TOWN OF YACOLT

ENGINEERING STANDARDS

For

Public Works Construction

July 12, 1994

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Prepared for

Town of Yacolt, Washington

by

Wallis Engineering

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CHAPTER I - GENERAL DESIGN REQUIREMENTS

1.00 Requirements For Public Improvements

A. General

The purpose of this document is to set standards for the construction of public improvements to serve new and future developments. These include street, bikeway, drainage, and water improvements as required by the development review process, Town Ordinance, and other Town policies adopted by the Town Council. Standards for site grading, erosion control, parking lot and driveway construction on private property are also contained in these standards. No such work shall commence prior to Town approval of the construction plans. Designs submitted shall be stamped by a registered Professional Engineer licensed to practice in the State of Washington.

All public improvements and private streets, parking lots, sidewalks, and driveways shall be designed and constructed in such a manner as to be readily accessible to and usable by individuals with disabilities as per the requirements of the Americans With Disabilities Act of 1990. This includes providing curb ramps at intersections with pedestrian crosswalks to allow a smooth transition between street and sidewalk elevations.

B. Shortened Designation

These Town of Yacolt Engineering Standards shall be cited routinely in the text as the "Standards".

C. Applicability

These Standards shall govern all new construction and upgrading of facilities both in the right-of-way and on-site for: transportation-related facilities; storm drainage facilities and stream channel improvements; sewer and water improvements; and park, recreation, and open-space facilities used by the public.

1.01 Precedence of Documents

If there is a conflict between approval documents, the document highest in precedence shall control.

The precedence shall be:

First: Permits from other agencies or jurisdictions, as may be required by law.

Second: Facilities Review, Site Development Permit, and Planning Commission Conditions of Approval.

Third: Town of Yacolt Engineering Standards and Standard Drawings.

Fourth: Town of Yacolt Ordinances.

Fifth: Plans and details prepared by the design engineer.

Sixth: 1994 APWA/WDOT Standard Specifications.

Seventh: Reference specifications.

Supplemental written agreements and approved revisions to plans and specifications by the appropriate jurisdictions will take precedence over documents listed above. Detailed plans shall have precedence over general plans. In any event, the determination of the Town Engineer shall be final.

1.02 Abbreviations and Definitions

AASHTO American Association of State Highway and Transportation Officials.

AC Asphaltic Concrete.

ACI American Concrete Institute.

ADA Americans with Disabilities Act of 1990.

ADT Average Daily Traffic.

ALTA Survey American Land Title Association Survey

ANSI American National Standards Institute.

APWA American Public Works Association.

ASTM	American Society for Testing and Materials.
AWWA	American Water Works Association.
Bicycle	A vehicle having two tandem wheels, propelled solely by human power.
Bicycle Facilities	A general term denoting improvements and provisions which accommodate or encourage bicycling, including parking facilities, maps, signs, pathways, bike lanes, widened sidewalks, bikeways and shared roadways designated for bicycle use.
Bicycle Lane (Bike Lane)	A portion of a roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.
Bicycle Path (Off-Street Pathway)	A paved pathway physically separated from motorized vehicular traffic by an open space or barrier within an independent right-of-way.
Bicycle Route (Bike Route)	A segment of a system of bikeways designated by the jurisdiction having authority with appropriate directional and informational markers, with or without a specific bicycle route number or as designated on a bicycle map, brochure or guidebook.
Bikeway	Any road, path or way which in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.
CARV	Combination Air and Vacuum Release Valve.
CBE	Crushed base equivalent (CBE) is the number that directly relates the traffic coefficient to the required number of inches of rock for street structural sections.
CBR	California Bearing Ratio.
Town Engineer	Town of Yacolt's town engineer having authorities specified in State law or Town ordinances, or their designated representative.
Contractor	The agent of the developer completing the construction activities associated with a given project.
Developer	The owner and/or his agent or contractor's responsible for a given project.

Director	The Planning Director.
Engineer	The Town Engineer.
Engineering Standards	The latest edition of the Town of Yacolt's "Engineering Standards for Public Works Construction".
EPA	U.S. Environmental Protection Agency.
FEMA	Federal Emergency Management Agency.
GPS	Global Positioning System.
IE	Invert Elevation.
Intersection	Refers to the area jointed by two (2) or more roads intersecting. For approaches of a continuous street at an acute curve or some other angle point with different street names.
Mayor	The current elected mayor of the Town of Yacolt.
MUTCD	Manual on Uniform Traffic Control Devices.
NEC	National Electric Code with Washington amendments.
OS and Y	Outside Stem and Yoke.
OSHA	Occupational Safety and Health Administration.
Parking Lot	Paved surfaces on private property intended for the movement and storage of 6 (six) or more vehicles.
PRV	Pressure Reducing Valve.
Sidewalk	The portion of a street designed for preferential or exclusive use by pedestrians.
Standard Details	The latest edition of the Town of Yacolt's standard details for public works construction. Reduced copies are included in Appendix A of this document.

Standard Specifications	The latest edition of the "Standard Specifications for Road, Bridge, and Municipal Construction" as published by the Washington State Department of Transportation and the American Public Works Association.
Street	A public way which affords the principal means of access to abutting property.
TCDH	Traffic Control Device Handbook.
Traffic Coefficient	A number used in determining the structural section ofa street.
Trail	In the context of the General Plan - "Trail" is synonymous with Bicycle Path (off-street pathway).
UBC	Uniform Building Code with Washington amendments.
UFC	Uniform Fire Code with Washington amendments.
UL	Underwriter's Laboratory.
UMC	Uniform Mechanical Code with Washington amendments.
UP	Uniform Plumbing Code with Washington amendments.
WDOT	The Washington State Department of Transportation.
Wetlands	Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Identification and delineation of jurisdictional wetlands and wetland boundaries shall be done by a qualified biologist using applicable State and Federal guidelines.

1.03 Permits

Permits, approvals, or agreements are required by the Town, and sometimes other jurisdictions, prior to initiating any construction or demolition work elements described within these Standards.

The majority of work covered under these Standards will require multiple permit authority review and approvals. Several types of permits and approvals require prior approval from the authority before a building or other substantial permit can be issued. Any questions regarding information about permits, approvals, and agreements should be directed to the Town Clerk or Clark County as applicable.

The following general categories describe the major permits, approvals, and agreements:

A. Environmental Review

For most projects, including clearing and grading activity, an Environmental Checklist must be completed by the applicant and submitted along with plans, specifications, and other information when approval or permits are being requested for a project. Clark County conducts the Environmental Review and makes a SEPA Threshold Determination for the Town.

B. Construction Permits

1. Clearing and Grading Permit: A Clearing and Grading Permit is required for all significant land alterations, including plats. A Clearing and Grading Permit is typically issued in conjunction with other permits.

2. Building Permit: A Building Permit is required for all construction work including alteration, repairs and demolition. Demolition Permits for structures greater than four thousand square feet (4,000 sq. ft.) require the submittal of an Environmental Checklist.

3. Right-of-Way Permit: A Right-of-Way Permit is required for any work within the street right-of-way which is not covered by other permits and agreements. Such work may include utilities work, land closures, driveways, curbs, sidewalks, and haul routes. Permission to temporarily close a street or portion thereof for construction activities or special events is obtained through the Right-of-Way Permit.

4. Utilities Work: Permits, service requests, and applications are required for water and sewer-related items, including side sewers, fire hydrant use permits and water meters.

C. Approvals and Other Permits

There are several other permits or approvals which may be required and referred to in these Standards: Developer Extension Agreements; plat and short plat approvals; and Certificate of Occupancy.

In addition, there are several other Town approvals (land use) which may have been obtained prior to the above listed permits and which may affect the Standards as contained in this document.

1.04 Submittal Requirements

A. General

1. Submittal requirements consist of design plans, grading plans (where required), erosion control plans (where required), drainage calculations, and other information as required. Letters of transmittal shall accompany all submittals.

2. The Standard Specifications are hereby adopted and incorporated as part of this document by reference except as modified herein.

B. Design Plan Format

1. The plans shall be submitted on 24 x 36-inch sheets.

2. Vicinity Maps shall be located on the first sheet of all plans and shall show the location of the project in respect to the nearest major street intersection.

3. A north arrow shall be shown on each plan view sheet of the plans and adjacent to any other drawing which is not oriented the same as other drawings on the sheet.

4. Site Development Plans shall be organized as follows:

   a. Title sheet to include project name, vicinity map, name and mailing address of developer/owner and engineering firm, general notes, notice to excavators, index, and space for town approval stamp (5 x 5-inch) in the lower right quadrant.

b. Composite utility plan: include existing public and private utilities, and proposed public improvements.

c. Sanitary sewer and water, including fire hydrant locations.

d. Street and storm sewer, showing existing and finished contours at 2-foot intervals.

e. Grading and erosion control plan with maximum contour intervals of 2 feet. Contours shall extend offsite a minimum of 50 feet. This sheet shall also note the source of information, date of field work, and location of original document.

f. Approved preliminary plat (if it is a subdivision).

g. Landscape plan including sidewalks, bikeways, retaining walls, irrigation, and lighting.

5. Details - All Town Standard Drawings and details shall be full size.

6. The scale shall be 1-inch = 2 feet, 3 feet, 4 feet, 5 feet, or 10 feet vertically and shall be 1-inch = 10 feet, 20 feet, 30 feet, 40 feet, or 50 feet horizontally for all drawings except structural details. Scale shall be shown with north arrow and within a title block.

7. Letter size shall not be smaller than 0.10 of an inch high.

8. The location and elevation of a National Geodetic Survey, United States Geological Survey, Clark County, or Town of Yacolt bench mark shall be shown. No other datum shall be used without permission of the Town Engineer. Temporary control bench marks and elevations shall also be shown on the plans.

9. A title block shall appear on each sheet of the plan set and shall be placed in the lower right-hand corner of the sheet, across the bottom edge of the sheet, or across the right-hand edge of the sheet. The title block shall include the names of the project, the engineering firm, the owner, the sheet title, and the sheet number.

10. The seal of the registered Washington Professional Engineer responsible for preparation of the plans shall appear on each sheet.

11. The description and date of all revisions to the plans shall be shown on each sheet affected, and shall be approved and dated by the registered Professional Engineer of record as evidenced by an original signature or initial.

12. Through use of standard drafting symbols, indicate the location and direction of view for all sections.

13. The following statement shall appear on the cover sheet of all plans at a location immediately above or below the developer engineer's professional stamp: **"I hereby certify that these plans, and related design, were prepared in strict conformance with the Town of Yacolt's Engineering Standards for Public Works Construction".**

C. Plan View

Plan views shall show the following:

- Right-of-Way, property, tract, and easement lines (existing and proposed).
- Subdivision name, lot numbers, street names, and other identifying labels. Subdivision and street names are subject to the approval of the Mayor, Fire Marshal's Office, and the County Surveyor.
- Location and stationing of existing and proposed street center lines and curb faces.
- Horizontal alignment and curve data of street center lines and curb returns.
- Existing underground utilities and trees over 6 inches in diameter within the construction limits.
- Location of existing buildings, wells, septic tanks, drain fields, fuel tanks, and any other buried structures. An ALTA survey shall be required for at least 100 feet surrounding any of the above items to remain.
- Location, stationing, and size of all mains and service lines for storm drainage, sanitary sewer and water. Location of all fire hydrants. Stationing shall be located in relationship to the street stationing at all manholes or other key locations.
- Match lines with sheet number references.

- Provisions for cross-connection control must be clearly shown on the plans, including any retro-fitting of existing water service connections and existing auxiliary water supplies, conversions to Town of Yacolt water service that are required as a condition of development approval, upgrading of existing service connections by replacement of same, and any other cross connection control required by state and local rules and codes.

- Street stationing to be noted at a minimum of 100-foot intervals.

- Top of curb elevations along curb returns at quarter-delta's, and at 100-foot stations.

- Location of the low points of street grades and curb returns.

- Sidewalk locations. This shall include ramps, transitions in location or width, and relationship with driveways.

- Crown lines along portions of streets transitional from one typical section to another.

- Center line stationing of all intersecting streets.

- Location and description of existing survey monuments, including but not limited to: section corners, quarter corners, donation land claim corners, and Town bench marks.

- Location of proposed street intersection monument boxes.

- FEMA designated 100-year flood plains and flood ways, or areas of flooding during a 100-year storm event.

- Wetland areas and storm water quality undisturbed corridors (buffer strips).

- Legend.

- Developer's name, address and phone number.

- Any additional information that the Town deems necessary.

D. Profile View

Profile Views shall show the following:

- Stationing, elevations, vertical curve data (including curve k factors), and slopes for center of streets or top of curbs. For off-set or superelevation cross-sections, both curbs shall be profiled. Where curbs are not to be constructed, center line of street and ditch inverts shall be shown.

- Original ground along the center line and if necessary at the edges of the right-of-way if grade differences are significant.

- Center line, top of curb, and gutter flow lines of existing streets for a distance of at least three hundred (300) feet each way at intersections with proposed streets. For stub streets that may be extended in the future, the vertical alignment shall be designed for at least 300 feet beyond the scope of the proposed construction. At the discretion of the Town Engineer, additional design information concerning the vertical and horizontal alignment of future street extensions may be required.

- Vertical alignment of streets, including existing center line monumentation.

- The top of curb for all cul-de-sacs, eyebrows and curb returns.

- All proposed drainage facilities, all invert and top elevations, slopes, materials, bedding, and backfill.

- Existing drainage facilities, including off-site facilities, upstream and downstream that affect the design (i.e., downstream restrictions that back water onto project site). In addition, base flood elevations shall be shown on the profile.

- Profiles for ditch and creek flowlines shall extend a minimum of two hundred (200) feet beyond the project, both upstream and downstream. Typical cross sections at fifty (50) foot intervals shall also be submitted.

- Designate structures using alpha or numeric labels on profiles to correspond to plan view notation.

- Profile for existing and proposed storm, sanitary, and water mains. Profiles for water mains less than 12 inches in diameter shall not be required unless directed so by the Town Engineer.

- All existing and proposed sanitary, water, storm lines and other utilities crossing the profile.

E. Site Grading Plan

The Town of Yacolt requires a site grading plan as part of the Application for any development that involves the excavation or fill of greater than fifty (50) cubic yards of material. Grading contours (existing & proposed) shall be at no more than 2 foot intervals, and shall extend off-site a minimum of 50 feet. This sheet shall also note source of information, date of field work, and location of original document.

All soil disturbing construction activity must adhere to the requirements of Chapter 2. A detailed erosion control plan shall be shown in conjunction with the site grading plan.

F. Drainage Calculations

Drainage calculations shall be presented in a clear, concise and complete manner. These calculations shall address all runoff into the drainage system; areas contributing flow to each inlet must be computed separately and each inlet with contributing area shall be designated and shown on an accompanying contour map work sheet.

Initial time of concentration calculation with assumptions listed and charts or nomographs used shall be included with drainage calculations.

G. Other Requirements

Other information to be shown on the construction drawings or the other submittals include:

- The design assumptions for each street (ex: traffic coefficient, R-value).

- The design elements such as:

1. Street classification;
2. Design speed;

3. Superelevation;
4. Average Daily Traffic (ADT) or Design Hourly Volume (DHV).

- Structural construction plans and the necessary calculations shall be submitted for proposed structures (ex: walls, box culverts, bridges).

- Any additional information that the Town Engineer deems necessary to review the plans and assure compliance with design standards.

H. Detail Sheets

Detail sheets shall be provided as part of the Site Development Plans. The detail sheet shall show all Town Standard Drawings and special details necessary for the project.

All Town Standard Drawings and details shall be full size.

1.05 Review Procedure

Seven (7) sets, or as directed by the Town Clerk, of complete draft plans shall be submitted for review. Plans shall be complete and shall be stamped and signed by the developer's engineer and shall contain the statement **"I hereby certify that these plans, and related design, were prepared in strict conformance with the Town of Yacolt's Engineering Standard for Public Works Constructions".** Supporting information and documentation, such as drainage and water system calculations, shall also be submitted.

Upon completion of the detailed review by the Town, the Town will return one (1) set of draft plans with "Red Line" comments. After the developer's engineer has completed all revisions, five (5) revised plans and the original "Red Line" plans shall be returned to the Town.

Following approval of draft plans and calculations by the Town, the developer's engineer will submit the original plans and one copy of all original plans and calculations to the Town Clerk for approval signature. Following obtaining the approval signatures, the Town Clerk will notify the developer's engineer that the original plans have been signed and are ready for release. The developer's engineer will provide the Town with four copies of complete final approved plans.

Plan review priority will be given to plans submitted for final review. This plan review and approval is valid for one (1) year from the date of plan review fee payment. If a site development permit is obtained, approval is valid for two years from the date of the issuance of the site development permit. Extensions to the permit can be made as part of the Development Permit extension process.

Plan approval means that the plans have been reviewed for reasonableness and compliance with minimum Town specifications and standards. This approval does not supersede those standards and specifications, unless specifically varied by the Town. Plan approval does not relieve the Engineer from responsibility for errors, omissions or deficiencies in the plans.

1.06 As-Built Drawings

Following completion of construction, the developer's engineer shall submit one (1) complete set of mylar as-built drawings. As-built drawings shall contain any and all revisions to the previously approved construction plans, and shall be accompanied by a completion certification letter from the developer's engineer. Each sheet of the as-constructed drawings shall be stamped "As-Built", and signed and dated by the developer's engineer. This signature constitutes a certification that the public improvements, grading, and other elements of the engineered drawings have been completed in accordance with the Town approved plans and to the standards of the Town. As-builts shall be black India ink on originals or reverse reading, fixed-line, photographically reproduced 4-mil mylar, 24 x 36-inches in size and to engineering scale. Each sheet included in the construction plan shall be as-built. Sepia mylars or vellums will not be accepted. If project was designed on a CAD system, the Town also shall receive a copy of all related drawings and documents (such as point files) in AutoCad format dxf or dwg, on disk. As-built drawings will include the following:

a. All public utility easements.
b. Distance between main lines in shared easements.
c. Type of main line, size, and material.
d. All laterals, including length, plan stationing, size, material, and depths.
e. Public sidewalk detail.

Submission of as-built drawings shall be made prior to final inspection of a completed project.

1.07 Professional Qualifications

Professionals in the technical fields of Civil Engineering, Electrical Engineering, Geotechnical Engineering, Landscape Architecture, Soils Engineering, Structural Engineering, and Surveying who prepare or are responsible for the preparation of drawings, plans, specifications, technical reports, etc. for the process of obtaining required permits/approvals shall be currently licensed or registered in the State of Washington and qualified by both experience and educational background in the specific technical areas as warranted by the specific needs of the proposed development project.

1.08 Changes to Standards

From time to time changes may be needed to add, delete, or modify the provisions of these standards. The Engineer may propose changes to these Standards and upon approval of the Town Council, they shall become effective and shall be incorporated into the existing provisions.

1.09 Design Modifications Process

A. Submittal

Requests to modify Town Standards shall be submitted in writing by the developer's engineer, to the Town. 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 Town Standards should be documented with reference to nationally accepted specifications/standards.

B. Review

The request to modify shall be reviewed by the Town's Engineer and public Works Superintendent, who shall consult the appropriate review authorities and make one of the following decisions:

- Approve as is,
- approve with changes,
- 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 decision from the review process to the Town Council. Such an appeal shall be in writing and shall be submitted to the Town at least 15 working days prior to a regularly scheduled Town Council meeting.

D. Criteria for Modification of Specification Standards

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

The specification or standard does not apply in the particular application.

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.

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.

1.10 Securities

Under certain circumstances or as required by code, securities may be required by the Town to guarantee the performance of, or correct permitted work. The amount of security shall cover the Town's cost to correct deficiencies. The type and amount of security shall be per code or, if not specified, be at the discretion of the Town. Types of securities include but are not limited to cash deposits, assigned savings, and bonds. Securities shall be released by the Town upon satisfactory completion of the required work and satisfaction of any additional previously specified stipulations related to the work being performed.

1.11 Errors and Omissions

At the discretion of the Town, any significant errors or omissions in the approved plans or information used as a basis for such approvals may constitute grounds for withdrawal of any approvals and/or stoppage of any or all of the permitted work. It shall be the responsibility of the developer to show cause why such work should continue, and make such changes in plans that may be required by the Town before the plans are reapproved.

1.12 Inspection

A. General Requirements

1. Work performed within the public right-of-way, or as described in these standards, whether by or for a private developer, by Town forces, or by a Town contractor, shall be done to the satisfaction of the Town and in accordance with the Standard

Specifications, any approved plans and these Standards. Unless otherwise approved, any revision to construction plans must be approved by the Town before being implemented.

2. The Town shall have authority to enforce the Standards as well as other referenced or pertinent specifications. The Town will appoint project engineers, assistants and inspectors as necessary to inspect the work and they will exercise such authority as the Engineer may delegate.

3. It is the responsibility of the developer, contractor or their agents to have an approved set of plans, and/or permits on the job site wherever work is being accomplished.

4. It is the responsibility of the developer, contractor, or their agents to notify the Town in advance of the commencement of any authorized work. A preconstruction conference and/or field review shall be required before the commencement of any work on significant projects.

5. Failure to comply with the provisions of these standards may result in stop work orders, removal of work accomplished, or other penalties as established by ordinance.

B. Substitution of Materials

It is not the intent of these Standards to exclude other equipment or materials of equal value, quality, or merit. Whenever a product is designated, or manufacturer's name, brand, or item designation is given or described, it shall be understood that the words "or approved equal" follows such name, designation, or description, whether in fact they do so or not. Determination of quality in reference to the project design requirement will be made by the Town. A contractor shall not use an "equal" product without prior written approval of the Town designated representative.

C. Town Inspector's Activities

Inspecting services provided by the Town shall include:

1. Monitoring both work progress and performance testing results.

2. The performance of administrative and coordination activities as required to support the processing and completion of the project.

3. The issuance of a stop work order by notice to the contractor to stop the work. The Town's Project Inspector, at the discretion of the Mayor or his representative, may post a stop work order.

4. Maintaining a completion file containing the following:

   a. The original of the project completion certification;

   b. A complete copy of the log book initialed by the engineer's inspector;

   c. The results of material tests, compaction tests, and soil analysis as detailed in the log book.

5. Inform the Town of all proposed plan changes, material changes, stop work orders, or errors or omissions in the approved plans or specifications as soon as practical. Any revision to approved plans must be under the direction of the Engineer. It shall be at the discretion of the Town's Project Inspector as to whether the revision is significant enough to warrant review by the Town Clerk. If so, the developer's engineer shall submit five (5) copies of the proposed revision; no work affected by the revision shall be done until approval by the Mayor or his representative.

1.13 Contractor's Responsibility for Scheduling

A. Sequence of Operations

The Contractor shall plan construction work and execute his operations with a minimum of interference with the operation of the existing public facilities. It may be necessary to do certain parts of the construction work outside normal working hours in order to avoid undesirable conditions, and it shall be the obligation of the Contractor to do this work at such times. This scheduling, however, is subject to the Town's approval and does not relieve the contractor from making work available for inspection.

The Contractor shall notify the Town at least 48 hours (two full working days) prior to any Town inspection. Connections between existing work and new work shall not be made until necessary inspection and tests have been completed on the new work and it is found to conform in all respects to the requirements of the plans and specifications.

B. Step Inspections

The following items of work shall be inspected by Town forces.

1. For street or sidewalk work, subgrade shall be inspected by the Town (and tested by the Contractor) prior to placement of crushed surfacing.

2. Crushed surfacing shall be inspected by the Town (and tested by the Contractor) prior to placement of paving, curb, or sidewalks.

3. Notify the Town prior to the placement of any paving, curbs, or sidewalk.

Other items of inspection notification are included under the various items of work outlined in these Standards.

C. Progress of Construction

Construction shall proceed in a systematic manner that will result in a minimum of inconvenience to the public.

In the case of a pipe-laying job for sanitary sewer, storm drainage, and water improvements the trenching equipment at no time shall be greater than 100 feet ahead of the pipe-laying crew, unless given permission by the Town Engineer. The trench shall be backfilled so that no section of the trench or pipe is left open longer than 24 hours. Trenches located in a right-of-way or public street shall be completely backfilled or plated before the contractor leaves the site each day.

1.14 Contractor's Requirement for Testing

A. General

Testing shall be performed by a certified independent testing lab hired by the developer or developer's contractor with the results being supplied to the Town Engineer. The developer shall pay the cost of all testing as outlined herein.

The testing is not intended to relieve the contractor from any liability for the trench restoration. It is intended to show the inspector and the Town that the restoration meets these specifications.

B. Asphalt Testing

1. Compaction of all lifts of asphalt shall be an average of ninety-two percent (92%) of maximum density as determined by WDOT Test Method 705. Number of tests required:

   a. For streets provide one test per every 5,000 square feet of pavement surface area.

   b. For surface restoration of utility trenches provide one test per every 200 feet of trench.

C. Subgrade and Crushed Surfacing Testing

1. Compaction testing as specified in the Standard Specifications. Number of tests required:

   a. For streets provide one test of the subgrade and one test of the crushed surfacing for every 5,000 square feet of surface area of pavement, curb, and sidewalk.

D. Bedding and Backfill for Utility Trenches

1. Compaction testing as specified in the Standard Specifications. Number of tests required:

   a. For utility trenches provide one test at top of bedding for every 500 feet of trench.

   b. For utility trenches provide one test for each lift of backfill for every 500 feet of trench.

E. Concrete Curb and Sidewalks

1. For each two cubic yards of cement concrete curb and/or sidewalk, provide one compression test.

1.15 Safety Requirements

The contractor is responsible for observing the safety of the work and of all persons and property coming into contact with the work. The contractor shall comply with all the requirements prescribed by OSHA. Traffic control in work zones shall conform to the MUTCD. At the Town's discretion, a traffic control plan shall be submitted and approved prior to construction.

The Town Project Inspector's role is not one of supervision or safety management, but is one of observation only. Nothing contained in this section or elsewhere in this book shall be interpreted to obligate the Town to act in any situation, nor shift the owner's responsibility for safety compliance to the Town. No responsibility for the safety of the work or for construction means, methods, techniques, sequences, or procedures shall attach to the Town by virtue of its action or inaction under this section.

1.16 Preservation, Restoration, and Cleanup

A. Site Restoration and Cleanup

The Contractor shall keep the premises clean and orderly at all times during the work and leave the project free of rubbish or excess materials of any kind upon completion of the work. During construction, the Contractor shall stockpile excavated materials so as to do the least damage to adjacent lawns, grassed areas, gardens, shrubbery, trees, or fences, regardless of the ownership of these areas. All excavated materials shall be removed from these areas, and these surfaces shall be left in a condition equivalent to their original condition and free from all rocks, gravel, boulders, or other foreign material. Stockpiling of construction materials shall not be allowed on existing sidewalks or the driving surface of existing streets.

All existing storm systems shall be cleaned and flushed, and original drainage restored. Sediment, rock, and other debris shall be collected and disposed of in a proper manner. In no case shall debris be flushed down a storm or sanitary sewer for disposal. All damaged irrigation and house drainage pipe, drain tiles, sewer lateral, and culverts shall be repaired expeditiously.

All areas disturbed by the Contractor's operations inside dedicated rights-of-way or easements shall be restored to original condition. Areas outside of the easements or rights-of-way which are disturbed by the Contractor's operations shall be graded and reseeded in a method acceptable to the property owner. The Contractor shall obtain a

written release from such property owners for any claims of injury or property damage prior to final acceptance of the work by the Town.

B. Street Cleanup

The Contractor shall clean all spilled dirt, gravel, or other foreign material caused by the construction operations from all streets and roads at the conclusion of each day's operation. Cleaning shall be by grader and front-end loader, supplemented by power brushing, and hand labor, unless otherwise approved by the Town. The contractor shall follow the Town's erosion control procedures.

As soon as practical after completion of all paving and gravel shoulder resurfacing, the Contractor shall remove all dirt, mud, rock, gravel, and other foreign material from the paved surface and storm drainage system.

C. Dust Prevention

During all phases of the work, the Contractor shall take precautions to abate any dust nuisance by cleaning up, sweeping, sprinkling with water, or other means as necessary to accomplish results satisfactory to the Town. Dust prevention measures shall be continuous until final acceptance by the Town. Obtaining water from a hydrant will require specific authorization from the applicable water jurisdiction.

D. Stream and Creek Crossings

The Contractor shall comply with all provisions of the permits required by the Washington Departments of Wildlife and Fisheries, and the U.S. Army Corps of Engineers.

Before any work may be performed in any stream, the method of operation and the schedule of such work shall be approved in writing by the Town Engineer. Work within major streams shall be scheduled to take place as specified in the applicable permits for such work, and once started, shall be completed without interruption of the work. Mechanized equipment shall enter streams only when necessary and only within the immediate work area.

E. Protection of Property

The Contractor shall exercise all due care in protecting property along the route of the improvement. This protection shall include, but not be limited to, trees, yards, fences, drainage lines, mail boxes, driveways, shrubs, and lawns. If any of the above have been disturbed, they shall be restored to as near their original condition as possible.

1.17 Railroad Crossings

A. General

Crossings of railroad rights-of-way shall be done in a manner which conforms with the requirements of the railroad having jurisdiction. If any bonds and/or certificates of insurance protection are required, they shall be furnished by the Contractor or Owner to the railroad company with the Town as an additionally-named insured.

B. Permits or Easements

Crossing agreements, permits, and/or easements for such crossings will be obtained by the applicant and all the terms of such permits or easements shall be met by the Owner and Contractor.

1.18 Penalties

Failure to comply with these standards will be cause for withholding or withdrawing approval of plans or plats, forfeiture of bond, withholding Temporary and/or Final Certificate of Occupancy, and/or other penalties as provided by law.

CHAPTER 2

LAND ALTERATION

CHAPTER 2 - LAND ALTERATION

2A POLICIES

2A.01 General

It is the purpose of this Chapter to provide for and promote the health, safety, and welfare of the general public, and not create or otherwise establish or designate any particular class or group of persons who will or should be especially protected or benefited by the terms of this Chapter.

The Standards established by this Chapter are intended to represent the minimum design standards for clearing, grading, and erosion control work. Compliance with these Standards does not relieve the designer of the responsibility to apply sound professional judgment to protect the health, safety, and welfare of the general public. Additionally, since these are minimum standards, special site conditions and environmental constraints may require a greater level of protection than would normally be required under these Standards. The designer must apply these Standards bearing in mind these constraints.

Conditions may change after clearing, grading, or construction has started due to unforeseen conditions. Design elements of the proposed project may have to be changed to comply with the conditions of any permits, codes and regulations, or these standards.

The primary objective of this chapter is the control of erosion at its source as a means of controlling water pollution, flooding, and habitat damage downstream. Typical examples of techniques for source control are limiting cleared areas (especially on steep terrain or adjacent to other sensitive areas), seasonal limits on work, mulching, hydroseeding or covering cleared areas as soon as work has finished, control of land use in sensitive areas, and establishment and maintenance of setbacks and buffer areas.

Secondary containment measures must be provided to backup the above measures in case of failure. These backup measures include desilting ponds and sediment traps, filter fencing and straw bales, catch basin filtration, and management plans. One method cannot be relied on without the other - both are mandatory to protect property, lives, and habitat.

Types of Land Alteration - Land alteration activities are those activities which are commonly referred to as clearing (the act of vegetation removal from the land surface by mechanical or chemical means - often referred to as land clearing), grubbing (the act of root vegetation removal from beneath the surface of the earth - usually in association with clearing), excavation (the mechanical removal of

earth material), filling (deposition of earth material placed by artificial means), grading (excavation or filling or combination thereof), compaction (densification of earth material by artificial means), stockpiling (temporary deposition of earth material placed by artificial means), and stabilizing (counteracting the actions of gravity, wind or water).

2A.02 Seasonal Limits

Land alteration operations shall be limited by the seasonal limitations specified.

A. When land alteration activities are interrupted by heavy rain, operations shall not be resumed until the Town determines that erosion control facilities (See Section 2B.02) are operating satisfactorily.

B. Land alteration activities near sensitive areas, including slopes over 5%, wetlands, flood plains, or riparian corridors shall be subject to limitations imposed by the Town. Permits from other agencies in addition to the Town may be required by law for such work. It is the responsibility of the project sponsor to obtain such permits prior to beginning work and to see that all applicable regulations are complied with at all times during the course of the work.

C. Work shall be stopped and the site shall be secured from erosion at any time when weather conditions change or the threat of heavy rain makes erosion problems likely.

2A.03 Preservation of Existing Vegetation

A. Existing vegetation shall be preserved whenever possible.

B. In general, preservation of existing vegetation in order to control erosion and to preserve an area's character and quality of the environment shall be considered during the Land Alteration design review process. All excavations and fills in the proximity of trees and shrubs shall be kept outside the dripline of said trees and shrubs.

2A.04 Temporary Erosion/Sedimentation Control

Erosion control during construction shall be required per the recommendations of the Puget Sound Manual.

2A.05 Permanent Erosion Control and Vegetation Restoration

A. Permanent erosion control shall be required per the Puget Sound Manual.

B. Vegetation shall be restored on those areas of the site disturbed by the land alteration activity which are not covered by permanent impervious surface improvements (e.g. buildings, parking lots, etc.) at the earliest possible time consistent with appropriate planting times. The soil shall be stabilized prior to vegetation restoration since vegetation alone cannot provide an effective erosion control cover and prevent soil slippage on a soil that is not stable due to its texture, structure, water movement or excessive slope.

C. In no case will the period between the land alteration operation and final and complete restorative, or permanent erosion control, vegetation planting for a given project or project phase be longer than one year. Said planting shall restore the vegetation on site to a condition equal to or better than the precleared condition to the maximum extent possible. Temporary erosion and sedimentation control measures shall be maintained in full operating condition for all areas to be restored until said restoration is complete and the site fully stabilized.

2A.06 100-Year Flood Plain

A. Encroachments, including fills, new construction, substantial improvements, and other development within the regulatory floodway that would result in any increase in flood levels during the occurrence of the "100-year" flood discharge shall be prohibited.

B. "100-year flood" means the flood having a one percent chance of being equalled or exceeded in any given year."

C. Delineation of the "100-year" flood plain shall be in accordance with the elevations established by the U.S. Geological Survey's Flood Insurance Study (latest published edition) for the U.S. Department of Housing and Urban Development.

2A.07 Clearing and Grading on Environmentally Sensitive Lands

Clearing and grading shall be prohibited in sensitive areas.

2A.08 Drainage Control

Drainage Control shall be required per Chapter 4 of these standards.

2A.09 Water Quality Standards

Water Quality shall be maintained per the recommendations of the Puget Sound Manual.

2B DESIGN STANDARDS

2B.01 Temporary Erosion Control

A. Prior to any clearing and grading of any land development, devices for interception of all runoff from the cleared area shall be installed. Said interception shall preclude discharging silt-laden runoff from the proposed land development to downstream properties to the maximum extent possible with the best available technology. Said interception shall cause all silt-laden runoff to be conveyed by open swale or other means to whatever temporary facility is necessary or required to remove silt from said runoff prior to discharge to downstream properties (see paragraph e below). Sequence of work shall be specified on the plans.

B. Care shall be taken so as to deposit no material from sites of land alteration activity onto public rights-of-way and/or adjoining properties. If such depositions occur, it shall be the responsibility of the Permittee to immediately remove such material from public rights-of-way and adjoining properties, and restore to the original conditions.

C. Since site conditions may change rapidly during construction due to construction activity, weather, and other factors, it should be anticipated that the erosion control measures on the approved plan may become ineffective. Under special conditions, measures additional to those showing on the plan may be required by the Town in order to control erosion and sedimentation when such special conditions occur.

D. The following shall be carried as general notes on the Temporary Erosion/Sedimentation Control Plan:

1. All construction shall be in accordance with the Town of Yacolt's Engineering Standards for Public Works Construction, Yacolt Ordinances, Permit Conditions, and all other applicable codes, ordinances, standards and policies.

2. The temporary erosion control system shall be installed prior to all other construction.

3. Where possible, maintain natural vegetation for erosion and siltation control .

4. As construction progresses and seasonal conditions dictate, more siltation control facilities may be required to ensure complete siltation control. Therefore during the course of construction, it shall be the obligation and responsibility of the developer to address any new conditions that may be created by his activities and to provide additional facilities over and above the minimum requirements as may be needed to achieve the performance standards required by the permit.

5. Temporary siltation ponds and all temporary siltation and erosion controls shall be maintained in a satisfactory conditions until such time that clearing and/or construction is completed, permanent drainage facilities are operational, and the potential for erosion has passed. Ponds and controls shall be cleaned or replaced as directed by the Town. Contractor shall maintain a 24 hour contact number at (206) - for emergency response to maintain and repair all on site erosion and sedimentation control measures and facilities.

6. All disturbed land areas unworked for seven (7) days or more shall be protected from erosion by hydroseeding with a mix or by a method approved by the Town. If required due to weather, timing, or site conditions, the hydroseeding shall be supplemented by mulching with straw a minimum of 1 inch thick and stapling jute or utility mesh over the mulch.

7. Approval of this temporary erosion and sedimentation control plan does not constitute an approval of design, nor location of pipes, restrictors, or retention facilities, or an approval of plans required for a building permit; but is an approval of grading and sedimentation control plan only, unless specifically noted on the plan approval stamp.

8. Prior to occupancy of the building, the permanent storm drainage system shall be cleaned by pumping (not into the storm drainage system) or other method as approved by the Town.

9. The Permittee shall be responsible for preventing water pollution due to construction materials, methods or equipment. All exposed aggregate concrete shall be installed and constructed so that no wash water enters the storm drainage system. The

contractor shall provide a separate area, a minimum of 200 square feet in size, for washing of concrete trucks. This area shall also be isolated so that no water enters the storm drainage system.

E. General Methods of Erosion and Sedimentation Controls - The types of controls, as outlined in the Puget Sound Manual, shall be utilized in such combination as is necessary to achieve the level of erosion control required by these Standards and meet water quality objectives. Erosion control facilities shall be periodically inspected and maintenance performed in order to ensure their proper functioning as required by the approved erosion and sedimentation control management plan.

2B.02 Environmental Protection During Construction

A. General Policy and Requirements

1. It is the policy of the Town of Yacolt to require temporary and permanent measures for all construction projects to lessen the adverse effects of construction on the environment.

   The Contractor shall properly install, operate, and maintain both temporary and permanent works as provided in this section or in an approved plan, to protect the environment during the term of the project.

   The Town may, in addition, require that a construction project be scheduled so as to minimize erosion or other environmental harm.

   Nothing in this section shall relieve any person from the obligation to comply with the regulations or permits of any federal, state, or other local authority.

2. For all projects the prohibitions and regulations of this section shall apply. The Town may temporarily suspend the work or require additional protection measures if it appears, based upon observed conditions of the project, that the approved plan is insufficient to prevent environmental harm, and that such suspension or additional measures will prevent or minimize such harm.

B. Air Pollution Control

1. Dust. Dust shall be minimized to the extent practicable, utilizing all measures necessary, including, but not limited to:

a. Sprinkling haul and access roads and other exposed dust producing areas with water. Obtaining water from a hydrant will require specific authorization from the applicable water jurisdiction.

b. Applying DOE approved dust palliatives on access and haul roads.

c. Establishing temporary vegetative cover.

d. Placing wood chips or other effective mulches on vehicle and pedestrian use areas.

e. Maintaining the proper moisture condition on all fill surfaces.

f. Pre-wetting cut and borrow area surfaces.

g. Use of covered haul equipment.

2. Fumes, Smoke, and Odors

a. Tires, oils, paints, asphalts, coated metals, or other such materials will not be permitted in combustible waste piles, and will not be burned at the construction site.

b. Open burning shall not be permitted unless approved by the Southwest Washington Air Pollution Control Authority and the County Fire Marshal's Office.

c. Open burning shall not be permitted within 1,000 feet of a structure or within 250 feet of the drip line of any standing timber or flammable growth.

d. Open burning shall not be permitted during a local air inversion or other climatic conditions that may result in a smoke pall hanging over a built-up area or community.

e. Open burning shall not be permitted when climatic and moisture conditions are contributing to high danger of forest or range fires as determined by town, state, or federal authorities.

f. All open burning shall be constantly attended by a crew with a supply of

fire-fighting tools and equipment. The number and size of fires shall be limited such that the burning crew can adequately control them.

C. Erosion Control

The Town of Yacolt has adopted the Puget Sound Manual. All construction standards must meet or exceed these requirements for the installation and maintenance of erosion control devices.

The Town has the following notations in addition to the Puget Sound Manual.

1. Measures to prevent erosion at construction sites shall be incorporated into the construction drawings and specifications.

2. All earth and soft or broken rock areas that have been disturbed by construction operations such as during stripping, excavation, and by traffic shall be protected from erosion by the action of concentrated runoff, by the impact of falling rain, by wind action, by vehicular tracking, or a combination of actions.

3. The concentration of runoff on or across slopes shall be prevented.

4. Sections of bare earth and the length of time of their exposure to potential erosion shall be minimized by proper scheduling, limiting the work areas, and placement of appropriate cover.

5. Precautions shall be taken in the use of construction equipment to prevent operations that increase the potential for erosion. Wheel tracks or ruts, particularly down slopes, that permit concentration of surface flows, shall be avoided. Fording of live streams that accelerate erosion and damage aquatic animal habitat shall be avoided. Where frequent stream crossings are necessary, temporary bridges shall be installed.

6. Areas for borrow pits and waste disposal shall be selected with full consideration of erosion control needs during and after borrow operations.

D. Maintaining Surface Water Quality

1. Construction between stream banks shall be kept to a minimum.

2. Pollutants such as fuels, lubricants, bitumens, raw sewage, and other harmful

materials shall not be discharged into or near rivers, streams, or impoundments. Sterilizing water from water line construction activities shall not be directly discharged into the public storm drainage system.

3. The use of water from a stream or impoundment shall not result in altering the temperature of the water body enough to affect aquatic life.

E. Fish and Wildlife Habitat Preservation

1. The construction shall be done in a manner to minimize the adverse effects on wildlife and fishery resources.

2. The requirements of local, state, and federal agencies charged with wildlife and fish protection shall be adhered to by the entire construction work force.

F. Control of Noise Levels

Construction noise shall be minimized by the use of proper engine mufflers, protective sound reducing enclosures, and other sound barriers. Construction activities producing excessive noise that cannot be reduced by mechanical means shall be restricted to locations where their sound impact is reduced to a minimum at the edge of the work area.

G. Natural Vegetation

1. As far as is practicable, the natural vegetation shall be protected and left in place. Work areas shall be carefully located and marked to reduce potential damage. Trees shall not be used as anchors for stabilizing working equipment.

2. During clearing operations, trees shall not be permitted to fall outside the work area. In areas designated for selective cutting or clearing, care in falling and removing trees and brush shall be taken to avoid injuring trees and shrubs to be left in place.

H. Historical and Archaeological Areas

When burial sites, buried camp areas, village sites, and other distinctive archaeological or historical items are uncovered, or other items suspected of being of historical or archaeologic significance are encountered, the Contractor shall report the matter to the Town and the state liaison officer. Construction operations shall be stopped until the

appropriate authorities can examine the area and give clearance to proceed with the work.

Under the Natural Historical Preservation Act, state liaison officers shall be notified when historical or archaeological items are unearthed.

The Washington Criminal Code prohibits disinterment of a corpse without permission of the appropriate authorities.

I. Use of Pesticides

1. The use of pesticides including insecticides, herbicides, defoliants, soil sterilants, and so forth, must strictly adhere to federal, state, county, and local restrictions. Time, area, method, and rate of application must be approved by all relevant authorities and their requirements followed.

2. All materials delivered to the job site shall be covered and protected from the weather. None of the materials shall be exposed during storage. Waste material, rinsing fluids, and other such material shall be disposed of in such a manner that pollution of groundwater, surface water, or the air does not occur. In no case shall toxic materials be dumped into drainageways.

3. All personnel shall stay out of sprayed areas for the prescribed time. All such areas should be fenced, appropriately signed, or otherwise protected to restrict entry.

CHAPTER 3

STREETS

CHAPTER 3 - STREETS

3A FUNCTIONAL CLASSIFICATION

The functional classification of existing and proposed roads is established by the Town on an individual basis using the existing land use and existing operational characteristics. Yacolt classifies roads and streets as follows:

1. Arterials.

   The arterial system complements and supports the principal and major systems, but is primarily oriented toward travel within and between adjacent sub-areas. These facilities provide connections to major activity centers and provide access into each sub-area.

2. Collectors.

   The collector system is deployed nearly entirely within sub-regions to provide mobility between communities and neighborhoods or from neighborhoods to the minor and major arterial systems. An adequate collector system is needed to ensure these movements do not occur on principal routes or major arterials. Land is directly accessible with emphasis on collection and distribution of trips within an arterial grid.

3. Access and Local Streets.

   The local street system is used throughout developed areas to provide for local circulation and direct land access. It provides mobility within neighborhoods and other homogenous land uses, and comprises the largest percentage of total street mileage. In general, local traffic should not occur on major arterials and principal routes.

3A.01 Access

Access to public streets shall conform to the requirements of Paragraph 3B.10. The Town Engineer shall have the authority to limit access and designate access locations on public streets under the jurisdiction of the Town. Access to streets and highways under Clark County or State of Washington jurisdiction must be formally approved by those entities at the applicant's initiative and expense.

3A.02 Width

Table 3B.04A is a summary of road width standards by the functional classification of the road. It should be noted that public utility easements beyond the right-of-way are typically required.

3A.03 Number of Lanes

The number of lanes for each class of road shall be as directed by the Town Engineer. Additional lanes may be required at intersections in excess of the road sections shown in Table 3B.04A.

Right-of-way may be needed in addition to that shown in Table 3B.04A to accommodate the increased number of lanes at intersections.

3A.04 Design Speed

The minimum design speed for each road classification shall be as shown in Tables 3B.04A or as otherwise determined by the Town Engineer.

3A.05 Dedications

A. Right-of-Way shall be deeded for streets and other improvements as required per Table 3B.04A to accommodate motorized and non-motorized transportation, landscaping, utility and buffer requirements. Some reduction in the minimum right-of-way requirement may be granted by the Town where it can be demonstrated that sufficient area has been provided for all functions within the right-of-way and/or alternate locations. Conveyance shall be fee simple using a statutory warranty deed.

B. Easements for all public systems shall be provided as required. Specific requirements for sewer, water, and storm drainage easements are detailed in the relevant chapters. Particular design features of a road may necessitate slope, wall or drainage easements. Such easements may be required by the Engineer in conjunction with dedication or acquisition of right-of-way and other standard easements (temporary construction, right of entry, sidewalk, pedestrian, street lighting, and traffic control devices, etc.).

C. Special Access Easements or Tracts.

Where it is necessary to facilitate pedestrian circulation between neighborhoods, schools, shopping or other activity centers, public access easements or tracts shall be dedicated.

Improvements to the easement shall include a sidewalk or trail consistent with other non-motorized facilities in the area. Fences shall be constructed along access easements in residential areas where buildings will be located nearer than fifty feet (50') to the edge of the easement. Diverters or bollards shall be installed at the direction of the Town.

D. All subdivisions and short subdivisions (short plats) will be required to deed additional right-of-way, as a condition of approval of the subdivision, where the existing right-of-way for a public street is not adequate to incorporate necessary frontage improvements for public safety and provide compatibility with area's circulation system.

   All short subdivisions (short plats) will be required to deed additional right-of-way, as a condition of approval of the short plat, under one or more of the following conditions:

   1. The short plat abuts an existing substandard public street and the additional right-of-way is necessary to incorporate future frontage improvements necessary for public safety, or

   2. Additional right-of-way is needed to provide right-of-way for the extension of existing public street improvements necessary for public safety, or

   3. Additional right-of-way is needed to provide future street improvements necessary for public safety for planned new public streets.

E. It is within the authority of the Town to refuse to approve or sign any land partition, partition plat, or subdivision plat for a development that has not installed or completed the construction of the necessary public infrastructure to serve the proposed and affected existing lots. Such approval may be withheld until it can be verified that the location and width of proposed rights of way and easements are adequate for the completed infrastructure.

F. Easements are subject to the approval of the Town Attorney prior to recording. Variation from the Town standard form of conveyance shall be allowed only when extraordinary circumstances warrant, as determined by the Mayor and Town Attorney.

G. All recording costs for easements created by private development shall be borne by the developer unless specifically agreed to by the Town.

3A.06 Private Streets

A. Criteria for Authorization. It is the Town of Yacolt's policy to discourage private streets

and to only permit them under unusual circumstances. Where private streets are permitted they will only be under the following conditions:

1. Covenants have been approved, recorded, and verified with the Town which provide for maintenance of the private streets and associated parking areas by owners in the development, and

2. Provision is made for the streets to be open at all times for emergency and public service vehicles, and

3. The private streets will not obstruct public street circulation, and

4. At least one of the following conditions exists:

   a. The plat or short plat street will ultimately serve four (4) or fewer lots.

   b. The roadways serve commercial or industrial facilities where no circulation continuity is necessary.

   c. The Town determines that no other access is available and the private road is adequate.

B. Notice. A statement is required on the face of any plat or short plat containing a private road with the following: "The Town of Yacolt has no responsibility to improve or maintain the private roads contained within or private roads providing access to the property described in this plat".

C. Easements. Private roads shall be constructed within easements with easement width 20 feet for service to one or two lots, and 30 feet for service to three to six lots.

D. Construction Requirements. Private streets shall conform to public street construction standards with the exceptions noted in Section 3B.02.

E. Acceptance as Public Streets. Acceptance of private streets as public streets will be considered if the street meets all applicable public street standards contained herein.

3A.07 Street Frontage Improvements

A. All residential subdivisions, commercial developments and short plats shall install street frontage improvements at the time of construction as detailed in their subdivision or short

plat approval, as detailed in their approved building plans, or as directed by the Town Engineer. Such improvements may include curb and gutter; sidewalk; street storm drainage; street lighting system; traffic signal modification, relocation or installation; utility relocation; landscaping and irrigation and street widening all per these Standards. Plans shall be prepared and signed by a licensed civil engineer registered in the State of Washington.

B. Plan preparation shall be as specified in Chapter 1 of these standards.

3A.08 Street Ends

A. Cul-de-sacs shall be provided at all public and private street ends.

B. Hammerheads may be used in lieu of a cul-de-sac provided that the street serves six (6) or less lots and the street is less than two hundred feet (200') in length.

C. Temporary Dead Ends. Where a street is temporarily dead ended, turn around provisions must be provided where the road serves more than one lot. The turn around may be a hammerhead if the dead end is less than two-hundred feet (200') in length. If over two-hundred feet (200') long, a cul-de-sac with a minimum radius of thirty-five feet (35') is required for residential streets, and forty-eight feet (48') for industrial streets.

3A.09 Medians

A median shall be in addition to, not part of, the specified roadway width. Medians shall be designed so as not to limit turning radius or sight distance at intersections. Landscaping and irrigation shall be installed when directed by theTown Engineer.

3A.10 Intersections

A. Traffic control will be as specified in the Manual of Uniform Traffic Control Devices (M.U.T.C.D.) or as modified by the Engineer as a result of appropriate traffic engineering studies.

B. Traffic signal modification, relocation or installation is required when roadway or driveway geometrics interfere with existing signal facilities, or would result in an unsignalized approach or intersection that meets signal warrants.

3A.11 Sight Obstruction Requirements

A. Sight distance should be maintained at all driveways, building or garage entrances where structures, wing walls, etc. are located adjacent to or in close proximity to a pedestrian walkway.

B. Sight lines to traffic control devices (signs, signals, etc.) should not be obscured by landscaping, street furniture, marquees, awnings or other obstructions. Refer to the Manual of Uniform Traffic Control Devices for required sightlines (MUTCD).

3A.12 Curb and Gutter - Types and Application

A. Curb and gutter shall be utilized for street edges whenever possible and shall always be used under the following conditions:

1. All streets - residential, commercial, or arterial.

2. Modified curb and gutter shall be used on designated bicycle lanes.

B. Vertical Curb shall be used for edges of islands and medians except when emergency vehicle access across the median is required.

C. Rolled Curb may be used at the end of cul-de-sacs where approved by the Town.

3A.13 Survey Monuments

A survey monument shall be located in all subdivisions and short plats.

3A.14 Concrete Sidewalks

A. Where Required. Concrete sidewalks shall be provided as follows:

1. Both sides of all arterial streets.

2. Both sides of all other streets (through street or dead-end) except permanent dead-end streets less than three-hundred feet (300') in length.

3. One side of local permanent dead-end streets less than three-hundred feet (300') in length.

4. Both sides of dead-end streets over three-hundred (300'), except in the cul-de-sacs or hammerhead turn arounds. In these circumstances installed sidewalks may end at the property line nearest the street/cul-de-sac transitions.

B. Exceptions

Where subdivision design provides an acceptable surfaced and maintained internal walkway system, as approved by the Town Engineer, a sidewalk may not be required adjacent to the street.

C. Wheelchair Ramps

In accordance with State law, wheelchair ramps shall be provided at all pedestrian crossings with curb sections.

3A.15 Asphalt Sidewalks

Asphalt sidewalks may be allowed in lieu of concrete sidewalks where the sidewalk as determined by the Town is deemed to be of a temporary nature (such as during construction activities) or due to future construction considerations.

3A .16 Multi-Use Trail

Multi-use trails may be used as a substitute for concrete sidewalks in planned unit developments where the Town deems that non-motorized transportation goals of the Town are being met.

3A.17 Bikeways/Bikelanes

Bikeway construction is required in conjunction with commercial development, plat or short plat approval, when the need for such a bikeway is established by the Council.

3A.18 Driveways

A. General Requirements.

1. Standard residential or commercial driveway's shall be required for all developments.

2. A private intersection opening shall be used in lieu of a conventional driveway in commercial areas where the following criteria as determined by the Town are met:

   a. Projected driveway usage is greater than two-thousand (2,000) vehicles per day.

   b. In any case where traffic signalization is approved and provided.

   c. A minimum one-hundred (100') foot storage area is provided between the street and any turning or parking maneuvers within the development.

   d. The opening is at least one-hundred and fifty feet (150') from any other intersection opening.

   e. The opening is at least one-hundred and fifty feet (150') away from any other driveway on the property frontage under control of the applicant.

   f. Easement dedication for traffic control devices.

B. Conditions of Approval

1. Driveways directly giving access onto arterials may be denied if alternate access is available.

2. All abandoned driveway areas on the street frontage to be improved shall be removed and new curb, gutter, and sidewalk shall be installed.

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

4. Left turns from and to a driveway may be restricted as a development condition or in the future if such maneuvers are found to be unduly hazardous.

5. Driveways shall be aligned wherever possible with existing driveways on the opposite side of the street on two (2) or three (3) lane streets.

6. All driveways shall be angled ninety-degrees (90°) to the street, unless designated as right turn only with the approval of the Engineer.

3A.19 Bridges

A. Design Principles. All bridges whether on public or private roadways shall meet the minimum requirements set forth in the latest addition of "Standard Specifications for Highway Bridges", adopted by AASHTO. All new bridges shall be designed to carry an AASHTO HS-20-44 live load or greater.

B. Geometrics. In the general case, the bridge shall comprise the full width and configuration of the road being served (traveled way plus curb, sidewalk, walkway, bike lane, and/or shoulder on one or both sides). Requirements of utilities shall be considered. Traffic and pedestrian railings or combination traffic-pedestrian railings shall meet AASHTO specifications. Overhead vertical clearances on the traveled street or under overpasses shall be sixteen and one-half feet (16.5') minimum.

3A.20 Landscaping in the Right-Of-Way, Easements and Access Tracts

A. Plantings established in the right-of-way shall be maintained by the abutting property owner.

B. Any existing planting areas within the right-of-way that are disturbed by construction activity shall be restored to their original condition.

C. Any plantings or other improvements placed within the right-of-way (by abutting property owners) are subject to removal when the right-of-way is needed for public use. The property owner is responsible for removing any landscaping or other improvements upon official notice. The property owners shall be responsible for survival of the relocated plantings.

D. Measures shall be taken by the developer to provide groundcover in areas within the right-of-way which have been stripped of natural vegetation or have a potential for erosion. Native plants shall be used whenever possible.

E. Plantings within the right-of-way shall comply with the following provisions:

1. All landscaping shall comply with the sight distance provisions of these standards.

2. Where existing landscaping maintained by the Town exists every effort shall be taken to protect and preserve the existing vegetation during construction. Plants shall be relocated or removed only upon approval of the Public Works Departments. Damaged landscape areas shall be restored prior to issuing a final occupancy permit.

3. In areas where an existing landscaping concept or pattern has been established or approved, all new landscaping shall conform to the intent of the concept. Plantings shall be of a similar variety, size, and spacing to those already established and/or approved for the area.

4. All trees planted in areas with adjacent pedestrian usage shall maintain a seven foot (7') clearance to the lowest branches.

5. Approval from the Public Works Department must be received before trees are planted in or adjacent to sidewalk sections.

3A.21 Mailboxes

A. Mailboxes should be clustered together when practical and when reasonably convenient to the houses served.

B. When mail boxes are located in the sidewalk, individually or in clusters, sidewalk shall be widened to provide the full design width around the mail boxes.

C. In the case of new road construction, or reconstruction requiring mail boxes to be moved back or rearranged, the designer and builder shall coordinate with the local postmaster of the U.S. Postal Service. Mail box locations approved by the Post Office shall be shown on approved road construction plans.

3A.22 Street Illumination

A. Plats and Short Plats

Street lighting is required for all public streets. The street lighting design shall be reviewed and approved by the Town prior to final plat approval. The cost of all street lighting shall be paid for by the developer.

The Town will accept maintenance and power cost responsibility for the public street light system when a plat is fifty percent (50%) or more occupied. Until the plat is fifty percent (50%) occupied, the developer is responsible for the maintenance and energy charges for the street lighting system.

Street lighting is not required on private streets within a plat. However, a street lighting system is encouraged. The Town does not install or maintain private street lighting

systems. On private streets, all street light maintenance and power cost shall be paid by the developer, homeowner, or homeowners association.

B. Existing Residential Areas

If a resident or group of residents desires the installation of a new street light they must apply to the Public Works Superintendent.

C. Commercial

Street lighting is required on all public street frontages. The developer is responsible for design, installation or relocation of new or existing lighting. Commercial development shall replace existing lighting systems on power poles with a new lighting system serviced by underground power if the system will not conflict with essential distribution lines.

D. General Considerations

All public street light designs shall be prepared by a licensed engineer experienced in lighting design. The design calculations should indicate illuminaire spacing, illumination levels, uniformity ratio, line losses and the electrical and physical layout of the system, including its connection to the existing system.

All public street light systems shall be accessible for public maintenance by a wheeled vehicle weighing twenty-thousand pounds (20,000 lbs.).

All street light installations including wiring, conduit, and power connections shall be located underground. Exception: existing residential areas with existing above ground utilities may have street lighting installed on the existing power poles.

As-built drawings on (24") x (36") mylar are required for all new or relocated underground street lighting systems prior to receiving a final occupancy permit.

3A.23 Traffic Control and Signing

A. Traffic Control Devices. The Town shall review and approve all traffic control devices.

B. Signing. In new plats the developer shall install all traffic control signs which shall include but not be limited to street name, parking, stop, dead end, and pedestrian signing. The developer will be responsible for supplying and installing the required signs.

C. Pavement Marking. In new plats or commercial developments pavement markings, including buttons, paint, thermoplastics and delineators will be required for roadway safety. Such markings shall be provided and installed by the developer. All markings shall be approved by the Town prior to installation.

D. Temporary Traffic Control. It is the responsibility of the developer to provide adequate temporary traffic control to ensure traffic safety during construction activities.

E. Traffic Signal Modification. Traffic signal modification designs shall be prepared by a licensed engineer experienced in traffic signal design.

3A.24 Appurtenances

An appurtenance shall be considered to be any fixed object located adjacent to the roadway and deemed to be a possible safety hazard.

A. All appurtenances shall be located a minimum of three feet (3') behind the face of the curb to the face of the object. Where no curb exists the distance from the edge of the travel way to the face of the object shall be at least six feet (6').

B. All breakaway objects shall be located a minimum of two feet (2') behind the face of curb to the face of the object. All objects having properties up to that of a 4" x 4" wooden post shall be considered breakaway.

C. Appurtenances shall be located outside of the sidewalk area except when the sidewalk is widened around the appurtenance to the satisfaction of the Engineer.

3A.25 Franchise Utilities

A. Non-Town owned franchise utilities are required to relocate existing facilities at their own expense when a conflict results between their facilities and public street improvements. The improvement work must be required by the non-Town owned utility in order for the relocation work to be the financial responsibility of the utility, otherwise all costs shall be the responsibility of the developer.

B. All non-Town owned franchise utility distribution or collection systems including power, telephone, and T.V. cable in new plats or short plats shall be underground.

C. As a minimum on all new single family plats and short plats, a minimum five foot (5') wide common or individual non-exclusive utility easement shall be provided connecting any lots

without public street frontage to a public street. Easements for existing or future utility lines which do not lie along rear or side lot lines shall be of a width specified by the serving utility.

3A.26 Safety Railing

A. Where a sidewalk or other non-motorized transportation facility is to be constructed above a slope or adjacent to a rockwall or retaining wall where the lowest finished elevation of the slope, rockwall or retaining wall is to be thirty inches (30") or more below the finished elevation of the sidewalk or other facility, a safety railing shall be required when:

1. The plane of a wall face is less than four feet (4') in horizontal distance from the near side face of the sidewalk or other facility.

2. The plane of the wall face is greater than four feet (4') horizontal distance to the near side face of the sidewalk or other facility but the slope down to the wall top exceeds three to one (3:1).

3. The slopes adjacent to the sidewalk or other facility average greater than two to one (2'H:1'V).

B. Safety railings or other approved devices (such as walls, high curbs, landscape features or guard rails) shall be required where grading operations will produce a parking area, service yard or other vehicle area which has a drop-off grade separation in relation to adjoining properties or streets.

3A.27 Guard Rails

For purposes of warrants, 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. The decision of whether to install a guardrail or not shall be based on information found in AASHTO publication, GUIDE FOR SELECTING, LOCATING, AND DESIGNING TRAFFIC BARRIERS.

3A.28 Surfacing Requirements

All materials and workmanship shall be in accordance with the Standard Specifications, these Standards, and as approved by the Engineer.

3A.29 Trench Backfill and Restoration

All materials and workmanship shall be per these standards and in accordance with the Standard Specifications except where otherwise noted in these Standards. Materials and workmanship are required to be in conformance with standards for the Standard Specifications for Road, Bridge, and Municipal Construction prepared by the Washington State Chapter of the American Public Works Association (APWA) and the Washington State Department of Transportation (WDOT) and shall comply with the current edition.

3B DESIGN STANDARDS

3B.01 Easements

A. Pedestrian access easements or tracts shall be a minimum of ten feet (10') wide. If the easement is over one-hundred and fifty feet (150') in length but less than three-hundred feet (300'), the width shall be fifteen feet (15'); if over three-hundred (300') in length, the width shall be twenty feet (20'). Structure setbacks shall be a minimum of fifteen feet from the edge of the easement or tract.

B. In residential subdivisions or residential short subdivisions, minimum panhandle width shall be twenty feet (20'). A greater width may be required to accommodate grading or utility requirements.

C. In commercial subdivisions or commercial short subdivisions, minimum private roadway easement or panhandle width shall be thirty feet (30'). A greater width may be required to accommodate grading or utility requirements.

3B.02 Private Streets

Private streets shall conform to public street construction standards with the following exceptions:

A. Private streets shall be improved with 2" of asphalt concrete over 8" of crushed rock. The improved roadway width shall be a minimum of ten feet (10') for streets serving one or two lots and twelve feet (12') for streets serving three to six lots.

B. Private roadway easement width shall be as listed in section 3A.06.

C. The maximum grade for private roadways shall be twenty percent (20%). Fire access roadways shall be a maximum of fifteen percent (15%).

D. Roadways in Planned Unit Developments (PUD's) shall be constructed to public street standards.

E. Drainage improvement requirements shall be as specified in Chapter 4 of these Standards.

F. Utility requirements shall be per this chapter, and Chapter 5 of these Standards.

G. Street illumination is required at the intersection of a private street and a public street. No street lighting is required on the private street.

3B.03 Street Frontage Improvements

A. Street Frontage design shall incorporate all applicable sections of these Standards and other standard reference materials. The designer shall utilize good engineering practice in any situation not specified in these Standards.

3B.04 Street Widths

See Table 3B.04A.

Table 3B.04A
Street Widths

	Residential Arterial	Residential Collector	Residential Access	Local
Right-of-way	60	60	60	50
Total Pavement Width	42	36	36	26
No. of Drive Lanes	2	2	2	1
Width of Drive Lane	12	10	10	10
No. of Turn Lanes	0	0	0	0
No. of Parking Lanes	2	2	2	2
Width of Parking Lane	9	8	8	8
No. of Sidewalks	2	2	2	2
Width of Sidewalks [1]	6	5	4	4
No. of Planter Strips [2] (Curb-sidewalk separation)	0	2	2	2
Width of Planter Strips [2]	0	10	10	10
Design Volume	10,000	5,000	2,000	500
Design Speed	35	35	25	25

Notes:

1. Width shall be increased by one foot where sidewalk is adjacent to the curb.

2. The planter strip is for water quality and may not be required where other approved water quality features are provided per the Town's Stormwater Management Plan.

3B.05 Horizontal Alignment

Street alignments shall meet the following requirements:

- Center line alignment of improvements should be parallel to the center line of the right-of-way.
- Center line of a proposed street extension shall be aligned with the existing street center line.
- Horizontal curves in alignments shall meet the minimum radius requirements as shown in Table 3B.05A.
- Reversing horizontal curves shall be separated by no less than 50 feet of tangent. On arterials, the separation shall be no less than 100 feet.

Table 3B.05A - Design Speed / Center Line Radius - Minimums

Arterials Streets

Design	Friction	Slope / R min.					
Speed (mph)	Factor(F)	(e)-4%	(e)-2.5%	(e) 0%	(e)2.5%	(e)4%	(e)6%
25	0.165	335'	300'	255'	220'	205'	185'
30	0.160	500'	445'	375'	325'	300'	275'
35	0.155	710'	630'	530'	455'	420'	380'
40	0.150	970'	855'	710'	610'	560'	510'
45	0.145	1285'	1125'	930'	795'	730'	660'
50	0.140	1665'	1450'	1190'	1010'	925'	835'
55	0.130	2240'	1920'	1550'	1300'	1190'	1060'
60	0.120	3000'	2525'	2000'	1655'	1500'	1335'

Residential Streets

Design Speed (mph)	Friction Factor(F)	Slope / R min. (e)-4%	(e)-2.5%	(e)0%	(e)2.5%	(e)4%	(e)6%
25	0.252	195'	185'	165'	150'	145'	135'
30	0.221	330'	305'	270'	245'	230'	215'
35	0.197	520'	475'	415'	370'	345'	320'

NOTES:

For Table 3B.05A - off right-of-way runoff shall be controlled to prevent concentrated cross flow in super-elevated sections.

Super elevations may only be used with the written approval of the Town. Where super elevation is used, street curves should be designed per AASHTO guidelines except that the maximum super elevation rate of 0.04 shall be used. If terrain dictates sharp curvature, a maximum super elevation of 0.06 is justified if the curve is long enough to provide an adequate super elevation transition.

On local streets, requests for design speeds less than 25 miles per hour shall be based on topography, right of way, or geographic conditions which impose an economic hardship on the applicant. Requests must show that a reduction in center line radius will not compromise safety. There will be posting requirements associated with designs below 25 miles per hour.

Off-set crown cross-sections are not acceptable as super elevation sections.

Super elevation transitions shall be designed to not allow concentrations of storm water to flow over the travel lanes.

3B.06 Vertical Alignment

Street alignments shall meet the following requirements:

- Minimum tangent street gradients shall be one-half (0.5) percent along the crown and curb.

- Maximum street gradients shall be fifteen (15) percent for residential streets and ten (10) percent for all other streets. Grades in excess of fifteen (15) percent must be approved in writing by the Town on an individual basis.

- Local streets intersecting with a residential collector or greater functional classification street or streets intended to be posted with a stop sign shall provide a landing averaging five (5) percent or less. Landings are that portion of the street within twenty (20) feet of the projected curb line of the intersecting street at full improvement.

- Grade changes of more than one (1) percent shall be accomplished with vertical curves.

- At street intersections, the crown of the major (higher classification) street shall continue through the intersection. The roadway section of the minor street will flatten to match the longitudinal grade of the major street at the projected curb line.

- Street grades, intersections, and super elevation transitions shall be designed to not allow concentrations of storm water to flow across the travel lanes.

- Off-set crowns shall be allowed only with the specific prior approval of the Town.

- Slope easements shall be dedicated or obtained for the purposes of grading outside of the right-of-way.

- Streets intersected by streets not constructed to full urban standards shall be designed to match both present and future (as far as practicable) vertical alignments of the intersecting street. The requirements of these standards shall be met for both present and future conditions.

When new streets are built adjacent to or crossing drainage ways, the following standards shall govern the vertical alignment:

FUNCTIONAL CLASSIFICATION	VERTICAL STANDARD
Arterial Streets	Travel lanes at or above the 50 year flood elevation but not lower than 6 inches below the 100 year flood elevation.
All other streets	Travel lanes at or above the 25 year flood elevation but not lower than 6 inches below the 50 year flood elevation.

If alternate access is available for properties served by a particular local street, a design could be considered for approval by the Town that would set the travel lanes at or above the 10 year flood elevation but not lower than 6 inches below the 25 year flood event.

B. For street width transitions from a wider width to a narrower width, the length of transition taper shall be determined as follows:

$L = S \times W$ (for S = 45 MPH or more)

$L = \frac{W \times S^2}{60}$ (for S = less than 45)

Where L = minimum length of taper (feet)
S = Design speed (MPH)
W = EP to EP offset width

Delineators, as approved by the Engineer, may be installed to define the configuration. Maximum spacing of delineators shall be the numerical value of the design speed, in feet (i.e. 35- foot spacing for 35 MPH).

In situations where a tapered transition cannot be provided, a barricade shall be installed at the end of the wider section of the street and a taper shall be appointed and delineated as approved by the Engineer. The barricade shall conform to the Standard Drawing. If the wider section does not provide an additional travel lane, only a barricade is required without the transition.

3B.08 Street Ends

The following specifies the minimum requirements for cul-de-sacs, eyebrows, and turnaround areas. Other turnaround geometrics may be used when conditions warrant and Town Engineer approves the design and application of its use.

- Cul-de-sacs shall have a minimum outside curb radius of forty-one feet (41') for residential streets and forty-eight feet (48') for industrial streets.

- Cul-de-sacs, eyebrows, and turnaround areas shall be allowed only on local streets and commercial/industrial streets.

- Cul-de-sacs shall not be more than 500 feet in length. The length of a cul-de-sac shall be measured along the center line of the roadway from the near side right-of-way of the nearest through traffic intersecting street to the farthest point of the cul-de-sac right-of-way.

- The minimum curb radius for transitions into cul-de-sac bulbs shall be 25 feet, and the right-of-way radius shall be sufficient to maintain the same right-of-way to curb spacing as in the adjacent portion of the road.

- Hammerheads may be used in lieu of a cul-de-sac provided that the street serves six (6) or less lots and the street is less than two hundred feet (200') in length.

- An eyebrow corner may be used on a local street where expected ADT will not exceed 500 vehicles per day or as otherwise approved by the Engineer. Minimum curb radius on the outside of an eyebrow corner is 36 feet; minimum right-of-way radius is 45 feet. Eyebrow geometry shall be evaluated on the basis of turning requirements for Fire Department vehicles.

3B.09 Medians

Where raised medians are allowed, the following criteria must be met:

A. Edges shall be vertical curb in urban areas, and either vertical curb or thickened edqe in suburban areas.

B. Landscaping and irrigation are required. Plans shall be prepared by a qualified Landscape Architect.

C. Shall be designed so as not to limit turning radius or sight distance at intersections.

- The raised median shall be set back at least 2 feet from the median lane on both sides.

- Street lighting shall be sufficient to provide illumination of the raised median.

- Objects, such as trees, shrubs, signs, and light poles shall not physically or visually interfere with vehicle or pedestrian traffic in the travel way.

- The style and design of the raised median shall be site specific. The raised median shall be safe for the design speed, and shall be subject to Town approval.

3B.10 Intersections and Curb Returns

A. Angle between intersections.

The following specifies the minimum requirements for intersections:

The interior angle at intersecting streets shall be kept as near to 90 degrees as possible and in no case shall it be less than 75 degrees. A tangent section shall be carried a minimum of 25 feet each side of intersecting right-of-way lines.

B. Maximum street spacing - 500 feet.

C. Minimum centerline offset of adjacent streets:

1. Residential - 160 feet

2. Residential or arterials intersecting arterials - 300 feet

D. Sloping approaches:

On sloping approaches, including commercial driveways, garage entrances, and private street openings, landings are not to exceed two feet (2') difference in elevation for a distance of thirty feet (30') approaching an arterial or twenty feet (20') approaching a local collector or industrial or commercial street, measured from the back of sidewalk or the back of curb if no sidewalk exists.

E. Curb returns

Curb radii at intersections shall be shown in Table 3B.10A for the various functional classifications. The right-of-way radii at intersections shall be sufficient to maintain at least the same right-of-way to curb spacing as the lower classified street.

Sidewalk access ramps shall be provided at all corners of all intersections, regardless of curb type, and shall conform to Standard Drawings.

Table 3B.10A - Turning Radii (Feet)
Edge of Pavement/Curb -Minimums

Street Classification	Arterial Street	Residential Collector Street	Commercial Industrial Street	Residential Access/Local Street
Major/Minor Arterial Street	55	30	40	20
Residential Collector Street	30	20	30	15
Commercial Industrial Street	40	30	40	25
Local Street	20	20	15	15

* If bike lane or on-street parking exists, above radii may be reduced by five (5) feet.

* The radii of the major street will be used for all intersection curb returns.

F. Sight Distance

It is the policy of the Town to have the developer's engineer evaluate safe intersection sight distance using the principles and methods recommended by AASHTO. The following minimum standards shall apply.

The following table is for intersection and driveway sight distances:

Table 3B.10B - Corner Sight Distance

Design Speed (MPH)	Minimum Corner Sight Distance* (Feet)
20	210
30	310
40	415
50	515
60	650

Sight distance should always be measured from a driver's eye 3.5 feet high and 15 feet from the near edge of the nearest lane to a distance of 4.25 feet. Sight distances must be checked on the actual vertical and horizontal values of the proposed improvement. There shall be nothing to block observation of objects between 6 inches and 4 feet, 3 inches above grade in both directions. The only exceptions should be for luminaire or utility poles, conforming traffic control devices, and fire hydrants. Cumulative effects must be considered, and all efforts taken to minimize sight obstructions.

Modifications or exceptions to these standards shall be approved by the Town.

3B.11 Curb & Grading

All curb and gutter shall be constructed with Class B concrete.

When new curbing is being placed, a stamp shall be placed to mark where each water and sanitary sewer service crosses the curb line. The method of marking the curb shall be approved by the Town Engineer and noted on the approved construction plans. If an imprinting stamp is used, the impression left for a water service shall be the letter "W"; for a sanitary service, it shall be the letter "S". These impressions shall be 2 inches high, placed on the top of the curb.

The following specifies the requirements for curbs and cross-slope grading for streets:

- All streets shall include curbs on both sides except in the situations of interim width improvements. Interim designs, where approved in writing by the Town shall have shoulders and ditches.

- Interim width streets shall have 6-foot side shoulders adjacent to the street at a 2-1/2 percent cross-slope and roadside ditches each side of the shoulders with a maximum side-

slope of 2 horizontal to 1 vertical. The 6-foot shoulder area may consist of a section of pavement and/or a section of crushed rock. The pavement section shall be a minimum of 2 feet wide and a maximum of 6 feet wide.

- Cross-slope of the street section shall be no less than 2.5 percent and no greater than 5 percent. Whenever possible, the crown of the street shall be the same elevation as the top of the curbs.

Grading outside the improved areas shall be as follows unless approved in writing by the Engineer.

- Arterials shall have a maximum 2 percent upward grading to the right-of-way line, and no steeper than 1-1/2 to 1 up, or 2 to 1 down, outside the right-of-way.

- Local Street and Commercial/Industrial functional classifications shall have a maximum 2 percent upward grading to the right-of-way line, a 5 to 1 upward or downward grading within the public utility easement, and no steeper than 1-1/2 to 1 up, or 2 to 1 down outside the public utility easement.

- Retaining walls shall be used if slopes are greater than the 1-1/2 to 1 requirement in the paragraphs above or where slope stability is a problem. If slopes are to be maintained (mowed) by the Town, a maximum of 3 to 1 slope will be required. Retaining walls shall be constructed to a height where the slope is no more than 1-1/2 to 1.

3B.12 Concrete Sidewalks

A. Width

1. Residential Streets: four feet (4') where separated from the curb. Five feet (5') where adjacent to the curb.

2. Local Commercial/Industrial Streets: six feet (6').

3. Arterial Streets: eight feet (6').

4. Width of sidewalk does not include curb when the sidewalk is adjacent to the curb.

5. Meandering sidewalks shall maintain the full design width around obstructions that cannot be relocated. Additional Right-of-Way (or easement) may be required to either relocate the obstruction or meander the sidewalk.

B. Material

All sidewalks shall be five inch (5") thick Class B concrete with a stiff broom finish. At driveways the concrete shall be six inches (6") thick.

C. Landscape/Separation

A minimum six foot (6') separation between the back of the curb and sidewalk is required for landscaping and appurtenance locating purposes unless no practicable alternative exists and when approved in writing by the Engineer. Sidewalks shall meander no more than six feet (6') from the curb at all pedestrian crossings and at driveways.

D. Curb Ramps

The edge of the sidewalk shall merge into curb ramps. One ramp is used on each curb return on residential streets and unsignalized intersections. At signalized intersections, a curb ramp shall be aligned with each crosswalk.

3B.13 Driveways

Design Criteria:

A. Width.

The maximum two (2)-way driveway width shall be twenty feet (20') for residential uses and thirty feet (30') for commercial uses. A wider commercial driveway width may be approved by the Engineer where a substantial percentage of oversized vehicle traffic exists. In this case the driveway should be sized to accommodate the largest vehicles. Commercial driveways shall be thirty feet (30') on any arterial, twenty-six feet (26') to thirty feet (30') on any local street. Where intersection openings are approved the width shall be as determined by the Engineer.

Maximum one way driveway width shall be ten feet (10') for residential and twenty-two feet (22') for commercial driveways. Commercial openway driveways shall meet the separation requirements of section 3A.18. Parking lot circulation needs shall be met on site. The public right-of-way shall not be utilized as part of a one way parking lot flow.

Driveways on local access streets serving single-family homes may be up to 30 feet in width, subject to approval by the Engineer.

B. Elevation

Back edge of driveway shall be at the same elevation as the back of the sidewalk adjacent to the driveway approach.

C. Clearance from Structures

No object (including fire hydrants, light or power poles, street trees) shall be placed or allowed to remain within fifteen feet (15') of the driveway edge.

Where the building facade or other design element is less than ten feet (10') behind the sidewalk front setback both pedestrian and vehicular sight distance shall be maintained. Vehicular sight distance shall be per section 3A.11.

D. Sight Distance

Pedestrian sight distance shall be as follows: The driver of an exiting vehicle shall be able to view a one-foot (1') high object fifteen feet (15') away from either edge of the driveway throat when the drivers eye is fourteen feet (14') behind the back of the sidewalk.

E. Maximum driveway grade shall be fifteen percent (15%).

F. On sloping approaches, a landing as described in section 3B.06, shall be provided.

G. Construction shall be per Standard Drawings.

H. Approach grades and configuration shall accommodate future street widening to prevent major driveway reconstruction.

3B.14 Bridges

See Policy Section 3A.19.

3B.15 Mailboxes

It shall be the responsibility of the developer to ascertain mailbox design requirements as required by the Postmaster. Mailboxes, in the general case, shall be set:

A. Bottom or base of box forty-four inches (44") above road surface or as directed by the Postmaster.

B. Placement in relation to curb or sidewalk:

1. Local Streets. Front of mailbox one foot (1') back of vertical curb face or outside edge of shoulder; six inches (6") behind back edge of rolled curbs.

2. Arterial Streets. Front of mailbox one foot (1') behind the back of sidewalk.

C. On posts strong enough to give firm support but not to exceed 4" x 4" wood or one and one-half inch (1-1/2") diameter pipe, or material with comparable breakaway characteristics.

D. Sidewalk widening behind the mailbox shall be five feet (5') long with a ten to one (10:1) taper to the standard sidewalk section.

3B.16 Survey Monuments

Monument case and cover - see WDOT Standard Drawings.

Refer to Platting and Subdivision Code for survey requirements.

3B.17 Street Illumination

A. Design Standards

Street lighting system designs are to be prepared by a licensed engineer experienced with lighting design. Calculations should include illuminaire spacing, illumination level, uniformity ratio, line loses, power source and other necessary details for the electrical and physical installation of the street lighting system. The lighting engineer shall use the standard specifications of the Washington State Department of Transportation, unless otherwise noted in the Standards.

Illumination Levels

Street Classification	Horizontal Foot Candles	Uniformity Ratio (average to minimum)
Arterials	1.0 FC	3:1
Local Commercial/Industrial	1.0 FC	3:1
Local Residential Collectors	0.7 FC	3:1
Local Residential Streets	0.3 FC	None; 300 foot maximum spacing.

B. General Considerations

1. All street lights shall be on two-hundred and forty (240v) volt single phase systems. The exact location of the power source should be indicated together with the remaining capacity of that circuit. System continuity and extension should be considered.

2. Contractor cabinets equipped with electrical meters, time clocks, circuit breakers and other required components are required on commercial installations of five (5) or more street lights.

3. All street lighting, wiring, conduit, service connections shall be located underground except in residential areas where existing power distribution poles exist.

4. Particular attention shall be given to locating luminaires near intersections, at all street ends and at pedestrian and/or equestrian crossings.

3B.18 Traffic Control and Signing

A. Traffic Control Devices. All traffic control devices shall conform to the "Manual on Uniform Traffic Control Devices" (M.U.T.C.D.) as adopted by the Washington State Department of Transportation (WDOT).

B. Signing. See WDOT Standard Drawings for typical installations and details.

For pavement sections other than those in Section 3B.20. Alternative sections may be approved by the Town Engineer following submission of calculations by a Registered Engineer and for the design requirements described herein. Soil testing to obtain the strength of the soil is required for all roads and streets in order to analyze and design the structural section. Soil tests are needed on undisturbed samples of the subgrade materials that are expected to be within three (3) feet of the planned subgrade elevation. Samples are needed for each five hundred (500) feet of roadway and for each visually observed soil type. Soil tests are required from a minimum of three (3) locations.

The selected design structural strength of the soil needs to be consistent with the subgrade compaction requirements. The strength and compaction moisture content, at optimum to slightly over optimum, needs to be specified. The soils report shall address subgrade drainage and ground water considerations for year round conditions.

Recommendations for both summer and winter construction shall be included. The required density of treated and untreated subgrade materials shall not be less than 95 percent maximum density as determined by AASHTO T-99.

C. Aggregate Base

All aggregate shall meet WDOT specifications for base rock.

During compaction, materials shall be maintained within 2 percent of the optimum moisture content. The contractor shall begin compaction of each layer immediately after the material is spread, and continue until a density of not less than 95 percent of the maximum density has been achieved. Maximum density will be determined by AASHTO T-180, or WDOT Test Method 705.

D. Asphalt Pavement Design

The base course of asphalt concrete (AC) streets shall be WDOT class "B" and the wearing course shall be WDOT class "B" or "G".

The compaction shall be at least 91 percent based on a Rice theoretical maximum density, as determined in conformance with AASHTO T 209, as modified by WDOT. In addition, for each mix used, a 50 blow Marshall (AASHTO T 245) shall be performed and all related test data shall be provided to the Town Engineer. The minimum stability shall be 1800 pounds, the flow shall be between 8.0 and 16.0 hundredths of an inch, and the voids shall be between 3.0 and 5.0 percent. The Marshall requirement may be waved by the Town Engineer on a case-by-case evaluation.

Asphalt pavement shall be designed by the Asphalt Institute Method, or an approved equivalent method provided it is a nationally recognized procedure.

Design of asphalt concrete pavement structures by the Asphalt Institute Method shall conform to the guidelines of The Asphalt Institute Publication, Thickness Design Asphalt Pavements for Highways and Streets Manual Series No. I.

- AASHTO T-193 (CBR Method), or
- AASHTO T-190 (R-Value Method), or

If the CBR value of the subgrade exceeds twenty (20) or the R value of the subgrade exceeds sixty (60) then CBR and R-value methods shall not be used.

E. Portland Cement Concrete Pavement

The design of portland cement concrete streets shall be governed by the guidelines and requirements of the Portland Cement Association (PCA) design procedures found in the below listed publications:

Concrete Streets: Typical Pavement Sections and Jointing Details

Thickness Design for Concrete Highway and Street Pavements

Joint Design for Concrete Highway and Street Pavements

The subgrade shall be tested to determine the Modulus of Subgrade Reaction, k, in order to design the street structure. A correlation of CBR to k may be made using Figure 2, Thickness Designs for Concrete Highway and Street Pavements. In addition, the Town will require that the following be incorporated into the design and construction specifications:

1. Use a minimum twenty (20) year design period.

2. Minimum thickness of portland cement concrete shall be five (5) inches.

3. The minimum concrete specifications shall be 5000 psi (compressive) and 650 psi (flexural) in 28 days. The minimum cement content will be 660 pounds per yard, with a maximum water/cement ratio of 0.48. The slump shall range from 3-inch to 4-1/2-inch. The entrained air shall be from 4.0 to 6.0 percent.

4. A design joint plan shall be prepared and incorporated into the street construction plans. Longitudinal and transverse joint locations shall be clearly delineated. Transverse joints shall be skewed forward two (2) feet per lane with right and left curb street stationing noted for each end. Joint spacing (in feet) should not exceed 1.5 to 1.75 times the slab thickness (in inches). For example, an 8-inch thick slab would have a maximum joint spacing of 12 to 14 feet. The maximum length to width ratio shall be 1.25 : 1.0 for any panel unless there are other constraints that the Town will examine on a case by case basis.

   Longitudinal joints shall be sawed at the same time or immediately following the transverse joints. Joints shall be sawed 0.25 inches in width and to a depth of at least one third the slab thickness. Sawing shall occur as early as possible, especially when large changes in temperatures are expected. At no time shall construction equipment or traffic be allowed on the new pavement until laboratory tests indicate at least 95 percent design strength has been attained, a minimum of seven days have passed since placement, or both the Town Engineer and the design engineer agree that the street is ready for traffic and construction loads.

   All joints shall be sealed. The concrete surfaces to which joint sealant will be applied must be clean and dry. To some degree, the technique or combination of techniques selected to accomplish this will depend on the conditions encountered in the field. Saw cutting (old joints), high pressure water jetting, sand blasting, wire brushing, and blowing out the joint with compressed air are methods that can be used. Air compressors used for this purpose must be equipped with traps capable of removing moisture and oil from the air. All residues must be removed from the joint that might prevent bonding of the joint sealant material. A 3/8-inch diameter, closed-cell, expanded polyethylene foam backer rod shall be placed in the joints according to the joint sealant manufacturer's recommendations. The joints shall be sealed with a hot rubber asphalt sealant (ASTM D3405 spec.) or Dow Corning 888 silicone sealant (or equivalent as determined by ASTM D1475, ASTM D3583, ASTM C719, and ASTM D793 spec.) and placed as per the manufacturer's specifications. The sealant type to be used shall receive approval from the Town Engineer and be noted on the design joint plan. The surface of the sealant should be 1 /4-inch beneath the surface of the pavement. All excess materials shall be removed from the surface.

5. All field testing shall follow ACI and WDOT procedures.

6. All other design criteria shall follow ACI and the 1994 Standard specifications.

3B.21 Utilities

A. Depth

Underground utilities shall be buried a minimum depth of thirty (30) inches as measured from finished grade to top of utility. See Chapter 5 for additional requirements.

B. Curb Markings

When new curbing is being placed, a stamp shall be placed to mark where each water and sanitary sewer service crosses the curb line. The method of marking the curb shall be approved by the Town Engineer and noted on the approved construction plans. If an imprinting stamp is used, the impression left for a water service shall be the letter "W"; for a sanitary sewer service, it shall be the letter "S". These impressions shall be two (2) inches high, placed on the top of the curb.

C. Trench Restorations

Trench restoration shall be either by a patch or overlay method. When a patch method is used, the trench limits shall be sawcut prior to the final patch.

All trench and pavement cuts shall be made by sawcuts. The sawcuts shall be a minimum of 1 foot (1 ') outside the trench width. If the permit requires an overlay, the contractor may use a jack hammer for the cutting of the existing pavement.

All trenching shall be backfilled with crushed surfacing materials conforming to Section 4-04 of the Standard Specifications. The trench shall be compacted to ninety-five percent (95%) maximum density, as described in Section 2-03 of the Standard Specifications.

Backfill compaction shall be performed in 8 to 12-inch lifts. The compaction tests shall be performed in four-foot (4') increments maximum. The test results shall be given to the Engineer for review and approval prior to paving. Number of tests required shall be as specified in Chapter 1. Additional testing may also be performed by the Town.

Temporary restoration of trenches for overnight use shall be accomplished by using MC mix (cold mix), ATB, or steel plates. ATB used for temporary restoration may be dumped directly into the trench, bladed out and rolled. After rolling, the trench must be filled flush with asphalt to provide a smooth riding surface.

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

Asphalt concrete Class B 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 Standard Specifications, except that longitudinal joints between successive layers of asphalt concrete shall be displaced laterally a minimum of twelve (12) inches or unless otherwise approved by the Town Engineer. Fine and coarse aggregate shall be in accordance with Section 9-03.8 of the Standard Specifications. Asphalt concrete over two inches (2") thick shall be placed in equal lifts not to exceed two inches (2") 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 Engineer shall be accomplished by raking out the oversized aggregates from the Class B mix as appropriate.

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

Asphalt patch depths will vary based upon the streets being trenched and whether the trenching is parallel or perpendicular to the streets. The actual depths of asphalt shall be shown on the Right-of-Way Use Permit and the work shall be performed as required by the attached details.

Compaction of all lifts of asphalt shall be an average of ninety-two percent (92%) of maximum density as determined by WDOT Test Method 705. Number of tests required shall be as specified in Chapter 1.

All joints shall be sand sealed using paving asphalt AR4000W.

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

The final patch shall be completed as soon as possible and shall be completed within thirty (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 or overlay work is allowable only subject to the Engineer's approval. The Engineer may deem it necessary to complete the work within the thirty (30) days time frame and not allow any time extension. If this occurs, the Contractor shall perform the necessary work as directed by the Engineer.

CHAPTER 4

STORM DRAINAGE

CHAPTER 4 - STORM DRAINAGE

4A POLICIES

4A.01 General

A. The Town of Yacolt has established the requirements for the design of facilities intended to protect the public health, safety, and welfare from damage due to flooding. Beyond that level of protection, additional measures are specified in this chapter which are intended to minimize any potential flooding damage and allow for efficient operation, repair, and maintenance of the storm drainage system.

B. Provisions must be made for gravity drainage of roofs and foundation drains for all new buildings and structures. For multi-family, residential, commercial, or industrial developments, these drains shall be piped directly to on-site stormwater systems. In single family residential developments, these drains shall be discharged to on-site splash blocks and shall not be permitted to discharge to the street gutter or directly to the public storm drain system.

C. Provisions must be made for stormwater from private property to remain on private property wherever feasible. Runoff from driveways shall not be permitted to drain directly to the street.

D. These requirements shall apply to all storm drainage facilities in existing and proposed public right-of-way, public drainage easements, and tracts of common ownership in the Town. Storm drainage systems include, but are not limited to: inlets, pipes, ditches, creeks, rivers, wetlands, and storm water quality and quantity facilities.

E. The Town of Yacolt has adopted the "Stormwater Management Manual for the Puget Sound Basin" (hereinafter referred to as the Puget Sound Manual) prepared by the Washington State Department of Ecology. All design and construction standards must meet or exceed these requirements and those shown on the Town's Standard Details. The Town has adopted the Puget Sound Manual with the following notations:

1. Storm water quantity management requirements are amended by Section 4B of these Standards.

2. All steps within structures must comply with OSHA standards. There shall be no more than 24 inches between the top of the casting and the rung of the top step.

3. No more than eight (8) inches of riser rings shall be used.

4. All inside drops and pollution control structures must be constructed with pipe; no partitions will be allowed.

5. All inside drops and pollution control manholes must be 60 inch or larger diameter structures.

6. All pipe shall be installed with watertight joints.

7. All backfill material shall be referenced per Standard Specifications.

8. No private storm sewer shall be located within any lot other than the lot which is the site of the building or structure served by such sewer. The exception to this will be common areas in planned unit developments, and/or Town right-of-ways, or as otherwise approved by the Town Engineer.

F. Drain inlets shall be curb inlets per the Standard Drawings. Curb inlets shall be placed so that no more than 7,000 square feet of hard surfacing, pavement and driveways which drain to the street including top of curb and sidewalk where sidewalk is adjacent to the curb, shall drain to each drain inlet.

G. Storm drain conveyance systems shall be designed in accordance with the requirements of Chapter 6 of these Standards. All storm sewer pipe and culverts used in the Town shall be gasketed concrete pipe meeting the requirements of the Standard Specifications.

H. Storm drainage design for all developments shall conform to the Town's Stormwater Management Plan.

4A.02 Television Inspections

Where requested by the Town Engineer, the developer's contractor shall pay for the cost of scanning all new public storm pipe along with existing sections of pipe which are disturbed or affected by new construction. Prior to a television scan, the contractor shall flush, clean, and remove all debris from the system and shall string all lines with nylon cord (or equivalent) having a minimum test strength of 250 pounds. The string ends shall be tied to the top rung of the steps in each structure.

4B DESIGN STANDARDS

4B.01 Water Quantity Standards

A. All development shall conform to the Town's Stormwater Management Plan. For the areas planned for surface water discharge to Yacolt Creek, it a development occurs prior to the availability of the regional facility, sites one-half (0.5) acre or greater in area shall be required to provide on-site detention.

B. Storm detention facilities shall be designed to provide storage using a 25 year event, with the safe overflow conveyance of the 100 year storm. Calculations of site discharge for both the existing and proposed conditions shall be required using the King County Hydrograph V4.20. Storms to be evaluated shall include the 2, 10, 25, and 100 year events. Allowable post-development discharge rate for the 2, 10, and 25 year events shall be that of the pre-development discharge rate, with a maximum allowable release rate of one half (0.5) cubic feet per second per acre in the 25 year event. An outfall structure such as a "Vee-Notch" weir or multiple orifice structure shall be designed to control the release rate for the above events. No flow control orifice smaller than 2.5 inches shall be allowed. If the allowable release rate can not be met with all the site drainage controlled by a single 2.5 inch orifice, the allowable release rate provided by a 2.5 inch orifice will be considered adequate at the discretion of the Town Engineer.

C. If a site is proposed to be constructed in phases, the first phase shall have a storm water quantity facility designed and built to accommodate the ultimate development of the site.

D. When the above storm detention requirement is to be met by creating a ponded area in a parking lot, the following shall apply:

1. Maximum depth of standing water in all parking lot ponds shall be one (1) foot. No more than 25 percent of the entire number of parking stalls in a parking lot shall be inundated by a parking lot pond during the design storm.

2. No parking lot ponds shall be located within the primary ingress/egress portions of a site. Parking lot ponding shall be so designed that, at maximum water level for the design storm, a minimum twenty (20) foot wide emergency vehicle lane to the buildings will remain unflooded, including during system overflow condition.

3. Slopes on all parking lot surface ponds should not be less than one (1) percent nor exceed five (5) percent in areas designed for vehicular traffic.

4. All parking lot ponds shall be designed and constructed in such a manner so as to provide a maximum water surface elevation 0.25 feet lower than any and all structures designed to contain the ponding.

5. Where curbing is used to contain a parking lot pond, extruded curbing shall not be used. A public standard "vertical" type curb will be required.

6. No parking lot ponding shall occur at an elevation more than one (1) foot below the lowest habitable floor elevation of buildings within the proximity of the pond. Under no circumstances shall ponds or other detention facilities be designed in such a manner that system failure would cause flooding in any habitable building area.

7. No parking lot ponding shall be designed for parking lots under buildings. Whenever the possibility of flooding an underground parking facility or other uninhabited building area exists, care shall be taken to floodproof electrical equipment areas and other building appurtenances with overflow and/or private pump systems being provided to drain such a flooded facility.

8. Parking lot pond construction plans shall include a note stating that "Grading is critical to functioning of detention system and plan must be strictly followed." Parking lot design volumes shall be shown on the plans and the pond volume inspected prior to paving. The developer's engineer shall certify that the design pond volume has been constructed.

4B.02 Water Quality Standards

The minimum standards for the design and construction of storm water quality facilities in the Town of Yacolt shall be the same as the current standards of the Puget Sound Manual as amended by the Clark County, Washington Stormwater Control Ordinance dated January 26, 1994 or the latest edition.

CHAPTER 5

WATER

CHAPTER 5 - WATER

5A POLICY ON EXTENSIONS OF THE WATER SYSTEM AND SERVICE

5A.01 Developer Extension Agreements

A. When extension of the existing water system is required for service, the developer shall submit a Request For Utility Service to the Town. The Town shall complete the document and resubmit it to the developer for signature. The developer shall then sign the document and return the original to the Town. Once finally signed by the Town, the document will become the Extension Agreement.

B. Upon completion of the design and approval by the Town, a pre-construction letter of requirements will be sent to the owner noting requirements to be completed prior to construction. Upon completion of the pre-construction requirements and 48 hours notice, a pre-construction meeting will be held with the Town at which time construction inspection will be scheduled. No water main construction work shall commence prior to the pre-construction meeting. After completion of construction and submittal of required documents and fees, final acceptance will be given by the Town at which time service will be available by application following payment of fees for water meters.

C. The owner is required to provide a surety bond for the project for a period of one (1) year after acceptance.

D. Easements for a mainline water system shall be a minimum of fifteen (15') feet wide. The easement shall be prepared by a Surveyor or Engineer licensed to practice in the State of Washington. The easement shall be reviewed and approved by the Town prior to acceptance.

E. Developer Extension projects shall be deeded to the Town for maintenance and operation by bill of sale.

5A.02 General Design Considerations

A. In all residential and commercial developments water main extensions are required to assure orderly development of the water utility system. All proposed water main extensions must comply with the Town's requirements for development, water quality and pressure zones, and fire protection requirements of the Town.

B. Design and construction of water mains, including but not limited to mainlines, valving, fire hydrants, fire sprinkler connections with backflow devices, domestic and irrigation services, pump stations, pressure reducing stations, telemetry and other appurtenances shall be in compliance with the Request for Utility Service Form, Town ordinances, special requirements of the Town, these standards, and Standard Details.

C. The applicant is responsible for designing the Developer Extension Water system(s). The System(s) must be designed by a licensed engineer and approved by the Town.

D. Water mains shall be extended through and to the extremes of the property being developed for gridding or future development as determined by the Town.

5A.03 Sizing and Pressure Requirements

A. In areas where gridding or fire flow is a requirement, eight-inch (8") diameter pipe will normally be required. A six-inch (6") diameter pipe may be substituted if the Town has determined that an adequate fire flow can be provided. Nothing shall preclude the Town from requiring the installation of a larger sized main if the Town determines a larger size is needed to meet fire protection requirements or for future service. The developer shall be required to pay the cost of all oversizing.

B. In areas where gridding or fire flow is not required, the mainline shall be sized to meet required domestic flow.

C. Minimum size mains shall be 6-inch, except that 4-inch may be permitted on runs less than 300 feet, when there will not be more than eight one inch services, where no fire hydrants are required, and when there is no possibility of future extensions.

D. Dead end mains normally shall not be allowed. When they are permitted, a blow off assembly will be required. In the event that the "dead end" finishes where there is risk of a vacuum being created due to water shut down, then a Combination Air and Vacuum Release Valve shall be installed in accordance with the Standard Drawings.

E. All water system installation shall be designed to provide a pressure range at the residence of 30 psi to 90 psi at all times, including during peak demand.

F. Pressure reducing devices are to be approved on a per project basis to ensure compliance with the Uniform Plumbing Specialty Code. Vaults for pressure reducing

devices shall be in accordance with these standards. PRV's shall be installed on water mains rather than on individual systems.

G. Water service size shall be evaluated by the developer's engineer and shall be of sufficient size that the requirements of this section shall be met. Booster pumps shall not be allowed on meter service lines in order to meet this requirement. The meter size shall be no smaller than the service line size unless approved by the Town Engineer.

H. Where requested by the Town Engineer, the developer's engineer shall provide a "pressure available" chart on the water system plan sheet of the construction plans. This sheet shall indicate the calculated pressures theoretically available to each lot during static and peak demand periods. In such cases it shall be the developer's engineer's responsibility to determine pressures based upon an analysis of the system. All work associated with the analysis shall be paid for by the developer.

5A.04 Shut-off Valves

A. Valves shall be located, whenever possible, at intersections (one valve per each line radiating from the intersection). In general, sufficient valves should be provided to permit shutting down any section of the line, not exceeding 500 feet, with valve operations in not more than three locations.

B. Valves shall be installed in clusters at pipeline intersections.

C. Valves 12 inches and smaller shall be gate valves.

D. Valves 14 inches and greater shall be butterfly valves.

5A.05 Air-release Valves

At high points in the water system, combination air and vacuum release valves (CARV) shall be installed as required by the Engineer. All Air-Vac, Air Evacuation, and Vacuum Prevention Valves of sizes 2-inches and larger shall vent to the outside of the vault. If construction of the valve does not permit the venting of leakage to the outside of the vault, a screened drain to daylight of at least the supply line size must be provided at a level that will prevent cross connection and/or backflow problems. This decision will be made by the Town prior to the plan approval.

5A.06 Hydrants

A. The number and locations of fire hydrants, fire flow requirements and fire sprinkler components will be determined by the Town or Clark County Fire Marshal's office. Following are general requirements for fire hydrant locations: (These criteria are subject to change. For the most current information, contact the Fire Marshal's office.)

1. **Commercial Buildings:** Fire hydrants shall be located so that no part of a commercial building is more than 250 feet from a fire hydrant measured along a route accessible to fire department vehicles. When a fire department connection (FDC) is installed in conjunction with an automatic sprinkler system, it is required to have a fire hydrant located within 70 feet of the FDC.

2. **Non-Commercial Buildings** Unless otherwise approved by the Fire Marshal, a fire hydrant shall be placed at each street intersection, or at spacings not exceeding 700'.

   Intermediate hydrants are required when the distances to any part of non-commercial buildings exceeds 500 feet measured along a route accessible to fire department vehicles.

B. Fire hydrants shall not be connected to mains less than 8 inches, or 6 inches in diameter where the length of 6-inch main is less than 200 feet. As per the UFC, fire hydrants shall be located to allow a 5-foot clear space surrounding the hydrant. For example, street lights, sign posts, protective posts, or retaining walls shall be no closer than 5' from the nearest portion of a hydrant. There shall also be no obstructions directly in line with any of the ports of the hydrant.

C. Fire hydrants shall have Storz fittings.

5A.07 Water Meters

A. Commercial water meters sized three-quarter inch (3/4"), one inch (1"), one and one-half inch (1-1/2") or two inch (2") shall be furnished and set by the Town. The owner is required to make application and pay meter fees prior to the acceptance of the project. The Town will install meters and lock off meter setters and turn on as requested by the owner after acceptance by the Town. Water meters will be set only after box and setter are at proper finished grade.

B. Meters three inches (3") and larger will be installed by the owner as part of the construction project and will be locked off by the Town. The three (3") inch and larger meters will be turned on by the Town by request from the owner after acceptance by the Town.

C. In plat and short plats, water meter applications will be processed for meter sets and water turned on after acceptance of the water mainline facility by the Town.

D. All irrigation meters require the installation of certified backflow devices. Certification must be either Town or State approved. All irrigation service shall be by separate connection and tapped off the water main. Deduct or exempt meters shall not be permitted in new construction.

All irrigation meters will be set and turned on after acceptance of the water system by the Town. The Town will not accept a water system until all the requirements of the Extension Agreement have been completed and all the fees have been paid.

E. Adjustments, repairs or replacement of the service line, meter box or setter shall be the responsibility of the property owner.

F. Any deficient water service brought up to standards by the Town as requested by a property owner by application shall be billed by the Town on a time and material basis.

G. Water services are to be single runs from the main line to each meter.

5A.08 Fees and Charges

All fees and charges related to development shall be in accordance with the latest requirements of the Town's ordinances.

5A.09 Cross Connection Control

A. All water system connections to serve buildings or properties with domestic potable water, fire sprinkler systems, or irrigation systems shall comply with the minimum backflow requirements as established by the Department of Social and Health Services (DSHS) and the Town.

B. The installation of all backflow devices shall be required to protect the existing water system and users from possible contamination. These backflow devices shall be

installed in accordance with the requirements of the "Accepted Procedure and Practice in Cross Connection Control" manual, the Uniform Plumbing Code and the Codes.

5A.10 Contract for Reimbursement (Latecomer Agreements)

The Town does not have a policy for reimbursement for utility extensions. Should the developer deem that the utility extension is an undue hardship and will significantly benefit other property owners, the developer may request for a latecomer agreement. Such requests shall be in writing and shall be made to the Town Council.

5A.11 Water Quality

The quality, taste and odor of water drawn from new construction water mains shall be the same as the water in the existing facility classed as acceptable for use by the Town. Should the water not be acceptable for use because of taste, required steps as approved by the Town shall be accomplished to attain water quality acceptable for use.

5B DESIGN STANDARDS

All extensions to the water system shall conform to the most recent edition of the design standards of the Town and American Public Works Association (APWA). The system shall be capable of future expansion and be constructed of permanent materials.

5B.01 Plans and Specifications

The installation of water extensions shall be in accordance with construction plans and specifications prepared by the developer's engineer and reviewed and approved by the Town. All work and materials shall be in accordance with this document and American Public Works Association (APWA) Standards. Where conflicts exist the more stringent specification shall apply as approved by the Town.

5B.02 Connections to Existing Pipelines

A. Connections may be made to existing pipes under pressure with a tapping machine by determining the size and type of pipe and installing tapping sleeve to fit complete with tapping gate valve. Where cut-ins are permitted to be made in existing pipes, the work shall be conducted at such a time and in such a manner as to minimize the interruption of service. Cut-in time must be approved by the Town. Necessary pipe,

fittings and gate valves shall be assembled at the site ready for installation prior to the shutting-off of water in the existing main. Once the water has been shut off, the work shall be performed vigorously and shall not be halted until the line is restored to service. Operation of all water main line valves shall be by the Town. The Town shall witness all wet taps and cut-in connections and requires forty-eight (48) hours notice and approval by the Town.

B. The Contractor shall have the responsibility of giving at least a forty-eight (48) hour notice to the Town and affected customers of intention to disrupt service.

C. Pipes to be abandoned shall be capped with mechanical couplings.

5B.03 Roadway and Railway Crossing

The owner shall use the method which has been designed on the plans and is acceptable to the Town and the government or private agency having control of the road. Permits are required and shall be obtained prior to construction approval.

5B.04 Trench Excavation

A. Clearing and grubbing where required shall be performed within the easement or public right-of-way and as permitted by the property owner and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the developer.

B. Trenching for water mains shall be completed in accordance with Section 7-10 of the Standard Specifications.

C. Trenching and shoring operations shall not proceed more than one-hundred (100') feet in advance of pipe laying without written approval of the Town.

D. Where a utility crosses under an existing asbestos cement water main or where a trench alters the bedding of an existing asbestos cement water main, the existing A.C. pipe shall be cut three feet (3') minimum from each side of the trench wall and replaced with a corresponding size ductile iron pipe Class 52. The ductile iron pipe shall be connected to A.C. pipe with transition couplings.

E. Contractor shall furnish a watertight plug of the appropriate size which shall be installed in the end of water main when work is delayed or stopped at the end of the work shift.

5B.05 Pipe in Filled Areas

Special treatment may be required at the discretion of the Town. This treatment may consist of compacting the backfill in six inch (6") layers, careful choice of backfill materials, use of Mechanical Joint Ductile Iron Pipe in short lengths, or such other reasonable method or combinations as may be necessary or as required by the Town.

5B.06 Pipe Installation For Water Mains

The work necessary to excavate, bed, and backfill water pipelines shall conform to the requirements of Section 7-11 of the Standard Specifications and the Standard Drawings.

A. Pipe and Fittings

Use only Class 52 ductile iron pipe and fittings in accordance with Section 7-11 of the Standard Specifications.

B. Permissible Deflection of Joints

Wherever it is necessary to deflect pipe from a straight line either in a vertical or horizontal plane, or where long-radius curves are permitted, the amount of deflection allowed shall not exceed the values in the following table:

Maximum Deflection Permitted*
18-Foot Length Pipe

	Mechanical Joint** Maximum Deflection		Push-on Joint Maximum Deflection	
Dia. In.	Angle Degrees And minutes	Deflection Inches	Angle Degrees	Deflection Inches
4	8-18	31	5	18
6	7-07	27	5	18
8	5-21	20	5	18
10	5-21	20	5	18
12	5-21	20	5	18

* The maximum deflection shall be whichever is less, the table or that recommended by the pipe manufacturer.

** Safe deflection for 150 pounds pressure. For higher pressure, reduce tabulated deflection proportionally 10 percent for each 150 pounds added pressure.

C. Downtime Protection

When stopping work for the day, the contractor shall plug pipe ends to prevent rodents, other small animals, or debris from entering the pipe. Use an inflatable ball as a plug in addition to a tight-woven canvas, securely tied around outside of pipe end.

5B.07 Bedding and Backfill

Use imported bedding for all water main pipe installed under pavement, curbs, sidewalks, or usable shoulders. Bed and backfill pipe and appurtenances in accordance with Section 7-10 of the Standard Specifications.

5B.08 Hydrostatic Tests

The contractor shall make pressure and leakage tests on all newly laid pipe in accordance with Section 7-11.3(11) of the Standard Specifications. Furnish all necessary equipment and material, make all taps in the pipe as required, and conduct the tests. The Engineer will

monitor the tests. The Town shall witness the test; if the test does not pass inspection for any reason, additional trips required to witness the test shall be at the owner's expense.

A. Correction of Excessive Leakage

Should any test of pipe laid disclose leakage greater than that allowed, locate and repair the defective joints or pipe until the leakage of a subsequent test is within the specified allowance.

B. Isolation of Existing Systems Prior to Testing

Existing water pipelines shall be protected from contamination during the testing process for new construction. Use of special "blind flanges" will be necessary if the line being tested cannot be adequately separated from existing systems. The developer's engineer shall submit shop drawings and proposed procedures to the Town prior to installing any special testing device.

5B.09 Sterilization and Flushing of Water Mains

Pipeline intended to carry potable water shall be sterilized before placing in service. Sterilizing procedures shall conform to AWWA C-60 1 as hereinafter modified or expanded, and Section 7-11.3(12) of the Standard Specifications.

A. Disposal of Sterilizing Water

Dispose of sterilizing water in an approved manner. Do not allow sterilizing water to flow into a waterway without adequate dilution or other satisfactory method of reducing chlorine to a safe level. Dechlorinization procedures are to be submitted in writing and approved by the Town Engineer prior to flushing system.

5B.10 Valves for Water Mains

A. Materials and construction shall be in accordance with Section 7-12 of the Standard Specifications and the Standard Details.

B. Valve marker posts shall be reinforced concrete posts, 4" X 4" on one end, 6" X 6" on the other end, forty-two inches (42") long. Valve marker post shall be painted white hi-gloss Rust-oleum with painted black dimension from marker to valve boxes.

5B.11 Hydrants

Materials and construction shall be in accordance with Section 7-12 of the Standard Specifications and the Standard Details.

5B.12 Service Connections

Materials and construction shall be in accordance with Section 7-12 of the Standard Specifications and the Standard Details.

5B.13 Connection Control and Backflow Assemblies

An approved backflow prevention assembly is required on all fireline systems, domestic water service larger than 2 inches, and/or building in excess of 30 feet above the water main. The assembly shall be installed at the location normally established for water meters, usually at the property line. A water service shall not be turned on until all required backflow prevention assemblies are installed, inspected, tested, approved, and registered with the Town of Yacolt. Costs of all installations, including all costs of inspection and testing fees, shall be the responsibility of the customer. The backflow prevention assembly will remain the property of the customer. The customer will be responsible for all maintenance and testing of the assembly and vault.

When required, backflow prevention assemblies for protection of the public water system shall meet the requirements set forth in the current Washington State Department of Health regulations, Uniform Plumbing Code, and Town ordinances.

There are three types of backflow prevention assemblies which the Town will allow as protection of the public water system. The Washington State Department of Health, provides a list of approved assemblies.

The type of backflow prevention assembly required is determined by the aforementioned rules and codes, based on the type of premises to which water service is being provided. The approved types of assemblies are listed below with some of the types of premises that must be protected by each type of assembly. However these lists are not complete, they are only intended to provide some basic guidelines.

A. Reduced Pressure Backflow Assembly

An approved Reduced Pressure Backflow Assembly shall be installed on the service connection above ground to the following:

1. Any tax lot that has an auxiliary water supply on or available to it. This will include any above or below ground water source. (The most commonly encountered type of auxiliary water supply is a private well.)
2. Commercial buildings which are located within an industrial zone.
3. Hospitals, medical centers, and clinics.
4. Mortuaries and nursing homes.
5. Gas stations.
6. Sewage pump and lift stations.
7. Dry cleaners and commercial laundries.
8. Any water system which has a pump to supplement pressure.
9. Irrigation systems which are designed to use chemical injection.

B. Double Check Assembly or Double Detector Check Assembly

An approved double check assembly or an approved double detector check assembly shall be required (provided that all internal plumbing is installed and maintained in accordance with the Uniform Plumbing Code), on the service connection to premises where there is:

1. Any fire system or water line to a private fire hydrant.
2. Multi-story buildings which are in excess of 30 feet above the water main at the service connection.
3. Shopping centers or large retail stores.
4. Restaurants or fast food establishments.
5. Any tax lot which is served by two water services supplied by the Town.
6. Any water service which is larger than two inches in diameter.

C. Installation and Testing

Backflow prevention assemblies shall be installed at the water service connection on the customer side of the meter. Backflow assemblies 3" diameter and larger shall be installed in a vault in accordance with these standards. Backflow prevention assemblies 1" and smaller shall be installed in a Carson Industries Box, series 1324 or an approved equal. 1 1/2" and 2" assemblies shall be installed in a series 1730 box, or equal.

After installation, all backflow prevention assemblies which are installed, must be tested upon installation by a State of Washington certified tester. The results of the testing shall be received by the Town prior to issuance of "final occupancy".

5B.14 Requirements for Water System Vault Installations

To ensure proper operation and accessibility of all assemblies, the following requirements shall apply to installation of these assemblies, unless otherwise approved by the Town. Vaults shall be constructed per the Standard Details.

A. The vault shall be sealed with Crystal Seal or approved equal on the outside of the vault. Vault penetrations shall be sealed with non shrink grout from the outside. Apply water proof coating over grout. Backfill around vault per the manufacturer's specifications.

B. Access to be through an H-20 rated standard Bilco door, or approved alternate.

C. Provide approved ladder if the vault or chamber depth is 5 foot 0 inches or greater and entry is through the vault or chamber roof. Ladders shall include a Model 1 Bilco LadderUP safety post or approved equal.

D. Adequate drainage for the vault or chamber shall be provided. (Drainage to piped storm systems allowed with check valve).

E. Vault must be equipped with a moisture proof light fixture if adequate lighting is not available.

F. Vault is to have no other use, except for use described by these standards.

G. Vault shall be installed on undisturbed base or compacted 3/4" - 0" gravel base.

H. No piping shall be installed in excess of 3 feet above the vault floor.

I. Assembly is to be adequately supported from the floor, and suitably restrained from movement. Supports shall consist of steel supports or approved equal; no wood supports shall be used.

J. All electrical wiring shall be inspected by the Washington State Electrical Inspector (Permit is required).

K. The assembly shall be readily accessible with adequate room for maintenance.

L. All new services are to be pressure tested and disinfected by the contractor and proven to be bacteriologically safe from the existing main to the vault.

5B.15 Backflow Prevention Device Assembly Vaults

Backflow prevention device assembly vaults shall be constructed in accordance with the standard drawings and requirements of this section. Backflow vaults shall be on private property and located outside of public easements.

5B.16 Fire Services and Domestic Services

A. No part of the backflow prevention assembly shall be submerged in water or installed in a location subject to flooding. In a vault or chamber, adequate drainage shall be provided; and test cocks shall be plugged. The plugs shall not be of dissimilar metals.

B. The backflow assembly shall be protected from freezing and other severe weather conditions.

C. All backflow assemblies shall have a minimum 12-inch clearance on the backside, 24-inch clearance on the test-cock side, and 12 inches below the assembly. Adequate clearance (6 inches minimum) must be maintained above gate-valve stem at full extension. Headroom of 6 foot, 0 inches is required in vaults without a full opening top. Access to the device and to any vault or chamber shall remain clear at all times.

5B.17 Special for Fire Service Only

A. Fire Service backflow prevention assemblies shall be installed at the property line, or edge of the public water line easement. The fire service from the public main to the backflow assembly shall be privately owned and meet all Town's Standard Drawings.

B. Only approved resilient seat indicating valves are allowed on fireline assemblies.

C. Only approved Double Detector Check Valve Assemblies are to be used for system containment on fire line services in the Town. The meter on the bypass assembly shall read in cubic feet.

D. Fire Line Flow and Tamper Switches installed, as required by UBC sec. 3803, must be connected to a monitored Fire Detection System approved by the Fire Marshal. The tamper switches are required on the OS and Y gate valves in the vault, as well as any other indicating control valves on the fire protection system. Electrical inspection and permit is required.

E. The remote reader (if allowed) shall be rigidly mounted on an exterior building wall (near the domestic meter), enclosed in a metal box with a slot opening which allows reading the remote without opening the box, and at an elevation of 5 feet above the ground level.

The remote reader shall have the same number configuration as the metering device itself, and read in cubic feet. All wires to the remote reader shall be enclosed in a heavy plastic or rigid metal conduit. All wiring shall be in conformance with appropriate sections of the National Electric Code.

5B.18 Water Meter Vaults

A. The vault is to be provided and installed by the contractor, per Standard Drawings.

B. The contractor will provide a meter size uni-flange on the inside of the vault 6 inches from the wall on the inside of the vault on the incoming (upstream) side. The Town will install the meter, bypass, valves, and tee's. The contractor will then provide the other flange and exit the vault.

5B.19 Pressure Reducing Valve Vaults

PRV vaults are unique to each situation. The Engineer shall detail the vault on the plans and submit for review. The Town will review the vault for size and compliance with the general requirements listed under this section.

5B.20 Appurtenances

A. Air and Vacuum Release Valves

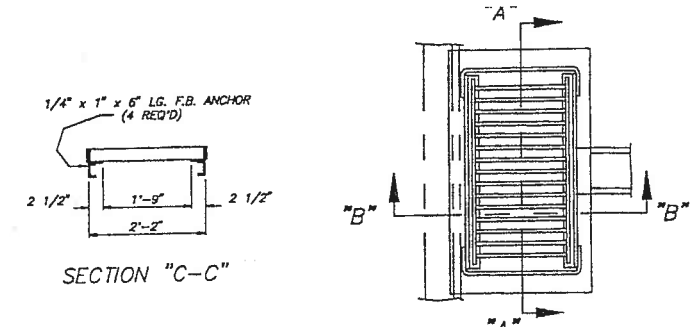
1. Air and vacuum release valves shall be APCO - Valve and Primer Corporation, "Heavy-Duty", combination air release valve, or equal.

2. Installation shall be as shown on the Standard Details.

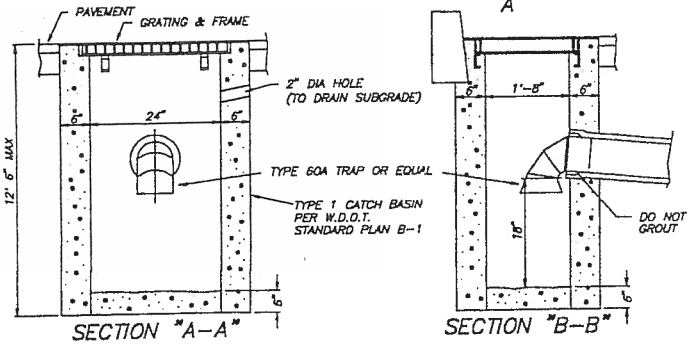
3. Piping and fittings shall be copper or brass. Location of the air release valves as shown on the plans is approximate. The installation shall be set at the high point of the line. Water line must be constructed so the air release valve may be installed in a convenient location.

APPENDIX

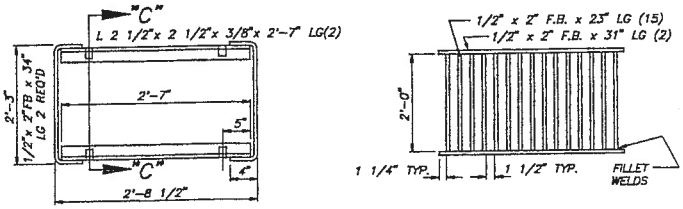
STANDARD DRAWINGS



SECTION "C-C"



SECTION "A-A" SECTION "B-B"



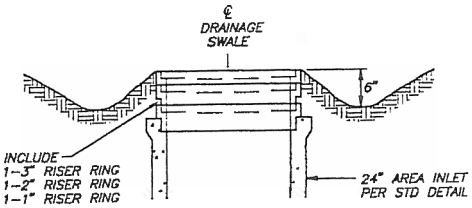
GRATING FRAME INLET GRATING

NOTES:

1. FOR PARKING AREAS USE CAST IRON FRAME & GRATE PER W.D.O.T. STANDARD PLAN B-2a.

STANDARD CATCH BASIN

NOT TO SCALE



SWALE INLET INSTALLATION

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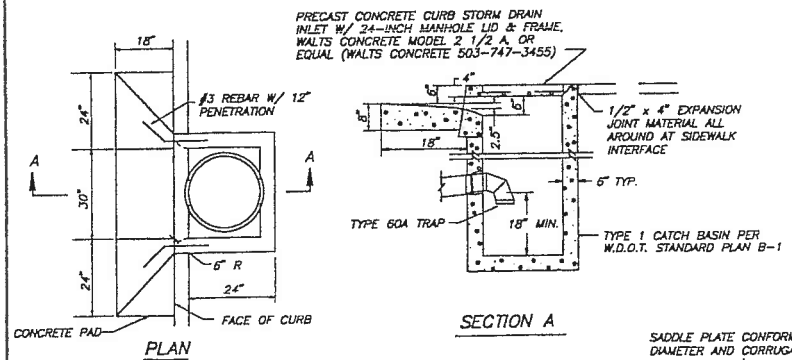
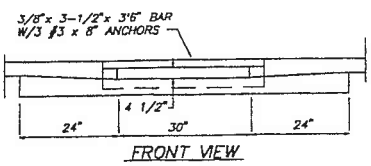


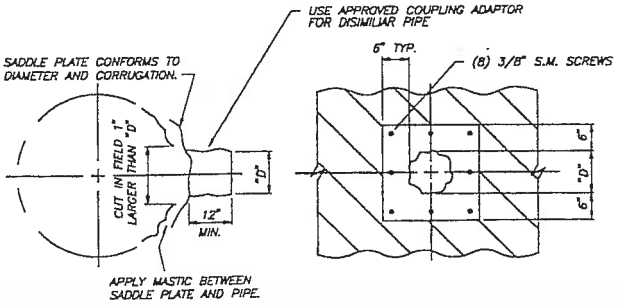
PLAN SECTION A



FRONT VIEW

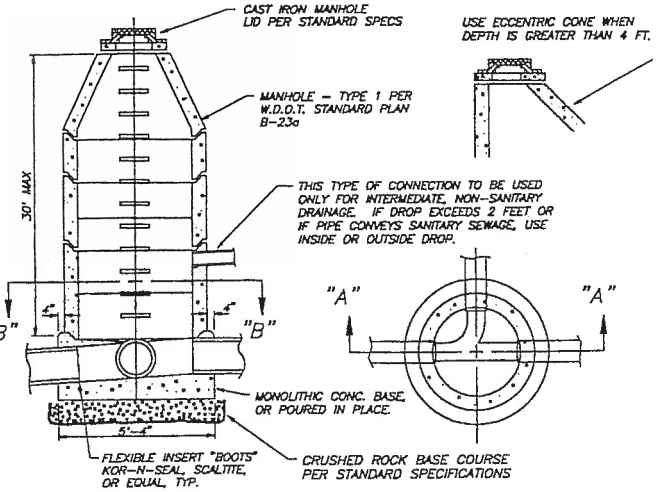
CURB INLET, TYPE 1

NOT TO SCALE



TAPPING SADDLE

FOR CATCH BASIN LATERALS



SECTION "A-A" SECTION "B-B"

STANDARD MANHOLE

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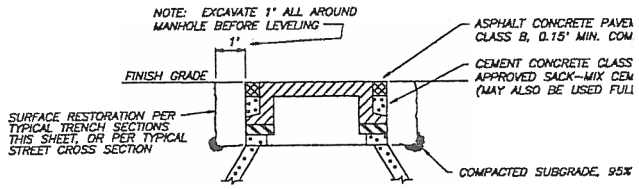
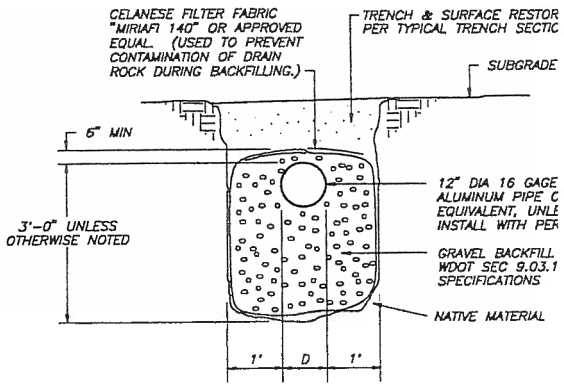


MANHOLE LID ADJUSTMENT FOR FACILI IN ROADWAY

NOT TO SCALE



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STANDARD F

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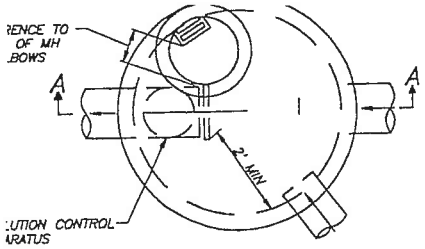

PLAN VIEW
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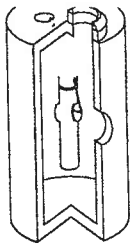

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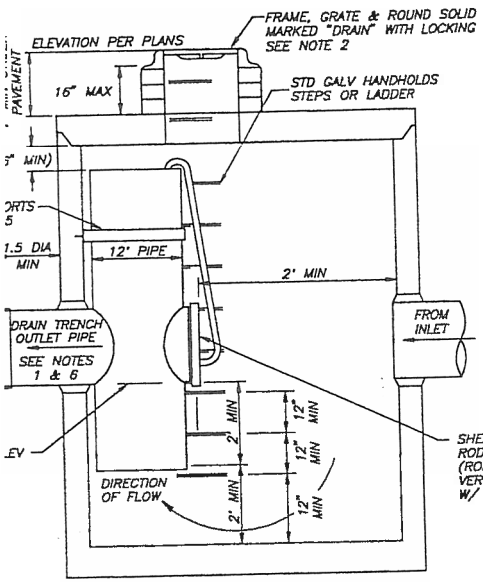
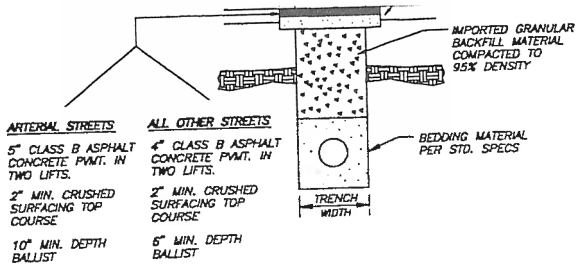


SECTION A–A
NOT TO SCALE

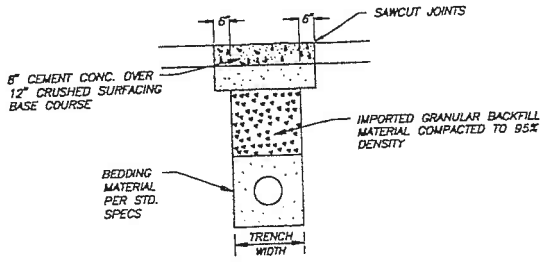
POLLUTION CONTROL MANHOLE
NOT TO SCALE

NOTES

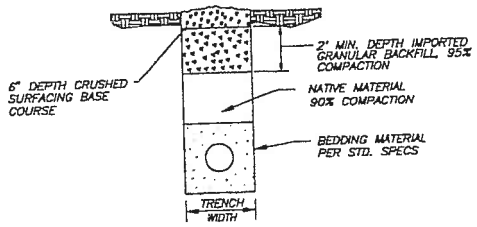
1. USE MIN 54" DIA MANHOLE.
2. METAL PARTS: CORROSION RESISTANT. GALVANIZED PIPE PARTS TO HAVE ASPHALT TREATMENT 1.
3. FRAME & LADDER OR STEPS OFFSET TO:
   A. CLEANOUT GATE IS VISIBLE FROM TOP.
   B. CLIMB–DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE.
   C. FRAME IS CLEAR OF CURB.
4. IF METAL OUTLET PIPE CONNECTS TO CEMENT PIPE: OUTLET TO PIPE TO HAVE SMOOTH O.D. EQUAL TO CONCRETE PIPE I.D. LESS 1/4".
5. PROVIDE AT LEAST ONE 3"x.090 GAGE SUPPORT BRACKET ANCHORED CONCRETE WALL. (MAX 3'–0" VERTICAL SPACING).
6. POLLUTION CONTROL APPARATUS REQUIRED ON ALL OUTLETS TO DRAIN TRENCH.



BITUMINOUS PAVED STREETS
2023000



CEMENT CONCRETE PAVED STREET
2023010



ROAD SHOULDERS & GRAVEL SURFACED STREETS
2023020

TYPICAL TRENCH SECTIONS
NOT TO SCALE

TRENCHING NOTES:
20150001

1. SEE CLARK COUNTY UTILITY PERMIT FOR ADDITIONAL TRENCH BACKFILL AND SURFACING REQUIREMENTS.
2. ALL BACKFILL SHALL BE MECHANICALLY COMPACTED IN LIFTS WHICH DO NOT EXCEED RATED CAPABILITY OF EQUIPMENT USED, BUT IN NO CASE EXCEED 12" LOOSE.
3. NATIVE MATERIAL MAY BE SUBSTITUTED FOR IMPORTED GRANULAR MATERIAL PROVIDING IT MEETS REQUIREMENTS OF SECTION 9–30.7(3) OF THE STANDARD SPECIFICATIONS.

GENERAL NOTES:
20150005

1. ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE MOST CURRENT EDITION OF THE WDOT/APWA STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION.
2. AT LEAST 48 HOURS PRIOR TO UNDERGROUND WORK, CALL THE ONE STOP UTILITY LOCATE CENTER AT 696–4848 FOR UTILITY LOCATE. SEE SITE TOPOGRAPHY PLAN FOR APPROXIMATE UTILITY LOCATIONS.

ALLOWABLE STRUCTURES AND PIPE SIZES

CATCH BASIN TYPE[1]	MAXIMUM PIPE DIAMETER: [2]CMP, SPIRAL RIB CPEP, HDPP, PVC	MAXIMUM PIPE DIAMETER: CONCRETE AND DUCTILE IRON
INLET[4]	12"	12"
TYPE 1[3]	18"	12"
TYPE 1L[3]	24"	18"
TYPE 2–48–INCH DIA.	30"	24"
TYPE 2–54–INCH DIA.	36"	30"
TYPE 2–72–INCH DIA.	54"	48"
TYPE 2–96–INCH DIA.	72"	72"
STD. MANHOLE DIA.		
48 INCH DIA.	30"	24"
60 INCH DIA.	36"	30"
72 INCH DIA	54"	48"

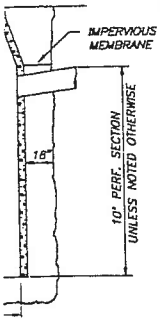
[1] CATCH BASINS, INCLUDING MANHOLE STEPS, LADDER, AND HANDHOLDS SHALL CONFORM TO CLARK COUNTY ROAD STANDARDS.

[2] GENERALLY THESE PIPE MATERIALS WILL BE ONE SIZE LARGER THAN CONCRETE DUE TO SIMILAR WALL THICKNESS. HOWEVER, FOR ANGLED CONNECTIONS OR THOSE WITH SEVERAL PIPES ON THE SAME PLANE, THIS WILL NOT APPLY.

[3] MAXIMUM 5 VERTICAL FEET ALLOWED BETWEEN GRATE AND INVERT ELEVATION.

[4] NORMALLY ALLOWED ONLY FOR USE IN PRIVATELY MAINTAINED DRAINAGE SYSTEMS AND MUST DISCHARGE TO A C.B. IMMEDIATELY DOWNSTREAM.

20150000



DRYWELL
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20232800

SITEWORK GRADING NOTES:
20150004

1. GRADES NOTED ON GRADING PLAN ARE FINISH GRADES AT TOP OF PAVEMENTS, SIDEWALKS, FLOORS, OR LAWNS.
2. SLOPE GRADES CONTINUOUS BETWEEN ELEVATIONS NOTED AT RIDGE LINES, CURB LINES, OR SWALE LINES, AND SLOPE DOWN CONTINUOUS TO CATCH BASINS FOR POSITIVE DRAINAGE.
3. ALL SUBGRADE UNDER PAVED SURFACES, CURBS, BUILDINGS, FOOTINGS, SLABS AND CONCRETE WALKWAYS SHALL BE COMPACTED TO 95% OF MAXIMUM RELATIVE DENSITY. WHERE FILLING IS REQUIRED, THE FILL MATERIAL SHALL BE PLACED IN 8" LIFTS WITH EACH LIFT BEING COMPACTED TO 95% OF MAXIMUM RELATIVE DENSITY OF THE FILL MATERIAL BEFORE THE NEXT LIFT OR FINISH SURFACES ARE PLACED. WHERE FILLING IS REQUIRED OUTSIDE THE ABOVE MENTIONED STRUCTURAL AREAS, COMPACTION REQUIREMENTS SHALL BE 90% OF MAXIMUM RELATIVE DENSITY.
4. ALL CUT AND FILL AREAS UNDER PROPOSED ASPHALT, CONCRETE AND BUILDING FOUNDATIONS SHALL BE STRIPPED OF SOD AND OTHER UNSUITABLE STRUCTURAL MATERIALS. SOD, UNSUITABLE MATERIALS AND EXCESS SUITABLE MATERIALS GENERATED BY SITE GRADING SHALL BE HAULED FROM THE SITE UNLESS OTHERWISE DIRECTED BY THE OWNER OF THESE PLANS.

SITEWORK DRAINAGE NOTES:
20150002

1. FOR PERCOLATION TYPE DRAINAGE SYSTEMS, LAY PERF. PIPE AND DRAIN TRENCH AT CONTINOUS GRADE BETWEEN ELEVATIONS NOTED. PERF. PIPE SHALL BE 16 GAGE ALUMINUM OR ADS PERFORATED TUBING.
2. ROOF DRAIN PIPES SHALL BE SCHD. 40 PVC LAYED AT MIN. 1% SLOPE WITH MINIMUM OF 2 FOOT COVER. ROOF DRAINS TERMINATED AT VACANT LOTS SHALL BE PLUGGED AND MARKED WITH 2X4. ROOF DRAIN LOCATIONS SHOWN ON DRAINAGE PLAN ARE ASSUMED. VERIFY WITH ARCHITECTURAL DRAWINGS PRIOR TO INSTALLATION.
3. ALL CMP & SRP 30" OR SMALLER TO BE 16 GAUGE ALUMINIZED STEEL OR 16 GAUGE ALUMINUM, UNLESS OTHERWISE SPECIFIED.

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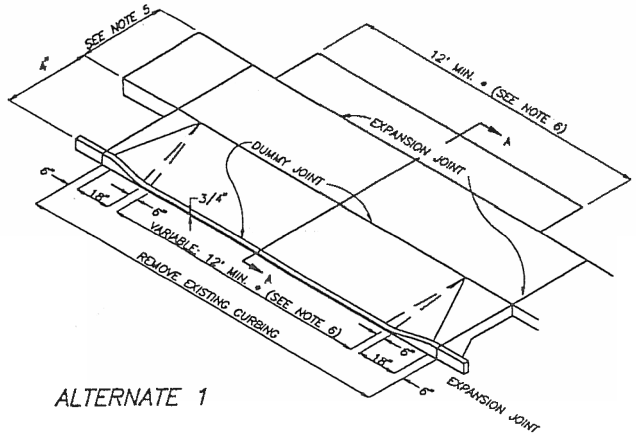
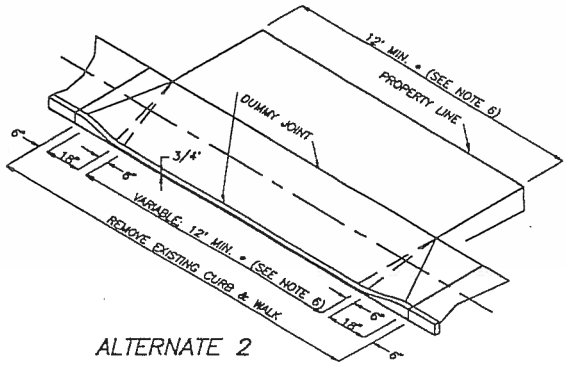


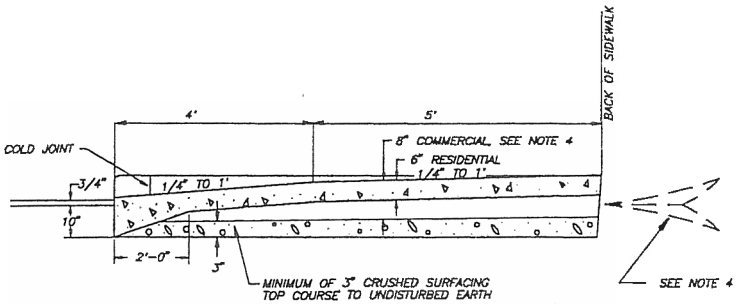
ALTERNATE 1



ALTERNATE 2

DRIVEWAY NOTES:

1. JOINTS: WHERE DRIVEWAY EXCEEDS 16' WIDTH, A 2" DUMMY JOINT SHALL BE PLACED LONGITUDINALLY ALONG CENTERLINE. TRANSVERSE DRIVEWAY JOINTS AS SHOWN OR DIRECTED BY ENGINEER.
2. MATERIAL & PROCEEDURES SHALL BE IN ACCORDANCE WITH SECTIONS 6-02 & 8-14 OF THE STANDARD SPECIFICATIONS.
3. CONCRETE: SHALL BE CLASS B PER STANDARDS 6-02 OF THE STANDARD SPECIFICATIONS.
4. VERTICAL CURVES: SHALL NOT EXCEED A 3 1/4" HUMP OR A 2" DEPRESSION IN A 19' CHORD.
5. PLACEMENT: SEE PLANS AND TYPICAL STREET SECTION FOR SIDEWALK LOCATIONS AND ADDITIONAL DETAILS.
6. • = 15' MIN. DRIVEWAY WIDTH ON ALL COUNT ARTERIALS.
7. COMMERCIAL DRIVEWAYS REQUIRE REINFORCING STEEL (6x6 – W 2.9 x W 2.9 WWF, MIN.)
8. CONCRETE SHALL HAVE BROOM FINISH PARALLEL TO DRIVEWAY CENTERLINE.



SECTION A–A

TOP OF CURB

RESIDENTIAL/COMMERCIAL DRIVEWAY

NOT TO SCALE

CURB NOTI

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2. CURBS SHALL JOINTS
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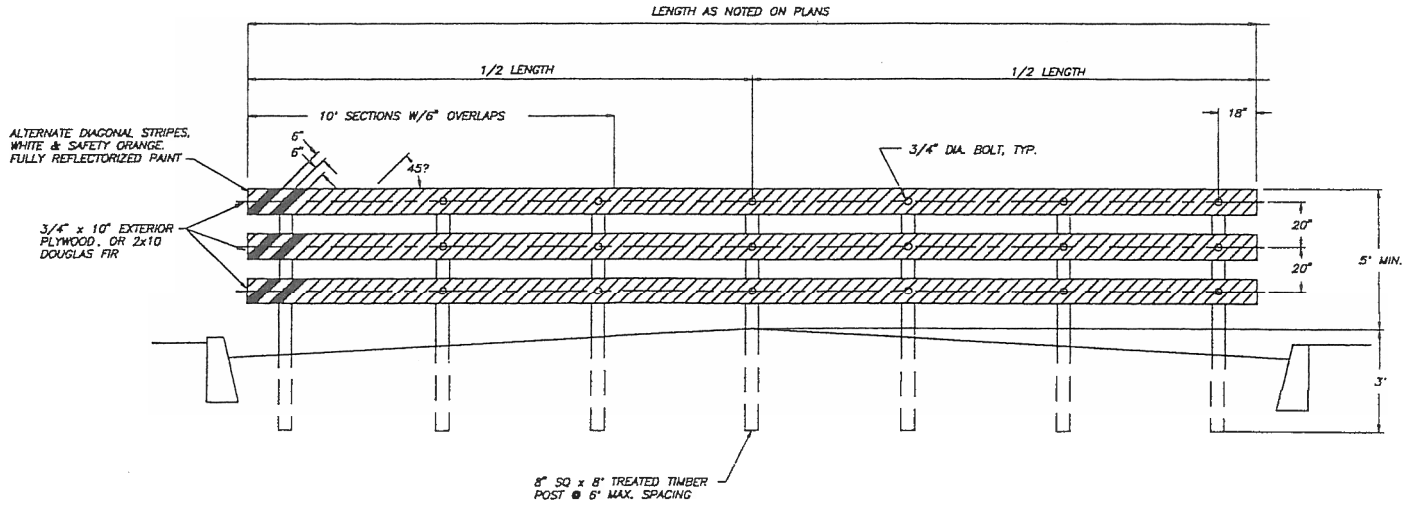
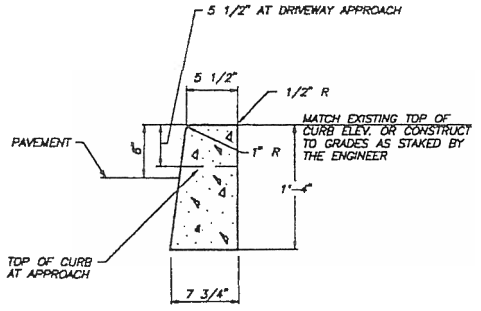


STANDARD STREET BARRICADE, TYPE III

By	APPR.	DATE	No.



CEMENT CONCRETE CURB

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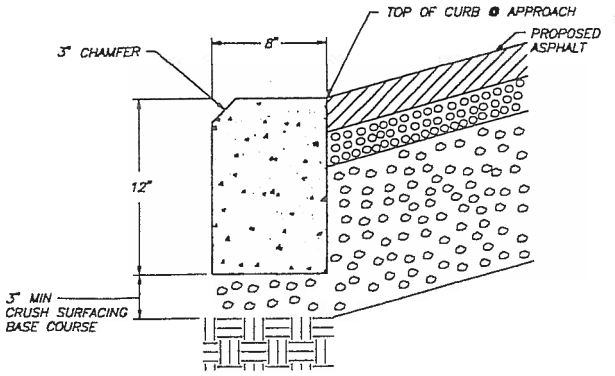

CEMENT CONCRETE FLUSH CURB DETAIL

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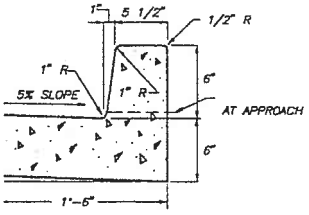

URB & GUTTER

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ONSTRUCTED ACROSS EXISTING DRIVEWAY APRON IS REQUIRED.

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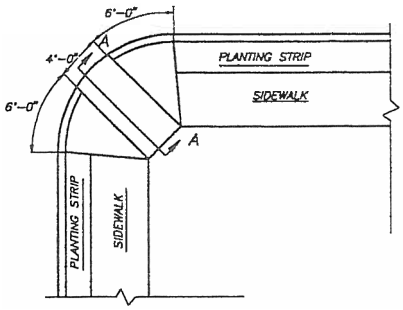
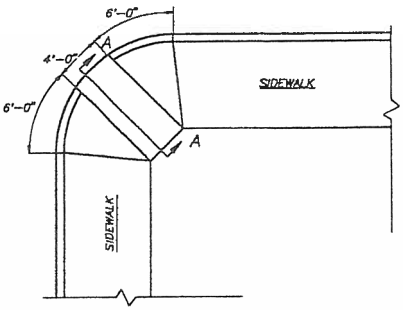


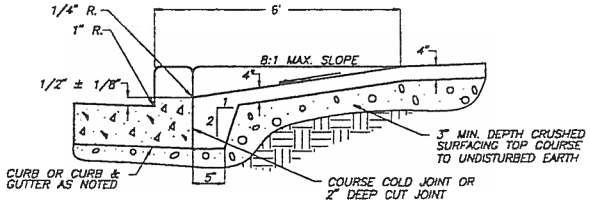
CURB RAMP

TYPE 1



CURB RAMP

TYPE 2



SECTION A–A

CURB RAMP DETAIL

NOT TO SCALE

NOTES:

1. WHEEL CHAIR RAMPS WILL BE PLACED AT ALL INTERSECTIONS REQUIRING SIDEWALKS SLOPED SURFACES SHALL BE BROOM FINISHED TO PROVIDE TEXTURED NON-SLIP TYPE SURFACE.
2. CURB RAMP SHALL NOT BE POURED INTEGRAL WITH SIDEWALK AND SHALL BE ISOLATED BY EXPANSION JOINT MATERIAL ON ALL SIDES, BUT NOT AT END OF RAMP ADJACENT TO ROADWAY PAVEMENT.

SIDEWALK NOTES:

1. CONTRACTION JOINTS (3/8" x 1/2") SHALL BE CONSTRUCTED AT 15' INTERVALS OR AS DIRECTED BY THE TOWN OF YACOLT.
2. ALL UTILITY POLES, METER BOXES, AND OTHER OBSTRUCTIONS SHALL HAVE A 3/8" EXPANSION JOINT MATERIAL PLACED AROUND THEM.
3. ALL SIDEWALK EDGES SHALL HAVE A 1/4" RADIUS.

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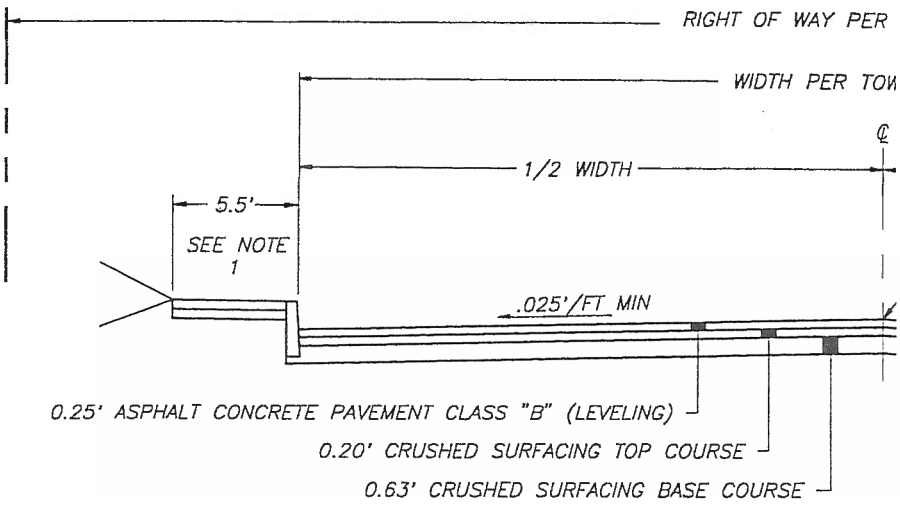
	STANDARD ROAD DETAILS	ST1
DATE		SHEET of



TYPICAL STREET SECTIO

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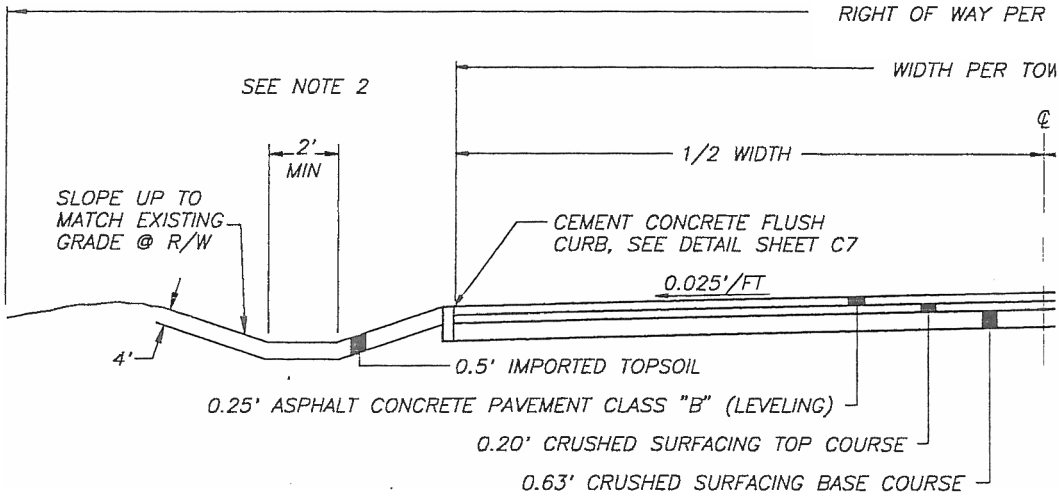
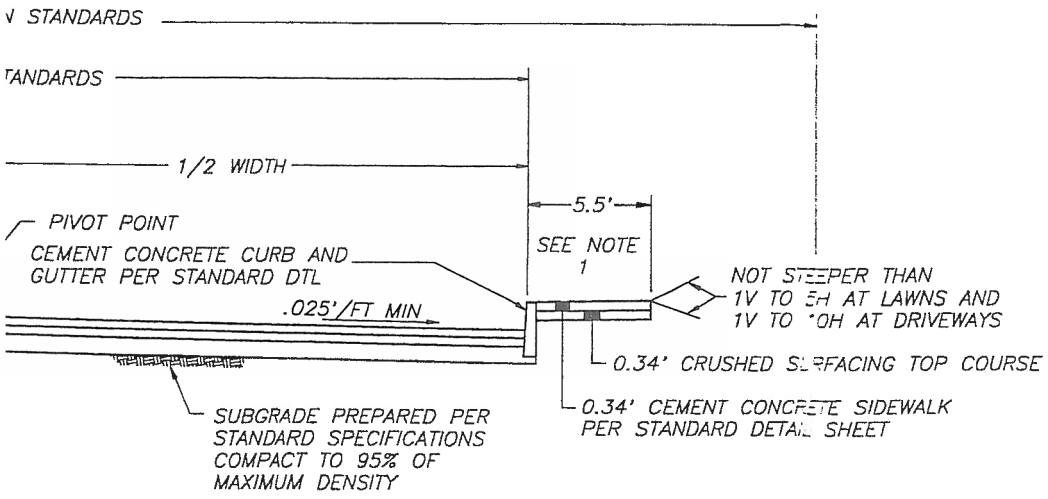


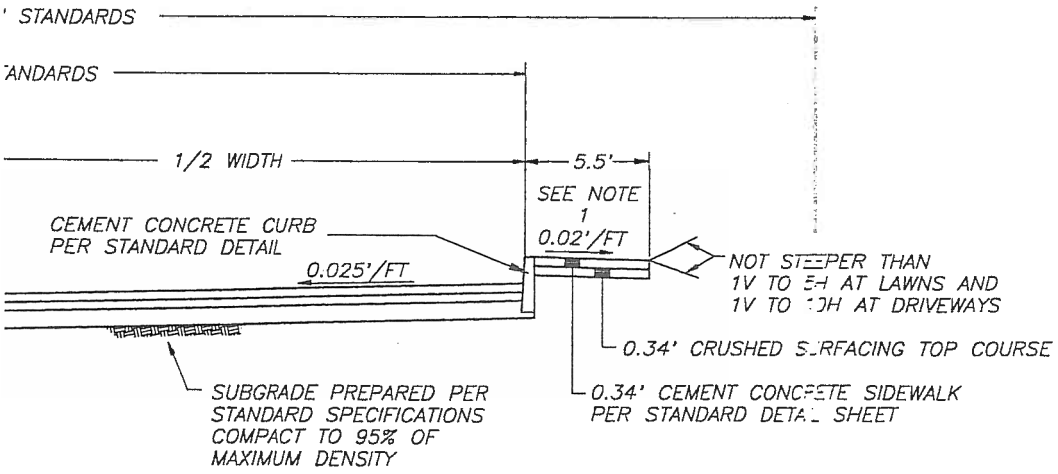
TYPICAL STREET SECTI

NOT TO

By	APPR.	DATE	No.



– CROWNED STREET



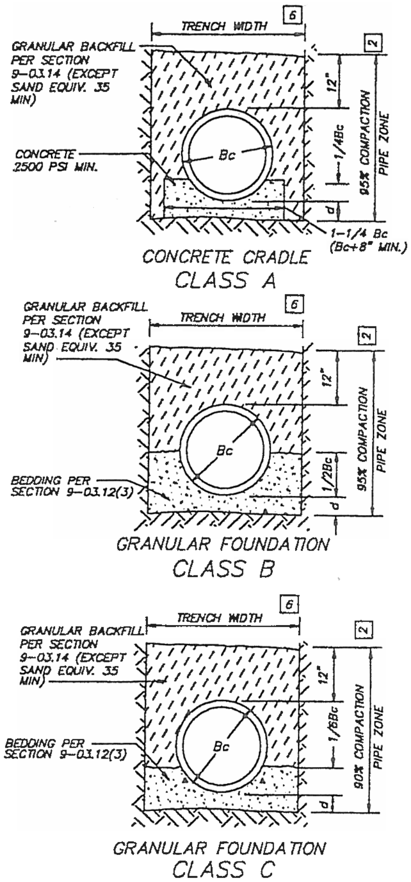
– CROSS SLOPED

NOTES:

1. SLOPE SIDEWALK AWAY FROM STREET WHERE GROUND ELEVATION BACK OF WALK IS LESS THAN CURB ELEVATION.
2. USE 10' MIN PLANTER STRIP FOR WATER QUALITY.
3. SECTIONS SHOWN ARE FOR RESIDENTIAL ACCESS STREETS. SEE ENGINEERING STANDARDS FOR ALTERNATIVE SECTIONS.

REVISIONS	DESIGNED	SCALE
	DRAWN	HOR.
	CHECKED	VERT.
	APPROVED	FIELD BOOK

JOB NUMBER	TOWN OF YACOLT	DRAWING NUMBER
DATE	STANDARD TYPICAL SECTIONS	ST2
		SHEET of



NOTES:

1. WHERE DIRECTED BY THE ENGINEER GRANULAR TRENCH FOUNDATION STABILIZATION SHALL BE PLACED PRIOR TO PLACEMENT OF THE BEDDING. SIZE AND DEPTH ARE DEPENDENT ON SOIL CONDITIONS.

2. BEDDING AND BACKFILL MATERIALS IN THE PIPE ZONE SHALL BE COMPACTED AS SPECIFIED PRIOR TO BACKFILLING THE REMAINDER OF THE TRENCH.

LEDGEND:

Bc = OUTSIDE DIAMETER
D = INSIDE DIAMETER
d = DEPTH OF BEDDING MATERIAL BELOW PIPE

DEPTH OF BEDDING MATERIAL BELOW PIPE	
D	d (min) 3
27" & SMALLER	4"
LARGER THAN 27"	6"

3. FOR ROCK AND OTHER INCOMPRESSIBLE MATERIALS, THE TRENCH SHALL BE OVER-EXCAVATED A MINIMUM OF 6" AND REFILLED WITH GRANULAR MATERIAL AS DIRECTED BY THE ENGINEER.

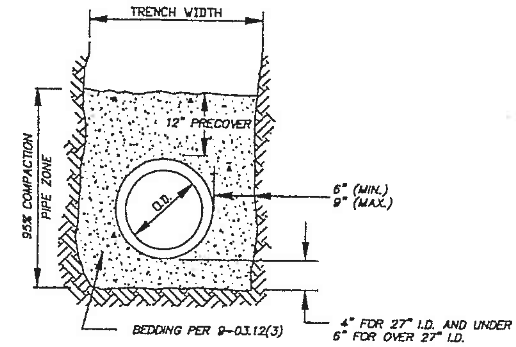
4. NATIVE MATERIAL MAY BE USED IN LIEU OF IMPORTED MATERIAL FOR BEDDING SPECIFIED, PROVIDED THAT THE NATIVE MATERIAL CONFORMS TO SECTION 9-03.12(3) OF THE STD. SPECIFICATIONS, AND IS APPROVED BY THE ENGINEER. THE CONTACTOR SHALL SUBMIT A SAMPLE OF THE NATIVE MATERIAL TO THE ENGINEER AT LEASE 72 HOURS PRIOR TO USE. THE ENGINEER MAY APPROVE, REJECT OR REQUIRE LABORATORY TESTING OF THE MATERIAL.

5. BACKFILL AND COMPACTION ABOVE THE PIPE ZONE SHALL BE AS SHOWN IN STD. PLAN S-1.3

6. TRENCH WIDTH SHALL NOT EXCEED ONE AND ONE-HALF THE INSIDE DIAMETER OF THE PIPE PLUS 18" AT THE TOP OF THE PIPE ZONE.

7. FOR FLEXIBLE PIPE BEDDING SEE STD. PLAN S-1.2

PIPE BEDDING DETAILS (RIGID PIPE)
S-1.1

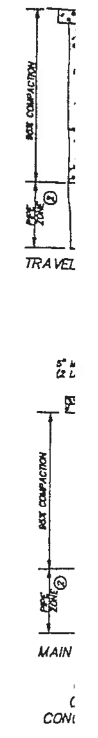


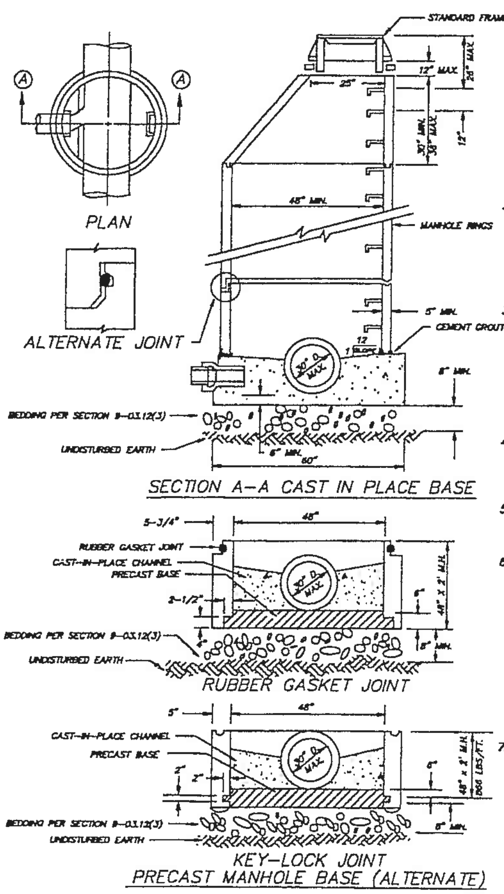
NOTES:

1. WHERE DIRECTED BY THE ENGINEER, GRANULAR TRENCH FOUNDATION STABILIZATION SHALL BE PLACED PRIOR TO PLACEMENT OF THE BEDDING. SIZE AND DEPTH ARE DEPENDENT ON SOIL CONDITIONS.
2. BEDDING AND BACKFILL MATERIALS IN THE PIPE ZONE SHALL BE COMPACTED AS SPECIFIED PRIOR TO BACKFILLING THE REMAINDER OF THE TRENCH.
3. FOR ROCK AND OTHER INCOMPRESSIBLE MATERIALS, THE TRENCH SHALL BE OVEREXCAVATED A MINIMUM OF 6" AND REFILLED WITH GRANULAR MATERIALS AS DIRECTED BY THE ENGINEER.
4. BACK FILL AND COMPACTION ABOVE THE PIPE ZONE SHALL BE AS SHOWN IN STANDARD PLAN NO. S-1.3
5. INSTALLATION SHALL CONFORM TO UNIBELL PLASTIC PIPE ASSN. STANDARD SPEC. UNI-B-5 (LATEST EDITION) EXCEPT AS NOTED.
6. FINAL INSTALLATION TO BE TESTED PER SECTION 7-17.3(4)H OF THE STANDARD SPECIFICATIONS .
7. ALTERNATIVE PRE-COVER MATERIALS ARE ALLOWABLE FROM PIPE CENTERLINE TO ONE FOOT ABOVE THE TOP OF PIPE. ALTERNATE PRE-COVER MATERIALS MUST BE PREAPPROVED BY THE INSPECTOR AND MAY BE SAND, CRUSHER SCREENINGS, GRAVEL, OR OTHER CLEAN GRANULAR MATERIAL CONTAINING NO ROCK LARGER THAN 1-1/4" IN LENGTH.

APPROVAL FOR SUCH ALTERNATE MATERIALS WILL BE GRANTED UPON CONFIRMATION BY TEST OF ITS COMPLIANCE WITH THESE REQUIREMENTS. SUBMIT 50 LB. SAMPLE FOR TESTING TO THE TOWN INSPECTOR, AND OBTAIN APPROVAL OF MATERIAL PRIOR TO STARTING PIPE INSTALLATION WORK. THE TEST REQUIRES A MINIMUM OF FIVE BUSINESS DAYS TO COMPLETE.

PIPE BEDDING DETAIL (FLEXIBLE PIPE)
S-1.2

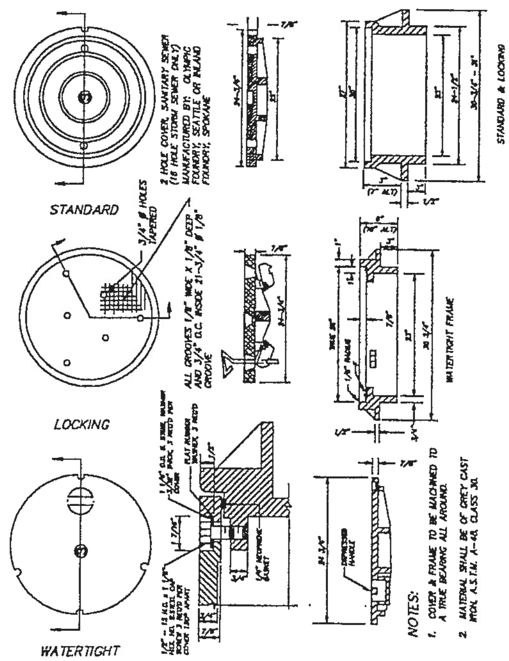




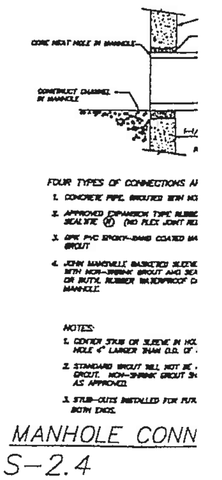
NOTES:

1. ALL PRECAST MANHOLE RINGS AND CONES SHALL CONFORM TO ASTM C-478 WITH CAST IN STEPS. (SEE STANDARD PLAN NO. S-2.3)
2. IN OVER EXCAVATED AREAS PROVIDE SUPPORT FOR THE PIPE AS FOLLOWS: PLACE 3/4" MINUS CRUSHED ROCK OVER UNDISTURBED GROUND IN 6" LAYERS AND COMPACT USING HAND TAMPER.
3. BASE CONCRETE SHALL BE 3000 P.S.I., 2-4 IN. SLUMP. FLOW LINES AND INSIDE SURFACES SHALL BE TROWLED SMOOTH & UNIFORM AT TIME OF POUR. MANHOLE BASE MAY BE MONOUTHICALLY CAST TO 8" ABOVE BARREL OF MAIN SEWER.
4. CAST-IN-PLACE, MONOLITHIC MANHOLE MAY BE SUBSTITUTED WITH SPECIFIC APPROVAL OF THE ENGINEER.
5. SEE STANDARD PLAN S-2.4 FOR MANHOLE CONNECTION DETAILS.
6. JOINTS SHALL BE CONSTRUCTED SO AS TO BE WATERTIGHT. KENT-SEAL NO. 2 OR APPROVED EQUAL SHALL BE USED ON TONGUE & GROOVE SECTIONS, AND ON RISER RINGS PREMOLDED "O-RING" MAY BE SUBSTITUTED ON BELL & SPIGOT SECTIONS. ALL JOINTS SHALL BE GROUTED WITH PORTLAND CEMENT CONCRETE GROUT & STRUCK EVEN WITH THE WALL.
7. MANHOLES UNDER 6'-0" IN DEPTH FROM RIM TO SHELF SHALL HAVE A TOP SLAB IN LIEU OF CONE (SEE STANDARD PLAN NO. S-2.5)

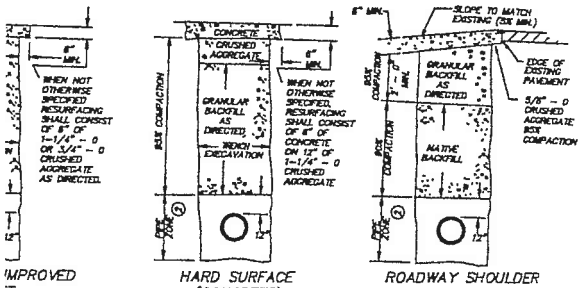
STANDARD PRECAST MANHOLE
S-2.1



STANDARD MANHOLE FRAMES & COVERS
S-2.2



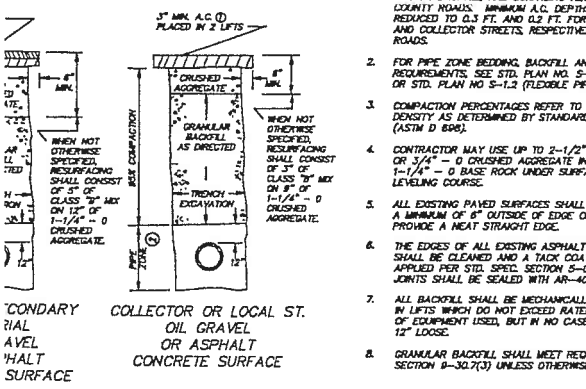
By	APPR.	DATE	No.



IMPROVED T

HARD SURFACE (CONCRETE)

ROADWAY SHOULDER



CONDARY RIAL AVEL HALT SURFACE

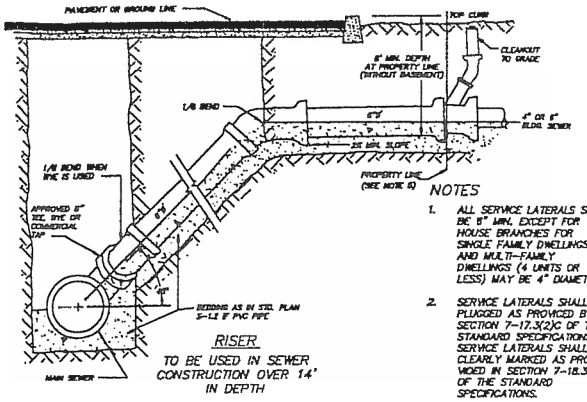
COLLECTOR OR LOCAL ST. OIL GRAVEL OR ASPHALT CONCRETE SURFACE

NOTES:

1. SEE CLARK COUNTY UTILITY PERMIT FOR ADDITIONAL TRENCH BACKFILL AND SURFACING REQUIREMENTS IN COUNTY ROADS. MINIMUM A.C. DEPTHS MAY BE REDUCED TO 0.3 FT. AND 0.2 FT. FOR ARTERIAL AND COLLECTOR STREETS, RESPECTIVELY, IN COUNTY ROADS.
2. FOR PIPE ZONE BEDDING, BACKFILL AND COMPACTION REQUIREMENTS, SEE STD. PLAN NO. S-1.1 (RIGID PIPE) OR STD. PLAN NO S-1.2 (FLEXIBLE PIPE).
3. COMPACTION PERCENTAGES REFER TO RELATIVE DRY DENSITY AS DETERMINED BY STANDARD PROCTOR (ASTM D 698).
4. CONTRACTOR MAY USE UP TO 2-1/2" OF 5/8" - 0 OR 3/4" - 0 CRUSHED AGGREGATE IN LIEU OF 1-1/4" - 0 BASE ROCK UNDER SURFACING FOR LEVELING COURSE.
5. ALL EXISTING PAVED SURFACES SHALL BE SAW CUT A MINIMUM OF 6" OUTSIDE OF EDGE OF TRENCH TO PROVIDE A NEAT STRAIGHT EDGE.
6. THE EDGES OF ALL EXISTING ASPHALT SURFACES SHALL BE CLEANED AND A TACK COAT SHALL BE APPLIED PER STD. SPEC. SECTION 5-04.3(5). ALL JOINTS SHALL BE SEALED WITH AR-4000 AND SANDED.
7. ALL BACKFILL SHALL BE MECHANICALLY COMPACTED IN LIFTS WHICH DO NOT EXCEED RATED CAPABILITY OF EQUIPMENT USED, BUT IN NO CASE EXCEED 12" LOOSE.
8. GRANULAR BACKFILL SHALL MEET REQUIREMENTS OF SECTION 9-30.7(3) UNLESS OTHERWISE SPECIFIED.

ICAL TRENCH SECTIONS: BACKFILL, BEDDING & SURFACING

-1.3

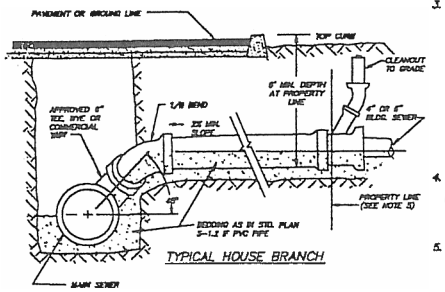


RISER

TO BE USED IN SEWER CONSTRUCTION OVER 14' IN DEPTH

NOTES

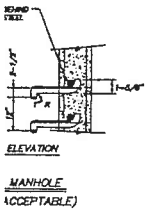
1. ALL SERVICE LATERALS SHALL BE 6" MIN. EXCEPT FOR HOUSE BRANCHES FOR SINGLE FAMILY DWELLINGS AND MULTI-FAMILY DWELLINGS (4 UNITS OR LESS) MAY BE 4" DIAMETER.
2. SERVICE LATERALS SHALL BE PLUGGED AS PROVIDED BY SECTION 7-17.3(2)C OF THE STANDARD SPECIFICATIONS. SERVICE LATERALS SHALL BE CLEARLY MARKED AS PROVIDED IN SECTION 7-18.3(5) OF THE STANDARD SPECIFICATIONS.
3. APPROVED COMMERCIAL TAPS:
   - SEALTIGHT Ⓡ TYPE "C" OR "D" SEWER SADDLE.
   - FOWLER QUIK-WAY Ⓡ SEWER TAP.
   - FOWLER "T & L" Ⓡ SEWER TEE.
   - "TAP-TITE" Ⓡ SEWER TEE.
4. TRANSITIONS BETWEEN DISSIMILAR PIPE MATERIALS OR SIZES SHALL BE MADE WITH APPROVED ADAPTORS (FERNCO, CAULDER OR EQUAL).
5. IN NEW SUBDIVISIONS AND OTHER CONSTRUCTION INVOLVING NEW ROADS, INSTALL LATERALS TO 6 FEET BEHIND PROPERTY LINE FOR SEWERS IN STREET RIGHT-OF-WAY.



TYPICAL HOUSE BRANCH

SERVICE LATERAL CONNECTIONS

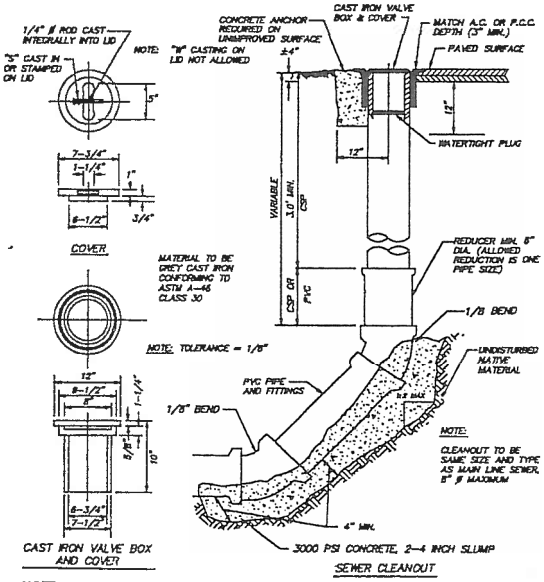
S-1.4



MANHOLE (ACCEPTABLE)

DETAILS

ON DETAILS



NOTE:

FOR 6" CLEANOUTS ONLY, USE IFCO FRAME NO. 235, AS MANUFACTURED BY INLAND FOUNDARY CO., OR APPROVED EQUAL. COVER SHALL BE THE MANUFACTURER'S STANDARD, WITH "S" OR "SEWER" CAST STAMPED ON TOP. INSTALL MECHANICAL PLUGS ON ALL CLEANOUTS.

STANDARD SEWER CLEANOUT

S-3.1

CONSTRUCTION SPECIFICATIONS FOR SANITARY SEWER

1. All materials and installation of sanitary sewers shall be in conformance with the most current edition of the Standard Specifications for Road, Bridge, and Municipal Construction, hereinafter referred to as the "Standard Specifications", prepared by the Washington State Chapter of the American Public Works Association (APWA) and the Washington State Department of Transportation, except as noted herein or on the standard plans. Wherever the standard specifications refer to the owner as either the "State" or "Secretary" or when reference is made to the Department of Transportation it shall be understood that the standard specifications should read the "Town".

2. All sanitary sewer construction is subject to inspection and approval by the Longview City Engineer. The contractor shall notify the City Engineer at least 48 hours prior to the start of construction. The town may require that a preconstruction conference be held.

3. The contractor is required to notify all utilities 48 hours prior to commencement of work. The contractor may contact the Utility Locate (206-425-2506) in lieu of contacting individual utilities.

4. Final acceptance of sanitary sewers are subject to Sections 1-05.11, 1-05.12, 7-17.3(4)D, 7-17.3(4)E, 7-17.3(4)H and 7-17.3(4)I of the Standard Specifications.

5. All pipe and fittings shall conform to the following:

A. Concrete pipe, nonreinforced, shall conform to ASTM C 14, Class 2, except as otherwise noted. Concrete pipe, reinforced, shall conform to ASTM C 76, and shall be of the class noted on the plans or in the special provisions.

B. Polyvinylchloride (PVC) sewer pipe 15" diameter or less shall conform to ASTM D3034, SDR 35 or ASTM F 789. It shall have a minimum pipe stiffness of 46 psi. PVC pipe 18" diameter and larger shall conform to ASTM F 679 or ASTM F 794, Series 46. All PVC pipe shall have an integral bell gasketed joint with elastomeric gasket and shall be furnished in 12-1/2 foot laying lengths.

C. Ductile iron (DI) pipe shall conform to ANSI A21.51 or AWWA C151, with push-on joints, Class 52, unless otherwise noted.

6. Installation of pipe shall conform to the following:

A. Concrete pipe shall be installed in conformance with standard plans S-1.1 (Class C, unless otherwise noted) and S-1.3.

B. PVC pipe shall be installed in accordance with manufacturer's recommendations and shall conform to standard plans S-1.2 and S-1.3.

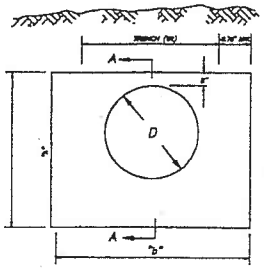
7. Cleanouts, service lateral connections, trench excavation, pipe bedding and street restoration, and appurtenances shall conform to the details shown on the standard plans. All other construction shall conform to the standard details contained in the Standard Plans For Road, Bridge and Municipal Construction.

8. The contractor shall comply with the provisions of all permits issued, or easements granted to the town in conjunction with the construction of sanitary sewers. The contractor shall obtain a street cut permit for work within the town right-of-way.

9. The contractor shall submit an approved traffic control plan to the City Engineer. Approval shall be obtained prior to beginning construction.

REVISIONS	DESIGNED	SCALE
	DRAWN	HOR.
	CHECKED	VERT.
	APPROVED	FIELD BOOK

JOB NUMBER	TOWN OF YACOLT	DRAWING NUMBER
DATE	STANDARD SEWER MAIN DETAILS	SN1
		SHEET of



SECTION A–A

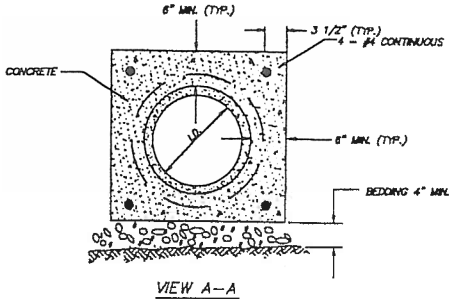
NOTES:

1. ALL CONCRETE TO BE 3000 P.S.I., 3" TO 4" SLUMP.
2. WALLS TO BE PLACED WHERE GRADE IS 20% OR OVER.
3. ANCHOR WALLS TO BE EQUALLY SPACED WITH MAXIMUM DISTANCE BETWEEN WALLS TO BE AS SHOWN IN TABLE "A".
4. PLACE WALL IMMEDIATELY BELOW BELL OF PIPE WHERE POSSIBLE.
5. CONCRETE SHALL BE POURED AGAINST FORMS OR STABLE UNDISTURBED SOIL.

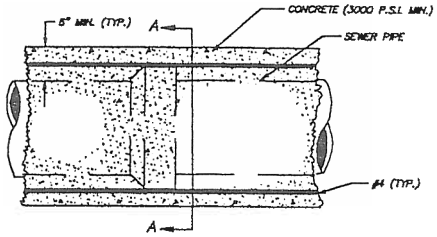
TABLE "A"		
SLOPE %		MAXIMUM SPACING (FT.) (MEASURED ON SLOPE)
OVER	TO	
20	35	36'
35	50	24'
50	100	16'

TABLE "B"				
PIPE SIZE (D)	TRENCH WIDTH MAX. (Wt)	h	b	VOLUME OF CONCRETE (APPROX.)
6", 8", 10"	2.5'	3.0'	4.0'	0.29 C.Y.
12", 15"	2.5'	4.0'	4.0'	0.37 C.Y.
18", 21", 24"	3.5'	4.0'	5.0'	0.42 C.Y.
30", 36"	4.5'	5.0'	6.0'	0.62 C.Y.

STANDARD PLAN FOR ANCHOR WALLS
S–1.5

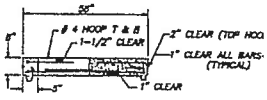


VIEW A–A

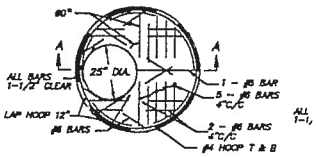


PLAN

CONCRETE ENCASED SEWER PIPE
S–1.6



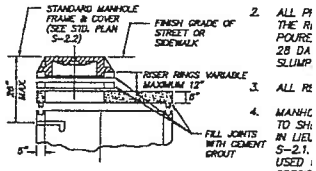
SECTION A–A



UNIT "MH"

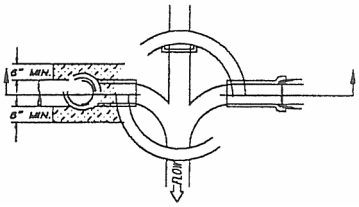
NOTES:

1. CONST NO. S-
2. ALL PI THE RI POURE 28 DA SLUMP
3. ALL RE
4. MANHO TO SH IN LIEU S-2.1, USED SPECIF FRAME BE US TOP SL

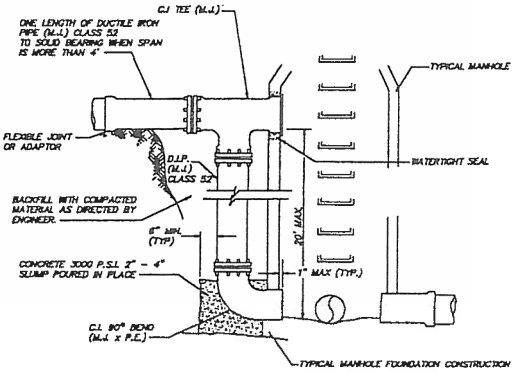


FLAT SLAB ALTERNATE

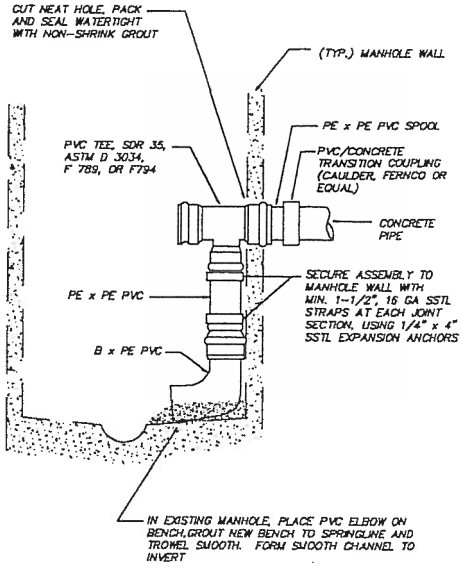
TOP SLAB FOR STANDARD
S–2.5



PLAN

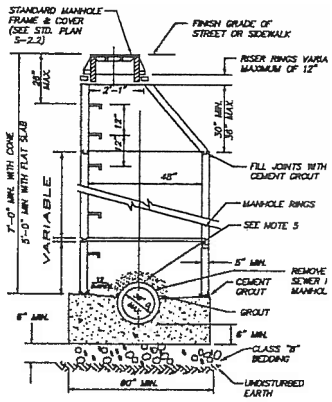


OUTSIDE DROP CONNECTION
S–2.6

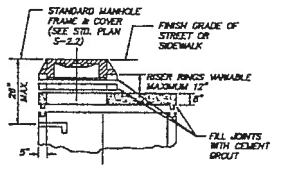


NOTE: INSIDE DROP ASSEMBLY MAY BE USED ONLY WHEN SPECIFICALLY APPROVED BY TOWN ENGINEER. MAXIMUM ONE ASSEMBLY PER 48" MANHOLE.

INSIDE DROP CONNECTION
S–2.7



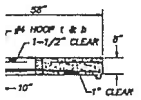
SECTION A – A



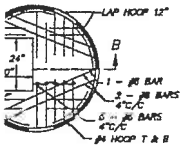
FLAT SLAB ALTERNATE

SAMPLING MAN
S–2.8

By	APPR.	DATE	No.



ECTION B-B



UNIT "CB"

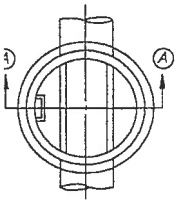
HALL CONFORM TO STD. PLAN
T OTHERWISE SHOWN.

CTIONS SHALL CONFORM TO
TS OF ASTM C-478. ALL
E CONCRETE SHALL HAVE A
TH OF 3000 P.S.I. & 2" TO 4"

SHALL BE GRADE 40 STEEL.

R 6'-0" IN DEPTH FROM RIM
HAVE UNIT "MH" TOP SLAB
AS SHOWN ON STD. PLAN
8" TOP SLAB SHALL BE
YPE 2" CATCH BASIN IS
NDARD RISER UNITS AND
TE FOR CATCH BASIN SHALL
UNCTION WITH TYPE "CB"

CAST MANHOLE



PLAN

F OF
OF

S:

STRUCTION SHALL CON-
M TO STD. PLAN NO.
2.1, IF NOT OTHERWISE
WN.

. PRECAST SECTIONS SHALL
FORM TO THE REQUIRE-
TS OF ASTM C-478.
. POURED IN PLACE CON-
TE SHALL HAVE A 28
STRENGTH OF 3000 P.S.I.
2" TO 4" SLUMP.

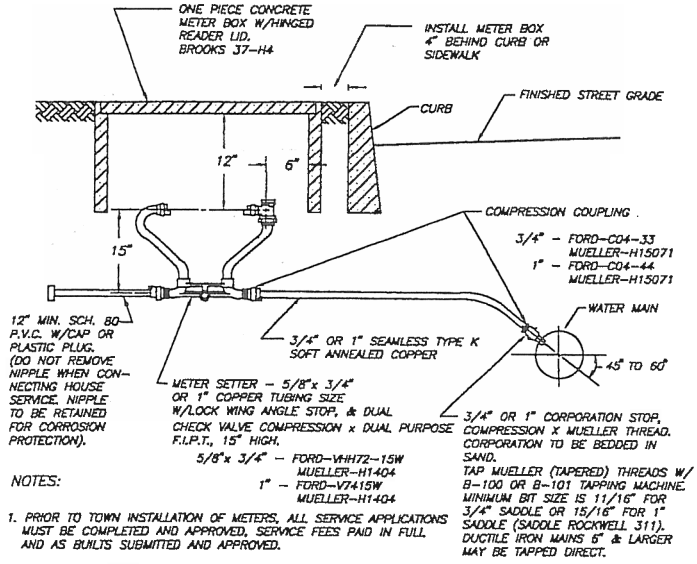
MANHOLE MAY BE
RED MONOLITHIC TO 8"
VE THE BARREL OF THE
N SEWER.

T SLAB MANHOLE COVER
FOR USE IN TRAFFIC
AS.

GROUTED CONNECTIONS,
S HOLE DIAMETER SHALL
EQUAL TO THE OUTSIDE
E DIAMETER PLUS THE
NHOLE WALL THICKNESS.

REVISIONS	DESIGNED	SCALE
	DRAWN	HOR.
	CHECKED	VERT.
	APPROVED	FIELD BOOK

JOB NUMBER	TOWN OF YACOLT	DRAWING NUMBER
DATE	STANDARD SEWER MAIN DETAILS	SN2
		SHEET of

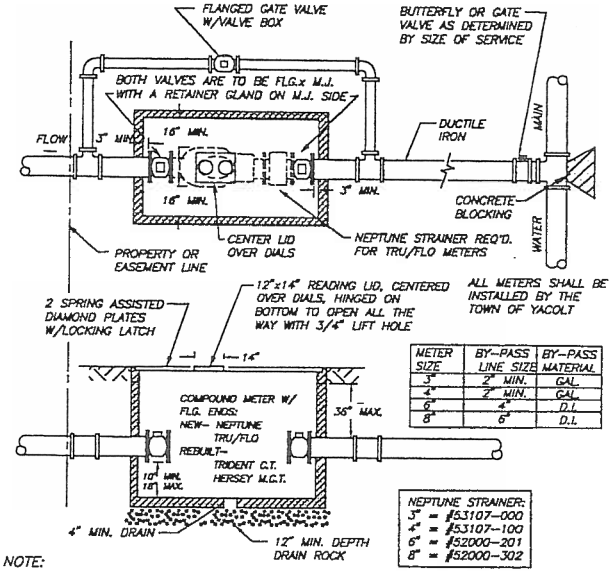


NOTES:

1. PRIOR TO TOWN INSTALLATION OF METERS, ALL SERVICE APPLICATIONS MUST BE COMPLETED AND APPROVED, SERVICE FEES PAID IN FULL AND AS BUILTS SUBMITTED AND APPROVED.
2. CONTRACTOR SHALL CONTACT THE TOWN OF YACOLT (686-3922) 48 HRS. PRIOR TO INSTALLING ANY WATER SERVICE CONNECTIONS.
3. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF WATER SERVICE CONSTRUCTION WITH OTHER UTILITIES. EXISTING UTILITY LOCATIONS AND COORDINATION ASSISTANCE MAY BE OBTAINED BY THE CONTRACTOR BY CALLING (696-4848).
4. METERS WILL NOT BE SET BY THE TOWN PRIOR TO DISINFECTION OF THE MAIN AND SERVICE, AND, PRIOR TO A SUCCESSFUL BACTERIOLOGICAL TEST.
5. WATER SERVICES SHALL BE PRESSURE TESTED ALONG WITH THE MAIN.
6. DURING THE PRESSURE TEST, THE MAIN SHALL BE OPEN TO INSPECTION AT ALL CORPORATIONS.

STANDARD 3/4" & 1" WATER SERVICE

N.T.S.



METER SIZE	BY-PASS LINE SIZE	BY-PASS MATERIAL
3"	2" MIN.	GAL.
4"	2" MIN.	GAL.
6"	4"	D.I.
8"	6"	D.I.

NEPTUNE STRAINER:
3" = #53107-000
4" = #53107-100
6" = #52000-201
8" = #52000-302

NOTE:
ALL JOINTS SHALL BE RESTRAINED FROM THE MAIN LINE TEE TO PROVIDE FOR METER REMOVAL WHILE USING BY-PASS LINE. PIPE MATERIAL SHALL BE GAL. OR D.I THRU THE LAST DOWN-STREAM BY-PASS TEE.
PRIOR TO METER INSTALLATION, GATE VALVES SHALL BE ALIGNED & SPACED W/RIGID SPOOL (DRILLED WITH HOLES SO AS NOT TO ALLOW WATER PASSAGE).
CONTACT TOWN OF YACOLT FOR DISTANCE BETWEEN METER GATE VALVES PRIOR TO INSTALLATION. (686-3922)
TEN PIPE DIAMETERS OF STRAIGHT PIPE REQ'D. IN & OUT OF METER.

VAULT

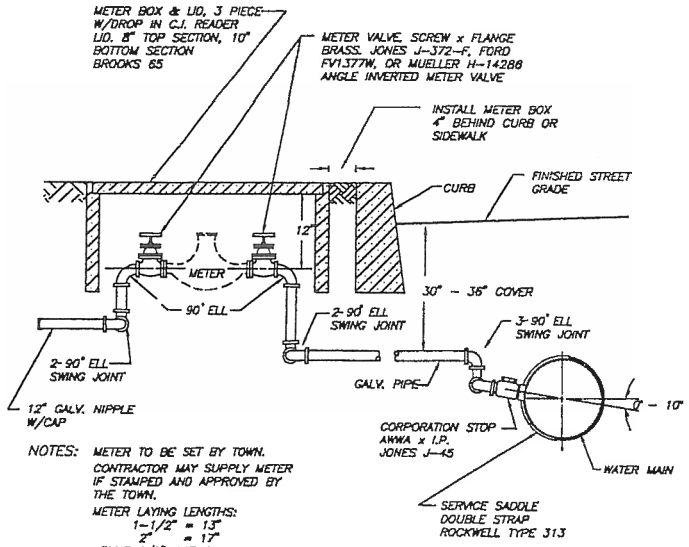
UTILITY VAULT CO.	R.C.P. VAULTS
#575-LA-3660P	#76632
#676-WA-3660P	W/#57-TL-B LID
W/#3660 GAL. LID	

VAULTS SHALL BE PRE-APPROVED PRIOR TO INSTALLATION

IN SUSPECTED HIGH GROUND WATER AREAS, THE DRAIN MAY BE OMITTED IF APPROVED BY THE TOWN OF YACOLT

STANDARD COMPOUND METER INSTALLATION

N.T.S.



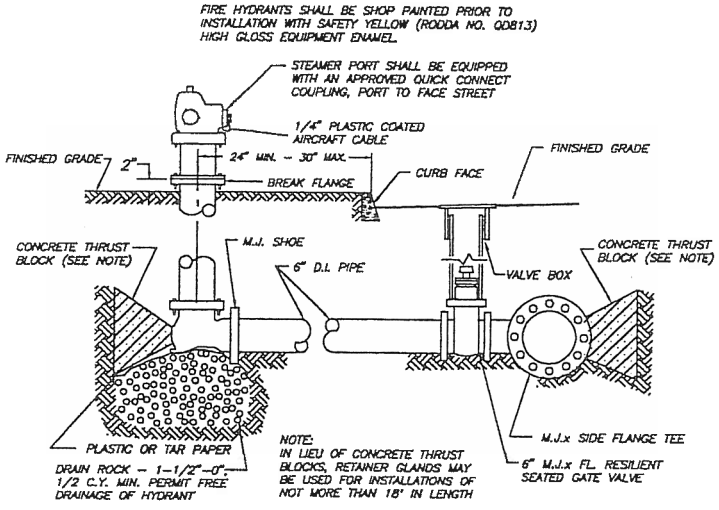
NOTES: METER TO BE SET BY TOWN. CONTRACTOR MAY SUPPLY METER IF STAMPED AND APPROVED BY THE TOWN.

METER LAYING LENGTHS:
1-1/2" = 13"
2" = 17"
PLUS 1/2" FOR GASKETS

SEE NOTES FOR 1" SERVICE INSTALLATION.

STANDARD 1-1/2" & 2" WATER SERVICE

N.T.S.



NOTE: IN LIEU OF CONCRETE THRUST BLOCKS, RETAINER GLANDS MAY BE USED FOR INSTALLATIONS OF NOT MORE THAN 18' IN LENGTH

NOTE: FIRE HYDRANT INSTALLATIONS SHALL BE INSPECTED PRIOR TO BACKFILLING. FIRE HYDRANT STANDARD BURY IS 3'-6" UNLESS OTHERWISE NOTED ON THE PLANS. FIRE HYDRANT LOCATIONS SHALL BE AS SHOWN ON THE PLANS. FIRE HYDRANTS SHALL NOT BE SET UNTIL LOCATION AND DEPTH ARE APPROVED BY THE TOWN.

APPROVED HYDRANTS
WATEROUS — WB67
CLOW — F2500

STANDARD FIRE HYDRANT ASSEMBLY

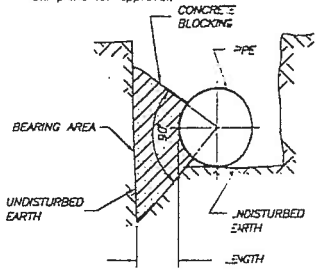
N.T.S.

By	APPR.	DATE	No

SOIL BEARING = 2000 LB/FT²				
PIPE SIZE	HORIZ. BENDS	BEARING AREA S.F.	VOL. OF BLOCKING C.F.	LENGTH OF BLOCKING
4"	TEE	2.3	0.8	0.86
	90°	3.2	1.4	1.06
	45°	1.7	0.5	0.73
	22-1/2°	0.9	0.2	0.46
	11-1/4°	–	–	–
6"	TEE	4.7	2.4	1.24
	90°	6.6	4.0	1.53
	45°	3.6	1.6	1.05
	22-1/2°	1.8	0.6	0.66
	11-1/4°	0.9	0.2	0.39
8"	TEE	8.0	5.4	1.63
	90°	11.4	9.0	2.00
	45°	6.2	3.6	1.37
	22-1/2°	3.1	1.3	0.87
	11-1/4°	1.6	0.5	0.51
10"	TEE	12.1	9.9	2.00
	90°	17.1	16.7	2.46
	45°	9.3	6.6	1.69
	22-1/2°	4.7	2.4	1.08
	11-1/4°	2.4	0.9	0.63
12"	TEE	17.1	16.7	2.37
	90°	24.2	28.0	2.93
	45°	13.1	11.2	2.01
	22-1/2°	6.7	4.1	1.28
	11-1/4°	3.4	1.5	0.74
16"	TEE	23.8	27.3	2.73
	90°	33.6	46.0	3.37
	45°	18.2	18.3	2.29
	22-1/2°	9.3	6.7	1.42
	11-1/4°	4.7	2.4	0.80
18"	TEE	29.9	38.5	3.05
	90°	42.2	64.7	3.79
	45°	22.9	25.8	2.57
	22-1/2°	11.7	9.4	1.60
	11-1/4°	5.9	3.3	0.80
20"	TEE	36.6	52.3	3.38
	90°	51.8	87.9	4.19
	45°	28.1	35.0	2.84
	22-1/2°	14.3	12.7	1.77
	11-1/4°	7.2	4.5	1.00
24"	TEE	52.3	89.1	4.03
	90°	74.0	149.8	5.00
	45°	40.0	59.7	3.55
	22-1/2°	20.4	21.7	2.11
	11-1/4°	10.3	7.7	1.18

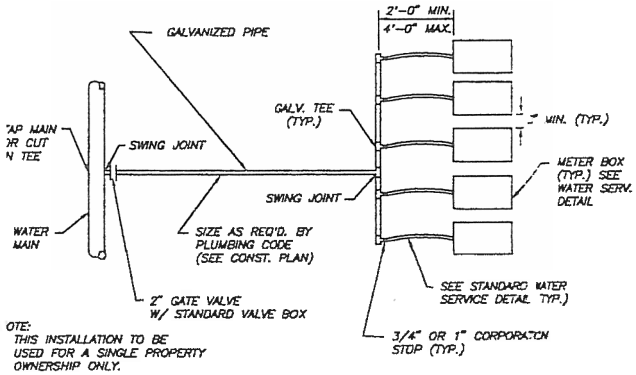
NOTES:

1. All blocking shall be poured against firm undisturbed soil.
2. When pouring against plugs and blind flanges, see special provisions.
3. Layout to be approved by the inspector prior to and after concrete pour.
4. All concrete blocking shall be poured in place without direct contact to the pipe or fittings. Some protective material such as tar paper shall be placed between the concrete and pipe or fitting.
5. Concrete for all blocking shall have a 28-day minimum compressive strength of 2,300 p.s.i.
6. Concrete blocking for vertical bends shall be Engineered and calculations submitted with the plans for approval.



STANDARD THRUST BLOCK

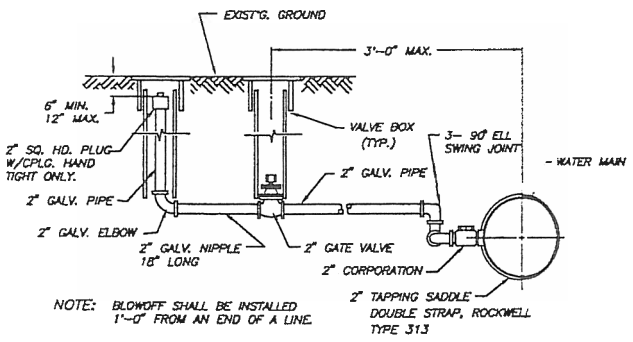
N.T.S.



NOTE: THIS INSTALLATION TO BE USED FOR A SINGLE PROPERTY OWNERSHIP ONLY.

STANDARD MULTIPLE METER INSTALLATION

N.T.S.



NOTE: BLOWOFF SHALL BE INSTALLED 1'-0" FROM AN END OF A LINE.

STANDARD BLOWOFF ASSEMBLY

N.T.S.

GENERAL NOTES & REQUIREMENTS

GENERAL

Specifications for all materials and construction shall be in conformance with the most current edition of the STANDARD SPECIFICATIONS for ROAD, BRIDGE & MUNICIPAL CONSTRUCTION" as prepared by the Washington State Chapter of the APWA and WDOT, except as noted herein.

All references to AWWA specifications shall mean their latest revision.

The contractor shall notify the Town of Yacolt (686-3922) 24 hours prior to the start of construction. Inspection and approval of the construction will be by the Town of Yacolt. A satisfactory pressure and bacteriological test for the water main construction is required for approval.

When construction is to take place within the Town or County right-of-way an approved traffic control plan will be required prior to the start of construction.

Where existing service must be interrupted, the contractor shall notify the Town of Yacolt and all customers affected as to the date and duration of the interruption. Notification must be done 24 hours in advance of interruption. The contractor shall schedule construction to provide minimum interruption of services as determined by the inspector. Under no circumstances shall a contractor schedule a water main shut-down without the required 24 hour notice. The contractor shall not operate the Town's water facilities without approval from the construction inspector.

DUCTILE IRON PIPE

All pipe furnished shall be new and conform to the requirements of AWWA C151.

Pipe sizes 12-inches and smaller shall be Class 52 and pipe sizes 14-inches and larger shall be Class 51, unless otherwise noted on the plans.

All pipe shall be furnished in 18 to 20 foot lengths and shall be cement lined, per AWWA C104.

All rubber gasket joints for ductile iron pipe shall conform to the requirements of AWWA C111.

GALVANIZED PIPE

All pipe furnished shall be 1-1/2" or 2" diameter galvanized, seamless conforming to ASTM A53, Grade B or ASTM A106, Grade B, Schedule 80.

CAST IRON or DUCTILE IRON FITTINGS

All fittings shall conform to the requirements of AWWA C110 or C153.

Fittings shall be of the size, type, type of iron, and type of joint as called for on the plans. All cast iron fittings shall have a pressure rating of 250 p.s.i. minimum. All ductile iron fittings shall be cement lined.

Compact fittings will only be allowed on installations thru 12" diameter. All compact fittings shall be ductile iron, cement lined, and have a pressure rating of 350 p.s.i.

All rubber gasket joints for ductile iron and grey iron fittings shall conform to the requirements of AWWA C111.

All reducers 6 inch and larger shall be restrained.

Bolts for buried flanged fittings shall be galvanized or zinc-cadmium plated and coated with 2 coats of bitumastic after installation. Bolts for mechanical joints shall be NSS Corten steel or Ductile iron only.

GALVANIZED FITTINGS

All fittings furnished shall be galvanized, screwed, 150-pound malleable iron conforming to ASTM A197 or ASTM A47.

TRENCH EXCAVATION and BACKFILL

The minimum cover for all sizes of pipe shall be 36 inches below finished street grade or below existing ground, whichever is greater.

Trench backfill materials shall be according to the backfill section shown on the plans and/or utility permit.

MECHANICAL COMPACTION

Compaction of the trench backfill shall be done according to the appropriate section of the specifications. Each backfill layer shall be compacted to 95% of the maximum density as determined by the compaction control tests.

Compaction control tests to determine optimum moisture content and maximum density shall be by the following methods:

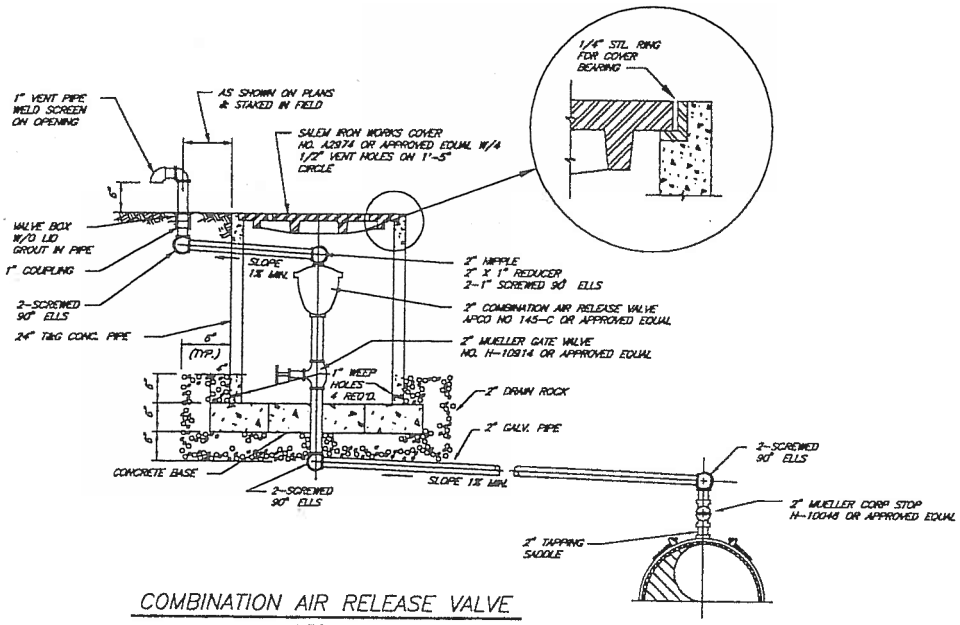
A. For non-granular materials – Method of test for Compaction Control of Granular Materials (WSDOT Test Method No. 609)
B. For granular materials – Method of test for Compaction of Granular Materials (WSDOT Test Method No. 606)
C. Field Moisture and Density of backfill material shall be determined by the Nuclear Moisture/Density Gauge.

WATER SERVICES

The services are to be installed by the contractor, and inspected by the Town of Yacolt (686-3922), 24 hours after completion of the service lines. The water meters will be set by the Town. Prior to installation of the water lines, it is required that the developer supply the Town with a reproducible copy of the plat map indicating the address of each lot. No water meters will be set until these conditions are met.

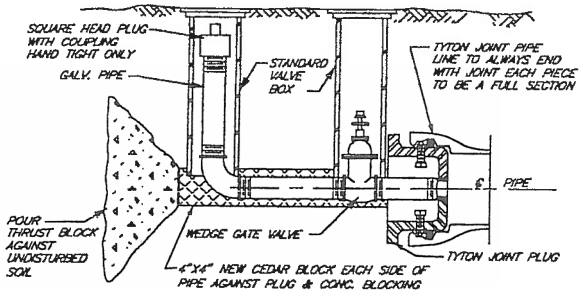
REVISIONS	DESIGNED 11/30/93	SCALE
	DRAWN 11/30/93	HOR. AS SHOWN
	CHECKED 11/30/93	VERT.
	APPROVED	FIELD BOOK

JOB NUMBER	TOWN OF YACOLT	DRAWING NUMBER
		W1
DATE	STANDARD WATER LINE DETAILS	SHEET of



COMBINATION AIR RELEASE VALVE

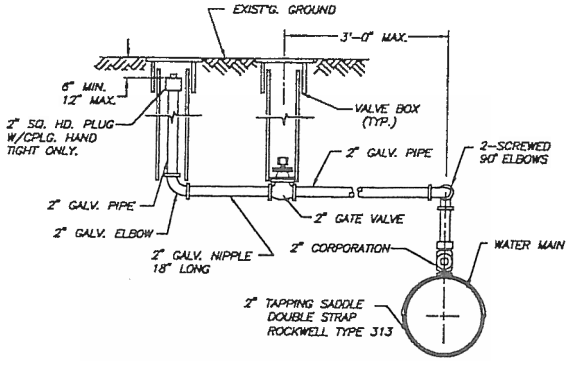
N.T.S.



NOTE: SIZE OF BLOWOFF DETERMINED BY SIZE AND LENGTH OF PIPE.

STANDARD TEMPORARY CONSTRUCTION BLOWOFF ASSEMBLY

N.T.S.



STANDARD MANUAL AIR RELEASE VALVE

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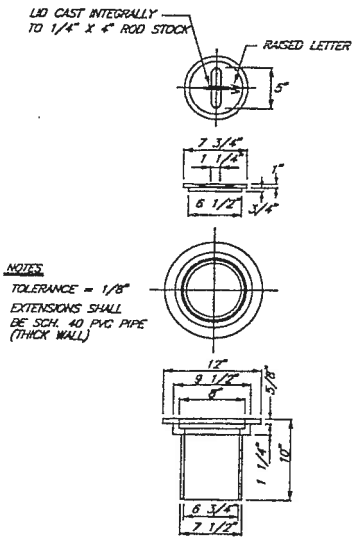

STANDARD VALVE BOX & COVER

N.T.S.

VALVES

Resilient-seated or wedg

Resilient-seated or wedg

Resilient-seated or wedg

Butterfly valves may be protection installations.

Butterfly valves shall be

Butterfly valves shall con

Butterfly valves shall be position. The operator sh shall be fully gasketed a of the road side of the

All valves shall be furnish nut and shall open with on the plans.

TAPPING SLEEVES and VA

Tapping sleeves shall be

Tapping sleeves shall be prior to making the tap.

Tapping sleeves furnished Clow F5205 or approved

Tapping sleeves furnished be Dresser 974 or appro

Tapping sleeves furnished steel with stainless steel

Bolts for all cast iron tap

Tapping sleeves furnished A certified welder, approv

Tapping sleeves furnished Sleeves shall be epoxy co

After a tap is made, all

Tapping sleeves furnished approved by the engineer.

Concrete blocking for tap

Tapping valves shall have flanged and outlet end sh

Tapping valves shall be m

Tapping valves shall be su

Tapping sleeves and valve

VALVE BOXES

Valve boxes shall be Fort

Valve box extensions shall

Valve boxes not set in pa

Operator nut shall have a finish grade.

FIELD TESTS

All sizes of pipe may be

DISINFECTION

Water main disinfection sh

By	APPR.	DATE	No.

NOTES & REQUIREMENTS

valves may be used for valve installations of 8 inch and smaller.

valves shall be used on all Fire Hydrant and Fire Protection Service installations.

valves shall conform to AWWA C509 and shall be epoxy coated on the inside.

r valve installations of 6 inch and 8 inch, except for fire hydrant and fire

r all valve installations of 10 inch and larger.

AWWA C504 and shall be Class 150-B with short body.

to have a minimum of 28 turns to move from fully open to fully closed mounted directly on the valve with no exposed or external couplings. Units sed packed. Valves shall be installed with the operator on the centerline

an underground manual operator with an AWWA 2 inch square operating ter-clockwise rotation. Valves shall be furnished with joints as called for

t 150 p.s.i. working pressure with ANSI B16 Class 125 bolt pattern.

s tested, on the pipe, at 150 p.s.i. for 15 minutes with no pressure drop

e on size taps, 12 inch and smaller, on grey or ductile iron pipe shall be mechanical joint.

luced outlet taps, 12 inch and smaller, on grey or ductile iron pipe shall al.

s on grey or ductile iron pipe larger than 12 inch shall be epoxy coated nd shall be approved by the engineer prior to installation.

eeves shall be NSS corten steel or Ductile iron only.

s on size taps on steel pipe shall be JCM 416 weld-on or approved equal. he Town, shall be used for all weld-on taps.

luced outlet taps on steel pipe shall be Rockwell 622 or approved equal. id supplied with stainless steel bolts.

areas of the pipe and sleeve shall be coated with a bitumastic coating.

s on asbestos cement pipe shall be as called for on the plans or as

eves shall be the same as required for an equal size tee.

he construction as specified for gate valves. Inlet end of valve shall be mechanical joint.

ured by Mueller Co., Iowa Valve Co., Kennedy Valve Mfg. Co. or Waterous Co.

by an 8" x 8" concrete block prior to making the tap.

be used only when specifically called for on the plans.

ver Pattern, cast iron or approved equal.

piece and constructed of Sch. 40 P.V.C. (thick wall).

as, shall be set on a concrete or asphalt pad. (18" square, 2" thick)

extension added, if over 4' to finish grade, to a distance of 18" from

ydrostatically at 150 p.s.i. for 15 minutes with no pressure drop.

er AWWA C-651.

REVISIONS	DESIGNED 11/30/93	SCALE
	DRAWN 11/30/93	HOR. AS SHOWN
	CHECKED 11/30/93	VERT.
	APPROVED	FIELD BOOK

JOB NUMBER	TOWN OF YACOLT	DRAWING NUMBER
DATE	STANDARD WATER LINE DETAILS	W2
		SHEET of