**

Long-term bicycle parking includes bike lockers, bike cages, or bike rooms. Bike lockers are small and secure bicycle storage areas that can accommodate up to two bicycles per locker. Individual bike lockers can be arranged in groups or stacked to provide bike parking for multiple users in a smaller footprint. Bike cages or rooms provide a controlled-access bike parking area that contains racks for multiple bicycles. Bike cages typically use metal fencing to create a secure area for bike parking within a parking garage or outdoors and can be easier to expand. Bike rooms are typically incorporated into a building design as a standalone room.

Bike lockers can be made from metal, molded plastic, or plastic or fiberglass on metal frames. Bicycle lockers are generally secure, but they can be cut or pried open if improperly designed or made of soft plastic. Security windows may be included in bike lockers provided that they do not introduce additional security vulnerabilities. Bike lockers shall be securely mounted to a hard surface following the manufacturer's specifications to prevent the lockers from being carried away. Concrete is the preferred hard surface for bicycle parking areas although asphalt may be used if a concrete footing is also provided for each anchor point. Bicycle lockers shall be anchored following manufacturer standards.

Bike cages shall be constructed from wire mesh or perforated steel as recommended by a manufacturer to be theft-resistant and allow for adequate visibility of the interior space. The enclosure shall be securely mounted to a hard, concrete surface and include a roof with a minimum 8 ft. clearance if located outside as a separate structure. Greater vertical clearances may be required if two-tier or hanging racks used. The wire mesh or perforated steel surrounding the bike cage shall be extended from the floor to the roof or ceiling of the bike cage. Since bike rooms are integrated into the building design, these enclosures provide additional security. However, windows should be provided in the door or entry area so users may feel more secure and allow for outside surveillance from building security.

All long-term bicycle parking should also provide adequate security measures to deter bicycle theft. Bike lockers may be secured through private locker keys, individual locks, or smart locks using either a keypad or a key card. An on-demand locker provides the most flexibility to users, secures the lockers while not in use, and allows for access by building personnel as needed. Utilizing individual locks also

provides flexibility to users, but individual locks cannot secure the lockers while not in use. Individual locks may also be vulnerable to theft if the lockers are located in secluded areas. Individual keys provide a guaranteed space for bicycle parking but can pose key management challenges for building personnel and may require lockers to be re-keyed if the keys are lost or not returned. Bike cages or rooms can also be secured through individual keys or smart locks. Individual keys may pose long-term security challenges compared to smart locks if not carefully managed to ensure that only authorized individuals have access to the secure bike parking.

Given the potential security limitations of some long-term bike parking access methods, additional security measures, like monitoring the parking area with active security cameras or an attendant are also recommended. Using security cameras to monitor long-term bike parking areas also provides evidence for police in the event a bicycle is stolen.

### **3.2 Bicycle Parking Location and Design**

Long-term bicycle parking shall generally be located to provide adequate clearance from sidewalks or designated pedestrian pathways, vehicle circulation, and parking areas and should be located in an area that provides convenient access for travelers arriving by bike. Bicycle parking that requires cyclists to carry their bicycles up or down a set of stairs to access the parking is not acceptable. Long-term bicycle parking may be provided in the parking garage (typically as a bike cage or set of bike lockers), inside the building (as a bike room), or as a separate, stand-alone structure or bike cage. All long-term bicycle parking shall include weather protection.

Bicycle parking located within a parking garage shall be located to ensure that bike parking is accessible as possible from building entrances and minimizes the distance travelled by cyclists through the parking garage. Bicycle entry to the garage shall not be restricted by the use of gates or other barricades intended to restrict vehicle access, and if used to control vehicle access, a minimum 5 ft. clear pathway must be provided for bicyclists around the gate or barricade. If the bicycle parking location requires cyclists to travel on parking garage ramps that exceed 5% grade, a minimum 5 ft. bike lane shall be provided for cyclists travelling uphill outside of the required vehicle drive aisle and pedestrian clear zone. The ramp shall be designed to ensure that vehicles do not need to encroach into the uphill bike lane as demonstrated by vehicle turning templates, and additional width may be required to ensure a clear vehicle path. If the bicycle parking is located within the building, the parking should be clearly identified and located within 50 ft. of the primary building entry. Otherwise, bicycle wayfinding shall be required. Stand-alone bicycle parking must be accessible from a designated bicycle path or the sidewalk and should be situated to be highly visible to cyclists accessing the site and the primary building entry.

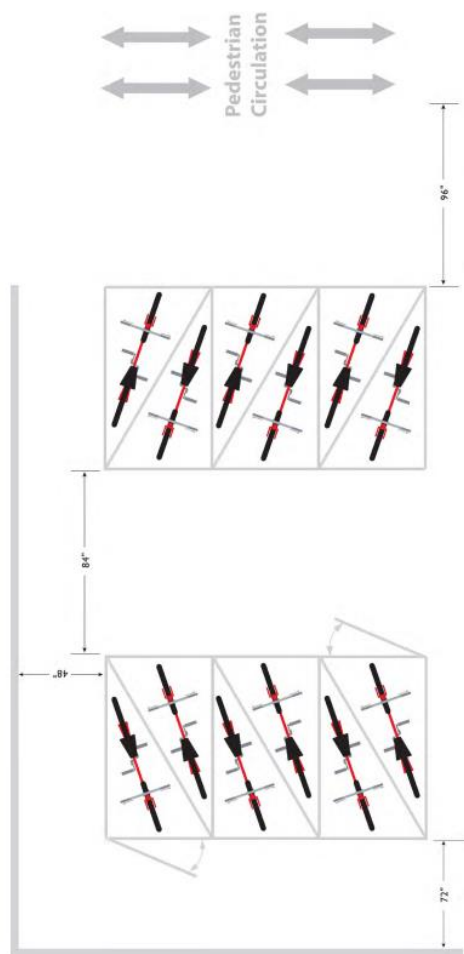
Bike lockers are ordered directly from manufacturers and can be installed on any level surface. Bike lockers should be installed in an area that is large enough to accommodate the locker's footprint and provide adequate clearance around the locker since most lockers can be accessed from both sides, allowing for two bikes to be stored in one locker. The size of a bike locker varies between manufacturers, but is around 40 inches wide, 75 inches long, and 50 inches tall. The following performance criteria shall be used to evaluate the arrangement of bike lockers:

- All bike lockers shall be placed to provide sufficient clearance from walls and other bike lockers to allow the door to fully open. If the bike lockers are arranged in parallel rows, bike lockers

located on a center aisle shall be placed to provide sufficient clearance for doors on each side to fully open.

- Bike lockers that open towards a wall, vehicle parking space, or other obstruction (*e.g.* a column) shall be located at least 6 ft. from the obstruction
- Bike lockers that open towards other bike lockers shall provide a minimum 7 ft. access aisle between the bike lockers
- Bike lockers that open towards pedestrian or vehicle circulation areas shall provide a minimum 8 ft. between the bike locker and the pedestrian clear zone or vehicle travelled way
- Bike lockers shall be located to provide a minimum 5 ft. clear aisle to access the bike parking
- At least 10% of the bike lockers shall be sized to accommodate oversized bicycles
- At least 50% of the bike lockers shall include power outlets for electric bike charging

A sample bike locker layout is provided below in Figure 5:



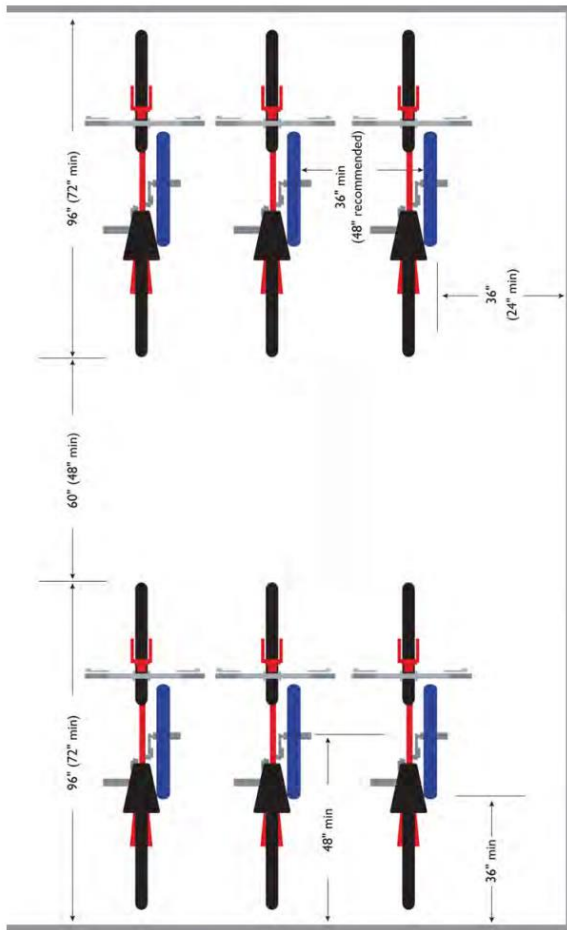
**Figure 5: Typical Layout of a Bike Locker Bank (Source: APBP<sup>2</sup>)**

Bike cages or rooms provide bicycle racks within a secure space to organize bicycle storage and provide additional security. Inverted U type bike racks are the preferred choice for long-term bike parking in bike cages or rooms. Other bicycle racks may be approved by Public Works provided that they meet the functional criteria for bike racks in Section 2.1 of this guide although vertical/hanging bike racks are not

acceptable to accommodate oversized or electric bicycles. All bicycle racks used in bike cages or rooms shall be installed with tamper resistant hardware following the manufacturer's specifications. The arrangement of bicycle racks within a bike cage or room shall be reviewed and approved by the Public Works department. The following performance criteria shall be used to evaluate the arrangement of bicycle parking within bike cages or rooms:

- Horizontal bike racks shall be spaced to provide a minimum 3 ft. between racks
- Vertical/hanging bike racks shall be spaced to provide a minimum 3 ft. between racks if racks are mounted at the same height and a minimum 2 ft. between racks if racks are staggered vertically
- Horizontal bike racks shall be installed at least 2 ft. from room or cage walls although 3 ft. is preferred where feasible
- Vertical/hanging bike racks shall be installed at least 1.5 ft. from room walls or other obstructions (*e.g.*, pipes)
- Vertical/hanging bike racks shall be installed at a height to meet the recommended floor and ceiling clearances as specified by the rack manufacturer
- Racks shall be installed to provide a minimum 5 ft. clear aisle to access the bike parking
- At least 10% of the bike racks shall be placed with greater clearances to accommodate oversized bicycles
- At least 50% of the bike racks shall have access to electric outlets (*i.e.*, an electric outlet shall be located within 3 ft. of the rack.
- No more than 50% of the bike racks shall require lifting (*e.g.*, vertical or hanging racks)

A sample bike room layout is provided below in Figure 6:



**Figure 6: Typical Layout of a Bike Parking Room (Source: APBP<sup>2</sup>)**

Up to 50% of the required long-term residential bike parking may be provided in unit provided that the following performance standards are met:

- The bicycle parking area is located within 15 ft. of the entrance to the dwelling unit and accessible from a minimum 5 ft. clear pathway that does not include stairs
- The bicycle parking area for one bicycle is a minimum 3 ft. by 6 ft.

### 3.3 Additional Long-Term Bicycle Parking Requirements

Since long-term bike parking is intended to primarily serve employees and residents, this parking may be located more than 50 ft. away from building entrances. Bike parking signage and wayfinding is required for any long-term bike parking that is not visible from a public building entrance. The design of the signage and wayfinding shall be coordinated with the Public Works department but should include the following elements at minimum:

- Signage that directs bicyclists from primary site access point(s) for bicyclists to the bike parking
- Building maps that identify the bicycle parking location
- New employee and resident information that identifies the bicycle parking location

### **3.4 Optional Additional Amenities**

Long-term bicycle parking may also include a bike repair station. Bike repair stations may be used by cyclists to make minor tune ups and can include elements like a stand to hold the bicycle, tire pump, and tools. Repair stations should be installed according to the manufacturer's specifications, and all individual components (*e.g.* repair tools) should be attached to the stand body in a secure manner to minimize potential theft. The bike repair station shall be situated to provide sufficient clearance between the repair station and adjacent racks or walls so that a user may freely work on their bike without reducing the availability of bike parking. The final position of any repair station must be approved by Public Works as part of the design process.

Providing shower or changing facilities may make bicycle commuting more appealing for workers, beyond having a secure bike storage option, and may be required for commercial or institutional developments of a certain size. Showers or changing facilities could be installed as part of the bike parking room or utilize other shower or changing facilities already provided on-site. Where feasible, these facilities should be co-located with the bike parking to enhance the visibility of these options for cyclists. If the provided shower or changing facilities are not located within 50 ft. of the provided bicycle parking, additional wayfinding should be provided. Showers or changing facilities shall be designed to meet all relevant building codes.

### **4. Temporary (Event)**

Additional temporary bicycle parking may be required for special events within the City of Kirkland. Temporary event parking requirements must be coordinated directly with the Department of Public Works and the Special Events Team.

### **5. References**

1. Kirkland Zoning Code. <https://www.codepublishing.com/WA/Kirkland/?html/KirklandZNT.html>
2. Association of Pedestrian and Bicycle Professionals. *Bicycle Parking Guidelines*, 2<sup>nd</sup> Ed. 2010.
3. Association of Pedestrian and Bicycle Professionals. *Essentials of Bike Parking*. 2015.  
[https://www.apbp.org/assets/docs/EssentialsofBikeParking\\_FINA.pdf](https://www.apbp.org/assets/docs/EssentialsofBikeParking_FINA.pdf)



## Policy R-37 Mailbox No Parking Signs: Authorization for Property Owners

**Background** Public Works receives routine requests for No Parking signs in front of mailboxes to discourage drivers from blocking mailboxes when mail is being delivered. The City of Kirkland passed an ordinance in 2016 that addresses this issue, but many drivers do not know of the ordinance or ignore it. The ordinance is incorporated into the Kirkland Municipals Code as Section 12.45.280 and states:

*Except when necessary to avoid conflict with other traffic, or in compliance with law or the directions of a police officer or official traffic control device, or momentarily to pick up or discharge a passenger or passengers, no person shall park a vehicle, whether occupied or not, within seven feet and six inches on either side of a public or private curbside mailbox between the hours of eight a.m. and five p.m. (Ord. 4510 § 5, 2016)*

Before the ordinance, the City authorized some residents to paint curbs red in front of mailboxes, which designated No Parking Anytime zones to help make sure mail could be delivered. The new parking code restriction, KMC 12.45.280, allows parking between 5 pm and 8 am. To help ensure parking supply is not unnecessarily restricted, red curb is no longer appropriate.

The number of No Parking in front of mailbox sign requests has grown over the years and the City does not have the resources to fabricate, install and maintain these signs.

To address the growing demand for No Parking in front of mailbox signs, the City developed a program authorizing residents to fabricate and install City-specified signs on their mailboxes. This authorization program would be managed and tracked the Neighborhood Traffic Control Coordinator or the City's Traffic Engineer. Authorization location and address shall be recorded in the City's GIS.

Attached is a form letter that authorizes residents to fabricate and install City-specified signs on their mailboxes. The City-specifications for the signs are shown in Attachment 1 of the letter.

August 2, 2019





Date

Address

**Subject: Mailbox No Parking Sign Authorization, Address**

This letter authorizes you to install a City-specified No Parking sign at your mailbox. This sign authorization is in accordance with attached policy R-37, subject to conditions listed in this authorization. Please retain this letter as proof of the City's authorization. If you move sometime in the future, please leave this letter with the new occupants. This authorization is not transferable to another address.

**Conditions of Authorization:**

1. The sign must replicate the sign shown in Attachment 1 consistent with No Parking signs with time restrictions as specified in *Manual of Uniform Traffic Control*. Any other sign is illegal and subject to removal or code enforcement action. Fast Sign, 13279 NE 20th St., Bellevue, WA 98005, 425-746-4151, <https://www.fastsigns.com/106-bellevue-wa>, can fabricate the sign for you.
2. Signs should be mounted on the mailbox stand in a way that does not interfere with mail delivery, block parking, reduce the width of sidewalks, are not at a height that interferes with walking or cycling, do not impede visibility of oncoming traffic, pedestrians or cyclists, do not create any other interference or hazard and must face the street or direction of traffic.
3. The City of Kirkland will not maintain this sign. Maintenance of the sign is solely your responsibility.
4. This authorization does not expire unless the City of Kirkland revokes it. The City reserves the right to revoke the authorization at any time.
5. The City does not warrant that drivers will comply with the sign, but it is official and as enforceable as if the City installed the sign. For enforcement, please contact the police at non-emergency 911 number (425) 577-5656 or [police@kirklandwa.gov](mailto:police@kirklandwa.gov).

Please let me know if you have any questions. Please also let me know when you have the sign installed, and I will field check and sign off. If you have any questions regarding this authorization, please contact me at (425) 587-[phone number](#) or [email address](#).

Sincerely,  
PUBLIC WORKS DEPARTMENT

**"NAME"**

Neighborhood Traffic Control Coordinator



## Attachment 1 – City of Kirkland Mailbox No Parking Sign



## **CITY OF KIRKLAND**

123 FIFTH AVENUE • KIRKLAND, WASHINGTON 98033-6189 • (425) 587-3800

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy R-38 Transportation Impact Analysis Review (TIAR)**

This policy establishes the requirements for a transportation impact analysis study and policies for mitigations to mitigate the transportation impacts of new developments. New development includes properties that are redeveloped or existing property with a new tenant that generates additional traffic. A transportation impact analysis (TIA) is a specialized study that focuses on the transportation impacts that a development will have on the surrounding transportation system. The TIA is an integral part of the development impact review process.

The purpose of a TIA study is to assess the impact that a development will have on the City's transportation system, including but not limited to peak periods of vehicle traffic conditions, transit users, pedestrians, bicyclists, safety, parking, driveway access and neighborhood livability. The TIA ensures that the traffic and transportation impacts of the proposed development are identified, evaluated, and mitigated as set forth in section G and H of this guideline. Furthermore, the requirements within this policy establish the transportation impact review to satisfy the requirements of the State Environmental Policy Act (SEPA), Chapter 43.21C RCW. The requirements within this policy further the City's Transportation Strategic Plan Policy T-9.5 that require new development to mitigate site specific and system wide transportation impacts.

To assist applicants in the preparation of the information needed for the TIA study, the City has established the following guidelines:

#### **GENERAL REQUIREMENTS**

If transportation concurrency review is required, the development must pass the transportation concurrency test prior to the scoping of the transportation impact analysis.

The TIA study must be conducted by a professional engineer registered in Washington, with expertise in transportation engineering, or a recognized transportation planning firm having experience in the preparation of transportation impact analysis and routine transportation engineering studies. The final report shall be stamped by the professional engineer responsible for conducting the TIA study.

The professional engineer performing the analysis should request approval of a scope of analysis from City Transportation Division Staff prior to commencement of the analysis. The intent is to reach agreement on the following:

- Roadways and intersections to be studied
- Information to be provided
- Analysis time periods, methods, and software to be used

- Technical parameters (saturation flow rates, peak hour factor, etc.) necessary to complete the analysis.

City Transportation Division Staff will respond in a timely fashion to this request.

The applicant must submit one electronic and one hard copy of the TIA report. If the development requires a SEPA review, the TIA report must be submitted through the Planning and Building Department. If SEPA review is not required, the TIA report can be submitted directly to City Transportation Division Staff or with the building or land surface permit. The review fee must be paid before the review process can begin.

#### **A. Levels of Analysis**

There are two levels of transportation impact analysis. The level of transportation impact analysis required is determined by the number of gross peak hour trips generated and SEPA regulations. Gross peak hour trips are the number of peak hour trips the proposed development will generate, excluding internal trips. Each development proposal that exceeds either of the analysis thresholds identified below shall include the appropriate transportation impact analysis with its the land use application for land use or design review approval.

##### ***Level One Transportation Impact Analysis Threshold:***

A Level One Transportation Impact Analysis is required when the proposed land use change or development proposals will not trigger a SEPA review and generates more than five gross peak hour vehicle trips and less than 50 gross peak hour vehicle trips.

##### ***Level Two Transportation Impact Analysis Threshold:***

A level two transportation impact analysis is required when the proposed land use change or development generates more than 50 gross peak hour vehicle trips or the development meets the threshold that requires State Environmental Policy Act (SEPA) review; some elements of an off-site transportation impact analysis may be required when the development does not generate more than 50 peak hour vehicle trips, but City Transportation Division Staff finds that the transportation impacts attributable to the development have the potential to significantly impact the safe and efficient operation of the existing transportation system.

The threshold for SEPA review includes but is not limited to (for more information, please contact the Planning and Building Department):

- Residential projects of 21 units or more;
- Farming structures of more than 30,000 square feet;
- Non-residential buildings of more than 12,000 square feet with associated parking of more than 40 stalls;
- Parking lots with more than 40 stalls; or
- Additions or modifications to, or replacement of, any building or facility if the proposal changes the character of the building or facility and/or the cumulative impacts make the total development no longer exempt.

**Table 1. TIA Thresholds**

<b>TIA Thresholds</b>	<b>No analysis</b>	<b>Level 1 Analysis</b>	<b>Level 2 Analysis</b>
SEPA Review Requires			Yes
Gross Peak Hour Trips <sup>1</sup>			
5 > trips	<b>X</b>		
5 < trips < 50		<b>X</b>	
50 or More			<b>X</b>

<sup>1</sup>Gross peak hour trips are the number of peak hour trips the proposed development will generate, excluding pass-by, diverted linked and internal trips.

## **B. Transportation Impact Analysis Study Requirements**

Regardless of the level of transportation impact analysis, all TIA study reports must be submitted in electronic form with at least one hard copy along with the review fee. The site plan must be drawn to engineering scale. The transportation impact analysis study must be stamped by a professional engineer licensed in the State of Washington and be based on a scope previously approved by City Transportation Division Staff. The TIA study review process will not begin until the review fee is paid in full.

All new developments that require concurrency testing must pass the concurrency test before submitting the transportation impact analysis report or any other transportation review.

### ***General Scope of Transportation Impact Analyses***

#### *Level One Transportation Impact Analysis:*

At the minimum, Level One transportation impact studies must include the following information:

1. A description of existing and proposed land uses and development intensities, driveway locations, existing access easements, parking, loading area, trash collection location, and the site parcel number(s).
2. Daily, AM, (midday if applicable), and PM peak hour trip generations. If the development is phased, a phased trip generation summary is also required.
3. Anticipated build-out year for the proposed development.
4. Document any roadway and other transportation improvements that are within 300 feet of the development site that are under construction, programmed, or planned.
5. A description of the existing street system adjacent to the proposed development, including functional classification, number of traveled lanes, lane width, shoulder treatment, transit facilities, pedestrian facilities, bicycle path corridors, and traffic control at study intersections. A figure may be used to illustrate existing transportation facilities.
6. A vicinity map of the project area showing the public and private streets that will be impacted by the development.
7. A site plan illustrating the placement and design of internal (on site) features such as parking layout, access to public streets, site circulation, pedestrian circulation, delivery

and loading areas and internal public street layout. Hard copies of the site plan must be at 1:20 or 1:30 engineering scale.

8. The applicant provides a site plan showing all non-project driveways within 150 feet of the project's driveways for arterial streets and within 100 feet of the project site for non-arterial streets. Analyze the development's driveway access. Analyze the safe sight distance for the development driveways in accordance to the current Policy R-13 of the Public Works Pre-Approved Plans.
9. Some development may be unique and may require additional analysis, City Transportation Division Staff has the discretion to require additional analysis to ensure the safe and efficient operation of the existing transportation system.

*Level Two Transportation Impact Analysis:*

At the minimum, Level Two TIA studies must include the following information:

1. Level One transportation impact analysis and the information required in the Level One analysis.
2. Calculate the proportional share impact to determine the significantly impacted intersections required to be analyzed. This analysis will establish the minimum study area. A proportional share impact calculation worksheet is available at <https://www.kirklandwa.gov/Government/Departments/Development-Services-Center/Tools-and-Resources/Transportation/Transportation-Impact-Analysis-Guidelines> or from City Transportation Division Staff.
3. Provide a description of other developments in the study area that are under construction, approved, or pending approval, as well as roadway and other transportation improvements in the study area that are under construction, programmed, or planned.
4. Calculate the level of service for all significant intersections as determined by the proportional share impact calculations, and any other intersections that City Transportation Division Staff believe to be significant. The following intersections are deemed to be significant intersections:
  - All signalized intersections impacted by more than 1% proportional impact
  - Significant unsignalized intersections impacted by more than 1% proportional impact
  - All development driveways
  - Other intersections identified by City Transportation Division Staff.
5. Analyze the impact of the development traffic within the study area, including but not limited to, the level of impact to significant intersections, adjoining developments, driveways within 150 feet of the development's driveway(s), pedestrians, bicycle, public transit facilities, existing or potential high collision areas (as determined by City Transportation Division Staff) and any other public facilities identified by City Transportation Division Staff.
6. Analyze existing conditions. The applicant analyzes the existing a.m., midday, and/or p.m. peak hour LOS using the operational method in the most recent Highway Capacity Manual or other methodologies as specified by City Transportation Division Staff. City Transportation Division Staff provides turning movement counts where current traffic counts are available; otherwise, the applicant collects the appropriate traffic counts. The existing traffic counts other than the City's annual traffic counts must not be older than 12 months from the time of the analysis.

7. Analyze the future conditions **without** the development traffic. The applicant calculates the LOS for the significant intersections for the year the project is anticipated to be fully developed.
  - a. City Transportation Division Staff supplies information on the appropriate level of background traffic, including traffic from pipeline projects that have received a passing Concurrency Test Notice, and are planned to be built within the build-out year of the proposed development. If the development is phased, a LOS analysis for each phase may be required.
  - b. Unless directed otherwise by City Transportation Division Staff, the pipeline projects traffic volumes and a 2% per year compounded growth factor shall be added to the existing traffic volumes to forecast future traffic condition. The City will provide the future traffic volumes at signalized intersections unless existing traffic is not available for the study intersections.
  - c. Only the six-year capital improvement projects that are fully funded and scheduled to be completed by the time the proposed development is anticipated to be built may be considered in the level of service calculation for future conditions.
8. Analyze the future conditions **with** the development traffic but **without** mitigation. The applicant calculates the LOS for the significant intersections for the year the project is fully developed. If the development is phased, a LOS analysis for each phase may be required.
9. If mitigation is required, analyze the future conditions with the development traffic **and** proposed mitigation. The applicant calculates the LOS for the significant intersections that did not meet the LOS standards contained in Table 2 in section G. If the development is phased, a LOS analysis for each phase may be required.
10. Analyze transportation safety impacts. At the minimum, crash analysis shall be done for all significant intersections, roadway segments that surround the site, and any other intersections that City Transportation Division Staff believes to be significant. Crash data may be requested from the City by contacting David Gourlie, Transportation Engineering Analyst ([DGourlie@kirklandwa.gov](mailto:DGourlie@kirklandwa.gov) or 425-587-3867). The applicant shall supplement the crash data from the City with crash data from the Washington State Patrol. The crash analysis shall analyze crash frequency, types, and patterns. It will also identify appropriate mitigating measures. Subsequently, the applicant analyzes and comments upon the impact of the project given the safety history of surrounding transportation network.
11. The applicant analyzes and comment on the project access and its impacts to pedestrians, cyclists, transit, on-site circulation, adjacent driveways and/or intersections.
12. The TIA report must include figures showing the future Daily, AM, (midday if applicable), and PM peak turning volumes at all studied intersections for all three conditions - existing, future without the development and future with the development. If the development is phased and a LOS analysis for each phase is required, then a map of traffic volumes for each phase is also required.
13. In addition to the intersection analysis for the AM and PM peak periods, other intersection analyses such as, but not limited to pedestrian, bicycle and site circulation; delivery and loading areas; parking demand and utilization; traffic queuing and gap analysis; nonmotorized transit operations and rider access; or traffic signal system operations and coordination may be needed depending on the project. In addition to intersection analysis, a corridor and peak direction analyses such as, but not limited to

travel time or origin/destination analyses may be required. Additionally, analysis of midday impacts may be required. The required analysis will be determined in coordination with the City traffic engineer during the TIA scoping process.

14. Document all assumptions and provide the data sources used in TIA report.
15. Details on the trip generation, crash data, traffic volumes, parking data, other data and references, LOS calculations and other calculations should be provided in the appendix of the TIA report.

### **C. Development Trip Generation**

1. If available, the calculation of trip generation shall be based on the current edition of the ITE Trip Generation Report. When both are available, the use of the fitted curve equation or the average rates will be determined based on the methodology described the ITE Trip Generation Handbook or as required by City Transportation Division Staff.
2. The applicant's transportation engineer may propose an alternate trip generation rate to the ITE rates for staff review and approval. If the proposed project does not fit the land use within the ITE Trip Generation Report or City Transportation Division Staff deems the ITE trip generation data insufficient or not reliable, the applicant shall perform an independent trip generation study approved by City Transportation Division Staff. The professional engineer performing the analysis shall request approval of the trip generation study methodology from City Transportation Division Staff prior to commencement of the study.

At the minimum, three days of traffic count data are required for the trip generation study. The traffic count data collection must be done for three consecutive typical days (Tuesday, Wednesday, and Thursday) unless the land use has a peak trip generation outside of the typical weekdays. Consideration of transportation demand management (TDM) to reduce the trip generation forecast will be evaluated on a case-by-case basis. When possible, independent trip generation data shall be developed by measurement rather than estimation.

3. Consistency in trip generation shall be maintained between the transportation concurrency submittal, the TIA report and independent transportation impact fee calculation. This means that if a non-ITE rate is developed for concurrency testing and the TIA report, the same rate shall be used for an independent transportation impact fee calculation, if an independent impact fee calculation is requested by the applicant (see the Kirkland Municipal Code, Chapter 27.04.040).
4. The number of trips generated by the existing land use may be deducted from the number of trips generated by the proposed land use. Trips that would have been generated by buildings that have been vacant for more than 12 months may not be deducted unless they were captured in the City's most current annual traffic count data.
5. Rates may be adjusted to account for pass-by, diverted, and internal trips; the use of such adjustments will be considered on a case-by-case basis. Net new trips will include diverted linked trips. The summary trip generation table shall be accompanied by a detailed table showing all the trip generation components.
6. The trip generation should also include a discussion of trip types and any trip credits for existing uses on the project site. The trip rate credit discussion should be supported by actual data and/or published reports in transportation and traffic engineering journals.



#### **D. Traffic Distribution and Assignment**

For developments generating more than 50 peak hour trips, the Public Works Department will provide to the applicant information concerning how PM peak project traffic travels on the roadway network in the form of a distribution analysis or PM peak link volumes, depending on the project. The manner in which project traffic uses the network is estimated using the Bellevue-Kirkland-Redmond Transportation Model (BKR Model). The location of project driveways and any new streets, as well as local traffic characteristics may result in needing to modify the project traffic circulation pattern within the vicinity of the project site forecasted by the BKR Model. The applicant may suggest a manual adjusted trip assignment to the City by providing traffic distribution and assignment data for City staff review and approval.

Within two weeks upon receiving the trip distribution percentage from City Transportation Division Staff, the engineering consultant shall provide to City Transportation Division Staff the AM and PM peak hour traffic assignment at the project driveways and all signalized intersections that are impacted by more than 10 peak hour trips.

#### **E. Proportional Share Impact Calculation**

A proportional share impact calculation is required as part of the Level Two transportation impact analysis. Signalized intersections that are impacted by the proposed development by 1% or more are considered to be "significant intersections"; thus, are required, at the minimum, to be analyzed for level of service and crash analysis. In addition, other unsignalized and signalized intersections may be required by City Transportation Division Staff as deemed necessary to evaluate the project's impacts. Intersections adjacent to the project's frontage are significant intersections.

#### **F. Level of Service Analysis**

The level of service analysis shall be done in accordance with the latest version of the Highway Capacity Manual using Highway Capacity Software (HCS), Synchro software or other software approved by City Transportation Division Staff.

The level of service calculation for signalized intersections for existing, future with development and future without development conditions shall be based on the City's signal phasing and operational parameters. The signal parameters may be requested from Thang Nguyen ([tnguyen@kirklandwa.gov](mailto:tnguyen@kirklandwa.gov) or 425-587-3869) or Rochelle Starrett ([rstarrett@kirklandwa.gov](mailto:rstarrett@kirklandwa.gov) or 425-587-3870). For the mitigated future with project condition, the applicant may propose an optimized signal phasing/setting, but it must comply with the City's signal parameters and be approved by City Transportation Division Staff.

#### **G. Adopted Levels of Service (LOS)**

The City of Kirkland adopts the SEPA "significant adverse environmental impacts" standard and the Highway Capacity Method of level of service. Table 2 identifies the City's transportation level of service standards.

**Table 2. Intersection LOS Standards**

<u>Peak Hour Intersection LOS with project traffic</u>	
Signalized intersection- use intersection average, unsignalized intersection- use minor approach impacted by project.	
	<u>Mitigation Required?</u>
<b>A thru D</b>	<b>No.</b>
<b>E</b>	<b>Yes</b> , If intersection proportional share $\geq 15\%$
<b>F</b>	<b>Yes</b> , If intersection proportional share $\geq 5\%$

## H. Installation of Mitigation and Improvements.

Table 2 is used to determine when the level of service mitigation is required. The intention of the intersection mitigation is to reduce a project's impact on a given intersection or provide the necessary transportation mitigation to attain the next better LOS grade as follows:

- If the level of service at a "significant intersection" is forecasted to operate at LOS-E and the proposed development impacts that intersection by 15% or more, then transportation mitigation is required to address the impact by maintaining the intersection current LOS-E.
- If the level of service at a "significant intersection" is forecasted to operate at LOS-F and the proposed development impacts that intersection by 5% or more, then transportation mitigation is required to address the impact by not increasing the delay<sup>1</sup> from the future condition without the project traffic. If the intersection delay<sup>1</sup> cannot be improved because the right-of-way is not available to improve the delay<sup>1</sup>, then the applicant must maintain the letter grade level of service for the future condition without the development's traffic, reduce the delay<sup>1</sup> for the intersection, and proposed other alternative mitigation(s) to improve the traffic flow near and/or through the intersection such as but not limited to corridor improvements, transit improvements, and/or nonmotorized improvements. The alternative mitigation shall be reviewed and approved on a case-by-case basis by the City Transportation Division Staff.

**Table 3. Mitigation Requirements**

<b>Peak Hour Intersection LOS with Project Traffic</b>	<b>Mitigation Required</b>	<b>Mitigation LOS Target</b>	<b>Alternative Targets</b>
LOS E	Yes, If intersection proportional share $\geq 15\%$	LOS E	
LOS F	Yes, If intersection proportional share $\geq 5\%$	Maintain vehicle delay from Future without Project Traffic condition	<ul style="list-style-type: none"> <li>• Maintain the letter grade level of service for the Future without Project Traffic</li> <li>• Reduce the delay<sup>1</sup> for the intersection</li> <li>• Propose other alternative mitigation(s) to improve the traffic flow near and/or through the intersection</li> </ul>

1. Intersection delay means intersection signal delay for signalized intersections and approach vehicle delay for unsignalized intersections.

In addition, installation of site-specific improvements may be required, or done voluntarily, to mitigate the development's transportation impacts on nonmotorized modes and transportation safety. The type of the required improvements is determined on a case-by-case basis and depend upon the significance of the development impacts to roadway and intersection performance, safety, specific access, and circulation needs, neighborhood impacts, and impacts on pedestrian and transit facilities. Required improvement shall be constructed or implemented prior to the occupancy of the development. Examples of transportation improvements include, but are not limited to the following:

- Construction of new pedestrian or multi-use paths or trails, access leading to the development
- Construction of acceleration and deceleration lanes, or turn lanes at intersections
- Installation of traffic control devices for driveways, paths, trails, and roads, such as traffic signals, warning beacons, signs, lane marking, etc.
- Installation of pedestrian improvements such as crosswalks, rectangular rapid flashing beacons (RRFBs), etc.
- Installation of transit improvements such as pedestrian connection to a transit facility, bus shelter, etc.
- Installation of neighborhood traffic calming devices
- Funding of a neighborhood traffic calming improvement project
- Contribution to a transportation corridor improvement
- Contribution to the City's transportation demand management program

Additional voluntary transportation improvements proposed must be completed within 6 years from the issuance of the development's final building permit

Developments are exempt from constructing any identified transportation improvements that are a part of a city's planned transportation project noted as "used to determine Impact Fee rate" in the Transportation Capital Facilities Plan if the identified transportation improvements are fully funded within the current 6-year CIP plan. However, additional mitigation necessary to

meet the LOS standards that are not part of the current 6-year CIP scope must be constructed concurrent with the development and the cost for the mitigation will be entirely borne by the new development and the additional mitigation may not be credited against the transportation impact fee that the development has to pay.

If the transportation improvements necessary to mitigate the development's impact are identified in the 6-year CIP, Transportation Strategic Plan, or other approved planning document, then the development is required to construct the improvement consistent with the plan. The development may not make partial improvement, except in cases where the partial improvement fully mitigates the development's impact, and it is possible to phase implementation of the planned project. Reasons the planned project could not be phased include, but are not limited to, the phased project creates an unsafe condition, the phased project would not meet city engineering standards, or the phased project creates an undue burden on the community. Phasing a planned project must be approved by City Transportation Division Staff.

For example, if Project A included a northbound right-turn lane and a southbound left-turn lane, and it is not possible to separate the improvement into two separate projects because constructing only one of the two turn lanes would create an unsafe condition, then the development must construct the entire improvement. However, if those two improvements are identified as separate projects, then the developer may construct the project(s) that mitigate the development's impact.

If Project B included only a northbound right-turn lane that is already funded by transportation impact fee and does not mitigate the development impact, but an additional southbound left-turn lane is required to mitigate the development impact and is feasible to construct as a separate project, then the applicant is responsible to construct the southbound left-turn lane prior to building occupancy. Otherwise, the applicant may elect to reduce the size of development to meet the level of service or postpone the development until the necessary improvement is constructed. The example below describes when mitigation is exempt if the required mitigation project is a 6-year CIP project.

Example:

<b>Improvements required to meet LOS standard at impacted intersections</b>	<b>Is it an impact fee funded improvement?</b>	<b>Is it fully<sup>1</sup> funded in the 6-year CIP?</b>	<b>Required to be mitigated by the development?</b>
NE 116 <sup>th</sup> Street/124 <sup>th</sup> Avenue NE	No	No	Yes
Juanita Drive/NE 122 <sup>nd</sup> Place	No	Yes	No
Market Street/13 <sup>th</sup> Avenue West	Yes	Yes	No
Central Way/4 <sup>th</sup> Avenue	Yes	No	Yes

1. Fully funded means the improvement project has 100% secured funding.

## TDM Mitigation

A Transportation Demand Management (TDM) program can only be used as mitigation when a traffic signal is required to improve the LOS, the forecasted intersection traffic volumes do not meet signal warrant(s) and the TDM measures approved by City Transportation Division Staff can reduce the proposed development's proportional share impact so that it will no longer trigger the LOS mitigation. The effectiveness of the TDM program must be verified with traffic counts when the development is built and at 90% occupancy to ensure that its trip generation

is reduced to the level that it no longer triggers the 15% proportional share for LOS-E and 5% proportional share for LOS-F.

### **I. Signal Warrants**

If an impacted intersection or driveway will operate at LOS-E or F and the proposed development triggers the criteria for mitigation as described in section **G. Adopted Levels of Service (LOS)** and the traffic volumes at the impacted intersection meets the MUTCD signal warrant 1 *Eight-Hour Vehicular Volume*, warrant 2 *Four-Hour Vehicle Volume*, and warrant 3 *Peak Hour Volume*, then the applicant shall install a traffic signal.

### **J. Internal Road**

Internal roads, driveways, and drive aisles, whether public or private, should be analyzed for safe and efficient internal traffic circulation and shall be designed to meet the Public Works Pre-Approved Plans standards.

### **K. Level II Transportation Impact Analysis Report Format**

The scope of analysis must be pre-approved by City Transportation Division Staff. The transportation impact analysis report shall include the following:

#### **Cover Page**

Title, date, development permit number, name of the development, professional license engineer stamp.

#### **Table of Content**

- Project Description
- Executive Summary
- Existing Conditions
- Future Conditions without Project Conditions
- Future conditions with Project Conditions
- Conclusion, Mitigations and Recommendations
- List of Figures
- List of Tables
- List of Appendices

#### **Project Description:**

- A. A description of ***existing*** and ***proposed*** land uses and development intensities. This section should include (but not be limited to):
  - a. Project name, location, size of project (including building sizes and their land uses), total development area (total acreage of the subject property if the project trip generation is based on acreage.)
  - b. The site parcel number(s).
  - c. Number of parking stalls if applicable (standard, compact and handicap).
  - d. Type and number of access points
  - e. The number and location of bicycle parking (racks and lockers).
  - f. Location of loading zone(s), if applicable.
  - g. Location(s) of trash collection, if applicable.
  - h. Proposed on-street parking, if applicable.

- i. Existing access easements.
  - j. and any other proposed transportation related elements or voluntary transportation mitigation.
- B. Daily, AM, mid-day if applicable, and PM peak hour trip generations.
- C. Anticipated build-out year for the proposed development and anticipated construction phasing if it is a phased development.
- D. A site plan that shows proposed building locations, property line and road setbacks, existing and proposed parking lot layouts, and if applicable, driveways and intersections within 150 feet of the project site. The site plan shall be consistent with any associated land use planning actions and/or development permits.
- E. List of intersections to be analyzed in the report.

**Existing Condition:**

A description of the existing street system within the study area including:

- a. An existing site plan or illustration of the current use, including driveways and nonmotorized connection to the project site.
- b. If applicable, a description of the existing site required transportation and parking management plans and any other conditions of approval for the project site.
- c. Street functional classification, number of traveled lanes, lane width, shoulder treatment, median types, sidewalk width, bicycle path corridors, transit facilities and services and traffic control at the intersections analyzed in the report. A figure may be used to illustrate existing transportation facilities.
- d. Pedestrian crossing within 300 feet of the project site.
- e. Transit routes and headways within the study area.
- f. On-street parking inventory along the project frontage and within 200 feet of the project site.
- g. On-street parking restrictions.
- h. A figure illustrating the existing daily and peak hours traffic volumes on the street or streets fronting the project site and at the intersections analyzed in the report. Existing traffic volumes may be available from the City. If not, the applicant is required to collect traffic volume data. Traffic volume data collection must be made at least one week from a holiday week.
- i. The AM, midday if required by City Transportation Division Staff, and PM peak hour level of service for the intersections analyzed in the report.
- j. A table summarizing the proportional share impact calculation results for the intersections analyzed in the report.
- k. At the minimum, the most recent 5-year historical crash data for the streets fronting the project site and at the intersections analyzed in the report. Provide details crash analysis such as crash types, frequency, patterns at the analyzed intersections that have an MEV (million entering vehicle) rate of one or more and at high accident locations.
- b. When applicable, provide a critical gap analysis at the site driveways and/or at the impacted intersections for peak periods. The critical gap analysis shall be based on measurements.

## **Future Conditions:**

### ***A. Future without Project conditions***

Provide a description of:

- a. Any transportation improvement projects in the City of Kirkland current 6-year Capital Improvement Plan at the analyzed intersections and those that are within 800 feet of the project site.
- b. Any transit improvement projects within the next 6 years that are within 800 feet of the project site.
- c. If different from the existing condition, transit routes and headways within the study area.
- d. If different from the existing condition, nonmotorized facilities connecting to the site.
- e. If different from the existing condition, Pedestrian crossings within 300 feet of the project site.
- f. If different from existing condition, on-street parking inventory.
- g. Any pipeline developments to be constructed within the proposed project's build-out year.
- h. Figures showing the daily and peak hours traffic volumes on the street or streets fronting the project site and at the intersections analyzed in the report.
- i. Description of the forecasted traffic volumes for the build-out year without the proposed project.
- j. The future without project conditions level of service for the intersections analyzed in the report.

### ***B. Future with Project conditions***

Provide a description of:

- a. The proposed development daily, AM and PM peak hour trip generations. The trip generation calculations shall be based on the latest ITE Trip Generation Manual unless the data are unreliable or if there is more reliable local data available. A trip generation study may be proposed by the applicant but must be approved by City Transportation Division Staff. If the ITE trip generation data is unreliable, the applicant is required to complete a trip generation study approved by City Transportation Division Staff.
- b. If the project is to be developed in phases, the trip generation table should reflect the phased development.
- c. The development trip distribution based on the BKR transportation forecast model shall be presented as a figure.
- d. The development trip assignment shall be presented as a figure. Show the daily, PM peak and AM peak hour traffic assignment for gross project trips and net new project trips.
- e. A table summarizing the proportional share impact calculation results for the intersections analyzed in the report within the future LOS summary table.
- f. Figures showing the cumulative daily and peak hours traffic volumes with the proposed development traffic assignment on the street or streets fronting the project site and at the intersections analyzed in the report.
- g. The future with project conditions without mitigation and, where applicable, with mitigation level of service for the intersections analyzed in the report.

- h. The level of service and queuing analysis for the project driveways.
- i. A table summarizing the level of service results with the proportional share calculation result.
- j. Queuing analysis for any intersections within 150 feet of the site driveways.
- k. Sight distance analysis for the site driveways.
- l. When applicable, provide a critical gap analysis at the site driveways and/or at the impacted intersections for the peak periods.
- m. When applicable, provide an on-street parking demand and utilization study.
- n. When applicable, a traffic signal warrants based on the Manual on Uniform Traffic Control Devices (MUTCD).

***C. Conclusion, Mitigations and Recommendations***

- a. Summarize the conclusion of the development impacts, all proposed traffic mitigation measures, and recommendations.

***D. Appendices***

- a. Traffic count data
- b. Trip Generation data and calculations
- c. Level of Service calculation results
- d. Parking data
- e. Queue data
- f. Gap analysis data
- g. Signal warrant results and calculations
- h. Crash data
- i. Supporting references used in the TIA analysis

Tables and figures must be numbered, and data must be provided in appendices for easy reference. All pages of the TIA report must be numbered. Any changes to the proposed development or responses to staff's comments must be updated within a revised TIA report.



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### DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

#### Policy R-39 Short-Term Parking Design, Use, and Location

Short-term parking spaces include designated commercial loading zones and passenger loading spaces that typically restrict parking to 30 minutes or less depending on the type of space. Due to the higher turnover of these spaces, special design considerations are needed to ensure their safe and efficient operations. This policy specifically applies to the engineering decisions that govern the design of these spaces assuming that a short-term parking space has already been approved by the City.

1. General Design Parameters: all short-term parking shall be designed to meet on-street parking design standards contained in Policy R-34A: On-Street Parking
2. Signage: Short-term parking zones shall be clearly signed to indicate the intended use of the space. The message and design of the sign shall be approved by Public Works.
3. Accessibility: Short-term parking shall be designed to provide direct access to the curb and sidewalk.
4. Bike Lanes: Where on-street bike lanes currently exist or are planned, the design of short-term parking shall be coordinated with Public Works. High turnover short-term parking zones should include a buffer between the bike lane and parking lane to minimize potential conflicts between cyclists and the loading area.
5. Passenger Loading Zone Design Regulations
  - a) Location on block: Passenger loading zones may be permitted at any location on the block. Locating passenger loading zones adjacent to driveways is desirable to provide additional maneuvering space. In the event that both a passenger loading zone and a commercial loading zone is permitted within a block, the location of the commercial loading zone shall have priority.
  - b) Distance from intersections or driveways:
    - Within existing on-street parking: if on-street parking currently exists on a collector or arterial street, passenger loading zones may be signed within any legal parking space. Passenger loading zones shall be located at least 30 ft. from adjacent intersections.
    - Within newly created on-street parking: passenger loading zones may be striped as part of frontage improvements that create new on-street parking provided that they comply with the recommended spacing in Table 1. Meeting the preferred values in Table 1 is required in most cases unless otherwise recommended by Public Works. Minimum values may be permitted by Public Works in Kirkland's urban centers (*i.e.*, the Central Business District, Juanita Business District, Totem Lake, or NE 85<sup>th</sup> Street Station Area), lower-volume arterial or collector streets, or when an operational analysis of the passenger loading zone demonstrates that signal operations will not be impacted due to anticipated traffic.
    - The required distance from intersections is measured from the stop bar to the start of the on-street parking space (see Figure 1).

- The required distance from driveways is measured from the driveway apron or curb return to the start of the on-street parking space (see Figure 1).

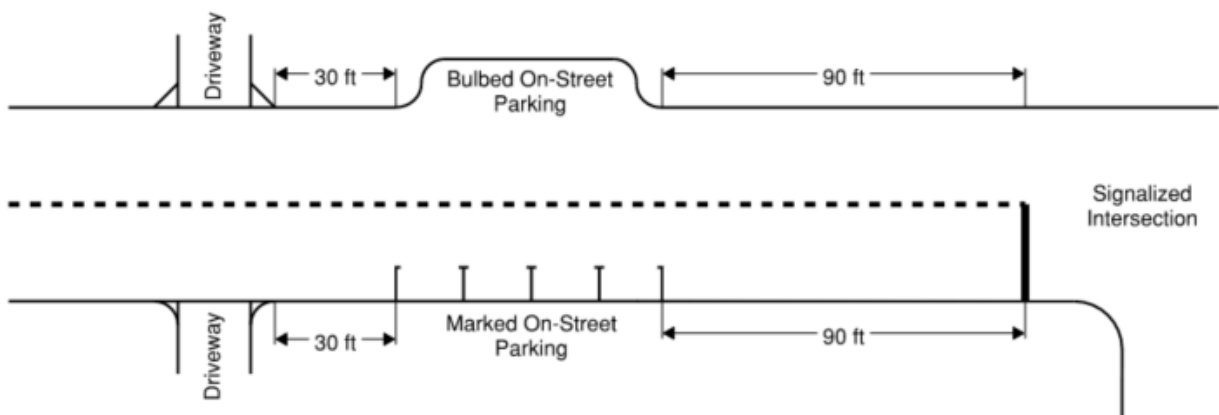
**Table 1: Required Passenger Loading Offsets for Newly Created On-Street Parking**

Functional Classification	Signalized Intersection or Roundabout (Exiting Approach) – Preferred	Signalized Intersection or Roundabout (Exiting Approach) – Minimum	All Other Cases
Arterial Outside Urban Center	150 ft.	30 ft.	30 ft.
Arterial Inside Urban Center	75 ft.	30 ft.	30 ft.
Collector	50 ft.	30 ft.	30 ft.

6. Commercial Loading Zone Design Regulations

- Location on block: Commercial loading zones are only permitted at either the beginning or end of on-street parking pull outs or adjacent to driveways since these locations provide additional maneuvering space for larger vehicles.
- Distance from intersections or driveways: Commercial loading zones shall be located at least 30 ft. from adjacent intersections or driveways. The required distance from intersections is measured from the stop bar to the start of the on-street parking space (see Figure 1). The required distance from driveways is measured from the driveway apron or curb return to the start of the on-street parking space (see Figure 1).
- Length: Commercial loading zone length shall typically be 30 ft. unless otherwise approved by Public Works based on anticipated vehicle size.
- Additional design criteria:
  - Part time commercial loading zones may be permitted based on the operational criteria of new development provided that provision of part time loading zones will not unduly restrict parking for existing residents and businesses
  - Commercial loading zones shall not be signed for use exclusively by specific businesses
  - Commercial loading zones shall only be located within parallel on-street parking
  - The length of a commercial loading zone shall be indicated with a yellow painted curb.

**Figure 1: Measurement of Required Offset for On-Street Parking from Intersections or Driveways**



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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY**

**Policy R-40: Street Lighting Design Guidelines**

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### **III APPENDIXES**

#### **APPENDIX A**

FIGURE 1: Functional Classification of Streets

FIGURE 2: Pedestrian Activity Map

TABLE A.1 Street Lighting - Luminance Criteria

TABLE A.2 Street Lighting - Illuminance Criteria

TABLE A.3 Full Intersection and Roundabout Illuminance Criteria

TABLE A.4 Partial Intersection – Illuminance Criteria

TABLE A.5 Pedestrian Facilities – Illuminance Criteria

#### **APPENDIX B**

Materials and Installation (Electrical, Poles, Luminaires)

TABLE B.1 Conduit Fill

TABLE B2.a Recommended Street and Pedestrian Lighting Standards for Arterial Streets

TABLE B2.b Recommended Street and Pedestrian Lighting Standards for Collector Streets

TABLE B2.c Recommended Street and Pedestrian Lighting Standards for Local Streets

## **I INTRODUCTION**

### **1 PURPOSE**

Street lighting refers to illumination that is provided for arterial, collector, and residential streets where vehicles, pedestrians, and bicyclists may be present during hours of darkness. Diminished visibility is a significant contributing factor to nighttime crashes. Therefore, the primary purpose of street lighting is to provide a visual environment that allows comfortable visibility and accurate identification of hazards at night, both on and adjacent to the street, so drivers, pedestrians and cyclists can appropriately take action ahead of time thereby reducing the incidence of nighttime crashes.

An enhanced visual environment affects safety-related driver behavior, adds a sense of personal security and increases the visibility of businesses, which may lead to an increase in commercial activity.

These guidelines establish procedures for the preparation and review of street lighting design pertaining to private and public development projects located at/within the vicinity of Kirkland's arterial, collector, and residential streets. These guidelines also apply to the design of lighting improvements at walkways, pedestrian crosswalks, associated bikeways, intersections, and roundabouts.

Additionally, this document provides the Design Engineer with sufficient information to prepare the plans for City review and approval.

The requirements of this document pertain to street lighting systems in the public right-of-way within the City of Kirkland including those owned and maintained by Puget Sound Energy (PSE). The requirements of this document do not apply to lighting systems located within transportation facilities under WSDOT's or other agencies' jurisdiction.

### **2 DESIGN GOALS**

Street lighting design should strive to achieve the following goals:

- Improve visual quality for all users including drivers, pedestrians, and cyclists.
- Provide quality light and increased contrast for detecting hazards.
- Illuminate high conflict areas such as intersections, roundabouts, midblock crosswalks, and driveways.
- Minimize the environmental impacts of lights during nighttime.
- Minimize impacts such as light trespass and excessive glare to adjacent areas.
- Implement lighting systems that optimize energy usage and are easy to maintain.

### **3 STANDARD PRACTICE**

The Design Engineer shall be a registered Civil or Electrical Professional Engineer. Plans and special provisions shall be sealed and signed by the Design Engineer.

The Design Engineer preparing plans for a roadway lighting system shall comply with the requirements of these guidelines as well as the following publications:

- City of Kirkland Pre-Approved Plans (Standard Details and Policies).
- Current edition of the *Standard Specifications for Road, Bridge, and Municipal Construction* published by the Washington State Department of Transportation (WSDOT), including all Amendments.
- Current edition of the Standard Plans for Road, Bridge, and Municipal Construction published by WSDOT.
- Applicable requirements of the State of Washington Department of Labor and Industries (L&I).
- NFPA 70, the National Electric Code, as adopted and modified by the State of Washington.
- Design of Roadway Facility Lighting ANSI/IES RP-8-22.
- *The Lighting Handbook* published by the Illuminating Engineering Society.
- AASHTO Roadside Barriers Design Guidelines.

## II DESIGN GUIDELINES

### 4 DESIGN AND REVIEW PROCESS

All street lighting systems installed in the City of Kirkland shall meet the requirements established in these guidelines.

The project owner (development applicant, City Capital project, etc.) or PSE shall be responsible for submitting materials to the City for review and approval of the proposed lighting system. If PSE will own and maintain the lighting system upon project completion, the project owner shall work in coordination with PSE to receive approval from the City for the design and installation of the system.

The following steps describe the typical process for the design review of street lighting systems. For questions on the City of Kirkland's street lighting review process or technical requirements, please contact Rochelle Starrett, [rstarrett@kirklandwa.gov](mailto:rstarrett@kirklandwa.gov).

- The Design Engineer shall identify applicable City of Kirkland's lighting system and lighting level requirements (based on street functional classification and pedestrian activity) and standards. These are included in Appendixes A and B.
- If a new service is required, the Design Engineer shall work with PSE to identify the 120/240 single phase service power location and specific connection requirements.
- The Design Engineer shall confirm with the City if a street lighting design analysis report is required as part of the project submittals. Projects requiring a street lighting design analysis report typically include large capital transportation projects involving significant street reconfiguration (widening, etc.), construction or reconstruction of arterial and collector streets, construction of new shared pedestrian/bicyclist pathways; and private development projects with significant frontage along arterial or collector streets. In addition to the submittal requirements described in this section, the street lighting design analysis report shall include narrative to document the design methodology, design alternatives evaluated, recommendations, and the results of photometric and electrical design analyses.
- Lighting analysis and evaluation must be performed using AGI32 Software for all projects that meet the requirements described in Section 5A(2) below.
- Submittals: Two submittals, the Preliminary and the Final may be required by the City. Each submittal shall include one (1) copy of the drawings and other required data. Plan sheets shall be submitted as part of the complete civil design package for the project. The civil design package intake will not be accepted for review unless a complete submittal, as detailed below, is included.
- **Preliminary submittal for review.** The Design Engineer shall provide the following:
  - Project description
  - Site plan (streets and project address labeled)
  - Vicinity map
  - Existing and proposed roadway and sidewalk geometry for reference

- Information on existing and/or future illumination system ownership
- Proposed illumination system layout including luminaire locations with labels for: luminaire type, wattage, color temperature, mounting height, pole material, and mast arm length. This information may be included in table format for clarity.
- Lighting level summary table comparing proposed average maintained illuminance (footcandles) and uniformity ratio (avg/min) to target levels.
- Supporting calculations document with AGI32 analysis outputs, including luminaire definitions, calculation summary, and Figure showing calculation area limits and individual calculation points.
- Identification of potential conflicts with utilities or other features and specific areas that may require potholing.
- **Final submittal after review.** Final Submittal shall include all of the above and responses to initial review comments. In addition, a temporary illumination design submittal as part of the submittal package is required if existing illumination cannot be maintained or is to be removed.

Resubmittal and Approval: If outstanding design issues still exist, the City will require the Design Engineer to submit a new set of Plans for further review and comment prior to approval.

## **5 STREET LIGHTING DESIGN REQUIREMENTS**

### **A. Lighting Analysis and Evaluation**

#### **(1) Objectives**

The main objective of street lighting analysis and evaluation is to identify the lighting improvements required to meet Kirkland's recommended lighting levels and standards. Recommended lighting improvements may include any of the following:

- i. Installation of new or upgrade to existing street and pedestrian lighting systems located within the vicinity of private developments, or on streets included within the limits of CIP (Capital Improvement Program) projects.
- ii. Installation of continuous street and pedestrian lighting systems on new and widened public streets, or on City-owned street frontage of private developments.
- iii. Installation of street lighting system at new signalized intersections.
- iv. Installation of street lighting at existing signalized and un-signalized intersections.
- v. Installation of street lighting at new uncontrolled marked crosswalks.
- vi. Installation of street lighting at existing uncontrolled marked crosswalks.
- vii. One on one luminaire / pole replacement at a single location.
- viii. Upgrade existing luminaire to LED, add new LED luminaire on an existing PSE pole.



## **(2) Lighting Analysis and Evaluation Tools/AGi32 Software Use**

The City of Kirkland has identified AGi32 (Lighting Analysts, LLC c/o Revalize Software) as the industry standard software tool for the calculation of accurate photometric predictions. AGi32 Software must be used to perform the lighting analysis and evaluation for projects of **any size** that meet the following criteria:

- a. The project has frontage on, connecting to, or at an intersection located on a street designated as arterial or collector as defined in Figure 1 on Appendix A.
- b. The project is located on a local street that has experienced one or more fatal and/or severe injury crashes, and/or one or more fixed object crashes, and/or one or more pedestrian- or bicyclist-involved crashes during the past five years. Crash history is available upon request by contacting Transportation Engineering Analyst David Gourlie at [dgourlie@kirklandwa.gov](mailto:dgourlie@kirklandwa.gov).
- c. The project is located on a local street along a school walk route as depicted in the Kirkland School Walk Routes Map on Transportation Strategic Plan, formerly known as the Transportation Master Plan (TMP). See Map on Page 29 of 2015 TMP (<https://www.kirklandwa.gov/files/sharedassets/public/v/2/public-works/city-of-kirkland-transportation-master-plan.pdf>)
- d. The project has frontage on any street or connecting to a designated Neighborhood Greenway as defined in the Kirkland's Neighborhood Greenway Network Map. (<https://www.kirklandwa.gov/Government/Departments/Public-Works-Department/Transportation/Data-and-Resources-Transportation-Division/Neighborhood-Greenways>)
- e. The project has frontage on or is within 50 feet of any street intersection with a marked crosswalk. Lighting analysis shall be required at the intersection as defined by the calculation area identified in these guidelines in addition to the subject project frontage.
- f. The project has frontage on or is within 50 feet of any street with a marked midblock crosswalk. Lighting analysis shall be required on the midblock crosswalk as defined by the calculation area identified in these guidelines in addition to the subject project frontage.
- g. The project is located on an area of major pedestrian sidewalks, pedestrian oriented streets, or through-block pathways as defined in Kirkland Zoning Code, Chapter 180, Plate 34 Series.  
(<https://www.codepublishing.com/WA/Kirkland/html/KirklandZ180/KirklandZ180.html#Plate34A>)

Use of AGi32 Software for lighting analysis is not required for residential developments of fewer than four units if **all** of the following conditions apply:

- i. Located on a local street; and,

- ii. Not in area that has experienced one or more of fatal, severe injury, fixed object, or pedestrian- or cyclist-involved crashes during the past five years; and,
- iii. Not defined as part of a school walk route as defined above; and,
- iv. Not defined as a Kirkland Neighborhood Greenways as defined above; and,
- v. No other public street exists within the development other than the frontage; and,
- vi. Not within 50 feet of an intersection with another public or private street.

If all the above conditions are met and use of AGi32 software for lighting analysis is not required, the proposed lighting improvements may be limited to the following, as directed by Public Works:

- 1. One-to-one luminaire and/or pole replacement
- 2. Upgrading an existing luminaire to a comparable new LED luminaire fixture
- 3. Adding a new LED luminaire on an existing PSE pole

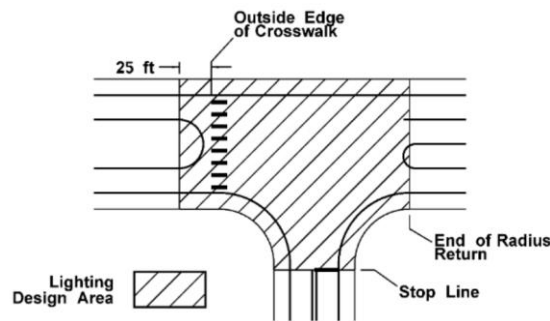
### **(3) Additional Considerations**

- a. Facility Evaluation Extent: Where a half-street improvement is required in conjunction with a development, the roadway width to be used in the lighting analysis for illumination design purposes will be the actual full width of the roadway at the time of design and not half of the ultimate width. Lighting levels shall be brought up to current standards for the whole width of the roadway adjacent to a new development. This may include installation of new streetlights on the opposite side of the street from the development to bring lighting levels to current standards. Existing light levels shall be evaluated for the length of the project frontage unless a modified evaluation extent is permitted in coordination with City staff.
- b. System Evaluation: When using AGi32 software in the analysis and evaluation of lighting improvements the following calculation criteria must be input into the program.
  - i. Light Loss Factor (LLF): 0.85 is to be used for LED luminaire fixtures. Existing High Pressure Sodium (HPS) luminaire fixtures shall use a LLF of 0.62.
  - ii. Initial Lumens Values: Typically included in the IES file provided by the manufacturer. For the latest IES file of the identified fixture, visit the manufacturer website or contact the manufacturer.
  - iii. Analysis Method: Luminance and/or Illuminance method can be used. Horizontal illuminance method is required for intersections and curved section of streets.
  - iv. Default Drive Current: 530mA. Confirm with City.

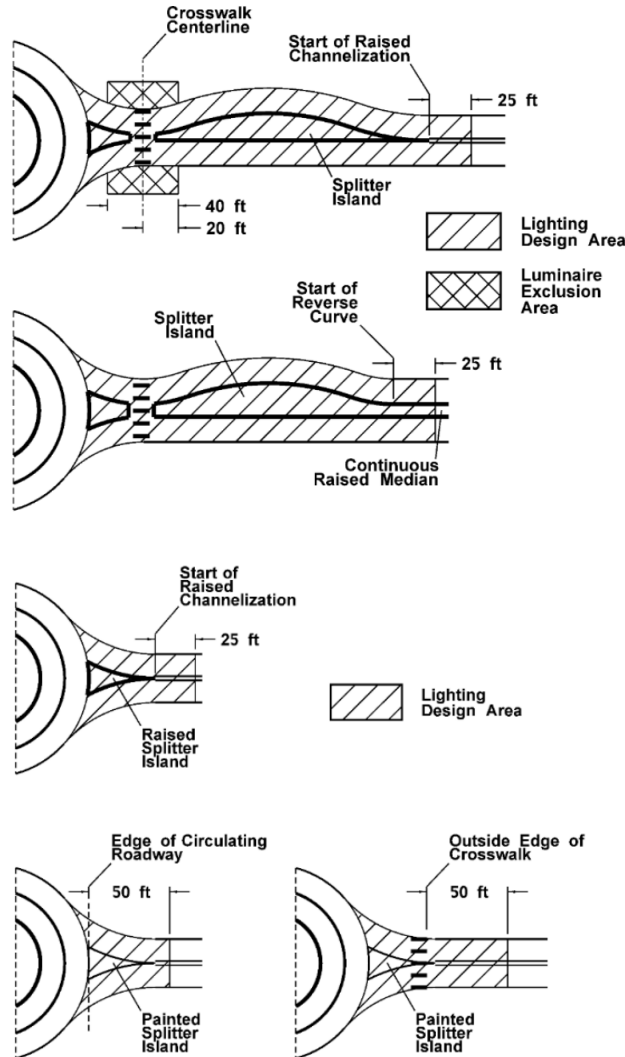
- v. Color Temperature: Warmer/softer light is preferred. 2700k is required on residential local and collector streets. On arterial streets 3000k is preferred, but 4000k may be considered on a case-by-case base.
- vi. Calculation areas shall be laid out on a 5-foot by 5-foot grid as follows:

- **Intersections:** The intersection and roundabout calculation area is required for the entirety of the intersection area, extends to face-of-curb or edge of pavement, and includes marked crosswalk areas.

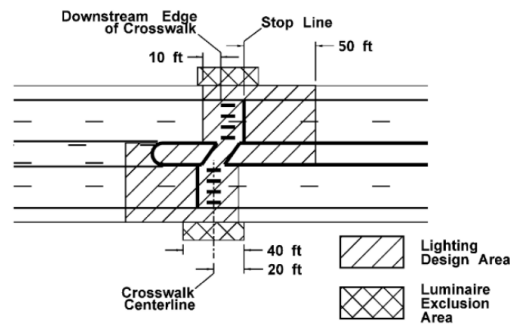
The calculation area for a typical non-roundabout intersection shall extend to the stop line or yield line, or to 25 feet beyond the outside edge of the marked crosswalk, whichever furthest from the center of the intersection. If no stop or yield line exist, the intersection area shall extend to the end of the radius return.



The calculation area for a roundabout may exclude the central island and truck apron. For safety and visibility, luminaire poles should not be placed within 20 feet of the centerline of any crosswalk. The calculation area shall extend to 25 feet before the start of either the raised channelization or the start of the reverse curve approach, 50 feet before the outside edge of the crosswalk, or 50 feet from the edge of the circulating roadway, whichever is furthest from the center of the intersection.



- **Roadway segments:** The roadway area extends to the face-of-curb or edge of pavement, and includes raised median islands, bicycle lanes, bicycle lane buffer areas, on-street bicycle/pedestrian shared paths and related buffer areas.
- **Midblock marked crosswalks:** regardless of control type, the analysis area extends 50 feet in advance of the stop line for the crosswalk, if present, and 10 feet beyond the downstream edge of the crosswalk for each approach direction. If pedestrian refuge islands are present, they should be included in the analysis area. For safety and visibility, luminaire poles should not be placed within 20 feet of the centerline of any crosswalk. Luminaire poles should be installed upstream of the crossing on each side of the roadway, such that there is positive lighting of any pedestrian in the crosswalk, to the maximum extent possible.



- **Sidewalks:** When required, the calculation area extends from face of curb to back of sidewalk and is evaluated for the entire length of the project.

## B. Design Inputs

The list below includes the factors that must be considered for street lighting design:

### (1) Road Geometrics

This refers to the number and width of travel lanes, size and location of medians, islands, bridge structures, culverts, utilities, location of driveways, crosswalks and intersections, presence of parking lanes, sidewalks, and bicycle lanes. This information may be obtained upon request from Kirkland's internal GIS browser via the project's Public Works contact.

### (2) Street Functional Classification

Streets are classified as principal and minor arterial, collector and local streets. Figure 1 in Appendix A depicts Kirkland's Street Functional Classification Map. This figure corresponds to Figure 3-11, Existing Roadway Network, in Kirkland's 2024 Transportation Strategic Plan.

### (3) Adjacent Area Land Use

This refers to specifically designated pedestrian circulation areas within the vicinity of the project where both pedestrian and street lighting are required. These are shown in Kirkland Zoning Code Chapter 180 and include the CBD (Central Business District) in Downtown Kirkland, Totem Lake Business District, NE 85<sup>th</sup> Street Station Area, Juanita Business District, and North Rose Hill Business District, among other areas.

The area of the Finn Hill Neighborhood within the boundaries of Juanita Drive and Holmes Point Drive may require installation of pedestrian lighting in lieu of street lighting on streets designated as local.

### (4) Nighttime Pedestrian Activity

The level of nighttime pedestrian activity is a key element in the design of street lighting systems. Areas with high nighttime pedestrian activity require street lighting systems that increase the visibility of pedestrians. Figure 2 in Appendix A depicts areas with high, medium and low nighttime pedestrian activity in Kirkland. However, the presence of schools and parks in some areas require consideration of higher pedestrian activity than those shown in Figure 2.

Areas with medium to high nighttime pedestrian activity may require both street and pedestrian scale luminaires/poles to meet lighting level requirements.

## **(5) Pavement Classification Type**

Most common pavements are grouped according to their light reflectance characteristics (which vary from mostly specular to mostly diffuse) and this information is used in the calculation of pavement luminance (amount of light reflected from it) and Small Target Visibility (STV).

## **(6) Other Design Inputs**

- a. Light Output: This refers to the quality and total quantity of light emanating from a light source in all directions, and it is measured in Lumens.
- b. Light Loss Factor: A Light loss factor should be applied to any luminaire considered to ensure that the maintained light levels will meet the target criteria.
- c. BUG Ratings: The luminaire BUG (Backlight-Uplight -Glare) rating system provides a numerical rating of the luminaire light distribution as it applies to light trespass, uplight, and glare.

## **(7) Lighting Level Requirements**

- a. General: Lighting level requirements, in general, depend upon the type of roadway facility under consideration (street segment, intersection, midblock crosswalk, roundabout, pedestrian walkways, shared use path), street functional classification and nighttime pedestrian activity. Tables A.1, A.2, A.3, A.4 and A.5 in Appendix A summarize recommended lighting levels based on the illuminance and luminance lighting design methods.
- b. The Illuminance method determines the amount of light incident upon on the road surface or on a vertical surface from the roadway lighting system. Horizontal and vertical illuminance criteria are recommended for pedestrian facilities and horizontal illuminance for intersections and curved segments of roads and streets.
- c. The luminance method approximates the brightness of road surface as perceived by the driver. It is the recommended method for straight road/street segments.
- d. Design criteria include:

- i. **Average Illuminance:** It is the average of the roadway surface illuminance at all grid points. It is measured in foot candles.
- ii. **Average Luminance (AL):** It is the average of the roadway surface luminance at all grid points. It is measured in candelas per square meter.
- iii. **Veiling Luminance (Lv):** It is used to evaluate disability glare as experienced by the driver.
- iv. **Veiling Luminance Ratio:** It is the veiling luminance maximum divided by the average luminance of the road.
- v. **Average Uniformity Ratio:** it is the ratio of the average value of either Luminance or Illuminance to the minimum value.
- e. **Lighting level for intersection, sidewalks and marked crosswalks shall be as follow:**
  - i. **Intersections:** Intersections shall have a minimum average light level equal to 1.5 times the average light level requirement of the intersecting street with the highest functional classification. Intersection uniformity shall be less than or equal to the uniformity ratio of the intersecting street with the highest functional classification. Average maintained light levels at intersections shall be no less than those shown in Tables A.3 and A.4 in Appendix A.
  - ii. **Sidewalks and Pedestrian Crossings:** Recommended lighting level within pedestrian facilities is shown on Table A.5 in Appendix A

### **C. Street Lighting Design Elements**

This section provides recommendations for street lighting design elements including pole spacing and placement, pole mounting height, arm length and pole offset, pole materials and pole foundation; luminaire design elements include type and wattage, light output, light distribution type, and color temperature.

Specific street lighting design requirements are listed below:

#### **(1) Pole Spacing and Placement, Pole Foundation and Materials**

- a. Recommended pole material type for various street functional classifications and designated land use areas are included in Tables B.3a, B.3b and B.3c in Appendix B.
- b. **Pole Spacing/Placement:** The Design Engineer shall determine the optimum pole spacing to achieve required illumination levels. Poles should be carefully placed to support a lighting system that provides the required level of illumination and uniformity for the facility under design. Pole placement issues that need to be addressed during the design process include presence of trees, driveways and clear zone requirements. Once optimum pole spacing is established, it shall be adjusted so that:

- i. No pole should be placed closer than 10 feet to a driveway measure from the outside wing. Poles should ideally be placed such that driveways are not located at the darkest point between luminaires.
  - ii. At least one pole should be placed at the approximate Point of Curvature/Point of Tangency (PC/PT) at a corner at unsignalized intersections.
  - iii. One pole should be placed at each corner of a signalized intersection. New luminaires shall be provided on signal poles.
  - iv. At midblock marked crosswalks located on arterials with three or more travel lanes, there should be at least two luminaires, each one located at least 20 feet upstream (from the drivers perspective) of the crosswalk for positive contrast. This helps avoid a silhouetting effect that reduces drivers' ability to perceive pedestrians in the crosswalk during hours of darkness.
  - v. To the maximum extent feasible, a luminaire pole should be located such that the centerline to centerline spacing between any adjacent existing or proposed trees and the light pole shall be greater than or equal to the mounting height of the light pole. The minimum spacing of any street light or pedestrian light pole to the center of an adjacent tree is 20 feet.
  - vi. Pole locations shall be adjusted between these control points to provide uniform spacing.
- c. Pole lateral placement: Where sidewalk is present, luminaire poles shall be located at the back of sidewalk wherever practical. A minimum distance of 3 feet shall be maintained from the face of pole to the face-of-curb. In some cases, sidewalk widening may be required to provide required clearance along the pedestrian access route around the pole per PROWAG standards. If no curb is present, the face of the pole shall be located at least 10 feet from the edge of traveled way. Breakaway or slip bases should be considered anytime a pole is placed closer than 10 feet from either the edge of traveled way or face-of-curb.
- d. Pole mounting height: The selection of pole mounting height shall be based on roadway width, adjacent area type and type of pole placement (staggered, single sided, or opposite). The selection of pole mounting height for residential areas needs to consider the impacts of spill over light and glare impacts resulting from taller poles. The values depicted in Tables B2.a, B2.b and B2.c in Appendix B are intended as general guidelines for the selection of mounting heights.
- e. Pole foundations shall follow City of Kirkland pre-approved plans and shall be confirmed by the City. Soils analysis may be required in some cases. Should unsuitable soils be encountered, the Design Engineer shall provide an



alternate design based on a soils analysis. WSDOT Standard Plans and Specifications shall be followed if over-excavation becomes necessary.

- f. Mast arm length recommended values range from 6 to 12 feet. In all cases with luminaire mast arms, the mast arm should provide a minimum luminaire overhang of approximately 2 feet from face of curb, unless a lighting analysis can show light level requirements are being met regardless of surrounding trees and other infrastructure.

## **(2) Luminaire Type and Materials**

The luminaires' main function is to position and control, both electrically and optically, a light producing source such as LED (Light Emitting Diodes).

The two agencies who own and maintain street and pedestrian lighting systems in Kirkland are the City of Kirkland and PSE. As of the publishing date of this document, the current preferred LED luminaires are:

- City of Kirkland owned and maintained
  - Roadway luminaires: Leotek GreenCobra Series LED
  - Pedestrian luminaires: pole and luminaire styles vary depending upon the specific land use designation of the area under consideration.
  - Tables B2.a, B2.b and B2.c in Appendix B depict recommended pole/luminaire styles for various areas in Kirkland.
- PSE owned and maintained
  - Roadway luminaires: GE Evolve LED (Types II and III distribution only) – ***Design Engineer is responsible for requesting latest list of allowable luminaire fixture models from PSE at time of design.*** Projects shall only propose luminaire fixtures that PSE stocks for replacement.
  - Pedestrian luminaires: GE Evolve, or Cooper Traditionaire LED post-top

## **(3) Type of System/System Layout -Configuration**

Kirkland is transitioning to all Light-Emitting Diode (LED) street lighting systems; therefore, LED systems shall be installed for all new and retrofit designs. Even if the photometric values are met, LED replacement is still required on frontage improvements.

- a. The preferred system layout/configuration shall be staggered. However, single-sided systems may be used if poles cannot be installed on the opposite side of the roadway due to overhead or underground utility conflicts or other obstructions.
- b. Opposite system layout may be specified on wider roadways or to match existing facilities.

#### **(4) Temporary Illumination (More than 48 Hours)**

- a. Temporary Illumination may be required for construction projects in the following cases:
  - Replacement of existing illumination systems
  - Complex roadway realignment or channelization
  - Multi-lane split around obstructions
  - Temporary traffic signals
  - All intersections with low lighting level as determined by the City and traffic control in place
- b. Existing illumination shall not be removed until a temporary system has been approved by the City and is fully operational
- c. All components of a temporary illumination system shall be crashworthy with breakaway features, outside the clear zone, or protected from traffic.
- d. The temporary lighting shall satisfy the greater of the “construction lanes and detours” light level and uniformity ratios in accordance with WSDOT *Design Manual* Chapter 1040 or the specific intersection light level and uniformity ratios, as defined in this chapter under Calculation Areas.
- e. All temporary lighting shall be connected to grid power.

#### **(5) Transit Stops**

The Design Engineer shall coordinate with transit agencies when any bus stops, park & ride facilities, or light rail stations are to be illuminated as part of any proposed system. Refer to King County Metro Transportation Facility Design Guidelines and Sound Transit Design Standards and Guidelines for Sound Transit Projects: Sounder & ST Express Passenger Facilities, Chapter 12 to obtain information on specific design requirements.

#### **(6) Installation and Material Requirements**

The information included in these guidelines is intended to provide guidance as to the type of materials and installation procedures to be used. Appendix B includes information on material and installation requirements for conduit, wiring, junction boxes and service cabinets.

Following the complete installation of public street lights, it is the responsibility of the Owner and/or Permit Holder to contact PSE to initiate the billing account transfer process. After the request has been initiated by the Owner and/or Permit Holder, PSE will reach out to Public Works for verification and complete account transfer process.

**APPENDIX A****MAP AND FIGURES**

Figure 1: Functional Classification Map

Figure 2: Pedestrian Activity Map

**LIGHTING LEVEL REQUIREMENTS**

Table A.1 Street Lighting- Luminance Criteria

Table A.2 Street Lighting- Illuminance Criteria

Table A.3 Full Intersection and Roundabout - Illuminance Criteria

Table A.4 Partial Isolated Intersection - Illuminance Criteria

Table A.5 Pedestrian Facilities- Illuminance Criteria

**Table A.1 Street Lighting – Luminance Criteria**

Street Classification	Pedestrian Activity Classification	Average Luminance $L_{avg}$ (cd/m <sup>2</sup> )	Average Uniformity Ratio $L_{avg}/L_{min}$	Maximum Uniformity Ratio $L_{max}/L_{min}$	Maximum Veiling Luminance Ratio $L_{vmax}/L_{avg}$
Arterial	High	1.2	3.0	5.0	0.3
	Medium	0.9	3.0	5.0	0.3
	Low	0.6	3.5	6.0	0.3
Collector	High	0.8	3.0	5.0	0.4
	Medium	0.6	3.5	6.0	0.4
	Low	0.4	4.0	8.0	0.4
Local	High	0.6	6.0	10.0	0.4
	Medium	0.5	6.0	10.0	0.4
	Low	0.3	6.0	10.0	0.4

**Table A.2 Street Lighting –Illuminance Criteria**

Street Classification	Pedestrian Activity Classification	Average Illuminance (Footcandles)	Average Uniformity Ratio $E_{avg}/E_{min}$	Maximum Uniformity Ratio $E_{max}/E_{min}$	Maximum Veiling Luminance Ratio $E_{vmax}/E_{avg}$
Arterial	High	1.7	3.0	5.0	0.3
	Medium	1.3	3.0	5.0	0.3
	Low	0.9	3.0	6.0	0.3
Collector	High	1.2	4.0	5.0	0.4
	Medium	0.9	4.0	6.0	0.4
	Low	0.6	4.0	8.0	0.4
Local	High	0.9	6.0	10.0	0.4
	Medium	0.7	6.0	10.0	0.4
	Low	0.3	6.0	10.0	0.4

**Table A.3 - Full Intersection and Roundabout- Illuminance Criteria (lux/ft)**

Functional Classification	Pedestrian Activity Level			Uniformity Ratio Eavg/Emin
	High	Medium	Low	
Principal/Principal (*)	34/3.2	26/2.4	18/1.7	3.0
Principal/Collector	29/2.7	22/2.2	15/1.4	3.0
Principal/Residential	26/2.4	20/1.9	13/1.2	3.0
Collector/Collector	24/2.2	18/1.7	12/1.1	4.0
Collector/Residential	21/2.0	16/1.5	10/0.9	4.0
Residential/Residential	18/1.7	14/1.3	8/0.7	6.0

(\*) Also referred to as Major

**Table A.4 - Partial Isolated Intersection-Illuminance Criteria (lux/ft)**

Road Functional Classification	Pavement Classification			Uniformity Ratio Eavg/Emin
	R1	R2 & R3	R4	
Arterial	6/0.6	9/0.8	8/0.7	3
Collector	4/0.4	6/0.6	5/0.5	4
Residential	3/0.3	4/0.4	4/0.4	6

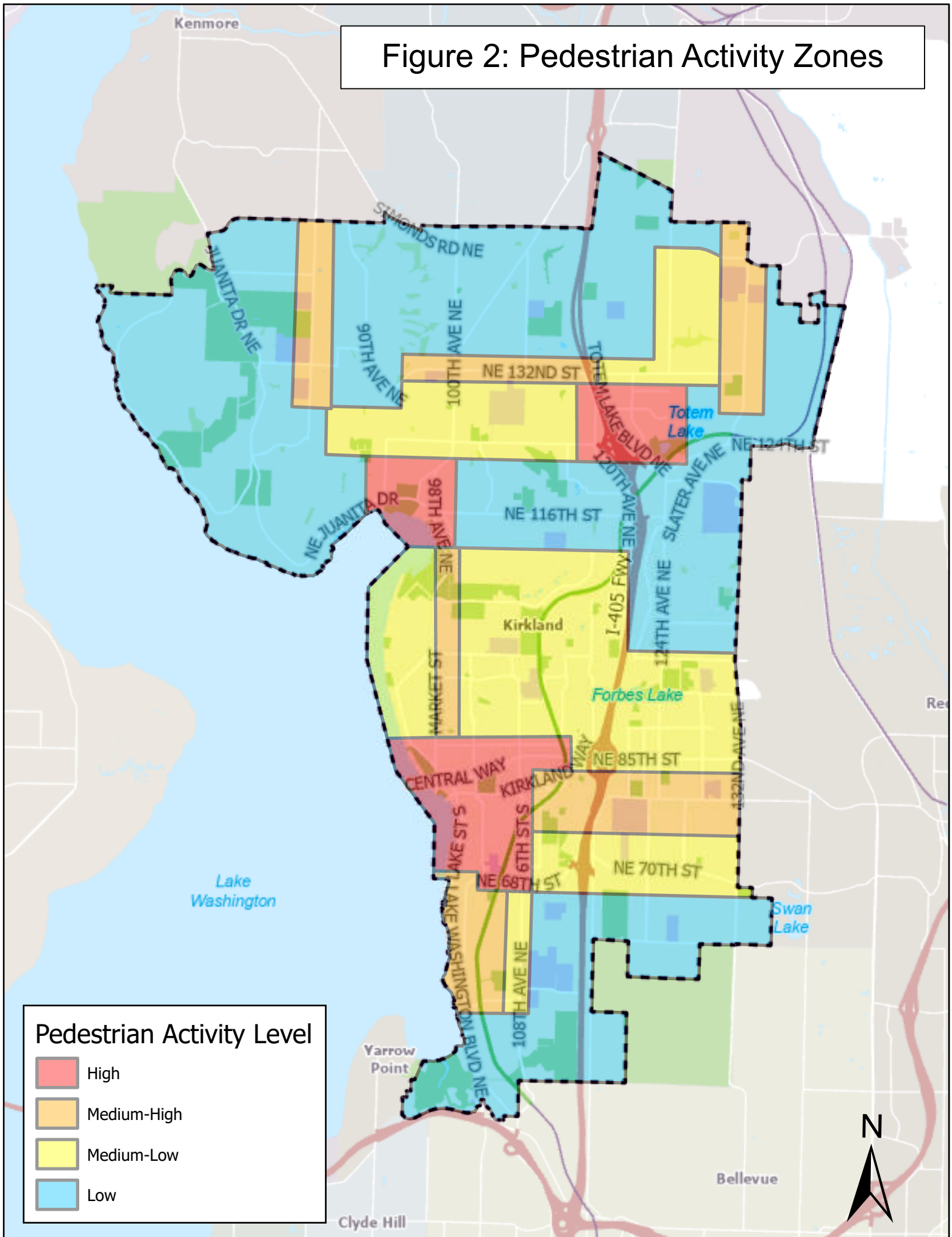
**Table A.5 Pedestrian Facilities – Illuminance Criteria**

<b>Pedestrian Facility</b>	<b>Target Maintained Average. (fc)</b>	<b>Uniformity Ratio (Avg/Min)</b>
Marked Crossing and Mid-block Crossing including curb ramps	1.5x adjacent intersection/corridor	3:1
Unmarked Crosswalk at Intersection	Same as adjacent Intersection	
Sidewalk: <i>All other sidewalk areas</i> <i>Residential</i>	0.7x adjacent roadway	4:1 6:1
Trails and multiuse paths other than sidewalks*	0.7x adjacent roadway	4:1

Figure 1: Street Functional Classification Map



Figure 2: Pedestrian Activity Zones



## **APPENDIX B**

### **Applicable City Policies and Standards**

#### **MATERIALS AND INSTALLATION REQUIREMENTS**

Design Engineer shall refer to the City of Kirkland Pre-Approved Plans and Policies, Sections 8-20 and 9-29 of the WSDOT Standard Specifications, and the WSDOT Standard Plans for complete material and installation requirements.

##### 1. Pole Foundations:

Pole foundations shall follow City of Kirkland Standard Plan CK-R47 and shall be confirmed by the City. Where unsuitable soils are encountered, as determined by the City of Kirkland, the Design Engineer shall provide an alternate design based on a soils analysis. Foundations shall be placed against undisturbed earth. WSDOT Standard Plans and Specifications shall be followed if over-excavation becomes necessary.

##### 2. Conduit:

- a. Conduit placed above ground or between the service point (power pole or vault) and the service cabinet shall be hot dip galvanized, rigid steel.
- b. Conduit beneath the roadway or shoulder area shall be Schedule 80 rigid Polyvinyl Chloride (PVC). Conduit placed elsewhere shall be Schedule 40 rigid PVC.
- c. A minimum of two conduits shall be installed along frontage improvements and roadway crossings. Conduit shall be extended from property line to property line and terminate in a junction box. If property line ends in a driveway or other obstruction, the conduit must be further extended to clear the obstruction or driveway.
- d. Minimum size conduit shall be 2 inches for power and 3 inches for communication. No half sizes shall be used.
- e. Illumination wires shall not be placed in the same conduit as signal, detection, or communication wires.
- f. Maximum conduit fill shall be 26 percent for new installations and 40 percent for retrofit installations. See Table III-2 for conduit fill requirements for various trade sizes. Conduit fill shall be based on the total area of the circuit wires within the conduit. Wire size to calculate conduit fill shall be as follows:
  - No. 8 Wire: 0.056 sq. in.
  - No. 6 Wire: 0.073 sq. in.
  - No. 4 Wire: 0.097 sq. in.
  - No. 2 Wire: 0.133 sq. in.

**Table B.1. CONDUIT FILL**

<b>Trade Size</b>	<b>Schedule 40</b>		<b>Schedule 80</b>	
	<b>26 Percent Fill</b>	<b>40 Percent Fill</b>	<b>26 Percent Fill</b>	<b>40 Percent Fill</b>
2"	0.856 sq. in.	1.316 sq. in.	0.747sq. in.	1.150sq. in.
3"	1.890 sq. in.	2.907 sq. in.	1.675 sq. in.	2.577 sq. in.
4"	3.264 sq. in.	5.022 sq. in.	2.927 sq. in.	4.503 sq. in.

**3. Junction Boxes:**

- a. Junction box installation shall conform to the City of Kirkland Standard Plans and WSDOT Standard Plans.
- b. A junction box shall be placed within 10 feet of each luminaire pole as well as adjacent to the service cabinet.
- c. Junction boxes shall be placed so that no conduit run is greater than 500 linear feet.
- d. Junction boxes shall be placed at all locations where the conduit turns 90 degrees or more horizontally.
- e. All large junction boxes shall be Type 8, dual lid units.
- f. Junction boxes shall not be located within the traveled way, pedestrian ramps, or driveways. Junction boxes located in sidewalk or any other Pedestrian Accessible Route shall have non-slip frames and lids.
- g. The size of the junction box shall be determined by the total of the conduit diameters entering the box as follows:
  - Type 1 Junction Box: Maximum of 6 inches
  - Type 2 Junction Box: Maximum of 12 inches
  - Type 8 Junction Box: Maximum of 24 inches
- h. Conduit containing illumination circuits shall not be routed through junction boxes containing conduit for signal, detection, and/or communication conduits, except where junction box serves type 3 signal pole.
- i. Traceable mule tape must be installed in all empty conduit

**4. Wiring:**

- a. Main circuit wires shall be sized to provide a maximum of 4 percent voltage drop at the end of each branch circuit.
- b. Minimum wire size shall be No. 8.
- c. A ground wire shall be included in all illumination runs and shall be equal in size to the largest conductor.
- d. Circuits from different services shall not enter the same junction box.
- e. Main and branch circuit wire shall be USE rated. Wire beyond fusing shall be NEC wet rated and sized accordingly to fixture and fuse ampacity.



- f. Splices and Disconnect Kits: Splices in the junction box to connect the individual luminaires to the main circuit shall be made with a mechanical C-Tap with 3M 2200 Mastic and 3m 88 Tape. A fused quick disconnect kit shall be provided in each pole base, and shall be made with a SEC Connector Company model 1791-SF.
- g. Fuse kits shall be in the j-box for pedestrian luminaries.
- h. All fixtures shall have a shunt in place of the photoelectric control.

#### 5. Service Cabinets:

- a. Service cabinets shall conform to City of Kirkland Standard Plan CK.TS.05A, B and C. Where a signalized intersection is being constructed in conjunction with the illumination system, the illumination system may be energized from the service cabinet at the signal.
- b. Where the service cabinet is installed to service only an illumination system, it shall be located near the midpoint of the system to minimize voltage drops.
- c. Service cabinets shall power illumination, ITS Devices and traffic signals only.
- d. All services shall be metered.
- e. Services shall be 120/240 volt single phase and have a twist lock photoelectric control inside a 6"X6" wire mesh guard, mounted on top of the cabinet.
- f. Minimum (1) spare 2" conduit shall be placed between the j-boxes
- g. Photoelectric Control

#### 6. Luminaires:

Approved City of Kirkland standards luminaires are Light-Emitting Diode (LED), cobra-head type with IESNA Type II (local and collector streets) and Type III (on arterial streets) distribution patterns. Recommended Nominal Color Temperature ranges from 2700K for local street and collectors and 3000 to 4000K for Arterial Streets. Recommended luminaires standards are summarized in Tables B2.a, B2.b and B2.c.

#### **Tables B2.a, B2.b and B2.c (attached)**

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Appendix B

Table B2.a Recommended Street and Pedestrian Lighting Standards for Arterial Streets

<u>Street Classification</u>	<u>Designated Land Use (LU) Areas</u>	<u>Land Use Pre-Approved Plan</u>	<u>Max Pole Spacing (*) (Ft)</u>		<u>Mounting Height (*) (Ft)</u>		<u>Arm Length (*) (Ft)</u>	<u>Max. Wattage(*)</u>		<u>Pre-Approved Luminaire and Pole Standards</u>			
			<u>Street Light</u>	<u>Pedestrian Light</u>	<u>Street Light</u>	<u>Pedestrian Light</u>	<u>Street Light</u>	<u>Street Light</u>	<u>Pedestrian Light</u>	<u>Street Light</u>		<u>Pedestrian Light</u>	
ARTERIAL	Central Business District	CK-R.47D	200	60	30-35	12	8-12	112	90	LED Cobra Head	CK -TS.08, J- Series Round Steel Fiber Glass Octagonal Concrete Tapered	Candela Series Cand1-1A, Aluminum Straight / Round Pole	CK-R47 CK-R.47A, CK-R. 47B CK-R.47C
	Totem Lake Center Neighborhood	CK-R.47F	200	60	30-40	12	8-12	112	65	LED Cobra Head	CK -TS.08 J -Series Round Steel Fiber Glass Octagonal Concrete Tapered	Candela Series Cand 2, Aluminum Straight / Round Pole	CK-R.47A CK-R.47B CK-R.47E CK-R.47M
	Juanita Business District	CK-R.47H	200	60	30-40	10	8-12	112	90	LED Cobra Head	CK -TS.08 J -Series Round Steel Fiber Glass Octagonal Concrete Tapered	Lumec Ancestra Series, Aluminum Straight / Round Pole	CK-R.47A CK-R.47B CK-R.47G CK-R.47I
	NE 85 <sup>th</sup> Planned Area	Pending	200	60	30-40	12	8-12	112	90	LED Cobra Head	CK -TS.08 J -Series Round Steel Fiber Glass Octagonal Concrete Tapered	Domus Small Aluminum Straight / Round Pole	CK-R.47A CK-R.47B CK-R.47K CK-R.47L
	North Rose Hill	CK-R.47J	200	60	30-40	12	8-12	112	90	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Octagonal Concrete Tapered	Candela Series Cand 2, Aluminum Straight / Round Pole	CK-R.47A CK-R.47B CK-R.47E CK-R.47M
	Rest of Kirkland		200	60-80	30-40	12-15	8-12	112	90	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Octagonal Concrete Tapered	TBD	TBD

(\*) These values may be modified depending on the specific design requirements of each project.

Table B.2b Recommended Street and Pedestrian Lighting Standards for Collector Streets

Street Classification			Max Pole Spacing (*) (Ft)		Mounting Height (*) (Ft)		Arm Length (*) (Ft)	Max. Wattage (*)		Pre-Approved Luminaire and Pole Standards			
	Designated Land Use (LU) Area	Land Use Pre-Approved Plan	Street	Pedestrian	Street	Pedestrian	Street	Street	Pedestrian	Street Light		Pedestrian Light	
COLLECTOR	Central Business District	CK-R.47D	200	60-80	25 - 30	12	8-10	84	90	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Concrete Octagonal Tapered	Candela Series Cand1-1A, Aluminum Straight / Round Pole	CK-R47 CK-R.47A, CK-R. 47B CK-R.47C
	Totem Lake Center/ Neighborhood	CK-R.47F	200	60-80	25 - 30	12	8-10	84	65	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Octagonal Concrete Tapered	Candela Series Cand 2, Aluminum Straight / Round Pole	CK-R.47A CK-R.47B CK-R.47E CK-R.47M
	Juanita Business District	CK-R.47H	200	60-80	25 - 30	10	8-10	84	90	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Octagonal Concrete Tapered	Lumec Ancestra Series, Aluminum Straight / Round Pole	CK-R.47A CK-R.47B CK-R. 47G CK-R.47I
	NE 85 <sup>th</sup> Street Planned Area	Pending	200	60-80	25 - 30	12	8-10	84	90	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Octagonal Concrete Tapered	Domus Small Aluminum Straight / Round Pole	CK-R.47A CK-R.47B CK-R. 47K CK-R.47L
	North Rose Hill District	CK-R.47J	200	60-80	25 - 30	12	8-10	84	90	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Octagonal Concrete Tapered	Candela Series Cand 2, Aluminum Straight / Round Pole	CK-R.47A CK-R.47B CK-R.47E CK-R.47M
	Rest of Kirkland		150-200	60-80	25-30	NA	8-10	84	NA	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Octagonal Concrete Tapered	NA	NA

(\*) These values may be modified depending on the specific design requirements of each project.

Appendix B

Table B2.c Recommended Street and Pedestrian Lighting Standards for Local Streets

Street Classification	Designated Land Use (LU) Areas	Land Use Pre-Approved Plan	Max Pole Spacing (*) (Ft)		Mounting Height (*) (Ft)		Arm Length (*) (Ft)	Max. Wattage(*)		Pre-Approved Luminaire and Pole Standards			
			Street Light	Pedestrian Light	Street Light	Pedestrian Light	Street Light	Street Light	Pedestrian Light	Street Light		Pedestrian Light	
LOCAL	Central Business District	CK-R.47D	250	60-80	25	12	6-10	39	90-R	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Octagonal Concrete Tapered	Candela Series Cand1-1A, Aluminum Straight / Round Pole	CK-R47 CK-R.47A, CK-R. 47B CK-R.47C
	Totem Lake Center Neighborhood	CK-R.47F	250	60-80	25	12	6-10	39	90	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Octagonal Concrete Tapered	Candela Series Cand 2, Aluminum Straight / Round Pole	CK-R.47A CK-R.47B CK-R.47E CK-R.47M
	Juanita Business District	CK-R.47H	250	60-80	25	10	6-10	39	90	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Octagonal Concrete Tapered	Lumec Ancestra Series, Aluminum Straight / Round Pole	CK-R.47A CK-R.47B CK-R. 47G CK-R.47I
	Ne 85 <sup>th</sup> Street Planned Area	Pending	250	60-80	25	12	6-10	39	90	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Concrete Octagonal Tapered	Domus Small, Aluminum Straight / Round Pole	CK-R.47A CK-R.47B CK-R. 47K CK-R.47L
	North Rose Hill District	CK-R.47J	250	60-80	25	12	6-10	39	90	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Octagonal Concrete Tapered	Candela Series Cand 2 Aluminum Straight / Round Pole	CK-R.47A CK-R.47B CK-R.47E CK-R.47M
	Rest of Kirkland (**)		250	60-80	25	12-15	6-10	39	90	LED Cobra Head	CK -TS.08 J-Series Round Steel Fiber Glass Octagonal Concrete Tapered	TBD	TBD

(\*) These values may be modified depending on the specific design requirements of each project.

(\*\*) The area of the Finn Hill Neighborhood west of Juanita Drive may install pedestrian lighting per PSE's recommended pedestrian pole/luminaires standards.

## CITY OF KIRKLAND

123 FIFTH AVENUE • KIRKLAND, WASHINGTON 98033-6189 • (425) 587-3800

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### DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

#### Policy R-41 Parking Sensor Replacement

The goal of this policy is to establish the procedure for replacement of any parking sensor used by the City that is removed, damaged, or otherwise rendered inoperable through construction activities.

Sensors that are removed, damaged, or otherwise rendered inoperable due to work in the public right-of-way or listed parking lots by a Project (private development, utility work, CIP project, or similar), the replacement cost will be covered by the Project. **Replacement cost includes new sensor equipment, installation, and other appurtenances required for a full installation.** Installation is performed by a sensor vendor who is contracted with the City of Kirkland. Once parking sensors are removed from the pavement, they cannot be reused.

To coordinate parking sensor replacement, please contact the project inspector or the Public Works Department at (425) 587-3800.

#### Locations

Parking sensors are installed in on-street parking stalls, on-street loading zones, within the two City of Kirkland paid public parking lots located in the Central Business District, and two Parks Department parking lots. The locations of these facilities are listed below.

##### Paid Public Parking Lots:

- Lakeshore Plaza & adjacent Auxiliary lot
- Lake & Central lot

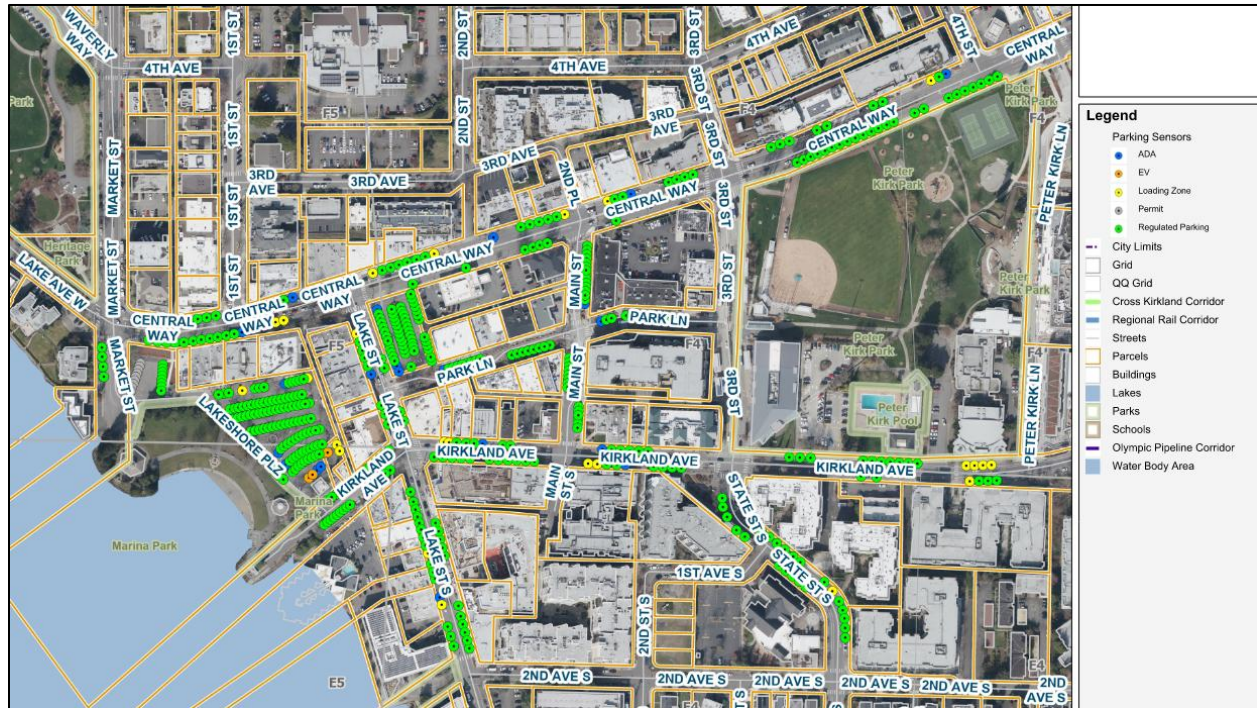
##### Parks Department lots:

- Houghton Beach Park lot
- Marsh Park lot

Approximate locations of on-street and loading zone parking sensors (as of October 2024) are shown in Figure 1.

It is possible at the time of construction that parking sensors have been added or removed from the on-street parking and loading zone areas. It is the Project's responsibility to verify current location information prior to pavement-disturbing work.

## Policy R-41 Parking Sensor Replacement



**Figure 1 - Approximate locations of parking sensors in the CBD.**

HISTORICAL SIGN BACKGROUND:

GREEN AND BROWN REFLECTIVE SHEETING  
WITH 3/8" WHITE BORDER.  
SHEETING SHALL MEET MUTCD  
REQUIREMENTS FOR REFLECTIVITY.

SIGN:

24"x8" SHEET ALUMINUM 0.080" THICK

FONT: 4", FHWA SERIES "B" OR "C",  
EXCEPT SUFFIXES AND PREFIXES 3" UC SERIES "B" OR "C" →

FONT: 0.625" RALEIGH (YEAR @45°)

FONT: 1.5" RALEIGH EXTRA BOLD BT (STREET NAME) →



PRIVATE ROAD BACKGROUND:

BLUE AND GREEN REFLECTIVE SHEETING  
WITH 3/8" WHITE BORDER.  
SHEETING SHALL MEET MUTCD  
REQUIREMENTS FOR REFLECTIVITY.

SIGN:

24"x8" SHEET ALUMINUM 0.080" THICK

FONT: 4", FHWA SERIES "B" OR "C",  
EXCEPT SUFFIXES AND PREFIXES 3" UC SERIES "B" OR "C" →

FONT: 1", FHWA UC SERIES "F" →



STANDARD STREET SIGN BACKGROUND:

GREEN REFLECTIVE SHEETING  
WITH 3/8" WHITE BORDER.  
SHEETING SHALL MEET MUTCD REQUIREMENTS  
FOR REFLECTIVITY.

SIGN:

24"x6" SHEET ALUMINUM 0.080" THICK

FONT: 4", FHWA SERIES "B" OR "C",  
EXCEPT SUFFIXES AND PREFIXES 3" UC SERIES "B" OR "C" →

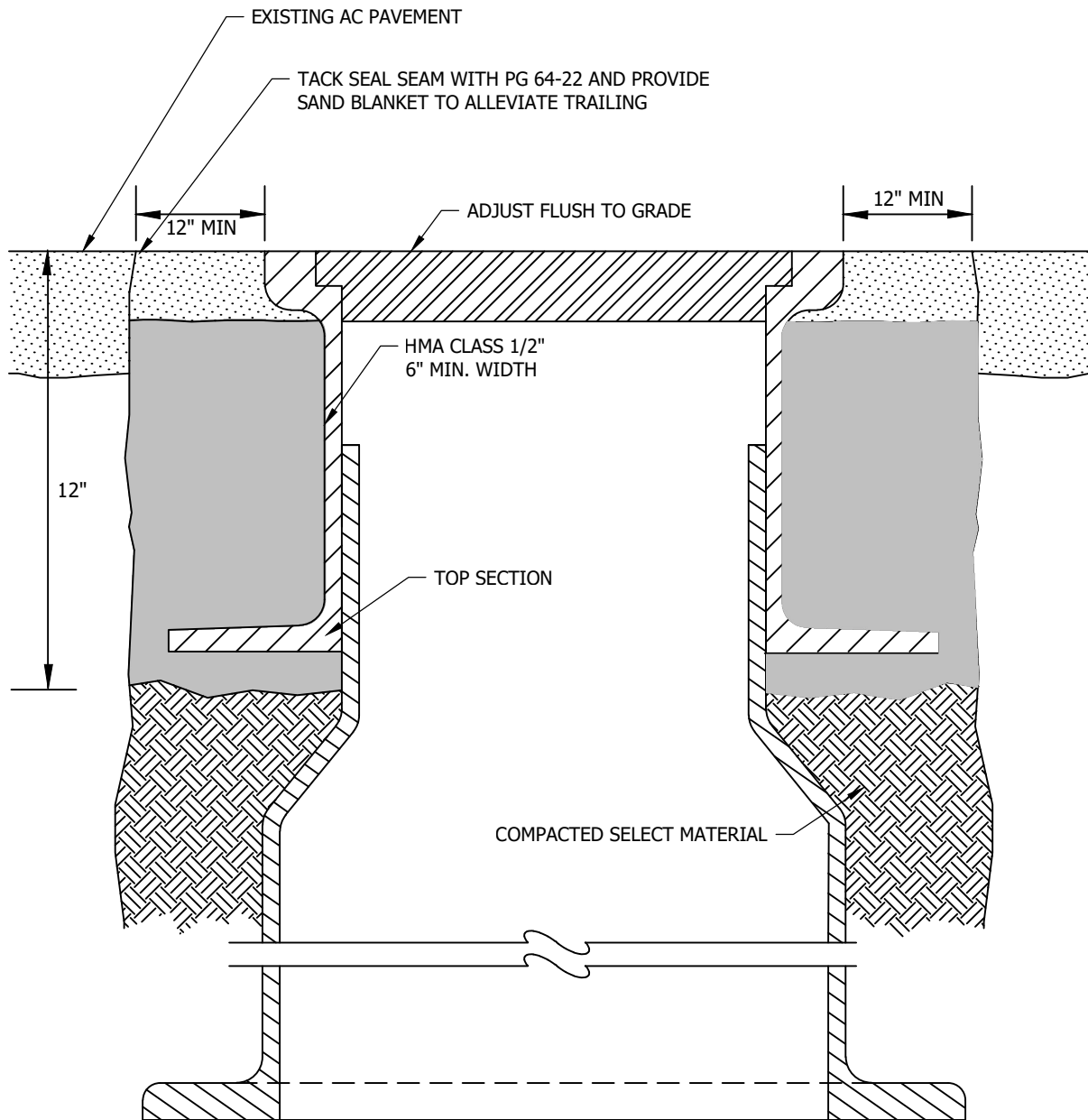


CITY OF KIRKLAND

PLAN NO. CK-R.01



STREET SIGN  
DESIGNATIONS



**NOTES:**

1. HMA MUST BE COMPACTED WITH PROCTOR HAMMER (PNEUMATIC BACKFILL COMPACTION TAMPER) IN 3" LIFTS.
2. LOCKING MH LIDS SHALL BE POSITIONED WITH ONE LUG CENTERED OVER STEPS.
3. SEE CK-D.18A FOR DIRECTION OF HINGED LIDS INSTALLATION.
4. WATER VALVE BOX EARS MUST POINT IN THE DIRECTION OF FLOW. CONTRACT CITY INSPECTOR IF FLOW DIRECTION CANNOT BE DETERMINED.
5. APPLY A TACK COAT TO ALL EDGES OF EXISTING ASPHALT PRIOR TO PLACEMENT OF NEW HMA. SEAL ALL JOINTS WHEN COMPLETE.

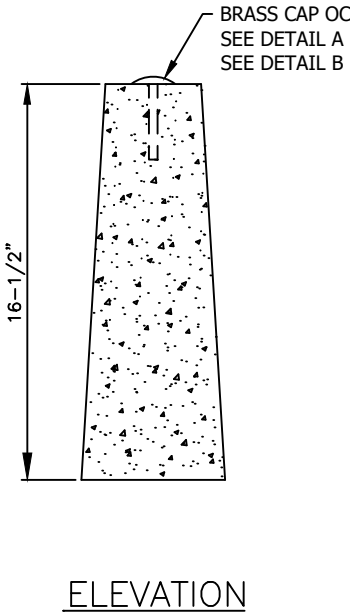
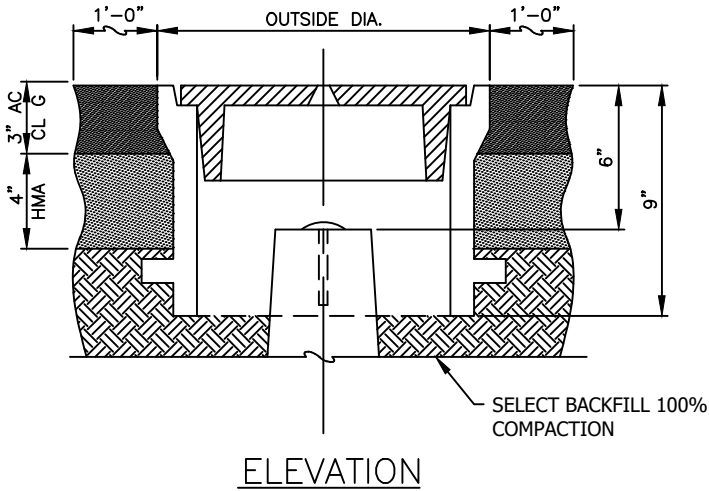
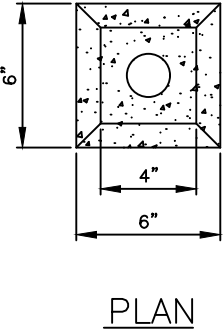
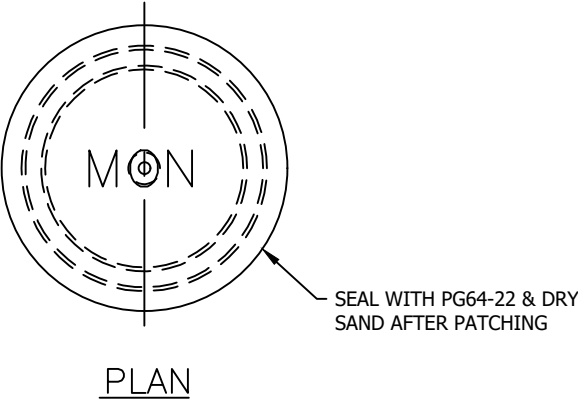
**CITY OF KIRKLAND**

PLAN NO. CK- R.02



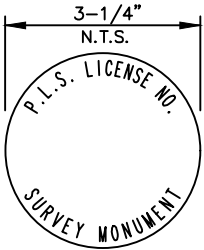
**GENERAL UTILITY  
ADJUSTMENT  
H.M.A. PAVEMENT**




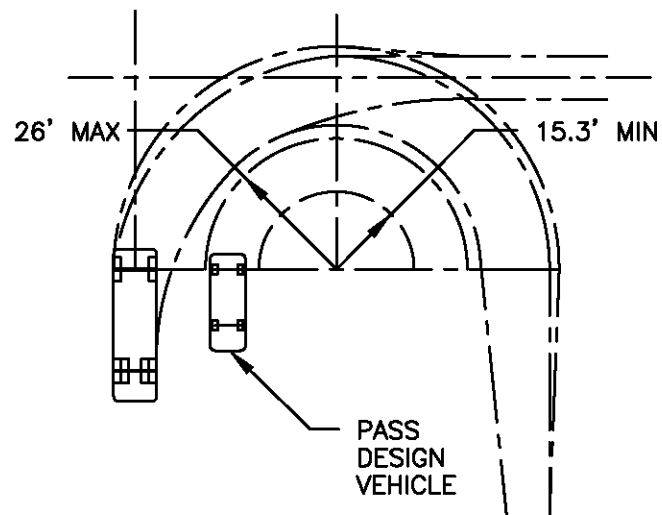


NOTES:

1. ALL JOINTS BETWEEN ASPHALT PATCH AND EXISTING PAVEMENT SHALL BE SEALED.
2. THE CASTINGS SHALL BE GREY-IRON CASTINGS, ASTM DESIGNATION A-48, CLASS 30B. THE COVER AND SEAT SHALL BE MACHINED SO AS TO HAVE PERFECT CONTACT AROUND THE ENTIRE CIRCUMFERENCE AND FULL WIDTH OF BEARING SURFACE.
3. CONCRETE COLLAR REQUIRED IF OUTSIDE OF ASPHALT AREA.
4. HMA MUST BE COMPACTED WITH PROCTOR HAMMER (PNEUMATIC BACKFILL COMPACTION TAMPER) IN 3" LIFTS



CITY OF KIRKLAND	
PLAN NO. CK-R.03	
	MONUMENT CASE AND COVER



**NOTE:**

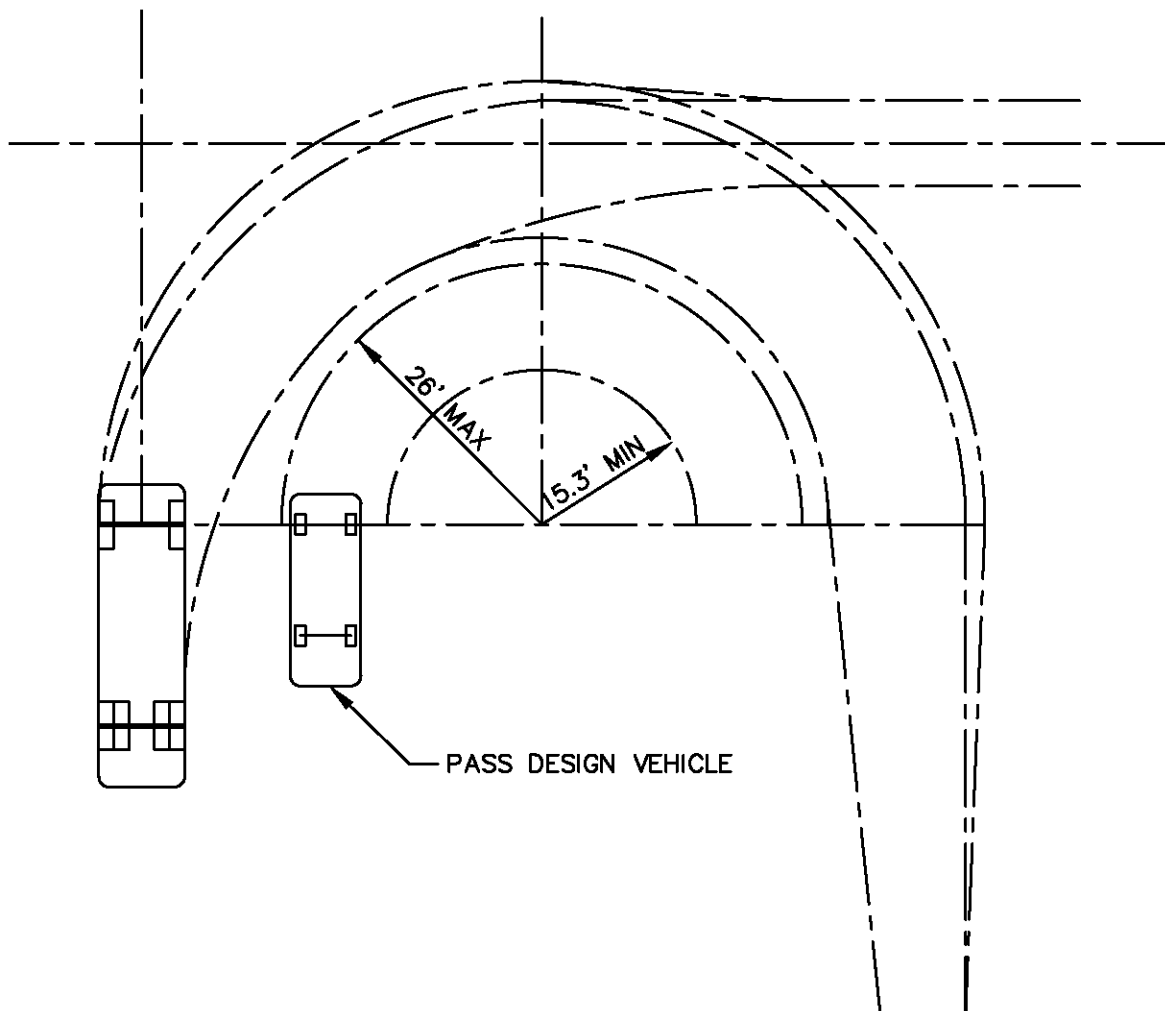
1. FROM PAGE 24 GEOMETRIC DESIGN OF RURAL HIGHWAYS BY AASHTO (GREEN BOOK).

CITY OF KIRKLAND

PLAN NO. CK-R.04



AASHTO SU  
DESIGN VEHICLE  
1" = 40'



**NOTE:**

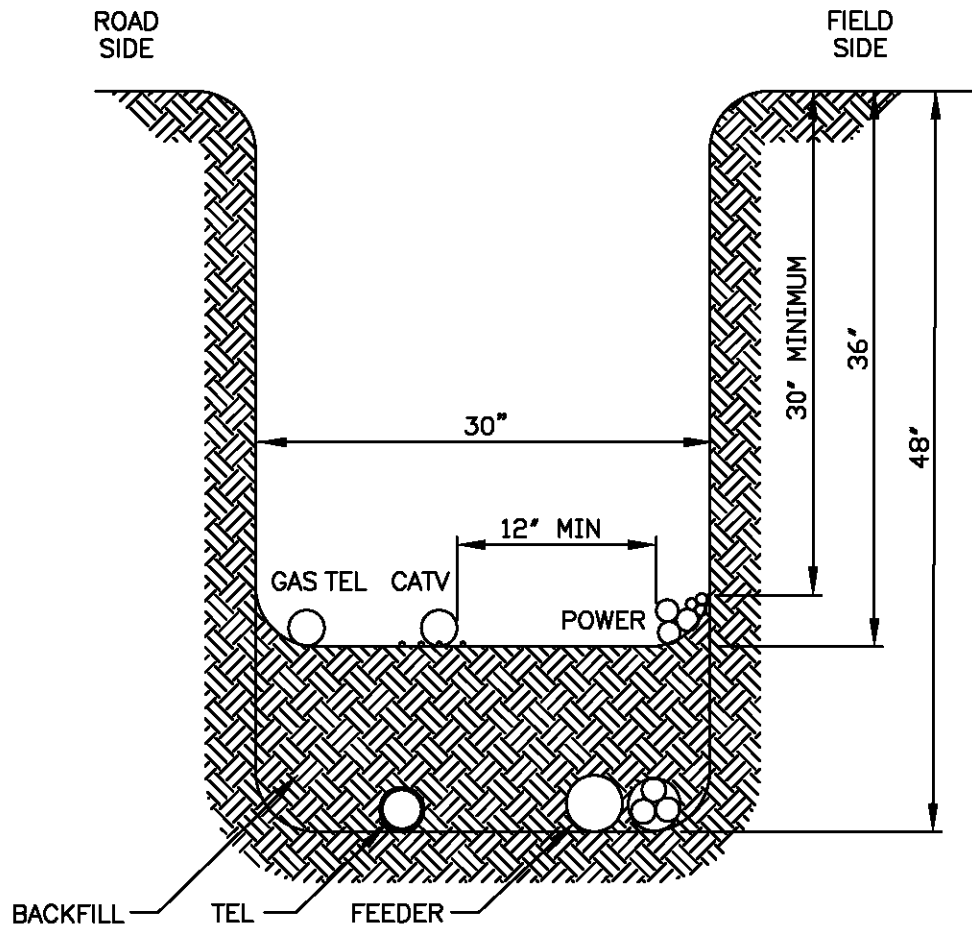
1. FROM PAGE 24 GEOMETRIC DESIGN OF RURAL HIGHWAYS BY AASHTO (GREEN BOOK).

CITY OF KIRKLAND

PLAN NO. CK-R.05



AASHTO SU  
DESIGN VEHICLE  
1" = 20'



### TYPICAL JOINT TRENCH CROSS SECTION

#### NOTES

1. IF THE 12 INCH SEPARATION REQUIREMENT CANNOT BE MET DUE TO SOIL, OR OTHER RESTRICTIONS, THE PRIME CONTRACTOR IS RESPONSIBLE FOR COORDINATING DEVIATIONS FROM STANDARD PROCEDURE. RANDOM SEPARATION REQUIRES THE INSTALLATION OF A SEPARATE COPPER OR BARE GROUND WIRE ACCORDING TO WAC 296-44-42559. IN ALL CASES, EXCAVATION MUST MEET REQUIREMENTS OF APPLICABLE CODES AND STANDARDS, INCLUDING WAC 296-44-42533 AND THE NATIONAL ELECTRIC SAFETY CODE. IF PUGET POWER IS THE PRIME CONTRACTOR, DEVIATIONS MUST BE APPROVED BY LOCAL SUPERVISION AND THE CUSTOMER SERVICE ENGINEER.
2. ALL OTHER FACILITIES, INCLUDING PRIMARY AND SECONDARY CONDUCTORS SHALL BE INSTALLED 36 INCHES DEEP. POWER 1/0 PRIMARIES AND SECONDARIES SHALL BE DIRECT BURIED.
3. POWER CABLES SHALL BE INSTALLED ON THE PROPERTY SIDE OF THE TRENCH AND GAS ON THE STREET SIDE, WITH TELEPHONE AND CATV IN THE MIDDLE.
4. FOR GENERAL INFORMATION ONLY. NOT CITY OF KIRKLAND STANDARDS.

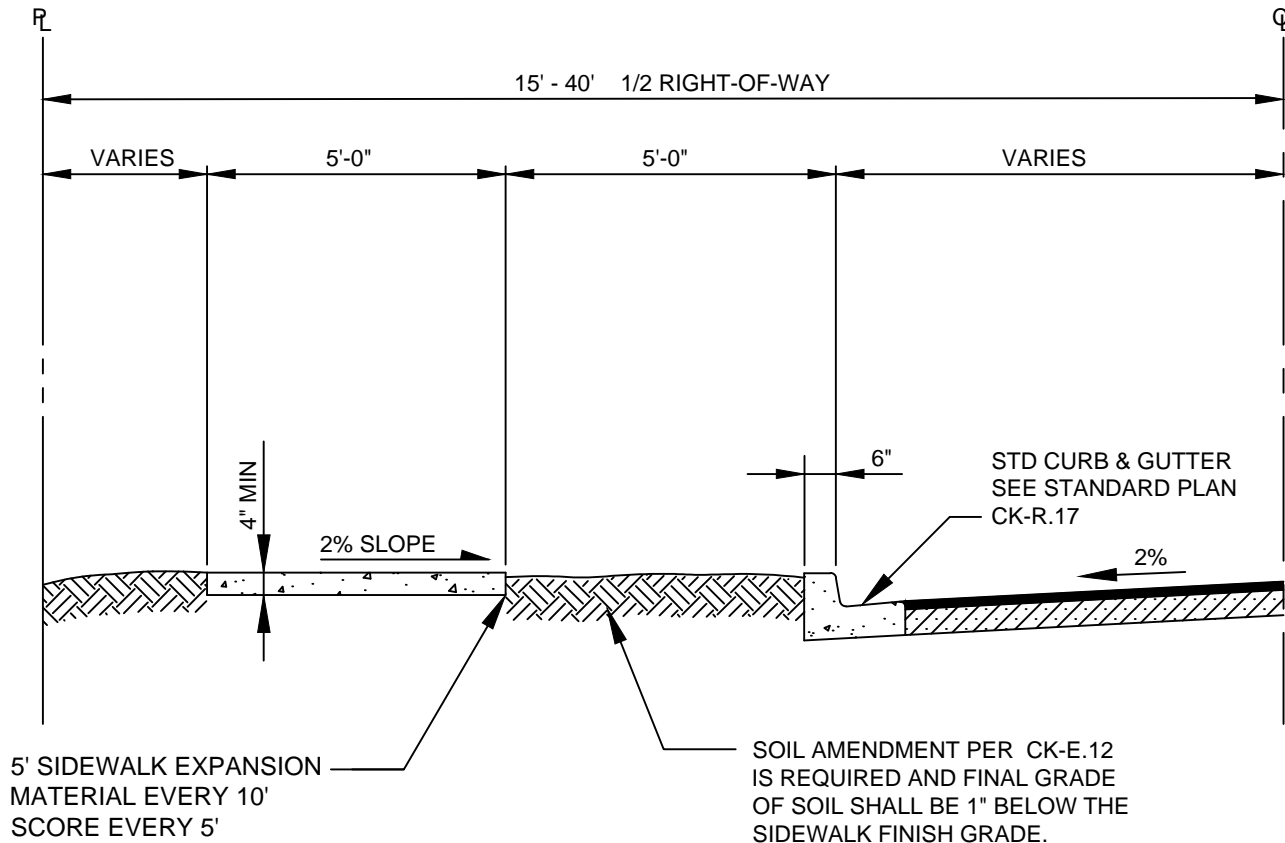
CITY OF KIRKLAND

PLAN NO. CK-R.06



JOINT OCCUPANCY  
TRENCHES IN  
RESIDENTIAL PLATS

SECTION OF  
LONGITUDINAL OR  
TRANSVERSE CUT




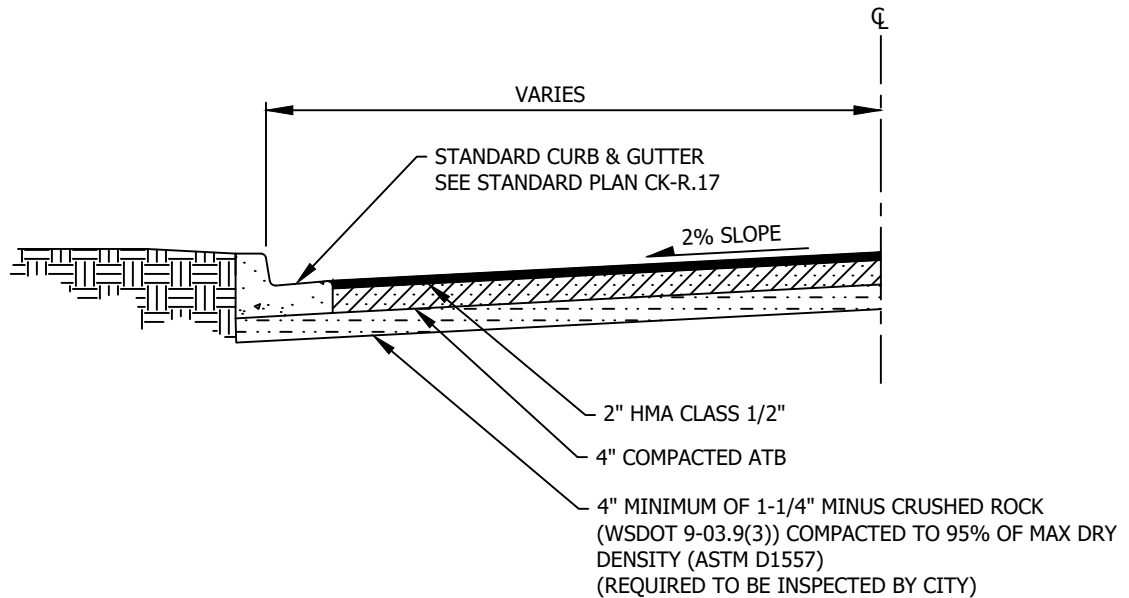
## STANDARD HALF-STREET IMPROVEMENT SECTION

### NOTE:

ABOVE DIMENSIONS MINIMUM, SEE  
PUBLIC WORKS AND/OR PLANNING FOR  
INFORMATION ON SPECIFIC STREETS

STREET TREES ARE REQUIRED EVERY  
30' O.C. PER POLICY R-10.

CITY OF KIRKLAND	
PLAN NO. CK-R.08	
	HALF-STREET SECTION



**NOTES:**

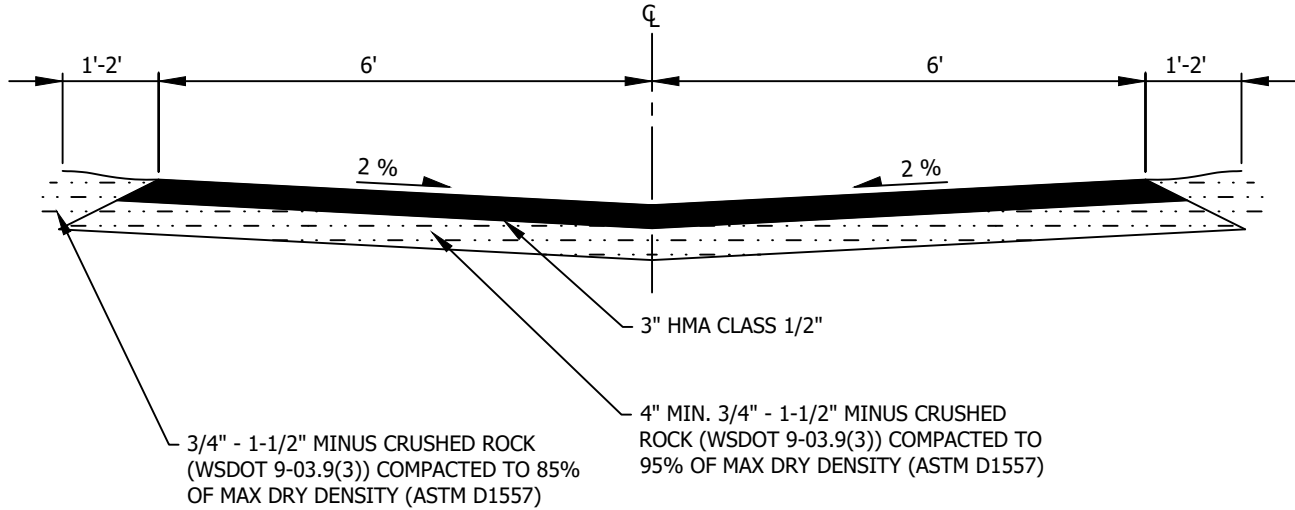
1. HOT MIX ASPHALT CLASS 1/2" MAY BE USED IN LIEU OF ATB.
2. MAXIMUM ALLOWABLE GRADE OF A STREET IS 15% UNLESS DIRECTED BY ENGINEER.
3. SIDE SLOPES SHALL BE 2:1 MAXIMUM.
4. WHEN PLACING NEW CURB AND GUTTER ALONG AN EXISTING ROADWAY, THE ASPHALT SHOULD BE SAWCUT AT A WIDTH TO ALLOW FOR A 20" TO 24" ASPHALT PATCH AS MEASURED FROM THE OUTER EDGE OF THE GUTTER.

CITY OF KIRKLAND

PLAN NO. CK-R.09



STANDARD ROAD  
CROSS SECTION



**NOTES:**

1. ALL ALLEYS SHALL HAVE A MINIMUM PAVEMENT WIDTH OF 12 FEET UNLESS APPROVED BY THE PUBLIC WORKS DEPARTMENT.
2. INVERT DRAINAGE TO BE COLLECTED AT LOW END OF IMPROVED SECTION WITH CATCH BASIN INSTALLATION AND TIGHTLINED TO STORM DRAIN SYSTEM.
3. COMPACTION TESTS ON SUBGRADE AND ROCK GRADE SHALL BE REQUIRED. THE NUMBER OF TESTS SHALL BE AT THE DISCRETION OF THE CITY INSPECTOR. ALL TESTS, AS REQUIRED, SHALL BE AT THE EXPENSE OF THE CONTRACTOR OR DEVELOPER THROUGH ANY LICENSED TESTING LAB OF THEIR CHOICE. THE MINIMUM COMPACTION SHALL BE 95 % OF MAXIMUM DRY DENSITY (PER ASTM D1557) ON BOTH SUBGRADE AND ROCK SURFACES.
4. ADJUSTMENT OF CATCH BASIN LIDS OR GRATES, MANHOLE LIDS, MONUMENT CASES, VALVE BOXES, ETC., SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR OR DEVELOPER AS REQUIRED AND SHALL BE ADJUSTED AFTER THE FINAL LIFT OF ASPHALT HAS BEEN PLACED.
5. PRIOR TO INSTALLING 3" ASPHALT OVERLAY, PRE-EMERGENCE HERBICIDE MUST BE APPLIED OVER THE COMPACTED BASE COURSE MATERIAL AND BELOW SHOULDER.

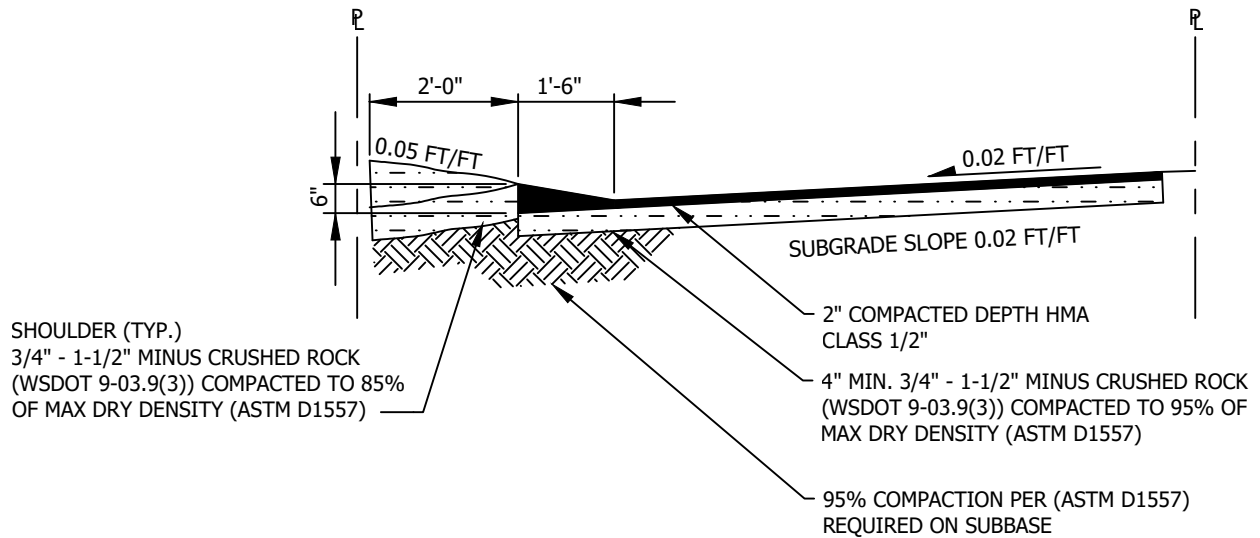
**CITY OF KIRKLAND**

PLAN NO. CK- R.10



**STANDARD ALLEY  
CROSS-SECTION**





NOTES:

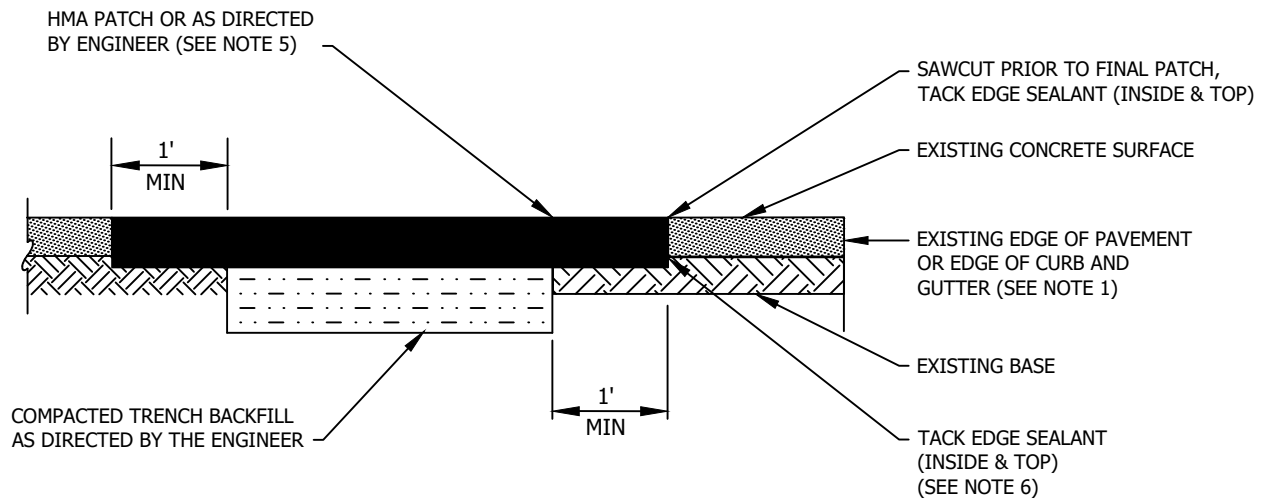
1. MAY BE USED FOR SPECIAL APPLICATIONS IN ALLEYS AS DETERMINED BY THE PUBLIC WORKS INSPECTOR OR ENGINEER.
2. REFER TO CK-R.09 FOR STANDARD ROAD CROSS SECTION AND CK-R.10 FOR STANDARD ALLEY SECTION

CITY OF KIRKLAND

PLAN NO. CK-R.11



THICKENED EDGE  
ROADWAY



### TYPICAL PATCH FOR PAVEMENT

NOTES:

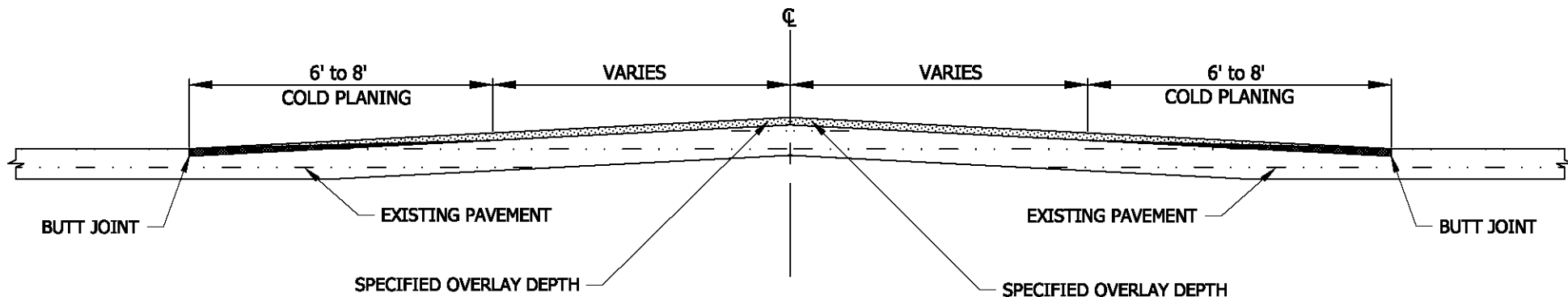
1. IF THE DISTANCE FROM THE EDGE OF PATCH TO THE EDGE OF PAVEMENT OR CURB AND GUTTER IS LESS THAN 3', THE PATCH MUST CONTINUE TO THE EXISTING EDGE; UNLESS ROADWAY IS OVERLAID WITHIN 60 DAYS.
2. HOT MIX ASPHALT SHALL BE CLASS 1/2".
3. ALL TRENCH BACKFILL SHALL BE CRUSHED SURFACING TOP COURSE MATERIAL FOR PERPENDICULAR TRENCHES, OR AS DIRECTED BY ENGINEER.
4. HMA CLASS 1/2" MAY BE USED IN LIEU OF ATB.
5. PATCH MUST ALWAYS BE 1" DEEPER THAN EXISTING ASPHALT; MAX 6" DEEP, OR AS DIRECTED BY ENGINEER.
6. TOP SEAL-USE PG 64-22 AND PROVIDE A SAND BLANKET TO ALLEVIATE TRAILING.
7. REFER TO COK STD. PLAN NO. CK-R.13C FOR REQUIREMENTS FOR GEOTECH BORING ASPHALT PATCHES.

**CITY OF KIRKLAND**

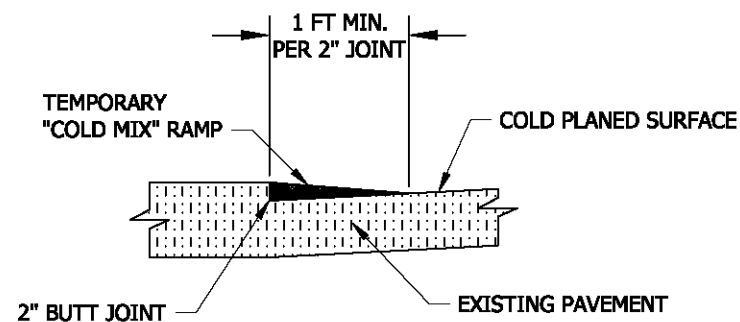
PLAN NO. CK- R.12



**RESTORATION DETAIL  
AND  
PAVEMENT PATCHING**



### BUTT JOINT COLD PLANING



### "COLD MIX" RAMP

#### NOTES:

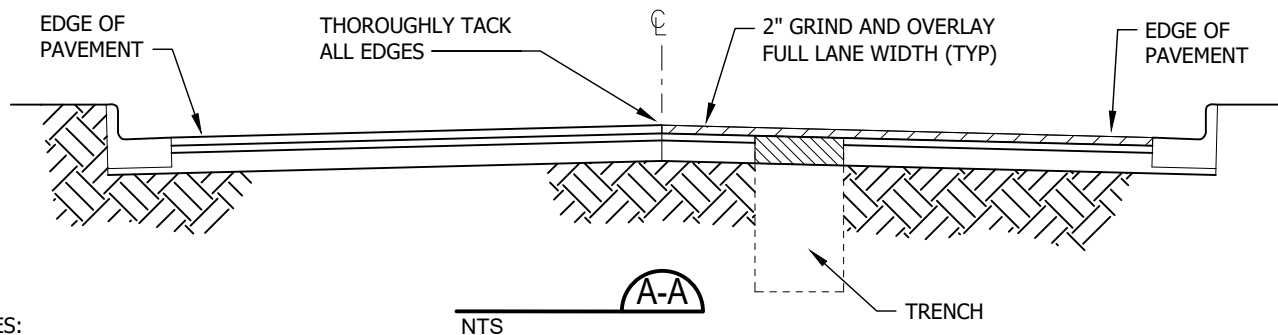
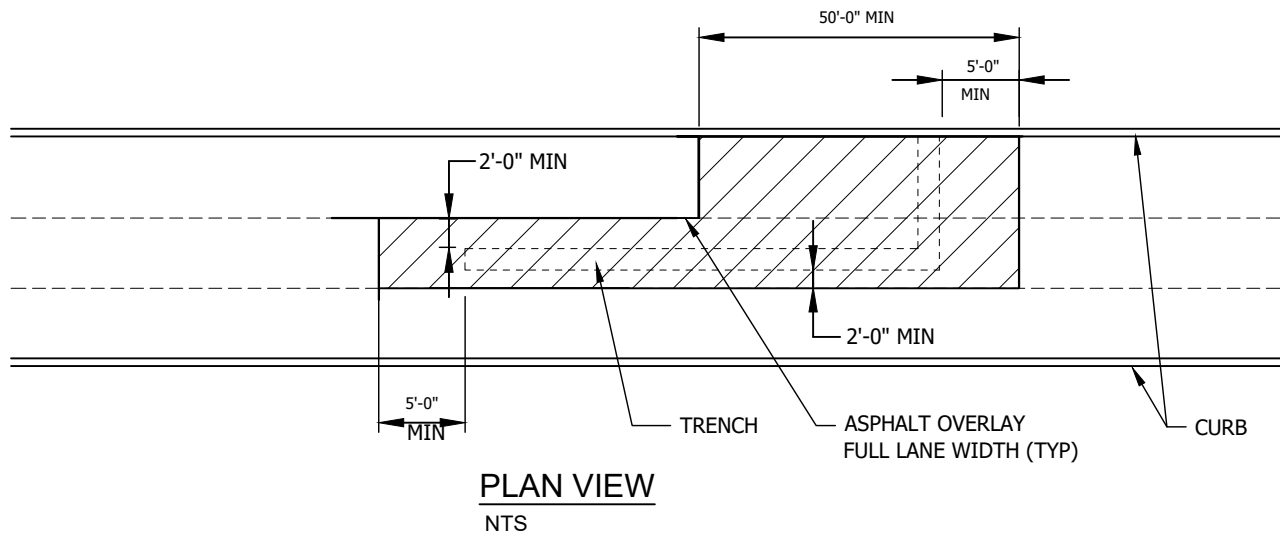
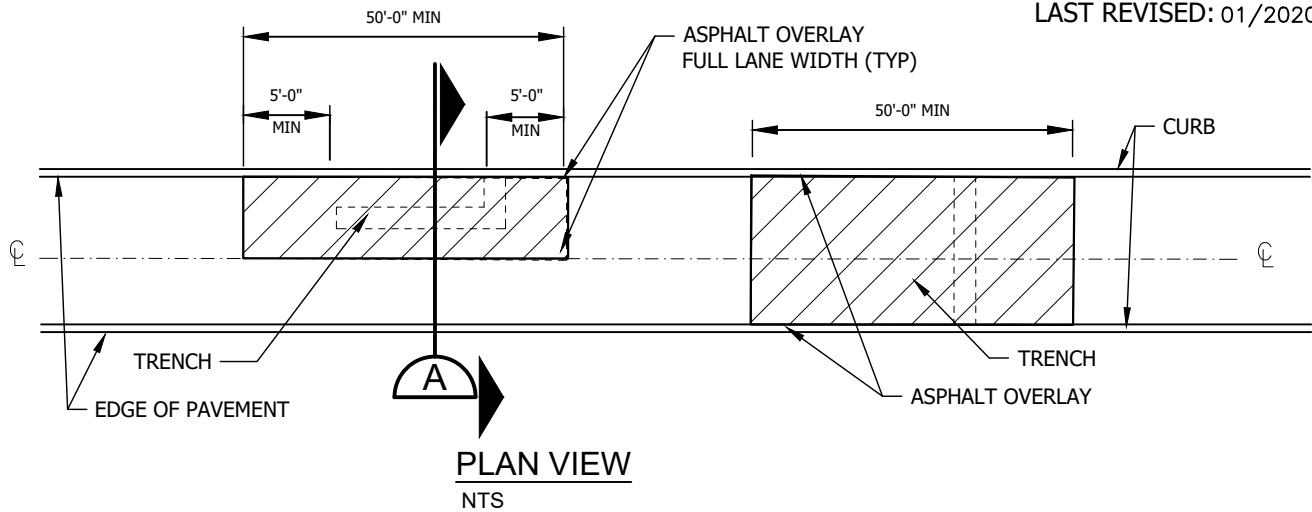
1. ALL JOINTS PLANED PERPENDICULAR TO TRAVEL LANES SHALL BE IMMEDIATELY PAPER JOINTED, COLD MIXED, AS PER THIS DETAIL, AND MAINTAINED UNTIL NEW HMA LAYER IS INSTALLED. PAPER JOINTS WILL BE REMOVED JUST PRIOR TO PLACEMENT OF WEARING COURSE.



CITY OF KIRKLAND

PLAN NO. CK-R.13

BUTT JOINT,  
COLD PLANING AND  
COLD MIX RAMP



NOTES:

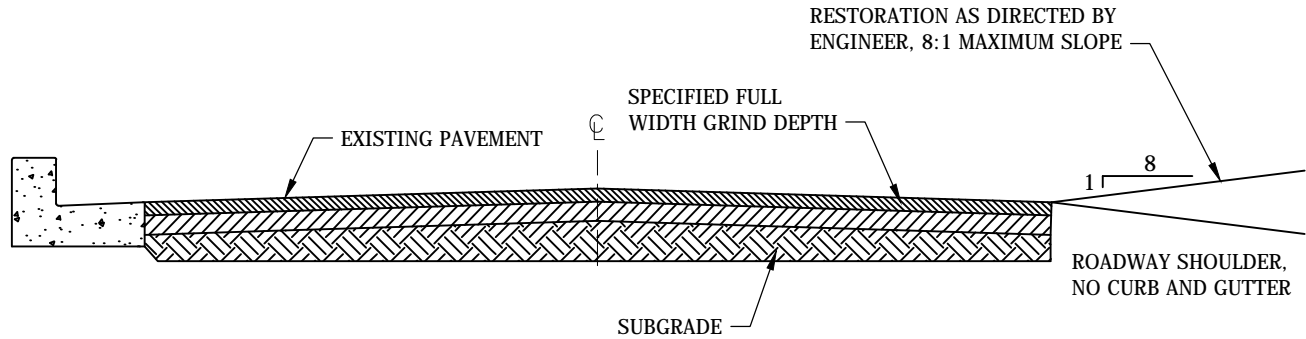
1. THIS STANDARD APPLIES TO ALL CUTS AND ARTERIAL STREETS AND ALL PAVEMENT LESS THAN 5 YEARS OLD.
2. OVERLAY AREA MAY BE MODIFIED BY CITY ON OLDER PAVEMENT DEPENDING ON CONDITIONS OR SCHEDULED CONSTRUCTION/MAINTENANCE.
3. ADJUST ALL UTILITY CASTING TO FINISH GRADE AND RESTORE CHANNELIZATION AND LOOP DETECTORS.
4. POTHOLES TO BE RESTORED WITH A 1' T-CUT. IF AFTER THE 1' T-CUT THE PATCH IS MORE THAN 4'x4', A GRIND AND OVERLAY IS REQUIRED UNLESS OTHERWISE APPROVED BY PUBLIC WORKS. IF THE PATCH IS WITHIN 2 LANES OF TRAVEL, THE GRIND AND OVERLAY WILL BE REQUIRED ON BOTH LANES. 50' MIN. LENGTH.
5. REFER TO COK STD. PLAN NO. CK-R.13C FOR REQUIREMENTS FOR GEOTECH BORING ASPHALT PATCHES.

**CITY OF KIRKLAND**

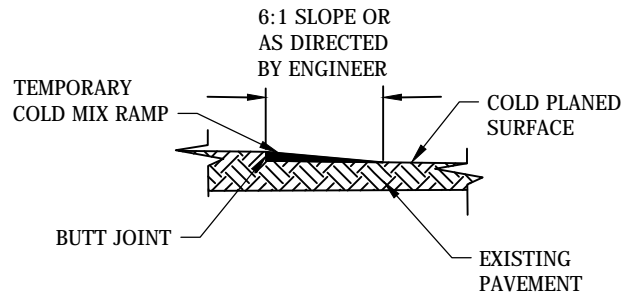
**PLAN NO. CK- R.13A**



**ASPHALT OVERLAY  
FOR ROADWAY  
TRENCH REPAIR**



### FULL WIDTH COLD PLANING DETAIL



### COLD MIX RAMP

#### NOTES:

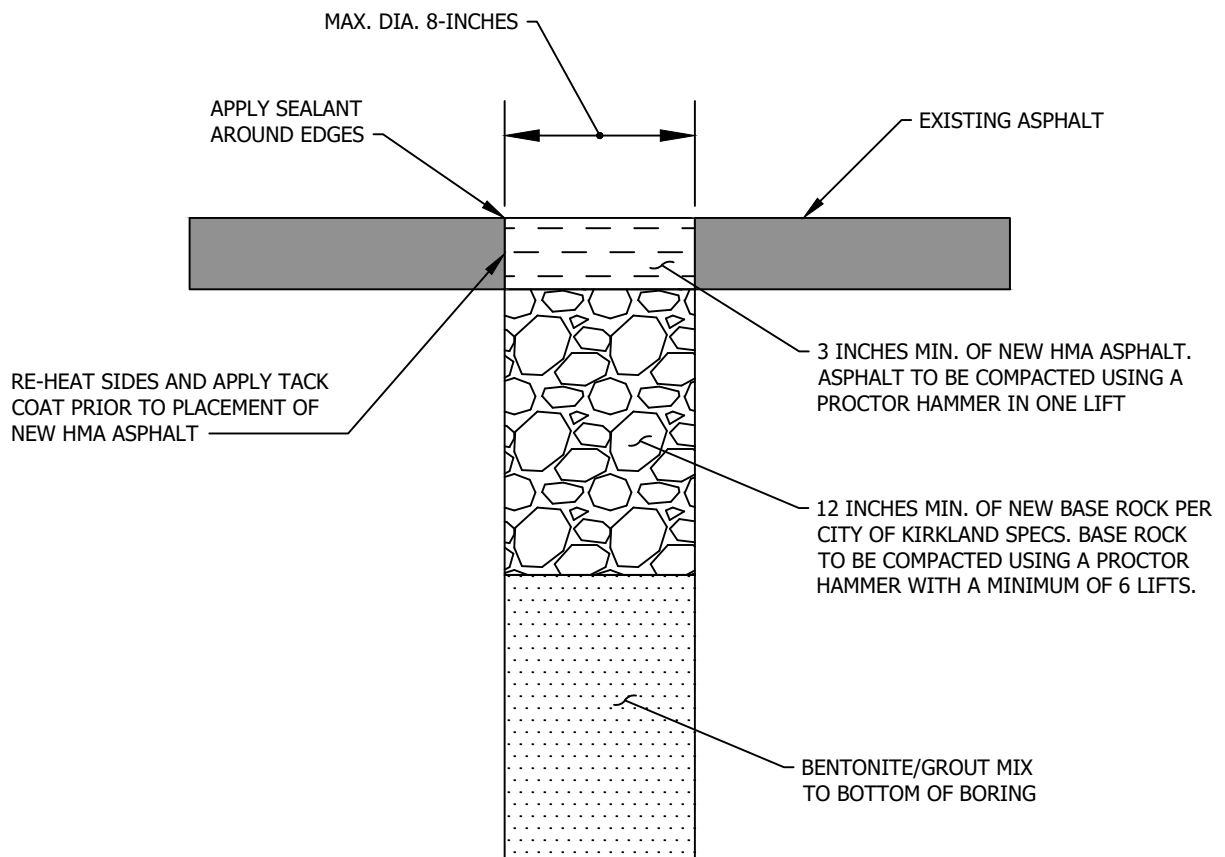
ALL JOINTS PLANED PERPENDICULAR TO TRAVEL LANES SHALL BE IMMEDIATELY PAPER JOINTED, COLD MIXED, AS PER THIS DETAIL, AND MAINTAINED UNTIL HMA LAYER IS INSTALLED. PAPER JOINTS WILL BE REMOVED JUST PRIOR TO PLACEMENT OF WEARING COURSES.

**CITY OF KIRKLAND**

**PLAN NO. CK- R.13B**



**FULL WIDTH COLD  
PLANING DETAIL**

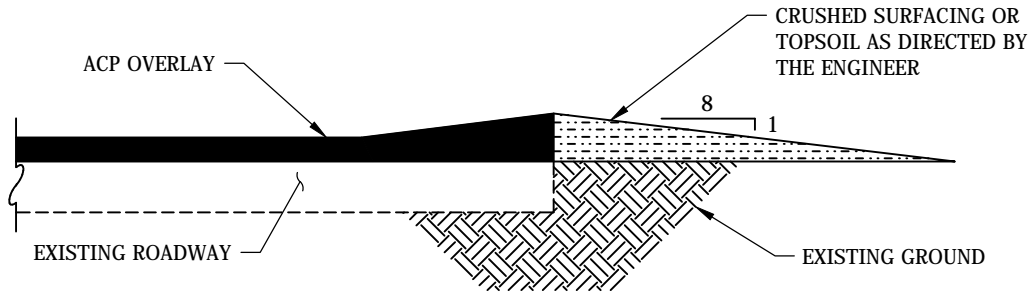


CITY OF KIRKLAND

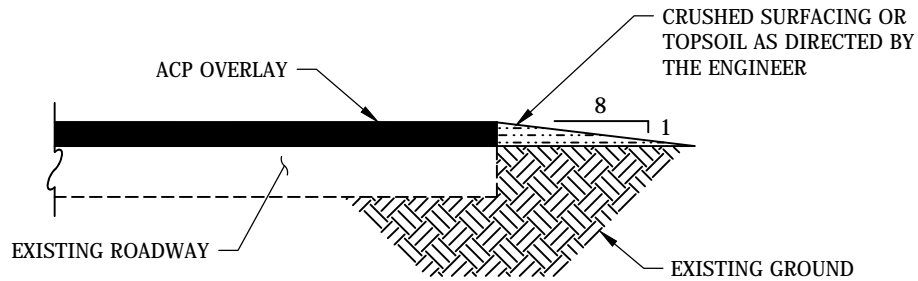
PLAN NO. CK-R.13C



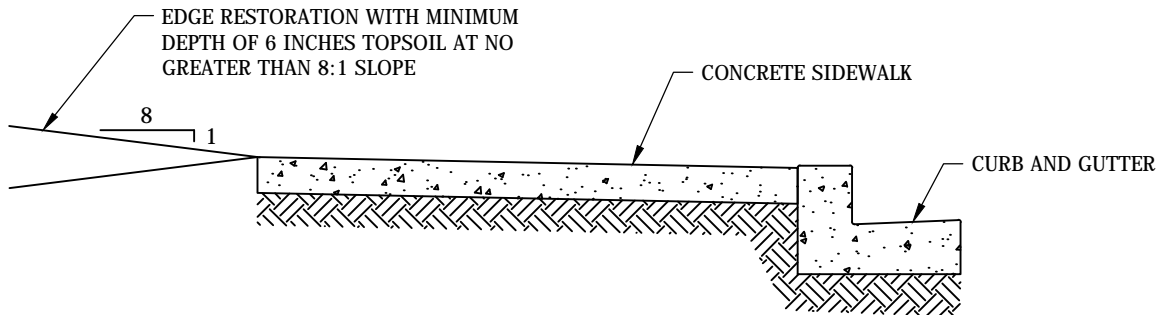
**GEOTECH BORING  
ASPHALT PATCH**



WITH THICKENED EDGE



WITHOUT THICKENED EDGE



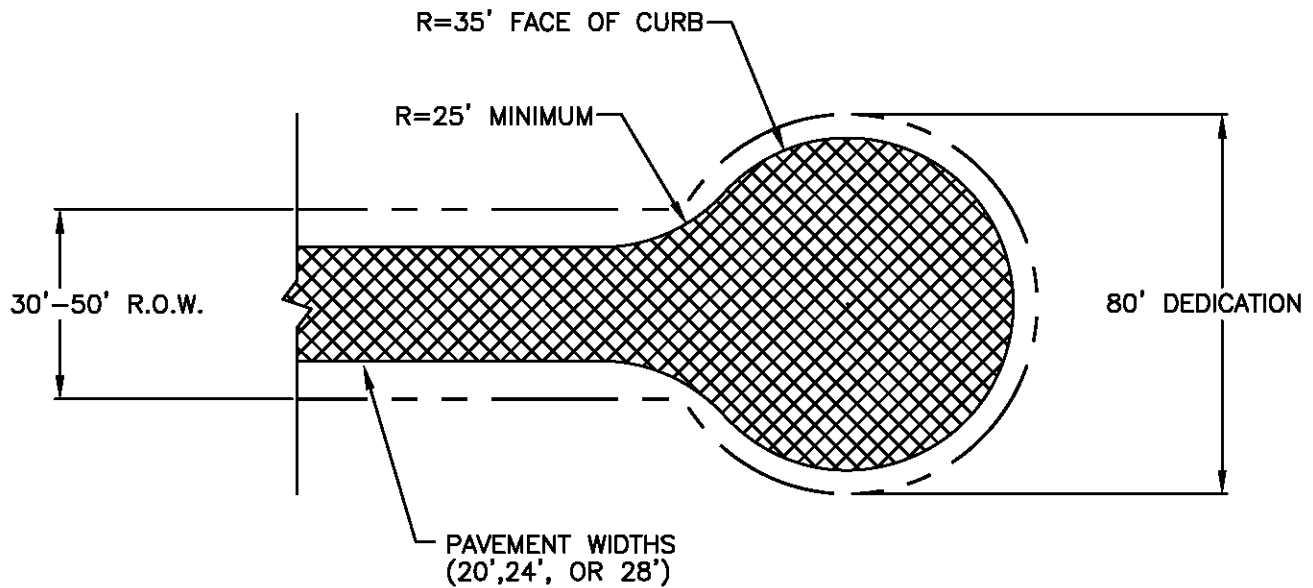
EDGE RESTORATION BEHIND CONCRETE SIDEWALK

CITY OF KIRKLAND

PLAN NO. CK-R.14



EDGE RESTORATION  
DETAILS



**NOTES:**

1. UTILITY EASEMENT AROUND THE PERIMETER OF THE CUL-DE-SAC MAY BE REQUIRED.
2. CUL-DE-SAC APPLIES TO PERMANENT AND TEMPORARY ROADWAY IMPROVEMENTS. ROADWAY IMPROVEMENTS.

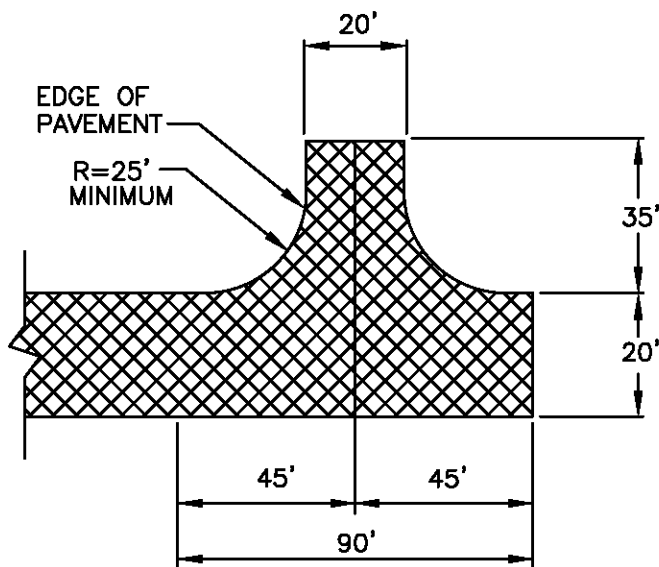
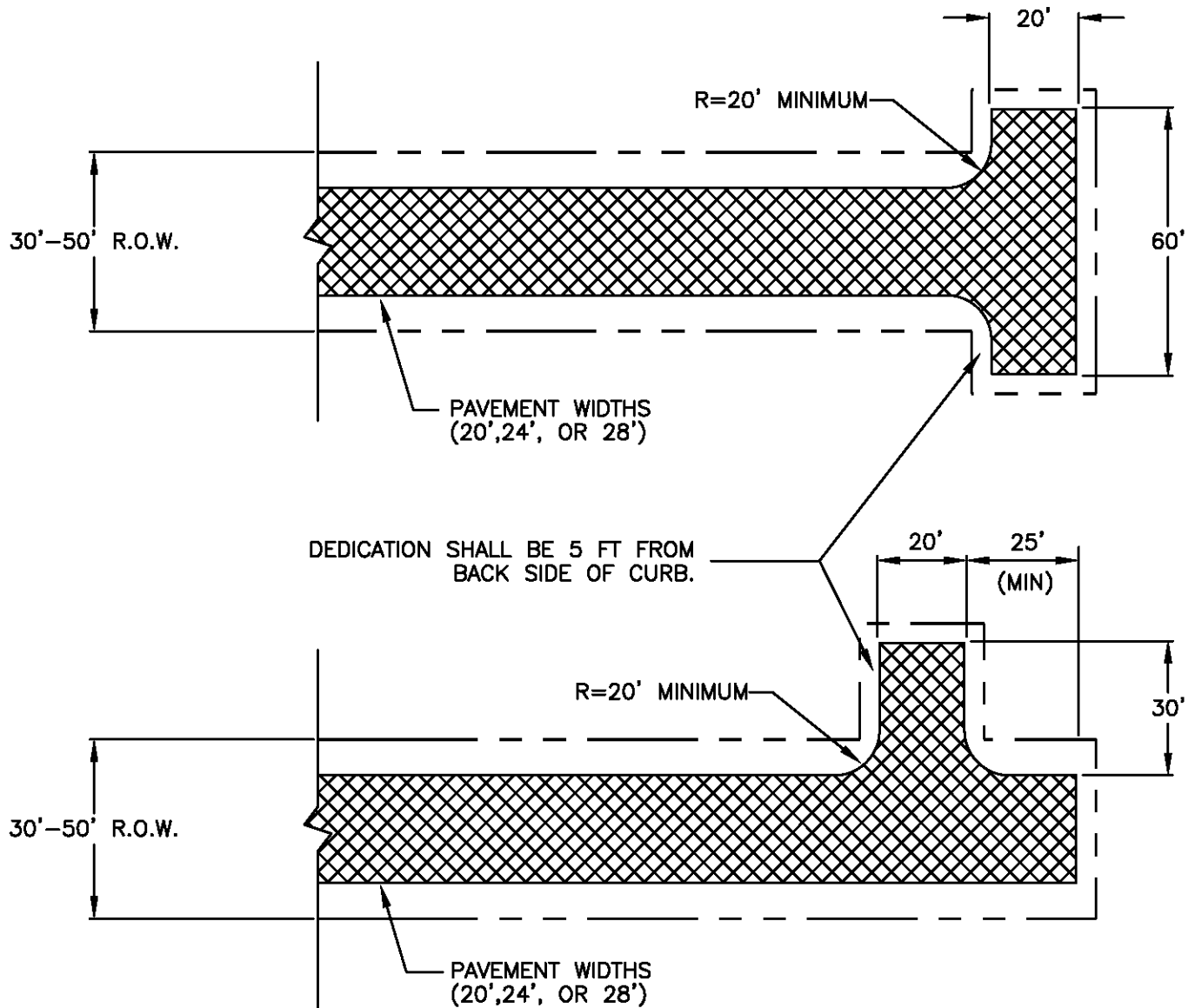
CITY OF KIRKLAND

PLAN NO. CK-R.15



TYPICAL VEHICLE  
CUL-DE-SAC STREET  
GREATER THAN 200'





FIRE DEPARTMENT  
TURN AROUND REQUIREMENTS

NOTES:

1. UTILITY EASEMENTS AROUND THE PERIMETER OF THE TURN-AROUND MAY BE REQUIRED.
2. TURN-AROUNDS APPLY TO PERMANENT AND TEMPORARY ROADWAY IMPROVEMENTS.

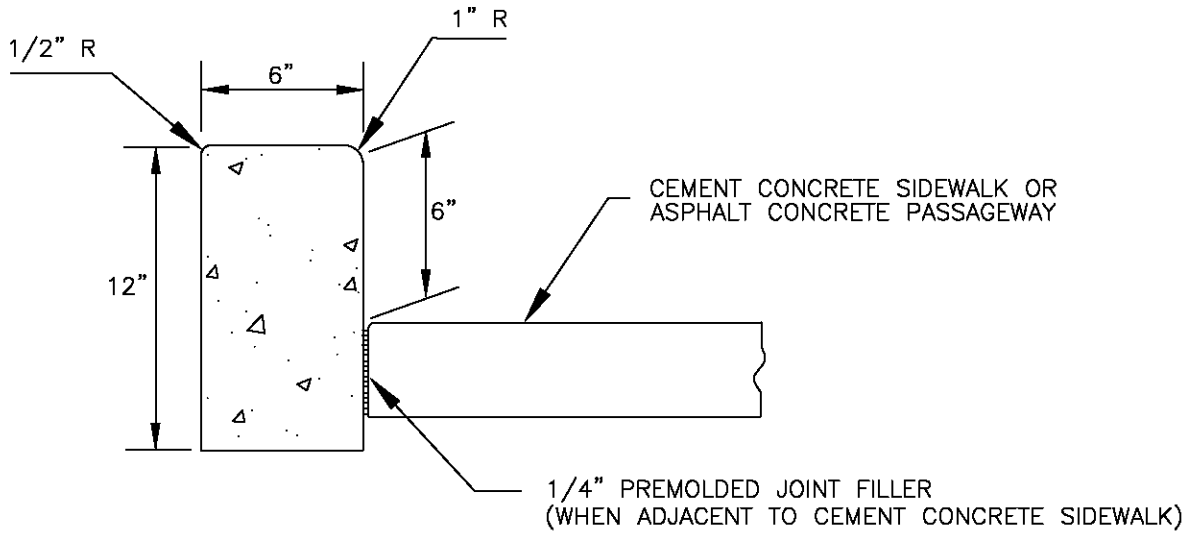
CITY OF KIRKLAND

PLAN NO. CK-R.16

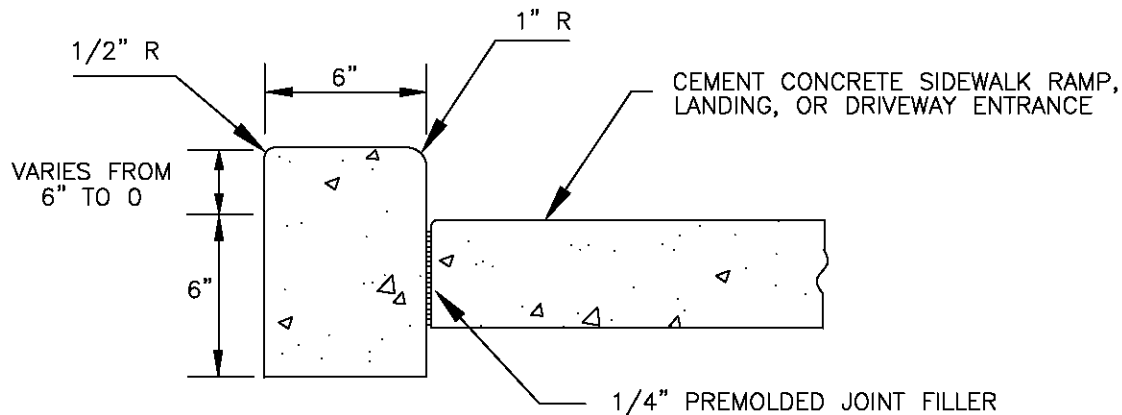


TYPICAL VEHICLE  
TURN-AROUND STREET  
LESS THAN 200'

CONCRETE CURB AND  
GUTTER, TYPE "A"



### CEMENT CONCRETE PEDESTRIAN CURB



### CEMENT CONCRETE PEDESTRIAN CURB

AT SIDEWALK RAMPS & LANDINGS, AND DRIVEWAY ENTRANCES

#### NOTES

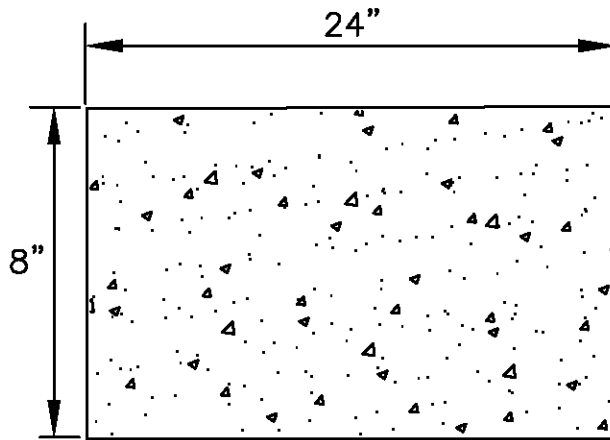
1. FORMS SHALL BE STEEL AND SET TRUE TO LINE AND GRADE (INSPECTION REQUIRED PRIOR TO PLACEMENT OF CONCRETE).
2. CONCRETE SHALL BE CEMENT CONCRETE CLASS 4000.
3. BASE COURSE SHALL BE 4" OF 5/8" MINUS CRUSHED ROCK.
4. SEE CK-R.17 FOR CURB EXPANSION AND CONTRACTION JOINT SPACING.

CITY OF KIRKLAND

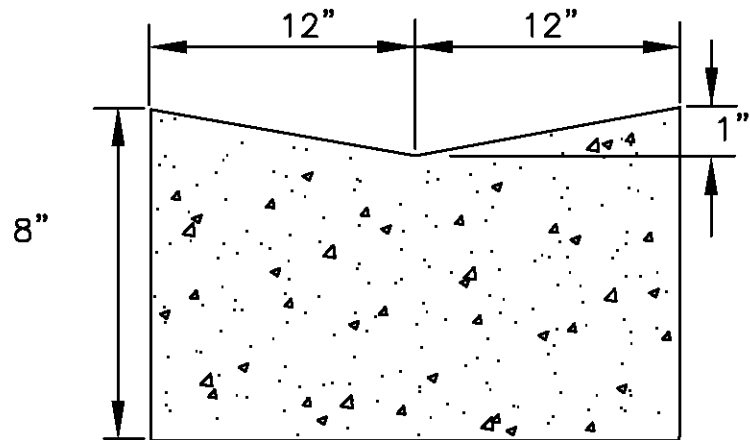
PLAN NO. CK-R.17A



CEMENT CONCRETE  
PEDESTRIAN CURB



FLAT CURB



VALLEY GUTTER

NOTES

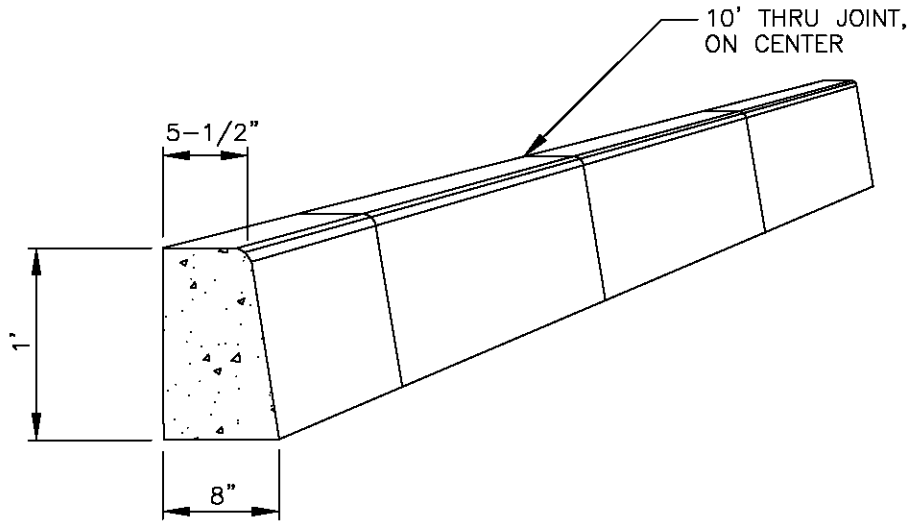
1. THIS DETAIL IS FOR SPECIAL USE ONLY WITH APPROVAL FROM PUBLIC WORKS INSPECTOR OR ENGINEER.
2. FORMS SHALL BE STEEL AND SET TRUE TO LINE AND GRADE (INSPECTION IS REQUIRED PRIOR TO PLACEMENT OF CONCRETE).
3. BASE COURSE SHALL BE 4" OF 5/8" MINUS CRUSHED ROCK.
4. CONCRETE SHALL BE CEMENT CONCRETE CLASS 4000.
5. SEE CK-R.17 FOR CURB EXPANSION AND CONTRACTION JOINT SPACING.
6. BROOM FINISH ONLY.

CITY OF KIRKLAND

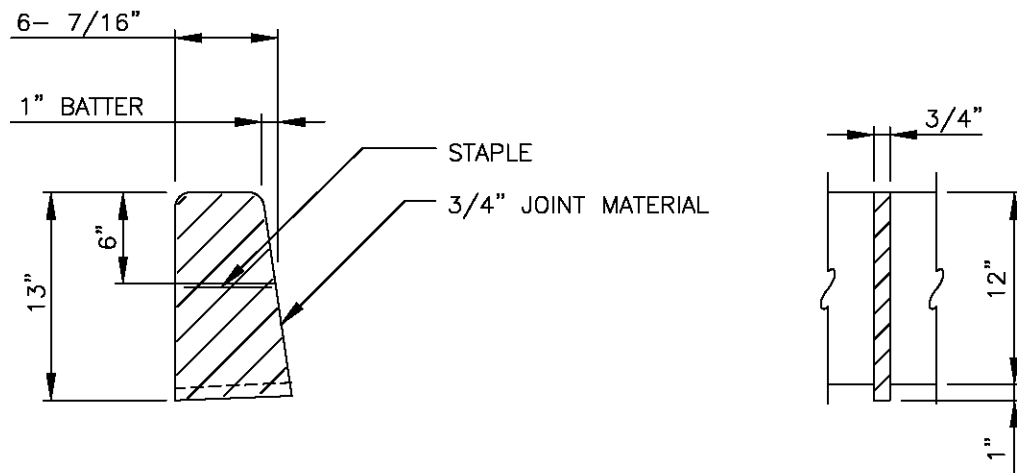
PLAN NO. CK-R.17B



FLAT CURB AND  
VALLEY GUTTER



TYPICAL SECTION FOR VERTICAL CURB



JOINT DETAIL

NOTES

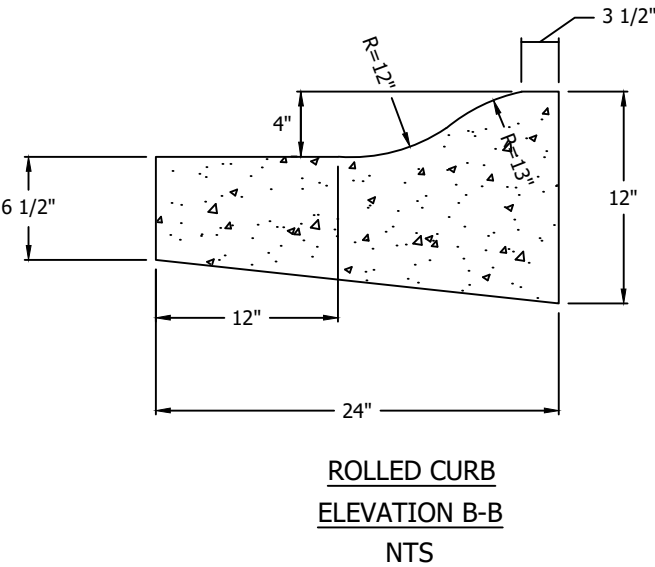
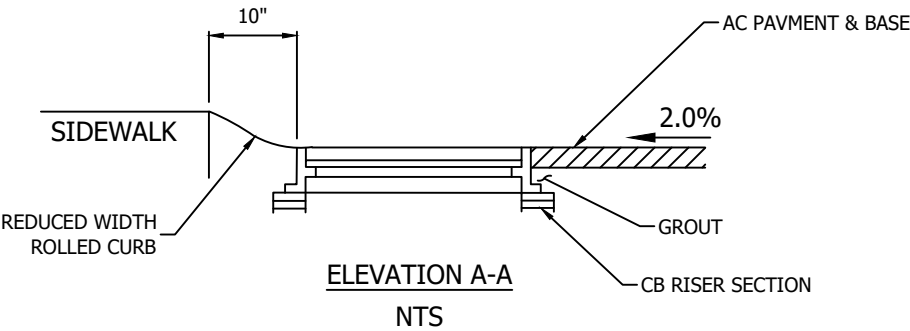
1. FORMS SHALL BE STEEL AND SET TRUE TO LINE AND GRADE (INSPECTION IS REQUIRED PRIOR TO PLACEMENT OF CONCRETE).
2. CONCRETE SHALL BE CEMENT CONCRETE CLASS 4000.
3. BASE COURSE SHALL BE 4" OF 5/8" MINUS CRUSHED ROCK.
4. INSTALLATION OF THIS TYPE OF CURB MUST HAVE PRIOR APPROVAL.

CITY OF KIRKLAND

PLAN NO. CK-R.17C




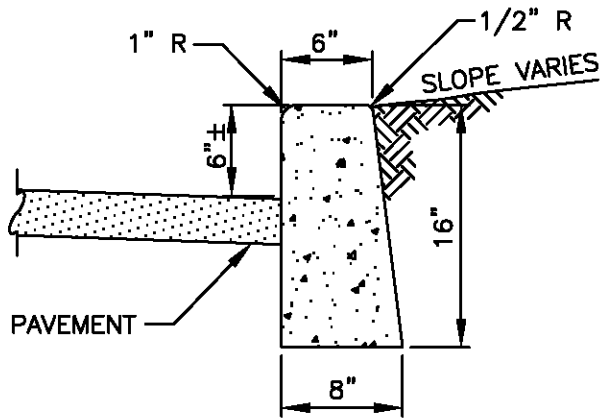
CONCRETE VERTICAL CURB



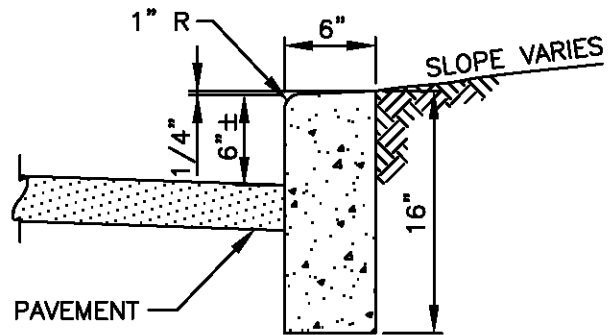
NOTES:

1. WHEN A THRU-CURB INLET IS REQUIRED, USE A ROLLED CURB FRAME AND GRATE.
2. MAY BE INSTALLED ONLY WITH APPROVAL FROM PUBLIC WORKS DEPARTMENT.
3. BASE COURSE SHALL BE 4" OF 5/8" MINUS CRUSHED ROCK.

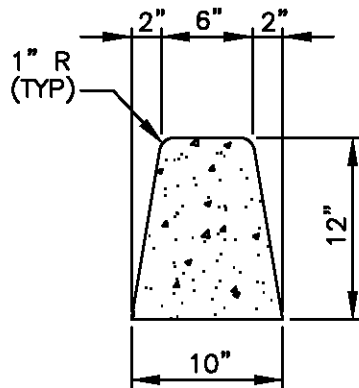
CITY OF KIRKLAND	
PLAN NO. CK - R.17D	
	GRATE/ROLLED CURB INSTALLATION



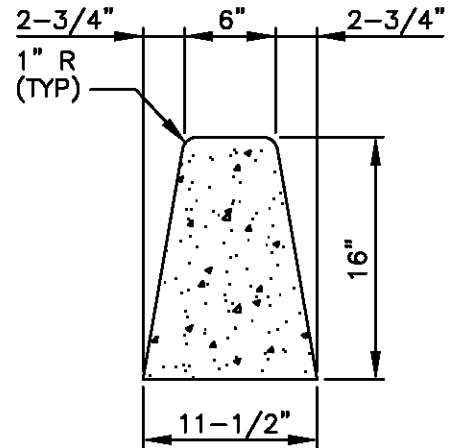
TYPE E-1 CURB



TYPE E-2 CURB



TYPE E-3 CURB



TYPE E-4 CURB

**NOTES**

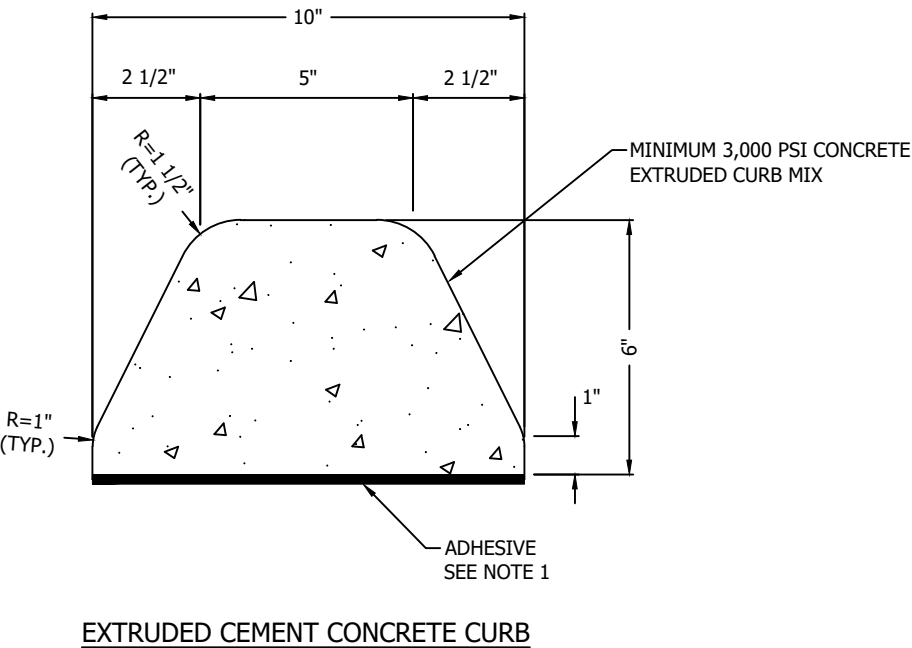
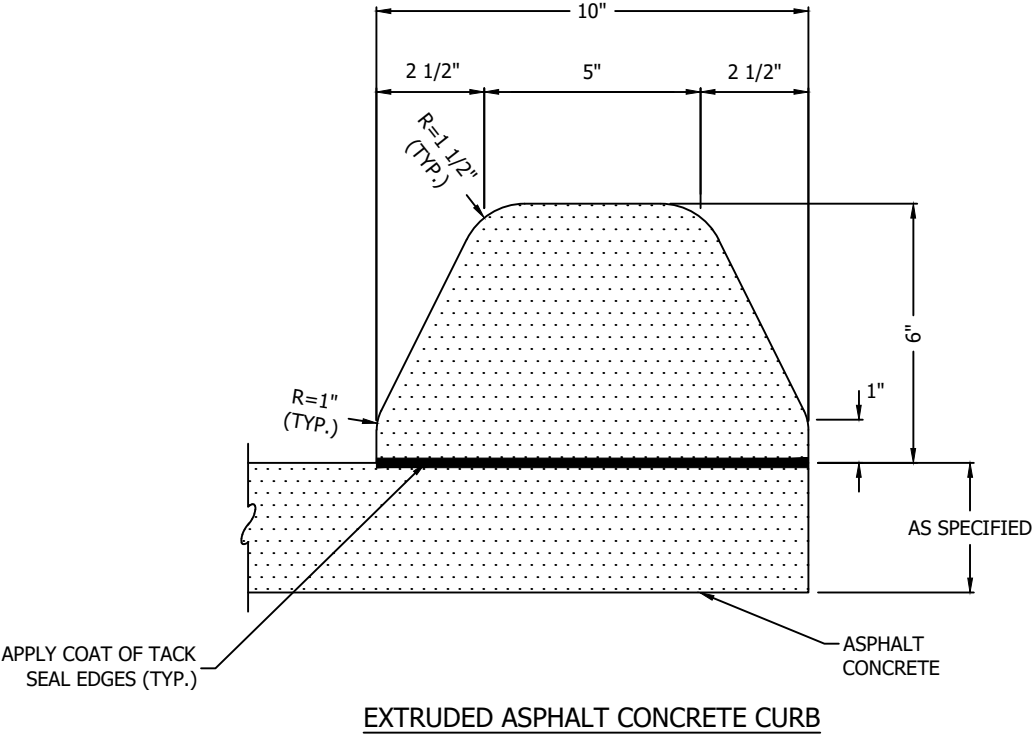
1. DUMMY JOINTS SHALL BE PLACED NOT TO EXCEED 15' CENTER TO CENTER, THEY SHALL BE NOT LESS THAN 3/16" IN THICKNESS AND SHALL EXTEND 2' BELOW THE GUTTER LINE.
2. 3/4" THRU JOINTS SHALL BE PLACED AT ALL COLD JOINTS OR AS DIRECTED BY THE ENGINEER AND SHALL EXTEND 1" BELOW BOTTOM OF CONCRETE.
3. MATERIALS SHALL MEET THE REQUIREMENTS OF THESE SPECIFICATIONS.
4. CONCRETE SHALL BE CEMENT CONCRETE CLASS 4000.

CITY OF KIRKLAND

PLAN NO. CK-R.18




CEMENT CONCRETE  
CURB E-1, E-2,  
E-3 & E-4

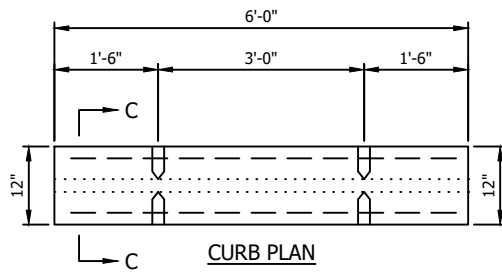


NOTES:

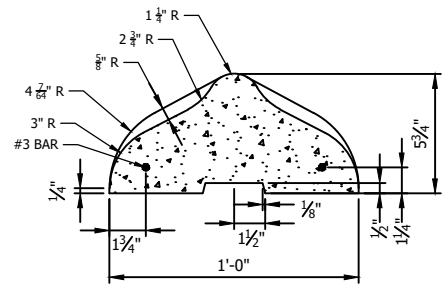
1. THE ADHESIVE SHALL MEET THE REQUIREMENTS OF WSDOT SSRBC SECTION 9-26.1 FOR TYPE-II EPOXY BONDING AGENT.
2. APPLY SUFFICIENT AMOUNT OF ADHESIVE TO ENSURE SQUEEZE OUT ALONG ALL EDGES.

CITY OF KIRKLAND	
PLAN NO. CK - R.19	
	EXTRUDED CURB

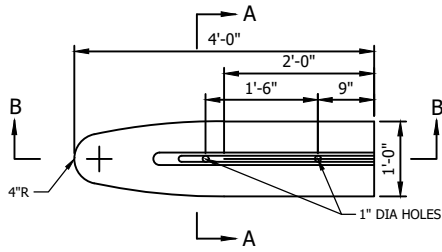




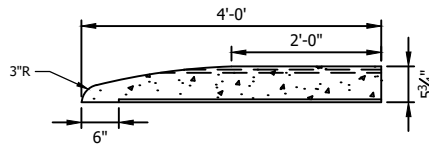
CURB PLAN



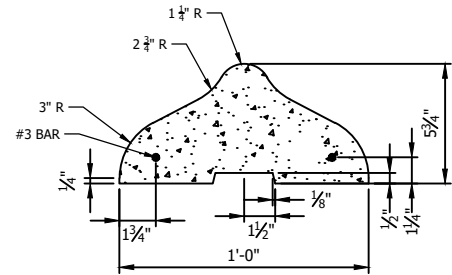
SECTION C-C



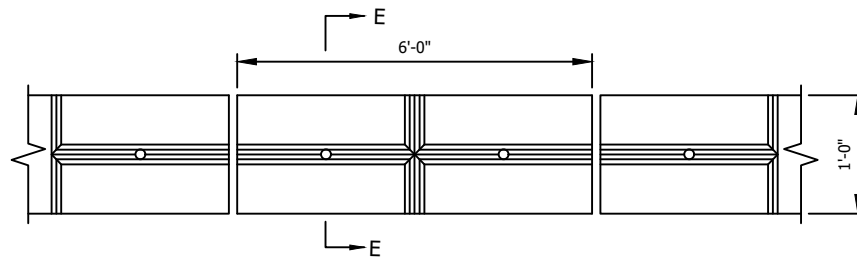
NOSING



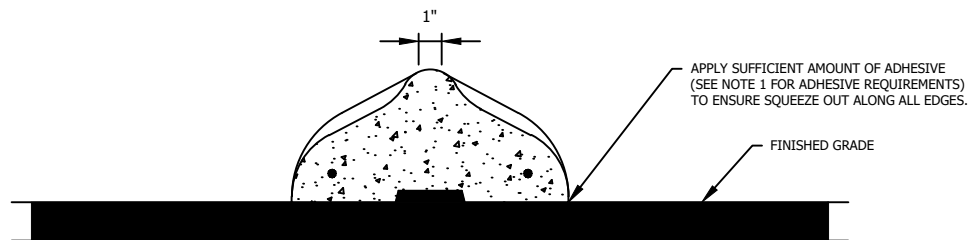
SECTION B-B



SECTION A-A



INSTALLATION DETAIL FOR STRAIGHT PRECAST TRAFFIC CURB



SECTION E-E

NOTES:

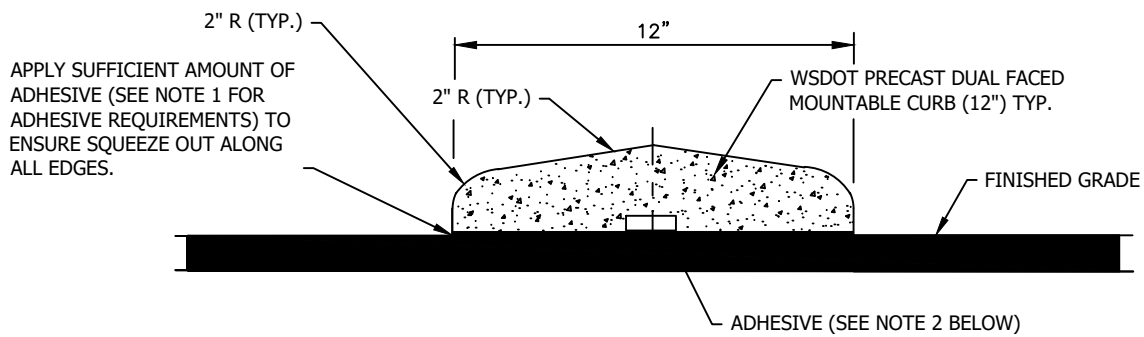
1. THE ADHESIVE SHALL MEET THE REQUIREMENTS OF SECTION 9.26(1) OF THE WSDOT STANDARD SPECIFICATION. USE APPROPRIATE ADHESIVE TYPE FOR EXISTING CONDITIONS.
2. MEDIAN CURB SHALL BE PAINTED. PAINT SHALL MEET SECTION 9.34.2 OF THE WSDOT STANDARD SPECIFICATION.

CITY OF KIRKLAND

PLAN NO. CK-R.19A



MEDIAN CURB



MOUNTABLE MEDIAN CURB  
NOT TO SCALE

NOTES:

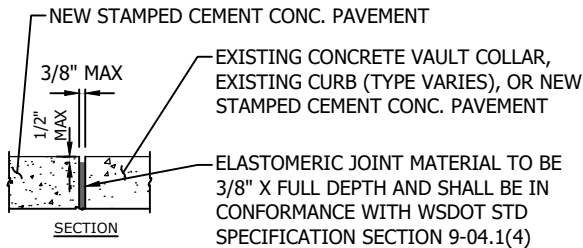
1. THE ADHESIVE SHALL MEET THE REQUIREMENTS OF SECTION 9.26(1) OF THE WSDOT STANDARD SPECIFICATION. USE APPROPRIATE ADHESIVE TYPE FOR EXISTING CONDITIONS.
2. MEDIAN CURB SHALL BE PAINTED. PAINT SHALL MEET SECTION 9.34.2 OF THE WSDOT STANDARD SPECIFICATION.
3. ALL SECTIONS TO BE 5 FOOT LENGTHS.

CITY OF KIRKLAND

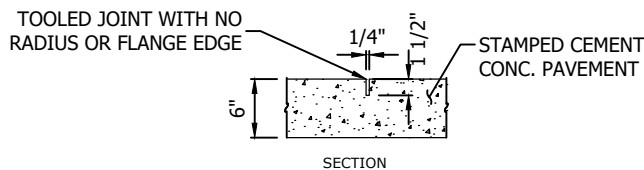
PLAN NO. CK-R.19B



MOUNTABLE  
MEDIAN CURB



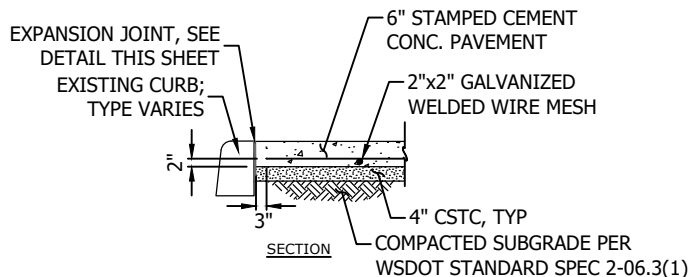
TYPICAL EXPANSION JOINT DETAIL  
NTS



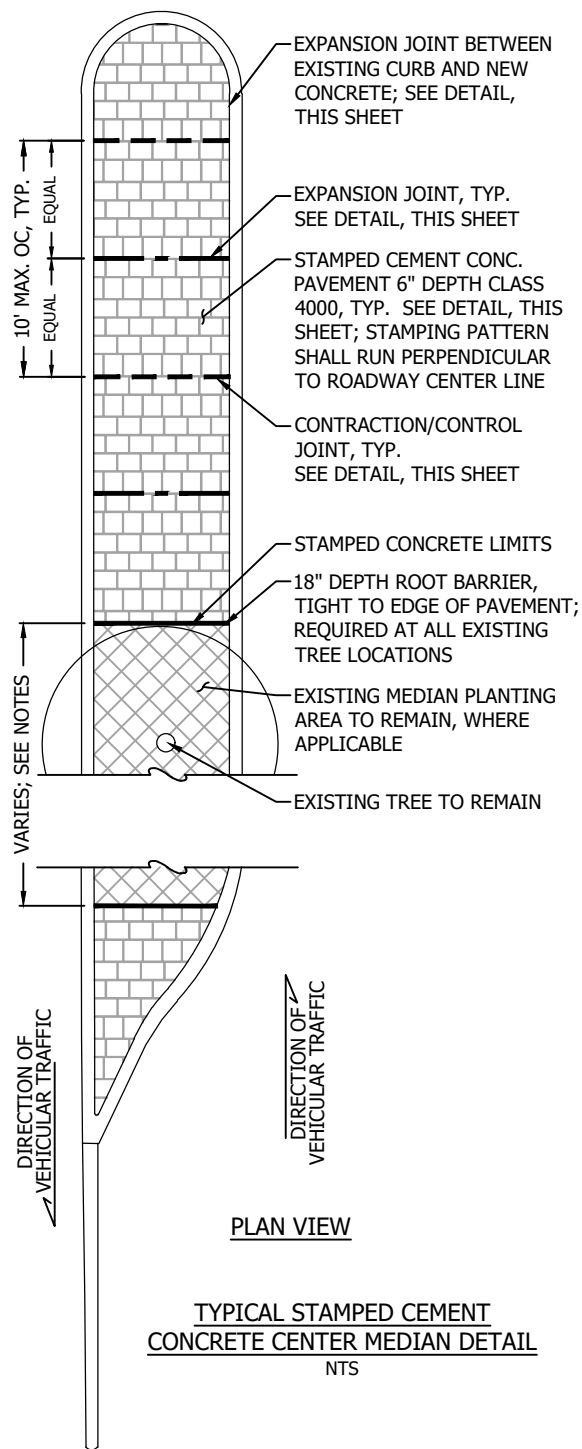
DETAIL NOTES:

1. PROVIDE CONTRACTION/CONTROL JOINTS WHERE SHOWN ON LAYOUT DETAILS.
2. CONTRACTION/CONTROL JOINTS SHALL BE FORMED IN CONFORMANCE WITH WSDOT STD SPECIFICATION SECTION 5-05.3(8)A.

TYPICAL CONTRACTION/CONTROL JOINT DETAIL  
NTS



TYPICAL STAMPED CEMENT CONC. PAVEMENT DETAIL  
NTS



NOTES:

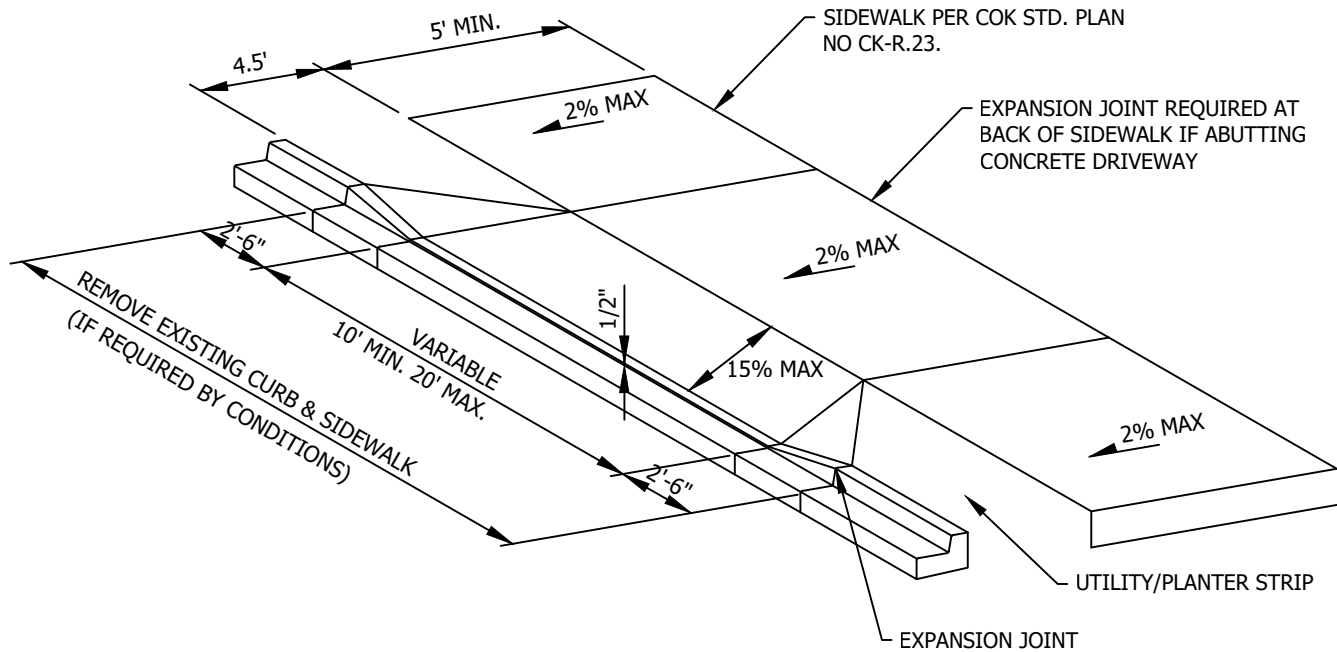
1. CONCRETE STAMPING TOOL FOR STAMPED CEMENT CONC. PAVEMENT SHALL BE 'COBBLESTONE' PATTERN BST5000 TEXTURED MAT AND CHISELED SLATE BST7618 TOUCH UP SKIN FROM BUTTERFIELD COLOR OR APPROVED EQUAL.
2. STAMPED CEMENT CONC. PAVEMENT SHALL RECEIVE ANTIQUING 2. RELEASE AGENT AND SEALER (INCLUDING ADDITIVE) APPLICATION USING BUTTERFIELD COLOR #PT12 PERMA-TIQUE ANTIQUING AGENT - STORM GRAY AND BUTTERFIELD COLOR CLEAR-GUARD CURE & SEAL OR APPROVED EQUAL.
3. STAMPED CEMENT CONC. PATTERN, COLOR, AND LAYOUT SHALL BE APPROVED BY CITY PRIOR TO INSTALLATION.
4. CONTRACTION/CONTROL AND EXPANSION JOINTS SHALL BE 10 FEET MAX. 4. O.C., SEE DETAIL THIS SHEET.
5. WHERE APPLICABLE, LENGTH OF PLANTER AREA VARIES BASED ON 5. DRIPLINE OF EXISTING TREE(S) TO REMAIN AND PRESENCE OF SURFACE ROOTS; LIMITS SHALL BE APPROVED BY THE CITY PRIOR TO INSTALLATION.

CITY OF KIRKLAND

PLAN NO. CK - R.20



TYPICAL STAMPED  
CEMENT CONCRETE  
CENTER MEDIAN DETAIL



SINGLE FAMILY DRIVEWAY WITH PLANTER STRIP

NOTES:

1. ALL DRIVEWAYS AND WHEEL CHAIR RAMPS MUST BE DESIGNED TO MEET ADA STANDARDS. USE WSDOT STANDARD PLANS FOR LAYOUTS NOT SHOWN ON THIS PLAN WITH CLASS 4,000PSI CONCRETE FOR ALL STANDARD PLANS.

[WWW.WSDOT.WA.GOV/DESIGN/STANDARDS/PLANS.HTM](http://WWW.WSDOT.WA.GOV/DESIGN/STANDARDS/PLANS.HTM)

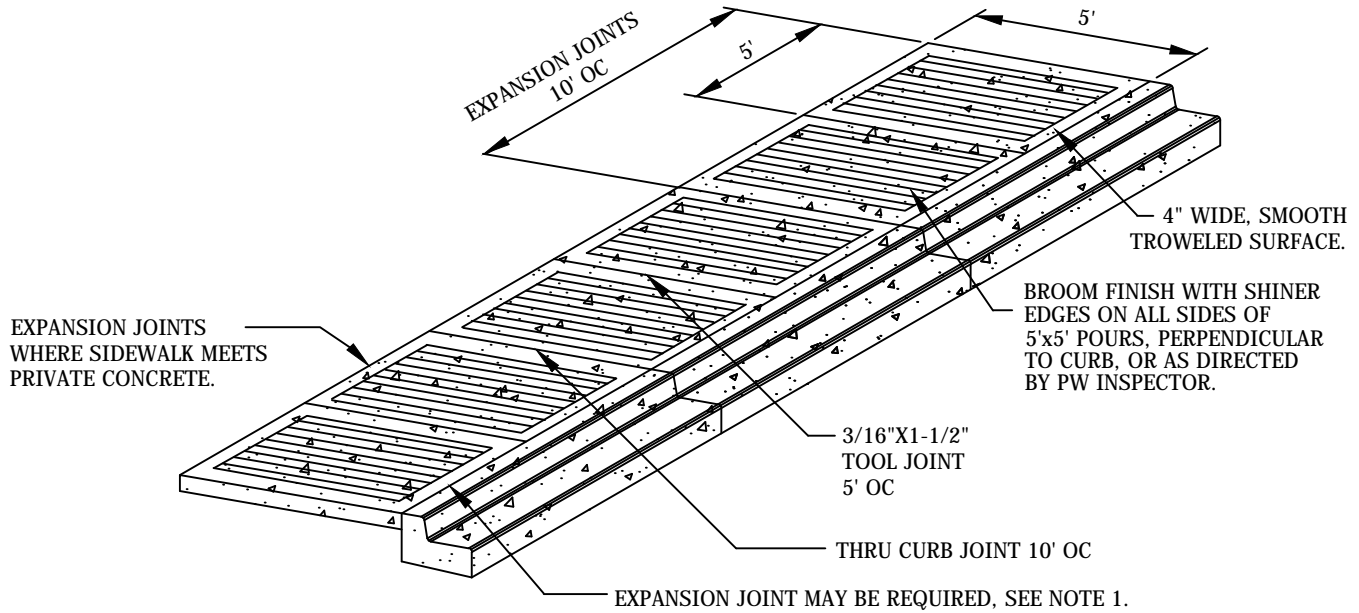
2. LANDING SHALL BE A MINIMUM OF 5' BY 5'.
3. EXPANSION JOINT SPACING NOT TO EXCEED 10'.

CITY OF KIRKLAND

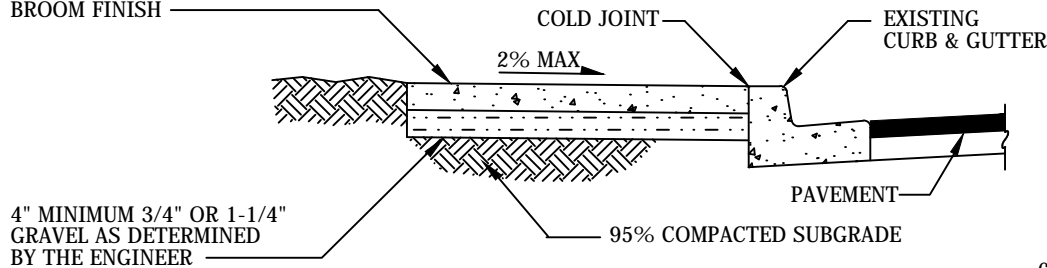
PLAN NO. CK-R.21



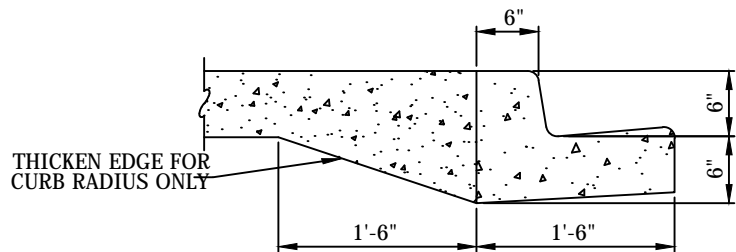
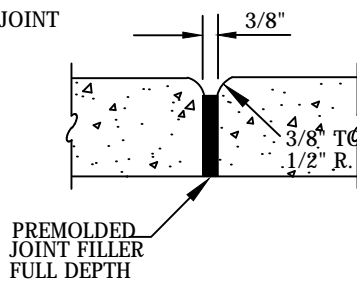
DRIVEWAYS AND  
WHEEL CHAIR RAMPS



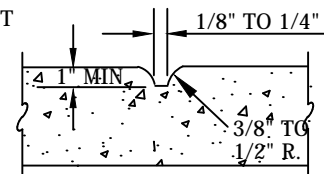
5' WIDE CONCRETE SIDEWALK  
4" MIN THICKNESS (6" AT DRIVEWAYS)  
BROOM FINISH



EXPANSION JOINT



CONTRACTION JOINT



**NOTES:**

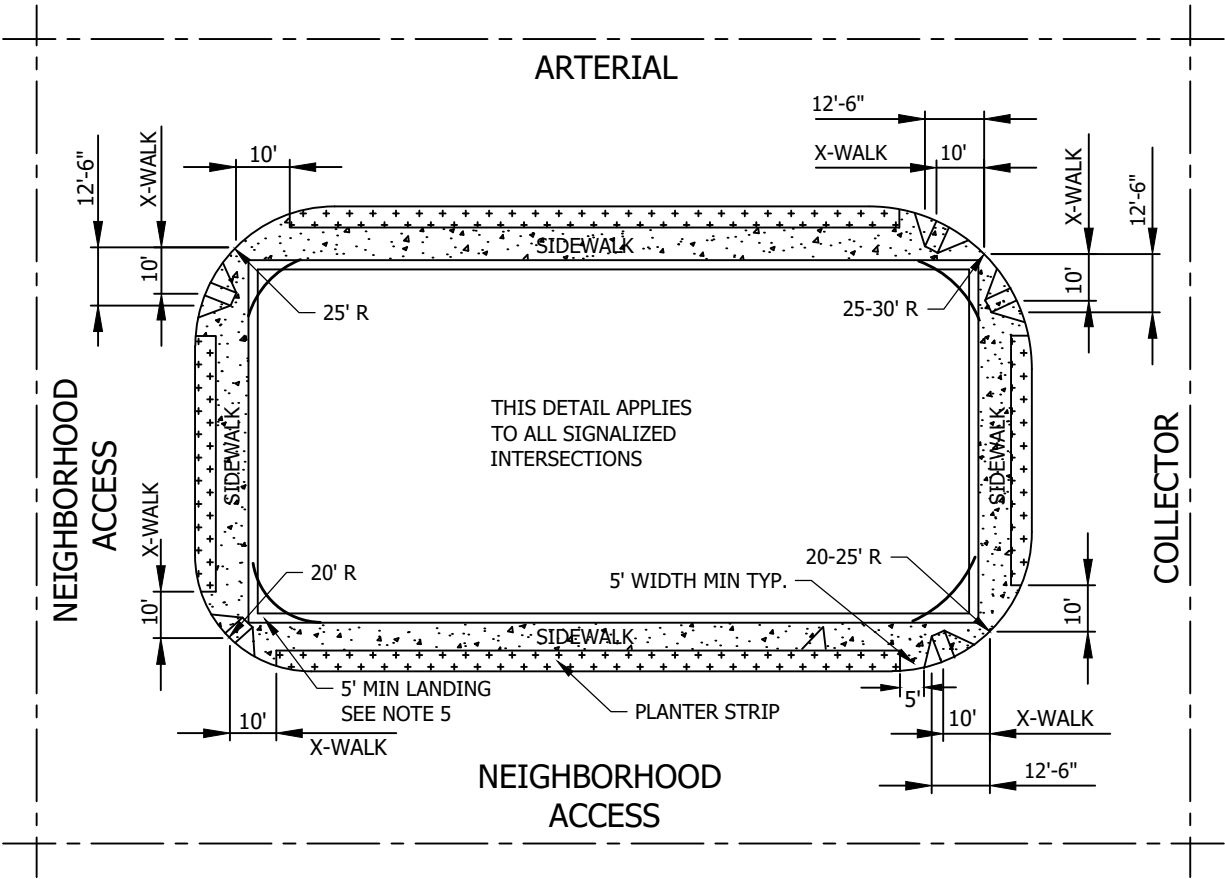
1. SIDEWALK AND CURB & GUTTER CANNOT BE POURED MONOLITHICALLY. EXPANSION JOINT WILL BE REQUIRED WHEN CONCRETE SIDEWALK IS SURROUNDED BY OTHER HARD SURFACES (E.G., DRIVEWAY); OR AS DIRECTED BY PW INSPECTOR.
2. CONCRETE SHALL BE CEMENT CONCRETE CLASS 4000 PSI MINIMUM, WITH AIR ENTRAINMENT. NO COLOR OR TINT SHALL BE ADDED.
3. FORMS SHALL BE SET TRUE TO LINE AND GRADE AND SHALL BE STEEL UNLESS OTHERWISE APPROVED BY INSPECTOR.
4. SIDEWALK SHALL NOT BE POURED IN THE RAIN. SEE POLICY R-8, PLACING CONCRETE OR ASPHALT IN ADVERSE WEATHER CONDITIONS.

CITY OF KIRKLAND

PLAN NO. CK- R.23



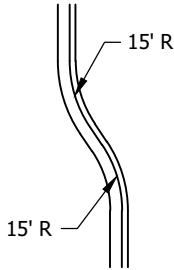
SIDEWALK  
SECTION



NOTES:

1. STORM DRAINAGE INLETS SHALL BE OUTSIDE THE CURB RAMP.
2. THE CURB RAMP MAY BE MOVED AWAY FROM THE CROSSWALK TO AVOID CONFLICTS WITH HYDRANTS, POLES, INLETS OR OTHER UTILITIES, EXCEPT WHERE THE STREET GRADE EXCEEDS 4%.
3. FOR SWEEPING EFFICIENCY WHEN CURB BULBS (PARKING SETBACKS) ARE USED, REVERSE CURVE RADII SHALL NOT BE LESS THAN 15 FEET. REFER TO DETAIL A.
4. FOR STAKING PURPOSES, RAMPS MAY BE LOCATED PER QUARTER DELTA AND PUBLIC WORKS APPROVAL.
5. CURB RADIUS SHALL BE AS SHOWN IN TABLE ABOVE. EXCEPTIONS CAN BE MADE FOR SPECIFIC LAND USE CONTEXTS, SUCH AS INTERSECTIONS ALONG TRANSIT ROUTES, HIGH-FREIGHT CORRIDORS, LOADING DOCKS, ETC., ON A CASE-BY-CASE BASIS. EXCEPTIONS MUST BE REVIEWED AND APPROVED BY CITY TRANSPORTATION DIVISION STAFF. SEE NOTE 6 FOR SPECIFIC REQUIREMENTS.
6. THE DEFAULT DESIGN VEHICLE FOR TURNING MOVEMENTS AT INTERSECTIONS SHALL BE A SINGLE-UNIT BOX TRUCK SU-30 FOR MOST CASES, UNLESS ON A TRANSIT OR FREIGHT ROUTE, AS DEFINED BY PUBLIC WORKS. USE OF A SWEEP-PATH ANALYSIS SOFTWARE (AUTOTURN OR SIMILAR) IS PREFERRED. A WB-67 SHALL BE ACCOMMODATED WITHIN ALL ARTERIAL INTERSECTIONS. AN SU-30 SHALL BE ACCOMMODATED AT ALL INTERSECTIONS, INCLUDING LOCAL OR NEIGHBORHOOD ACCESS STREETS. "ACCOMMODATING" FOR A VEHICLE ALLOWS ENCROACHMENT OF OTHER LANES IN THE SAME DIRECTION OF TRAVEL TO COMPLETE THE REQUIRED MANEUVER. NO ENCROACHMENT IS ALLOWED INTO OPPOSING OR ONCOMING TRAFFIC LANES. COORDINATE WITH CITY TRANSPORTATION DIVISION STAFF FOR LOCATION-SPECIFIC INQUIRIES AND DETAILS.


CURB RADIUS AT INTERSECTIONS			
	ARTERIAL	COLLECTOR	NEIGHBORHOOD ACCESS
ARTERIAL	30 Ft	25 - 30 ft	25 ft
COLLECTOR	X	25 - 30 ft	20 - 25 ft
NEIGHBORHOOD ACCESS	X	X	20 ft



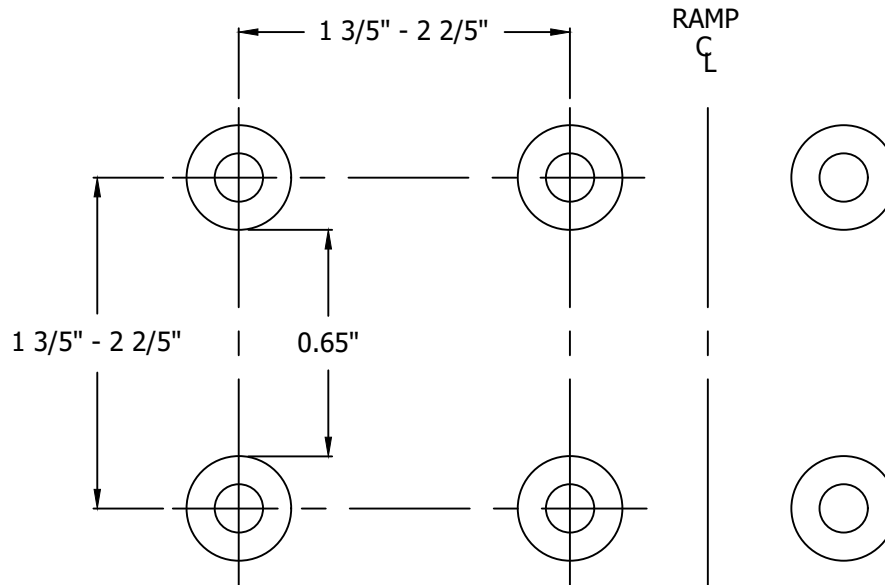
DETAIL A - MINIMUM RADIUS FOR CURB BULB/PARKING SETBACK

CITY OF KIRKLAND

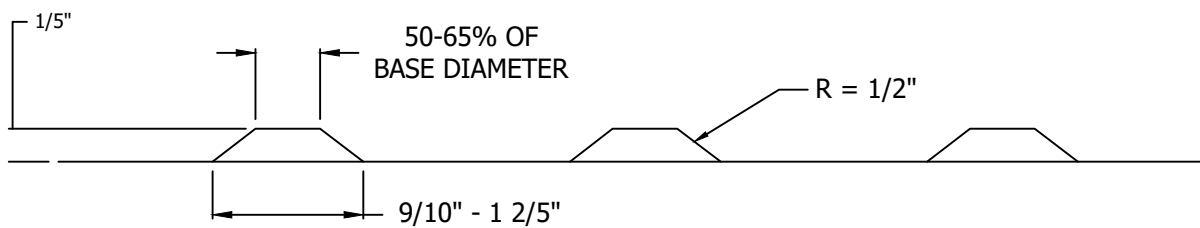
PLAN NO. CK- R.24

CITY OF KIRKLAND  
WASHINGTON

CURB RADIUS  
STANDARDS & CURB  
RAMP LOCATIONS



PLAN



ELEVATION

NOTE:

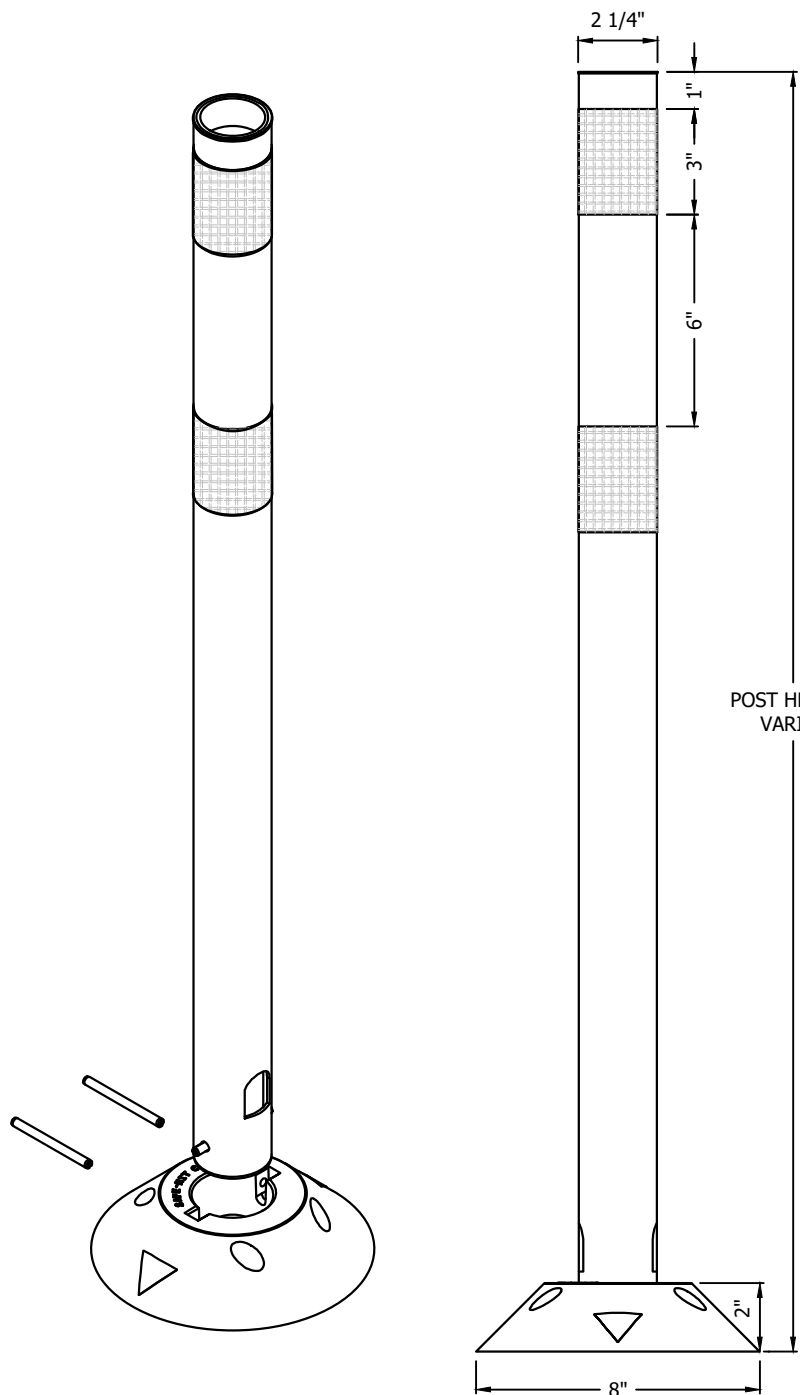
1. THE DETECTABLE WARNING PATTERN SHALL BE FORMED BY ADDING A MANUFACTURED MATERIAL BEFORE THE CONCRETE HAS CURED.
2. THE TWO-FOOT WIDE DETECTABLE WARNING PATTERN AREA ON THE RAMP SHALL BE YELLOW AND SHALL MATCH THE COLOR OF "STANDARD INTERSTATE YELLOW" PAINT AS SPECIFIED IN FORMULA K-2-83.
3. EMBOSSING THE WET CONCRETE OR INSTALLING MASONRY OF CERAMIC TILES MUST BE APPROVED BY CITY ENGINEER.

**CITY OF KIRKLAND**

**PLAN NO. CK - R.25B**



**TRUNCATED DOME  
TEXTILE WARNING  
SURFACE**




POST HEIGHT VARIES WITH TWO  
3-INCH WIDE SILVER HIGH  
INTENSITY FLEXIBLE PRISMATIC  
REFLECTIVE BANDS, WITH BLACK  
PIN-LOCK SURFACE MOUNT BASE

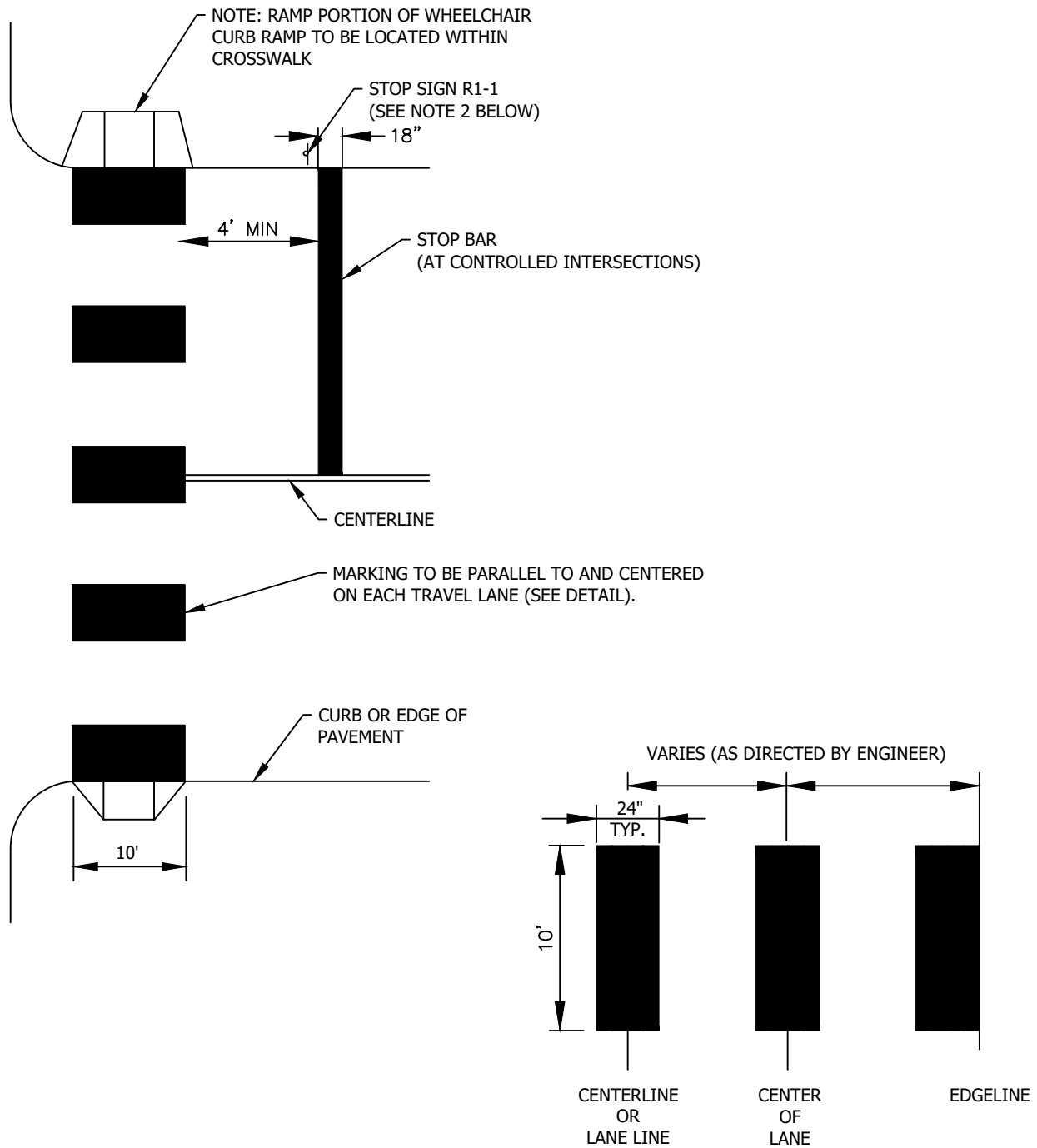
NOTES:

- 1. INSTALL ACCORDING TO  
MANUFACTURER'S SPECIFICATION.
- 2. USE ADHESIVE ACCORDING TO  
MANUFACTURER'S SPECIFICATIONS.
- 3. COLOR AND HEIGHT ACCORDING TO  
ENGINEER'S SPECIFICATION

POST HEIGHT  
VARIES

CITY OF KIRKLAND	
PLAN NO. CK - R.26	
	TYPE 5 FLEXIBLE DELINEATOR SURFACE MOUNT





DETAIL

**NOTES:**

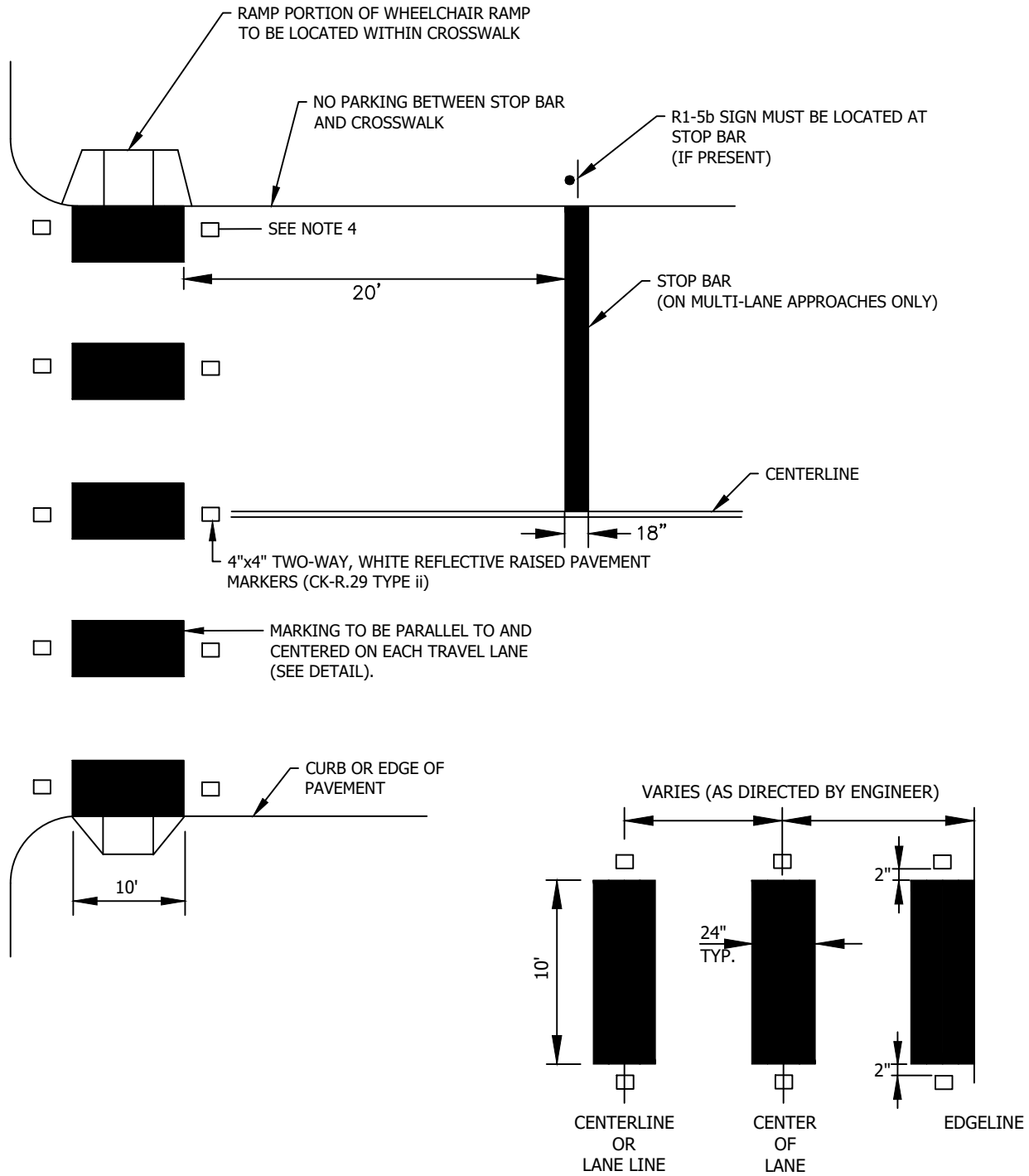
1. MARKINGS SHALL BE THERMOPLASTIC.
2. STOP SIGN LOCATION ADJACENT TO STOP BAR, OR AS DIRECTED BY ENGINEER

CITY OF KIRKLAND

PLAN NO. CK-R.28



CROSSWALK AND  
STOP BAR DETAIL



DETAIL

**NOTES:**

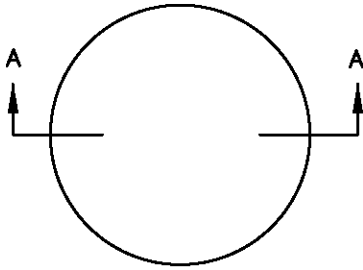
1. MARKINGS SHALL BE THERMOPLASTIC.
2. FOR TWO-WAY REFLECTIVE RAISED PAVEMENT MARKERS, SEE PLAN NO. CK-R.29 TYPE 2.
3. DO NOT PLACE RPM IN BIKE LANE OR ON EDGE LINES.

CITY OF KIRKLAND

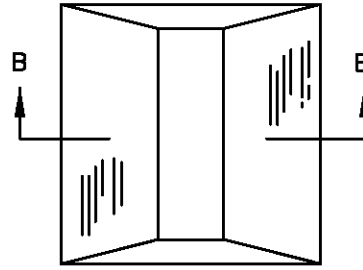
PLAN NO. CK-R.28A



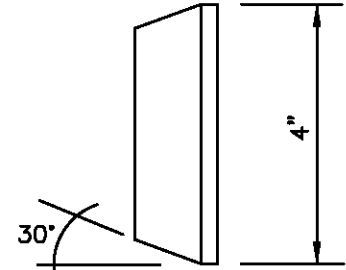
CROSSWALK AND STOP BAR  
DETAIL FOR UNCONTROLLED  
APPROACHES



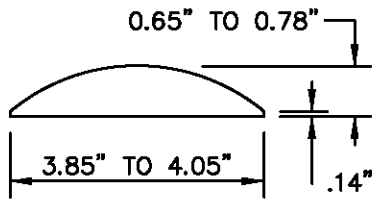
PLAN



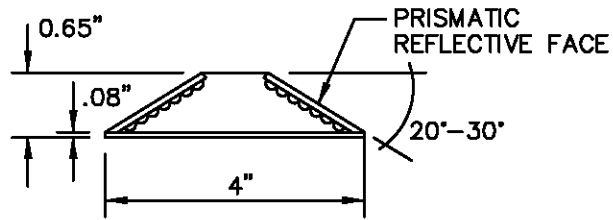
PLAN  
DIRECTION OF TRAFFIC



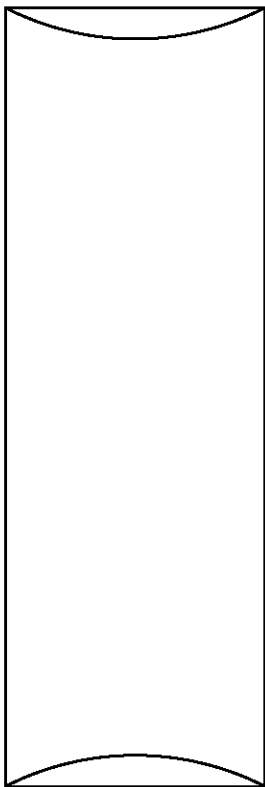
SIDE VIEW



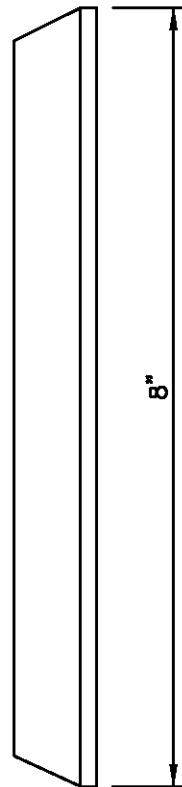
TYPE 1  
SECTION A-A



TYPE 2  
SECTION B-B



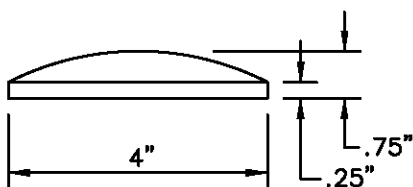
PLAN



SIDE VIEW

### NOTES

1. TYPE C PAVEMENT MARKERS TO BE USED ONLY UPON APPROVAL BY TRAFFIC ENGINEER.
2. NOT TO BE USED ON EDGELINES.



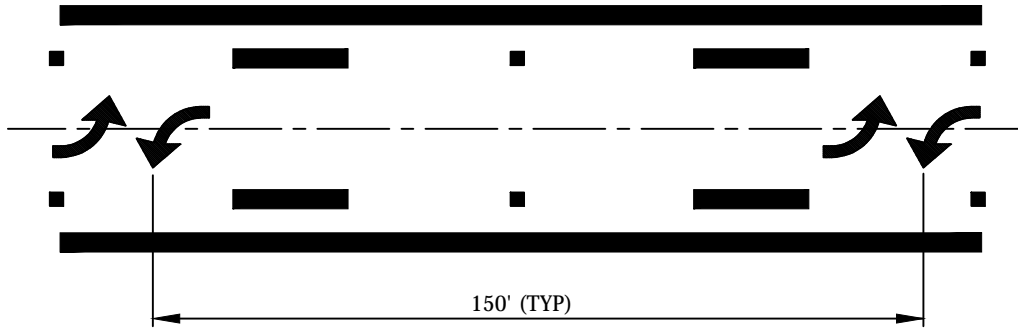
TYPE C

CITY OF KIRKLAND

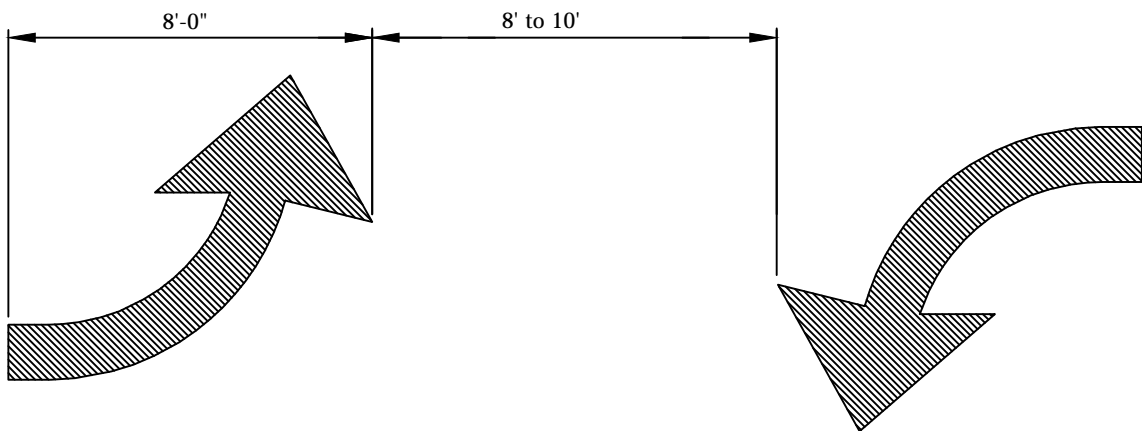
PLAN NO. CK-R.29



LANE MARKERS  
(DIMENSIONS)



## TWO-WAY LEFT TURN MARKERS



## TYPICAL ARROW

### NOTES

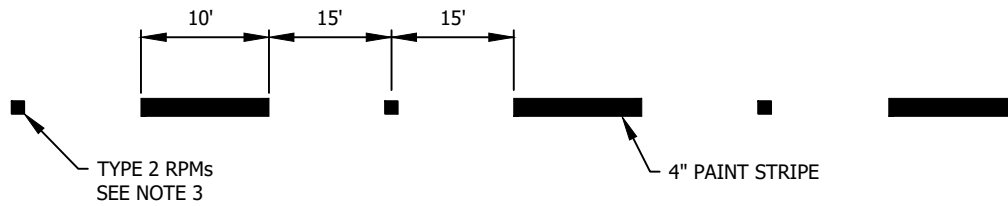
1. THERMOPLASTIC REQUIRED

**CITY OF KIRKLAND**

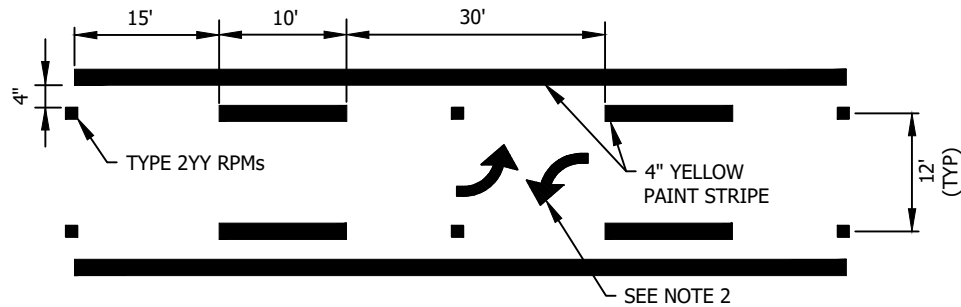
PLAN NO. CK- R.30



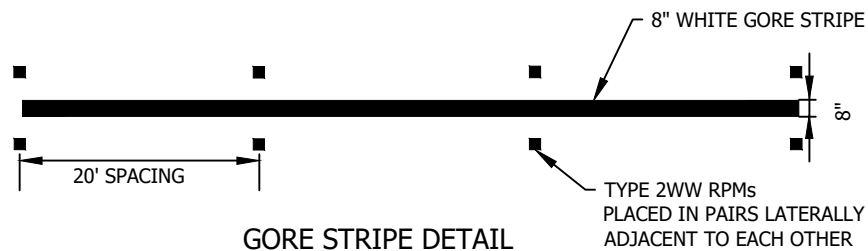
**TWO-WAY LEFT  
TURN LANE AND  
TYPICAL ARROW**



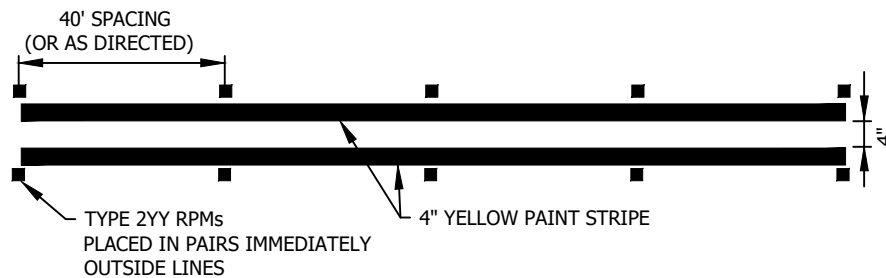
SKIP CENTER & LANE STRIPE DETAIL



TWO-WAY LEFT TURN DETAIL



GORE STRIPE DETAIL



DOUBLE YELLOW CENTER DETAIL

NOTES:

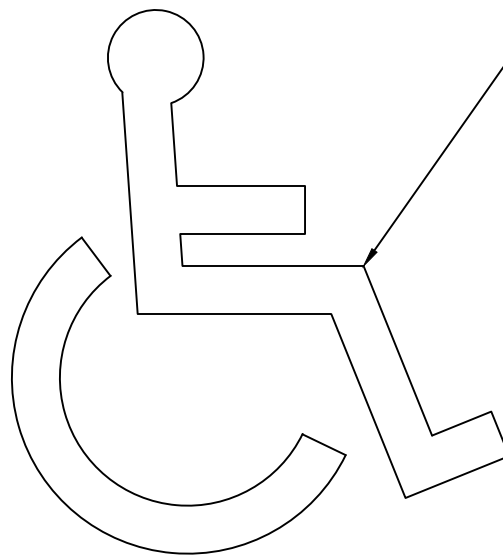
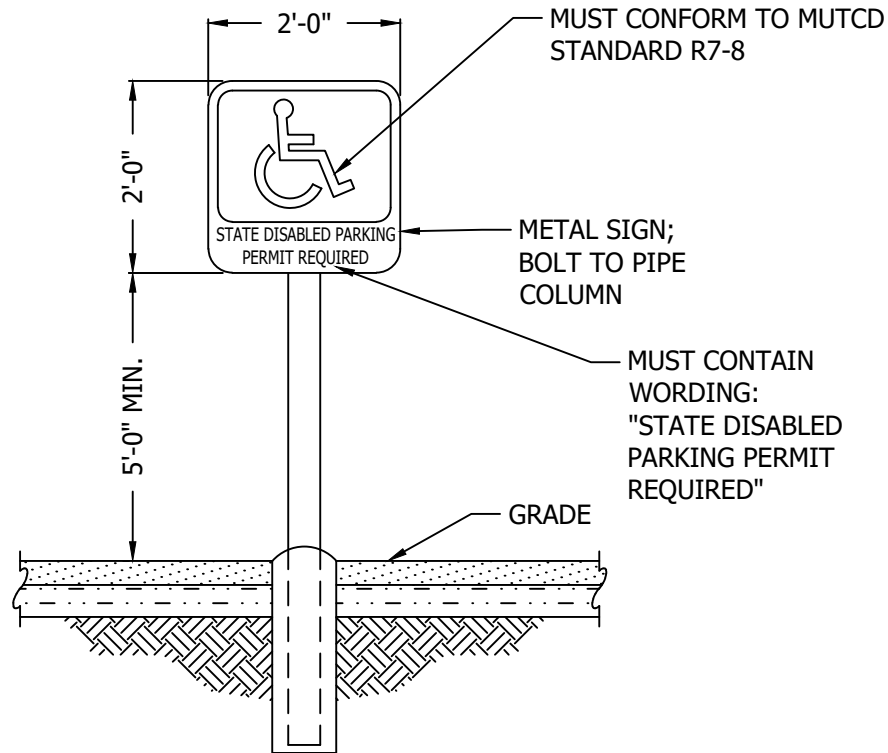
1. MATCH EXISTING PAVEMENT MARKING DIMENSIONS.
2. SEE CK-R.30 FOR TWO-WAY LEFT TURN ARROW PLACEMENT.
3. RAISED PAVEMENT MARKER BODY AND LENS COLOR SHALL CONFORM TO THE COLOR OF THE MARKING FOR WHICH THEY SUPPLEMENT, SUBSTITUTE FOR, OR SERVE AS A POSITIONING GUIDE FOR.

CITY OF KIRKLAND

PLAN NO. CK-R.31



PAVEMENT  
MARKING DETAIL

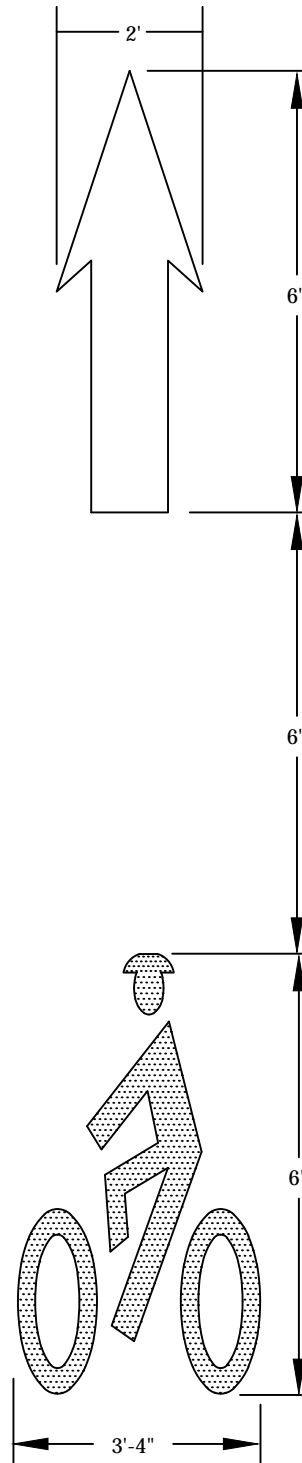


REFER TO WSDOT STANDARD PLAN M-24.60-04 FOR REQUIRED DIMENSIONS. ACCESS PARKING SPACE SYMBOL SHALL BE "STANDARD" SIZE WITH BLUE BACKGROUND AND WHITE BORDER. NOTE THAT THE "MINIMUM" SIZE CANNOT BE USED UNLESS EXPRESSLY REQUIRED OR APPROVED BY THE CITY.

**NOTES:**

1. PROVIDE SYMBOL IN ALL HANDICAPPED PARKING STALLS INDICATED ON SITE PLAN.
2. PROVIDE SIGN AT ALL HANDICAPPED PARKING STALL INDICATED ON SITE PLAN.
3. SEE STANDARD DETAIL CK-R.43 FOR SIGN INSTALLATION.
4. MATERIAL SHALL BE EITHER 90 MIL. PREFORMED THERMOPLASTIC OR METHYL METHACRYLATE (MMA).

CITY OF KIRKLAND	
PLAN NO. CK - R.33	
	HANDICAP SIGN & MARKING



NOTES:

1. BIKE LANE SYMBOLS AND ARROW MATERIAL SHALL BE 90 MILL, PREFORMED, SKID RESISTANT THERMOPLASTIC.
2. BICYCLE SYMBOL FACES ROADWAY CENTERLINE.

CITY OF KIRKLAND

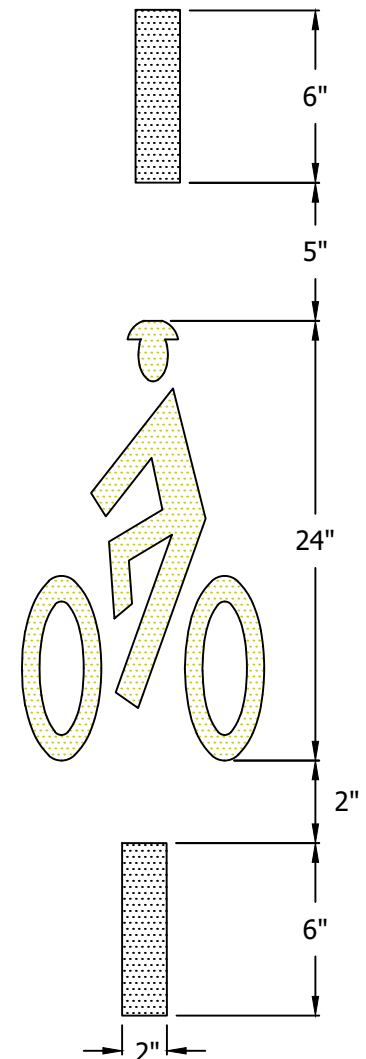
PLAN NO. CK-R.34



BICYCLE LANE  
MARKINGS

NOTES:

1. INSTALL MARKING AT SIGNALIZED INTERSECTIONS TO INDICATE WHERE BICYCLES SHOULD STOP IN ORDER TO ACHIEVE REGULAR AND RELIABLE DETECTION BY SIGNAL EQUIPMENT.
2. USE MARKING ON ANY APPROACH TO A SIGNALIZED INTERSECTION WHERE LOOP DETECTORS SPECIFICALLY FOR BICYCLES ARE NOT PRESENT AND ANY APPROACH WHICH IS SHOWN A GREEN INDICATION ONLY WHEN VEHICLE LOOPS ARE ACTUATED, I.E. THE APPROACH IS NOT ON "RECALL" OPERATION.
3. PLACE MARKING SUCH THAT BICYCLES WHICH STOP OVER THE MARKINGS WILL ACTIVATE THE SIGNAL.
4. PLACE THE MARKING TO ALLOW BICYCLES GOING THROUGH, TURNING RIGHT, OR TURNING LEFT TO ACTIVATE THE SIGNAL.
5. MARKINGS ARE NOT NECESSARY IN EXCLUSIVE LEFT TURN LANES OF APPROACHES THAT ARE OPERATED BOTH (1) ON RECALL AND (2) IN PERMISSIVE ONLY MODE.
6. IF AN APPROACH HAS MULTIPLE LANES SERVING THROUGH MOVEMENTS AND/OR MULTIPLE LANES SERVING THE SAME TURNING MOVEMENT, ONLY THE RIGHTMOST OF SUCH MULTIPLE LANE GROUPS SHALL BE MARKED.
7. WHERE MULTIPLE LOOPS ARE PRESENT IN A SINGLE LANE, MARKINGS SHALL BE PLACED AS CLOSE TO THE STOP BAR AS POSSIBLE.
8. IN GENERAL, MARKINGS SHALL BE PLACED OVER THE RIGHT EDGES OF SQUARE LOOPS OR CONGRUENT WITH A LINE TANGENT TO THE RIGHTMOST POINT ON THE EDGE OF A CIRCULAR LOOP.
9. IN GENERAL, BICYCLE MARKINGS ARE NOT NEEDED ON APPROACHES WHERE VIDEO DETECTION IS IN PLACE, AS LONG AS BICYCLES CAN BE DETECTED REGULARLY AND RELIABLY BY STOPPING AT THE STOP BAR IN THE MIDDLE OF THE LANE.
10. MATERIAL SHALL BE 90 MIL. PREFORMED, SKID RESISTANT THERMOPLASTIC.
11. SEE ALSO 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES SECTION 9C.05; RCW 46.61.710; 2004 STANDARD HIGHWAY SIGNS PAGE 10-17.



BICYCLE DETECTION MARKING DETAIL  
NOT TO SCALE

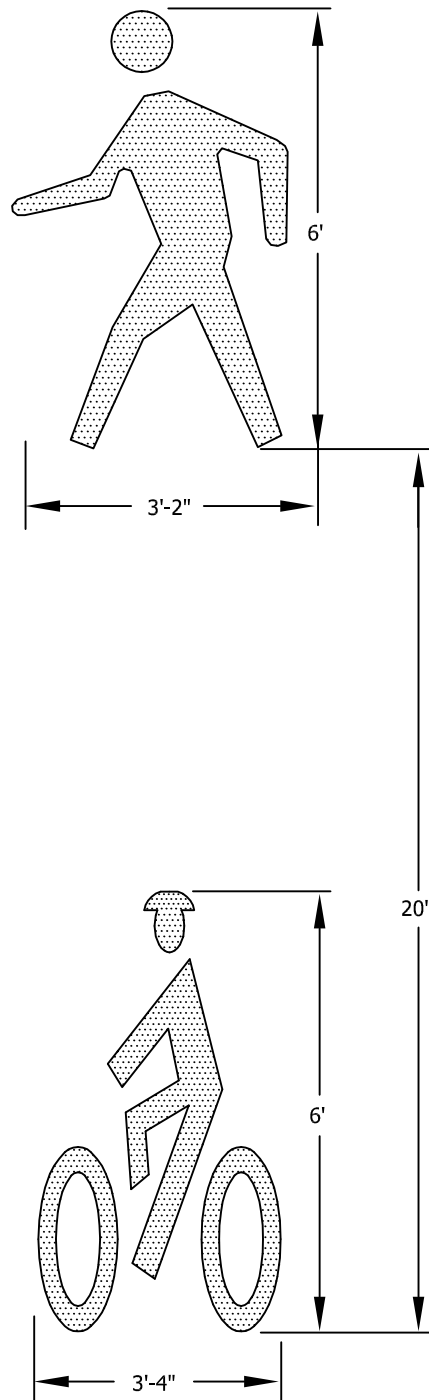
CITY OF KIRKLAND

PLAN NO. CK - R.34A



BICYCLE  
DETECTION  
MARKING





NOTES:

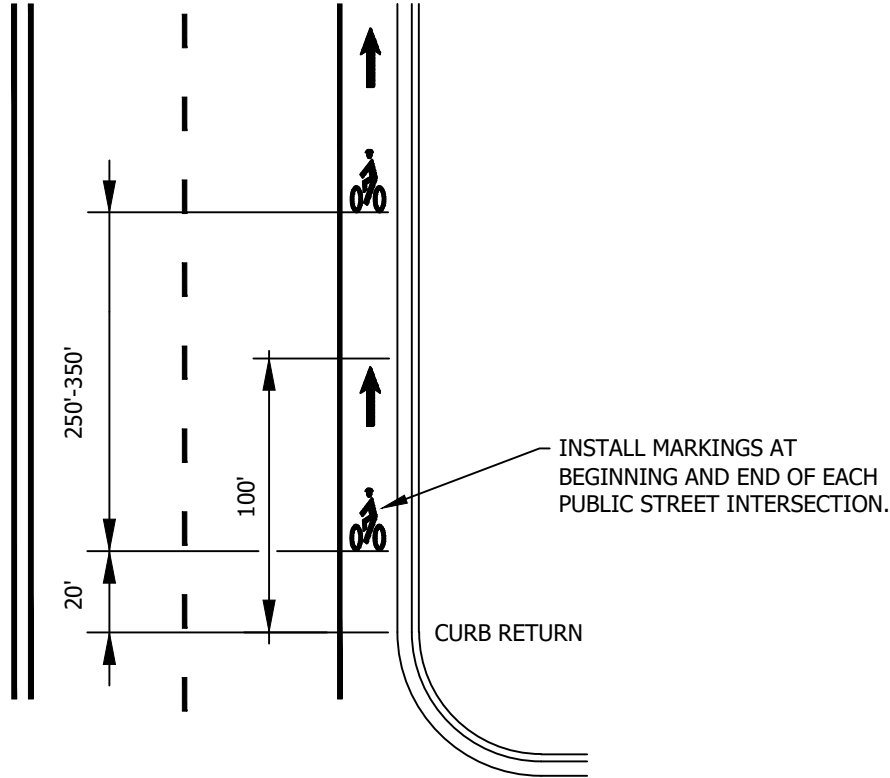
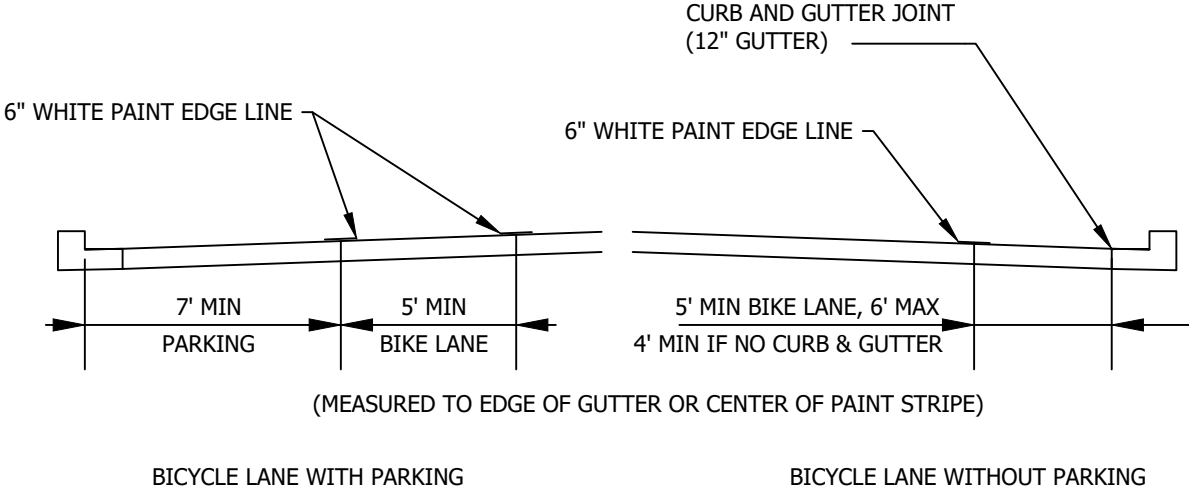
1. BIKE AND PEDESTRIAN LANE SYMBOLS MATERIAL SHALL BE 90 MILL, PERFORMED, SKID RESISTANT THERMOPLASTIC.
2. BICYCLE AND PEDESTRIAN SYMBOLS FACES ROADWAY CENTERLINE.

CITY OF KIRKLAND

PLAN NO. CK-R.34B




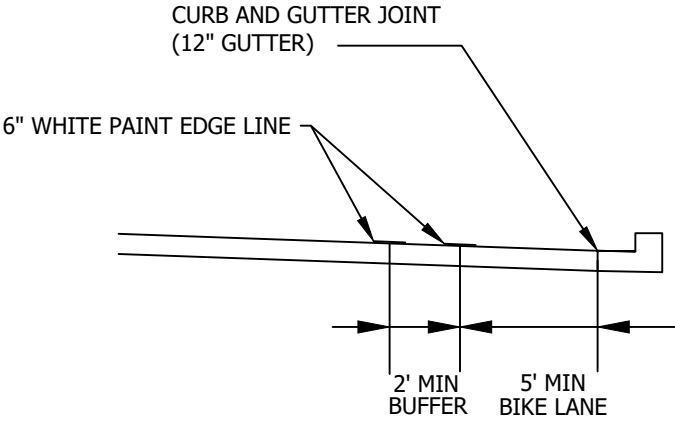
BICYCLE AND  
PEDESTRIAN LANE  
MARKINGS



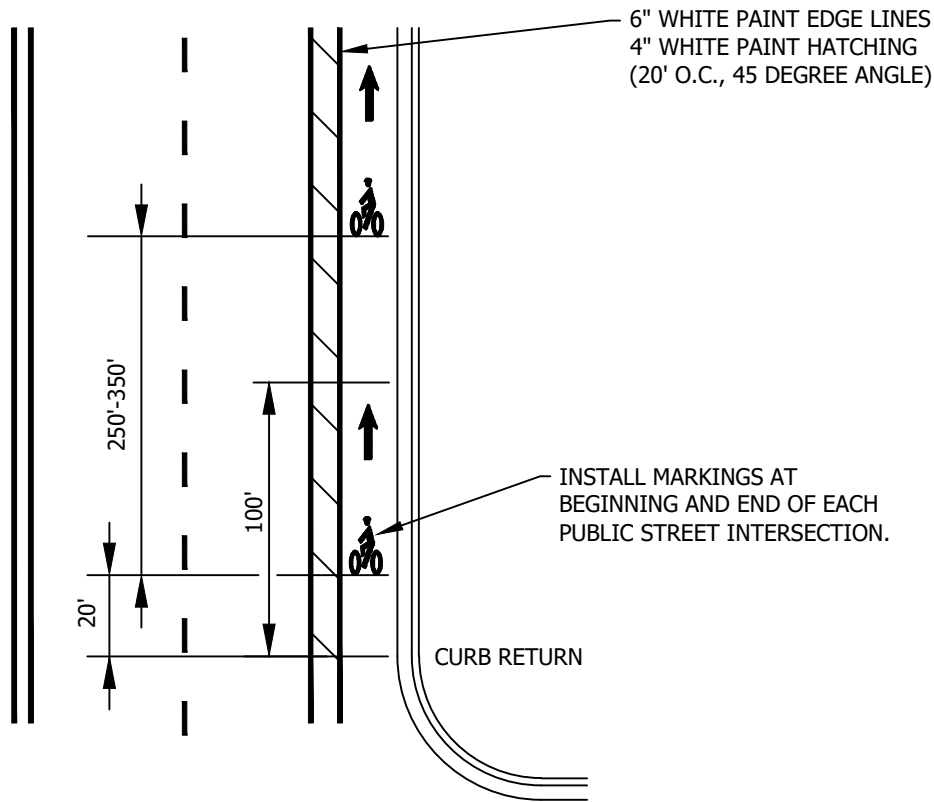
NOTES:

1. SEE MUTCD FOR MORE INFORMATION AND SPECIFICATIONS.
2. PER SEC. 9B.04 2009 MUTCD, DO NOT USE R3-17 SIGNS.
3. BICYCLIST AND PEDESTRIAN SYMBOLS PER CK-R.34B
4. 4' BIKE LANE WIDTH MAY BE CONSIDERED IN CONSTRAINED LOCATIONS.

CITY OF KIRKLAND	
PLAN NO. CK- R.35	
	TYPICAL BICYCLE LANE - WIDTH, SIGNING & MARKING




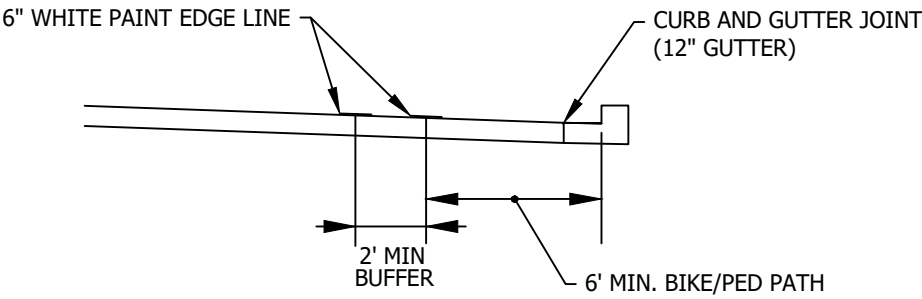
BUFFERED BICYCLE PEDESTRIAN LANE WITHOUT PARKING  
(MEASURED TO EDGE OF GUTTER OR CENTER OF PAINT STRIPE)



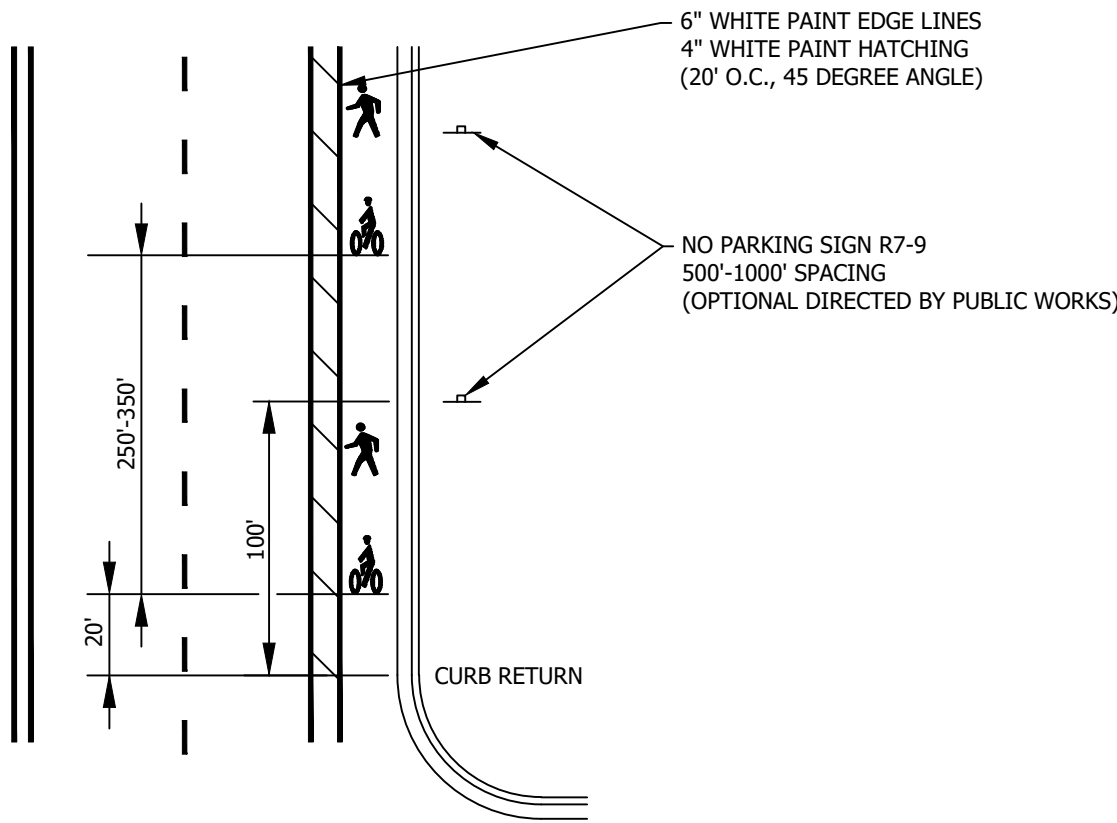
NOTES:

1. SEE MUTCD FOR MORE INFORMATION AND SPECIFICATIONS.
2. PER SEC. 9B.04 2009 MUTCD, DO NOT USE R3-17 SIGNS.
3. BICYCLIST AND PEDESTRIAN SYMBOLS PER CK-R.34.
4. 4' BIKE LANE WIDTH MAY BE CONSIDERED IN CONSTRAINED LOCATIONS.

CITY OF KIRKLAND	
PLAN NO. CK-R.35A	
	TYPICAL BUFFERED BICYCLE LANE - WIDTH, SIGNING & MARKING




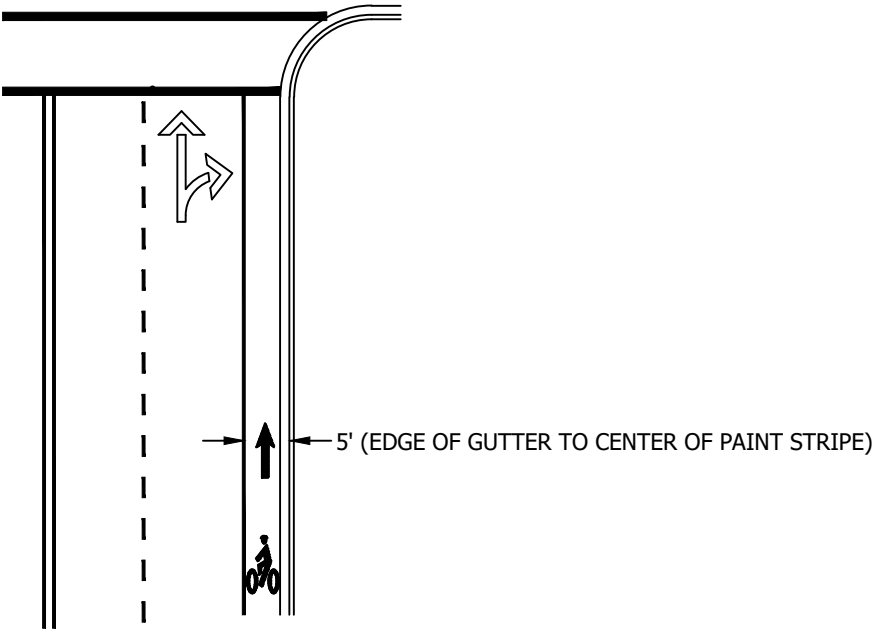
BUFFERED BICYCLE / PEDESTRIAN PATH WITHOUT PARKING  
(MEASURED TO FACE OF CURB OR CENTER OF PAINT STRIPE)



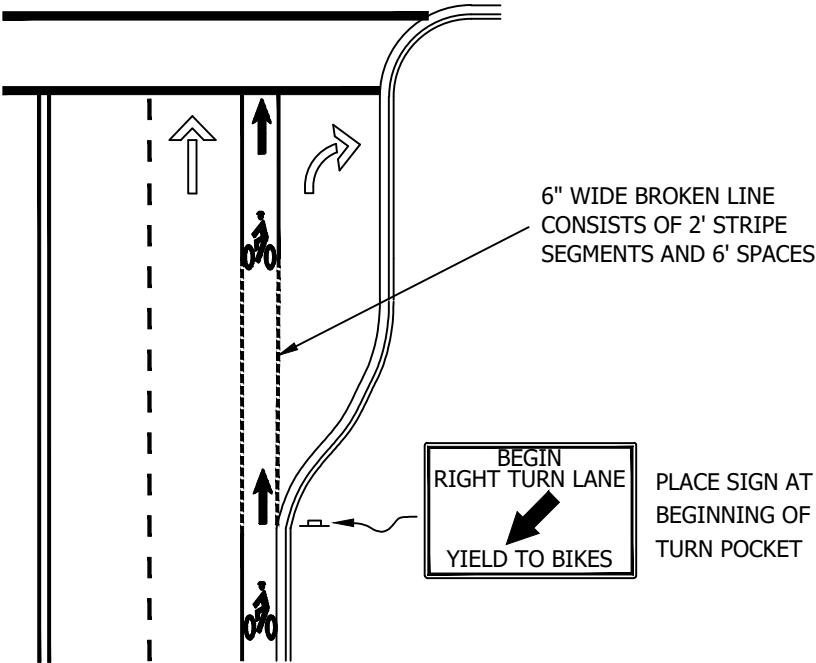
NOTES:

1. SEE MUTCD FOR MORE INFORMATION AND SPECIFICATIONS.
2. PER SEC. 9B.04 2009 MUTCD, DO NOT USE R3-17 SIGNS.
3. BICYCLIST AND PEDESTRIAN SYMBOLS PER CK-R.34B

CITY OF KIRKLAND	
PLAN NO. CK- R.35B	
	TYPICAL ON-STREET BUFFERED BICYCLE/ PEDESTRIAN SHARED PATH




TYPICAL RIGHT-THROUGH LANE  
(BICYCLE LANE CONTINUES THROUGH INTERSECTION)

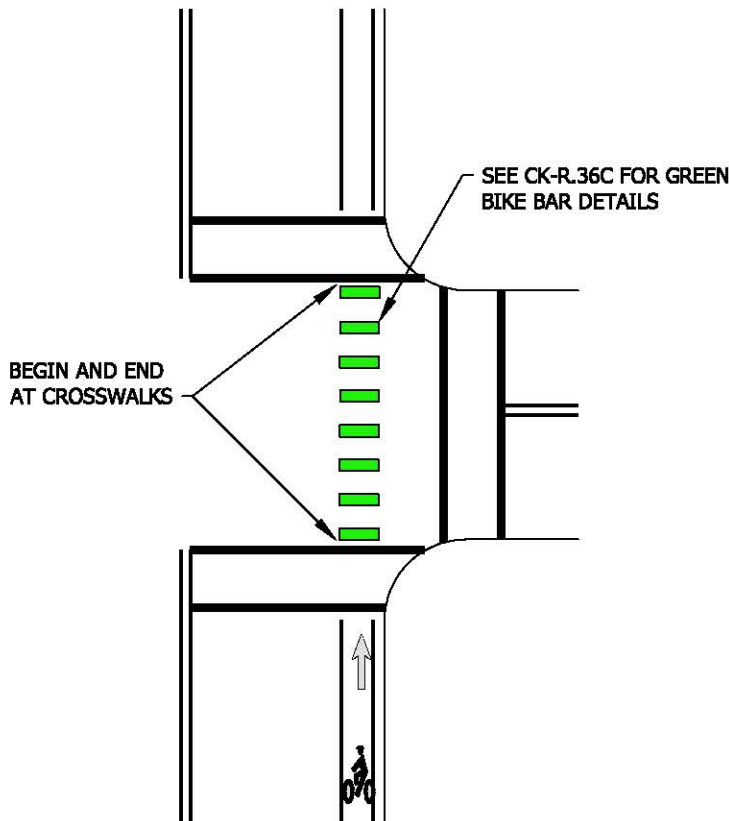


TYPICAL RIGHT TURN POCKET  
(BICYCLE LANE CONTINUES THROUGH INTERSECTION)

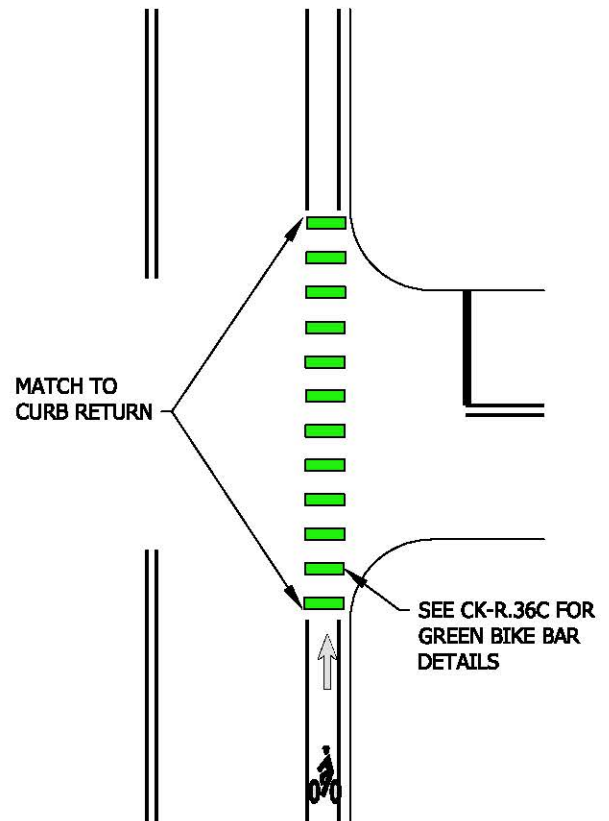
NOTE:

SEE MUTCD FOR MORE INFORMATION AND SPECIFICATIONS.  
RIGHT TURN POCKETS WITH HIGH RIGHT TURN VEHICLE VOLUMES OR LOCATED ON PRIORITY BICYCLE CORRIDORS SHALL BE 90 MIL, PREFORMED, SKID-RESISTANT GREEN THERMOPLASTIC or MMA BETWEEN BROKEN LINES, REFER TO CK-R.36A FOR DETAILS.

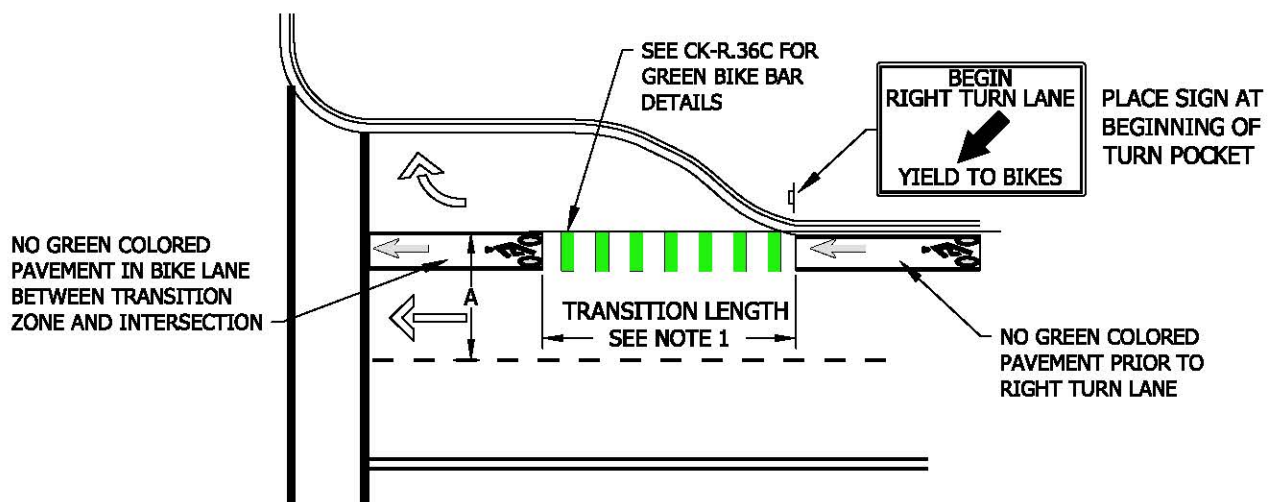
CITY OF KIRKLAND	
PLAN NO. CK– R.36	
	TYPICAL BICYCLE LANE TREATMENTS AT INTERSECTION



**TYPICAL TREATMENT THROUGH INTERSECTION WITH CROSSWALKS**



**TYPICAL TREATMENT THROUGH INTERSECTION WITHOUT CROSSWALKS**



**TYPICAL TREATMENT AT A RIGHT TURN POCKET (BICYCLE LANE CONTINUES THROUGH INTERSECTION)**

**NOTES:**

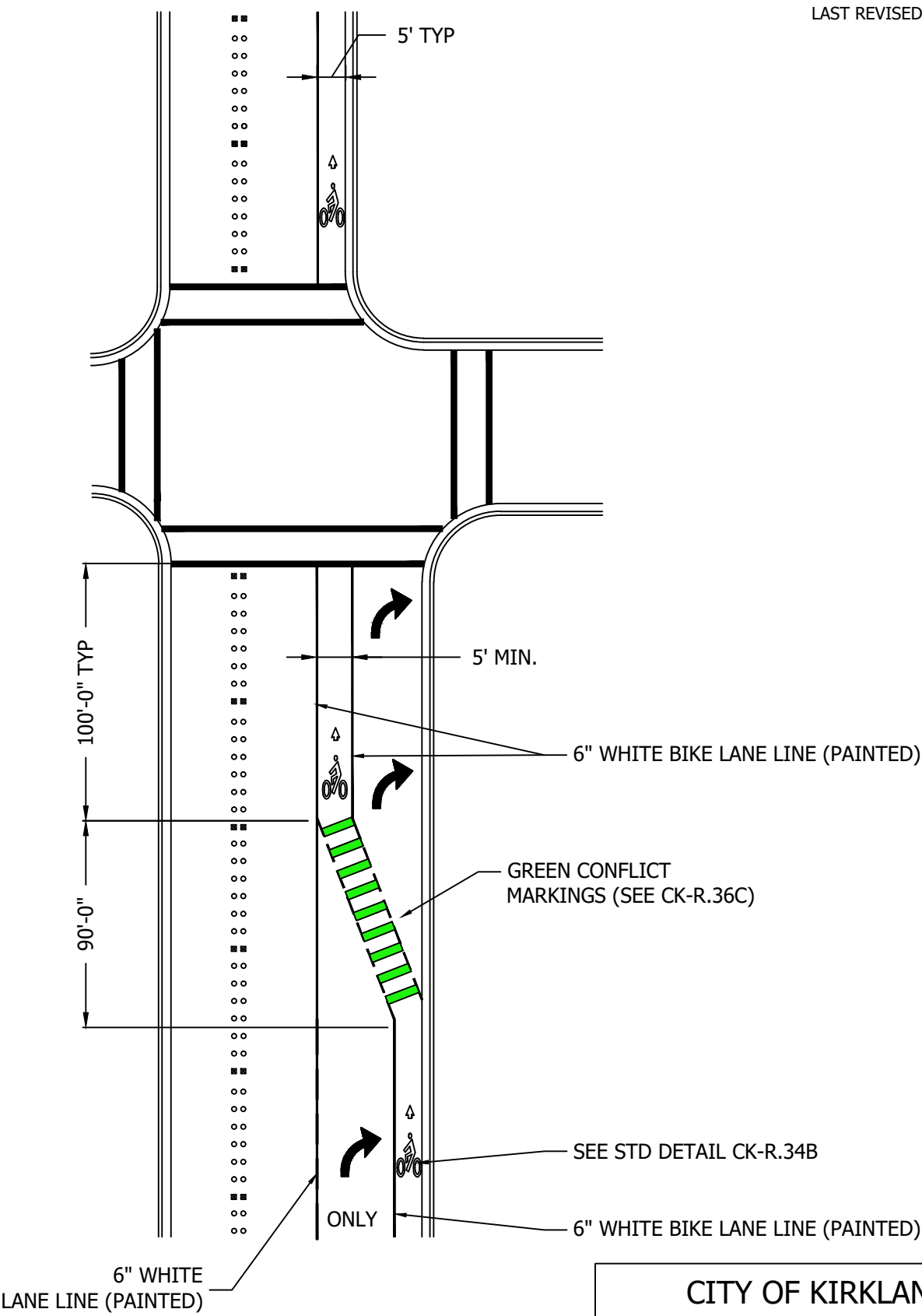
1. TRANSITION LENGTH =  $5 \times A$  (TYPICALLY 80' AS SHOWN).
2. GREEN COLORED PAVEMENT, BIKE LANE SYMBOL, AND ARROW SHALL BE EITHER 90 MIL PREFORMED THERMOPLASTIC OR METHYL METHACRYLATE (MMA).
3. SEE PLAN NO. CK-R.34 FOR MORE DETAILS ABOUT BIKE LANE SYMBOLS AND ARROWS.
4. MARKING UNSIGNALIZED INTERSECTIONS WITH GREEN PAVEMENT IS EVALUATED ON A CASE-BY-CASE BASIS


CITY OF KIRKLAND

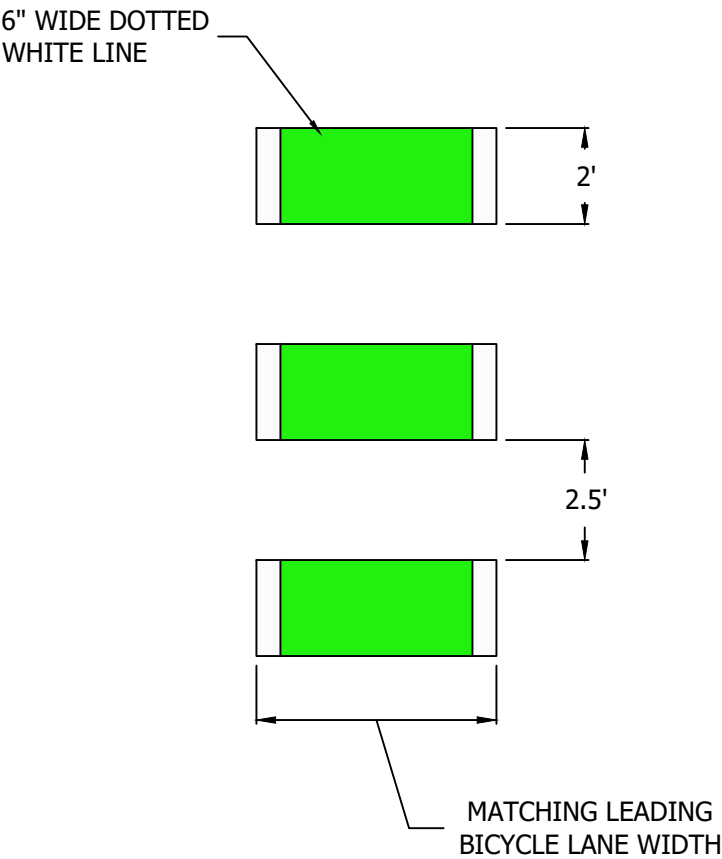
PLAN NO. CK-R.36A



GREEN BIKE  
LANE AT  
INTERSECTION



CITY OF KIRKLAND	
PLAN NO. CK - R.36B	
	BIKE LANE TREATMENT AT DROP LANE RIGHT TURN

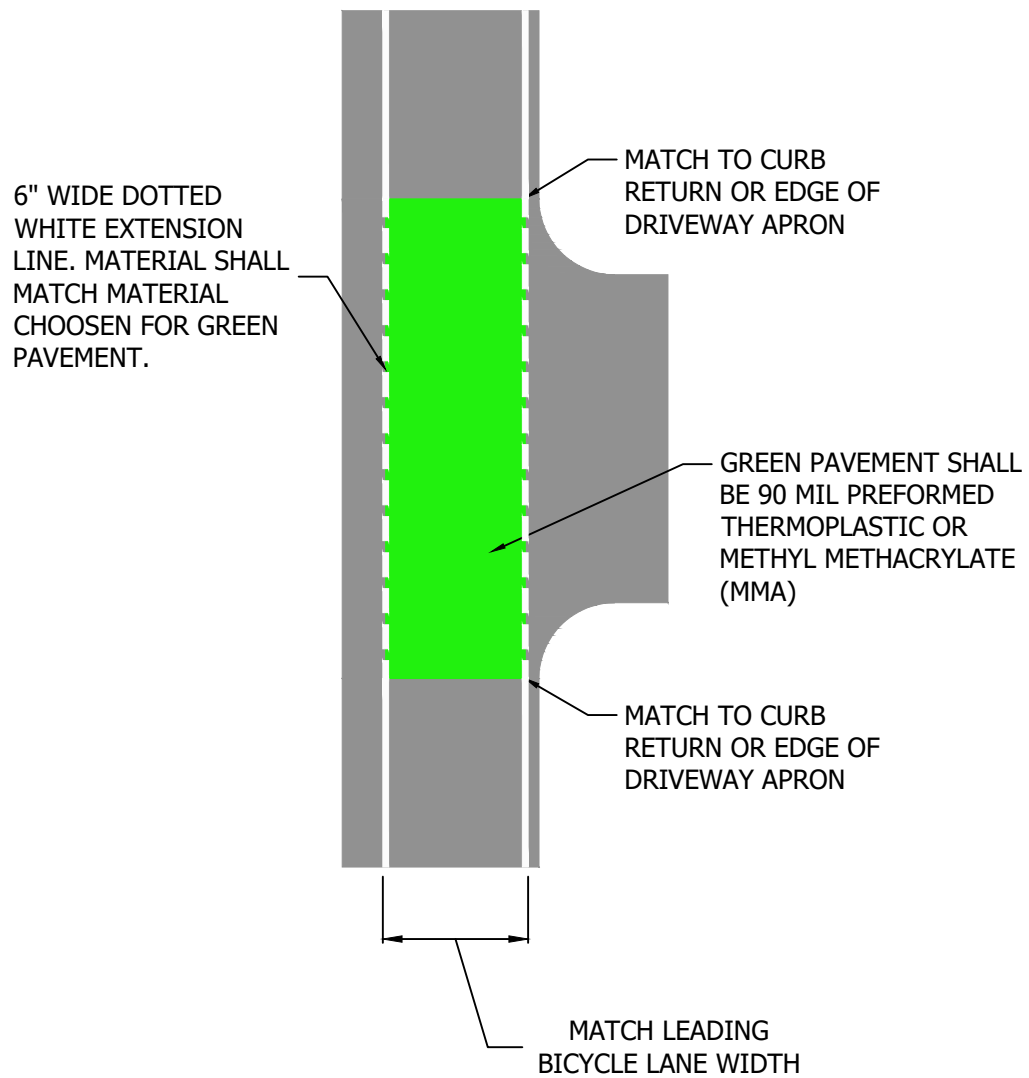


NOTE:

ALL MARKINGS, INCLUDING GREEN COLORED PAVEMENT AND WIDE DOTTED WHITE LINE, SHALL BE EITHER 90 MIL. PREFORMED THERMOPLASTIC OR METHYL METHACRYLATE (MMA)


CITY OF KIRKLAND	
PLAN NO. CK - R.36C	
	TYPICAL INTERSECTION/ CONFLICT ZONE BIKE LANE PAVEMENT MARKING

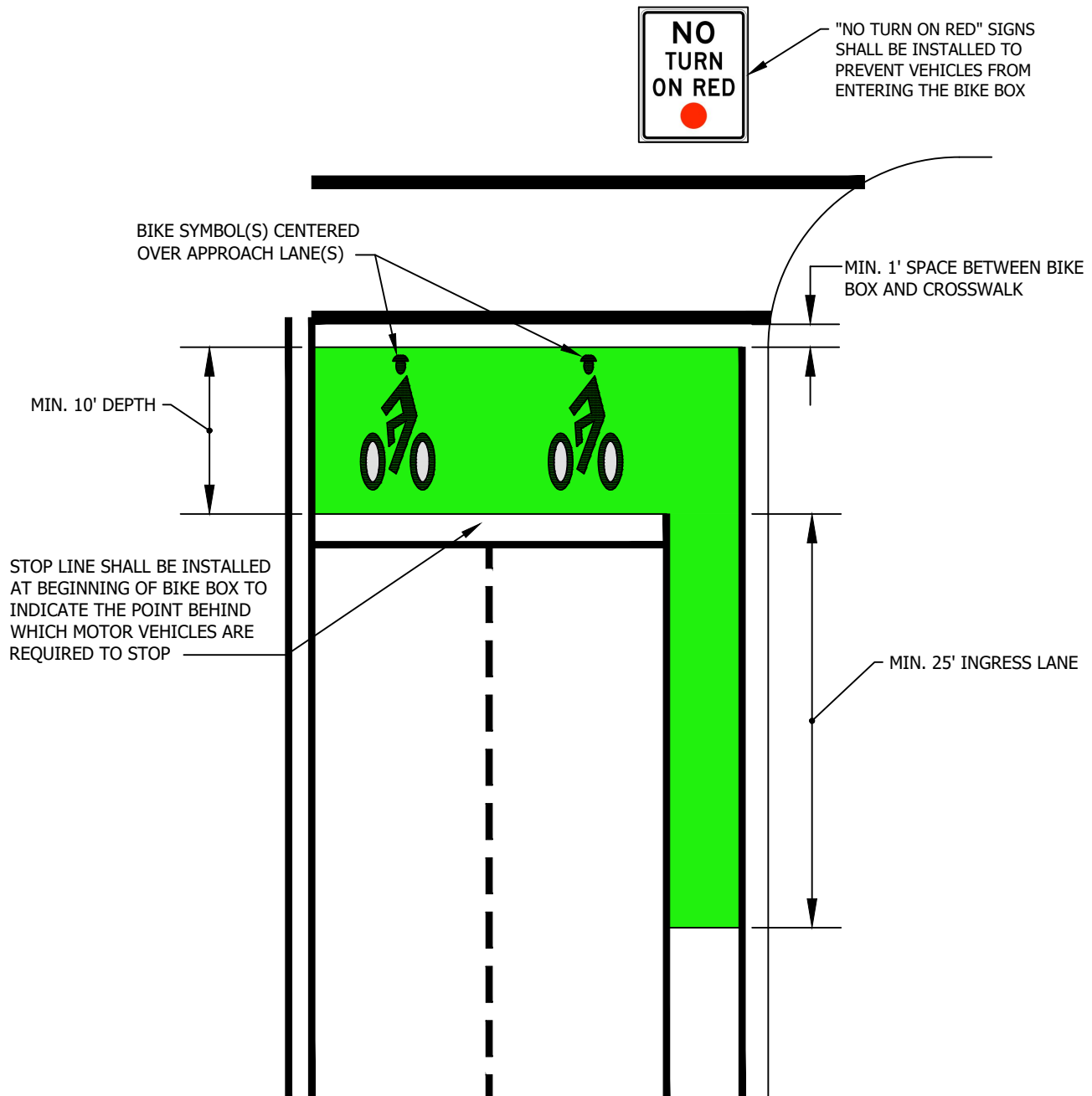




NOTE:

DRIVEWAYS ARE NOT TYPICALLY MARKED WITH GREEN PAVEMENT, BUT DRIVEWAYS WITH HIGH VEHICLE VOLUMES OR OTHER COMPLEX VEHICULAR MOVEMENTS SHOULD BE EVALUATED TO INCLUDE GREEN PAVEMENT MARKINGS.

CITY OF KIRKLAND	
PLAN NO. CK - R.36D	
	TYPICAL DRIVEWAY CROSSING BIKE LANE PAVEMENT MARKING



**NOTES:**

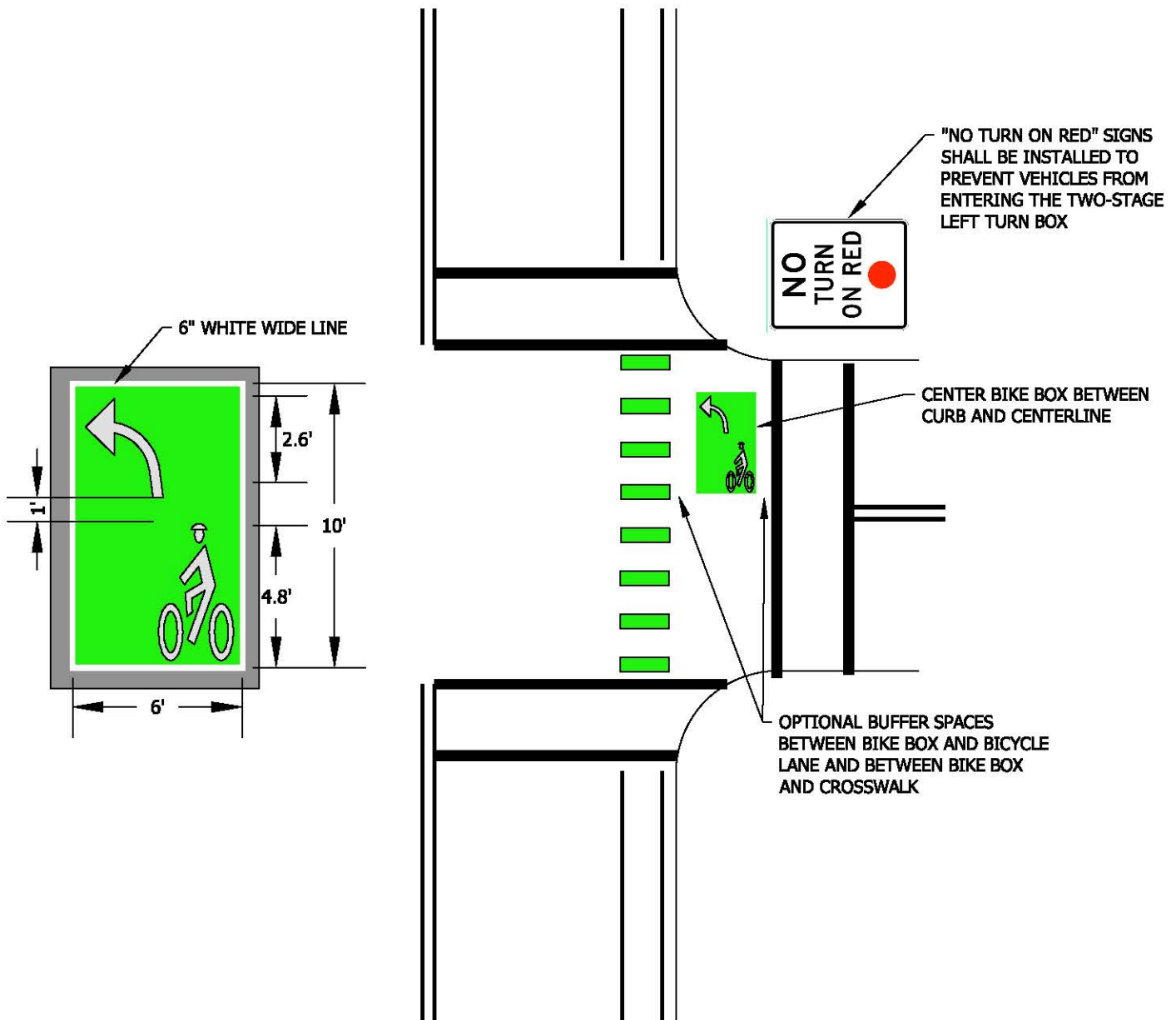
1. GREEN COLORED PAVEMENT AND BIKE LANE SYMBOL SHALL BE EITHER 90 MIL PREFORMED THERMOPLASTIC OR METHYL METHACRYLATE (MMA). THE SAME MATERIAL SHALL BE USED FOR BOTH THE BIKE SYMBOLS AND THE GREEN PAVEMENT TREATMENT.
2. SEE PLAN NO. CK-R.34 FOR BIKE LANE SYMBOL DETAILS.
3. SEE CK-R.28 FOR STOP LINE DIMENSIONS.

CITY OF KIRKLAND

PLAN NO. CK-R.36E



**TYPICAL BIKE BOX  
AT A SIGNALIZED  
INTERSECTION**



**NOTES:**

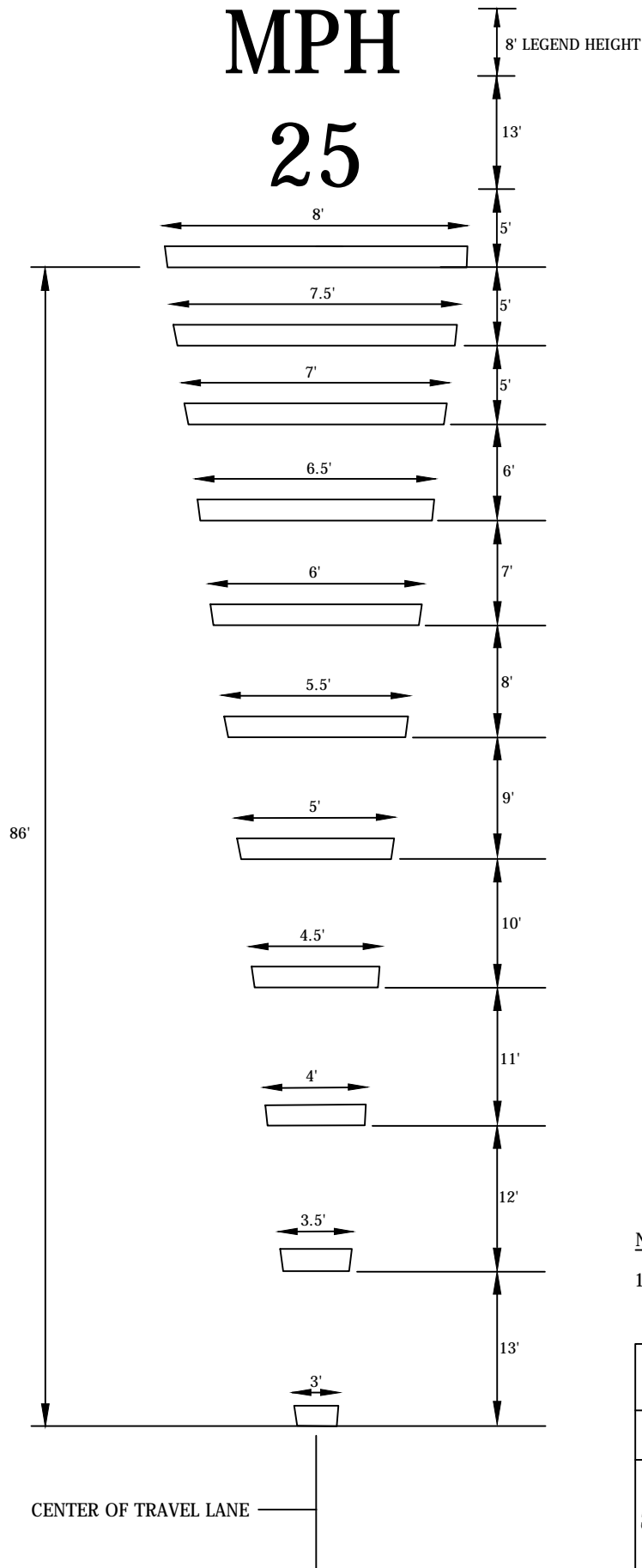
1. ARROW, BIKE SYMBOL, WHITE WIDE LINE, AND GREEN COLORED PAVEMENT SHALL BE EITHER 90 MIL PREFORMED THERMOPLASTIC OR METHYL METHACRYLATE (MMA). THE SAME MATERIAL SHALL BE USED FOR ALL ELEMENTS OF THE TWO-STAGE LEFT TURN BOX.
2. THE QUEUE BOX SHALL BE PLACED IN A PROTECTED AREA. THIS WILL TYPICALLY BE BETWEEN THE BICYCLE LANE AND THE PEDESTRIAN CROSSWALK BUT CAN ALSO BE PLACED ON THE LEFT SIDE OF THE BICYCLE INTERSECTION CROSSING DEPENDING ON INTERSECTION GEOMETRY.

CITY OF KIRKLAND

PLAN NO. CK-R.36F



**TYPICAL TWO STAGE  
LEFT TURN BIKE BOX**



## PAVEMENT MARKING DETAIL

NOT TO SCALE

### NOTES:

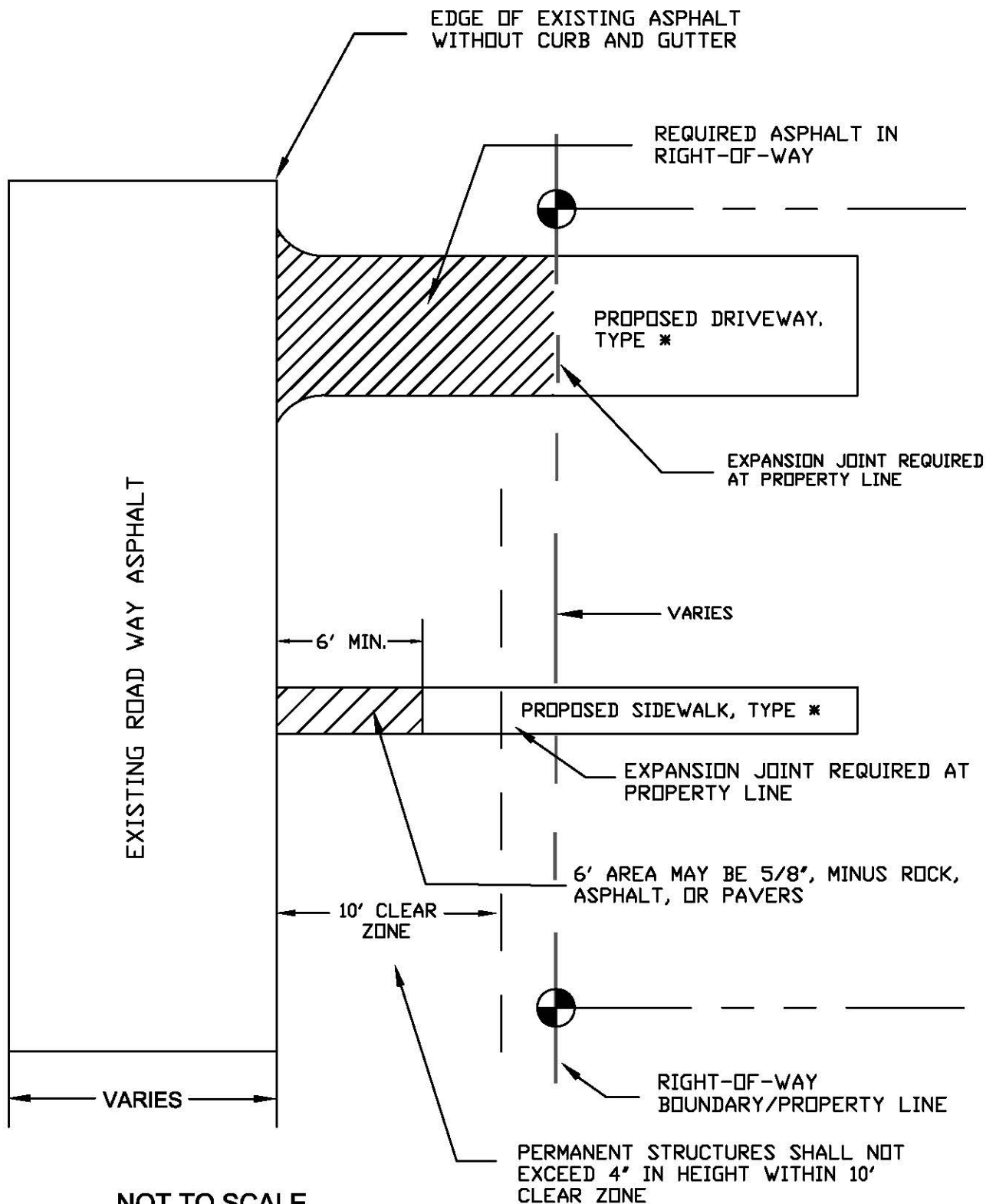
1. TRANSVERSE BAR WIDTH IS 1'.

CITY OF KIRKLAND

PLAN NO. CK- R.38



TRANSVERSE BAR  
PAVEMENT MARKING  
PATTERN



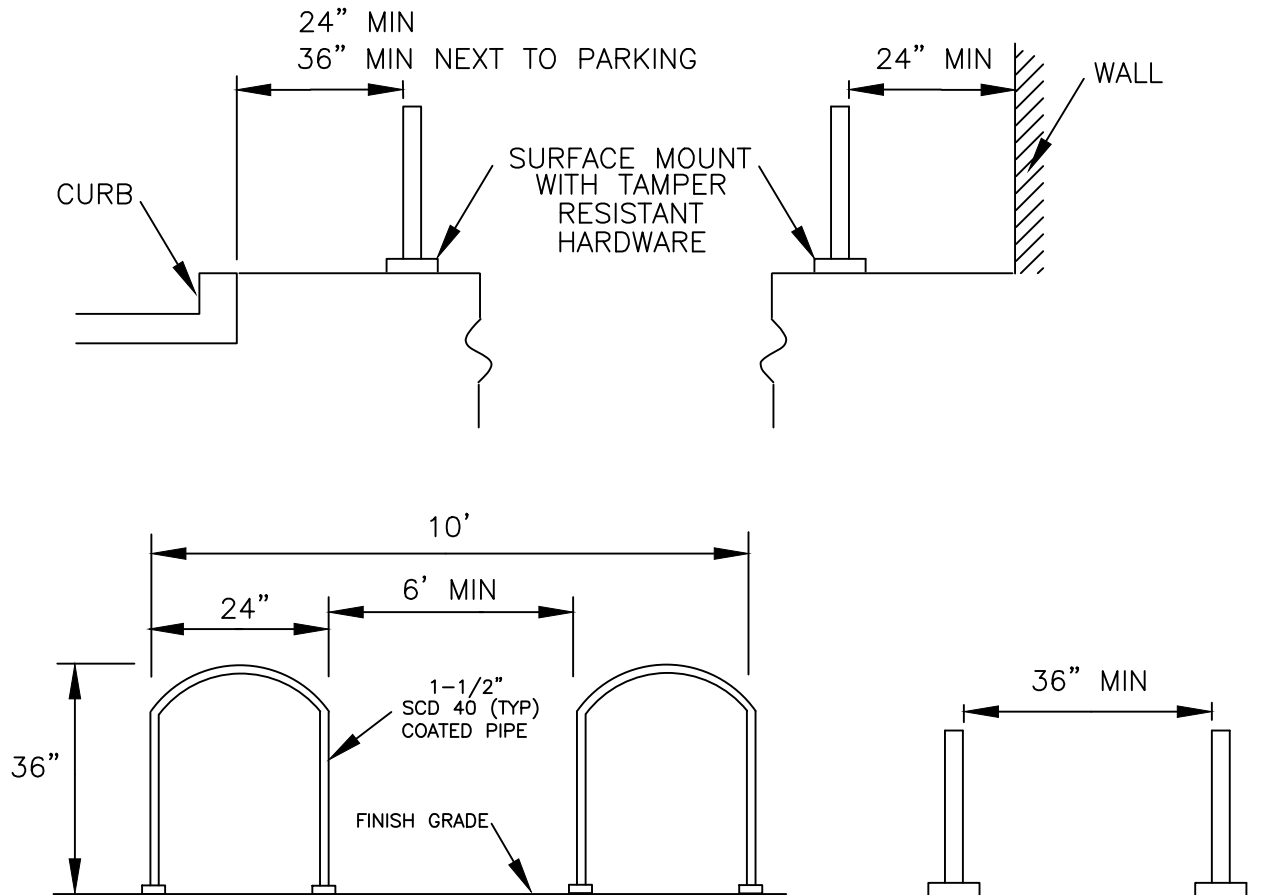
\*ALL PRIVATE SIDEWALKS AND DRIVEWAYS IN THE PUBLIC RIGHT-OF-WAY SHALL BE MAINTAINED BY ADJACENT PROPERTY OWNER

CITY OF KIRKLAND

PLAN NO. CK-R.39




PRIVATE SIDEWALK AND DRIVEWAY FOR UNIMPROVED RIGHT-OF-WAY

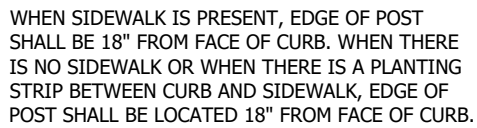


BICYCLE PARKING RACK DETAIL  
NOT TO SCALE

NOTES:

1. UNLESS OTHERWISE APPROVED, BICYCLE PARKING RACKS SHALL BE GALVANIZED OR STAINLESS STEEL "INVERTED U TYPE" OR APPROVED EQUIVALENT. OTHER RACKS MAY BE ALLOWED BUT MUST MEET THE FOLLOWING FUNCTIONAL REQUIREMENTS:
  - SUPPORT THE FRAME OF A BICYCLE IN TWO PLACES AND PREVENT THE BICYCLE FROM TIPPING OVER
  - ALLOW THE FRAME AND ONE WHEEL TO BE LOCKED TO THE RACK WHEN BOTH WHEELS ARE LEFT ON THE BIKE.
  - ALLOW THE FRAME AND BOTH WHEELS TO BE LOCKED TO THE RACK IF THE FRONT WHEEL IS REMOVED.
  - ALLOW THE USE OF A U-SHAPED LOCK.
  - BE SECURELY ANCHORED BY SURFACE MOUNT.
  - BE USABLE BY BIKES WITH NO KICKSTAND.
  - BE USABLE BY BIKES WITH WATER BOTTLE CAGES.
  - BE USABLE BY A WIDE VARIETY OF SIZES AND TYPES OF BICYCLES.
  - BE COATED BY MANUFACTURER.
  - UTILIZE AN INTUITIVE DESIGN.
2. INSTALL PER MANUFACTURER'S RECOMMENDATION.

CITY OF KIRKLAND	
PLAN NO. CK-R.40	
	BICYCLE PARKING RACK



NOTES:

1. IF SIGN MUST BE PLACED IN EXISTING CONCRETE, CORE HOLE SHALL BE 8" DIAMETER.
2. S1-1 SIGNS SHALL BE BLACK ON FLUORESCENT GREEN.
3. W11-2 SIGNS SHALL BE BLACK ON YELLOW.
4. ALL SIGNS SHALL HAVE ANTI-GRAFFITI COATING. SEE CONTACT SPECIAL PROVISIONS FOR MORE INFORMATION.

CITY OF KIRKLAND

PLAN NO. CK-R.43



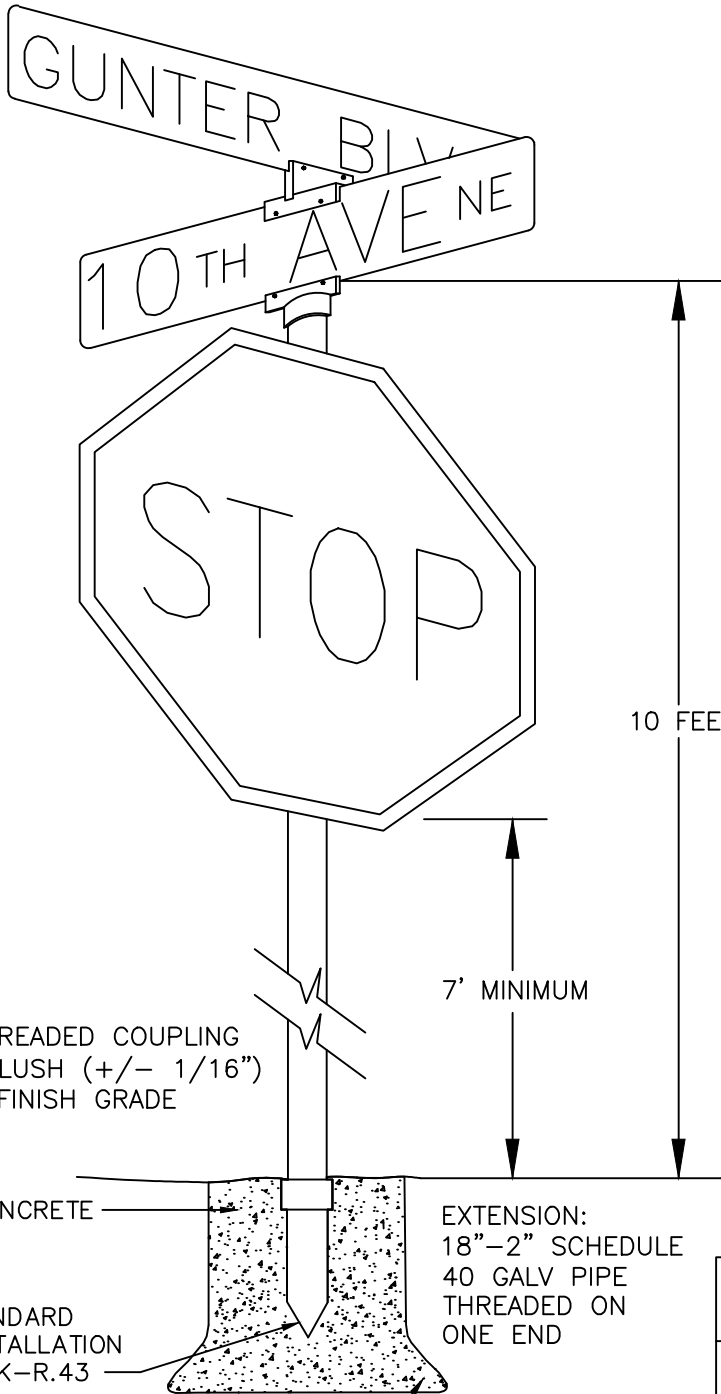
## STANDARD SIGN INSTALLATION

10TH AVE NE

SIGN:  
6"x24" SHEET ALUMINUM 0.080" THICK

LETTERS  
4" UC C SERIES, EXCEPT SUFFIXES  
AND PREFIXES 3" UC C SERIES

BACKGROUND:  
GREEN REFLECTIVE SHEETING, OR BLUE  
FOR PRIVATE ROADS WITH 3/8" WHITE  
BORDER. SHEETING SHALL MEET MUTCD  
REQUIREMENTS FOR REFLECTIVITY.



STREET SIGN MOUNTING  
HARDWARE:  
TRAFFIC SAFETY SUPPLY 16503925  
OR EQUIVALENT

STOP SIGN MOUNTING  
HARDWARE:  
TRAFFIC SAFETY SUPPLY  
THDW-105 U BRACKET  
OR EQUIVALENT

POST:  
10'x2" SCHEDULE 40  
GALVANIZED STEEL PIPE

SIGN:  
R1-1 30"x30"  
HIGH INTENSITY PRISMATIC

- NOTES:
1. IF SIGN MUST BE PLACED IN EXISTING CONCRETE, CORE HOLE SHALL BE 8" DIAMETER.
  2. ALL SIGNS SHALL HAVE ANTI-GRAFFITI COATING. SEE CONTRACT SPECIAL PROVISIONS FOR MORE INFORMATION.

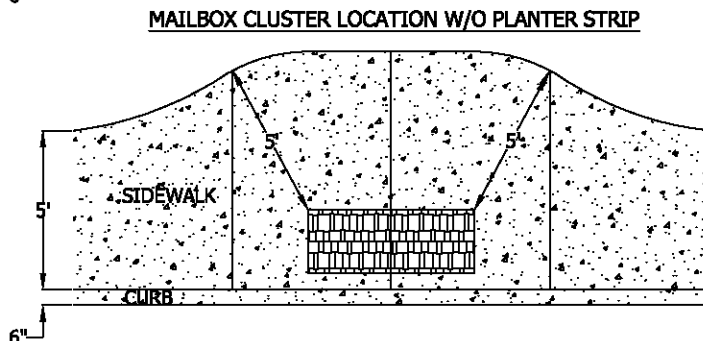
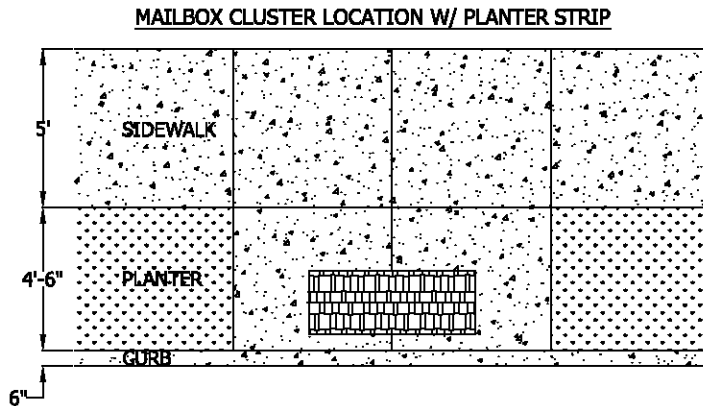
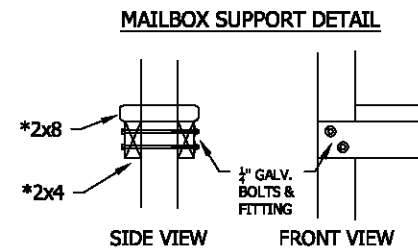
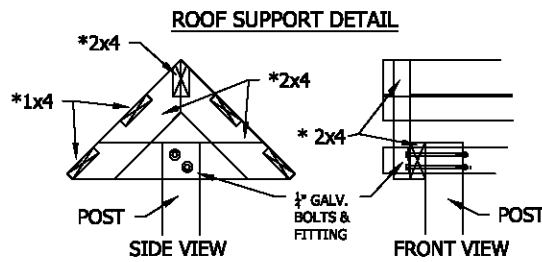
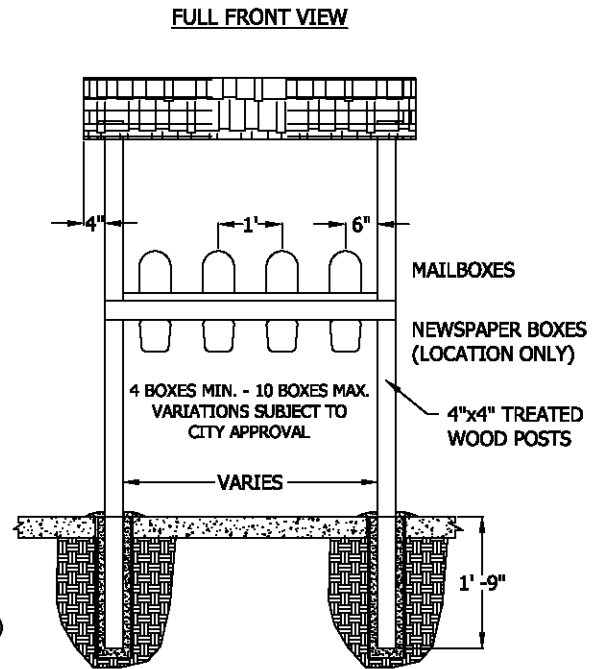
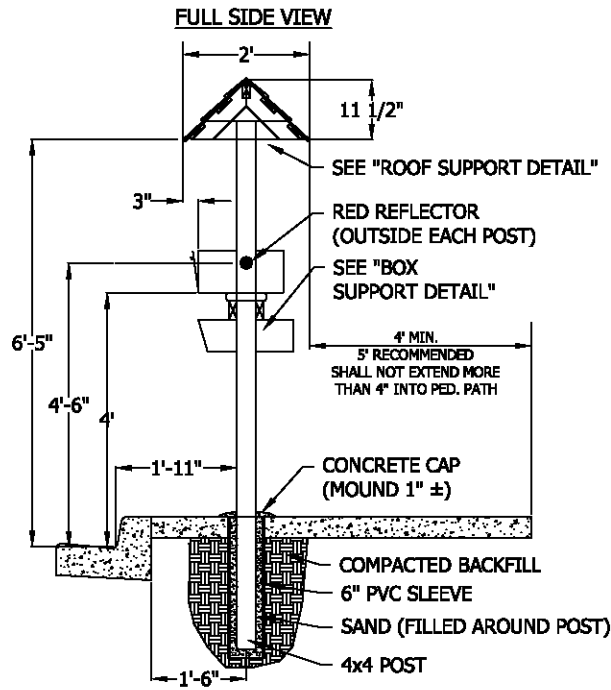
CITY OF KIRKLAND

PLAN NO. CK-R.44



STREET NAME  
SIGN STANDARD





**NOTES:**

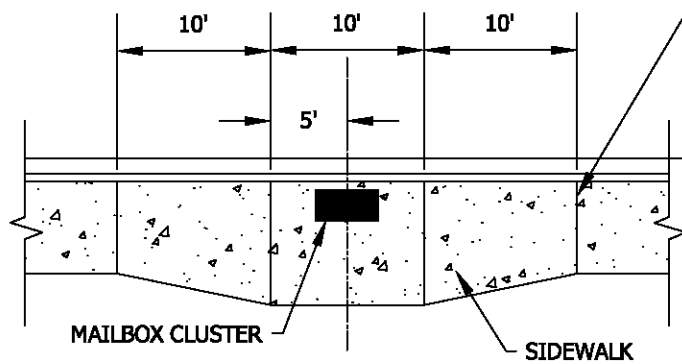
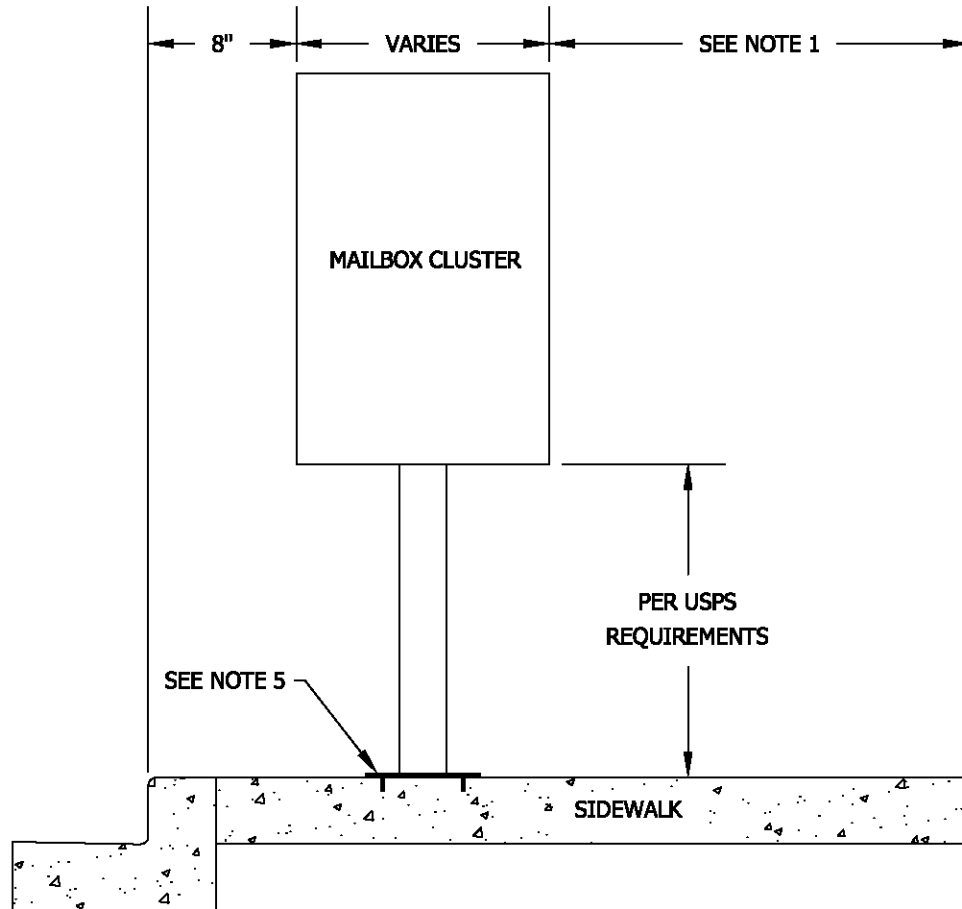
1. ALL WOOD SHALL BE NO. 1 GRADE CEDAR OR PRESSURE TREATED.
2. MAILBOXES MUST BE TYPE "APPROVED BY THE POSTMASTER GENERAL" WITH A UNIFORM BOX STYLE AND METHOD OF ADDRESS IDENTIFICATION PER EACH STANDARD.
3. LOCATION IS SUBJECT TO APPROVAL BY CITY FOR PROTECTION OF VIEWS AND ACCESS.
4. THIS STANDARD DETAIL DEPICTS THE MINIMUM STRUCTURAL AND DIMENSIONAL STANDARD. ANY DEVIATION MUST BE APPROVED BY THE APPROPRIATE CITY PERSONNEL.
5. IF PLACED IN THE PEDESTRIAN CIRCULATION PATH, THE MAIL BOX AND/OR ROOF SHALL NOT EXTEND MORE THAN 4" INTO THE PATH.

CITY OF KIRKLAND

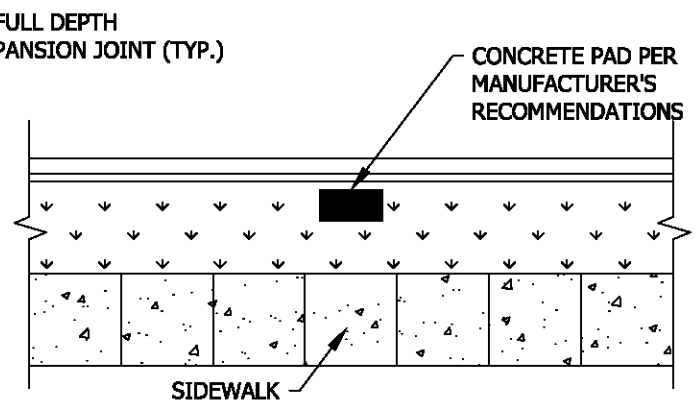
PLAN NO. CK-R.45A



**MAILBOX CLUSTER -  
TRADITIONAL WOOD  
DESIGN**



**SINGLE RIBBON SIDEWALK  
TRANSITION DETAIL**



**SIDEWALK WITH PLANTER STRIP**

**NOTES:**

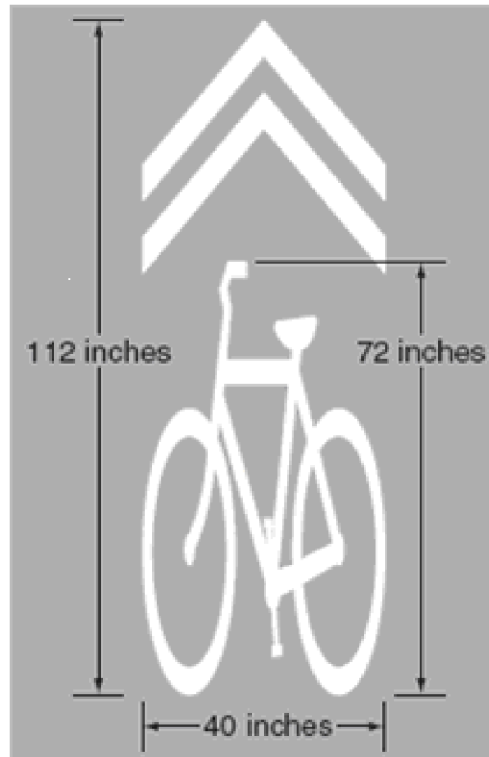
1. MEANDER SIDEWALK AROUND MAILBOX TO MAINTAIN FULL WIDTH OF SIDEWALK.
2. COORDINATE MAILBOX LOCATION WITH LOCAL POSTMASTER AND ENSURE MAILBOX SHALL NOT IMPACT SIGHT LINES.
3. ADDITIONAL REQUIREMENTS PER REVIEW ENGINEER FOR INSTALLATION ALONG ARTERIAL STREETS.
4. FOR USE WITH USPS APPROVED MAILBOXES ONLY.
5. ANCHOR BOLDS SHALL BE CUT FLUSH TO MOUNTING SURFACE.
6. ALL SIDEWALKS INSTALLED PER COK STD. PLAN NO. CK-R.23.
7. FOR INSTALLATION AT LOCATION WITHOUT CURB, TOP OF CONCRETE PAD SHALL BE FLUSH WITH GROUND SURFACE. PLACEMENT SHALL BE APPROVED IN ADVANCE BY REVIEW ENGINEER.
8. REFER TO COK POLICY R-37 FOR MAILBOX NO PARKING SIGN INFORMATION.

CITY OF KIRKLAND

PLAN NO. CK-R.45B



**MAILBOX CLUSTER -  
METAL DESIGN**



**SHARED LANE MARKING DETAIL**

NOT TO SCALE

**NOTES:**

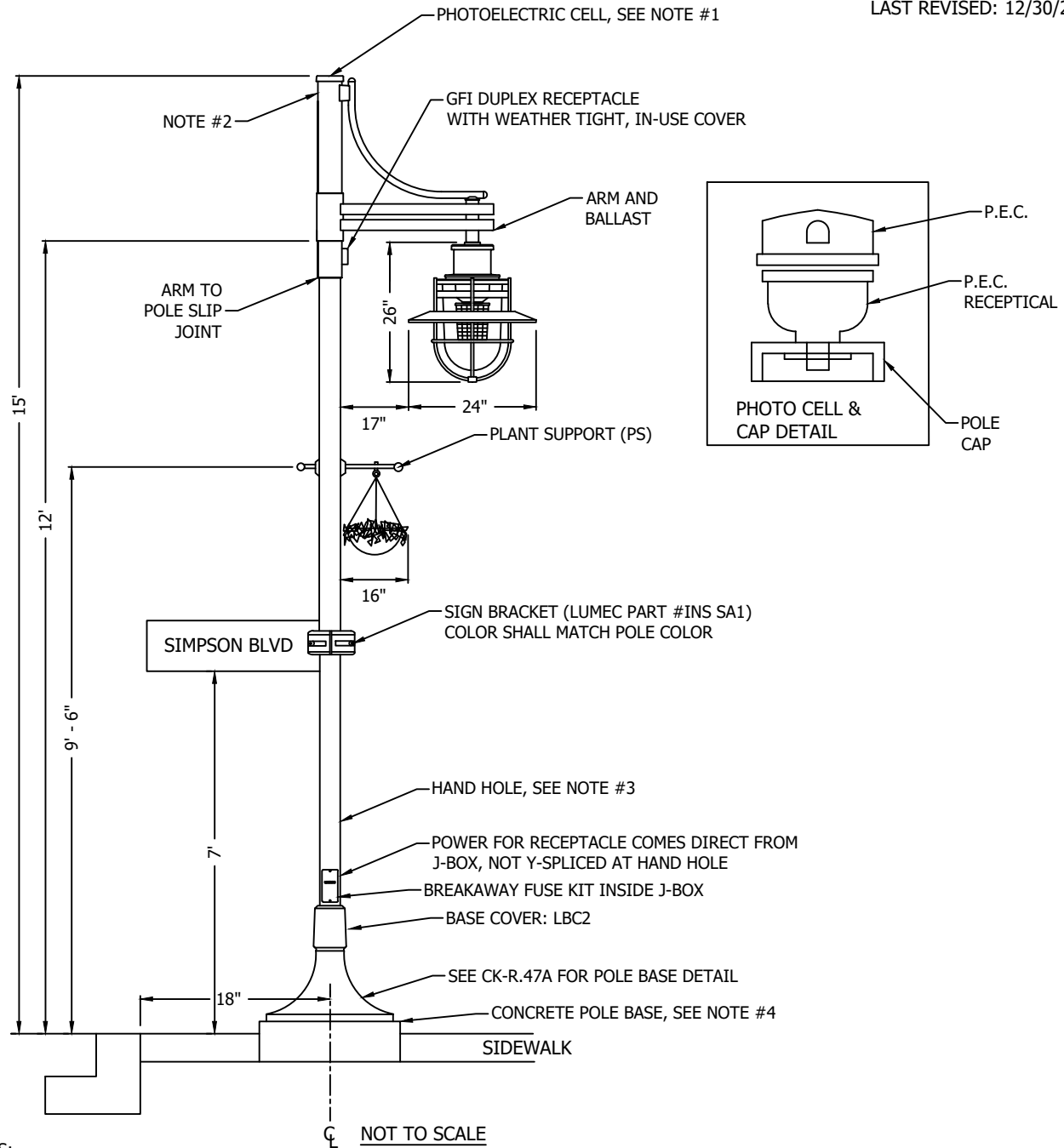
1. PLACE MARKING IN CENTER OF TRAVELED WAY, EVERY 250'-350'.
2. SEE SECTION 9C.07, 2009 MUTCD FOR MORE GUIDANCE.
3. SHARED LANE MARKING MATERIAL SHALL BE 90 MILL, PREFORMED, SKID RESISTANT THERMOPLASTIC.

**CITY OF KIRKLAND**

PLAN NO. CK- R.46



**SHARED LANE  
MARKING**



**NOTES:**

1. INSTALL PHOTO ELECTRIC CELL (P.E.C.) ON POLE CAP. USE TWISTLOCK TYPE, SEE DETAIL. SEE CITY OF KIRKLAND INSPECTOR FOR PART NUMBERS OR EQUIVALENT. FACTORY INSTALLED P.E.C. IS NOT ACCEPTABLE.
2. WIRES FROM J-BOX, OUTLET, AND BALLAST WILL BE CONNECTED AT THIS AREA; NOT BY THE SLIP JOINT.
3. THE ONLY CONNECTION MADE AT HAND HOLE IS THE POLE GROUNDING CONNECTION.
4. WITH SLOPED SIDE WALKS, THE POLE BASE MUST PROTRUDE ABOVE FINISHED GRADE SO THAT BASE COVER WILL SIT LEVEL.
5. PS ORIENTATION UNDERNEATH LIGHT UNLESS OTHERWISE DESIGNATED.
6. LIGHTS SHALL BE GENERALLY SPACED AT 60' ON CENTER.
7. ALL PEDESTRIAN LIGHTS SHALL HAVE 1 SIGN BRACKET.
8. ALL SPlice CONNECTIONS IN J-BOX SHALL BE MADE USING:
  - A. C-TAP (COPPER CRIMP)
  - B. 3M 2000 MASTIC COVER
  - C. 3M SUPER 88 TAPE

**CITY OF KIRKLAND**

**PLAN NO. CK - R.47**



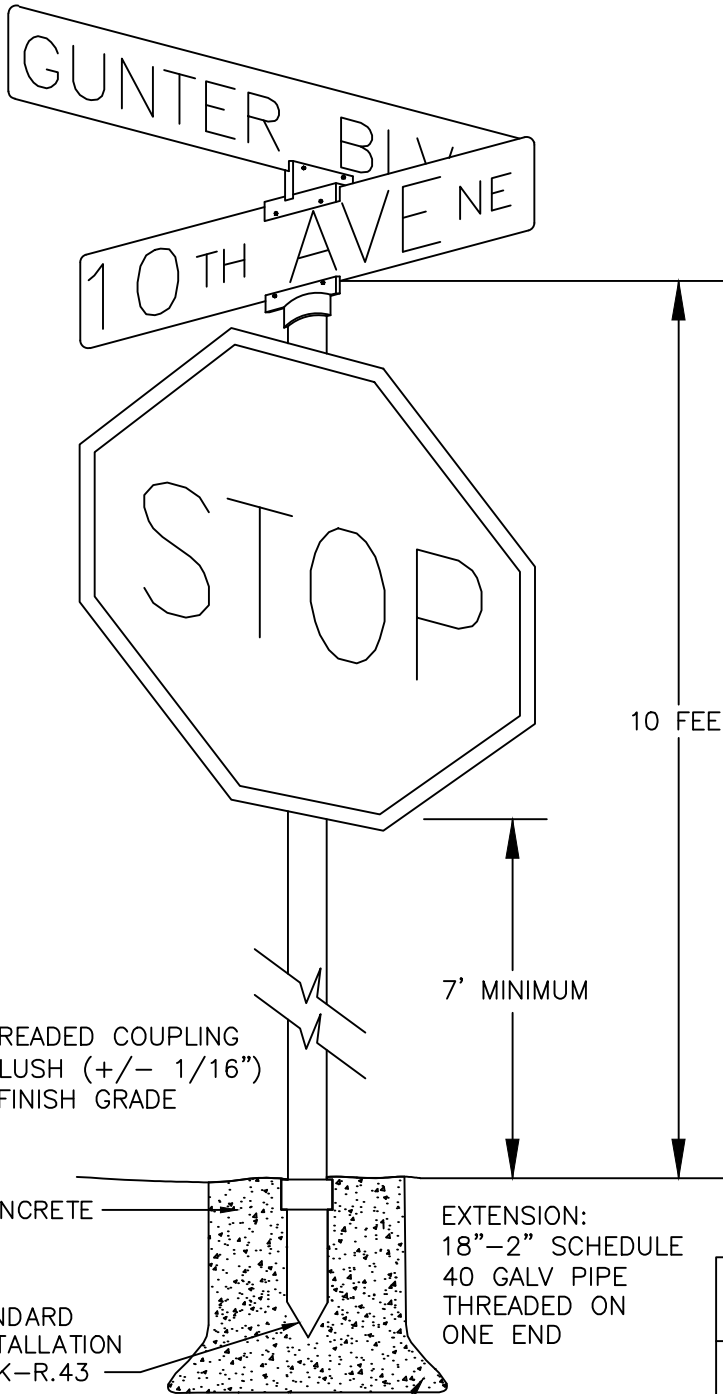
**CENTRAL BUSINESS  
DISTRICT PEDESTRIAN  
LIGHT STANDARD**

10TH AVE NE

SIGN:  
6"x24" SHEET ALUMINUM 0.080" THICK

BACKGROUND:  
GREEN REFLECTIVE SHEETING, OR BLUE  
FOR PRIVATE ROADS WITH 3/8" WHITE  
BORDER. SHEETING SHALL MEET MUTCD  
REQUIREMENTS FOR REFLECTIVITY.

LETTERS  
4" UC C SERIES, EXCEPT SUFFIXES  
AND PREFIXES 3" UC C SERIES



STREET SIGN MOUNTING  
HARDWARE:  
TRAFFIC SAFETY SUPPLY 16503925  
OR EQUIVALENT

STOP SIGN MOUNTING  
HARDWARE:  
TRAFFIC SAFETY SUPPLY  
THDW-105 U BRACKET  
OR EQUIVALENT

POST:  
10'x2" SCHEDULE 40  
GALVANIZED STEEL PIPE

SIGN:  
R1-1 30"x30"  
HIGH INTENSITY PRISMATIC

- NOTES:
1. IF SIGN MUST BE PLACED IN EXISTING CONCRETE, CORE HOLE SHALL BE 8" DIAMETER.
  2. ALL SIGNS SHALL HAVE ANTI-GRAFFITI COATING. SEE CONTRACT SPECIAL PROVISIONS FOR MORE INFORMATION.

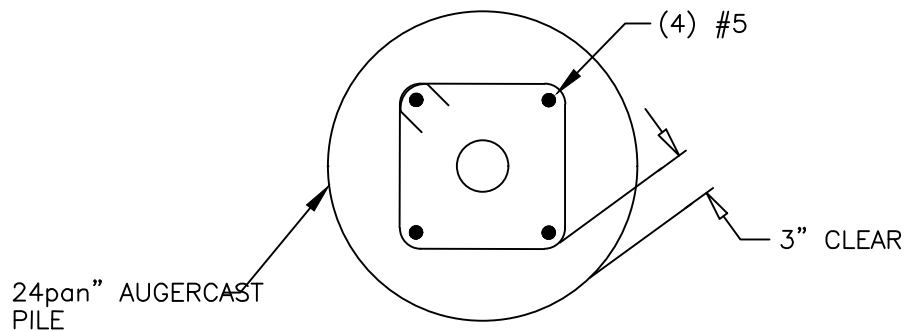
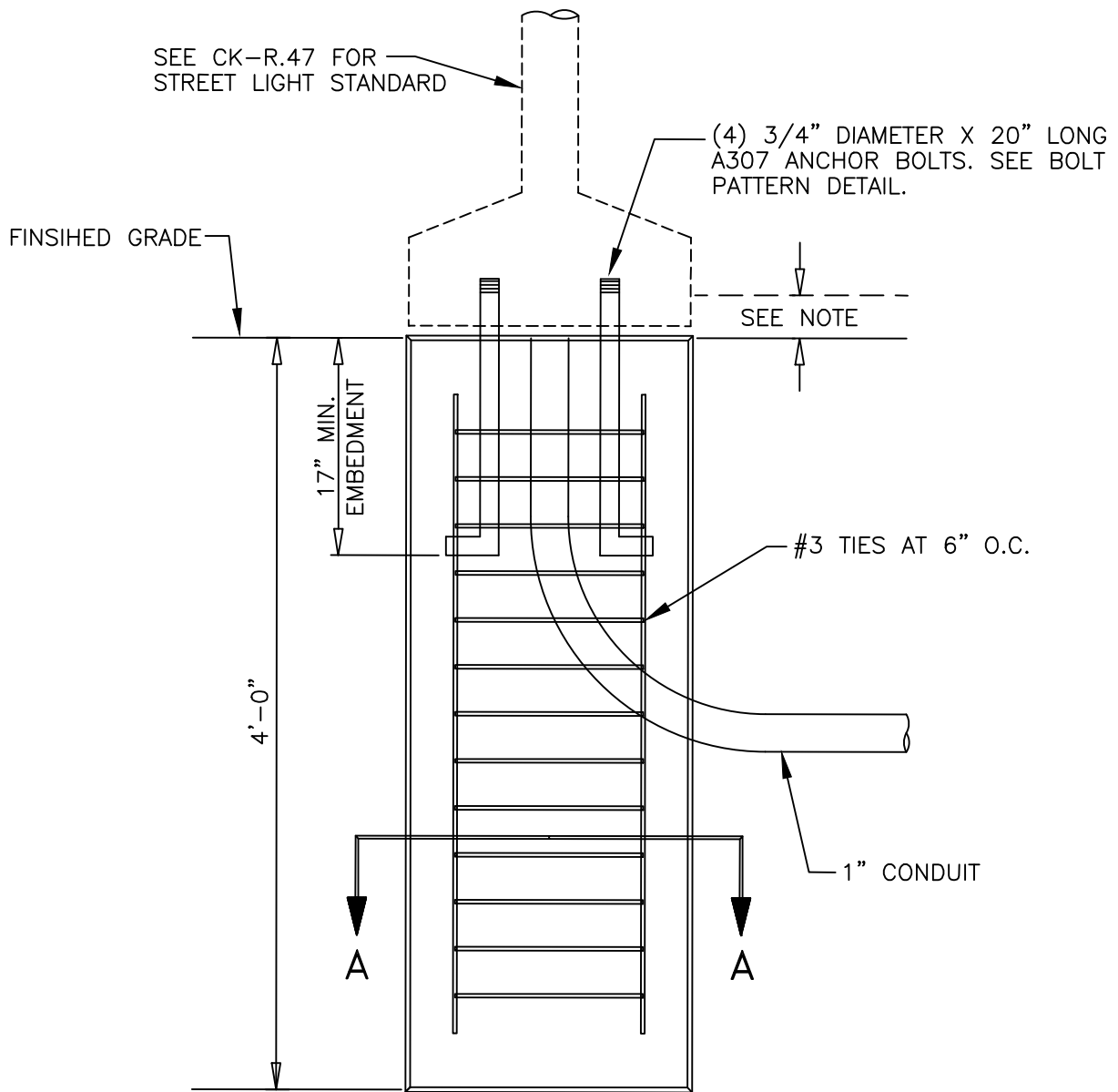
SEE STANDARD  
SIGN INSTALLATION  
DETAIL CK-R.43

CITY OF KIRKLAND

PLAN NO. CK-R.44



STREET NAME  
SIGN STANDARD



## SECTION A-A

### NOTE:

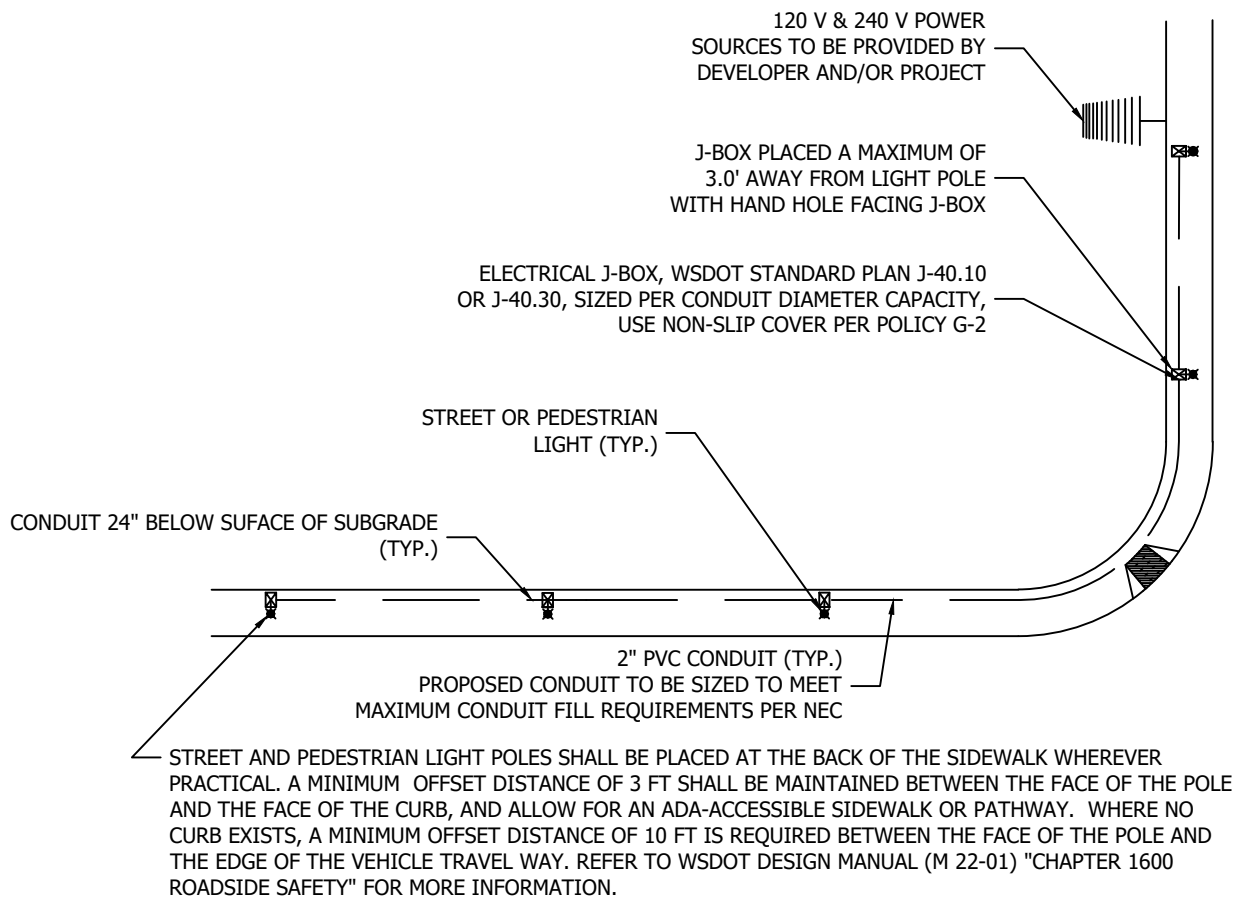
IF SLOPE OF GRADE EXCEEDS 2% THEN FLAT TOP OF PILE WILL EXTEND ABOVE GRADE AROUND ALL OF IT'S CIRCUMFERENCE.

CITY OF KIRKLAND

PLAN NO. CK-R.47A

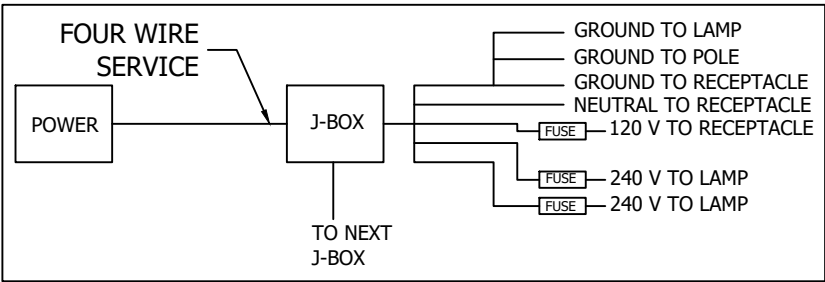



PEDESTRIAN LIGHT  
POLE BASE DETAIL



**NOTES:**

1. ALL SPLICE CONNECTIONS IN J-BOX SHALL BE MADE USING:
  - A. C-TAP (COPPER CRIMP)
  - B. 3M 2000 MASTIC COVER
  - C. 3M SUPER 88 TAPE
2. STREET AND PEDESTRIAN LIGHT POLES SHALL HAVE A MINIMUM 4-FOOT OFFSET FROM THE FACE OF THE POLE TO ANY NEARBY BARRIERS, WALLS, FENCES, AWNINGS, OR SIMILAR FOR MAINTENANCE ACCESS.
3. STREET AND PEDESTRIAN LIGHT POLES SHALL HAVE A MINIMUM 10 FT OFFSET FROM THE EDGE OF DRIVEWAY CUT. SEE CITY OF KIRKLAND STREET LIGHT DESIGN GUIDELINES FOR MORE INFORMATION.
4. REFER TO POLICY R-10 FOR OFFSET REQUIREMENTS TO STREET TREES.



CITY OF KIRKLAND	
PLAN NO. CK - R.47B	
	STREET AND PEDESTRIAN LIGHT PLAN LAYOUT

MANUFACTURER	LUMEC 640 CURE-BOIVIN BROISBRAND QC CANADA, J7G2A7
LOCAL SUPPLIER	ELECTRICAL REPRESENTATIVES WEST, INC. 624 LUCILE STREET, SEATTLE, WA 98108 (206-767-7722)
LUMINAIRE	CAND1-65W42LED4K-PC-C-RLE5-240-GN
BRACKET	CN1-1A-GN
MODEL	CAND CANDELA SERIES CONFIGURATION CAND 1-1A
COLOR	TEAL (GN) ALONG SPECIFIED STREETS IN CENTRAL BUSINESS DISTRICT (CBD) DARK GREEN (GN8) ALONG ALL OTHER STREETS IN CBD
BASE COVER	LBC2, LANDSCAPE BASE COVER
GLOBE	POLYCARBONATE, CLEAR
FUSE CONNECTOR KIT	MODEL 1791-SF SEC CONNECTOR COMPANY, OR EQUAL
FUSES	"TRI-ONIC" TRM 2 (LAMP) & TRM 20 (RECEPTACLE) OR EQUAL
POLE HEIGHT	12 FEET
POLE TYPE	APR4U-12-GFI-LBC2-PSS16-GN
REQUIRED OPTIONS	G.F.I. DUPLEX RECEPTACLE (DR) WITH A WEATHER TIGHT, IN-USE COVER. SIGN BRACKET (SA1) COLOR TO MATCH POLE. SINGLE PLANT ARM (PS) COLOR TO MATCH POLE. PHOTOELECTRIC CELL (SWITCH) FROM MANUFACTURER IS <u>NOT</u> ACCEPTABLE.
PHOTOELECTRIC SWITCH	LUMATRAL QUICK RESPONSE PHOTOCONTROL MODEL #8690 PRECISION MULTIPLE CONTROLS, INC. 33 GREENWOOD AVE., MIDLAND PARK, NJ 07432 OR "M" OR "F" SERIES, AREA LIGHTING RESEARCH, INC. 60 ASBURY RD, HACKETTSTOWN, NJ 07840 OR EQUAL
OPTICAL SYSTEM	RLE5
SPACING	ALTERNATE BETWEEN STREET TREES (MAX. 60' O.C., MIN. 30' O.C.)
UTILITY BOX	CONCRETE J-BOX WITH METAL LID MARKED "ELECTRICAL" (SEE CK-R.47B)
POWER	TO BE PROVIDED BY DEVELOPER 120V FOR DUPLEX RECEPTACLE, 240V FOR THE STREET LIGHT
CONDUIT	2" PVC FROM SERVICE DISCONNECT 1" PVC BETWEEN J-BOX AND STREET LIGHT
BULB	65W42LED4K
WIRING	THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING WIRE THAT MEETS NEC STANDARDS. COPPER WIRE ONLY.
PERMIT	A SEPARATE ELECTRICAL PERMIT FROM THE CITY IS REQUIRED.
SPLICE CONNECTIONS	USE: C-TAP (COPPER CRIMP), 3M 2000 MASTIC WATERPROOFING, 3M SUPER 88 TAPE.

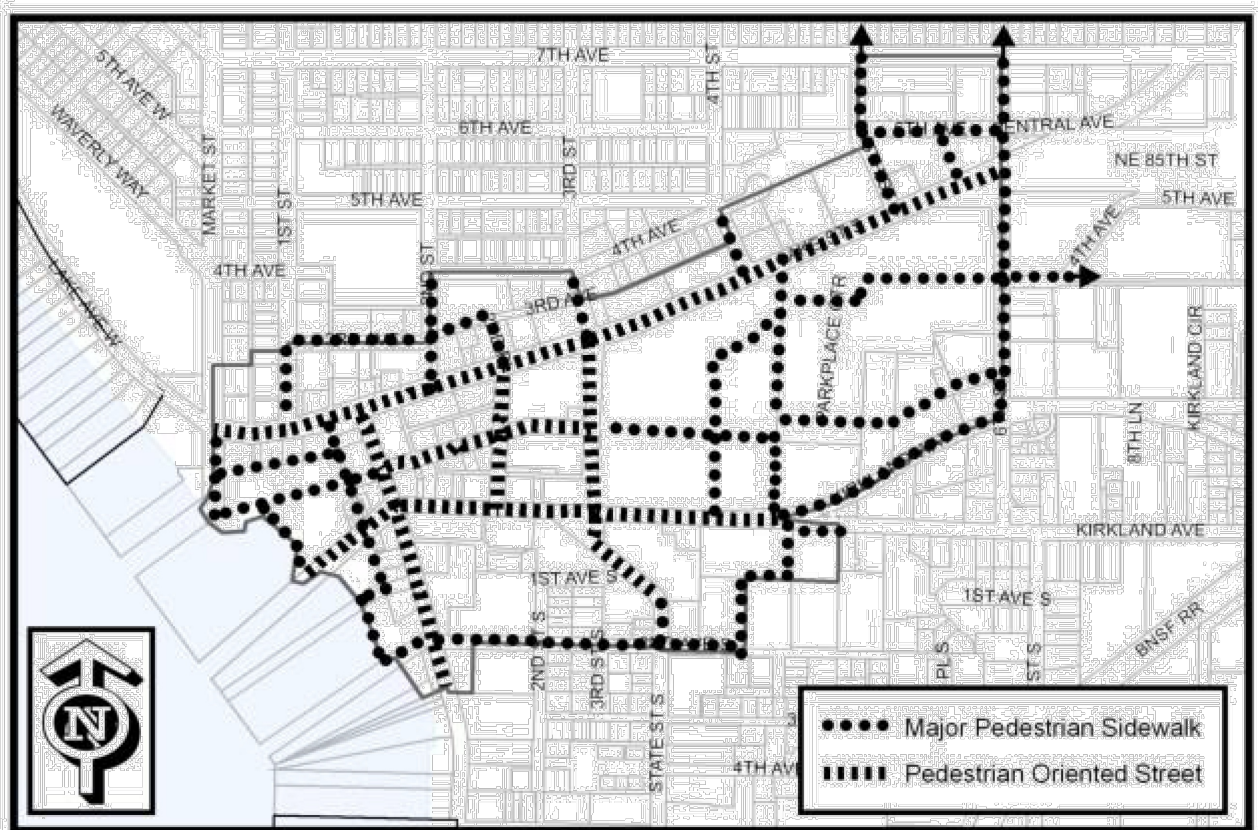
CITY OF KIRKLAND

PLAN NO. CK - R.47C



CBD  
STREET LIGHT  
SPECIFICATION





**NOTES:**

1. PEDESTRIAN LIGHTING IS REQUIRED ALONG ALL PEDESTRIAN-ORIENTED STREETS AND ALONG ALL MAJOR PEDESTRIAN PATHWAYS.
2. SIDEWALK WIDTHS AND REQUIREMENTS VARY THROUGHOUT THE PEDESTRIAN CORRIDOR. REFER TO CHAPTER 110.52 OF THE KIRKLAND ZONING CODE.

CITY OF KIRKLAND

PLAN NO. CK-R.47D



PEDESTRIAN  
CIRCULATION  
IN THE CBD

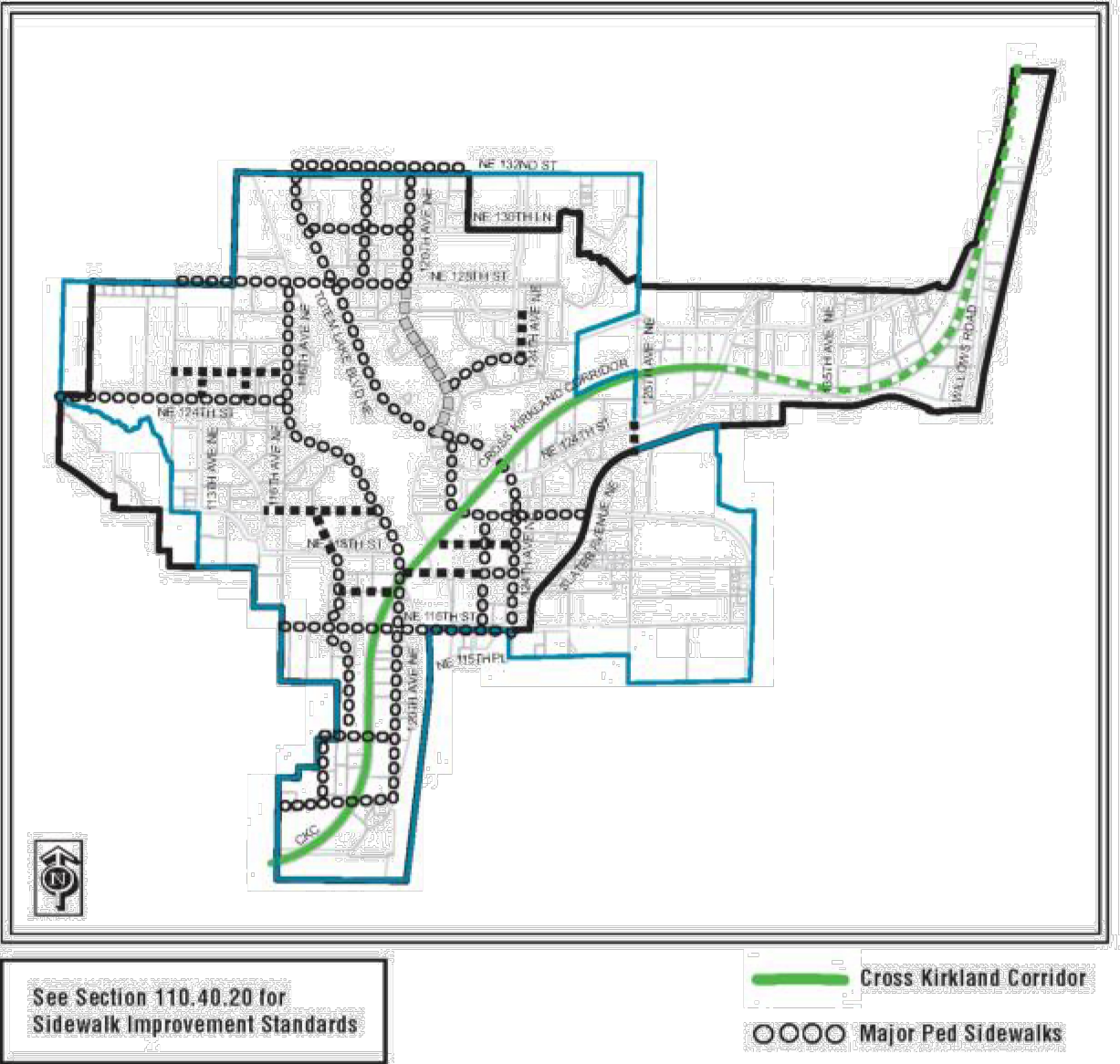
MANUFACTURER	LUMEC 640 CURE-BOIVIN BROISBRAND QC CANADA, J7G2A7
LOCAL SUPPLIER	ELECTRICAL REPRESENTATIVES WEST, INC. 624 LUCILE STREET, SEATTLE, WA 98108 (206-767-7722)
MODEL	CANDELA SERIES CAND2
COLOR	DARK GREEN (GN8 - SMOOTH)
BASE COVER	LBC2 BASE
GLOBE	POLYCARBONATE, CLEAR
FUSE CONNECTOR KIT	MODEL 1791-SF SEC CONNECTOR COMPANY, OR EQUAL
FUSES	"TRI-ONIC" TRM 2 (LAMP) & TRM 20 (RECEPTACLE) OR EQUAL
POLE HEIGHT	12 FEET
POLE TYPE	ALUMINUM, STRAIGHT, ROUND, 4", APR4U
REQUIRED OPTIONS	G.F.I. DUPLEX RECEPTACLE (DR) WITH A WEATHER TIGHT, IN-USE COVER. SIGN BRACKET (SA1) COLOR TO MATCH POLE. SINGLE PLANT ARM (PS) COLOR TO MATCH POLE. PHOTOELECTRIC CELL (SWITCH) FROM MANUFACTURER IS <u>NOT</u> ACCEPTABLE
PHOTOELECTRIC SWITCH	LUMATROL QUICK RESPONSE PHOTOCONTROL MODEL # 8690 PRECISION MULTIPLE CONTROLS, INC. 33 GREENWOOD AVE., MIDLAND PARK, NJ 07432 OR "M" OR "F" SERIES, AREA LIGHTING RESEARCH, INC. 60 ASBURY RD, HACKETTSTOWN, NJ 07840 OR EQUAL
OPTICAL SYSTEM	RR5 ROUND REFRACTOR TYPE V
SPACING	ALTERNATE BETWEEN STREET TREES (MAX. 60' O.C., MIN. 30' O.C.)
UTILITY BOX	CONCRETE J-BOX WITH METAL LID MARKED "ELECTRICAL" (SEE CK-R.47B)
POWER	TO BE PROVIDED BY DEVELOPER 120V FOR DUPLEX RECEPTACLE, 240V FOR THE STREET LIGHT
CONDUIT	2" PVC FROM SERVICE DISCONNECT 1" PVC BETWEEN J-BOX AND STREET LIGHT
BULB	65W42LED4K
WIRING	THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING WIRE THAT MEETS NEC STANDARDS. COPPER WIRE ONLY.
PERMIT	A SEPARATE ELECTRICAL PERMIT FROM THE CITY IS REQUIRED.
SPLICE CONNECTIONS	USE: C-TAP (COPPER CRIMP), 3M 2000 MASTIC WATERPROOFING, 3M SUPER 88 TAPE.

## CITY OF KIRKLAND

PLAN NO. CK - R.47E



TOTEM LK NEIGHBRHD  
TOTEM CTR & NRHBD  
STREET LIGHT SPECS.



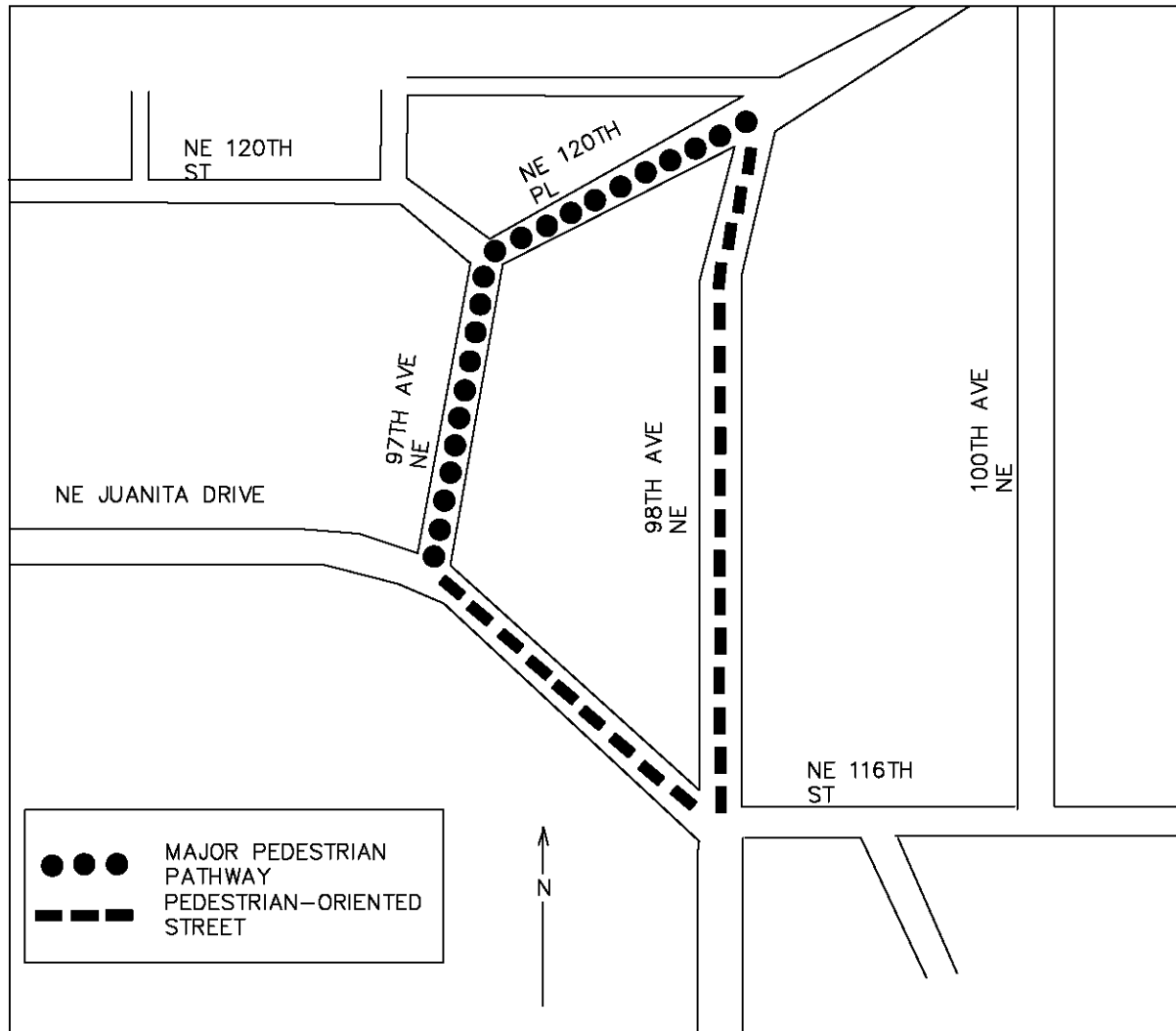
MANUFACTURER	LUMEC 640 CURE-BOIVIN BROISBRAND QC CANADA, J7G2A7
LOCAL SUPPLIER	ELECTRICAL REPRESENTATIVES WEST, INC. 624 LUCILE STREET, SEATTLE, WA 98108 (206-767-7722)
MODEL	LUMEC ANCESTRA SERIES #AT-30
COLOR	RD2TX, TEXTURED BURGUNDY
BASE COVER	B40 DECORATIVE BASE COVER; FINISH TO MATCH LUMINAIRE
GLOBE	POLYCARBONATE, CLEAR
FUSE CONNECTOR KIT	MODEL 1791-SF SEC CONNECTOR COMPANY OR EQUAL
FUSES	FNM-5 (LAMP) & FNM-15 (RECEPTACLE) OR EQUAL
POLE HEIGHT	10 FEET (APR4U-10) OR 8 FEET (APR4U-8)
POLE TYPE	APR4U-12 ALUMINUM POLE W/B40 DECORATIVE BASE COVER. FINISH TO MATCH LUMINAIRE.
REQUIRED OPTIONS	G.F.I. DUPLEX RECEPTACLE (DR) WITH A WEATHER TIGHT, IN-USE COVER. SIGN BRACKET (SA1) COLOR TO MATCH POLE. SINGLE PLANT ARM (PS) COLOR TO MATCH POLE. PHOTOELECTRIC CELL (SWITCH) FROM MANUFACTURER IS <u>NOT</u> ACCEPTABLE
PHOTOELECTRIC SWITCH	ALR 2090-NPS
OPTICAL SYSTEM	LE3S
SPACING	ALTERNATE BETWEEN STREET TREES (MAX. 60' O.C., MIN. 30' O.C.)
UTILITY BOX	CONCRETE J-BOX WITH METAL LID MARKED "ELECTRICAL" (SEE CK-R.47B)
POWER	240V
CONDUIT	2" SCHEDULE 40 PVC
LAMP	LED (90W49LED4K)
WIRING	THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING WIRE THAT MEETS NEC STANDARDS. COPPER WIRE ONLY.
PERMIT	A SEPARATE ELECTRICAL PERMIT FROM THE CITY IS REQUIRED.
SPLICE CONNECTIONS	USE: C-TAP (COPPER CRIMP), 3M 2000 MASTIC WATERPROOFING, 3M SUPER 88 TAPE.

CITY OF KIRKLAND

PLAN NO. CK - R.47G



JBD  
STREET LIGHT  
SPECIFICATIONS



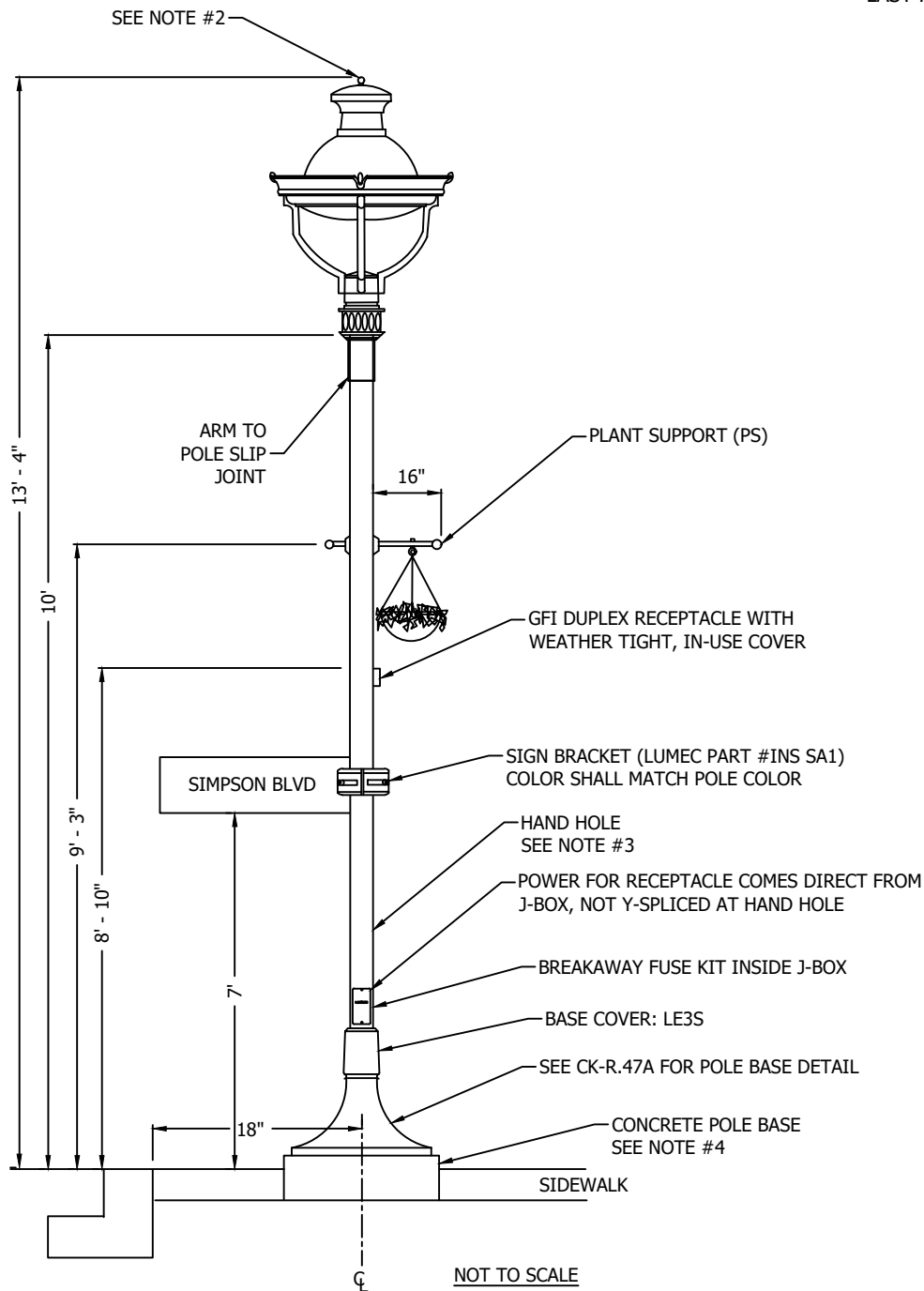
NOTE:  
PEDESTRIAN LIGHTING IS  
REQUIRED ALONG ALL  
PEDESTRIAN-ORIENTED STREETS  
AND ALONG ALL MAJOR  
PEDESTRIAN PATHWAYS.

CITY OF KIRKLAND

PLAN NO. CK-R.47H



PEDESTRIAN  
CIRCULATION  
IN THE JBD



**NOTES:**

1. INSTALL PHOTO ELECTRIC CELL (P.E.C.) ON POLE CAP (IF POWERED BY CUSTOMER CIRCUIT). USE TWISTLOCK TYPE. SEE CITY OF KIRKLAND INSPECTOR FOR PART NUMBERS OR EQUIVALENT. FACTORY INSTALLED P.E.C. IS NOT ACCEPTABLE.
2. WIRES FROM J-BOX, OUTLET, AND BALLAST WILL BE CONNECTED AT THIS AREA; NOT BY THE SLIP JOINT.
3. THE ONLY CONNECTION MADE AT HAND HOLE IS THE POLE GROUNDING CONNECTION.
4. WITH SLOPED SIDE WALKS, THE POLE BASE MUST PROTRUDE ABOVE FINISHED GRADE SO THAT BASE COVER WILL SIT LEVEL.
5. LIGHTS SHALL BE GENERALLY SPACED AT 60' ON CENTER.
6. ALL PEDESTRIAN LIGHTS SHALL HAVE 1 SIGN BRACKET.
7. ALL SPLICE CONNECTIONS IN J-BOX SHALL BE MADE USING:
  - A. C-TAP (COPPER CRIMP)
  - B. 3M 2000 MASTIC COVER
  - C. 3M SUPER 88 TAPE

**CITY OF KIRKLAND**

**PLAN NO. CK - R.47I**



**JBD  
STREET LIGHT  
STANDARD**

Pedestrian Circulation  
in the North Rose Hill Business  
District

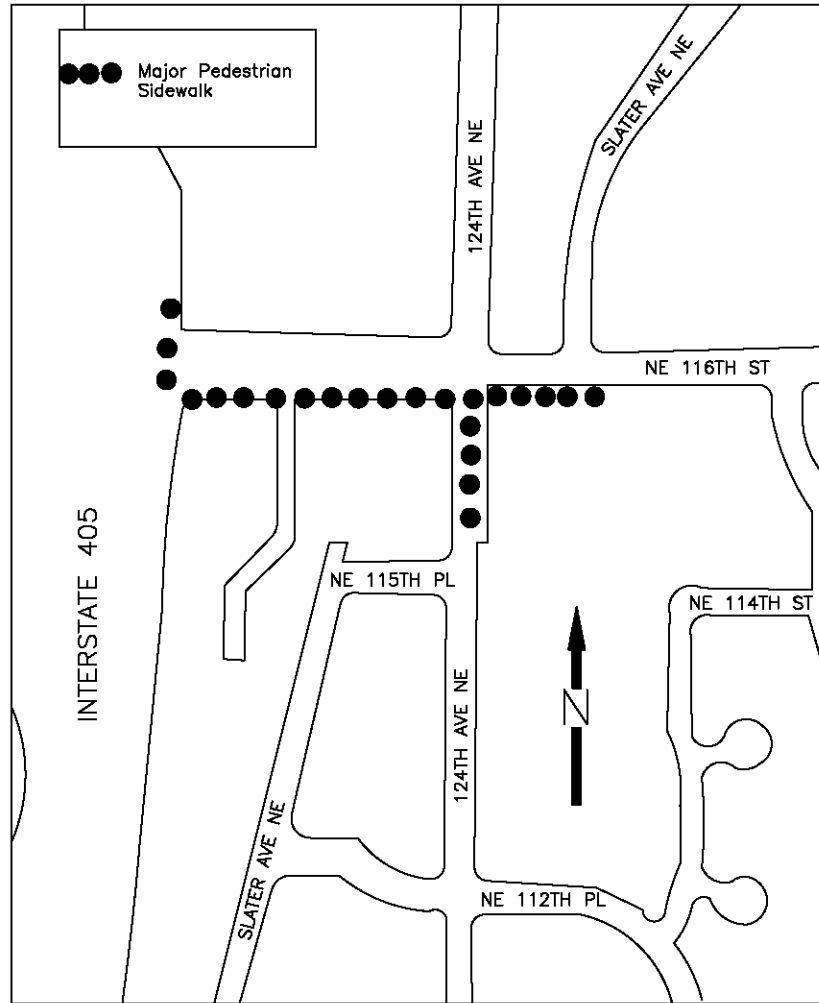


FIGURE 92.10.C

NOTE:  
PEDESTRIAN LIGHTING IS  
REQUIRED ALONG ALL  
PEDESTRIAN-ORIENTED STREETS  
AND ALONG ALL MAJOR  
PEDESTRIAN PATHWAYS.

CITY OF KIRKLAND

PLAN NO. CK-R.47J



PEDESTRIAN  
CIRCULATION  
IN NRHBD

MANUFACTURER	PHILIPS LUMEC
MODEL	DOMUS SMALL (DOS-DBB-1A)
COLOR	RD4TX 'TEXTURED SCARLET' (PER SUBMITTAL REVIEW)
BASE COVER	LBC4C
FUSE CONNECTOR KIT	VERIFY WITH TECHNICIANS
FUSES	VERIFY WITH TECHNICIANS
POLE HEIGHT	12 FEET
POLE TYPE	APR4U-12
REQUIRED OPTIONS	N/A
PHOTOELECTRIC SWITCH	IN ELECTRICAL SERVICE CABINET OR IN THE FIRST POLE IN THE SERIES, PROVIDED BY POLE MANUFACTURER
OPTICAL SYSTEM	PER PLANS
SPACING	PER PLANS
UTILITY BOX	PER PLANS
POWER	PER PLANS
CONDUIT	PER PLANS
LAMP	LED, WATTAGE PER PLANS
WIRING	PER PLANS
PERMIT	A SEPARATE ELECTRICAL PERMIT FROM THE CITY IS REQUIRED.
SPLICE CONNECTIONS	USE: C-TAP (COPPER CRIMP), 3M 2000 MASTIC WATERPROOFING, 3M SUPER 88 TAPE.

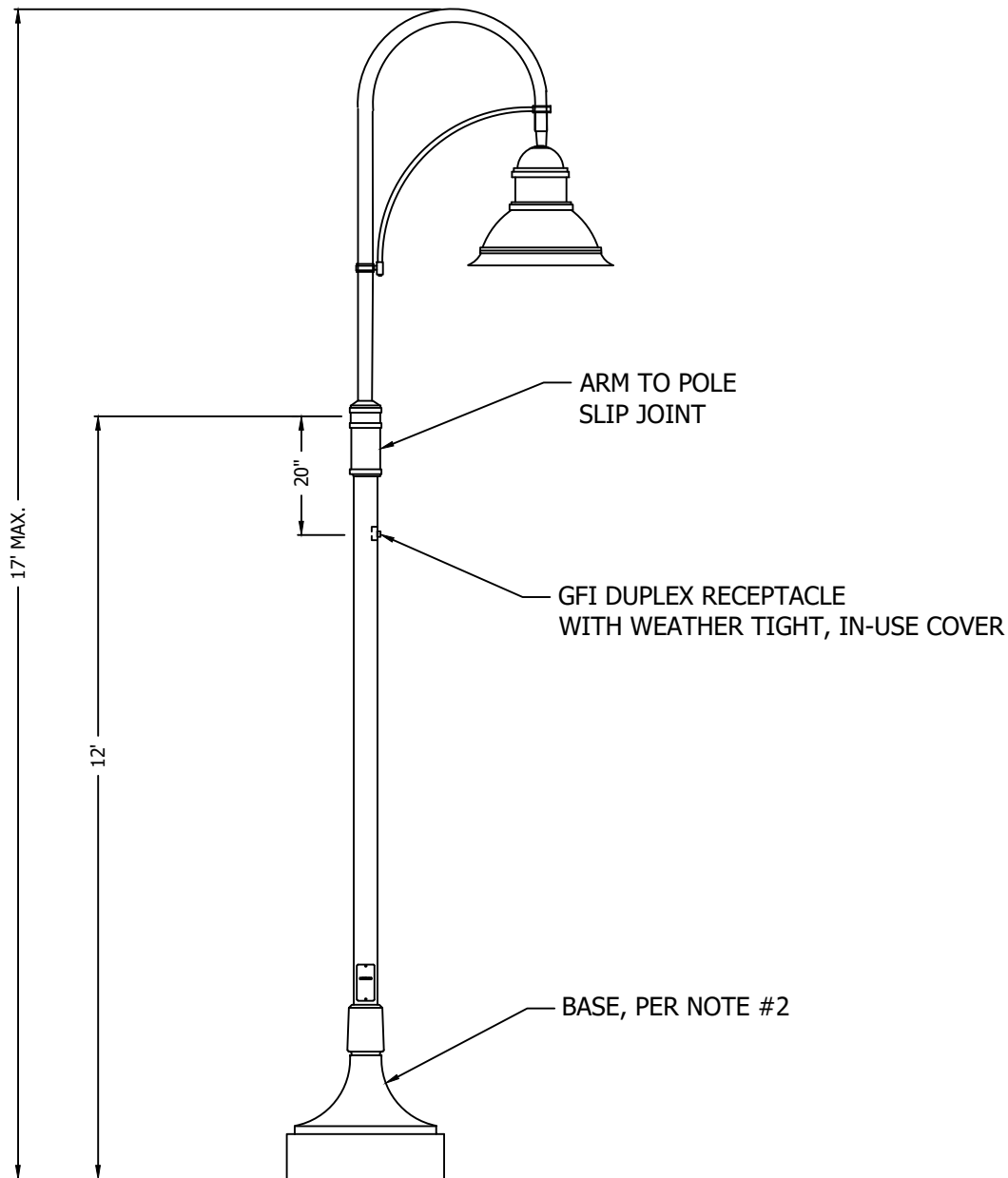
CITY OF KIRKLAND

PLAN NO. CK - R.47K



NE 85TH ST  
STREET LIGHT  
SPECIFICATIONS





NOT TO SCALE

NOTES:

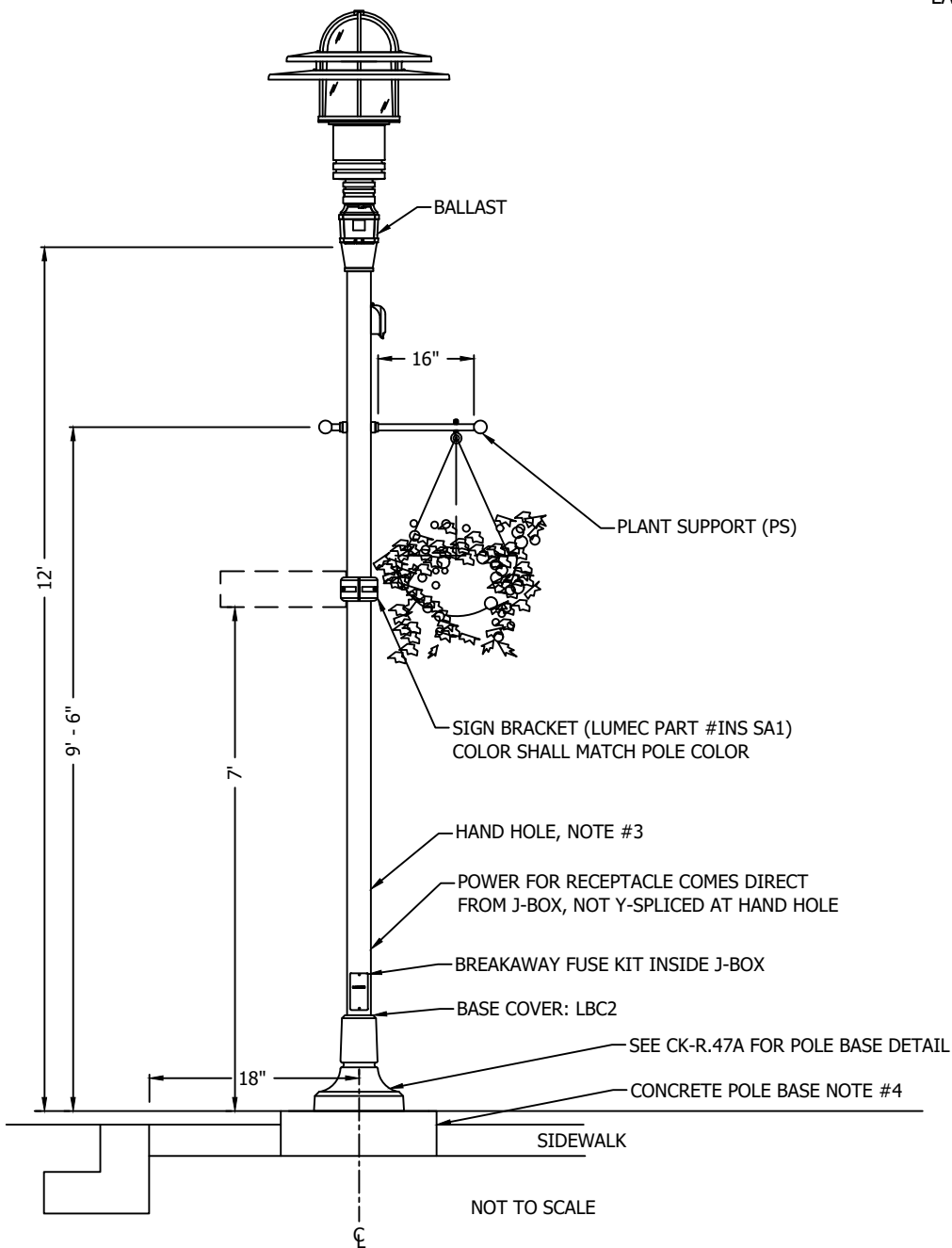
1. CONNECTION PER MANUFACTURER'S WIRING SCHEDULE.
2. BASE PER MANUFACTURER'S CUT SHEET.
3. SIDEWALK LOCATION PER PLAN.
4. WITH SLOPED SIDE WALKS, THE POLE BASE MUST PROTRUDE ABOVE FINISHED GRADE SO THAT BASE COVER WILL SIT LEVEL.
5. ALL SPLICE CONNECTIONS IN J-BOX SHALL BE MADE USING:
  - A. C-TAP (COPPER CRIMP)
  - B. 3M 2000 MASTIC COVER
  - C. 3M SUPER 88 TAPE

**CITY OF KIRKLAND**

**PLAN NO. CK - R.47L**



**NE 85TH ST  
STREET LIGHT  
STANDARD**



**NOTES:**

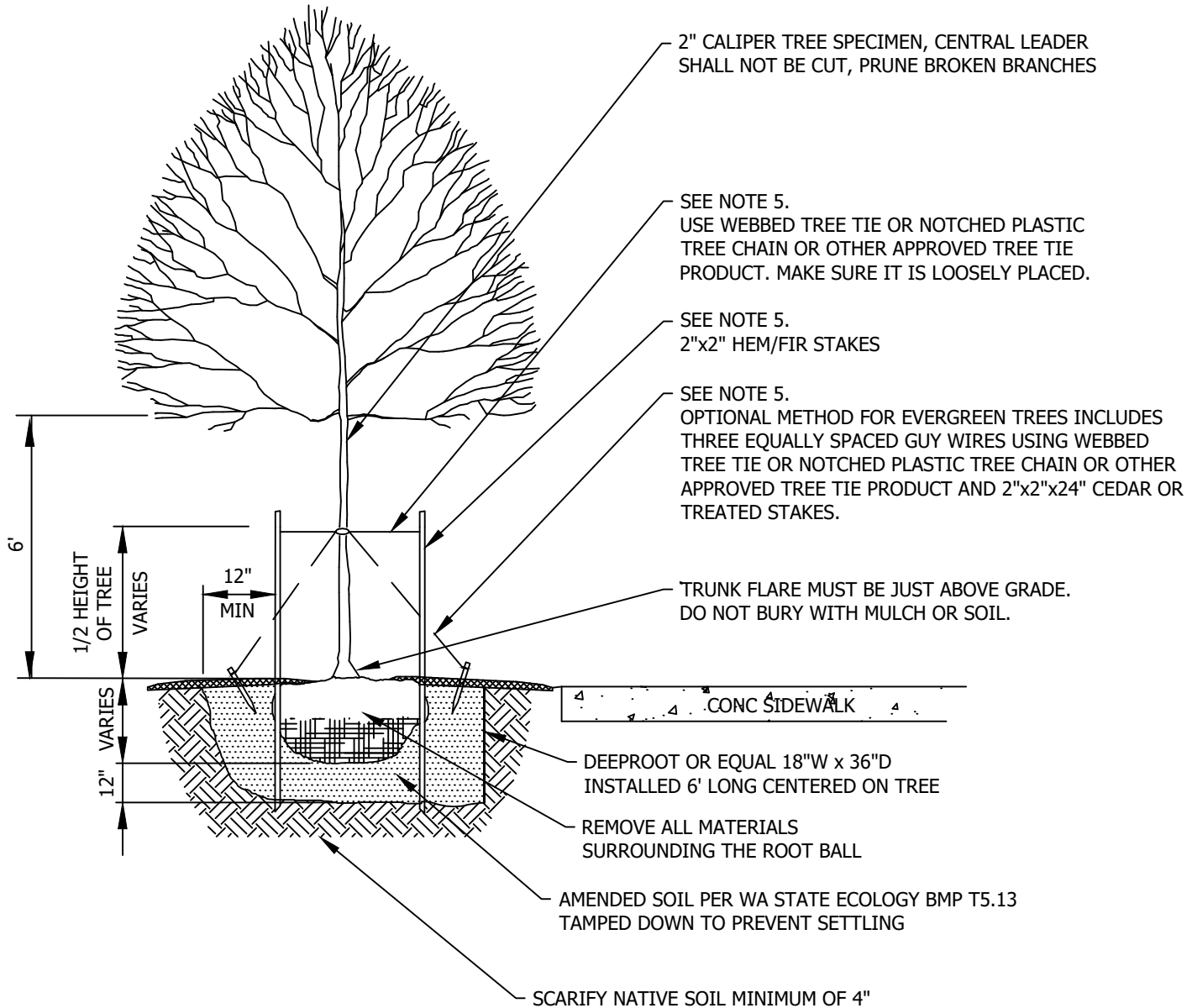
1. INSTALL PHOTO ELECTRIC CELL (P.E.C.) ON LIGHTING CABINET. SEE CITY OF KIRKLAND INSPECTOR FOR PART NUMBERS OR EQUIVALENT. FACTORY INSTALLED P.E.C. IS NOT ACCEPTABLE.
2. THE ONLY CONNECTION MADE AT HAND HOLE IS THE POLE GROUNDING CONNECTION.
3. WITH SLOPED SIDE WALKS, THE POLE BASE MUST PROTRUDE ABOVE FINISHED GRADE SO THAT BASE COVER WILL SIT LEVEL.
4. PS ORIENTATION UNDERNEATH LIGHT UNLESS OTHERWISE DESIGNATED.
5. LIGHTS SHALL BE GENERALLY SPACED AT 60' ON CENTER.
6. ALL PEDESTRIAN LIGHTS SHALL HAVE 1 SIGN BRACKET.
7. ALL SPLICE CONNECTIONS IN J-BOX SHALL BE MADE USING:
  - A. C-TAP (COPPER CRIMP)
  - B. 3M 2000 MASTIC COVER
  - C. 3M SUPER 88 TAPE

**CITY OF KIRKLAND**

**PLAN NO. CK - R.47M**



**TOTEM LAKE  
PEDESTRIAN STREET  
LIGHT STANDARD**

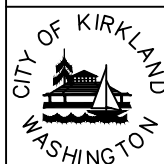


**NOTES:**

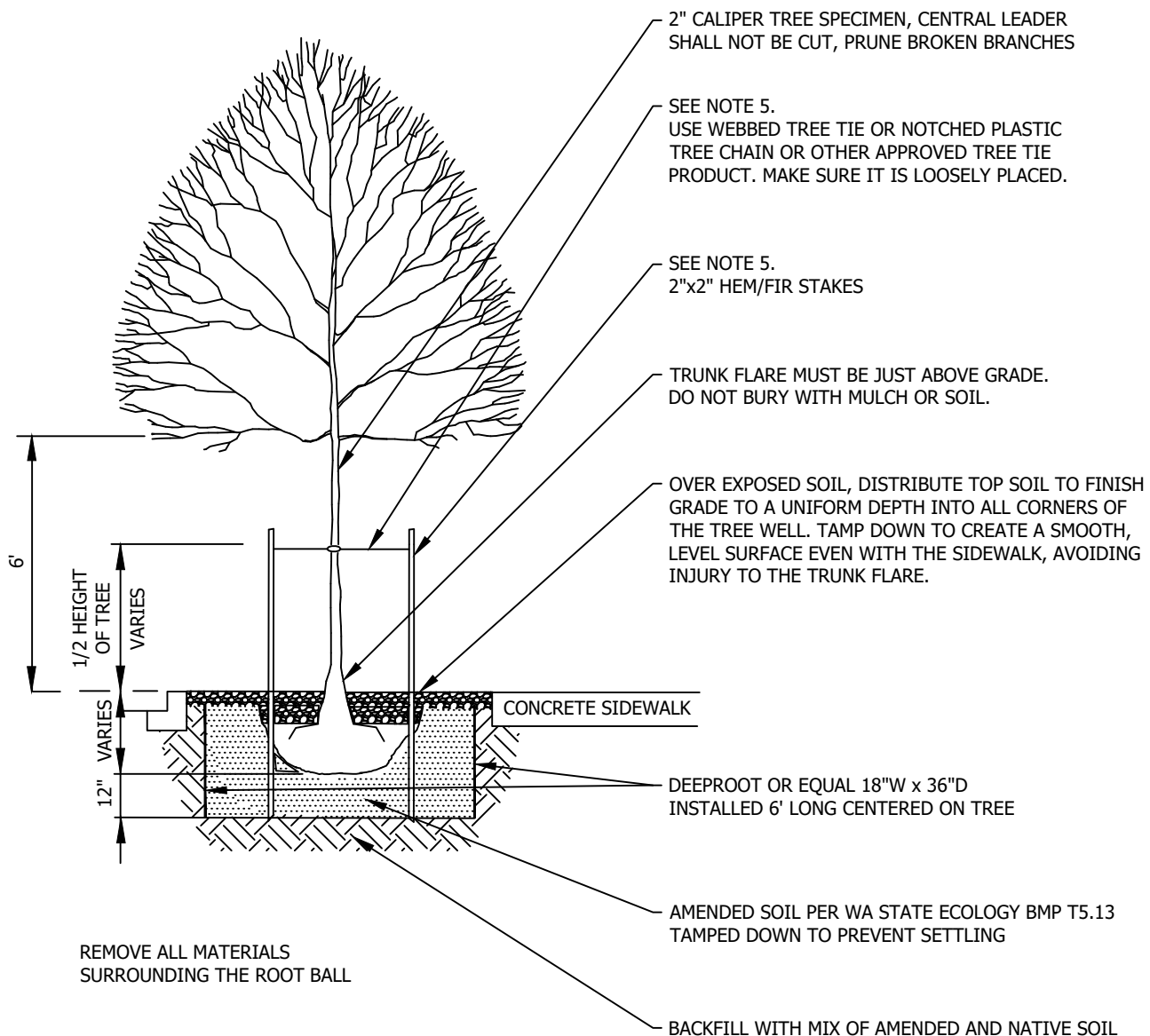
1. SIZE OF PLANTING PIT SHALL BE 4' BY 6' BY 3' DEEP.
2. FOR DECIDUOUS TREES, 2" CALIPER MINIMUM AND BRANCHING STARTS 5' ABOVE GRADE (UNLESS OTHER APPROVED BY CITY.)
3. FOR PLANTING DISTANCES NEAR INTERSECTIONS AND DRIVEWAYS, REFER TO PRE-APPROVED PLANS NOTEBOOK.
4. TREES SHALL NOT BE PLANTED WITHIN 10' OF ANY UG UTILITY ACCESS WHICH MAY BE LOCATED IN THE PLANTER STRIP OR ADJACENT SIDEWALK.
5. STAKE ONLY WHEN NECESSARY OR IF REQUIRED BY THE CITY AND INCLUDE TIMELINE FOR REMOVAL OF STAKES AND TIES.
6. ROOT BARRIER TO BE DEEPROOT (OR APPROVED EQUAL 18" BY 36" BY 6' LONG INSTALLED ON BOTH CURB AND SIDEWALK SIDE.
7. SPECIAL CONSTRUCTION NOTE FOR FILTERRA TREE BOXES: AT THE TIME OF PLANTING, IN ADDITION TO FILTERRA MANUFACTURER SPECS., TREES MUST BE A MIN. 51 INCHES TALL ABOVE THE TREE GRATE SURFACE AND 0.75 INCH DIAM. AT THE GRATE OPENING. THE TREE SHOULD MEASURE AT LEAST 5.25 FT FROM THE ROOT COLLAR OF THE TREE.

CITY OF KIRKLAND

PLAN NO. CK-R.48



**TREE PLANTING  
DETAIL**



**NOTES:**

1. SIZE OF PLANTING PIT SHALL BE 3 TIMES LARGER THAN ROOT BALL.
2. FOR DECIDUOUS TREES, 2" CALIPER MINIMUM AND BRANCHING STARTS 5' ABOVE GRADE (UNLESS OTHER APPROVED BY CITY).
3. FOR PLANTING DISTANCES NEAR INTERSECTIONS AND DRIVEWAYS, REFER TO PRE-APPROVED PLANS NOTEBOOK.
4. TREES SHALL NOT BE PLANTED WITHIN 10' OF ANY UG UTILITY ACCESS, WHICH MAY BE LOCATED IN THE PLANTER STRIP OR ADJACENT SIDEWALK.
5. STAKE AND INCLUDE TIMELINE FOR REMOVAL OF STAKES AND TIES.
6. ROOT BARRIER TO BE DEEPROOT (OR APPROVED EQUAL) 18" WIDTH BY 36" DEPTH BY 6' LONG TOTAL INSTALLED ON BOTH CURB AND SIDEWALK SIDE.
7. SPECIAL CONSTRUCTION NOTE FOR FILTERRA TREE BOXES: AT THE TIME OF PLANTING, IN ADDITION TO FILTERRA MANUFACTURER SPECS., TREES MUST BE A MIN. 51 INCHES TALL ABOVE THE TREE GRATE SURFACE AND 0.75 INCH DIAM. AT THE GRATE OPENING. THE TREE SHOULD MEASURE AT LEAST 5.25 FT FROM THE ROOT COLLAR OF THE TREE.

CITY OF KIRKLAND

PLAN NO. CK-R.48A

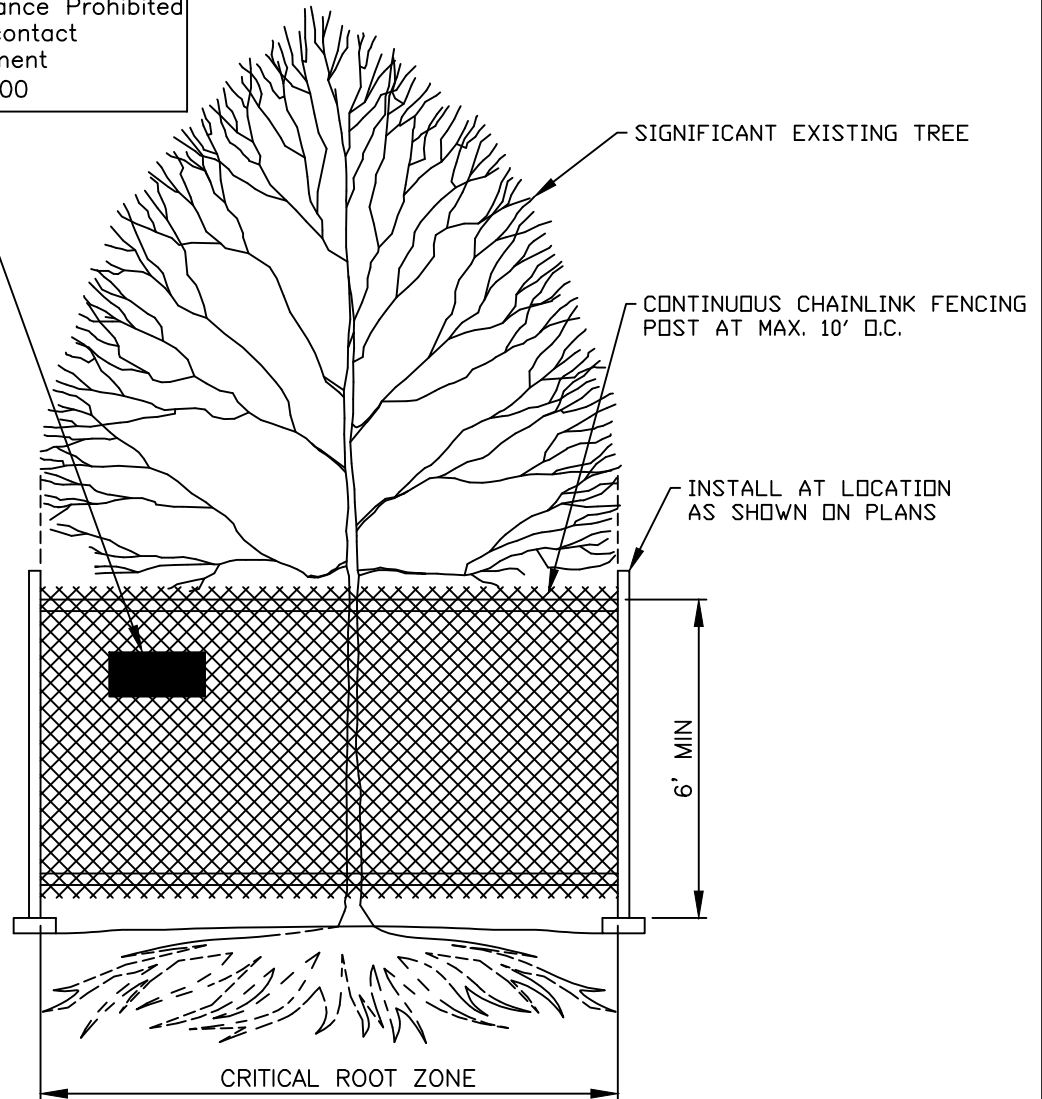


**4'X6' TREE WELL  
PLANTING DETAIL**

# FENCING SIGN DETAIL

LAST REVISED: 1/2022

Tree Protection Area, Entrance Prohibited  
To report violations contact  
City Code Enforcement  
at (425) 587-3600



## NOTES:

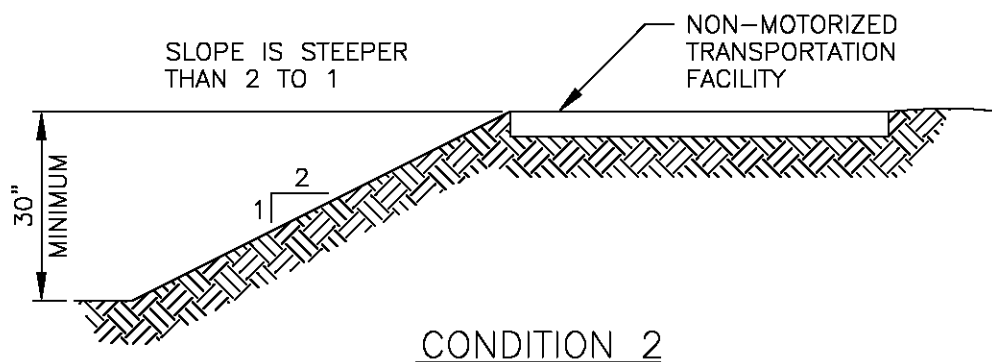
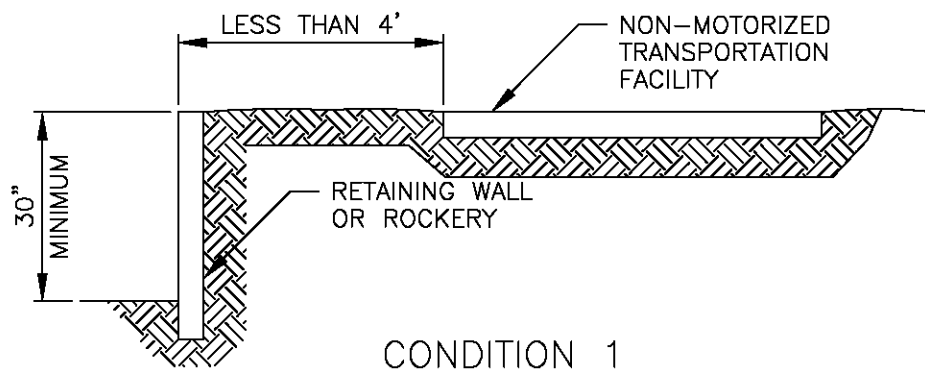
1. MINIMUM SIX (6) FOOT HIGH TEMPORARY, CONTINUOUS CHAIN LINK FENCE SHALL BE PLACED AT THE CRITICAL ROOT ZONE OR DESIGNATED LIMIT OF DISTURBANCE OF THE TREE TO BE SAVED, FENCE SHALL COMPLETELY ENCIRCLE SIGNIFICANT EXISTING TREE(S). INSTALL CONTINUOUS CHAIN LINK FENCING POST(S) USING PIER BLOCK ONLY AT MAXIMUM 10 (TEN) FEET O.C. AVOID POST OR STAKES INTO MAJOR ROOTS, MODIFICATIONS TO FENCING MATERIAL AND LOCATION MUST BE APPROVED BY PLANNING OFFICIAL.
2. TREATMENT OF ROOTS EXPOSED DURING CONSTRUCTION; FOR ROOTS OVER ONE (1) INCH DIAMETER DAMAGED DURING CONSTRUCTION, MAKE A CLEAN STRAIGHT CUT TO REMOVE DAMAGED PORT OF ROOT, ALL EXPOSED ROOTS SHALL BE TEMPORARILY COVERED WITH DAMP BURLAP TO PREVENT DRYING AND COVERED WITH SOIL AS SOON AS POSSIBLE.
3. NO STOCKPILING OF MATERIALS, VEHICULAR TRAFFIC, OR STORAGE OF EQUIPMENT OR MACHINERY SHALL BE ALLOWED WITHIN THE LIMIT OF THE FENCING, FENCING SHALL NOT BE MOVED OR REMOVED UNLESS APPROVED BY THE CITY PLANNING OFFICIAL. WORK WITHIN PROTECTION FENCE SHALL BE DONE MANUALLY UNDER THE SUPERVISION OF THE ON-SITE ARBORIST AND WITH PRIOR APPROVAL BY THE CITY PLANNING OFFICIAL.
4. A PRINTED TREE PROTECTION AREA SIGN NOTING (TREE PROTECTION AREA – ENTRANCE PROHIBITED. TO REPORT VIOLATIONS, CONTACT CITY CODE ENFORCEMENT AT 425-587-3600.”, MUST BE POSTED ALONG THE FENCE EVERY FIFTEEN (15) FEET. PRINT AND LAMINATE THE SIGN (AVAILABLE ONLINE) AND POST ON SITE.

CITY OF KIRKLAND

PLAN NO. CK-R.49



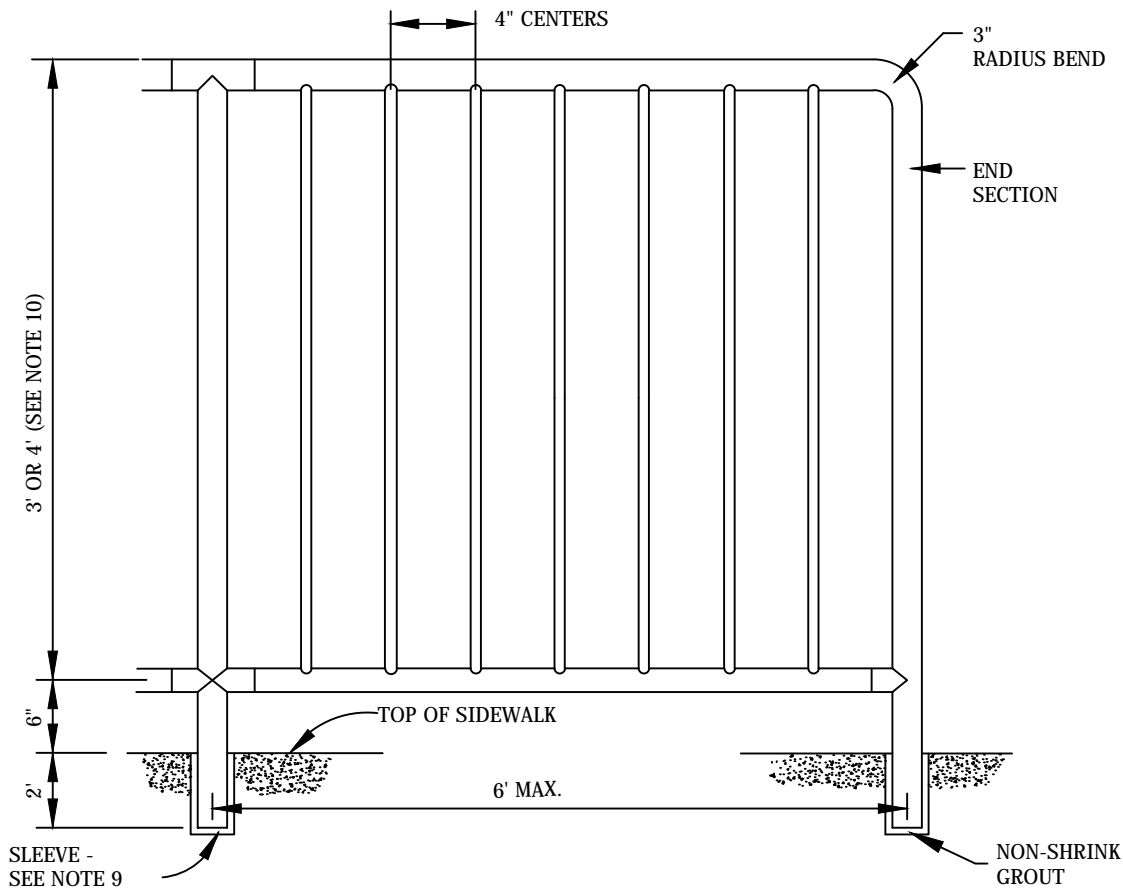
TREE  
PROTECTION



# NOTES

1. SAFETY RAIL TYPE AND INSTALLATION TO BE SPECIFIED BY THE REVIEW ENGINEER.

CITY OF KIRKLAND	
PLAN NO. CK-R.50	
	<p>CONDITIONS REQUIRING SAFETY RAILINGS</p>



### PIPE SCHEDULE

(ALL DIMENSIONS O.D.)

PANEL HEIGHT	TOP RAIL/POST	BOTTOM RAIL	BALUSTER
3'	1.90"	1.90"	.840"
4'	2.875"	2.375"	.840"

### NOTES

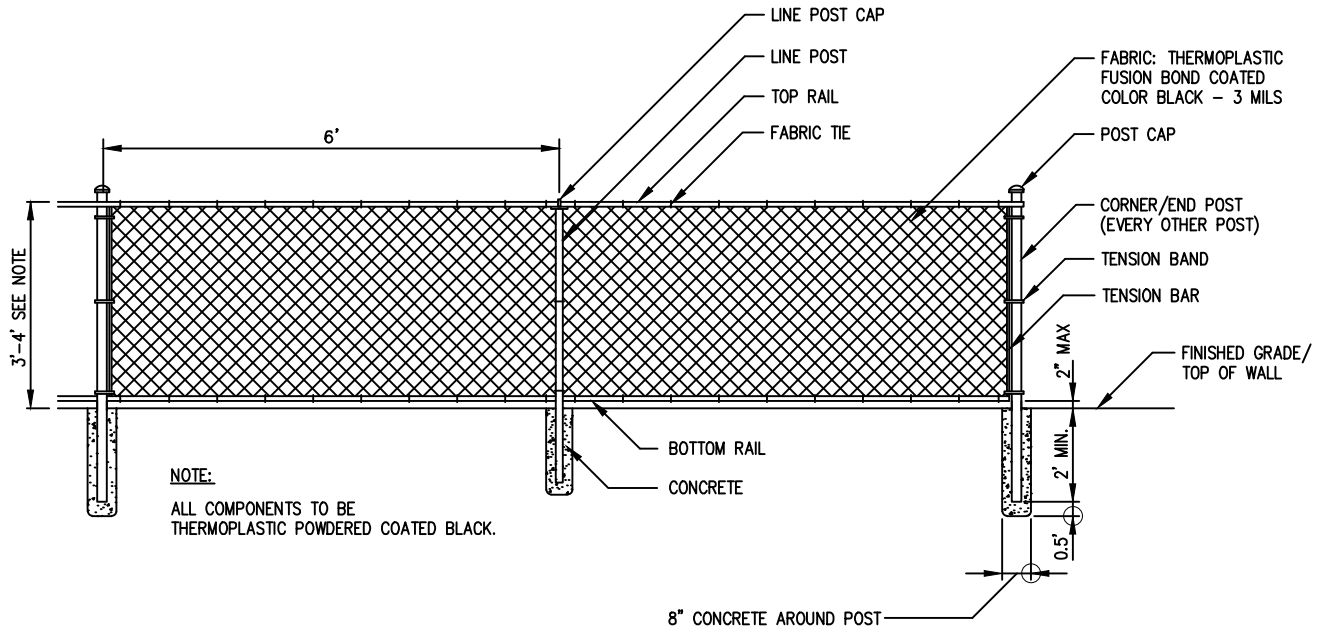
- RAILING SHALL BE ALUMINUM PIPE RAIL OR APPROVED EQUIVALENT. INSTALLATION PER MANUFACTURER'S RECOMMENDATIONS.
- SHOP DRAWINGS OF RAILING SHALL BE SUBMITTED FOR APPROVAL SHOWING COMPLETE DIMENSIONS AND DETAILS OF FABRICATION AND INCLUDING AN ERECTION DIAGRAM. MATERIALS BEING USED SHALL BE SPECIFIED IN THE SHOP DRAWINGS.
- ALL ALUMINUM PARTS SHALL BE GIVEN A CLEAR ANODIC COATING AT LEAST 0.0006 INCH THICK AND BE HOT WATER SEALED AND SHALL HAVE A UNIFORM FINISH.
- PIPE RAILING AND PIPE RAILING SPLICES MAY BE HEATED TO NOT MORE THAN 400°F FOR A PERIOD NOT TO EXCEED 30 MINUTES TO FACILITATE FORMING OR BENDING.
- CUTTING SHALL BE DONE BY SAWING OR MILLING AND ALL CUTS SHALL BE TRUE AND SMOOTH. FLAME CUTTING WILL NOT BE PERMITTED.
- PIPE RAILING, PIPE BALUSTERS AND PIPE RAILING SPLICES SHALL BE ADEQUATELY WRAPPED TO ENSURE SURFACE PROTECTION DURING HANDLING AND TRANSPORTATION TO THE JOB SITE.
- WELDING OF ALUMINUM SHALL BE IN ACCORDANCE WITH THE LATEST AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS.
- ALLOW FOR EXPANSION AT APPROXIMATELY EVERY FOURTH POST.
- RAILS, POSTS AND FORMED ELBOWS SHALL BE A.S.T.M B-241 OR B-429 ALLOY, 6063-T6 SCHEDULE 40 (STD. PIPE). BRACKETS, ENDCAPS AND OTHER FITTINGS SHALL BE A.S.T.M. 6063-T5. SPLICES AND REINFORCING SLEEVES SHALL BE DRAWN ALUMINUM TUBING 6063-T832. SLEEVE I.D. SHALL BE 1" GREATER THAN POST O.D.
- PANEL HEIGHT: 3 FEET FOR PEDESTRIAN USES  
4 FEET FOR COMBINED BICYCLE AND PEDESTRIAN USES

## CITY OF KIRKLAND

PLAN NO. CK- R.51



## SAFETY RAILING IN SIDEWALK



## PIPE SCHEDULE

(ALL DIMENSIONS I.D.)

BOTTOM/TOP RAIL	CORNER/END POST	LINE POST
1.25"	2.5"	2"

### NOTES

- ALL FENCING MATERIALS SHALL COMPLY WITH THE WSDOT/APWA STANDARD SPECIFICATIONS SECTION 9-16 CLASS 1 MATERIAL. INSTALLATIONS PER MANUFACTURER'S RECOMMENDATIONS.
- SHOP DRAWINGS OF RAILING SHALL BE SUBMITTED FOR APPROVAL SHOWING COMPLETE DIMENSIONS AND DETAILS OF FABRICATION AND INCLUDING AN ERECTION DIAGRAM. MATERIALS BEING USED SHALL BE SPECIFIED IN THE SHOP DRAWINGS.
- ALL STEEL PARTS SHALL BE GIVEN A BLACK ULTRAVIOLET-INSENSITIVE THERMOPLASTIC POWDER COATING AT LEAST 3 MILS THICK AND SHALL HAVE A UNIFORM FINISH.
- CUTTING SHALL BE DONE BY SAWING OR MILLING AND ALL CUTS SHALL BE TRUE AND SMOOTH. FLAME CUTTING WILL NOT BE PERMITTED.
- ALL MATERIALS SHALL BE ADEQUATELY WRAPPED TO ENSURE SURFACE PROTECTION DURING HANDLING AND TRANSPORTATION TO THE JOB SITE.
- ANY WELDING OF STEEL SHALL BE IN ACCORDANCE WITH THE LATEST AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS.
- PANEL HEIGHT:
  - 3 FEET FOR PEDESTRIAN USES
  - 4 FEET FOR COMBINED BICYCLE AND PEDESTRIAN USES

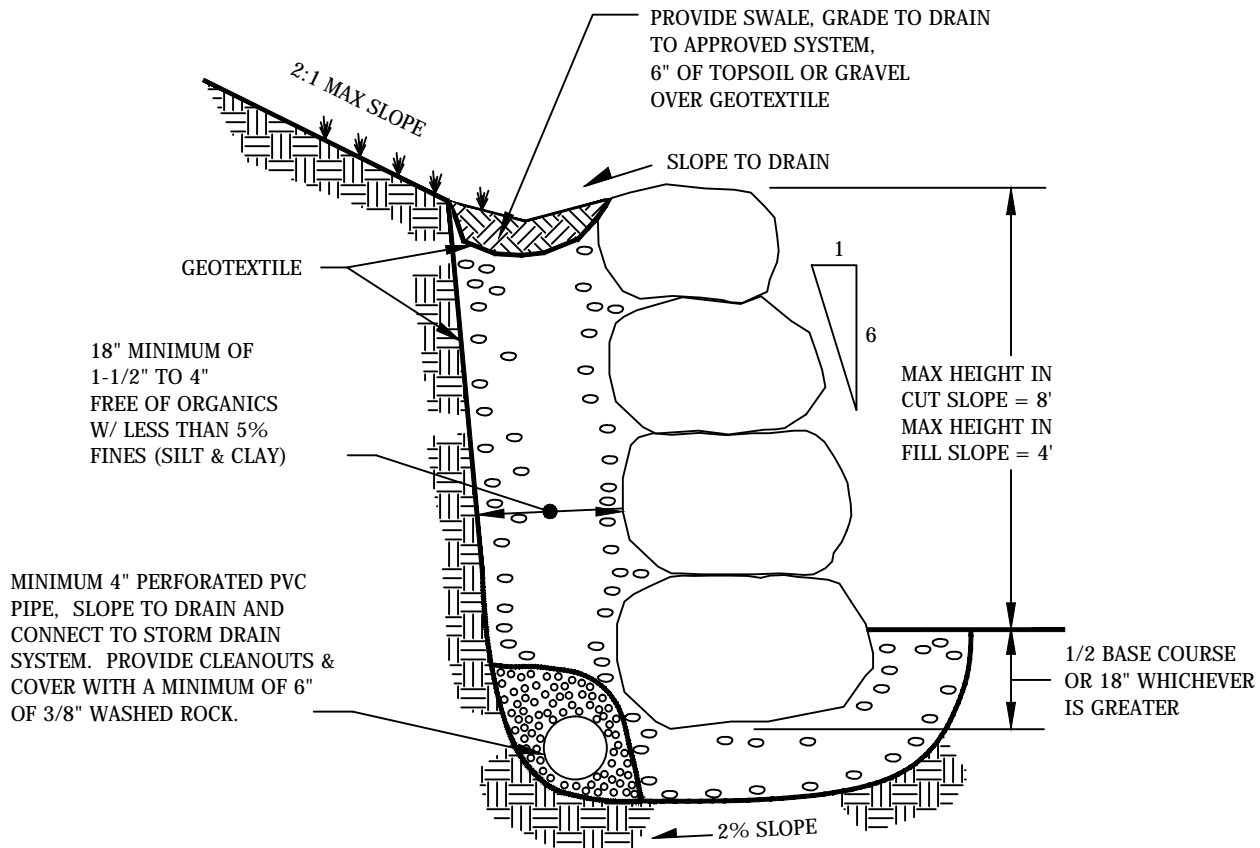
CITY OF KIRKLAND

PLAN NO. CK-R.51A



CHAIN LINK  
SIDEWALK  
SAFETY RAIL





NOTES:

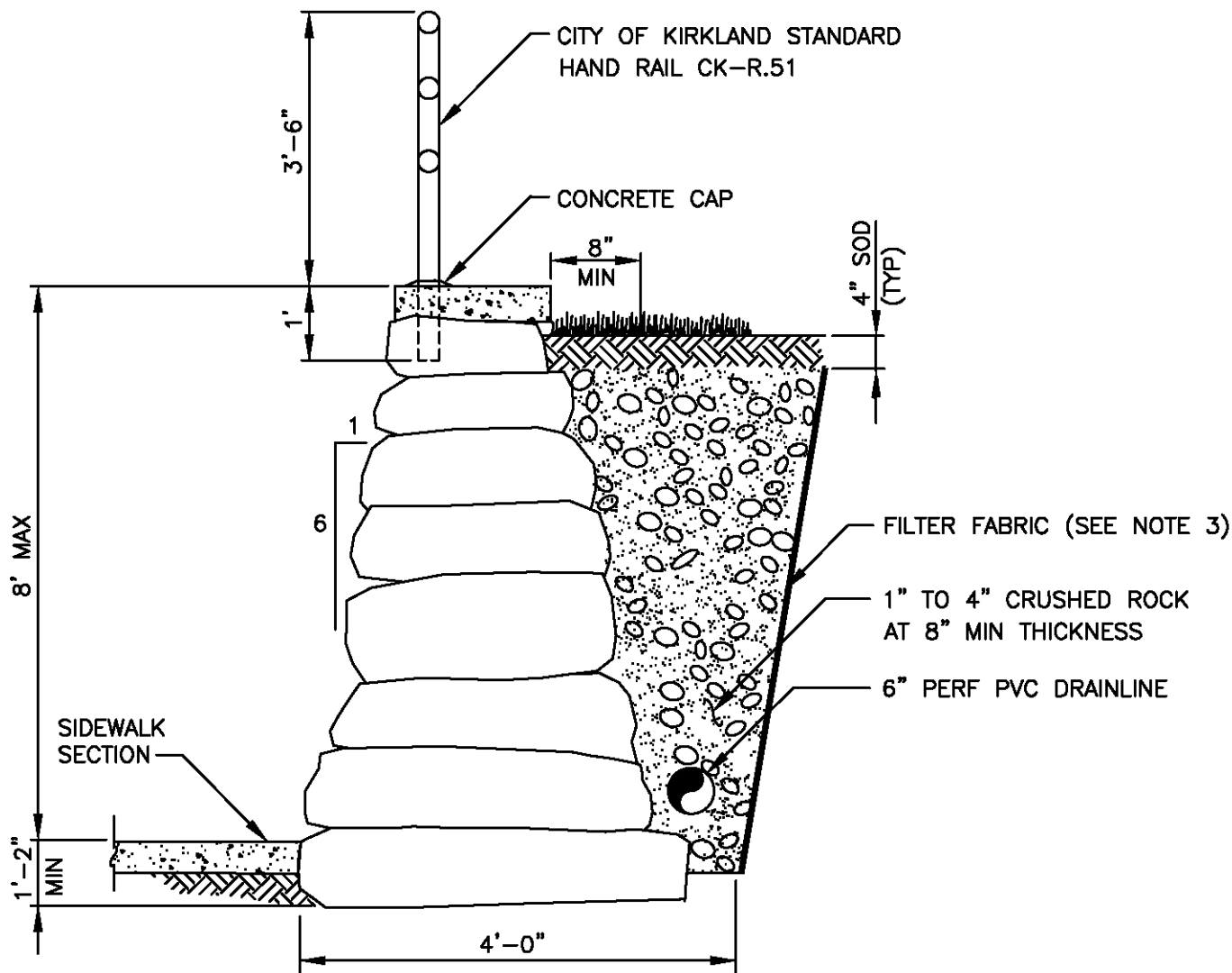
1. CALL FOR CLEAR AND GRADE INSPECTION PRIOR TO BASE COURSE BEING PLACED. VERIFICATION OF ROCKERY HEIGHT, FOUNDATION MATERIAL, AND ROCK SIZE BY CITY CLEAR AND GRADE INSPECTOR IS REQUIRED.
2. 4" TO 6" QUARRY SPALLS SHOULD BE PLACED DIRECTLY FROM TRUCK OR OTHER SUITABLE CONTAINER IN ORDER TO MAINTAIN CLEAN BACKFILL.
3. SPALLS MAY NOT BE NEEDED AT BASE OF ROCKERY IF NATIVE FOUNDATION MATERIAL IS SUITABLE AS DETERMINED BY THE GEOTECHNICAL ENGINEER OR THE CITY CLEARING AND GRADING INSPECTOR.
4. OPENINGS CHINKED WITH QUARRY SPALLS.
5. IF ROCKERY HEIGHT EXCEEDS 4', IT MUST BE DESIGNED BY A PRACTICING GEOTECHNICAL/ CIVIL ENGINEER LICENSED IN THE STATE OF WASHINGTON. NO ROCKERY SHALL BE GREATER THAN 8' IN HEIGHT UNLESS APPROVED BY CITY.
6. A ROCKERY GREATER THAN 4' IN HEIGHT AND ON PRIVATE PROPERTY SHALL REQUIRE A BUILDING PERMIT WITH A THIRD PARTY INSPECTION TO BE CONSTRUCTED.

**CITY OF KIRKLAND**

PLAN NO. CK- R.52



**ROCKERY WALL  
(RIGHT-OF-WAY  
AND PRIVATE ACCESS  
ROAD USE ONLY)**



ROCKERY HEIGHT (FT)	SIZE OF D	MIN ROCK SIZE (BASE)	MIN ROCK SIZE (TOP)
2	3 INCHES	2-MAN	1-MAN
4	6 INCHES	3-MAN	2-MAN
6	9 INCHES	4-MAN	2-MAN
8	12 INCHES	5-MAN	2-MAN

NOTES

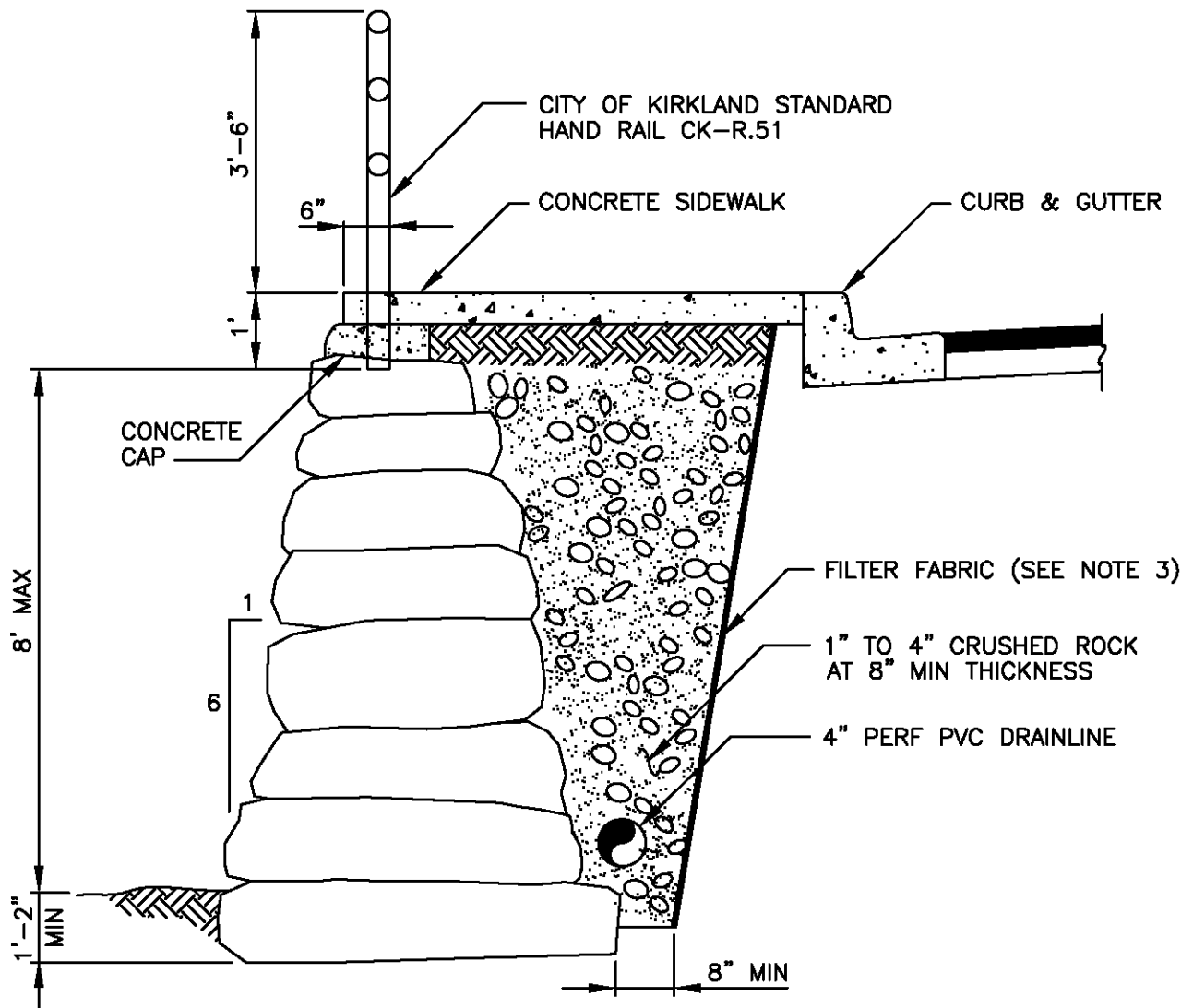
1. ROCKERY MUST BE INSTALLED BY LICENSED ROCKERY CONTRACTOR.
2. IF ROCKERY HEIGHT EXCEEDS 4', IT MUST BE DESIGNED BY A PRACTICING GEOTECHNICAL/ CIVIL ENGINEER LICENSED IN THE STATE OF WASHINGTON.
3. FILTER FABRIC SHALL BE MIRAFI 140 N SERIES OR APPROVED EQUAL.
4. APPROVED 6" PERF PVC DRAINLINE TIE TO PUBLIC STORM SYSTEM MUST BE INSPECTED BY PUBLIC WORKS.

CITY OF KIRKLAND

PLAN NO. CK-R.53




ROCKERY DETAIL  
BANK SUPPORT

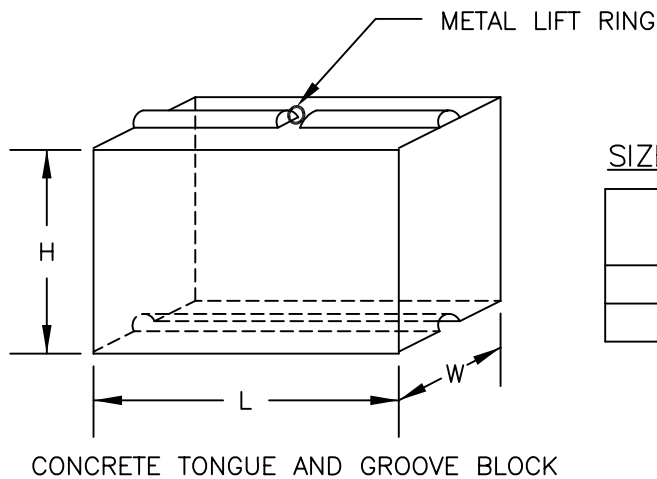
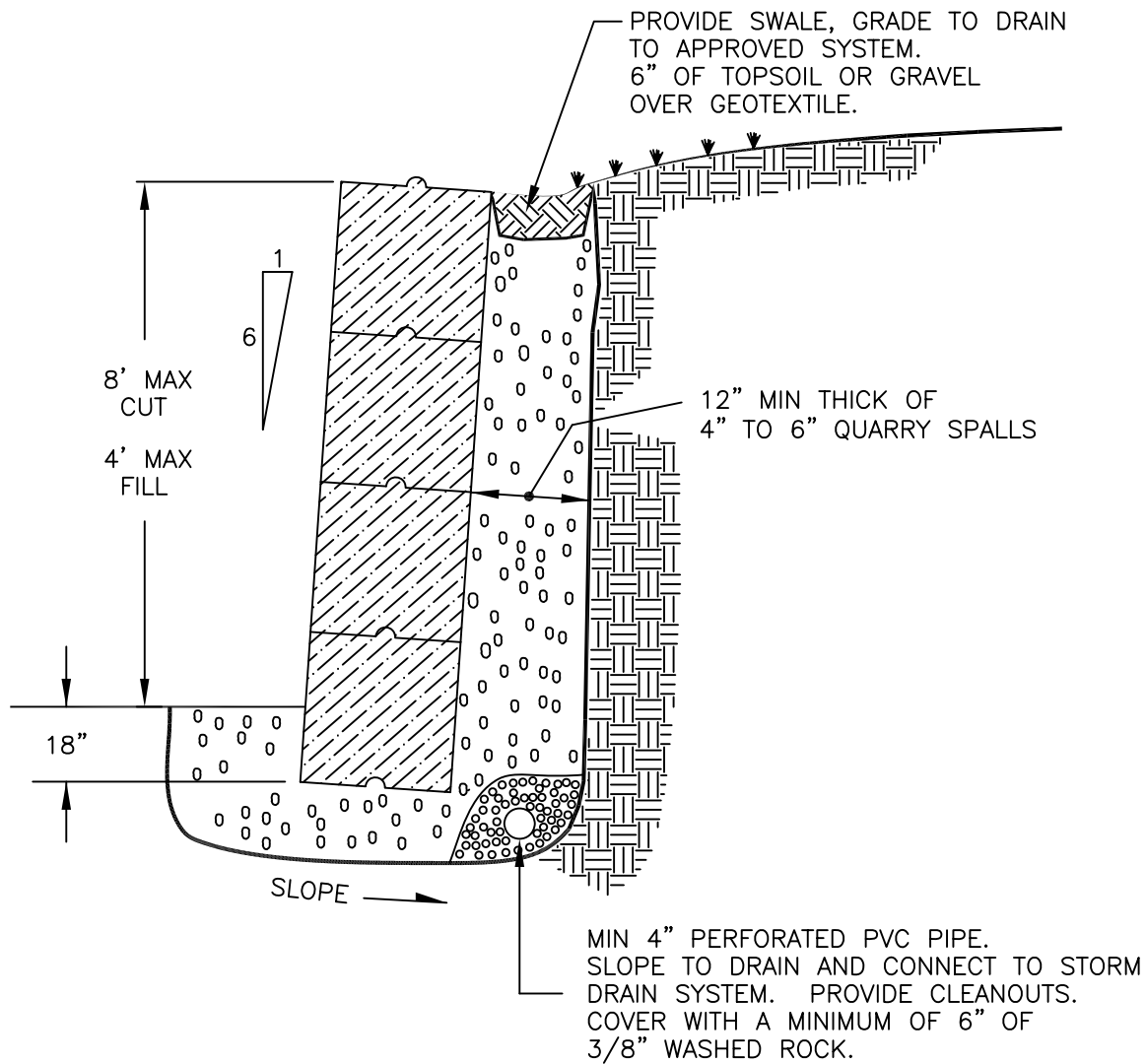


ROCKERY HEIGHT (FT)	SIZE OF D	MIN ROCK SIZE (BASE)	MIN ROCK SIZE (TOP)
2	3 INCHES	2-MAN	1-MAN
4	6 INCHES	3-MAN	2-MAN
6	9 INCHES	4-MAN	2-MAN
8	12 INCHES	5-MAN	2-MAN

**NOTES**

1. ROCKERY MUST BE INSTALLED BY LICENSED ROCKERY CONTRACTOR.
2. IF ROCKERY HEIGHT EXCEEDS 4', IT MUST BE DESIGNED BY A PRACTICING GEOTECHNICAL/ CIVIL ENGINEER LICENSED IN THE STATE OF WASHINGTON.
3. FILTER FABRIC SHALL BE MIRAFI 140 N SERIES OR APPROVED EQUAL.
4. APPROVED 6" PERF PVC DRAINLINE TIE TO PUBLIC STORM SYSTEM MUST BE INSPECTED BY PUBLIC WORKS.

CITY OF KIRKLAND	
PLAN NO. CK-R.54	
	ROCKERY DETAIL SIDEWALK SUPPORT



SIZES

H	L	W
2'-0"	3'-0"	2'-0"
2'-0"	6'-0"	2'-0"

NOTE:

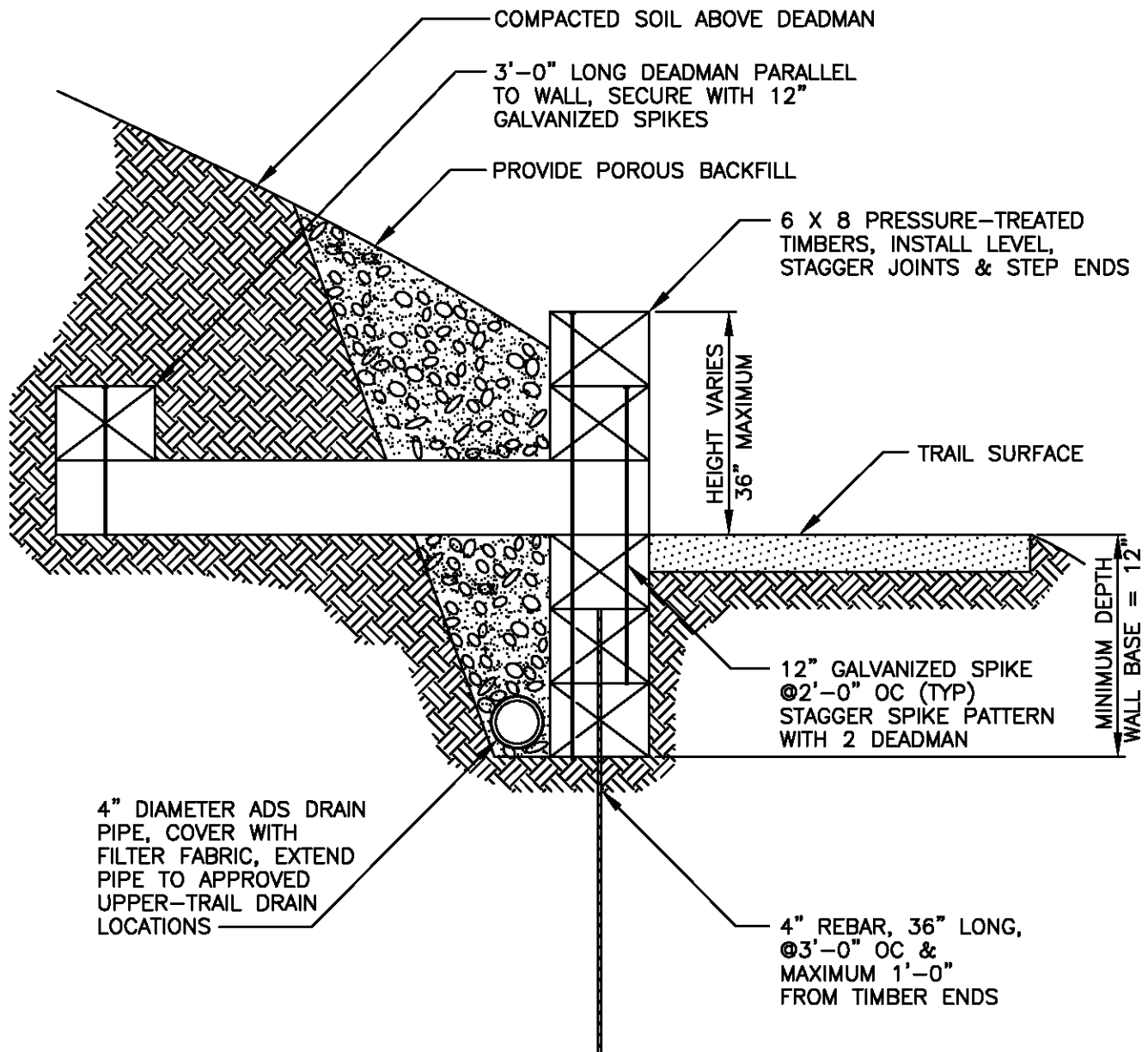
1. MAX DEPTH OF CUT SHALL BE 8 FEET, AND MAX DEPTH OF FILL SHALL BE 4' OR AS APPROVED BY GEOTECHNICAL ENGINEER. IN ANY CASE, THE CITY MAY REQUIRE INSPECTION AND APPROVAL BY A GEOTECHNICAL ENGINEER.

CITY OF KIRKLAND

PLAN NO. CK-R.55



ECOLOGY BLOCK  
WALL



# NOTES

1. ALL WOOD SHALL BE 'HEM-FIR', #2 OR BETTER.
2. ALL WOOD ACZA PRESSURE-TREATED PER LP-22, 0.6 RETENTION OR AS APPROVED BY OWNER.

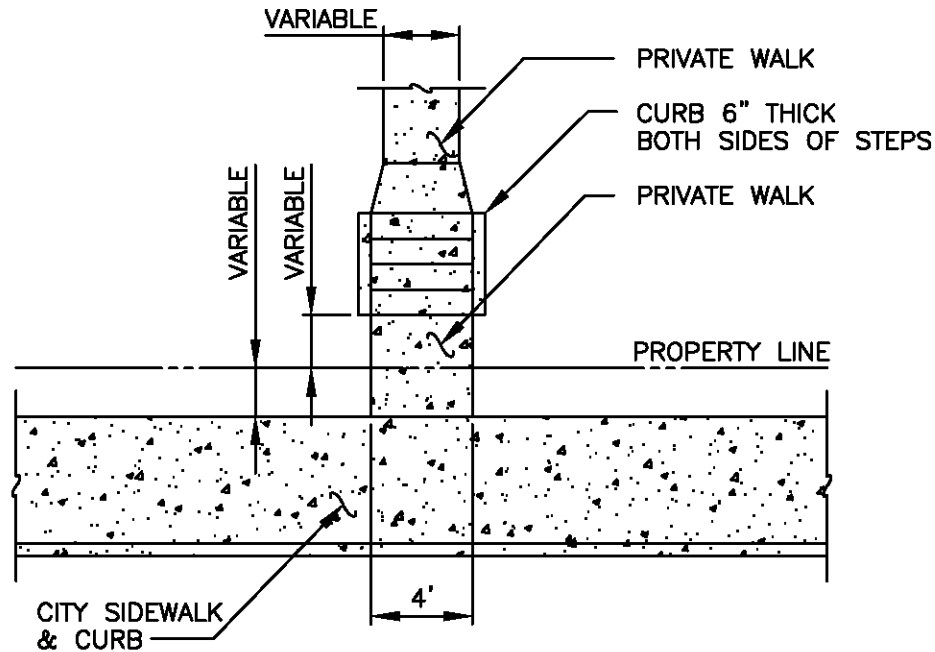
CITY OF KIRKLAND

PLAN NO. CK-R.56

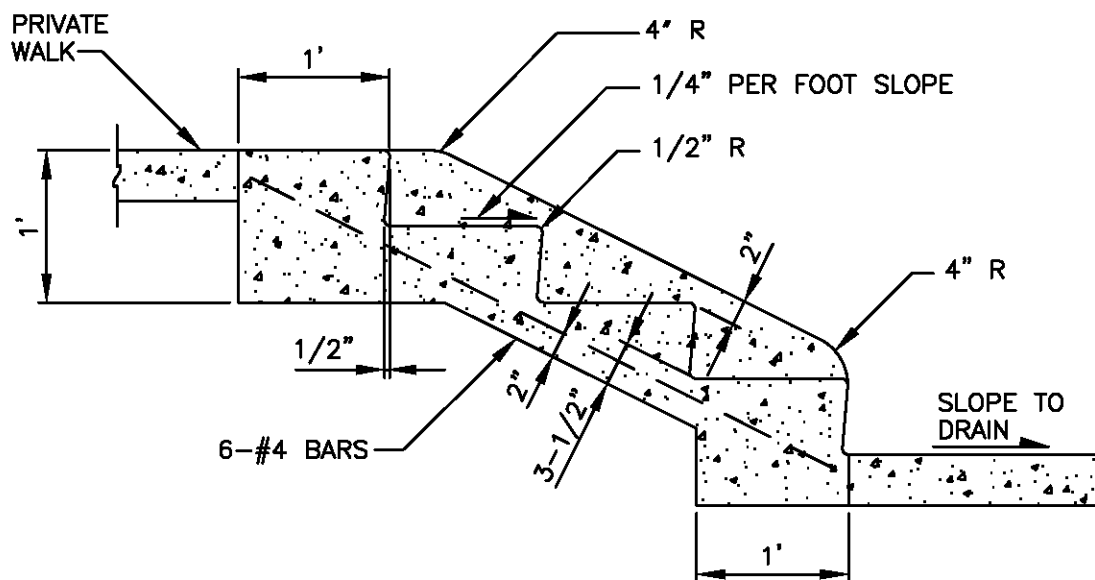


TIMBER  
RETAINING WALL

VARIABLE



PLAN



SECTION

## NOTES

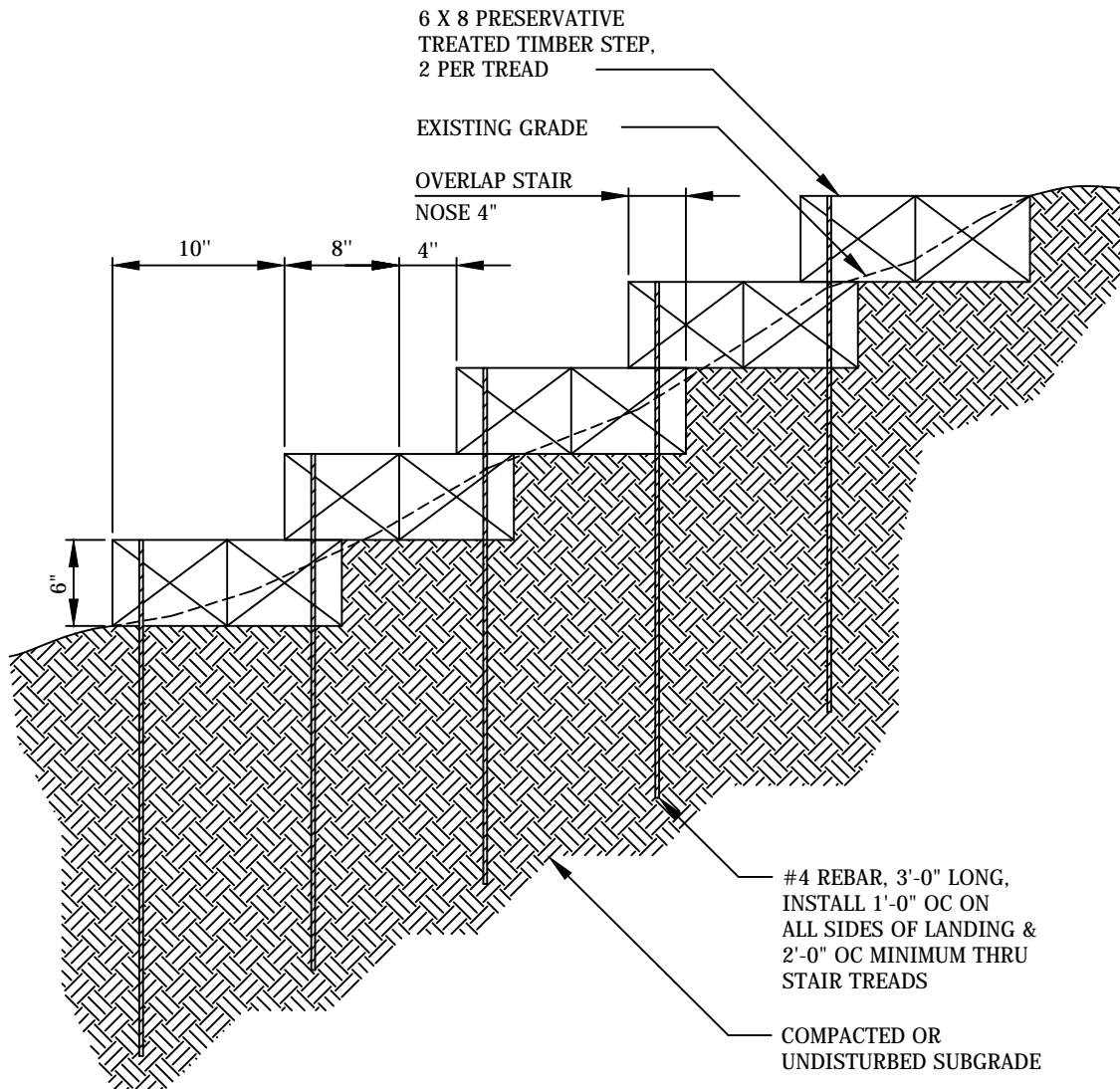
1. STEPS SHALL BE 4'-0" WIDE, CURB TO CURB, PLUS 6" CURBS ON EACH SIDE.
2. CEMENT CONCRETE SHALL BE CLASS 4000 TROWEL FINISH.
3. NUMBER OF STEPS SHALL SUIT INDIVIDUAL CONDITIONS, WITH TREAD AND RISER DIMENSIONS TO SUIT THE GRADE.
4. RISERS SHALL BE 5" MINIMUM, 7" MAXIMUM: TREAD SHALL BE 11" MINIMUM, 12" MAXIMUM.
5. HANDRAIL REQUIRED ON BOTH SIDES PER BUILDING CODE STANDARDS.

CITY OF KIRKLAND

PLAN NO. CK-R.57



## CEMENT CONCRETE STEPS



NOTES

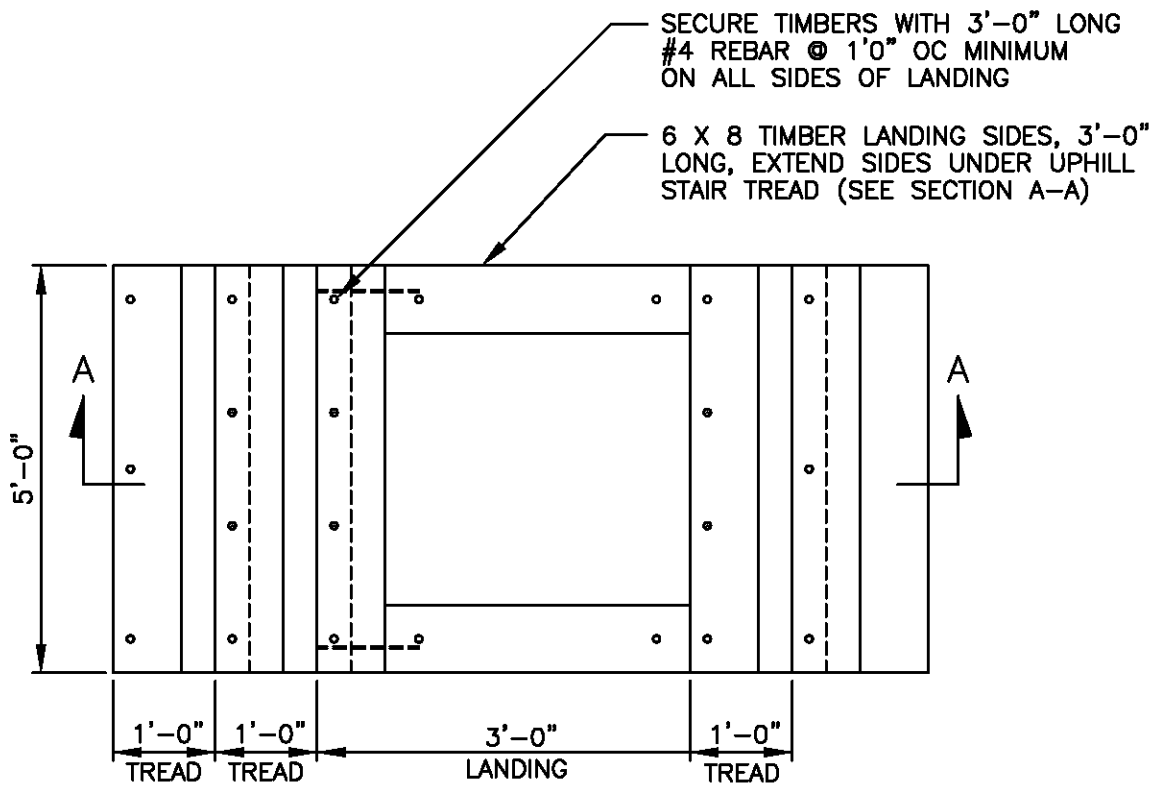
1. ALL WOOD SHALL BE 'HEM-FIR', #2 OR BETTER (WITH ROUGH-SAWN WALKING SURFACE).
2. ALL WOOD ACZA PRESSURE-TREATED PER LP-22, 0.6 RETENTION OR AS APPROVED BY CITY.

**CITY OF KIRKLAND**

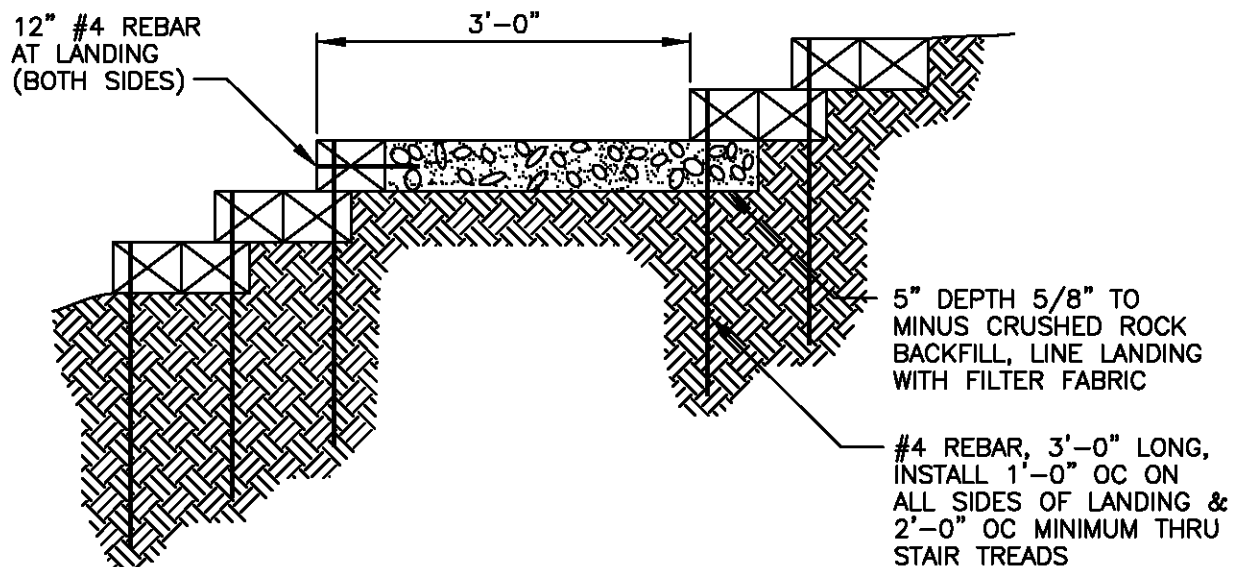
PLAN NO. CK- R.58



**TIMBER STAIRS**



PLAN



SECTION A-A

NOTES

1. ALL WOOD SHALL BE 'HEM-FIR', #2 OR BETTER (WITH ROUGH-SAWN WALKING SURFACE).
2. ALL WOOD ACZA PRESSURE-TREATED PER LP-22, 0.6 RETENTION OR AS APPROVED BY CITY.

CITY OF KIRKLAND

PLAN NO. CK-R.59



TIMBER STAIRS  
LANDING



## CK-R.60: Permitted Groundcover in Public Landscape Strip

IN ADDITION TO GRASS, THE FOLLOWING TYPES OF GROUNDCOVER CAN BE PLANTED IN A LANDSCAPE STRIP (THE PLANTING AREA BETWEEN CURB AND SIDEWALK) IN THE PUBLIC RIGHT-OF-WAY.

- \* LOWFAST COTONEASTER
- \* POTENTILLA
- \* KINNIKINNICK
- \* SALAL
- \* HEATHER AND HEATH
- \* VINCA MINOR (FOR SHADY AREAS)
- \* ORNAMENTAL GRASS SUCH AS:
  - BLUE FESCUE
  - CAREX/ SEDGE
  - DWARF LAVENDER
  - IBERIS
  - OTHERS AS APPROVED.

MAINTENANCE OF THE GROUNDCOVER, INCLUDING WATERING, TRIMMING, AND WEEDING IS THE RESPONSIBILITY OF THE ADJACENT PROPERTY OWNERS.

PLANTING SHALL BE AS FOLLOWS:

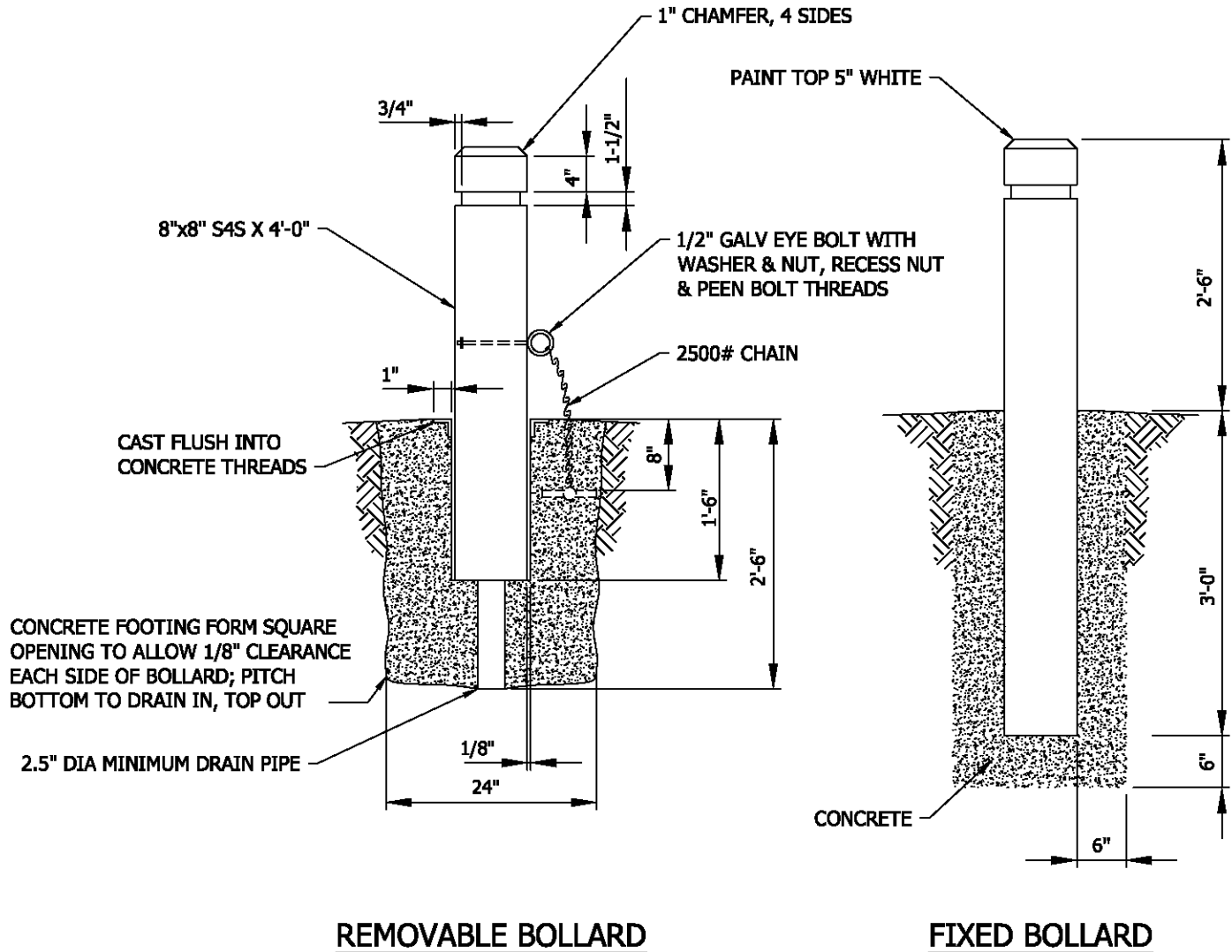
- \* 4" MINIMUM PLANT SIZE
- \* 9" MINIMUM SPACING ON CENTER
- \* GROWTH SHALL BE NO HIGHER THAN 12" ADJACENT PROPERTY OWNER IS RESPONSIBLE FOR KEEPING HEIGHT BELOW THIS 12" MAXIMUM.
- \* PREFERRED PLANTING DATES BETWEEN OCTOBER AND FEBRUARY.

**CITY OF KIRKLAND**

PLAN NO. CK- R.60



**PERMITTED GROUNDCOVER  
PUBLIC LANDSCAPE STRIP**



**NOTES:**

1. TIMBER SHALL BE PRESSURE TREATED FIR, DENSE CONSTRUCTION GRADE, AND SHALL BE PRESSURE TREATED.
2. NUTS BOLTS, AND WASHERS CONFORM TO ASTM A307.
3. ALL ALUMINUM CONSTRUCTION.
4. CONCRETE SHALL BE CLASS C.
5. PITCH GRADE ON FIXED BOLLARD TO DRAIN AWAY FROM POST.
6. SPACING OF BOLLARDS TO BE 5' ON CENTER.

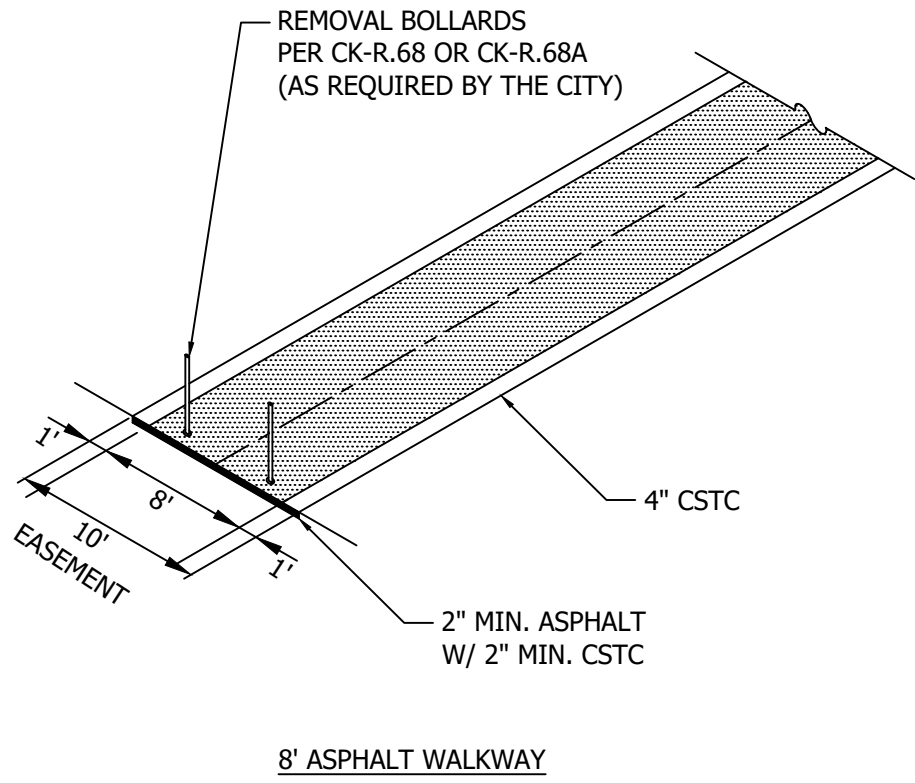
**CITY OF KIRKLAND**

PLAN NO. CK- R.61




**BOLLARDS**



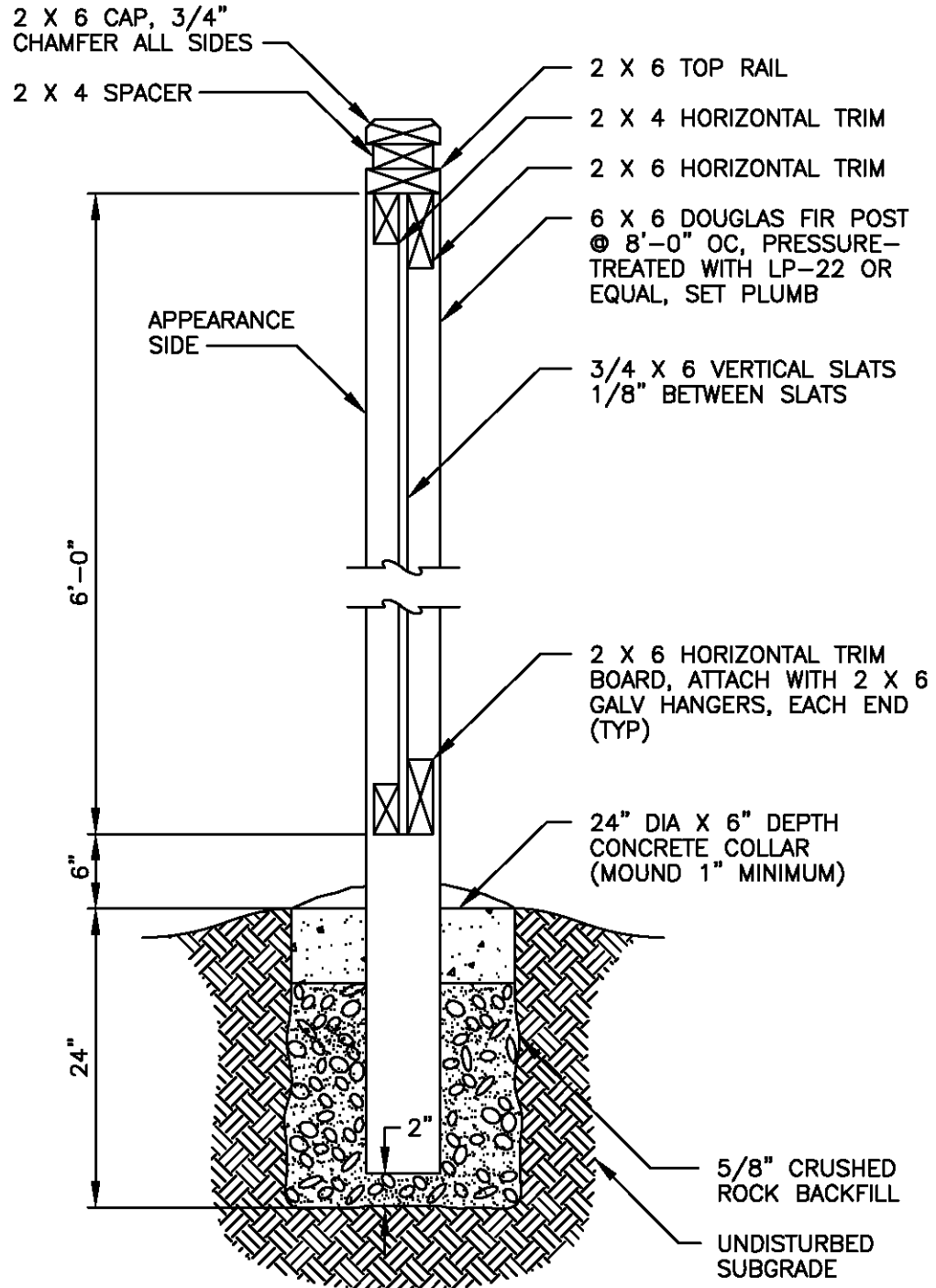


NOTES:

1. FOLLOW CK-R.68 OR CK-R.68A FOR INSTALLATION REQUIREMENTS.
2. WALKWAY PAVEMENT WIDTH MUST BE 10' WHERE CONNECTIONS ARE REQUIRED TO THE CROSS KIRKLAND OR EASTSIDE RAIL CORRIDORS.

CITY OF KIRKLAND	
PLAN NO. CK - R.62	
	PEDESTRIAN / WALKWAY EASEMENT

## WOOD SAFETY RAILING



# NOTES

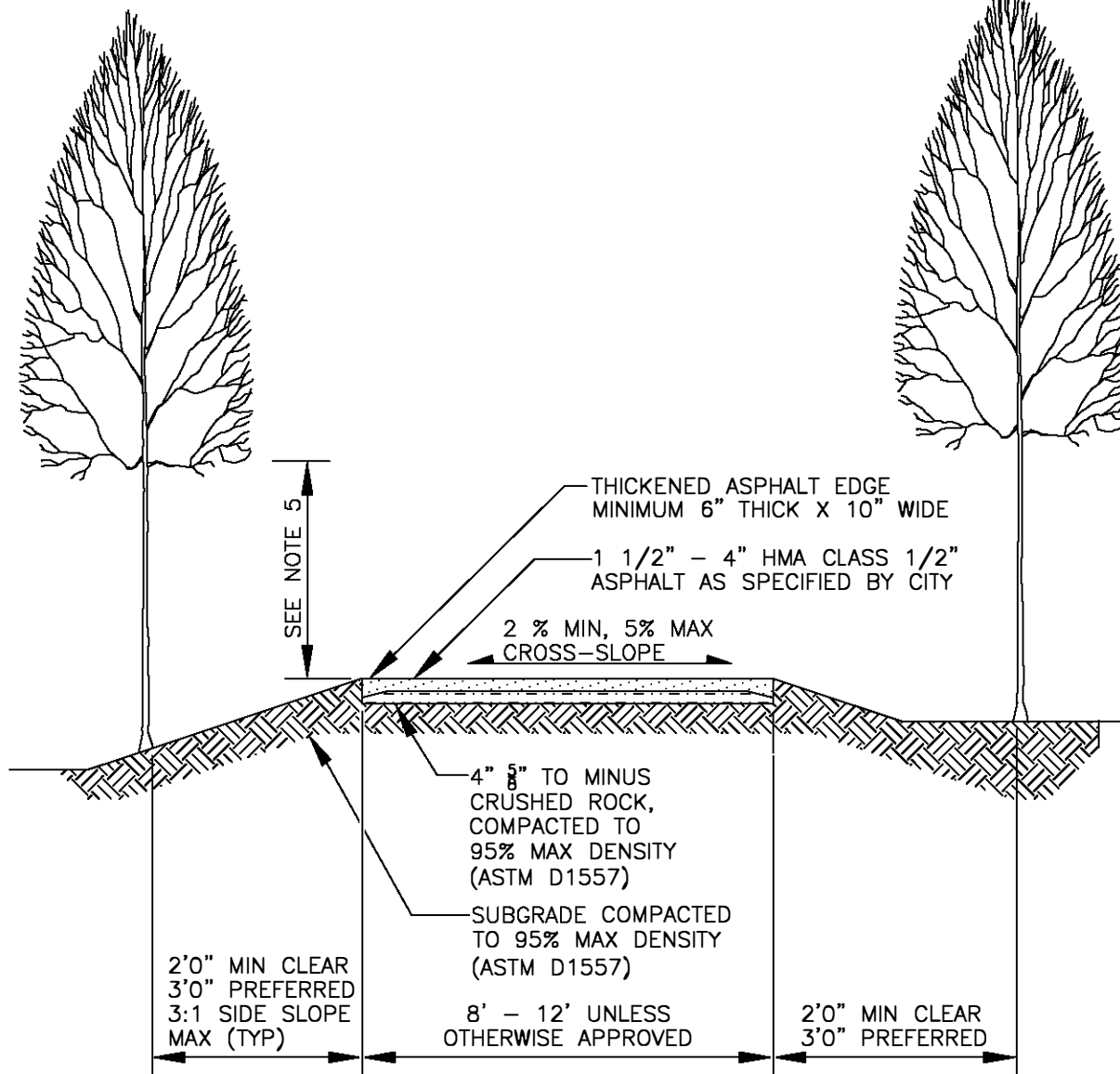
1. ALL WOOD TO BE WESTERN RED CEDAR GRADE 'B' OR BETTER UNLESS OTHERWISE INDICATED.
2. FASTEN ALL MATERIALS WITH 10d GALVANIZED NAILS UNLESS OTHERWISE INDICATED.

CITY OF KIRKLAND

PLAN NO. CK-R.64



BOARD FENCE



# NOTES

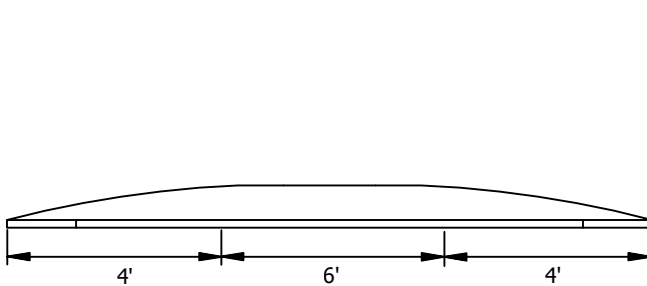
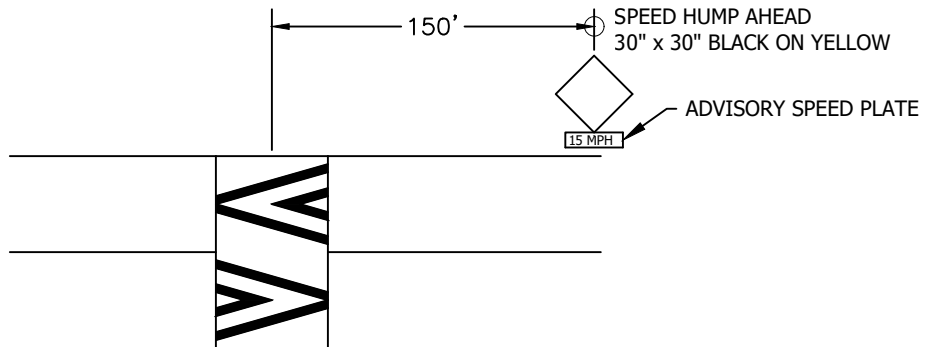
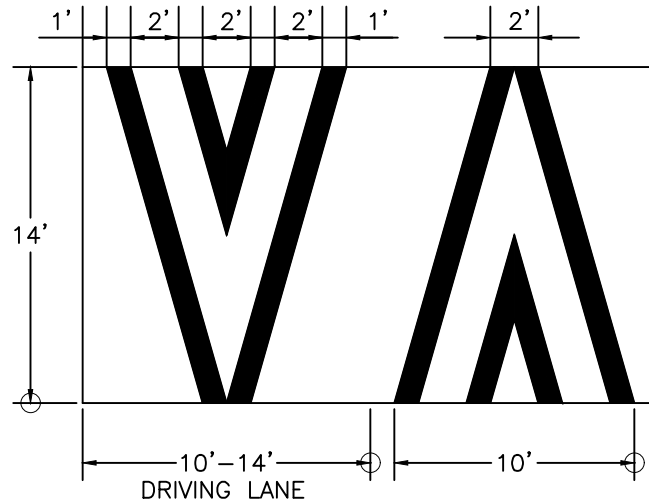
- ALL PLANS MUST BE APPROVED BY THE CITY PRIOR TO CONSTRUCTION OF THE TRAIL. TRAIL CENTERLINE TO BE STAKED IN FIELD BY CONTRACTOR AND APPROVED BY THE APPROPRIATE CITY INSPECTOR.
- ALL HAZARD TREES AND TREE LIMBS, AS DEFINED BY THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES HAZARD TREE BULLETIN, SHALL BE FELLED AND REMOVED FROM THE SITE.
- SUBGRADE TO BE TREATED WITH AN APPROVED HERBICIDE PRIOR TO PLACING ASPHALT.
- MINIMUM BRANCH CLEARANCE ABOVE TRAIL SURFACE = 7'-0" (TYPICAL), 10'-0" IF EQUESTIAN USE IS ANTICIPATED.

CITY OF KIRKLAND

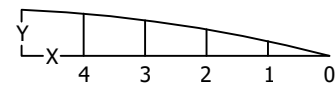
PLAN NO. CK- R.65



ASPHALT SECTION  
FOR MULTIPURPOSE  
AND  
PAVED PATHS



SLOTTED SPEED HUMP SECTION  
NO SCALE



X (ft)	Y (in)
0	0.00
1	1.50
2	2.25
3	2.75
4	3.00

VERTICAL DIMENSION CHART  
NO SCALE

NOTES:

- CHEVRON MARKINGS TO BE WHITE 3M PREFORMED COLD PLASTIC.
- SIGN LOCATION SHALL BE VERIFIED BY THE PROJECT ENGINEER PRIOR TO INSTALLATION.

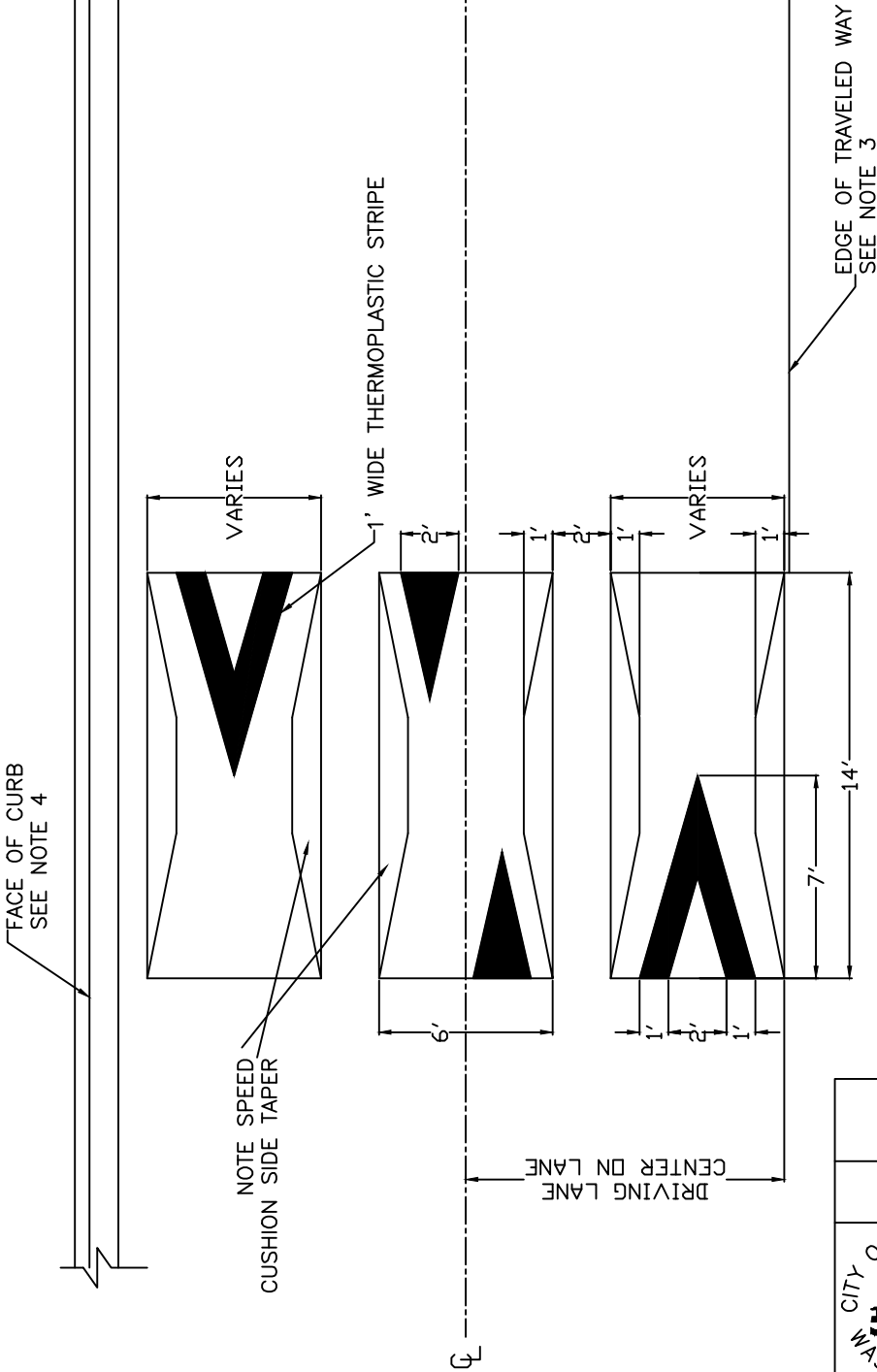
CITY OF KIRKLAND

PLAN NO. CK-R.67



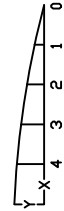
SPEED HUMP  
MARKING AND  
SIGNAGE



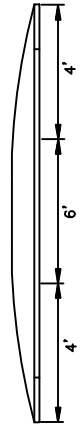


SPEED CUSHION

NO SCALE  
MARKING, LAYOUT, AND EDGE DETAIL



X (ft)	Y (in)
0	0.00
1	1.50
2	2.25
3	2.75
4	3.00



SPEED CUSHION SECTION  
NO SCALE

VERTICAL DIMENSION CHART  
NO SCALE

NOTES:

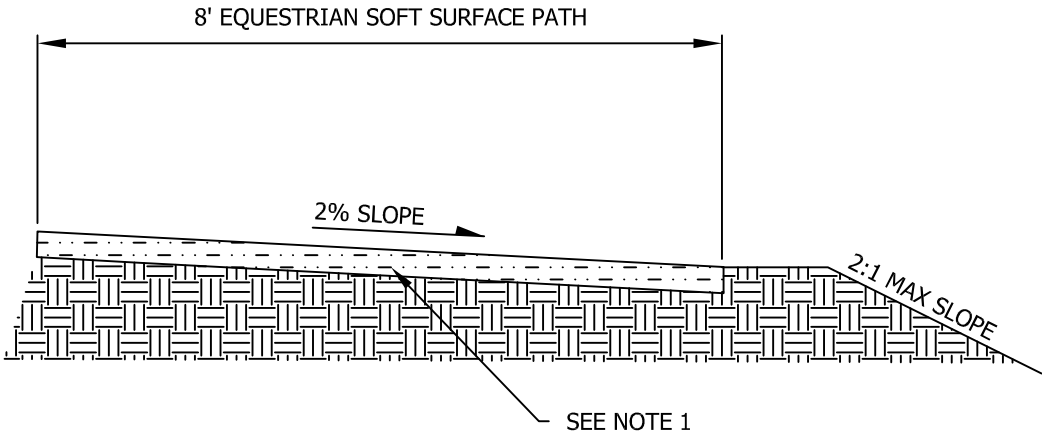
1. PAVEMENT MARKINGS TYPICAL IN BOTH DIRECTIONS OF TRAVEL
2. ALL SPEED CUSHION MARKINGS SHALL BE PLASTIC
3. WHEN PLACED ON ROADWAY WITH NO CURB AND GUTTER, EDGE OF SPEED CUSHION EXTENDS TO EDGE OF TRAVEL WAY
4. WHEN PLACED ON ROADWAY WITH CURB AND GUTTER, EDGE OF SPEED CUSHION TO BE PLACED 2' FROM FACE OF CURB.
5. NOTE SIDE TAPER ON SPEED CUSHION.

CITY OF KIRKLAND

PLAN NO. CK-R.67B




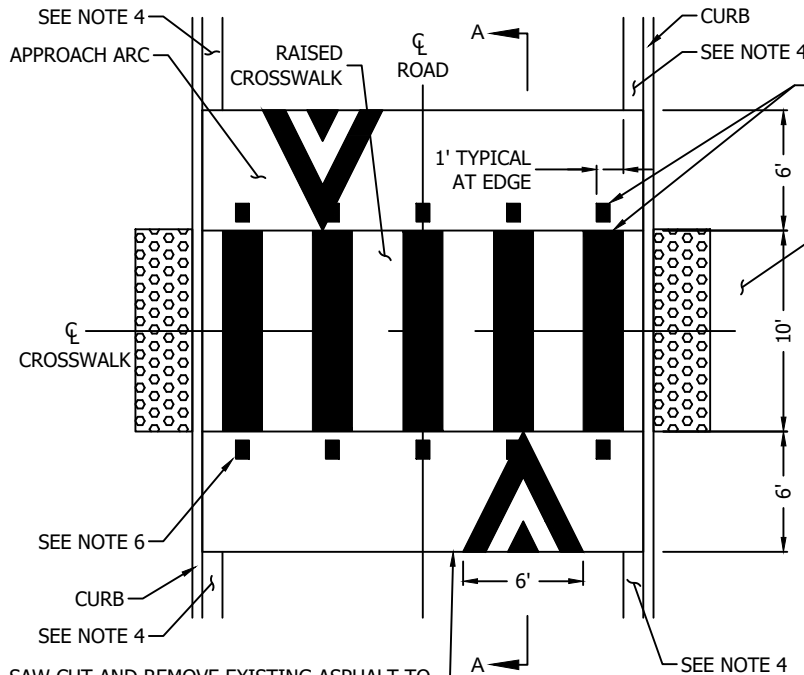
SPEED  
CUSHION MARKING  
AND SIGNAGE



NOTE:

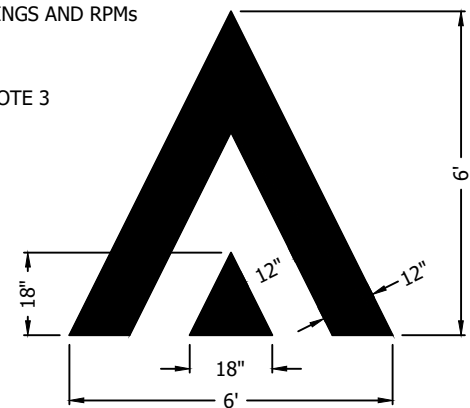
MATERIAL FOR PATHWAY PER STABILIZER SOLUTIONS OR EQUAL.  
MULTI-USE PATH TO BE 4" THICK GRAVEL PATH ( $\frac{1}{4}$ ") MINUS WITH  
STABILIZER BINDER MIXED IN AT RATE OF 15 LB/ TON OF GRAVEL  
AND INSTALLED PER STABILIZER MANUFACTURER'S SPECIFICATIONS.

CITY OF KIRKLAND	
PLAN NO. CK-R.68	
	EQUESTRIAN SOFT TRAIL DETAIL



SAW CUT AND REMOVE EXISTING ASPHALT TO SUBGRADE, OR GRIND EXISTING ASPHALT SO THAT APPROACH ARC IS FEATHERING DOWN TO A VERTICAL EDGE. (TYPICAL)

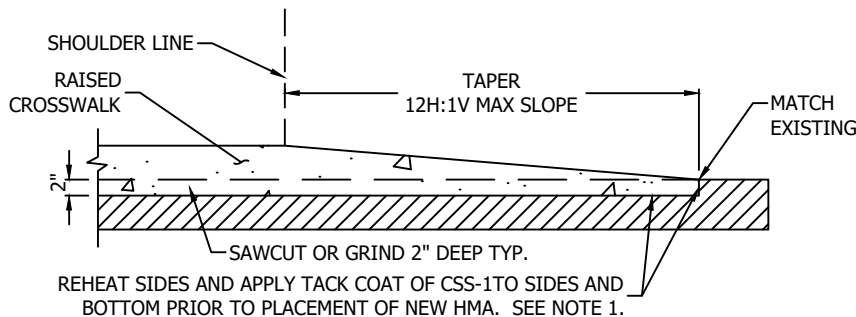
**MARKING DETAIL**



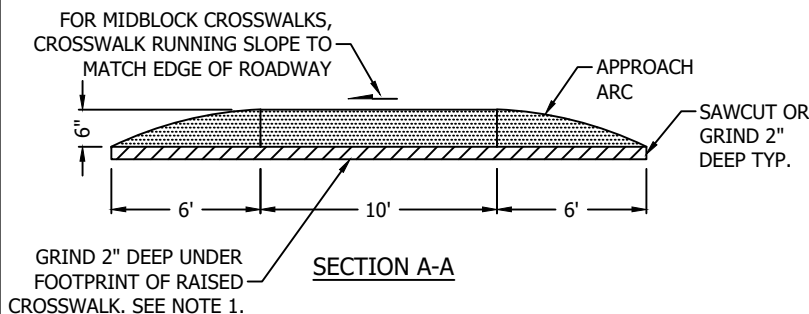
**CHEVRON DETAIL**

**NOTES:**

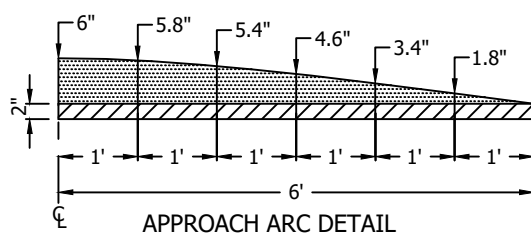
1. RAISED CROSSWALK SHALL BE 1/2" HMA. GRIND EXISTING PAVEMENT TO 2" DEPTH, OR SAWCUT AND REMOVE ASPHALT UNDER RAISED CROSSWALK FOOTPRINT. APPLY CSS-1TACK COAT PRIOR TO PLACING NEW HMA. SEAL ALL JOINTS WITH PG 64-22 AND APPLY A SAND BLANKET WHEN COMPLETE. HMA MUST BE COMPACTED IN NO GREATER THAN 2" LIFTS. ALL RAISED CROSSWALK MARKINGS SHALL BE THERMOPLASTIC, HEAT FUSED PREFORMED, 90 MIL., OR EQUAL APPROVED BY THE ENGINEER.
2. CHEVRON TO BE CENTERED IN THE DRIVING LANE. LOCATION SHALL BE VERIFIED BY THE ENGINEER PRIOR TO INSTALLATION.
3. INSTALLATION OF A RAISED CROSSWALK AT AN EXISTING CROSSWALK LOCATION WILL REQUIRE EXISTING CURB RAMPS TO BE REDESIGNED.
4. THE DESIGN OF THE RAISED CROSSWALK SHALL ENSURE STORMWATER IS ADEQUATELY ADDRESSED TO AVOID PONDING.
5. RAISED CROSSWALKS SHALL ONLY BE INSTALLED ON STREETS FUNCTIONALLY CLASSIFIED AS LOCAL OR COLLECTOR.
6. DO NOT PLACE RPM IN BIKE LANE OR ON EDGE LINES.
7. SEE CITY OF KIRKLAND PRE-APPROVED PLAN CK-R.69A AND CK-R.69B FOR SIGNING DETAILS AND REQUIREMENTS.
8. RAISED CROSSWALKS SHALL NOT BE INSTALLED ON ROADWAYS WITH LONGITUDINAL GRADES EXCEEDING 8%.



**SECTION - RAISED CROSSWALK AT ASPHALT SHOULDER**



**SECTION A-A**



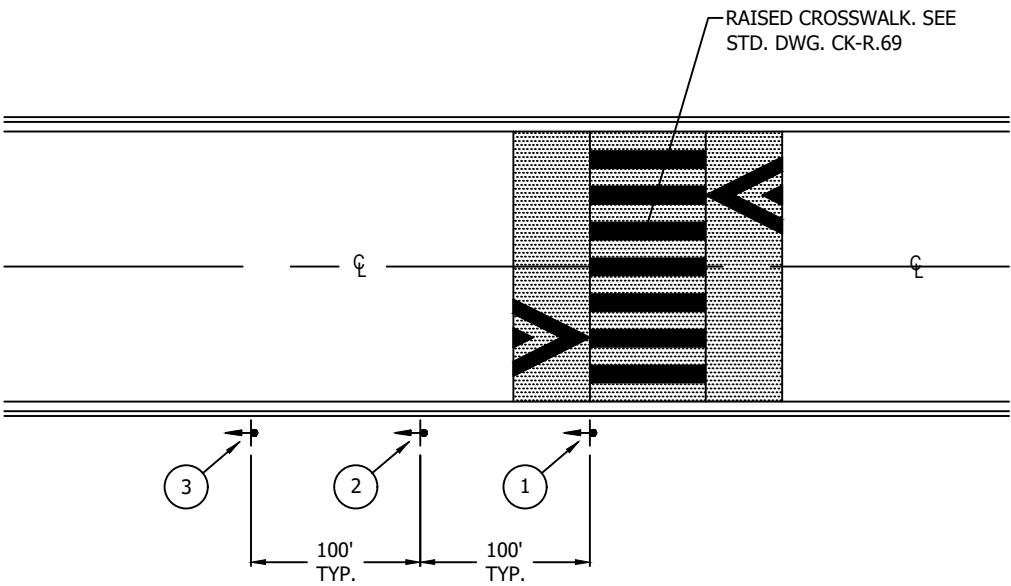
**APPROACH ARC DETAIL**

**CITY OF KIRKLAND**

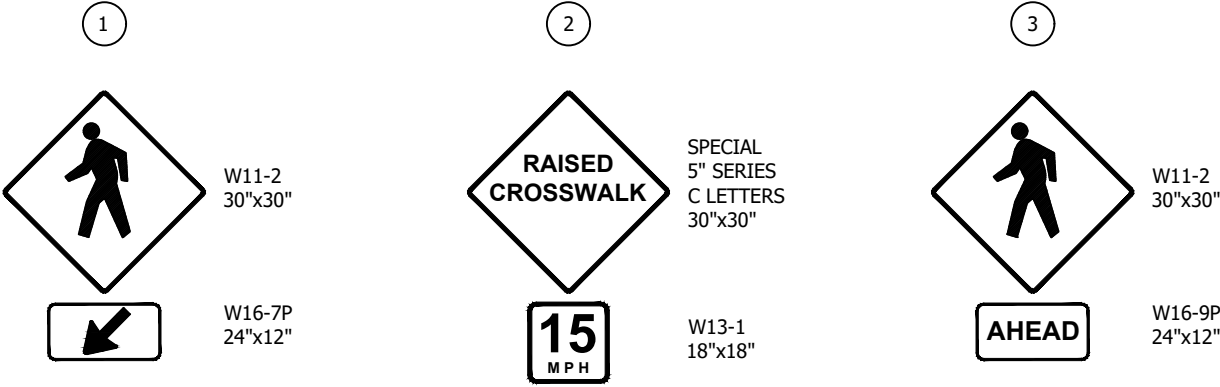
**PLAN NO. CK - R.69**



**RAISED  
CROSSWALK  
DETAIL**




SIGNING PLACEMENT

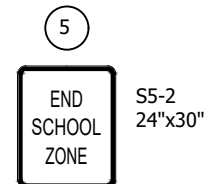
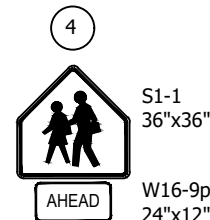
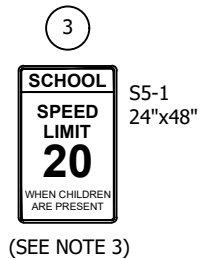
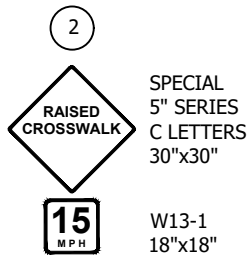
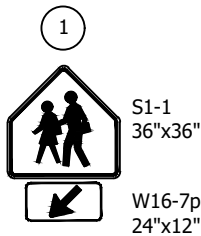
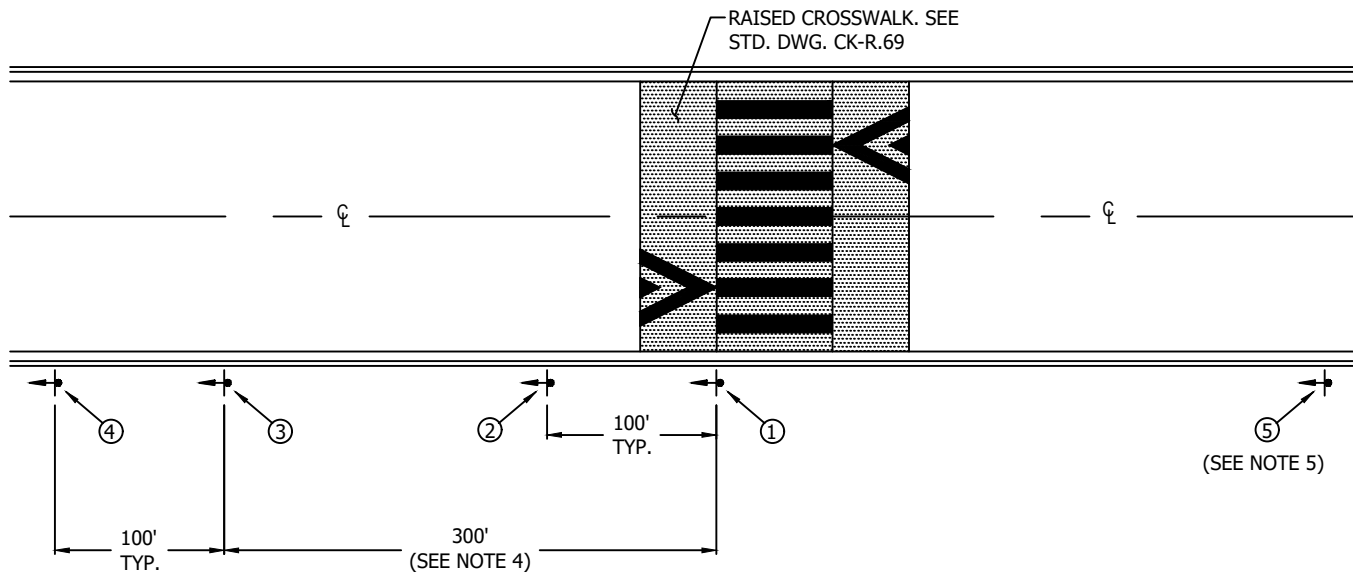


(OPTIONAL SIGN - APPROVAL BY ENGINEER)

NOTES:

1. SIGNS SHALL HAVE YELLOW BACKGROUND WITH BLACK LEGEND AND BORDER.
2. SIGN SPACING MAY BE ADJUSTED TO REFLECT SITE CONDITIONS AND SHALL BE APPROVED BY THE ENGINEER.
3. REFER TO PRE-APPROVED PLAN CK-R.43 FOR ADDITIONAL SIGN PLACEMENT REQUIREMENTS.

CITY OF KIRKLAND	
PLAN NO. CK - R.69A	
	<b>RAISED CROSSWALK SIGNING DETAIL</b>



**NOTES:**

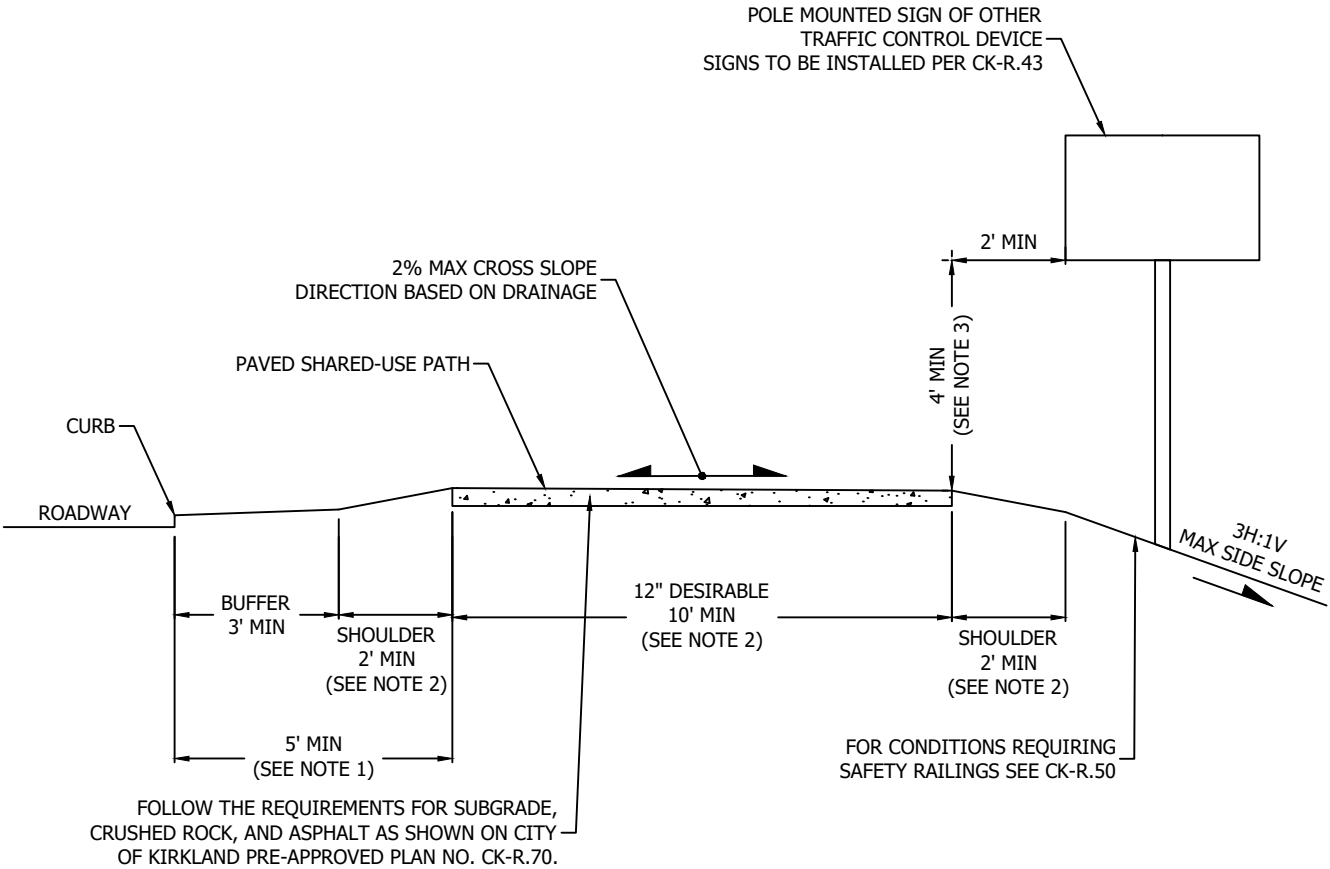
1. SIGN COMBINATIONS ①,②,③,④ ADDITIONAL PLAQUES SHALL BE FLUORESCENT YELLOW-GREEN WITH BLACK LEGEND AND BORDER. CONSTRUCT ALL SIGNS PER CURRENT MUTCD REQUIREMENTS.
2. SIGN SPACING MAY BE ADJUSTED TO REFLECT SITE CONDITIONS AND SHALL BE APPROVED BY THE ENGINEER.
3. IN SCHOOL SPEED ZONES WITH FLASHING BEACONS, USE BOTTOM MESSAGE "WHEN FLASHING" OR AS DIRECTED BY THE ENGINEER.
4. IF ROADWAY BORDERS A SCHOOL, THIS DISTANCE MAY INCREASE AS PER RCW 46.61.440.
5. CONFIRM SCHOOL ZONE LIMITS WITH TRANSPORTATION ENGINEER.
6. REFER TO PRE-APPROVED PLAN CK-R.43 FOR ADDITIONAL SIGN PLACEMENT REQUIREMENTS.

CITY OF KIRKLAND

PLAN NO. CK - R.69B




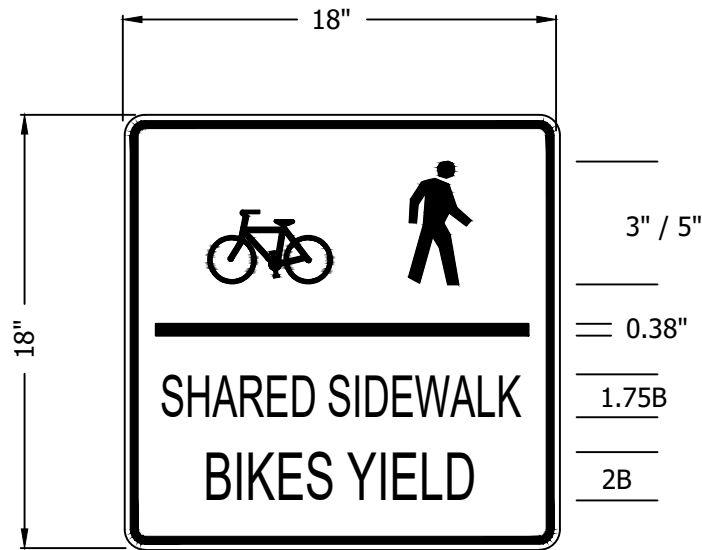
RAISED SCHOOL  
CROSSWALK  
SIGNING DETAIL



**NOTES:**

1. MINIMUM 5 FT SEPARATION FROM ROADWAY REQUIRED FROM A COMBINED WIDTH OF BUFFER AND PATH SHOULDER. IN CONSTRAINED CONDITIONS BUFFER MAY BE LESS WITH BARRIER SEPARATION. BUFFER MATERIAL SHALL BE STAMPED CONCRETE WHEN LESS THAN 4 FT WIDTH.
2. PATH SURFACE MATERIAL MAY BE ASPHALT OR CONCRETE. IF CONCRETE IS USED, THE DESIGNER SHALL PROVIDE A PAVEMENT DESIGN TO BE REVIEWED AND APPROVED BY THE CITY OF KIRKLAND. SHOULDERS MAY BE GRAVEL OR PAVED THE SAME MATERIAL AS THE PATH SURFACE. IF SHOULDERS ARE PAVED, THEY SHALL HAVE A CROSS SLOPE MATCHING THE PAVED PATH. IF THE SHOULDERS ARE UNPAVED, THEY SHALL HAVE A MAX CROSS SLOPE OF 6H:1V.
3. IF BUFFER OR SHOULDER IS PAVED/WALKABLE USE 7FT VERTICAL CLEARANCE FROM EDGE OF PATH TO BOTTOM EDGE OF ANY VERTICAL OBSTRUCTION.


CITY OF KIRKLAND	
PLAN NO. CK - R.70	
	<b>SHARED-USE PATH: ADJACENT TO ROADWAY DETAIL</b>

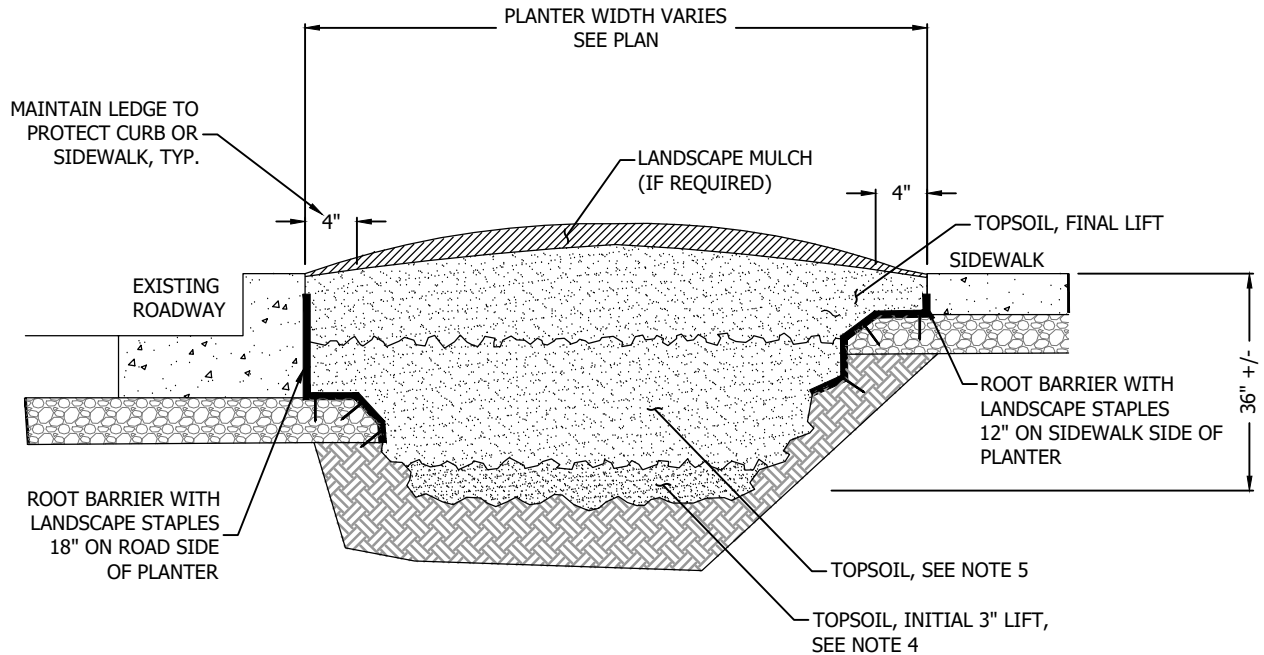


BLACK ON WHITE

**NOTES:**

1. SHARED SIDEWALK SIGN TO BE USED ON WIDE SIDEWALKS THAT DON'T MEET REQUIREMENTS FOR SHARED-USE PATH. SEE CONTRACT PLANS FOR PLACEMENT.
2. ALL SIGNS SHALL HAVE ANTI-GRAFFITI COATING. SEE CONTRACT SPECIAL PROVISIONS FOR MORE INFORMATION.
3. REFER TO PRE-APPROVED PLAN CK-R.43 FOR ADDITIONAL SIGN PLACEMENT REQUIREMENTS.

CITY OF KIRKLAND	
PLAN NO. CK - R.71	
	<b>SHARED SIDEWALK SIGN DETAIL</b>



# **NOTES:**

1. EXCAVATE EXISTING SOIL TO 36" +/- DEPTH FROM TOP OF ADJACENT CURB OR SIDEWALK. AVOID UNDERMINING ADJACENT CURB OR SIDEWALK.
2. ROOT BARRIER SHALL BE FLEXIBLE MESH MATERIAL, 100% NYLON, RASCHEL KNIT CONSTRUCTION, MIN. 10 OZ/SQ. YD., TRIMMED SELVAGE, FIRM/EXTRA FIRM ACRYLIC TOPICAL RESIN FINISH, MINIMUM BURST STRENGTH 250 LBF (ASTM D 3787-89 BURST OF KNIT GOODS). Q899 WITH EXTRA FIRM FINISH BY JASON MILLS IS PRE-APPROVED.
3. INSTALL ROOT BARRIER WITH A MINIMUM DEPTH OF 12"-18" (SEE FIGURE ABOVE) AND OVERLAP ROOT BARRIER PIECES BY A MINIMUM OF 12", SECURE WITH LANDSCAPE STAPLES AS NECESSARY. THE ROOT BARRIER SHALL BE INSTALLED NO HIGHER THAN 2" BELOW THE TOP OF CURB OR SIDEWALK, SHALL BE CONTINUOUS AROUND THE BED PERIMETER, AND SHALL EXTEND 5 FEET ON EITHER SIDE OF THE TREE TRUNK.
4. PLACE 3"+/- OF TOPSOIL TYPE A AND INCORPORATE TO A DEPTH OF 6" (3" TO 4" INTO THE SUBGRADE).
5. INSTALL 12" +/- LIFT OF TOPSOIL TYPE A AND COMPACT TO 85%.
6. INSTALL FINAL LIFT OF TOPSOIL TYPE A TO ACHIEVE FINISH GRADE, FLUSH WITH THE TOP OF CURB OR SIDEWALK WITH A MOUND IN THE CENTER 6:1, AND COMPACT TO 85%.
7. INSTALL 2" +/- LANDSCAPE MULCH, FULL DEPTH IN THE CENTER AND FEATHERED AT THE EDGES TO BECOME FLUSH WITH CURB OR SIDEWALK.
8. OPEN SOIL: EXCLUSIVELY REFERS TO EITHER UNCOMPACTED NATIVE SOILS (NO GREATER THAN 80% PROCTOR) OR AMENDED SOILS MEETING THE STANDARDS FOR APPROVED "TYPE A" TOPSOIL.

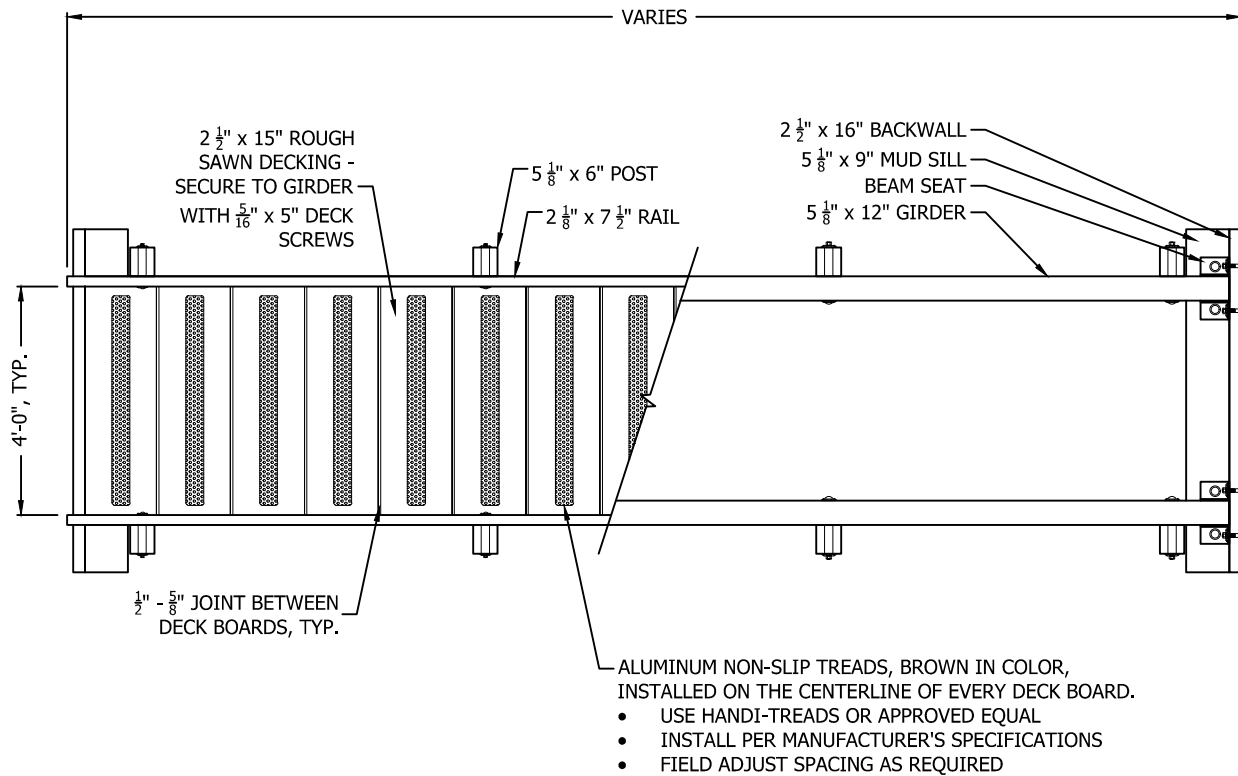
**CITY OF KIRKLAND**

**PLAN NO. CK - R.72**



**SOIL PREPARATION  
FOR TREE PLANTING**





**NOTES:**

1. THIS DRAWING IS FOR REFERENCE ONLY. EACH BRIDGE SHALL BE ENGINEERING BASED ON SPECIFIC SITE CONDITIONS, ADA COMPLIANCE (IF REQUIRED), AND THE CITY OF KIRKLAND BUILDING CODE REQUIREMENTS.
2. ALL WOOD SHALL BE GLULAM WEST COAST DOUGLAS FIR 24F-VA/COMB. 2, OR GLULAM ALASKAN YELLOW CEDAR COMB. 70, OR APPROVED EQUAL. WOOD TREATMENT TO BE DETERMINED BY KIRKLAND PUBLIC WORKS OR PARKS STAFF.
3. ALL HARDWARE AND CONNECTORS SHALL BE HOT DIPPED GALVANIZED.

CITY OF KIRKLAND

PLAN NO. CK - R.73



TRAIL BRIDGE  
GUIDELINE

Technical drawing of a 1.5 inch diameter x 6 inch long threaded rod with a 1 inch chamfer. The drawing includes a side view showing the 1.5 inch diameter, 6 inch length, and 1 inch chamfer. The end view shows the 1.5 inch diameter and 1 inch chamfer. Dimensions are given in inches.

1. POSTS SHALL BE 5-FOOT BY 6-INCH DIAMETER ROUND POSTS MILLED FROM PINE, OR AS APPROVED BY KIRKLAND PUBLIC WORKS. END AND 90° POST HOLES TO BE DRILLED AT HALF PENETRATION, LINE (180°) POST HOLES TO BE DRILLED AT FULL PENETRATION.
2. RAILS SHALL BE 10-FOOT BY 3 ½-INCH DIAMETER ROUND RAILS MILLED FROM PINE, OR AS APPROVED BY KIRKLAND PUBLIC WORKS.
3. ALL MATERIALS TO BE PT ACQ/CBA, OR APPROVED EQUAL, PRIOR TO SITE DELIVERY AND INSTALLATION.
4. SECURE RAILS BY DRIVING 3-INCH WOOD SCREWS THROUGH THE BACKSIDE (SIDE FACING AWAY FROM TRAIL, PARKING LOT, ETC.) OF POSTS.

FENCE - POST AND  
TWO RAIL

1. POSTS SHALL BE 7-FOOT BY 6-INCH DIAMETER ROUND POSTS MILLED FROM PINE, OR AS APPROVED BY KIRKLAND PUBLIC WORKS. END AND 90° POST HOLES TO BE DRILLED AT HALF PENETRATION, LINE (180°) POST HOLES TO BE DRILLED AT FULL PENETRATION.
2. RAILS SHALL BE 10-FOOT BY 3 ½-INCH DIAMETER ROUND RAILS MILLED FROM PINE, OR AS APPROVED BY KIRKLAND PUBLIC WORKS.
3. ALL MATERIALS TO BE PT ACQ/CBA, OR APPROVED EQUAL, PRIOR TO SITE DELIVERY AND INSTALLATION.
4. SECURE RAILS BY DRIVING 3-INCH WOOD SCREWS THROUGH THE BACKSIDE (SIDE FACING AWAY FROM TRAIL, PARKING LOT, ETC.) OF POSTS.

Technical drawing of a stepped shaft. The drawing shows two views: a side view and a front view. The side view shows a shaft with a total length of 6 inches. It has a central section with a diameter of 2 1/2 inches and a length of 3 1/2 inches. The ends of the shaft have a diameter of 2 inches and a length of 1 1/4 inches. The transition between the sections is a 1-inch chamfer. The front view shows the shaft with a diameter of 2 inches and a length of 2 inches. The top view shows a 6-inch diameter shaft with a 1-inch chamfer on the top edge.



## FENCE - POST AND THREE RAIL (CKC FENCING)

# Erosion Control

## INDEX

### **EROSION CONTROL PRE-APPROVED POLICIES**

E-1     Use of Temporary Sediment Settling Tanks

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Temporary Construction Plat/Commercial Entrance .....	E.02
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## **EROSION/SEDIMENTATION CONTROL - PLAN NOTES**

1. The approved Construction Sequence shall be as follows:
  - a. Conduct pre-construction meeting.
  - b. Flag or fence clearing limits.
  - c. Post sign with name and phone number of TESC supervisor.
  - d. Install catch basin protection downstream and as determined by the City inspector.
  - e. Grade and install construction entrance(s).
  - f. Install perimeter protection (silt fence, brush barrier, etc.).
  - g. Construct sediment ponds and traps.
  - h. Grade and stabilize construction roads.
  - i. Construct surface water controls (interceptor dikes, pipe slope drains, etc.) simultaneously with clearing and grading for project development.
  - j. Maintain erosion control measure in accordance with City of Kirkland Standards and manufacturer's recommendations.
  - k. Relocate erosion control measures or install new measures so that as site conditions change, the erosion and sediment control is always in accordance with the City TESC minimum requirements.
  - l. Cover all areas within the specified time frame with straw, wood fiber mulch, compost, plastic sheeting, crushed rock or equivalent.
  - m. Stabilize all areas that reach final grade within 7 days.
  - n. Seed or sod any areas to remain unworked for more than 30 days.
  - o. Upon completion of the project, all disturbed areas must be stabilized and best management practices removed if appropriate.
2. Contractor is responsible for keeping streets clean and free of contaminants at all times and for preventing an illicit discharge (KMC 15.52) into the municipal storm drain system. If your construction project causes an illicit discharge to the municipal storm drain system, the City of Kirkland Storm Maintenance Division will be called to clean the public storm system, and other affected public infrastructure. The contractor(s), property owner, vendor, and any other responsible party may be charged all costs associated with the clean-up and may also be assessed a fine (KMC 1.12.200). The minimum fine is \$500. A fine for a repeat violation shall be determined by multiplying the surface water fine by the number of violations. A fine may be reduced or waived for persons who immediately self-report violation to the city at 425-587-3900. A Final Inspection of your Project will not be granted until all costs associated with the clean-up, and penalties, are paid to the City of Kirkland.
3. Construction dewatering discharges shall always meet water quality guidelines listed in COK Policy E-1. Specifically, discharges to the public stormwater drainage system must be below 25 ntu, and not considered an illicit discharge (per KMC 15.52.090). Temporary discharges to sanitary sewer require prior authorization and permit from King County Industrial Waste Program (206-477-5300) and notification to the Public Works Construction Inspector.
4. All work and materials shall be in accordance with City of Kirkland standards and specifications.

## Erosion – Plan Notes (continued)

5. The boundaries of the clearing limits shown on this plan shall be set by survey and clearly flagged in the field by a clearing control fence prior to construction. During the construction period, no disturbance or removal of any ground cover beyond the flagged clearing limits shall be permitted. The flagging shall be maintained by the Permittee/Contractor for the duration of construction.
6. Approval of this erosion/sedimentation control (ESC) plan does not constitute an approval of permanent road or drainage design (e.g., size and location of roads, pipes, restrictors, channels, retention facilities, utilities, etc.).
7. The implementation of this ESC plan and the construction, maintenance, replacement, and upgrading of these ESC facilities is the responsibility of the Permittee/Contractor until all construction is approved.
8. A copy of the approved ESC plans must be on the job site whenever construction is in progress.
9. The ESC facilities shown on this plan must be constructed prior to or in conjunction with all clearing and grading activities in such a manner as to ensure that sediment-laden water does not enter the drainage system or violate applicable water standards. Wherever possible, maintain natural vegetation for silt control.
10. The ESC facilities shall be constructed in accordance with the details on the approved plans. Locations may be moved to suit field conditions, subject to approval by the Engineer and the City of Kirkland Inspector.
11. The ESC facilities shown on this plan are the minimum requirements for anticipated site conditions. During the construction period, these ESC facilities shall be upgraded (e.g., additional sumps, relocation of ditches and silt fences, etc.) as needed for unexpected storm events. Additionally, more ESC facilities may be required to ensure complete siltation control. Therefore, during the course of construction it shall be the obligation and responsibility of the Contractor to address any new conditions that may be created by their activities and to provide additional facilities over and above the minimum requirements as may be needed.
12. The ESC facilities shall be inspected by the Permittee/Contractor daily during non-rainfall periods, every hour (daylight) during a rainfall event, and at the end of every rainfall, and maintained as necessary to ensure their continued functioning. In addition, temporary siltation ponds and all temporary siltation controls shall be maintained in a satisfactory condition until such time that clearing and/or construction is completed, permanent drainage facilities are operational, and the potential for erosion has passed. Written records shall be kept documenting the reviews of the ESC facilities.
13. The ESC facilities on inactive sites shall be inspected and maintained a minimum of once a month or within 48 hours following a storm event.
14. Stabilized construction entrances shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures, such as wash pads, may be required to ensure that all paved areas are kept clean for the duration of the project.

## Erosion – Plan Notes (continued)

15. All denuded soils must be stabilized with an approved TESC method (e.g. seeding, mulching, plastic covering, crushed rock) within the following timelines:
  - May 1 to September 30 – soils must be stabilized within 7 days of grading.
  - October 1 to April 30 – soils must be stabilized within 2 days of grading.
  - Stabilize soils at the end of the workday prior to a weekend, holiday, or predicted rain event.
16. The long-term use of plastic covering on a site shall be limited to one wet season (October 1 to April 30). After that, the site will be required to hydroseed or install other TESC methods as approved by the Public Works Department.
17. Where seeding for temporary erosion control is required, fast germinating grasses shall be applied at an appropriate rate (example: annual or perennial rye applied at approximately 80 pounds per acre).
18. Where straw mulch is required for temporary erosion control, it shall be applied at a minimum thickness of 2".
19. All lots adjoining or having any native growth protection easements (NGPE) shall have a 6' high temporary construction fence (chain link with pier blocks) separating the lot (or buildable portions of the lot) from the area restricted by the NGPE and shall be installed prior to any grading or clearing and remain in place until the Planning Department authorizes removal.
20. Clearing limits shall be delineated with a clearing control fence. The clearing control fence shall consist of a 6-ft. high chain link fence adjacent the drip line of trees to be saved, wetland or stream buffers, and sensitive slopes. Clearing control fences along wetland or stream buffers or upslope of sensitive slopes shall be accompanied by an erosion control fence. If approved by the City, a four-foot high orange mesh clearing control fence may be used to delineate clearing limits in all other areas.
21. Off-site streets must be kept clean at all times. If dirt is deposited on the public street system, the street shall be immediately cleaned with power sweeper or other equipment. All vehicles shall leave the site by way of the construction entrance and shall be cleaned of all dirt that would be deposited on the public streets.
22. Rock for erosion protection of roadway ditches, where required, must be of sound quarry rock, placed to a depth of 1' and must meet the following specifications: 4"-8" rock/40%-70% passing; 2"-4" rock/30%-40% passing; and 1"-2" rock/10%-20% passing. Recycled concrete shall not be used for erosion protection, including construction entrance or temporary stabilization elsewhere on the site.
23. If any part(s) of the clearing limit boundary or temporary erosion/sedimentation control plan is/are damaged, it shall be repaired immediately.
24. All properties adjacent to the project site shall be protected from sediment deposition and runoff.
25. At no time shall more than 1' of sediment be allowed to accumulate within a catch basin. All catch basins and conveyance lines shall be cleaned immediately following removal of



## Erosion – Plan Notes (continued)

erosion control BMPs. The cleaning operation shall not flush sediment-laden water into the downstream system.

26. Any permanent retention/detention facility used as a temporary settling basin shall be modified with the necessary erosion control measures and shall provide adequate storage capacity. If the permanent facility is to function ultimately as an infiltration or dispersion system, the facility shall not be used as a temporary settling basin. No underground detention tank, detention vault, or system which backs under or into a pond shall be used as a temporary settling basin.
27. All erosion/sedimentation control ponds with a dead storage depth exceeding 6" must have a perimeter fence with a minimum height of 3'.
28. The washed gravel backfill adjacent to the filter fabric fence shall be replaced and the filter fabric cleaned if it is nonfunctional by excessive silt accumulation as determined by the City of Kirkland. Also, all interceptor swales shall be cleaned if silt accumulation exceeds one-quarter depth.
29. Prior to the October 1 of each year (the beginning of the wet season), all disturbed areas shall be reviewed to identify which ones can be seeded in preparation for the winter rains. The identified disturbed area shall be seeded within one week after October 1. A site plan depicting the areas to be seeded and the areas to remain uncovered shall be submitted to the Public Works Construction Inspector. The Inspector can require seeding of additional areas in order to protect surface waters, adjacent properties, or drainage facilities.
30. Any area to be used for infiltration or pervious pavement (including a 5-foot buffer) must be surrounded by silt fence prior to construction and until final stabilization of the site to prevent soil compaction and siltation by construction activities.
31. If the temporary construction entrance or any other area with heavy vehicle loading is located in the same area to be used for infiltration or pervious pavement, 6" of sediment below the gravel shall be removed prior to installation of the infiltration facility or pervious pavement (to remove fines accumulated during construction).
32. Any catch basins collecting runoff from the site, whether they are on or off the site, shall have adequate protection from sediment. Catch basins directly downstream of the construction entrance or any other catch basin as determined by the City Inspector shall be protected with a "storm drain protection insert" or equivalent.
33. If a sediment pond is not proposed, a baker tank or other temporary ground and/or surface water storage tank may be required during construction, depending on weather conditions.
34. Do not flush concrete by-products or trucks near or into the storm drainage system. If exposed aggregate is flushed into the storm system, it could mean re-cleaning the entire downstream storm system, or possibly re-laying the storm line.
35. Recycled concrete shall not be stockpiled on site, unless fully covered with no potential for release of runoff.

**CITY OF KIRKLAND**123 FIFTH AVENUE • KIRKLAND, WASHINGTON 98033-6189 • (425) 587-3800

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**DEPARTMENT OF PUBLIC WORKS  
PRE-APPROVED PLANS POLICY****Policy E-1: USE OF TEMPORARY SEDIMENT SETTLING TANKS****Purpose**

Temporary sediment settling (TSS) tanks are commonly used to remove sediment from stormwater runoff and groundwater associated with construction activities. Common trade names for these facilities include "Baker Tanks" or "Rain For Rent" tanks. Alternative sediment retention facilities include in-ground sediment traps or ponds. TSS tanks are often a good option in cases where the building footprint covers a large portion of the site. The tanks are portable so they can be moved to accommodate construction and require less area than an in-ground sediment pond or trap.

**FREQUENTLY ASKED QUESTIONS ASSOCIATED WITH TSS TANKS & CONSTRUCTION DEWATERING****1. *What are the requirements in Kirkland for Construction Dewatering?***

It may be necessary during construction to pump groundwater or excess stormwater away from the project site. This water can be contaminated with pollutants (including sediment) and cannot be discharged directly into the street or down a storm drain without any precautions. Discharges to the public stormwater drainage system must be below 25ntu, and not considered an illicit discharge (per KMC 15.52.090). If your construction project causes an illicit discharge to the municipal storm drain system, the City of Kirkland Storm Maintenance Division will be called to clean the public storm system, and other affected public infrastructure. The contractor(s), property owner, and any other responsible party may be charged all costs associated with the clean-up and may also be assessed monetary penalties (KMC 1.12.200).

The following options are available to applicants for construction dewatering:

- 1) Pump the excess water to another area of the site and allow it to disperse or infiltrate on site.
- 2) If infiltration/dispersion is not possible, water can temporarily be pumped to a storage facility (e.g., a pond or tank) to allow settling prior to discharge to storm or sanitary sewer.
  - To discharge to the storm system, water turbidity must be less than 25ntu and cannot have an odor of solvent gasoline, hydrogen sulfide (rotten egg odor), oil sheen, or unusual color.
- 3) Before discharging to the sanitary sewer:
  - Notify the City of Kirkland, Public Works Inspector at (425) 587-3800.
  - All projects (except Single Family Infill) must obtain permit authorization from the King County Industrial Waste Program (206-477-5300). More information is available at the website listed below.
  - Single family infill projects may discharge to sanitary sewer without a permit from King County Industrial Waste Program as long as the discharge is less than 7 mg/L of suspended solids.

[www.kingcounty.gov/environment/wastewater/IndustrialWaste/GettingDischargeApproval/Construction.aspx](http://www.kingcounty.gov/environment/wastewater/IndustrialWaste/GettingDischargeApproval/Construction.aspx)

## **2. *Where can I get a TSS tank?***

Vendors providing TSS tanks can be found on the internet, ask other contractors for recommendations, or look at the list below. The City of Kirkland provides this list for your convenience and makes no recommendation whatsoever regarding these firms. If you would like your business added to this list, please contact a Surface Water Utility Engineer at (425) 587-3800.

**BAKERCORP**  
9715 – 24<sup>th</sup> Place West  
Everett, WA 98204  
Phone: (425) 347-8811  
Or 1-800-225-3712  
www.unitedrentals.com

**RAIN FOR RENT**  
19430 – 59<sup>th</sup> Ave. NE  
Arlington, WA 98223  
Phone: (360) 403-3091  
Or 1-800-742-7246  
www.rainforrent.com

## **3. *How do I determine what size TSS tank to use?***

To determine the appropriate size of a TSS tank, see calculations in the 2021 King County Surface Water Design Manual (Appendix D) or use the size recommended by the product manufacturer.

## **4. *How do I pump sediment-laden storm runoff into a TSS tank?***

Excavate a small "sump", like a 4'x4'x4' pit filled with cobbles, at the naturally occurring low elevation on-site. The inlet hose from the sump pump will then discharge storm/ground water collected within this sump into the TSS tank.

## **5. *How do I determine where and when water in a TSS tank may be discharged?***

The contractor shall coordinate water quality sampling and discharge with the PW Inspector. Prior to discharge, the PW Inspector will verify water quality sampling results, and will determine whether runoff meets guidelines for discharge into a piped stormwater system or a natural drainage course, or for discharge to the sanitary sewer system.

Sampling is used to determine whether storm/ground water meets the discharge guidelines outlined below. The purpose of the guidelines is to keep excess sediment and other contaminants out of natural waterways, the storm drainage system, and the sanitary sewer. The PW Inspector may require a sampling log be kept for record keeping purposes (see sample log on page 4).

<b>WATER QUALITY GUIDELINES FOR CONSTRUCTION DEWATERING DISCHARGE</b>	
< 25 NTUs	May be discharged to a piped stormwater system or "natural" discharge location.
> 25 NTUs	May be discharged to sanitary sewer based upon PW Inspector's discretion. Discharge must be translucent, without odor or oil sheen.
> 7 ml/L*	Not allowed for discharge to Storm or Sanitary Sewer.
<b>Notes:</b> The discharge of construction dewatering runoff to the sanitary sewer system requires prior approval from King Co. Dept. of Natural Resources (Contact King Co. Industrial Waste Program, 206-477-5300). In addition, permission from the City of Kirkland Public Works	

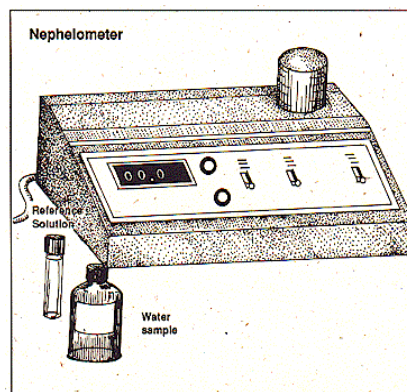
Department is required (contact the PW inspector).  
\*Units are based upon weight/volume ratio.

### **6. *What is the difference between Total Suspended Solids and Turbidity?***

Total suspended solids (TSS) concentrations and turbidity both indicate the amount of solids suspended in the water, whether mineral (like soil particles) or organic (like algae). The TSS test measures an actual weight of material per volume of water, while turbidity measures the amount of light scattered from a sample (more suspended particles cause greater scattering). TSS concentrations are reported in units of milligrams of suspended solids per liters of water (mg/L). Turbidity is reported as nephelometric turbidity units (NTUs). Although the correlation between turbidity and total suspended solids is inexact and depends on site soils, the City has found that turbidity is a reasonable indicator of the magnitude of the total suspended solids load in the water.

### **Nephelometer Sampling Process**

Turbidity measurement does not require any sample preparation, other than shaking the sample bottle well before analysis. The sample is simply poured into a glass tube, placed inside the instrument with a reference solution and the result is read directly from the instrument.



### **Imhoff Cone Sampling Process**

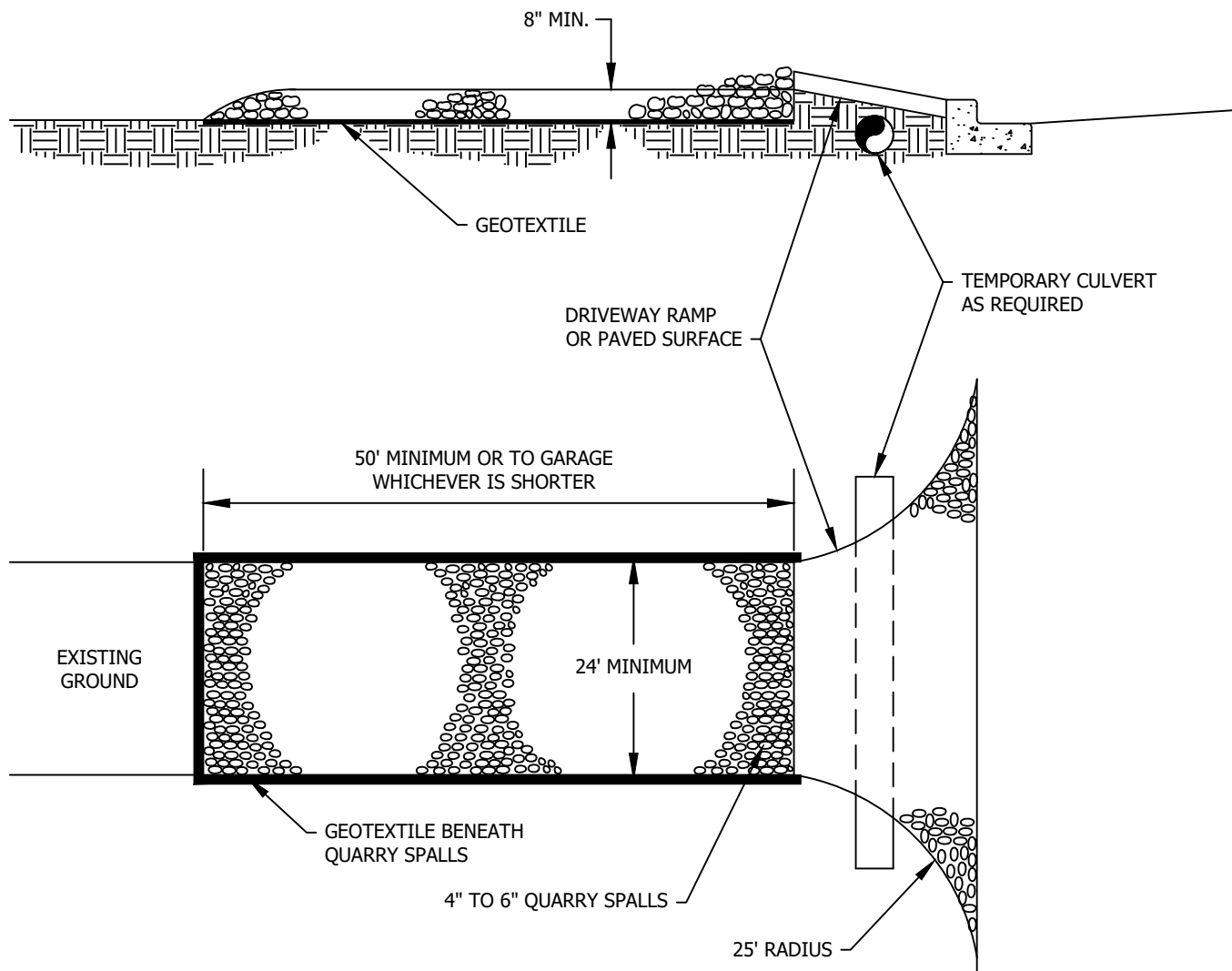
A wastewater sample is poured into an Imhoff cone for settleable solids analysis. The sample is added to the 1-liter mark. After 45 minutes, the cone will be turned to loosen material which has stuck to the sides during settling. After another 15 minutes, the volume of collected material will be read, in milliliters, from graduations marked near the bottom of the cone.



### TEMPORARY SEDIMENT SETTLING TANK SAMPLING LOG EXAMPLE

This TSS Tank Sampling Log example has been prepared to assist construction contractors and PW Inspectors. City policy provides the PW Inspector with discretion to require the use and maintenance of a TSS Tank Sampling Log to document the effectiveness of this Best Management Practice. In addition to the log, the City will continue to rely upon Federal, State, and municipal regulations to insure water quality requirements have been achieved.

TEMPORARY SEDIMENT SETTLING TANK SAMPLING LOG					
C.E.S.C.L. Name: _____ 24 Hour Emergency Contact Number: _____ Applicant: _____ Permit No.: _____ - _____ Site Address: _____					
	Activity Date	Turbidity Reading (NTUs)	Imhoff Cone Reading (ml/L)	Discharge Location (Storm, Stream, or Sanitary sewer)	Total Discharge Volume – Estimated
Tank Installation:	__/__/__				
Water Quality Sample Verification #1	__/__/__	___ NTUs	___ ml/L	Storm system, Stream, or Sanitary sewer	___ Gal's.
Water Quality Sample Verification #2	__/__/__	___ NTUs	___ ml/L	Storm system, Stream, or Sanitary sewer	___ Gal's.
Water Quality Sample Verification #3	__/__/__	__/__/__	___ ml/L	Storm system, Stream, or Sanitary sewer	___ Gal's.
Water Quality Sample Verification #4	__/__/__	__/__/__	___ ml/L	Storm system, Stream, or Sanitary sewer	___ Gal's.
Water Quality Sample Verification #5	__/__/__	__/__/__	___ ml/L	Storm system, Stream, or Sanitary sewer	___ Gal's.
Water Quality Sample Verification #6	__/__/__	__/__/__	___ ml/L	Storm system, Stream, or Sanitary sewer	___ Gal's.
Tank Removal	__/__/__				
Notes/Comments: _____ _____ _____					



### SINGLE FAMILY

#### NOTES:

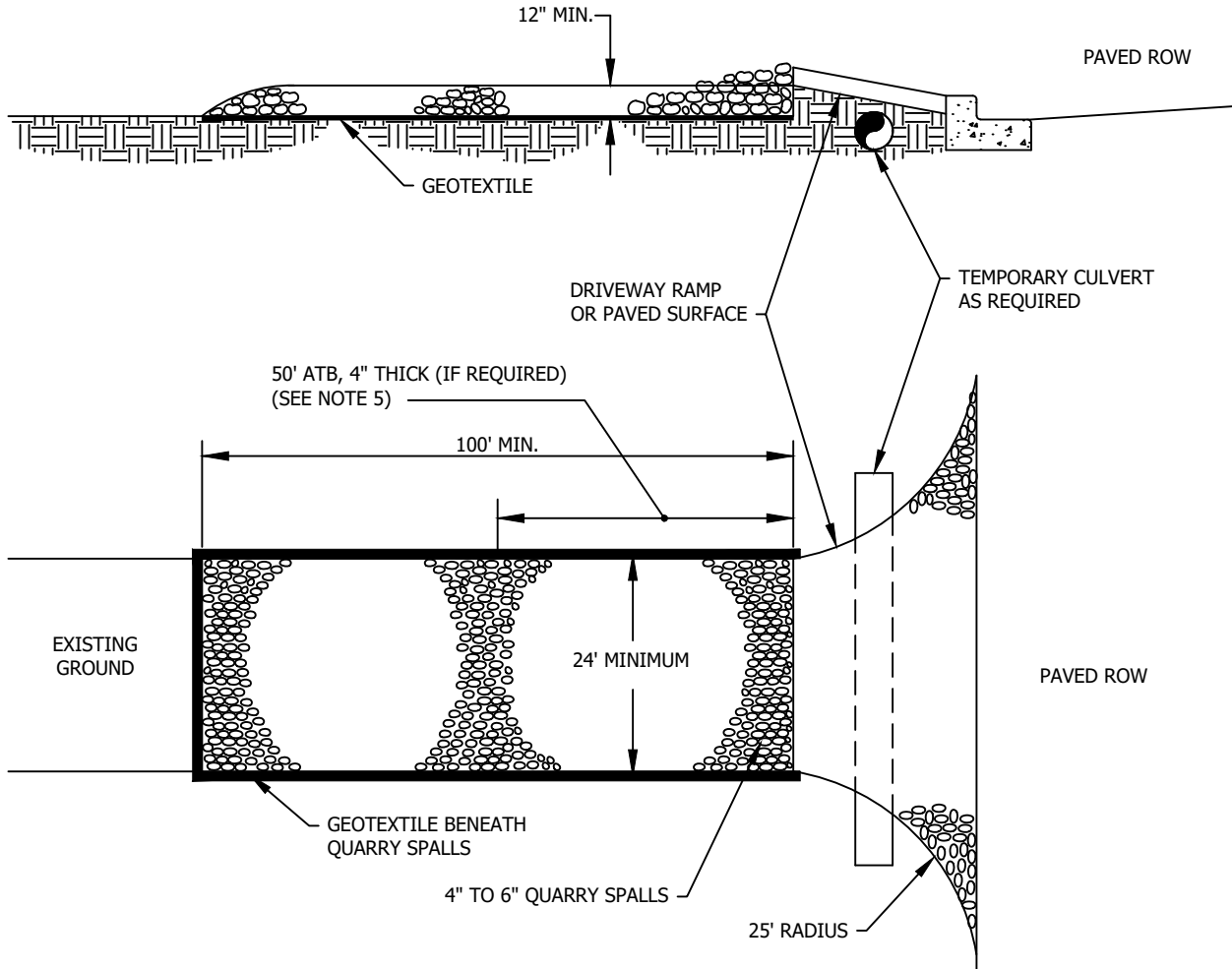
1. PAD SHALL BE REMOVED AND REPLACED WHEN SOIL IS EVIDENT ON THE SURFACE OF THE PAD OR AS DIRECTED BY THE CITY CLEARING AND GRADING INSPECTOR.
2. PAD SHALL BE INSTALLED IN PLANTING STRIP AS APPROPRIATE.
3. PAD THICKNESS SHALL BE INCREASED IF SOIL CONDITIONS DICTATE AND/OR PER THE DIRECTION OF THE CITY CLEARING AND GRADING INSPECTOR.
4. CONTRACTOR RESPONSIBLE FOR CURB & GUTTER CONDITION.
5. RECYCLED CONCRETE SHALL NOT BE USED FOR THE CONSTRUCTION ENTRANCE DUE TO HIGH LEVELS OF PH.
6. ALTERNATIVE DESIGN ALLOWABLE WITH PUBLIC WORKS APPROVAL.

CITY OF KIRKLAND

PLAN NO. CK-E.01



TEMPORARY  
SINGLE FAMILY  
CONST. ENTRANCE



PLAT/COMMERCIAL

NOTES:

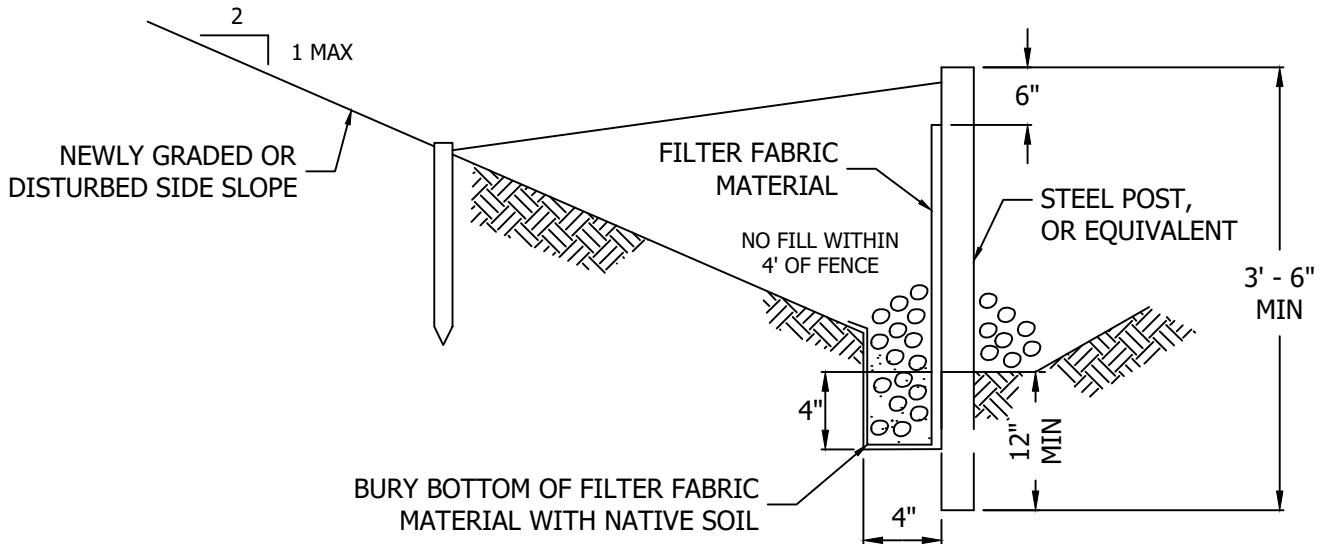
1. PAD SHALL BE REMOVED AND REPLACED WHEN SOIL IS EVIDENT ON THE SURFACE OF THE PAD OR AS DIRECTED BY THE CITY CLEARING AND GRADING INSPECTOR.
2. PAD SHALL BE INSTALLED IN PLANTING STRIP AS APPROPRIATE.
3. PAD THICKNESS SHALL BE INCREASED IF SOIL CONDITIONS DICTATE AND/OR PER THE DIRECTION OF THE CITY CLEARING AND GRADING INSPECTOR.
4. CONTRACTOR RESPONSIBLE FOR CURB & GUTTER CONDITION.
5. ATB MAY BE REQUIRED PER PW INSPECTOR.
6. RECYCLED CONCRETE SHALL NOT BE USED FOR THE CONSTRUCTION ENTRANCE DUE TO HIGH LEVELS OF PH.
7. ALTERNATIVE DESIGN ALLOWABLE WITH PUBLIC WORKS APPROVAL.

CITY OF KIRKLAND

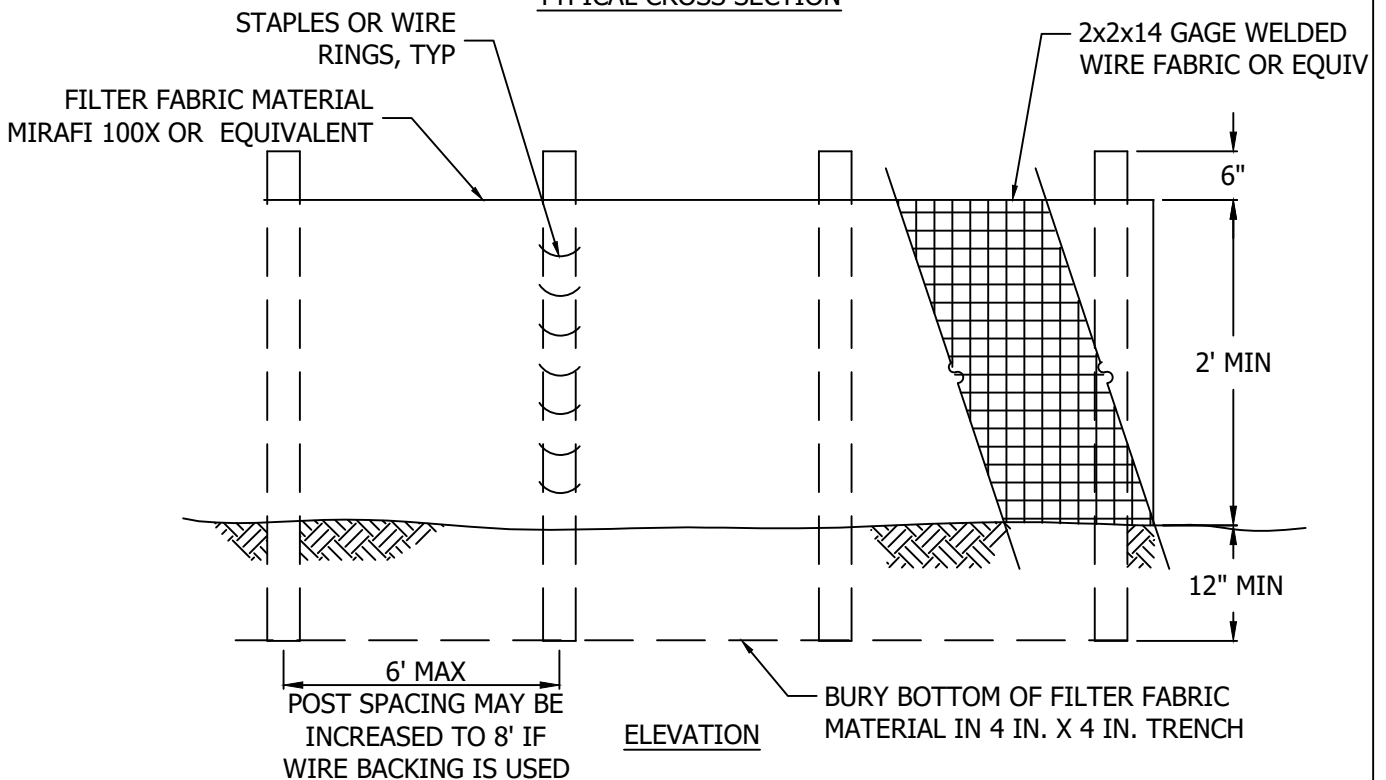
PLAN NO. CK-E.02



TEMPORARY  
PLAT/COMMERCIAL  
CONST. ENTRANCE



TYPICAL CROSS SECTION



NOTES

1. PREFAB FENCE ALLOWED IF REINFORCED AND APPROVED BY CITY INSPECTOR.
2. FENCE SHALL NOT BE INSTALLED ON SLOPES STEEPER THAN 2:1.
3. JOINTS IN FILTER FABRIC SHALL BE SPICED AT POSTS. USE STAPLES, WIRE RINGS, OR EQUIVALENT TO ATTACH FABRIC TO POSTS AND FENCE.
4. REMOVE SEDIMENT WHEN IT REACHES 1/3 FENCE HEIGHT.
5. LOCATION OF FENCING SHALL BE AS SHOWN ON APPROVED PLANS OR AS DIRECTED BY THE CITY.
6. MAXIMUM 100' SHEET OR OVERLAND FLOW PATH LENGTH TO SILT FENCE.
7. DO NOT DIRECT FLOWS GREATER THAN 0.5 CFS TO FENCE.
8. SILT FENCE SHOULD NOT BE INSTALLED IN STREAMS OR V-SHAPED DITCHES.
9. FILTER FABRIC SHOULD BE INSTALLED ALONG CONTOURS WHENEVER POSSIBLE.

CITY OF KIRKLAND

PLAN NO. CK - E.03



SILT FENCE

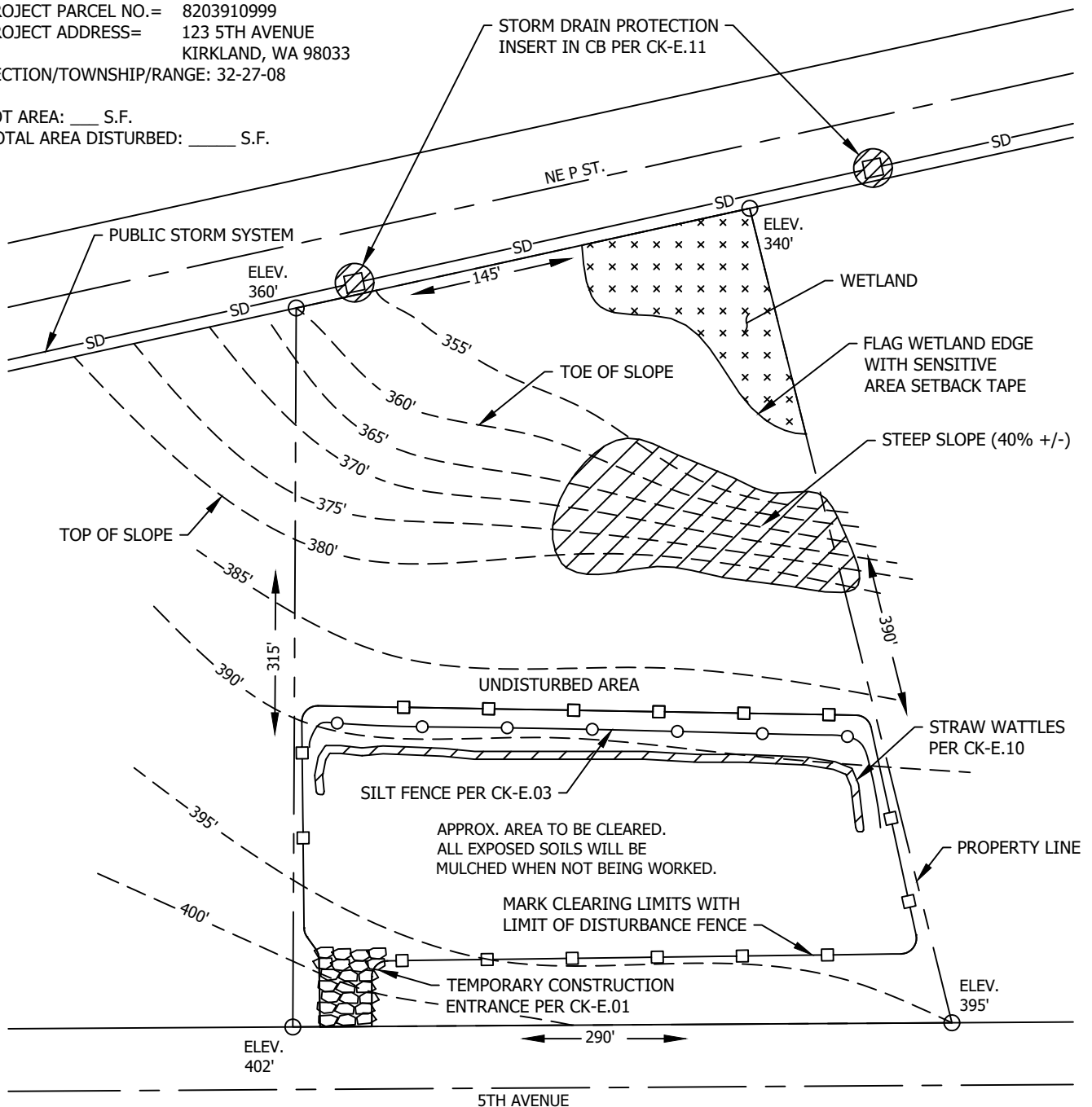


APPLICANT: MALENE MCRESIDENT  
123 5TH AVENUE  
KIRKLAND, WA 98033  
(425) 587-3900

LAST REVISED: 01/2020

PROJECT PARCEL NO.= 8203910999  
PROJECT ADDRESS= 123 5TH AVENUE  
KIRKLAND, WA 98033  
SECTION/TOWNSHIP/RANGE: 32-27-08

LOT AREA: \_\_\_\_ S.F.  
TOTAL AREA DISTURBED: \_\_\_\_ S.F.



EXAMPLE TESC PLAN FOR A SMALL SINGLE FAMILY RESIDENCE PROJECT ONLY

#### NOTES

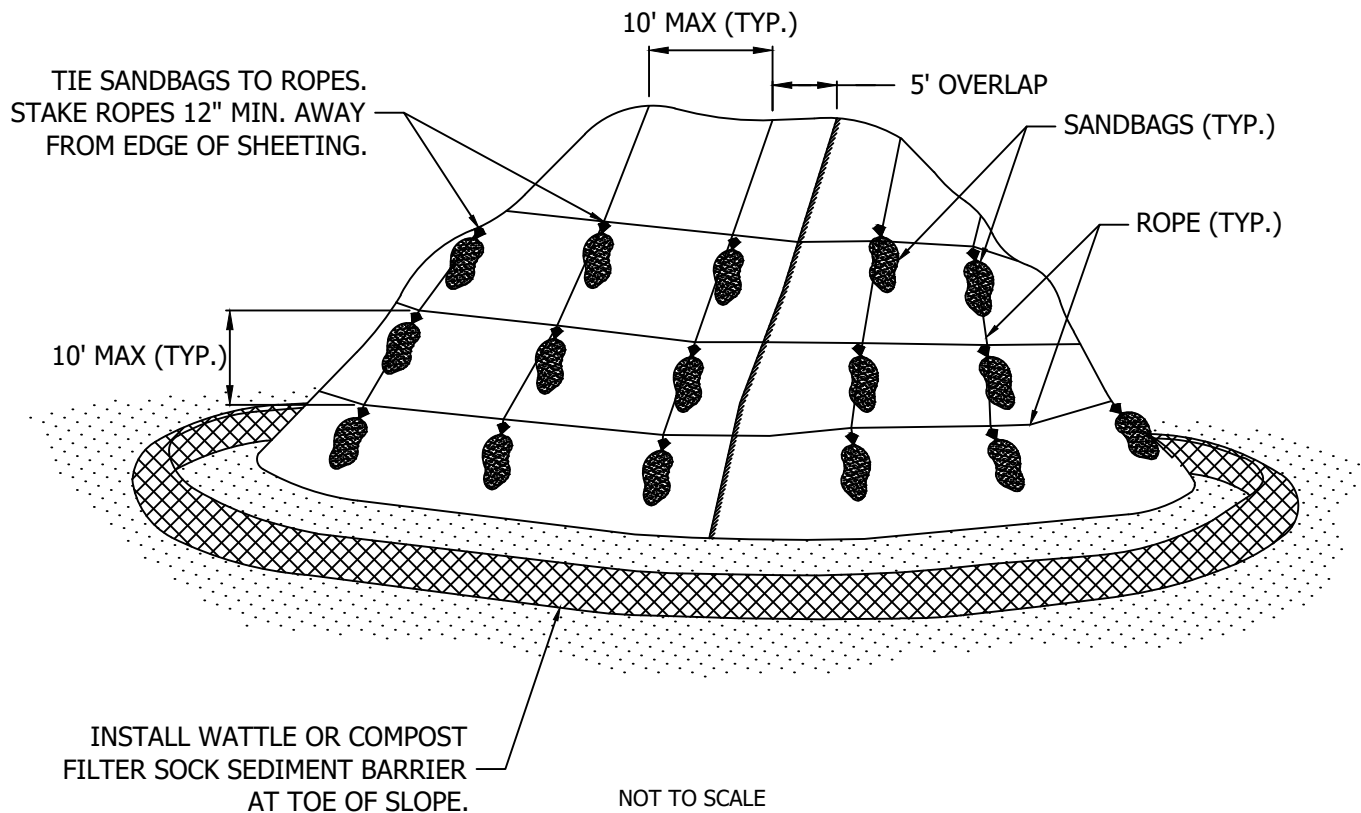
1. IDENTIFY ALL SENSITIVE AREAS (EROSION AREAS, STEEP SLOPES, LANDSLIDE HAZARD AREAS, LAKES, STREAMS, WETLANDS).
2. REFER TO THE CURRENT VERSION OF KING COUNTY SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #5 FOR ESC STANDARDS ADOPTED BY THE CITY OF KIRKLAND. REFER TO CITY OF KIRKLAND POLICIES FOUND WITHIN THE EROSION AND SEDIMENT CONTROL PRE-APPROVED PLANS.

CITY OF KIRKLAND

PLAN NO. CK-E.04



EXAMPLE TEMP.  
EROSION & SEDIMENT  
CONTROL PLAN



#### NOTES

1. INSTALL PLASTIC SHEETING VERTICALLY DOWN SLOPE.
2. INSTALL PLASTIC SHEETING SO EDGES OVERLAP AND ARE SHINGLED AWAY FROM PREVAILING WINDS.
3. PLASTIC SHEETING SHALL BE BLACK MIN 6 MIL.
4. COVER MEASURES SHALL BE INSTALLED IF AN AREA IS TO REMAIN UNWORKED FOR MORE THAN SEVEN DAYS DURING THE DRY SEASON (MAY 1 TO SEPTEMBER 30) OR FOR MORE THAN TWO CONSECUTIVE WORKING DAYS DURING THE WET SEASON (OCTOBER 1 TO APRIL 30).
5. DURING THE WET SEASON, EXPOSED STOCKPILE SLOPES WITH AN INCLINE OF 3 HORIZONTAL TO 1 VERTICAL (3H:1V) OR STEEPER AND WITH MORE THAN TEN FEET OF VERTICAL RELIEF SHALL BE COVERED IF THEY ARE TO REMAIN UNWORKED FOR MORE THAN 12 HOURS.

CITY OF KIRKLAND

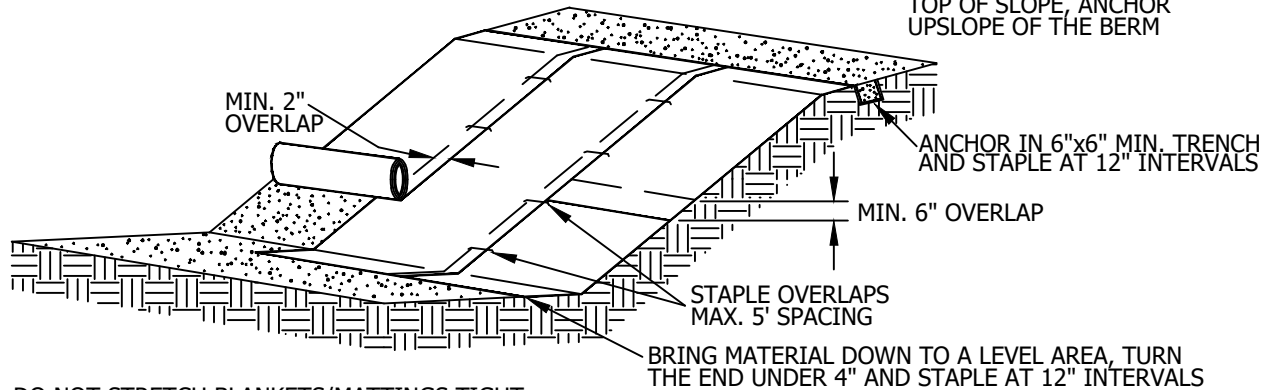
PLAN NO. CK - E.05



TEMPORARY  
STOCKPILE

SLOPE SURFACE SHALL BE SMOOTH BEFORE  
PLACEMENT FOR PROPER SOIL CONTACT

STAPLING PATTERN AS PER  
MANUFACTURER'S RECOMMENDATIONS



DO NOT STRETCH BLANKETS/MATTINGS TIGHT -  
ALLOW THE ROLLS TO MOLD TO ANY IRREGULARITIES

FOR SLOPES LESS THAN 3H:1V, ROLLS  
MAY BE PLACED IN HORIZONTAL STRIPS

LIME, FERTILIZE AND SEED BEFORE INSTALLATION.  
PLANTING OF SHRUBS, TREES, ETC. SHOULD OCCUR  
AFTER INSTALLATION.

### NET & BLANKET INSTALLATION

NOT TO SCALE

#### NOTES:

1. IF BLANKET IS NOT LONG ENOUGH TO COVER THE ENTIRE SLOPE LENGTH, THE TRAILING EDGE OF THE UPPER BLANKET SHOULD OVERLAP THE LEADING EDGE OF THE LOWER BLANKET AND BE STAPLED.
2. MULCH IS REQUIRED FOR NETS, AND NOT REQUIRED FOR BLANKETS.
3. USE 100% BIODEGRADABLE BLANKETS IN SENSITIVE AREAS.
4. MAINTAIN GOOD CONTACT WITH THE GROUND. EROSION MUST NOT OCCUR BENEATH THE BLANKET.
5. INSPECT NETS AND BLANKETS AFTER EACH SIGNIFICANT STORM; MAINTAIN AND REPAIR PROMPTLY.

#### TEMPORARY STABILIZATION NOTES:

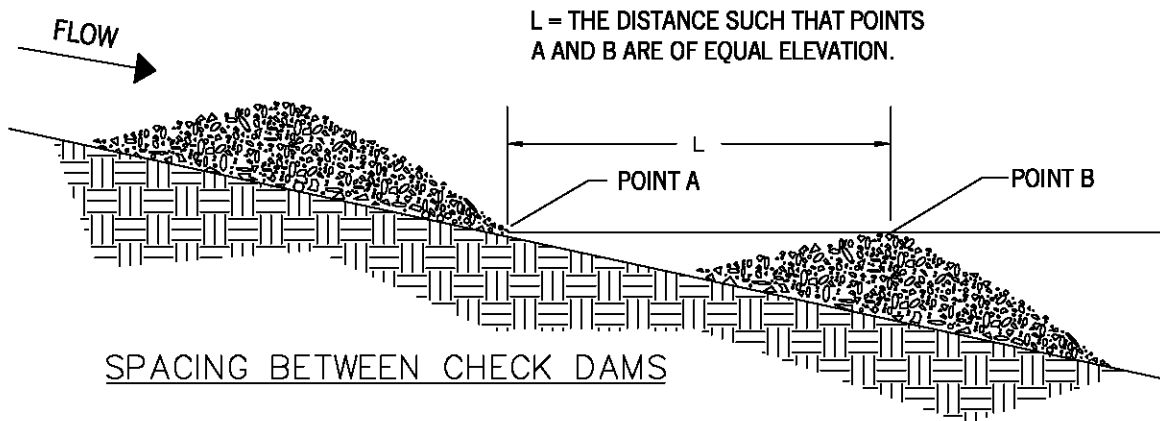
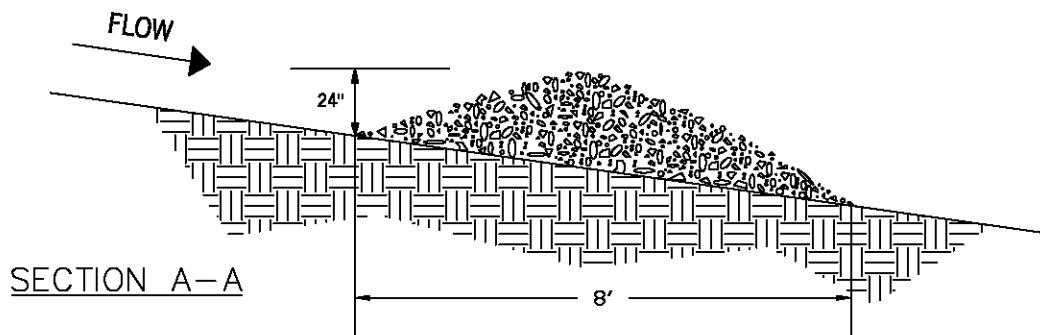
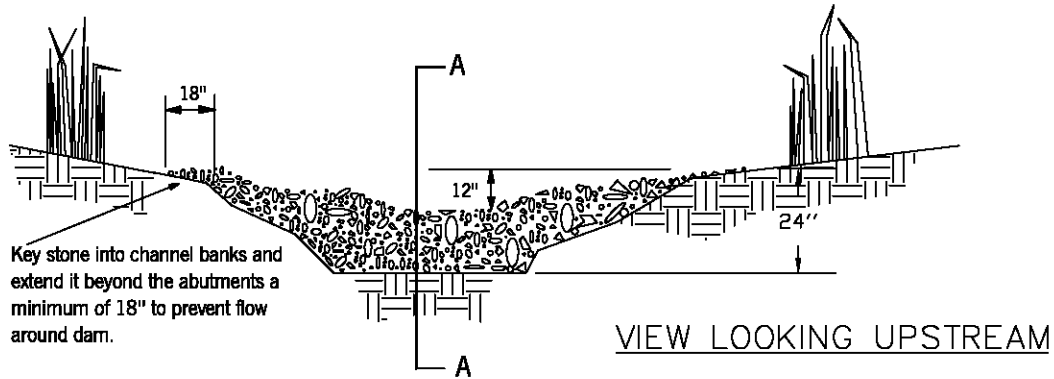
1. STRAW, WOOD FIBER CELLULOSE, COMPOST, AND CHIPPED SITE VEGETATION USED FOR TEMPORARY STABILIZATION SHALL BE PLACED AT A MINIMUM 2" THICK ACROSS THE AREA TO BE STABILIZED.
2. HYDRAULIC MATRICES SHALL BE APPLIED PER MANUFACTURER'S RECOMMENDATION.
3. SEE TABLE D.2.1.2.A IN THE 2021 KING COUNTY SURFACE WATER DESIGN MANUAL FOR MORE DETAIL.

**CITY OF KIRKLAND**

PLAN NO. CK - E.06




**NETS, BLANKETS,  
TEMP. STABILIZATION**

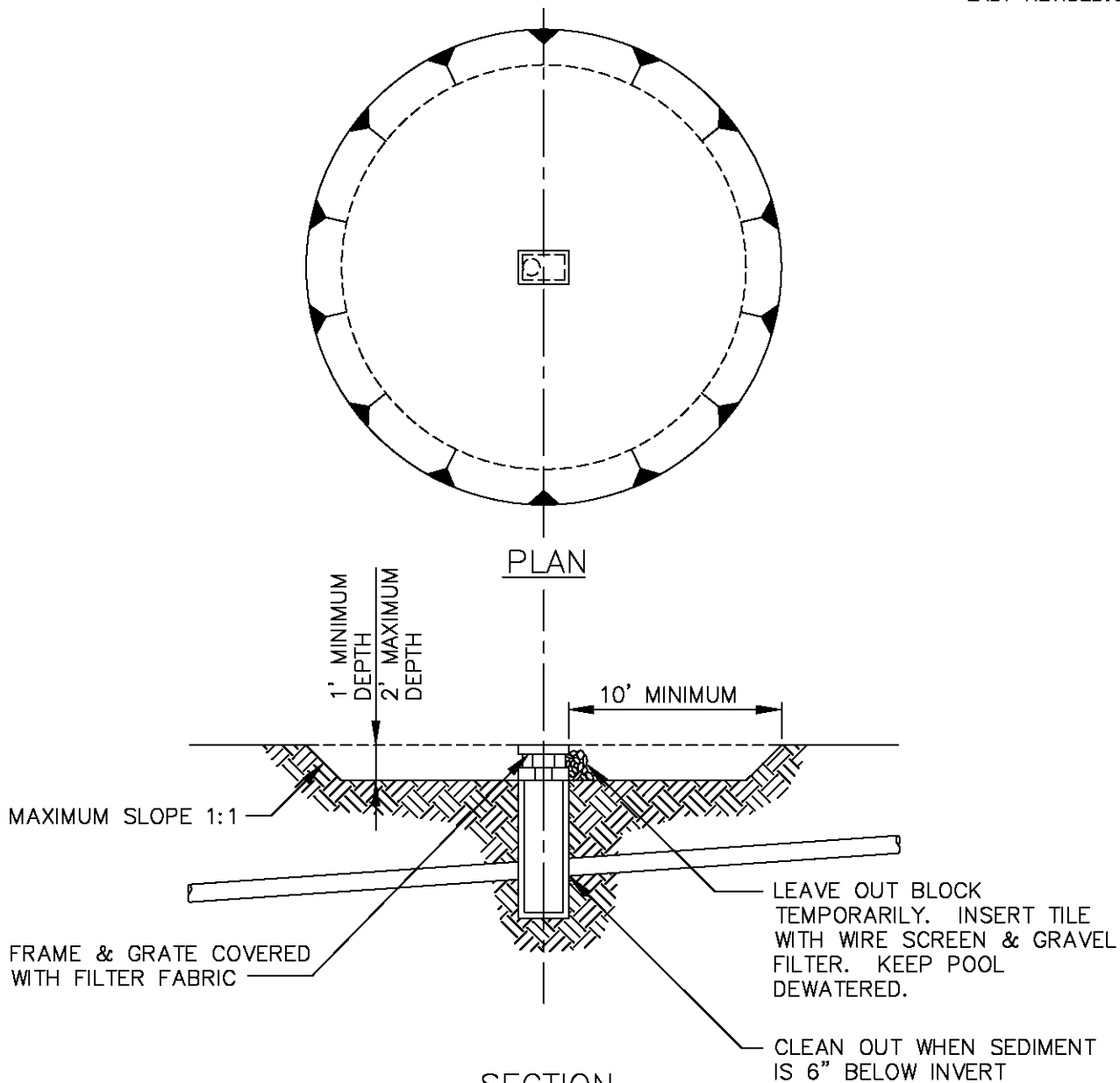


**NOTES:**

1. CHECK DAMS TO BE CONSTRUCTED OF ROCK, PEA-GRAVEL FILLED BAGS, SAND BAGS, OR EQUIVALENT APPROVED BY PUBLIC WORKS.
2. PLACE CHECK DAMS PERPENDICULAR TO FLOW OF WATER.
3. SIDE SLOPES ARE 2:1 (H:V) OR FLATTER.
4. USE FILTER FABRIC FOUNDATION UNDER CHECK DAM.
5. ROCK CHECK DAMS SHALL BE CONSTRUCTED OF APPROPRIATELY SIZED ROCK, AND PLACED BY HAND OR MECHANICAL MEANS (NO DUMPING OF ROCK TO FORM DAM).
6. INSPECT DAM AFTER EACH SIGNIFICANT STORM; MAINTAIN AND REPAIR PROMPTLY.

NOT TO SCALE

CITY OF KIRKLAND	
PLAN NO. CK- E.07	
	CHECK DAM

NOTES

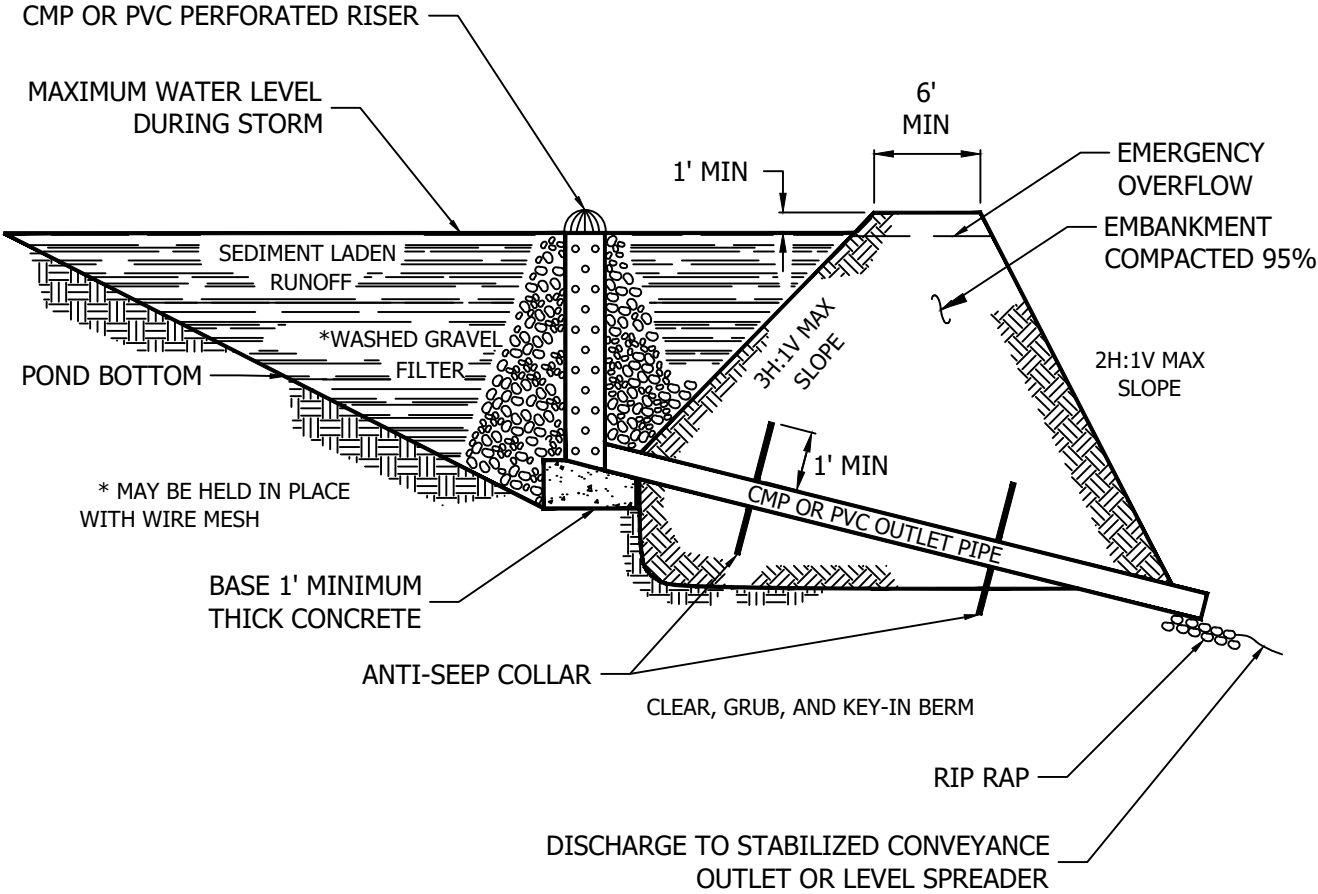
1. PROTECT INLETS DURING CONSTRUCTION. KEEP SEDIMENT OUT OF THE STORM DRAINAGE SYSTEM. USE HALF-CIRCLE BEHIND CURB INLETS DURING STREET CONSTRUCTION. MODIFY PROTECTION AS CONSTRUCTION PROGRESSES.
2. CIRCULAR SHAPE IS NOT ESSENTIAL; VARY SHAPE TO FIT DRAINAGE AREA AND TERRAIN. OBSERVE TO CHECK TRAP EFFICENCY AND MODIFY AS NECESSARY TO INSURE SATISFACTORY TRAPPING OF SEDIMENT. CAN BE ADAPTED TO THRU-CURB INLET.
3. ALLOW 2' MINIMUM OVERHANG OR FILTER FABRIC. FILTER FABRIC OVERHANG MUST BE COVERED WITH 1-1/4" CRUSHED ROCK.
4. FILTER FENCE MAY BE REQUIRED AROUND PERIMETER OF BASIN.

CITY OF KIRKLAND

PLAN NO. CK-E.08




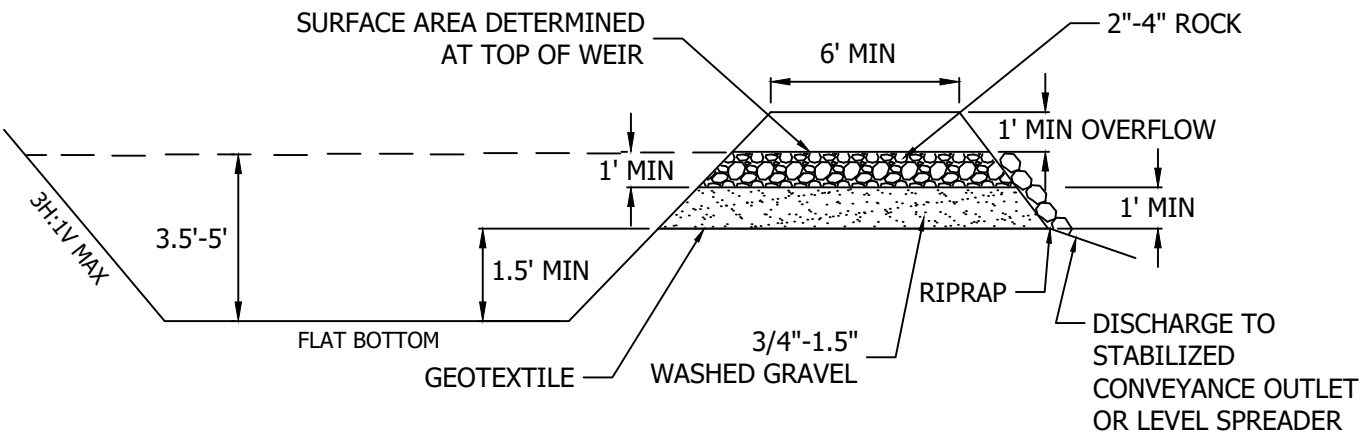
CATCH BASIN/INLET  
SEDIMENTATION  
TRAP



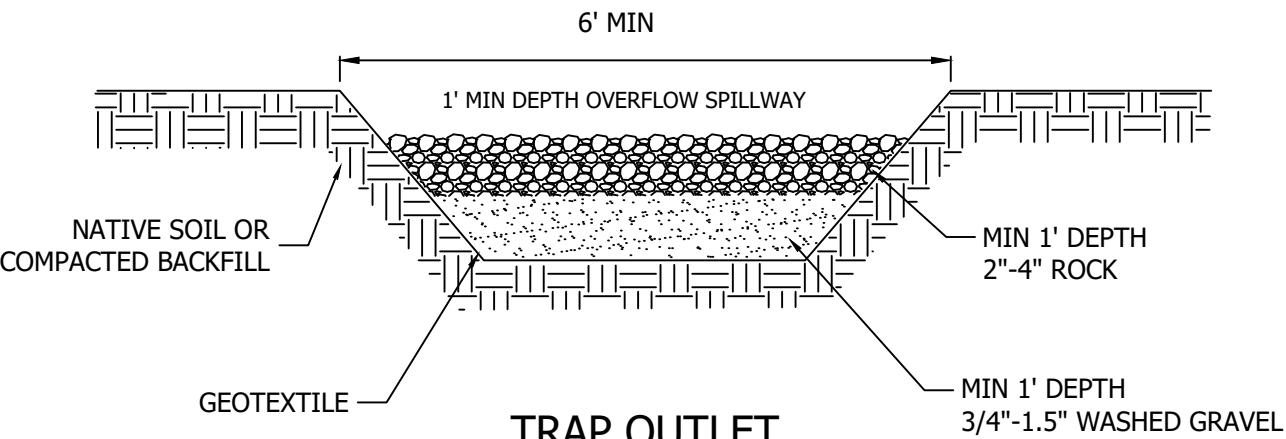
NOTES

1. VOLUME SHALL BE DETERMINED BY THE KING COUNTY SURFACE WATER MANUAL.
2. REMOVE SEDIMENT FROM THE POND WHEN IT ACCUMULATES 1 FOOT DEPTH.
3. POND LENGTH SHALL BE 3 TIMES GREATER THAN THE WIDTH.

CITY OF KIRKLAND	
PLAN NO. CK - E.09	
	TEMPORARY SEDIMENT POND




CROSS-SECTION

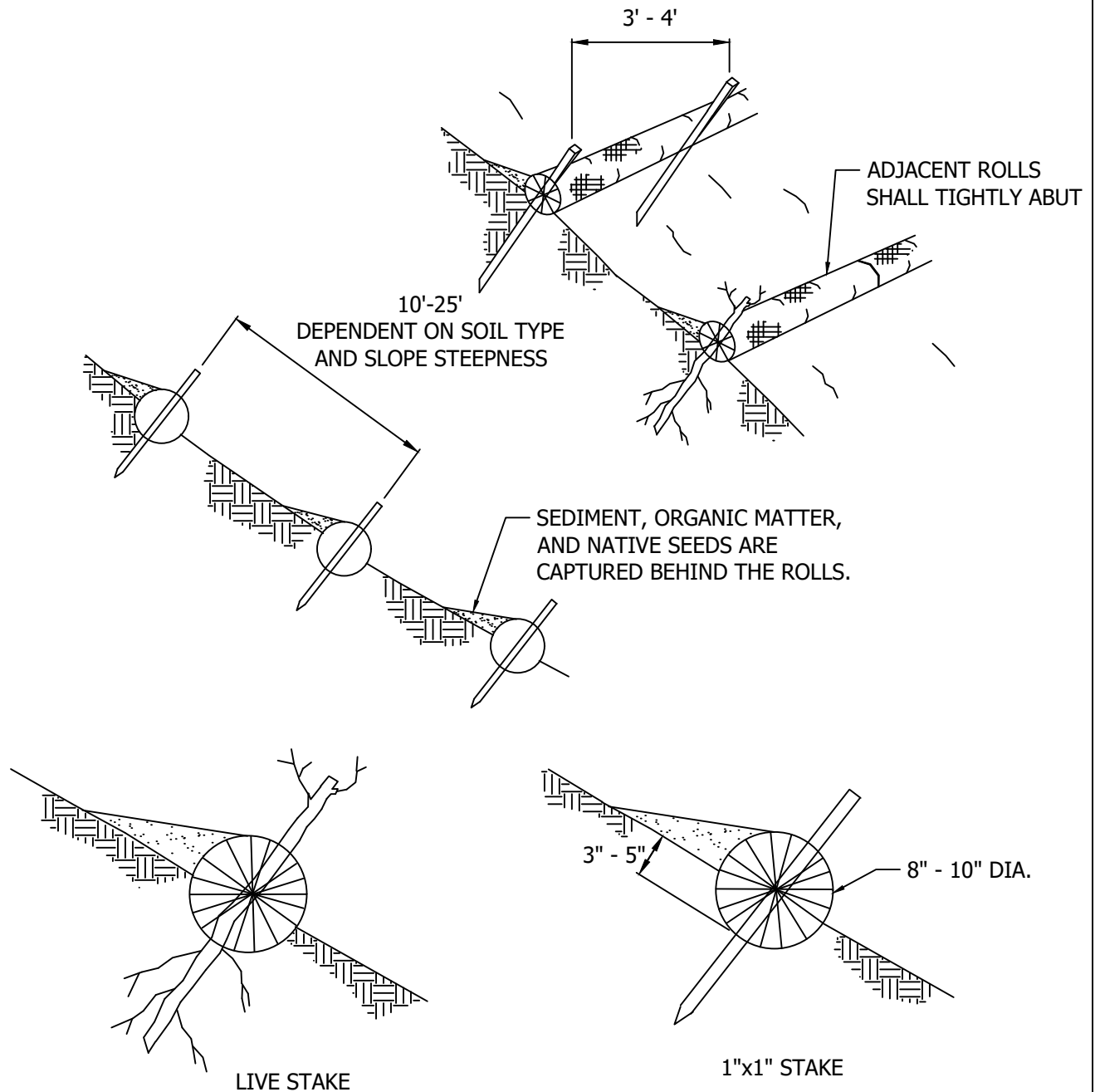


TRAP OUTLET

NOTES

1. VOLUME SHALL BE DETERMINED BY THE KING COUNTY SURFACE WATER DESIGN MANUAL.
2. REMOVE SEDIMENT FROM THE TRAP WHEN IT ACCUMULATES 1 FOOT DEPTH.

CITY OF KIRKLAND	
PLAN NO. CK - E.09A	
	TEMPORARY SEDIMENT TRAP



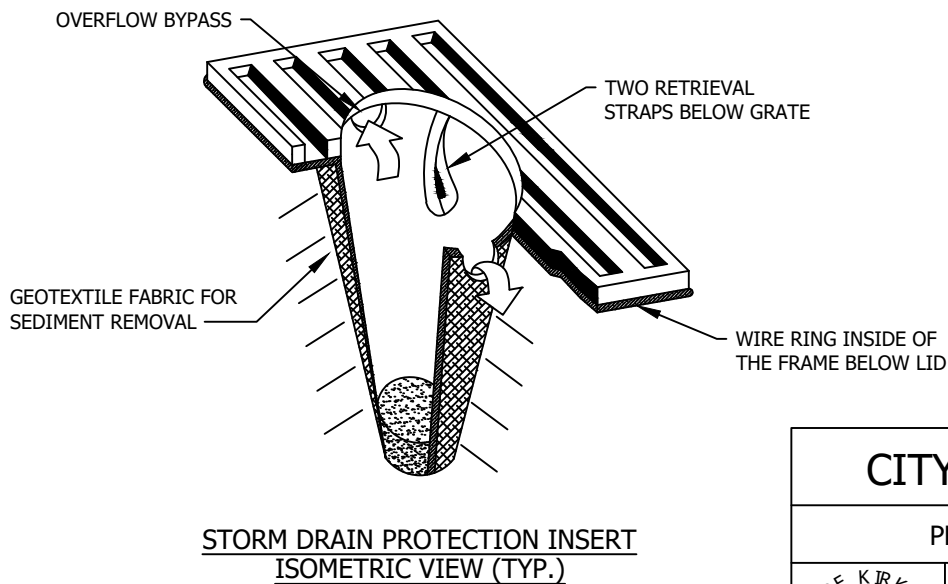
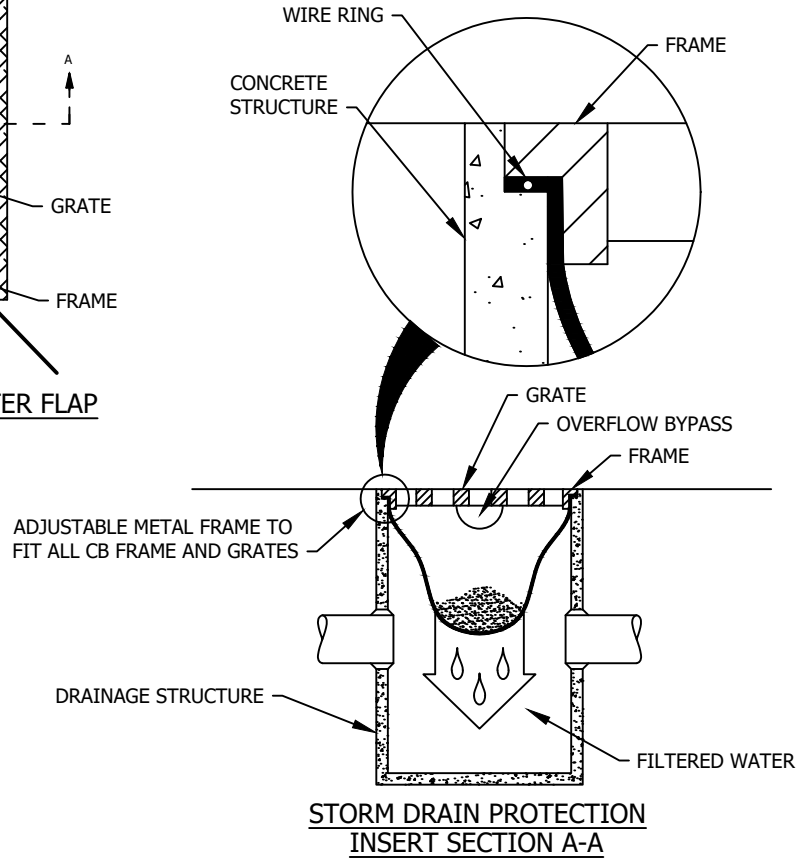
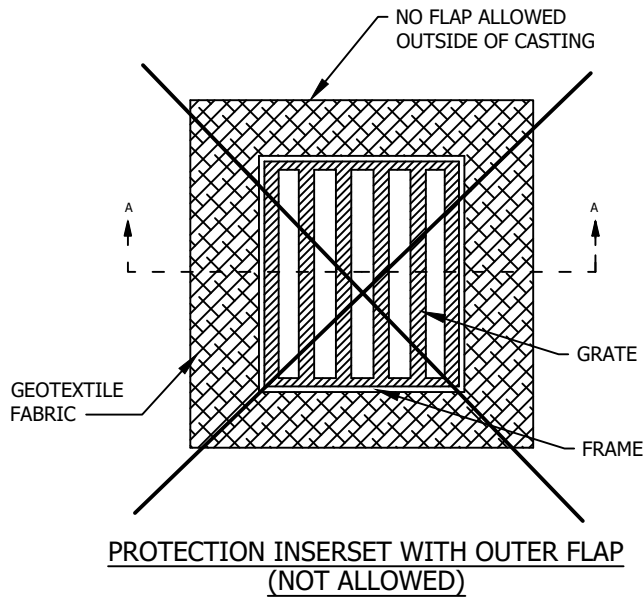
# NOTES

NOT TO SCALE

1. STRAW ROLLS SHALL BE PLACED ALONG SLOPE CONTOURS.
2. STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3"-5" DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.
3. DRIVE STAKE THROUGH MIDDLE OF WATTLE, LEAVING 2"-3" OF STAKE PROTRUDING ABOVE WATTLE.

CITY OF KIRKLAND	
PLAN NO. CK - E.10	
	STRAW WATTLES





CITY OF KIRKLAND

PLAN NO. CK- E.11

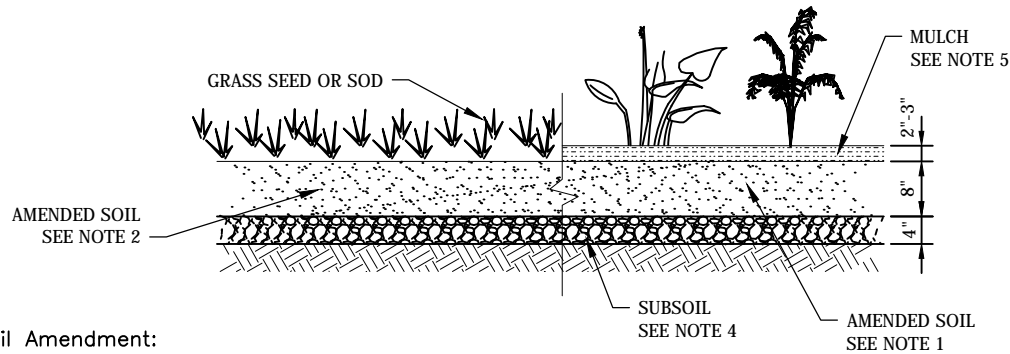


STORM DRAIN PROTECTION INSERT

# SOIL AMENDMENT NOTES FOR BMP T5.13

LAST REVISED: 01/2019

REFERENCE: WA STATE DEPT. OF ECOLOGY'S STORMWATER MANAGEMENT MANUAL FOR W. WA



## Notes for Soil Amendment:

### General:

1. For planting areas, the minimum acceptable organic matter content by dry weight is 10% (loss-on-ignition testing).
2. For turf areas, the minimum acceptable organic matter content by dry weight is 5% (loss-on-ignition testing).
3. A minimum organic-amended depth of 8 inches (except in tree protection areas) is required.
4. Subsoil shall be scarified 4 inches below amended layer to produce 12-inch depth of un-compacted soil.
5. Planting beds should be mulched after planting with 2 to 3 inches of organic material such as arborist wood chip mulch.
6. Soil amendment cannot be placed in overly saturated soils. It is recommended that the soil amendment be placed between May 1 and October 1, when soils are typically driest and less subject to compaction.
7. Prior to soil installation, applicant will submit soil test verification, including tests from either supplier or contractor (depending on option chosen) to verify organic matter content and that compost meets WAC specifications. Soil verification test method must meet ASTM D2974. The verification shall clearly state the following (at a minimum): test date, test method used, testing company, and loss-on-ignition (LOI) results.

### For projects 4 lots or less – you must import amended soil meeting the requirements below:

1. For planting beds, a mix by volume of 40% compost (meeting WAC 173-350-220) with 60% mineral aggregate is pre-approved to meet the organic matter content by dry weight (loss-on-ignition test).
2. For turf areas, a mix by volume of 25% compost (meeting WAC 173-350-220) with 75% mineral aggregate is pre-approved to meet the organic matter content by dry weight (loss-on-ignition test).

### For projects 5 lots or greater – you may either import amended soil meeting the requirements above or follow Option 1 or Option 2 below:

#### Option 1 – Amending Existing Disturbed Topsoil:

1. For planting beds, 3 inches of compost (meeting WAC 173-350-220) on 9 inches scarified or tilled soil (total amended depth of 12") is pre-approved to meet the organic matter content by dry weight (loss-on-ignition test).
2. For turf areas, 1.75 inches of compost (meeting WAC 173-350-220) on 10 inches scarified or tilled soil (total amended depth of 12") is pre-approved to meet the organic matter content by dry weight (loss-on-ignition test).

#### Option 2 – Amending Stockpiled Topsoil from Cleared Areas:

1. Stockpile and cover soil with 3 inches of wood chips, weed barrier, or other breathable materials that sheds moisture yet allows air transmission.
2. Test stockpile material (prior to adding compost) for organic matter content to determine whether additional compost must be tilled into the stockpiled material to meet the required organic matter content by dry weight (loss-on-ignition test).
3. After the stockpiled material has been laid, a soil sample will be taken by the applicant/contractor for every 5,000 sf or every lot (whichever is less) to test that the site meets the required organic matter content by dry weight (loss-on-ignition test).

CITY OF KIRKLAND

PLAN NO. CK-E.12



SOIL AMENDMENT

# Traffic Signals

# **TRAFFIC SIGNALS DESIGN GUIDELINE, PLAN NOTES, AND INDEX** **(Revised January 2025)**

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## **I. INTRODUCTION**

This Section contains information about traffic signals and is intended to be used by designers, consultants, and contractors, as well as serve as a reference for internal use.

## **II. DESIGN**

### **A. GENERAL PROCEDURE**

1. Prior to beginning design, develop a scope of work approved by transportation engineering and traffic signal maintenance.
2. Consider signal spacing and timing for signals that are designed to operate as a system. Provide documentation that the system can operate reasonably under future year volumes.
3. Obtain information on existing and future traffic conditions pertaining to the location under consideration. This information includes but it is not limited to hourly and daily volumes, land uses, prevailing speeds, and collision history.
4. Unless other information is available, assume that the 85th percentile speed is five mph higher than the posted speed limit.
5. All signal projects should be consistent with and fit within the framework of the city's ITS (Intelligent Transportation System) plan.
6. All traffic signals should be connected to the city fiber network. Verify equipment needed and path of connection with the Information Technology Department.
7. On corridors that extend or could extend into an adjacent city or that include traffic signals operated by other agencies, contact those agencies for their comments on design. Obtain comments from King County Metro and Sound Transit where buses operate through a project.
8. Whenever possible, procure traffic signal equipment including cabinets, controllers and pluggable devices from state contract. Equipment purchased this way results in lower project cost.
9. Traffic signal design plans shall be signed and stamped by a registered Professional Engineer (PE) in the State of Washington with recent, relevant experience doing traffic signal design work.

### **B. PLANS**

1. The plans should show all existing and proposed traffic signal appurtenances including but not limited to:
  - a. Junction boxes
  - b. Conduit and wiring
  - c. Cabinets (signal, terminal, service)
  - d. Poles (signal, pedestrian, CCTV)
  - e. Signal heads (vehicle, pedestrian)
  - f. Overhead and underground utilities
  - g. Right of way

- h. Power source
  - i. Channelization
  - j. Detection
  - k. CCTV cameras
  - l. Signs
  - m. Emergency pre-emption equipment
- 2. The plans should include schedules of both existing and proposed:
  - a. Junction boxes by type
  - b. Conduit/wiring
  - c. Signs by type
- 3. The plans should have a plan sheet for mast arms showing street name position, directional signs and 10' terminal cabinet. See WSDOT Signal Standard IS-13.

## **C. DESIGN CONSIDERATIONS AND REQUIREMENTS**

### **1. PHASING**

- a. Phase labeling shall be in accordance with CK-TS.01. Phase labels are based on cardinal directions. For example, phase 4 is northbound thru, phase 6 is eastbound thru.
- b. Left turn phasing is determined by the guidelines in Section 4.3.6 of the FHWA Signal Timing Manual.
- c. At certain locations pedestrian volumes and accidents may require protected only left turns. Determination shall be on a case-by-case basis.
- d. Blank out "No Right Turn on Red" signs shall be used for right turns that may conflict with dual lefts (MUTCD, Section 2B.60)
- e. Blank out "No Right Turn on Red" signs should be operated through a load switch and not hard wired.
- f. Consider the possibility of U-turns and the need for "No Right Turn on Red" Blank Out signs.
- g. Consider right turn overlaps wherever exclusive right turn lanes are used. See CK-TS.01 for overlap labeling.

### **2. VEHICULAR SIGNAL HEADS**

#### **GENERAL**

- a. Use aluminum led signal heads factory painted federal green.
- b. Use programmable heads only with approval of Public Works Transportation Engineering.
- c. Use four section bi-modal heads not five section heads.
- d. Back plates shall be installed on all signal heads mounted over the roadway. All back plates shall have a two-inch yellow reflective strip around its perimeter.

#### **SIGNAL HEAD PLACEMENT**

- a. Submit documentation that shows signal head meet placement and visibility requirements of MUTCD and WSDOT (MUTCD Table 4D-2 for example)
- b. Field check to evaluate the effects of existing and proposed trees on visibility of signal heads, cameras and emergency vehicle preemption receivers. Propose mitigation when necessary.
- c. Supplemental signal heads should be mounted in a far-left configuration for protected only left turns.
- d. Provisions (including cables, tenons, etc.) shall be made for the future installation of protected left turn heads wherever permissive only or protected/permissive left turns are being installed.

#### BLOCKING DUE TO OVERHEAD UTILITIES

- a. Attempts should be made to clear signal heads from blockage due to overhead cables.
- b. The city must share the cost of undergrounding existing overhead utilities.
- c. No new utilities facilities can be located overhead, but existing overhead utilities can be upgraded.

#### 3. PEDESTRIAN SIGNAL HEADS

- a. Countdown signals are required.
- b. All pedestrian signal heads on a type I pole shall be "clamshell" mounted not top mounted. See WSDOT Standard Plan J-75.10-01, Type E.

#### 4. PEDESTRIAN PUSH BUTTON ASSEMBLIES

- a. Locate pedestrian push buttons assemblies in accordance with relevant sections of the most current MUTCD. Where feasible pedestrian push buttons shall be located 10 ft or more apart.
- b. Pedestrian push buttons shall be accessible and programmed in accordance with the most current MUTCD.
- c. See City of Kirkland Pre-Approved Plan CK-TS.12 for details.

#### 5. POLES AND MAST ARMS

##### GENERAL

- a. All signal poles shall be separated from vehicular traffic by at least five feet.
- b. Unused holes or holes left after permanent removal of existing signal pole mountings shall have plates welded on them and the plates shall be cold galvanized.
- c. Use [WSDOT standard plans](#) for Type I, II, or III signal poles. Those structures have been designed according to the Fifth Edition 2009 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. Basic wind velocity is 90 mph, Design Life/Recurrence Interval of 50 years, and Fatigue Category III.

- d. Due to the design life of the structure, if a Type I, II, or III signal pole is within the construction limits of, abutting, or reasonably adjacent to, any ground-disturbing Project, **the Project will be required to replace signal pole foundation, signal pole, and mast arm assemblies that will be more than 50 years old at the time of substantial Project completion.** Projects that shall comply with this requirement include new construction, reconstruction, development frontage improvements, ground-disturbing restoration, or alterations of existing roadway and sidewalk facilities. Regular maintenance activities such as striping or re-striping, sidewalk repair, utility repair, traffic signal repair, and traffic signal alterations that do not require ground-disturbing activities, are excluded from this requirement.

#### MAST ARM LOAD CALCULATION

- a. Calculate the wind loading of all proposed and existing equipment to be placed on mast arms including signs, vehicle signal heads, luminaire arms, etc. Follow the requirements set forth in the WSDOT standard plans. See [WSDOT Traffic Signal Standard Chart IS-13](#) for details.
- b. Where new equipment is placed on existing mast arms, demonstrate that existing foundations, poles, and mast arm assemblies can support proposed loads within the original design value for that assembly. If proposed values for wind loading exceed the original design wind loading maximum for that assembly, the Project must replace the foundation, pole, and mast arm assembly.

#### POLE FOUNDATIONS

- a. The final location of pole foundations shall be approved by the engineer in the field prior to installation.
- b. Pole foundations shall be per WSDOT applicable design standards.

#### 6. ILLUMINATION / ELECTRICAL

- a. New illumination or illumination added to existing systems shall comply with the City's Lighting Design Guidelines (Policy R-40).
- b. Existing illumination systems served by a single power source may need to be split into systems with separate power sources.
- c. Existing or higher illumination levels shall be maintained by using existing or temporary illumination until the new illumination system is operational.
- d. The contractor shall perform an independent utility verification prior to any illumination, vault and conduit installation and inform the engineer immediately if any additional conflicts are found.
- e. The Contractor is responsible for maintaining a minimum 10' clearance zone around existing aerial primary power lines during construction. Coordinate work with the power company. See [WAC 296-155-428](#) for more information.
- f. Luminaire standards and foundations shall be installed according to WSDOT applicable standard plans. Contractor shall verify soil conditions prior to construction.



- g. Illumination splices shall be made with C-TAP (COPPER CRIMP), 3M 2000 MASTIC WATERPROOFING, and 3M SUPER 88 TAPE.
- h. The contractor shall coordinate with the electric utility company regarding the electrical service connection. The contractor shall propose the exact location to the CIP representative and meet with the electrical utility company representative prior to installation of meter base.
- i. Pedestrian and roadway illumination poles shall NOT be located within ten (10) feet of a driveway.

## 7. SIGNING

- a. Street names on mast arms should follow MUTCD standard. 2009 MUTCD Section 2D.43 calls for street names to have 12" high initial capital letters and 9" high lowercase letters.
- b. All street name signs shall have a city logo.
- c. All signs shall be new. The City does not allow relocations of existing signs to ensure that signs meet current standards for legibility and retro-reflectivity.

## 8. CABINETS

### GENERAL

- a. Cabinets shall be delivered to the City of Kirkland signal shop for testing.
- b. Cabinets shall attach to foundation per manufacturer's specification. Installation shall be done in dry conditions.
- c. Contractor shall place a minimum 1/2" continuous silicon bead between the cabinet and the foundation.

### TRAFFIC SIGNAL CABINET LOCATION

- a. Factors to consider when choosing a location:
  - 1) Proximity to power supply.
  - 2) Proximity to fiber connections.
  - 3) View of vehicles approaches from the cabinet location.
  - 4) Door should open to allow technicians to face the intersection when viewing the inside of the cabinet.
  - 5) Sight distance for vehicular movements including right turn on red.
  - 6) Access for maintenance vehicles and equipment/distance to parking.
  - 7) Above likely flood areas.
  - 8) Out of likely path of errant vehicles.
  - 9) Obstructions posed to pedestrians.
  - 10) Distance from high voltage sources.
  - 11) Distance from existing utilities.
  - 12) Traffic signal cabinets shall be located at or above finished grade to prevent water intrusion.
  - 13) Aesthetic considerations.

#### TRAFFIC SIGNAL CABINET FOUNDATION

- a. See cabinet foundation pre-approved plans [CK-TS.03](#) and [CK-TS.04](#).
- b. Cabinet foundation shall be class 3000 air entrained concrete from a commercially mixed source. Engineer shall approve form work before placement of concrete.
- c. Conduit shall extend 2" above cabinet foundation.

#### SERVICE CABINETS

- a. See [CK-TS.05A](#) and [CK-TS.05B](#).
- b. A 1" conduit shall be installed under service cabinet for grounding.

#### ITS CABINETS (FUTURE)

#### TERMINAL CABINETS

- a. Poles with double mast arms shall have two terminal cabinets.
- b. All new signal based pole mounted terminal cabinet shall be placed on the pole to provide 10' clearance from the bottom of cabinet to the finished grade of walkway.
- c. Locations of terminal cabinets are to be verified prior to cutting holes for mounting.

#### RRFB CABINETS

- a. See CK-TS.14 for details on mounting RRFB controller cabinets.
- b. See [CK-TS.10](#) and [CK-TS.11](#) for service cabinet details.

### 9. VEHICLE DETECTION

- a. For approaches with speed limit less than 35 MPH, use video detection with (45') stop bar detection zones.
- b. Video detection zones shall be aimed and adjusted as approved by the engineer.
- c. The location of video detection cameras shall be verified in the field by the engineer prior to installation.
- d. On approaches with speed limit equal or greater than 35 MPH combine video detection at the stop bars (short detection zone) with inductive loops located upstream based on stopping sight (Xs) distance from stop bar. Where:  
 **$X_s = S t + \frac{s^2}{2(d + (32.2 * G))}$**   
**S**=85<sup>th</sup> Percentile Speed (ft/sec)  
**t**=Perception Reaction Time (1 sec)  
**d**=Deceleration Rate (10 ft/sec<sup>2</sup>)  
**G**=grade
- e. Check to see dilemma zones are not created and that slower vehicles can clear the intersection. Refer to FHWA *Traffic Detector Handbook-2006* **Detection for Dilemma Zone**, Pages 4-25.

- f. Use inductive loops as system loops to support traffic responsive operation and for individual lane counting. System loops should be placed so that entering turning and entering and exiting through vehicles can be counted separately.
- g. In some cases, small diamond shape loops may be required to count right turning vehicles.
- h. See Standard CK-TS.02 for typical detection layout and numbering system.
- i. Pull a separate lead-in wire for each of the system/counting loops, 2CS per loop, from the nearest J-box to the controller cabinet.
- j. Induction loops shall be spliced and tested by Contractor.
- k. The location of induction loops shall be verified in the field by the engineer prior to installation.

#### 10. CCTV CAMERAS

- a. The location of CCTV cameras shall be verified in the field by the engineer prior to installation.

#### 11. JUNCTION BOXES

- a. WSDOT Type 8 junction boxes (WSDOT Standard Plan J-40.30-04) are usually placed on each quadrant of an intersection. Types 1 and 2 are used in other locations.
- b. Use TA vaults wherever fiber is being pulled.
- c. All junction box and vault covers shall be rated for h20 loading.
- d. All existing junction boxes shall be replaced with new ones when within the ground-disturbing limits of a construction project, or wherever a conduit leading to an existing junction box is replaced.
- e. Existing junction boxes in paved areas should be relocated outside those paved areas.
- f. **New** junction boxes shall **not** be placed in the following locations:
  - 1. Sidewalks ramps
  - 2. Traveled way, unless a utility-style manhole is provided
  - 3. Sidewalks, unless otherwise approved by Transportation Division Staff
  - 4. Paved shoulders
- g. In the event a junction box is located in a pedestrian circulation path, it shall have an approved non-skid coating on the lid. Refer to City of Kirkland Policy G-2.
- h. In the event a junction box is located within a sidewalk, it shall be placed parallel or perpendicular to the sidewalk panel in which it resides.
- i. Use heavy duty junction boxes per WSDOT Standard Specs 9-29.2(2) where maintenance vehicles are likely to drive over them, for example near controller cabinet.
- j. Junction box lids shall be labeled in accordance with WSDOT Standard Spec 9-29.2(4)
- k. Junction boxes, connected by 2" conduit, shall be placed at the limits of each project to allow for future expansion of conduit systems.

- l. The location of junction boxes shall be approved by the engineer in the field prior to installation.
- m. Junction box dimensions shall be sized according to the number and size of conduits sweeping into and out of the box as well as the junction box's specific capacity requirements. Refer to [WSDOT standard plans J-40.10](#) and [J-40.30](#) for specific dimensions and capacity requirements.

## 12. CONDUIT/CABLE/WIRE

- a. Any existing galvanized conduit shall be replaced with PVC conduit.
- b. Conduits shall be PVC schedule 80 when installed under roadways and high-volume driveways. In all other locations, conduits shall be PVC schedule 40 unless otherwise specified by Transportation Division staff.
- c. All new PVC conduits containing conductors shall have ground wire. Ground wire size shall match the largest conductor (Min #8 or as noted otherwise in wire notes). Spare/empty conduit shall contain electrically detectable pull tape and be marked as "City of Kirkland" conduit.
- d. Verify capacity of any existing conduit considered for re-use by passing a mandrel through them.
- e. Preserve existing PVC conduit and junction boxes, particularly those used for advance loops.
- f. Open cuts shall be backfilled with CDF.
- g. Lighting circuitry, conductors, and fiber optic cable shall each be located in separate conduit and junction box systems.
- h. Fiber optic cable shall be located at least 12" from any other conductor.
- i. Two spare 2" conduits with pull ropes should be placed across all road crossings.
- j. To allow for expansion of signal heads, signs, etc., without construction of a new foundation, one spare 2" conduit shall be installed from each mast arm foundation to the nearest junction box.
- k. Turns or bends in conduits shall occur only at junction boxes. This is to ensure they are locatable in the future.
- l. Conduit shall enter poles only through junction boxes.
- m. The contractor shall install conduit by directional boring unless otherwise specified. No trenching or "blind" drilling shall be permitted.
- n. Conduit may be spliced by glued joints only.
- o. All conduits shall be terminated with a bushing.
- p. Fiber optic cable shall not be coiled in controller cabinet.
- q. The contractor shall perform an independent utility verification prior to conduit installation and inform the engineer immediately if any conflict is found.
- r. The final location of all conduits shall be approved by the engineer prior to installation.

### **III. MATERIALS (FUTURE)**

#### **IV. TRAFFIC SIGNAL GENERAL NOTES**

The following traffic signal general notes should be added to construction plans for projects of all types involving traffic signals, roadway/pedestrian illumination, RRFBs, speed radar feedback signs, and school zone flashing beacons. Only relevant notes that apply to specific project types should be shown. Further notes can be added based on engineering judgement.

1. A PRE-CONSTRUCTION CONFERENCE SHALL BE HELD PRIOR TO THE START OF CONSTRUCTION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SECURING ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION.
3. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH WSDOT/APWA STANDARD PLANS, STANDARD SPECIFICATIONS, CITY OF KIRKLAND PRE-APPROVED PLANS, AND THE LATEST AMENDMENTS TO PROJECT MANUAL, SPECIAL PROVISIONS, AND THE APPROVED PLANS.
4. A COPY OF THE APPROVED PLANS MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
5. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ADEQUATE TRAFFIC CONTROL TO ENSURE TRAFFIC SAFETY DURING CONSTRUCTION ACTIVITIES; THEREFORE, THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN TO THE PUBLIC WORKS DEPARTMENT AT LEAST TWO WEEKS PRIOR TO STARTING ANY WORK IN THE RIGHT OF WAY. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND THE [CITY OF KIRKLAND'S POLICY R-29](#).
6. ANY EXISTING PUBLIC IMPROVEMENTS DAMAGED DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE PRIOR TO FINAL INSPECTION.
7. THE CONTRACTOR IS RESPONSIBLE FOR KEEPING ALL PUBLIC STREETS FREE OF MUD AND DEBRIS AT ALL TIMES. THE CONTRACTOR SHALL BE PREPARED TO USE POWER SWEEPERS OR OTHER PIECE OF EQUIPMENT NECESSARY TO KEEP THE ROADWAYS CLEAN.
8. EXISTING SIGNAL SYSTEM TO BE OPERATIONAL AND VISIBLE BY THE INTENDED USER UNTIL SWITCH OVER. SEE CONTRACT SPECIAL PROVISIONS FOR SWITCH OVER AND REMOVAL INFORMATION.
9. EXISTING STREET AND PEDESTRIAN LIGHTING TO REMAIN OPERATIONAL UNTIL SWITCH OVER TO NEW SYSTEM. ILLUMINATION SHALL BE MAINTAINED TO EXISTING BETTER LEVELS DURING ALL PHASES OF CONSTRUCTION. A TEMPORARY SYSTEM MAY BE USED TO ACHIEVE THIS GOAL. SEE KIRKLAND'S STREET LIGHTING DESIGN GUIDELINES FOR MORE INFORMATION.

10. ALL SIGNAL SYSTEM COORDINATION WITH KIRKLAND TRAFFIC SHALL BE DONE THROUGH KIRKLAND CIP REPRESENTATIVE.
11. ANY ROADWAY/INTERSECTION SIGN/MARKING REMOVED OR TEMPORARILY MOVED BY THE CONTRACTOR SHALL BE RESTORED BY THE END OF DAY AS TO COMPLY WITH THE CURRENT CITY OF KIRKLAND STANDARDS.
12. ALL SIGNS SHALL BE NEW.
13. WHEN AN EXISTING ROADWAY IS TO BE WIDENED, THE EXISTING PAVEMENT MUST BE SAWCUT AT LEAST ONE FOOT FROM THE EDGE TO PROVIDE A PROPER MATCH BETWEEN NEW AND EXISTING ASPHALT. HOWEVER, WHEN EXISTING PAVEMENT CONTAINS ALLIGATORED AREAS, THOSE AREAS MUST BE REMOVED PRIOR TO WIDENING. ALL SAWCUTS MUST BE PARALLEL OR PERPENDICULAR TO THE RIGHT OF WAY CENTERLINE.
14. BACKFILL IN ALL STREET CUTS ON ARTERIALS WILL BE CONTROL DENSITY FILL (CDF). CONTRACTOR MUST PROVIDE STEEL PLATES TO ALLOW THE CDF TO CURE.
15. WHEN INSTALLING NEW SIDEWALKS, THE AREA BEHIND THE SIDEWALK MUST BE GRADED SO THAT THE YARD DRAINAGE DOES NOT DRAIN OVER THE SIDEWALK.
16. SIDEWALK AND CURB AND GUTTER CANNOT BE POURED MONOLITHICALLY. THERE MUST BE A COLD JOINT OR FULL-DEPTH EXPANSION JOINT BETWEEN THEM.
17. ALL CONCRETE FOR SIDEWALKS AND CURBS AND GUTTERS MUST BE 4000 PSI MINIMUM.

## **V. INSPECTION/TESTING PROCEDURES**

(FUTURE)

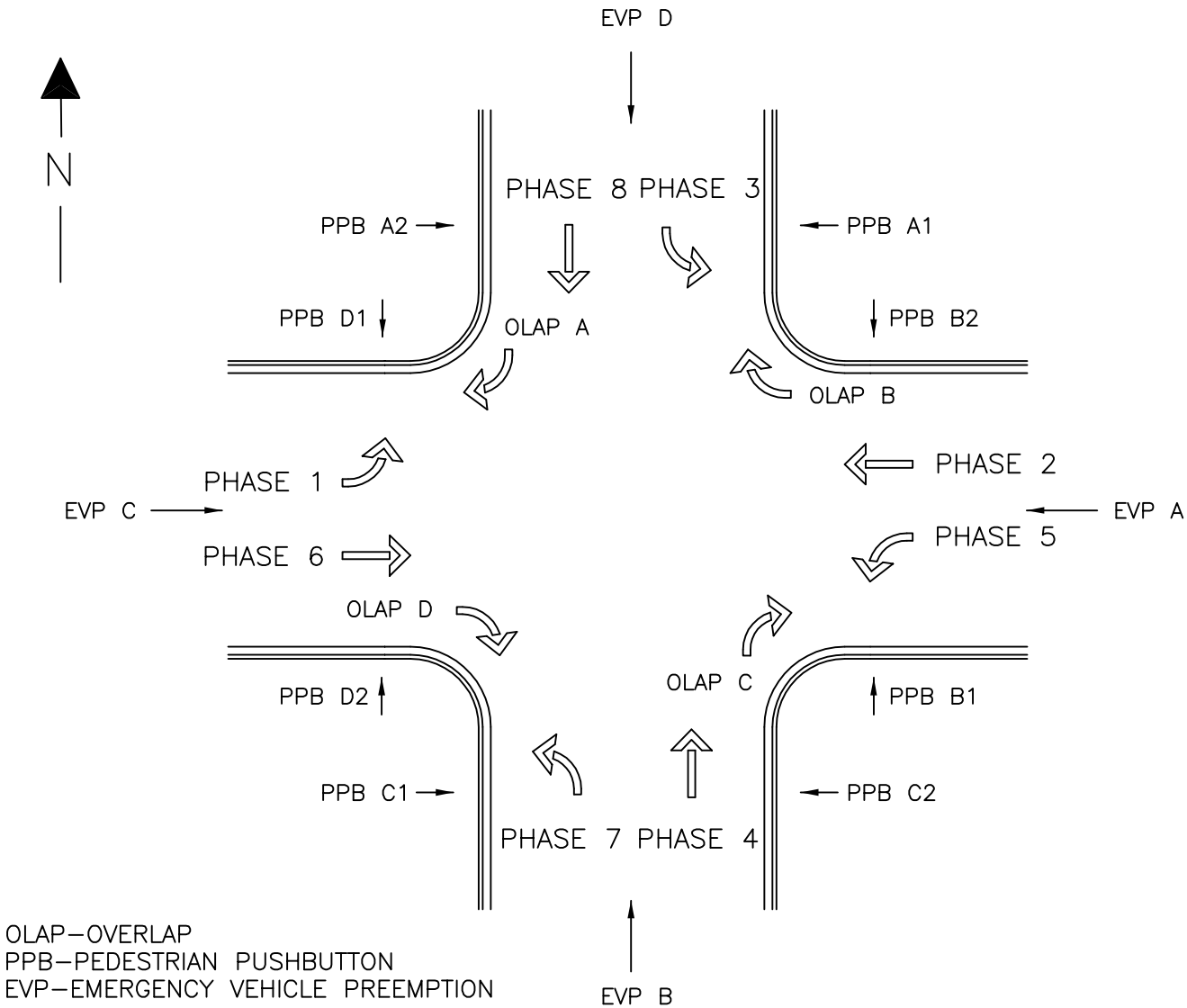


## **VI. PRE-APPROVED PLANS INDEX**

CK-TS.01	Typical Traffic Signal Labeling
CK-TS.02	Typical Detection Layout and Numbering
CK-TS.03	Controller Cabinet Foundation
CK-TS.04	Signal and Service Cabinet Foundation
CK-TS.05	Service Cabinet
CK-TS.06	Fiber Optic Vault
CK-TS.07	Signal Head Clearance Detail
CK-TS.08	Roadway Lighting Detail
CK-TS.09	Service Cabinet Foundation
CK-TS.10	Tiny Service Cabinet
CK-TS.11	Tiny Service Cabinet Foundation
CK-TS.12	Pedestrian Pushbutton Detail
CK-TS.13	Flashing School Zone Beacon Detail
CK-TS.14	Rectangular Rapid Flashing Beacon (RRFB) Detail
CK-TS.15	Radar Speed Sign Detail
CK-TS.16A	4" Aluminum Pole Bases - Option A
CK-TS.16B	4" Aluminum Pole Bases - Option B
CK-TS.17	4" Aluminum Pole Base Foundation

## **VII. PRE-APPROVED POLICIES INDEX**

TS-01	Pedestrian Recall Guidelines
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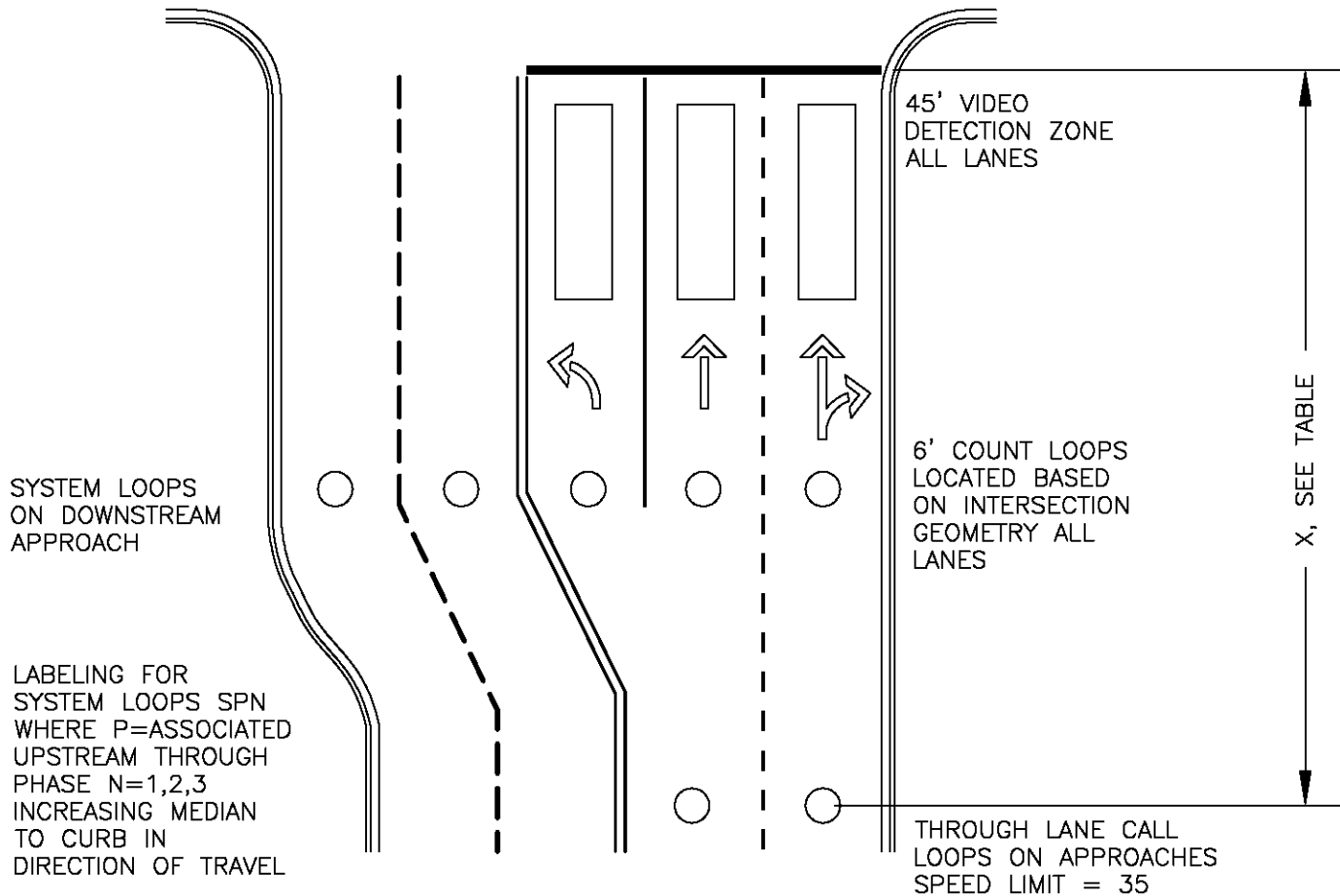


TRAVEL DIRECTION	PHASE		EMERGENCY VEHICLE PREEMPTION	PEDESTRIAN PUSHBUTTON	
	THRU	LEFT		EAST	WEST
NORTHBOUND	4	7	B	B1	D2
SOUTHBOUND	8	3	D	B2	D1
EASTBOUND	6	1	C	A2	C1
WESTBOUND	2	5	A	A1	C2

CITY OF KIRKLAND

PLAN NO. CK—TS.01

TYPICAL TRAFFIC SIGNAL LABELING

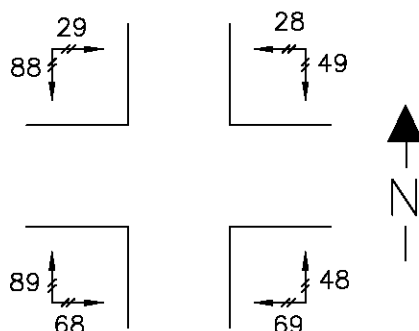


LABELING FOR NON-SYSTEM LOOPS PN WHERE P=ASSOCIATED PHASE AND N=1,2,3 INCREASING

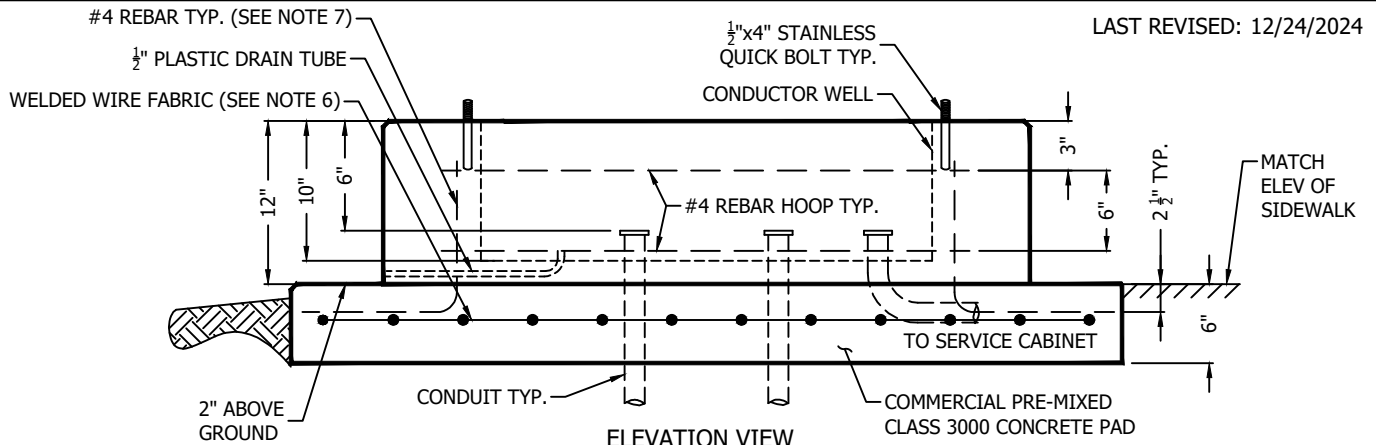
- 1) STOP BAR TO UPSTREAM WITHIN LANE THEN
- 2) BY LANE MEDIAN TO CURB

TABLE													
GRADE (%)	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
X (FT)	275	265	255	250	245	235	230	225	220	215	210	205	200

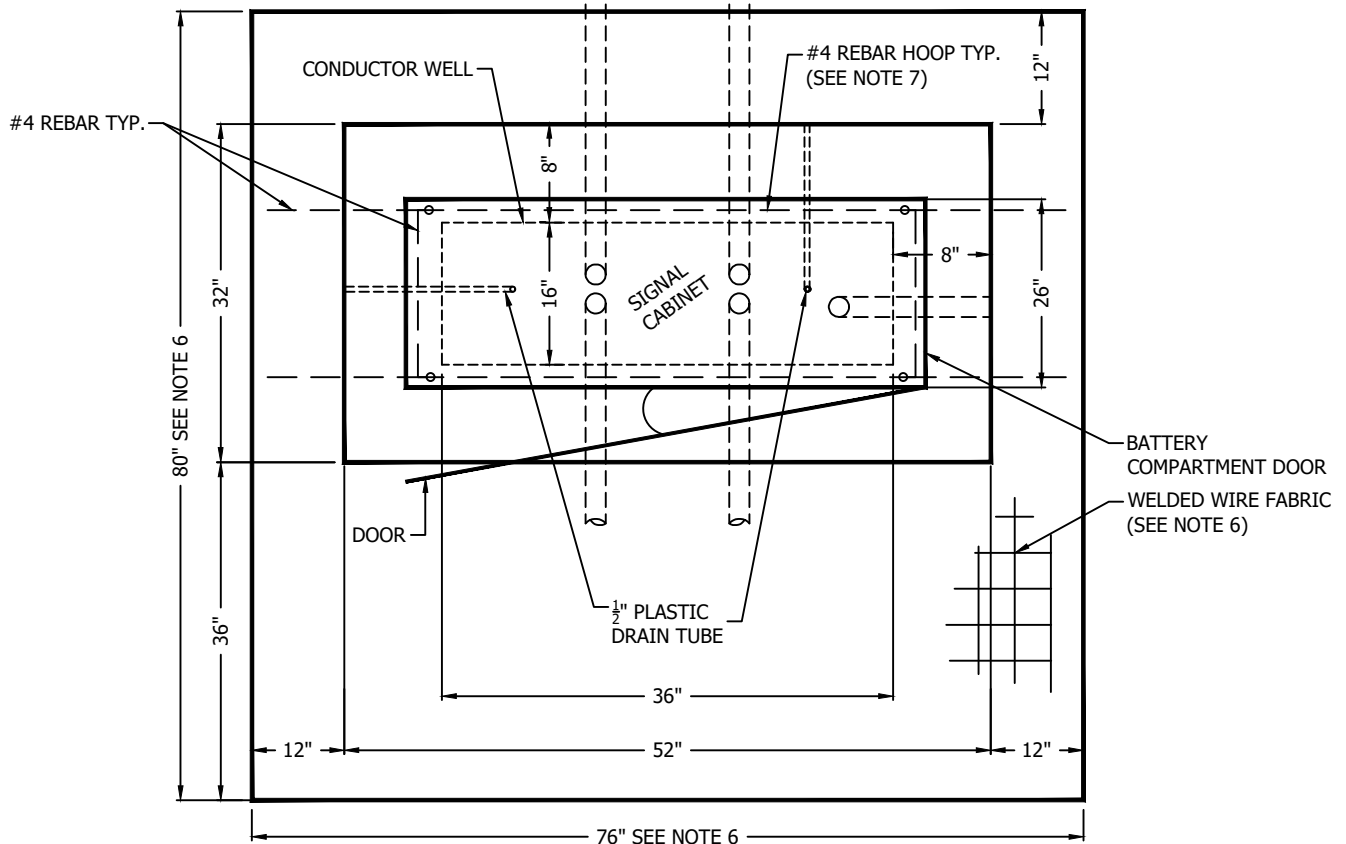
TYPICAL VEHICLE AND PEDESTRIAN HEAD LABELING PLAN. LABEL VEHICLE HEADS PN WHERE P=ASSOCIATED PHASE, N=1,2,3... INCREASING MEDIAN TO CURB.



CITY OF KIRKLAND	
PLAN NO. CK-TS.02	
	TYPICAL DETECTION LAYOUT AND NUMBERING PLAN



ELEVATION VIEW



PLAN VIEW

**NOTE:**

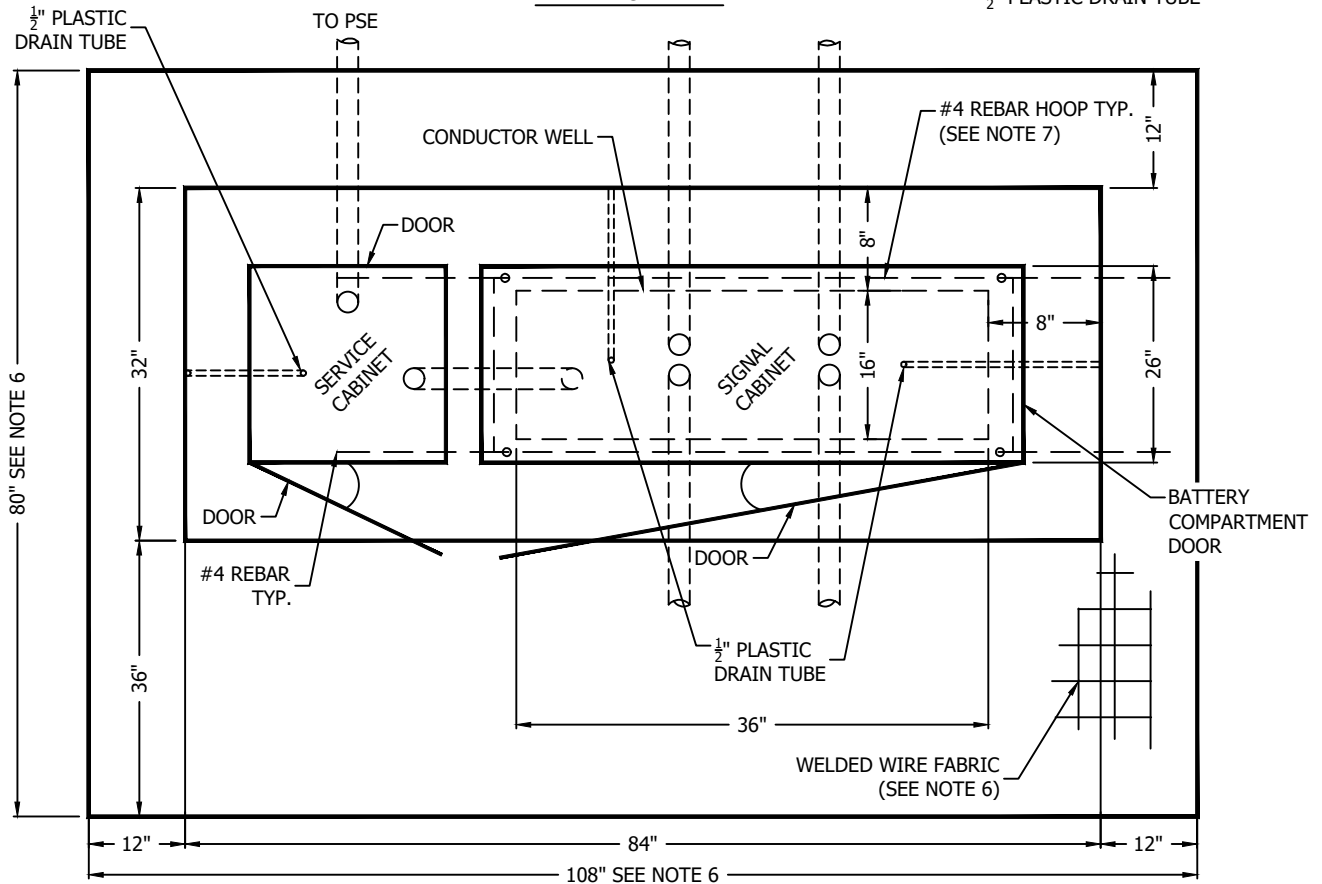
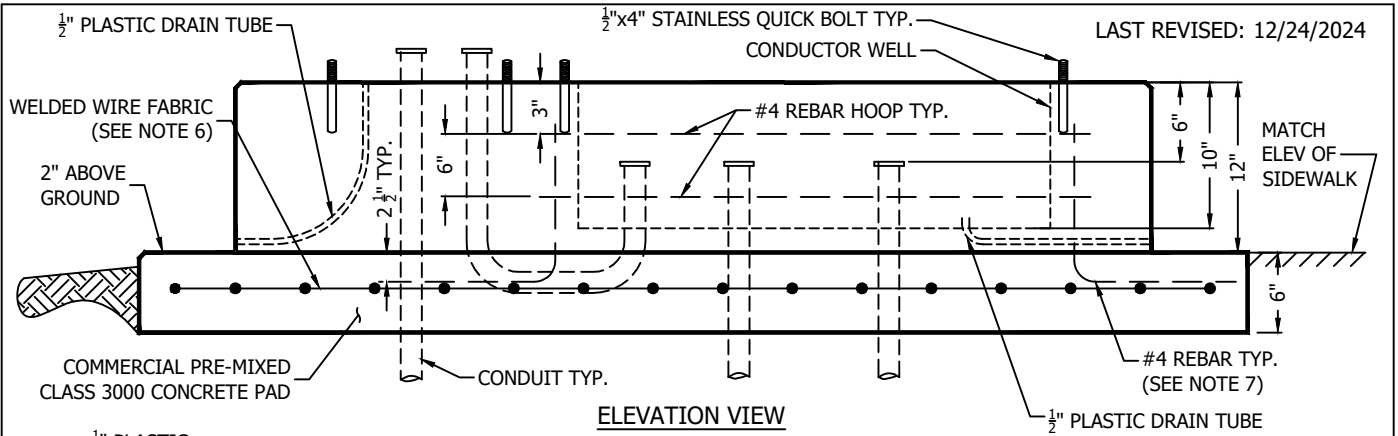
1. CONTRACTOR TO VERIFY BOLT PATTERN WITH CABINET.
2. CONTRACTOR SHALL PROVIDE A MINIMUM CLEARANCE OF 48 INCHES FROM FRONT FACE OF CABINET TO ALLOW FOR DOOR SWING AND WORKING SPACE. CONTRACTOR SHALL HAVE A MINIMUM 4-FOOT OFFSET FROM ANY OBSTRUCTIONS SUCH AS A WALL TO ALLOW FOR FUTURE MAINTENANCE.
3. CONTRACTOR SHALL PROVIDE A MINIMUM OF FOUR (4) 3" CONDUITS AND ONE (1) 2" CONDUIT INTO THE NEAREST JUNCTION BOX.
4. CONTRACTOR SHALL INSTALL CABINET GROUNDING PER WSDOT STANDARD PLAN J-60.05.
5. CONTRACTOR SHALL POUR FOUNDATION TO BE SMOOTH AND LEVEL TO ENSURE PROPER OPERATION OF CABINET. ALL CONCRETE CORNERS SHALL HAVE A 1" CHAMFER, UNLESS ABUTTING SIDEWALK, WHERE IT SHALL BE SQUARE AND SEPARATED FROM THE SIDEWALK WITH JOINT FILLER.
6. CABINET HOUSEKEEPING PAD SHALL BE MINIMUM DIMENSIONS SHOWN, FLAT, UNCONSTRAINED BY OTHER STRUCTURES, AND OUTSIDE OF LOW POINT AREAS WHERE STORMWATER COLLECTS. WELDED WIRE FABRIC IN PAD SHALL BE 4" X 4" MEETING THE REQUIREMENTS OF WSDOT STANDARD SPECIFICATION 7-07.7. AS AN ALTERNATIVE, A GRID OF #3 REBAR MAY BE USED, WITH BARS SPACED AT 12" CENTERS Laterally and Longitudinally.
7. ALL REBAR SHALL BE DEFORMED STEEL REINFORCING BAR FOR CONCRETE FOUNDATIONS CONFORMING TO ASTM A615 GRADE 60.

**CITY OF KIRKLAND**

**PLAN NO. CK - TS.03**



**NEMA CONTROLLER  
CABINET FOUNDATION  
DETAIL**



**NOTES:**

1. CONTRACTOR TO VERIFY BOLT PATTERN WITH CABINETS.
2. CONTRACTOR SHALL PROVIDE A MINIMUM CLEARANCE OF 48 INCHES FROM FRONT FACE OF CABINETS TO ALLOW FOR DOOR SWING AND WORKING SPACE. CONTRACTOR SHALL HAVE A MINIMUM 4-FOOT OFFSET FROM ANY OBSTRUCTIONS SUCH AS A WALL TO ALLOW FOR FUTURE MAINTENANCE.
3. CONTRACTOR SHALL PROVIDE A MINIMUM OF FOUR (4) 3" CONDUITS AND ONE (1) 2" CONDUIT FROM SIGNAL CABINET INTO THE NEAREST JUNCTION BOX.
4. CONTRACTOR SHALL INSTALL TWO GROUND RODS AND CABINET GROUNDING PER WSDOT STANDARD PLANS J-10.10 AND J-60.05.
5. CONTRACTOR SHALL POUR FOUNDATION TO BE SMOOTH AND LEVEL TO ENSURE PROPER OPERATION OF CABINET. ALL CONCRETE CORNERS SHALL HAVE A 1" CHAMFER, UNLESS ABUTTING SIDEWALK, WHERE IT SHALL BE SQUARE AND SEPARATED FROM THE SIDEWALK WITH JOINT FILLER.
6. CABINET HOUSEKEEPING PAD SHALL BE MINIMUM DIMENSIONS SHOWN, FLAT, UNCONSTRAINED BY OTHER STRUCTURES, AND OUTSIDE OF LOW POINT AREAS WHERE STORMWATER COLLECTS. WELDED WIRE FABRIC IN PAD SHALL BE 4" X 4" MEETING THE REQUIREMENTS OF WSDOT STANDARD SPECIFICATION 7-07.7. AS AN ALTERNATIVE, A GRID OF #3 REBAR MAY BE USED, WITH BARS SPACED AT 12" CENTERS Laterally and Longitudinally.
7. ALL REBAR SHALL BE DEFORMED STEEL REINFORCING BAR FOR CONCRETE FOUNDATIONS CONFORMING TO ASTM A615 GRADE 60.

**CITY OF KIRKLAND**

**PLAN NO. CK - TS.04**



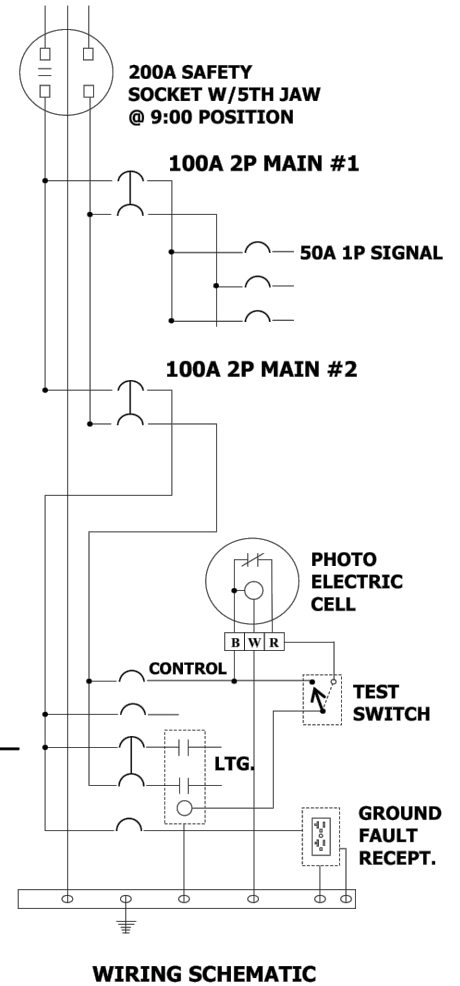
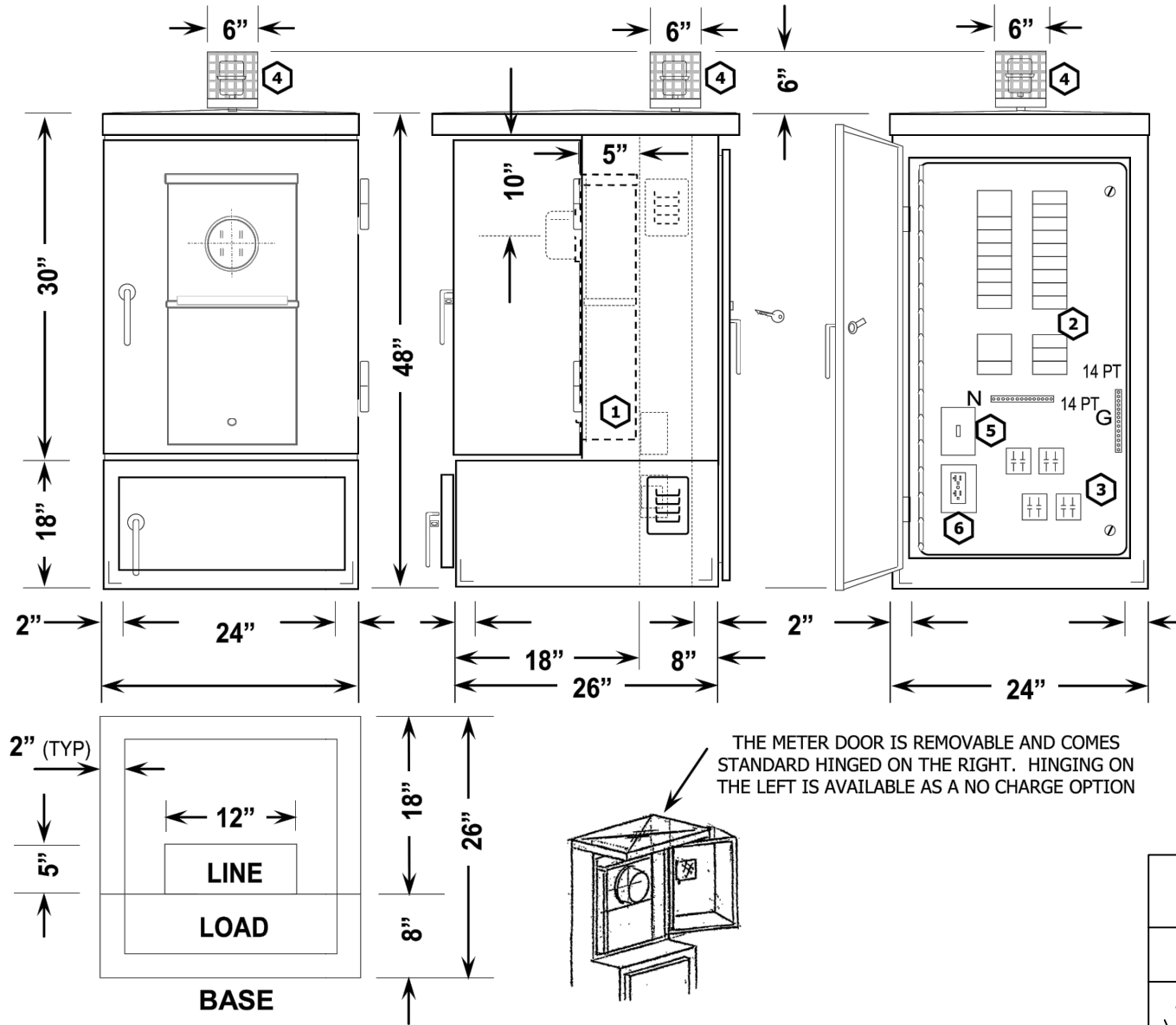
**SIGNAL & SERVICE  
CABINET FOUNDATION  
DETAIL**

**FRONT VIEW**

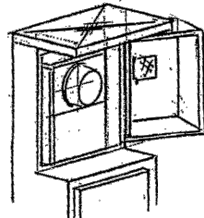
**SIDE VIEW**

**REAR VIEW**

120/240V, SINGLE PHASE 3 WIRE



THE METER DOOR IS REMOVABLE AND COMES STANDARD HINGED ON THE RIGHT. HINGING ON THE LEFT IS AVAILABLE AS A NO CHARGE OPTION



SEE COMPONENT SCHEDULE AND CABINET SPECIFICATIONS

CITY OF KIRKLAND

PLAN NO. CK-TS.05A



SERVICE  
CABINET  
62460-R1

NOTES:  
SKYLINE ELECTRIC & MFG. CO. OR EQUAL

# **PANELBOARD SCHEDULE "S" 120/240V 1P 3W 22K AIC SERIES RATED**

CKT#	DESCRIPTION	TYPE	TRIP/POLE	TRIP/POLE TYPE			DESCRIPTION	CKT#
1	MAIN CB	QBH	100/2		30/2	BAB	ILLUMINATION #3	2
3								4
5	ILLUMINATION #1	BAB	30/2		30/2	BAB	ILLUMINATION #4	6
7								8
9	ILLUMINATION #2	BAB	30/2		20/1	BAB	GFI RECEPTACLE	10
11					15/1	BAB	CONTROL	12
13	RECEPTACLE	BAB	20/1		20/1	BAB	RECEPTACLE	14
15	PREPARED SPACE						PREPARED SPACE	16
17	PREPARED SPACE						PREPARED SPACE	18

S/N

A

B


S/N

## **CITY OF KIRKLAND PANELBOARDS "S" & "T" PANELBOARD SCHEDULES**

### **ELECTRICAL DATA:**

**PANELBOARD:** 120/240VAC 1 PHASE 3 WIRE, 22K AIC SERIES RATED, SPLIT BUS, 250 AMP SILVER PLATED COPPER BUS, COPPER NEUTRAL AND GROUND BUS ,  
**MAIN CBS:** CUTLER HAMMER QBHW2100H  
**BRANCH CBS:** WESTINGHOUSE BAB BOLT-ON CBS  
**PER UL67 FILE NO. E21192**

# **PANELBOARD SCHEDULE "T" 120/240V 1P 3W 22K AIC SERIES RATED**

CKT#	DESCRIPTION	TYPE	TRIP/POLE	TRIP/POLE TYPE				DESCRIPTION	CKT#
1	MAIN CB	QBH	100/2		20/1		ITS	2	
3							PREPARED SPACE	4	
5	SIGNAL	BAB	50/1				PREPARED SPACE	6	

S/N

A

B

S/N

## **CITY OF KIRKLAND**

PLAN NO. CK-TS.05B



**PANELBOARDS "S" & "T" CIRCUIT BREAKER SCHEDULES**


**CITY OF KIRKLAND    SERIES #62460-R1**  
**SERVICE CABINET FOR SERVICE AND STREET AND TRAFFIC SIGNAL**

**COMPONENT SCHEDULE**

- ① **METER BASE:** 200 AMP, BY-PASS TYPE, 4-JAW, SINGLE PHASE,  
5TH JAW INSTALLED AT 9:00 POSITION, B-LINE U264
- ② **PANELBOARD:** 120/240 VAC, 1 PHASE, 3 WIRE, 250 AMP COPPER BUS (W/RATING LABEL),  
SPLIT BUS , 22 KAIC SERIES RATED, BOLT-ON BRANCH BREAKERS, EATON TYPE BAB  
SIGNAL SECTION: 100 AMP, 2 POLE MAIN BREAKER, EATON QBHW2100, 6 CKT  
1 - 50 /1 SIGNAL BRANCH  
1 - 20 /1 ITS BRANCH  
2 - 1 POLE SPACE  
ILLUMINATION SECTION: 100 AMP, 2 POLE MAIN BREAKER, EATON QBHW2100, 18 CKT  
4 - 30/2 ILLUMINATION BRANCH  
2 - 20/1 RECEPTACLE BRANCH  
1 - 15/1 CONTROL CKT BRANCH  
1 - 20/1 GROUND FAULT RECEPTACLE BRANCH
- ③ **CONTACTORS:** LIGHTING RATED, 30 A, 2 POLE, 120 VAC COIL, 4 – REQUIRED
- ④ **PHOTO ELECTRIC CELL:** 1800 WATT, 120 VAC, TWIST LOCK, TYCO #SST-PV-IES-UL  
WITH 6" x 6" x 6" WIRE MESH GUARD
- ⑤ **PHOTO-CELL BYPASS SWITCH:** SPDT, 15 AMP, 277 VAC
- ⑥ **GROUND FAULT RECEPTACLE:** 20 AMP, 125 VAC, DUPLEX

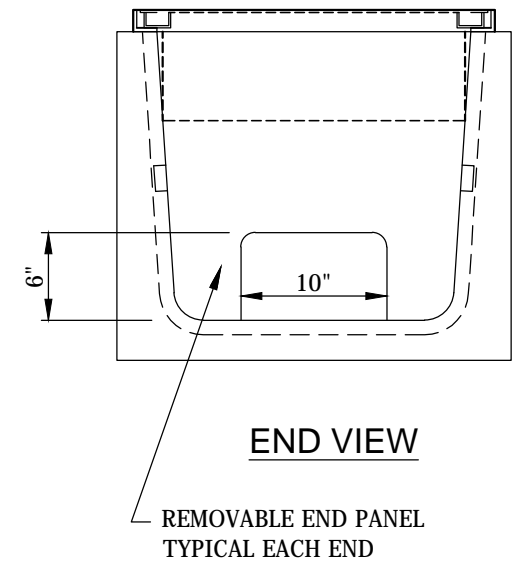
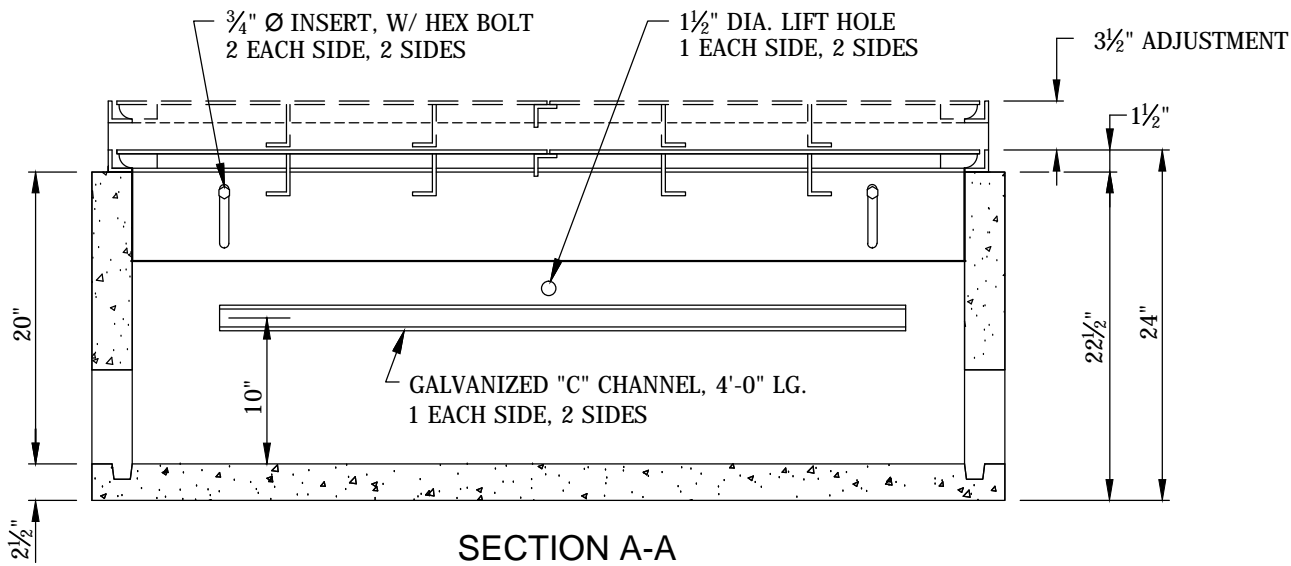
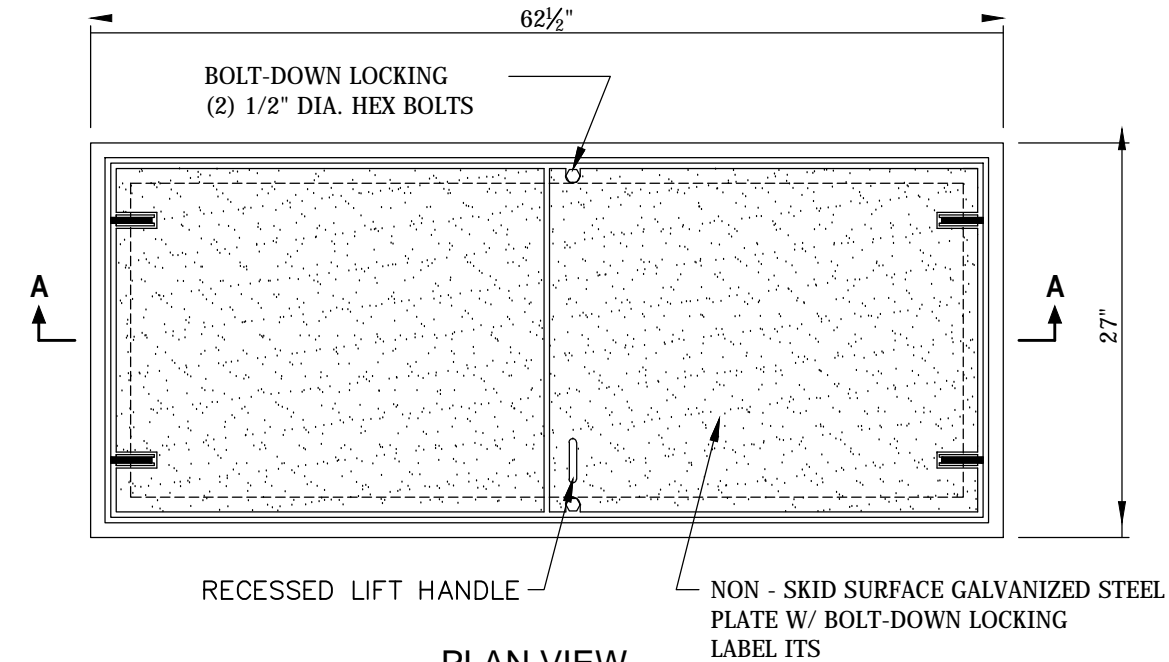
CABINET:        NEMA 3R, PADMOUNT, 1/8" ALUMINUM 5052-H32 CONSTRUCTION  
                     2 SCREENED AND GASKETED VENTS  
DOORS: HEAVY DUTY HINGES (LIFT-OFF TYPE), WELDED IN PLACE  
                     STAINLESS STEEL VAULT HANDLES, PADLOCKABLE METER DOOR  
                     "BEST" CX LOCK ON DISTRIBUTION DOOR, POLISHED WIRE GLASS  
                     WINDOW IN METER DOOR, CLOSED CELL NEOPRENE GASKET,  
                     CARD HOLDER  
FINISH: MILL FINISH ALUMINUM, DEADFRONT WHITE

CITY OF KIRKLAND

<b>CITY OF KIRKLAND</b>	
PLAN NO. CK-TS.05C	
	<b>COMPONENT SCHEDULE</b>



LAST REVISED: 1/1/18

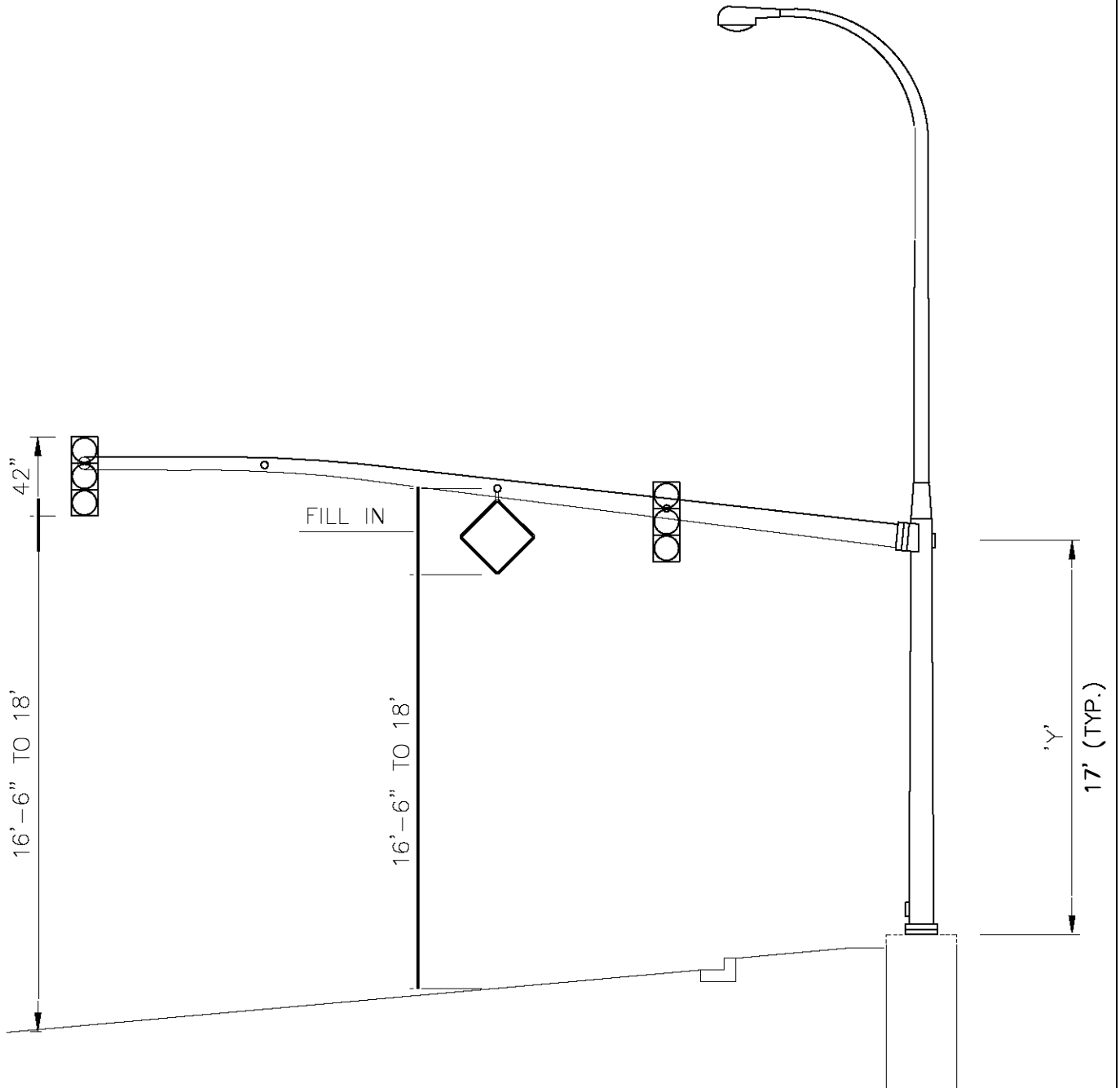


CITY OF KIRKLAND

PLAN NO. CK- TS.06



FIBER  
OPTIC  
VAULT



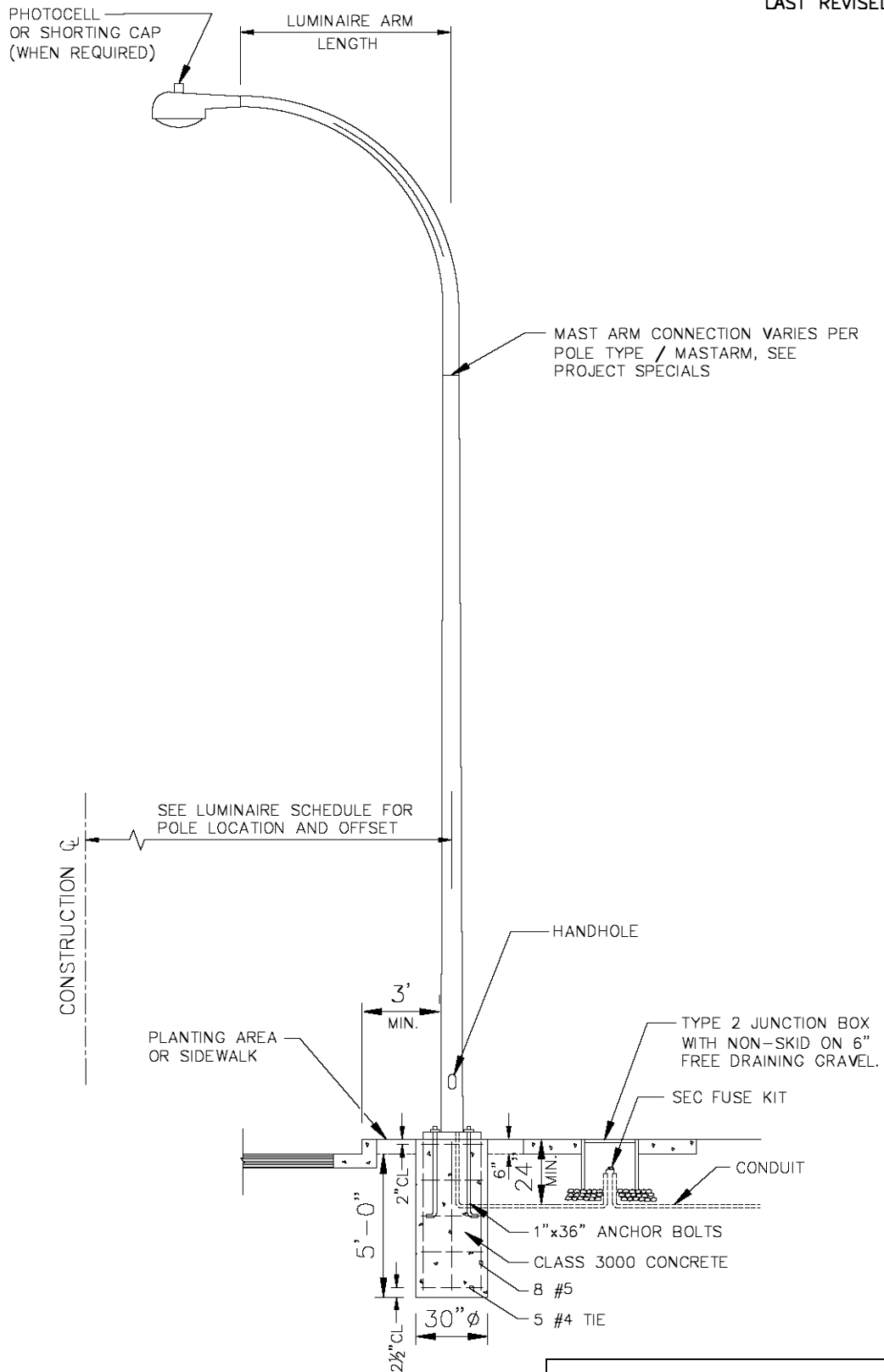
CITY OF KIRKLAND

PLAN NO. CK-TS.07



SIGNAL HEAD  
CLEARANCE DETAIL

LAST REVISED: 1/1/18

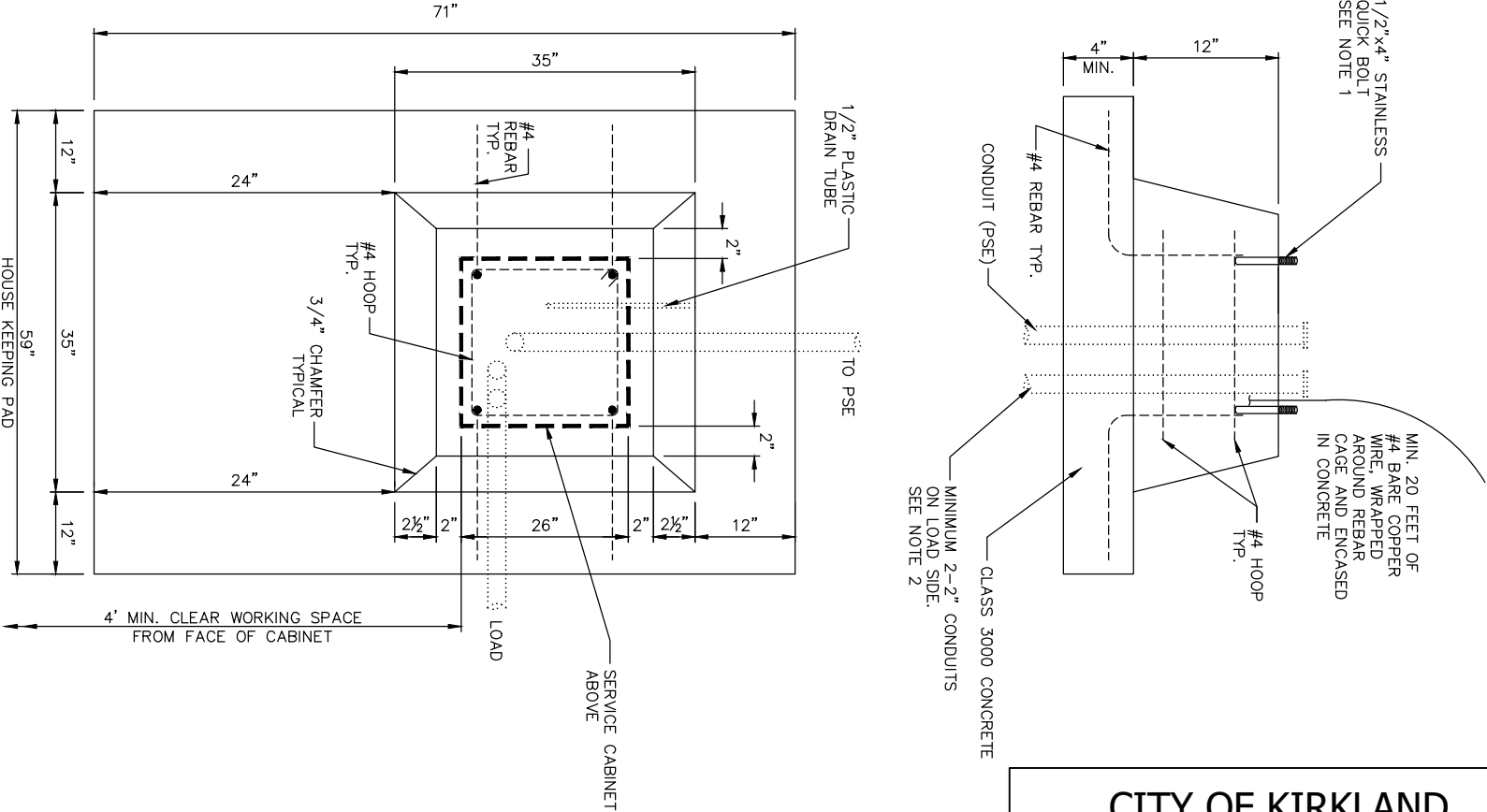


CITY OF KIRKLAND

PLAN NO. CK-TS.08




ROADWAY LIGHTING  
DETAIL

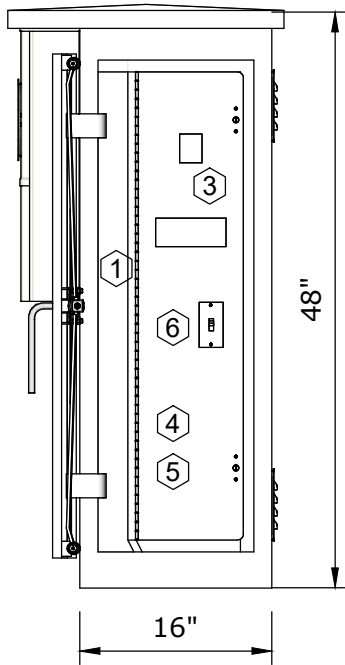


- NOTES:**
1. CONTRACTOR TO VERIFY BOLT PATTERN WITH CABINETS.

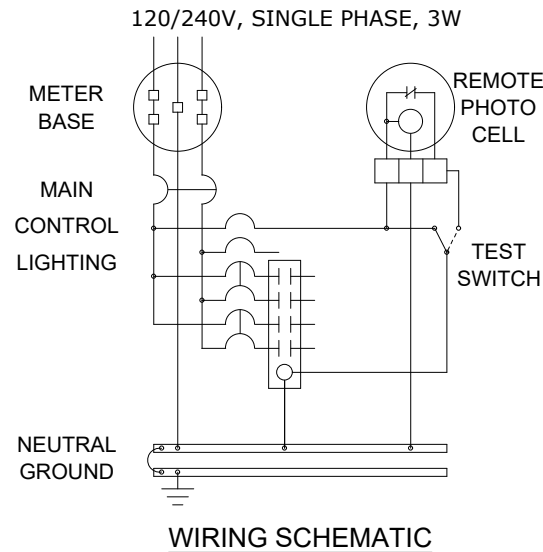
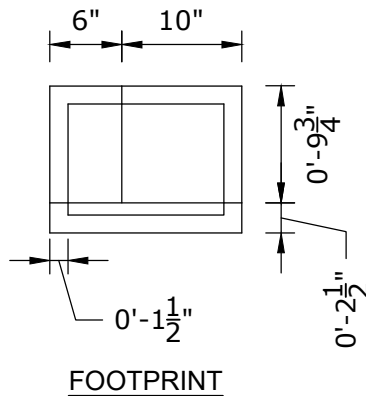
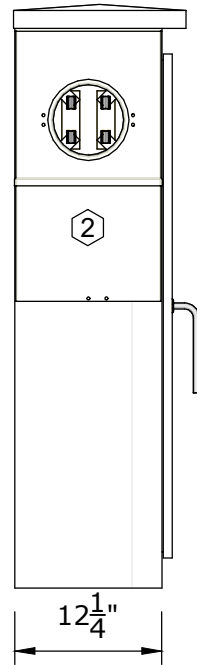
**SERVICE CABINET FOUNDATION DETAIL**

<b>CITY OF KIRKLAND</b>	
PLAN NO. CK- TS.09	
	<b>SERVICE CABINET FOUNDATION</b>

FRONT



SIDE



**CITY OF KIRKLAND "TINY" CABINET**  
**SKYLINE SERIES# 62460-T1**

LAST REVISED: 01/2023

**CABINET:**

**CONSTRUCTION:**

NEMA TYPE 3R, OUTDOOR PADMOUNT, 1/8" 5052-H32 ALUMINUM CONSTRUCTION, 2 SCREENED AND GASKETED VENTS, REMOVABLE EQUIPMENT MOUNTING PAN, CABINET GROUND WITH MINIMUM BONDING WIRE TO NEUTRAL

**DOORS:**

HEAVY-DUTY CONCEALED HINGES (LIFT-OFF TYPE), STAINLESS STEEL VAULT HANDLE WITH ROLLER RODS THAT PROVIDE 3- POINT COMPRESSION ON CLOSED CELL NEOPRENE GASKET, "BEST" LOCK

**DEADFRONT:**

HINGED AND SECURED WITH QUARTER-TURN FASTENERS

**FINISH:**

MILL FINISH ALUMINUM  
DEADFRONT AND WIREWAY COVER -- WHITE

**COMPONENT SCHEDULE:**

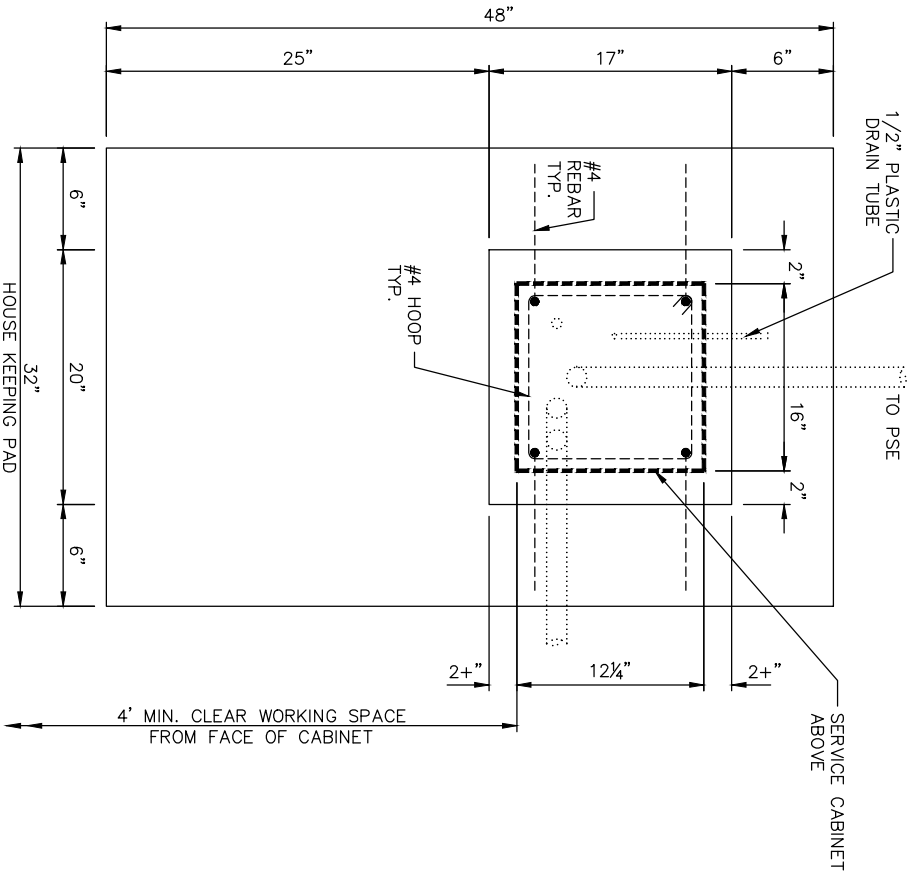
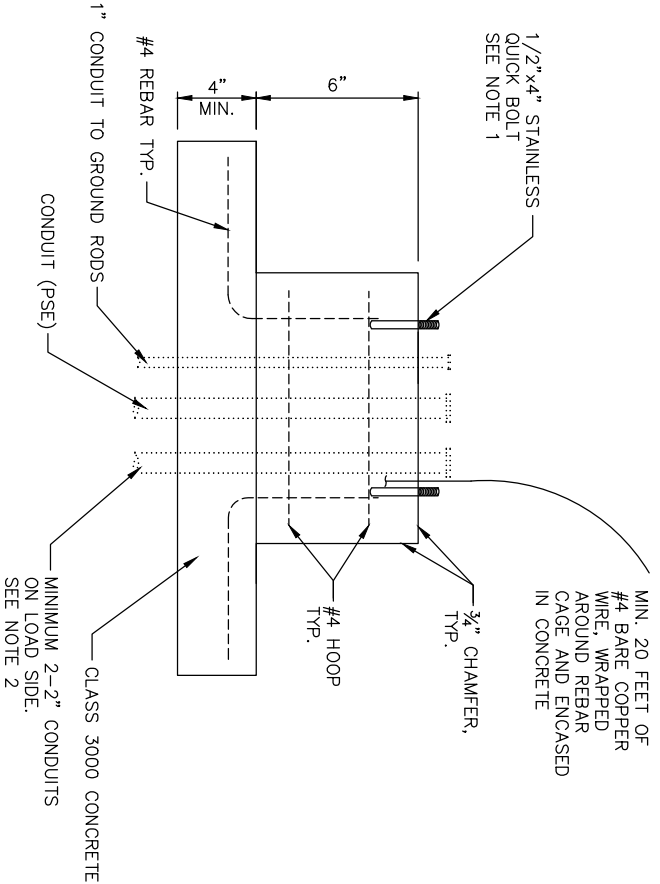
- ① SERVICE WIREWAY
- ② METERBASE: 200A, 4 JAW, MANUAL BYPASS, B-LINE U264, W/ 5TH JAW
- ③ PANELBOARD: 120/240 VAC, 125 AMP COPPER BUS, 1 PHASE, 3 WIRE, 6 CKT, FULLY RATED AT 10K AIC, WITH ENGRAVED NAME PLATES  
MAIN BREAKER: 100 AMP, 2 POLE, EATON QC2100  
BRANCH BREAKERS, BOLT ON, EATON TYPE BAB:  
2 – 20/2 LIGHTING 1, 2  
1 – 20/1 RRFB  
1 – 15/1 CONTROL
- ④ CONTACTOR: LIGHTING RATED, 30A, 4 POLE, 120V COIL, SQD 8910DPA34V02U1
- ⑤ TERMINAL BLOCK FOR FIELD WIRE CONNECTION TO REMOTE PHOTO CELL
- ⑥ PHOTOCELL BYPASS SWITCH

**CITY OF KIRKLAND**

PLAN NO. CK-TS.10




**TINY CABINET**

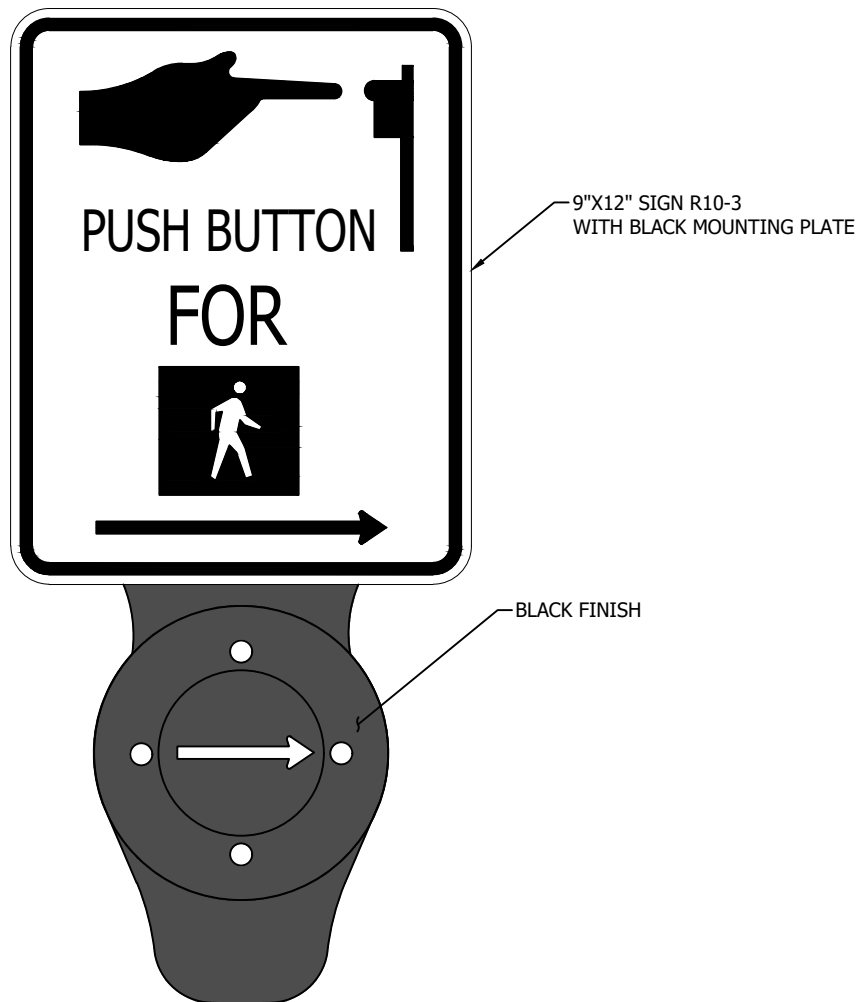


NOTES:

1. CONTRACTOR TO VERIFY BOLT PATTERN WITH CABINETS.

"TINY" SERVICE CABINET FOUNDATION DETAIL

CITY OF KIRKLAND	
PLAN NO. CK- TS.11	
	TINY SERVICE FOUNDATION



**NOTES:**

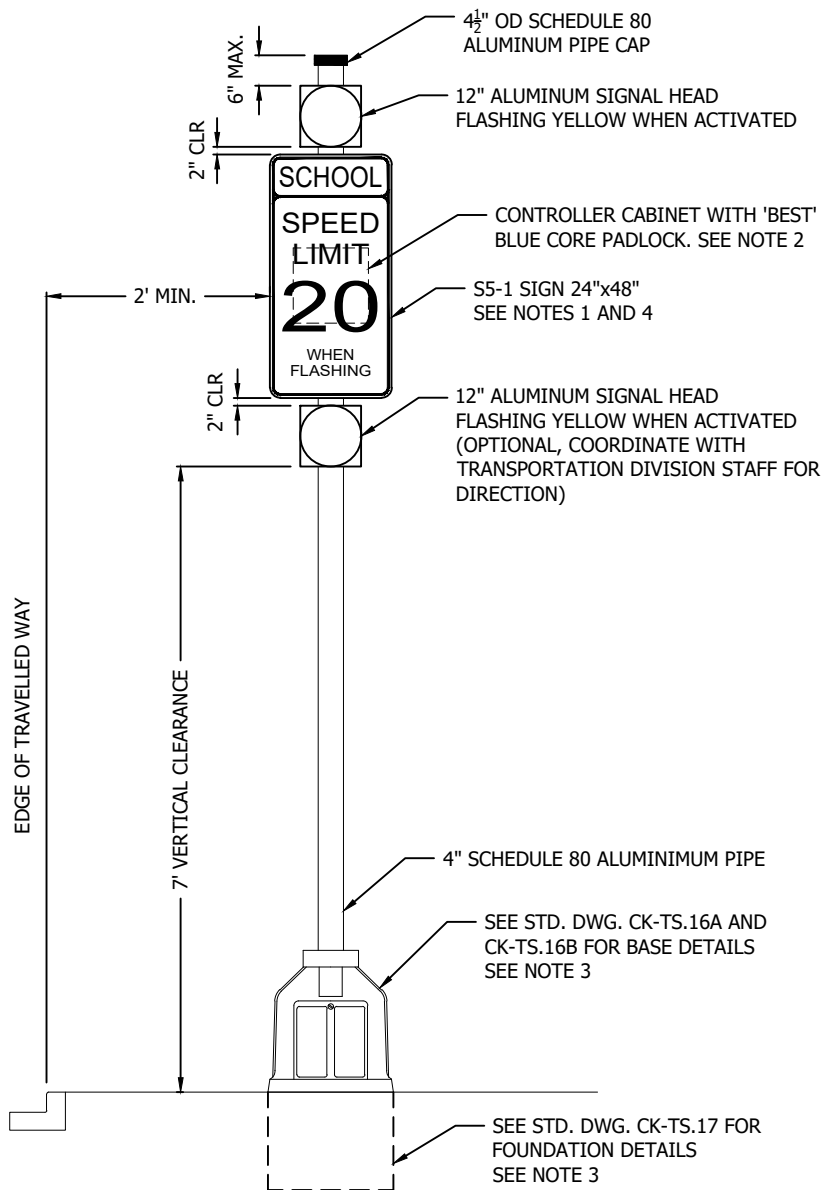
1. SEE CITY OF KIRKLAND PRE-APPROVED PLANS POLICY R-31 FOR ADDITIONAL INFORMATION.
2. PEDESTRIAN PUSHBUTTONS AND PUSHBUTTON PLACEMENT SHALL FOLLOW CURRENT PUBLIC RIGHT-OF-WAY ACCESSIBILITY GUIDELINES (PROWAG) TO THE MAXIMUM EXTENT FEASIBLE.
3. SEE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) SECTION 4I.05 FOR TYPICAL PUSHBUTTON LOCATIONS.
4. THE PREFERRED TRAFFIC SIGNAL PUSHBUTTON IS THE MOST CURRENT POLARA INS MODEL, OR APPROVED EQUAL. IN ADDITION TO COMPLYING WITH ACCESSIBILITY FEATURES LISTED IN PROWAG AND MUTCD, AT A MINIMUM, NEW ACCESSIBLE PEDESTRIAN PUSHBUTTONS SHALL HAVE THE FOLLOWING FEATURES:
  - 2-WIRE SYSTEM
  - CAPABILITY OF TOUCHLESS ACTUATION (WAVE FEATURE) WITH AN ADJUSTABLE DETECTION RANGE OF 1-20 INCHES
  - COMPATIBILITY WITH SMARTPHONE APPLICATION THAT ALLOWS PEDESTRIANS TO ACCESS AUDIBLE INFORMATION AND REMOTELY ACTUATE PUSHBUTTONS FROM THEIR SMARTPHONE
  - EXTENDED PUSH ACTIVATION
5. SEE ELECTRICAL SPECIAL PROVISIONS FOR MORE INFORMATION.
6. ALL SIGNS SHALL HAVE ANTI-GRAFFITI COATING. SEE CONTRACT SPECIAL PROVISIONS FOR MORE INFORMATION.
7. FOR RRFB INSTALLATIONS, SEE PRE-APPROVED PLAN NOS. CK-TS.14, CK-TS.16A, CK-TS.16B AND CK-TS.17. THE PREFERRED RRFB PUSHBUTTON IS THE 6-WIRE POLARA INX MODEL, OR APPROVED EQUAL.
8. IF USED, ASSOCIATED PUSHBUTTON EXTENDER BRACKETS SHALL BE BLACK IN COLOR.
9. ARROWS ON THE PUSHBUTTON AND SIGN SHALL POINT (RIGHT OR LEFT) TOWARD THE CROSSWALK SERVED.

**CITY OF KIRKLAND**

**PLAN NO. CK - TS.12**




**PEDESTRIAN  
PUSHBUTTON  
DETAIL**

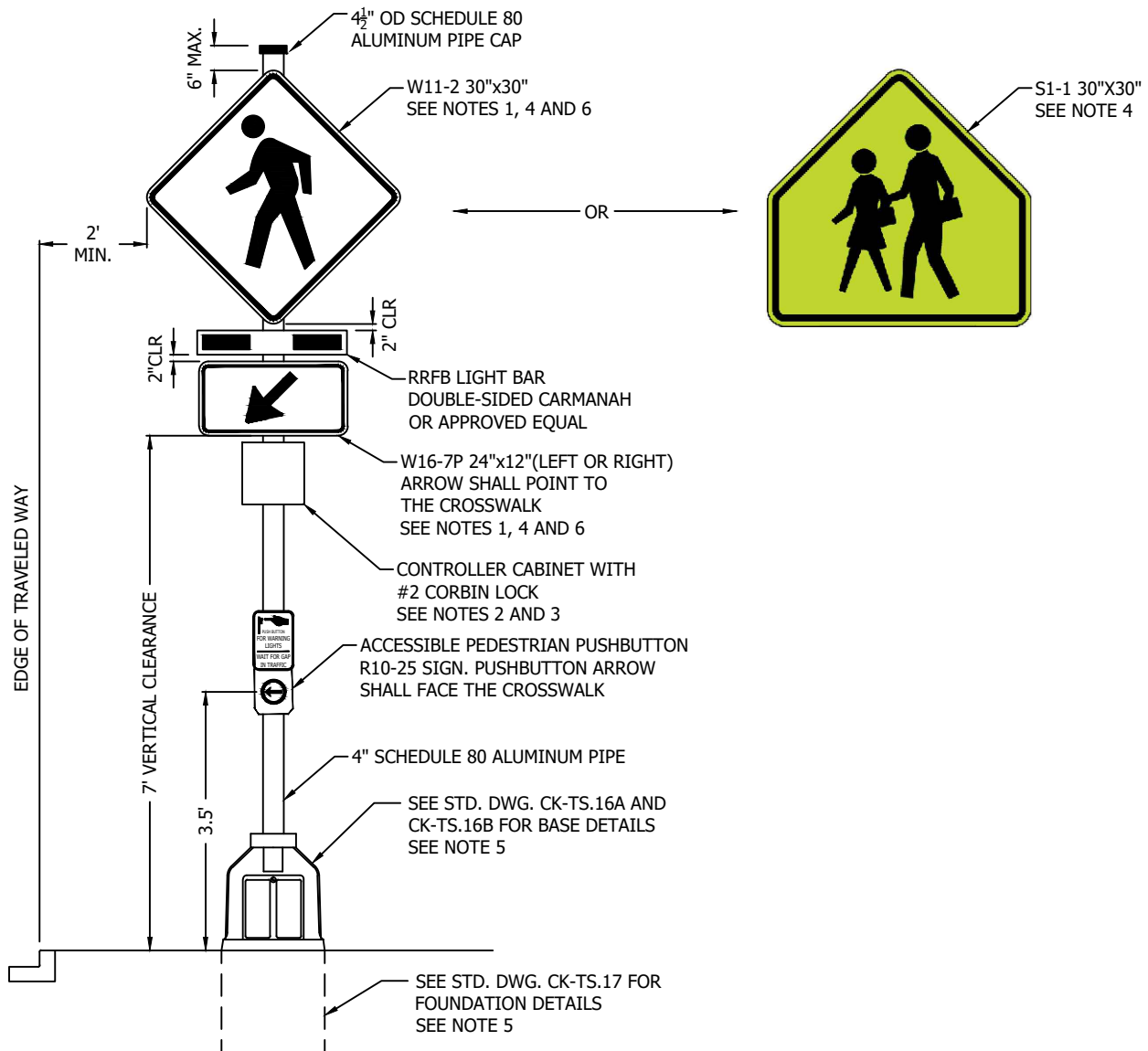


**NOTES:**

1. SEE CONTRACT PLANS AND SPECIFICATIONS FOR POLE HEIGHT, SIGN SHEETING TYPE, AND OTHER DETAILS. REFER TO PRE-APPROVED PLAN CK-R.43 FOR ADDITIONAL SIGN PLACEMENT REQUIREMENTS.
2. REFER TO THE CURRENT KIRKLAND SPECIAL PROVISIONS FOR APPROVED SCHOOL ZONE FLASHING BEACON COMPONENTS.
3. THE SIGN BASE AND FOUNDATION SHALL BE LOCATED SO THAT 4' MINIMUM CLEARANCE IS MAINTAINED FOR THE PEDESTRIAN ACCESS ROUTE. SIDEWALK WIDENING MAY BE REQUIRED TO ENSURE MINIMUM CLEARANCE DISTANCE.
4. ALL SIGNS SHALL HAVE ANTI-GRAFFITI COATING. SEE CONTRACT SPECIAL PROVISIONS FOR MORE INFORMATION.

CITY OF KIRKLAND	
PLAN NO. CK - TS.13	
	FLASHING SCHOOL ZONE BEACON DETAIL





#### NOTES:

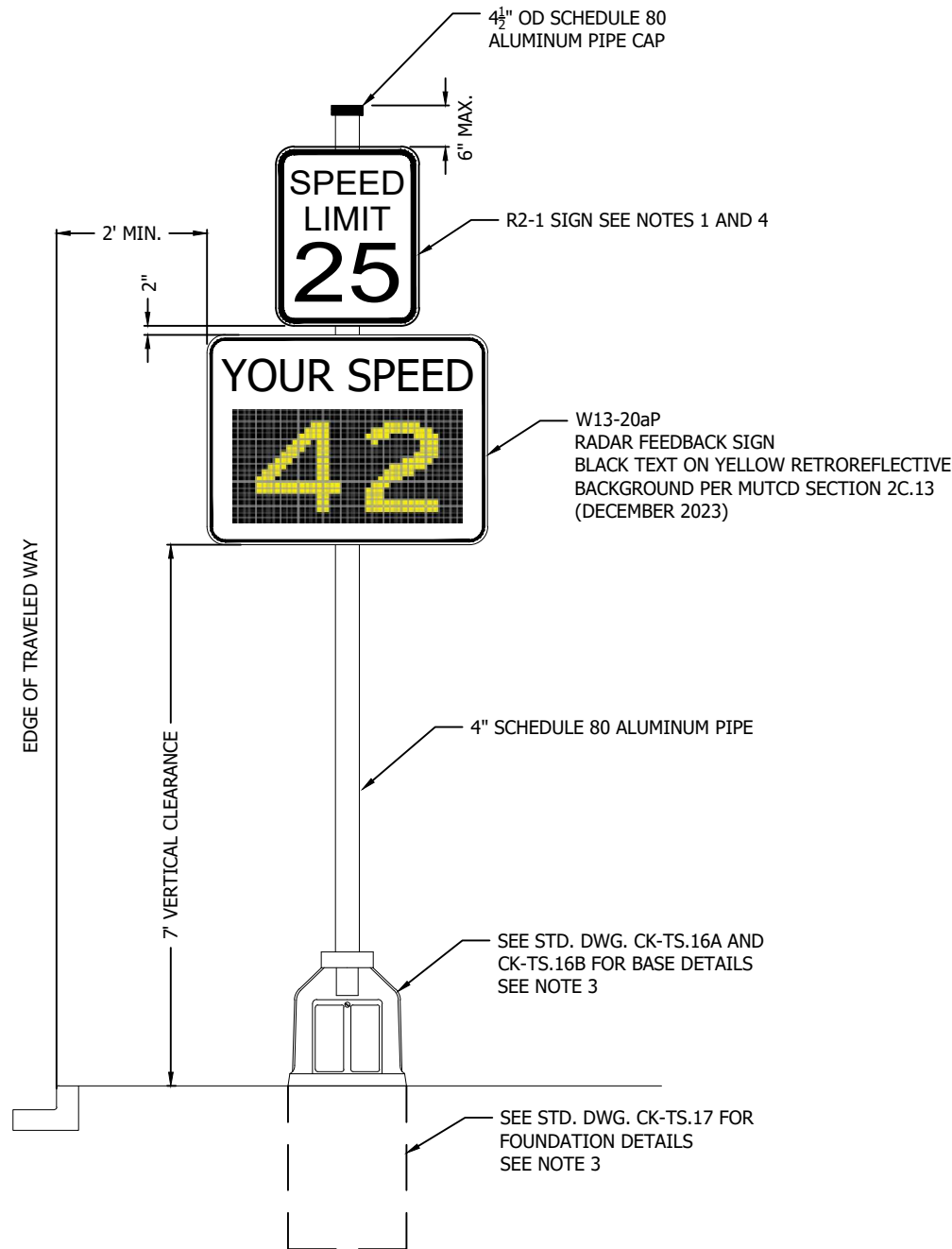
1. SEE CONTRACT PLANS AND SPECIFICATIONS FOR POLE HEIGHT, SIGN SHEETING TYPE, AND OTHER DETAILS. REFER TO PRE-APPROVED PLAN CK-R.43 FOR ADDITIONAL SIGN PLACEMENT REQUIREMENTS.
2. SEE CK-TS.12 AND CONTRACT SPECIAL PROVISIONS FOR APPROVED RRFB COMPONENTS. REFER TO PRE-APPROVED POLICY R-24 FOR POWER SOURCE DETERMINATION AND OTHER DETAILS.
3. THE PREFERRED PLACEMENT OF RRFB CONTROLLER CABINET IS BELOW THE W16-7P SIGN. IF THE RRFB IS LOCATED WITHIN OR ADJACENT TO A WALKING AREA, PROVIDE A MINIMUM 7' VERTICAL CLEARANCE TO BOTTOM OF CONTROLLER CABINET.
4. FOR SCHOOL CROSSINGS, AN S1-1 SIGN SHALL BE USED INSTEAD OF W11-2. IF USED, BOTH THE S1-1 AND W16-7P SHALL BE FLUORESCENT YELLOW GREEN IN COLOR.
5. THE RRFB POLE BASE AND FOUNDATION SHALL BE LOCATED SO THAT 4' MINIMUM CLEARANCE IS MAINTAINED FOR THE PEDESTRIAN ACCESS ROUTE. SIDEWALK WIDENING MAY BE REQUIRED TO ENSURE MINIMUM CLEARANCE DISTANCE.
6. ALL SIGNS SHALL HAVE ANTI-GRAFFITI COATING. SEE CONTRACT SPECIAL PROVISIONS FOR MORE INFORMATION.

CITY OF KIRKLAND

PLAN NO. CK - TS.14




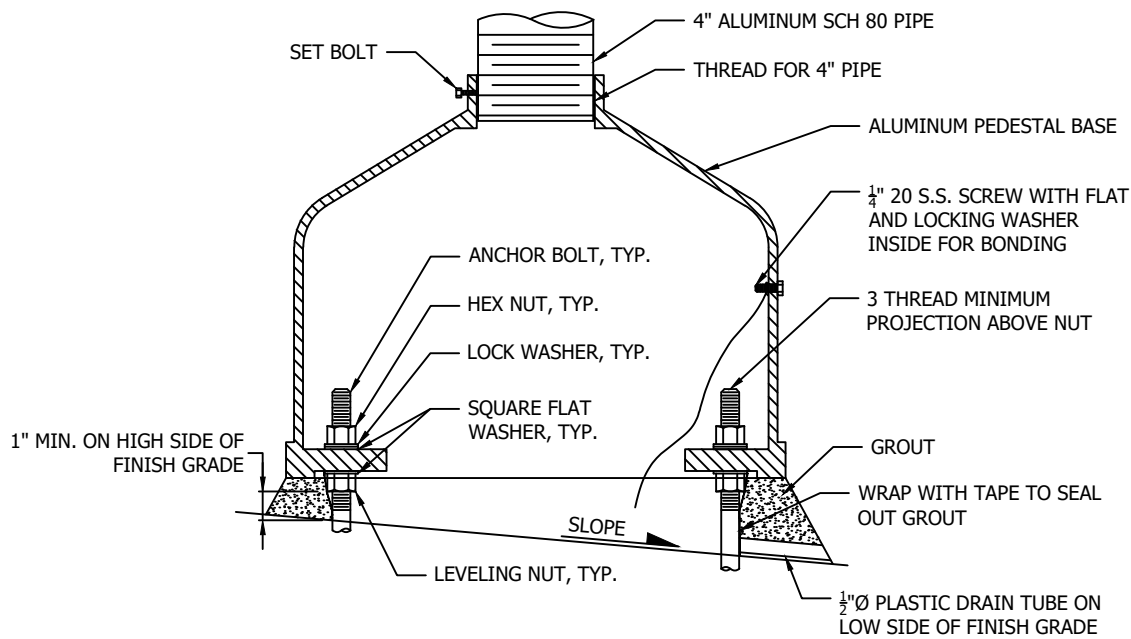
RECTANGULAR RAPID  
FLASHING BEACON  
(RRFB) DETAIL



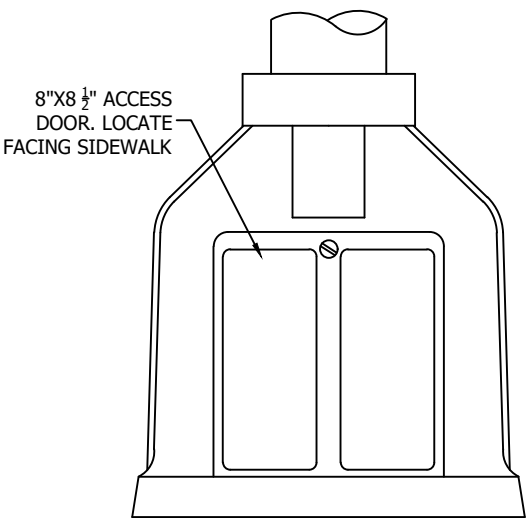
**NOTES:**

1. SEE CONTRACT PLANS AND SPECIFICATIONS FOR POLE HEIGHT, SIGN SIZES, SIGN SHEETING TYPE, AND OTHER DETAILS. REFER TO PRE-APPROVED PLAN CK-R.43 FOR ADDITIONAL SIGN PLACEMENT REQUIREMENTS.
2. REFER TO THE CURRENT KIRKLAND SPECIAL PROVISIONS FOR APPROVED SCHOOL ZONE FLASHING BEACON COMPONENTS.
3. THE RADAR FEEDBACK SIGN BASE AND FOUNDATION SHALL BE LOCATED SO THAT 4' MINIMUM CLEARANCE IS MAINTAINED FOR THE PEDESTRIAN ACCESS ROUTE. SIDEWALK WIDENING MAY BE REQUIRED TO ENSURE MINIMUM CLEARANCE DISTANCE.
4. ALL SIGNS SHALL HAVE ANTI-GRAFFITI COATING. SEE CONTRACT SPECIAL PROVISIONS FOR MORE INFORMATION.
5. A/C POWER IS PREFERRED. REFER TO PRE-APPROVED POLICY R-24 FOR POWER SOURCE DETERMINATION REQUIREMENTS.

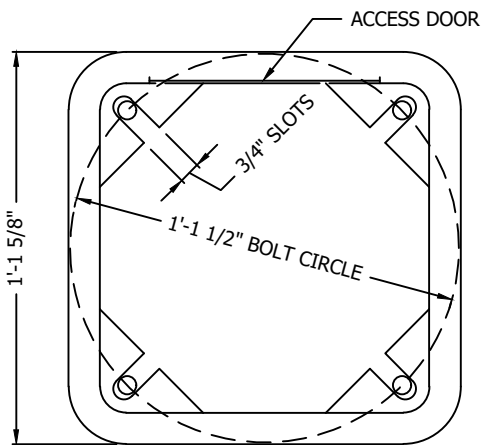
CITY OF KIRKLAND	
PLAN NO. CK - TS.15	
	RADAR SPEED SIGN DETAIL



BASE MOUNTING DETAIL




BASE ELEVATION

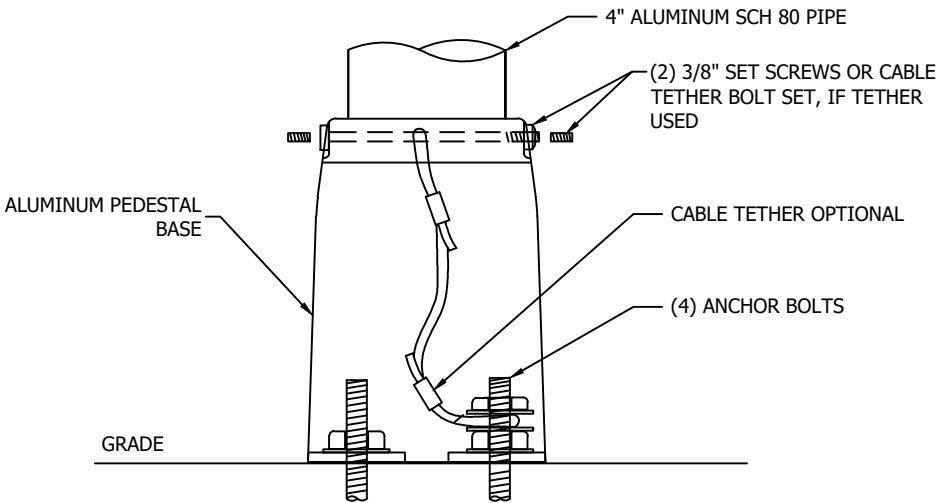


NOTE: BASE SHALL MEET AASHTO BREAKAWAY REQUIREMENTS

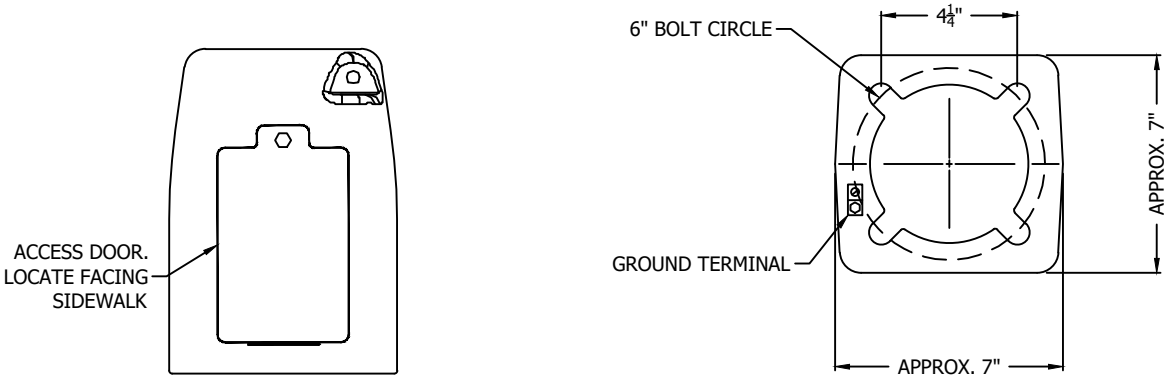
BOTTOM VIEW

PEDESTAL OPTION A-1'-1 1/2" BOLT CIRCLE

CITY OF KIRKLAND	
PLAN NO. CK - TS.16A	
	4" ALUMINUM POLE BASES DETAIL OPTION A




BASE MOUNTING DETAIL



BASE ELEVATION

BOTTOM VIEW

PEDESTAL OPTION B - 6" BOLT CIRCLE

CITY OF KIRKLAND	
PLAN NO. CK - TS.16B	
	4" ALUMINUM POLE BASES DETAIL OPTION B

8 #4

#4 HOOP TIES @ 12" OC MAX

1. THIS FOUNDATION HAS BEEN DESIGNED ACCORDING TO THE AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, FIRST EDITION, 2015. ULTIMATE WIND SPEED IS 100 MPH.
2. FLAT GROUND CONDITION SHALL BE USED IF SLOPE IS 4H:1V OR LESS.
3. SLOPED GROUND CONDITION SHALL BE USED IF SLOPE IS GREATER THAN 4H:1V BUT LESS THAN 2H:1V.
4. FOUNDATION DEPTHS PROVIDED ASSUME SOIL CAN BE CLASSIFIED AS SAND. FOR PREDOMINATELY CLAY SOILS A PROJECT-SPECIFIC DESIGN WILL BE REQUIRED.
5. IF THE LOADING AT THE BASE OF THE POLE IS GREATER THAN 12,000 FT-LB, A PROJECT-SPECIFIC DESIGN WILL BE REQUIRED.
6. FOUNDATION SHALL BE POURED IN ONE UNIFORM INSTALLATION.

FOUNDATION SCHEDULE		
LOADING AT BASE M	GROUND CONDITION (SEE NOTES)	FOUNDATION DEPTH D
M < 8,500 FT-LB	FLAT SLOPED	4'-0" 5'-0"
8,500 FT-LB < M < 12,000 FT-LB	FLAT SLOPED	5'-0" 6'-0"

CITY OF KIRKLAND

PLAN NO. CK - TS.17



### 4" ALUMINUM POLE BASE FOUNDATION DETAIL

## **CITY OF KIRKLAND**

123 FIFTH AVENUE • KIRKLAND, WASHINGTON 98033-6189 • (425) 587-3800

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### **DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY**

#### **Policy TS-1: Pedestrian Recall Guidelines**

##### **General**

Pedestrian recall is a traffic signal timing function that causes a pedestrian walk phase to activate automatically every cycle. Pedestrian recall can benefit pedestrians by reducing pedestrian delay and improving safety at signalized intersections.

These guidelines establish the methodology for how, when, and where pedestrian recall is implemented at a given crosswalk. The purpose of these methodology and guidelines is to ensure that pedestrian recall is applied to locations and at times of high pedestrian demand.

##### **Methodology**

Pedestrian activity at a given crosswalk will be measured by the percentage of cycles where the Walk phase is activated by a pedestrian pushbutton. City Staff will gather this data over the course of two consecutive weeks; weekday and weekend data will be separated. This process will be repeated on a seasonal basis since pedestrian activity at a given location can fluctuate throughout the year.

In cases where two vehicles phases always begin and end together, the associated crosswalks for those vehicle phases will be analyzed for how often either one is activated. Since both vehicle phases are activated together, then both corresponding crosswalks will be analyzed together as well.

##### **Guidelines**

The following guidelines will be used to determine when pedestrian recall should be implemented at a given crosswalk:

- If a pedestrian movement is active greater than 75% of cycles during peak daytime hours, then pedestrian recall is recommended for implementation.
- If a pedestrian movement is active greater than 60% of cycles during peak daytime hours, then pedestrian recall will be considered. Overall impact to operations at the intersection will be considered before pedestrian recall is implemented.
- If a pedestrian movement near a school is active greater than 50% of the time during drop off and pickup hours, then pedestrian recall is recommended for implementation.
- For areas designated as having a high pedestrian priority, pedestrian recall will be considered when the pedestrian movement is active greater than 50% of the time. Evaluation of the rate of increase of pedestrian usage during the day should indicate the appropriate time to activate recall operation.
- Crosswalks that are active during the main street phases should be on recall whenever the intersection is coordinated with other traffic signals or if the main street has a green time equal to or greater than the time for the pedestrian phase.

Pedestrian recall will be evaluated whenever a new signal is installed, an existing signal is modified, an existing corridor or signal is retimed, or if a community request is received to evaluate a specific location.