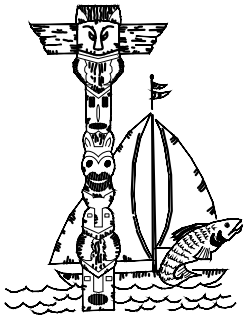
CITY OF KALAMA

COWLITZ COUNTY **WASHINGTON**



DEVELOPMENT GUIDELINES AND PUBLIC WORKS STANDARDS

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FORWARD

The Mayor and Council of the City of Kalama welcome you to develop in a community dedicated to maintaining a quality environment.

Kalama's Staff will work with you to create first class additions to our city. As staff, we believe that the best way to help you through this process is to meet with you prior to the development of plans and details.

This document will show you our process and our standards. We feel that many of your questions will be answered here. While these standards are intended to apply to all projects within the City limits, they are also intended to be utilized in applicable circumstances where the City's service areas, annexation areas or planning areas extend outside its limits. These standards can also be used for annexation agreements with the county.

We attempt to achieve maximum uniformity of planning, engineering, and construction practices within the City of Kalama. These are minimum standards and are intended to assist, but not to substitute for competent work by engineering and design professionals. Special conditions or environmental constraints may require a more stringent design than would normally be required under these standards. It is not the intent of the City to unreasonably limit any innovative effort which could result in a superior project design. A proposed design which is different than these Development Guidelines will be evaluated on the basis that the proposed design will produce a comparable or superior result, and in every way adequate for the user, the City, and the public.

This document may contain minor errors, discrepancies or omissions which will be corrected in future updates. In the interim, the City shall have the right of imposing the "intent" of the City.

Adam Smee
City Administrator

Kelly Rasmussen
Superintendent of Public Works

DEVELOPMENT POLICIES AND PUBLIC WORKS STANDARDS

Table of Contents

SECTION 1
INTRODUCTION

SECTION 1

1. INTRODUCTION

These standards shall apply to all improvements within the public right-of-way and/or public easements, to all improvements required within the proposed public right-of-way of new subdivisions, for all improvements intended for ownership, operations or maintenance by the City and for all other improvements for which the City Code requires approval from the City Public Works Director and/or City Planning Commission and/or the City Council. These standards are intended as guidelines for designers and developers in preparing their plans, studies and/or reports and for the City in reviewing same. Where minimum values are stated, greater values should be used whenever practical; where maximum values are stated, lesser values should be used where practical. The developer/proponent is however cautioned that higher standards and/or additional studies and/or environmental mitigation measures may, and will, in all likelihood, be imposed by the City when developing on, in, *or adjacent to critical areas* which include, but not limited to; steep embankments, creeks, ponds, lakes, wetlands, certain wildlife habitat, unstable soils, high water tables, wetland areas, etc.

Alternate design standards may be accepted when it can be shown, to the satisfaction of the City, that such alternate standards will provide a design equal to or superior to that specified. In evaluating the alternate design, the City shall consider appearance, durability, ease of maintenance, public safety and other appropriate factors, including the 2012 WSDOT Standard Specification for Road. Bridge & Municipal Construction, State of Washington, and current amendments thereto.

Where improvements are not covered by these details nor by the Standard Specifications nor by the standard details, the City will be the sole judge in establishing appropriate standards. Where these "standards" conflict with any existing City ordinances or discrepancies exist within the body of this text, the higher "standards" shall be utilized as determined by the City Administrator. Plans for major improvements in the public right-of-way or within public easements, or improvements to be "deeded" or "gifted" to the City, shall bear an approval signature from the City.

The designer shall submit calculations or other appropriate materials supporting the design of utilities, pavements and storm drainage facilities. The designer shall submit calculations for structures and other designs when requested by the City.

A. Definitions: As used herein:

(a) “Alley”: A strip of land dedicated for public use which is less than twenty one feet in width between property lines and which is intended to provide driveway access to adjacent properties.

(b) "City": means the City of Kalama, Washington, Cowlitz County, a municipal corporation, existing under and by virtue of the laws of the State of Washington. Actions designated as taken by the City are the acts of the Council acting through the Mayor.

(c) “City Engineer”: means the City of Kalama Engineer, whether staff engineer or consultant.

(d) "Contractor": means the Developer's contractor or subcontractor.

(e) “Developer": means the party having an agreement with the City to cause the installation of certain improvements, to become a part of the City's utility and/or roadway system upon completion and acceptance. The term shall also include the Developer's contractor employed to do the work or the Contractor's employees.

(f) “Superintendent of Public Works”: The City of Kalama Public Works Superintendent or his/her duly authorized representative.

(g) “Easement”: The right to use a defined area of property for a specific purpose/purposes as set forth in easement documents, on a subdivision plat or short subdivision plat or as required for purposes of this ordinance.

(h) “Engineer”: Any Washington State licensed professional engineer who represents the developer.

(i) "Facility": means trenching and trench repair, electric lines, telephone lines, fire alarm and telephone/television cables, gas lines, water and sanitary sewer lines, storm drainage lines, all pump stations, transfer stations, buildings and structures needed in their support and/or service.

(j) "Half Street": means those streets with a high probability that lots or dwelling units will be proposed on the opposite side of the street and eventually the street will be at full designated width.

(k) "Interceptor" means a sewer line that receives flow from a number of main or trunk sewer lines, force mains, etc.

(l) "KMC": means the City of Kalama Municipal Code

(m) "Lateral" means that section of the sewer line extending from the City's main line to the right-of-way or easement line that has no other common sewers discharging into it.

(n) "Mayor" means mayor of the City of Kalama or his/her authorized representative.

(o) "Maintenance Bond" means a bond furnished by the Developer and written by a corporate body qualified to write surety in the State of Washington, guaranteeing that the Developer will repair any defects found in the work within the time period as further identified herein.

(p) "Operations and Maintenance Supervisor": means the City's Public Works Superintendent.

(q) "Performance Bond" means a bond furnished by the Developer and written by a corporate body qualified to write surety in the State of Washington, guaranteeing that the work will be completed in accordance with the plans and specifications.

(r) "Plans" mean drawings, including reproductions thereof, of the work to be done as an extension to the City's transportation or utility systems, prepared by an Engineer licensed in the State of Washington.

(s) "Project" means the general term encompassing all phases of the work to be performed and is synonymous to the term "improvement" or "work"

(t) "Right-Of-Way" means all real property owned or held by the city in fee, or by way of easement, or dedicated to the public and located within the city, and used or intended for use as a street, alley, sidewalk, public way or easement for public or private utilities, whether developed or undeveloped.

(u) "Road" Used interchangeably with street.

(v) "Sidewalk" means a concrete walk for pedestrian use outside the building lot line of any privately owned property, for use by the general public.

(w) "Specifications" means the directions, provisions, and requirements designated by an Engineer licensed in the State of Washington for the performance of the work and for the quantity and quality of materials, as contained or referenced herein.

(x) "Street" Streets are divided into major (or principal) arterial, minor (or secondary) arterial, collector, local access, minor access, and half street in accordance with regional transportation needs and the functional use each serves.

Functional classification of streets are as follows:

- Major Arterials: Streets connecting two or more arterials together or serving industrial areas;
- Collector Streets: Streets currently serving or anticipated to serve more than sixty four (64) dwelling units or connecting to an arterial;

- Local Access Street: Streets currently serving or anticipated to serve in the future from sixteen (16) to sixty four (64) dwelling units;

- Minor Access Street: Streets which serve or are anticipated to serve in the future fifteen (15) dwelling units or less and/or terminate in non-extendable cul-de-sacs;

(y) "Work" means the labor or materials or both, superintendence, equipment, transportation, and other facilities necessary to complete the project.

B. Developer to be Informed:
It is the Developer's responsibility to be fully informed regarding the nature, quality, and the extent of the work to be done, and, if in doubt, to secure specific instructions from the City.

C. Authoritv of the City Administrator:
The City Administrator or his authorized representative shall have the authority to determine compliance with these standards.

D. Payment for City Services:
The Developer shall be responsible for promptly reimbursing the City for all costs and expenses incurred by the City in the pursuit of project submittal, review, approval, and construction. These costs include, but are not limited to, the utilization of staff and consultants as may be necessitated to adequately review and inspect construction of the project(s). All legal, administrative, and engineering fees for project review, meetings, approvals, site visits, construction inspection, etc., shall be subject to prompt reimbursement. The Developer may pay any of the above charges and fees under protest to receive project approval, while appealing the costs to the Kalama City Council if he/she does not believe the bills are accurate or believes the amount is exorbitant.

SECTION 2
PERMITS

SECTION 2

2. PERMITS

2.01 Permit Process

No person(s), firm or corporation shall commence work on the construction, connection, alteration or repair of any facility located either in the public right-of-way or a public easement or any project or work which may jeopardize the City's infrastructure without first having been obtained from the City *all* necessary approvals and permit(s)

Any party requesting such approval or permit shall file written Right-of-Way Use Application Form with the City at least seven (7) working days before construction activity is proposed to start. The application shall be made on the form, available in the Kalama Public Works Department or the Kalama City Hall. In addition to the information below, **a complete application shall contain all information set forth in Kalama Municipal Code, Chapter 11.24.050 and show "proof-of-insurance" as per, Section 3.03 of these standards.**

2.02 Application Denied - Appeal

No permit shall be issued until the application has been approved by the Public Works Superintendent or his/her designee

No application shall be approved nor a permit issued where it appears that the proposed work, or any part thereof, conflicts with the provisions of this ordinance or any other ordinance of the City of Kalama, nor shall issuance of a permit be construed as a waiver of any ordinance requirements concerning the plan. Any permit issued in error shall be null and void.

Appeal of a denied Application shall be to the Kalama City Council, as per Kalama Municipal Code, Chapter 11.24.090 -Revocation or Changing Permit -Appeal. Decision of the Council shall be final and binding on both parties.

2.03 Application Approved

Upon approval of the aforementioned application and collection of all related fees, a Right-Of-Way Permit, as authorized by Kalama Municipal

Code, Chapter 11.24 - Construction, Repair And Maintenance Of the Public Right-Of-Way, will be issued.

A complete Permit Form is available at the Kalama Public Works Department or at Kalama City Hall.

The fee for right-of-way construction permits shall be as established by the Kalama Municipal Code (KMC), Chapter 11.04.070- Construction, Repair And Maintenance Of Public Rights-Of-Way(or as hereafter amended).

The City shall be the applicant for Cowlitz County right-of-way permits required along county roads within the Kalama water service area. The party requesting the approval shall provide the project drawings to the City of Kalama Public Works Department and shall also reimburse the City of Kalama for all permit fees charged by Cowlitz County.

2.04 Modifications to the Standards

A. Submittal

Requests to modify standards contained in the Development Guidelines and Public Works Standards shall be submitted in writing by the developer's engineer, to the Public Works Superintendent. This written request shall state the desired modification(s), the reason(s) for the request(s) and a comparison between the specification(s), standard(s), and the modification(s).

Any request for modification or variance of City Standards should be documented with reference to nationally accepted specifications/standards.

B. Review

The request to modify shall be reviewed by the Public Works Superintendent and/or City Engineer, who shall consult the appropriate review authorities and make one of the following decisions:

1. Approve as is,
2. approve with changes,
3. or deny with an explanation.

The modification, if approved, is for project specific use. Approval of a request shall not constitute a precedent.

C. Appeal

The applicant may appeal the Public Works Superintendent's decision to the City Council.

D. Criteria for Modification of Standards

The Public Works Superintendent may grant a modification to the adopted specifications or standards when any one of the following conditions are met:

1. The specification or standard does not apply in the particular application.
2. Topography, right-of-way, or other geographic conditions impose an economic hardship on the applicant and an equivalent alternative which can accomplish the same design is available that does not compromise public safety or accessibility for the disabled.
3. A change to a specification or standard is required to address a specific design or construction problem which if not enacted will result in an undue hardship.

SECTION 3
PUBLIC WORKS CONSIDERATIONS

SECTION 3

3. PUBLIC WORKS CONSIDERATIONS

3.01 Bonding

Developers and contractors performing work within current public right-of-way shall be prepared to satisfy the following two bonding requirements.

(A) Furnishing a performance bond, approved as to surety by the City Administrator and as to form by the City Attorney, which bond shall be conditioned upon faithful completion of that portion of the work performed pursuant to the permit which will require completion by the City should the permittee or his contractor default. The amount of such bond shall be 150% of the City approved value of the improvements. The City engineer shall review and provide approval, as may be applicable of the submitted amount.

(B) Furnishing a Maintenance Bond. All work shall be guaranteed by the Contractor for a two-year period from the time of inspection and final written approval of the construction by the City. The Contractor shall supply a maintenance bond in the amount of 15% of the total improvement cost in the right-of-way. Work over areas of certain soils (soils with shrink-swell properties, sliding potential, etc.) or use of materials of questionable quality or functional longevity or signs of paving failures, storm drain failures, etc., may require an extension of the Maintenance Bond for up to five years.

Subdivisions may be subject to additional bonding requirements per KMC Section 16.10.170.B.

3.02 Hold Harmless Clause

The Developer shall enter voluntarily into an agreement to indemnify against liability for negligence relative to construction, alteration, improvement, etc., of structure or improvement attached to real estate. A covenant, promise, agreement mentor or understanding in, or in connection with or collateral to, a contract or agreement relative to the

construction, alteration, repair, addition to, subtraction rom, improvement to, or maintenance of, any building, highway, road, railroad, excavation, or other structure, project, development, or improvement attached to real estate, including moving and demolition in connection therewith, purporting to indemnify against liability for damages arising out of bodily injury to persons or damage to property:

(1) Caused by the resulting form the sole negligence of the indemnities, his agents or employees is against public policy and is void and unenforceable;

(2) Caused by or resulting form the concurrent negligence of (a) the indemnitee or the indemnitees's agents or employees, and (b) the indemnitor the indemnitor's agents or employees, is valid and enforceable only to the extent of the indemnitor's negligence and only if the agreement specifically and expressly provides therefor, and may waive the indemnitor's immunity under industrial insurance, Title 51 RCW, only if the agreement specifically and expressly provides therefore and the waiver was mutually negotiated by the parties.

3.03 Developer's Public Liability & Property Damage Insurance

The Developer shall not commence work until he*/she* has furnished evidence (in duplicate copy) of insurance required hereunder, and such insurance has been reviewed (upon request) by the City Attorney *and/or the City's Insurance Carrier*; nor shall the Developer allow any contractor or subcontractor to commence work on his contract or subcontract until the same insurance requirements have been complied with by such contractor or subcontractor. Any approval of the insurance as may be given by the *City's Insurance Carrier* shall not relieve or decrease the liability of the Developer thereby.

Companies writing the insurance under this article shall be licensed to do business in the State of Washington.

The Developer shall maintain, during the life of the Contract,

Comprehensive General and Automobile Liability Insurance, as detailed herein. The insurance shall include, as Additional Named Insured, the City. All insurance policies shall be endorsed to provide that the policy shall not be canceled or reduced in coverage until after ten (10) days prior written notice, as evidenced by return receipt of registered letter has been given to the City.

Comprehensive General Bodily Injury and Property Damage Insurance shall include:

a. Premises & Operations;
b. Developer's Protective Liability;
c. Products Liability, including Completed Operations Coverage
d. Contractual Liability
e. Broad Form Property Damage;

Comprehensive Automobile Bodily Injury and Property Damage Insurance shall include:

a. All owned automobiles (vehicles and equipment);
b. Non-owned automobiles (vehicles and equipment);
c. Hired automobiles (vehicles and equipment).

The insurance coverage's listed above shall protect the Developer from claims for damages for bodily injury, including death resulting therefrom, as well as claims for property damage, which may arise from operations under this contract, whether such operations be by himself or by any subcontractor or by anyone directly employed by either of them, it being understood that it is the Developer's obligation to enforce the requirements of this article as respects any contractor or subcontractor.

Comprehensive General and Automobile Liability Insurance shall provide coverage for both bodily injury and property damage, as follows:

a. Comprehensive General and Automobile Bodily Injury Liability Insurance on an occurrence basis of not less than One Million dollars ($1,000,000.00) for bodily injury, sickness or disease, including death resulting therefrom, sustained by each person; and for limits of not less than One Million Dollars ($1,000,000.00) for each occurrence.

b. Comprehensive General Property Damage Liability Insurance on an occurrence as is for limits of not less than One Million Dollars ($1,000,000.00) for damage to or destruction of property, including loss of use thereof, arising from each occurrence, and in an amount of not less than Two Million Dollars ($2,000,000.00) in aggregate.

c. Comprehensive Automobile Property Damage Liability Insurance on an occurrence basis for limits of not less than One Million Dollars ($1,000,000.00) for damage to or destruction of property, including loss of use thereof, arising from each occurrence.

d. Comprehensive Liability Insurance shall include the City and its agents as Additional Named Insured.

e. Comprehensive General Property Damage Liability Insurance shall include liability coverage for damage to or destruction of property of other, including loss of use of property damaged or destroyed, and all other indirect and consequential damage for which liability exists in connection with such damage to or destruction of property of others, and shall include coverage for:

(i) Injury to or destruction of any property arising out of blasting or explosion;

(ii) Injury to or destruction of any property arising out of the collapse of/or structural injury to any building or structure due:

1. to excavation, including borrowing, filling or backfilling in connection therewith, or tunneling, pile driving, coffer-dam work or caisson work; or

2. to moving, shoring, underpinning, raising or demolition of any building or structure or removal or rebuilding of any structural support thereof.

(iii) Injury to or destruction of wires, conduits, pipes, mains, sewers or other similar property or any apparatus in connection therewith, below the surface of the ground, if such injury or destruction is caused by and occurs during

the use of mechanical equipment for the purpose of excavating or drilling; or

(iv) Injury to or destruction of property at any time resulting therefrom.

There shall be included in the liability insurance, contractual coverage sufficiently broad to insure the provisions of "Hold Harmless Clause".

Nothing contained in these insurance requirements is to be construed as limiting the extent of the Developer's responsibility for payment of damages resulting from his operations under this Contract.

In the event the Developer is required to make corrections on the premises after the work has been inspected and accepted, he shall obtain, at his own expense, and prior to commencement of any corrective work, full insurance coverage, as specified herein.

The Developer shall furnish, upon request by the City, certified copies of the insurance policy or policies within two weeks of the City's request.

3.04 Compensation & Employer's Liability Insurance

The Developer shall maintain Workmen's Compensation Insurance or, as may be applicable, Maritime Workmen's Insurance, as required by state or federal statute for all of his employees to be engaged in work on the Project and, in case any such work is sublet, the Developer shall require the contractor or subcontractor similarly to provide Workmen's Compensation Insurance or Maritime Workmen's Insurance for all of the latter's employees to be engaged in such work. The Developer's Labor & Industries account number shall be provided to the City.

In the case of an employer who is self-insured under the provisions of the Industrial Insurance Act, the Developer shall also maintain and shall cause each contractor or subcontractor which is self-insured to maintain Employer's Liability Insurance with a private insurance company for limits of at least One Hundred Thousand Dollars ($100,000.00), each person, and Three Hundred Thousand Dollars ($300,000.00), each accident, list the City as an additional insured, and furnish, upon request of the City, satisfactory evidence of same.

3.05 Non-interference

The permittee shall be responsible for minimum interference with:

Traffic Routing
Fire Facility Clearance
Adjoining Property(ies)
Utility Facilities
Natural Surface Drainage
Pedestrian Safety

These items are to be discussed in a pre-construction meeting with the Public Works Department, Fire and Police Departments and the Building Department, and special provisions may be included in any applicable City Permit(s). A written plan to reduce any or all of the aforementioned interference's may be required of the permittee by the City. An erosion control plan shall also be submitted and approved by the City.

3.06 Work Standards

All work performed pursuant to a permit issued shall be done in accordance with these standards and the current amendments thereto, as well as, any prevailing regulatory requirements. Job site safety and trench shoring requirements, in accordance with the Washington State Labor and Industries, shall be the full responsibility of the permittee.

3.07 Inspection

A. General

The City may exercise full right of inspection of all excavating, construction, and other invasions of City right-of-way or public easements. The Public Works Superintendent shall be notified on the working day prior to commencing any work in the City's right-of-way or public easements. The Public Works Superintendent and/or his authorized representative is authorized to and may issue immediate stop work orders in the event of noncompliance with this chapter and/or any of the terms and provisions of the permit or permits issued hereunder.

B. Final Inspection

Prior to final written approval of construction, a visual inspection of the job site will be made by the City and a written report may be prepared and submitted. Restoration of the area shall be complete with all improvements being restored to substantially their original or superior condition. Final written approval of construction shall not be given earlier than thirty (30) days after satisfactory completion of construction, as witnessed by the City, and the submission and City approval of developer sponsored as-built drawings.

3.08 As-built Drawings

Permittees who install utility or roadway systems within, on, or below the City's public rights-of-way or public easements shall furnish the City with accurate drawings, plans and profiles, showing the location and curvature of all underground structures installed, including existing facilities where encountered and abandoned installations. Horizontal locations of utilities are to be referenced to street centerlines, as marked by survey monuments, and shall be accurate to a tolerance of plus or minus one half (1/2) foot. The depth of such structure may be referenced to the elevation of the finished street above said utility, with depths to the nearest one-tenth foot being shown in a minimum of fifty-foot intervals along the location of said utility. The datum shall be per City datum as mandated by the City engineer.

Such as-built drawings shall be submitted to the City within thirty (30) calendar days after completion of the work, and are required prior to the issuance of the City’s final written approval of construction.

In the event that the permittee does not have qualified personnel to furnish the as-built drawing required by this section, he shall advise the Public Works Superintendent (48 hours advance notice) in order that necessary field measurement may be taken during construction for the preparation of as-built drawings. All costs of such field inspection and measurement, to include the preparation of the as-built drawings, shall be at the sole expense of the permittee.

Drawing Standards:

Minimum scale - 1" = 50' horizontal; 1" = 5' vertical
Detail scale - Larger as necessary

As-built drawings shall be submitted with a signature and date which verifies the "as-built" condition of the project. All data as shown on the drawings shall be in computerized format. Hand drawn “red-lines” will not be accepted. Non-essential data shall be removed from the Plans at the City’s discretion. Sticky back (glue) reproductions or "sepia" mylars shall not be considered acceptable. The developer shall provide two full size paper copies of the record drawings. The developer shall also provide an electronic copy of the record drawings both in AutoCAD format (verify with the City on the version required) and .pdf format.

SECTION 4
WATER

SECTION 4

4. WATER SYSTEM STANDARDS

4.01 General

The standards established by this chapter are intended to represent the **minimum** standards for the design and construction of water system facilities. Greater or lesser requirements may be mandated by the City due to localized conditions. Extensions, connections or modifications to the existing system shall be in compliance with the State Department of Health.

4.02 Design Standards

The following design standards shall apply to all extensions, connections, or modifications to the City of Kalama water system.

A. Detailed plans shall be submitted for the City's review which provide the location, size, and type of the proposed water system and intertie connection. These Plans shall be separate from the Sewer Plans.

B. Project plans shall have a minimum horizontal scale of 50 feet to the inch, unless otherwise approved by the City. Plans shall clearly show:

1. Location of streets, rights-of-way, property lines, survey control, driveways, existing utilities, water system facilities, and other pertinent information.

2. Proposed and finishing ground surface, pipe type and size, and water valves, bends, blow-offs, water meters, and hydrant stationing.

3. All known existing structures, both above and below ground, which might interfere with the proposed construction, particularly sewer lines, gas mains, storm drains, overhead and underground power and all underground structures, telephone lines and television cables.

4. All utility easements, and applicable County recording number(s).

C. Computations and other data used for design of the water system shall be submitted to the City for approval.

D. Water line shall be extended to the far property line(s) to facilitate future extensions.

D. The water system facilities shall be constructed in conformance with these Specifications and current amendments thereto and other applicable standards as allowed by the City.

E. Material and installation specifications shall contain appropriate requirements that have been established by the industry in its technical publications, such as ASTM, AWWA, WSDOT, and APWA standards. Requirements shall be set forth in the specifications for the pipe and methods of bedding and backfilling so as not to damage the pipe or its joints.

F. Except as otherwise noted herein, all work shall be accomplished as recommended in applicable American Water Works Association (AWWA) Standards, and according to the recommendations of the manufacturer of the material or equipment concerned.

G. The location of the water mains, valves, hydrants, and principal fittings including modifications shall be staked in the field by the Developer. No deviation shall be made from the required line or grade without the specific further authorization of the City. The Contractor shall verify and protect all underground and surface utilities encountered during the progress of this work.

H. Prior to final inspection, all pipelines shall be satisfactorily tested and disinfected.

I. Before acceptance of the water system by the City, all pipes, assemblies, and other appurtenances shall be cleaned of all debris and foreign material. After all other work is completed and before final acceptance, the entire area, including the roadway, planting, sidewalk areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be cleaned and neatly finished to the

lines, grades and cross sections for a new roadway consistent with the original section.

J. The Developer shall be required, upon completion of the work and prior to acceptance by the City, to furnish the City with a written guarantee covering all material and workmanship for a period of two years after the date of final acceptance and he shall make all necessary repairs during that period at his own expense, if such repairs are necessitated as the result of furnishing poor materials and/or workmanship. The Developer shall obtain warranties from the contractors, subcontractors and suppliers of material or equipment where such warranties are required and shall deliver copies to the City upon completion of the work.

4.03 General Requirements

A. Prior to construction, the Contractor shall notify the City (5 days in advance) for a pre-construction meeting. This meeting is mandatory.

B. Work shall be performed only by contractors experienced in constructing public water mains used for potable water systems. No Contractor or Subcontractor shall perform work prior to obtaining a City business license.

C. Prior to any work being performed, the Contractor shall contact the City's Public Works Superintendent or City Engineer to set forth his proposed work schedule.

D. Contractor shall obtain approval of materials to be used from City's Public Works Superintendent and/or City Engineer prior to ordering of materials. Contractor shall provide the City with manufacturer's submittal material (four copies) for the City's review and files.

E. Water mains shall be laid only in dedicated streets or in easements which have been or will be granted to the City. A street is normally not considered dedicated until the plat which created it has been officially filed with the County Auditor.

F. All water main distribution pipeline construction shall have a minimum 36" cover from finished grade and 42-inch cover over transmission mains. Greater depth shall be required by the City in order to minimize localized system high and low points. **Mains shall be laid straight and generally**

be located parallel to and five feet northerly or easterly of street centerline. Water mains shall be extended to the far property line(s) of the property being served. Off-site extensions, looping, or upsizing may be required to provide reliable service to the property. Oversizing of water mains may also be required to be installed per the City's current (adopted) Water Comprehensive Plan.

G. Fire hydrants are generally required approximately every 400 feet in residential areas, and every 300 feet in commercial areas. However, fire hydrants shall be furnished and installed at all locations as specifically mandated by the local fire chief and/or per Building Code.

H. Fire hydrants on dead end streets and roads shall be located within approximately 150 feet from the center of the farthest lot. Distances required herein shall be measured linearly along street or road.

J. Pipes connecting hydrants to mains shall be restrained and 6 inch in diameter (or larger) and not longer than 50 feet.

K. Valves shall be provided so that not more than 1,000 feet of water main length can be isolated by valve closure. At least 3 valves shall be provided at each tee and 4 valves at each cross.

L. Permanent dead end lines shall not be permitted without specific written approval of the Public Works Superintendent. Dead-ended water mains located within cul-de-sacs shall extend to the plat line beyond the cul-de-sac to service neighboring property for a convenient future connection, and have a two (2) inch blow off assembly installed at the termination point. All lines must be capable of being looped upon full development. Public easements shall be provided and deeded to City (at no cost to City) to facilitate such public/future extension of the system “by others”.

M. All materials shall be new of the last grade and quality and undamaged.

N. All fittings shall be cement-lined short-bodied ductile iron with restrained joints and thrust block.

O. Mechanical joint bends (and blocking) shall be provided in field to suit construction parameters. Pipeline shall not exceed allowable permissible deflection at pipe joints, per manufacturer’s recommendations.

P. Adequate horizontal and vertical blocking shall be provided at all fittings and bends in accordance with the City standards and conditions. Blocking shall be designed by Developer's Engineer. Calculations (stamped by engineer) shall be provided upon request of the City.

Q. All valve marker posts shall be painted yellow and marked (black paint) with stenciled numbers (2-inches high) the distance to the valve being referenced.

R. Residential water service pipe shall be one-inch diameter, 200 psi, IPS "poly" pipe, connection shall be made by Mueller Instatite Fittings. Services shall be bored beneath existing pavement where possible.

S. Commercial service lines between the water main and the water meter shall be one inch diameter minimum.

T. Commercial meter services and meter boxes shall be set to final grade and all adjustments shall be made prior to final pressure testing of the system.

U. All water services shall end within road right-of-way. Easements shall be used only with the further approval of the City.

V. All meters shall be installed by the City, unless otherwise approved by the Public Works Superintendent.

W. Contractor shall furnish and install one water sampling station per the development of 1 to 10 lots and an additional station for each additional 50 lots or portions thereof.

X. All new buildings and residences shall include in their water service a suitable and City approved pressure reducing valve and/or expansion tank to protect the plumbing from excessive pressures, where pressures at service meter exceed 80 psi. These devices can be deleted only if waived (in writing) by the City Public Works Superintendent.

Y. All new service connections shall comply with the *"Accepted Procedure and Practice - Cross Connection Control Manual"* as published by the Pacific Northwest Section of the American Water Works Committee",

2012, Seventh Edition, and current amendments thereto. A copy of such is available for review at the Public Works Superintendent's office.

Z. Hot tap connections will be required unless specific approval is provided by the Public Works Superintendent. Cut in connections shall not be made on Fridays, holidays or weekends. Only experienced contractors shall be allowed to "cut into" City systems. All tapping sleeves and tapping valves shall be pressure tested prior to making connection to existing mains.

AA. Contractor shall request the Public Works Superintendent approval prior to any water intertie, shut-off , or turn-on, a minimum of 48 hours in advance of such action.

BB. Road restoration shall be per City, County or State design and construction standards, as may be applicable. Developer and Contractor shall become familiar with all State, County and City conditions of required permits, and shall adhere to all conditions and requirements.

4.04 Materials

A. **Water Mains & Fittings:**

1. Water mains to be installed unless otherwise approved (or required) in writing by the City Engineer shall be either ductile iron or PVC C900. In specific cases the City Public Works Superintendent may approve or require HDPE SDR17 pipe. The minimum size for all water lines shall be 8 inches, except for pipes connecting hydrants less than 50' long.

2. Ductile iron pipe shall conform to ANSI/AWWA C151/A21.51-91 Standards, and current amendments thereto, except the ductile iron pipe shall be thickness Class 52 for 4" through 14" diameter pipe (except for 6-inch hydrant spools which shall be Class 53) and Class 50 for 16" and larger. Grade of iron shall be a minimum of 60-42-10. The pipe shall be cement lined to a minimum thickness of 1/16", and the exterior shall be coated with an asphaltic coating. Each length shall be plainly marked with the manufacturer's identification, year case, thickness, class of pipe and weight. Where ductile iron pipe is used, soils shall be evaluated for corrosivity using the "10-Point Soil Test Evaluation," described in ANSI/AWWA Standard C105 A21.5-55. Ductile iron pipe or fittings installed in corrosive soils shall be installed with polyethylene encasement.

3. PVC pipe shall conform to AWWA C-900, Class 150, capable of connecting to ductile iron fittings. All fittings shall be ductile iron.

4. HDPE piping shall be SRD 17 butt welded PE 3408 HDPE pipe conforming to ASTM D3350 having a cell classification of PE 345434C and ASTM D1248 pipe grade resin type III, Class C, Category 5, grade P34 polyethylene compound. Pipe dimensions and workmanship shall conform to ASTM F714. Pipe shall be Driscopipe 1000 or equal.

   Fittings shall be standard HDPE fittings, meet the above HDPE pipe specifications and be manufactured by injection molding or extrusion and machining.

5. Type of joint shall be mechanical joint or push-on type, employing a single gasket, such as "Tyton", except where otherwise calling for flanged ends. Bolts furnished for mechanical joint pipe and fittings shall be high strength ductile iron, with a minimum tensile strength of 50,000 psi.

6. Restrained joint pipe, where shown on the Plans shall be push-on joint pipe with "Fast Tight" gaskets as furnished by U.S. Pipe or equal for 12" diameter and smaller pipe and "TR FLEX" as furnished by U.S. Pipe or equal for 16" and 24" diameter pipes. The restrained joint pipe shall meet all other requirements of the non-restrained pipe. Restrained joint pipe will be installed at “dead end” installations.

7. All pipe shall be jointed by the manufacturer's standard coupling, be all of one manufacturer, be carefully installed in complete compliance with the manufacturer's recommendations.

8. Joints shall be "made up" in accordance with the manufacturer's recommendations. Standard joint materials, including rubber ring gaskets, shall be furnished with the pipe. Material shall be suitable for the specified pipe size and pressures.

9. All fittings shall be short-bodied, ductile iron complying with applicable ANSI/AWWA C110 or C153 Standards for 350 psi pressure rating for mechanical joint fittings and 250 psi pressure rating for flanged fittings. All fittings shall be cement lined and either flanged or mechanical joint flanged with restraint joints and thrust block, as indicated on the Plans.

10. Restrained joints shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be Romac "Grip Ring" (retainer glands) or City approved equal.

11. All couplings shall be ductile iron mechanical joint sleeves, or long pattern solid sleeves.

12. The pipe and fittings shall be inspected for defects before installation. All lumps, blisters and excess coal tar coating shall be removed from the bell and spigot end of each pipe, and the outside of the spigot and the inside of the bell shall be wire-brushed and wiped clean and dry, and free from oil and grease before the pipe is laid.

    Every precaution shall be taken to prevent foreign material from entering the pipe while it is stored, stockpiled, strung and installed. After placing a length of pipe in the trench, the spigot end shall be centered in the bell and pipe forced home and brought to correct line and grade. The pipe shall be secured in place with select backfill tamped under it. Precaution shall be taken to prevent dirt from entering the joint space. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a water-tight plug. If water is in the trench when work resumes, the seal shall remain in place until the trench is pumped completely dry. No pipe shall be stored or laid in water or when trench conditions are unsuitable.

13. The cutting of pipe for installing fittings or closure pieces shall be done in a neat and workmanlike manner, without damage to the pipe or cement lining, and so as to leave a smooth end at right angles to the axis of the pipe. Pipe shall be laid with bell ends facing in the direction of the laying, unless directed otherwise by the City's inspector. Wherever it is necessary to deflect pipe from a straight line, the amount of deflection allowed shall not exceed the pipe manufacturer's recommendations.

14. For connection of mechanical joints, the socket, plain end of each pipe and gasket shall be cleaned of dirt before jointing, and shall be jointed according to manufacturer's directions. Bolts shall be tightened alternately at top, bottom and sides, so pressure on gasket is even.

15. For connection of "Tyton" joints, the jointing shall be done according to manufacturer's recommendations, with special care used in cleaning gasket seat to prevent any dirt or sand from getting between the gasket and pipe.

Lubricant to be used on the gasket shall be non-toxic and free from contamination. When a pipe length is cut, the outer edge of the cut shall be beveled with a file to prevent injury to the gasket during jointing.

16. Valves, fittings, plugs and caps shall be set and jointed to pipe in the manner as required. All dead ends on new mains shall be closed with dead end M.J. caps or plugs.

17. Fittings shall be "blocked" with poured-in-place concrete, with a firm minimum bearing against an undisturbed earth wall. Timber blocking will not be permitted. Thrust blocks shall be poured as soon as possible after setting the fittings in place to allow the concrete to "set" before applying the pressure test. The concrete thrust blocks shall be in place before beginning the pressure test. Anchor blocks shall be allowed to set sufficiently to develop the necessary bond strength between the reinforcing rods and the concrete anchor before beginning the pressure test.

18. All of the new piping, valves and blocking shall have been installed, disinfected and tested up to the point of cutting into existing lines before the crossover is made. The crossover to the existing system shall be in full readiness, including the cut and sized specials. Forty-eight (48) hour notice shall be given the City in advance of the planned "cut-ins". All sleeves shall be ductile iron.

B. **Valves**:

All valves 14" and larger shall be butterfly valves. All valves 12" and smaller shall be resilient seat gate valves.

1. **Resilient-Seated Gate Valves**

All gate valves shall conform to ANSI/AWWA C509 Standards for resilient-seated, high strength, bronze stemmed gate valves. The valves shall be iron-bodied, iron disk completely encapsulated with polyurethane rubber and bronze, non-rising stem with "O" ring seals. The polyurethane sealing rubber shall be fusion bonded to the wedge to meet ASTM tests for rubber to metal bond ASTM D429. The valves shall open counter-clockwise and be furnished with a 2-inch square operating nut. Valves located in vaults shall be furnished with City approved handwheels. All

surfaces, interior and exterior shall be fusion bonded epoxy coated, acceptable for potable water. Bolts for gate valves shall be stainless steel.

The valves shall be set with stems vertical. The axis of the valve box shall be common with the axis projected off the valve stem. The tops of the adjustable valve boxes shall be set to the existing or established grade, whichever is applicable.

Valves shall be Dresser, M&H, or Waterous.

2. **Butterfly Valves**

Butterfly valves shall be of the tight closing rubber seat type with rubber seat either bonded to the body or mechanically retained in the body with no fasteners or retaining hardware in the flowstream. The valves may have rubber seats mechanically affixed to the valve vane. Where threaded fasteners are used, the fasteners shall be retained with a locking wire or equivalent provision to prevent loosening. Rubber seats attached to the valve vane shall be equipped with stainless steel seat ring integral with the body, and the body internal surfaces shall be epoxy coated to prevent tuberculations buildup which might damage the disc-mounted rubber seat.

No metal-to-metal sealing surfaces shall be permitted. The valves shall be bubble-tight at rated pressures with flow in either direction, and shall be satisfactory for applications involving valve operations after long periods of inactivity. Valve discs shall rotate ninety (90) degrees from the full open position to the tight shut position. The valves shall meet the full requirements of AWWA C504, Class 150B. In some instances valves shall be furnished to withstand pressures greater than 250 psi.

3. **Tapping Sleeves & Tapping Valves**

The tapping sleeves shall be rated for a working pressure of 200 psi minimum and furnished complete with joint accessories. Tapping sleeves shall be constructed in two sections for ease of installation and shall be assembled around the main without interrupting service.

Mechanical joint style sleeves shall be ductile iron. Sleeves are required for size-on-size connection to cast iron pipe. Mechanical joint sleeves shall be cast by Clow, Dresser, Mueller, Tyler, U.S. Pipe, or owner

approved equal.

Fabricated steel style sleeves shall only be provided for A.C. pipe connection. This shall be fusion bonded coated, acceptable for potable water, and is acceptable for A.C. pipe taps only. Fabricated steel sleeves shall be manufactured by JCM, Romac or approved equal.

Tapping valves shall be provided with a standard mechanical joint outlet for use with ductile iron pipe and shall have oversized seat rings to permit entry of the tapping machine cutters. In all other respects, the tapping valves shall conform to the resilient seat gate valves herein specified with regards to operation and materials.

The installation of the tapping sleeves and valves shall be performed by a qualified contractor such as Spear Tap, Pacific Water Works, or City approved equal.

5. **All Valves**

All valves with operating nuts located more than 42" below finished grade shall be equipped with extension stems to bring the operating nut to within 18" of the finished grade.

At the top of the extension stem, there shall be a two-inch (2") standard operating nut, complete with a centering flange that closely fits the five-inch (5") pipe encasement of the extension stem. The valve box shall be set in a telescoping fashion around the five-inch (5") pipe cut to the correct length to allow future adjustment up or down.

Each valve shall be provided with an adjustable two-piece cast iron valve box of five inches (5") minimum inside diameter. Valve boxes shall have a top section with an eighteen-inch (18") minimum length. The valve boxes and covers shall be “Vancouver Style” or City approved equal.

6. **Valve Markers**

For each valve outside of asphalt, provide a valve marker post.

The concrete marker posts shall have a 3-inch minimum square section and a minimum length of thirty-six inches (36"), with beveled edges, and contain at least one (1) three-eighths inch (3/8") diameter bar of reinforcing steel. Markers shall be placed at the edge of the right-of-way opposite the valve, and set so as to leave twelve inches (12") of the post exposed above grade. The exposed portion of the marker posts shall be painted with two (2) coats of yellow expoxypaint, Tnemec, or equal. Distance to referenced valve shall be to the nearest 0.5 foot, and shall be clearly stenciled in black numerals two inches (2") in height.

C. **Fire Hydrants:**

The fire hydrants shall be Waterous Pacer or Kennedy K81D Guardian. All fire hydrants shall be approved by the National Board of Fire Underwriters and conform to AWWA Specification C502, break-away type, in which the valve will remain closed if the barrel is broken. The hydrant barrel shall have a diameter of not less than eight and one-half (8-1/2") inches, and the valve diameter shall be not less than five-and-one-quarter inches (5-1/4"). Each hydrant shall be equipped with two (2) two-and-one-half-inch (2-1/2") hose ports (National Standard Thread), and one (1) five-and-one-quarter-inch (5-1/4") NST (National Standard Thread) pumper connection with a Storz adapter and cap. Each hydrant shall be equipped with a suitable positive acting drain valve and one-and-one-quarter-inch (1-1/4") pentagonal operating nut (counter-clockwise opening). A blue pavement marker shall be furnished and installed (permanently adhered to pavement surface). Marker location to be approved by Fire Marshall.

The holding spools between the gate valve and fire hydrant shall be made from six-inch (6") Class 53 ductile iron pipe, 0.34-inch wall thickness. The hydrant and gate valve shall be anchored in place using Romac Grip Rings. Holding spools with length in excess of seventeen feet (17') shall be supplied with an M. J. sleeve and mechanical joint restraint device.

The fire hydrants shall be painted per local fire marshall requirements with two (2) coats of yellow epoxy paint, Tnemec or equal. After installation, they shall be wire brushed and field painted with two additional coats of

similar yellow epoxy paint. Distance to the hydrant valve shall be clearly stenciled in black numerals two inches (2") in height on the fire hydrant below the pumper port.

Between the time that the fire hydrant is installed and the completed facility is placed in operation, the fire hydrant shall at all times be wrapped in burlap, or covered in some other suitable manner to clearly indicate that the fire hydrant is not in service.

D. **Blow-offs & Air Relief Assemblies:**

Two (2) inch blowoff assemblies shall be installed at the terminus of all dead end water mains. Blowoffs utilized by the Contractor for flushing the water main shall be sufficient size to obtain 2.5 feet per second velocity in the main. Temporary blow-offs shall be removed and replaced with a suitably sized watertight brass plug.

Two (2) inch air and vacuum release valves shall be installed at principal high points in the system. See detail.

The installation of these items shall include connection piping, gate valve, valve box, and all accessories. Valve markers shall be optional with City.

E. **Water Sampling Station**

One water sampling station shall be provided to the City for each development in size of 1 to 10 lots. One additional sampling station shall be provided for each additional 50 lots or portion thereof. The water sampling station shall be furnished and installed at a location as determined by the City Engineer or per City direction, they shall be delivered to the City shop for future installation by City crews. See Detail.

F. Water Meters and Service Fittings

Water meters and service fittings shall be as shown on the standard details. Water meters and service fittings shall meet the requirements of NSF 61-G.

4.05 Water Pipe Testing & Disinfecting

All pipelines shall be satisfactorily tested and disinfected prior to acceptance of work. Water for this purpose must be procured from the City. A water hydrant meter shall be required and procured from the City for all water utilized for flushing pipelines. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed and operated by the Contractor. Feed for the pump shall be from a barrel or other container within the actual amount of "makeup" water, so that it can be measured periodically during the test period.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All blocking shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking.

As soon as pipe is secured against movement under pressure, it may be filled with water. Satisfactory performance of air and vacuum valves shall be checked while the line is filling.

Contractor shall preflush to a City approved location all water mains after water has remained in the main for 24 hours and before pressure testing the main.

After the pipe is filled and all air expelled, it shall be pumped to a test pressure of 250 psi, and this pressure shall be maintained for a period of not less than thirty (30) minutes to insure the integrity of the thrust and anchor blocks. **The contractor/developer is cautioned regarding pressure limitations on butterfly valves.** All tests shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. Hydrostatic tests shall be performed on every complete section of water main between two valves, and each valve shall withstand the same test pressure as the pipe with no pressure active in the section of pipe beyond the closed valve.

In addition to the hydrostatic pressure test, a leakage test shall be conducted on the pipeline. The leakage test shall be conducted at 150 psi for a period of not less than one (1) hour. The quantity of water lost from

the main shall not exceed the number of gallons per hour determined by the formula:

$$L = \frac{ND(P)^{0.5}}{7,400}$$

in which

L = Allowable leakage, gallons/hour
N = Number of joints in the length of pipeline tested
D = Nominal diameter of the pipe in inches
P = Average test pressure during the leakage test, psi

Defective materials or workmanship, discovered as a result of the tests, shall be replaced by the Contractor at the Contractor's expense. Whenever it is necessary to replace defective material or correct the workmanship, the tests shall be re-run at the Contractor's expense until a satisfactory test is obtained.

As sections of pipe are constructed and before pipelines are placed in service, they shall be sterilized in conformance with the requirements of the State of Washington Department of Health Services.

The Contractor shall be responsible for flushing all water mains prior to water samples being acquired. The water mains shall be flushed at a rate to provide a minimum 2.5 feet per second velocity in the main.

In all disinfection processes, the Contractor shall take particular care in flushing and wasting the chlorinated water from the mains to assure that the flushed and chlorinated water does no physical or environmental damage to property, streams, storm sewers or any waterways. The Contractor shall chemically or otherwise treat the chlorinated water to prevent damage to the affected environment, particularly aquatic and fish life of receiving streams.

Chlorine shall be applied in one of the following manners, listed in order of preference, to secure a concentration in the pipe of at least 50 ppm.

1) Injection of chlorine-water mixture from chlorinating apparatus through corporation cock at beginning of section after pipe has

been filled, and with water exhausting at end of section at a rate controlled to produce the desired chlorine concentration;

2) Injection similarly of a hypochlorite solution;

3) Placement of dry chlorinated lime throughout pipeline, as constructed, in proper quantities to produce the desired dosage. Filling of pipeline with this method should be at a very slow rate. Pipeline should be filled within two (2) days of placing sterilizing agent.

After the desired chlorine concentration has been obtained throughout the section of line, the water in the line shall be left standing for a period of twenty-four (24) hours. Following this, the line shall be thoroughly flushed and a water sample collected. The line shall not be placed in service until a satisfactory bacteriological report has been received.

City forces only will be allowed to operate existing and new tie-in valves. The Contractor's forces are expressly forbidden to operate any valve on any section of line which has been accepted by the City.

4.06 Backflow Prevention and Sprinkler Systems

1. All water systems connected to the public water system shall have backflow prevention as required by WAC 248-54-285.

2. All fire sprinkler systems that have a fire department connection shall have backflow prevention as required by WAC 248-54-285.

4.07 Staking

All surveying and staking shall be performed by an engineering or surveying firm employed by the Developer and capable of performing such work. The engineer or surveyor directing and/or performing such work shall be currently licensed by the State of Washington to perform said tasks.

A preconstruction meeting shall be held with the City prior to commencing staking and notification will be given to the City that the staking is complete prior to beginning construction for their review.

The minimum staking of water systems shall be as follows:

A. Provide staking sufficient to satisfy City Public Works Superintendent. In new plat development roadway centerline staking must be readily identifiable.

B. Stake locations of all proposed fire hydrants, blow-offs, air-vac, valves, meters, etc. Stake property corners.

4.08 Trench Excavation

A. Clearing and grubbing where required shall be performed within the easement or public right-of-way as permitted by the City and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the owner or contractor in accordance with the terms of all applicable permits.

B. Trenches shall be excavated to the line and depth designated by the City to provide a minimum of 36 inches of cover over the pipe. Except for unusual circumstances where approved by the City, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for adequate working space as allowed by the governing agency and in compliance with all safety requirements of the prevailing agencies. See Detail. The trench shall be kept free from water until joining is complete. Surface water shall be diverted so as not to enter the trench. The owner shall maintain sufficient pumping equipment on the job to insure that these provisions are carried out.

C. The contractor shall perform all excavation of every description and whatever substance encountered and boulders, rocks, roots and other obstructions shall be entirely removed or cut out to the width of the trench and to a depth 6 inches below the pipeline grade. Where materials are removed from below the pipeline grade, the trench shall be backfilled to grade with material satisfactory to the City and thoroughly compacted.

D. Trenching and shoring operations shall not proceed more than 100 feet in advance of pipe laying without approval of the City, and

shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Office of Safety and Health Administration (OSHA) Safety Standard.

E. The bedding course shall be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to make up the joint.

4.09 Backfilling

Backfilling and surface restoration shall closely follow installation of pipe so that not more than 100 feet is left exposed during construction hours without approval of the City. Selected material shall be placed and compacted around and under the watermain by hand tools. Special precautions should be provided to protect the pipe to a point 12 inches above the crown of the pipe. The remaining backfill shall be compacted to 95 percent of the maximum density in traveled areas and road prisms, 90 percent outside driveway, roadways, road prism, shoulders, parking or other traveled areas. Where governmental agencies other than the City have jurisdiction over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction. Typically, all trenches located in roadway sections, roadway "prisms", and in traffic bearing areas shall be required to be backfilled and compacted with 5/8-inch minus crushed rock. Clean sand or imported bank run gravel , may be used as an alternate only if pre-approved (in writing) by the City Public Works Superintendent. Due to local conditions, as may be specifically approved by the City, suitable excavated backfill material, as determined by the City, may be utilized as backfill, or if such material is not available from trenching operations, the City may order the placing of gravel base conforming with Section 9-03.10 of the Standard Specifications (WSDOT) for backfilling the trench. All excess material shall be promptly loaded and hauled to waste.

4.10 Street Patching and Restoration

See Chapter 6 for requirements regarding street patching and trench restoration.

4.11 Erosion Control

The detrimental effects of erosion and sedimentation shall be minimized by conforming with the following general principles:

1. Soil shall be exposed for the shortest possible time.
2. Reducing the velocity and controlling the flow of runoff.
3. Detaining runoff on the site to trap sediment.
4. Releasing runoff safely to downstream areas.

The contractor shall conform to City Municipal Code(s) in this regard. In applying these principles, the Developer and/or Contractor shall provide for erosion control by conducting work in workable units; minimizing the disturbance to cover crop materials; providing mulch and/or temporary cover crops, sedimentation basins, and/or diversions in critical areas during construction; controlling and conveying runoff; and establishing permanent vegetation and installing erosion control structures as soon as possible.

A. Trench Mulching

Where there is danger of backfill material being washed away due to steepness of the slope along the direction of the trench, backfill material shall be compacted and held in place by covering the disturbed area with straw and held with a covering of jute matting or wire mesh anchored in place.

B. Cover-Crop Seeding

A cover crop shall be sown in all areas excavated or disturbed during construction that were not paved, landscaped and/or seeded prior to construction. Areas landscaped and/or seeded prior to construction shall be restored to their original or superior condition.

Cover-crop seeding shall follow backfilling operations.

The Developer and/or Contractor shall be responsible for protecting all areas from erosion until the cover crop affords such protection. The cover crop shall be re-seeded if required and

additional measures taken to provide protection from erosion until the cover crop is capable of providing protection.

During winter months, the Contractor may postpone seeding, if conditions are such that the seed will not germinate and grow. The Developer and/or Contractor will not, however, be relieved of the responsibility of protecting all areas until the cover crop has been sown and affords protection from erosion.

The cover crop shall be sown at a rate of 10 to 15 pounds of seed per acre using a hand or power operated mechanical seeder capable of providing a uniform distribution of seed.

4.12 Finishing and Cleanup

After all other work on this project is completed and before final acceptance, the entire roadway, including the roadbed, planting, sidewalk areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be neatly finished to the lines, grades and cross sections of a new roadway consistent with the original section, and as hereinafter specified.

On water system construction where all or portions of the construction is in undeveloped areas, the entire area which has been disturbed by the construction shall be shaped so that upon completion the area will present a uniform appearance, blending into the contour of the adjacent properties. All other requirements outlined previously shall be met.

Slopes, sidewalk areas, planting areas and roadway shall be smoothed and finished to the required cross section and grade by means of a grading machine insofar as it is possible to do so without damaging existing improvements, trees and shrubs. Machine dressing shall be supplemented by hand work to meet requirements outlined herein, to the satisfaction of the City Inspector and/or the City Engineer.

Upon completion of the cleaning and dressing, the project shall appear uniform in all respects. All graded areas shall be true to line and grade. Where the existing surface is below sidewalk and curb, the area shall be filled and dressed out to the walk. Wherever fill material is required in the planting area, the finished grade shall be elevated to allow for final

settlement, but nevertheless, the raised surface shall present a uniform appearance.

All rocks in excess of six (6) inch diameter shall be removed from the construction area and shall be disposed of the same as required for other waste material. In no instance shall the rock be thrown onto private property. Overhang on slopes shall be removed and slopes dressed neatly so as to present a uniform, natural, well-sloped surface.

All excavated material at the outer lateral limits of the project shall be removed entirely. Trash of all kinds resulting from clearing and grubbing or grading operations shall be removed to a permitted site capable of handling this material and not placed in areas adjacent to the project. Where machine operations have broken down brush and trees beyond the lateral limits of the project, the Developer and/or Contractor shall remove and dispose of same and restore said disturbed areas "in kind" at his own expense.

Drainage facilities such as inlets, catch basins, culverts, and open ditches shall be cleaned of all debris.

All pavements and oil mat surfaces, whether new or old, shall be thoroughly cleaned. Existing improvements such as Portland cement concrete curbs, curb and gutters, walls, sidewalks, and other facilities which have been sprayed by the asphalt cement shall be cleaned to the satisfaction of the City Public Works Superintendent and/or City Engineer.

Castings for monuments, water valves, vaults and other similar installations which have been covered with the asphalt material shall be cleaned to the satisfaction of the City and/or the Engineer.

4.13 General Guarantee and Warranty

The Developer shall be required, upon completion of the work and prior to acceptance by the City, to furnish the City a written guarantee covering all material and workmanship for a period of two years after the date of final acceptance and he shall make all necessary repairs during that period at his own expense, if such repairs are necessitated as the result of furnishing poor materials and/or workmanship. The Developer shall obtain warranties from the contractors, subcontractors and suppliers of material

or equipment where such warranties are required, and shall deliver copies to the City upon completion of the work.

Easement documents, if applicable, shall be filed and recorded with the Cowlitz County Auditor's office and the documents reviewed by the City prior to project acceptance.

4.14 Water System Construction Details

See details located towards the back of these Standards.

SECTION 5
SANITARY SEWER

SECTION 5

5. SANITARY SEWER STANDARDS

5.01 General

The standards established by this chapter are intended to represent the **minimum** standards for the design and construction of sanitary sewer facilities. Greater or lesser requirements may be mandated by the City due to localized conditions. Washington State Department of Ecology's Design Standards shall also be employed by the City in its review and approval of system connections, extensions, and/or modifications. The following design and construction considerations shall apply:

It is the intent of the City of Kalama to have all buildings connected to a gravity sewer collection system. Line extensions may be required to provide service to developments. Longer routes may be required to avoid lift station and pressurized main lines. The City will support right-of-way acquisitions and latecomer's agreements to facilitate the intent.

5.02 Design Standards

The design of sanitary sewer systems shall be dependent on local site conditions. The design elements of sanitary sewer systems shall conform to minimum City Standards set forth herein. Department of Ecology approval of sewer extensions may be required.

A. If future extensions of the system are deemed probable by the City, the proposed systems shall be designed and sized to service tributary areas and also be extended to "far" property line(s) so as to provide access to future development. Easements shall be provided to facilitate same.

B. Detailed plans shall be submitted for the City's review which provide the location, size, type and direction of flow of the proposed sewers and the connection with existing sewers. All elevation information shall be to the City datum.

C. Project plans should have a minimum horizontal scale 50 feet to the inch and a vertical scale of not more than 5 feet to the inch. Plan views shall be drawn to a corresponding horizontal scale. Plans and profiles shall show:

Locations of streets, right-of-ways, existing utilities, driveways, and sewers.

All associated right-of-way, adjacent property lines, easements and/or proposed property lines.

Site topography at a minimum of five (5') foot intervals, to include a minimum of twenty (20') foot within adjacent areas.

Vicinity and site location map.

Ground surface, pipe type, class and size, manhole stationing, invert and surface elevation at each manhole, and grade of sewer between adjacent manholes. All manholes shall be numbered on the plans and correspondingly numbered on the profile. Where there is any question of the sewer being sufficiently deep to serve any residence, the Developer shall indicate building and basement floor elevations in the profile.

All known existing structures, both above and below ground, which might interfere with the proposed construction, particularly water mains, gas mains, storm drains, overhead and underground power lines, telephones lines, and television cables.

All utility easements, including County recording numbers.

Details in scale drawings which clearly show special sewer joints, connections, and cross-sections, and sewer appurtenances such as manholes and related items and all other items as required by the City to clearly identify construction items, materials, and/or methods.

C. Construction of new sewer systems or extensions of existing systems will be allowed only if the existing and downstream receiving systems are capable of supporting the added hydraulic load.

D. Sewers shall be extended to the far property line(s) to facilitate future extensions of same to service tributary areas. Sewer facilities shall be designed and installed to service tributary areas.

E. Collection and interceptor sewers shall be designed and constructed for the ultimate development of the tributary areas and as may be further established in the City's Sewer Comprehensive Plan.

F. Sewer systems shall be designed and constructed to achieve total containment of sanitary wastes and maximum exclusion of infiltration and inflow. Sewers installed below water table shall require special design and inspections.

G. Computations and other data used for design of the sewer system shall be submitted to the City for approval.

H. The sewage facilities shall be constructed in conformance with standards herein and current amendments thereto, and other applicable standards as allowed by the City.

I. Material and installation specifications shall contain appropriate requirements that have been established by the industry in its technical publications, such as ASTM, WSDOT, WEF, and APWA standards. Requirements shall be set forth in the specifications for the pipe and methods of bedding and backfilling so as not to damage the pipe or its joints, impede cleaning operations and future tapping, nor create excessive side fill pressure or ovulation of the pipe, nor seriously impair flow capacity.

J. All sewers shall be designed to prevent damage from superimposed loads. Proper allowance for loads on the sewer because of the width and depth of trench should be made. When standard-strength sewer pipe is not sufficient, extra-strength pipe shall be used.

K. All pipe shall be laid in straight lines and at uniform rate of grade between manholes. Variance from City approval established line and grade shall not be greater than one-half inch (1/2"), provided that such variation does not result in a level or reverse sloping invert; provided, also, that variation in the invert elevation between adjoining ends of pipe, due to non-concentricity of joining surface and pipe interior surfaces, does not exceed one-sixty-fourth inch (1/64") per inch of pipe diameter, or one-half inch (1/2") maximum. Any corrections required in line and grade shall be reviewed with the City and/or the City Engineer and shall be made at the expense of the Developer and/or Contractor.

L. Deflection tests shall be performed on all PVC sewer mains and the deflection test limit shall be 5.0 percent of the base inside diameter of the pipe.

M. Prior to final inspection, all pipelines shall be tested, flushed and cleaned and all debris removed and disposed of at a location approved by the City. A pipeline "cleaning ball" of the proper diameter for each size of pipe shall be flushed through all pipelines prior to final inspection. Hydrant meters shall be acquired from the City and utilized by the Contractor for all water withdrawn from the City's system for flushing purposes.

N. Before sewer lines are accepted, the Contractor/Developer shall perform a complete televised inspection of the sewer pipe and appurtenances and shall provide to the City an audio-visual tape recording of these inspections. All equipment and materials shall be compatible with existing City equipment. It shall be the Contractor/Developer's responsibility to confirm equipment compatibility with the City prior to inspection.

O. At all times during the televised inspection process, the City's Public Works Superintendent and/or his designated representative shall be present. The City's Public Works Superintendent shall be notified forty-eight (48) hours prior to any televised inspection.

P. After all other work is completed and before final acceptance, the entire roadway, including the roadbed, planting, sidewalk areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be neatly finished to the lines, grades and cross sections for a new roadway consistent with the original section.

Q. The Developer shall be required, upon completion of the work and prior to acceptance by the City, to furnish the City with a written guarantee covering all material and workmanship for a period of two years after the date of final acceptance and the Developer shall make all necessary repairs during that period at his own expense, if such repairs are necessitated as the result of furnishing poor materials and/or workmanship. The Developer shall obtain warranties from the contractors, subcontractors and suppliers of material or equipment where such warranties are required, and shall deliver copies to the City upon completion of the work.

5.03 General Requirements

1. Prior to construction, the sewer plans shall be reviewed and approved by City's Public Works Department (may also require DOE approval).

2. Prior to construction, the Contractor shall notify the City for a pre-construction meeting.

3. Work shall be performed only by Washington State licensed and bonded contractors with a demonstrated experienced in constructing public sewer systems of the type being proposed for construction. No contractor shall perform work prior to obtaining a City business license.

4. Prior to any work being performed, the Contractor shall contact the City Public Works Superintendent or City Engineer to set forth his proposed schedule.

5. Contractor shall obtain approval of materials to be used from the City prior to ordering or delivery of materials.

6. Sewer pipelines shall be laid only in dedicated streets or alleys which have been or will be prior to acceptance exclusively granted to the City.

7. The sewer pipelines shall be located in roadways when at all possible 5 feet southerly or westerly of street centerline. The sewer main shall maintain a minimum 10 foot horizontal separation from proposed or existing water mains.

8. The maximum distance between manholes shall be 400 feet unless specifically approved otherwise by the City Engineer.

9. PVC pipe shall be a minimum Class S.D.R. 35 and be manufactured in accordance with ASTM D3034. Ductile iron pipe shall be Class 52 and conform to AWWA C151 and C104.

10. The allowable cover (finished grade) for the various types of pipe are:

PVC Pipe:	3' to 25'
D.I. Pipe (Class 53):	2’ to 3' (if allowed)
	25' & above

Slopes of 18 percent or greater
Force Mains

All pipe shall have a minimum of thirty six (36) inches of cover (24" in the case of a side sewer on private property). The City reserves the right to require a minimum of three feet of cover unless topography, existing facilities or other future improvements prohibit this minimum cover for installation.

11. The minimum slope for 6" side sewer laterals shall be 2.0%
The minimum slope for 8" gravity mains shall be 0.5%.
The minimum slope for 10" gravity mains shall be 0.4%.
The minimum slope for 12 gravity mains shall be 0.3%.
Minimum slope shall be maintained unless specifically waived by the Public Works Superintendent.

12. All side sewer laterals shall be of the same material as the main line and shall be provided with a 6"x6" tee with an approved water-tight cap located within the public right-of-way to be utilized as a clean out. A water-tight six-inch capped stub shall be installed which extends vertically from the 6"x6" tee to within 18 inches of finished grade. See detail.

13. Each side sewer lateral shall have an approved water-tight cap at the termination of the stub, it shall be adequately "blocked" to satisfactorily resist the air pressure testing.

14. Each side sewer lateral shall have a treated 2" x 4" wood "marker" at the termination of the stub. The "marker" shall extend from the bottom of the trench to 24" above finished grade. Above the ground surface, it shall be painted "white" with "S/S" and the depth, in feet, stenciled in black letters 2" high.

15. Front lot corners shall be staked prior to construction for side sewer tee location.

16. All side sewers shall be extended a minimum of 5 feet past the street right-of-way line (or property line).

17. Side sewer connections if allowed directly into manholes shall be constructed to match the sewer main crown (outlet) and the manhole channeled accordingly.

18. Manholes, where sewer extension may occur, shall be provided with knock-outs and channeled accordingly.

19. Manholes shall be provided with a 0.10 foot drop across the channel.

20. Locking lids shall be provided for all manholes located outside pavement areas and all manhole lids shall have the word "sewer" cast integrally onto its surface.

21. Concrete collars shall be placed around all frames per the Standard Detail for manholes.

22. Pipe connections to manholes shall be as follows:

    PVC Pipe: Core the manhole and connect sewer pipe with a water-tight flexible rubber boot in manhole wall, Kor-N-Seal boot or equal.

    D.I. Pipe: Core the manhole and connect sewer pipe with a water-tight flexible rubber boot in manhole wall, Kor-N-Seal boot or equal.

    PVC and D.I. pipe, optional: Core the manhole and connect sewer pipe with a water-tight flexible rubber boot in manhole wall, Kor-N-Seal boot or equal.

23. Provide the City's Engineer and City Public Works Superintendent a copy of the material data sheets prior to construction.

24. Pipe trenches shall not be backfilled until pipe and bedding installation has been inspected and approved by the City's Inspector.

25. Final air testing shall not be accepted until after the finished paving is accomplished, all other underground utilities have been installed, and the lines have been satisfactorily flushed, cleaned, deflection tested and television inspected.

26. Manhole rim and invert elevations shall be field verified after construction by the Developer's engineer(s) and the "as constructed" drawings individually stamped by a Washington State licensed professional engineer which shall attest to the fact that the information is correct. As-builts shall

be to City datum, and must be submitted in a format described in Chapter 3 and approved by the City prior to project acceptance.

5.04 Materials and Testing

A. Sewer Mains, Laterals And Force Mains

PVC pipe shall be a minimum Class S.D.R. 35 and be manufactured in accordance with ASTM D3034. The pipe and fittings shall be furnished with bells and spigots which are integral with the pipe wall. Pipe joints shall use flexible elastomeric gaskets conforming to ASTM D3212. Nominal laying lengths shall be 20 feet and 13 feet.

The ductile iron pipe shall conform to ANSI/AWWA C151/A21.51-91 Standards, and current amendments thereto, except the ductile iron pipe shall be thickness Class 50 for gravity sewers and Class 52 for force mains. Grade of iron shall be a minimum of 60-42-10. The pipe shall be cement lined to a minimum thickness of 1/16", and the exterior shall be coated with an asphaltic coating. Each length shall be plainly marked with the manufacturer's identification, year case, thickness, class of pipe and weight.

Type of joint shall be mechanical joint or push-on type, employing a single gasket, such as "Tyton", except where otherwise calling for flanged ends. Bolts furnished for mechanical joint pipe and fittings shall be high strength ductile iron, with a minimum tensile strength of 50,000 psi.

Restrained joint pipe, where required shall be push-on joint pipe with "Fast Tight" gaskets as furnished by U.S. Pipe or equal for 12" diameter and smaller pipe and "TR FLEX" as furnished by U.S. Pipe or equal for 16" and 24" diameter pipes. Mechanical joint pipe with retainer glands (grip rings) as manufactured by "Romac" may also be required at the discretion of the City. The restrained joint pipe shall meet all other requirements of the non-restrained pipe.

All pipe shall be jointed by the manufacturer's standard coupling, be all of one manufacturer, be carefully installed in complete compliance with the manufacturer's recommendations.

All fittings shall be short-bodied, ductile iron complying with applicable ANSI/AWWA C110 or C153 Standards for 350 psi pressure rating for mechanical joint fittings and 250 psi pressure rating for flanged fittings. All fittings shall be cement lined and either mechanical joint or flanged, as indicated on the Plans.

Fittings in areas shown on the Plans for restrained joints shall be mechanical joint fittings with a mechanical joint restraint device. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be EBAA Iron, Inc., MEGALUG, or ROMAC "Grip Ring", as required and approved by the City Engineer.

All couplings shall be ductile iron mechanical joint sleeves.

The sewer pipe, unless otherwise approved by the City Public Works Superintendent and/or City Engineer, shall be laid upgrade from point of connection on the existing sewer or from a designated starting point. The sewer pipe shall be installed with the bell end forward or upgrade. When pipe laying is not in progress, the forward end of the pipe shall be kept tightly closed with an approved temporary plug. Wherever movable shoring (steel box) is used in the ditch, pipe shall be restrained by use of a winch mounted in the downstream manhole and a line of sufficient strength threaded through the pipe and set tight before each move. Any indication that joints are not being held shall be sufficient reason for the City to require restraints, whether or not movable shoring is being used.

All pipe shall be laid in straight lines and at uniform rate of grade between manholes. Variance from established line and grade shall not be greater than one-half inch (1/2"), provided that such variation does not result in a level of reverse sloping invert; provided, also, that variation in the invert elevation between adjoining ends of pipe, due to non-concentricity of joining surface and pipe interior surfaces, does not exceed one-sixty-fourth inch (1/64") per inch of pipe diameter, or one-half inch (1/2") maximum. Any corrections required in line and grade shall be reviewed with the City Public Works Superintendent and/or City Engineer and shall be made at the expense of the Developer.

All extensions, additions and revisions to the sewer system, unless otherwise indicated, shall be made with sewer pipe jointed by means of a flexible gasket which shall be fabricated and installed in accordance with the manufacturer's specifications.

All joints shall be made up in strict compliance with the manufacturer's recommendations and all sewer pipe manufacture and handling shall meet or exceed the ASTM recommended specifications, current revisions.

Pipe handling after the gasket has been affixed shall be carefully controlled to

avoid disturbing the gasket and knocking it out of position, or loading it with dirt or other foreign material. Any gaskets so disturbed shall be removed, cleaned, relubricated if required, and replaced before the rejoining is attempted.

Care shall be taken to properly align the pipe before joints are entirely forced home. During insertion of the tongue or spigot, the pipe shall be partially supported by hand, sling or crane to minimize unequal lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned. Since most flexible gasketed joints tend to creep apart when the end pipe is deflected and straightened, such movement shall be held to a minimum once the joint is home.

Sufficient pressure shall be applied in making the joint to assure that it is home, as described in the installation instructions provided by the pipe manufacturer. Sufficient restraint shall be applied to the line to assure that joints once home are held so, until fill material under and alongside the pipe has been sufficiently compacted. At the end of the work day, the last pipe laid shall be blocked in an effective way to prevent creep during "down time."

For the joining of dissimilar pipes suitable adapter couplings and gaskets shall be used which have been approved by the City Inspector and/or the Engineer.

All gravity sewer pipe shall be bedded with pea gravel. The PVC pipe shall be bedded from a depth of four (4) inches below the pipe to six (6) inches above the pipe and ductile iron gravity sewer pipe shall be bedded from a depth of four (4) inches below the pipe to the springline of the pipe. The bedding material shall extend across the full width of the trench and shall be compacted under the haunches of the pipe.

Special concrete bedding shall consist of a pipe cradle constructed of Portland cement concrete containing not less than four (4) sacks of cement per cubic yard. Sand, gravel and water proportions are subject to approval by the Engineer. Maximum aggregate size shall be 1-1/2". Maximum slump shall be 4". The bottom of the trench shall be fully compacted before the placement of pipe cradle. The Contractor shall protect pipe against flotation and disturbing the horizontal alignment of the pipe during the pouring of the concrete. (Washington State Department of Transportation Standard Specifications for "Class A" concrete bedding will be acceptable.)

Clay or Bentonite dams shall be installed across the trench and to the full depth of the granular material in all areas of steep slopes, stream crossings and wetland to prevent migration of water along the pipeline.

All backfill shall be placed and compacted in accordance with City, County, or State requirements as may be applicable and copies of the compaction results shall be provided to the City Engineer.

B. Manholes

Manholes shall be of the offset type and shall be precast concrete sections. Joints between precast wall sections shall be confined O-ring or as otherwise specified.

For connections to existing systems, a concrete coring machine, suitable for this type of work, shall be utilized in making the connection. The existing manhole shall be rechanneled, steps re-aligned, top cone section rotated, etc., all as required for a suitable installation. The new pipe connection shall be plugged (water tight) until the new pipe system has been installed, tested, and approved. The Contractor shall be responsible for any existing defects in the existing manhole unless these defects are witnessed by a representative of the City prior to any work being performed to make the connection. The Contractor shall be required to remove any and all deleterious material in the existing manhole and downstream reaches as a result of his/her work.

1) Manhole Sections

Manhole sections shall be placed and aligned so as to provide vertical sides and vertical alignment of the ladder steps. The completed manhole shall be rigid, true to dimension, and be water tight. Rough, uneven surfaces will not be permitted.

The mortar used between the joints in the precast sections and for laying manhole precast concrete grade rings shall be composed of one part cement to two parts of plaster sand. All joints shall be thoroughly wetted and completely filled with mortar, smoothed both inside and outside to insure water tightness.

The outside and inside of manhole grade rings and the joints of precast concrete sections shall be plastered and troweled smooth with 1/2" (minimum) of mortar in order to attain a watertight surface.

2) Manhole Steps

Manhole steps shall be polypropylene, Lane International Corp. No. P13938 or equal. Ladders (maximum 3 foot length) shall be polypropylene Lane International Corp. or equal, and shall be compatible with steps.

3) Grade Adjustment

Where work is located in public right of way, not less than 18" or more than 26" shall be provided between the top of the cone or slab and the top of the manhole frame.

4) Channels

Channels shall be made to conform accurately to the sewer grade and shall be brought together smoothly with well-rounded junctions, satisfactory to the City Public Works Superintendent. The channels shall be field poured after the inlet and outlet pipes have been laid and firmly grouted into place at the proper elevation. Allowances shall be made for a one-tenth foot (0.1') drop in elevation across the manhole in the direction of flow. Channel sides shall be carried up vertically from the invert to three-quarters of the diameter of the various pipes. The concrete shelf shall be warped evenly and sloped 3/8" per foot to drain. Rough, uneven surfaces will not be permitted. Channels shall be constructed to allow the installation and use of a mechanical plug or flow meter of the appropriate size.

5) Drop Manholes

Drop manholes shall, in all respects, be constructed as a standard manhole with the exception of the drop connection as further detailed herein.

6) Lift Holes and Steel Loops

All lift holes shall be completely filled with expanding mortar, smoothed both inside and outside, to insure water tightness. All steel loops shall be removed, flush with the manhole wall. The stubs shall be covered with mortar and smoothed. Rough, uneven surfaces will not be permitted.

7) Frames and Covers:

Frames and covers shall be ductile iron. Castings shall be free of porosity, shrink cavities, cold shuts or cracks, or any surface defects, which would impair serviceability. Repair of defects by welding, or by the use of "smooth-on" or similar material, will not be permitted. Frames and covers shall be machine finished or ground on seating surfaces so as to assure non-rocking fit in any position and interchangeability of covers. Frames and covers shall be provided with three bolt-locking lids. Rings and covers shall be positioned so one of the three locking bolts is located over the manhole steps and shall be adjusted to conform to the final finished surface grade of the street or easement to the satisfaction of the City or agent for the City. Manhole frames and covers shall be as manufactured by "Sather" Manufacturing Company, or City approved equal.

C. Side Sewer Lateral

A side sewer lateral is considered to be that portion of a sewer line that will be constructed between a main sewer line and a property line or easement limit line.

All applicable specifications given herein for sewer construction shall be held to apply to side sewer laterals.

Side sewers shall be for a single connection only and be a minimum four-inch (4") diameter pipe. Side sewers shall be connected to the tee, provided in the sewer main where such is available, utilizing approved fittings or adapters. The side sewer shall rise at a maximum of 45° and a minimum of 2%, from the sewer main to provide each lot with the deepest sewer possible.

The Contractor shall provide for each side sewer service a 2-inch x 4-inch wooden post, which extends from the invert of the end of the 6-inch pipe to 24” above the existing ground. The exposed area of this post shall be painted white and shall have selected thereon in two inch letters (black paint) "S/S" and shall also indicate the depth of the sewer service stub from finished grade.

Where no tee or wye is provided or available, connection of 4” and 6” side sewer shall be made by machine-made tap and saddle, only with specific written authorization of the City. The City shall review the exact location and material list in its evaluation. Saddles shall be placed between 45° and 80° off vertical.

The maximum bend permissible at any one fitting shall not exceed forty-five degrees (45^{o}). The maximum bend of any combination of two adjacent fittings shall not exceed 45^{o} (one-eighth bend) unless straight pipe of not less than three (3) feet in length is installed between such adjacent fittings.

D. Private Side Sewers

Private side sewers are the extension of side sewer laterals located outside of the public rights-of-way or easements granted to the City.

1. Side sewer pipe located on private property shall be 4" minimum, ductile iron or PVC ASTM 3034, and shall be installed at 2% minimum grade (1/4-inch fall per foot). Construction on private property may be performed by owner.

2. Pipe shall be bedded with pea gravel or clean, free draining sand.

3. Private yard sewers shall be installed per the International Plumbing Code.

4. Side sewer shall be inspected by the City's Representative / Inspector prior to backfilling. Side sewer shall be plugged and tested in the presence of the City Inspector by filling with water. Leakage rate shall not exceed 0.31 gal./hr. for 4-inch pipe and 0.47 gal./hr. for 6-inch pipe, per 100 feet of pipe.

5. On private property, minimum desirable cover shall be 24" over top of pipe from the point, which is 30" out from house and continuing to the connection with the City's sewer system.

6. Parallel water and sewer lines shall be 10 feet apart horizontally wherever possible and have a vertical separation of 18" if a vertical crossing is necessary. Sewer lines should be installed below water lines.

7. No more than 100 feet is allowed between cleanouts. Cleanouts are required for bends equal to or greater than 45^{o}. Cleanout shall be a watertight plugged gasketed tee or wye lateral.

8. Provide "grease trap" of a size and type approved by the City at all such locations as may be deemed necessary by the City. Grease

trap shall be sized and stamped by Developer's Engineer. Design Calculations shall be provided to the City upon request.

E. Testing Gravity Sewers For Acceptance

The Contractor and/or Developer shall furnish all facilities and personnel for conducting tests under the observation of the City Engineer or City Inspector.

1. Preparation for Testing for Leakage

The Contractor and/or Developer shall be required, prior to testing, to clean and flush all gravity sewer lines with an approved cleaning ball and clean water. The completed gravity sewer, including side sewer stubs, after completion of backfill and cleaning shall be televised inspected. This will be permitted prior to paving. The sewer shall then be tested by the low pressure air test method and/or an infiltration test but only after all utilities are installed and the project paved. Except, however, that in certain conditions an exfiltration test may be required by the City Public Works Superintendent and/or City Engineer.

The first section of pipe not less than 300' in length installed by each crew shall be tested, in order to qualify the crew and/or the material. A successful installation of this first section shall be a prerequisite to further pipe installation by the crew. At the Contractor's option, crew and/or material qualification testing may be performed at any time during the construction process after at least two (2) feet of backfill has been placed over the pipe.

Before the test is performed, the pipe installation shall be cleaned. The Contractor shall furnish an inflatable diagonally ribbed rubber ball of a size that will inflate to fit snugly into the pipe to be tested. The ball may, at the option of the Contractor, be used without a tag line, if a rope or cord is properly fastened to the ball to enable the Contractor to know and control its position at all times. The ball shall be placed in the last cleanout, or manhole on the pipe to be cleaned, and water shall be introduced behind it.

The ball shall pass through the pipe with only the pressure of the water impelling it. All debris flushed out ahead of the ball shall be removed at the first manhole where its presence is noted. In the event cemented or wedged debris, or a damaged pipe shall stop the ball, the Contractor and/or

Developer shall remove the obstruction, and/or repair any damaged pipe. All visible leaks showing flowing water in pipelines or manholes shall be stopped even if the test results fall within the allowable leakage. The cleaning shall be carried out in such a manner to not infiltrate existing facilities. Precautions shall be taken to prevent any damage caused by cleaning and testing. Any damage resulting shall be repaired by the Contractor and/or Developer at his own expense. The manner and time of testing shall be subject to approval of the City Public Works Superintendent and/or the City Engineer.

2. Low Pressure Air Test

The sewer pipe shall be tested for leaks through the use of air in the following manner:

Immediately following the pipe cleaning and televised inspection, the pipe installation shall be tested with low pressure air. Air shall be slowly supplied to the plugged pipe installation until the internal air pressure reaches 4.0 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe. At least two minutes shall be allowed for temperature stabilization before proceeding further.

The rate of air loss shall then be determined by measuring the time interval required for the internal pressure to decrease from 3.5 to 2.5 pounds per square inch greater than the pipe section's average adjacent groundwater back pressure.

The pipeline shall be considered acceptable, when tested at an average pressure of 3.0 pounds per square inch greater than the pipe section's adjacent groundwater back pressure if the total rate of air loss from any section tested in its entirety between manholes, cleanouts or pipe ends does not exceed the following table:

Length of 6" Pipe (ft)

Length of 8" Pipe (Feet)	0	50	100	150	200	250	300	350	400
0	0	0:40	1:20	1:58	2:38	3:18	3:58	4:38	5:16
50	1:10	1:50	2:30	3:10	3:48	4:28	5:08	5:48	5:56
100	2:20	3:00	3:40	4:20	5:00	5:38	6:14	6:12	6:08
150	3:32	4:10	4:50	5:30	6:10	6:30	6:26	6:22	6:18
200	4:42	5:22	6:00	6:40	6:44	6:38	6:34	6:30	6:26
250	5:52	6:32	6:48	6:58	6:50	6:44	6:40	6:36	6:32
300	7:02	7:20	7:10	7:02	6:56	6:50	6:44	6:40	6:36
350	7:34	7:22	7:14	7:06	7:00	6:54	6:50	6:44	6:42
400	7:34	7:24	7:16	7:08	7:02	6:58	6:52	6:48	6:44

Test time in minutes and seconds

If the pipe installation fails to meet these requirements, the Developer and/or Contractor shall determine at his own expense the source or sources of leakage, and he shall repair (if the extent and type of repairs proposed by the Developer and/or Contractor appear reasonable to the City Engineer) or replace all defective materials or workmanship. The completed pipe installation shall meet the requirements of this low pressure air test or the alternative water exfiltration test before being considered for acceptance.

Plugs used to close the sewer pipe for the air test shall be securely braced to prevent the unintentional release of a plug which can become a high velocity projectile. Gauges, air piping manifolds and valves shall be located at the top of the ground. No one shall be permitted to enter a manhole where a plugged pipe is under pressure. Air testing apparatus shall be equipped with a pressure release device such as a rupture disk or a pressure relief valve designed to relieve pressure on the pipe under test at 6 psi.

3. Vacuum Testing of Manholes

The Contractor shall be fully familiar with the vacuum testing equipment that they proposed to use. In addition, the Contractor shall provide a minimum of 4 hours of instruction by a Factory-Authorized representative at the outset of the work. The vacuum test shall be performed prior to backfilling the manhole. The boot clamps shall be properly tightened to prevent the boot from being sucked into the manhole. Proper bracing of stub ends is required.

Testing of all manholes shall be in accordance with the following:

a. Initial pressure test – 10 inches Hg.

b. Test time – A vacuum of 10 inches of Hg shall be drawn and the vacuum pump shut off. With the valve closed, the time shall be measured for the vacuum to drop to 9 inches. The manholes shall pass if the time is greater than that shown below.

Depth (ft)	Time (seconds)					
	48" Dia.	54" Dia.	60" Dia.	72" Dia.	120" Dia.	144" Dia.
0-10	60	70	80	90	110	120
10-15	90	100	110	120	140	150
15-25	120	130	140	150	170	180

If pressure drops exceeds 1" Hg in 2 minutes, the unit shall be repaired and retested.

If a unit fails to meet a 1" Hg drop in 1 minute after repair, the units shall be water exfiltration tested and repaired as necessary.

Joint repairs by parging are to be done on both outside and inside of joint to ensure a permanent seal. Vacuum testing draws together the joint and applies high pressure to the elastomeric joint material. Properly placed and sized elastomeric joint material must be used to avoid leakage or to enable sections to be separated if necessary to effect a repair.

Repairs to manholes required to meet leakage requirements shall be accomplished using knife grade IGAS mastic, or joint sealant (chemical grouting) applied from outside the manhole or by other methods proposed by the Contractor and approved by the Engineer.

4. Exfiltration Test (if approved by City)

All pipe and manholes shall be cleaned before the exfiltration test. Prior to making exfiltration leakage tests, the Developer and/or Contractor may fill the pipe and manholes with clear water to permit normal absorption into the pipe walls; provided however, that after so filling the pipe he shall complete the leakage test within twenty-four (24) hours after filling. When under test, the leakage allowable shall comply with the provisions that follow:

Leakage shall be no more than 0.15 gallons per hour per inch of diameter per one hundred (100) feet of sewer pipe, with a minimum test pressure of six (6) feet of water column above the crown at the upper end of the pipe or above the active groundwater table, whichever is higher as determined by the City. The length of pipe tested shall be limited so that the pressure on the invert of the lower end of the section tested shall not exceed sixteen (16) feet of water column. For each increase in pressure of two (2) feet above a basic six (6) feet measured above the crown at the lower end of the test station, the allowable leakage shall be increased by 10 percent.

The Developer and/or Contractor shall furnish all equipment, materials, and labor necessary for making test. The equipment shall be to the approval of the City Public Works Superintendent and/or City Engineer. The manner and time of testing shall be subject to approval of the City Engineer. It shall be the Developer's and/or Contractor's responsibility to determine the level of the water table at each manhole. If leakage exceeds the allowable amount, corrective measures shall be taken and the line then be retested to the satisfaction of the City's designated inspector.

4. Infiltration Test (if approved by City)

Infiltration testing shall take place during jetting of backfill, except when the natural groundwater table is above the crown of the higher end of the test section. The maximum allowable limit for infiltration shall be 0.15 gallon per hour per inch of internal diameter per 100 feet of length with no allowance for external hydrostatic head.

5. Deflection Test

Deflection tests shall be performed on all PVC gravity sewer mains by pulling a mandrel through the pipe and the deflection test limit shall be 5.0 percent of the base inside diameter or for example 7.28 inches for 8-inch diameter pipe. The sewer lines shall be thoroughly cleaned prior to the deflection test.

F. Testing Force Main

1. Test Specifications

All force mains shall be tested prior to acceptance of work. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed and operated by the Contractor. Feed for the pump shall be from a barrel or other container within the actual amount of "makeup" water, so that it can be measured periodically during the test period.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All blocking shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking.

The pipeline shall be subjected to a pressure and leakage test of a minimum of 150 pounds per square inch for a period of not less than one (1) hour. The test pressure shall be applied at the low end of the section tested.

The quantity of water lost from the main shall not exceed the number of gallons per hour determined by the formula:

$$L = \frac{ND(P)^{0.5}}{7{,}400}$$

in which

L = Allowable leakage, gallons/hour
N = Number of joints in the length of pipeline tested
D = Nominal diameter of the pipe in inches
P = Average test pressure during the leakage test, psi

Defective materials or workmanship, discovered as a result of the tests, shall be replaced by the Contractor at the Contractor's expense. Whenever it is necessary to replace defective material or correct the workmanship, the tests shall be re-run at the Contractor's expense until a satisfactory test is obtained.

2. Preliminary Tests

Developer and/or Contractor shall conduct preliminary tests and assure himself that the section to be tested is in an acceptable condition before requesting the City Inspector and/or City Engineer to witness the test.

3. Thrust Blocks & Anchor Blocks

All fittings shall be blocked with concrete in order to prevent movement and separation of pipe joints. Timber will not be permitted as permanent blocking. Sufficient time shall be allowed for concrete to set before commencement of pressure tests. The type and size of blocks and anchors shall be as detailed herein. A visqueen barrier shall be provided to protect glands, bolts, and other miscellaneous materials required for this type of connection from the concrete.

5.05 Video Inspection

Upon completion, the sewer lines shall be internally video inspected by a qualified firm providing said services. Two digital copies of the video inspection on DVD or USB drive along with a written log of the video inspection shall be submitted to the City for their review and approval, and if accepted, shall be retained in the City's files. This work can be performed prior to paving. The City's inspector shall be notified of the date of video inspection to insure his availability and on-site witnessing of the event during this time.

5.06 State Highway Crossings

All state highway and stream crossings shall be encased with a steel casing or ductile iron or PVC sleeve, as approved by the City and prevailing regulatory agencies. The welded steel casing or sleeve shall be of sufficient diameter, size and strength to enclose the sewer pipe and to withstand maximum highway or railroad loading. Sizing and wall thickness of casing is subject to approval by the City Engineer. Sand backfill or grout fill between the casing and the sewer pipe shall be required. In order to prevent the sand from being washed from the casing the ends of the casing shall be bricked and cemented after installation, backfill and testing of the pipe are completed.

5.07 Staking

All surveying and staking shall be performed by an engineering or surveying firm employed by the Developer and capable of performing such work. The engineer or surveyor directing or performing such work shall be currently licensed by the State of Washington to perform said tasks.

A preconstruction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of sanitary sewer systems shall be as follows:

A. Stake centerline alignment at a minimum of fifty foot intervals unless otherwise approved by the City.

B. Stake location of all manholes and side sewer laterals for grade and alignment.

C. Stake all property corners.

D. Provide a copy of "cut sheets" to City inspector.

E. Stake finished manhole rim elevation and invert elevations of all pipes in manholes.

5.08 Trench Excavation

A. Clearing and grubbing where required shall be performed within the easement or public right-of-way as permitted by the City and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the owner or contractor in accordance with the terms of all applicable permits.

B. Trenches shall be excavated to the line and depth designated by the City to provide a City approved minimum of cover over the pipe. See Details as applicable. Except for unusual circumstances where approved by the City, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for adequate working space as allowed by the governing agency and in compliance with all safety requirements of the

prevailing agencies. The trench shall be kept free from water until joining is complete. Surface water shall be diverted so as not to enter the trench. The owner shall maintain sufficient pumping equipment on the job to insure that these provisions are carried out.

C. The contractor shall perform all excavation of every description and whatever substance encountered and boulders, rocks, roots and other obstructions shall be entirely removed or cut out to the width of the trench and to a sufficient depth below sewer line grade as shown on the Details. Where materials are removed from below pipe grade, the trench shall be backfilled to grade with material satisfactory to the City and thoroughly compacted.

D. Trenching and shoring operations shall not proceed more than 100 feet in advance of pipe laying without approval of the City, and shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Office of Safety and Health Administration (OSHA) Safety Standard.

E. The bedding course shall be constructed to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to make up the joint.

5.09 Bedding

Gravel backfill for pipe bedding shall be installed in conformance with the Specifications herein, or other approved applicable standards is approved by the City.

Bedding for Sewer Pipe

Bedding for flexible pipe shall be pea gravel.

Gravel backfill for rigid pipe bedding shall consist of crushed, processed, or naturally occurring granular material. It shall be essentially free from various types of wood waste or other extraneous or objectionable materials. It shall have such characteristics of size and shape that it will compact readily and shall meet the following specifications for grading and quality:

Sieve Size	Percent Passing*
3/4" Square	100
3/8" Square	95-100
U.S. No. 8	0-10
U.S. No. 200	0-3
Sand Equivalent	35 MIN.

*All percentages are by weight.

5.10 Backfilling

Backfilling and surface restoration shall closely follow installation of pipe so that not more than 100 feet is left exposed during construction hours without approval of the City. Selected backfill material shall be placed and compacted around and under the sewer pipe by hand tools. Special precautions shall be provided to protect the pipe to a point 12 inches above the crown of the pipe. The remaining backfill shall be compacted to 95 percent of the maximum density in traveled areas and road "prisms", 90 percent outside driveway, roadways, road prism, shoulders, parking or other traveled areas. Where governmental agencies other than the City have jurisdiction over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction. Typically, all utility trenches located perpendicular to roadway sections, roadway "prisms", or beneath traffic bearing areas shall be backfilled with CDF or 5/8-inch minus crushed rock. Due to localized conditions, the City may allow/permit the backfill of the trench section with suitable excavated material, as determined by the City, or if suitable native material is not available from trenching operations, the City may order the placing and compaction of gravel base conforming with Section 9-03.10 of the Standard Specifications (WSDOT) for backfilling the trench. All excess material shall be loaded and hauled to waste.

5.11 Street Patching and Restoration

See Section 6, Street patching and restoration.

5.12 Erosion and Dust Control

The detrimental effects of erosion and sedimentation shall be minimized by conforming with the following general principles:

A. Soil shall be exposed for the shortest possible time.
B. Reducing the velocity and controlling the flow of runoff.
C. Detaining runoff on the site to trap sediment.
D. Releasing runoff safely to downstream areas.

In applying these principles, the Developer and/or Contractor shall provide for erosion and dust control by conducting work in workable units; minimizing the disturbance to cover crop materials; providing mulch and/or temporary cover crops, sprinkling sedimentation basins, and/or diversions in critical areas during construction; controlling and conveying runoff; and establishing permanent vegetation and installing erosion control structures as soon as possible.

1. Trench Mulching

Where there is danger of backfill material being washed away due to steepness of the slope along the direction of the trench, backfill material shall be compacted and held in place by covering the disturbed area with straw and held with a covering of jute matting or wire mesh anchored in place.

2. Cover-Crop Seeding

A cover crop shall be sown in all areas excavated or disturbed during construction that were not paved, landscaped and/or seeded prior to construction. Areas landscaped and/or seeded prior to construction shall be restored to their original or superior condition.

Cover-crop seeding shall follow backfilling operations.

The Developer and/or Contractor shall be responsible for protecting all areas from erosion until the cover crop affords such protection. The cover crop shall be re-seeded if required and additional measures taken to provide protection from erosion until the cover crop is capable of providing protection.

During winter months, the Contractor may postpone seeding, if conditions

are such that the seed will not germinate and grow. The Developer and/or Contractor will not, however, be relieved of the responsibility of protecting all areas until the cover crop has been sown and affords protection from erosion.

The cover crop shall be sown at a rate of 10 to 15 pounds of seed per acre using a hand or power operated mechanical seeder capable of providing a uniform distribution of seed.

5.13 Adjustment Of New And Existing Utility Structures To Grade

This work consists of constructing and/or adjusting all new and existing utility structures encountered on the project to finished grade.

1. Asphalt Concrete Paving Projects

On asphalt concrete paving projects, the manholes shall not be adjusted until the pavement is completed, at which time the center of each manhole lid shall be relocated from references previously established by the Developer and/or Contractor. The pavement shall be cut as further described and base material removed to permit removal of the cover. The manhole shall then be brought to proper grade.

Prior to commencing adjustment, a plywood and visqueen cover as approved by the City Inspector shall be placed over the manhole base and channel to protect them from debris.

The asphalt concrete pavement shall be cut and removed to a neat circle, the diameter of which shall not exceed 48" or 14" from the outside diameter of the ductile iron frame, whichever is smaller. The ductile iron frame shall be brought up to desired grade, which shall conform to surrounding road surface.

Adjustment to desired grade shall be made with the use of concrete or bricks. No cast or ductile iron adjustment rings will be allowed. An approved class or mortar (one part cement to two parts of plaster sand) shall be placed between manhole sections; adjustment rings or bricks and ductile iron frame to completely fill all voids and to provide a watertight seal. No rough or uneven surfaces will be permitted inside or out. Adjustment rings or brick shall be placed and aligned so as to provide vertical sides and vertical alignment of manhole steps and ladder.

Check manhole specifications for minimum and maximum manhole adjustment and step requirements. Special care shall be exercised in all operations in order not to damage the manhole, frames and lids or other existing facilities.

As soon as the street is paved past each manhole, the asphalt concrete mat shall be scored around the location of the manhole, catch basin, meter boxes or valve box. After rolling has been completed and the mat has cooled, it shall be cut along the scored lines. The manholes, catch basins, meter boxes and valve boxes shall then be raised to finished pavement grade and the annular spaces filled with cement concrete to within 1-1/2 inches of the finished grade. The remaining 1-1/2 inches shall be filled with commercial hot mix asphalt to give a smooth finished appearance. See detail in Project Plans.

After pavement is in place, all joints shall be sealed with hot asphalt cement. A sand blanket shall be applied to the surface of the hot asphalt cement binder to help alleviate "tracking".

Asphalt concrete patching shall not be carried out during wet ground conditions or when the ambient air temperature is below 50^{O}F. Asphalt concrete mix shall be at required temperature when placed. Before making the asphalt concrete repair, the edges of the existing asphalt concrete pavement and the outer edge of the casting shall be tack coated with hot asphalt cement. The remaining 2" shall then be filled with commercial hot mix asphalt and compacted with hand tampers and a patching roller.

The completed patch shall match the existing paved surface for texture, density and uniformity of grade. The joint between the patch and the existing pavement shall then be carefully painted with hot asphalt cement or asphalt emulsion and shall be immediately covered with dry paving sand before asphalt cement solidifies. All debris such as asphalt pavement, cement bags, etc., shall be removed and disposed of by the Developer and/or his Contractor.

Prior to acceptance of a project, manholes shall be cleaned of all debris and foreign material. All manhole steps and ladders shall be cleaned free of grout. Any damage occurring to the existing facilities due to the

Developer's and/or Contractor's operations shall be repaired at his/her own expense.

2. Adjustment of Manholes in Easements

Manholes in easement areas shall be adjusted to insure drainage away from the manhole frame and cover. The manhole frame and cover shall be set approximately 0.1 foot above finished grade. Concrete collars shall be set about the structure, as detailed herein, in all non-paved areas.

3. Adjustment of Valve Box Castings

Adjustment of valve box castings (force main valving) shall be made in the same manner as for manholes.

5.14 Finishing And Cleanup

Before acceptance of sewer system construction, all pipes, manholes, catch basins, and other appurtenances shall be cleaned of all debris and foreign material. After all other work on this project is completed and before final acceptance, the entire area, including the roadway, planting, sidewalk areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be cleaned and neatly finished to the lines, grades and cross sections of a new roadway consistent with the original section, and as hereinafter specified.

On sewer construction where all or portions of the construction is in undeveloped areas, the entire area which has been disturbed by the construction shall be shaped so that upon completion the area will present a uniform appearance, blending into the contour of the adjacent properties. All other requirements outlined previously shall be met.

Slopes, sidewalk areas, planting areas and roadway shall be smoothed and finished to the required cross section and grade by means of a grading machine insofar as it is possible to do so without damaging existing improvements, trees and shrubs. Machine dressing shall be supplemented by hand work to meet requirements outlined herein, to the satisfaction of the City Inspector and/or the City Engineer.

Upon completion of the cleaning and dressing, the project shall appear uniform in all respects. All graded areas shall be true to line and grade. Where the existing surface is below sidewalk and curb, the area shall be filled and dressed out to the

walk. Wherever fill material is required in the planting area, the finished grade shall be elevated to allow for final settlement, but nevertheless, the raised surface shall present a uniform appearance.

All rocks in excess of six (6) inches diameter shall be removed from the construction area and shall be disposed of the same as required for other waste material. In no instance shall the rock be thrown onto private property. Overhang on slopes shall be removed and slopes dressed neatly so as to present a uniform, natural, well-sloped surface.

All excavated material at the outer lateral limits of the project shall be removed entirely. Trash of all kinds resulting from clearing and grubbing or grading operations shall be removed and not placed in areas adjacent to the project. Where machine operations have broken down brush and trees beyond the lateral limits of the project, the Developer and/or Contractor shall remove and dispose of same and restore said disturbed areas at his own expense.

Drainage facilities such as inlets, catch basins, culverts, and open ditches shall be cleaned of all debris which is the result of the Developer and/or Contractor's operations.

All pavements and oil mat surfaces, whether new or old, shall be thoroughly cleaned. Existing improvements such as Portland cement concrete curbs, curb and gutters, walls, sidewalks, and other facilities which have been sprayed by the asphalt cement shall be cleaned to the satisfaction of the City Inspector and/or City Engineer.

Castings for manholes, valves, lamp holes, vaults and other similar installations which have been covered with the asphalt material shall be cleaned to the satisfaction of the City.

5.15 Final Acceptance

Prior to final written approval by the City, all pipelines and sewer lines shall be flushed and cleaned and all debris removed. A pipeline "cleaning ball" of the proper diameter for each size of pipe shall be flushed through all pipelines prior to final inspection. All lines shall be inspected for line and grade by checking each section between manholes for alignment. A full circle of light shall be seen by looking through the pipe at a light held in the manhole at the opposite end of the section of sewer line being inspected. Any corrections required in line and grade shall be made at the expense of the Developer and/or Contractor. Final written

approval of construction shall not be given earlier than thirty (30) days after satisfactory completion of construction, as witnessed by the City, and only after the submission and City acceptance of as-built drawings and electronic "as built" files.

5.16 General Guarantee And Warranty

The Developer shall be required, upon completion of the work, and acceptance by the City, to furnish the City a written guarantee covering all material and workmanship for a period of two years after the date of final acceptance and he shall make all necessary repairs during that period at his own expense, if such repairs are necessitated as the result of furnishing, poor materials and/or workmanship. The Developer shall obtain warranties from the contractors, subcontractors and suppliers of material or equipment where such warranties are required, and shall deliver copies to the City upon completion of the work.

Easement documents, if applicable, shall be filed and recorded with the County Auditor's office and the documents reviewed by the City's Engineer and/or Attorney prior to project acceptance.

5.17 Pressure Sewer Systems

A. General

Low pressure grinder pump systems shall only be considered only for exceptional situations. Step systems or septic tank effluent pump systems shall not be allowed. The City shall be the sole judge in determining allowance for same. If allowed, grinder pump systems shall be positive displacement systems such as manufacutured by E-One or equal.

B. Design Standards

The design of systems shall provide for the future expansion of the system to serve tributary areas as determined by the City. Consequently, main extensions shall be extended to far property lines to facilitate future extensions. Mains shall be designed and sized for upstream flows/capacity as well. Easements shall be so granted to the City for this purpose.

New sewer systems shall be designed by methods in conjunction with the basis of per capita flow rates. Methods shall include the use of peaking factors for the contributing area, allowances for future commercial and industrial areas, and

modification of per capita flow rates based on specific data. Documentation of the designs methods used shall be provided along with plans.

C. Material

Pressured sewer lines shall be HDPE (SDR 17). In special circumstances, the City may allow ductile iron AWWA C151 Class 52 or PVC C900 with ductile iron fittings and gasketed joints. All ductile iron pipe and fittings shall be epoxy coated or PE lined and designed for use with corrosive materials. Pipes shall have a minimum 36 inches of cover.

D. Air/Vacuum Valves

Air release valves and air/vacuum valves shall be located at the high points of the line within a standard 48-inch manhole or a comparable sized, approved vault. Air release valves shall be fitted with an activated carbon canister to absorb compounds with disagreeable odors prior to releasing the air to the surrounding area. Grades shall be designed to minimize the need for air/vacuum valves when practical. Valve stations shall be located in public right-of-way.

E. Main Drains

Provisions to drain a pressure system to facilitate repairs or to temporarily remove line from service shall be provided at all low points. This is accomplished through the use of a three valved tee connected to a sump manhole at the low point of the line. A manhole shall also be set over the force main at the valved tee.

F. Thrust Blocking

Location of thrust blocking shall be shown on plans. Thrust block concrete shall be Class 3000 poured against undisturbed earth. Size of block to be designed by Developer's engineer. A plastic barrier shall be placed between all thrust blocks and fittings.

See Standard Detail in water details. Designed and approved restraining joint systems may be allowed in lieu of thrust blocking. Restraining joint brand, type, and size shall be specified on the plans.

G. Line Termination

Hydrogen sulfide odors (H2S) and the buildup of sulfuric acid (H2S04) may occur

in the operation of pressurized lines. To mitigate these conditions, some type of odor control methods shall be used. This may include chemical addition at the pump station and/or the reaeration of the waste water at or near the terminus.

At a minimum, the manhole at the terminus and the first manhole downstream of the terminus shall be coated with Tnemec 120 vinyl ester, Quantum polymorphic resin or approved equal which is resistant to sulfuric acid and hydrogen sulfide.

Design of line termination should provide for a smooth transition between force main (pressure flow) and gravity to reduce turbulence and odors.

H. Pump System

Operation and maintenance of the tank, grinder pump, pump controls, check valves, and line to main sewer line shall be the responsibility of the property owner.

5.18 Sanitary Sewer Lift Stations

A. Objective

Section 5.17 is intended to present information and provide an outline of the **minimum** general standards to be accomplished in planning a sewage lift station installation within the City's service area. Other types of stations may be proposed for consideration, and/or mandated by local conditions as determined by the City Engineer. In general, sewer lift stations are discouraged due to operational and safety issues. Sewage lift stations shall not be allowed where gravity sewer flow is feasible.

The Developer shall submit to the City for review and approval, complete sewage lift station plans and design which provide for the lift station, electrical service/controls and telemetry system, and auxiliary generator/transfer switch together with all accessories for a complete, automatically operating installation.

Design material and drawings shall provide all civil, mechanical and electrical details and align with all applicable codes and regulations, and good engineering practice. The Developer shall be required to acquire all permits and approvals for the installation/construction of this facility as required from regulatory agencies.

The principle components of a sewage lift station installation will be addressed in the remainder of this section.

B. Lift Station

1. Type

The type of sewage lift station to be furnished, supplied, and installed shall be at the City's sole discretion and option. Generally, the station shall be a submersible pump station with an above ground entrance hatch having a steel lockable cover to City standards. Wet well/dry well lift stations will be considered for larger facilities. Construction shall be in compliance with DOE design standards, where applicable.

All submersible lift stations shall have, as a minimum, two non-clog sewage pumps manufactured by Flygt or ABS. The pumps shall have sufficient capacity and capability to efficiently handle the peak design flow with one pump and to insure a minimum velocity of 3 feet per second in the force main. Design calculations and pump curves indicating the same shall be provided with the submittal information.

The pump and motor shafts shall be the maximum diameter available for these units.

Pump motors shall be 3-phase, 60-cycle, and operate at the voltage as supplied by the utility company.

No controls shall be placed in confined space as defined by State regulatory agencies.

The sewage lift station supplier shall check the station during installation to determine if the installation is correct. Written confirmation of each visit and recommendations shall be provided to the City Engineer.

The sewage lift station supplier shall provide four hours of check-out training for City personnel at the station site during start-up.

The sewage lift station supplier shall provide four complete copies of maintenance and operation material to the City Engineer.

The Developer shall demonstrate that no surge problems exist with the station, and if found to exist, that they shall be corrected at the developer's sole expense. The City will mandate minimum improvements to alleviate this condition. The

construction of "surge" tanks is not considered an adequate corrective measure.

All keys, miscellaneous items, and spare parts shall be given to the City prior to approval.

The Developer shall provide an area yard light including electrical for the lift station site.

2. Capacity

The Developer's engineer shall perform a study and make the determination to assure that the lift station installation is sized to serve the overall sewage flows generated within the potential service area. The flow study shall include the Developer's plat boundary area as well as adjacent and future service areas (tributary areas). The service areas shall be the areas within that which could be served by the installation of the lift station(s). The City must review and approve of the developer submitted calculations (to be stamped by developer's engineer), any assumed design parameters, and service area.

The station's design flow capacity shall be based on an average daily per capita flow with related peaking factors and inflow/infiltration allowances.

Documentation of present and future service area flow rates for lift station size and capacity determination shall be provided to the City.

The effects of the minimum flow conditions shall be estimated to be sure that retention of the sewage in the wet well will not create a nuisance and that pumping equipment will not operate too infrequently.

Lift station capacity shall meet the maximum rate of flow expected. The capacity of the receiving sewer shall also match the flow expected. At least two pump units shall be provided at each lift station installation, each capable of handling the expected maximum flow. Design calculations shall be provided regarding detention time at "start-up" and "build out". Odor control facilities as determined by the City may be required.

3. Location

The Developer shall furnish a site layout for the lift station installation.

The sewage lift station shall be located as far as practicable from present or

proposed built-up residential areas, and an asphalt concrete access road shall be provided. Noise control, odor control, and station architectural design shall be taken into consideration. Sites for sewage lift stations shall be of sufficient size for future expansion or addition, if applicable. Lift stations are not allowed within a 100 yr. flood plain.

The limits of the cut and fill areas for the lift station site and access shall be within the easement area and the slope of all embankments shall not exceed 2:1. The method of fill construction, i.e., compaction, etc., shall be noted on the plans. The easement shall be submitted to the City for review prior to construction of the lift station. Lift station sites not located within the plat boundary shall be procured by the developer and deeded to the City.

The water service to the lift station site shall be 1-inch with a 1-inch buried washdown hydrant, together with backflow preventer of the reduced pressure type, both installed near the wet well, including meter box, meter and hose bib and 1-inch heavy-duty rubber hose, 50-foot long with a spray nozzle.

A high galvanized chain link fence with vertical wooden stained redwood slats in-laid for screening, and a combination 12-foot wide gate all with 3 rows of barbed wire enclosing the lift station and generator site shall be provided. The height of the chain link fence shall be determined by the City. The barb wire shall not be installed until separate written approval is provided by City.

4. Wet Well for Submersible Pump Station

The wet well shall be of pre-cast concrete construction with flat slab cover and 30-inch hatch or manhole cover for access. The flat slab concrete cover shall be provided with a 4-inch vent which is "hooked and screened".

The wet well shall provide for the volute of the pumps to be fully submerged and a minimum of 3 minutes between pump cycles at pump capacity. The high water alarm shall be set a minimum of 7 inches below the invert of the lowest gravity sewer inlet pipe, or at an elevation as may be set by the City.

The wet well and the steel lift station shall be located on a common reinforced concrete slab. Protection against buoyancy shall be provided, together with the calculations to verify the same. The wet well chamber shall be provided with polypropylene safety steps as specified for typical precast manhole in accordance with the City's Standard Details.

The suction lines from the wet well to the pumps shall be a minimum of 6-inch inside diameter ductile iron, Class 53.

The force main shall be (unless otherwise specified or approved by the City Engineer) a minimum 4-inch diameter HDPE (SDR 17) and provided with a continual positive slope. There shall be no intermediate high point between the pump station and the force main discharge point (depth shall be a minimum of 4'-0", if at all possible). All pipes (gravity and pressure) entering and leaving the wet pit or dry pit shall have flexible couplings within 18-inches of the structure.

Odor control facilities may be required to be installed by the Developer based on design conditions and/or as required by the City Engineer.

An emergency pump connection shall be located near the wet well. A "pig" launching facility shall also be provided for maintenance of the force main. A "pig" as approved by the City shall also be provided.

C. Electrical Service/Controls & Telemetry System

1. General

Codes and regulations exist at the federal, state, and local level dictating minimum acceptable requirements for electrical systems. The following partial list of codes and regulations shall be used as a basis for design and review.

- National Electric Code (NEC)
- Occupational Safety & Health Act (OSHA)
- State & Local Building Codes
- National Electrical Safety Code (NESC)

Various manufacturers and technical societies publish standards and recommendations. The following partial list of standards and recommendations shall be used as a basis for design and review whenever the project specifications have not made them mandatory.

- National Electrical Manufactures Association (NEMA)
- Underwriters' Laboratory (UL)

- Insulated Power Conductor Engineering Association (IPCEA)
- American National Standards Institute (ANSI)
- Institute of Electrical & Electronic Engineers (IEEE)

2. Electrical Service

The local electric utility will be the primary source of electrical power. The Developer shall ascertain proper coordination between the nominal secondary delivery voltage supplied by the appropriate electric utility and the connection to the lift station equipment. The electrical service shall be 4-wire, 3-phase, 60 hertz, with a solid neutral terminal at the disconnect or as may otherwise be required by local power company; this shall be confirmed with the local power company and confirmed by the suppliers.

The pump motors, generator and transfer switch shall match the utility supplied voltage.

All wire shall be copper.

All conduit shall be galvanized, rigid.

All installation shall be approved by the local power company and shall be in conformance with the N.E.C. (current issue) U.L. 98, O.S.H.A. and County and State electrical codes. The City shall be furnished with a certificate of final inspection by the various regulatory and inspecting agency(ies).

All underground conduits shall be marked with polyethylene tape placed 6-inches below finished grade and directly above the conduit.

All conduit shall have a minimum of 24 inches of cover.

Heating strips shall be provided for outside electrical enclosures.

A service entrance shall be provided with a pedestal on which shall be mounted, as a minimum, the following equipment:

a. Meter and meter can (as required by the electric utility).

b. Meter C.T. (as required by the electric utility).

c. Main disconnect circuit breaker in a N.E.M.A., 3-R, enclosure, with padlock to City standards.

d. A generator transfer switch, sized for the full connected load, in a N.E.M.A. 3-R enclosure, with padlock to City standards.

e. 277/480 Volt circuit, a 5 KVA minimum, 480 to 240/120-volt, single-phase transformer for outside installation with padlock to City Standards.

f. A 240/120-volt panel (12-circuit) in a N.E.M.A. 3-R enclosure with padlock to City standards.

g. A 120-volt duplex in N.E.M.A. 3-R enclosure with padlock to City standards.

h. Ground rod and connector wire in conduit to N.E.C. standards.

i. For mounting electrical equipment, provide two, 6'-0" high (above ground) 4" H.W. steel galvanized pipe support posts with H.W. galvanized *"super strut"* for supporting equipment; for minimum required the length of the pedestal secure to the posts. Post shall be encased in ground 3'-0" with 12-inch diameter concrete encasement. Enclose assembly in 8-inch thick poured-in-place concrete pad (finished surface 3 inches above ground), reinforced with #5 bars at 8 inches wide. Chamfer all concrete edges 3/4-inch.

j. When applicable, as determined by the City, include a galvanized roof structure over electrical enclosures.

k. Provide a 2-inch future conduit from a point 6 inches above the concrete slab as noted above, thence, underground to a point 24 inches from slab. Cap both ends.

l. The electrical design shall incorporate provisions to isolate electrical equipment in classified spaces per NEC requirements and NFPA 820. Compliance methods using vented troughs and above

ground disconnect panels are preferred over below ground seal-off vaults.

Provide electrical single-line diagram showing all components and control between pedestal, lift station and generator with wire and conduit sizes.

The City shall be provided with a complete reproducible set of as-constructed Plans and Details showing final location of all equipment, conduit and wire.

3. Controls

Control and instrument system plans shall thoroughly and completely depict system design. The plans, in conjunction with the specifications, shall define the type of control system, the type of components in the system, set points and the interface between the instrumentation and control system and the lift station system. To accomplish this, the control and instrument plan(s) shall include, as a minimum, the following:

a. control and instrumentation system legend and general notes

b. control, instrumentation and distribution diagram

c. plans showing location of all control, instrument, and distribution system equipment and components, both electrical and pneumatic

d. all equipment and installation details

The power, control and instrumentation systems shall be designed with both operational reliability and maintainability. Use standard products wherever possible.

All components within the lift station system, including both internally and face-mounted instruments and devices, shall be clearly identified with phenolic nameplates of black background with white letters.

All wiring between cabinet, equipment and components shall be marked and multiple color coded where applicable.

All wiring shall be copper.

All pump motors shall have an independent circuit breaker located within the lift

station and the lift station shall have a main circuit breaker located outside the lift station.

The lift station shall be furnished with a wet well gauge in the control panel. The control panel shall be furnished with an A-O-H switch for each pump motor and voltage monitor relays to protect the pump motors from single-phasing, phase reversal and low voltage.

The pump controls shall be based on an ultrasonic level transducer with back-up float controls. The control elevations shall be indicated on the plans, i.e., on-off, first pump on, second pump on, and high water alarm.

The single-phase transformer for the lift station shall be 5 KVA, or as required for proper operation of the single phase side system.

The lift station electrical circuit shall be modified for generator starting and telemetry as required.

Provide check valve limit switches and relays to confirm pump run to telemetry on each pump.

A complete set of spare fuses shall be provided for all fused equipment.

4. Telemetry

The lift station installation shall be installed with a complete telemetry system. This shall include all remote equipment, at the lift station, and all central based equipment to be located at the the City of Kalama, public works shop.

Telemetry shall be shall be compatible with the City's current system and shall send all signals to the City office. The alarm priority shall be: 1) telemetry line failure; 2) normal power failure; 3) water in dry pit; 4) high/low water wet well; and 5) pump failure; 6) generator run. All contacts shall close on alarm. The panel shall be installed within the lift station.

The City will coordinate with the telemetry supplier and further mandate those alarms which the City desires to transmit.

All telemetry equipment shall be installed in a single NEMA 3R metal enclosure with an inner and outer door and shall be padlocked to City Standards. This equipment shall be installed on the electrical service mounting rack.

For ease of serving and maintaining the equipment, all wiring shall be multi-colored and numbered, using solderless pressure connectors.

All major components, including relays, timers, tone transmitters, and receivers, and power supplies shall be identified using phenolic or vilam engraved labels.

A line (surge) protector unit shall be provided for the telemetry equipment. The unit shall protect the equipment from transient and electrical surges on the telephone line. Protection shall include line fuses and clamps for voltages over 25 volts, gas tubes shall be provided as an integral part of the lighting protection unit.

The telemetering between the central based system and the lift station site shall be performed over a voice grade circuit leased to the City from the local telephone company. The telemetry supplier shall coordinate with the City to ensure proper circuits are furnished.

D. Auxiliary Power System

1. General

Emergency power generation equipment shall be provided at the lift station site which will operate the lift station in the event of a commercial power outage.

It is essential that the emergency system be designed with capacity and rating to carry safely the entire connected lift station load.

The auxiliary power unit shall be complete in every respect and shall include, but not be limited to, the following:

1. Generator, control panel & circuit breaker.
2. Engine, radiator & exhaust system.
3. Fuel tank.
4. Generator set enclosure.
5. Automatic transfer switch.
6. Battery & rack.
7. Battery charger.
8. Conduit, wire and piping.

The auxiliary power unit shall be new, factory assembled, tested and as manufactured by Cummins/Onan, or owner approved equal. The generator set

shall be manufactured and installed to all current electrical and other codes and regulations, as required by national, state, county and local agencies having jurisdiction.

Generator shall be capable of automatic starting and maintaining a full load from a cold start.

Generator shall have locking panels to engine and battery compartment. Fuel tank and radiator cap shall be lockable with common key.

Provide mouse proofing where applicable to ground-mounted structures.

2. Power System

Generator, engine and accessories enclosed in metal enclosure with removable panels and sides. Enclosures shall be lockable to City standards.

Generator shall be designed so that the danger of accidents to the operator will be minimized.

Suitable guards shall be provided on all electrical parts to minimize the personal shock hazard.

Generator shall be broken-in sufficiently to permit application of full load immediately upon installation.

Generator supplier shall provide all tools for the generator set as recommended and required by the manufacturer.

Generator installation shall be checked three (3) times by the supplier during construction to determine that the installation is correct. Written confirmation of each visit and recommendations shall be provided to the City.

Generator supplier shall provide two (2) eight (8) hour days of supervision during start-up.

Generator supplier shall provide training for City personnel. This training shall be four (4) hours in length, and shall be conducted at the lift station site.

Generator manufacturer shall provide four (4) copies of a maintenance and operations manual. These manuals shall be complete and shall include all

information necessary to allow City personnel to maintain the generator.

Generator mounting pad shall be reinforced concrete to carry the weight of the unit and shall extend a minimum of 3 inches beyond generator housing. Chamfer all edges 3/4-inch.

Propane tank support pad shall be as above.

Provide a roof structure over generator. The structure shall be designed by the Developer's engineer and subject to the City's approval. It shall be designed to protect the generator and City personnel from inclement weather, to be utilized as a noise barrier, and be aesthetically pleasing to the surrounding area.

a. Engine

(Shall be provided with/have):

Unless otherwise approved by the City Engineer, the engine shall be diesel fueled. Fuel tank shall be above-ground. Capacity shall be 24 hours when full + 100% reserve.

Fuel system shall be provided with an electrical shut-off valve with flexible connection to the generator. The generator set shall be manufacturer in compliance with the following codes, regulations and standards; N.E.M.A., I.E.E., A.N.S.I., N.E.C. and O.S.H.A.

Generator recovery after acceptance of 100% rated load in one step shall be 1 second.

Cooling shall be by radiator, provided with anti-freeze protected to -45^{O}F and with corrosion protection. Provide block heater. Radiator cover shall have padlock hasp and padlock to City standards.

Lubrication shall be full circulation pressure type, with replaceable filter with bypass.

Engine governor shall be gear-type mechanical.

Engine air filter shall be replaceable type.
Generator unit shall be furnished with vibration mounts.

Electrical fuel shut-off and flex-connections to engine.

Engine oil drain extension.

Stainless steel flexible exhaust connector and hospital (critical) rated muffler with condensation and rain collector including insulation.

Skid base with vibration isolators between base and concrete pad; secure to concrete per manufacturer's specifications.

High amperage industrial rated batteries and cables.

Battery charger capable of recharging battery in 4 hours from complete discharge.

Engine shall be 1,800 rpm, 4-cycle.

b. Generator

(Shall be provided with/have):

Designed and manufactured in accordance with N.E.M.A., I.E.E., and A.N.S.I. standards for temperature rise and all applicable electrical codes.

Revolving field, dynamically balanced, static excited, static regulated, 12-lead.

Upon application of rated continuous load, in one step, voltage dip shall be less than 25 percent or less with recovery to normal voltage in less than one second, measured with a light beam oscillograph.

Voltage regulation, solid state, within $\pm$ 1 percent.

Frequency regulation within 3-hertz.

Radio suppression.

Self-ventilated, drip-proof construction.

Brushless, fast response, amortisseur rotor winding, Class "B" and "F" fungus resistant. Coils and stator mechanically and epoxy braided.

Winding heaters shall be provided (120-volt).

Shock mounted.

Pump lockout circuit when generator is running.

Low coolant level alarm shall shut down unit if coolant lever is low.

Generator shall be 3-phase, 60-cycle and shall match the supply voltage of the utility distribution system.

c. Control Panel

(Shall be provided with/have):

Three position selector switch (off, test, automatic), which shall include a red flashing indicator light which lights in the off position.

Manual start-stop switch for testing without interrupting normal source.

Contact for an alarm and report system (6 contacts) N.O./N.C.

Cranking reset button.

Over-cranking protection shall open cranking circuit after 30-90 seconds of cranking (adjustable).

Cranking cycler with four attempts of 15 seconds each and 10 second rest periods between attempts.

Line circuit breaker rated at full generator capacity.

AC volt meter with switch for each phase.

AC ammeter with switch for each phase.

Current transformers.

Frequency meter.

Running time meter (99,999.9 hours capacity)

Panel light.

Oil pressure gauge.

Water temperature gauge.

Voltage adjusting reostat.

Alarm indication panel with shut-off control; 1) over-speed; 2) over-crank; 3) high temperature; 4) low oil pressure; 5) low coolant level.

All contacts shall close on alarm.

All alarm sensors and instruments shall be protected by individual push-type reset circuit breakers.

Generator load meter (to measure true load on generator) in kW.

Panel to be N.E.M.A. 12 construction.

3. Transfer Switch

The transfer switch shall be sized, for 125% of the full connected load of the lift station generator and auxiliary equipment. The transfer switch shall be enclosed in a N.E.M.A. 3-R cabinet with padlock to City standards and mounted on the entrance pedestal.

Shall be U.L., 1008 and C.S.A. approved.

Shall protect all types of loads, inductive and resistive.

Shall be rated, 3-phase, 60-cycle, 3-pole, 4-wire with neutral lug and match the commercially supplied system voltage.

Shall be rated for all classes of loads without de-rating, either open or closed.

Shall automatically start generator and then transfer load upon failure of normal power and return upon restoration of normal power.

The automatic transfer panel shall have solid state, close-differential, field-adjustable, voltage-sensing relays, nominally set at 95 percent drop-out and 98 percent pick-up, both modes: emergency to normal and normal to emergency.

Interrupting and withstand capacity, measured symmetrical of breakers shall be as follows:

40, 70, 100 amp =	14,000 amps
150, 260 amp =	30,000 amps
400,600 amp =	65,000 amps
800,1000 amp =	65,000 amps

The automatic transfer switch shall obtain current from the source to which the load is being transferred.

Panel shall be front opening.

All equipment listed shall be mounted directly in the automatic transfer panel lockable cabinet.

All equipment shall be accessible from the front of the cabinet for ease of maintenance or removal.

All pilot devices and/or relays shall be industrial type rated 10-amperes with self-cleaning contacts.

Components of the operation mechanism shall be insulated or electrically dead.

The transfer mechanism shall be energized only momentarily during transfer.

Components of linkages and handles of operating mechanism shall be ruggedly constructed and not subject to deterioration.

Time Delay - transfer from normal power source to standby generator set, shall be delayed in order to override momentary power fluctuations or outages. Adjustable, 0 to 50 seconds.

Time Delay - emergency to normal transfer shall be delayed after normal power resumes to permit stabilization of the normal power source prior to transfer. Adjustable, 30 seconds to 30 minutes.

Time Delay for Engine Cool-Off - a time delay shall allow the engine to run, unloaded for a period of not less than two minutes after power has been transferred back to the normal source. The time delay shall be adjustable from a minimum period of 60 seconds to 15 minutes.

Protection for under-voltage, over-voltage, phase reversal, single-phasing, unbalanced operating voltage; both modes - emergency to normal and normal to emergency.

Auxiliary Contacts - a minimum of six (6) pairs of auxiliary contacts shall be provided in the transfer switch panel, complete with switches to prevent chosen circuits from operating during periods of normal power outage. The contacts shall be cartridge type convertible from normally closed to normally open.

Time delay at the neutral position - when transferring from normal power to generator power and from generator power to normal power. Time delay shall be adjustable from 0.2 to 50 seconds.

5.19 Sewer System Construction Details

See details located towards the back of these Standards.

SECTION 6
STREET

SECTION 6

6. STREET & ASPHALT CONCRETE PATHS AND/OR BIKEWAYS STANDARDS

6.01 General

The overall goal of this chapter is to encourage the uniform development of an integrated, fully accessible public transportation system that will facilitate present and future travel demand with minimal environmental impact to the community as a whole.

Development of properties on or tributary to substandard or unsafe (safety issues) roadways may, depending on the size and type of development, be cause for "off-site" improvements to the substandard or unsafe corridors, to include road drainage facilities. The City Engineer shall determine when and if such conditions exist. At a minimum "half street improvements" will be required as a condition of development in and along the entire property as it abuts City rights-of-way.

This chapter provides *minimum* street design standards as well as minimum design standards for "stand alone" pedestrian and/or bike trails/paths. Higher design and construction standards may be warranted due to localized design and construction parameters, and, impacts caused to the existing system.

6.02 Streets

A. General

All street design must provide for the maximum traffic loading and capacity conditions anticipated. The width and grade of the pavement must conform to specific standards set forth herein for safety and uniformity.

B. Design Standards

The design of streets and roads shall depend upon their type and usage. The design elements of streets shall conform to City standards as set forth herein.

The layout of streets shall provide for the continuation of existing arterial streets in adjoining subdivisions or of their proper projection when adjoining property is not subdivided. Local access streets, which serve primarily to provide access to abutting property, shall be designed to discourage through traffic. See the table of the Minimum Street Design Standards.

1. Grade. Street profile grade should conform closely to the natural contour of the land. In some cases, a different grade may be required by the City Engineer. Unless otherwise approved by the City, the minimum profile grade shall be 0.7 percent. Local conditions may, in the opinion of the City's Engineer, require a lesser profile grade in which case (if specifically approved by the Public Works Superintendent), the minimum allowable profile grade shall be 0.5 percent. The maximum allowable grade shall be fifteen (15%) percent, depending upon the street classification, unless otherwise approved in writing by the City.

2. Width. The pavement and right-of-way width depend upon the street classification. The table of Minimum Street Design Standards show the minimum widths allowed.

   Street widths shall be measured from face of vertical curb to face of vertical curb on streets with cement concrete curb and gutter, and from centerline of gutter to centerline of gutter or streets without concrete vertical curb and gutter. Vertical concrete curb is the typical City Standard.

3. The developer is required to retain a licensed soils engineer to make soils tests and to provide engineering recommendations for design of the sub-base and roadway sections based on "in place" soils, depth of "free draining" structural materials, projected pavement loadings, roadway classification, average daily traffic volume, etc.

4. In special circumstances, as may be specifically approved/required by the City Planning Commission and/or City Council, due to local conditions and/or geometric restrictions, paving widths or improvement standards may be required which are different than those specifically listed herein.

5. There shall be no islands in the center of any cul-de-sac without specific City council approval.

6. The location and alignment of streets shall generally conform to existing streets and to the City's official street naming policy or ordinance except where, in the opinion of the City Engineer, topography or some physical features eliminate the possibility of connecting these streets in the future. The City Council shall approve all street names after consultation with the Cowlitz County Emergency Services.

7. Streets and lots shall be placed in relationship to natural topography so that grading and filling and/or other alternations of existing conditions is minimized. Reserve strips or street plugs controlling access to streets will not be approved unless, in the judgment of the City Engineer, such is necessary for the

protection of the public welfare or substantial property rights, and in such cases they will be required. The control and disposal of the land comprising such strips or plugs shall be placed within the jurisdiction of the City.

8. If, in the opinion of the City Engineer, it is necessary to give access to, or permit future subdivision of adjoining land, streets shall be extended to the boundary of the subdivision and the resulting dead-end street shall be provided with a temporary cul-de-sac. The cul-de-sac shall be paved, with curbs, gutters and sidewalks and constructed to City standards.

9. Half streets shall be prohibited except when approved by the City and Fire Marshall's office.

10. The street system (in residential subdivisions and short subdivisions) shall be laid out with a minimum number of intersections with other arterial streets at intersections closer than one thousand three hundred twenty feet and no streets shall intersect at intervals closer than one hundred twenty five feet, unless, in the judgment of the City Engineer, an exception to this rule would be in the public interest and welfare.

11. Streets shall be laid out so as to intersect as nearly as possible at right angles, and in any event, no street shall intersect with any other street at an angle of less than sixty degrees, without specific written City approval.

12. Street jogs with centerline offsets less than one hundred twenty-five feet are prohibited.

13. Intersecting streets shall be laid out so that blocks between street lines are not more than one thousand three hundred twenty feet in length, except where in the opinion of the City Engineer, extraordinary conditions justify a departure from the maximum.

14. Streets shall conform to all requirements of the latest edition of the International Fire Code adopted by the City.

15. All street construction plans shall be submitted to the City and shall include the following required information:

    - Plan and profile;
    - Street name;
    - Centerline bearings;
    - Centerline/baseline stationing;
    - Centerline elevations every fifty feet;
    - Gutterline elevations every fifty feet if not standard crown;
    - Slope shall be in percent;

- Transverse slope: Two percent standard crown (to be used unless approved/required by City;
- Longitudinal slope - see design standard table;
- Horizontal and vertical curves shall be required when a change of centerline grade occurs greater than one percent:
  a. Fifty feet minimum length;
  b. Elevations required at twenty five feet stations and at the P.C., P.I., P.T. and low point or high point;
- Longitudinal gutterline slope - see design standard table;
- Pavement cross sections per City standard detail;
- Accurate locations of monuments at all centerline intersections, cul-de-sacs, P.C.'s, P.T.'s, and P.R.C's;
- Length and width of sidewalks and driveways;
- The location of all existing fire hydrant within 300 feet of the project shall be indicated;
- Curb and gutter;
- Wheelchair ramps;
- Illumination. (Illumination not required to be shown on same street as on plan/profile, but approval at location of miscellaneous utilities (i.e., gas, power, CATV, cable) as required. Plan shall be submitted to City Engineer for approval prior to installation.)
  a. Luminaries - location, material, height and wattage.
  b. Service cabinet - location and material.
  c. Conduits and wire - location, material size and depth.
  d. Junction boxes - location and material;

- Channelization and Signing:
  a. Lane markers - location and type.
  b. Pavement markings - location and type.
  c. Signs - location and type.

Dead end/cul-de-sacs shall terminate in a circular turnaround having minimum pavement radius of fifty (50) feet.
Grades (slopes).

a. Arterials, 15% percent.
b. Allow an average maximum grade on all other streets as follows: 15% percent maximum c. Grades of pedestrian ways or crosswalks shall not be more than eight percent (unless otherwise approached in writing by the City Engineer).
d. All vertically aligned profile grade changes shall be connected with a vertical curve which shall have a minimum sight distance of one thousand feet on arterials, five hundred feet on collector streets and three hundred feet on all other streets.

At street intersections, property line corners shall be rounded by an arc, the minimum radii of which shall be twenty feet. In business districts, a chord may be substituted for such arc if specifically approved by the City Engineer.

Street intersections with centerline offsets of less than two hundred feet shall not be allowed.

Cul-de-sacs are required for roads longer than one hundred fifty feet but they cannot exceed four hundred (400) feet in length without a variance. Residential cul-de-sacs shall not have a right-of-way radius less than fifty feet. Industrial cul-de-sacs shall have a paved section not less than seventy-five feet;

All public streets, sidewalks and alleys shall conform to one of the herein referenced minimum construction standards and shall be adjusted as necessary to match existing facilities, serve the proposed development, and meet the needs of anticipated future development;

All topsoil and unsuitable soils shall be removed from below the proposed street between the back of sidewalks.

16. In addition to the above requirements, street design shall incorporate the following minimum requirements:

a. Cul-de-sacs for residential and rural streets shall be four hundred (400) feet maximum in length without a variance, and constructed with a fifty (50) foot minimum radius of pavement at the bulb. Right-of-way at the cul-de-sac bulb shall be sixty (60) feet minimum in radius. All other requirements shall be in accordance with the applicable street standards. No island shall be allowed unless approved by City Engineer and fire chief;

c. **All new utility systems such as power, gas, cable TV and telephone shall be buried,** except where topography or site conditions prohibit reasonable installation. Design and installation of the system shall be done by the franchised utility company. Design shall be submitted to the City Engineer for review and approval prior to installation;

e. **Any project of sixteen dwelling units or more, accessing off of an arterial road must evaluate the need for a center turn lane and right hand turn lanes;**

f. Roads are to be saw cut before permanent patch is made or new AC pavement is tied into existing road;

g. To facilitate future development within the city, streets and rights-of-way shall be planned to give access to or

permit the future subdivision of adjoining land. Streets shall be extended to the boundary of the future subdivisions or adjoining land and the resulting dead end street shall be either barricaded pursuant to WSDOT standards or provided with a temporary or permanent cul-de-sac. The cul-de-sac shall be paved. The inclusion of the curbs, gutters and sidewalks in the cul-de-sac may be required depending upon whether the cul-de-sac should be a permanent street feature of whether it would be eliminated by future street extensions. In designing streets, existing development, proposed development and possible future development shall all be considered in the recommendation of right-of-way widths, street widths, paving sections, sidewalks and other applicable standards;

h. If, in the opinion of the City Engineer, it is necessary to give access to, or permit future subdivision of adjoining land, streets shall be extended to the boundary of the subdivision and the resulting dead end street shall be provided with a temporary cul-de-sac. The cul-de-sac shall be paved, with curbs, gutter and sidewalks constructed to City standards;

i. The street system (in residential subdivisions and short subdivisions) shall be laid out with a minimum number of intersections with arterial streets. Arterial streets shall not intersect with other arterials streets at intervals closer than one thousand three hundred twenty feet and no streets shall intersect at intervals closer than one hundred twenty-five feet, unless, in the judgment of the City engineer, an exception to this rule would be in the public interest and welfare;

j. Streets shall be laid out so as to intersect as nearly as possible at right angles, and in any event, no street shall intersect with any other street at an angle of less than sixty degrees.

17. The General Notes numbered 1 through 6, as shown and further referenced herein, shall be included or referenced on any plans submitted to the City for construction approval dealing with street design.

GENERAL NOTES (STREET CONSTRUCTION)

1. All workmanship and materials shall be in accordance with current City of Kalama Standards and current amendments thereto and the 2012 State of Washington Standard Specifications for Road, Bridge, and Municipal Construction, and any current amendments thereto, amended as per City Standards.

2. The contractor shall be responsible for all traffic control in accordance with the MUTCD manual. Prior to disruption of

any traffic, traffic control plans shall be prepared and submitted to the City for possible approval. No work shall commence until all approved traffic control is in place. Work shall cease when traffic control fails to meet minimum requirements.

3. All curb and gutter, street grades, sidewalk grades, and any other vertical and/or horizontal alignment shall be staked by an engineering or surveying firm capable of performing such work. Such firms shall be currently licensed in the State of Washington to perform such work.

4. Where new asphalt joins existing, the existing asphalt shall be cut to a neat vertical edge and tacked with Asphalt Emulsion in accordance with the standard specifications. The new asphalt shall be feathered back over existing to provide for a seal at the saw cut location and the joint sealed with paving asphalt. A sand blanket shall be applied to the surface to minimize "tracking" of same.

5. Compaction of subgrade, rock, and asphalt shall be in accordance with the WSDOT Standard Specifications.

6. Form and subgrade inspection by the City is required before pouring concrete. A minimum forty-eight hours notice is required to be provided to the Public Works Superintendent for form inspection.

7. See City of Kalama Standards for testing and sampling frequencies.

6.03 Functional Classification

City streets are divided into major (or principal) arterial, minor (or secondary) arterial, collector, local access, minor access, and half street in accordance with regional transportation needs and the functional use each serves. Function is the controlling element for classification and shall govern right-of-way, road width, and road geometrics. The proponent/developer shall request information on the functional classification of existing streets from the Public Works Superintendent. New streets will be classified by the City.

Generally speaking, the functional classification of streets are defined as follows:

- Major arterials are defined as streets connecting two or more arterials together or serving industrial areas.
- Collector streets are defined as streets currently serving or anticipated to serve more than sixty four (64) dwelling units or connecting to an arterial.
- Local access streets currently serving or anticipated to serve in the future sixteen (16) and sixty four (64) dwelling units.

- Minor access streets are residential only streets which will serve fifteen (15) dwelling units or less and/or terminate in non-extendable cul-de-sacs.
- Half streets are those streets with a high probability that lots or dwelling units will be proposed for the opposite side of the street eventually resulting in a full street width.
- Alley is defined as a strip of land dedicated for public use which is less than twenty one feet in width between property lines and which is intended to provide driveway access to adjacent properties.

MINIMUM STREET DESIGN STANDARDS

Design Standard	Major Arterial	Minor Arterial	Collector	Local Access	Minor Access	Half Streets
Minimum Right-of-Way	60 to 100 feet w/ 10' easements (both sides) for future widening on 60' widths	60 to 100 feet w/ 10' easements (both sides) for future widening on 60' widths	60 to 100 feet w/ 5' easements on both sides for future development	50 min. w/ 5' easements both sides for future development	45' min. w/ 5' easements both sides for future development	50' min. w/ 5' easements both sides for future development
Minimum Pavement Width	48'	40'	40' (Note 2)	32' (Note 3)	32' (Note 3)	28' to 30'
Parking Lane	None	Both sides	Both sides	One Side	One Side	None
Minimum/Maximum Grade(Note 1)	0.7%-15%	0.7%-15%	0.7%-15%	0.7%-15%	0.7%-15%	0.7%-15%
Curb	Cement Concrete Curb & Gutter Both Sides	Cement Concrete Curb & Gutter Both Sides	Cement Concrete Curb & Gutter Both Sides	Cement Concrete Curb & Gutter Both Sides	Cement Concrete Curb & Gutter Both Sides	Cement Concrete Curb & Gutter On One Side
Sidewalks	Both Sides: See Detail (Note 4)	Both Sides: See Detail (Note 4)	Both Sides: See Detail	Both Sides See Detail	Both Sides: See Detail	One Side See Detail
Cul-De-Sac Radius (pavement width)	N/A	N/A	N/A	50' paved radius (residential)	N/A	N/A
Intersection Curb Radius	30'	30'	30'	25'	15'	25'
Design Speed (MPH)	25	25	25	25	15	15
Minimum Centerline Radius for Normal Crown	460'	460'	460'	200'	As Approved	As Approved
Stopping Site Distance	250'	250'	250'	160'	As Approved	As Approved

NOTES:

1. Maximum grade may be exceeded for short distances of 300 feet or less upon showing that no practical alternative exists. Exceptions which exceed 15% will require approval by the Fire Marshall. Additional fire protection requirements may be required. Grades exceeding 15% shall be portland cement concrete (Class 4000) minimum 7-inches thick with heavy broom finish perpendicular to road grade. Local conditions or roadway classification may require additional concrete thickness or reinforcement.
2. Pavement width may be reduced on approval of Planning Commission and City Council in areas where parking lanes are not necessary or desirable or where topographic constraints limit available roadway width.
3. Pavement width may be reduced to 28 feet on approval of Planning Commission and City Council in areas where topographic constraints limit available roadway width.
4. Commercial areas may require up to 10' widths at the discretion of the planning commission.

6.04 Street Names

The Cowlitz County Emergency Services shall insure that the name assigned to a new street is consistent with policies of the City.

An address number will be assigned to all new buildings at the time the building permit is issued. It is then the owner's responsibility to see that the house numbers are placed clearly and visibly at the main entrance to the property or at the principal place of ingress.

6.05 Signing

The developer is responsible for providing all traffic control signs. Traffic control signing shall comply with the provisions as established by the U.S. Department of Transportation Manual on Uniform Traffic Control devices (MUTCD).

Street designation signs, including poles and hardware, will be paid for by the developer. Street designation signs shall display street names or grid numbers as applicable. The City shall identify locations, numbers, size and type of street signs.

6.06 Right-of-Way

Right-of-way is determined by the functional classification of a street. Arterials shall have a right-of-way of not less than 60 feet. Collectors and local access streets shall have a right-of-way of not less than 50 feet. Local access cul-de-sacs streets shall have a right-of-way of not less than 50 feet. Minor access streets shall have a right-of-way of not less than 50 feet. See Minimum Street Design Standards Table for specific additional information. See "Minimum Street Design Standard Table" for radius requirements at cul-de-sac "bulb".

Additional roadside easements will be required to facilitate future roadway widening at the discretion of the City.

Right-of-way requirements may be increased if additional lanes, pockets, transit lanes, bus loading zones, operational speed, bike lanes, utilities, schools or other factors are proposed and/or required by the City.

Right-of-way shall be conveyed to the City on a recorded plat or by a right-of-way dedication deed. All costs of same to be borne by the property owner/developer.

6.07 Street Frontage Improvements

A. All commercial and residential development, plats, and short plats shall install street frontage improvements at the time of construction as required by the City. Such improvements may

include curb and gutter, sidewalk, street storm drainage, street lighting system, utility relocation, landscaping and irrigation, and street widening all per these Standards. Plans shall be prepared and signed by a licensed civil engineer currently registered in the State of Washington.

B. All frontage improvements shall be made across full frontage of property from centerline to right-of-way line.

C. Exceptions. When the Public Works Superintendent deems that the above such improvements cannot be accomplished at the time of building construction, a recorded agreement on forms provided by the City shall be completed which provide for these improvements to be installed at a later date by the applicant or by the applicant's signing of a waiver of protest in a Local Improvement District (L.I.D.), or Utility Local Improvement District (U.L.I.D.).

6.08 Cul-de-sac

Streets designed to have one end permanently closed shall be no longer than 400 feet. At the closed end, there shall be a widened "bulb" having a minimum paved traveled radius as shown in the Minimum Street Design Standards Table.

6.09 Temporary Dead Ends

Where a street is *temporarily* dead ended, turn around provisions must be provided where the road serves more than one lot. If pre-approved by the local fire marshall and the City the turn around may be a hammerhead with a minimum inside turning radius of 35 feet and a minimum distance on both sides at the centerline intersection of 60 feet to facilitate emergency vehicle turn-around.

6.10 Intersections

A. Traffic control will be as specified in the Manual on Uniform Traffic Control Devices (MUTCD) or as may be specifically modified by the City Public Works Superintendent as a result of appropriate traffic engineering studies.

B. Street intersections shall be laid out so as to intersect as nearly as possible at right angles. Sharp angled intersections shall be avoided. For reasons of traffic safety, a "T" intersection (three-legged) is preferable to the crossroad (four-legged) intersection for local access streets. For safe design, the following types of intersection features should be avoided:

1. Intersections with more than four intersecting streets;

2. "Y" type intersections where streets meet at acute angles;

3. Intersections adjacent to bridges and other sight obstructions.

C. Spacing between adjacent intersecting streets, whether crossing or "T" should be as follows:

When highest classification involved is:	Minimum centerline offset should be:
Major Arterial	350 feet
Minor Arterial	300 feet
Collector	300 feet
Local Access	150 feet

When different class streets intersect, the higher standard shall apply on curb radii. Deviations to this may be allowed at the direction of the City Engineer.

D. On sloping approaches at an intersection, landings shall be provided with grade not to exceed one foot difference in elevation for a distance of 30 feet approaching any arterial or collector or 20 feet approaching a local access street, measured from nearest right-of-way line (extended) of intersecting street.

6.11 Driveways

1. Driveway details are located at the end of these Standards.

2. All abandoned driveway areas on the same frontage shall be removed and the curbing and sidewalk or shoulder and ditch section shall be properly restored, at the Property Owner's expense.

3. Unless otherwise approved by the Public Works Superintendent, all driveway aprons shall be constructed of Portland Concrete Cement, and shall be at least 6-inches thick, over a 4-inch crushed surfacing (5/8" minus) top course. All driveways shall be constructed of Portland Concrete Cement and shall be at least 4-inches thick, over a 4-inch crushed surface (5/8" minus) top course. Driveways shall be subject to the same testing and inspection requirements as curb, gutter, and sidewalk construction.

4. Joint-use driveways serving two adjacent parcels shall be considered and may be built on their common boundary upon formal written agreement by both property owners **and** approval of the City. The agreement shall be a recorded easement for both parcels of land specifying joint usage.

5. Grade breaks, including the tie to the roadway, shall be constructed as smooth vertical curves. The maximum change in driveway grade shall be 8 percent within any 10 feet of distance on a crest and 12 percent within any 10 feet of distance in a sag vertical curve. The grades of all driveway approaches are to be approved by the City.

6. No commercial driveway shall be approved where backing onto the sidewalk or street will occur.

7. No driveway aprons shall extend into the street further than the face of the curb.

8. The angle between any driveway and the street shall be not less than 45°.

9. The two edges of each driveway shall be parallel.

10. Every driveway must provide access to a garage, carport, parking apron or other structure on private property requiring the entrance of vehicles. No public curb shall be cut unless a driveway is installed.

11. Maintenance of driveway approaches shall be the responsibility of the owners whose property they serve.

12. A driveway permit shall be required. No person shall begin work on the construction, alteration, repair or removal of any driveway or the paving of any parking strip on and/or adjacent to any street, alley or other public place in the City without first obtaining a permit from the City. Exceptions to permit acquisition requirements may be granted at the discretion of the Public Works Superintendent and/or Building Official.

13. Driveway Location:

    No driveway shall be located as to create a hazard to pedestrians, bicyclists or motorists or to invite or compel illegal or unsafe traffic movements.

14. No driveway shall be constructed in such a manner as to be a hazard to any existing street lighting standard, utility pole, traffic regulating device or fire hydrant. The cost of relocating any such street structure when necessary to do so shall be paid by the abutting property owner. The relocation of any street structure shall be allowed with the specific written approval of the Owner of the structure involved.

15. Driveway approach to City streets to be paved, unless otherwise approved by the Public Works Superintendent.

16. Driveway Size and Number:

    a. Except as otherwise provided, the width of any residential driveway shall not exceed twenty-four feet (exclusive of the radii of the returns). The maximum width for any commercial driveway shall be sixty feet. The City Engineer may authorize additional residential driveway widths for three-car garages or for access driveways necessary for off-street parking or recreational vehicles.
    b. The width of any driveway shall not be less than twelve feet, exclusive of the radii of the returns.
    c. The total width of all driveways for any one ownership on a street shall not exceed thirty percent of that ownership along the street. Any driveway which has become abandoned or unused through a change of the conditions for which it was originally intended or which for any other reason has become unnecessary, shall be closed and the owner shall replace any such driveway curb-cut with a standard curb according to the City's standards.
    d. The length of any driveway shall not exceed one hundred fifty feet, unless approved by the Public Works Superintendent.
    e. There shall not be more than two driveways on one street for any one ownership except where a single ownership is developed into more than one unit of operation, each sufficient in itself to meet the requirements of off-street parking and loading as required by the zoning ordinance and where the necessity for separate access to the street is evident. In such cases, there shall not be more than two driveways on the street for any one unit of operation.

17. Driveway Slopes:

    Driveway slopes or grades shall not exceed fifteen (15%) percent unless otherwise authorized/approved by the City Engineer in writing. The City Engineer will consider authorizing driveway slopes exceeding fifteen percent, if it is determined that:

    a. The steeper driveway is the only reasonably economical and environmentally reasonable alternative.
    b. The driveway will not present a traffic, pedestrian, bicycle or safety hazard.
    c. The police and fire chief concur in allowing the increased driveway slope.

d. The public health, safety and general welfare will not be adversely affected.

e. No driveway may access an arterial streets within 75 feet (measured along the arterial) of any other such arterial street access on either side of the street; provided, that such access may be located directly opposite another access.

f. No driveway access shall be allowed onto an arterial street within 150 feet of the nearest right-of-way line of an intersecting street. No driveway shall be located within 20 feet of a crosswalk.

g. Within the limitations set forth above, access to arterial streets within the City shall be limited to one driveway for each tract of property separately owned, except that automobile service stations may be allowed two driveways as further stated herein.

h. Driveways giving direct access onto arterials may be denied if alternate access is available. Deviations of these standards may be permitted by the City Engineer.

i. In general, residential and commercial driveways, except automobile service stations, shall not exceed the following maximum widths:

PRIVATE OR COMMERCIAL DRIVEWAYS
(EXCEPT AUTOMOBILE SERVICE STATIONS)

PROPERTY FRONTAGE	MAXIMUM DRIVEWAY WIDTH
<16'	8'
16' to 30'	8' or 30% of frontage
>30' to 50'	12' or 30% of frontage
>50' to 75'	22'
>75' to 100'	24'

In general, service station driveways shall not exceed the following maximum widths.

AUTOMOBILE SERVICE STATIONS

PROPERTY FRONTAGE	MAXIMUM NUMBER OF DRIVEWAYS	MAXIMUM DRIVEWAY WIDTH
<16'	1	8'
16' to 30'	1	50% of frontage
>30' to 50'	1	22'
>50' to 75'	1	26'
	or 2	18'
>75' - 1,000'	1	30'
	or 2	22'

j. A road approach or wider driveway width may be approved by the City Engineer where a substantial percentage of oversized vehicle traffic exists, where divisional islands are required/desired, or where multiple exit or entrance lanes are needed.

k. Parking lot circulation and signing needs shall be met on site. The public right-of-way shall not be utilized as part of a parking lot flow.

l. Road approaches and/or ingress and egress tapers may be required in industrial and commercially zoned areas as directed by the City Engineer.

6.12 Sight Obstruction

The following sight clearance requirements take into account the proportional relationship between speed and stopping distance.

The sight distance area is a clear-view triangle formed on all intersections by extending two lines of specified length (A) and (B) as shown below from the center of the intersecting streets along the centerlines of both streets and connecting those endpoints to form the hypotenuse of the triangle. See detail at the end of these Standards. The area within the triangle shall be subject to restrictions to maintain a clear view on the intersection approaches.

Sight Distance Triangle:

Stop or Yield Controlled Intersection:

Speed Limit	Major Street	Sight Distance (Ft.) (A) (B) Minor Street
20 mph	200	*
25 mph	250	*
30 mph	300	*
35 mph	350	*
40 mph	400	*

* Sight distance measured from a point on the minor road 15 feet from the edge (extended) of the major road pavement and measured from a height of eye at 3.50 feet on the minor road to height of object at 4.25 feet on the major road.

Uncontrolled Intersection:

Speed Limit	Major Street	Sight Distance (Ft.) (A) (B) Minor Street
20 mph	90	90
25 mph	110	110
30 mph	130	130
35 mph	155	155
40 mph	180	180

A. The vertical clearance area within the sight distance triangle shall be free from obstructions to a motor vehicle operator's view between a height of 3 feet and 10 feet above the existing surface of the street.

B. Exclusions. Sight obstructions that may be excluded from these requirements include: fences in conformance with this chapter, utility poles, regulatory signs, trees trimmed from the base to a height of 10 feet above the street, places where the contour of the ground is such that there can be no cross visibility at the intersection, saplings or plant species of open growth habits and not in the form of a hedge which are so planted and trimmed as to leave at all seasons a clear and unobstructed cross view, buildings constructed in conformance with the provisions of appropriate zoning regulations and preexisting buildings.

6.13 Subgrade Preparation

The subgrade area of the street right-of-way shall be cleared of brush,

weeds, vegetation, grass and debris, per Section 2-01 of the aforementioned Washington State Standard Specifications. All cleared and grubbed material shall be satisfactorily disposed of. All depressions, or ruts, which contain water will be drained.

The subgrade shall then be bladed and dragged to remove inequalities and secure a uniform surface. The existing subgrade will be compacted to a minimum density as defined in the Washington State Standard Specifications and as witnessed by the City Inspector. Compaction tests may be required to be conducted at the discretion of the City to verify same.

6.14 Crushed Surfacing (Base and Top Course)

Surfacing shall consist of the construction of two or more courses of crushed stone upon an existing roadway surface, or upon a subgrade properly prepared as outlined above. Crushed surfacing material shall be uniform in quality and substantially free from wood, roots, bark and other extraneous material. It will compact into a dense and unyielding mass which will be true to line, grade and cross-section. It shall meet the following test requirements:

Los Angeles Wear, 500 Rev. (ASTM Designation C 131) 35% Max.
Grading Requirement (% by weight)

Percent Passing	Base Course	Top Course
1-1/4" square sieve	100	
5/8" square sieve	50 to 80	100
1/4" square sieve	30 to 50	50 to 65
U.S. No. 40 sieve	3 to 18	8 to 23
U.S. No. 200 sieve (wet sieving)	7.5 Max.	10 Max.
Sand equivalent	40 Min.	40 Min.

Base courses and top courses shall be placed in accordance with the approved cross-section. Compaction shall be a minimum of 95% of standard density as determined by the compaction control test for granular materials. Base course rock may be composed of larger fractured rock if recommended by the developer's engineer and approved by the City Engineer.

6.15 Surfacing Requirements

All streets in the City will be paved with either Asphalt Concrete or Cement Concrete, in strict compliance with these standards.

The pavement design shall meet the requirements in the latest publication of the AASHTO Guide for Design of Pavement Structures. The pavement section shall be designed and stamped by an engineer currently licensed in the State of Washington.

One soil sample per each 500 LF of centerline with 3 minimum per project representative of the roadway subgrade shall be taken by the Developer and delivered to a City approved soils lab in order to determine a statistical representation of the existing soil conditions.

Soil tests shall be performed by an engineering firm specializing in soils analysis and currently licensed in the State of Washington.

The soils report, signed and stamped by a soils engineer licensed by the State of Washington, shall be based on actual soils tests and submitted with the plans. All depths indicated are a minimum compacted depth.

Construction of streets paved with Asphalt Concrete shall conform to Section 5-04 of the Standard Specifications. Pavement material shall be Class ½", PG 64-22 asphalt concrete and be constructed at least two (2) inches thick (minimum compacted thickness) over the prepared crushed surface, top course, or asphalt treated base. Mechanical spreading and finishing will be as described in Section 5-04.3(9) of the Standard Specifications. Compaction will be performed by the equipment and methods presented in Section 5-04.3(10) of the Standard Specifications, and Surface Smoothness shall satisfy the requirement of Section 5-04.3(13) of the Standard Specifications.

Cement concrete streets will be constructed as specified in Section 5-05 of the Standard Specifications.

Permanent pavement patching will be performed as described in the pavement repair detail listed herein, and in compliance with Section 5-04 of the Standard Specifications. All fill material will be placed in lifts no thicker than six inches and mechanically compacted to 95 percent of standard density, as described in Section 2-03 of the Standard Specifications and to the satisfaction of the City Inspector.

6.16 Temporary Street Patching

Temporary restoration of trenches shall be accomplished by using 2" Class ½", PG 64-22 Concrete Pavement when available or 4" medium-curing (MC-250) liquid asphalt (cold mix), 3" Asphalt Treated Base (ATB), or steel plates suitable for H-20 traffic loading conditions. Steel plates shall be provided with a cold mix "lip" to accommodate a smooth transition from pavement to steel plate.

ATB used for temporary restoration may be dumped directly into the trench, bladed and rolled. After rolling, the trench must be filled flush with asphalt concrete pavement to provide a smooth riding surface.

All temporary patches shall be maintained by the contractor until such time as the permanent pavement patch is in place. All temporary patch materials shall be loaded and hauled to waste by the Developer, in compliance with applicable governmental regulations.

If the contractor is unable to maintain a patch for whatever reason, the City will patch it at actual cost plus overhead and materials. The property owner/developer/permittee shall be invoiced for any City expenses incurred to comply with this Contractor requirement.

6.17 Trench Backfill and Restoration

Trench restoration shall be either by a patch or patch plus overlay as required by the City.

A. All trench and pavement cuts shall be made by sawcuts. The cuts shall be a minimum of 1 foot outside the trench width.

B. All trenching shall be backfilled with gravel base, or crushed surfacing materials conforming to Section 4 of the WSDOT Standard Specifications. The trench shall be compacted to 95 percent maximum density, as described in Section 2-03 of the WSDOT Standard Specifications. The City will be the sole judge of approving materials to be utilized for backfill. Typically, crushed rock (5/8-inch minus) shall be placed and compacted in the trench sections for all street crossings.

   If the existing material is determined by the City to be suitable

for backfill, the contractor may use the native material except that the top 12 inches of trench shall be 5/8-inch minus crushed rock. Exceptions may be granted by the City based on site evaluation of excavated materials. All trench backfill materials shall be compacted to 95% density.

Backfill compaction shall be performed in 6 inch lifts, unless otherwise approved by the City.

Replacement of the asphalt concrete or Portland concrete cement shall match existing asphalt concrete or Portland concrete cement depth, except asphalt shall be a minimum compacted thickness of 2 inches and concrete cement shall be a minimum compacted thickness of 6 inches.

C. Tack shall be applied to the existing pavement and edge of cut and shall be emulsified asphalt grade CSS-1 as specified in Section 9-02.1(6) of the WSDOT Standard Specifications. Tack coat shall be applied as specified in Section 5-04 of the WSDOT Standard Specifications.

D. Asphalt concrete Class ½", PG 64-22 shall be placed on the prepared surface by an approved paving machine and shall be in accordance with the applicable requirements of Section 5-04 of the WSDOT Standard Specifications, except that longitudinal joints between successive layers of asphalt concrete shall be displaced laterally a minimum of 12 inches unless otherwise approved by the City. Fine and coarse aggregate for asphalt concrete shall be in accordance with Section 9-03.8 of the WSDOT Standard Specifications. Asphalt concrete over 2 inches thick shall be placed and compacted in equal lifts not to exceed 2 inches each.

All street surfaces, walks or driveways within the street trenching areas affected by the trenching shall be feathered and shimmed to an extent that provides a smooth-riding connection and expeditious drainage flow for the newly paved surface. Shimming and feathering as required by the City Inspector shall be accomplished by raking out the oversized aggregates from the asphalt as appropriate.

Surface smoothness shall be per Section 5-04.3(13) of the WSDOT Standard Specifications. The paving shall be corrected by removal and repaving of the trench only.

E. All joints shall be sealed using paving asphalt.

F. When trenching within the roadway shoulder(s), the shoulder shall be restored to its original or better condition.

G. The final patch shall be completed as soon as possible and shall be completed within 30 days after first opening the trench. This time frame may be adjusted if delays are due to inclement paving weather, or other adverse conditions that may exist. However, delaying of final patch of overlay work is allowable only subject to the Public Works Superintendent's approval. The Public Works Superintendent may deem it necessary to complete the work within the 30 days time frame and not allow any time extension. If this occurs, the Contractor shall perform the necessary work as required by the City.

6.18 Survey Staking

All surveying and staking shall be performed by an engineering or surveying firm employed by the Developer and capable of performing such work. The engineer or surveyor performing and directing such work shall be currently licensed by the State of Washington to perform said task.

A pre-construction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of streets shall be as follows:

A. Stake centerline alignment every 25 feet (50 feet in tangent sections) with cuts and/or fills to subgrade.

B. Stake top of ballast and top of crushed surfacing at centerline and edge of pavement every 25 feet.

C. Stake top back of curb at a consistent offset for vertical and horizontal alignment.

6.19 Material and Construction Testing

Testing shall be required at the developer's or contractor's expense. The testing shall be ordered by the developer or contractor and the chosen testing lab shall be preapproved by the City. Testing shall be done on all materials and construction as specified in the WSDOT Standard Specifications and with frequency as required by the City engineer up to the maximum frequency as specified herein.

In addition, the City shall be notified before each phase that street construction commences (i.e. staking, grading, subgrade, ballast, base, top course, and surfacing).

CITY OF KALAMA
TESTING AND SAMPLING FREQUENCY GUIDE

ITEM	TYPE OF TESTS	MIN. NO. FREQUENCY	
GRAVEL BORROW	GRADING & SE	1 EACH	1-4000 TON
SAND DRAINAGE BLANKET	GRADING	1 EACH	1-4000 TON
CSTC	GRADING, SE & FRACTURE	1 EACH	1-2000 TON
CSBC	GRADING, SE & FRACTURE	1 EACH	1-2000 TON
BALLAST	GRADING, SE & DUST RATIO	1 EACH	1-2000 TON
BACKFILL/SAND DRAINS	GRADING	1 EACH	1-2000 TON
GRAVEL BACKFILL FOR:			
FOUNDATIONS	GRADING, SE & DUST RATIO	1 EACH	1-1000 TON
WALLS	GRADING, SE & DUST RATIO	1 EACH	1-1000 TON
PIPE BEDDING	GRADING, SE & DUST RATIO	1 EACH	1-1000 TON
DRAINS	GRADING	1 EACH	1-100 TON
PCC STRUCTURES: (Sidewalk, Curb and Gutter, Foundations)			
COARSE AGGREGATE	GRADING	1 EACH	1-1000 TON
FINE AGGREGATE	GRADING	1 EACH	1-500 TON
CONSISTENCY	SLUMP	1 EACH	1-100 CY
AIR CONTENT	AIR	1 EACH	1-100 CY
CYLINDERS (28 DAY)	COMPRESSIVE STRENGTH	2 EACH	1-100 CY
CEMENT:	CHEMICAL & PHYSICAL CERTIFICATION	1	1-JOB
ASPHALT CEMENT CONCRETE:			
BLEND SAND	SE	1 EACH	1-1000 TON
MINERAL FILLER	S.G. & PI, CERTIFICATION	1	1-JOB
COMPLETED MIX	FRACTURE, SE, GRADING, ASPHALT CONTENT	1 EACH	1-1000 TON
	COMPACTION	2 EACH	5-400 TON
ASPHALT TREATED BASE:			
COMPLETED MIX	SE, GRADING, ASPHALT CONTENT	1 EACH	1-1000 TON
	COMPACTION	1 EACH	5-Control Lot*
ASPHALT MATERIALS	CERTIFICATION	1	1-JOB
RUBBERIZED ASPHALT:	CERTIFICATION	1	1-JOB
COMPACTION TESTING:			
EMBANKMENT	COMPACTION	1 EACH	1-500 LF
CUT SECTION	COMPACTION	1 EACH	1-500 LF
CSTC	COMPACTION	1 EACH	1-500 LF
CSBC	COMPACTION	1 EACH	1-500 LF
BALLAST	COMPACTION	1 EACH	1-500 LF
TRENCH BACKFILL	COMPACTION	1 EACH	1-500 LF

SE = Sand Equivalency

* A control lot shall be a normal day's production. For minor quantities 200 tons or less per day, a minimum of two (2) gauge readings shall be taken.

6.20 Sidewalks, Curbs And Gutters

A. General

All properties within commercial zones of the City, properties abutting arterial streets, collectors or local access streets shall, in conjunction with new construction on such properties or alterations, reconstruction, or improvements, where the total cost of construction, reconstruction or remodeling in the opinion of the City warrants frontage improvements, shall be required to provide sidewalks, curbs and gutters along abutting streets. See Details provided herein. Single-family residences, not associated with short plats or long plats, shall be exempt from this requirement.

B. Design Standards

Plans for the construction of sidewalks, curbs and gutters are to be submitted as part of the street plans when applicable.

The City has set forth minimum standards as shown in details which must be met in the design and construction of sidewalks, curbs and gutters. Because these are minimum standards, they may be modified by the City should the City Engineer feel circumstances require variances to minimum design standards.

C. Sidewalks

Sidewalks shall be constructed of Portland Cement Concrete, 4 inches thick (6-inch thick at driveway sections) per Section 8-14 of the WSDOT Standard Specifications. When the sidewalk, curb and gutter are contiguous, the width of the sidewalk shall be measured from back of curb to back of sidewalk.

Sidewalks will be constructed on a compacted gravel base (Class B), or 5/8-inch minus crushed rock of suitable thickness to provide a firm and unyielding base. Sidewalks will be constructed of Portland Cement Concrete as described in Section 8-14 of the Standard Specifications and be designed and constructed in compliance with those Details as shown herein. Typically, in commercially zoned areas the sidewalks shall abut the curb. The Planning Commission and/or City Council shall be at liberty to vary sidewalk dimensional characteristics and location to meet localized or existing conditions.

The sidewalk thickness shall be as follows:

SIDEWALK LOCATION	SIDEWALK THICKNESS
Typical sidewalk	4" thick
Driveway sections	6" thick

The sidewalks will be divided into five foot lengths by surface joints, and control joints will be at intervals of no more than 15 feet. Joints shall be constructed as shown on the standard details.

1. Arterial and Collector Streets. Sidewalks, curbs and gutters shall be required on both sides of all major and minor arterial streets and collector streets interior to the development. Sidewalks, curbs and gutters shall also be required on the development side of streets abutting the exterior of said development.

   The sidewalks shall vary from five (5) feet (minimum) to eight (8) feet (maximum) in width, at discretion of Planning Commission and/or City Council, in commercial corridors or match existing widths if greater than ten (10) feet wide. See Detail.

2. Local Access Streets. Sidewalks shall be required on both sides of local access streets interior to the development and on the development side of local access streets abutting the exterior of said development including cul-de-sacs.

   The sidewalks on Local Access Streets shall be five (5) feet wide. See Detail.

3. The design and construction of all sidewalks, curbs, gutters and walkways shall meet the following minimum standards:

   The width of sidewalks shall be as shown in details. The City Public Works Department shall require that the design of all sidewalks provides for a gradual rather than an abrupt transition between sidewalks of different widths or alignments.

4. Form and subgrade inspection by the City, are required before sidewalk is poured.

5. Monolithic pour of curb, gutter and sidewalk will not be allowed.

6. For driveway requirements, see Section 6B.10 herein.

D. Curb and Gutter

Cement concrete curb and gutter shall be used for all street edges unless otherwise approved by the Public Works Superintendent. All

curbs and gutters shall be constructed of Class "B" Cement Concrete in accordance with Section 6-02 of the Standard Specifications. Curbs shall be of the vertical face type. No rolled curb and gutter profile will be allowed without specific approval of the Public Works Superintendent. When rolled curbs are approved, all sidewalks within the Plat shall be a minimum 6 inches thick.

Extruded curb and gutter per WSDOT Standard Specifications is allowed only with the specific approval of the City Engineer.

Form and subgrade inspection by the City are required before curb and gutter are poured.

Forms, wood or steel, shall be staked securely in place, true to line and grade.

Sufficient support shall be given to the form to prevent movement in any direction, resulting from the weight of the concrete or the concrete placement. Forms shall not be set until the subgrade has been compacted within one inch of the established grade. Forms shall be clean and well oiled prior to setting in place. When set, the top of the form shall not depart from grade more than one-eighth (1/8) inch when checked with a ten-foot straightedge. The alignment shall not vary more than one-fourth (1/4) inch in ten (10) feet. Immediately prior to placing the concrete, forms shall be carefully inspected for proper grading, alignment and rigid construction. Adjustments and repairs as needed shall be completed before placing concrete.

The subgrade shall be properly compacted and brought to specified grade before placing concrete. The subgrade shall be thoroughly dampened immediately prior to the placement of the concrete. Concrete shall be spaded and tamped thoroughly into the forms to provide a dense, compacted concrete free of rock pockets. The exposed surfaces shall be floated, finished and brushed longitudinally with a fiber hair brush approved by the City's inspector and/or engineer.

The face form of the curb shall be stripped at such time in the early curing as will enable inspection and correction of all irregularities that appear thereon.

Forms shall not be removed until the concrete has set sufficiently to retain its true shape. The face of the curb shall be troweled with a tool cut to the exact section of the curb and at the same time maintain the shape, grade and alignment of the curb. The exposed surface of the curb shall be brushed with a fiber hair brush.

White pigmented or transparent curing compounds shall be applied to all exposed surfaces immediately after finishing. Transparent curing compounds shall contain a color dye of sufficient strength to render the film distinctly visible on the concrete for a minimum period of four (4) hours after application.

When the curb section is to be placed separately, the surface of the gutter directly underneath the curb section shall be covered with a protective cover to protect that area from the curing agent when the gutter is sprayed. This cover must remain in place until the curb is placed. Care shall be taken in the placing of this cover to prevent the steel dowels from puncturing the cover.

If, at any time during the curing period any of the forms are removed, a coat of curing compound shall be applied immediately to the exposed surface. The curing compound shall be applied in sufficient quantity to obscure the natural color of the concrete. Additional coats shall be applied if the City Inspector determines that the coverage is not adequate. The concrete shall be cured for the minimum period of 72 hours time set forth in Section 8-04 of the Standard Specifications.

Joints shall be constructed in the manner and at the locations shown in Details SW-1 and SW-2. They shall be cleaned and edged as shown on the drawings. All expansion and contraction joints shall extend entirely through the curb section above the pavement surface. Joint filler in the curb shall be normal to the pavement and in full but contact with pavement joint filler.

E. Handicap Ramps

All sidewalks must be constructed to provide for handicap ramps in accordance with the current standards of applicable state law. Details provided herein are minimum and subject to change.

Handicap Ramps shall be constructed of Portland Cement Concrete. Form and subgrade inspection by the City are required before handicap ramp is poured.

F. Survey Staking

All surveying and staking shall be performed by an engineer or surveying firm employed by the Developer and capable of performing such work. The engineering or surveyor directing and/or performing such work shall be currently licensed by the State of Washington to perform said task.

A preconstruction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of curb, gutter and sidewalk shall be as follows:

Stake top back of curb at a consistent offset for vertical and horizontal alignment every 25 feet (50 feet in tangent sections).

G. Testing

Testing shall be required at the developer's or contractor's expense on all materials and construction as specified in the WSDOT Standard Specifications.

At a minimum, one slump test and 2 test cylinders shall be taken once per day. All other testing frequencies shall be as specified in the Testing and Sampling Table.

In addition, the City shall be notified before each phase of sidewalk, curb and gutter construction commences.

6.21 Illumination

A. General

All new commercial or residential subdivisions, short plats or property development requiring review shall provide street lights in accordance with these standards. Large Lot (KMC 17.21)Subdivisions may be exempted from lighting standards with the written approval of the City.

B. Design Standards

A street lighting plan submitted by the applicant and approved by the City shall be required for all street light installations. All public street light designs shall be prepared by an engineering firm capable of performing such work. All developments shall submit the lighting plans on a separate sheet. Street light layout plans shall be on separate drawings from the street plan/profile sheets. The final locations shall be approved by the City and comply with these Standards.

Street lighting plans shall include:

a. Street light: location, type, height, and wattage
b. Service Cabinets: location and type
c. Conduits and Wire: location, type, size and length
d. Junction Boxes: locations and types

C. General Material Requirements

a. Conduit

All conduit shall be buried a minimum of 24 inches deep. All roadway crossing shall be Schedule 80 PVC. Conduit shall conform to Section 9-29 of WSDOT Standard Specifications. Schedule 40 PVC may be used in locations other than roadway crossings.

b. Junction Boxes (when required):

Junction boxes shall be installed at locations as shown on the Plans. They will conform to WSDOT Standard J-11a, Type I. They shall be installed within the landscape strip and firmly to prevent future settlement.

c. Conductors, Wire, Etc.:

Wire conductors for underground feeder runs and for circuitry from the in-line fuse in the poles to the Junction Box shall be 600 volt, single conductor stranded copper and insulated with USE grade polyvinyl chloride compound or approved equal in accordance with the Insulated Power Cable Engineer's Association Specifications. An AWG 10 bare solid copper wire or green insulated stranded copper wire will be run from the service ground rod to the safety ground lug on each pole. Feeders shall be sized in accordance with the National Electrical Code. Splices will be allowed in junction boxes and poles based only.

d. Fuses:

Luminaire Fusing and Electrical connections at Light Standard Base shall conform to Section 9-29.7 of the State of Washington Standard Specifications.

e. Safe Wiring Labels:

The Contractor is advised that Safe Wiring Labels as required by Labor and Industries shall apply on all projects.

f. Location and Spacing:

In general, poles and luminaries shall be spaced as described below to provide average illumination of 0.4 foot candles on the roadway with a Uniformity Ratio of 6 to 1 (average/minimum), as prescribed for a Local-Residential classification with R 2/3 surface in IES Standard RP 8, "Roadway Lighting."

1. Poles shall be spaced 36 inches from the face of the curb.

2. Poles shall be spaced to provide the specified illumination. Locate poles on alternate sides of residential streets wherever possible. Calculations supporting the selected spacing shall be provided.

3. Locate extra luminaires on corners if more than 50 feet from another luminaire.

4. Locate an extra luminaire at the end of a cul-de-sac shorter than 50 feet.

5. Street light conduit for wiring shall be located in the utility easement form power, gas, telephone, and cable TV wherever possible.

For all streets other than "local-residential", please refer to the I.E.S. Standards and provide photometric calculations.

D. Poles and Luminaire

a. Residential Areas:

Residential areas shall be provided with the following street light and pole unless an alternative is approved by the Public Works Superintendent.

1. Luminaires:

The standard residential streetlight luminaire shall be the Holophane Acrylic Washington Postlite II LED2. Voltage 240V. Fixture housing color shall be black. Catalogue number AWDE2-P20-40K-AS-M-BK-3-M-S-BK-P7-PCLL-NL1X1.

2. Poles:

The standard residential streetlight pole shall be the Holophane Charleston Aluminum Pole. The lighting post shall be all aluminum, one-piece construction, with classic tapered and fluted base design. Pole shall have a 15-foot mounting height. Pole color shall be black. Catalogue number CHA-15-F5J-16-P07-ABG-BK-FPH1/CO-5-CA/BK-BA-18-C52-H-4.

b. Downtown Area:

The downtown area shall be provided with the following street light and pole unless an alternative is approved by the Public Works Superintendent.

1. Luminaires:

The standard downtown streetlight luminaire shall be the Holophane GlasWerks Hallbrook Extended Cover LED. Voltage 240V. Fixture housing color shall be black. Catalogue number GELF2-P30-40K-AH-2-B-L3-H-PCS.

2. Poles:

The standard downtown streetlight pole shall be the Holophane Charleston Aluminum Pole and the Holophane Valencia Crossarm. The lighting post shall be all aluminum, one-piece construction, with classic tapered and fluted base design. Pole shall have a 16-foot mounting height. Pole color shall be black. The Valencia crossarm shall be made of cast aluminum, shall be black, and requires a P11 tenon. Catalogue number VL27/1CA-BKH-CH15S5/16U-U789A-PBA18H/1/CO2(180)EBBK-FPH4C5.0BKH-AB-31-4-RFD306817. Flag holders and banner arms to match existing.

c. Arterials, and Industrial Streets

Street lights for arterials and industrial streets shall be as approved by the Public Works Superintendent.

E. Electrical Services

- All electrical services shall be Tesco service cabinet catalog #26-100, anodized aluminum with meter base and keyed lock or approved equivalent.

- Conduit size and quantity as required by plans of N.E.C.

- For residential street lighting the contractor shall be responsible to install one meter for the plat lighting system per Cowlitz County PUD requirements. On very large plats Cowlitz County PUD may require more than one meter.

- Base of service cabinet shall be sealed with silicone or approved equivalent and have a half inch drain hole.

F. Photo cells

Each lighting system shall be supplied with photo cell control.

G. Installation

It shall be the contractor's responsibility to coordinate the installation of the street light system with all utilities, private and public, to avoid schedule and location conflicts. The contractor shall provide written permission from Cowlitz County PUD for the electrical service location, and a copy of the load calculations to the City of Kalama.

6.23 Signals

A. General

Signalization will be required if warranted as determined by an existing study and/or transportation study performed at the request of the City by the Developer.

6.24 Roadside Features

A. General

Miscellaneous features included herein shall be developed and constructed to encourage the uniform development and use of roadside features wherever possible.

B. Design Standards

The design and placement of roadside features included herein shall adhere to the specific requirements as listed for each feature.

C. Survey Staking

All surveying and staking shall be performed by an engineering or surveying firm employed by the Developer and capable of performing such work. The engineer or surveyor directing and/or performing such work shall be currently licensed by the State of Washington to perform said tasks.

A preconstruction meeting shall be held with the City prior to commencing staking. All staking shall be inspected by the City prior to construction, and subject to the City's approval.

D. Testing

Testing shall be required at the developer's or contractor's expense on all materials and construction as specified in the WSDOT Standard Specifications and with a frequency as specified in the WSDOT Construction Manual.

E. Survey Monuments

1. All existing (or new) survey control monuments and/or markers which are disturbed, lost, or destroyed during surveying or building shall be replaced with the proper monument as outlined in B or C below by a land surveyor currently registered (licensed) in the State of Washington at the expense of the responsible contractor, builder or developer.

2. Street type: Major Arterial or Minor Arterial; Collector Street;

A pre-cast concrete monument with cast iron monument case and cover installed per City Standards is required.

If the monument case and cover are placed in cement concrete pavement, the pre-cast base will not be necessary.

3. Street type: Local Access;

A cast-in-place concrete surface monument with sufficient ferrous metal embedded to allow for detection by a magnetic detection device per City standards is required.

4. Monument Locations

Appropriate monuments shall be placed:

a. At all street intersections;

b. At the PC and PT's of all horizontal curves;

c. At PI of all horizontal curves of streets where the PI lies within the limits of the traveled roadway;

d. At all corners, control points and angle points around the perimeter of subdivisions as determined by the City;

e. At all section corners, quarter corners, and sixteenth corners that fall within the right-of-way.

F. Mailboxes

1. During construction, existing mailboxes shall be accessible for the delivery of mail or, if necessary, moved to a temporary location. Temporary relocation shall be coordinated with the local U.S. Postal Service. The mailboxes shall be reinstalled at the original location or to a new location as may be required by the local Postmaster, as further outlined below and approved by the U.S. Postal Service.

2. For new developments, cluster mailboxes shall be provided. Mailboxes shall meet U.S. Postal Service requirements. Mailboxes shall be located so that they do not decrease the width of the sidewalk.

3. Location

   a. Bottom or base of box shall be 36" to 42" above the road surface.

   b. Front of mailbox 18 inches behind vertical curb face or outside edge of shoulder.

   d. Buck-outs in sidewalks and sidewalk re-alignment may be required to maintain the required sidewalk width around the mailbox.

4. Mailboxes shall be per WSDOT Standard Plans H-12 or material and design with comparable breakaway characteristics. Deviations may be allowed only with the written approval of the City.

G. Guard Rails

For purposes of design and location, all guard rails along roadways shall conform to the criteria of the "Washington State Department of Transportation Design Manual" as may be amended or revised.

H. Rock Walls

1. Rock walls may be used for erosion protection of cut or fill embankments up to a maximum height of 6 feet in stable soil conditions which will result in no significant foundation settlement or outward thrust upon the walls. For heights over 6 feet or when soil is unstable, structural wall of acceptable design stamped by a structural engineer currently licensed in the State of Washington shall be used. Design and construction shall be per the Association of Rockery Contractors (ARC) Specifications and/or applicable geotechnical recommendations. Rock walls over 6 feet high shall be subject

to inspection by a geotechnical engineer as outlined in the following paragraph.

Any rock wall over 30 inches high in a fill section shall require an engineered design by a geotechnical engineer. The geotechnical engineer shall continuously inspect the installation of the wall as it progresses and shall submit inspection reports, including compaction test results and photographs taken during the construction, documenting the techniques used and the degree of conformance to the geotechnical engineer's design.

In the absence of such a rock wall design, walls having heights over 6 feet or walls to be constructed in conditions when soil is unstable require a structural wall having a design approved by the City. The design of structural walls shall be by a professional engineer currently licensed in the State of Washington qualified in retaining wall design.

2. The rock material shall be as nearly rectangular as possible. No stone shall be used which does not extend through the wall. The rock material shall be hard, sound, durable and free from weathered portions, seams, cracks and other defects. The rock density shall be a minimum of 160 pounds per cubic foot.

3. The rock wall shall be started by excavating a trench having a depth below subgrade of one half the base course or one foot (whichever is greater).

4. Rock selection and placement shall be such that there will be minimum voids and, in the exposed face, no open voids over 6 inches across in any direction. The final course shall have a continuous appearance and shall be placed to minimize erosion of the backfill material. The larger rocks shall be placed at the base of the rockery so that the wall will be stable and have a stable appearance. The rocks shall be placed in a manner such that the longitudinal axis of the rock shall be at right angles or perpendicular to the rockery face. The rocks shall have all inclining faces sloping to the back of the rockery. Each course of rocks shall be seated as tightly and evenly as possible on the course beneath. After setting each course of rock, all voids between the rocks shall be chinked on the back with quarry rock to eliminate any void sufficient to pass a 2 inch square probe.

5. The wall backfill shall consist of quarry spalls with a maximum size of 6 inches and a minimum size of 4 inches or as specified by a licensed engineer. This material shall be placed to a 12-inch minimum thickness between the entire wall and the cut or fill material. The backfill material shall be placed in lifts to an elevation approximately 6 inches below the top of each course of rocks as they are placed, until the uppermost course is

placed. Any backfill material on the bearing surface of one rock course shall be removed before setting the next course.

6. Perforated drainage pipe and filter fabric shall be installed as required by the City.

I. Street Trees & Landscaping Items

Street trees and/or landscaping items (including irrigation if appropriate) shall be furnished and installed as may be specifically required by the City's Planner and/or Planning Commission, and as further approved by the City. If such is required, landscaping shall be of one of the referenced types as specified herein and/or as otherwise may be approved by the City Administrator. These landscaping items, including trees and irrigation, shall be furnished and installed at the City's sole discretion, direction, and approval. Exact size, spacing, type, location, and quantity to be as specified by the City's Planner and/or Planning Commission, and as approved by the City Public Works Superintendent.

6.25 Parking Lots

A building permit is required prior to surfacing any unsurfaced designated parking area.

Storm water detention shall be provided and shall follow the criteria as set forth in these standards.

Four sets of plans and specifications shall be required to be submitted for review and approval by the City with respect to storm drainage discharge and on site retention or detention, matching street and/or sidewalk grades, access locations, parking layout, and to check for future street improvement conformity and City zoning regulations.

Parking lot surfacing materials shall satisfy the requirement for a permanent all-weather surface. Asphalt concrete pavement and cement concrete pavement satisfy this requirement and are approved materials. Gravel surfaces are not acceptable or approved surface material types. Combination grass/paving systems are approved surface material types, however, their use requires submittal of an overall parking lot paving plan showing the limits of the grass/paving systems and a description of how the systems will be irrigated and maintained. If the City Engineer determines the grass/paving system is not appropriate for the specific application, alternate approved surfacing materials shall be utilized.

6.26 Utilities

Utilities shall be furnished and installed within the right-of-way beneath new roads, or in existing roadways and rights-of-way so as to provide minimal interference with existing utilities and shall be located

as generally shown in Standard Details listed herein. Where existing utilities are in place, new utilities shall conform to these Standards as nearly as practical and yet be compatible with the existing installations. Exceptions may be approved by the City when necessary to meet special or localized requirements. Utilities shall be sized and designed to serve adjacent and tributary areas. Typically, utilities will be required to be extended to "far" property lines. Easements shall be procured and provided by the developer to facilitate same.

A. Water Lines

Water lines shall be located as follows:

1. Shoulder-and-Ditch Section (on existing "standard" street sections):
   If practical: Outside of ditch line (existing roads).
   Otherwise: In shoulder 3 feet minimum from edge of travel lane (existing roads).

2. Curb and Gutter Section: 5 feet from centerline. Mains and service connections to all lots should be completed prior to placing of surface materials. A location outside of existing roadway improvements will be considered by the City Engineer based on local conditions. This location, however, must be approved by the City Engineer.

3. Designated side of centerline: North and East.

4. Depth: Per City standards.

B. Sanitary Sewers

Sanitary sewers shall be located 5 feet south and west of centerline; depth approximately 8 feet minimum from finished grade, unless otherwise required and/or approved by the City Engineer. Greater depths may be required to serve adjacent properties and tributary properties. Easements shall be provided to facilitate same.

Sanitary and water lines shall be horizontally and vertically separated per Washington State Department of Ecology minimum requirements unless otherwise approved by the City Engineer.

Gravity systems, whether sanitary or storm drainage, shall have precedence over other systems in planning and installation.

C. Other Utilities

Other utilities (gas, power, telephone, and cable TV) shall be located as follows:

Preferable: Underground, either side of road, at horizontal location and depth compatible with other utilities and storm drains.

Otherwise: On poles (as applicable) set back of ditchline or sidewalk, at locations compatible with driveways, intersections, and other essential road features. To extent practical, utilities should share facilities so that a minimum of poles are needed, and preferably on only one side of road.

Notwithstanding other provisions, "private" underground systems shall be located at least 5 feet away from road edge and where they will not otherwise disturb existing survey monumentation.

D. Utility Crossings in Existing Streets

For smaller diameter pipes and wires the crossing shall be made without surface cut of the traveled portion where the street is of oil mat or better. The crossing shall be made by pushing or boring a pipe under the road. Where rock is known or expected in the area of the crossing, the attempt need not be first, open cutting will be permitted, but prior approval of the City is required.

6.27 Asphalt Concrete Pedestrian Paths and/or Bikeways

A. Minimum Easement or Right-of-Way Width: Ten feet minimum. Fifteen feet preferred.
B. Construction Width. Five feet *minimum.* Greater widths may be required by City.
C. Subgrade. Prepared per Section 2.06 of APWA.
D. Bankrun Gravel, Class A. As required.
E. Crushed Rock Base Course one and one-half inch minus. One and one-half inch minimum depth. Greater depths may be required by City Engineer based on use and local ground conditions.
F Crushed Rock Top Course five-eights inch minus. One and one-half inch minimum depth. Greater depths may be required by City Engineer based on use and local ground conditions.
G. Paving Course. One and one-half inch (minimum) asphalt concrete class ½" PG 58-22. Greater depths may be required by City Engineer based on use, location, and local ground conditions.

SECTION 7
STORM DRAINAGE

SECTION 7

7. STORM DRAINAGE STANDARDS

7.01 General

The standards established by this Chapter are intended to represent the **minimum** standards for the design and construction of storm drainage facilities. Greater or lesser requirements may be mandated by the City due to localized conditions. Storm drainage revisions, additions, modification, or changes shall be made in compliance with City standards, ordinances, and Best Management Practices as identified by the State Department of Ecology 1992 Stormwater Management Manual for the Puget Sound Basin. Adequate provisions shall be made for storm drainage, storm sewers, and associated appurtenances sufficient to transmit maximum seasonal flows and one hundred year flood waters characterized by the area.

If warranted based on the condition and capacity of the existing storm drainage infrastructure (or lack thereof) and, impacts caused by the proposed development, off-site improvements may be required, at the City Engineer's discretion, to mitigate impacts caused by the proposed development.

7.02 Design Standards

On-site runoff control systems shall be provided to ensure that stormwater flow rates following development do not exceed the predevelopment rates. The design of storm drainage treatment and control systems shall depend on their type and local site conditions. The design elements of storm drainage systems shall conform to City Standards as set forth herein. The following design considerations shall apply:

A. The use of commercial parking lots for detention of stormwater will be reviewed by the City Engineer and approved or denied based on the design, location and general parameters of the project. The detention area shall be situated away from areas of pedestrian movement unless means for rapid closing of the areas is incorporated in the design. The maximum depth of water in parking lot storage shall be limited to 6 inches. Curbs cannot be used for retaining storage.

B. Maximum catch basin spacing shall be 200 feet on road grades up to 3 percent, 300 feet when the road grade is 3 percent or greater. No surface water (unless otherwise approved in writing by the Public Works Superintendent) shall cross any

roadway. In addition, catch basins shall be placed whenever the length of surface drainage exceeds 300 feet on road grade, extending either direction from crest or sag on vertical curves. Vaned grates shall be employed on street grades exceeding 6 percent slope.

C. Where storm drains run outside an existing public right-of-way, permanent easements will be required for public or private maintenance as may be required and warranted. Such easement shall be a minimum of 15 feet in width unless otherwise approved or required by the City. Where the City is to maintain the storm drain, a permanent easement will be required having a minimum width of 15 feet. A construction (temporary) easement of suitable width shall also be provided.

D. Stormwater Treatment and Control Systems shall be, at a minimum, designed and constructed in strict compliance with the currently adopted the Washington State Department of Ecology's 1992 Stormwater Program Guidance Manual for the Puget Sound Basin and any amendments thereto. Local prevailing conditions may warrant higher standards as determined by the City Engineer.

E. The City may choose to accept dedication of stormwater facilities that primarily handle runoff from public streets. If the City chooses not to accept dedication of the facility, the Developer and/or Homeowners Association shall enter into a formal, legally binding agreement, as approved by the City Attorney, regarding the landowner's duties and obligations regarding their ownership, operation and maintenance of the system.

F. Fences shall be erected around all ponds. Drive gates with locks (City to also have key) shall be installed.

G. The General Notes, numbered 1 thru 8, as shown and further referenced below shall be included or referenced on any plans submitted to the City for construction approval dealing with storm system design.

GENERAL NOTES (STORM DRAIN CONSTRUCTION)

1. All workmanship and materials shall be in accordance with City Standards and the most current copy of the State of Washington Standard Specifications for Road, Bridge and Municipal Construction (WSDOT).

2. Temporary erosion/water pollution measures shall be required in accordance with Section 1-07.15 of the Standard Specifications.

3. Contractor shall be responsible for complying with all other permits and other requirements by the City or other governing authority or agency as may be applicable.

4. A preconstruction meeting shall be held with the City prior to the start of construction.

5. All storm mains and retention/detention areas shall be staked for grade and alignment by an engineering or surveying firm capable of performing such work, and currently licensed in the State of Washington to do so.

6. Contractor shall provide traffic control plan(s) as required in accordance with MUTCD.

7. Call underground locate line at 1-800-424-5555 a minimum of 48 hours prior to any excavations.

8. Where connections require "field verifications," connection points will be exposed by contractor and fittings verified 48 hours prior to distributing shut-down notices.

7.03 Conveyance

Structures: Structures shall be installed at all changes in pipe size, slope, and direction. Structures shall consist of WSDOT Type 1 or Type 2 catch basins or 48-inch diameter manholes as appropriate. All inlet structures shall be WSDOT Type 1 or Type 2 catch basins as appropriate.

Pipe: Storm drain pipe within a public right-of-way or easement shall be sized to carry the maximum anticipated runoff from the possible contributing tributary area.

The minimum main size shall be 12 inches diameter. Lateral lines if approved by the City Engineer may be 8 inches diameter. Runoff shall be computed and, if the flow requires it, a larger pipe shall be used. Nothing shall preclude the City from requiring the installation of a larger sized main if the City determines a larger size is needed to serve adjacent areas or for future service.

Storm drain gradients shall be such as to assure minimum flow velocity of three feet per second when flowing full.

All pipe for storm mains shall be "preapproved" by the City's Engineer based on localized conditions and comply with one of the following types:

Polyvinyl Chloride: PVC pipe shall conform to ASTM D 3034, SDR 35 or ASTM F 789 with joints and rubber gaskets conforming to ASTM D3212 and ASTM F477.

Plain Concrete: Plain concrete pipe per WSDOT Standard Specifications as set forth in Section 7-04.

Reinforced Concrete: Reinforced concrete pipe per WSDOT Standard Specifications as set forth in Section 7-04.

Ductile Iron: Ductile iron pipe shall conform to AWWA C151 Class 50 and have a cement mortar lining conforming to AWWA C 104. All pipes shall be joined using non-restrained joints which shall be rubber gaskets, push on type or mechanical joint, conforming to AWWA C 111.

Polyethylene: PE smooth wall pipe per Advanced Drainage Systems (ADS) N-12 (bell and spigot), or City approved equal, constructed per WSDOT Standard Specifications 7-04.

Corrugated Metal: Zinc-coated (galvanized) corrugated iron or steel pipe shall be coated uniformly with asphalt.

7.04 Connections

Connections of storm drain pipe leading from an existing street inlet location may be made into an existing main storm drain only with a new structure, subject to case-by-case review and approval of the City Engineer or Public Works Field Inspector/Superintendent and subject to the following additional requirements:

1. The inletting structure shall be a catch basin and not a simple inlet lacking a catch or drop section.

2. Length of inlet connection shall be as approved by the City Engineer.

7.05 Survey Staking

All surveying and staking shall be performed by an engineering or

surveying firm employed by the Developer and capable of performing such work. The engineer or surveyor directing and/or performing such work shall be currently licensed by the State of Washington to perform said tasks.

A preconstruction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of storm sewer systems shall be as follows:

A. Stake centerline alignment every 25 feet with cuts and/or fills to bottom of trench.

B. Stake location of all catch basins/manholes and other fixtures for grade and alignment.

C. Stake location, size and depth of retention/detention facility.

D. Stake finished grade of catch basin/manhole rim elevation and invert elevations of all pipes in catch basins, manholes, and those that daylight.

7.06 Trench Excavation

A. Clearing and grubbing where required shall be performed within the easement or public right-of-way as permitted by the City and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the owner or contractor in accordance with the terms of all applicable permits.

B. Trenches shall be excavated to the line and depth designated by the City to provide a minimum of 24 inches of cover over the pipe. Ductile iron pipe shall be used where cover is less than 30 inches. Except for unusual circumstances where approved by the City, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for adequate working space as allowed by the governing agency and in compliance with all safety requirements of the prevailing agencies. The trench shall be kept free from water until joining is complete. Surface water shall be diverted so as not to enter the trench. The Contractor shall maintain sufficient pumping equipment on the job to insure that these provisions are carried out.

C. The contractor shall perform all excavation of every description and whatever substance encountered and boulders, rocks, roots and other obstructions shall be entirely removed or cut out to the width of the trench and to a depth 6 inches below storm line grade. Where materials are removed from below the pipeline grade, the trench shall be backfilled to grade with material satisfactory to the City and thoroughly compacted.

D. Trenching and shoring operations shall not proceed more than 100 feet in advance of pipe laying without specific written approval of the City, and shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Office of Safety and Health Administration (OSHA) Safety Standard.

E. The bedding course shall be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to facilitate the construction of pipe joints.

7.07 Bedding

Gravel backfill for pipe bedding shall be installed in conformance with Section 2-09 of the Standard Specifications (WSDOT). See Detail.

Bedding for Rigid Pipe (Concrete or Ductile Iron Pipe):

Gravel backfill for rigid pipe bedding shall consist of crushed, processed, or naturally occurring granular material. It shall be essentially free from various types of wood waste or other extraneous or objectionable materials. It shall have such characteristics of size and shape that it will compact readily and shall meet the following specifications for grading and quality:

Sieve Size	Percent Passing*
3/4" Square	100
3/8" Square	95-100
U.S. No. 8	0-10
U.S. No. 200	0-3
Sand Equivalent	35 min.

*All percentages are by weight.

Bedding for Flexible Pipe (P.V.C. pipe):

Gravel backfill for flexible pipe (P.V.C. pipe) bedding shall consist of crushed, processed, or naturally occurring granular material. It shall be essentially free from various types of wood waste or other extraneous or objectionable materials. It shall have such characteristics of size and shape that it will compact readily and shall meet the following specifications for grading and quality:

Sieve Size	Percent Passing*
3/4" Square	100
3/8" Square	95-100
U.S. No. 8	0-10
U.S. No. 200	0-3
Sand Equivalent	35 min.

*All percentages are by weight.

Native Material shall not be used for bedding, unless approved by the Engineer.

Bedding for Flexible Pipe (H.D.P.E. pipe):

Bedding material for flexible pipe shall be a clean gravel mixture free from organic matter and conforming to the following gradation:

Sieve Size	Percent Passing*
3/4" Square	100
3/8" Square	70-100
U.S. No. 4	55-100
U.S. No. 10	35-95
U.S. No. 20	20-80
U.S. No. 40	10-55
U.S. No. 100	0-10
U.S. No. 200	0-3

*All percentages are by weight.

7.08 Backfilling

Backfilling and surface restoration shall closely follow installation of pipe so that not more than 100 feet is left exposed during construction hours without approval of the City. Selected material shall be placed and compacted around and under the storm drain by hand tools. Special precautions should be provided to protect the pipe to a point

12 inches above the crown of the pipe. The remaining backfill shall be compacted to 95 percent of the maximum density in traveled areas, 90 percent outside driveway, roadways, road prism, shoulders, parking or other traveled areas. Where governmental agencies other than the City have jurisdiction over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction. Typically, trench sections crossing existing roadways, in roadway "prisms" or beneath traffic bearing areas shall be backfilled and compacted with 5/8-inch minus crushed rock. Due to localized conditions, the City may allow/permit the backfill of the trench section with suitable excavated material, as determined by the City, or if this material is not available from trenching operations, the City may order the placing and compaction of gravel base conforming with Section 9-03.10 of the Standard Specifications (WSDOT) for backfilling the trench. All excess material shall be loaded and hauled to waste.

7.09 Street Patching and Restoration

See Chapter 6 for requirements regarding street patching and trench restoration.

SECTION 8
MISCELLANEOUS UTILITY SERVICE

SECTION 8

8. MISCELLANEOUS UTILITY SERVICES AND ADDITIONAL DEVELOPMENT REQUIREMENTS

8.01 General

The standards established by this chapter are intended to represent the **minimum** standards for the design and construction of additional facilities. Greater or lesser requirements may be mandated by the City due to localized conditions. The following design and construction considerations shall apply.

8.02 Utility Services

All utility lines, including electric, telephone, fire alarm and television cables shall be placed underground prior to paving. Easement for maintenance of all utilities, both on and off-site, shall be provided as applicable to the satisfaction of the City Superintendent of Public Works.

8.03 Street Lighting

Street lighting shall be provided subject to the discretion of the City Planning Commission and/or City Council to the guidelines established by the City Engineer. All costs of such, including, but not limited to, design, underground wiring, light standard base and luminaire shall be borne by the developer. The City will approve of all street lighting plans as furnished by the developer to include size, spacing, and type of illuminaire.

8.04 Cable Television

Service lines (suitable empty conduits placed and capped) for cable television shall be installed underground (location as approved by City Engineer) on all subdivisions regardless of whether or not cable television service is currently available.

8.05 Street Name and Traffic Signs

All street name signs and traffic directional signs shall be designated and provided by the City Public Works Department. All costs of providing the signs, to include the installation, labor, materials, and other relevant City costs associated with determining the type, location, and associated items shall be invoiced to and paid by the developer.

8.06 Landscaping

Street landscaping shall be provided where recommended by the City's Planning Commission and/or as required by the City Council. Landscaping items shall be furnished and installed as directed and

approved by the City Engineer. Irrigation may be required, and if so, shall be designed, furnished, and installed by the developer.

SECTION 9
SAMPLE DOCUMENTS

SECTION 9

SAMPLE DOCUMENTS

- Developer Extension Agreement
- Sample Easement Document
- Sample Bill of Sale Document
- Affidavit of "No Liens" on Project
- Developer Extension Checklist
- Performance Bond Document
- Maintenance Bond Document
- Latecomer's Agreement
- Permit for Work in Street Rights-of-Way

SAMPLE

CITY OF KALAMA

DEVELOPER AGREEMENT

THIS AGREEMENT, by and between the City of Kalama, a municipal corporation, hereinafter referred to as "City", and _____, hereinafter referred to as "Developer",

WITNESSETH: That whereas the City of Kalama, a municipal corporation, provides utilities and transportation services within the corresponding service area boundary, and the above-named Developer is preparing to construct certain additions thereto, and said development requires the City's approval to extend or construct said improvements;

WHEREFORE, THE PARTIES AGREE AS FOLLOWS:

1) Developer agrees to design and/or construct the necessary infrastructure or additions thereto, to be connected to the City's transportation or utility system, and to maintain such additions until such time as the improvements are accepted by the City, with the agreements conditioned as set forth below. The infrastructure, or additions thereto, shall be located within that area commonly referred to as: _____ _____ _____ which property is described in Exhibit "A" attached hereto and referred to hereinafter as "Premises."

2) As a condition precedent to City obligations under this agreement, the Developer shall design and/or construct the proposed infrastructure, or additions thereto, within said premises in conformance with the City's "Development Guidelines and Public Works Standards" as adopted (and by reference made a part hereof), together with any City approved amendments thereto made, and further to conform with the City's comprehensive plans, which shall include over sizing of facilities as may be identified in the City's adopted planning documents.

3) The Developer agrees that the construction of the infrastructure, or additions thereto, shall not commence until the following conditions have been fulfilled:

   a) The Developer shall furnish the City with eight (8) sets of detailed plans at Developer's own expense, prepared by a qualified engineer licensed in the State of Washington.

   b) The above plans shall require the review and approval by the City and its Engineer and agents, and the cost of such review shall be at the Developer's own expense.

   c) Minimum requirements for all plans submitted to the City for review are:

(1) Eight (8) sets of all plans and documents shall be submitted, wherein two (2) sets will be returned to the applicant.

(2) A preliminary plat of the area in which said infrastructure, or additions thereto, are to be constructed, which plat has been approved by the City, or County as applicable.

(3) A map showing the location of the plat in relation to the surrounding area.

(4) A contour map of the plat with contour intervals of five feet (5') or less.

(5) A map showing the location and depth of all proposed utilities and any connections and/or interconnections to existing facilities or future extensions and connections.

(6) A 1" = 50' plan of the utility systems showing streets, lot lines, dimensions, and location of bench marks and monuments for the proposed plat, together with an indication of the development of the adjacent property.

(7) A profile 1" = 50' horizontal and 1" = 5' vertical of the finished road grades with the utility and roadway system and other pertinent underground utilities located, with elevations noted thereon. The elevation datum shall be the same as mandated by the City. It shall be the responsibility of the Developer to confirm such datum with the City.

(8) Full-sized detail sheets shall be included as part of the construction drawings, as required to clearly indicate any special details, consistent with City standards.

(9) Specifications sufficient to fully describe the work, consistent with City's "Conditions and Standards."

(10) Approvals from the regulatory agencies.

d) Construction requirements in addition to the City standards and details for developer extensions, as adopted, are as follows:

(1) Unless otherwise approved in writing by the City, all streets and/or roadways shall be graded to within six inches (6") of final grade before installation of utility improvements.

(2) All lots shall be fully staked to assist all parties involved in the proper location of the utility systems including services.

(3) All hydrants, valves, side sewers, manholes, curb alignments and other pertinent items shall be fully staked in the field and reviewed and approved by the City prior to installation of same. Adjustments to

"approval construction drawings" may be warranted and required by the City based on actual local field conditions.

(4) All contractor and subcontractors shall have a current Washington State Contractors License.

(5) The Developer's utility systems, or additions thereto, on Premises shall not be connected to the City utility systems until authorized by the City, and such connection shall be performed under the supervision and direction of the City.

e) For the purpose of applying RCW 4.24.115 to this Contract, the Developer and the city agree that the term "damages" applies only to the finding in a judicial proceeding and is exclusive of third party claims for damages preliminary thereto.

The Developer agrees to indemnify and hold harmless the City from all claims for damages by third parties, including costs and reasonable attorney's fees in the defense of claims for damages, arising from performance of the Developer's express or implied obligations under this Agreement. The Developer waives any right of contribution against the City.

It is agreed and mutually negotiated that in any and all claims against the City or any of its agents or employees by any employee of the Developer, any contractor or subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation hereunder shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Developer or any contractor/subcontractor under Workmen's Compensation Acts, disability benefits acts or other employees' benefit acts. The City and the Developer agree that all third-party claims for damages against the City for which the Developer's insurance carrier does not accept defense of the City may be tendered by the City by the Developer who shall, if so tendered by the City, accept and undertake to defend or settle with the claimant. The City retains the right to approve claim investigation and counsel assigned to said claim, and all investigation and legal work product regarding said claim shall be performed under a fiduciary relationship to the City. In the event that the City agrees or a court finds that the claim arises from the sole negligence of the City, this indemnification shall be void and the City shall be responsible for all damages payable to the third-party claimant. In the event that the City and the Developer agree or a court finds that the claim arises from the sole negligence of the City, this indemnification shall be void and the City shall be responsible for all damages payable to the third party claimant. In the event that the City and the Developer agree or a court finds that the claim arises from or includes negligence of both the Developer and the City, the Developer shall be responsible for all damages payable by the Developer to the third party claimant under the court findings, and, in damages paid or payable to the City under the court findings in an amount not to exceed the percentage of total fault attributable to the Developer. For example, where the Developer is

25% negligent, the Developer shall not be required to indemnify to the City for any amount in excess of 25% of the claimant's total damages.

f) In the event the Developer in his operation damages or disrupts existing improvements, the repairs shall be made at the Developer's expense. In the event they are so damaged or the service disrupted and the Developer fails or is unable to immediately restore the service, then the Owners of the improvements may cause the repairs to be made by the others and all costs for the same shall be at the Developer's own expense.

Where the construction crosses or is adjacent to existing utilities, the Developer shall exercise extreme care to protect such utilities from damage.

If any damage is done to an existing utility, the Developer shall notify the utility company involved, who will dispatch a crew to repair the damage at the Developer's expense. All costs for the same shall be at the Developer's own expense.

The Developer shall be aware that some existing water facilities are known to contain asbestos cement pipe. The Developer shall conduct all work related to existing asbestos cement pipe in strict accordance with current WISHA safety regulations and provisions contained with WAC 296-62-077. All costs related to work in compliance with established rules and regulations shall be the responsibility of the Developer. Demolition of existing asbestos cement pipe, if required, will be permitted only after any regulatory permits or approvals are obtained. The Developer shall be responsible for all associated fees and permits required for asbestos removal and disposal. Work crews shall be provided with proper protective clothing and equipment. Hand tools shall be used, and the asbestos cement pipe shall be scored and broken in lieu of sawing or other methods which release fibers into the atmosphere. Waste asbestos pipe shall be buried in the trench. Asbestos pipe to be abandoned in place shall not be disturbed, except as noted herein, and shall remain in its original position.

The Developer is cautioned that all existing drainage systems, whether open ditch, buried pipe, or drainage structures, are not on record. It shall be the responsibility of the Developer to repair or replace all such systems found during construction, which are damaged by the Developer's construction in a manner which is satisfactory to the City.

Where the Developer is allowed to use private property adjacent to the work, the property so used shall be returned to its original or superior condition. The Developer shall make all arrangements in advance with such property owners, to insure that no conflicts will ensue after the property is restored as described above. The Developer will be required to furnish the City with a written release from said private property owners, if the City deems it to be necessary to obtain such document.

4) The construction of the Developer's utility or roadway system, or additions thereto, on the Premises shall be supervised by the City in such a manner and at such times as the City deems reasonably necessary to assure that construction of the system will conform to the above-mentioned plans and specifications, and other relevant City standards and codes. The Developer herewith agrees to allow such inspections and agrees to cooperate providing reasonable advance notice on his construction schedule during the various construction phases as requested by the City. The Developer further agrees to reimburse the City for all engineering fees and related expenses incurred by the City for such supervision.

5) The Developer's utility and roadway system, or additions thereto, on Premises shall not be accepted for service and use until the same have been fully inspected and approved, and the following requirements have been performed:

   a) Submit to the City in Auto-CADD format, latest revisions (unless otherwise approved by the City), the computer file supplied on a CD accompanied by the original (fixed line) mylars, with all conditions. The Developer's Engineer shall certify the accuracy of the record drawings and shall affix his seal and signature.

   b) Payment of all permit fees and equivalent assessment charges and any other applicable City charges required for Premises.

   c) Payment of all plan check and inspection fees.

   d) Prepare, furnish, and record the required easements in compliance with the City's standard form, and furnish same to the City for approval by the City Attorney, prior to recording the same. The proponent shall pay all the necessary recording fees.

   e) Furnish the City with an affidavit warranting there are no liens against the improvements constructed on Premises by the Developers. This affidavit shall be in the form prescribed by the City.

   f) Furnish the City with a Bill of Sale conveying the utility and roadway system to the City, which shall include a one-year guarantee that the "systems" shall be free of defects in labor and materials. Form shall be as prescribed by the City.

6) In the event any warranty repairs are required, the City agrees, whenever feasible, to provide the Developer with reasonable notice before directly undertaking such repairs. The City reserves the right, however, to effect emergency repairs as deemed necessary by the City. The City shall be reimbursed by the Developer for all costs thereof.

7) Upon performing all requirements, including those as set forth in Paragraph 5 above, the City shall accept the water system, and agree therewith to operate and maintain said system.

SUBMITTED this _____ day of _____, 20___.

BY DEVELOPER:

_____ _____
Signature Date

_____
Printed Name

_____
Company Title (as applicable)

CITY OF KALAMA
DEVELOPER AGREEMENT

Accepted this _____ day of _____, 20_____.

_____
City of Kalama – Responsible Official

CITY OF KALAMA

DEVELOPER AGREEMENT

EXHIBIT "A"

PLAT NAME: _____

DEVELOPER: _____

LEGAL DESCRIPTION:

_____

_____

_____

_____

_____

_____

_____

_____

_____

AFTER RECORDING, RETURN TO:

City of Kalama
Attn: City Clerk/Treasurer
P.O. Box 1007
Kalama, WA 98625

Document Title:	EASEMENT AGREEMENT
Grantor:	_____
Grantee:	City of Kalama
Legal Description:	[insert abbreviated legal description here] The complete legal description may be found on page ____ of the document.
Property Tax Parcel No:	_____

Reference No. of Documents Assigned or Released: _____

EASEMENT AGREEMENT

THIS INSTRUMENT, executed this day by and between the City of Kalama, a Washington municipal corporation (the "City" herein), and _____ a/an _____ organized under the laws of the State of Washington], as the owners of the within-described property (the "Owners" herein):

WITNESSETH:

WHEREAS, Owners own a fee simple and/or have substantial beneficial interest in the following real property, commonly known as _____, _____, Washington 98_____, and legally described as follows (the "Property" herein):

WHEREAS, the City desires an easement for the purpose of monitoring, inspecting, maintaining, operating, improving, repairing, constructing, and reconstructing a _____;

NOW, THEREFORE, the parties hereto agree as follows:

In consideration of one dollar ($1.00), receipt of which is hereby acknowledged, Owners hereby convey and warrant to the City, a perpetual, nonexclusive easement, under, over, through and across the Property, for the purposes of monitoring, inspecting, maintaining, improving, repairing, constructing, and reconstructing a _____, which easement (the "Easement" herein) is legally described as follows:

This Easement is subject to and conditioned upon the following terms and covenants, which both parties promise to faithfully and fully observe and perform:

1. **Responsibility to Repair Damage.** The City shall, upon completion of any work within the Property covered by the Easement, restore the surface of the Easement, and any improvements on the Property not owned by the City, disturbed, damaged or destroyed during execution of the work, as nearly as practicable to the condition they were in immediately before commencement of the work or entry by the City. However, the City shall not be required to restore any such improvements installed and/or construction on the Easement by the Owners subsequent to execution of this Easement Agreement, and as otherwise provided in paragraph "2" below.

2. **Limitations on Owners.** The Owners shall retain the right to use the surface of the Easement. However, the Owners shall not directly or indirectly have the right to:

   a. Erect or install, or cause to be erected or installed, any buildings, structures, pavement, or facilities, within the Easement; or

b. Plant, or cause to be planted, any additional trees, shrubs, or vegetation with deep root patterns which may cause damage to or interfere with the drainage system located within the Easement; or

c. Develop, landscape, or beautify, or cause to be developed, landscaped, or beautified, the Easement area in any way that would unreasonably increase the costs to the City of restoring the Easement or restoring any Owner-caused or Owner authorized improvements therein; or

d. Grant any additional or subsequent easement inconsistent with the rights of the City as granted herein. The City shall make the final determination whether any proposed subsequent easement is inconsistent with the City's Easement.

3. **Notice of Entry.** The Owners, their successors and assigns, shall allow access to the Easement by the City, without the City having to give prior notice of its intent to access the Easement.

4. **Indemnification, Hold Harmless.** The Owners hereby release, covenant not to bring suit and agree to indemnify, defend and hold harmless the City, its officers, officials, employees, agents and representatives from any and all claims, costs, judgments, losses or suites including attorney's fees, awards or liabilities to any person arising out of or in connection with this Easement, except for injuries or damages caused by the sole negligence of the City.

In the event of liability for damages arising out of bodily injury to persons or damages to property caused by or resulting from the concurrent negligence of the Owners and the City, its officers, officials, employees, agents and representatives, the Owners' liability hereunder shall be only to the extent of the Owners' negligence.

The provisions of this section shall survive the termination of the Easement.

5. **Dispute Resolution and Attorney Fees.** If any dispute arises between the Owners and the City under any of the provisions of this Easement which cannot be resolved by agreement of the parties, jurisdiction of any resulting litigation shall be filed in the Cowlitz County Superior Court, Cowlitz County, Washington. This Easement shall be governed by and construed in accordance with the laws of the State of Washington. The prevailing party of any such litigation shall be entitled to recover its reasonable attorneys' fees and costs, including any expert witness fees.

6. **Waiver.** No waiver by either party of any term or condition of this Easement shall be deemed or construed to constitute a waiver of any other term or condition or of any subsequent breach, whether of the same or different provision of this Easement.

7. **Merger.** This Easement contains all of the agreements of the Parties with respect to any matter covered or mentioned in this Easement and no prior agreements shall be effective for any purpose.

8. **Severability.** If any of the provisions contained in this Easement are held in illegal, invalid or unenforceable, the remaining provisions shall remain in full force and effect.

9. **Easement Binding on Successors and Assigns.** This instrument shall be recorded in the records of the Cowlitz County Auditor at the expense of the Owners and shall insure to the benefit of and be binding upon the Owners, its legal responsibilities, assigns, heirs, and all owners of an after acquired interest in the Property, and their successors and assigns.

Dated this _____ day of _____, 20 ___.

CITY OF KALAMA

By: _____
Mayor

OWNERS:

_____

Printed Name: _____

_____

Printed Name: _____

APPROVED AS TO FORM:

_____
City Attorney

ATTEST:

_____
City Clerk

STATE OF WASHINGTON)
) ss.
COUNTY OF)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath stated that (he/she) was authorized to execute the instrument and acknowledged it as the _____ of the _____, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: _____

_____
NOTARY PUBLIC, State of Washington
residing at: _____

My Commission expires: _____

STATE OF WASHINGTON)
) ss.
COUNTY OF)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath stated that (he/she) was authorized to execute the instrument and acknowledged it as the _____ of the _____, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: _____

_____
NOTARY PUBLIC, State of Washington
residing at: _____

My Commission expires: _____

SAMPLE COPY

CITY OF KALAMA, COWLITZ COUNTY

BILL OF SALE

KNOW ALL BY THESE PRESENTS that for and in consideration of the sum of One Dollar ($1.00) and other good and sufficient consideration, receipt whereof is hereby acknowledged, the undersigned grantor(s) _____ do(es) by these presents hereby convey, set over, assign, transfer and sell to the City of Kalama, Cowlitz County, Washington, a municipal corporation, the following described water/sanitary/storm or roadway system and all appurtenances thereto, situated in the City of Kalama, Cowlitz County, Washington:

DESCRIPTION	ALONG	FROM	TO	SIZE	LENGTH

the said grantor(s) hereby warrants that he, they, it, is/are the sole owner(s) of all the property above described; that they have full power to convey all rights herein conveyed and agree to hold the City of Kalama harmless from any and all claims which might result from execution of this document.

IN WITNESS WHEREOF the grantor(s) has/have executed these presents this _____ day of _____, 20__.

STATE OF WASHINGTON)
) ss.
COWLITZ COUNTY)

On this _____ day of _____, 20__, before me the undersigned Notary Public personally appeared _____, to me known to be the individual(s) who executed the within and foregoing instrument and acknowledged that___ he___ signed and sealed the same as _____ free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal the day and year in this certificate above written.

_____
Notary Public in and for the State of Washington

Residing at _____

_____

SAMPLE COPY

AFFIDAVIT OF NO LIENS

STATE OF WASHINGTON)
) ss
COUNTY OF COWLITZ)

Re: _____

The undersigned, being first duly sworn upon oath, depose and say:

I am the developer of a road and/or utility systems, or additions thereto, for the above-referenced project, and hereby certify as follows:

1. That there are no liens against or which may be filed against said project.

2. That all debts, labor bills, and the state sales taxes have been paid in connection with the above-referenced project.

_____

By:_____

SUBSCRIBED AND SWORN to before me this ___ day of _____, 20__.

_____

Notary Public in and for the State of
Washington, residing at

(Notary Seal)

CITY OF KALAMA

DEVELOPER EXTENSION CHECKLIST

NAME OF PLAT _____

DEVELOPER _____

CONTACT PERSON _____ PHONE _____

DEVLOPER'S ENGINEER _____ PHONE _____

CONTRACTOR _____ PHONE _____

JURISDICTION _____ COUNTY _____

RESIDENTIAL _____ MULTI-FAMILY _____ COMMERCIAL _____

INDUSTRIAL _____ MIXED _____

	DATE	INITIAL IF COMPLETED
MASTER PLAN RECEIVED	_____	_____
DEVELOPER AGREEMENT/FEE	_____	_____
SEPA/EIS RECEIVED	_____	_____
THRESHOLD DETERMINATION	_____	_____
CIVIL PLANS COMPLETED AND TRANSMITTED AND APPROVED	_____	_____
COWLITZ COUNTY FIRE MARSHALL APPROVAL	_____	_____
PERFORMANCE BOND RECEIVED	_____	_____
INSURANCE BOND RECEIVED	_____	_____
PRE-CONSTRUCTION CONFERENCE	_____	_____
CITY, COUNTY & STATE PERMITS APPLIED FOR	_____	_____
CITY, COUNTY & STATE PERMITS RECEIVED	_____	_____
CONSTRUCTION		
1. START	_____	_____

INSPECTION REPORT

1. CONSTRUCTION SCHEDULE (Begins/Ends) _____ _____

2. FINAL INSPECTION - PUNCH LIST _____ _____

CONSTRUCTION FILE SENT TO CITY PUBLIC WORKS DIRECTOR _____ _____

PUBLIC WORKS DIRECTOR'S APPROVAL _____ _____

BILL OF SALE RECEIVED, REVIEWED & APPROVED _____ _____

EASEMENTS RECEIVED, APPROVED, AND RECORDED _____ _____

MAINTENANCE BOND RECEIVED _____ _____

ATTORNEY'S REVIEW MEMO _____ _____

EASEMENTS RECORDED BY DEVELOPER _____ _____

TITLE REPORT ON EASEMENT RECEIVED _____ _____

COUNCIL MINUTES FILED _____ _____

SERVICE AGREEMENT COMPLETED _____ _____

AUTHORITY TO INSTALL SERVICES, AS APPLICABLE _____ _____

"AS-BUILTS" COMPLETED APPROVED AND IN CITY'S FILE _____ _____

ALL FEES PAID (Connection, inspector, engineering, etc.)

*Final approval granted this _____ day of _____, 19___.

_____	_____	_____
City Official's Signature	Title	Date
_____	_____	_____
City Official's Signature	Title	Date

PERFORMANCE BOND

DATE POSTED:_____
PROJECT COMPLETION DATE:_____

RE: Kalama Subdivision/Plat/Permit No.: _____
Owner/Developer/Contractor: _____
Project Address: _____

KNOW ALL PERSONS BY THESE PRESENTS: That we, _____, (hereinafter called the "Principal"), and _____, a corporation organized under the laws of the State of _____, and authorized to transact surety business in the State of Washington (hereinafter called the "Surety"), are held and firmly bound unto the City of Kalama, Washington, in the sum of _____ dollars ($_____), lawful money of the United States of America, for the payment of which sum we and each of us bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, by these presents. THE CONDITIONS of the above obligation are such that:

WHEREAS, the above named Principal has entered into a certain agreement with the City, or has been granted approval by the City, for a _____ within the City;

WHEREAS, the agreement or the approval granted by the City requires that certain improvements be made in connection with construction of the project; and that such improvements be constructed in full compliance with City standards, and the plans and specifications submitted with the project, as required by the City; and

WHEREAS, the agreement or the approval granted by the City requires that the improvements are to be made or constructed within a certain period of time, unless an extension is granted in writing by the City; and

NOW, THEREFORE, it is understood and agreed that this obligation shall continue in effect until released in writing by the City of Kalama, but only after the Principal has performed and satisfied the following conditions:

A. Conditions.

1. The improvements to be constructed by the Principal include:

_____

_____

_____

_____

2. The Principal must construct the improvements to conform to the design, location, materials and other specifications for the indicated site improvements, as required by the City in the above-referenced City file. In addition, the Principal must construct the improvements according to the applicable ordinances and standards of the City and/or state statutes, as the same now exist or are hereafter amended.

3. The Principal must have completed all improvements required by the above-referenced conditions, plans and City file within _____, which time period shall begin to run from the earlier of _____, or the date of the start of development, unless an extension is granted by the City.

4. The Principal must have paid all sums owing to laborers, contractors, mechanics, subcontractors, materialmen and suppliers or others as a result of such work for which a lien against any City property has arisen or may arise.

5. The Principal must obtain acceptance by the City of the work completed, all on or before thirty (30) days after the completion date set forth in paragraph 3 above.

B. Default.

1. If the Principal defaults and does not perform the above conditions within the time specified, then the Surety shall, within twenty (20) days of demand of the City, make a written commitment to the City that it will either:

a). remedy the default itself with reasonable diligence pursuant to a time schedule acceptable to the City; or

b). tender to the City within an additional ten (10) days the amount necessary, as determined by the City, for the City to remedy the default, up to the total bond amount.

Upon completion of the Surety's duties under either of the options above, the Surety shall then have fulfilled its obligations under this bond. If the Surety elects to fulfill its obligation pursuant to the requirements of subsection B(1)(b), the City shall notify the Surety of the actual cost of the remedy, upon completion of the remedy. The City shall return, without interest, any overpayment made by the Surety, and the Surety shall pay to the City any

actual costs which exceeded the City's estimate, limited to the bond amount.

2. In the event the Principal fails to complete all of the above referenced improvements within the time period specified by the City, then the City, its employees and agents shall have the right at the City's sole election to enter onto said property described above for the purpose of completing the improvements. This provision shall not be construed as creating an obligation on the part of the City or its representatives to complete such improvements.

C. Corrections. Any corrections required by the City shall be commenced within seven (7) days of notification by the City and completed within thirty (30) days of the date of notification. If the work is not performed in a timely manner, the City shall have the right, without recourse to legal action, to take such action under this bond as described in Section B above.

D. Extensions and Changes. No change, extension of time, alteration or addition to the work to be performed by the Principal shall affect the obligation of the Principal or Surety on this bond, unless the City specifically agrees, in writing, to such alteration, addition, extension or change. The surety waives notice of any such change, extension, alteration or addition thereunder.

E. Enforcement. It is specifically agreed by and between the parties that in the event any legal action must be taken to enforce the provisions of this bond or to collect said bond, the prevailing party shall be entitled to collect its costs and reasonable attorney fees as a part of the reasonable costs of securing the obligation hereunder. In the event of settlement or resolution of these issues prior to the filing of any suit, the actual costs incurred by the City, including reasonable attorney fees, shall be considered a part of the obligation hereunder secured. Said costs and reasonable legal fees shall be recoverable by the prevailing party, not only from the proceeds of this bond, but also over and above said bond as a part of any recovery (including recovery on the bond) in any judicial proceeding. The Surety hereby agrees that this Agreement shall be governed by the laws of the State of Washington. Venue of any litigation arising out of this Agreement shall be in Cowlitz County Superior Court.

F. Bond Expiration. This bond shall remain in full force and effect until the obligations secured hereby have been fully performed and a bond guaranteeing maintenance of all improvements for a period of _____ (____) months from acceptance has been submitted to the City in an amount to be determined by the City Engineer, in a form suitable to the City and until released in writing by the City.

DATED this ___ day of _____, 2003.

SURETY COMPANY DEVELOPER/OWNER

By: _____
Its _____

By _____
Its _____

Business Name: _____

Business Name: _____

Business Address: _____

Business Address: _____

City/State/Zip Code: _____

City/State/Zip Code: _____

Telephone Number: _____

Telephone Number: _____

CITY OF KALAMA

By: _____
Its _____

City of Kalama
_____
Kalama, Washington 98___
(360) _____

APPROVED AS TO FORM:

_____
Office of the City Attorney

CHECK FOR ATTACHED NOTARY SIGNATURE

____ Individual (Form P-1)
____ Corporation (Form P-2)

MAINTENANCE BOND

DATE POSTED: _____
PROJECT COMPLETION DATE: _____

RE: Kalama Subdivision/Plat/Permit No.: _____
Owner/Developer/Contractor: _____
Project Address: _____

KNOW ALL PERSONS BY THESE PRESENTS: That we, _____, (hereinafter called the "Principal"), and _____, a corporation organized under the laws of the State of _____, and authorized to transact surety business in the State of Washington (hereinafter called the "Surety"), are held and firmly bound unto the City of Kalama, Washington, in the sum of _____ dollars ($_____), lawful money of the United States of America, for the payment of which sum we and each of us bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, by these presents. THE CONDITIONS of the above obligation are such that:

WHEREAS, the above named Principal has constructed and installed certain improvements in connection with a project as described above within the City; and

WHEREAS, in order to provide security for the obligation of the Principal to repair and/or replace said improvements against defects in workmanship, materials or installation for a period of _ __ (_) months after written and final acceptance of the same and approval by the City; and

WHEREAS, in order to enable the City to release the performance bond filed by the Principal with the City in connection with such improvements;

NOW, THEREFORE, this Maintenance Bond has been secured and is hereby submitted to the City. It is understood and agreed that this obligation shall continue in effect until released in writing by the City of Kalama, but only after the Principal has performed and satisfied the following conditions:

A. The work or improvements installed by the Principal and subject to the terms and conditions of this Bond are as follows:

_____
_____
_____

B. The Principal and Surety agree that the work and improvements installed pursuant to the Performance Bond or other security instrument filed with the City in the above-referenced project shall remain free from defects in material, workmanship and installation (or, in the case of landscaping, shall survive,) for a period of _____ (_____) (years/months) after written and final acceptance of the same and approval by the City. Maintenance is defined as acts carried out to prevent a decline, lapse or cessation of the state of the project or improvements as accepted by the City during the _____ month period after final and written acceptance, and includes, but is not limited to, repair or replacement of defective workmanship, materials or installations.

C. The Principal shall, at its sole cost and expense, carefully replace and/or repair any damage or defects in workmanship, materials or installation to the City-owned real property on which improvements have been installed, and leave the same in as good condition as it was before commencement of the work.

D. The Principal and the Surety agree that in the event any of the improvements or restoration work installed or completed by the Principal as described herein, fail to remain free from defects in materials, workmanship or installation (or in the case of landscaping, fail to survive), for a period of _____ (_____) (years/months) from the date of acceptance of the work by the City, the Principal shall repair and/replace the same within ten (10) days of demand by the City, and if the Principal should fail to do so, then the Surety shall:

1. Within twenty (20) days of demand of the City, make written commitment to the City that it will either:

a). remedy the default itself with reasonable diligence pursuant to a time schedule acceptable to the City; or

b). tender to the City within an additional ten (10) days the amount necessary, as determined by the City, for the City to remedy the default, up to the total bond amount.

Upon completion of the Surety's duties under either of the options above, the Surety shall then have fulfilled its obligations under this bond. If the Surety elects to fulfill its obligation pursuant to the requirements of subsection B(1)(b), the City shall notify the Surety of the actual cost of the remedy, upon completion of the remedy. The City shall return, without interest, any overpayment made by the Surety, and the Surety shall pay to the City any actual costs which exceeded the City's estimate, limited to the bond amount.

2. In the event the Principal fails to make repairs or provide maintenance within the time period requested by the City, then the City, its employees and agents shall have the right at the City's sole election to enter onto said property described above for the purpose of

repairing or maintaining the improvements. This provision shall not be construed as creating an obligation on the part of the City or its representatives to repair or maintain such improvements.

E. Corrections. Any corrections required by the City shall be commenced within ten (10) days of notification by the City and completed within thirty (30) days of the date of notification. If the work is not performed in a timely manner, the City shall have the right, without recourse to legal action, to take such action under this bond as described in Section D above.

F. Extensions and Changes. No change, extension of time, alteration or addition to the work to be performed by the Principal shall affect the obligation of the Principal or Surety on this bond, unless the City specifically agrees, in writing, to such alteration, addition, extension or change. The surety waives notice of any such change, extension, alteration or addition thereunder.

G. Enforcement. It is specifically agreed by and between the parties that in the event any legal action must be taken to enforce the provisions of this bond or to collect said bond, the prevailing party shall be entitled to collect its costs and reasonable attorney fees as a part of the reasonable costs of securing the obligation hereunder. In the event of settlement or resolution of these issues prior to the filing of any suit, the actual costs incurred by the City, including reasonable attorney fees, shall be considered a part of the obligation hereunder secured. Said costs and reasonable legal fees shall be recoverable by the prevailing party, not only from the proceeds of this bond, but also over and above said bond as a part of any recovery (including recovery on the bond) in any judicial proceeding. The Surety hereby agrees that this Agreement shall be governed by the laws of the State of Washington. Venue of any litigation arising out of this Agreement shall be in Cowlitz County Superior Court.

H. Bond Expiration. This bond shall remain in full force and effect until the obligations secured hereby have been fully performed and until released in writing by the City at the request of the Surety or Principal.

DATED this ____ day of _____, 2003.

SURETY COMPANY

By: _____
Its _____

DEVELOPER/OWNER

By _____
Its _____

Business Name: _____

Business Address: _____

City/State/Zip Code: _____

Telephone Number: _____

Business Name: _____

Business Address: _____

City/State/Zip Code: _____

Telephone Number: _____

CITY OF KALAMA

By: _____
Its _____

City of Kalama

_____
Kalama, Washington 98___
_____

APPROVED AS TO FORM:

_____
Office of the City Attorney

CHECK FOR ATTACHED NOTARY SIGNATURE

____ Individual (Form P-1)
____ Corporation (Form P-2)

LATECOMERS AGREEMENT FOR REIMBURSEMENT
OF MUNICIPAL WATER AND SEWER

THIS AGREEMENT, made this __ day of _____ 2003__, between _____ ___ parties respectively referred to herein as "Owner" and "City".

WITNESSETH:

RECITALS

1. The City owns and operates a sewer system within and adjacent to its limits; and

2. The Owner has constructed, under agreement with the City, pursuant to the Municipal Water and Sewer Facilities Act, RCW 35.91.010, et seq., certain extensions to said system more particularly described on Exhibit "A" attached hereto and incorporated herein by this reference, which additions are capable of serving areas now owned by the Owner; and

3. The area capable of being served by the extensions to said systems described in Exhibit "A", is herein referred to as the "benefitted property," and is more particularly described in Exhibit "B", attached hereto and by this reference incorporated herein; and

4. The extensions to said system described in Exhibit "A" are located within the area served by the City and have not been accepted by the City for maintenance and operation; and

5. The cost of construction of the extensions described in Exhibit "A" under the provisions of said Municipal Water and Sewer Facilities Act amounts to $_____; and

6. The City has determined and the Owners have agreed that the area benefitted by said extensions amounts to _____ lineal front feet of which _____ lineal front feet is directly attributable to the Owner and the remaining benefitted property, resulting in a fair prorata share of the cost of construction of said extensions, to be collected from the owner or owners of any parcel benefitted thereby, and who tap on or connect to said system of $_____ per lineal front foot; and

7. The City and Owner desire and intend by this Agreement to provide for collection of the fair prorata share of the cost of construction of said extensions from the

owners of the benefitted properties (as described on Exhibit "B") who did not contribute to the original cost thereof, under the provisions of the Municipal Water and Sewer Facilities Act, PROVIDED, that nothing contained herein shall be construed to affect or impair in any manner the right of the City to regulate the use of its said system of which the extensions described in Exhibit "A" shall become a part under the terms of this Agreement, pursuant to the provisions of any ordinance, resolution, or policy now or hereafter in effect. The imposition by the City of any such requirement shall not be deemed an impairment of this Agreement though it may be imposed in such a manner as to refuse service to an owner of the benefitted property in order to secure compliance with such requirements of the City.

NOW, THEREFORE, in consideration of the mutual covenants and agreements hereafter set forth, it is agreed by and between the parties hereto as follows:

A. All of the recitals set forth above are adopted by the parties as material elements of this Agreement.

B. The Owner shall transfer title, free and clear of all encumbrances to the extensions described in Exhibit "A", by a Bill of Sale to be executed and delivered by Owner to the City upon acceptance of said extensions for maintenance by the City. This Bill of Sale shall contain the Owner's warranty that it has good title and the right to convey said extensions, that it will warrant and defend the City against the claim of interest therein asserted by any third person, that it will guarantee the workmanship and materials in said facility for a period of one year after the date of acceptance by the City and that it warrants said extensions to be fit for the use for which they are intended.

C. Owner further warrants that it is the owner in title absolute of the extensions described in Exhibit "A", that it has neither permitted or suffered any person or other entity to tap onto said extensions prior to the date of this Agreement; that the sum of $_____ is a fair prorata charge to be assessed against the owner of each parcel within the benefitted premises who subsequently tap on to or connect to said facility, and do further warrant that there are no persons, firms or corporations who have filed or have the right to file a lien against said extensions pursuant to the provisions of Title 60 of the Revised Code of Washington, other than those heretofore filed which have been satisfied. In the event that any lien or other claim against said extensions are asserted after conveyance to the City, (which Owner shall defend and save harmless the City from loss on account thereof), and in the event the City shall be put to any expense in defense of such claim or otherwise, then the City shall have a lien against any funds then or thereafter deposited with it pursuant to this Agreement.

D. In consideration of the conveyance of the extensions described in Exhibit "A", the City agrees to accept said extensions for maintenance as part of its facility, after inspection and testing by the Utilities Engineer and his recommendation of acceptance, and further agrees to collect from the owners of the real property benefitted by said facility

who have not heretofore contributed to the cost of construction thereof, and who subsequently tap onto or use the same, a fair prorata share of the cost of such construction based upon the sum of which unit charge shall be conclusively presumed to be a fair prorata charge against the benefitted parcels. The City shall charge, in addition to its usual and ordinary charges made against persons applying for service from said facility and in addition to the amount agreed to be collected by the City in this paragraph, a sum equal to fifteen percent (15%) to be collected from owners or persons tapping onto said facility, which sum shall be used by the City to defray the cost of labor, bookkeeping, and accounting, pursuant to the terms of this Agreement.

E. The City shall pay to the Owner the sums agreed by it to be collected pursuant to the provisions of the preceding paragraph, within sixty (60) days after receipt thereof at the address of the Owner as set forth hereinafter or at such other addresses as the Owner shall provide by Certified Mail. If said payments are returned to the City unclaimed by the Owner or if the City is unable to locate the Owner after six (6) months, the City shall retain all sums then received and all future sums collected under this Agreement.

F. In the event of the assignment or transfer of the rights of the Owner voluntarily, involuntarily, or by operation of law, then the City shall pay all benefits accruing hereunder, after notice, to such successor of the Owner as the City, in its sole judgment, deems entitled to such benefits; and in the event conflicting demands are made upon the City for benefits accruing under this Agreement, then the City may, at its option, commence an action in interpleader joining any party claiming rights under this contract, or other parties which the City believes to be necessary or proper. If the City takes such action, the City shall be discharged from further liability upon paying the person or persons whom any court having jurisdiction of such interpleader action shall determine, and in such action the City shall be entitled to recover its reasonable attorney's fees and cost, which fees and costs shall constitute a lien upon all funds accrued or accruing pursuant to this Agreement.

G. The City agrees not to allow an owner or user of any benefitted property as described in Exhibit "B" to tap onto said facility without such owner or user having first paid to the City a sum equal to the fair prorata charge hereinabove set forth.

H. In the event of any claims arising as a result of the negligent acts or omissions of the City, its officers, officials, employees representatives and agents, in the performance of the services described in this Agreement, the Owner hereby agrees to release, indemnify, defend and hold the City, its officers, officials, employees, agents and representatives, harmless from any and all claims, costs, judgments, awards or liabilities to any person.

I. The City shall be entitled to rely with acquittance on the provisions of this Agreement with respect to the fairness of the prorata charge herein provided, and upon the description of the benefitted properties set forth in Exhibit "B".

J. This Agreement shall become operative upon its being recorded with the Auditor of each County in which any of the benefitted lands are situated, at the expense of the Owner, and shall remain in full force and effect for a period of fifteen (15) years after the date of such recording, or until the Owner, or its successors or assigns, shall have been fully reimbursed as aforesaid, whichever event occurs earlier; provided, that in the event the additions described in Exhibit "A" or any portions thereof shall, during the term of this Agreement, be rendered useless by the redesign or reconstruction of a portion of the City's facility, such determination of uselessness to be in the absolute discretion of the City's Engineer, then the City's obligation to collect for the Owner of the tapping charges provided pursuant to this Agreement shall cease.

K. No waiver, alteration or modification of any of the provisions of this Agreement shall be binding unless in writing and signed by a duly authorized representative of the City and Owner.

L. All communications regarding this Agreement shall be sent to the parties at the addresses listed below, unless notified to the contrary.

City of Kalama
_____
Kalama, WA 98___

(Owner)
_____
_____

M. All of the provisions, conditions, regulations and requirements of this Agreement shall be binding upon the successors and assigns of the Owner, as if they were specifically mentioned herein.

N. This Agreement shall be construed in accordance with the laws of the State of Washington, and jurisdiction of any resulting dispute shall be in Cowlitz County Superior Court, Cowlitz County, Washington. The prevailing party in any legal action shall be entitled to all other remedies provided herein, and to all costs and expenses, including attorneys' fees, expert witness fees or other witness fees and any such fees and expenses incurred on appeal.

O. Any invalidity, in whole or in part, of any of the provisions of this Agreement shall not affect the validity of any other of its provisions.

P. No term or provision herein shall be deemed waived and no breach excused unless such waiver or consent shall be in writing and signed by the party claimed to have waived or consented.

Q. This Agreement, including its exhibits and all documents referenced herein, constitutes the entire agreement between the City and the Owner, and supersedes all proposals, oral or written, between the parties on the subject.

IN WITNESS WHEREOF, the parties have executed this Agreement on the day and year above written.

CITY OF KALAMA

By:_____

_____

OWNERS

_____

ATTEST:

_____
City Clerk

APPROVED AS TO FORM
OFFICE OF THE CITY ATTORNEY

_____
Carol A. Morris

STATE OF WASHINGTON)
) ss.
COUNTY OF COWLITZ)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that (he/she) signed this instrument, on oath stated that (he/she) was authorized to execute the instrument and acknowledged it as the _____ of the City of Kalama, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: _____

_____

_____
(print or type name)
NOTARY PUBLIC in and for the
State of Washington, residing
at: _____
My Commission expires: _____

STATE OF WASHINGTON)
) ss.
COUNTY OF COWLITZ)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that (he/she) signed this instrument, on oath stated that (he/she) was authorized to execute the instrument and acknowledged it as the _____ of _____, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: _____

_____

_____
(print or type name)
NOTARY PUBLIC in and for the
State of Washington, residing
at: _____
My Commission expires: _____

Call for an Inspection at 673-5211 (24Hours in advance)

Inspection must be completed before Final is issued.

PERMIT FOR WORK IN STREET RIGHTS-OF-WAY

Subject to all terms, conditions and provisions written or printed below or on any part of this form, PERMISSION IS HEREBY GRANTED TO:

_____ ("Grantee"), its successors and assigns,

Telephone Number _____ Address _____

City/Town _____ State _____ Zip _____.

(INSERT DESCRIPTION OF PROJECT HERE) Include Site Plan

_____

_____

_____

Project Location: _____.

1. **Facilities to be placed/installed per City approved drawing (attached hereto). See Special Conditions.**
2. **Utility locate to be called In 48 hours prior to commencing work (800-424-5555).**
3. **The City's Public Works Department must be called 24 hours prior to starting work. Contact the Director of Public Works at (360) 673-3706.**
4. All trench depths to comply with industry standards and the finished surface will conform with the City's Development Guidelines and Public Works Standards, unless otherwise approved in writing by the City Director of Public Works or City Engineer.
5. All trenches located beneath paved (asphalt or concrete) surfaces or driveways, or located beneath roadway shoulders (within 3' of edge of road) shall be backfilled with crushed surfacing top course (5/8" minus) or imported gravel base, Class B. Backfill shall be placed and compacted in maximum 6-inch lifts to 95% of standard density. Native excavated materials cannot be utilized for backfill in these areas, unless authorized by the Director of Public Works.
6. All trenches located outside of paved (asphalt or concrete) surfaces or driveways, or outside roadway shoulders shall be backfilled in 6-inch lifts with suitable excavated materials compacted to 95% of standard density. When unsuitable on-site native backfill material exists (material cannot achieve minimum compaction requirements), then trenches shall be backfilled with import gravel base, Class B, material as furnished and supplied by the Grantee. This Permit does not warrant the availability or presence of suitable native materials for trench backfill.
7. All compaction shall be mechanically tamped to achieve the desired level of compaction. Water settling will not be allowed unless authorized by the Director of Public Works.
8. All asphalt pavement restoration shall be made with a minimum 12-inch lift of compacted (95% standard density) crushed rock top course (5/8" minus) and 2-inch minimum (compacted thickness) of asphalt concrete Class B. The pavement restoration shall extend a minimum of 12 inches (each side) beyond the constructed trench widths. When existing asphalt thickness is found to be greater than 2 inches, asphalt concrete Class B shall be placed, in maximum 2-inch lifts, to a depth equal to or exceeding existing pavement thickness. Edges shall be sealed with CSSI and seal surface joint with hot asphalt (AR40000W) and sand blanket.
9. Special trench and pavement restoration will be required for trenching through concrete or "asphalt over concrete" pavement roadways. The Grantee shall procure those additional requirements from the City prior to commencing work under this Permit.
10. Before repair of oil mat and/or asphalt concrete cuts, the City shall be notified (24-hour notice) of the pending work, and all such work shall be made by experienced personnel with adequate equipment. All paving material shall be hot asphalt concrete Class B.
11. No pavement cuts across streets, roads or driveways constructed of asphalt concrete or Portland cement concrete shall be made unless approval has been granted in writing by the Director of Public Works or City Engineer, or his authorized representative, for such crossing. All pavement cuts shall be made only by mechanical saws specifically made for this purpose.
12. At no time during construction will any roadway be entirely closed without written permission. One-way traffic shall normally be maintained.
13. All traffic control and construction signs shall be provided, installed, and maintained in accordance with the latest issue of the Manual on Uniform Traffic Control Devices (MUTCD). All flaggers shall be State certified.
14. Where construction occurs on a graveled surface, roadways and shoulders will be returned to original or better condition.
15. A temporary patch of cold mix asphalt (4-inch minimum compacted thickness) will be placed and maintained on road crossings and driveways after backfilling until a permanent patch can be placed, unless waived by the Director of Public Works. Permanent patching will be done by the Grantee.
16. No work requiring street closures shall be done under this Permit until the party or parties to whom it is granted shall have communicated with and received instructions, if required, from the local school district, police, private utility companies, and local Fire Chief. The Fire Chief and Police Department must be notified prior to and after completion of the work or project.

/__/ Applicable /__/ Nonapplicable

17. This Permit is covered by Bond Number _____ in the amount of $_____ with _____.

/__/ Applicable /__/ Nonapplicable

18. This Permit may be voided unless the work herein contemplated shall have been completed within ninety (90) days or by _____.
19. Payment of all Permit fees shall be calculated by the City of Kalama and paid by the Grantee in accordance with Ordinance 991.

SPECIAL CONDITIONS: _____

GENERAL PROVISIONS APPLICABLE TO ALL PERMITS

a. In accepting this Permit, the Grantee, his/her successors or assigns, agrees to protect the City and save it harmless from all claims, actions or damages of every kind and description which may occur to or be suffered by any person or persons, corporation or property by reason of (1) the performance by Grantee of any work authorized by this Permit of any such work, (2) character of materials used by Grantee in such work or (3) manner of installation, maintenance and operation by Grantee of such work or (4) by the improper occupancy of rights-of-way of public place or public structure by work performed under the terms of this Permit, and in case any suit or action is brought against said City for damages arising out of or by reason of any of the above causes, the Grantee, its successors or assigns, will upon notice to it of commencement of such action, defend the same at its own sole cost and expense and will satisfy judgment after the said suit or action shall have finally been determined if adverse to the City provided, however, that neither Grantee nor any of his/her successors or assigns shall have any liability or obligation pursuant to this Paragraph (a) with respect to items (1), (2), and/or (3) of this Paragraph (a) unless the Grantee, its successors or assigns shall have been negligent in the performance of such work, selection of materials, or manner of installation, maintenance or operation; provided further, that neither Grantee nor any of its successors or assigns shall have any liability or obligation pursuant to this Paragraph (a) with respect to item (4) of this Paragraph (a) if such occupancy has been approved by the City Director of Public Works or by any other officer, employee or agent of the City; and provided further that neither Grantee nor any of its successors or assigns shall have any liability or obligation pursuant to this Paragraph (a) to the extent that its allegedly negligent act(s) and/or omission(s) when undertaken at the direction of, or pursuant to requirement by, the City Director of Public Works or of any other officer, employee or agent of the City.

b. If the work done under this Permit interferes in any way with the drainage of the City streets, or causes damage, the Grantee shall wholly and at his/her own expense make such provisions as the City Director of Public Works (or his authorized representative) may direct to take care of said drainage and/or damage. Installation of any utilities in any City storm conveyance system is strictly prohibited (except right angle crossings). When ditch sections or open conveyance systems are disturbed in the course of any work authorized by this Permit, the ditch section or conveyance system shall be restored and armor plated with quarry spalls to the City's satisfaction. In the course of performing work authorized by this Permit, (1) the Grantee is responsibl for protecting the City's storm system from erosion, and (2) The Grantee shall utilize Best Management Practices outlined by the Department of Ecology. Notwithstanding the foregoing, neither the Grantee nor any of its successors or assigns shall have any liability or obligation pursuant to this Paragraph (d) with respect to any interference with, or damage to, any ditch section or conveyance system if the location of the same was not properly identified by the City or its authorized representative in accordance with Chapter 19.122, Revised Code of Washington.

c. On completion of said work herein contemplated, all rubbish and debris shall be immediately removed and the roadway, and roadside shall be left neat and presentable and satisfactory to the City's Director of Public Works.

d. No work shall be performed on Saturday, Sunday or City holiday, or between the hours of 7:00 p.m. and 6:00 a.m. of any working day, except in case of emergency and then only upon notification and approval of the City.

/__/ Applicable /__/ Nonapplicable

e. The Permit or privilege shall not be deemed or held to be an exclusive one and shall not prohibit the City from granting other permits or franchise rights of like or other nature to other public or private utilities, nor shall it prevent the City from using any of its roads, streets, or public places, or affect its right to full supervision and control over all or any part of them, none of which is hereby surrendered.

f. The City may revoke, annul, change, amend, amplify, or terminate the Permit or any of the conditions herein enumerated if Grantee fails to comply with any or all of its provisions, requirements or regulations as herein set for or through willful or unreasonable neglect, fails to heed or comply with notices given or if the facility herein granted is not installed or operated and maintained in conformity herewith or at all or for any cause or reason whatsoever.

g. In accepting this Permit, the Grantee, its successors and assigns, agrees that any damage or injury done to the property of the City may be corrected by a contractor working for the City or any City employee at the sole expense of the Grantee, its successors or assigns.

I have read and understand all terms and conditions contained on both sides of this document. The undersigned hereby accepts this Permit subject to the terms and conditions as herein set forth.

Dated this _____ day of _____, 200___.

Approved By:

_____

Title: _____

Date: _____

Issued By: _____

Grantee:

Signed: _____

Print Name: _____

Company: _____

Title: _____

Telephone No. _____

For Office Use Only

Inspection Fee $50.00 Receipt #_____

Date Paid _____ By_____

WATER DETAILS

LIST OF WATER DETAILS

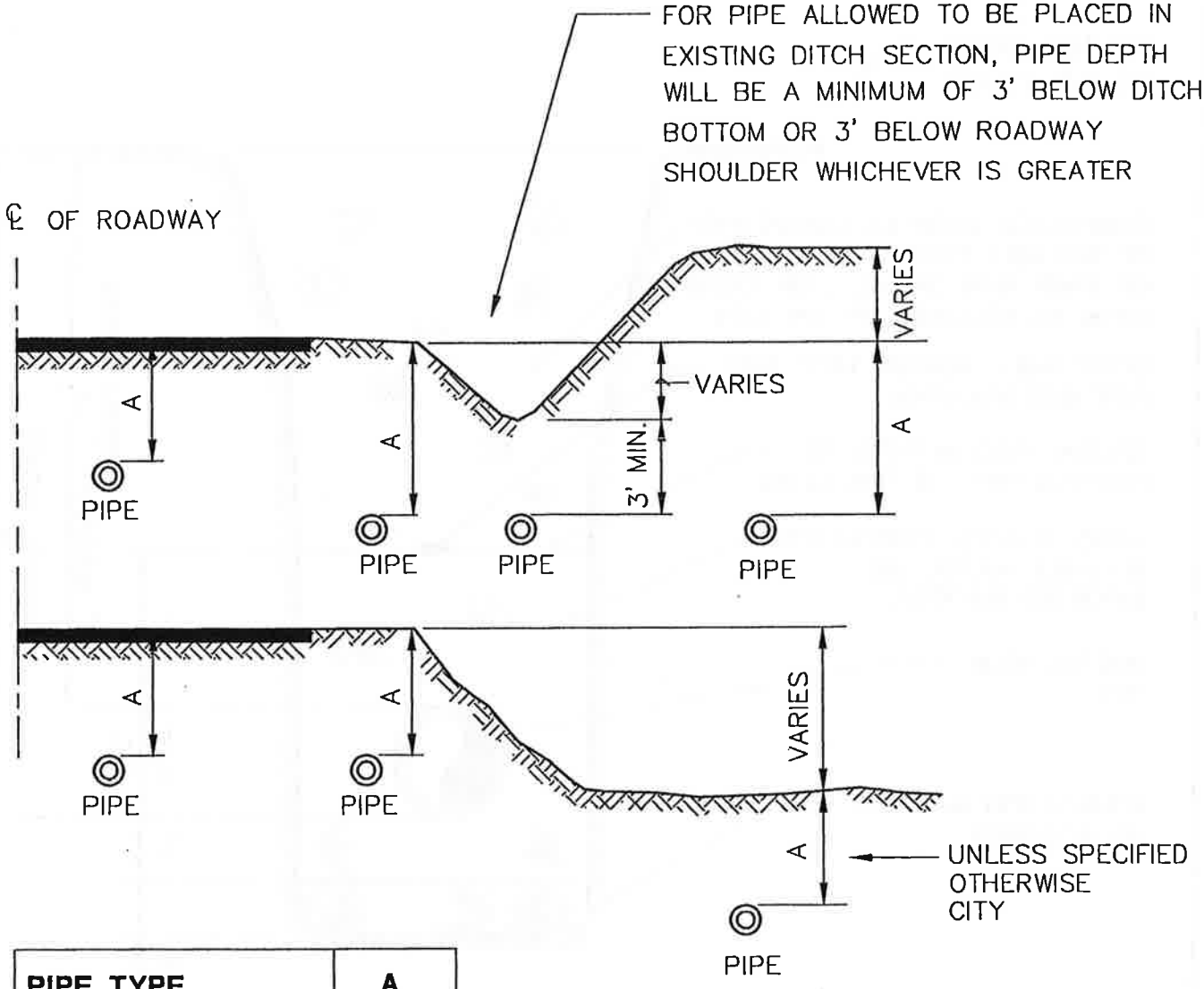
Reduced Pressure Back Flow Device

Air & Vacuum Release Assembly

Double Check Detector with Fire Connection

Detector Double-Check Valve Assembly

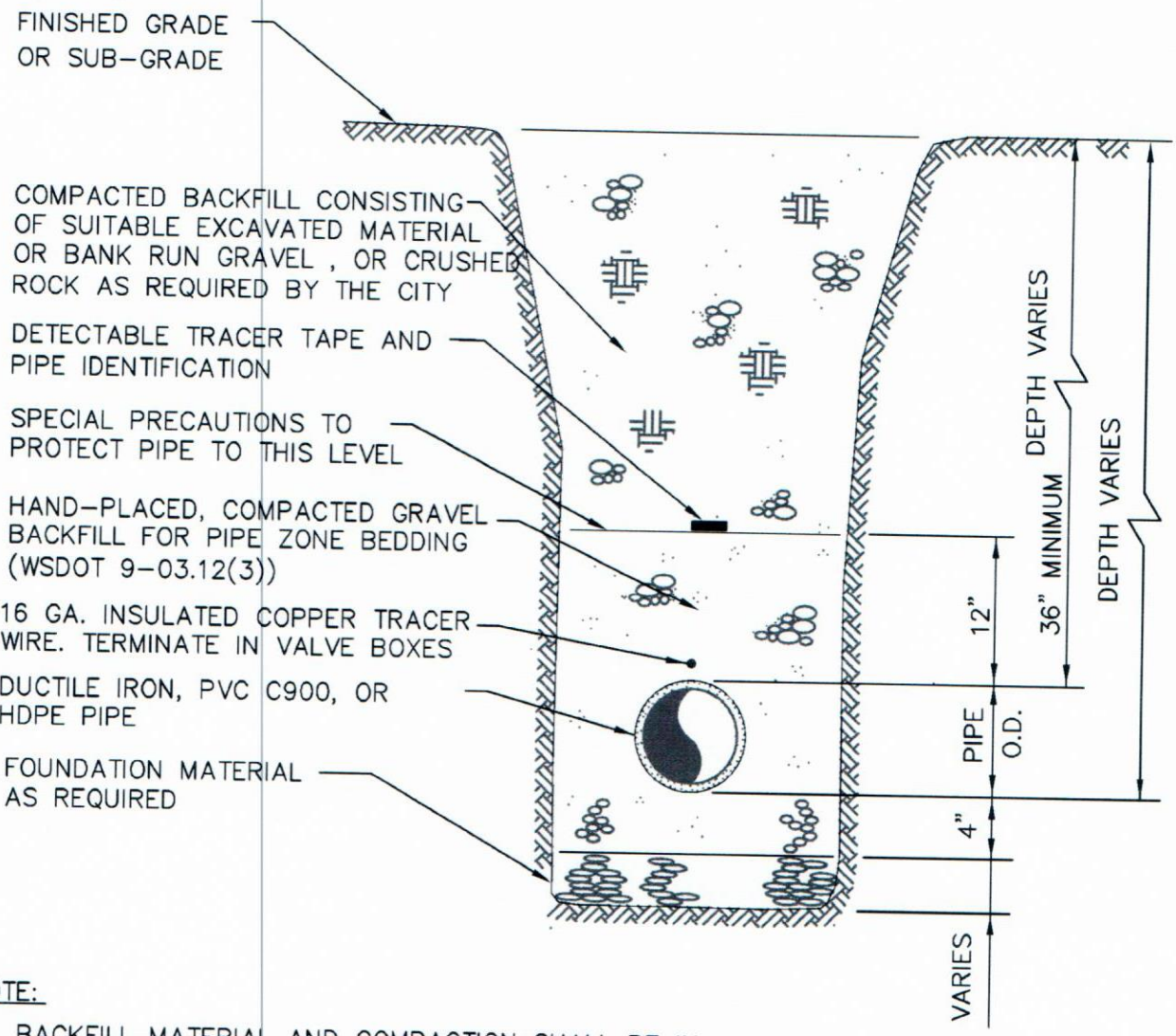
Asphalt Pavement Repair



PIPE TYPE	A
TRANSMISSION	42"
DISTRIBUTION	36"

* MINIMUM DEPTH

CITY OF KALAMA WATER STANDARD DETAILS			
WATER MAIN DEPTH REQUIREMENTS			
APPROVED: Paul M McCrorey PUBLIC WORKS DIR.		6-30-03 DATE	DWG. NO. 1
DATE: 5/03	DRWN: E.S.T.	CHKD: T.L.S.	SCALE: NONE



NOTE:

1. BACKFILL MATERIAL AND COMPACTION SHALL BE IN CONFORMANCE WITH MINIMUM CITY STANDARDS AND\OR THE COWLITZ COUNTY PERMIT REQUIREMENTS, AS MAY BE APPLICABLE.
2. PIPE BEDDING FOR DUCTILE IRON PIPE MAYBE SUITABLE NATIVE IF ALLOWED BY THE CITY.

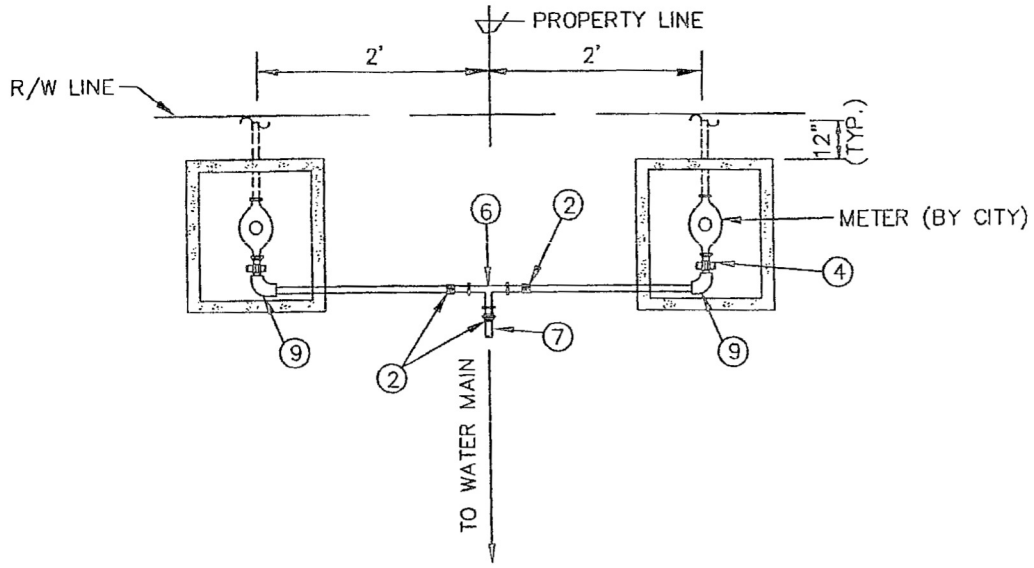
CITY OF KALAMA
WATER STANDARD DETAILS

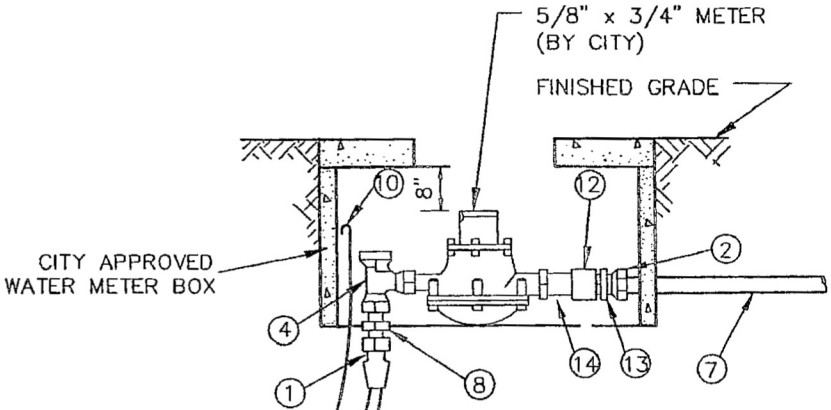
WATER MAIN TRENCH SECTION

APPROVED: _____ 5-21-2014
PUBLIC WORKS DIR. DATE

DWG. NO. 2

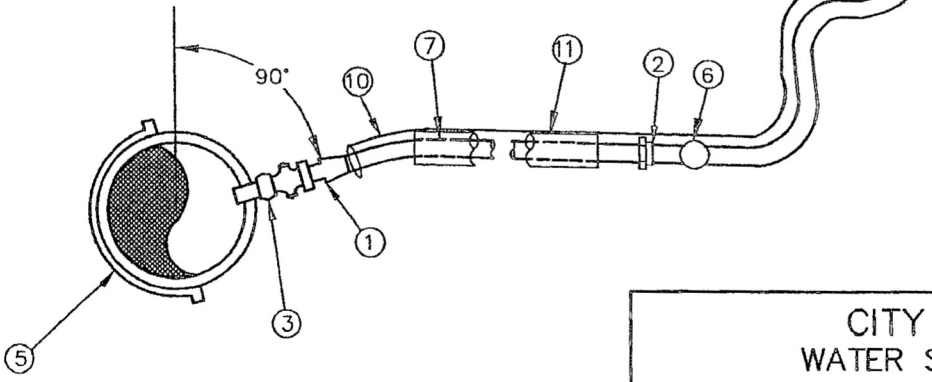
DATE:	DRWN:	CHKD:	SCALE:
2/02	P.E.	M.B.J.	NONE





NOTE:

SET BOTTOM OF METER BOX AT TOP OF INLET AND OUTLET OF METER



CITY OF KALAMA
WATER STANDARD DETAILS

1" AND SMALLER WATER SERVICE WITHOUT METER SETTER

APPROVED: Carlton McCrary 6-30-03 PUBLIC WORKS DEPT. DATE			DWG. NO. 12-A
DATE: 6/03	DRWN: EST/MCH	CHKD: T.J.O.	SCALE: NONE

WATER SERVICE DETAIL 1" AND SMALLER

LEGEND

(1) 1" OR 3/4" FEMALE "INSTA-TITE" FIP X IPS MUELLER H15456

(2) 1" OR 3/4" MALE "INSTA-TITE" FIP X IPS MUELLER H15456

(3) 1" OR 3/4" MIP X MIP CORP STOP EQUAL TO MUELLER H100713

(4) 1" OR 3/4" ANGLE OR STRAIGHT METER STOP WITH LOCKING RING

(5) ROMAC SADDLE SINGLE STRAP FOR PIPE DIAMETERS LESS THAN 10" AND DOUBLE STRAP FOR PIPE DIAMETERS 10" AND GREATER.

(6) 1 X 3/4" X 3/4" BRASS TEE (OPTIONAL)

(7) 1" (DOUBLE SERVICE) HIGH MOLECULAR (200 PSI) IPS "POLY" PIPE (LENGTH AS REQUIRED)

(8) 1" OR 3/4" BRASS NIPPLE (LENGTH AS REQUIRED)

(9) 1" OR 3/4" BASS STREET ELL

(10) 14 GAUGE WIRE FROM MAINLINE TAP TO METER BOX AND EXPOSE 6" MINIMUM IN BOX (RUN INSIDE 2" GALVANIZED STEEL GUARD CONDUIT WHERE APPLICABLE)

(11) INSTALL SERVICE LINE IN 2" GALVANIZED GUARD PIPE (SCH-80) WHEN CROSSING ROADWAY (BENEATH PAVEMENT SECTION)

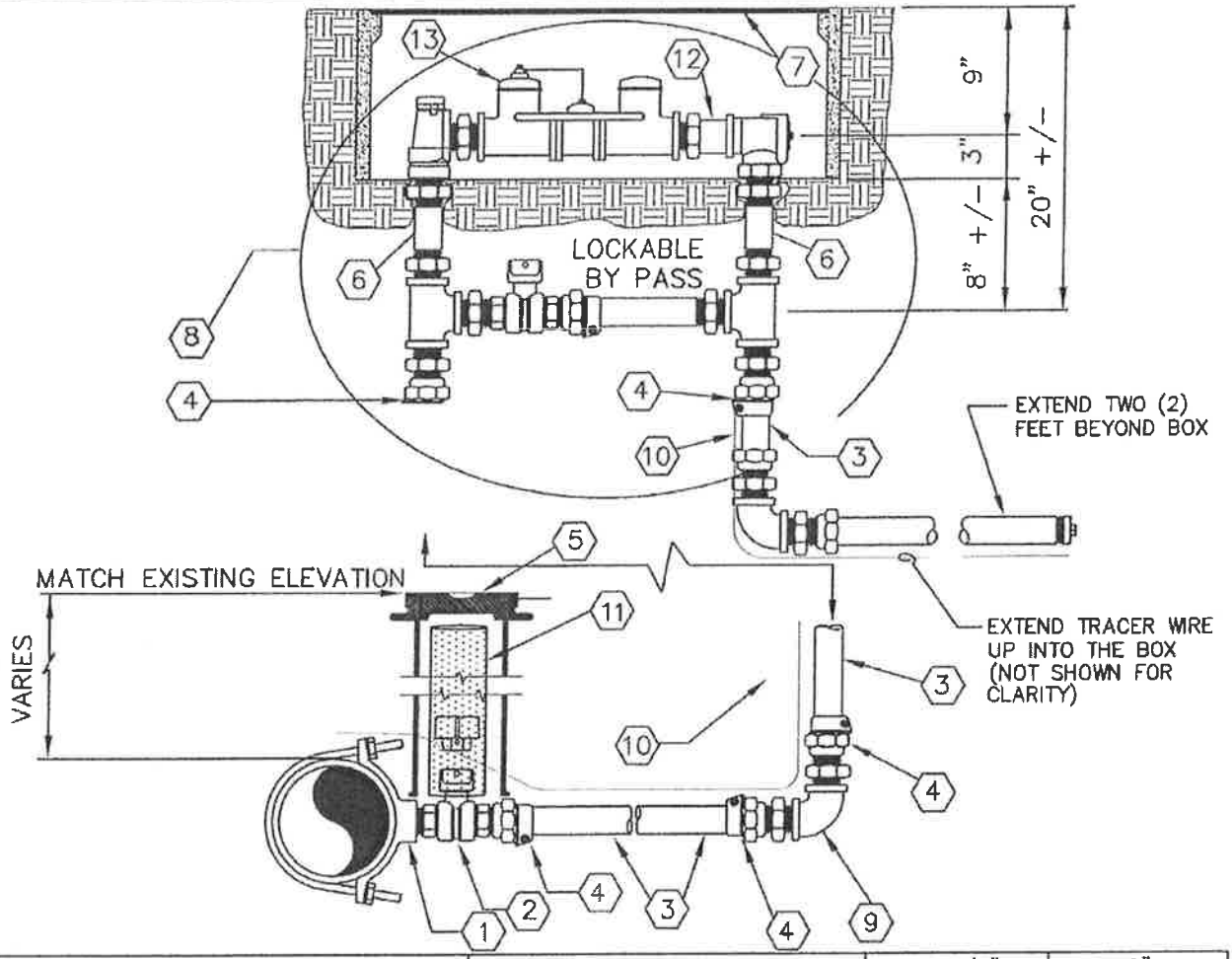
(12) 1" OR 3/4" SWING CHECK

(13) 1" OR 3/4" X 1" BRASS BUSHING (AS NECESSARY)

(14) 1" OR 3/4" X 1" TRAILPIECE (FORD)

(15) CARSON INDUSTRIES 1324-12 METER BOX BODY WITH 1324-5B COVER

CITY OF KALAMA WATER STANDARD DETAILS			
1" AND SMALLER WATER SERVICE WITHOUT METER SETTER			
APPROVED: Carl M McCleary 8/6/08 PUBLIC WORKS DEPT. DATE			DWG. NO. 12-A
DATE: 4/07	DRWN: NDB	CHKD: MBJ	SCALE: NONE



DESCRIPTION	MAKER OR RATING	1-1/2"	2"
1. Double Strap Saddle	Romac or Equal	202 IPT	202 IPT
2. Gate Or Ball Valve w/ 2" Operating Nut	Ford or equal	Ball Valve	Resilient Seat
3. Pipe – Copper	SDR7(200PSI)	B11-666 w/Qt67	GATE
4. Coupling Male			
5. Valve Box (Vancouver Style)	Ford or Equal	C84-66	C84-77
6. Nipple (Brass)	Rich or Equal		
7. Meter Box		1-1/2" x 6"	2" x 6"
8. Meter Setter w/Lockable Bypass	Fogtite #2w/H20 Load	VFH 66-12 B	VFH 77-12 B
9. Brass 90° Elbow	Ford or Equal	1-1/2"	2"
10. Tracer Wire	14 Gauge Copper Wire	Solid	Solid
11. PVC Sleeve Beneath Pavement	PVC-SCH.80	4" Dia.	4" Dia.
12. Ball Valve	Ford	BF 33-6	BF 33-7
13. 1-1/2" Water Meter	Master Meter Dialog 36		
2" Water Meter	Master Meter Ultrasonic Octave w/ Encoder Data Cable		

NOTE: TEMPORARILY INSTALL "SPACER" IN METER SETTER UNTIL METER IS INSTALLED

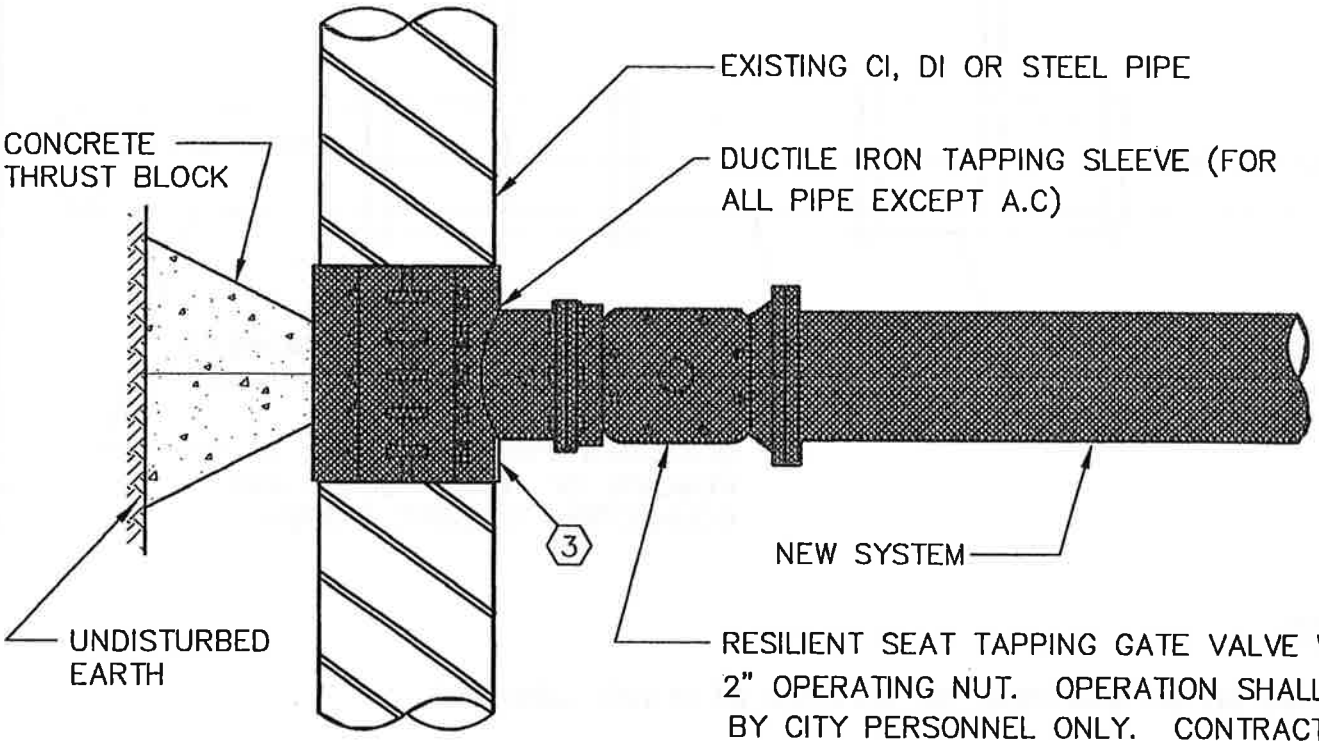
CITY OF KALAMA
WATER STANDARD DETAILS

1-1/2" & 2" WATER SERVICE

APPROVED: _____ 11-4-2013
PUBLIC WORKS DEPT. DATE

DWG. NO. 13

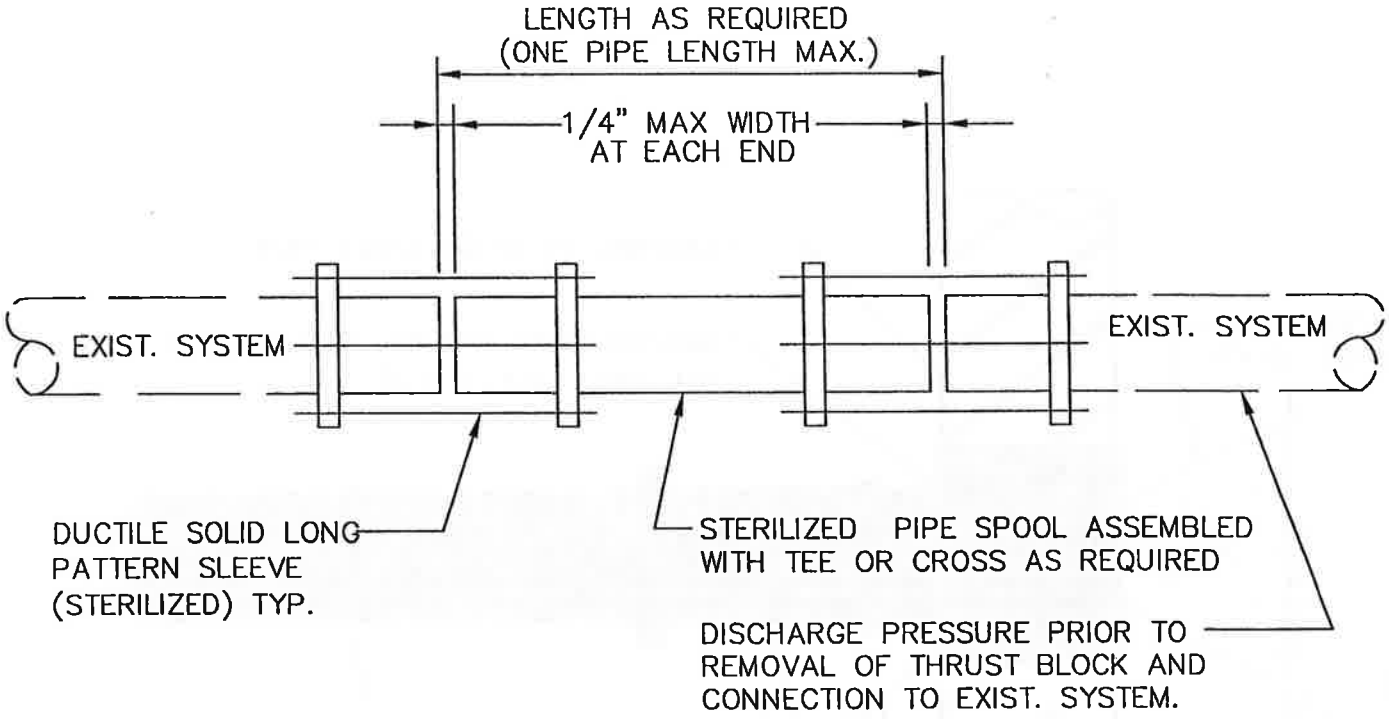
DATE:	DRWN:	CHKD:	SCALE:
11/13	EST/MCH	T.J.O.	NONE



NOTE:

1. VALVE BOX TO HAVE A LOCKING LID UNTIL ACCEPTED BY THE CITY
2. O.D. STEEL PIPE SHALL USE S.S. SLEEVE (FUSION COATED)
3. STAINLESS STEEL SLEEVE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY
4. DELIVER PIPE "COUPON" TO CITY

CITY OF KALAMA WATER STANDARD DETAILS			
WET TAP CONNECTION			
APPROVED: Carl M. McCrary 5-29-03 PUBLIC WORKS DEPT. DATE			DWG. NO. 6
DATE: 11/97	DRWN: EST/MCH	CHKD: T.J.O.	SCALE: NONE



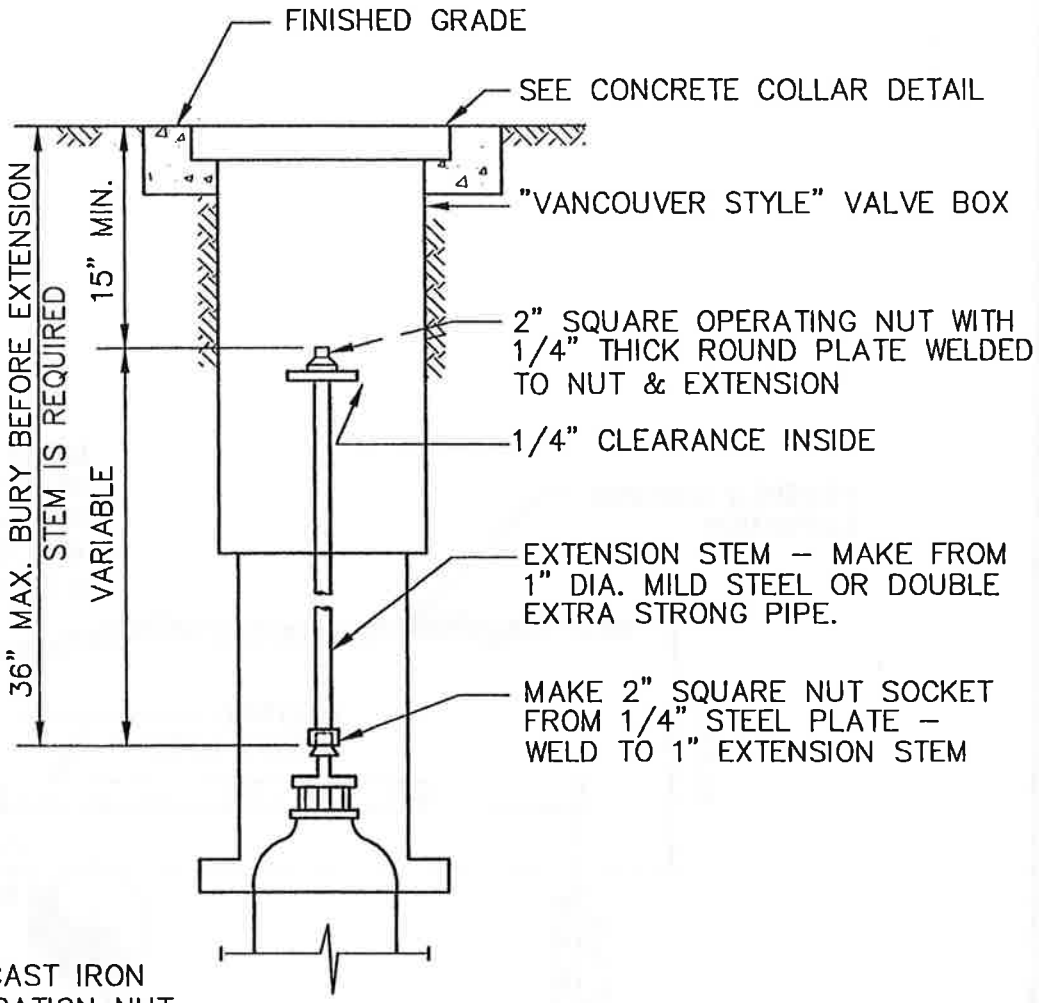
NOTE:

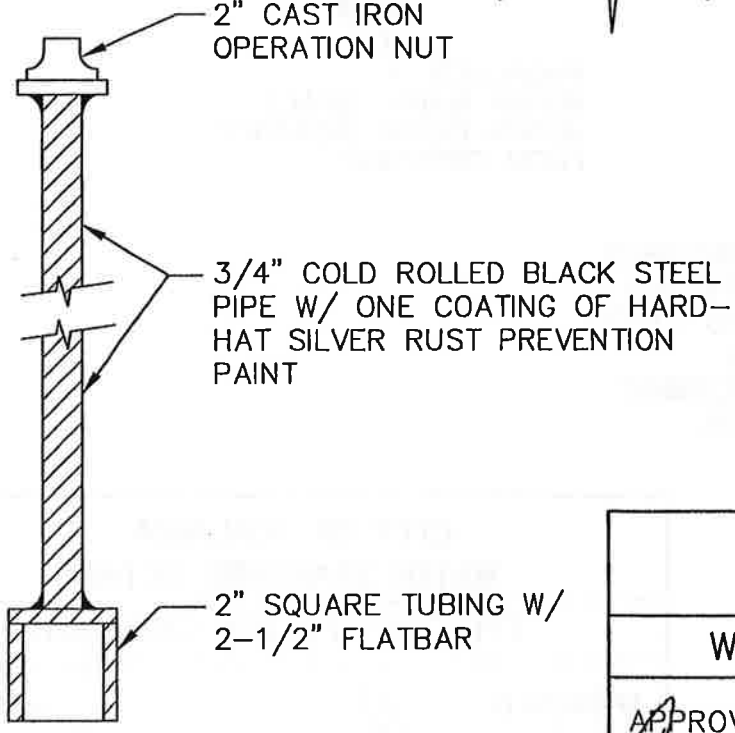
① NO DEFLECTION SHALL BE ALLOWED AT EITHER COUPLING.

② CUT–IN CONNECTIONS ON STEEL PIPE TO USE D.I. x O.D. STEEL TRANSITION COUPLINGS ROMAC OR EQUAL.

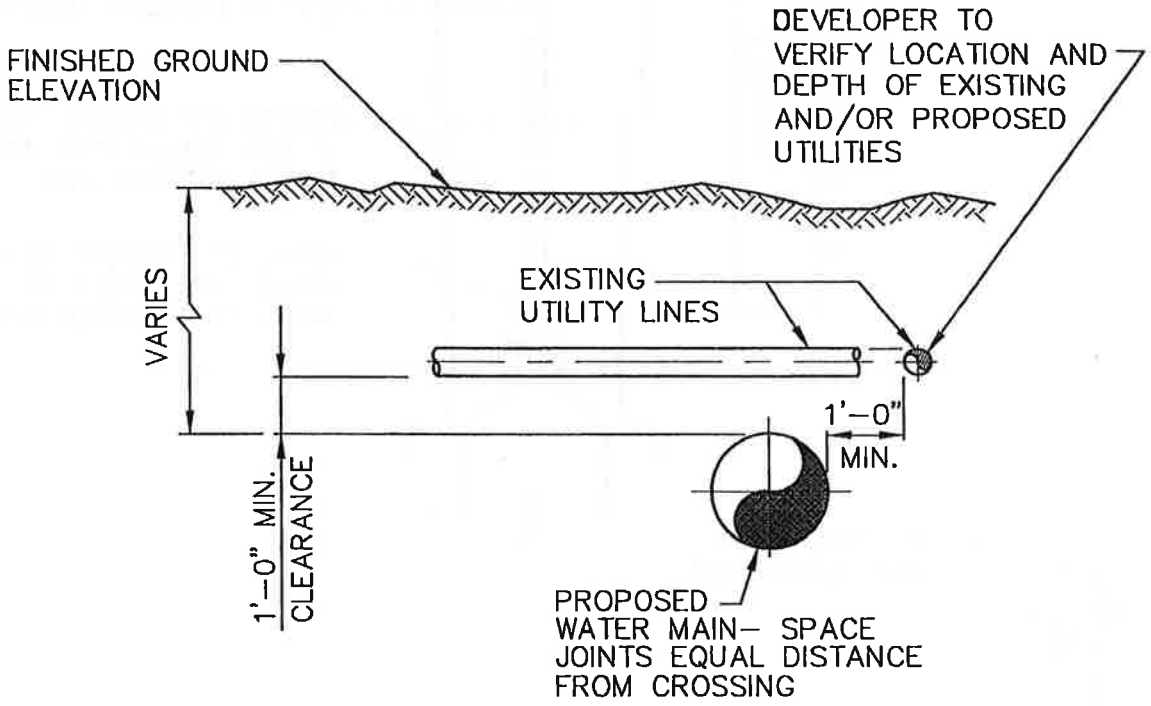
③ IN–LINE VALVE(S) IN EXISTING SYSTEM MAY BE REQUIRED AT THE SOLE DISCRETION OF THE CITY AT ALL NEW INTERTIE LOCATIONS. (NOTE: VALVE(S) ARE NOT SHOWN ABOVE FOR CLARITY)

CITY OF KALAMA WATER STANDARD DETAILS			
CUT IN CONNECTION			
APPROVED: Carl M. Mahony 5-29-03 PUBLIC WORKS DEPT. DATE			DWG. NO. 7
DATE: 11/97	DRWN: EST/MCH	CHKD: T.J.O.	SCALE: NONE





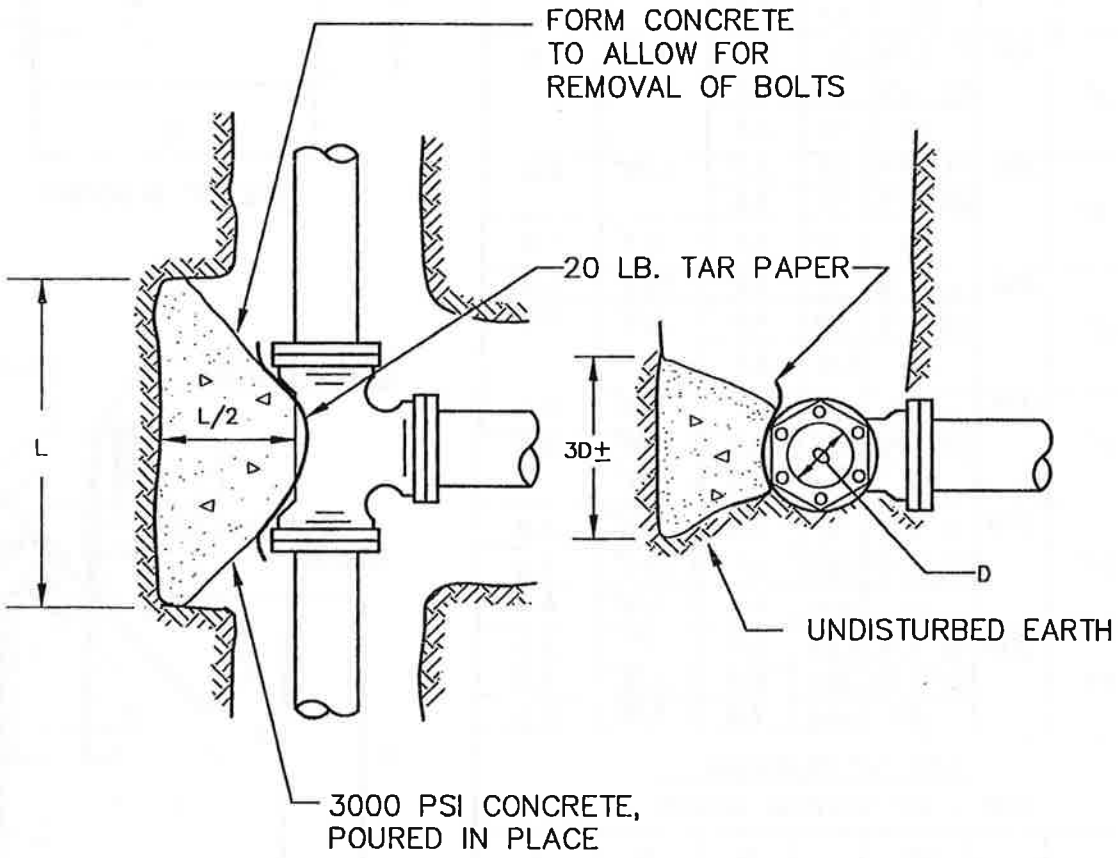
CITY OF KALAMA WATER STANDARD DETAILS			
WATER VALVE STEM EXTENSION			
APPROVED: Paul M. McCrary 5-29-03 PUBLIC WORKS DIR. DATE			DWG. NO. 21
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE



NOTE: CONCRETE ENCASEMENT (BEDDING) SHALL BE UTILIZED, IF APPROVED BY THE CITY, AT LOCALIZED UTILITY CROSSING IF MINIMUM PIPE SEPARATION (ELEVATION) CANNOT BE MAINTAINED / ACHIEVED.

CITY OF KALAMA WATER STANDARD DETAILS			
TYPICAL UTILITY CROSSING			
APPROVED: Carl M. McCrary 5-29-03 PUBLIC WORKS DIR. DATE			DWG. NO 3
DATE: 11/97	DRWN: EST/MCH	CHKD: T.L.S.	SCALE: NONE

MINIMUM BEARING AREA TABLE					
FITTING D	TEE	90°	45°	22 1/2°	11 1/4°
6"	4 SQ.FT.	6 SQ.FT.	3 SQ.FT.	2 SQ.FT.	2 SQ.FT.
8"	7 SQ.FT.	10 SQ.FT.	6 SQ.FT.	3 SQ.FT.	2 SQ.FT.
10"	10 SQ.FT.	15 SQ.FT.	9 SQ.FT.	5 SQ.FT.	3 SQ.FT.
12"	14 SQ.FT.	22 SQ.FT.	12 SQ.FT.	6 SQ.FT.	4 SQ.FT.
16"	25 SQ.FT.	38 SQ.FT.	21 SQ.FT.	11 SQ.FT.	7 SQ.FT.
18"	32 SQ.FT.	48 SQ.FT.	27 SQ.FT.	14 SQ.FT.	8 SQ.FT.



PLAN **ELEVATION**

NOTE:

1. BEARING AREA TABLE BASED ON 250 PSI PRESSURE AND 2000 PSF SOIL BEARING. IF PRESSURE IS GREATER OR SOIL BEARING IS LESS, THE THRUST BLOCK SIZE SHALL BE INCREASED.
2. ALL FITTINGS SHALL BE RESTRAINED JOINT W/ ROMAC GRIP RINGS.

THIS TABLE REPRESENTS THE "MINIMUM" CONSTRUCTION STANDARDS. THE DEVELOPER'S ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE SIZE OF ALL THRUST BLOCKS BASED ON EXISTING AND LOCAL CONDITIONS.

CITY OF KALAMA
WATER STANDARD DETAILS

CONCRETE THRUST BLOCK

APPROVED: Carl M. McCary 5-29-03
PUBLIC WORKS DIR. DATE

DWG. NO. 4

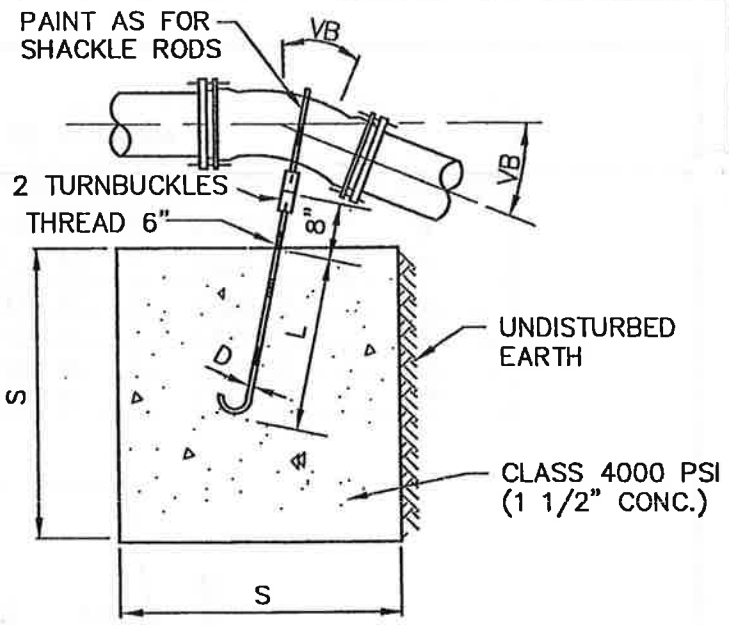
DATE:	DRWN:	CHKD:	SCALE:
2/02	P.E.	M.B.J.	NONE

TYPE "A" BLOCKING
FOR 11 1/4°–22 1/2°–30° VERTICAL BENDS

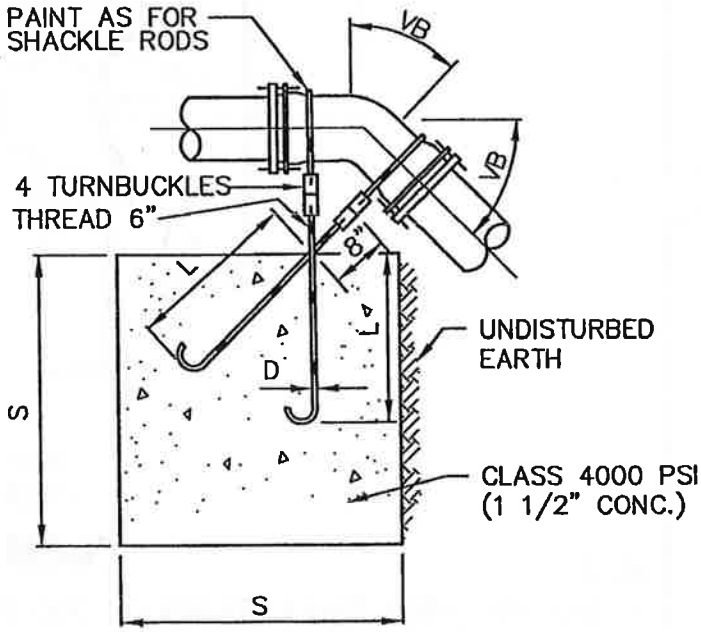
PIPE SIZE NOMINAL DIAMETER– INCHES	TEST PRESSURE PSI	VB VERTICAL BEND DEGREES	No. OF CU. FT. OF CONC. BLOCKING	S SIDE OF CUBE LIN. FT.	D DIAM. OF SHACKLE RODS (2) INCHES	L DEPTH OF RODS IN CONCRETE LIN. FT.
4"	300	11 1/4	8	2	5/8"	1.5
		22 1/2	11	2.2		2.0
		30	17	2.6		
6"	300	11 1/4	11	2.2	5/8"	2.0
		22 1/2	25	2.9		
		30	41	3.5		
8"	300	11 1/4	16	2.5	5/8"	2.0
		22 1/2	47	3.6		
		30	70	4.1	3/4"	2.5
12"	250	11 1/4	32	3.2	5/8"	2.0
		22 1/2	88	4.5	7/8"	3.0
		30	132	5.1		
16"	225	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"	200	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"	200	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 7/8"	5.5

TYPE "B" BLOCKING
FOR – 45° VERTICAL BENDS

		VB		S	D	L
4"	300	45	30	3.1	5/8"	2.0
6"			68	4.1		
8"			123	5.0		
12"	250		232	6.1	3/4"	2.5
16"	225		478	7.8	1 1/8"	4.0
20"	200		560	8.2	1 1/4"	
24"			820	9.4	1 3/8"	4.5



TYPE "A" BLOCKING



TYPE "B" BLOCKING

THIS TABLE REPRESENTS THE "MINIMUM' CONSTRUCTION STANDARD. THE DEVELOPER'S ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE SIZE OF ALL ANCHOR BLOCKS BASED ON EXISTING AND LOCAL CONDITIONS. FITTINGS SHALL ALSO BE RESTRAINED.

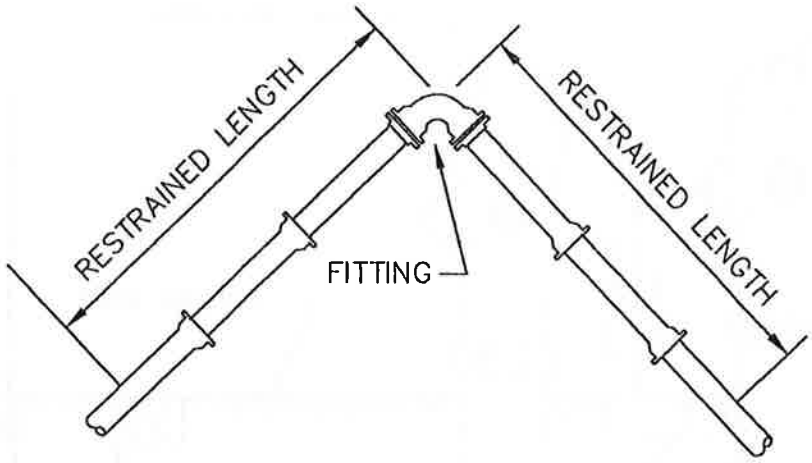
CITY OF KALAMA
WATER STANDARD DETAILS

VERTICAL ANCHOR BLOCK

APPROVED: Carma McCrary 11/12/03
PUBLIC WORKS DIR. DATE

DWG. N
5

DATE:	DRWN:	CHKD:	SCALE:
11/97	EST/MCH	T.L.S.	NONE



PIPE SIZE	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	TEE OR DEAD END CAP
	RESTRAINED LENGTH IN FEET				
4"	40	17	8	4	30
6"	55	23	11	6	39
8"	73	31	15	8	53
10"	88	37	18	9	67
12"	103	43	21	10	82
16"	133	55	27	13	110
18"	145	60	29	15	124

RESTRAINED LENGTHS SHOWN ARE MINIMUM AND FOR LINEAL FEET REQUIRED ON EACH SIDE OF FITTING INDICATED.

FOOTAGES ARE BASED ON 250 PSI PRESSURE AND 42 INCHES COVER. IF PRESSURE IS GREATER OR COVER IS LESS, THE RESTRAINED LENGTH SHALL BE INCREASED. DEVELOPER'S ENGINEER TO DESIGN SAME.

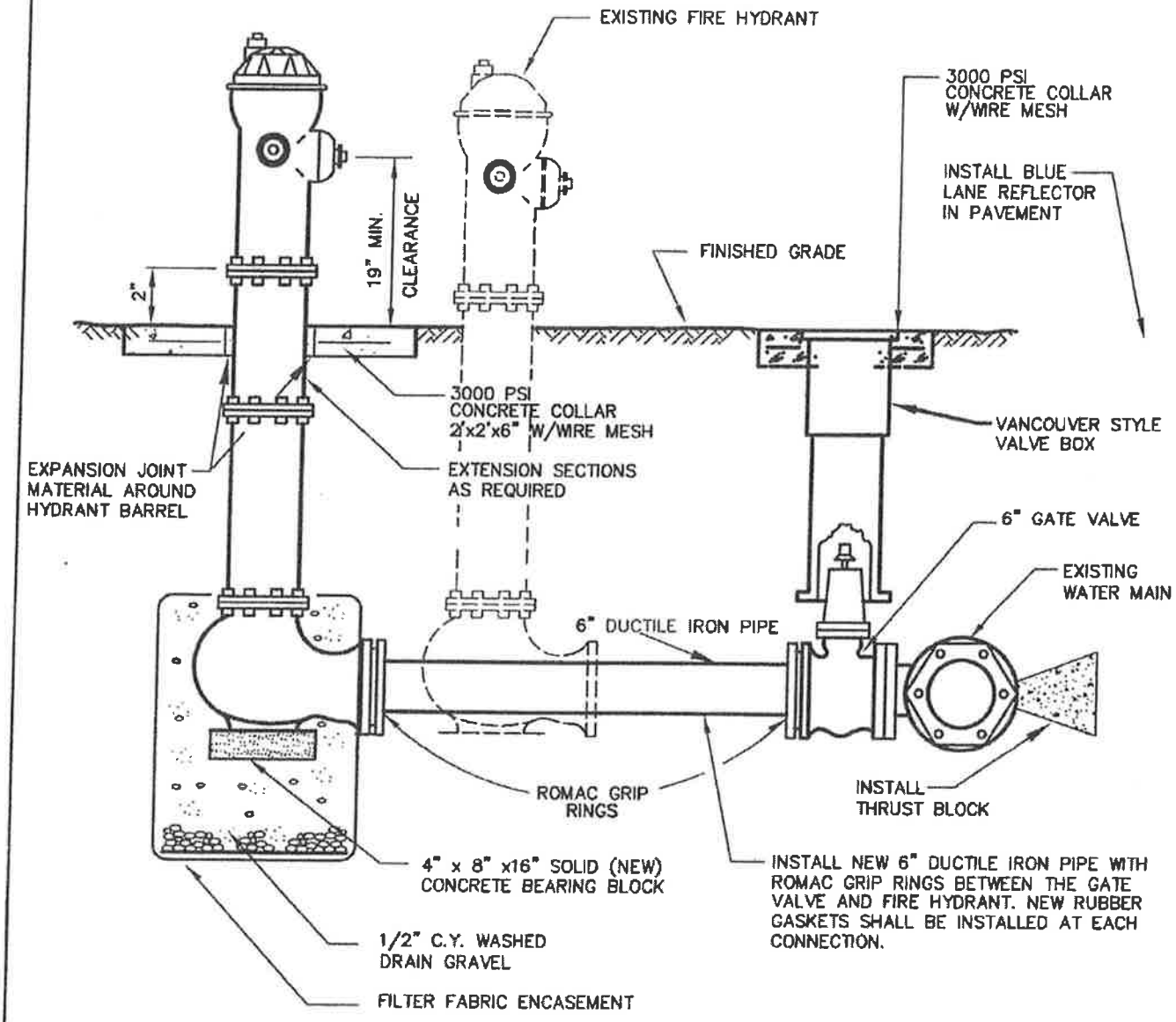
CITY OF KALAMA

THRUST RESTRAINT FOR DUCTILE IRON PIPE

APPROVED: Paul M. McKay 5-29-03
PUBLIC WORKS DIRECTOR DATE

DWG. NO. TRDIP

DATE:	DRWN:	CHKD:	SCALE:
11/97	R.L.O.	T.J.O.	NONE



NOTES :

① ALL RELOCATED FIRE HYDRANTS SHALL HAVE 5 1/4" PUMPER PORTS AND STORZ ADAPTER .

② PROVIDE 15' OF 12" (MIN.) STORM PIPE IN ANY ADJACENT DITCH SECTION. RIP-RAP ENDS AND FILL ABANDONED DITCH SECTION

③ REPAINT FIRE HYDRANT SAFETY YELLOW, BASE No. 288-14 COLOR CODE AX-6732, C-24, T-4432

④ PROVIDE MIN. 3' - 0" CLEARANCE AND LEVEL AREA AROUND RELOCATED HYDRANT

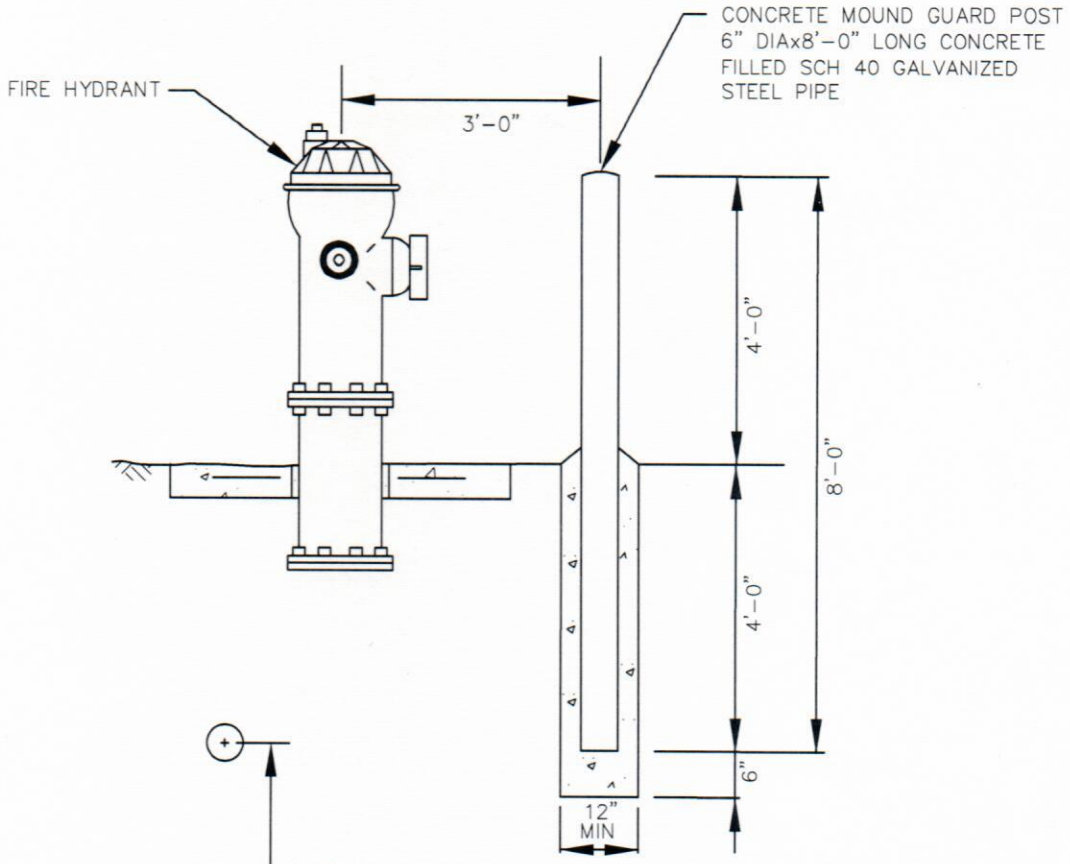
CITY OF KALAMA
WATER STANDARD DETAILS

FIRE HYDRANT RELOCATION

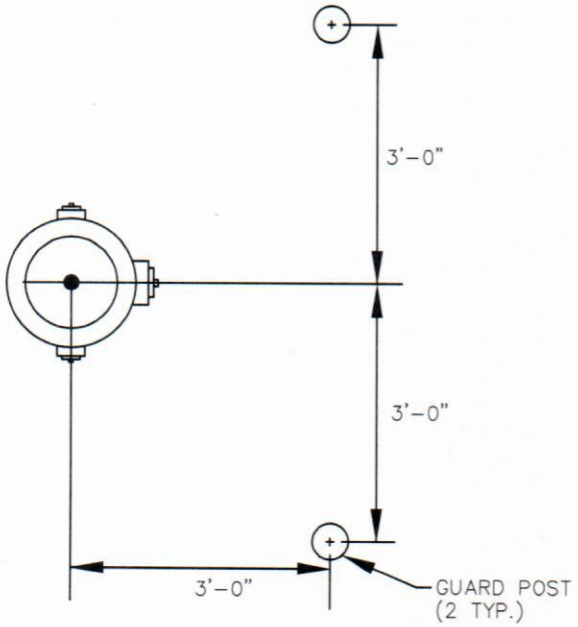
APPROVED: _____ 11-4-2013
PUBLIC WORKS DEPT. DATE

DWG. NO. 9

DATE:	DRWN:	CHKD:	SCALE:
11/13	P.E.	M.B.J.	NONE



SECTION



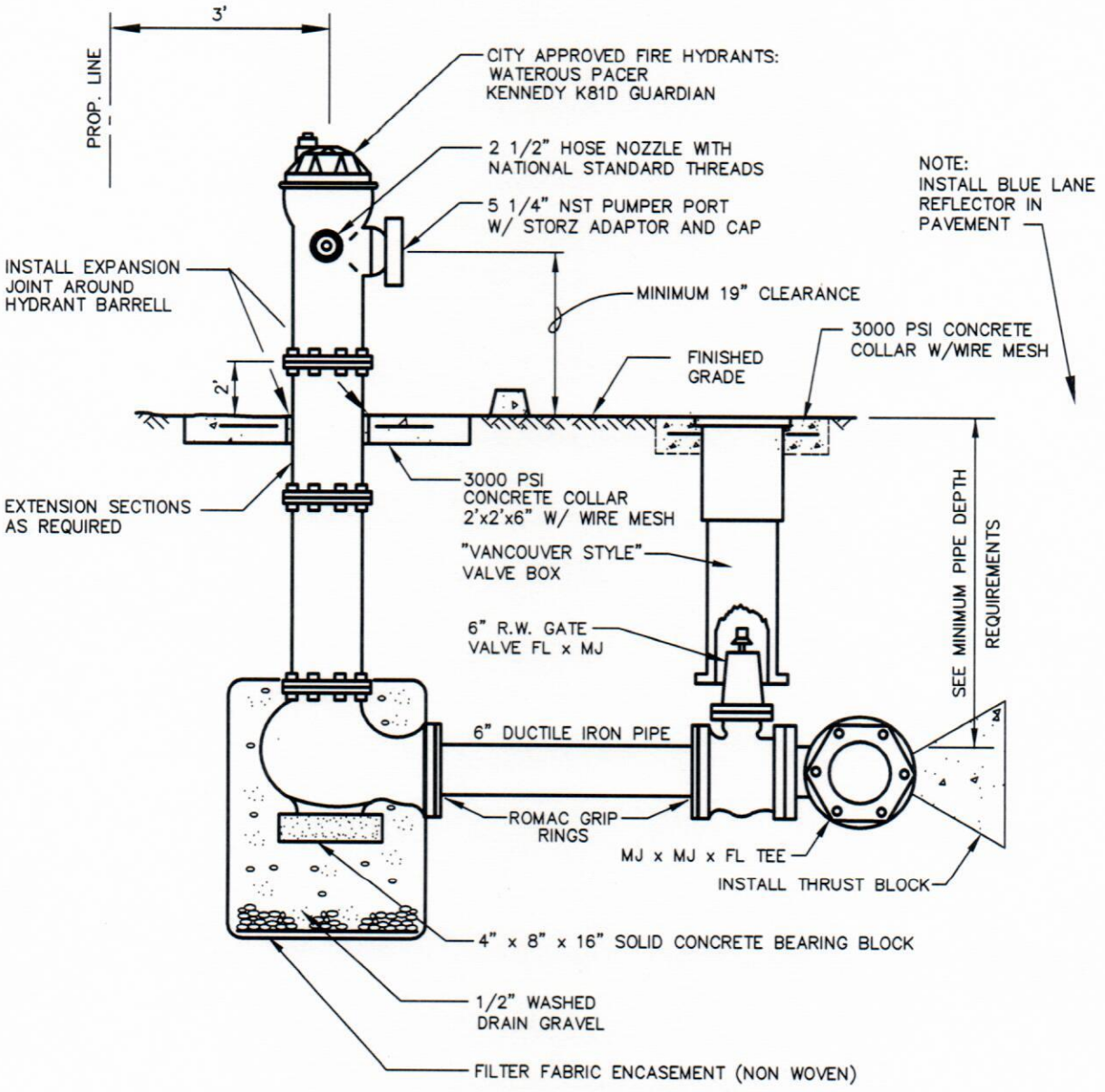
PLAN

* PAINT GUARD POST RUSTOLEUM SAFETY YELLOW BASE No. 288-14, COLOR CODE AX-6732, T-4432

NOTE:

CONCRETE GUARD POATS SHALL BE INSTALLED WHEN REQUIRED BY CITY ENGINEER

CITY OF KALAMA WATER STANDARD DETAILS			
FIRE HYDRANT GUARD POST			
APPROVED: PUBLIC WORKS DEPT. 5-13-2019 DATE			DWG. NO. 8A
DATE: 3/6/19	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE



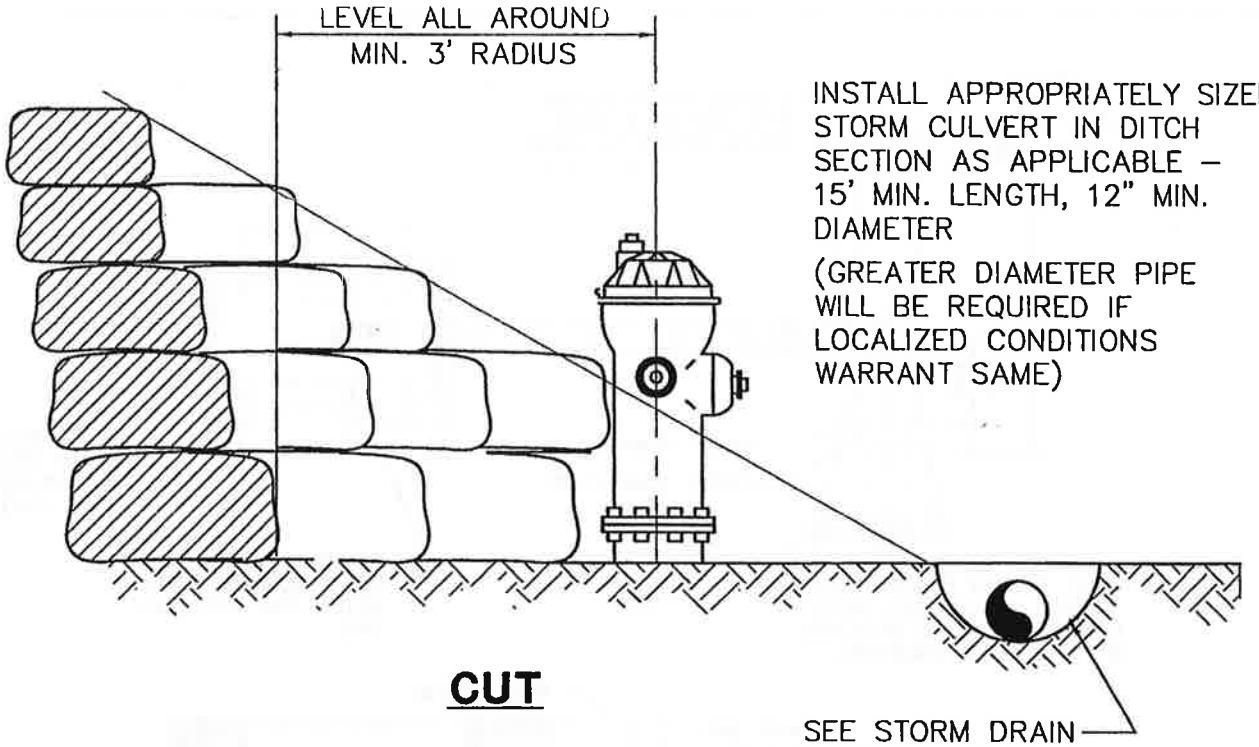
* PAINT FIRE HYDRANT RUSTOLEUM SAFETY YELLOW
BASE No. 288-14, COLOR CODE
AX-6732, T-4432

CITY OF KALAMA
WATER STANDARD DETAILS
FIRE HYDRANT INSTALLATION

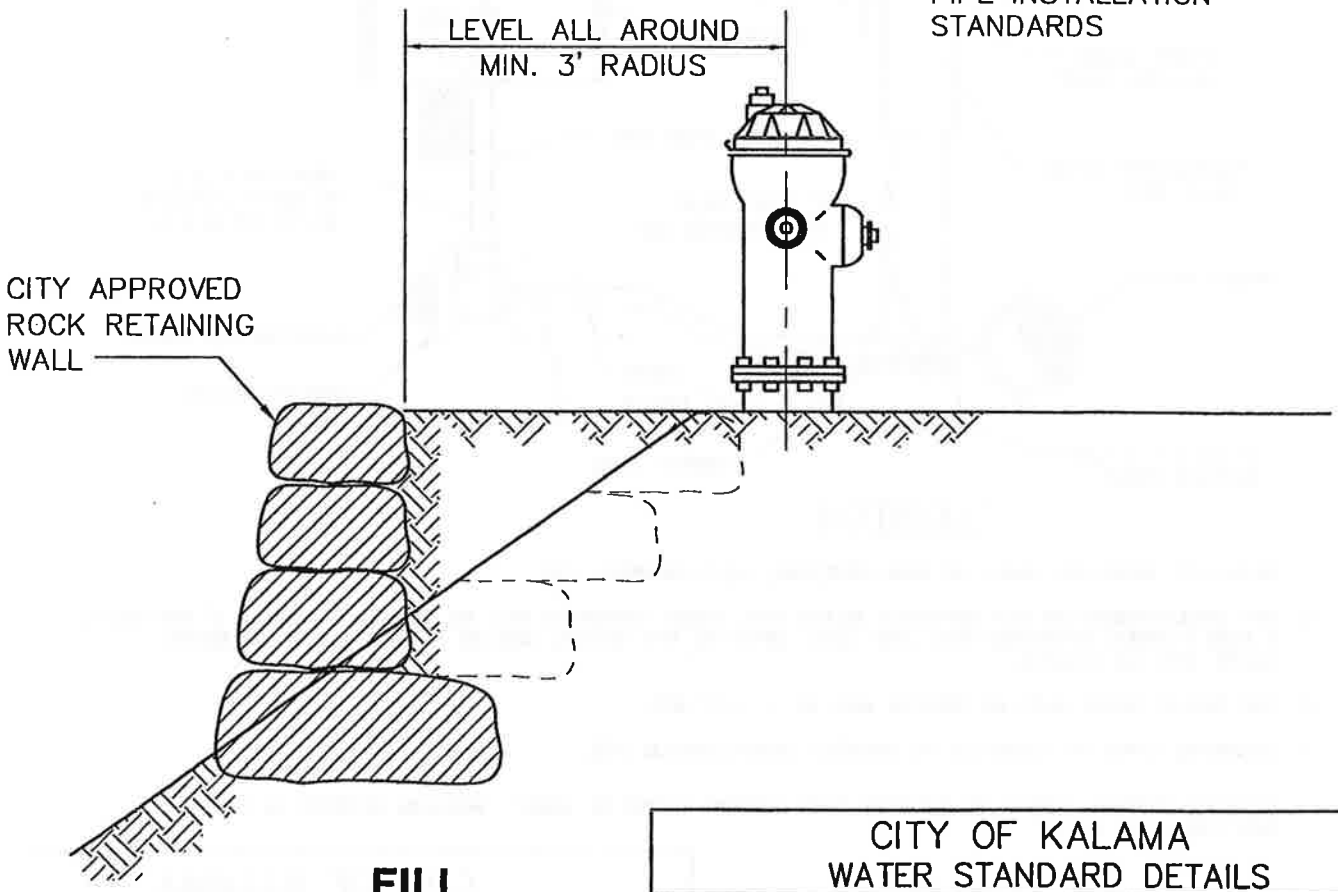
APPROVED: _____ 3-13-2019
PUBLIC WORKS DEPT. DATE

DWG. NO. 8

DATE:	DRWN:	CHKD:	SCALE:
3/6/19	P.E.	M.B.J.	NONE

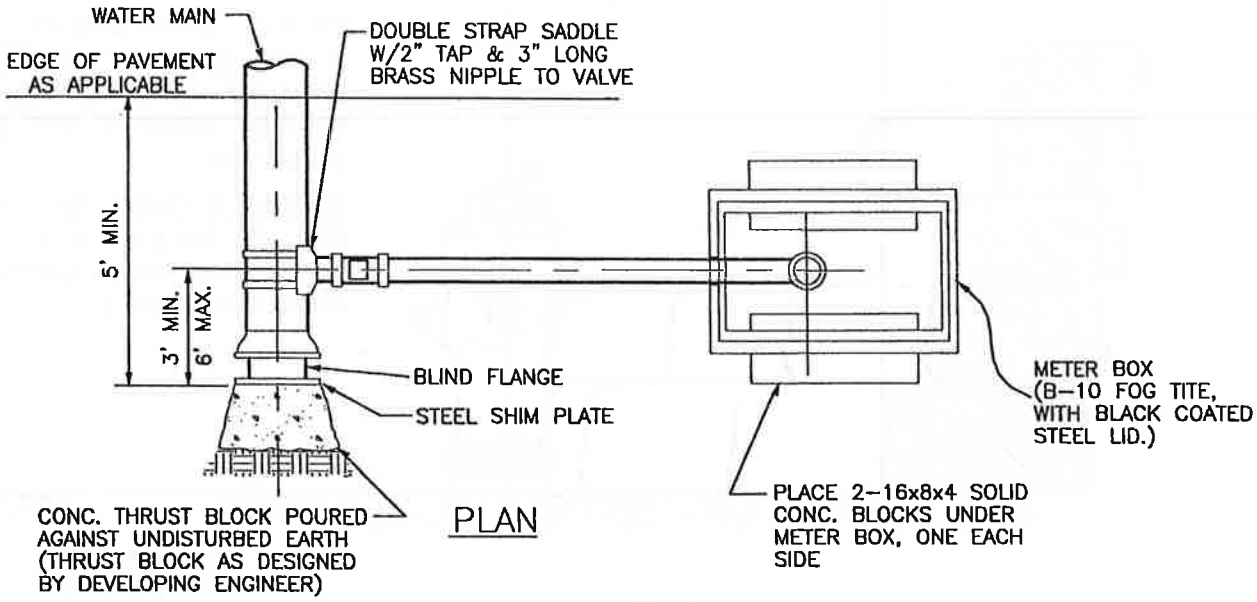


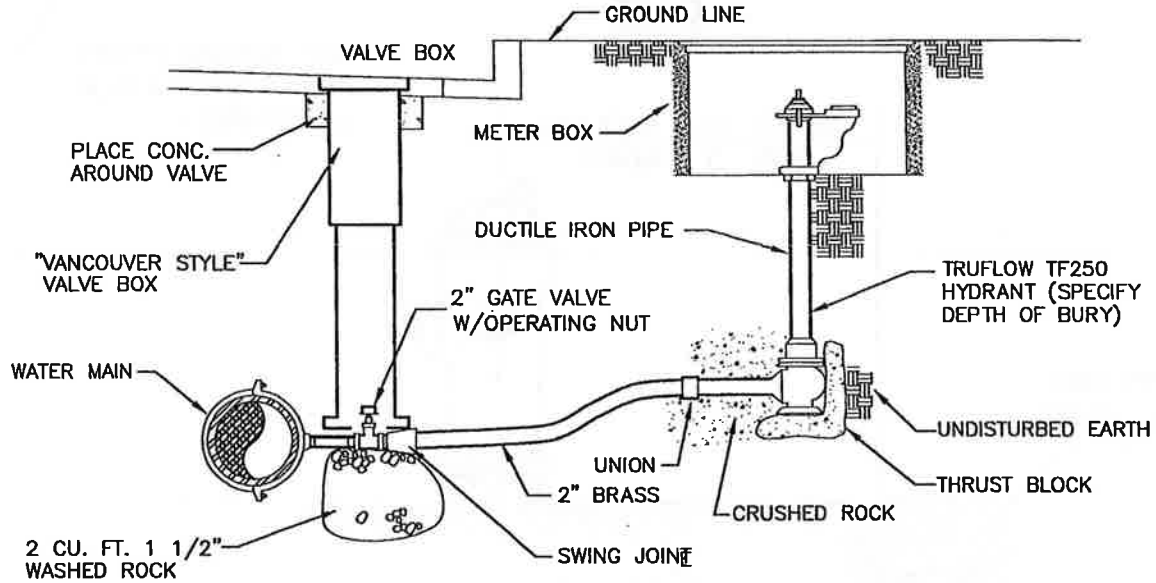
CUT



FILL

CITY OF KALAMA WATER STANDARD DETAILS			
FIRE HYDRANT LOCATION IN CUT OR FILL			
APPROVED: Carlos McCrary 5-29-03 PUBLIC WORKS DEPT DATE			DWG. NO. 10
DATE: 11/97	DRWN: EST/MCH	CHKD: T.J.O.	SCALE: NONE



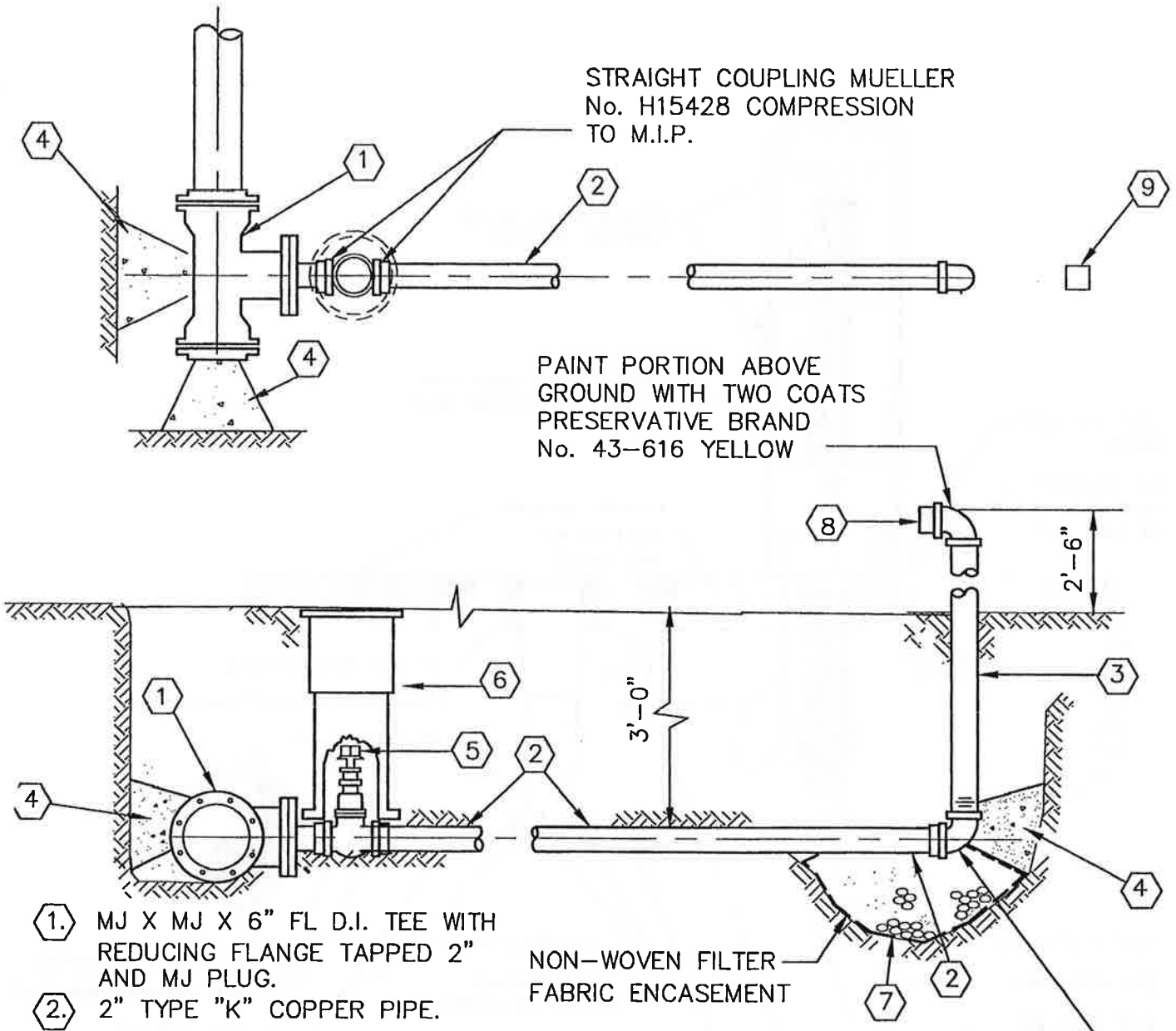


BLOW-OFF HYDRANTS SHALL BE NON-FREEZING, SELF-DRAINING TYPE.

1. SET UNDERGROUND IN CITY APPROVED METER BOX, THESE HYDRANTS WILL BE FURNISHED WITH A 2" FIP INLET, A NON-TURNING OPERATING ROD, AND SHALL OPEN TO THE DESIGN, AND BE SERVICEABLE FROM ABOVE GRADE WITH NO DIGGING.
2. THE OUTLET SHALL ALSO BE BRONZE AND BE 2-1/2" NST.
3. HYDRANTS SHALL BE LOCKABLE TO PREVENT UNAUTHORIZED USE.

(SPECIFY OVERALL LENGTH 6" SHORTER THAN NORMAL DEPTH OF BURY. MINIMUM OPENING IN METER BOX SHALL BE 10".)

CITY OF KALAMA WATER STANDARD DETAILS			
2" BLOW-OFF ASSEMBLY			
APPROVED: Carl M McClary 5-29-03 PUBLIC WORKS DEPT. DATE			DWG. 15
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE



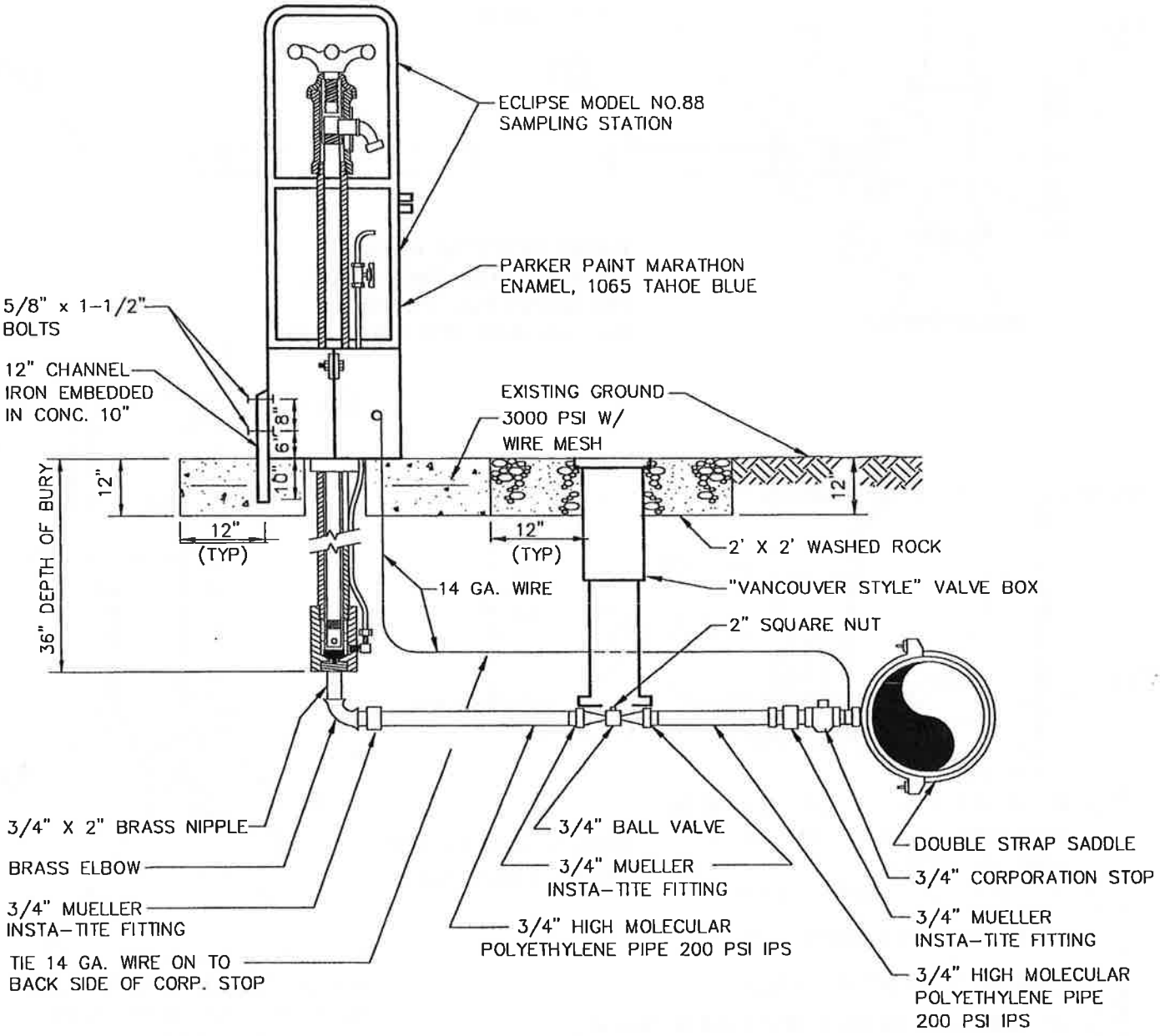
1. MJ X MJ X 6" FL D.I. TEE WITH REDUCING FLANGE TAPPED 2" AND MJ PLUG.
2. 2" TYPE "K" COPPER PIPE.
3. 2" GALVANIZED IRON PIPE.
4. CONCRETE THRUST BLOCK.
5. 2" AWWA RESILIENT SEAT GATE VALVE, THD X THD, WITH OPERATING NUT.
6. "VANCOUVER STYLE" VALVE BOX
7. 1/4 CUBIC YARD WASHED GRAVEL POCKET.
8. 2" x 2–1/2" HOSE THREADS BRASS INSERT WITH CAP AND CHAIN
9. VALVE MARKER POST

NOTES

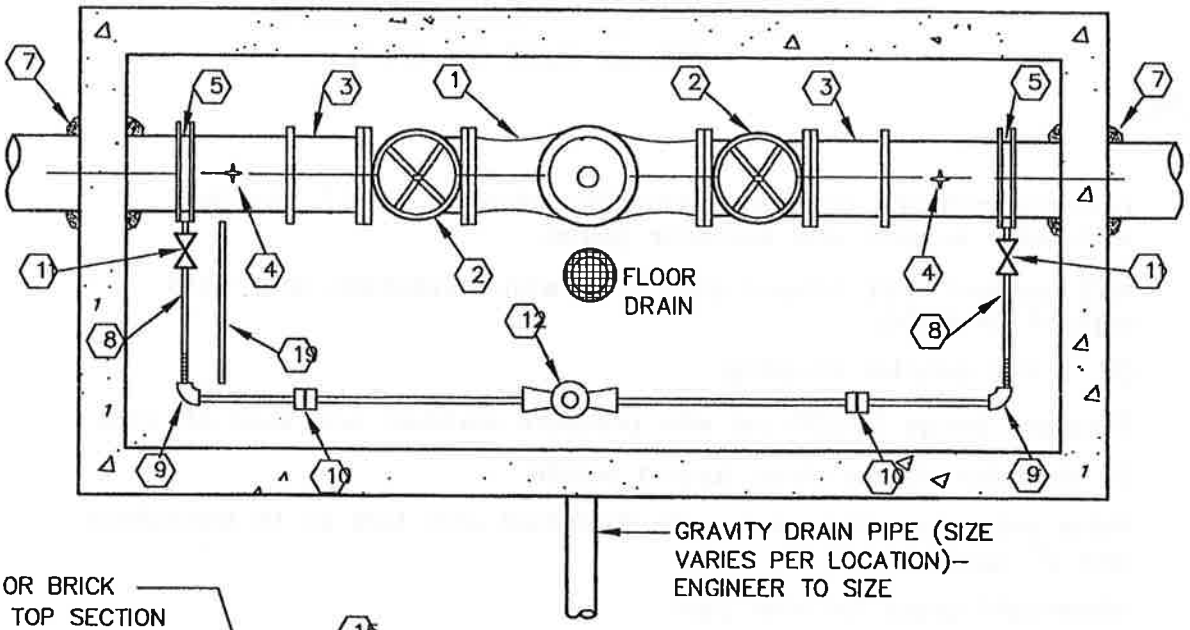
1 TURN NOZZLE TOWARDS ROADSIDE DITCH INSTALL DIELECTRIC COUPLINGS AT DISSIMILAR METALS.

3. TEMPORARY BLOWOFFS INSTALLED FOR FLUSHING WATERMAIN SHALL BE SIZED TO PROVIDE 2.5fps VELOCITY IN MAIN LINE.

CITY OF KALAMA			
PERMANENT END–LINE BLOW OFF ASSEMBLY			
APPROVED: Carlton McKay 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. NO. PELBOA
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE

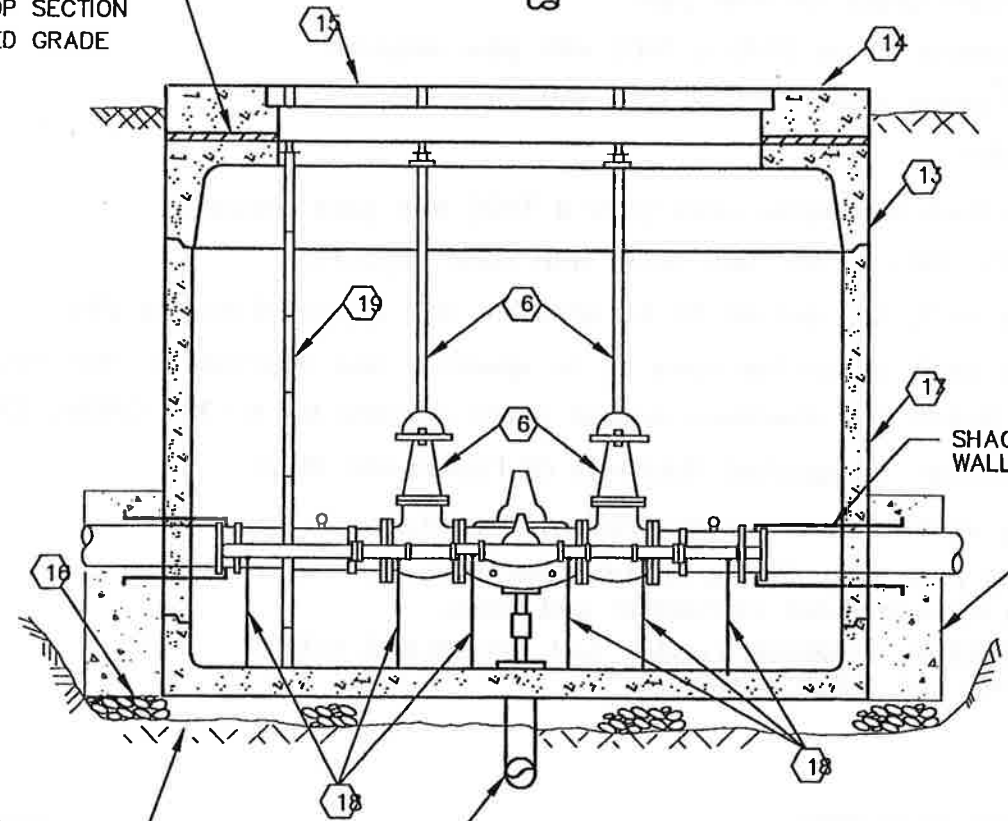


CITY OF KALAMA WATER STANDARD DETAILS			
WATER SAMPLING STATION			
APPROVED: Carl M. McCrary 5-29-03 PUBLIC WORKS DEPT. DATE			DWG. 17
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE



GRAVITY DRAIN PIPE (SIZE VARIES PER LOCATION)– ENGINEER TO SIZE

GROUT OR BRICK TO SET TOP SECTION TO FINISHED GRADE (TYPICAL)



SHACKLE THRU WALL (TYP.)

THRUST BLOCK (TYP. BOTH SIDES)

UNDISTURBED EARTH

DRAIN PIPE TO DAYLIGHT ENGINEER TO SIZE

CITY OF KALAMA
WATER STANDARD DETAILS

PRESSURE REDUCING STATION

APPROVED: Paul M. McHary 5-29-03
PUBLIC WORKS DIR. DATE

DWG. NO. 19

DATE:	DRWN:	CHKD:	SCALE:
11/97	EST/MCH	T.J.O.	NONE

PRESSURE REDUCING STATION

(TO BE SIZED BY CITY)

LEGEND

(1) pressure reducing pressure sustaining valve (FL x FL), Cla–Val with valve support and indicator gauge.

(2) NRS resilient seat flanged gate valve with handwheel, and valve support assembly.

(3) (FL x MJ) adaptor coupling.

(4) Pressure gauge 0–200 psi with pressure snubber and shut off cock

(5) 2" diameter double strap tapped saddle.

(6) Valve extension stem and guide furnished with fork to fit handwheel and 2" opening nut.

(7) Watertight grout for inlet pipe.

(8) 2" diameter brass (THD x THD) with pipe support.

(9) 2" 90° brass elbow (THD x THD) with pipe support.

(10) 2" union.

(11) 2" resilient seat gate valve (THD x THD) with pipe support.

(12) 2" PRV, Cla–Val No. 90G–01AS with valve support.

(13) Utility vault, top section to be specified and approved by the city.

(14) Utility vault, adjustable cover to be specified and approved by the city.

(15) Bilco Hatch Co., aluminum access doors suitable for H–20 LOADING (Watertight)

(16) 8" Minimum Compacted Thickness Of Foundation Rock

(17) Utility vault, size to be specified by the city.

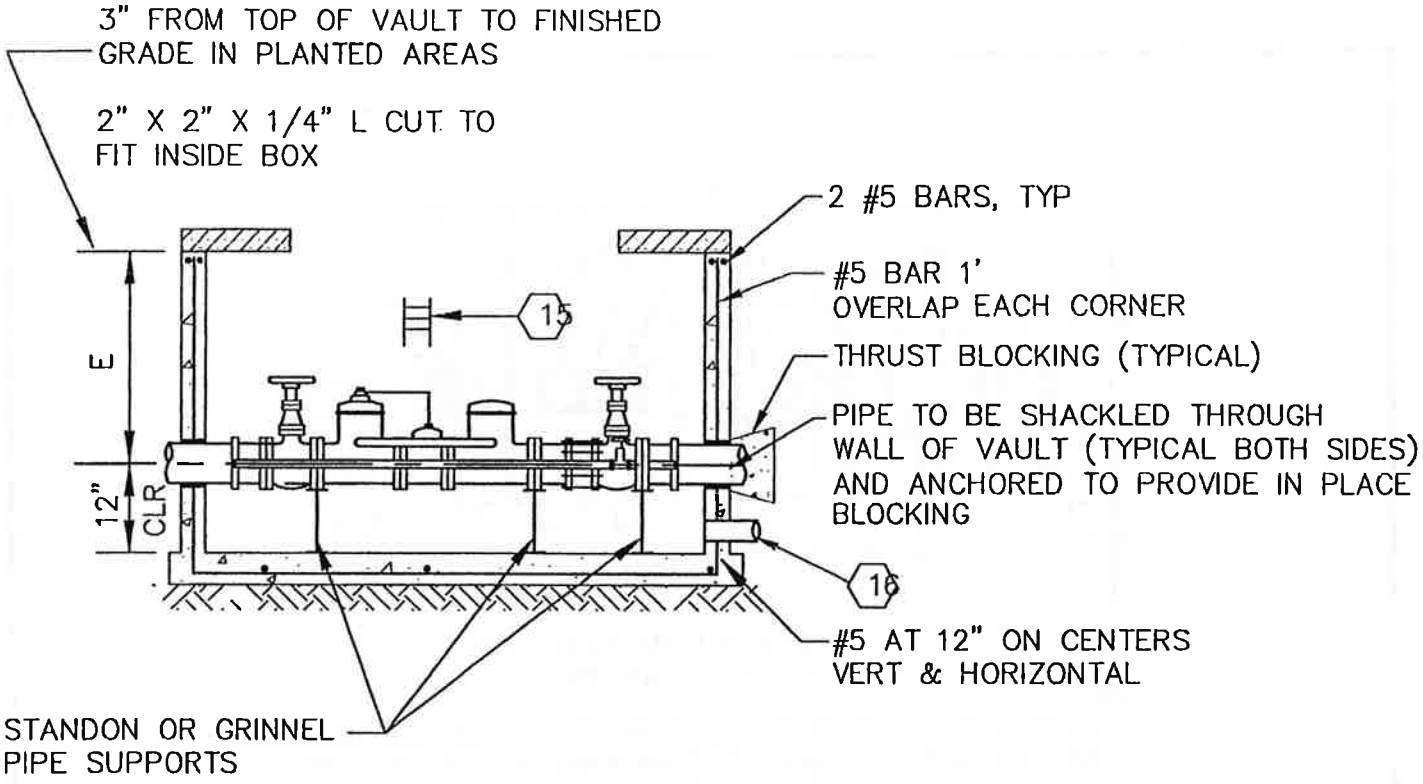
(18) Grinnel pipe supports, to include steel yoke, bolt to vault floor using recommended connection and sizes.

(19) TELESCOPIC ALUMINUM Ladder, bolt (STAINLESS STEEL) at floor and hatch opening.

NOTE:

1. ALL 2" PIPE TO BE BRASS
2. PAINT ALL PIPING WITH PARKER PACIFIC MARINE ENAMEL MARATHON 1065 TAHOE BLUE

CITY OF KALAMA WATER STANDARD DETAILS			
PRESSURE REDUCING STATION			
APPROVED: Carl M McCrary 5/2/05 PUBLIC WORKS DEPT. DATE			DWG. NO 19
DATE: 11/97	DRWN: EST/MCH	CHKD: T.J.O.	SCALE: NONE



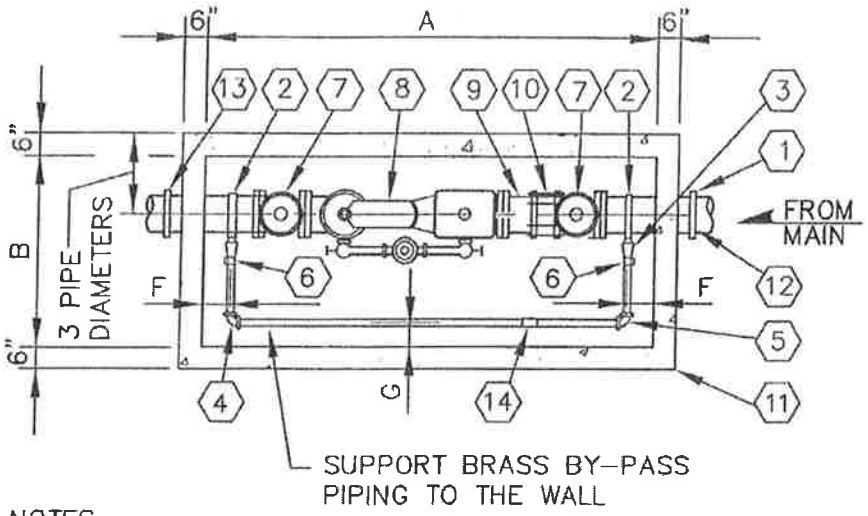
NOTES:

INSTALL 4" DRAIN PIPE TO DAYLIGHT UNLESS OTHERWISE APPROVED. 1% MIN. SLOPE.

BACKFLOW PREVENTOR REQUIRED FOR ALL FIRE LINES AND IRRIGATION LINES, IN SEPARATE VAULTS

BRASS DOES NOT NEED TO BE PAINTED, ALL OTHER PIPE TO BE PAINTED WITH MARINE ENAMEL, MARATHON 1065 TAHOE BLUE.

CITY OF KALAMA WATER STANDARD DETAILS			
METER AND METER VAULT ASSEMBLY 3" THROUGH 10"			
APPROVED: Carl M. McChesney 5-29-03 PUBLIC WORKS DEPT / DATE			DWG. NO. 14
DATE: 11/97	DRWN: EST/MCH	CHKD: T.J.O.	SCALE: NONE



NOTES

1. METERS 3" – 10" SHALL BE SUPPLIED BY THE CONTRACTOR, METERS SHALL BE MASTER METER ULTRASONIC OCTAVE METERS WITH ENCODER DATA CABLE AND SHALL READ IN CUBIC FEET.
2. VAULT SHALL BE PRECAST, UTILITY VAULT OR OWNER APPROVED EQUAL.
3. ALL PIPE & FITTINGS 4" AND LARGER SHALL BE CEMENT LINED.
4. PIPING FROM MAIN TO VAULT SHALL BE 4" ON 3" METER INSTALLATION, TEE WITH VALVE ON EXISTING MAIN REQUIRED.

METER SIZE	MAIN-LINE	BYPASS	A	B	C	D	E	F	G
3"	4" DI.	1 1/2" BRASS	7'-6"	3'-0"	9 1/2"	6"	2'-8"	9"	4"
4"	4" DI.	1 1/2" BRASS	7'-6"	3'-0"	9 1/2"	6"	2'-8"	9"	4"
6"	6" DI.	2" BRASS	9'-6"	3'-6"	12"	6"	2'-8"	9"	4"
8"	8" DI.	4" DI.	11'-0"	4'-0"	12"	9"	3'-6"	14"	6"
10"	10" DI.	4" DI.	13'-0"	5'-0"	16"	12"	4'-0"	16"	6"

CITY OF KALAMA
WATER STANDARD DETAILS

METER AND METER VAULT ASSEMBLY 3" THROUGH 10"

APPROVED: _____ 11-4-2013
PUBLIC WORKS DEPT. DATE

DWG. NO. 14

DATE:	DRWN:	CHKD:	SCALE:
11/13	EST/MCH	T.J.O.	NONE

MATERIAL LIST

1. 2–FLEX CPLG TO FIT ROCKWELL 441 (4" X 3") MJ REDUCER FOR 3" METER
2. 2–DOUBLE STRAP SERVICE CLAMPS, ROMAC 101 WITH IPS TAP, OR EQUAL
3. 3–STRAIGHT CPLG. BRASS TO OUTSIDE I.P. THREAD MUELLER H–15425,H–15428 110 COMP., OR EQUAL
4. 1 1/4" BEND CPLG BRASS TO BRASS MUELLER H–15525.
5. 1 1/4" BEND CPLG, BRASS TO OUTSIDE I.P. THREAD MUELLER H–15530, OR EQUAL.
6. 1 BALL VALVE WITH PADLOCK WING OR LOCK CAP, FORD B21–444W OR B21–666 WITH LOCK CAP OR B21–777 WITH LOCK CAP.
7. 2–RESILIENT SEAT GATE VALVE, FL X FL (RISING STEM)
8. 1–3" TO 10" METER AS SPECIFIED BY CITY SHALL BE FURNISHED BY CONTRACTOR/DEVELOPER
9. 1 C.I. ADPT. FL X PE (LENGTH TO FIT)
10. 1–CPLG. ADAPT., FL ROCKWELL 912, OR OWNER APPROVED EQUAL
11. CAST IN PLACE OR PRECAST CONCRETE VAULT WITH (H20) BILCO (HATCH SIZE AND LOCATION TO BE APPROVED BY CITY)
12. WELDED FL RESTRAINT OR SHACKLE TO THRUST BLOCK TO PREVENT MOVEMENT IF METER IS REMOVED
13. INSULATED CPLG. TO 3" CU SERVICE.
14. UNION (BRASS)
15. INSTALL ALUMINUM LADDER WITH TELESCOPIC RISER FASTEN TO WALL WITH STAINLESS STEEL FASTENER AT MAXIMUM THREE FOOT INTERVALS.
16. PROVIDE 6" GRAVITY DRAIN PIPE (AT PUMP) TO DAYLIGHT MIN. SLOPE = 2%

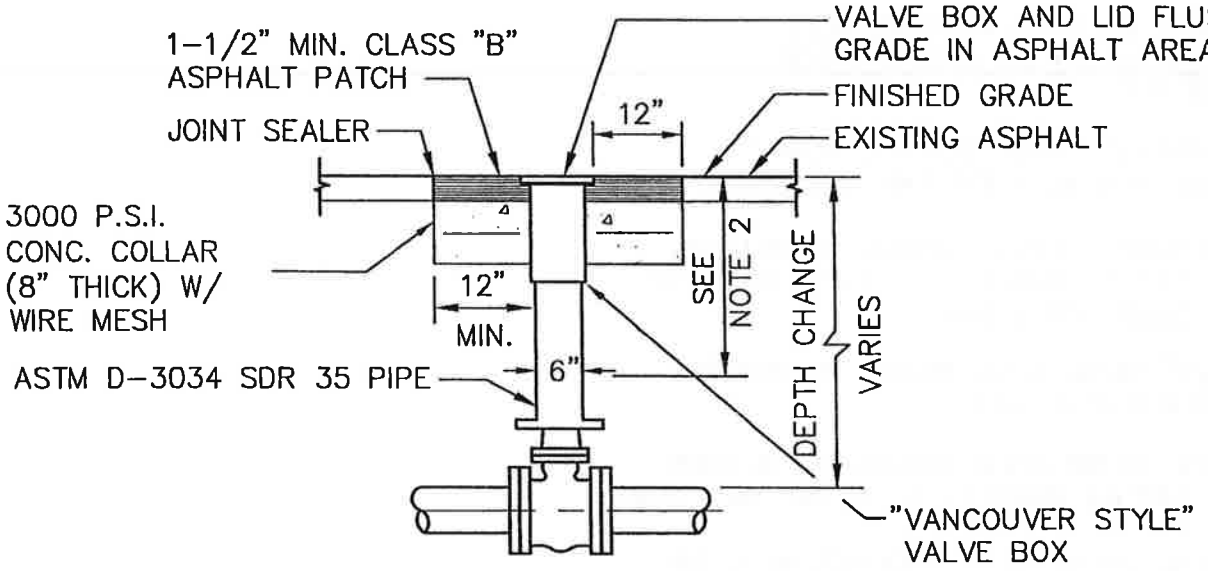
CITY OF KALAMA
WATER STANDARD DETAILS

METER AND METER VAULT ASSEMBLY 3" THROUGH 10"

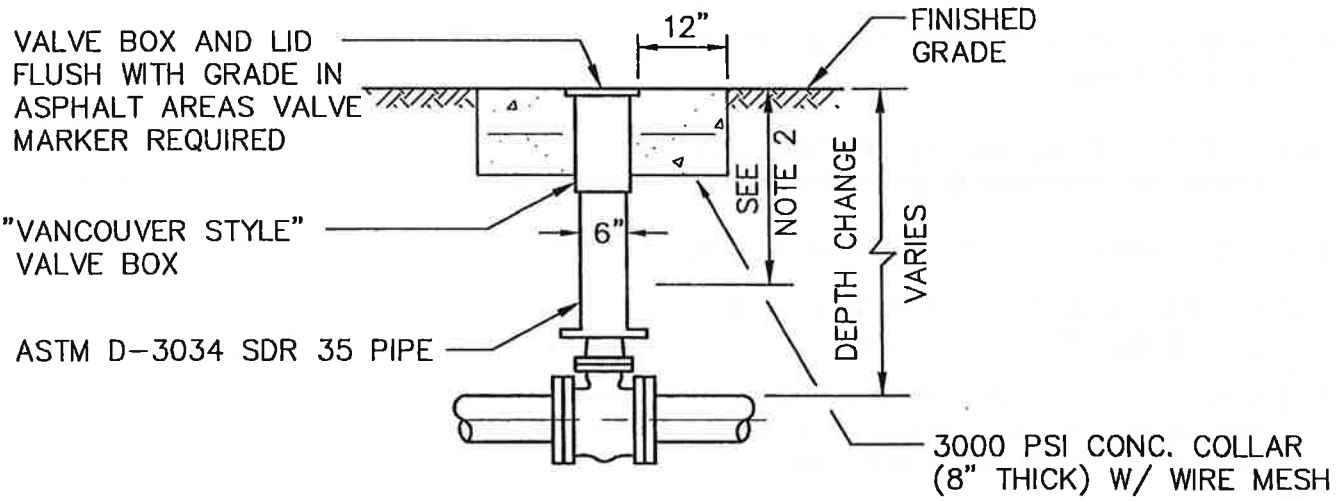
APPROVED: Carl M McKay 6-30-03
PUBLIC WORKS DEPT. DATE

DWG. NO. 14

DATE:	DRWN:	CHKD:	SCALE:
6/03	EST/MCH	T.J.O.	NONE



VALVE BOX IN ASPHALT AREA



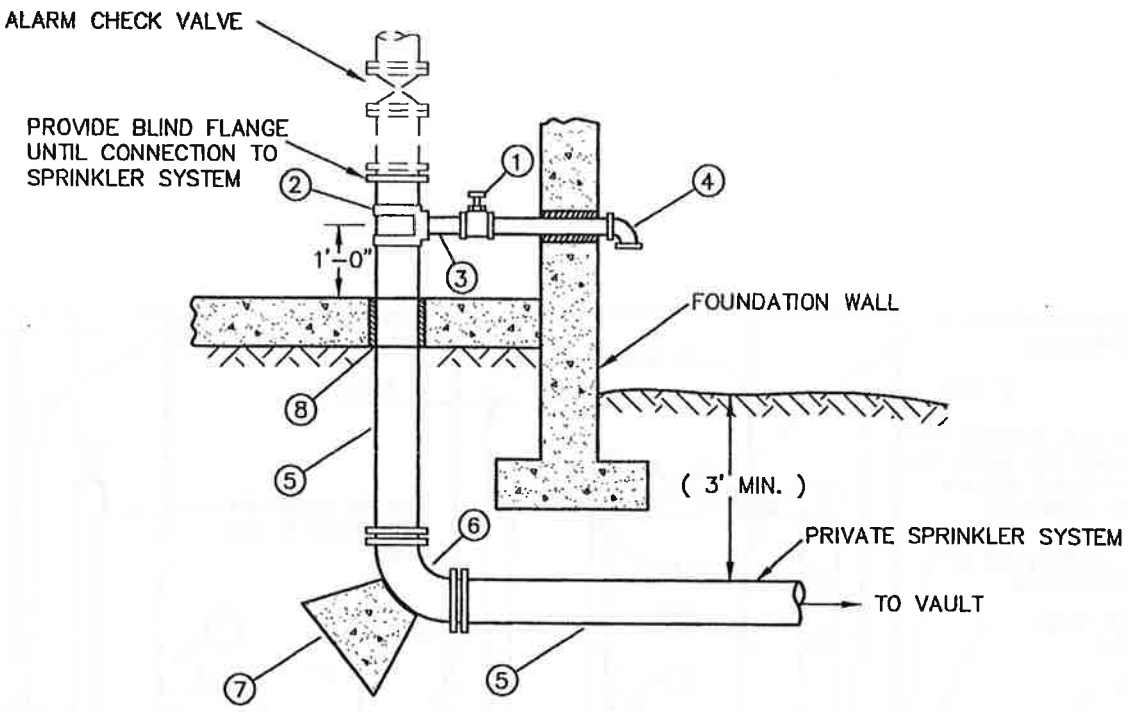
VALVE BOX IN UNIMPROVED AREA

NOTES:

1. EACH VALVE SHALL BE PROVIDED WITH AN ADJUSTABLE CAST IRON VALVE BOX OF 5 INCHES (5") INSIDE DIAMETER. VALVE BOXES SHALL HAVE A TOP SECTION WITH AN EIGHTEEN INCH (18") MIN. LENGTH. THE VALVE BOX SHALL BE "VANCOUVER STYLE" OR APPROVED EQUAL.

2. 15" MINIMUM, 36" MAXIMUM FOR OPERATOR NUT. EXTENSION MAY BE REQUIRED.

CITY OF KALAMA WATER STANDARD DETAILS			
VALVE BOX ADJUSTMENT			
APPROVED: Carl M. McCrary 5-29-03 PUBLIC WORKS DIR. DATE			DWG. NO 20
DATE: 11/97	DRWN: EST/MCH	CHKD: T.L.S.	SCALE: NONE

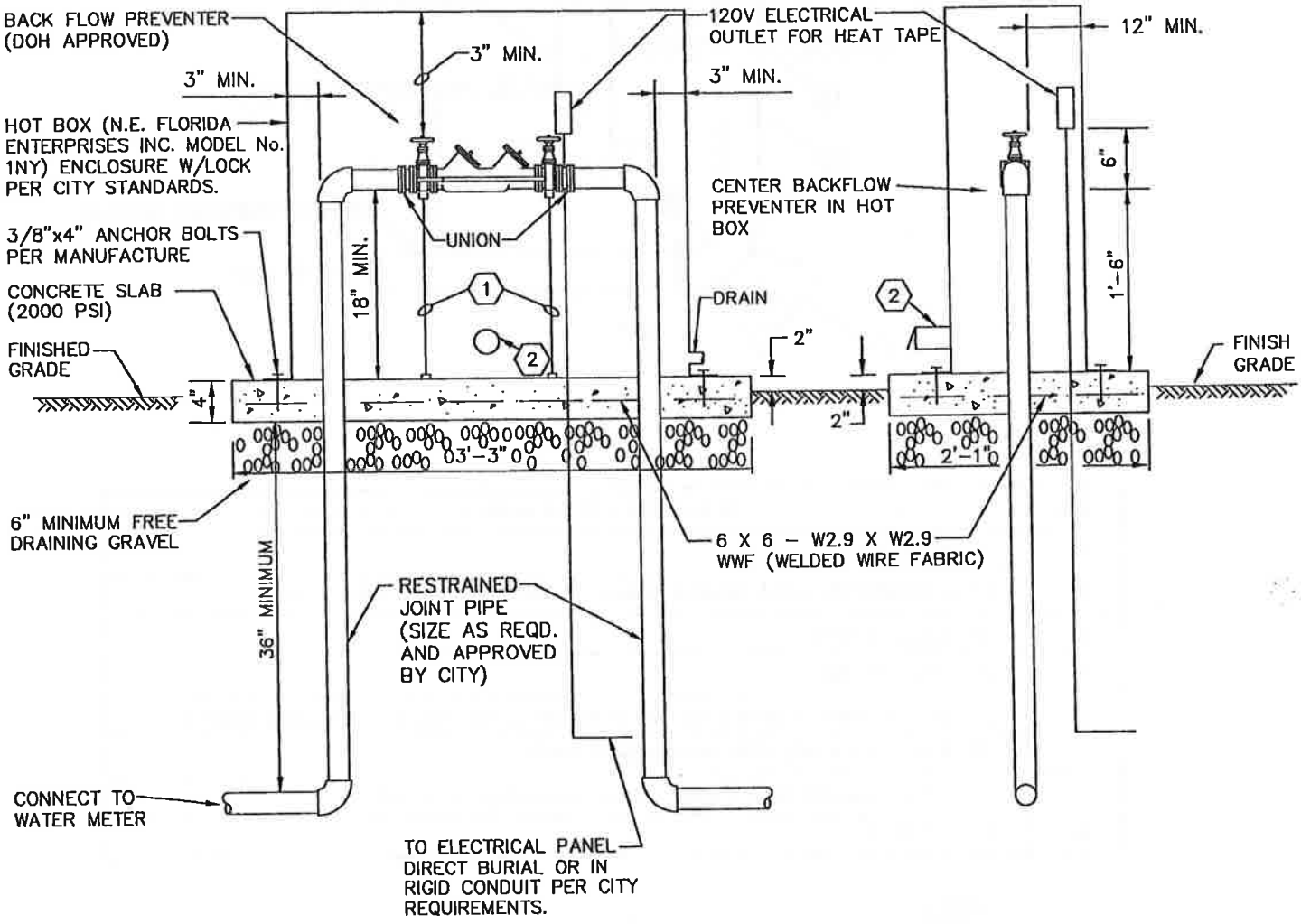


NO.	DESCRIPTION
1	2" GATE VALVE
2	FORD STAINLESS STEEL DOUBLE STRAP SADDLE (OR APPROVED EQUAL)
3	2" GALV. NIPPLE
4	2" GALV. 90° ELL
5	D.I. CL. 52 SUPPLY MAIN (SIZE AS DETERMINED BY FIRE FLOW REQUIREMENTS)
6	90° BEND (MJ X MJ) WITH ROMAC GRIP RINGS
7	CONCRETE THRUST BLOCK (SIZE TO BE APPROVED BY CITY)
8	PIPE SLEEVE

NOTES:

1. AFTER SYSTEM IS TESTED, PURITY SAMPLES WILL BE TAKEN AT ALL RISERS IN SYSTEM

CITY OF KALAMA			
RISER DETAIL			
APPROVED: Carl M. McCrary 5-29-03 BY CITY DATE			DWG. NO. RISER
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



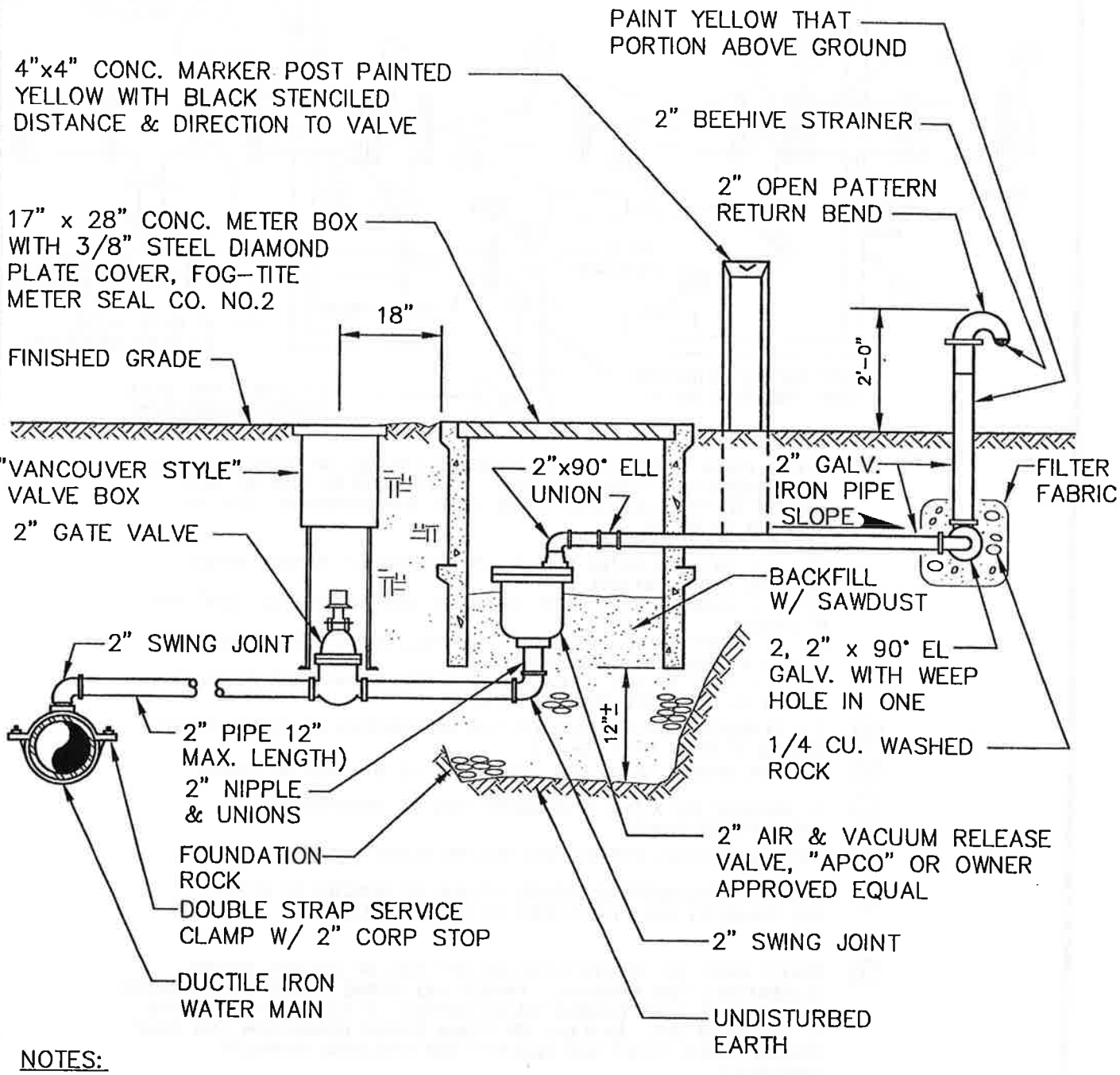
REDUCED PRESSURE BACKFLOW DEVICE

NOT TO SCALE

(1) PROVIDE CITY APPROVED SUPPORT FOR 2 1/2" AND LARGER DEVICES.

(2) DRAIN W/ FLAPPER. DRAIN TO BE SIZED AS PER DOH REQUIREMENTS

CITY OF KALAMA WATER STANDARD DETAILS			
REDUCED PRESSURE BACKFLOW DEVICE			
APPROVED: Paul M. McCrary 6-30-03 PUBLIC WORKS DEPT. DATE			DWG. 25
DATE: 6/03	DRWN: M.S.J.	CHKD: T.J.O.	SCALE: NONE



NOTES:

1. GATE VALVE: AWWA RESILIENT SEAL, THRD x THRD WITH OPERATING NUT
2. ALL PIPING BETWEEN DOUBLE STRAP SADDLE AND INLET SIDE OF COMBINATION AIR & VAC ASSEMBLY SHALL BE BRASS
3. TAP MAIN AT SYSTEM HIGH POINT. LOCATION TO BE APPROVED BY THE CITY
4. PAINT PORTION ABOVE GROUND WITH TWO COATS PRESERVATIVE BRAND No. 43-616 YELLOW

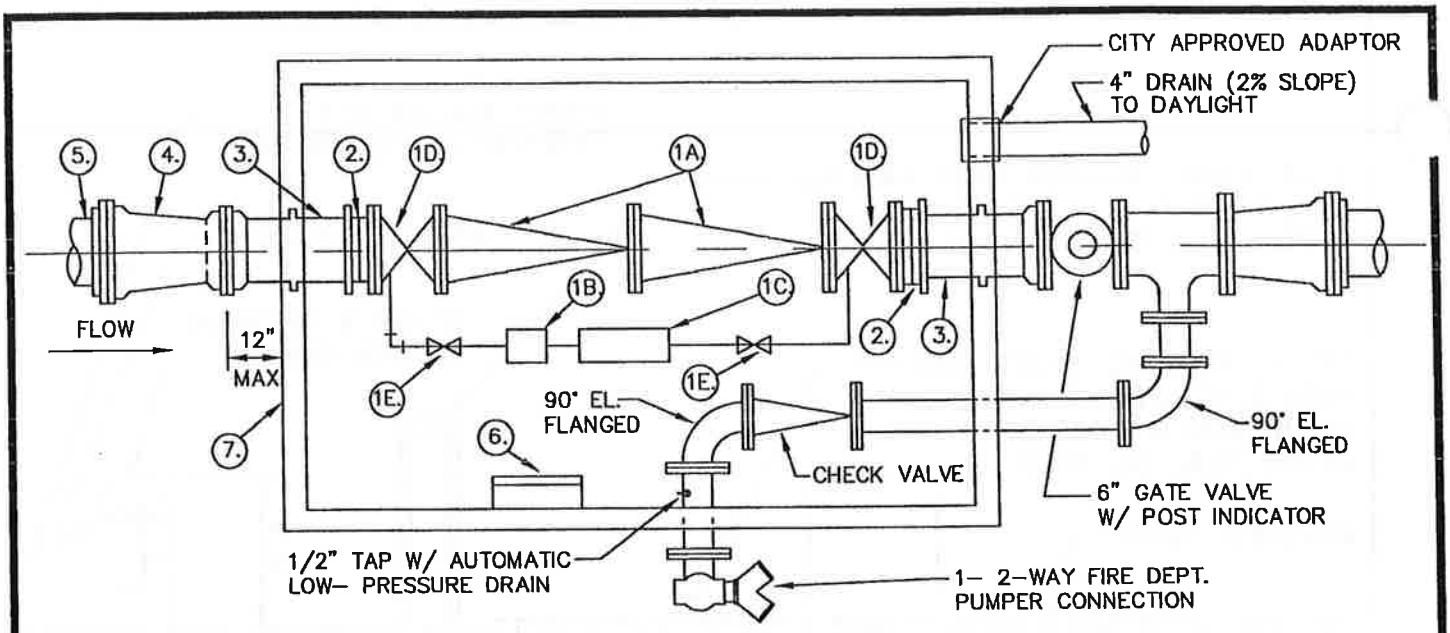
CITY OF KALAMA
WATER STANDARD DETAILS

AIR & VACUUM RELEASE ASSEMBLY

APPROVED: Carl M. McCrary 5-29-03
PUBLIC WORKS DIR. DATE

DWG. NO. 16

DATE:	DRWN:	CHKD:	SCALE:
2/02	P.E.	M.B.J.	NONE



LEGEND

(1.) DOUBLE-CHECK DETECTOR VALVE ASSEMBLY CAPABLE OF METERING WATER USAGE UNDER LOW FLOW CONDITIONS. 10.0 P.S.I. HEAD LOSS AT 1600 GPM FOR 8" SIZE. ASSEMBLY TO BE STATE DOH APPROVED. SIZE AS SPECIFIED ON PLANS.

- 1A. 2 - CHECK VALVES, (FL)
- 1B. 1 - BY-PASS METER 5/8" X 3/4" SENSUS C.F. READING METER COMPLETE WITH SPUD NUT.
- 1C. 1 - DOUBLE CHECK VALVE ASSEMBLY, (DOH APPROVED.) 3/4" FOR 8" D.D.C.V.
- 1D. 2 - GATE VALVES, (FL) W/HAND WHEEL; RISING STEM, RESILIENT SEATED AS PER STATE REQUIREMENTS.
- 1E. 2 - GATE VALVES, (FL) W/ HAND WHEEL; RISING STEM, RESILIENT SEATED AS PER STATE REQUIREMENTS.

(2.) 2 - FLANGED COUPLING ADAPTER, SIZE AS SPECIFIED ON PLANS. (LOCATE MINIMUM 6" FROM INNER WALL)

(3.) 2 - PIPE SPOOLS, PLAIN END. SAME SIZE AS SPECIFIED ON PLANS.

(4.) 1- REDUCER (MJ X MJ), IF REQUIRED. SIZE AS SPECIFIED ON PIPE SUPPORT PLANS.

(5.) WATER MAIN CL50, SIZE AS SPECIFIED ON PLANS.

(6.) ALUMINUM (TELESCOPING) LADDER, LOCATE AS DIRECTED BY CITY, USE STAINLESS STEEL FASTENERS AT 3' MAX. SPACING

(7.) UTILITY VAULT CO. VAULTS SHALL BE CITY STD. OF QUALITY; SUBMIT ALTERNATIVES FOR APPROVAL. HINGED AND SPRING LOCKED STEEL DIAMOND P/L COVER 2-332P, (DOUBLE HATCH COVER.) 4" C.I. FLOOR DRAIN INTO 4" PVC DRAIN LINE. DAYLIGHT OR STORM SYSTEM CONNECTION. (NO SUMP PUMPS) CHECK VAULT SIZE REQUIRED FOR ENCLOSING COMPLETE ASSEMBLIES.

(8.) PROVIDE GRINNEL PIPE SUPPORTS, TO INCLUDE STEEL YOKE, BOLT TO VAULT FLOOR USING RECOMMENDED CONNECTION AND SIZES.

MIN. VAULT SIZES:

4"	5106 LA	--	5'-0" X 10'-6" X 6'-3" HIGH
6"	5106 LA	--	5'-0" X 10'-6" X 6'-3" HIGH
8"	612 LA	--	6'-0" X 12'-0" X 6'-6 1/2" HIGH
10"	612 LA	--	6'-0" X 12'-0" X 6'-6 1/2" HIGH

NOTE:

1. PAINT ALL PIPING WITH PARKER PAINT MARINE ENAMEL, MARATHON 1065 TAHOE BLUE
2. PROVIDE GRINNEL PIPE SUPPORTS, WHERE REQUIRED.(3 MINIMUM)

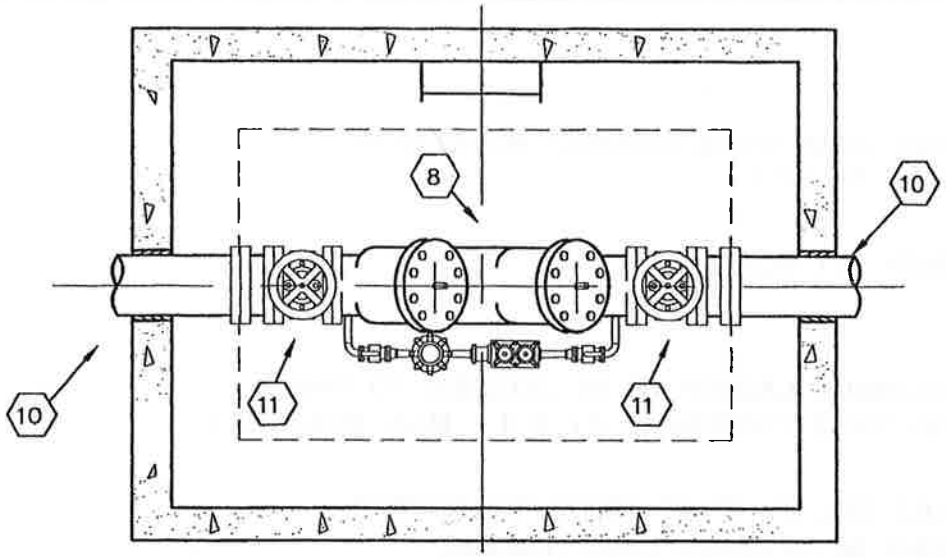
CITY OF KALAMA
WATER STANDARD DETAILS

DOUBLE-CHECK DETECTOR WITH FIRE CONNECTION

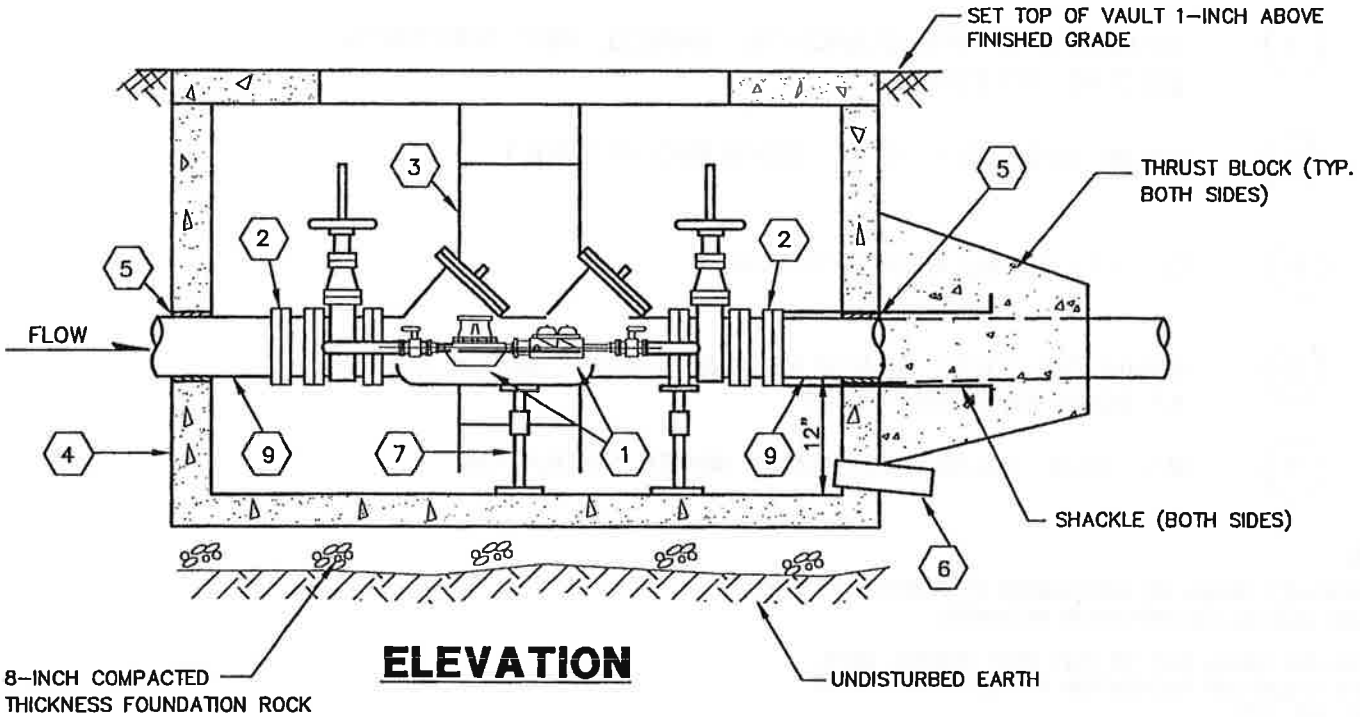
APPROVED: Paul M. McClary 6-29-03
PUBLIC WORKS DIR. DATE

DWG. NO. 18

DATE:	DRWN:	CHKD:	SCALE:
11/97	L.T.	T.N.	NONE



PLAN



ELEVATION

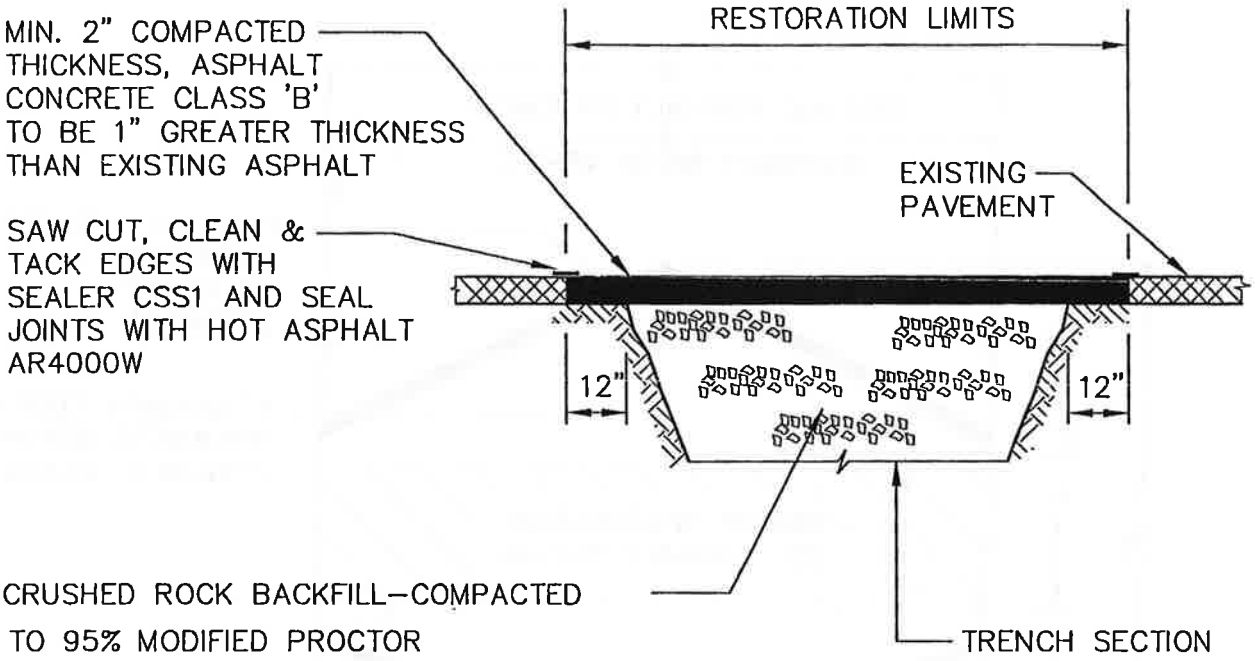
CITY OF KALAMA WATER STANDARD DETAILS			
DETECTOR DOUBLE–CHECK VALVE ASSEMBLY			
APPROVED: Carl M. McCrary 5-29-03 PUBLIC WORKS DEPT DATE			DWG. NO. 24
DATE: 11/97	DRWN: E.S.T.	CHKD: T.J.O.	SCALE: NONE

1. DETECTOR DOUBLE CHECK VALVE ASSEMBLY MODEL TO BE PRE APPROVED BY THE CITY
2. UNI–FLANGE WITH SET SCREWS
3. TELESCOPIC ALUMINUM LADDER TO BE SECURED TO VAULT WITH STAINLESS STEEL FASTENERS AT 3–FT. MAX. INTERVALS
4. CONCRETE VAULT (5'x 9'x 7'–2" INSIDE DIMENSIONS) , WITH WATERTIGHT BILCO COVER (H20 LOADING)
5. WATER–TIGHT GROUT. RESTRAIN INLET/OUTLET PIPE WITH WELDED FLANGE OR SHACKLE TO THRUST BLOCK TO PREVENT. SHACKLE THROUGH VAULT IF CHECK VALVE ASSEMBLY IS REMOVED.
6. 4" DRAIN TO DAYLIGHT (MINIMUM SLOPE 2%)
7. ADJUSTABLE PIPE STANCHION, GRINELL PIPE SUPPORTS. (SECURE TO FLOOR)
8. VALVE ASSEMBLY TO BE CENTERED IN VAULT
9. CL. 53 D.I., MJ WITH MEGALUGS
10. STAINLESS STEEL SHACKLES AND THRUST BLOCK (3000PSI) AT BOTH ENDS OF VAULT
11. R.S. GATE VALVE WITH HAND WHEEL OPERATION

NOTES:

1. ASSEMBLY SHALL BE MAINTAINED BY PROPERTY OWNER AND ANNUAL CERTIFICATION REQUIRED.
2. FIRELINE SHALL NOT BE PUT INTO SERVICE UNTIL THE BACKFLOW PREVENTION DEVICE IS APPROVED BY THE CITY
3. A REDUCED PRESSURE BACKFLOW PREVENTION DEVICE MAY BE REQUIRED BY THE DIRECTION OF THE CITY
4. PAINT PIPING WITH PARKER PAINT MARINE ENAMEL, MARARTHON 1065, TAHOE BLUE.
5. SIZE OF SYSTEM TO BE APPROVED BY THE CITY

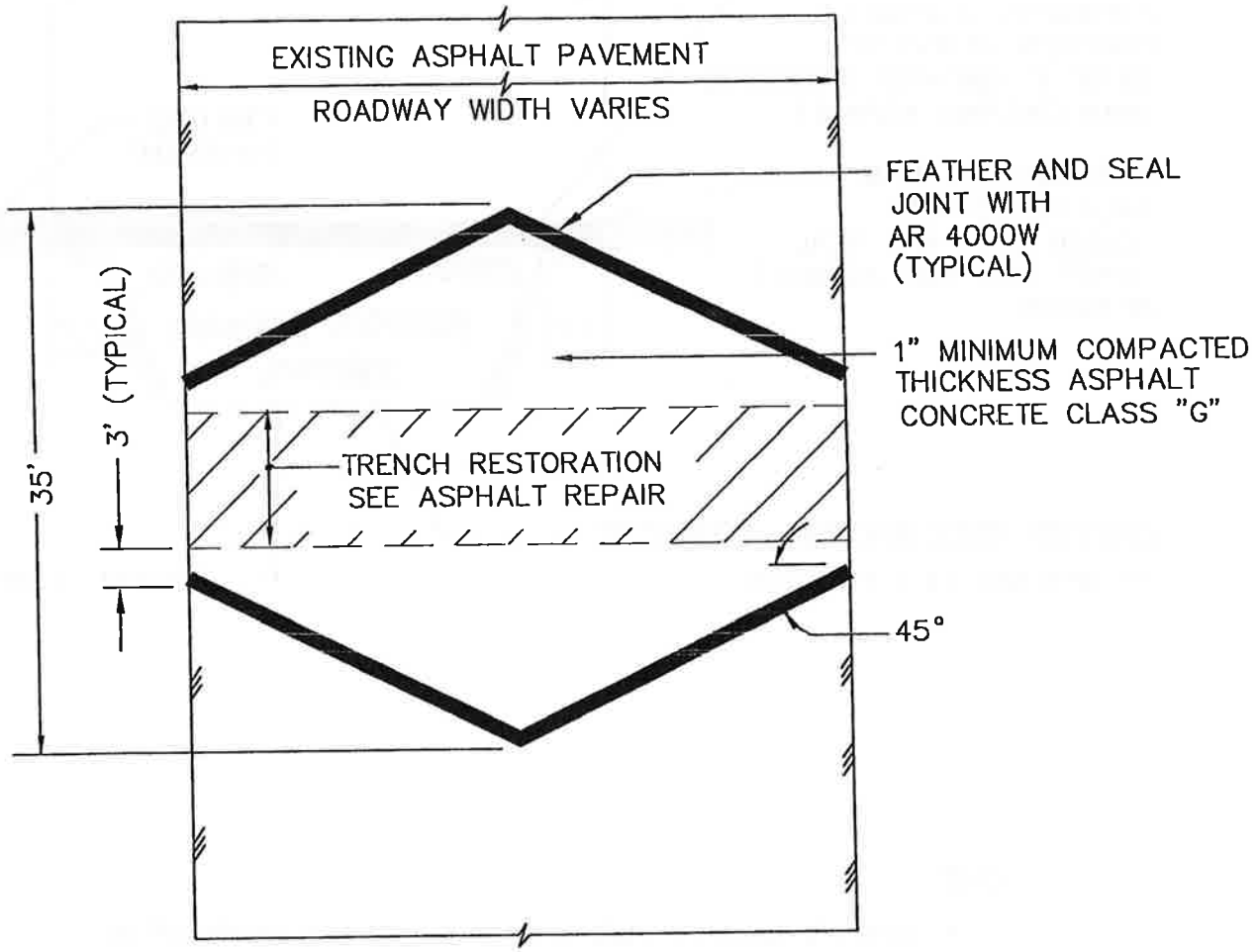
CITY OF KALAMA WATER STANDARD DETAILS			
DETECTOR DOUBLE–CHECK VALVE ASSEMBLY			
APPROVED: Carl M. McCrary PUBLIC WORKS DEPT.		5-29-03 DATE	DWG. NO. 24
DATE: 11/97	DRWN: EST/MCH	CHKD: T.J.O.	SCALE: NONE



NOTES:

1. COWLITZ COUNTY PUBLIC WORKS R.O.W CONSTRUCTION PERMITS MAY REQUIRE ALTERNATE RESTORATION
2. 100% CRUSHED ROCK BACKFILL REQUIRED ON ALL ROADWAY CUTS

CITY OF KALAMA WATER STANDARD DETAILS			
ASPHALT PAVEMENT REPAIR			
APPROVED: Carl M McCleary 5-29-03 PUBLIC WORKS DIR. DATE			DWG. NO. 23
DATE: 11/97	DRWN: E.S.T.	CHKD: T.L.S.	SCALE: NONE



CITY OF KALAMA WATER STANDARD DETAILS			
ASPHALT			
APPROVED: Lon M. McHargue 5-29-03 PUBLIC WORKS DIR DATE			DWG. NO 22
DATE: 11/97	DRWN: M.C.H.	CHKD: T.L.S.	SCALE: NONE

SANITARY SEWER DETAILS

LIST OF MISCELLANEOUS SANITARY SEWER DETAILS

Typical Precast Manhole

Typical Manhole Plan (View)

Typical Shallow Precast Manhole

Typical Saddle Manhole

Outside Drop Manhole

Inside Drop Manhole

Manhole Frame and Cover

Manhole Frame Collar

Polypropylene Ladder and Manhole Steps

Force Main Discharge Manhole l

Sanitary Sewer Trench Section for DI Pipe

Sanitary Sewer Trench Section for PVC Pipe

Pressure Line and Force Main Typical Trench Section

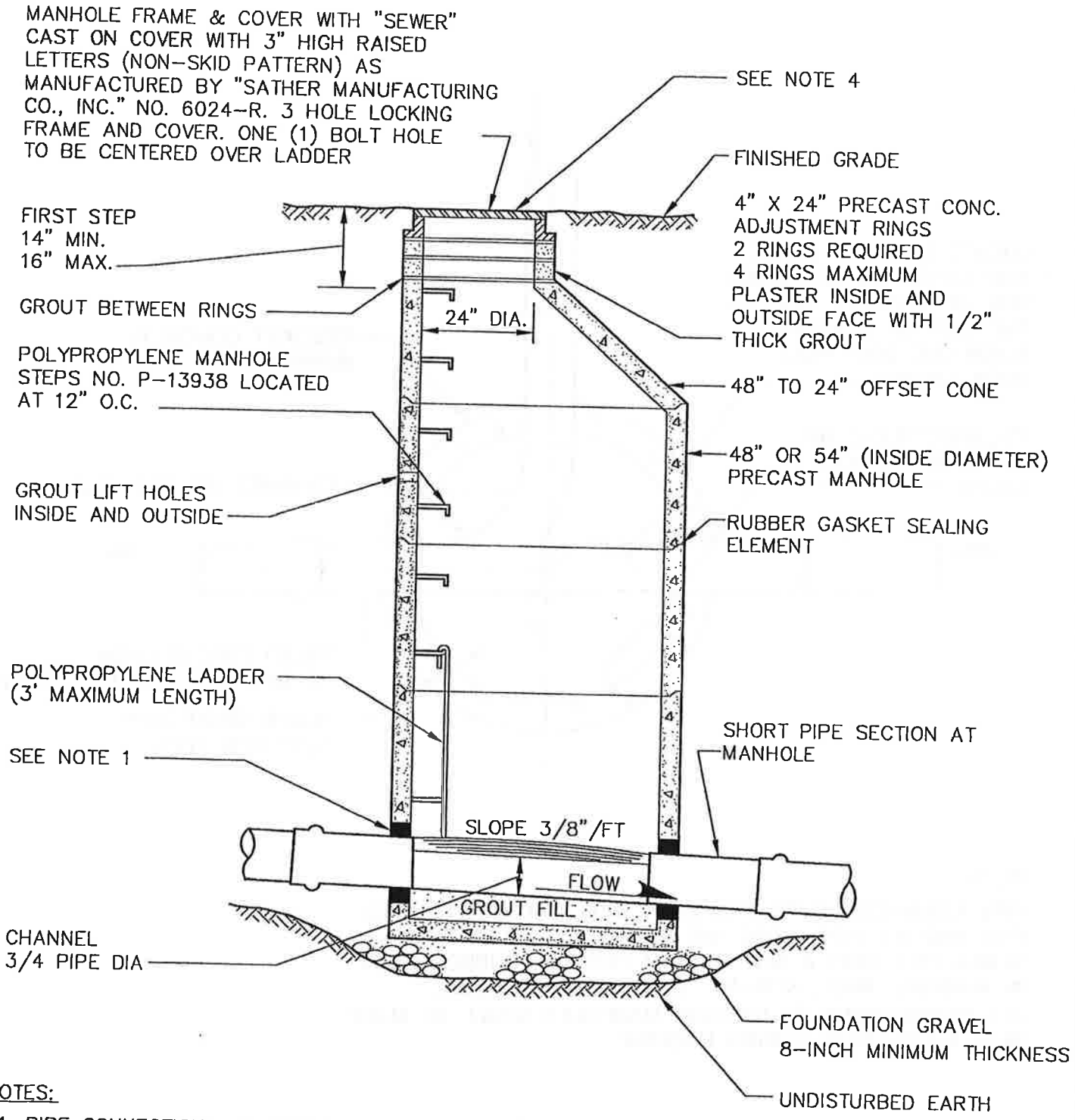
Typical Side Sewer Detail within New Development

Side Sewer Detail (within Existing Street ROW)

Standing Side Sewer

Private Side Sewer Installation

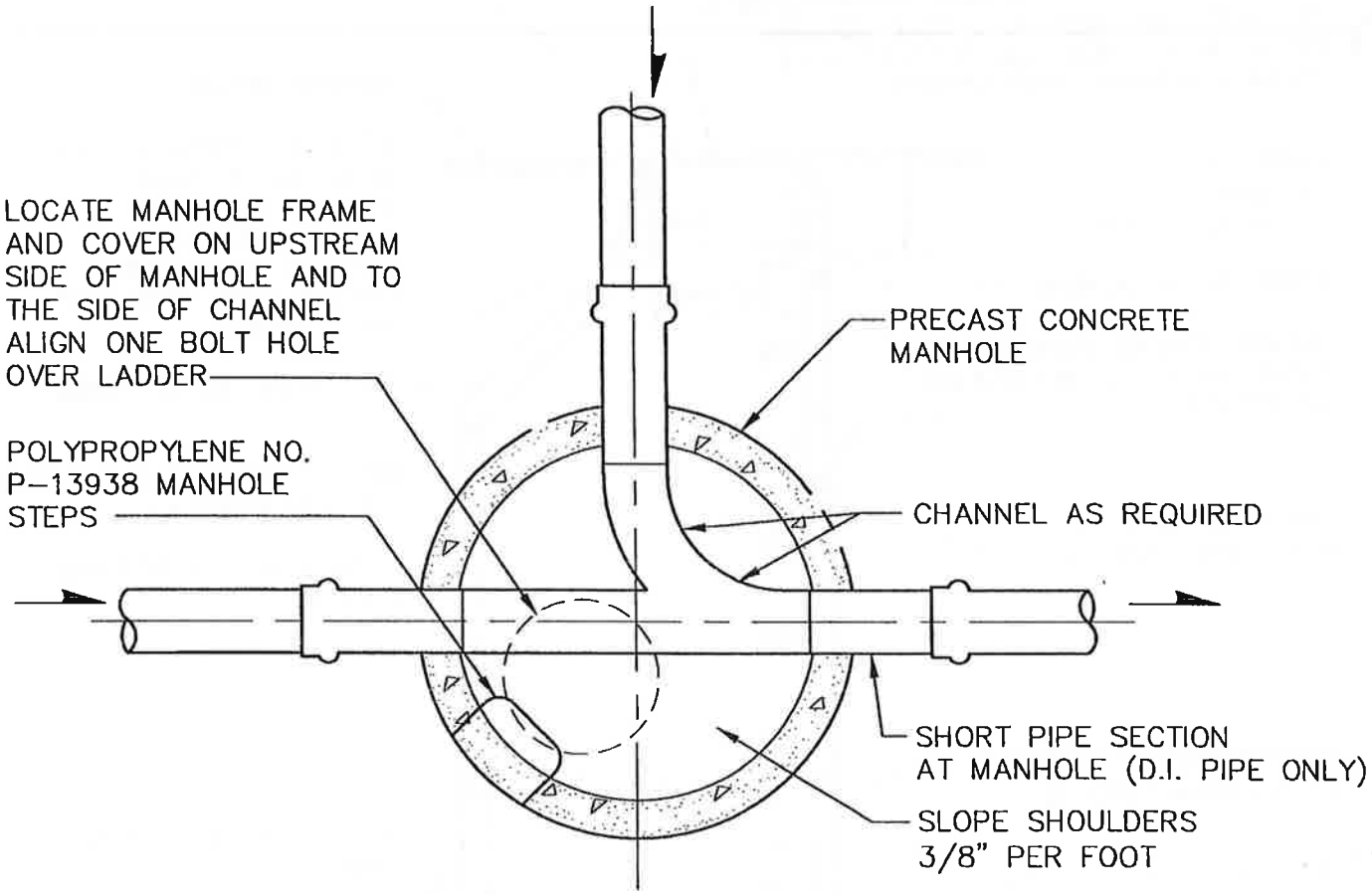
Roof Structure for Electrical Enclosure Detail Lift Station



NOTES:

1. PIPE CONNECTIONS TO MANHOLES SHALL BE AS FOLLOWS: PVC AND D.I. PIPE, CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER TIGHT FLEXIBLE RUBBER BOOT IN MANHOLE WALL, KOR-N-SEAL BOOT, OR EQUAL.
2. DROP OF GRADE THRU MANHOLE SHALL BE 0.10.
3. LARGER MANHOLES WILL BE REQUIRED AT THE DISCRETION OF THE CITY ENGINEER BASED ON PIPE SIZE, NUMBER AND ORIENTATION OF PIPE(S).
4. INSTALL CONCRETE COLLAR. SEE DETAIL.
5. PRE-CHANNELED MANHOLES ARE NOT ACCEPTABLE.

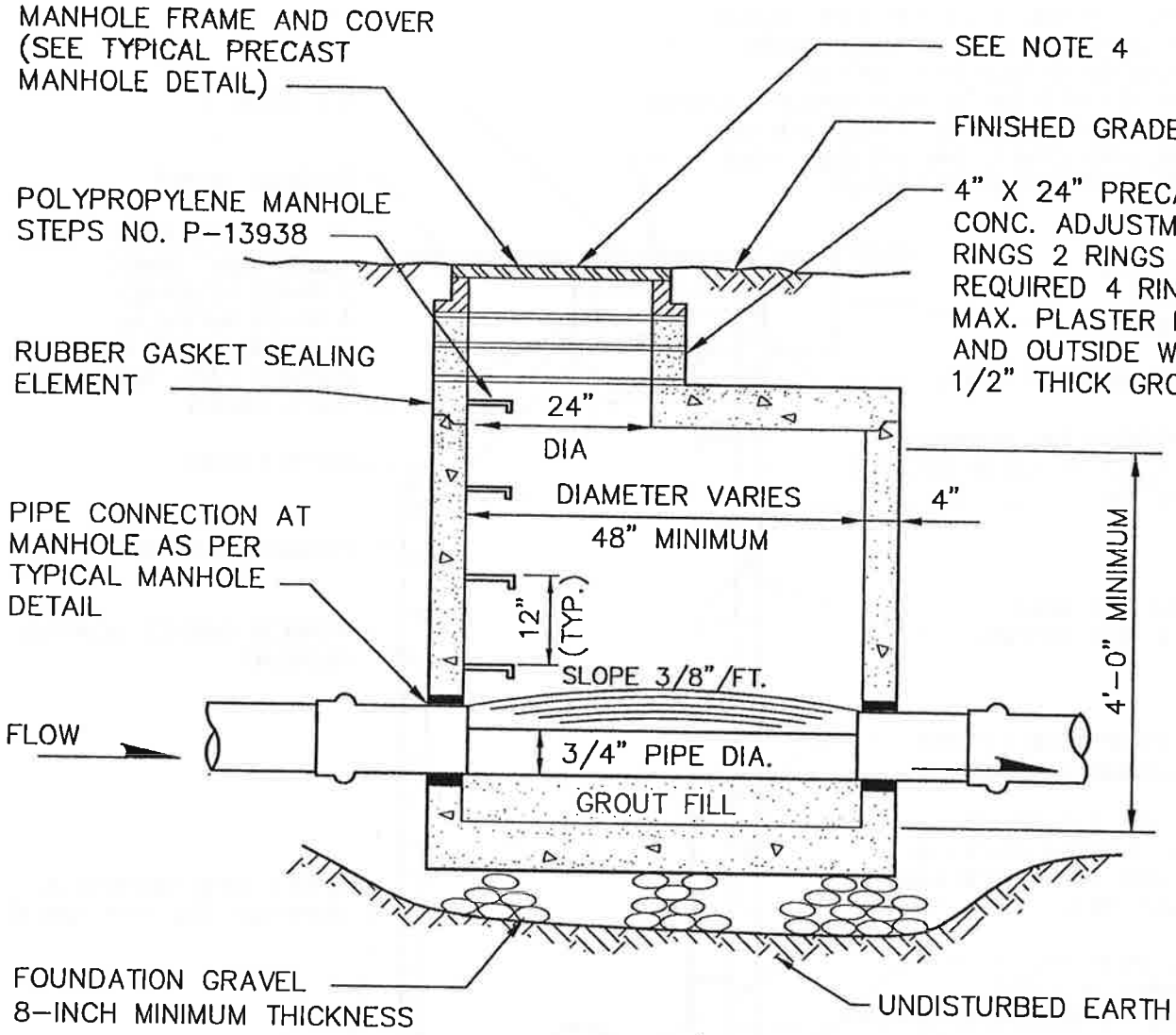
CITY OF KALAMA			
TYPICAL PRECAST MANHOLE			
APPROVED: Carl M. Mehrens 6-30-03 PUBLIC WORKS DIRECTOR DATE			DWG. NO. TPMH
DATE: 6/03	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE



NOTE:

PIPE CONNECTIONS TO MANHOLES SHALL BE AS FOLLOWS: PVC AND D.I. PIPE, CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER TIGHT FLEXIBLE RUBBER BOOT IN MANHOLE WALL, KOR-N- SEAL BOOT, OR EQUAL. ALL CONNECTIONS TO EXISTING MANHOLES SHALL BE MADE WITH A CONCRETE CORING MACHINE.

CITY OF KALAMA			
TYPICAL MANHOLE PLAN			
APPROVED: Paul M. McCrary 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. TMHP
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE



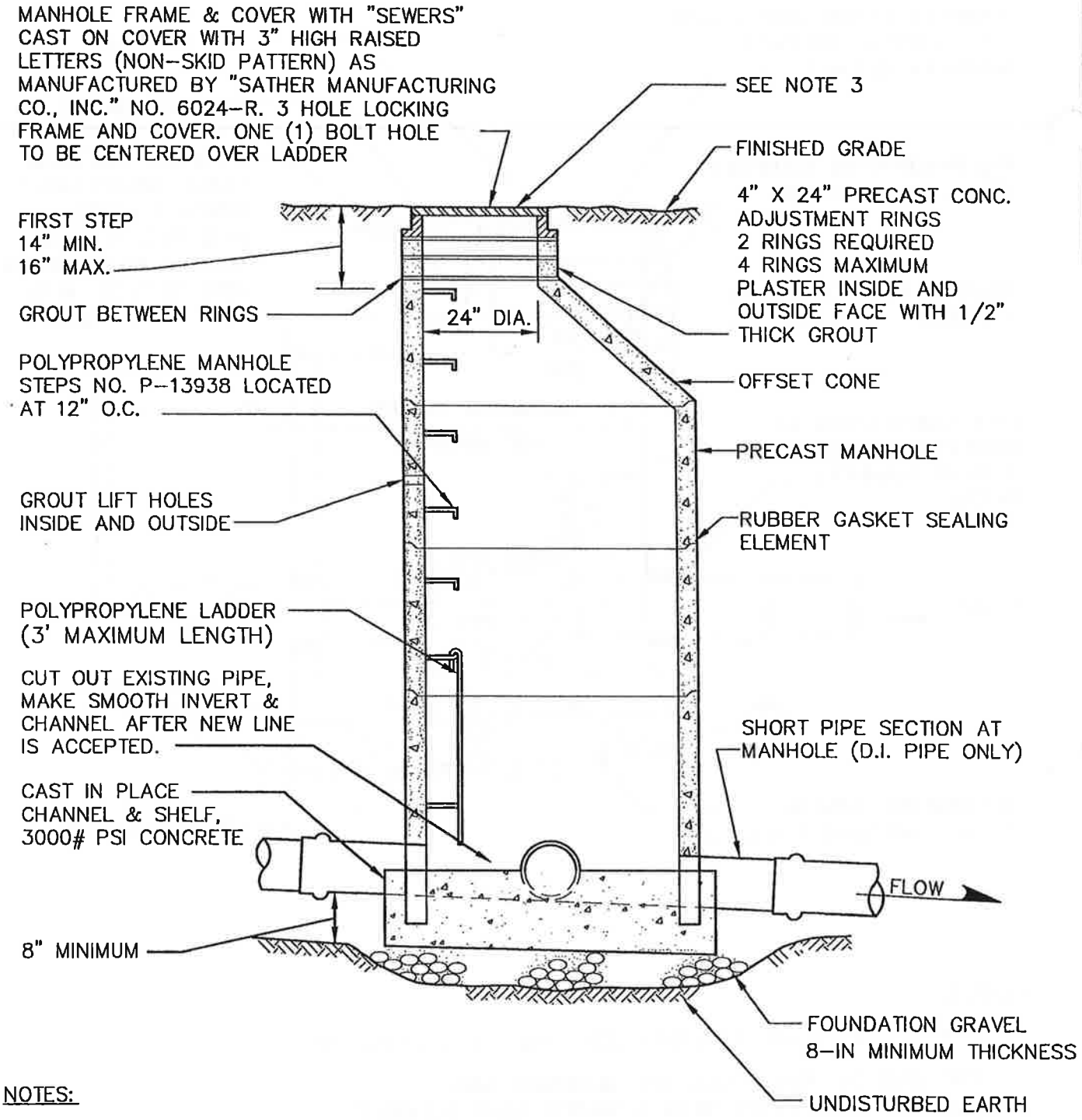
NOTES:

1. PIPE CONNECTIONS TO MANHOLES SHALL BE AS FOLLOWS:

   PVC AND D.I. PIPE, CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER TIGHT FLEXIBLE RUBBER BOOT IN MANHOLE WALL, KOR-N-SEAL BOOT, OR EQUAL.

2. DROP OF GRADE THRU MANHOLE SHALL BE 0.10'.
3. PRE-CHANNELED MANHOLES ARE NOT ACCEPTABLE.
4. CONSTRUCT CONCRETE COLLARS PER DETAILS.

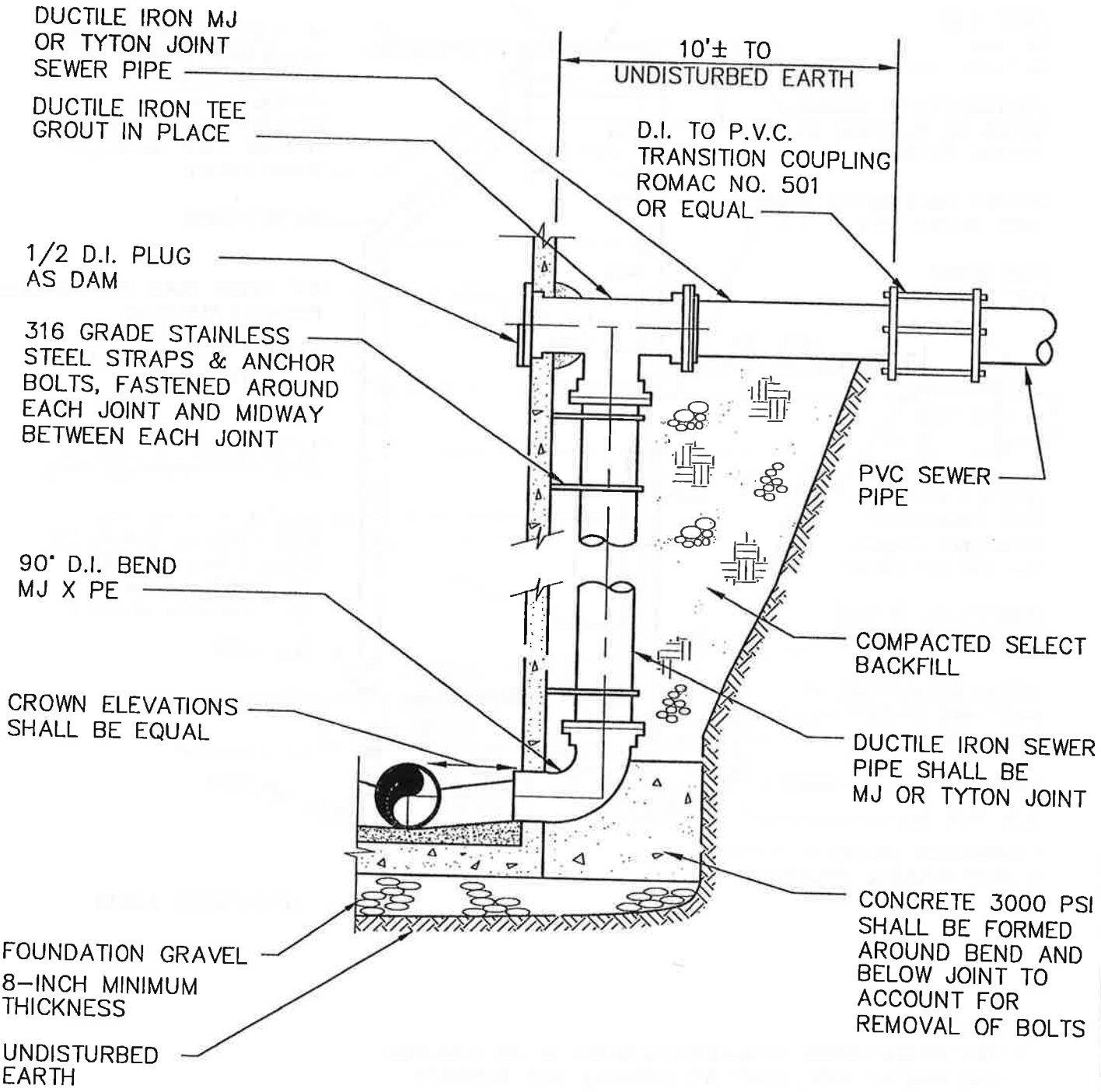
CITY OF KALAMA			
TYPICAL SHALLOW PRECAST MANHOLE			
APPROVED: Carl M. McCrary 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. NO. TSPMH
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE



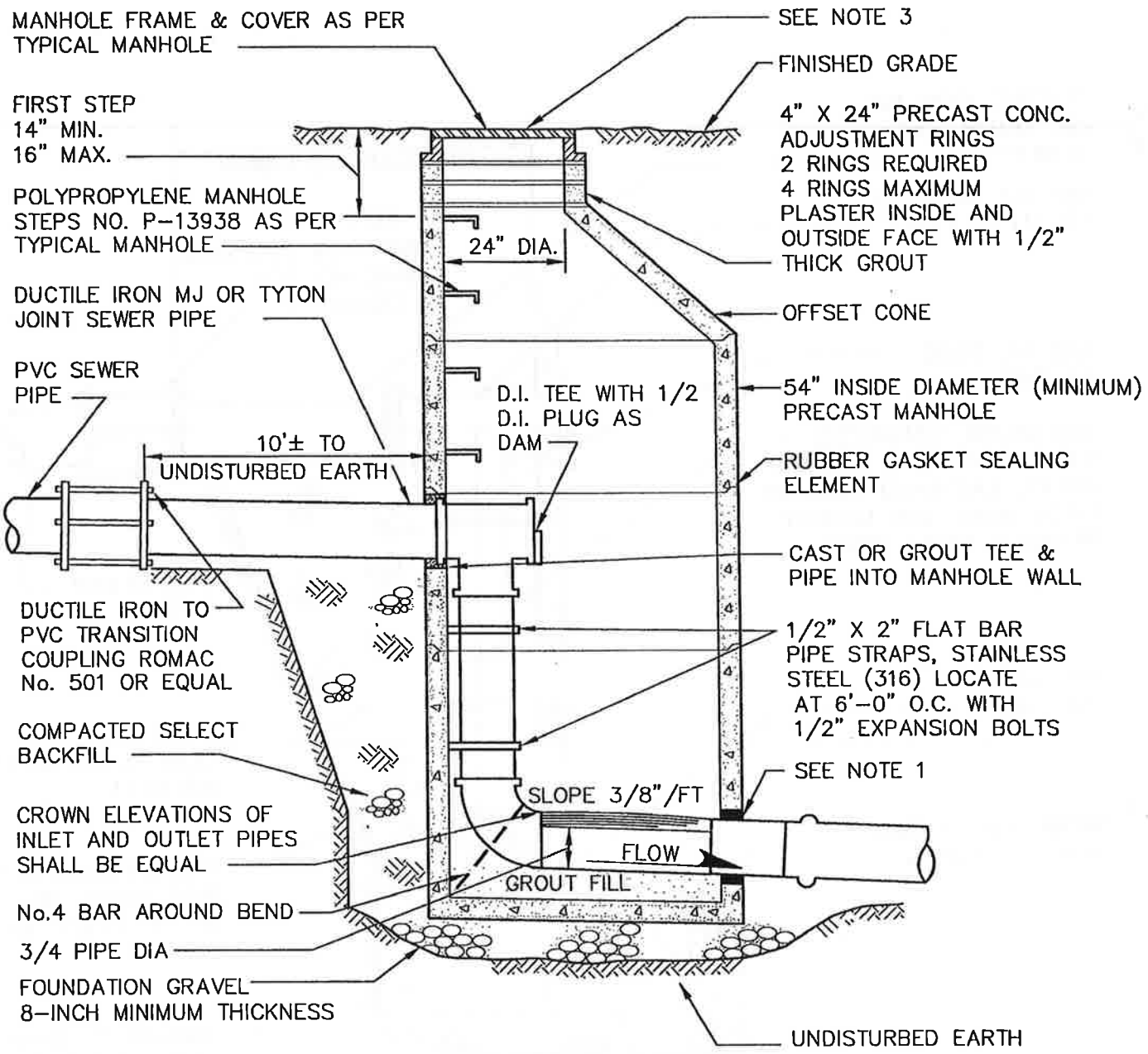
NOTES:

1. PIPE CONNECTIONS TO MANHOLES SHALL BE AS FOLLOWS: PVC AND D.I. PIPE, CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER TIGHT FLEXIBLE RUBBER BOOT IN MANHOLE WALL, KOR-N-SEAL BOOT, OR EQUAL.
2. DROP OF GRADE THRU MANHOLE SHALL BE 0.10'.
3. INSTALL CONCRETE COLLAR. SEE DETAIL.

CITY OF KALAMA			
TYPICAL SADDLE MANHOLE			
APPROVED: Paul M. McCrory 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. NO. TSMH
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE



CITY OF KALAMA			
OUTSIDE DROP MANHOLE			
APPROVED: Carl M. McCrary 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. NO. ODMH
DATE: 11/97	DRWN: R.L.O.	CHKD: T.J.O.	SCALE: NONE

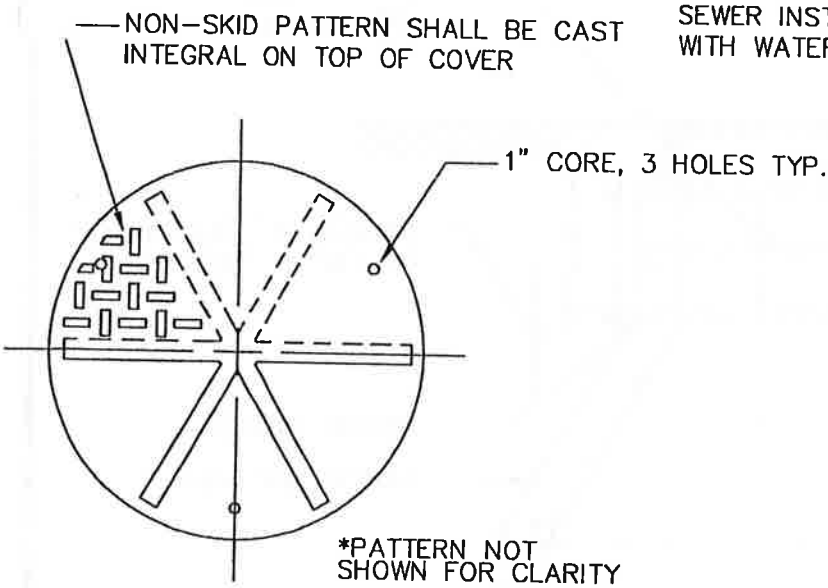


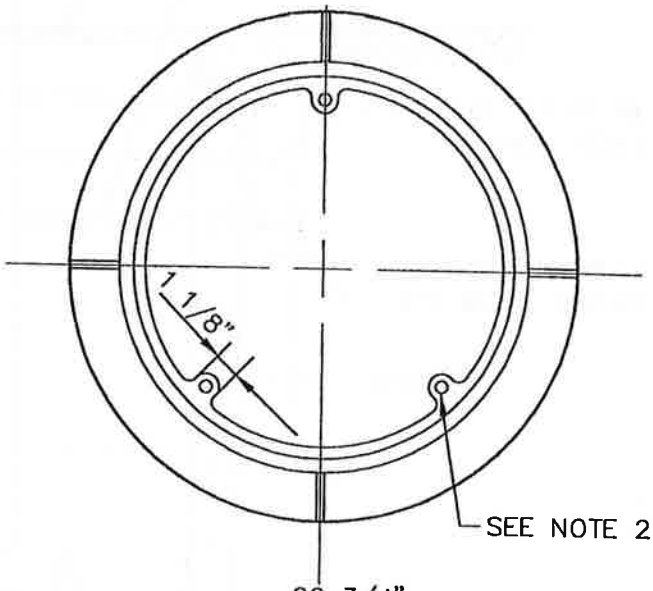
NOTES:

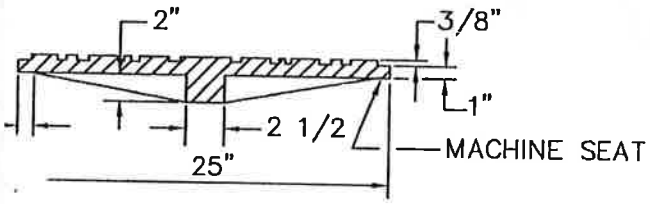
1. PIPE CONNECTIONS TO MANHOLES SHALL BE AS FOLLOWS: PVC AND D.I. PIPE, CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER TIGHT FLEXIBLE RUBBER BOOT IN MANHOLE WALL, KOR-N-SEAL BOOT, OR EQUAL.
2. DROP OF GRADE THRU MANHOLE SHALL BE 0.10'.
3. INSTALL CONCRETE COLLAR. SEE DETAIL.
4. PRE-CHANNELED MANHOLES ARE NOT ACCEPTABLE.

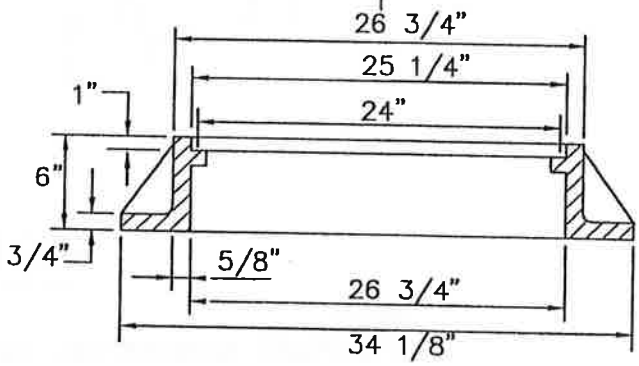
CITY OF KALAMA			
INSIDE DROP MANHOLE			
APPROVED: Carl M. McCrary 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. # IDMH
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE

COVERS SHALL HAVE THE WORD "SEWER" IN RAISED LETTERS WHEN USED IN CONNECTION WITH SANITARY SEWER INSTALLATION, OR "WATER" WHEN IN CONNECTION WITH WATER DISTRIBUTION INSTALLATION.







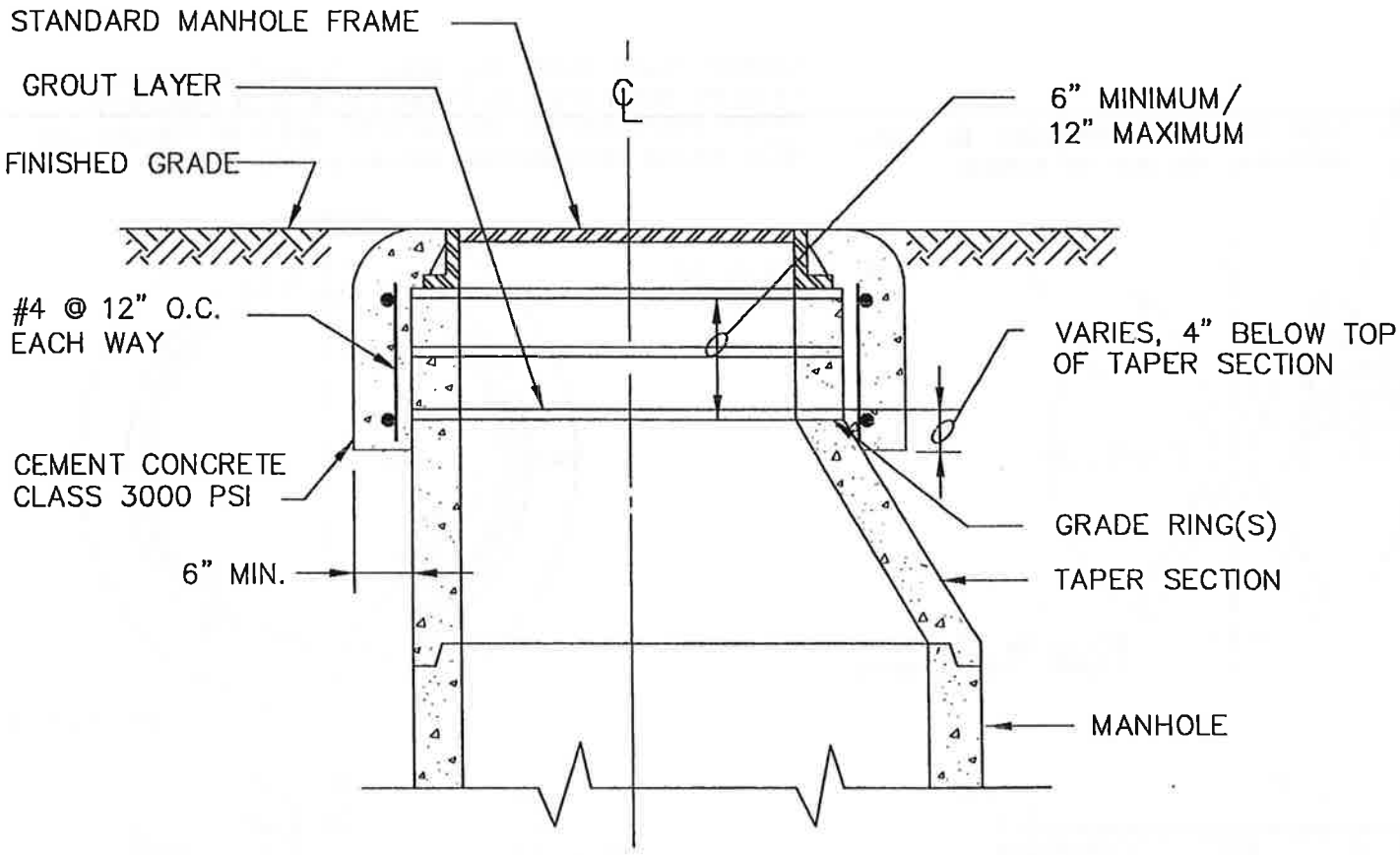


DUCTILE IRON LOCKING COVER
MINIMUM WEIGHT 180 LBS

NOTES:

1. MATERIALS ARE DUCTILE IRON ASTM A-40 CLASS 30
2. DRILL AND TAP THREE 5/8" HOLES THRU FRAME AT 120° AND 11 1/16" RADIUS
3. SATHER MANUFACTURING CO 6024-R OR OTHERWISE APPROVED EQUAL
4. WATERTIGHT MANHOLE FRAME AND COVERS MAY BE REQUIRED BASED ON LOCAL CONDITIONS.
5. ALL MANHOLES LOCATED OUTSIDE PAVEMENT AREAS SHALL BE PROVIDED WITH LOCKING MANHOLE FRAME AND COVER,

CITY OF KALAMA			
MANHOLE FRAME AND COVER			
APPROVED: Carl M. McCary 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. NO. MHFC
DATE: 11/97	DRWN: R.L.O.	CHKD: T.J.O.	SCALE: NONE



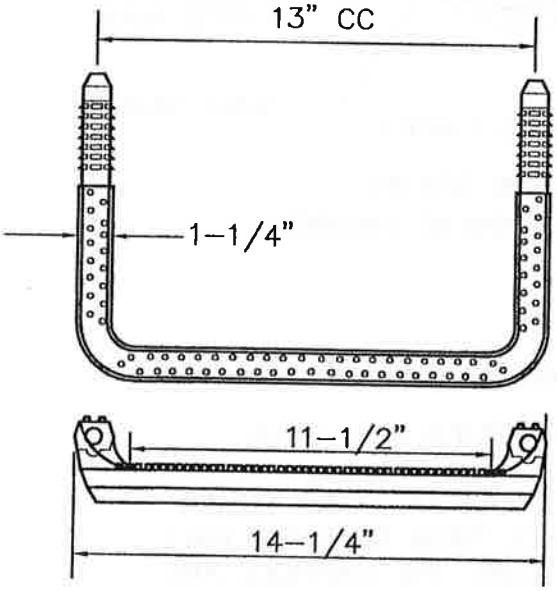
SECTION

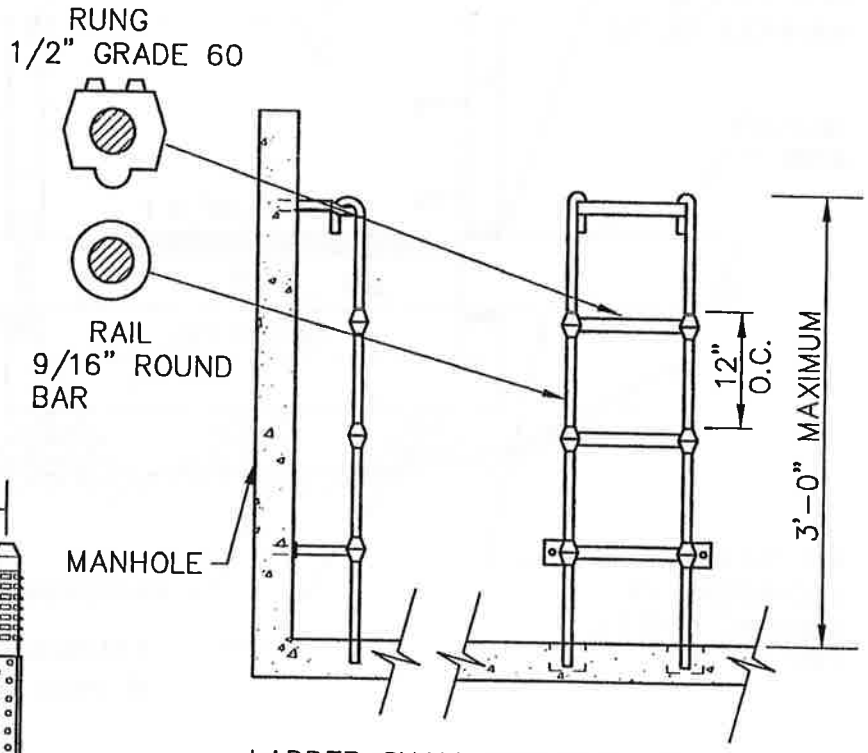
NOTE:

CONSTRUCT CONCENTRIC CONCRETE COLLARS AROUND ALL MANHOLE FRAMES LOCATED OUTSIDE OF PAVEMENT AREAS

MANHOLE FRAME COLLAR

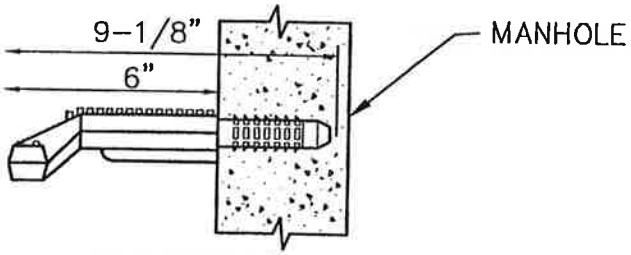
CITY OF KALAMA			
MANHOLE FRAME COLLAR			
APPROVED: Carl M. McKay 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. NO MHCLAR
DATE: 11/97	DRWN: R.L.O.	CHKD: T.J.O.	SCALE: NONE





LADDER SHALL CONFORM TO POLYPROPYLENE ASTM D–4101 1/2" GRADE 60 REINFORCING BAR A–615 9/16" COLD DRAWN BAR C–1018

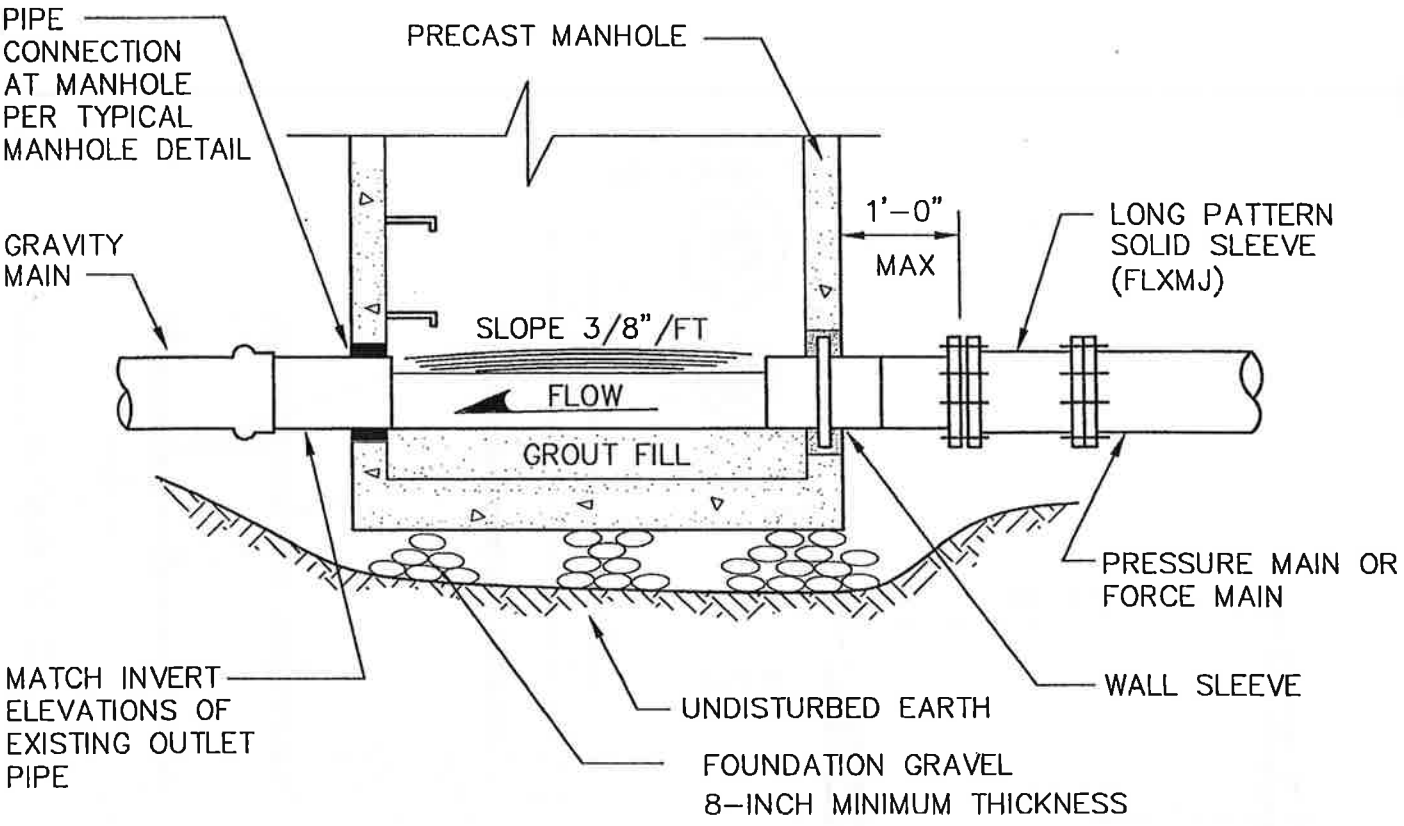
POLYPROPYLENE LADDER



POLYPROPYLENE STEP, LANE NO. P–13938 OR EQUAL

POLYPROPYLENE MANHOLE STEPS

CITY OF KALAMA			
POLYPROPYLENE LADDER AND MANHOLE STEPS			
APPROVED: Carl M McIlroy 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. NO. PLMHS
DATE: 11/97	DRWN: R.L.O.	CHKD: T.J.O.	SCALE: NONE



NOTES:

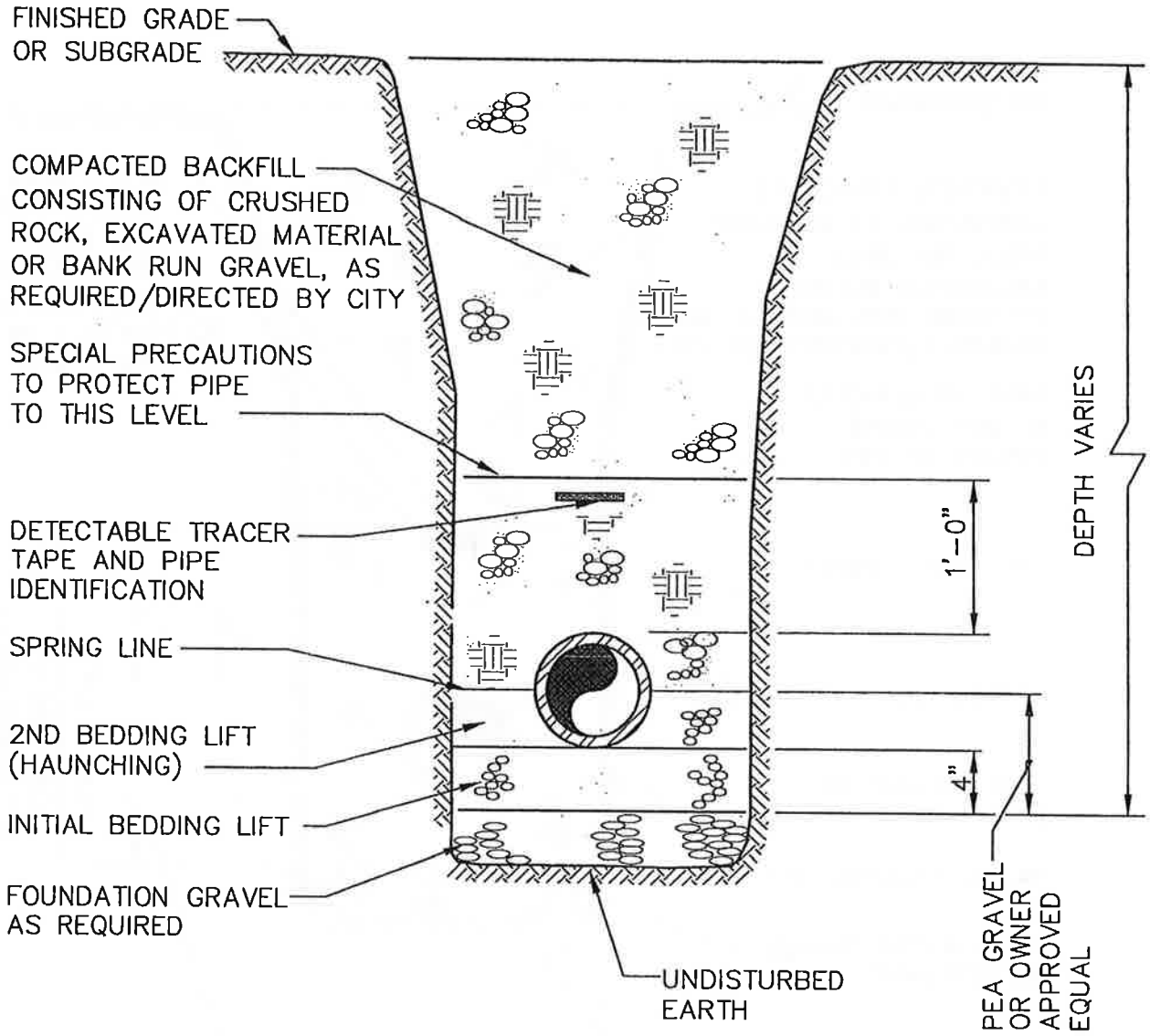
1. PIPE CONNECTIONS TO MANHOLES SHALL BE AS FOLLOWS:

   PVC PIPE: CAST OR GROUT A MANHOLE COUPLING INTO WALL.

   D.I. PIPE: BELL AND SPIGOT JOINT OR FLEXIBLE COUPLING EITHER SHALL BE 12" MAXIMUM DISTANCE FROM MANHOLE WALL. PVC AND D.I. PIPE, OPTIONAL: CORE THE MANHOLE AND CONNECT FORCE MAIN WITH A WATER TIGHT WALL SLEEVE.

2. DROP OF GRADE THRU MANHOLE SHALL BE 0.10'.

CITY OF KALAMA			
FORCE MAIN DISCHARGE MANHOLE			
APPROVED: Carl M. McCrary 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. N FMDMH
DATE: 11/97	DRWN: R.L.O.	CHKD: T.J.O.	SCALE: NONE

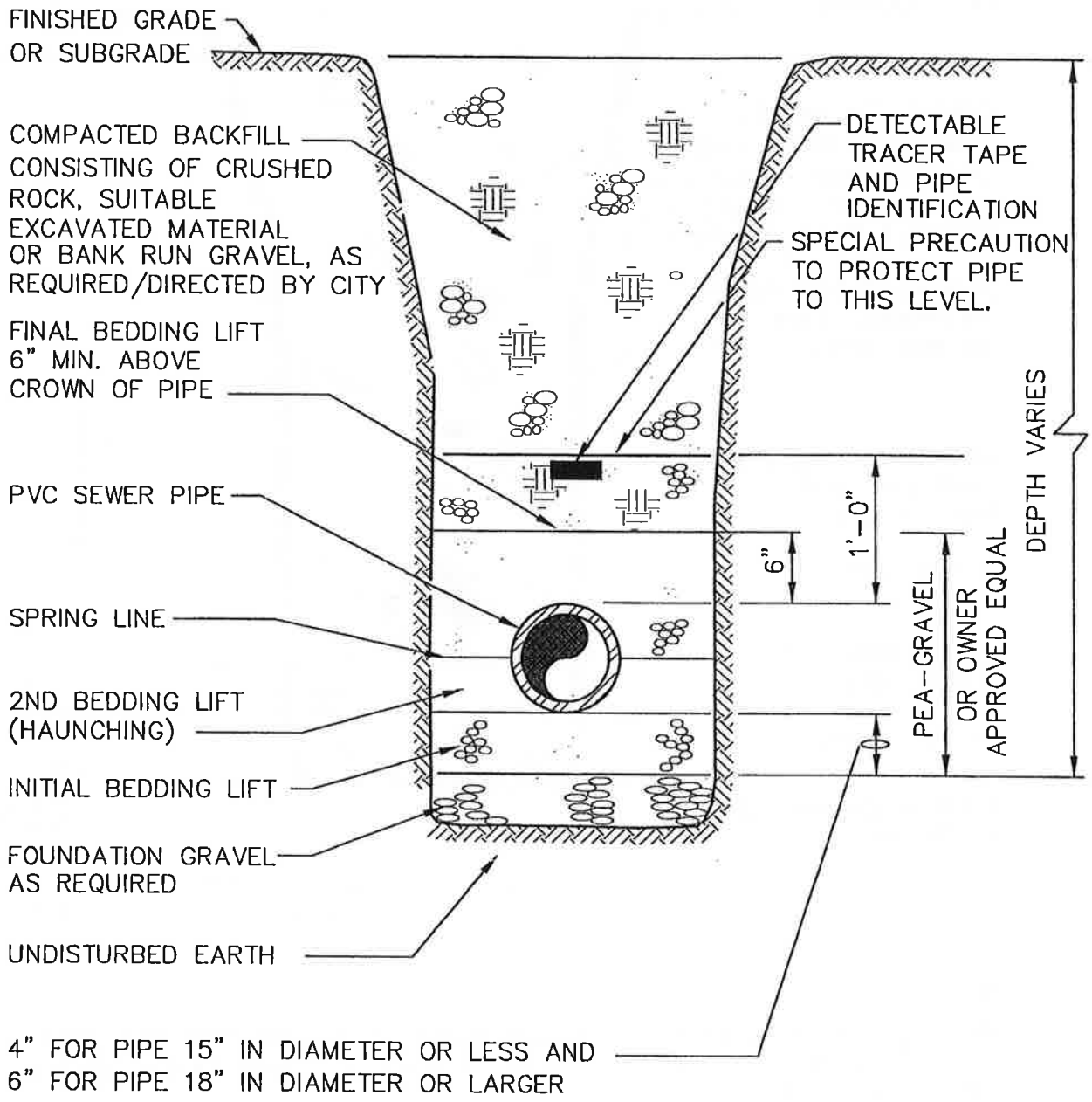


NOTE:

BACKFILL MATERIAL AND COMPACTION SHALL BE IN CONFORMANCE WITH CITY STANDARDS AND/OR THE STATE OR COUNTY PERMIT REQUIREMENTS, (AS BE APPLICABLE)

PRESSURE LINES SHALL HAVE WARNING I.D. TAPE.

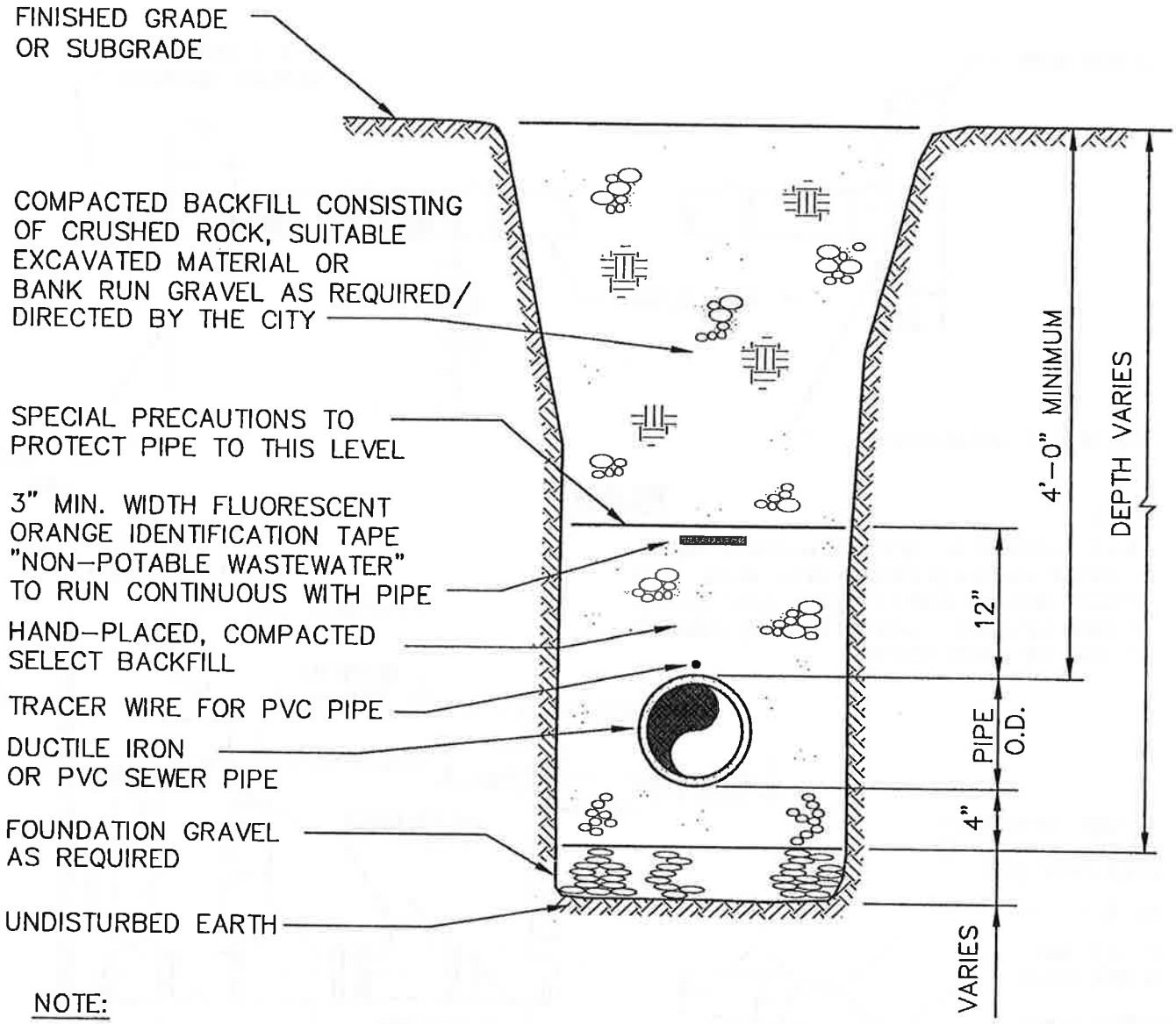
CITY OF KALAMA			
SANITARY SEWER TRENCH SECTION FOR D.I.			
APPROVED: Carl M. McCurry 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. NO. SSTSDIP
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE



NOTE:

BACKFILL MATERIAL AND COMPACTION SHALL BE IN CONFORMANCE WITH CITY STANDARDS AND/OR THE STATE OR COUNTY PERMIT REQUIREMENTS (AS MAY BE APPLICABLE)

CITY OF KALAMA			
SANITARY SEWER TRENCH SECTION FOR P.V.C. PIPE			
APPROVED: Carl M. Mulvay 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. SSTSPVCP
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE

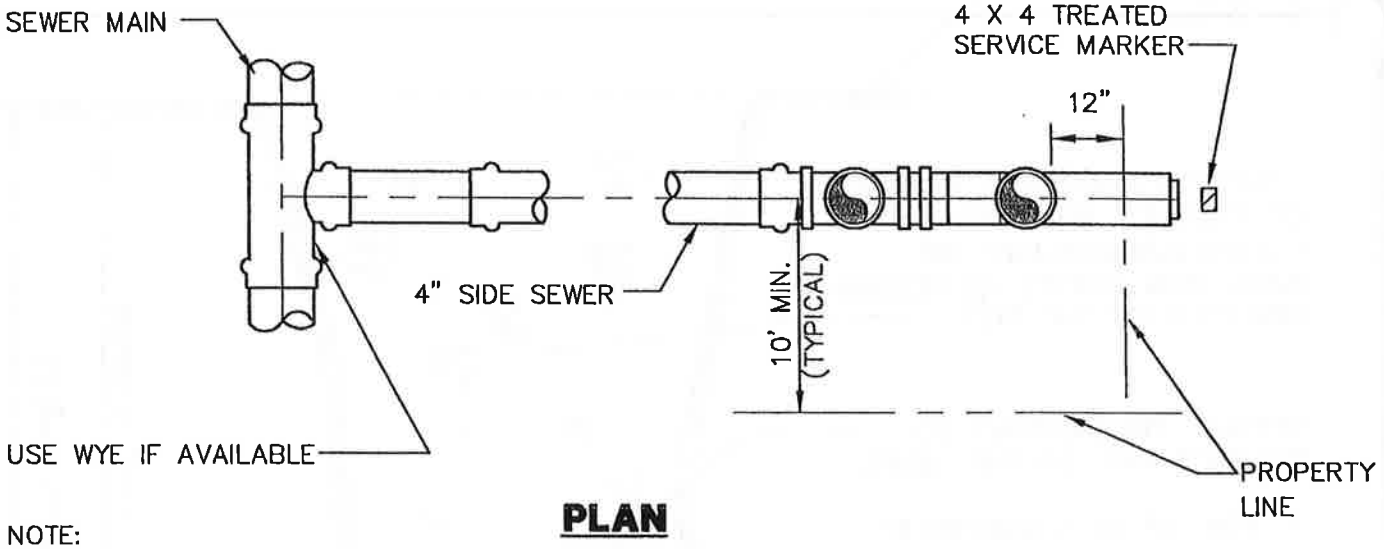


NOTE:

1. BACKFILL MATERIAL AND COMPACTION SHALL BE IN CONFORMANCE WITH THE CITY STANDARDS AND/OR THE STATE OR COUNTY PERMIT REQUIREMENTS, (AS MAY BE APPLICABLE)

2. TRACER WIRE SHALL BE 16 GAUGE COPPER (CONTINUOUS)

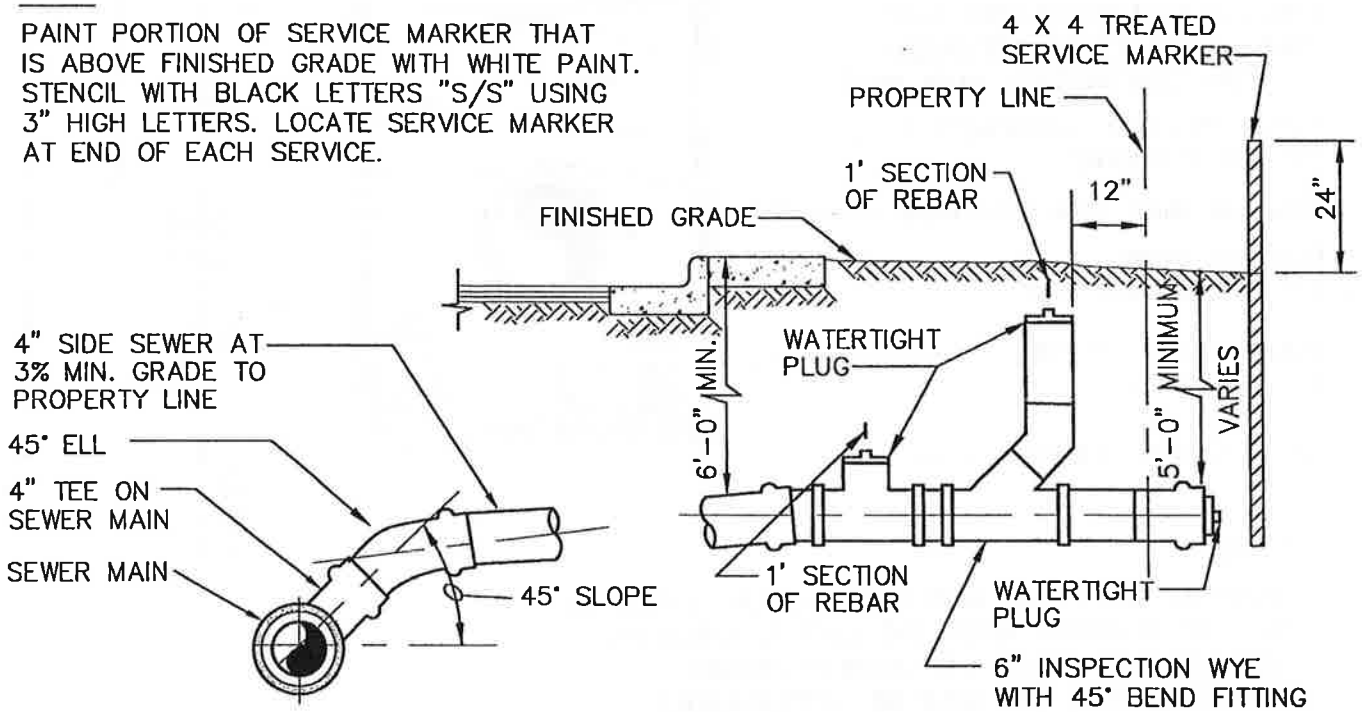
CITY OF KALAMA			
PRESSURE LINE AND FORCE MAIN TYPICAL TRENCH SECTION			
APPROVED: Carl M. McKay 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. NO. PLFMTTS
DATE: 11/97	DRWN: R.L.O.	CHKD: T.J.O.	SCALE: NONE



PLAN

NOTE:

PAINT PORTION OF SERVICE MARKER THAT IS ABOVE FINISHED GRADE WITH WHITE PAINT. STENCIL WITH BLACK LETTERS "S/S" USING 3" HIGH LETTERS. LOCATE SERVICE MARKER AT END OF EACH SERVICE.

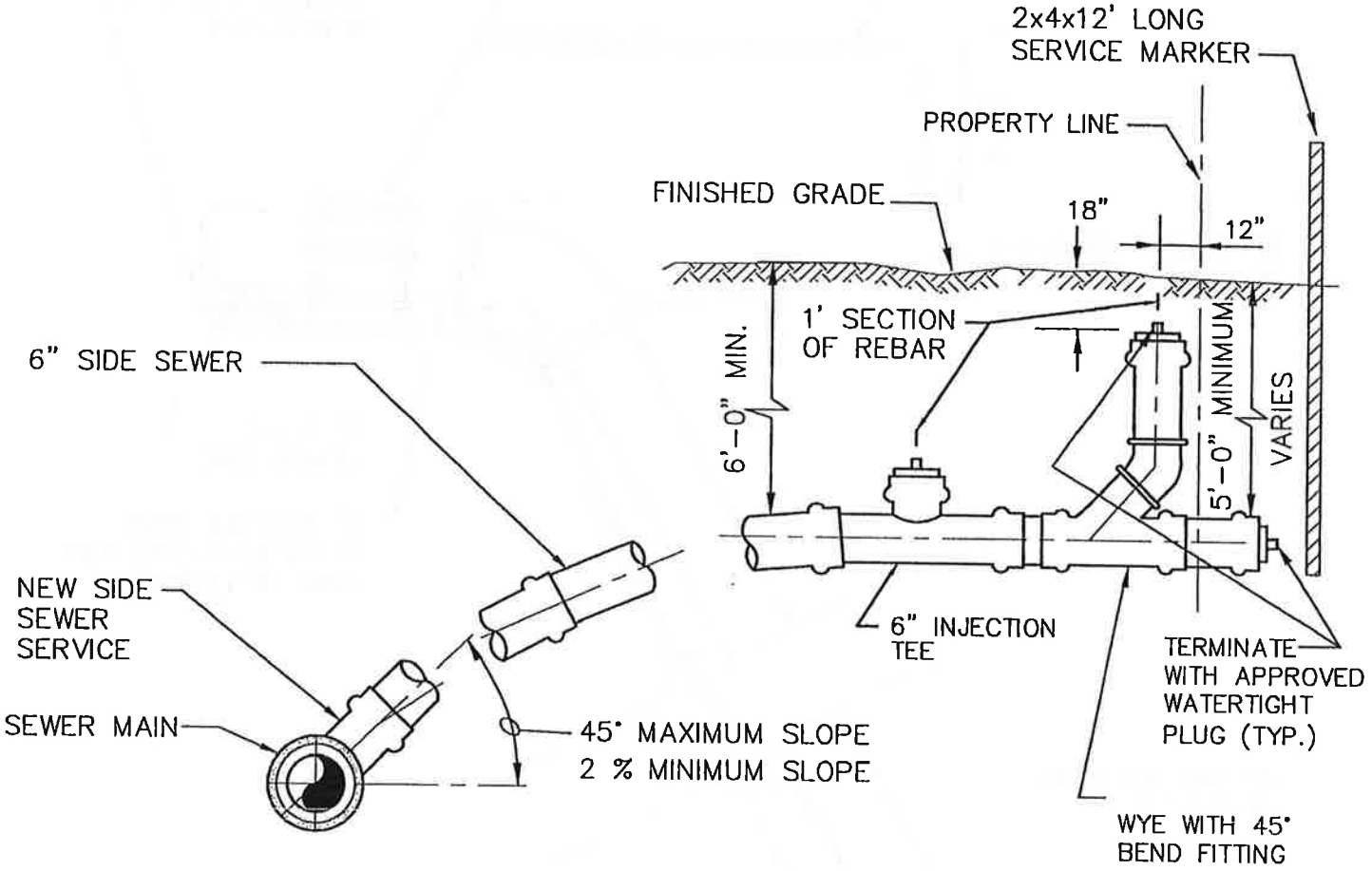


ELEVATION

NOTES:

1. MAXIMUM DEFLECTION NOT TO EXCEED PIPE MANUFACTURER RECOMMENDATIONS.
2. SIDE SEWER LATERAL SHALL BE THE SAME MATERIAL AS THE MAIN LINE SEWER AND BEDDED THE SAME
3. PIPE TO BE BEDDED IN PEA GRAVEL.

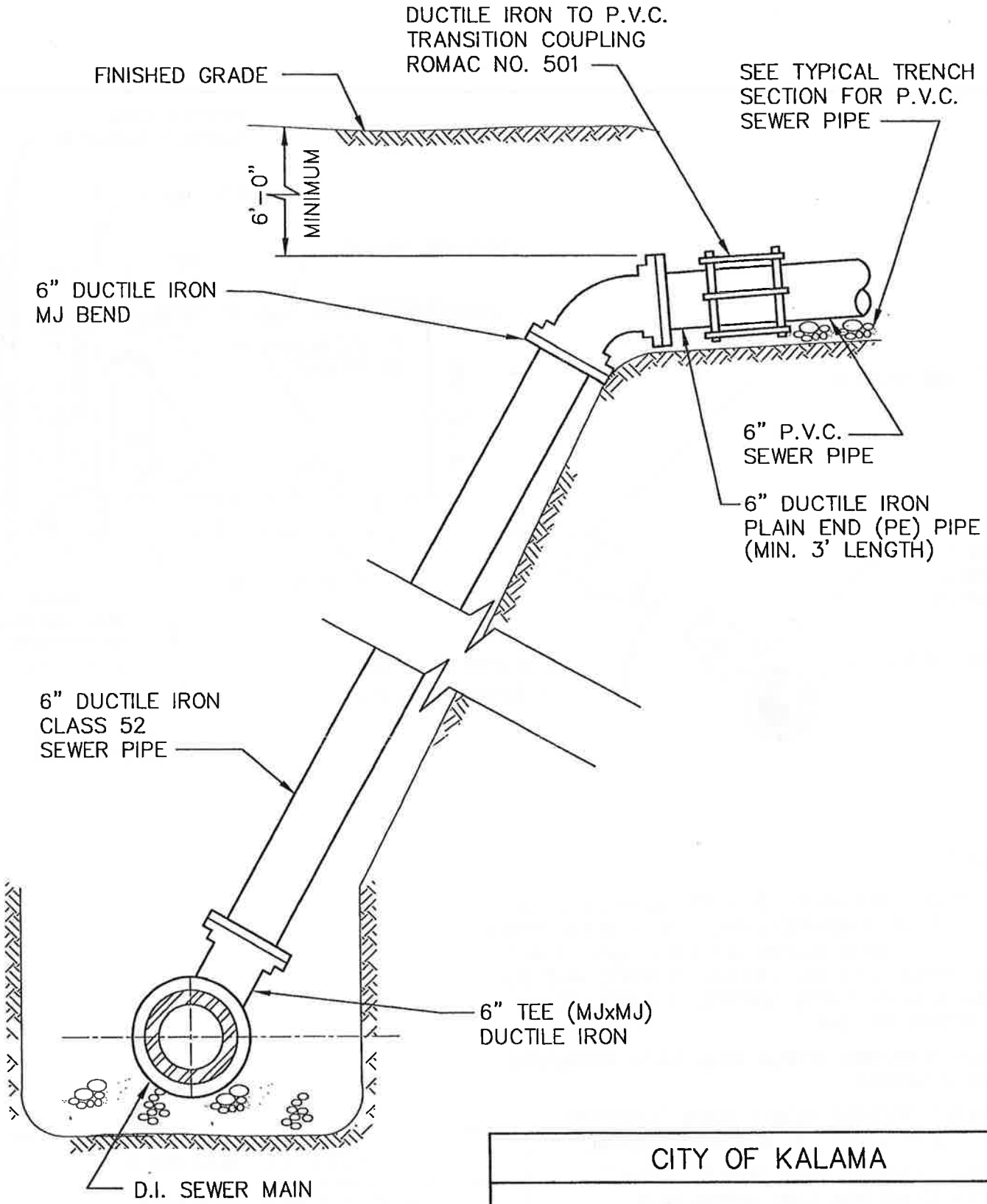
CITY OF KALAMA			
TYPICAL SIDE SEWER DETAIL (WITHIN NEW DEVELOPMENT)			
APPROVED: Carl M McCrary 5-29-03 PUBLIC WORKS DIRECTOR DATE			DWG. TSSD
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE



NOTES:

1. PAINT PORTION OF SERVICE MARKER THAT IS ABOVE FINISHED GRADE WITH WHITE PAINT. STENCIL WITH BLACK LETTERS "S/S" USING 3" HIGH LETTERS. LOCATE SERVICE MARKER AT END OF EACH SERVICE. STENCIL TOTAL LENGTH OF 2x4.
2. TAP EXISTING SEWER MAIN WITH APPROVED CITY SADDLE.
3. MUST PROVIDE SEWER MAIN "COUPON" TO CITY STAFF, IF WET TAP ALLOWED.
4. SEE "TYPICAL SIDE SEWER DETAIL" FOR CONSTRUCTION WITHIN NEW DEVELOPMENT.
5. PROVIDE PEA GRAVEL PIPE BEDDING AND 5/8" CRUSHED IN TRENCH.

CITY OF KALAMA			
SIDE SEWER SERVICE (WITHIN EXISTING STREET RIGHT-OF-WAY)			
APPROVED: Carl M. McHarg 5-29-03 BY CITY DATE			DWG. NO. SSD
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE

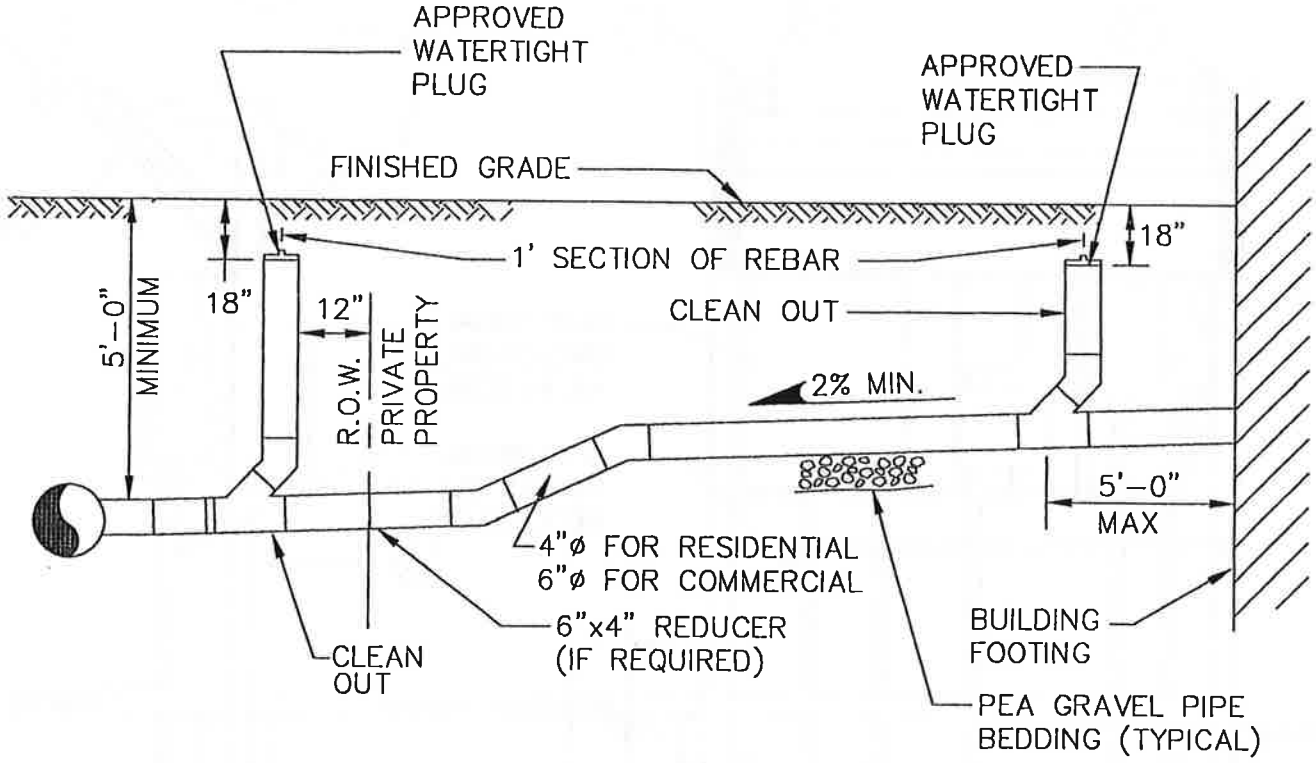


NOTE:

1. SEE TYPICAL TRENCH SECTION FOR DUCTILE IRON SEWER PIPE.
2. LOCATION OF STANDING SIDE SEWERS MUST BE APPROVED BY CITY PRIOR TO INSTALLATION.

CITY OF KALAMA			
STANDING SIDE SEWER			
APPROVED: Carl M. McCary 5-29-03 BY CITY DATE			DWG. N SSS
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE

FILENAME: L:\KALAMA\97810\SEWER\SSS.DWG CREATED: OCT 14 1997 15:23:07 UPDATED: NOV 13 1997 10:39:49 PLOTTED: NOV 13 1997 11:14:23 OPERATOR: MC

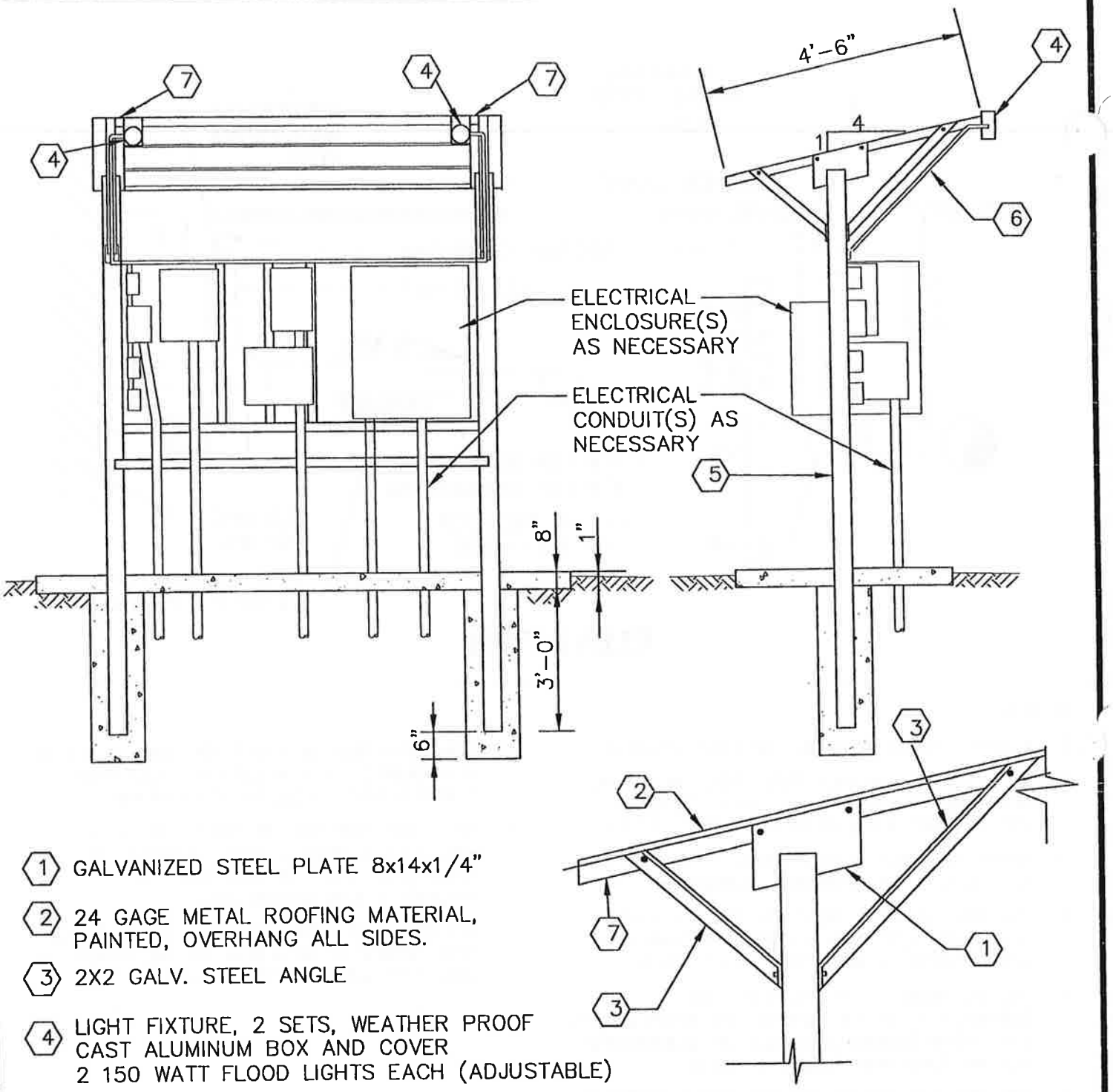


ELEVATION

NOTES:

1. ELBOWS SHALL NOT BE GREATER THAN 45°.
2. A CLEAN OUT IS REQUIRED FOR EACH PIPE RUN GREATER THAN 100' AND FOR EACH 90° ACCUMULATED BEND/100' OF LENGTH.
3. RIGHT-OF-WAY RESTORATION SHALL MATCH OR EXCEED THE ORIGINAL CONDITION.
4. TRENCH BACKFILL BENEATH PAVED SURFACE SHALL BE 5/8" MINUS CRUSHED SURFACING TOP COURSE, COMPACTED IN 12" LIFTS.
5. ALL PLUMBING OUTLETS SHALL BE CONNECTED TO THE SEWER. NO DOWNSPOUTS OR STORM DRAINAGE SHALL BE CONNECTED TO THE SANITARY SEWER SYSTEM.
6. 18" MINIMUM COVER ON ALL PIPES (PRIVATE PROPERTY) AND SLOPE @ 2% MINIMUM.
7. 6' MINIMUM PIPE COVER AT PROPERTY LINE.
8. LAY PIPE IN STRAIGHT LINE BETWEEN BENDS. MAKE ALL CHANGES IN GRADE OR LINE WITH AN ELBOW OR WYE. 90° CHANGE WITH AN ELBOW AND WYE.
9. 6" SEWER PIPE MINIMUM SIZE IN RIGHT-OF-WAY 2% MINIMUM GRADE, 45% MAXIMUM GRADE.
10. 4" SEWER PIPE MINIMUM SIZE ON PRIVATE RESIDENTIAL PROPERTY. 6" SEWER PIPE MIN. SIZE ON COMMERCIAL PROPERTIES. 2% MINIMUM GRADE, 45° MAXIMUM.
11. CONSTRUCTION IN RIGHT-OF-WAY SHALL BE PERFORMED BY A REGISTERED LICENSED CONTRACTOR. ACQUIRE CITY PERMIT.
12. ALL CONSTRUCTION IN RIGHT-OF-WAY REQUIRES A PERMIT AND PAYMENT OF FEE. COMPLETE LEGAL DESCRIPTION OF PROPERTY AND DIMENSIONS.
13. AS-BUILT DRAWING SHOWING LOCATION OF SIDE SEWER IN RELATION TO THE HOUSE IS REQUIRED AFTER INSTALLATION.

CITY OF KALAMA			
PRIVATE SIDE SEWER INSTALLATION			
APPROVED: Paul M McCary BY CITY 6-30-03 DATE			DWG. NO. PSSI
DATE: 6/03	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE



1. GALVANIZED STEEL PLATE 8x14x1/4"
2. 24 GAGE METAL ROOFING MATERIAL, PAINTED, OVERHANG ALL SIDES.
3. 2X2 GALV. STEEL ANGLE
4. LIGHT FIXTURE, 2 SETS, WEATHER PROOF CAST ALUMINUM BOX AND COVER 2 150 WATT FLOOD LIGHTS EACH (ADJUSTABLE)
5. 6" I.D. ELECTRICAL GALV. CONDUIT (SCHEDULE 40) CLOSED TOP (WELDED)
6. ELECTRICAL CONDUIT, 3/4" GALV.
7. 2-1/2" SQUARE TUBE STEEL, 1/4" WALL WITH 4 ROOF SUPPORT STRINGERS.

CITY OF KALAMA

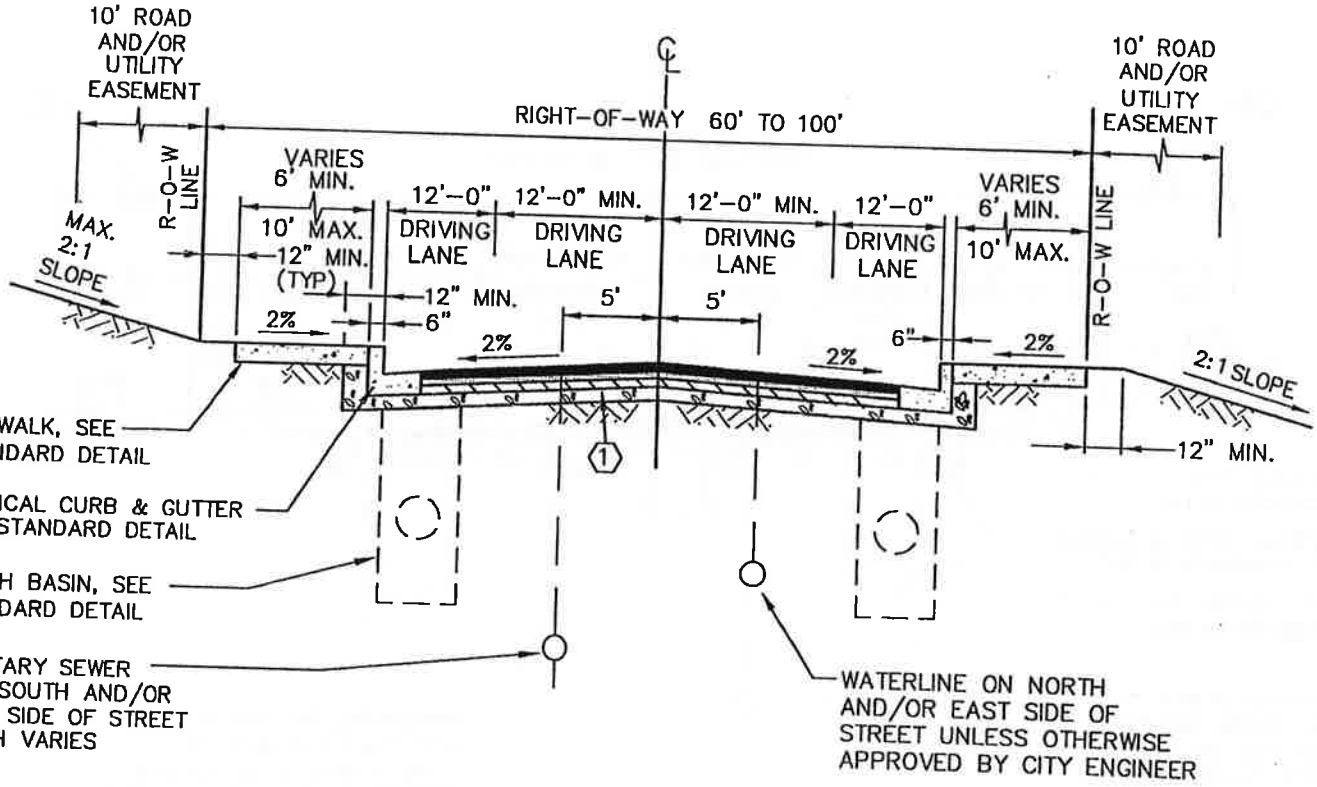
ROOF STRUCTURE FOR ELECTRICAL ENCLOSURE

APPROVED: Carl McCrary 5-29-03 BY CITY DATE			DWG. NO RSEE
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE

STREETS DETAILS

LIST OF STREET DETAILS

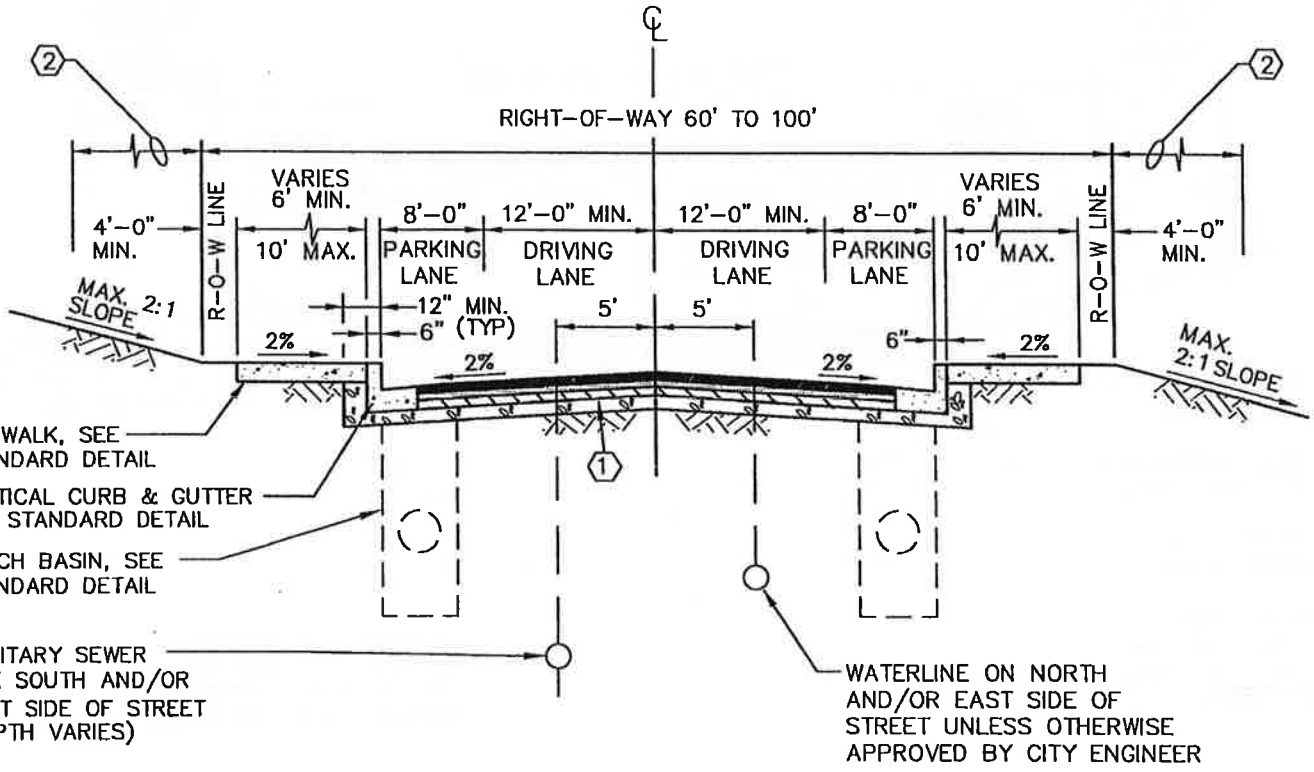
3 or 4 lane



NOTE:

(1) PAVEMENT DESIGN BY CURRENT WASHINGTON STATE LICENSED CIVIL ENGINEER AND AS APPROVED BY THE CITY ENGINEER.

CITY OF KALAMA			
MAJOR ARTERIAL STREET SECTION			
APPROVED: Carl M. McCrary BY CITY 5-29-03 DATE			DWG. NO. ST-1
DATE: 3/98	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE

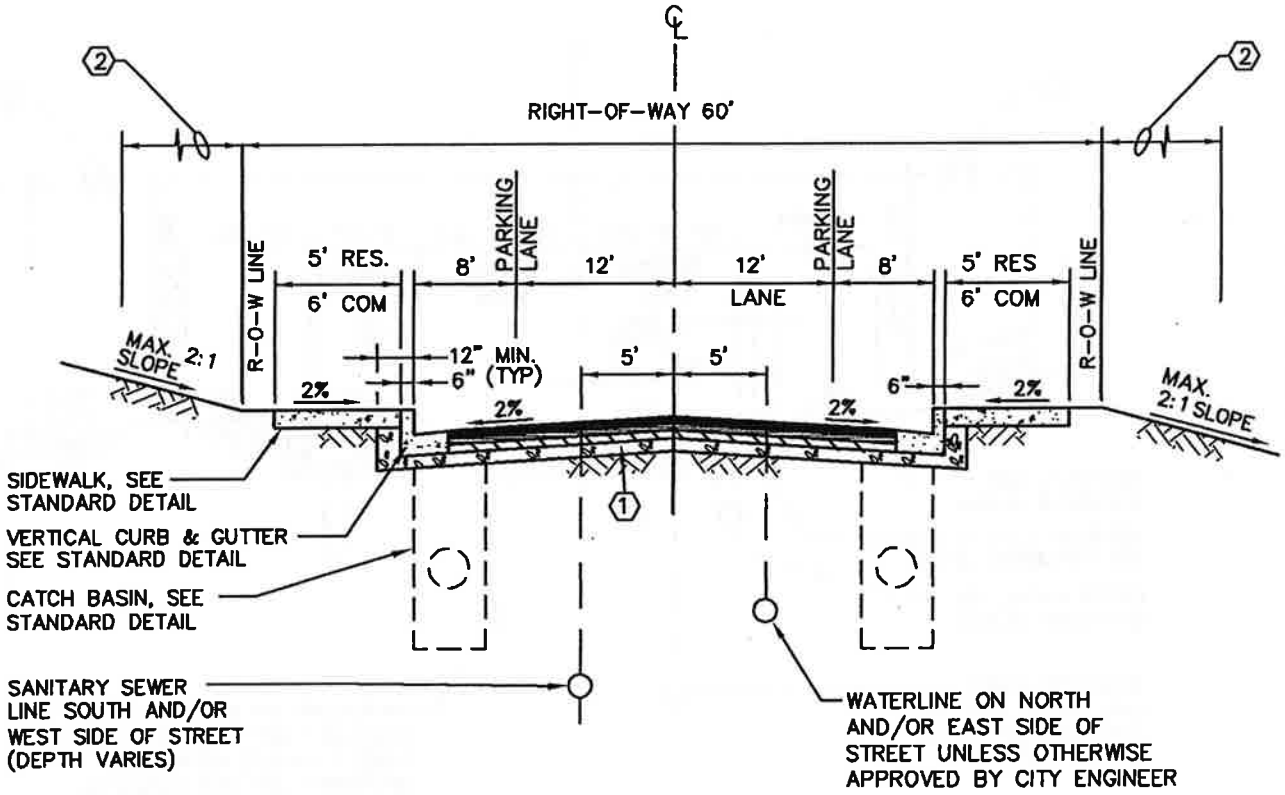


NOTE:

(1) PAVEMENT DESIGN BY CURRENT WASHINGTON STATE LICENSED CIVIL ENGINEER AND AS APPROVED BY THE CITY ENGINEER.

(2) 10' ROAD AND/OR UTILITY EASEMENT REQUIRED (BOTH SIDES)

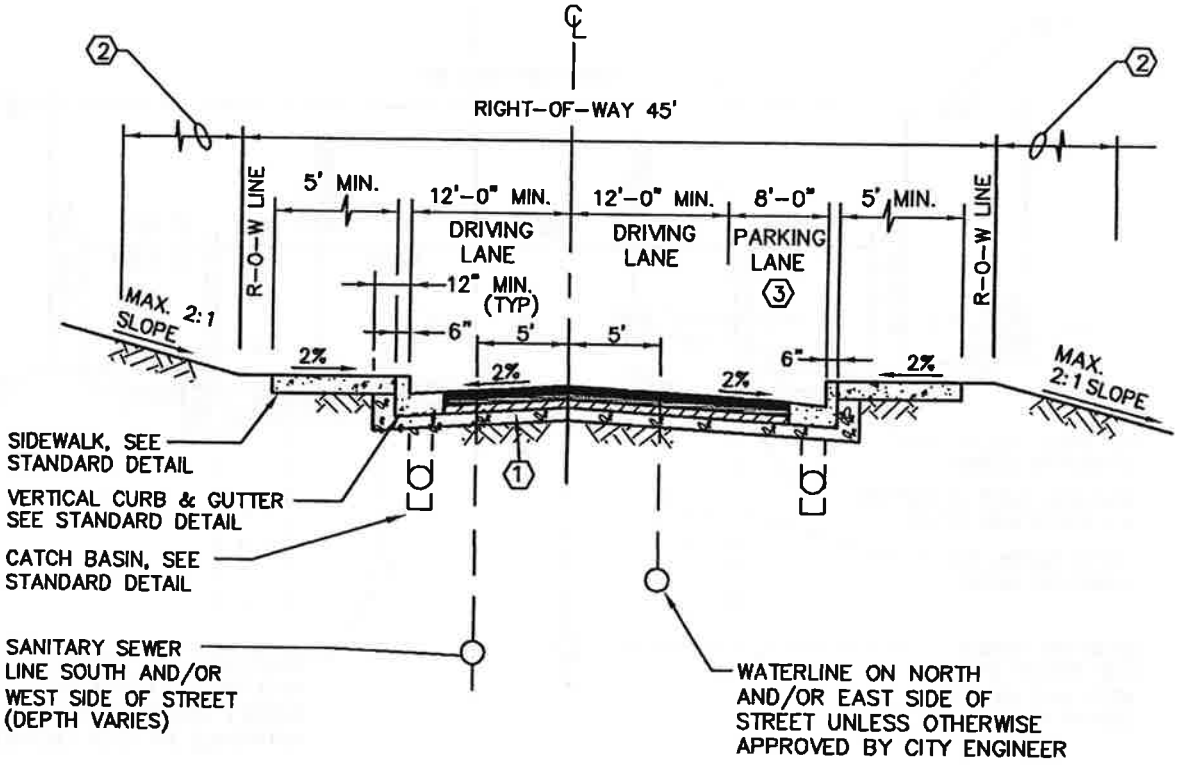
CITY OF KALAMA			
MINOR ARTERIAL STREET SECTION			
APPROVED: Carl M. McClary BY CITY — 5-29-03 DATE			DWG. N' ST-2
DATE: 3/98	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



NOTE:

(1) PAVEMENT DESIGN BY CURRENT WASHINGTON STATE LICENSED CIVIL ENGINEER AND AS APPROVED BY THE CITY ENGINEER.

CITY OF KALAMA			
COLLECTOR STREET SECTION			
APPROVED: Carl M McClary 8-27-08 BY CITY DATE			DWG. NO. ST-2A
DATE: 8/08	DRWN: D.B.	CHKD: M.B.J.	SCALE: NONE



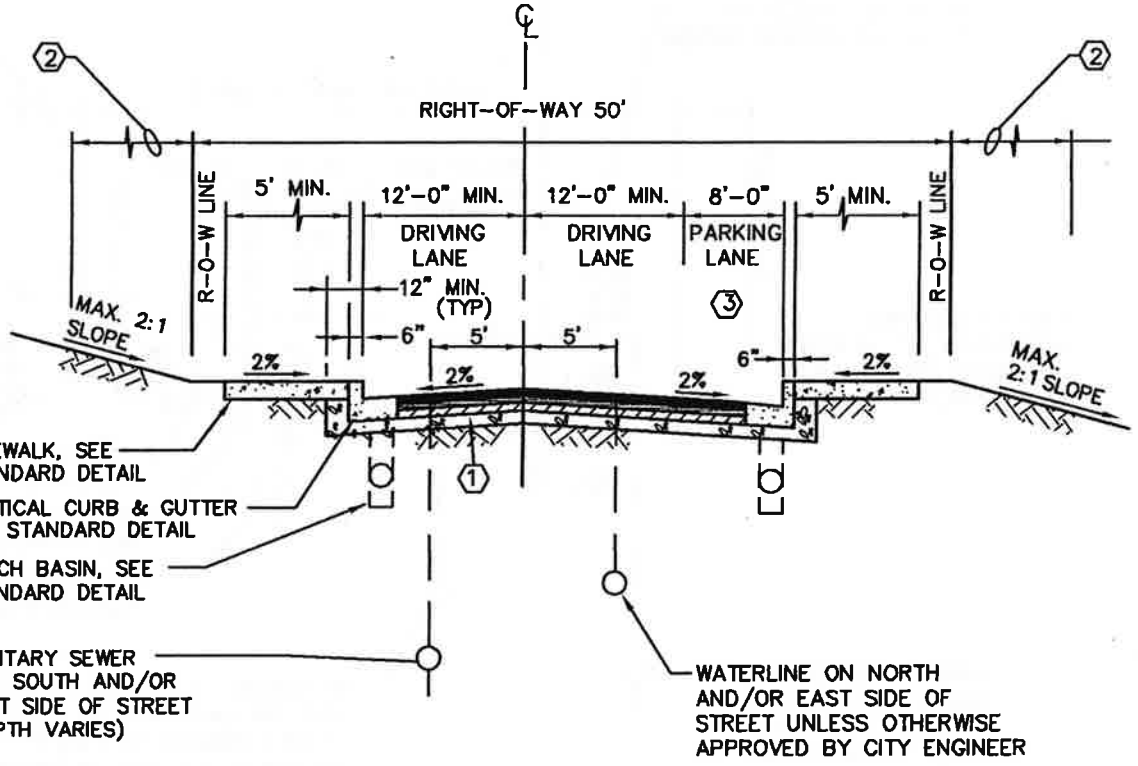
NOTE:

(1) PAVEMENT DESIGN BY CURRENT WASHINGTON STATE LICENSED CIVIL ENGINEER AND AS APPROVED BY THE CITY ENGINEER.

(2) 5' ROAD AND/OR UTILITY EASEMENT REQUIRED (BOTH SIDES)

(3) CITY TO DETERMINE WHICH SIDE OF STREET TO INSTALL PARKING STRIP.

CITY OF KALAMA			
MINOR ACCESS STREET SECTION			
APPROVED: Ted McGary 8-27-08 BY CITY DATE			DWG. NO. ST-2B
DATE: 8/08	DRWN: D.B.	CHKD: M.B.J.	SCALE: NONE



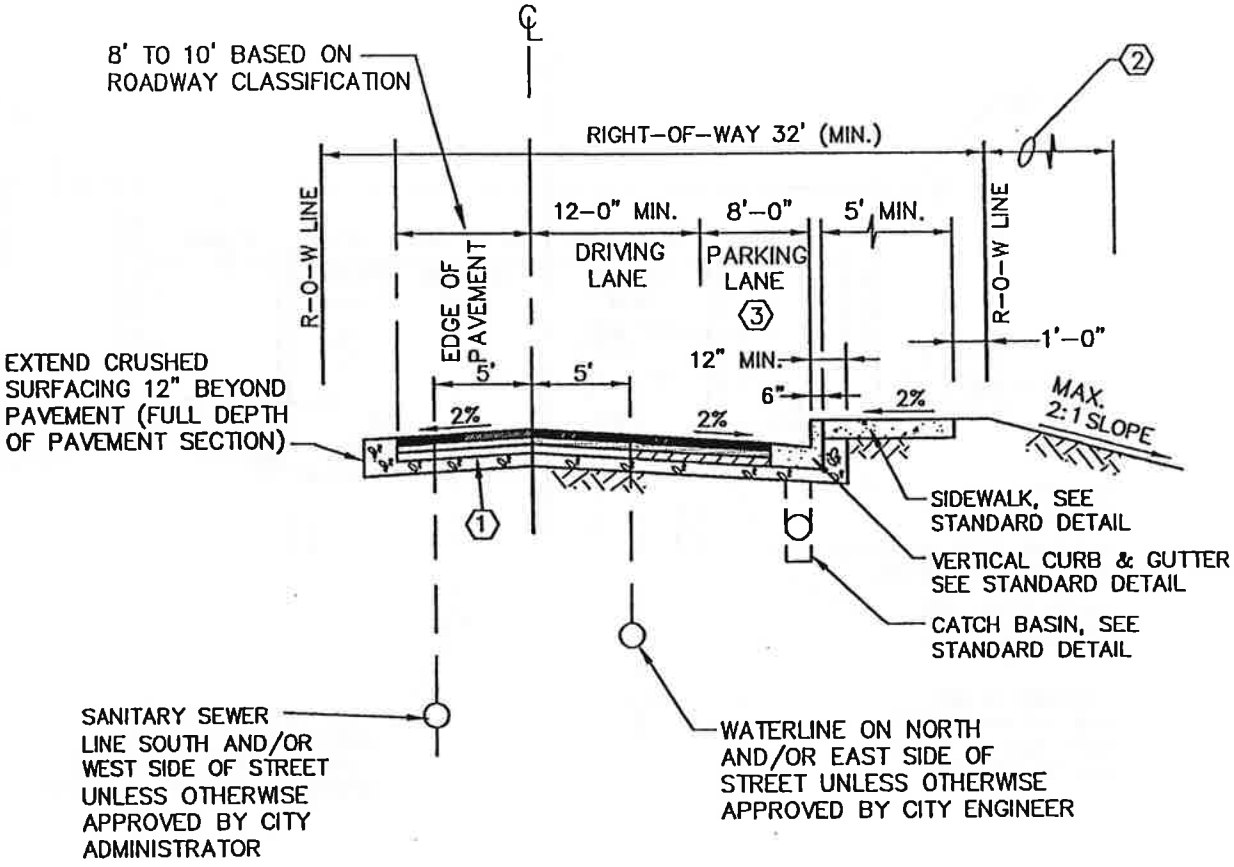
NOTE:

(1) PAVEMENT DESIGN BY CURRENT WASHINGTON STATE LICENSED CIVIL ENGINEER AND AS APPROVED BY THE CITY ENGINEER.

(2) 5' ROAD AND/OR UTILITY EASEMENT REQUIRED (BOTH SIDES)

(3) CITY TO DETERMINE WHICH SIDE OF STREET TO INSTALL PARKING STRIP.

CITY OF KALAMA			
LOCAL ACCESS STREET SECTION			
APPROVED: Bill M. McIvay 8-27-08 BY CITY DATE			DWG. NO. ST-2C
DATE: 8/08	DRWN: D.B.	CHKD: M.B.J.	SCALE: NONE



NOTE:

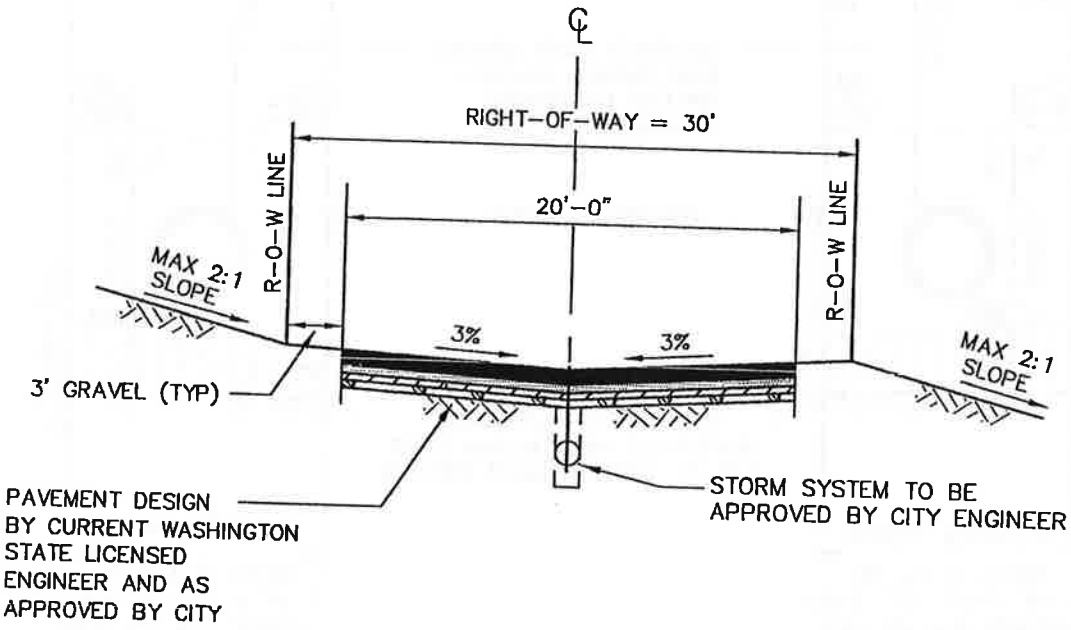
(1) PAVEMENT DESIGN BY CURRENT WASHINGTON STATE LICENSED CIVIL ENGINEER AND AS APPROVED BY THE CITY ENGINEER.

(2) 5' ROAD AND/OR UTILITY EASEMENT REQUIRED (BOTH SIDES)

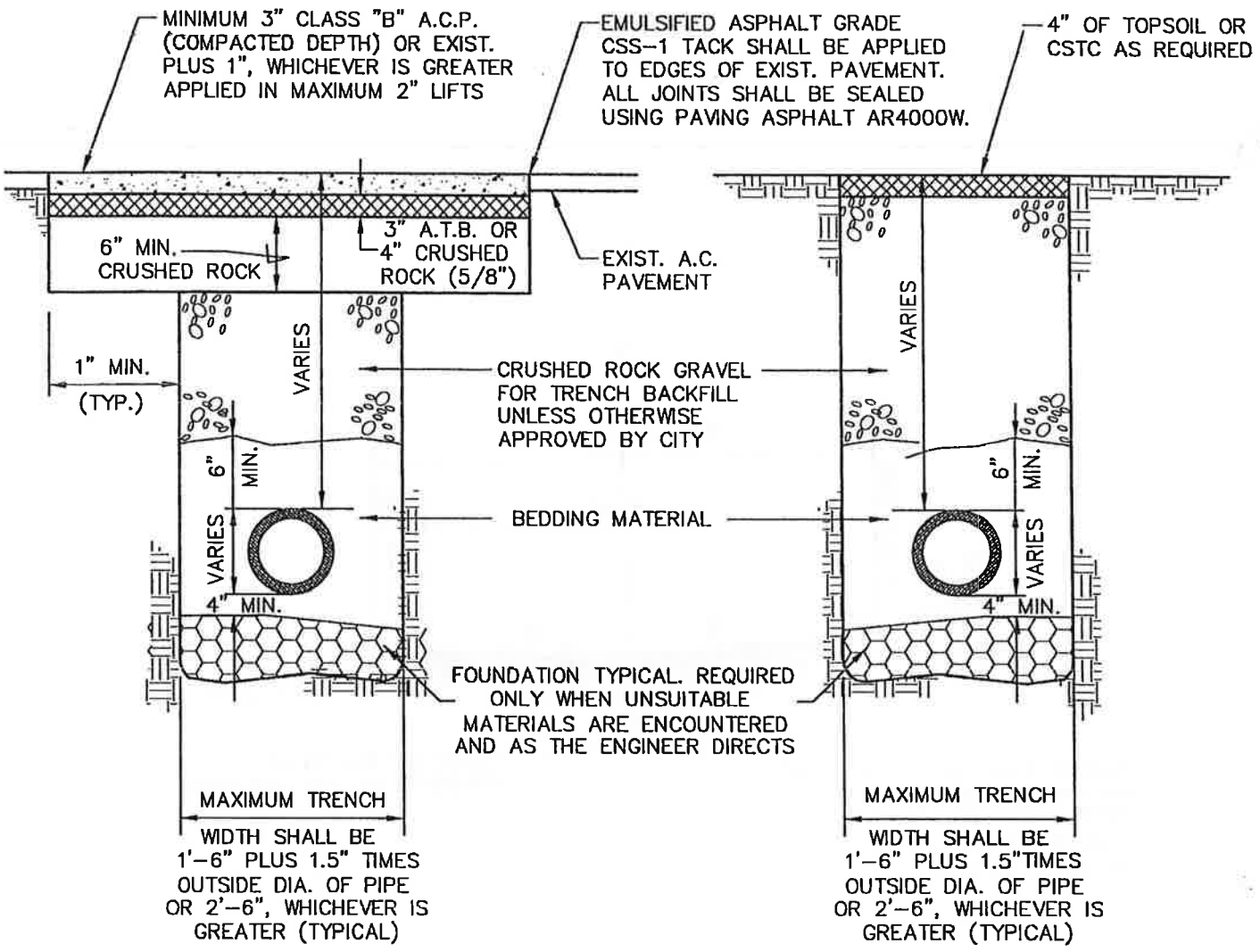
(3) CITY TO DETERMINE WHICH SIDE OF STREET TO INSTALL PARKING STRIP.

(4) PARKING SHALL BE ALLOWED ONLY ON ONE SIDE OF THE ROADWAY. APPROPRIATELY LOCATED "NO PARKING" SIGNAGE SHALL BE PROVIDED AS DIRECTED BY THE CITY.

CITY OF KALAMA			
HALF-STREET SECTION			
APPROVED: Carl M. McCrary BY CITY 5-29-03 DATE			DWG. NO ST-2D
DATE: 3/98	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



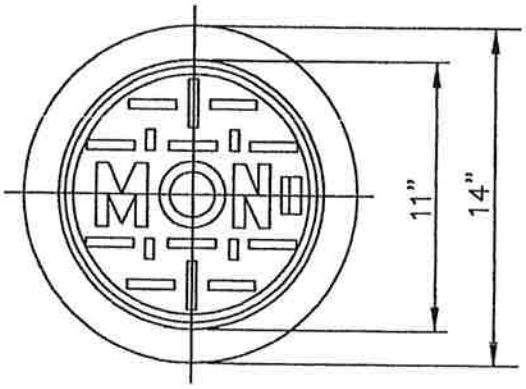
CITY OF KALAMA			
ALLEY SECTION/PRIVATE ROAD			
APPROVED: Paul M. McGrane 5-29-03 BY CITY DATE			DWG. NO. ST-4
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



NOTES:

1. ALL MATERIALS EXCEPT A.C.P. AND BEDDING MATERIAL SHALL BE COMPACTED IN 6-INCH MAXIMUM LIFTS TO 95% DENSITY.
2. BEDDING SHALL CONFORM TO CITY STANDARDS OF STANDARD SPECIFICATIONS.
3. COMPACTION: BEDDING SHALL BE COMPACTED TO 95% MAX. AS DETERMINED BY ASTM D1557. BACKFILL SHALL BE COMPACTED TO 85% IN UNPAVED AREA, AND 95% IN PAVED OR SHOULDER AREAS AS DETERMINED BY ASTM D1557.
4. ALL MATERIALS, WORKMANSHIP, AND INSTALLATION SHALL BE IN CONFORMANCE WITH THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION AS AMENDED BY CITY STANDARDS.
5. KEEP TRENCH BOTTOM COMPACTED WITH UNIFORM GRADE. A BELL JOINT SHALL BE REQUIRED AT EACH JOINT FOR PROPER SUPPORT. NO TEMPORARY SUPPORTS, I.E. BLOCKS, WILL BE ALLOWED TO SUPPORT PIPE. TRENCH BOTTOM SHALL BE TO GRADE PRIOR TO PIPE INSTALLATION.

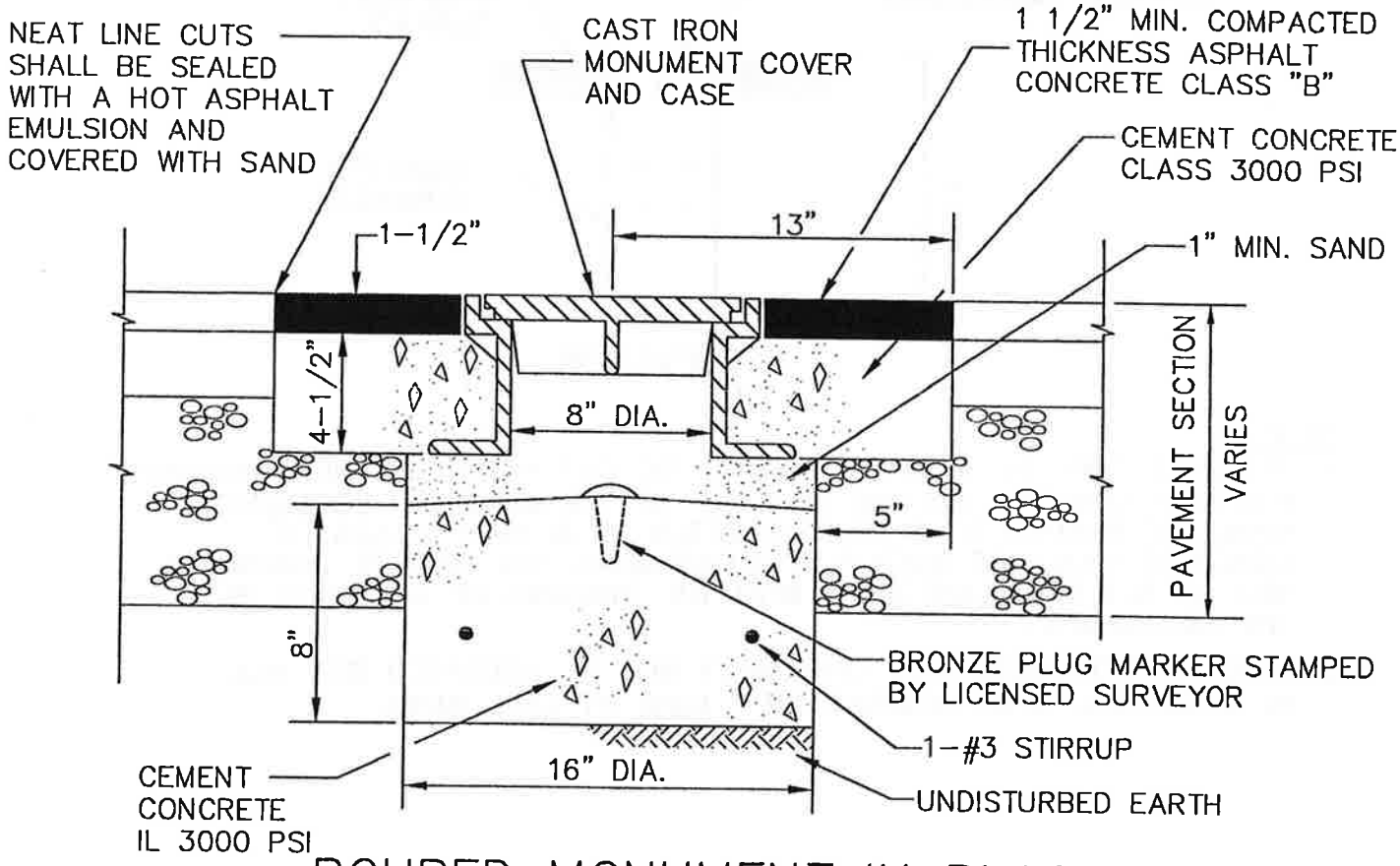
CITY OF KALAMA			
TRENCH – PAVEMENT RESTORATION			
APPROVED: Paul M. McCrory 5-29-03 BY CITY DATE			DWG. NO ST-5
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



NOTES:

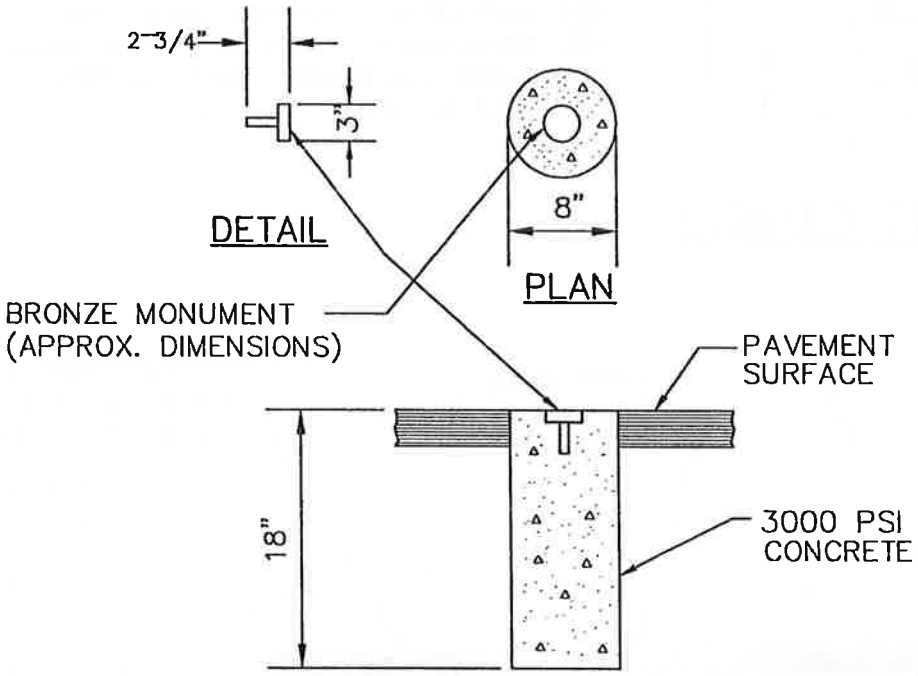
1. MACHINE BEARING FACES OF COVER AND CASE TO INSURE POSITIVE FIT.
2. MATERIAL SHALL CONFORM TO THE "1994 STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION" PREPARED BY THE WASHINGTON STATE DEPT. OF TRANSPORT-ATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER.

MONUMENT COVER



POURED MONUMENT IN PLACE

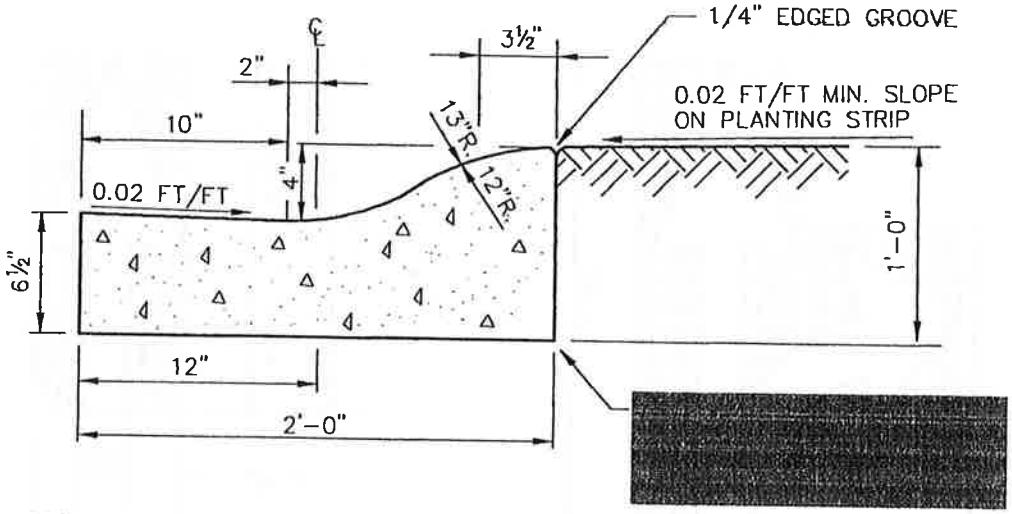
CITY OF KALAMA			
POURED MONUMENT IN PLACE			
APPROVED: Carl M. McCrary BY CITY 5-29-03 DATE			DWG. NO. MON-1
DATE: 11/97	DRWN: M.C.	CHKD: T.J.O.	SCALE: NONE



NOTE:

1. THE HOLE FOR THE MONUMENT SHALL BE CUT AFTER THE NEW PAVEMENT HAS BEEN CONSTRUCTED. THE UPPER 3" OF THE MONUMENT ENCASEMENT SHALL BE SHAPED TO A TRUE DIAMETER OF 8-INCH. CLASS "C" CONCRETE SHALL BE USED FOR ENCASEMENT. THE BRONZE MONUMENT WILL BE SET SIMULTANEOUSLY WITH THE POURING OF CONCRETE IN THE ENCASEMENT.
2. SURFACE MONUMENT WILL GENERALLY NOT BE ACCEPTED BUT WILL BE EVALUATED, UPON REQUEST, ON A CASE BY CASE BASIS.

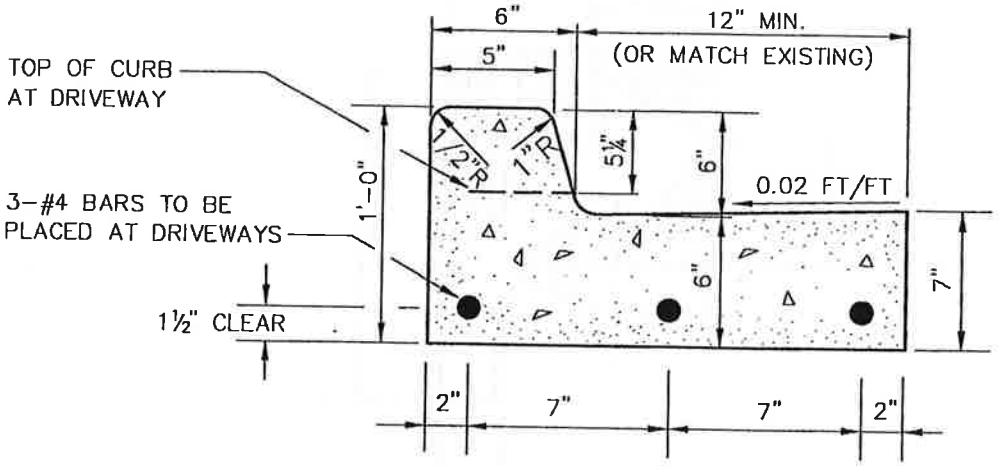
CITY OF KALAMA			
SURFACE MONUMENT			
APPROVED: Carl M. McClary 5-29-03 BY CITY DATE			DWG. NO ST-8
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



ROLLED CONCRETE CURB AND GUTTER

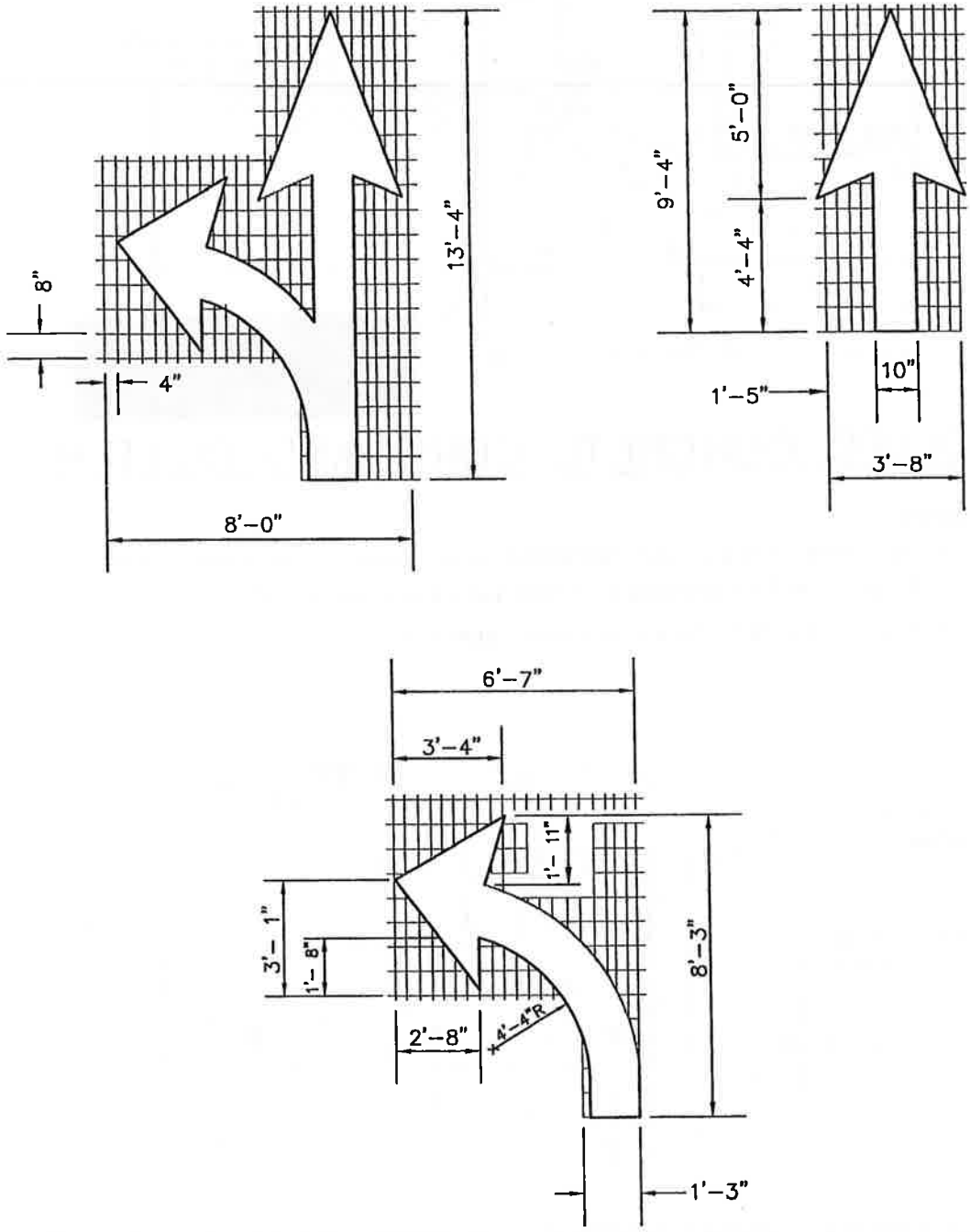
NOTES:

1. THE CURBS, GUTTERS AND SIDEWALKS SHALL HAVE CONTRACTION JOINTS (3/8" x 1½") AT INTERVALS OF NOT GREATER THAN 15'-0"
2. CEMENT CONCRETE SHALL BE CLASS 3000 PSI



VERTICAL CONCRETE CURB AND GUTTER

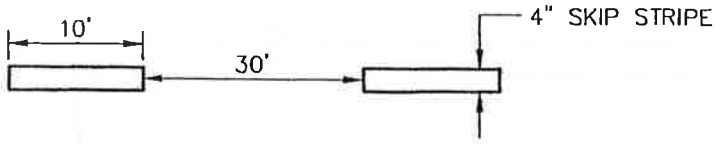
CITY OF KALAMA			
CONCRETE CURB AND GUTTER			
APPROVED: Carl M McCrary 5-29-03 BY CITY DATE			DWG. NO. CG-1
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



PAVEMENT MARKING ARROWS

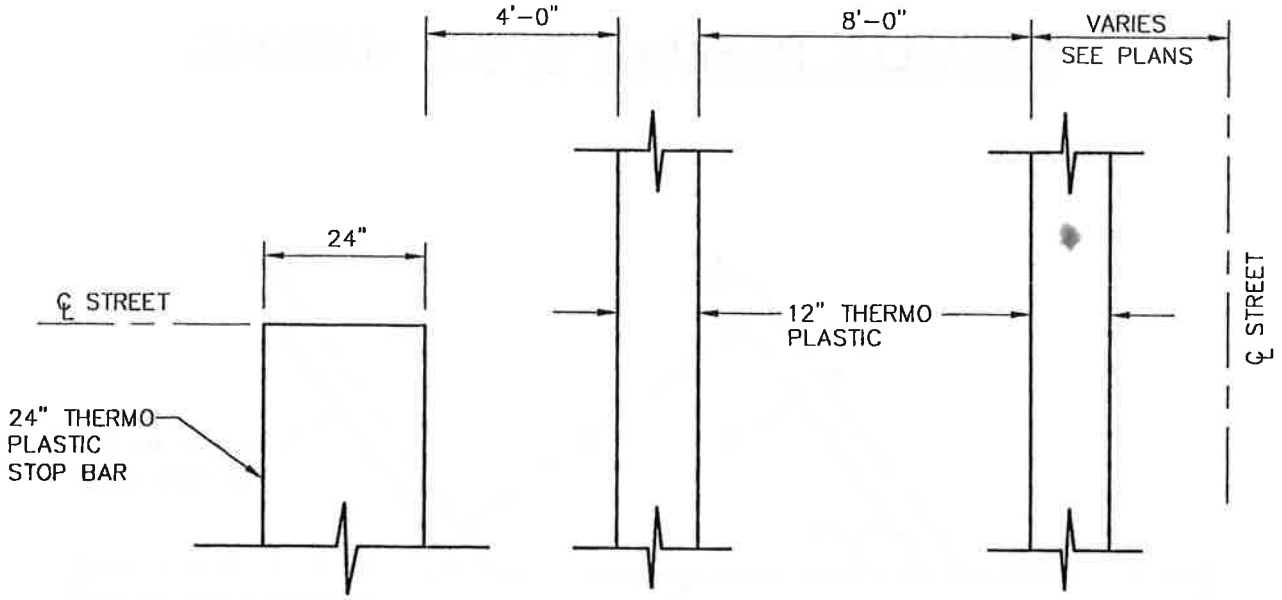
NOT TO SCALE

CITY OF KALAMA			
TURN ARROW DETAILS			
APPROVED: Carl M. McCrary 5-29-03 BY CITY DATE			DWG. NO CHAN-1
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



SKIP CENTERLINE STRIPE

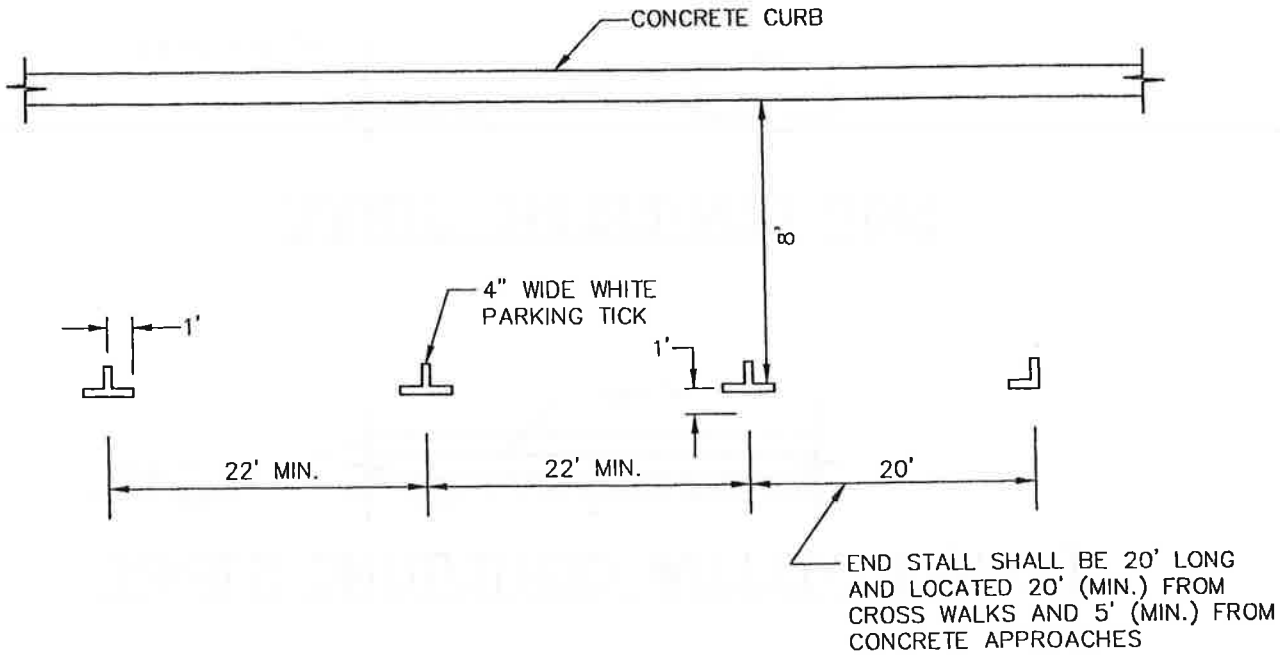
DOUBLE YELLOW CENTERLINE STRIPE



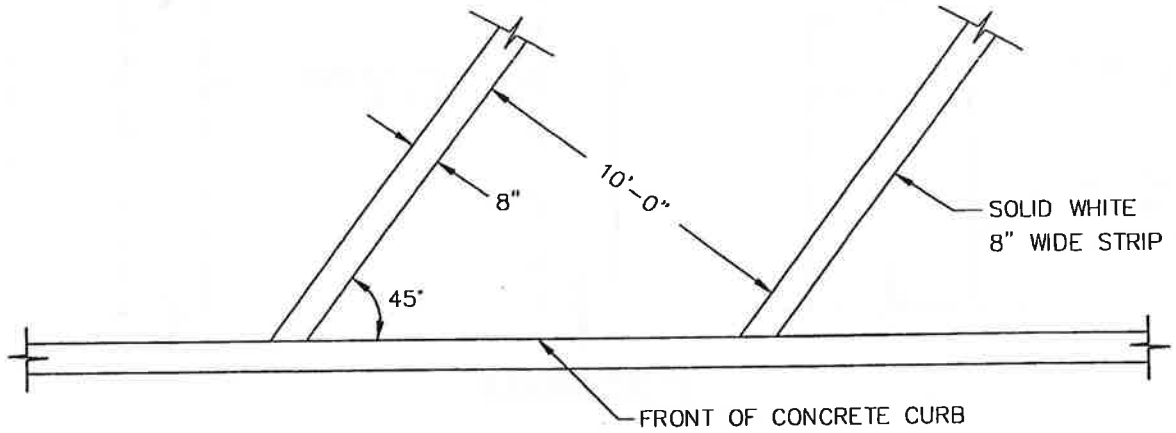
CROSSWALK

PAVEMENT MARKINGS

CITY OF KALAMA			
PAVEMENT MARKINGS			
APPROVED: Carl M. McCary 5-29-03 BY CITY DATE			DWG. NO. CHAN-2
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



PARALLEL PARKING SPACE MARKING

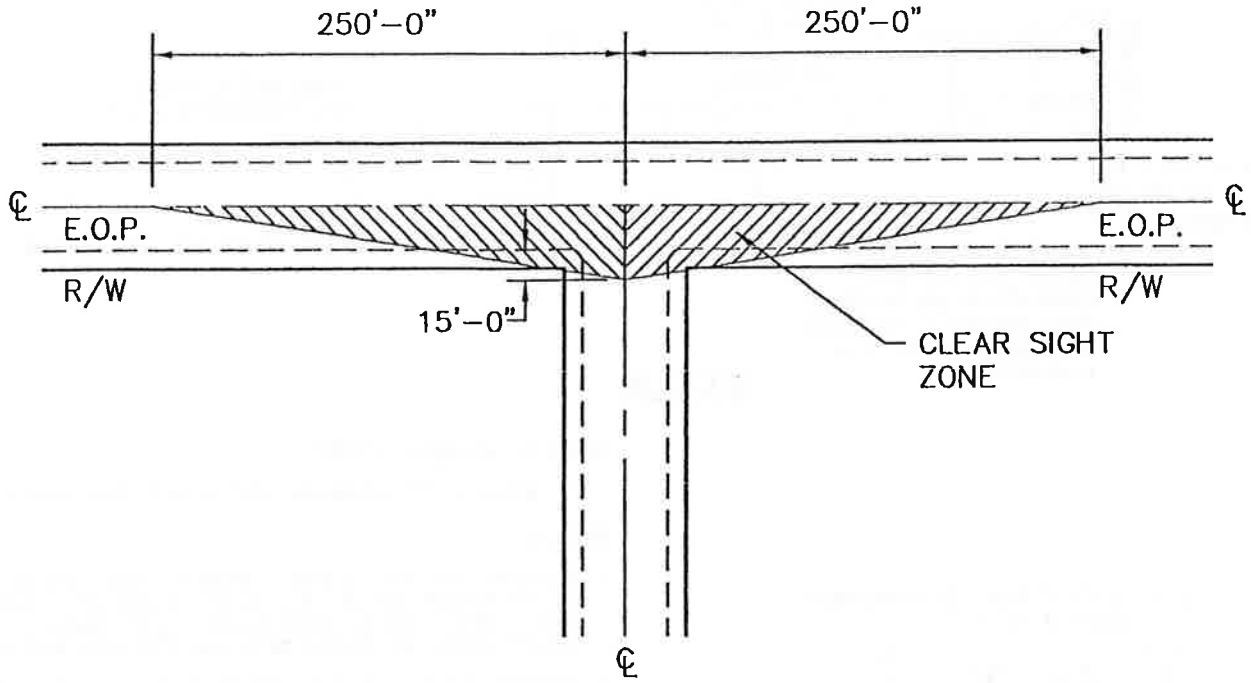


ANGLE PARKING SPACE MARKING

CITY OF KALAMA			
PARKING SPACE MARKINGS			
APPROVED: Carl M McClung 5-29-03 BY CITY DATE			DWG. NO. CHAN-3
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE

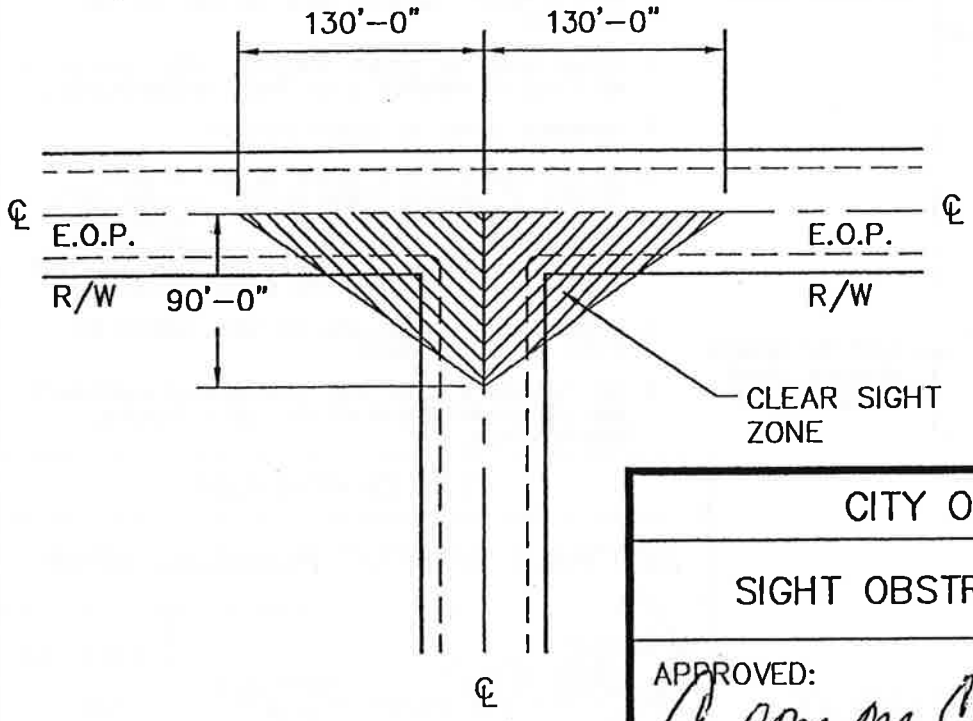
STOP OR YIELD CONTROLLED INTERSECTIONS

EXAMPLE: MAJOR STREET SPEED LIMIT = 25 M.P.H.

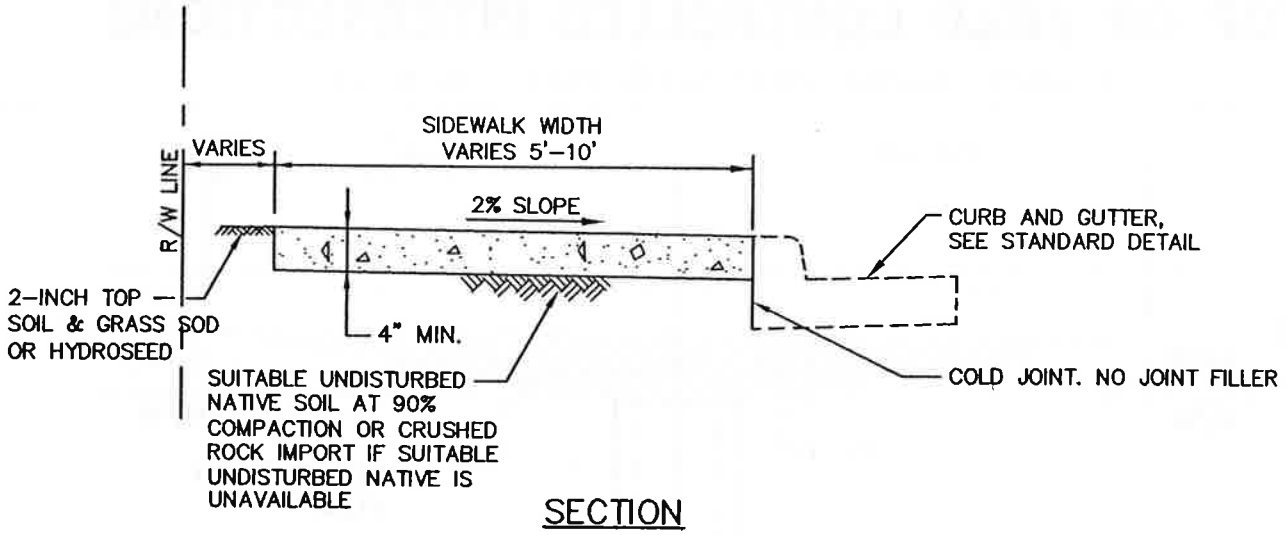


UNCONTROLLED INTERSECTIONS

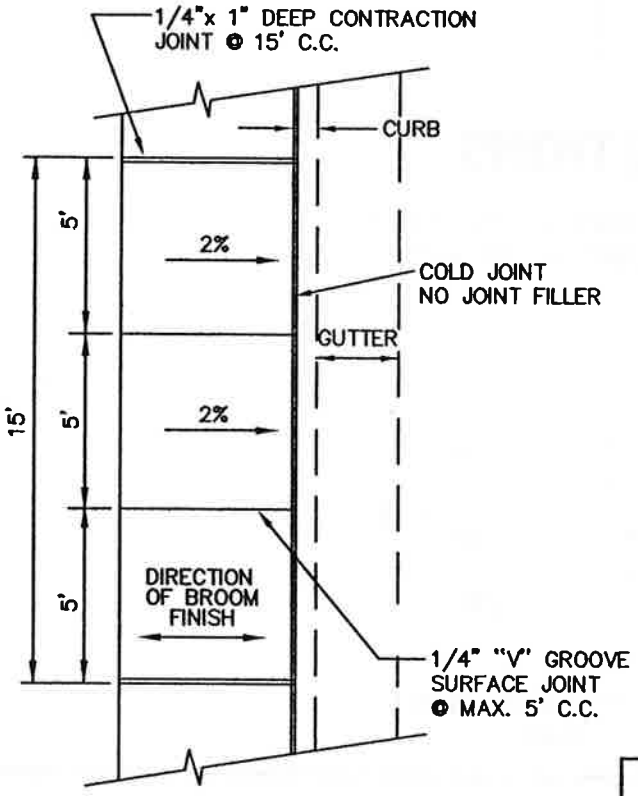
EXAMPLE: MAJOR STREET SPEED LIMIT = 30 M.P.H.
MINOR STREET SPEED LIMIT = 20 M.P.H.



CITY OF KALAMA			
SIGHT OBSTRUCTION DETAIL			
APPROVED: Carl M. McCray 5-29-03 BY CITY DATE			DWG. NO. ST–6
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



SECTION



PLAN

SIDEWALK WITHOUT PLANTING STRIP

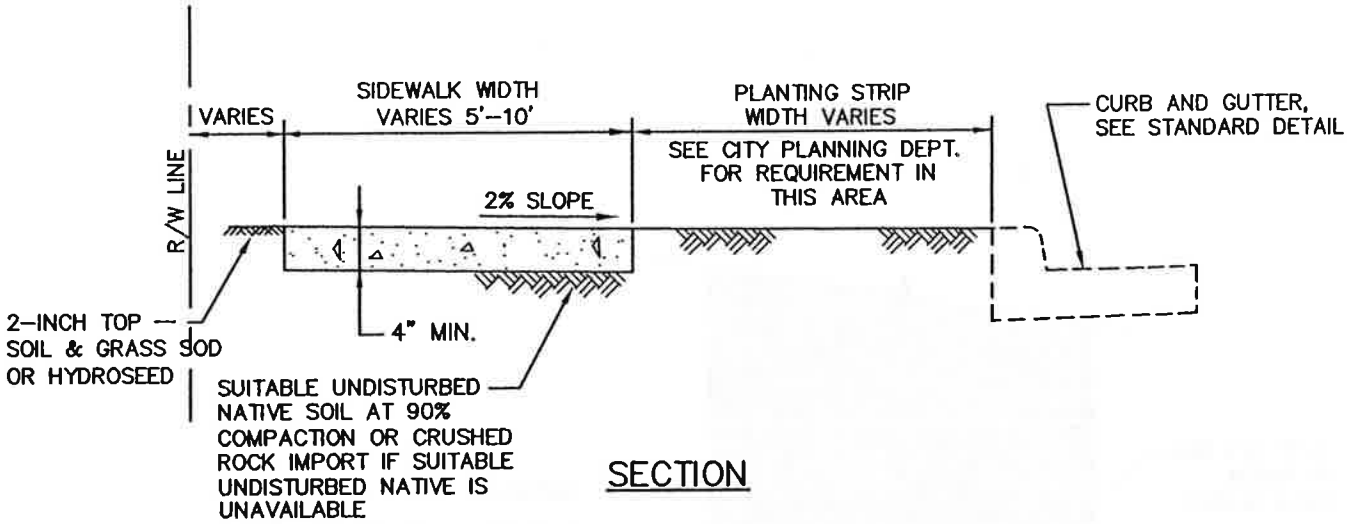
MINIMUM SIDEWALK WIDTHS

5' MINIMUM, 10' MAXIMUM, SEE DESIGN STANDARDS

NOTES:

1. CONTRACTION JOINTS AND SURFACE JOINTS SHALL BE AS SHOWN ABOVE. ALL JOINTS SHALL BE CLEAN AND EDGED WITH AN EDGE HAVING 1/4" RADIUS. JOINTS SHALL BE FLUSH WITH THE FINISHED SURFACE.
2. PROVIDE 3/8" WIDE FULL DEPTH THRU JOINTS IN THE SIDEWALK SECTION AT ADA RAMPS, DRIVEWAY AND ALLEY RETURNS. IN THRU JOINTS PROVIDE PREMOLDED JOINT FILLER WHICH SHALL BE 3/8" x 4" ASPHALT SATURATED FELT BOARD. PROVIDE JOINT SEALER ON TOP OF JOINT FILLER
3. ALL UTILITY POLES, METER BOXES, ETC. IN SIDEWALK AREAS SHALL HAVE 1/2" JOINT MATERIAL (FULL DEPTH) PLACED AROUND THEM BEFORE PLACING CONCRETE.
4. FORMS SHALL BE EITHER WOOD OR STEEL AND SHALL MEET ALL REQUIREMENTS OF THESE SPECIFICATIONS.
5. CONCRETE SHALL BE CLASS 3000 PSI.
6. ON SIDEWALKS WITH A GRADE OF 5% OR LESS PROVIDE 2" SMOOTH FINISH BORDER AROUND EACH SIDEWALK PANEL OR MATCH EXISTING BORDER. ON SIDEWALKS WITH GRADES 5% TO 10% OMIT THE 2" SMOOTH BORDER. ON SIDEWALKS GREATER THAN 10% PROVIDE A RAKED FINISH PER DETAIL SW–5.
7. WHERE ROLLED CURBS ARE ALLOWED, SIDEWALKS SHALL BE MIN. 6" THICK.
8. SEE SECTION 6.20 OF THE DEVELOPMENT GUIDELINES AND PUBLIC WORK STANDARDS FOR ADDITIONAL REQUIREMENTS.

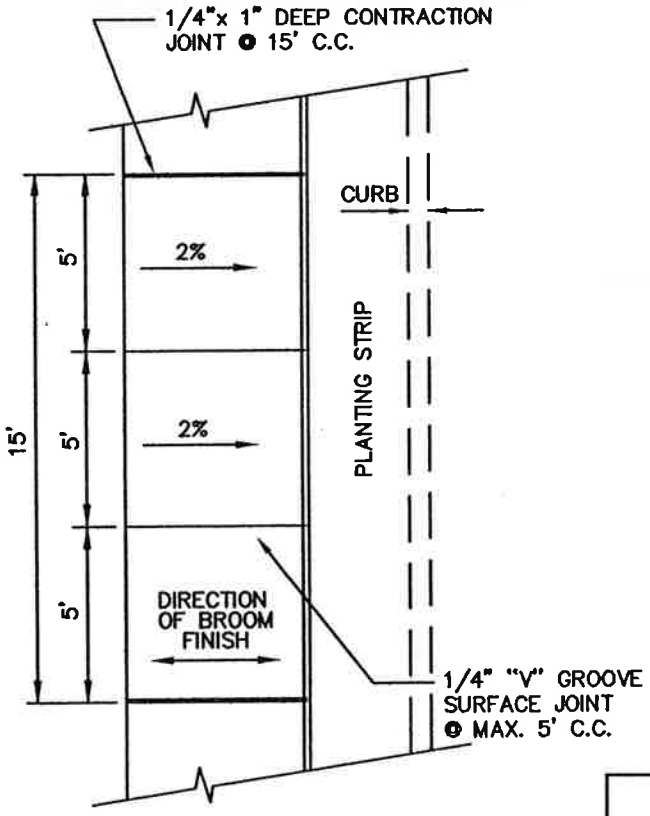
CITY OF KALAMA			
SIDEWALK WITHOUT PLANTING STRIP			
APPROVED: Carol M. McCrory 8/6/08 BY CITY DATE			DWG. NO. SW–1
DATE: 7/08	DRWN: J.H.	CHKD: M.B.J.	SCALE: NONE



SECTION

MINIMUM SIDEWALK WIDTHS

5' MINIMUM, 10' MAXIMUM
SEE DESIGN STANDARDS



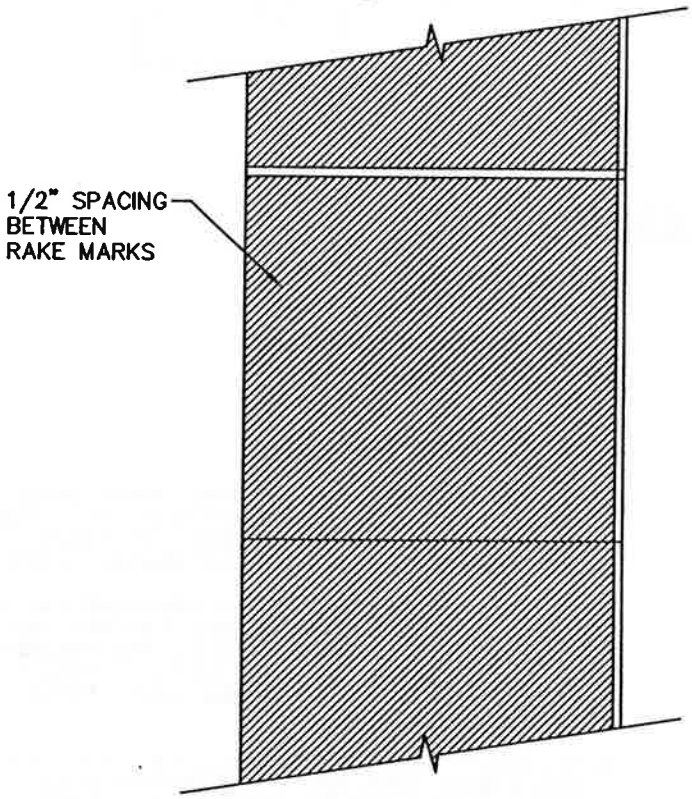
PLAN

SIDEWALK WITH PLANTING STRIP

NOTES:

1. CONTRACTION JOINTS AND SURFACE JOINTS SHALL BE AS SHOWN ABOVE. ALL JOINTS SHALL BE CLEAN AND EDGED WITH AN EDGE HAVING 1/4" RADIUS. JOINTS SHALL BE FLUSH WITH THE FINISHED SURFACE.
2. PROVIDE 3/8" WIDE FULL DEPTH THRU JOINTS IN THE SIDEWALK SECTION AT ADA RAMPS, DRIVEWAY AND ALLEY RETURNS. IN THRU JOINTS PROVIDE PREMOLDED JOINT FILLER WHICH SHALL BE 3/8" x 4" ASPHALT SATURATED FELT BOARD. PROVIDE JOINT SEALER ON TOP OF JOINT FILLER
3. ALL UTILITY POLES, METER BOXES, ETC. IN SIDEWALK AREAS SHALL HAVE 1/2" JOINT MATERIAL (FULL DEPTH) PLACED AROUND THEM BEFORE PLACING CONCRETE.
4. FORMS SHALL BE EITHER WOOD OR STEEL AND SHALL MEET ALL REQUIREMENTS OF THESE SPECIFICATIONS.
5. CONCRETE SHALL BE CLASS 3000 PSI.
6. ON SIDEWALKS WITH A GRADE OF 5% OR LESS PROVIDE 2" SMOOTH FINISH BORDER AROUND EACH SIDEWALK PANEL OR MATCH EXISTING BORDER. ON SIDEWALKS WITH GRADES 5% TO 10% OMIT THE 2" SMOOTH BORDER. ON SIDEWALKS GREATER THAN 10% PROVIDE A RAKED FINISH PER DETAIL SW–5.
7. SEE SECTION 6.20 OF THE DEVELOPMENT GUIDELINES AND PUBLIC WORK STANDARDS FOR ADDITIONAL REQUIREMENTS.

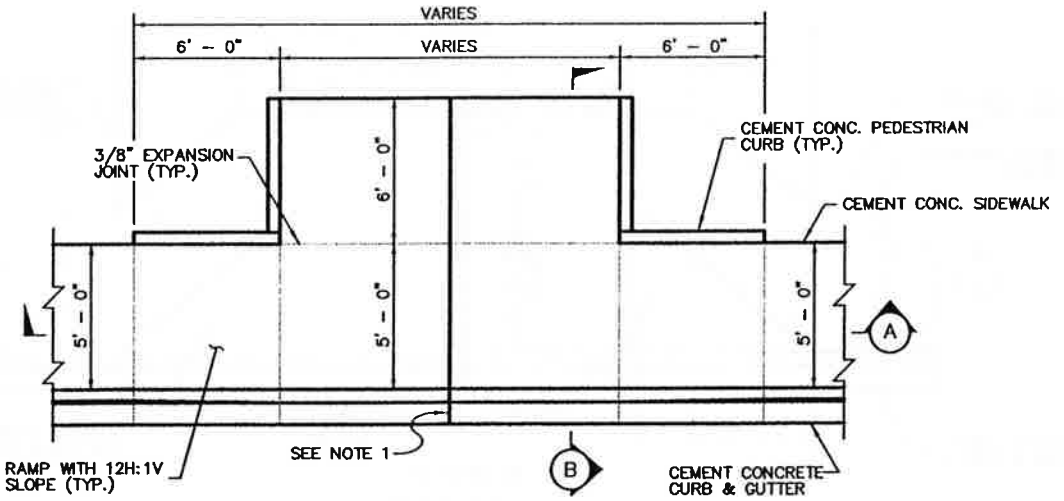
CITY OF KALAMA			
SIDEWALK WITH PLANTING STRIP			
APPROVED: BY CITY 8/6/08 DATE			DWG. NO. SW–4
DATE: 7/08	DRWN: J.H.	CHKD: M.B.J.	SCALE: NONE



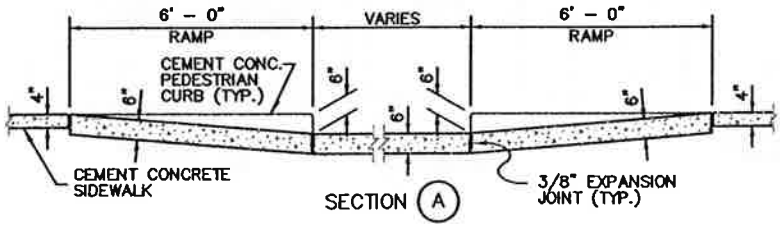
NOTES:

1. RAKE FINISH TO BE USED ON SIDEWALKS >10% SLOPE.
2. RAKE PATTERN TO BE AT 45° TO DIRECTION OF TRAVEL, PATTERN TO DRAIN TOWARDS STREET.
3. RAKE MARKS SHALL BE 1/8" WIDE, 1/16" DEEP.

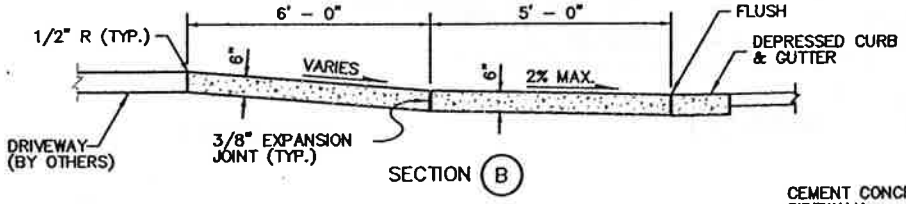
CITY OF KALAMA			
SIDEWALK RAKE FINISH DETAIL			
APPROVED: BY CITY 8/6/08 DATE			DWG. NO. SW-5
DATE:	DRWN:	CHKD:	SCALE:



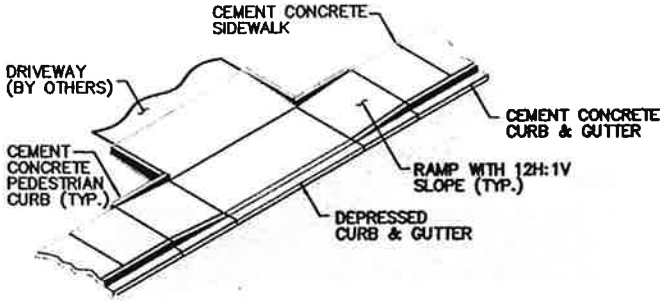
PLAN VIEW



SECTION (A)



SECTION (B)

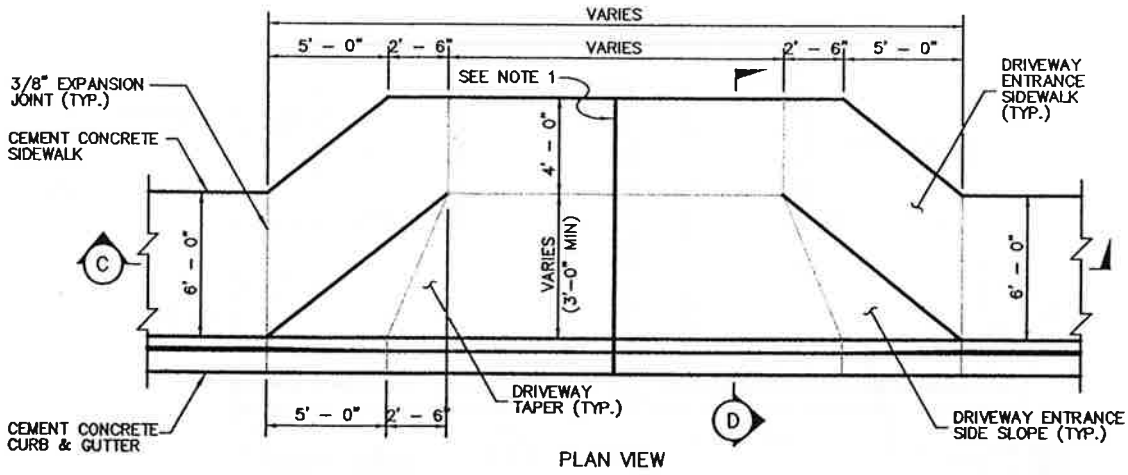


NOTE:

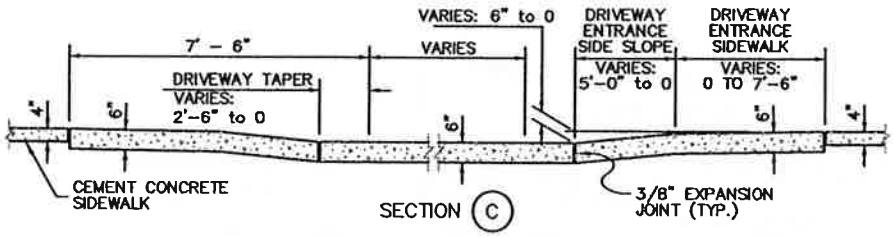
1. WHEN THE DRIVEWAY WIDTH EXCEEDS 15 FEET, CONSTRUCT A FULL DEPTH EXPANSION JOINT WITH 3/8" JOINT FILLER ALONG THE DRIVEWAY CENTERLINE. CONSTRUCT EXPANSION JOINTS PARALLEL WITH THE CENTER-LINE AS REQUIRED AT 15' MAXIMUM SPACING WHEN DRIVEWAY WIDTHS EXCEED 30'.

CEMENT CONCRETE DRIVEWAY TYPE 1

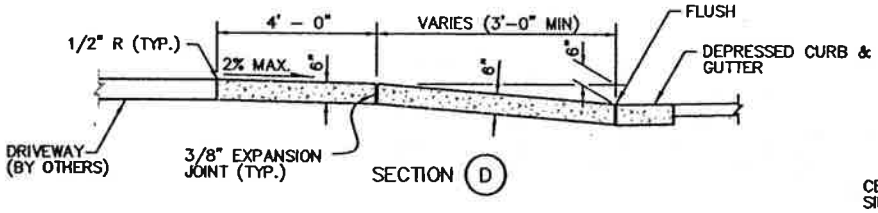
CITY OF KALAMA			
CEMENT CONCRETE DRIVEWAY TYPE 1			
APPROVED: BY CITY — 8/6/08 DATE			DWG. NO. DW-1A
DATE: 8/07	DRWN: S.G.	CHKD: M.B.J.	SCALE: NONE



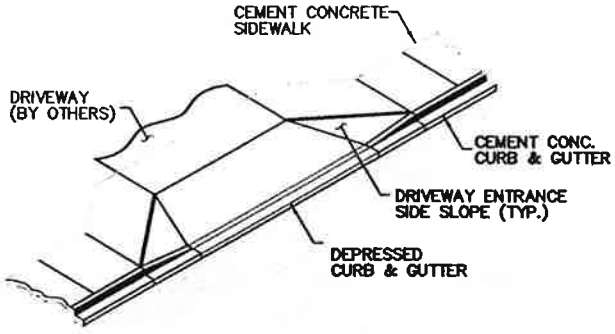
PLAN VIEW



SECTION (C)



SECTION (D)

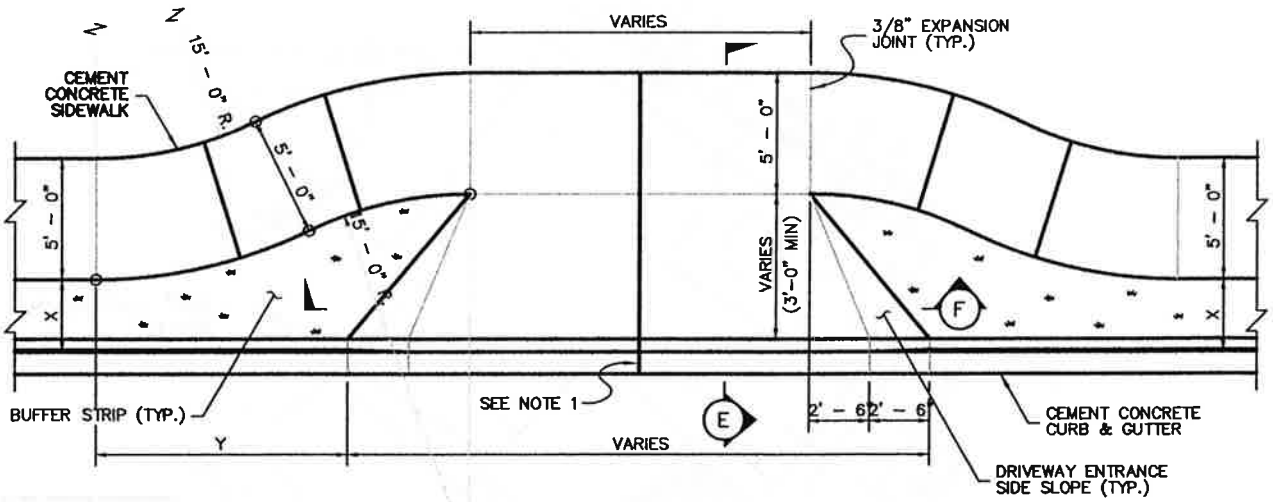


NOTE:

1. WHEN THE DRIVEWAY WIDTH EXCEEDS 15 FEET, CONSTRUCT A FULL DEPTH EXPANSION JOINT WITH 3/8" JOINT FILLER ALONG THE DRIVEWAY CENTERLINE. CONSTRUCT EXPANSION JOINTS PARALLEL WITH THE CENTER–LINE AS REQUIRED AT 15' MAXIMUM SPACING WHEN DRIVEWAY WIDTHS EXCEED 30'.

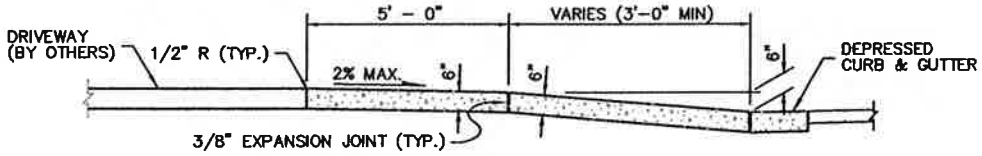
CEMENT CONCRETE DRIVEWAY TYPE 2

CITY OF KALAMA			
CEMENT CONCRETE DRIVEWAY TYPE 2			
APPROVED: Paul M. McCrary BY CITY 8/6/08 DATE			DWG. NO. DW–1B
DATE: 8/07	DRWN: S.G.	CHKD: M.B.J.	SCALE: NONE

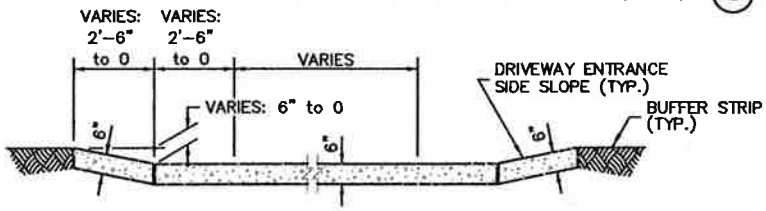


X	Y
2'-0"	12'-3"
3'-0"	10'-4"
4'-0"	8'-1"
5'-0"	5'-3 1/4"
6'-0"	1'-1 3/4"

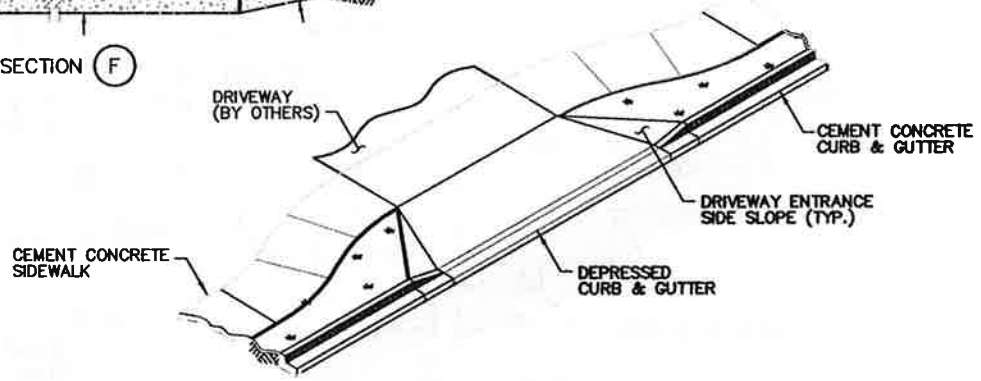
PLAN VIEW



SECTION (E)



SECTION (F)



NOTE:

1. WHEN THE DRIVEWAY WIDTH EXCEEDS 15 FEET, CONSTRUCT A FULL DEPTH EXPANSION JOINT WITH 3/8" JOINT FILLER ALONG THE DRIVEWAY CENTERLINE. CONSTRUCT EXPANSION JOINTS PARALLEL WITH THE CENTER-LINE AS REQUIRED AT 15' MAXIMUM SPACING WHEN DRIVEWAY WIDTHS EXCEED 30'.

CEMENT CONCRETE DRIVEWAY TYPE 3

CITY OF KALAMA

CEMENT CONCRETE DRIVEWAY TYPE 3

APPROVED: _____ 8/6/08
BY CITY DATE

DWG. NO. DW-1C

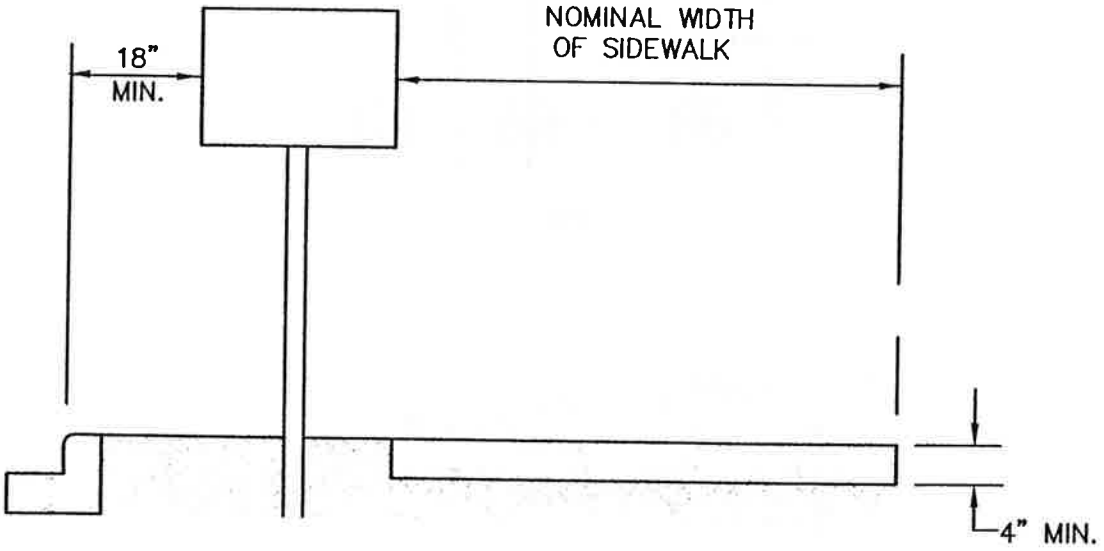
DATE:	DRWN:	CHKD:	SCALE:
8/07	S.G.	M.B.J.	NONE

DRAWING SW-3 WHEEL CHAIR RAMP

All wheel chair and curb ramps shall be constructed in accordance with the current WSDOT Standard Plans and current ADA standards.

DRAWING SW-2 TRUNCATED DOME
TEXTILE WARNING SURFACE

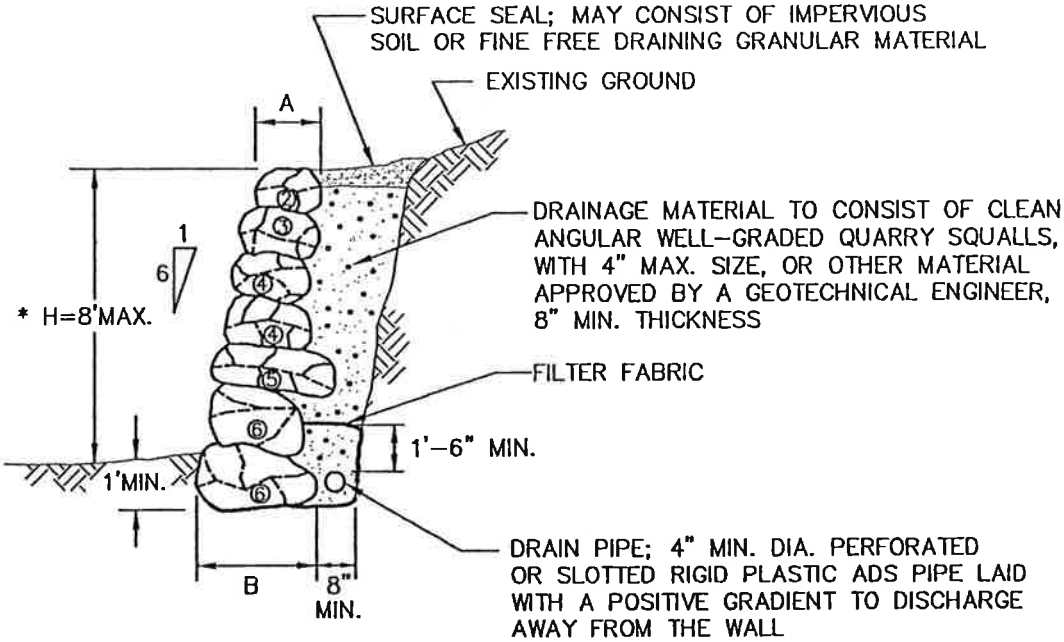
All truncated dome textile warning surfaces shall comply with the current WSDOT Standard Plans and current ADA standards.



NOTES:

1. MAILBOXES FOR NEW DEVELOPMENTS SHALL BE CLUSTER MAILBOXES MEETING USPS REQUIREMENTS.
2. MAILBOXES SHALL BE PER WSDOT STANDARD PLANS H-12 TYPE I OR TYPE 2.
3. MAILBOXES SHALL BE LOCATED IN PLANTER STRIP WHERE POSSIBLE. WHERE THERE IS NO PLANTER STRIP, THE REQUIRED SIDEWALK WIDTH SHALL BE MAINTAINED AROUND THE MAILBOX.

CITY OF KALAMA			
MAILBOX DETAIL			
APPROVED: 8/6/03 BY CITY DATE			DWG. NO. ML-1
DATE: 6/03	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



SECTION

SIZE	APPROXIMATE WEIGHT – LBS.	APPROXIMATE DIAMETER
1 MAN	50–200	12"– 18"
2 MAN	200–700	18"– 28"
3 MAN	700–2000	28"– 36"
4 MAN	2000–4000	36"– 48"
5 MAN	4000–6000	48"– 54"
6 MAN	6000–8000	54"– 50"

* NOTE:

4' MIN. HIGH CYCLONE FENCE REQUIRED ABOVE WALL WHEN WALL HEIGHT IS 3' OR GREATER

NOTE:

PROVIDE SUITABLE CITY APPROVED FENCE AT TOP OF WALL FOR ALL HEIGHTS OF WALL EXCEEDING 30 INCHES.

H	B	A	REVISIONS
6'– 0" OR LESS	3'– 0"	2'– 0"	
6'– 0' H≤ 8'– 0"	4'– 4"	3'– 0"	

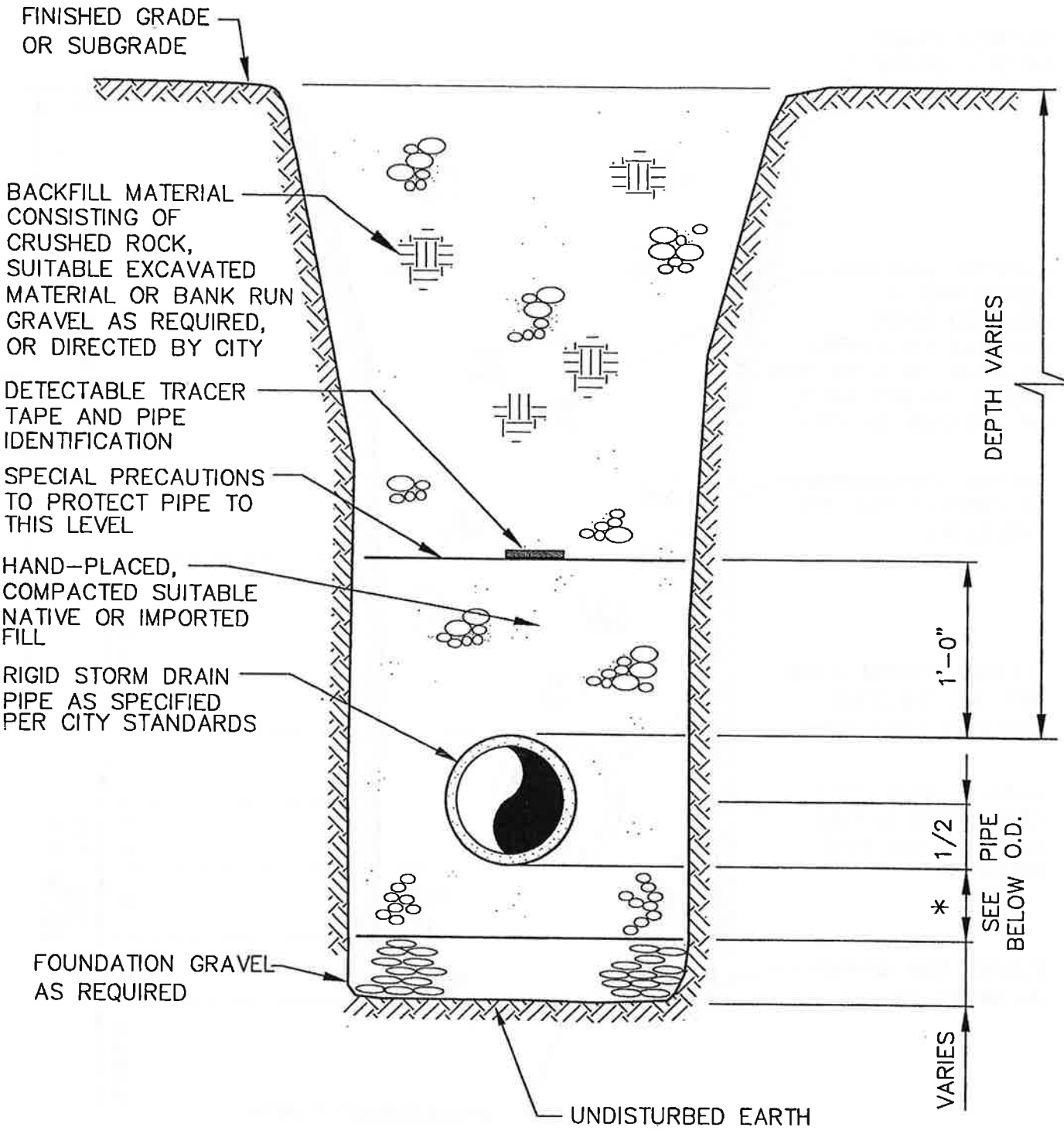
ROCKERY SCHEDULE

ROCK WALL DETAIL

CITY OF KALAMA			
ROCK WALL DETAIL			
APPROVED: Paul M. McKay 5-29-03 BY CITY DATE			DWG. NO RKWL
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE

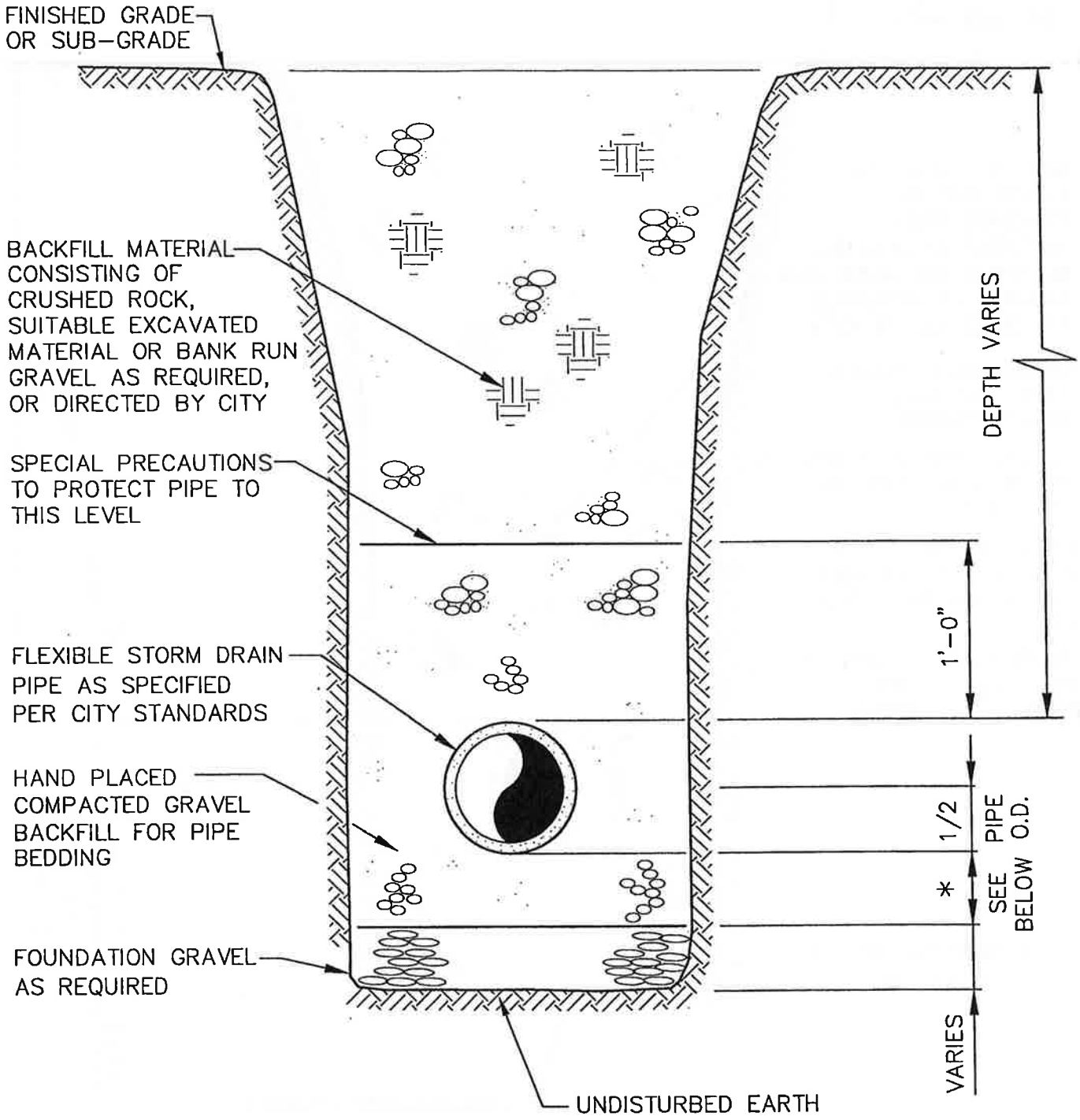
STORM DETAILS

LIST OF STORM DETAILS



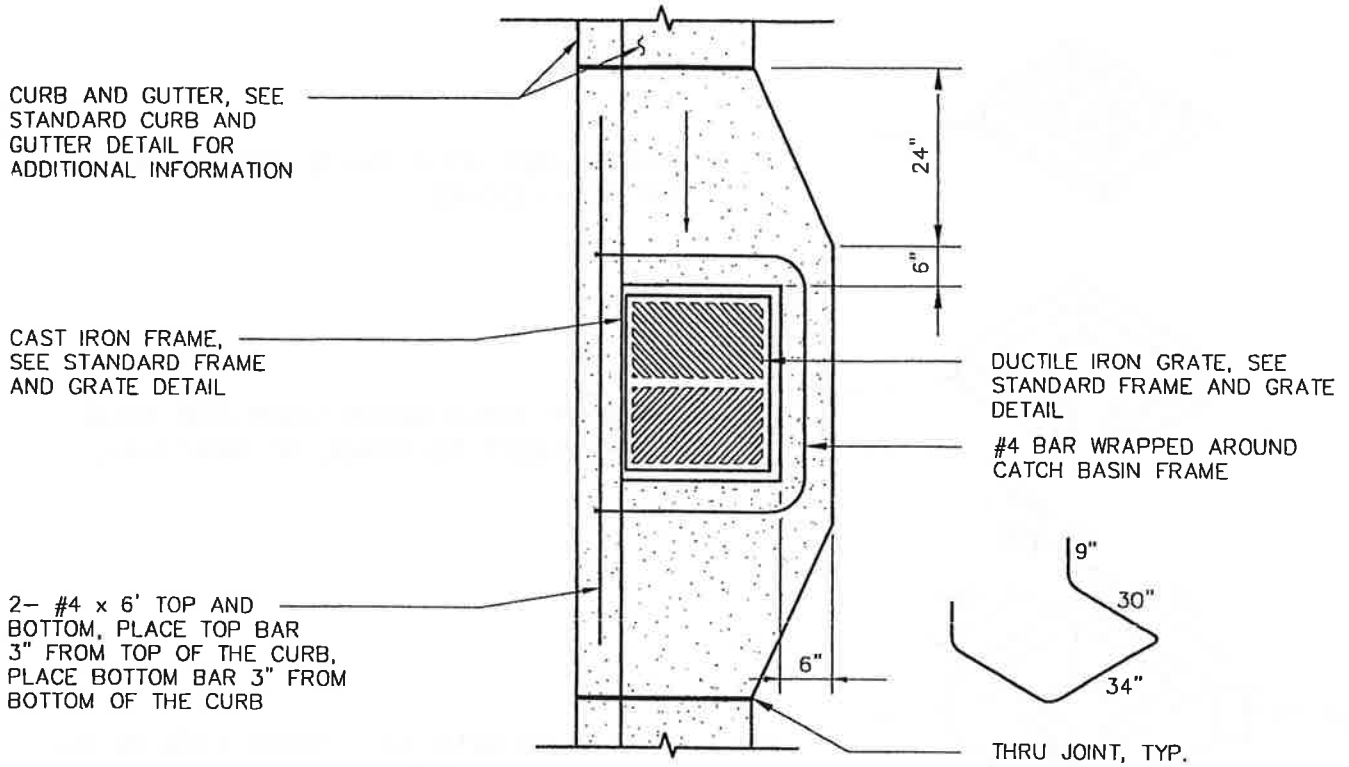
* 4-INCHES FOR PIPE 18-INCH DIA. AND LESS 6-INCHES FOR PIPE GREATER THAN 18-INCH DIA.

CITY OF KALAMA			
RIGID STORM DRAIN PIPE TRENCH SECTION			
APPROVED: Carl M. McClung 5-29-03 BY CITY DATE			DWG. NO. STOM-1
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE

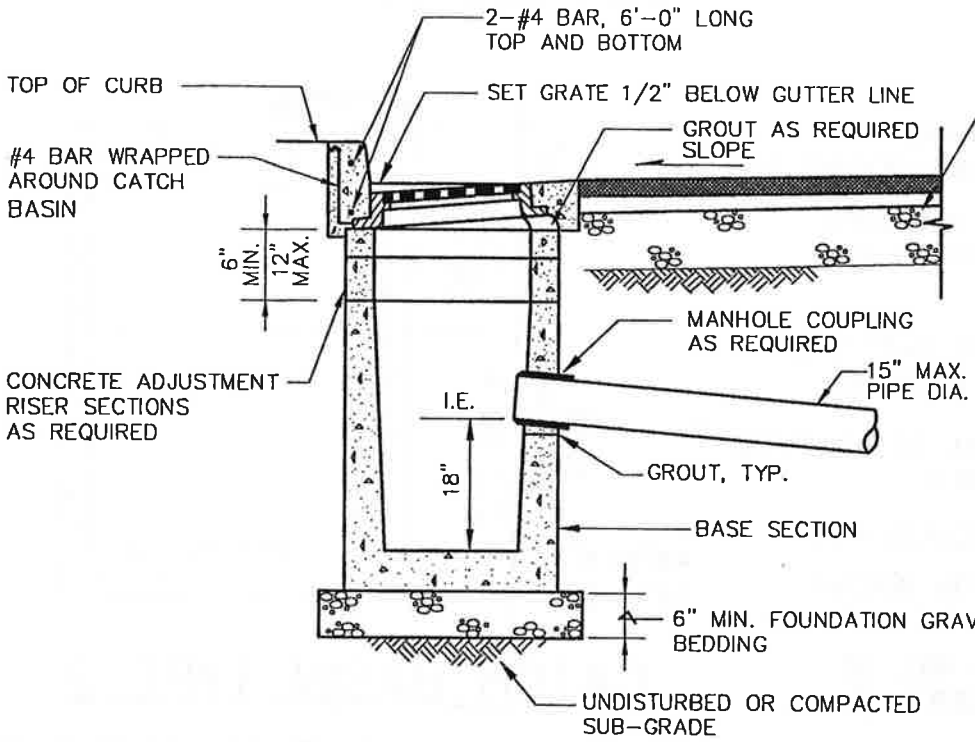


* 4-INCHES FOR PIPE 18-INCH DIA. AND LESS 6-INCHES FOR PIPE GREATER THAN 18-INCH DIA.

CITY OF KALAMA			
FLEXIBLE STORM DRAIN PIPE TRENCH SECTION			
APPROVED: Paul M. McCrary 5-29-03 BY CITY DATE			DWG. STOM-6
DATE: 2/02	DRWN: P.E.	CHKD: M.B.J.	SCALE: NONE



PLAN



NOTES:

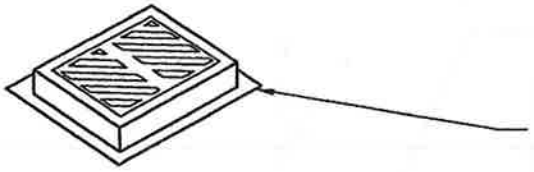
1. CATCH BASINS SHALL BE SPACED PER MINIMUM CITY DESIGN STANDARDS

2. TYPE I CATCH BASIN IS USED FOR DEPTHS LESS THAN 5'-0" FROM THE TOP OF THE GRATE TO I.E. (INVERT)

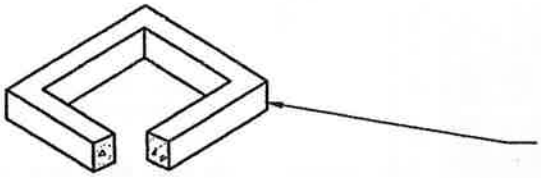
ELEVATION

CATCH BASIN TYPE I

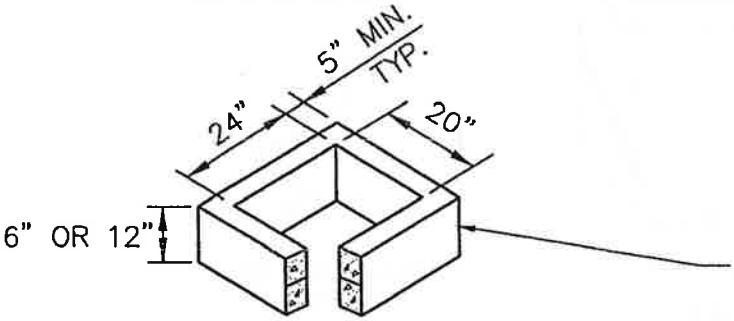
CITY OF KALAMA			
CATCH BASIN TYPE I			
APPROVED: Carlton McKay 5-29-03 BY CITY DATE			DWG. NO. CB-1
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



FRAME AND OPEN GRATE, VANED GRATE, OR SOLID COVER.



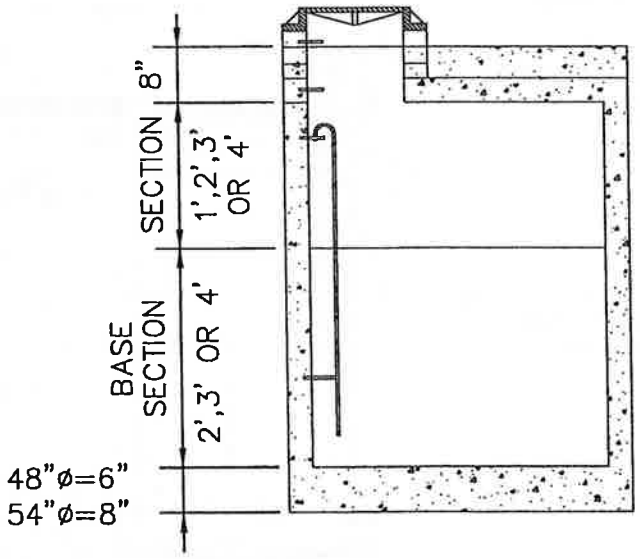
2"x4"x8" SOLID BRICK USED FOR FINAL ADJUSTMENT TO GRADE 6" HIGH MAX.



TOP SLAB WITH 24" ROUND ACCESS OR 20"x24" RECTANGULAR ACCESS, USE SEWER STANDARD. DETAIL 640 FOR STEPS AND LADDER.

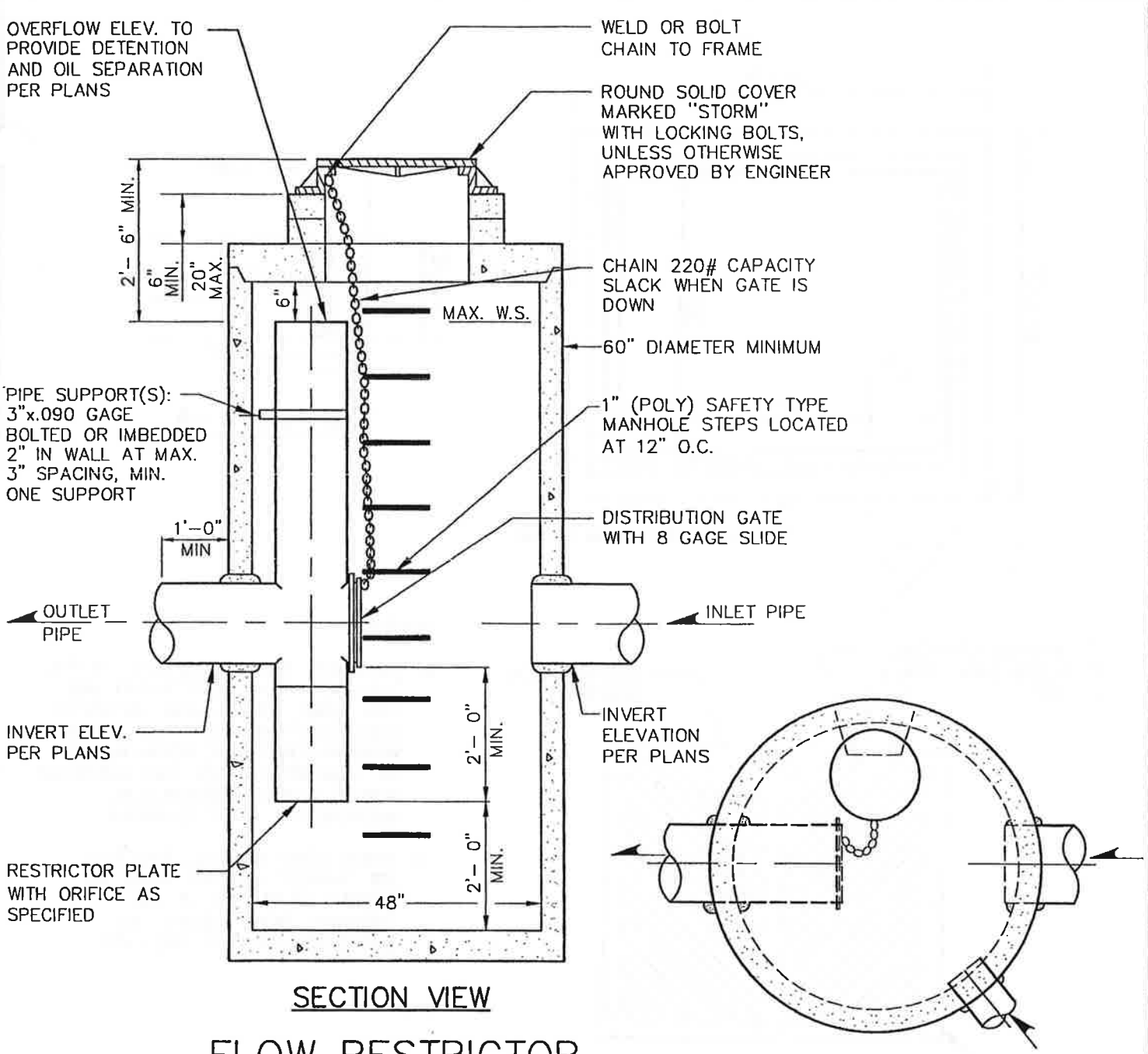
NOTES:

1. ALL TYPE 2 CB'S EQUIPPED WITH OPEN GRATES SHALL BE LOCKING TYPE.
2. ALL TYPE 2 CB'S NOT IN PAVED AREAS SHALL BE EQUIPPED WITH LOCKING LIDS.
3. CB'S SHALL BE SET SO THAT STEPS ARE DIRECTLY UNDER OPENING.
4. ALL TYPE II CB'S SHALL BE EQUIPPED WITH STEPS AND LADDER.
5. CONCRETE SHALL BE CLASS 4000.
6. MINIMUM DISTANCE FROM INVERT TO CB BOTTOM SHALL BE 2.0'.
7. CB SECTIONS AND LID WILL BE HS20 TRAFFIC LOAD CERTIFIED BY MFG.
8. HOLE SIZE – PIPE O.D. + 5" MAX
   MAX HOLE SIZE – 36" (28" CB)
   MAX HOLE SIZE – 42" (54" CB)



CATCH BASIN TYPE 2

CITY OF KALAMA			
CATCH BASIN TYPE 2			
APPROVED: Carl M. McClary 5-29-03 BY CITY DATE			DWG. NO. CB–II
DATE: 11/97	DRWN: M.C.	CHKD: T.J.O.	SCALE: NONE



SECTION VIEW

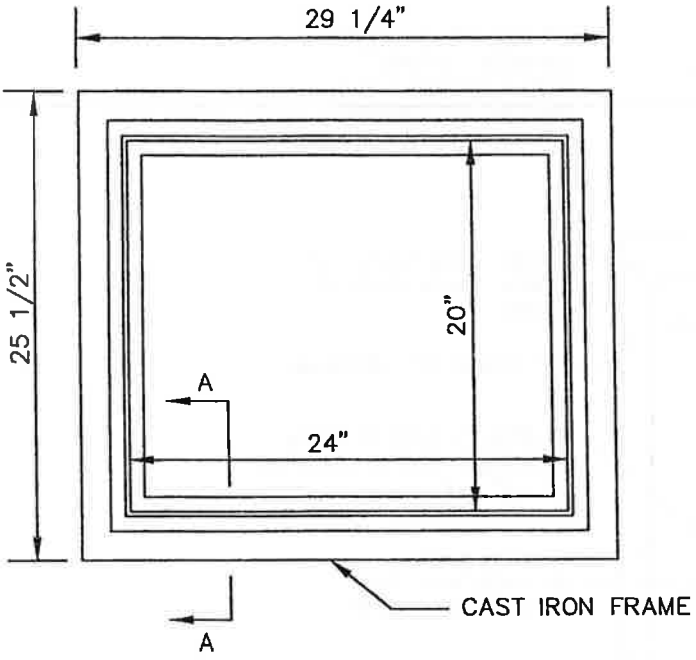
PLAN VIEW

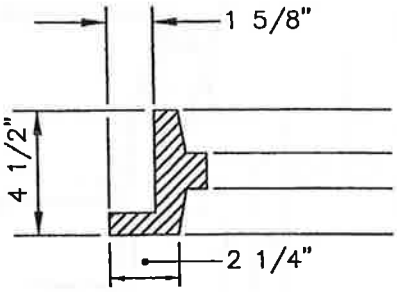
FLOW RESTRICTOR CATCH BASIN TYPE 2

NOTES:

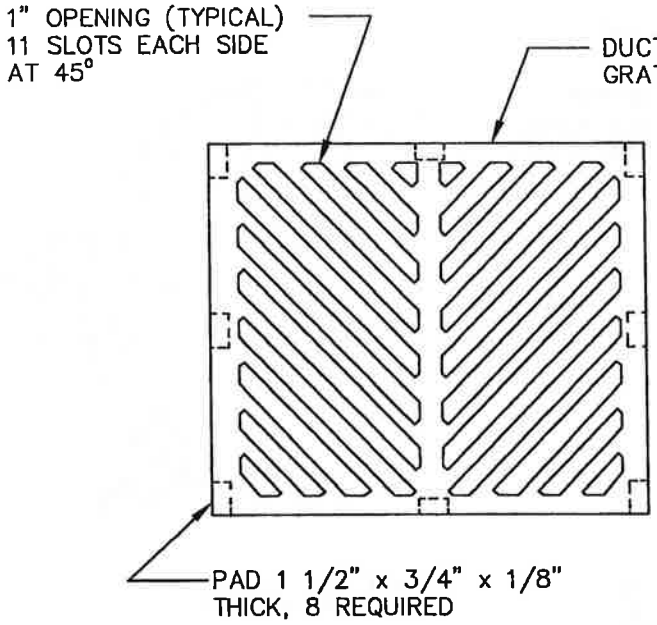
1. PIPE SIZES AND SLOPES: PER APPROVED PLANS
2. OUTLET CAPACITY: NOT LESS THAN COMBINED INLETS
3. METAL PARTS: CORROSION RESISTANT. GALVANIZED PIPE PARTS TO HAVE ASPHALT TREATMENT 1
4. FRAME AND LADDER OR STEPS OFFSET SO:
   A. CLEANOUT GATE IS VISIBLE FROM TOP
   B. CLIMB-DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE
   C. FRAME IS CLEAR OF CURB
5. 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"

CITY OF KALAMA			
FLOW RESTRICTOR CATCH BASIN TYPE 2			
APPROVED: Paul M McRoy 5-29-03 BY CITY DATE			DWG. NO. CB-2
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE





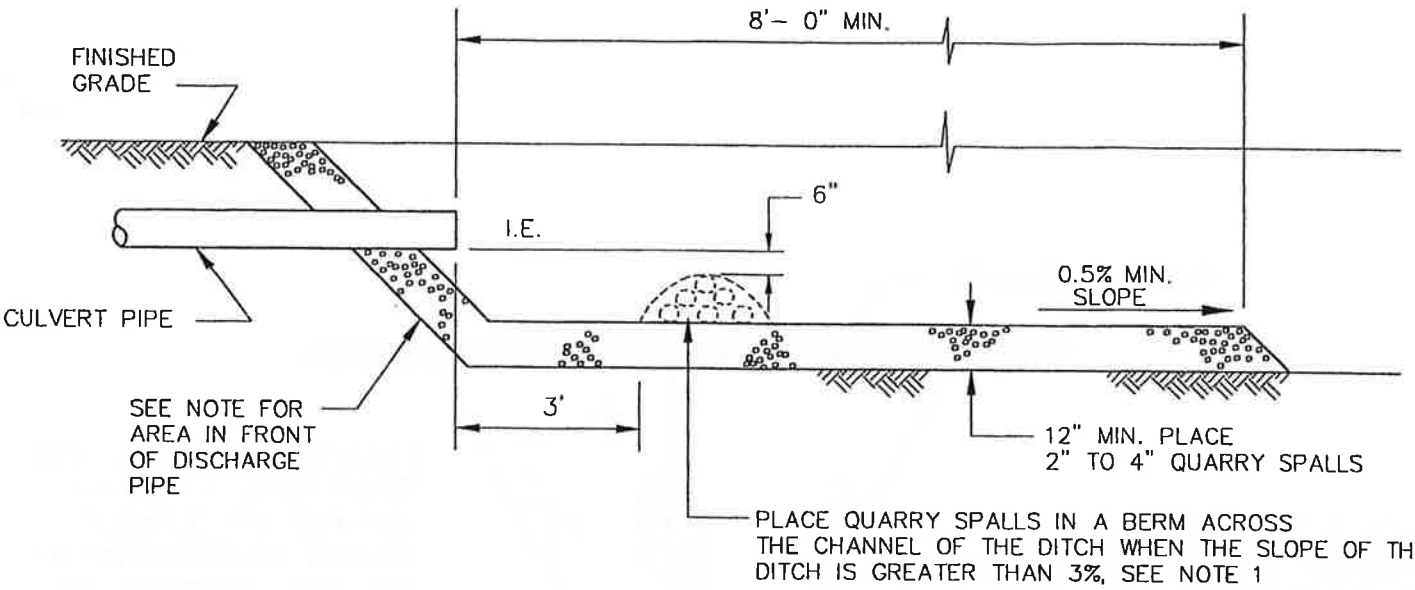
SECTION A–A

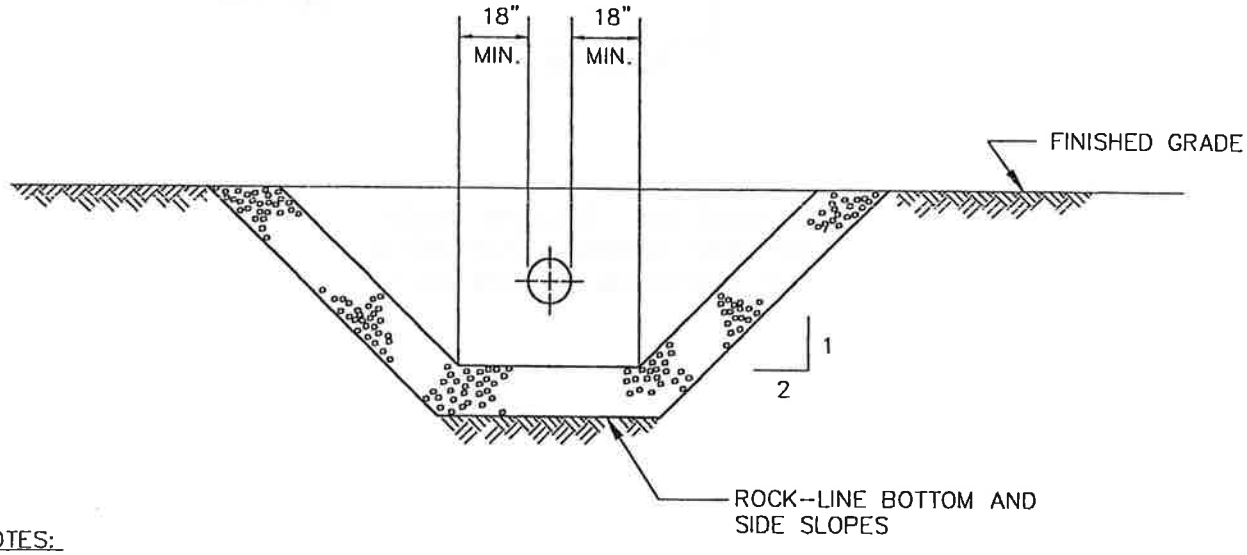


NOTES:

1. MATERIAL SHALL CONFORM TO THE "1994 STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION" PREPARED BY THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER.
2. WHEN ROAD PROFILE, EXCEEDS 6% "VANED" GRATES SHALL BE INSTALLED IN LIEU OF THE "HERRING BONE" GRATE, AT THE DISCRETION OF THE CITY.

CITY OF KALAMA			
CATCH BASIN FRAME AND GRATE			
APPROVED: Paul M McKay 5-29-03 BY CITY DATE			DWG. NO. STOM-3
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



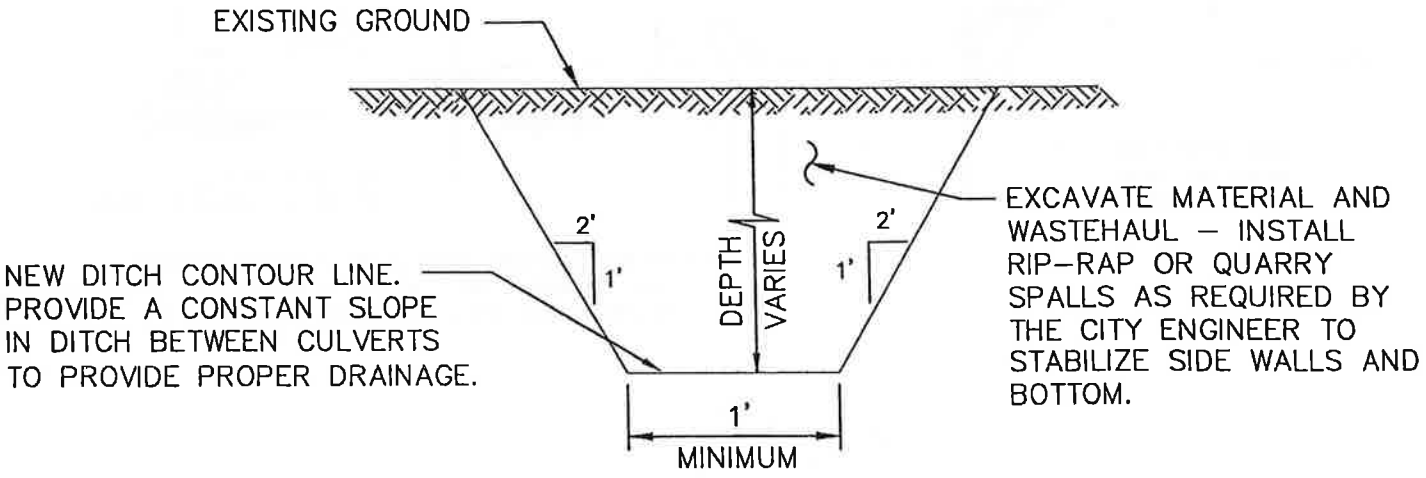


NOTES:

1. PLACE QUARRY SPALLS IN FRONT OF CULVERT DISCHARGE, ENGINEER SHALL SIZE QUARRY SPALL BERM

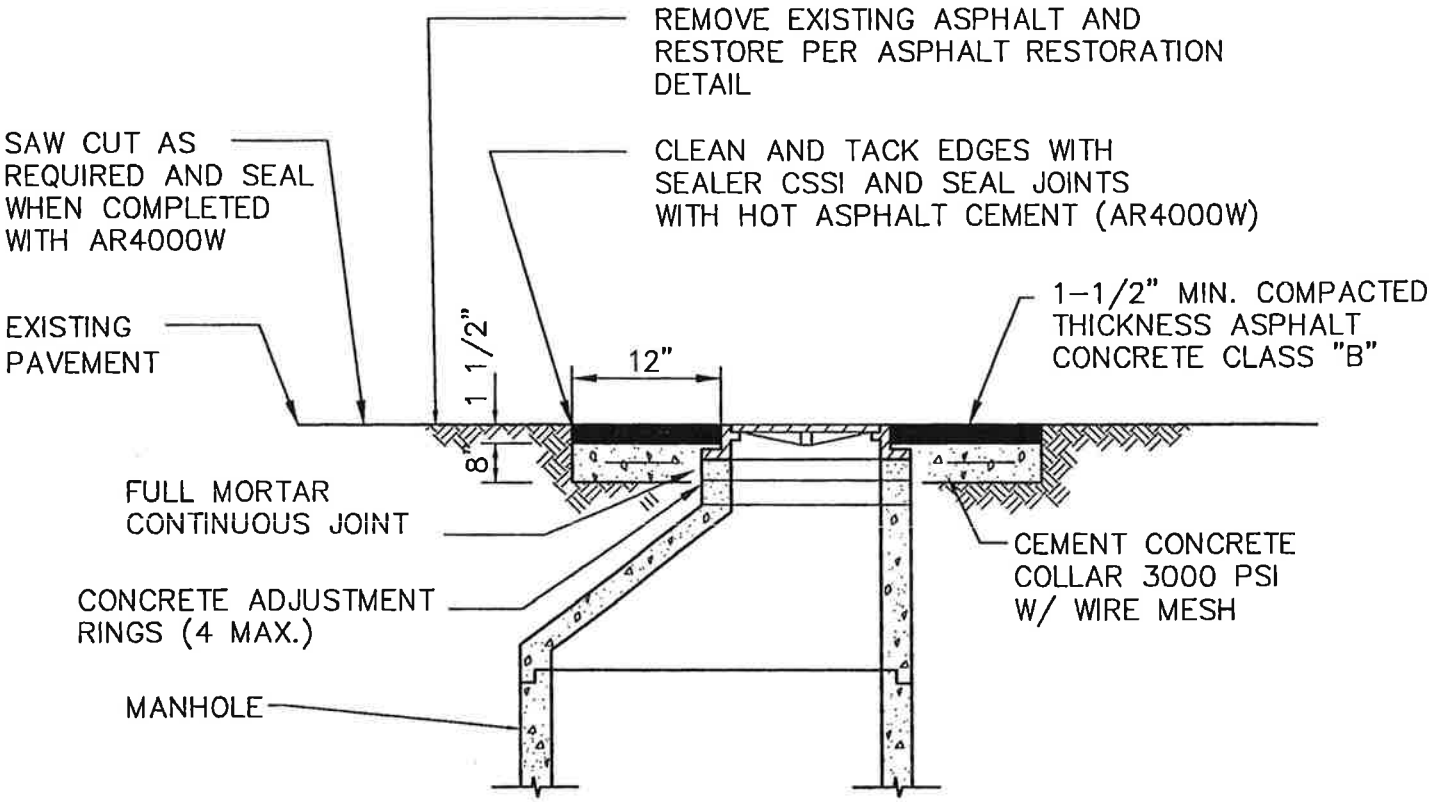
RIPRAP AND ENERGY DISSIPATION FOR DITCH

CITY OF KALAMA			
RIPRAP AND ENERGY DISSIPATION FOR DITCH			
APPROVED: Paul M. McCary BY CITY 5-29-03 DATE			DWG. NO. DTCH-2
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



* DITCHES MAY REQUIRE ROCK RIP–RAP ARMOUR PLATING AT THE DIRECTION OF THE CITY

CITY OF KALAMA			
NEW DITCH CONSTRUCTION			
APPROVED: Paul M. McGary 5-29-03 BY CITY DATE			DWG. STOM–5
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



CITY OF KALAMA			
MANHOLE, OR CATCH BASIN (TYPE II) GRADE ADJUSTMENT DETAIL			
APPROVED: Carl M. McCrary 5-29-03 BY CITY DATE			DWG. NO. STOM-2
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE

MISCELLANEOUS DETAILS

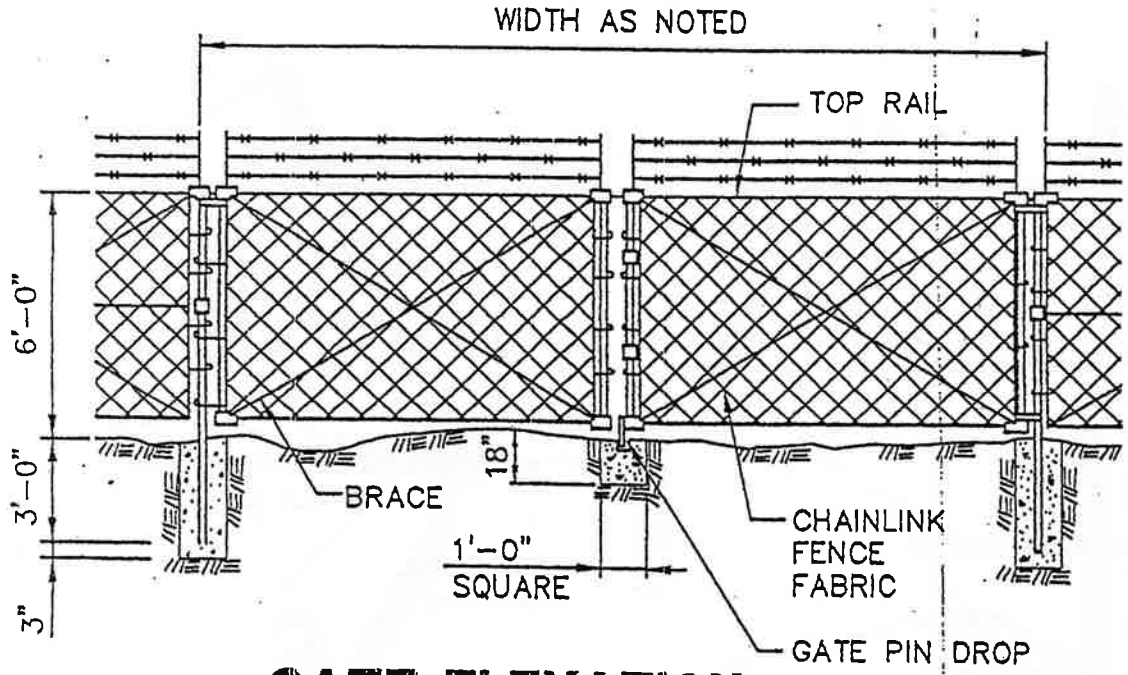
LIST OF MISCELLANEOUS DETAILS

Swing Gate and Fence

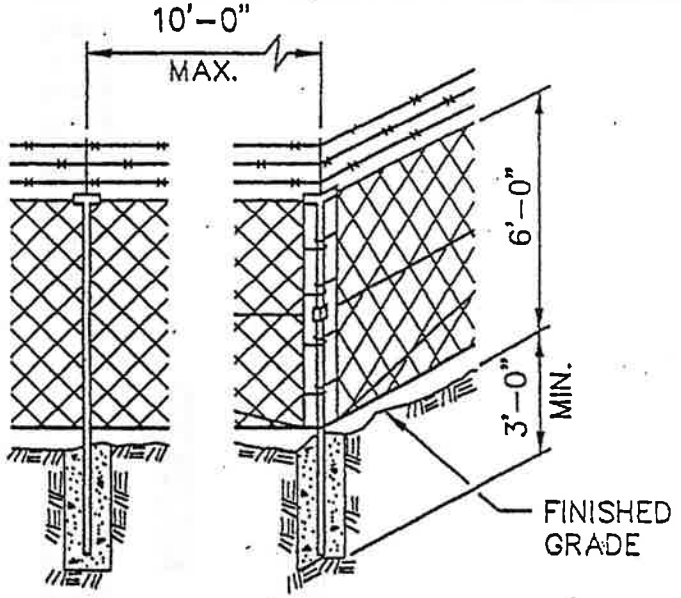
Silt Fence

Storm Drain Inlet Protection

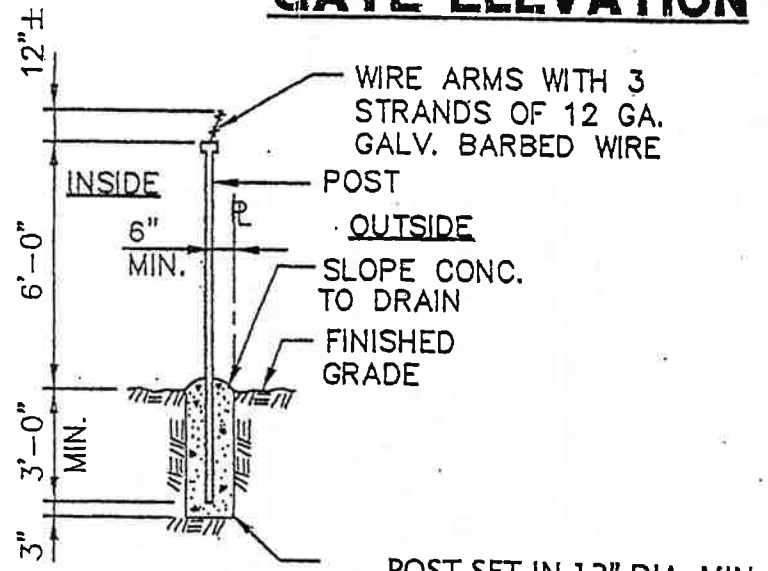
Street Tree Planting and Staking



GATE ELEVATION



CORNER POST



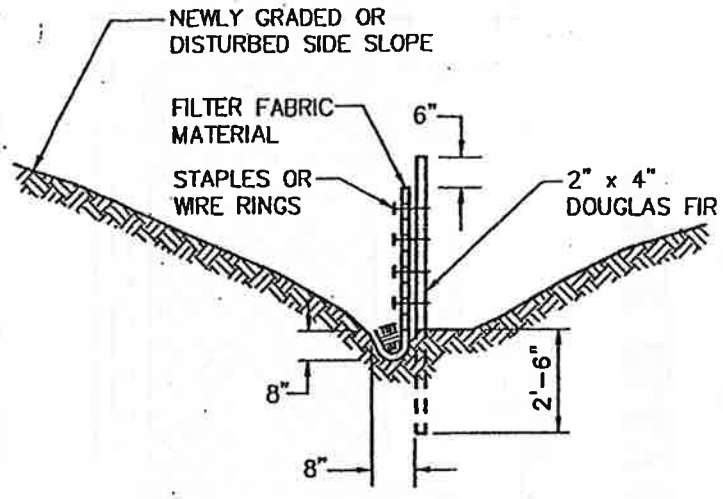
SECTION

NOTES:

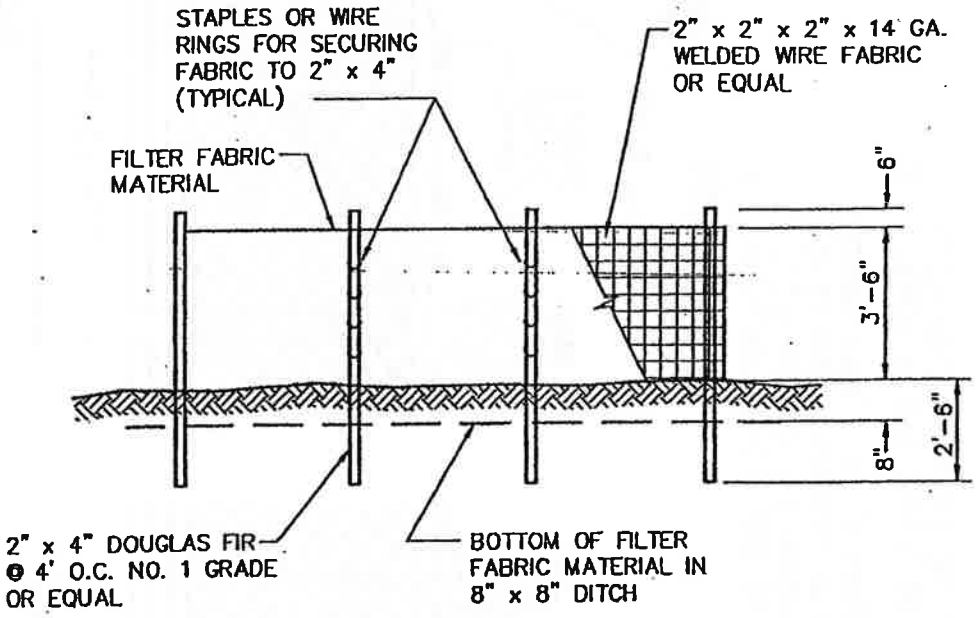
1. CHAINLINK FENCE AND GATE SHALL BE FURNISHED AND INSTALLED ACCORDING TO THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS 1996 FOR CHAINLINK FENCE TYPE 1 AS DETAILED ON STANDARD PLANS L-2 AND L-3.
2. CORNER POSTS SHALL BE INSTALLED AT ALL POINTS WHERE THE ALIGNMENT CHANGES 30° OR MORE.

CITY OF KALAMA			
SWING GATE AND FENCE DETAILS			
APPROVED: Carl M. McCrae 5-29-03 BY CITY DATE			DWG. NO. SGF-1
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE

FILENAME: L:\V\97810\STREET\SGF-1.DWG OPERATOR: MC CREATED: SEP 09 199 ...38 UPDATED: AUG 13 1996 17:49:18 PLOTTED: NOV 13 1997



CROSS SECTION



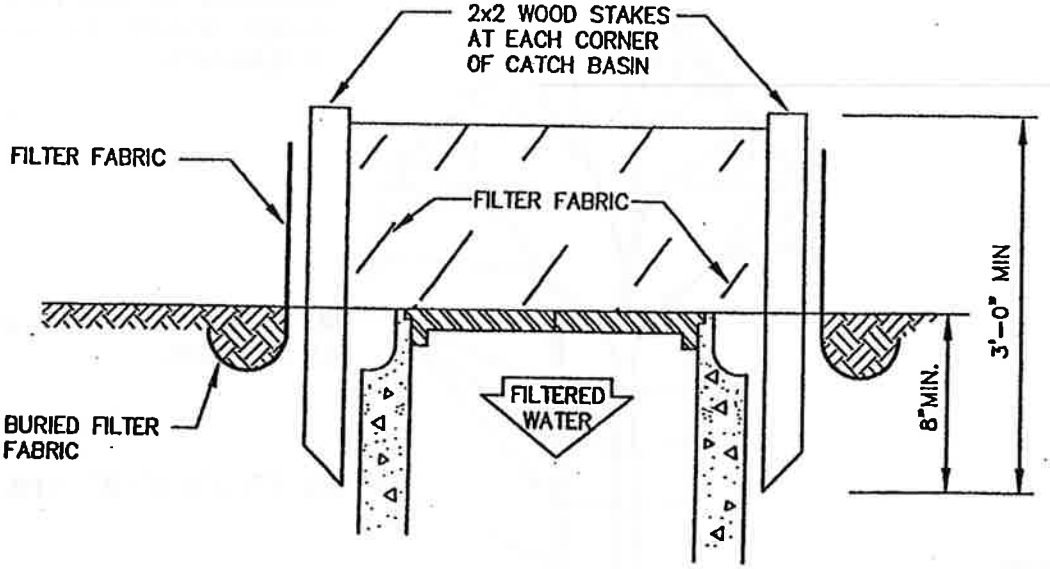
ELEVATION

SILT FENCE

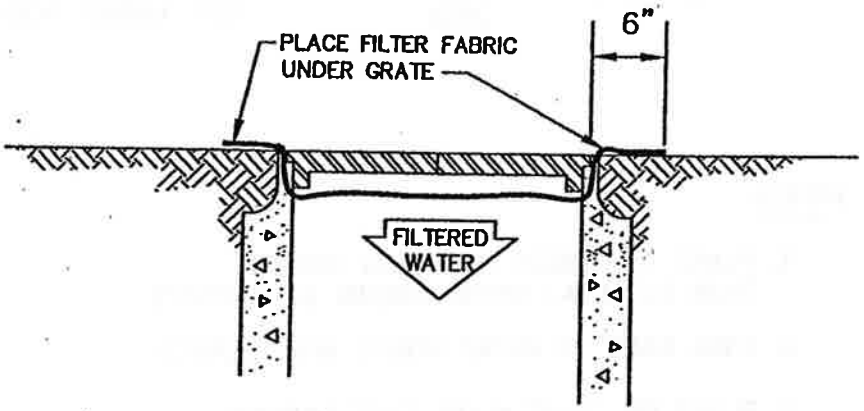
NOTES:

1. WHERE POSSIBLE, MAINTAIN NATURAL VEGETATION FOR SILT CONTROL
2. TEMPORARY SILTATION SHALL BE CONSTRUCTED BY PLACING FILTER FABRIC FENCES ACROSS SWALES UTILIZING FILTER SYSTEM PRIOR TO DISCHARGE
3. ALL TEMPORARY SILTATION FENCING SHALL BE MAINTAINED IN A SATISFACTORY CONDITION UNTIL SUCH TIME THAT CLEARING AND/OR CONSTRUCTION IS COMPLETED AND SURFACE RESTORATION HAS BEEN COMPLETED AND VEGETATION IS STABILIZED
4. RETURN SILTATION CONTROL AREAS TO ORIGINAL GROUND CONDITIONS, UNLESS SPECIFICALLY DIRECTED OTHERWISE BY THE CITY

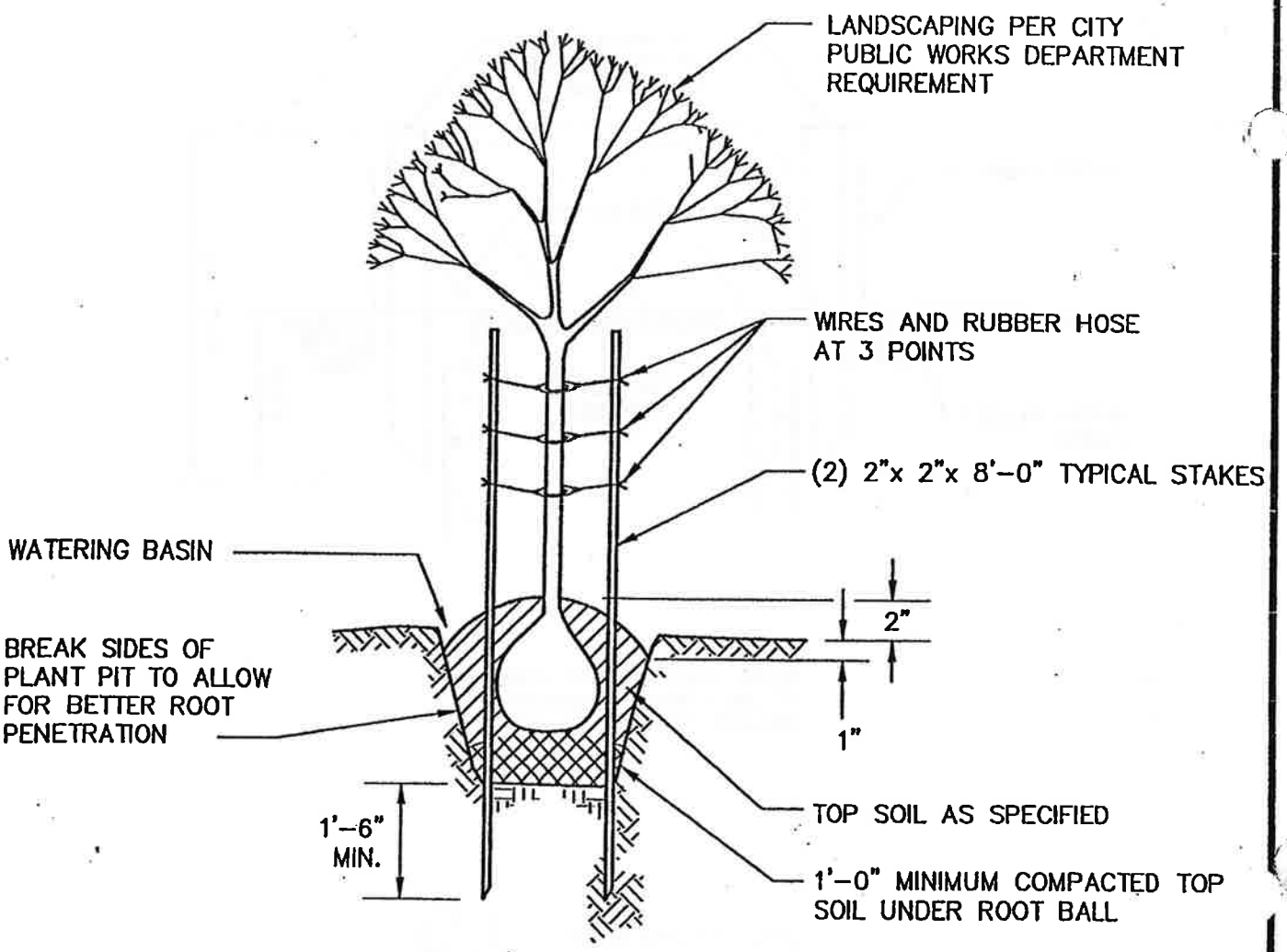
CITY OF KALAMA			
SILT FENCE			
APPROVED: Paul M. McKay 5-29-03 BY CITY DATE			DWG. NO. EC-1
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



NOTE:
WOOD STAKES AROUND PERIMETER OF INLET SHALL BE SPACED A MAXIMUM OF 3 FEET APART



CITY OF KALAMA			
STORM DRAIN INLET PROTECTION			
APPROVED: Paul M. McCrary 5-29-03 BY CITY DATE			DWG. NO. STOM-4
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE



NOTES:

1. PLANT ALL TREES ONE INCH HIGHER THAN LEVEL AT WHICH GROWN IN NURSERY
2. TAKE CARE TO AVOID ROOTS WITH STAKES
3. PLANT PIT 3'-0" ϕ OR 1'-0" LARGER THAN ROOT SPREAD, WHICHEVER IS GREATER.

CITY OF KALAMA			
STREET TREE PLANTING AND STAKING DETAIL			
APPROVED: Paul M. McCrary 5-29-03 BY CITY DATE			DWG. NO. LSCP-1
DATE: 11/97	DRWN: J.H.	CHKD: T.J.O.	SCALE: NONE